Caulmert Limited

Engineering, Environmental & Planning
Consultancy Services

Bryn Posteg

Sundorne Products (Llanidloes) Limited

Landfill Gas Risk Assessment

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EXECUTIVE SUMMARY

This Landfill Gas Risk Assessment for Bryn Posteg Landfill Site has been undertaken to support a Permit Variation Application, proposing new restoration profile for the site. The risk assessment takes into consideration additional waste tonnage proposed to be accepted to create the proposed profile, and updates the phasing of capping and gas extraction infrastructure installation as a result.

The assessment was undertaken using GasSim 2.5 and the associated Tier 1 and Tier 2 screening modules. The existing conceptual model for the site was updated with projected waste inputs and recent monitoring data.

Overall, the predicted gas generation rates are similar to those predicted and assessed previously. Validation against extraction flow rates for the engine and flare suggest that the site is more-accurately modelled by the 'average' scenario. However, the currently available data is not sufficient to conclusively exclude the possibility that gas generation rates may be as high as modelled by the 'wet' scenario. Nevertheless, the risk assessment was carried out on the basis of the more-conservative Scenario 2.

GasSim2.5 was found not to be able to reliably simulate the effect of transient conditions on one part of the site, (such as potentially elevated leachate in Cell 9D). In terms of impact on gas generation and site impact, saturated waste would have low degradation rates (as described in LFTGN03 and the GasSim manual), and any such conditions are likely to have decreased the amount of gas generated and emitted from this part of the site. Therefore, such conditions would likely lower any potential impact from landfill gas on human health or the environment for a cell where gas extraction is not extensive. It is not possible to use the results of the GasSim modelling or validation to comment on the likelihood of such conditions having occurred in Cell 9D.

Tier 1 Risk Screening of the gas emissions from the landfill showed that the majority of emissions are insignificant and do not require further modelling. However, some of the surface and engine emissions were identified as potentially significant and that further modelling was required. The Tier 2 model was therefore run for these compounds.

The Tier 2 atmospheric dispersion module of GasSim2 is an in-built AERMOD Gaussian plume dispersion model which simulates atmospheric dispersion of gases emitted from the engines and flares as well as surface emissions and determines the maximum ground-level concentrations of individual gases for a given year at any defined receptor. The Tier 2 modelling exercise assesses the concentration of those emissions at each defined receptor against short term and long term environmental assessment levels and environmental quality standards.

Tier 2 modelling confirmed that no air quality standards would be exceeded at any of the identified off-site receptors except for As when modelled at the 95th percentile. Since no As has been detected in trace gas analyses at the site, is considered more appropriate to model this at the 50th percentile, when no exceedances at offsite receptors are predicted.

The review of the predicted global impact results indicates that optimised gas extraction and utilisation or flaring is required to minimise the site's global warming potential.

BRYN POSTEG LANDFILL GAS RISK ASSESSMENT

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DRAWINGS

3428-CAU-XX-XX-DR-V-1806.A0-C1 – Site Setting and Nearby Receptors plan
3428-CAU-XX-XX-DR-V-1807.A0-C1 –Site layout, gas extraction infrastructure and monitoring locations

APPENDICES

1.0 INTRODUCTION

1.1 Report Context

1.1.1 Bryn Posteg landfill site is operated by Sundorne Products (Llanidloes) Limited, which is part of the Potters Waste Management group of companies. The associated landfill gas plant is also operated by Sundorne Products (Llanidloes) Limited, although owned by Gwynt Cymru Limited which also is part of the Potters Group. The landfill gas plant currently consists of two 1 MW engines and a 2000 m^3/h flare.

1.1.2 The assessment has been compiled in accordance with the Environment Agency H1 Environmental Risk Assessment for Permits, Annex F Air Emissions (v 2.2 December 2011) [as adopted by Natural Resources Wales].

1.1.3 The assessment was undertaken by Caulmert Ltd using GasSim v2.5 and the incorporated Tier 1 and Tier 2 modules, where the Tier 2 is a simplified AERMOD module. The existing site specific GasSim model submitted with the previous LFGRA for the site in 2009[1] and subsequently amended in 2010 to include a more comprehensive list of trace gases, was updated with recent site data in March 2018 (report number 3428-CAU-XX-XX-RP-V-0302). This model has been amended to reflect the risks associated with additional waste that would be taken as part of completing the site to the proposed restoration contours (as described in document reference 3428-CAU-X-XX-RP-V-0313. The updated GasSim model was used to run the Tier 1 and Tier 2 screens in the Air Quality Assessment modules.

1.1.4 This report presents the site conceptual model, revision to the model input parameters to accurately reflect the proposed activities and uses the GasSim model and the subsequent Tier 1 and Tier 2 (AERMOD) results to assess the impact the site would have on the surrounding area.

1.2 Site Location and Surrounding Land-use

1.2.1 Bryn Posteg Landfill Site is located approximately 2.8 km south east of Llanidloes, Powys, at NGR SN970822. The site is operated by Sundorne Products (trading as Potters Waste Management). The site is accessed via the B4518, the Llanidloes to Tylwch Road. The site location is marked by the red circle in Figure 1 below.

1.2.2 The site is situated amongst predominantly agricultural land. It is bound to the west by the B4518. Few residential properties are situated within close proximity to the site (described in Section 2 below). The site and the surrounding receptors are shown on Drawing 3428-CAU-XX-XX-RP-V-1806.

1.2.3 The landfill has a landfill gas utilisation plant (flare and two engines), and their role in managing the gases generated as a result of the waste decomposition are considered here.

[1] Egniol Consulting Ltd, Report number B/3345: Assessment of Landfill Gas Generation Rates at Bryn Posteg Landfill. March 2009

The site also has a leachate treatment plant, Material Recycling Facility (MRF), a Composting Facility and a Biomass boiler. The potential emissions from these facilities are considered elsewhere and do not form part of this landfill gas risk assessment.

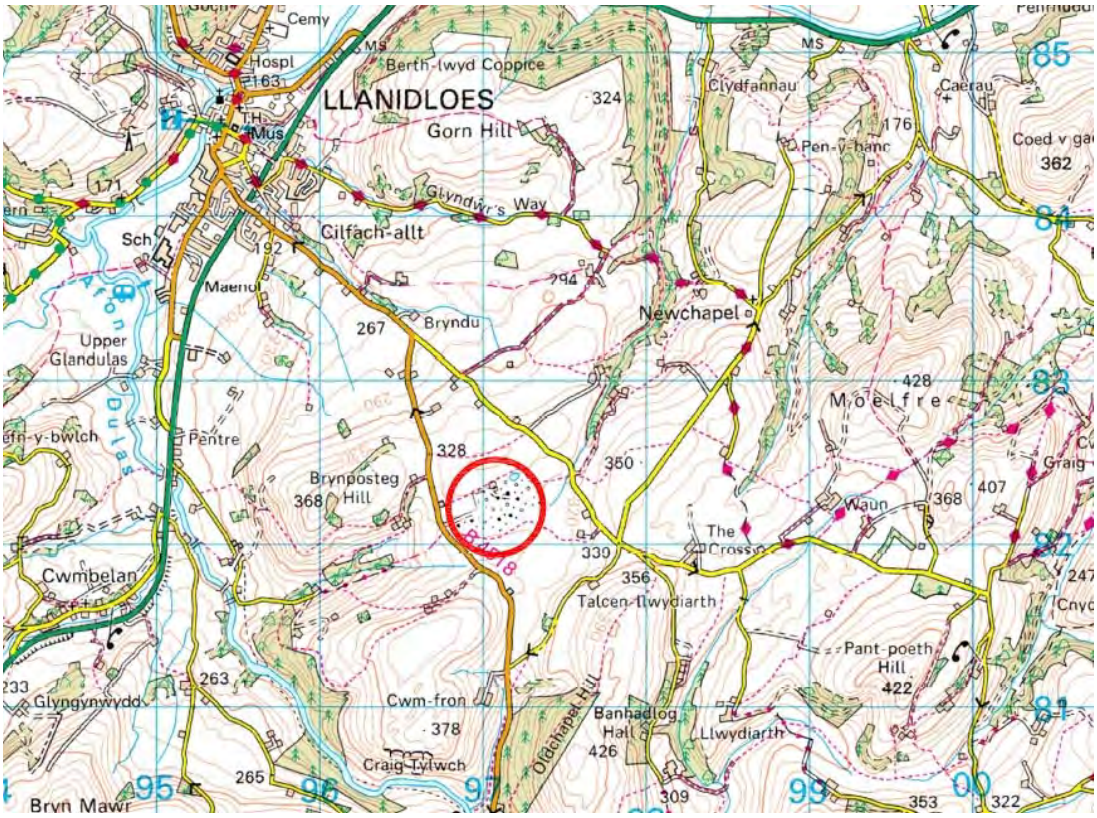


Figure 1: Site Location Plan

2.0 BACKGROUND

2.1 Site History

2.1.1 The landfill site at Bryn Posteg has been developed in the surface void associated with an old lead mine. Approximately 17 hectares of the site have been subject to controlled landfilling since 1982.

2.1.2 Phases 1-5 were operated by Montgomery, later Powys County Council, between 1982 and 1997. Evans Logistics Ltd operated Phases 6 – 8. Potters acquired the site in 2005. Phases 9A – 9D have been developed in the southern part of the site, and waste is currently accepted in Phase 9D. Between 2008 and 2017 additional tipping was also 'piggy-backing' onto the existing site (Phases 3A, 3B, 4A and 4B).

2.2 Landfill Details – Site Conceptual Model

Engineering and Restoration

2.2.1 Phases 1-5 were operated between 1982 and 1997. This part of the site is believed to be lined with a mineral liner (1 m thick re-compacted clay) but no validation of the construction took place. Phases 6 – 8 are lined with a composite liner consisting of a geosynthetic clay liner and a geomembrane. Phases 9A-9D are lined with 0.5 m mineral liner, geosynthetic clay liner and geomembrane.

2.2.2 Phases 1 to 9C are all capped. Phases 1 and 2 are believed to be capped with 1 m mineral liner and up to 1 m restoration soils. Phases 3 to 6 have received a 1 mm lap-lay geomembrane liner covered with 0.75 m restoration soils. Phases 6 - 9C are capped with 1 m mineral cap.

Source Term – Waste Inputs and Properties

2.2.3 The site accepts municipal waste, which is reported to consist of 60-70% household waste and 30-40% commercial trade waste. Some industrial waste is also accepted. As far as in known, this composition has remained similar during the time Evans Logistics and Potters have operated the site, and it is also assumed that it will remain similar until the site's completion, projected to be in 2018.

2.2.4 The waste accepted at the site is processed in a Materials Recycling Facility (MRF). The outputs from the process included metals which are screened out and recycled, oversized fraction (>80 mm) which is landfilled, and fines (<80 mm) which are composted for two weeks and subsequently landfilled.

2.2.5 The materials accepted at the site are putrescible, and as such will generate landfill gas (methane, carbon dioxide and a range of trace gases) upon biodegradation. As such the waste at the site represents a source of landfill gas.

2.2.6 The waste tonnages, waste types and phasing used in this assessment are a combination of historical data from the previous GasSim model (for wastes prior to 2010), and information from Potters including waste returns (for wastes accepted after 2010). The waste breakdown is assumed to remain similar to that in 2017 for the remainder of the site's operational life, until its proposed completion in 2019. A revised version of the default waste composition is used for the site, with an average non-degradable percentage being approximately 30%, rather than the default 46%, which is considered to better reflect site-specific conditions. A breakdown of the GasSim waste input parameters and justifications can be found in Section 4.2.

Landfill Gas Plant

2.2.7 The site has an active gas control system designed for positive collection and combustion of landfill gas in an engine. The gas plant also contains a high-temperature flare stack as back-up should the engine(s) fail. Landfill gas extraction wells are installed in all Phases, and further landfill gas extraction wells are progressively and retrospectively installed as site infilling progresses (the locations of gas extraction wells and the extraction system layout are included on Drawing 3428-CAU-XX-XX-DR-V-1807).

2.2.8 The gas plant is located along the northern boundary of the site, 400 m to the east of the site entrance (Drawing 3428-CAU-XX-XX-DR-V-1807).

2.2.9 A landfill gas flare was initially installed on site in August 2000. The flare was installed by Organics Ltd and had a maximum gas flow rate of 750 m^3/h. The Organics flare was replaced with a GTS flare in 2011. The GTS flare is a modern high-temperature enclosed flare which has a maximum capacity of 2000 m^3/h.

2.2.10 The current landfill gas engines consist of a Caterpillar CAT 3516TA, that was installed at the beginning of 2003 by Finnings UK Ltd and then Gwynt Cymru purchased a second-hand CAT 3516 A+ engine, that was installed in 2011.

Pathways

2.2.11 Gas generated within the waste will travel along preferential pathways and be emitted into the atmosphere or surrounding strata, unless it is collected via a gas extraction system. The site has an active extraction system, which abstracts the gas and routes it to utilisation and treatment plant (two engines and a flare). Therefore, under normal operating conditions of the system, the exhausts of the engines and flare represent point sources of emissions.

2.2.12 Any residual gases not captured by the gas collection system will be emitted as either:

- point source emissions from parts of the gas or leachate extraction system that are not air-tight; or
- diffuse emissions either though the landfill surface, e.g. from uncapped areas.

2.2.13 Emissions through the surface are controlled by the capping of the waste together with active gas extraction. Diffuse emissions away from the waste and into the surrounding strata are controlled by the engineered liner of the waste. If gas escapes through the liner, the migration of the emissions is then controlled by the properties of the surrounding strata, including porosity and moisture content.

2.2.14 According to previous ground investigations (previously reported and not repeated here), the site is underlain by boulder clay. Locally the boulder clay is described as soft grey orange mottled sandy silty clay with mudstone fragments and gravel becoming stiff with depth. These deposits are generally less than 4 m thick, and contain gravel lenses in places (as demonstrated by trial pits within Phase 9).

2.2.15 This overlies the Llandovery Series. The Llandovery Series comprises locally weathered mudstones and shales. The mudstones contain close-spaced fractures with fracture sets reported at 60 and 90 degrees. Fine clays are reported to fill the discontinuities.

2.2.16 Gas flux within the superficial deposits will occur through the un-saturated part of the sand and gravel lenses. The extent of migration may be limited by the spatial distribution and interconnection between these lenses. Migration of gas will be inhibited through the boulder clay due to the low permeability of these deposits.

2.2.17 The perched groundwater reported as being present within the superficial deposits and above the Llandovery Series will act as a barrier to gas fluxes penetrating down to the underlying bedrock. The strata below the site have a negligible permeability and are classified as a non-aquifer (Groundwater Vulnerability Sheet 20), indicating that primary porosity is very low. It is therefore considered unlikely that any gas migration would be occurring through the strata in the Llandovery Series.

Receptors

2.2.18 Bryn Posteg landfill site is situated in a rural area with no close areas of dense population. The nearest town of Llanidloes is situated 2.8 km to the north-west of the site. The closest properties to the site are Valley View, Rhoswen, Pant and Bryn Posteg Farm, within 250 m of the site boundary.

2.2.19 B4518 road is located adjacent to the southwest of the site. To the north, north-east and south-east is predominantly agricultural land. Tylwch Road is located adjacent south-west of the site.

2.2.20 In accordance with the EA H1 Guidance, any Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) or Ramsar sites within 10 km radius of the site should be considered. The guidance also states that Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves within 2 km of the installation should be considered. The nearest European habitat site to Bryn Posteg is 6.5 km away at the nearest point and the nearest SSSIs are 2.5 km away; this is summarised in Table 1 below. In our experience, the emissions from landfill gas plants are negligible at a distance of 2 km from the site, so these receptors have therefore not been included in the assessment.

Table 1: Residential properties around the site modelled as discrete receptors

Receptor ID	Description	X-coordinate	Y Coordinate	Distance from site (m)	Direction
DR001	Site Office	296887	282199	0	North
DR002	Valley View	296733	282277	100	North-West
DR003	Rhoswen	297587	282244	200	East
DR004	Pant	297632	282322	250	East
DR005	Bryn Posteg Farm	296478	282134	250	West
DR006	Penbryndu	297208	282758	300	North
DR007	Tawelfa	296977	282852	300	North
DR008	Maes-Socyn	296621	281813	350	South-west
DR009	Talcen-Llwydiarth	297680	281909	450	South-east
N/A	River Wye SAC			6500	West/South-West
N/A	Coed Mawr SSSI			2500	West
N/A	Coed Hafofraith SSSI			3500	East
N/A	Coed Craigiar SSSI			2500	South-East

2.3 The Nature of the Landfill Gas Risk Assessment

2.3.1 The presence of a source at the site, which has the potential to affect nearby receptors through emissions either from point sources or as diffuse emissions from the site, indicates that detailed numerical modelling is required to quantify the magnitude of emissions and therefore assess the risks the site poses to nearby receptors.

2.3.2 Further justification for the selected model (GasSim2.5) in the context of its assumptions and required assessment scenarios is included in Section 3 below.

2.4 Lifecycle phases

2.4.1 Currently, the site is almost complete, and under the proposed restoration contours, only approximately 90,500 m^3 of void space remains. The lifecycle stages considered relevant to the performance of the site are:

- Operational phase (until final permanent capping is complete)
- Post closure period – after final capping, but when gas generation rates still require active management
- Completion – no further active management is required. This will occur when the completion criteria is achieved.

2.4.2 The implications in terms of risk assessment and for management relating to the lifecycle phases described above can be derived from the results of the quantitative modelling using GasSim 2.5, undertaken as part of this risk assessment. The results of the model can be used to determine the time required to reach completion.

2.4.3 It is considered that the combination of liner and capping materials means that while the geomembranes may decay over a period of 200 years (LandSim default), the clay and cover soils will continue to contain emissions from the site after this period (particularly if protected from erosion by appropriate vegetation cover. Since the waste at the site represents a declining source in terms of gas, it is considered likely that the completion criteria will be achieved before the geomembrane materials decay. Therefore, no assessment is required of the stage of the site's lifecycle when the containment systems are no longer operating as designed.

2.5 Generated gases to be modelled

2.5.1 The putrescible fraction of the waste accepted at the site will generate landfill gas upon anaerobic biological degradation. Monitoring results show that the bulk gases methane and carbon dioxide are generated at the site. These two gases will be modelled to understand the gas-generation behaviour of the waste and likely periods when trace gas concentrations are likely to be high (typically concurrent with high bulk gas concentrations).

2.5.2 In addition, trace gas monitoring has indicated that a number of trace gases are encountered within the raw gas at Bryn Posteg including hydrogen sulphide, acetone, benzene, carbon disulphide, toluene and xylenes. Therefore, the full list of trace gases included in GasSim V 2.5 (which includes the above gases) will be considered, and the ranges amended to more accurately reflect the conditions onsite based on available trace gas monitoring results.

2.5.3 As detailed above, point source emissions from the installation comprise exhausts from the landfill gas engines and, if/when operational, the flare. There should not be any other point source emissions from the installation under normal operating conditions, however, fugitive emissions from the landfill surface may occur, and are included in the GasSim model.

2.5.4 The primary products from any combustion process, such as the landfill gas engines and the flare, are carbon dioxide and water. Other potentially significant emissions from the identified point sources are oxides of nitrogen and sulphur and carbon monoxide. Unburnt hydrocarbons (as VOCs), particulates and dioxins and furans may be emitted, but are usually not significant in these type of combustion processes.

2.5.5 The most important oxides of nitrogen formed in combustion processes are nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O). They are collectively referred to as NO_x and modelled as NO_2. Generally, NO_x is seen as the main pollutant of concern, and one which could potentially have localised impact on the air quality. This parameter was therefore selected for detailed modelling from both point sources.

2.5.6 Carbon monoxide is a colourless, odourless gas produced by incomplete or inefficient combustion. CO formation may increase if the combustion temperature is too low. Sulphur dioxide is formed in the combustion process by oxidation of sulphur compounds in the feed gas. Carbon monoxide and sulphur dioxide were also chosen as parameters for the detailed assessment.

2.5.7 All the major gases potentially formed and emitted as a result of landfill gas utilisation or flaring are included in the model. The ranges of the gases have been amended to reflect monitoring results of the flare and engines exhausts.

3.0 NUMERICAL MODELLING

3.1 Justification for Modelling Approach and Software

3.1.1 GasSim 2.5 was employed to model the gas generation and likely emissions from the site. The selected modelling programme has been developed by Golders Associates on behalf of the Environment Agency (EA) as a tailor-made tool for landfill gas generation and emission assessments, and incorporates the assessment of both fugitive emissions and combustion emissions. It is undergoing regular updating to reflect a better understanding of the landfill conceptual model and the current environmental policies. GasSim 2.5 is an upgrade from the previous version of GasSim 2 which was used for the previous GasSim model for the site. One of the most important changes is that the smallest time unit is now a month as opposed to a year. The current version allows calculations to be made on a cell-by-cell basis.

3.1.2 The GasSim software was designed to meet the requirements of the EA's *Guidance on the Management of Landfill Gas LFTGN03*. It takes into account the following characteristics:

- The source parameters: annual waste input, breakdown of the waste streams, waste moisture content and geometry of the site, trace gases;
- Infiltration levels based on the amount of rainfall and surface water which enter the fill;
- Engineering properties of the site and materials used for lining and capping of the fill;
- The surrounding geology, its physical properties of ground porosity and moisture content;
- Gas utilisation plant including flares and engines, operation, efficiency and emissions;
- Gas dispersion pathways by air and via site surface and subsurface; and
- Receptors to landfill gas – the nature and distance to the receptors within a 500m radius from the landfill.

3.1.3 GasSim is a probabilistic model that uses the Monte-Carlo simulation technique to quantify landfill gas generation and emissions distribution for solid waste landfills. This allows for a range of values which describe the parameters at the site, to be entered. Input parameters for the simulation are entered as a Probability Density Functions (PDF) using site specific data to estimate emissions or if this is unavailable, using default values. During each simulation, the parameters are assigned a value from within the user defined range. After the prescribed number of simulations has been carried out, a range of possible outcome values are obtained.

3.1.4 The GasSim model is constructed in a modular structure. Each module simulates the effects of the additional processes. The source term module determines the generation of landfill gas on the basis of the mass of waste deposited and the composition of the waste streams. The waste degradation is simulated using a first-order decay model that then calculates long-term landfill gas generation.

3.1.5 GasSim has the following main assumptions and limitations:

- The model operates as a steady-state with a minimum time-period of one month for generation and emission forecasts;

- There is no modelling of gas migration in the saturated zone (leachate or groundwater);
- The model does not determine the pressure generated by the landfill and to simplify the model pressure has been excluded from all modules;
- Where site-specific data is not available, conservative default values are used; and
- Since the model is a long-term risk assessment model, it does not simulate an acute time frame or low probability events, e.g. the rapid movements of gases into buildings.

3.1.6 The input parameters for the GasSim2.5 model, including site layout, engineering specifications, waste volumes and types, environmental parameters (rainfall, winds and geosphere) and trace gas concentrations are specified and justified.

3.1.7 The Tier 1 screening module of GasSim provides an opportunity to screen out insignificant gas emissions from the gas plant and the landfill surface which do not pose a hazard to local receptors and which can therefore be excluded from further assessment and pollution control.

3.1.8 The Tier 1 risk screening is based on the EA Horizontal Guidance Note H1 - Environmental Risk Assessment for permits[2]. GasSim uses the following criteria to determine whether surface, flare or engine emissions for each modelled gas are insignificant or require further detailed assessment.

- Screen out insignificant emissions by comparing short-term and long-term Process Contributions (PC) of substances emitted to air with the relevant short-term and long-term Environmental Assessment Levels (EAL) or Environmental Quality Standard (EQS):
  $PC_{long\ term}$ ≤ 1% of the long-term EAL or EQS at ground level at the considered receptor
  $PC_{short\ term}$ ≤ 10% of the short-term EAL or EQS
- Identify which emissions warrant further detailed modelling. Further Tier 2 assessment is required, if:
  $PC_{long\text{-}term}$ + background concentration >70% long-term EAL or EQS
  $PC_{short\text{-}term}$ + 0.2 x background concentration >20% short-term EAL

3.1.9 The results of Tier 1 risk screening would determine the choice of gases subsequently assessed by the Tier 2 assessment method. The Tier 2 module assesses the Predicted Environmental Concentration (PEC) – which is the sum of the Process Contribution (PC) and the Background Concentration (BC) – at each receptor location.

3.1.10 The Tier 2 assessment within GasSim 2.5 is based on a simplified version of AERMOD. AERMOD (American Meteorological Society and Environmental Protection Agency Regulatory Model) is a Gaussian plume model. It calculates the atmospheric dispersion on-site and off-site from the surface of the landfill, flare and engine emissions. Ground level concentrations of pollutants are calculated using the AERMOD model algorithms. The Tier 2 assessment process considers various averaging periods for long-term and short-term periods, and the output is compared to relevant Environmental Quality Standards (EQS) and Environmental Assessment Levels (EALs).

[2] H1 Environmental Risk Assessment for Permits, Annex F Air Quality v 2.2 December 2011

3.2 Model set-up

3.2.1 The model input parameters used for the gas generation and emission modelling at Bryn Posteg landfill site and gas plant are based on information received from Potters, historical information, from Construction Quality Assurance (CQA) plans and CQA reports and from trace gas monitoring, emission monitoring and gas field balancing monitoring data. Where site specific data was missing, best estimates or default values were used. A print-out of the GasSim2.5 model (Scenario 1) settings is included in Appendix 1.

3.2.2 The start year was 1982, and the site is projected to be completed in 2019. The operational period was set as 38 years within the GasSim model. The modelling was run for a total of 150 years allowing for the gas extraction system utilisation to be modelled until the end of its predicted lifespan.

3.2.3 All simulations were run for 201 iterations, allowing for greater convergence of the results and increasing the accuracy of the calculated outputs to the required level of confidence required for risk assessment (95th percentile).

Assessment scenarios

3.2.4 Two assessment scenarios were simulated:

- Scenario 1: Waste moisture content modelled as 'average' in all Phases during operation and after closure. This was the previously-assumed typical waste condition at the site, and as such forms a baseline for the assessment;

- Scenario 2: Waste moisture content was modelled as 'wet'. Observations made onsite suggest that due to the relatively high rainfall at the site, the waste is likely to be more accurately modelled as 'wet' rather than 'average' This scenario is proposed to allow comparison with the base scenario 1, and assess the sensitivity of the model to moisture content of the waste.

3.2.5 An attempt was made to quantify the impacts of a reported period of high leachate levels in Phase 9D on gas generation at the site using GasSim 2.5. The moisture content within the model was set to 'saturated' during the operational phase, and to 'wet' after capping. The simulated gas generation rates were significantly higher than the highest generation rate for the remainder of the modelled years. This result is in discord with the lower degradation rate that should be applied when 'saturated' moisture content is set[3] to reflect the inhibited gas generation due to the waste being saturated, and suggests an error within the computational code. The modelling was repeated, with the moisture content set to 'dry' for Phase 9D during operation (since the default degradation rates for saturated waste are equal to those for dry waste). The modelled generation gases once again showed a significant increase at 2018. Therefore, it is considered that GasSim2.5 cannot reliably simulate the effect of such transient

[3] Golder Associates: GasSim2.5 Manual. 2011.

conditions on one part of the site, and so the potential impacts are evaluated qualitatively instead.

Accidents and their consequences

3.2.6 Potential accidents and damage to landfill gas infrastructure could lead to either reduced pumping rates, or in case of flare or engine failure an increased downtime of the plant, which could lead to higher residual emissions. These potential conditions have been taken into account by operating one engine in conjunction with a backup gas flare. The engine and flare are both estimated in the model to have a downtime of 3-5%, which is considered to be sufficient to address potential failure of gas infrastructure, temporary pump breakdown or other accidents.

Sensitivity analysis

3.2.7 As described in section 3.1, The GasSim model is constructed in a modular structure where each module incorporates the effects of the additional processes. The model is probabilistic, using the Monte-Carlo simulation technique to model the uncertainty associated with many of the input parameters. During each simulation the parameters are assigned a value from within the defined ranges. After the prescribed number of simulations has been carried out (e.g. 201), a range of possible outcome values are obtained.

3.2.8 The distribution output is expressed in percentiles. These percentiles (%iles) specify the probability with which a certain value will not be exceeded. If the model shows that the 95%ile gas generation rate for one year is given as 1000 m^3/h, there is a 95% chance that the gas generation would be *below* or *equal to* this value and only a 5% chance that the gas generation would be above this. The 95%ile is used to express the 'worst case' scenario, and therefore used exclusively for risk assessment purposes. At the same time any decision-making such as regarding suitability of the gas plant or in assessing the likely gas generation rates in certain years were made using the predicted 50%ile.

3.2.9 For the key parameter, waste moisture content, a range of values cannot be entered. The sensitivity of the modelled results to different moisture conditions is considered through the proposed assessment scenarios.

Model Validation

3.2.10 The GasSim model was compared and adapted to actual gas abstraction rates. This will allow a comparison between the modelled outputs against field observations. The results have been discussed in section 5 and 6.

3.3 Model Parameterisation

Site Layout, Phasing and engineering

3.3.1 The model was set up to reflect the gas generation within Phases 1 to 9D. A base site plan indicating the layout of these Phases was imported into the software model, and the site boundary traced out according to this plan. The Phase geometry within the model was defined as being split into 15 Phases (see Drawing 3428-CAU-XX-XX-DR-V-1806).

3.3.2 The years in which each Phase was active and its respective waste inputs were inserted into GasSim. As modelled and justified previously[1], the 9A and 9B piggyback has been inserted into GasSim as over-tipping of Phases 3A, 3B, 4A and 4B respectively, as this was deemed the best representation in GasSim. The final Phase of the site is referred in this report and associated documentation as Phase 9D and includes the areas that in other documentation may have been termed 'Phase 9D and 9E'.

3.3.3 The phasing and engineering parameterisation are summarised in Table 2 below.

Waste tonnages and types

3.3.4 Annual waste inputs were based on site specific data as detailed in; the GasSim model undertaken for the PPC Application for all previous years (1982-2004), and information provided by Potters regarding the waste input tonnages (2005-2010). Waste input volumes for the remaining operational period (2011-2017) are based on waste returns reported by Potters.

3.3.5 The model is updated to reflect the proposed phasing, where wastes accepted in 2018 and 2019 infill the remaining void for waste to the proposed restoration profile. This void is estimated to be 90,500m3. At a waste density of 0.83 t/m^3 this is equivalent to 109,050 tonnes of waste. The input tonnage for 2018 and 2019 has therefore been specified to cover a range of waste densities between 0.8 and 0.9 t/m^3, (with 109,050 being the most likely value) with 40% of the waste being accepted in 2018 and 60% in 2019.

3.3.6 The breakdown of the accepted waste streams was defined in the model using waste stream data supplied by the EA and was applied to all operational years. For infilling in cells prior to the installation of the MRF, the following breakdown has been used in the model:

- Domestic (%) TRIANGULAR [55, 65, 70]
- Commercial (%) TRIANGULAR [30, 35, 40]

3.3.7 After installation of the MRF (in 1998) to 2011 the breakdown was parameterised as:

- Domestic (%) UNIFORM [40, 50]
- Commercial (%) UNIFORM [5-10]
- Residual fines (MRF) (%) UNIFORM [40, 50]

3.3.8 The breakdown from 2011 reflects the actual waste breakdown according to the European Waste Codes and descriptions provided in the quarterly waste returns.

3.3.9 GasSim2.5 allows for the site to be entered into the model as separate Phases or phases. It then requires that waste input volumes are defined as total tonnage within each Phase for every year of landfilling. A summary of the parameterisation of the waste tonnages, the Phases where the waste was accepted and the breakdown are included in Table 3 below.

3.3.10 The waste streams were assumed to be of 'Wales 2000-2010 waste streams', 'Wales 2010-2013 waste streams' and 'Wales 2013-2020' waste streams respectively (as defined in GasSim). The MRF residue waste stream was defined using the results from the waste composition analysis undertaken by SLR during their study into the reduction in biodegradability during the MBT Operations at Bryn Posteg[4]. This study also confirmed that the biological content of the incoming waste to Bryn Posteg is very similar to the Welsh Government assumed average biological content for Wales.

3.3.11 The density of waste within the landfill depends on the initial waste density, the compaction methodology and the maximum depth of waste. The industrially accepted range of waste density within landfills is between 0.8 t/m^3 and 1.2 t/m^3 (reflected in default settings within GasSim2). This value is applied if moisture content within the model is set to 'calculate'. Since the moisture content in both assessment scenarios is specified, this value does not affect any of the calculations within GasSim and has not been altered.

[4] MBT Operations at Bryn Posteg and Reduction in Biodegradability, Making Connections – Bryn Posteg Landfill Site, Llandrindod Wells, Powys, SLR Ref: 406-0485-00003 March 2008

Table 2: Site phasing and engineering parameterisation details

	LINER			TEMPORARY CAP				PERMANENT CAP			
Phase	**Description**	**Thickness (m)**	**Hydraulic conductivity (m/s)**	**Year**	**Description**	**Thickness (m)**	**Hydraulic conductivity (m/s)**	**Year**	**Description**	**Thickness (m)**	**Hydraulic conductivity (m/s)**
1	1m clay	UNI [0.8, 1.2]	LOGUNI [1E-9, 1E-8]	1986	As modelled in 2009 report, LLDPE	SINGLE [1E-3]	LOGUNI [1E-14, 1E-13]	1986	1 m boulder clay 1 m cover soils	UNI [1, 1.5]	LOGUNI [1E-9, 1E-8]
2				1986				1986			
3A				1988				2009	Geomembrane cap and cover soils	UNI [0.7, 0.9] SINGLE [0.001]	LOGUNI [1E-9, 1E-8] LOGUNI [1E-12, 1E-8]
3B				1990				2009			
3C				1992				1992			
4A				1994				2017			
4B				1996				2017			
5				1998				1998			
6	GCL and HDPE	SINGLE [0.002] UNI [0.05, 0.1]	LOGUNI [1E-14, 1E-12] LOGUNI [1E-11, 1E-10]	2000				2000	1m mineral clay	UNI[1.0, 1.1]	LOGUNI[5E-10, 1E-8]
7				2002				2003			
8				2006				2006			
9A	0.5 m min liner, GCL and Geomembrane	UNI [0.5, 0.6] SINGLE [0.002]	LOGUNI [1E-10, 1E-9] LOGUNI [1E-14, 1E-12]	2009				2009			
9B				2011				2017			
9C				2013				2017			
9D				2019				2019			

Table 3: Waste inputs – year, phase, parameterisation of accepted tonnages and waste types

Year	Year since start	Operational Cell	Comments	Accepted waste tonnage PDF	Waste breakdown types PDF
1982	1	1&2		TRI[15000,20000,25000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1983	2	1&2		TRI[12500,15000,17500]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1984	3	1&2		TRI[12500,15000,17500]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1985	4	1&2		TRI[12500,15000,17500]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1986	5	3A		TRI[25000,30000,35000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1987	6	3A		TRI[35000,40000,45000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1988	7	3B		TRI[37000,40000,45000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1989	8	3B		TRI[37000,40000,45000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1990	9	3C		TRI[35000,40000,45000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1991	10	3C		TRI[65000,70000,75000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1992	11	4A		TRI[65000,70000,75000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1993	12	4A		TRI[45000,50000,55000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1994	13	4B		TRI[45000,50000,55000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1995	14	4B		TRI[45000,50000,55000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1996	15	5		TRI[65000,70000,75000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1997	16	5		TRI[65000,70000,75000]	Domestic TRI[55, 65, 70], Commercial TRI[30, 35, 40]
1998	17	6		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5,10], RESIDUAL FR MRF [40,50]
1999	18	6		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5,10], RESIDUAL FR MRF [40,50]
2000	19	7		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2001	20	7		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2002	21	8		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2003	22	8		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2004	23	8		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2005	24	8		SINGLE [75081]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]

Year	Year since start	Operational Cell	Comments	Accepted waste tonnage PDF	Waste breakdown types PDF
2006	25	9A		SINGLE [75055]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2007	26	9A		SINGLE [81713]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2008	27	9A	2/3 over 3A, 1/3 over 3B	3A UNI[47500, 52500] 3B TRI[11500, 15000, 27500]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2009	28	9B		TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2010	29	9B	1/2 over Cell 4A	TRI[70000,75000,80000]	Domestic UNI [40, 50]. Commercial UNI[5, 10], RESIDUAL FR MRF [40, 50]
2011	30	9B		SINGLE [64800]	Domestic SINGLE [51.3]. Commercial UNI[5, 10], RESIDUAL FR MRF SINGLE[38.1]
2012	31	9B	1/3 over Cell 4B	SINGLE [40000] Phase 9 SINGLE[9300] Cell 4B	Domestic SINGLE [40.1]. Commercial UNI[8, 12], RESIDUAL FR MRF SINGLE[49.7]
2013	32	9C		SINGLE [61200]	Domestic SINGLE [36.9]. Commercial SINGLE[23.8], RESIDUAL FR MRF SINGLE[39.3]
2014	33	9C		SINGLE [60100]	Domestic SINGLE [36]. Commercial SINGLE[28.2], RESIDUAL FR MRF SINGLE[35.8]
2015	34	9D		SINGLE [103000]	Domestic SINGLE [19]. Commercial SINGLE[17], RESIDUAL FR MRF SINGLE[64]
2016	35	9D		SINGLE [76700]	Domestic SINGLE [25]. Commercial SINGLE[15.5], RESIDUAL FR MRF SINGLE[59.5]
2017	36	9D		TRI[95000,100000, 105000]	Domestic SINGLE [28]. Commercial SINGLE[20], RESIDUAL FR MRF SINGLE[52]
2018	37	9D		TRI[40200, 43620, 45250]	Domestic UNI [20, 30]. Commercial UNI[17, 20], RESIDUAL FR MRF [40, 60]
2019	37	9D		TRI[60300, 65430, 67875]	Domestic UNI [20, 30]. Commercial UNI[17, 20], RESIDUAL FR MRF [40, 60]

Gas Extraction and Trace Gases

3.3.12 Monitoring of the trace gas components of the raw landfill gas is undertaken regularly and the model has been previously updated to reflect those. The results from the most recent monitoring round were used and the trace gases detected were inserted in the GasSim model. All other gases were left at default concentrations. The trace gas results used for this update are included in Appendix 6 to this report.

3.3.13 While no hydrogen sulphide (H_2S) (an important gas in terms of human health risks and odour nuisance) was detected in any of the trace gas monitoring rounds at the site, in-waste extraction field balancing records collected in 2017 and start of 2018 show that some is detected on occasion. Therefore, the probability density function within GasSim was updated to LOGTRI [0.01, 8.3, 562] to reflect the range of H_2S detected in in-waste boreholes in 2017 (according to data provided by Sundorne Products). The maximum value reflects a reading of 405 ppm recorded in February 2018, while the most likely value reflects the median of all the available readings during this period.

3.3.14 The gas plant settings in the model considered the existing gas plant with two 1 MWe engines and one 2000 m^3/h flare. The 1 MWe engines were set at the nominal capacity of 600 m^3/h (their minimal capacity is 300 m^3/h). The gas composition was defined as 50-57% methane (CH_4), and 32-39% carbon dioxide (CO_2) based on gas field monitoring data.

3.3.15 The flare is used as a back-up during engine down-time periods or potential failures. The flare has a turn down ratio of 1:5 which equates to a minimum capacity of 400 m^3/h. The model was set to run the engines first and then the flare.

3.3.16 The emissions from the Flare and engines were updated to reflect the most recent round of emissions monitoring completed in January 2018. The raw emissions results are included in Appendix 6.

Environmental Setting

3.3.17 The surrounding geology was set in the model as clay based “Geosphere”. The porosity was defined as LOGUNIFORM between 0.5 % and 10 %, to reflect the fractured nature of the strata as opposed to intergranular porosity (in line with the HRA review for the site). The moisture content was set to be between 20 % and 30 %.

3.3.18 The average annual uncapped infiltration was modelled as previously[1] as a normal distribution with mean of 236.8 mm per year and standard deviation of 23.6, reflecting typical annual rainfall for the site modified to represent the effective rainfall figures for grassland. As suggested in the GasSim manual, an infiltration rate through the capped areas was assumed by the model as 10% of the annual effective rainfall. It should be noted that infiltration rate forms part of the calculation of the moisture content of the waste if this is set to ‘calculate’. Since the moisture content of the waste is defined in all the assessed scenarios (as ‘wet’ or ‘average’), the model will not be sensitive to variations in rainfall amount/infiltration.

3.3.19 The Tier 2 module uses wind data to disperse the gases generated at the gas compound. Figure 2 shows the windrose used for EA Wales: South West in relation to the 2012 windrose recorded at the Bryn Posteg weather station. It is considered that the default AERMOD windrose for EA Wales: South Wales is representative of the wind pattern at the site and so was used for the Tier 2 assessment.

3.3.20 The background concentrations for the main regulated gases NO_x, NO_2, and PM_{10} were derived from the background maps at National Air Quality Archive hosted under DEFRAs Local Air Quality Management Area archive. This information comes in the form of a table of concentrations for every 1 km x 1 km grid. For this study the values in Powys CC were quoted for the four nearest grid points to the site grid location. (X296777, Y282098). The values used in the assessment were the average values for PM_{10} and NO_x the year 2015.

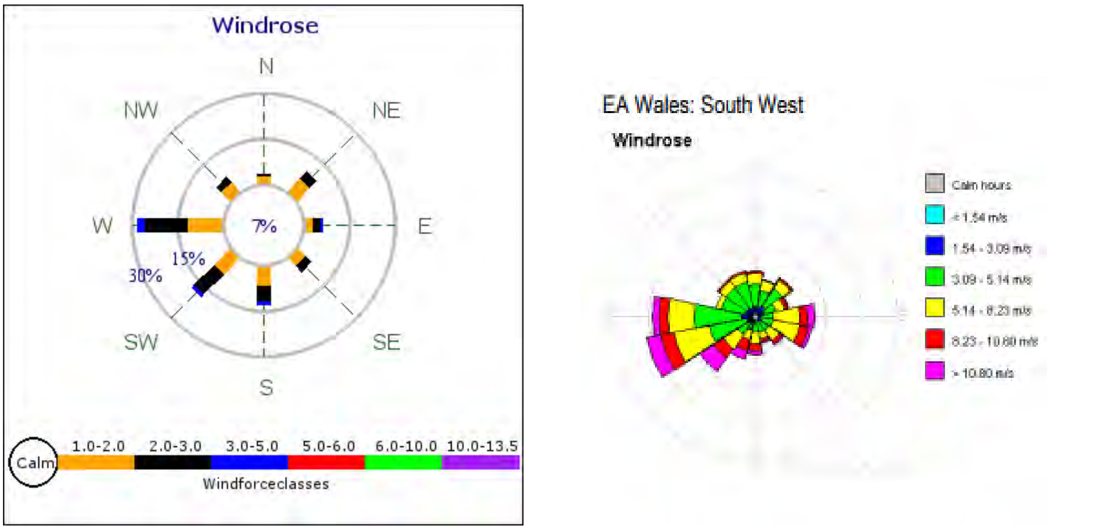


Figure 2: Bryn Posteg Site weather station wind data (Windrose for 2012) compared to the windrose used for the Tier 2 assessment, default for Wales (South West).

4.0 MODELLING RESULTS

4.1 Model sensitivity and validation

4.1.1 Two scenarios were considered as part of this risk assessment. They explored the impact of moisture content on the predicted gas generation rates, and are considered to cover the likely range of conditions at the site. GasSim output graphs of the calculated results are included in Appendix 2.

4.1.2 The uncertainty associated with the calculated gas generation rates due to the combination of ranges of input parameters can be evaluated from the difference between the predicted values at the 5th and 95th percentiles. For Scenario 1 this was 2.6% (1187.5 and 1219.6 m3/h respectively) in the peak generation year (2018), and for Scenario 2 was 3.9% (1327 and 1380.9 m^3/h). As moisture content (which affects degradation rates and therefore gas generation rates) cannot be set as a range, so the two scenarios provide a measure of the sensitivity of the model to the waste moisture content. The model predict that gas generation rates at the 50th percentile would be 1202.7 m^3/h as 'average' moisture content (scenario 1), and 1356.9 m^3/h as 'wet' (scenario 2) which constitutes approximately 11.36 % difference. This indicates that the predicted gas generation rates are more sensitive to the assumed moisture content than the ranges of values for the other input parameters.

4.1.3 Validation of the modelled results was undertaken by comparing actual extraction rates reported by the site, and the predicted results at the 50th %ile (likely value) for both scenarios. Measurements collected at the gas plant in 2015-2017 were used to calculate the amount of gas treated and utilised in those three years. The average annual flow rates quoted for the blower (which supplies gas to all plant and is therefore a measure of the total gas reaching the gas plant) are presented in Table 5 below, alongside the annual MWh outputs and downtime hours for the two engines. No separate operational hours or flow are available for the flare, however, it was noted that the flare is not operational for the majority of the time and is used as a back-up during engine maintenance and repair. The results were corrected to 55% methane (rather than the 50% methane rating used for the theoretical conversion of MWh to m^3/h.

4.1.4 The estimated average combined engine flow rates in m^3/h are comparable to the total figures reported at the blower, confirming that the flare is not operational for the majority of the time, as reported by the site. Some discrepancies observed in the values (such as greater gas utilisation rates estimated for the engines in 2017 than were reported on average at the blower), likely reflect the way the flows are recorded. The blower figure gives an instantaneous measurement at the moment of monitoring, while the average calculated for the combination of the two engines uses the total output figures.

4.1.5 The two GasSim model scenarios both predict generation rates of approximately twice the amount extracted onsite. It should be noted that the total gas generation rates predicted by the model do not represent the maximum gas that can be extracted, as practical inefficiencies of the extraction system are recognised (on average approximately 95% of the generated gases is expected to be extracted from permanently capped areas). This efficiency is modelled to be lower if the area is temporarily capped (as for example Phase 9D). The figures in Tables 5 indicate that the current extraction rates represent between 69 and 98% extraction efficiency of the simulated gases available for extraction according to Scenario 1, and between 90 and 98% of the available-for-extraction gases for Scenario 2.

4.1.6 Further review of the modelled residual gases (discussed in Section 4.4 below) shows that for 2015-2017, the two models predict utilisation rates comparable to those observed onsite (see Table 5). This means that the available site information can be used to confirm that both models predict the current conditions onsite relatively accurately in terms of the amount of gas being utilised by the gas plant, however, it is not possible to confirm whether the total gases generated by Scenario 1 or 2 are more accurate in reflecting gas generation rates for the site as a whole. The results below are therefore discussed for Scenario 2 (‘wet' scenario), as it represents a conservative scenario in terms of risk.

Table 5: Model validation figures – actual extraction rates (blue columns) compared to predicted generation and simulated-as-extracted rates (both orange columns).

Year	Engine 1	Engine 2	Total engines	Blower	Scenario 1 (average moisture content)		Scenario 2 (wet moisture content)	
	MWh total		m^3/h	m^3/h	Simulated total	Simulated extracted	Simulated total	Simulated extracted
					m^3/h	m^3/h	m^3/h	m^3/h
2015	769	8615	**632**	583	1124	**916**	1213	**649**
2016	1374	7161	**522**	625	1165	**637**	1333	**582**
2017	908	7885	**572**	516	1184	**584**	1355	**582**

4.2 Generated gases

4.2.1 The modelled long-term prediction of total bulk landfill gas generation for both scenarios is shown in Figure 3 below. The figure is created using the numerical export of the gas generation data calculated by GasSim and presents the 50th and 95th percentile for both scenarios.

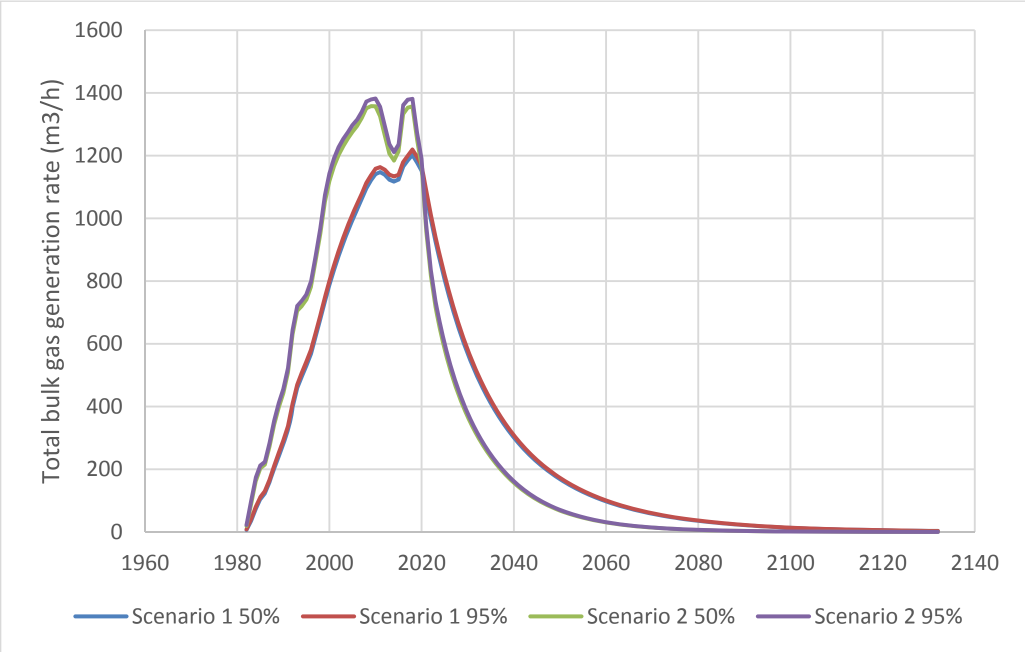


Figure 3: Comparison of total bulk gas generation rates predicted for 'average' and 'wet' moisture content waste.

4.2.2 For both scenarios the gas generation is predicted to be highest in 2018. The predicted maximum gas generation rate for Scenario 1 ('average' moisture content), at the 95th percentile is 1219.6 m^3/hour while for Scenario 2 ('wet' moisture content), it is 1380.9 m^3/hour. The greater moisture content specified in Scenario 2 is seen as greater gas generation rates for Scenario 2 until 2020.

4.2.3 The potential impact of a reported period of elevated leachate head in Phase 9D could not be simulated using GasSim 2.5. If waste is waterlogged (saturated), this is likely to inhibit biodegradation and gas generation[3, 5].

4.2.4 After waste is no longer accepted, as the putrescible fraction of the deposited waste is degraded, gas generation decreases exponentially. The faster degradation in the 'wet' Scenario 2 leads to higher gas generation rates and a quicker decay of gas generation once no more waste is accepted. As the biodegradable materials become depleted over time gas generation can become sporadic and localised due to the heterogeneous nature of the waste mass, and only a relatively small percentage of the theoretically-predicted gas generated may

[5] Environment Agency LFTGN03: Guidance on the management of landfill gas. 2004.

be practically recoverable. It is considered that total bulk gas generation rates of 100 m^3/hour represent the practical limit of extraction and flaring control of emissions.

4.2.5 It is predicted that gas generation rates will decrease to below 100 m^3/hour after the year 2045 - 2061 (predicted by the 'wet' and 'average' scenarios respectively).

4.3 Utilisation plant

4.3.1 The engines and flare were defined for a hypothetical period of up to year 2050, to estimate their maximum likely lifespan. The predicted gas generation and combusted gases for the average scenario are shown on Figure 4 below (it should be noted that the overall comments below apply to both scenarios).

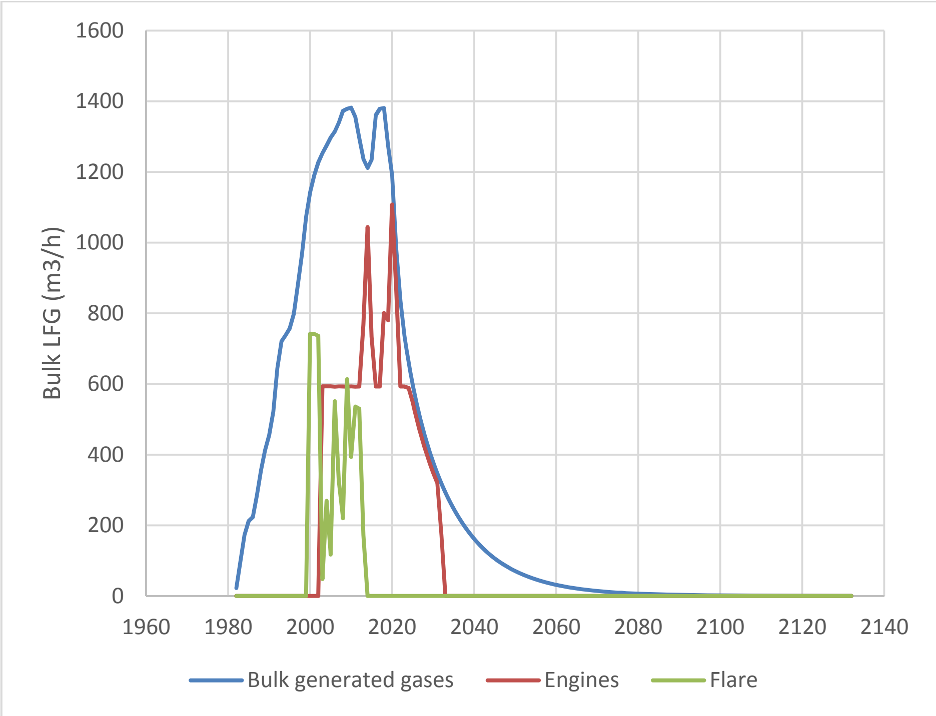


Figure 4: Comparison of total bulk gas generation rates, flare and engine outputs predicted for the 'wet' moisture content waste.

4.3.2 The gas utilisation plant onsite has a maximum combined capacity of 1200 m^3/h, which is appropriate for the gas generation rates predicted for the site. The flare capacity is sufficient to burn all the generated gas should the engines not be operational.

4.3.3 Due to the way the model simulates the initialisation of the gas plant (running each in turn, starting with the engines, before the flare, and each plant to maximum capacity before considering the next), it can be seen that after the year 2014, the flare is not predicted to initialise. This is because the model assumes that the first engine will operate at full capacity before the next engine is considered and at the end the flare. This does not represent the optimal gas management strategy for the available plant, as it means that as much as 300-400 m^3/h of bulk gases would not be utilised/flared due to the limits of the lower capacities of the engines and flare respectively. Instead, the second engine and flare may be operated intermittently to ensure that the maximum amount of gas is extracted and treated. Both the predicted gas generation rates, and simulated gas plant output results suggest that a smaller flare, which can initiate at a lower gas flow rate, may be more appropriate for the site.

4.3.4 Additionally, as mentioned in Section 4.1 the total generated gases do not reflect the total gas that is available for extraction. The model recognises that extraction from uncapped or temporarily capped areas is less efficient. Extraction rates are likely to increase after 2019 as the active phase is capped and further gas extraction wells are installed.

4.3.5 After 2027 (Scenario 2) – 2035 (Scenario 1) it is predicted that gas generation rates will decrease below the lower capacity of the current flare (the emissions could still be managed by one of the engines currently onsite until 2032 (Scenario 2) -2039 (Scenario 1). To manage emissions long term, the flare onsite will then need to be replaced with a smaller flare to ensure generated gases can continue to be treated.

4.4 Residual Gases

4.4.1 The maximum residual gases are predicted to have been emitted before the installation of the flare in the year 2000. After this year, some spikes are seen in the predicted residual gases (Appendix 2). The majority of those relate to the modelling artefacts discussed above. The predicted residual gases are likely to be higher than actual residual gases onsite when gas plant is managed so as both engines and flare are operational to optimise extraction.

4.4.2 Graphs 4 and 10 in Appendix 1 (Scenario 1 and 2 respectively) show a spike of residual gases between 600 m^3/h and 775 m^3/h respectively for the year 2016-2017. These values exceed the lower limit of the flare and second engine, both of which are predicted not to initialise at this period. This is interpreted as the result of the modelled phasing of the site, as it occurs during a period between phases of capping. The extraction efficiency from the temporarily capped parts of the site is modelled as ~1/3 lower than that of a permanent gas extraction system in a permanently capped part of the site.

4.4.3 The final period when residual gases are predicted to be elevated is when gas generation rates decrease to below the lower capacity of the engine. As discussed above, a change to a smaller flare, would allow continued extraction and therefore decrease the actual residual gases accordingly.

4.4.4 The model predicts that less than 5 % of the residual gases would be emitted as lateral emissions through the geosphere.

4.4.5 Lateral migration is determined within GasSim2 using a conservative one-dimension advection and diffusion equation. The diffusivity is determined for the diffusivity of gas in air, which is corrected for the porosity and moisture content of the medium. Atmospheric mixing is considered as an optional loss term, but methane oxidation is not included in the lateral migration module. Since lateral emissions are likely to be very low, and the surrounding geology has low porosity, no lateral migration was simulated for this assessment.

4.5 Tier 1 screening

4.5.1 The Tier 1 screening was carried out for both scenarios and included all default trace gases. The Tier 1 screen was run for all years, as diffuse emissions from the surface and combustion emissions from the gas plant would peak at different times.

4.5.2 The results of the Tier 1 screening for the two scenarios are summarised in Table 4 below. A print out of the Tier 1 screen for both scenarios is included in Appendix 3.

Table 4: Tier 1 screen results – gases requiring further modelling highlighted in orange

		Scenario 1		Scenario 2	
Determinand	**Year**	**Short term**	**Long term**	**Short Term**	**Long Term**
Arsenic	2018	YES	N/A	YES	N/A
Hydrogen Sulphide	2018	YES	No	YES	No
Nitrous Oxides	2020	YES	YES	YES	YES
Sulphur dioxide	2020	YES	No	YES	No

4.5.3 The trace gases highlighted in orange require further Tier 2 modelling. Both arsenic and hydrogen sulphide relate to surface emissions from the site and have highest concentrations 2018, when both generation rates and residual gas emissions are predicted to be high. It is noted, that neither As nor H2S have been detected in the trace gas analyses conducted at the site since 2011, and therefore, predicted concentrations of these at the 95th percentile represent an unrealistic, very conservative worst case scenario.

4.6 Tier 2 Atmospheric Dispersion

4.6.1 In order to assess the risk of significant gas emissions to receptors around the landfill site, the Tier 2 atmospheric dispersion module of GasSim2 was used. The in-built AERMOD Gaussian plume dispersion model simulates atmospheric dispersion of gases emitted from the engines and flares as well as surface emissions and determines the maximum ground-level concentrations of individual gases for a given year.

4.6.2 The impacts of the gases of interest were considered at the boundary (every 50 m), and the defined closest offsite receptors.

4.6.3 The Tier 2 modelling was carried out using the 95th percentile results of the source term and Tier 1 modules. Only the 'wet' scenario was modelled, since it represents a more conservative assessment scenario. The year of modelling was 2018 for As and H_2S, and 2020 for NO_x SO_2. The combination of both of these conservative approaches to this assessment provides a significant margin of safety in terms of the potential harm that may be caused by the assessed emissions from the site. Where exceedances were noted at the 95th percentile, the gases were also assessed at the more realistic 50th percentile. Both sets of results are dicussed

4.6.4 All sources were included in the assessment (diffuse from the landfill's surface and point source). The discrete receptors were modelled, to evaluate the potential impact on human health; and boundary receptors to assess the potential impact at the site boundary (worst case).

4.6.5 The detailed modelling of sulphur dioxide at the 95th percentile showed that none of the discrete or boundary receptors would exceed the relevant short term air quality standards in the modelled year (2020). In addition, emissions of nitrous oxides and hydrogen sulphide predicted at the 95th percentile would not exceed their short or long term EALS at any of the discrete receptors in the modelled years. Exceedances of the long term EAL for H_2S are predicted at boundary receptors surrounding the currently-active phase, and the short and long term EAL for NO_x at boundary receptors near the gas compound. Neither of those sets of locations relate to human receptors, and no exceedances were noted at these locations when emissions were modelled at the 50th percentile. Therefore, it is not considered that the site poses a risk to human health from emissions of these compounds.

4.6.6 Emissions of arsenic were predicted to exceed the short term air quality standard at all receptors when modelled at the 95th percentile. When modelled at the 50th percentile, only exceedances were at boundary receptors near Phase 9D and at the discrete receptor DR001, which is the site offices. It is noted that arsenic has not been detected during trace gas monitoring at the site, and these emissions are based on the default arsenic values within GasSim 2.5. The low emissions of PM_{10} particulates will also aid in mitigating any potential risks associated with arsenic emissions from the site[6]. It is recommended that As is included in the trace gas analysis for the site, at a low detection limit to allow verification of the projected results or provide data to allow amending the modelled range for future assessments.

4.6.7 As part of this assessment, odour units (predicted) were modelled, to understand the cumulative impact of emissions from the site in terms of potential nuisance to nearby residents. This assessment was carried out at the 95th percentile, and for the year 2018 (when surface emissions would be highest) to reflect worst case scenario. As there are no thresholds for odour, within GasSim, 1 odour unit is used to denote a potential problem, as this aligns with the definition of the unit (the amount of a mixture of odours present in 1 m^3 that can be detected by 50% of members of an odour panel). The Tier 2 modelling indicated that odour units would not exceed the detectable threshold at any of the offsite residential receptors. As would be normal for an active landfill site, exceedances are predicted for DR001 (site office), and some boundary receptors around the site.

4.7 Global Impact

4.7.1 The global impact as a sum of all years was calculated for the more representative Scenario 2. The total global warming potential expressed as tonnes of carbon dioxide is calculated as 2,560,000 tonnes. The gas utilisation at the site is calculated to have decreased the global warming potential contributed by the site by 1,890,000 through decrease of the amount of methane released.

[6] Environment Agency. H1 Annex F – Air Emissions.V2.2, 2011.

4.7.2 The calculated global impact is subject to the modelling artefacts discussed above, and therefore is considered to overestimate the actual global warming potential contribution of the site. With optimal gas plant operation and replacement with lean flare technology as the gas generation rates decrease, the overall global warming potential contribution of Bryn Posteg will be decreased further.

5.0 LANDFILL GAS MANAGEMENT PLAN

5.1 Appropriateness of the landfill gas control system

5.1.1 As discussed in section 4 above, the modelling results indicate that the utilisation and flaring capacity available at Bryn Posteg at present is sufficient for the amount of gas likely to be generated at the site, even under worst case scenario conditions (if the waste is wet). With efficient management of the extraction system, to maximise extraction, and optimal operation of the available gas plant, the site's gas control infrastructure is appropriate for the site conditions until site completion.

5.1.2 As landfill gas quantity and quality decline, the gas plant will be decommissioned and replaced with plant that can operate at a lower gas flow in line with industry standards.

5.2 Gas Management Plan

5.2.1 The landfill gas management plan for the site (LFGMP) forms a stand-alone document, which has been revised to reflect the findings of this risk assessment. The plan includes details of:

- Management approach, including balancing and utilisation plant operation;
- Operational procedures, responsibilities and record-keeping;
- Emissions monitoring and assessment from various parts of the landfill gas infrastructure including methods of determining collection efficiency.
- Triger and compliance limits for monitoring locations and the actions associated with exceeding those to prevent impact on the environment or human health.

6.0 SUMMARY AND CONCLUSIONS

6.1 Summary

6.1.1 The landfill gas risk assessment for Bryn Posteg landfill site has been revised including an update of the GasSim model for the site, to more accurately reflect the waste inputs and degradation rates for the site, and assess the potential impact of waste acceptance in line with the proposed restoration profile.

6.1.2 Validation of the model suggests that the current gas extraction is represented accurately by the model, however, it could not be confirmed which scenario was more accurate in terms of gas generation at the site. Therefore the 'wet' waste Scenario 2 was used for the basis of the risk assessment, as it represents worst case, conservative scenario. Scenario 2 predicts maximum gas generation rates of 1380 m^3/h at the 95th percentile in 2018. Site records show that in 2015-2017 gas flow at the flare and engines was on average 575 m^3/h. This is likely to reflect amongst other factors, physical limitations to extraction efficiency (e.g. 10% of the total available gas), the limited extraction undertaken from the currently active Cell 9D and the heterogeneity of gas generation in the older parts of the site (such as Phase 1 and 2), where it may not be possible to reach abstraction equilibrium with the remaining pockets of gassing waste. These factors are estimated to account for as much as ~700 m^3/h of flow in 2017 that was not operationally possible to capture.

6.1.3 Faster degradation rates will lead to quicker depletion of gas. The current gas plant on site is sufficient to control the current generated gas volumes, but requires management to ensure that the combination of the engines and flare operate optimally to minimise the residual gases.

6.1.4 The model indicates that by the year 2025 the flare onsite will require replacement with a smaller unit to continue controlling the generated gases as the amount of generated LFG decreases. It is predicted that active extraction is likely to be required till 2060, with landfill gas quality and quantity too poor for extraction after this date.

6.1.5 Tier 1 screening indicated that most gases would remain below their EALs or EQS levels. Tier 2 modelling at the 95th percentile confirmed that no EALs or EQS levels would be exceeded for any parameter at the discrete offsite receptors around the site, except for arsenic. No offsite exceedances are predicted for As at the more representative 50th percentile. Potential exceedances of arsenic, hydrogen sulfide, odour and nitrous oxides were predicted for receptors at the site boundary (or the site office), but this is considered to reflect a very conservative scenario.

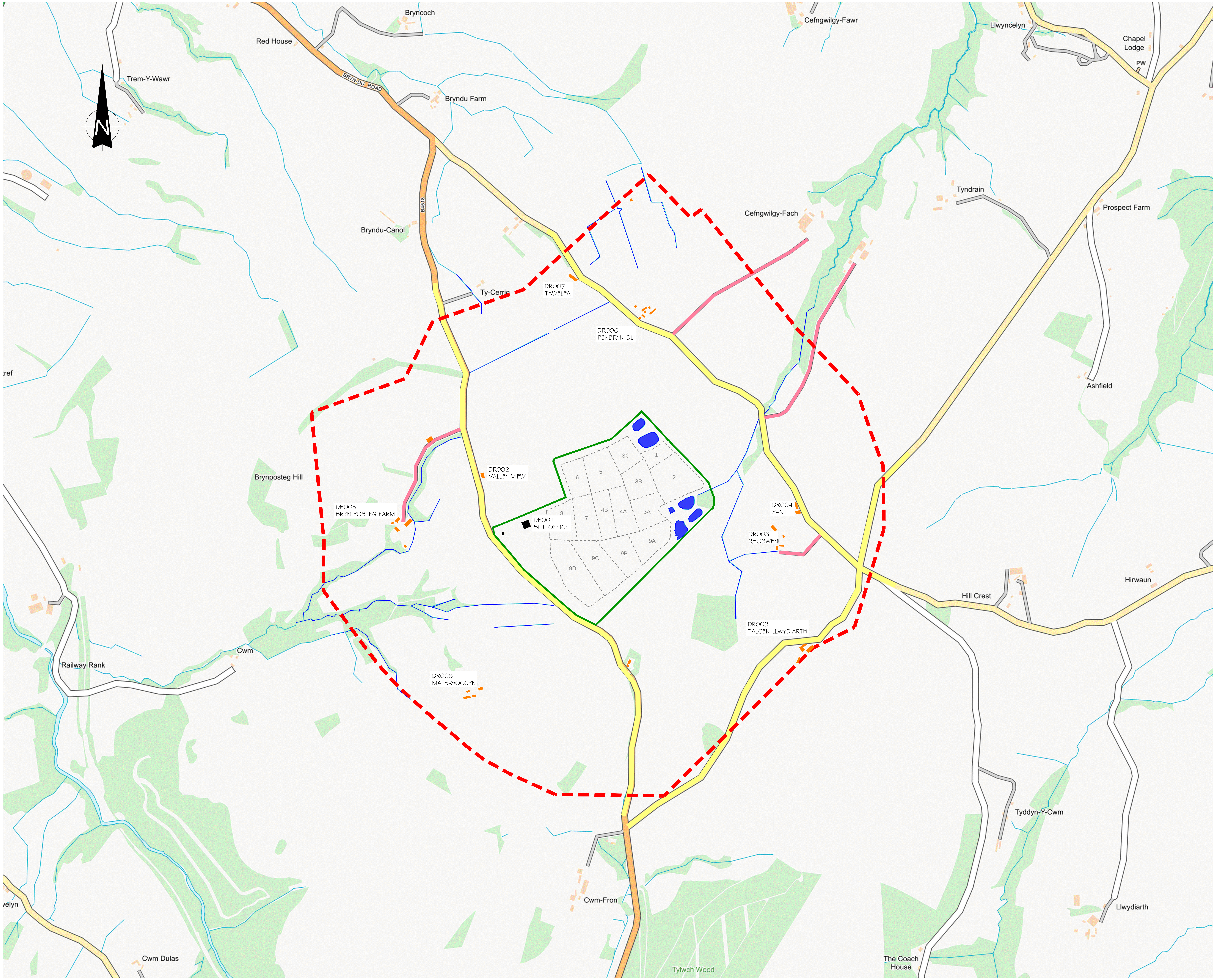
6.2 Compliance with the Landfill Directive 1999

6.2.1 The information reviewed here and the results of the GasSim model show that the engineered containment, gas infrastructure and management, utilisation plant and operation are overall compliant with the Landfill Directive (1999).

6.2.2 It is recommended that gas continues to be managed in accordance with the LFGMP for the site, to ensure continued compliance with the Landfill Directive. The requirement for exchange of gas plant to better accommodate the generated gases onsite should be reviewed periodically (e.g. annually), to ensure that greenhouse gas emissions from the site are minimised.

DRAWINGS

3428-CAU-XX-XX-DR-V-1806.A0-C1 – Site Setting and Nearby Receptors plan
3428-CAU-XX-XX-DR-V-1807.A0-C1 –Site layout, gas extraction infrastructure and monitoring locations



NOTE

1. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN METRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

PERMIT BOUNDARY
500m OFFSET
SURFACE WATER
RESIDENTIAL
ROAD MAJOR
ROAD MINOR

REV	MODIFICATIONS	BY	RE	AP	DATE
C1	ISSUED TO CLIENT	EJD	DB	DB	12.03.18
P1	ISSUED FOR COMMENT	EJD	DB	DB	19.02.18

POTTERS WASTE MANAGEMENT

PROJECT:
BRYN POSTEG LANDFILL SITE

TITLE:
LFGRA
SITE SETTING &
RECEPTORS PLAN

DRAWN BY	DATE	
EJD	19.02.2018	
REVIEWED BY	SCALE @ A1	JOB REF:
DB	1:5000	3428
AUTHORISED BY	ISSUE	REVISION
DB	A0	C1

DRAWING NUMBER
3428-CAU-XX-XX-DR-V-1806

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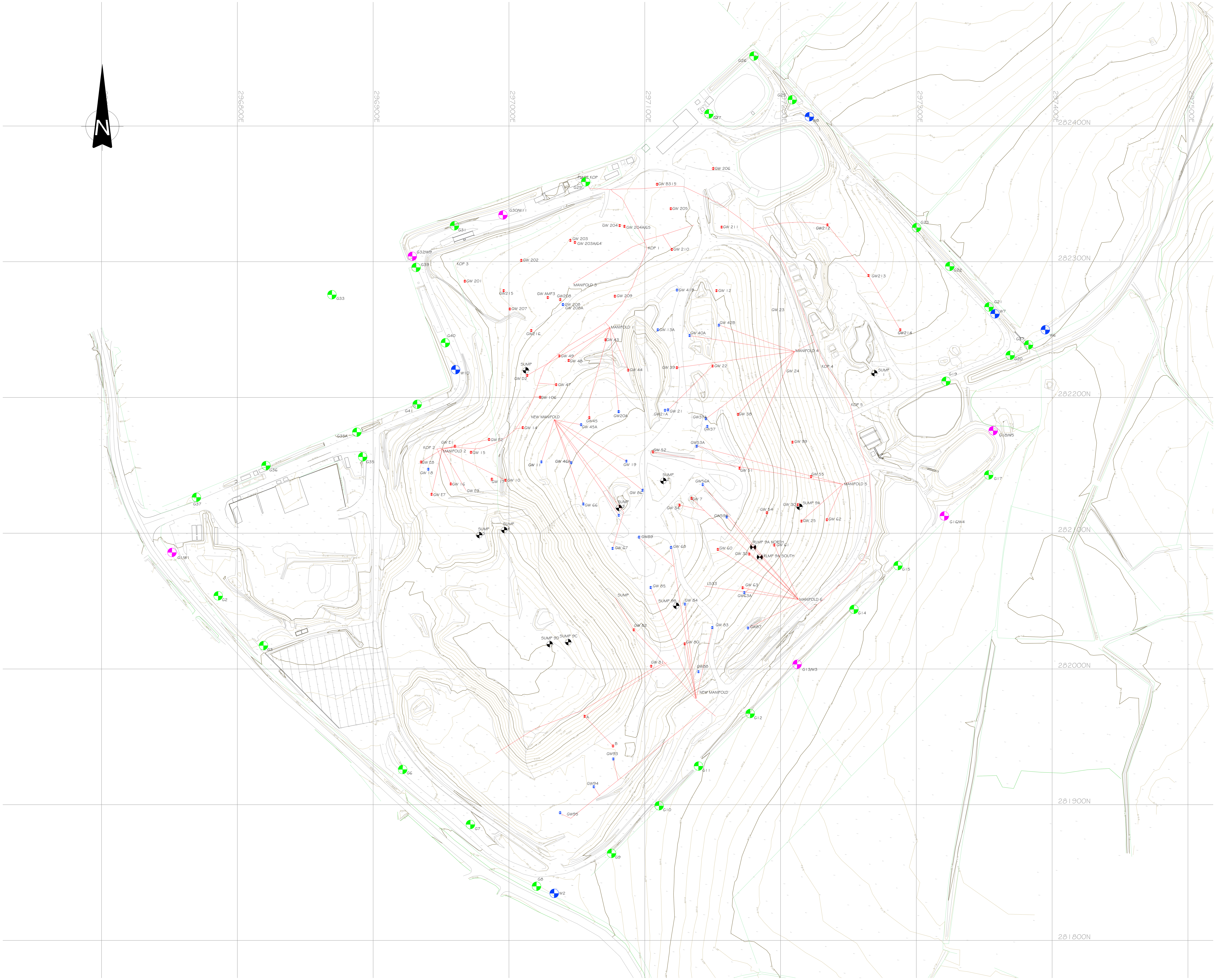

REV	MODIFICATIONS	BY	RE	AP	DATE
P2	RE-SCALED TO 1:1250	EJD	DB	DB	07.03.18
P1	ISSUED FOR COMMENT	EJD	DB	DB	20.02.18

POTTERS WASTE MANAGEMENT

PROJECT:

BRYN POSTEG LANDFILL SITE

TITLE:

GAS EXTRACTION AND MONITORING INFRASTRUCTURE PLAN

DRAWN BY	DATE	
EJD	20.02.2018	
REVIEWED BY	SCALE @ A1	JOB REF:
DB	1:1250	3428
AUTHORISED BY	ISSUE	REVISION
DB	S1	P2

DRAWING NUMBER

3428-CAU-XX-XX-DR-S-1807

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APPENDIX 1

GasSim model set up (Scenario 1 and Scenario 2)

ProjectDetails

Project Name	Bryn Posteg 2018
Client	Potters Waste Management
Model	s:\public\clients\p\potters waste management\3428 bryn posteg notice 2 response\5-documentation\5-calculations\2-wip\gas\2 lfgra\bp 2018 pv scenario 1.gss
Model Date	09/04/2018 09:34:25
Comments	permit variation LFGRA 2018 Scenario 1 - average moisture content
Start Year	1982
Operation Period	38
Simulation Period	150
Iterations	201

Confined Migration Pathway

Waste Composition

Year	Composition
1982	Wales 2000-2010 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(21.0)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(2.8)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(1.8)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(2.3)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(7.0)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)

Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(12.7)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(17.8)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(5.2)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(29.4)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)
Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)
Recycling Schemes	TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge	TRIANGULAR(0.3, 4.8, 8.2)

Industrial Liquid Waste	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3	TRIANGULAR(0.3, 4.8, 8.2)
1983	Wales 2000-2010 waste streams - Bryn Posteg
1984	Wales 2000-2010 waste streams - Bryn Posteg
1985	Wales 2000-2010 waste streams - Bryn Posteg
1986	Wales 2000-2010 waste streams - Bryn Posteg
1987	Wales 2000-2010 waste streams - Bryn Posteg
1988	Wales 2000-2010 waste streams - Bryn Posteg
1989	Wales 2000-2010 waste streams - Bryn Posteg
1990	Wales 2000-2010 waste streams - Bryn Posteg
1991	Wales 2000-2010 waste streams - Bryn Posteg
1992	Wales 2000-2010 waste streams - Bryn Posteg
1993	Wales 2000-2010 waste streams - Bryn Posteg
1994	Wales 2000-2010 waste streams - Bryn Posteg
1995	Wales 2000-2010 waste streams - Bryn Posteg
1996	Wales 2000-2010 waste streams - Bryn Posteg
1997	Wales 2000-2010 waste streams - Bryn Posteg
1998	Wales 2000-2010 waste streams - Bryn Posteg
1999	Wales 2000-2010 waste streams - Bryn Posteg
2000	Wales 2000-2010 waste streams - Bryn Posteg
2001	Wales 2000-2010 waste streams - Bryn Posteg
2002	Wales 2000-2010 waste streams - Bryn Posteg
2003	Wales 2000-2010 waste streams - Bryn Posteg
2004	Wales 2000-2010 waste streams - Bryn Posteg
2005	Wales 2000-2010 waste streams - Bryn Posteg
2006	Wales 2000-2010 waste streams - Bryn Posteg
2007	Wales 2000-2010 waste streams - Bryn Posteg
2008	Wales 2000-2010 waste streams - Bryn Posteg
2009	Wales 2000-2010 waste streams - Bryn Posteg
2010	Wales 2010-2013 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(15.8)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(2.1)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(1.4)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)

Disposable nappies	
Domestic	SINGLE(1.7)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(5.3)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(9.5)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(13.4)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(3.9)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(46.9)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)

Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)
Recycling Schemes	TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Industrial Liquid Waste	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3	TRIANGULAR(0.3, 4.8, 8.2)
2011	Wales 2010-2013 waste streams - Bryn Posteg
2012	Wales 2010-2013 waste streams - Bryn Posteg
2013	Wales 2010-2013 waste streams - Bryn Posteg
2014	Wales 2013-2020 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(10.5)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(1.4)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(0.9)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(1.2)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(3.5)
Civic Amenity	SINGLE(4.2)

Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(6.4)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(8.9)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(2.6)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(64.6)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)
Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)

Recycling Schemes		TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge		TRIANGULAR(0.3, 4.8, 8.2)
Industrial Liquid Waste		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3		TRIANGULAR(0.3, 4.8, 8.2)
2015		Wales 2013-2020 waste streams - Bryn Posteg
2016		Wales 2013-2020 waste streams - Bryn Posteg
2017		Wales 2013-2020 waste streams - Bryn Posteg
2018		Wales 2013-2020 waste streams - Bryn Posteg
2019		Wales 2013-2020 waste streams - Bryn Posteg
Justification:	[Changed]	default Wales waste streams w added MRF stream defined

Trace Gases

No Combustion Products Selected

Cell 1

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1982		TRIANGULAR(1.50E+04, 2.00E+04, 2.50E+04)
1983		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1984		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
Justification:	[Changed]	Data from previous GasSim model

Waste Breakdown

1982		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1983		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1984		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)

Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.5)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 2

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1983		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1984		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1985		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
Justification:	[Changed]	data from old GasSim model

Waste Breakdown

1983		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1984		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1985		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)

Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.5)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 3a

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year	AmountDepositied (t)
1986	TRIANGULAR(2.50E+04, 3.00E+04, 3.50E+04)
1987	TRIANGULAR(3.50E+04, 4.00E+04, 4.50E+04)
1988	SINGLE(0.0)
1989	SINGLE(0.0)
1990	SINGLE(0.0)
1991	SINGLE(0.0)
1992	SINGLE(0.0)
1993	SINGLE(0.0)
1994	SINGLE(0.0)
1995	SINGLE(0.0)
1996	SINGLE(0.0)

1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		UNIFORM(4.75E+04, 5.25E+04)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1986		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1987		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1988		
1989		
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)

Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	data from 2009/2010 GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model

Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 3B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1987		SINGLE(0.0)
1988		TRIANGULAR(3.70E+04, 4.00E+04, 4.50E+04)
1989		TRIANGULAR(3.70E+04, 4.00E+04, 4.50E+04)
1990		SINGLE(0.0)
1991		SINGLE(0.0)
1992		SINGLE(0.0)
1993		SINGLE(0.0)
1994		SINGLE(0.0)
1995		SINGLE(0.0)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		TRIANGULAR(2.25E+04, 2.50E+04, 2.75E+04)
Justification:	[Changed]	data from old GasSim model and Potters

Waste Breakdown

1987		
1988		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1989		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)

Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase	Average
Justification: [Changed]	Assumed average moisture content

Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	data from 2009/2010 GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 3C

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1990		TRIANGULAR(3.50E+04, 4.00E+04, 4.50E+04)
1991		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
Justification:	[Changed]	Data from old GasSim model

Waste Breakdown

1990		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1991		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)

Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)

Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap	Composite
First Layer:	
Cap Thickness	UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity	LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:	
Cap 2 Thickness	SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity	LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications	

Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.5)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 4A

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDeposited (t)
1992		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
1993		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1994		SINGLE(0.0)
1995		SINGLE(0.0)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		SINGLE(0.0)
2009		SINGLE(0.0)
2010		TRIANGULAR(3.50E+04, 3.75E+04, 4.00E+04)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1992		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1993		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
2009		
2010		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)

2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Actual capping phasing (Potters data)
Cap Thickness	[Changed]	Data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model
Liner Thickness	[Changed]	Data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 4B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1994		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1995		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		SINGLE(0.0)
2009		SINGLE(0.0)
2010		SINGLE(0.0)
2011		SINGLE(0.0)
2012		SINGLE(9.30E+03)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1994	
Domestic	TRIANGULAR(55.0, 65.0, 70.0)
Commercial	TRIANGULAR(30.0, 35.0, 45.0)
1995	
Domestic	TRIANGULAR(55.0, 65.0, 70.0)
Commercial	TRIANGULAR(30.0, 35.0, 45.0)
1996	
1997	
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	

2009
2010
2011
2012

Domestic		SINGLE(40.1)
Commercial		UNIFORM(8.0, 12.0)
Residues from MRF		SINGLE(49.7)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 3.3, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(1.6, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.9, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.6, 3.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 2.60E+00, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 3.70E+00, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.9, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 1.45, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)

Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 5.45, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 3.61E+00, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Actual capping phasing (Potters data)
Cap Thickness	[Changed]	Data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model
Liner Thickness	[Changed]	Data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 5

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1996		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
1997		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
Justification:	[Changed]	Potters (incl MRF residues)

Waste Breakdown

1996		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1997		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases		Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane		LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane		LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane		LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane		LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene		LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane		SINGLE(0.0)

1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)

Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 6

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1998		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
1999		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2000		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
Justification:	[Changed]	Potters (incl MRF residues)

Waste Breakdown

1998		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
1999		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2000		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases		Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane		LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane		LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane		LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane		LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene		LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane		SINGLE(0.0)
1,2-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol		LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane		LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol		LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane		LOGUNIFORM(0.05, 1.5)
2-Propanol		LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)		LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone		LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile		LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic		LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)

Benzene		LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane		SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)		LOGUNIFORM(1.00E-30, 2.00E-02)
Butane		LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid		LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide		LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide		LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)		LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide		LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane		LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane		LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value

Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 7

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2000		SINGLE(0.0)
2001		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2002		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
Justification:	[Changed]	POtters (incl MRF residues)

Waste Breakdown

2000		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2001		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2002		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases		Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane		LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane		LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane		LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane		LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene		LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane		SINGLE(0.0)
1,2-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol		LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane		LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol		LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane		LOGUNIFORM(0.05, 1.5)
2-Propanol		LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)		LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone		LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile		LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic		LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene		LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane		SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)		LOGUNIFORM(1.00E-30, 2.00E-02)
Butane		LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid		LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide		LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide		LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)		LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide		LOGTRIANGULAR(0.006, 0.2, 4.4)

Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane		LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane		LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters

Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 8

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2003		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2004		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2005		SINGLE(7.51E+04)
Justification:	[Changed]	Data from Potters

Waste Breakdown

2003		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2004		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2005		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)

Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		

Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

CELL 9A

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2006		SINGLE(7.51E+04)
2007		SINGLE(8.17E+04)
2008		SINGLE(0.0)
Justification:	[Changed]	Data from Potters

Waste Breakdown

2006

Domestic	UNIFORM(40.0, 50.0)
Commercial	UNIFORM(5.0, 10.0)
Residues from MRF	UNIFORM(40.0, 50.0)

2007

Domestic	UNIFORM(40.0, 50.0)
Commercial	UNIFORM(5.0, 10.0)
Residues from MRF	UNIFORM(40.0, 50.0)

2008

Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)

Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310

Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 9B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2009		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2010		TRIANGULAR(3.50E+04, 3.75E+04, 4.00E+04)
2011		SINGLE(6.48E+04)
Justification:	[Changed]	Actual tonnages and breakdown (waste returns, Potters)

Waste Breakdown

2009		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2010		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2011		
Domestic		SINGLE(51.3)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		SINGLE(38.1)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)

Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 9C

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year	AmountDepositied (t)
2012	SINGLE(4.00E+04)

2013		SINGLE(6.12E+04)
Justification:	[Changed]	Actual tonnages and waste breakdown (Potters waste returns)

Waste Breakdown

2012		
Domestic		SINGLE(40.1)
Commercial		UNIFORM(8.0, 12.0)
Residues from MRF		SINGLE(49.7)
2013		
Domestic		SINGLE(36.9)
Commercial		SINGLE(23.8)
Residues from MRF		SINGLE(39.3)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)

Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 9D

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2014		SINGLE(6.01E+04)
2015		SINGLE(1.03E+05)
2016		SINGLE(7.67E+04)
2017		TRIANGULAR(9.50E+04, 1.00E+05, 1.05E+05)
2018		TRIANGULAR(4.02E+04, 4.36E+04, 4.53E+04)
2019		TRIANGULAR(6.03E+04, 6.54E+04, 6.79E+04)
Justification:	[Changed]	Info from Potters (Actual tonnages, waste returns until end 2017; 2018 -19 tonnages estimated from remaining void to proposed profile and range of density between 0.8 and 0;9

Waste Breakdown

2014		
Domestic		SINGLE(36.0)
Commercial		SINGLE(28.2)
Residues from MRF		SINGLE(35.8)
2015		
Domestic		SINGLE(19.0)
Commercial		SINGLE(17.0)

Residues from MRF	SINGLE(64.0)
2016	
Domestic	SINGLE(25.0)
Commercial	SINGLE(15.5)
Residues from MRF	SINGLE(59.5)
2017	
Domestic	SINGLE(28.0)
Commercial	SINGLE(20.0)
Residues from MRF	SINGLE(52.0)
2018	
Domestic	UNIFORM(20.0, 30.0)
Commercial	UNIFORM(17.0, 20.0)
Residues from MRF	UNIFORM(40.0, 60.0)
2019	
Domestic	UNIFORM(20.0, 30.0)
Commercial	UNIFORM(17.0, 20.0)
Residues from MRF	UNIFORM(40.0, 60.0)
Justification: [Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 11.0, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 6.6, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.6, 3.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 2.60E+00, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 2.30E+00, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)

Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 2.5, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 8.1, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 3.70E+00, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Average
Justification:	[Changed]	Assumed average moisture content
Degradation rate - after change		Average
Justification:	[Changed]	Assumed average moisture content
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.3)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Projected capping phasing
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Site Characteristics

Proportion to CO2 [%]		TRIANGULAR(32.0, 35.5, 39.0)
Justification:	[Changed]	Typical values at BP
Proportion to CH4 [%]		TRIANGULAR(50.0, 55.0, 57.0)
Justification:	[Changed]	Typical values at BP

Cellulose Decay Rates

		Slow	Moderate	Fast
Dry		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
Average		SINGLE(0.046)	SINGLE(0.076)	SINGLE(0.116)
Wet		SINGLE(0.076)	SINGLE(0.116)	SINGLE(0.694)
Saturated		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
User Defined 1		SINGLE(0.046)	UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)
User Defined 2		UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)	UNIFORM(0.116, 0.694)
Justification:	[Default]	Default Value		

Gas Plant

CAT 3516TA		Spark Ignition Engine	
January 2003 to December 2050		300 to 600	Downtime [%]: UNIFORM(1.0, 5.0)
Justification:	[Changed]	Finnings UK	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	Finnings UK	
CAT 3516 A+		Spark Ignition Engine	
June 2013 to December 2050		300 to 600	Downtime [%]: UNIFORM(1.0, 5.0)
Justification:	[Changed]	Gwynt Cymru engine	
Destruction Efficiency CH4	[Changed]	Default	
Destruction Efficiency H2	[Changed]	Default	
Properties	[Changed]	Gwynt Cymru specification	
Organics SC750		Flare	
January 2000 to December 2012		100 to 750	Downtime [%]: NORMAL(2.0, 10.0)
Justification:	[Changed]	Organics Ltd	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	Organics Ltd	
GTS		Flare	
January 2013 to December 2132		400 to 2000	Downtime [%]: UNIFORM(3.0, 5.0)
Justification:	[Changed]	Flare specification	
Destruction Efficiency CH4	[Changed]	Not Justified	
Destruction Efficiency H2	[Changed]	Not Justified	
Properties	[Changed]	Flare specification	
Engine/Flare Order	[Changed]	Engines first	

Trace Gas Plant

1,1,1,2-Tetrafluorochloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1,1-Trichlorotrifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1,2-Trichloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichloroethene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichlorotetrafluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,2-Dichloropropane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,2-Dichlorotetrafluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1-butanethiol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1-Chloro-1,1-difluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-butoxy ethanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-Chloro-1,1,1-trifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)

Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-Propanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acetalehyde (ethanal)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acetone		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acrylonitrile		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Arsenic		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzo(a)pyrene		
Spark Ignition Engine:	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Dual Fuel Engine:	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(1.00E-06, 6.00E-04)
Bromodichloromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butadiene (modelled as 1,3-Butadiene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butene isomers		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butyric acid		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon monoxide		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(508.0, 1046.92, 1800.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(26.0, 49.12, 2178.0)
Carbon tetrachloride (tetrachloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbonyl sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorobenzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)

Flare:	non-combustion products	SINGLE(99.0)
Chlorodifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorofluorocarbons (CFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chloroform (trichloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorotrifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichlorodifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichloromethane (methylene chloride)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Diethyl disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dimethyl disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dimethyl sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dioxins and furans (modelled as 2,3,7,8-TCDD)		
Spark Ignition Engine:	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Dual Fuel Engine:	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(9.00E-09, 3.10E-08, 3.60E-07)
Ethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethanethiol (ethyl mercaptan)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethyl butyrate		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Ethyl toluene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylbenzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene dibromide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene dichloride		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Fluorotrichloromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Formaldehyde (methanal)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Freon 113		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Furan		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Halons		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hexachlorocyclohexane (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hexane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrochlorofluorocarbons (HCFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrofluorocarbons (HFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrogen chloride, or (Total chloride (reported as HCl))		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(5.00E-04, 1.00E+01, 5.84E+02)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.5, 36.0)
Hydrogen fluoride, or (Total fluoride (reported as HF))		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(2.00E-04, 7.00E+00, 4.50E+01)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.4, 21.0)
Hydrogen sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Limonene		

Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Mercury		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methanethiol (methyl mercaptan)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl chloride (chloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl chloroform (1,1,1-Trichloroethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl ethyl ketone (2-butanone)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl isobutyl ketone		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Nitric acid		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Nitrogen dioxide (NO2)		
Spark Ignition Engine:	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Nitrogen monoxide (NO)		
Spark Ignition Engine:	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Nitrogen oxides (NOx)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(330.0, 435.0, 1000.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	TRIANGULAR(43.0, 78.19, 149.0)
Odour Units (Predicted)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
PAH (reported as Naphthalene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Perfluorocarbons (PFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Phenol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)

Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
PM10s		
Spark Ignition Engine:	combustion products	TRIANGULAR(1.2, 4.6, 12.5)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	UNIFORM(1.0, 10.0)
Propane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Propanethiol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphide, total simulations with H2S		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphide, total simulations without H2S		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphur dioxide		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(18.0, 83.0, 402.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(0.01, 2.81, 482.0)
t-1,2-Dichloroethene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Tetrachloroethylene (Tetrachloroethene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Toluene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Total non-methane volatile organic compounds (NMVOCs)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(0.0118, 0.5, 90.0)
Dual Fuel Engine:	combustion products	TRIANGULAR(0.0118, 18.1, 90.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.1, 30.0)
Total volatile organic compounds (VOCs)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(0.0118, 18.1, 1643.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(4.6, 10.0)
Trichlorobenzene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichloroethylene (trichloroethene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichlorotrifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trimethylbenzene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)

Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Vinyl chloride (chloroethene, chloroethylene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Xylene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Justification: [Changed] Site specific data trace gas monitoring in Jan 2011, April 2014, December 2015 and Jan 20

Global Impact

Bulk Gases

Global Warming Potential

Carbon Dioxide [t]:		1
Methane [t carbon dioxoide]:		25
Hydrogen [t carbon dioxide]:		0
Justification:	[Default]	Default Value

Ozone Depletion Potential

Carbon Dioxide [t trichlorofluoromethane]:		0
Methane [t trichlorofluoromethane]:		0
Hydrogen [t trichlorofluoromethane]:		0
Justification:	[Default]	Default Value

Trace Gases

Gas	Global Warming Potential	Ozone Depletion Potential
1,1,1,2-Tetrafluorochloroethane	609	0.02
1,1,1-Trichlorotrifluoroethane	6130	1
1,1,2-Trichloroethane	0	0
1,1-Dichloroethane	0	0
1,1-Dichloroethene	0	0
1,1-Dichlorotetrafluoroethane	10000	0.94
1,2-Dichloropropane	0	0
1,2-Dichlorotetrafluoroethane	0	0
1-butanethiol	0	0
1-Chloro-1,1-difluoroethane	2310	0.07
2-butoxy ethanol	0	0
2-Chloro-1,1,1-trifluoroethane	0	0
2-Propanol	0	0
Acetalehyde (ethanal)	1.3	0
Acetone	0.5	0
Acrylonitrile	0	0
Arsenic	0	0
Benzene	0	0
Benzo(a)pyrene	0	0
Bromodichloromethane	1300	1890
Butadiene (modelled as 1,3-Butadiene)	0	0
Butane	4	0
Butene isomers	0	0
Butyric acid	0	0
Carbon disulphide	0	0
Carbon monoxide	0	0
Carbon tetrachloride (tetrachloromethane)	1400	0.73
Carbonyl sulphide	0	0
Chlorobenzene	0	0
Chlorodifluoromethane	1810	0.05
Chloroethane	0	0
Chlorofluorocarbons (CFCs) (Total)	0	0
Chlorofluoromethane	0	0
Chloroform (trichloromethane)	30	0
Chlorotrifluoromethane	14400	0
Dichlorodifluoromethane	10900	1
Dichlorofluoromethane	210	0
Dichloromethane (methylene chloride)	9	0
Diethyl disulphide	0	0
Dimethyl disulphide	0	0
Dimethyl sulphide	0	0
Dioxins and furans (modelled as 2,3,7,8-TCDD)	0	0
Ethane	5.5	0
Ethanethiol (ethyl mercaptan)	0	0
Ethanol	0	0
Ethyl butyrate	0	0
Ethyl toluene (all isomers)	0	0
Ethylbenzene	0	0
Ethylene	3.7	0
Ethylene dibromide	0	0
Ethylene dichloride	0	0
Fluorotrichloromethane	4750	1
Formaldehyde (methanal)	0	0
Freon 113	6130	1
Furan	0	0
Halons	0	0
Hexachlorocyclohexane (all isomers)	0	0

Hexane	0	0
Hydrochlorofluorocarbons (HCFCs) (Total	0	0
Hydrofluorocarbons (HFCs) (Total)	0	0
Hydrogen chloride, or (Total chloride (reported as HCl))	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF))	0	0
Hydrogen sulphide	0	0
Limonene	0	0
Mercury	0	0
Methanethiol (methyl mercaptan)	0	0
Methyl chloride (chloromethane)	146	0
Methyl chloroform (1,1,1-Trichloroethane)	0	0
Methyl ethyl ketone (2-butanone)	0	0
Methyl isobutyl ketone	0	0
Nitric acid	0	0
Nitrogen dioxide (NO2)	0	0
Nitrogen monoxide (NO)	0	0
Nitrogen oxides (NOx)	0	0
Odour Units (Predicted)	0	0
PAH (reported as Naphthalene)	0	0
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	0	0
Pentane	0	0
Pentene (all isomers)	0	0
Perfluorocarbons (PFCs) (Total)	0	0
Phenol	0	0
PM10s	0	0
Propane	3.3	0
Propanethiol	0	0
Sulphide, total simulations with H2S	0	0
Sulphide, total simulations without H2S	0	0
Sulphur dioxide	0	0
t-1,2-Dichloroethene	0	0
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	0	0
Tetrachloroethylene (Tetrachloroethene)	0	0
Toluene	2.7	0
Total non-methane volatile organic compounds (NMVOCs)	0	0
Total volatile organic compounds (VOCs)	0	0
Trichlorobenzene (all isomers)	0	0
Trichloroethylene (trichloroethene)	0	0
Trichlorofluoromethane	4750	1
Trichlorotrifluoroethane	6130	1
Trimethylbenzene (all isomers)	0	0
Vinyl chloride (chloroethene, chloroethylene)	0	0
Xylene (all isomers)	0	0

Lateral Migration

Bulk Gases

Air Diffusion Coefficients		
CO2 Dispersivity		SINGLE(0.1613)
CH4 Dispersivity		SINGLE(0.2192)
H2 Dispersivity		#UNDEFINED?
Justification:	[Default]	Default Value

Geosphere

Cell	Cell 1
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 2
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3a
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3B
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3C
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 4A
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 4B
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 5
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 6
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 7

Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 8
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	CELL 9A
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 9B
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 9C
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 9D
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Justification: [Changed]	Geosphere properties interpreted as per HRA for Bryn Posteg, reflecting migration through fractures rather than intergranular migration

Trace Gases

Gas	Air Diffusion Coefficient
1,1,1,2-Tetrafluorochloroethane	SINGLE(0.071)
1,1,1-Trichlorotrifluoroethane	#UNDEFINED?
1,1,2-Trichloroethane	#UNDEFINED?
1,1-Dichloroethane	SINGLE(0.0742)
1,1-Dichloroethene	#UNDEFINED?
1,1-Dichlorotetrafluoroethane	#UNDEFINED?
1,2-Dichloropropane	#UNDEFINED?
1,2-Dichlorotetrafluoroethane	#UNDEFINED?
1-butanethiol	#UNDEFINED?
1-Chloro-1,1-difluoroethane	#UNDEFINED?
2-butoxy ethanol	#UNDEFINED?
2-Chloro-1,1,1-trifluoroethane	#UNDEFINED?
2-Propanol	#UNDEFINED?
Acetalehyde (ethanal)	SINGLE(0.1235)
Acetone	#UNDEFINED?
Acrylonitrile	#UNDEFINED?
Arsenic	#UNDEFINED?
Benzene	SINGLE(0.088)
Benzo(a)pyrene	SINGLE(0.043)
Bromodichloromethane	#UNDEFINED?
Butadiene (modelled as 1,3-Butadiene)	SINGLE(0.102)
Butane	#UNDEFINED?
Butene isomers	SINGLE(0.0977)
Butyric acid	#UNDEFINED?
Carbon disulphide	SINGLE(0.108)
Carbon monoxide	SINGLE(0.2013)
Carbon tetrachloride (tetrachloromethane)	SINGLE(0.078)
Carbonyl sulphide	#UNDEFINED?
Chlorobenzene	SINGLE(0.073)
Chlorodifluoromethane	#UNDEFINED?
Chloroethane	SINGLE(0.1085)
Chlorofluorocarbons (CFCs) (Total)	SINGLE(0.0826)
Chlorofluoromethane	#UNDEFINED?
Chloroform (trichloromethane)	SINGLE(0.104)
Chlorotrifluoromethane	#UNDEFINED?
Dichlorodifluoromethane	#UNDEFINED?
Dichlorofluoromethane	#UNDEFINED?
Dichloromethane (methylene chloride)	SINGLE(0.099)
Diethyl disulphide	#UNDEFINED?
Dimethyl disulphide	SINGLE(0.0898)
Dimethyl sulphide	SINGLE(0.0898)
Dioxins and furans (modelled as 2,3,7,8-TCDD)	SINGLE(0.104)
Ethane	#UNDEFINED?
Ethanethiol (ethyl mercaptan)	#UNDEFINED?
Ethanol	#UNDEFINED?
Ethyl butyrate	#UNDEFINED?
Ethyl toluene (all isomers)	SINGLE(0.0796)
Ethylbenzene	#UNDEFINED?
Ethylene	SINGLE(0.0796)
Ethylene dibromide	#UNDEFINED?
Ethylene dichloride	SINGLE(0.104)
Fluorotrichloromethane	#UNDEFINED?
Formaldehyde (methanal)	SINGLE(0.1591)
Freon 113	#UNDEFINED?
Furan	#UNDEFINED?
Halons	SINGLE(0.0754)
Hexachlorocyclohexane (all isomers)	#UNDEFINED?
Hexane	#UNDEFINED?
Hydrochlorofluorocarbons (HCFCs) (Total	SINGLE(0.0967)
Hydrofluorocarbons (HFCs) (Total)	#UNDEFINED?
Hydrogen chloride, or (Total chloride (reported as HCl))	SINGLE(0.1763)
Hydrogen fluoride, or (Total fluoride (reported as HF))	SINGLE(0.2081)

Hydrogen sulphide	SINGLE(0.1623)
Limonene	#UNDEFINED?
Mercury	#UNDEFINED?
Methanethiol (methyl mercaptan)	#UNDEFINED?
Methyl chloride (chloromethane)	SINGLE(0.1724)
Methyl chloroform (1,1,1-Trichloroethane)	SINGLE(0.078)
Methyl ethyl ketone (2-butanone)	#UNDEFINED?
Methyl isobutyl ketone	#UNDEFINED?
Nitric acid	#UNDEFINED?
Nitrogen dioxide (NO2)	SINGLE(0.2276)
Nitrogen monoxide (NO)	SINGLE(0.2276)
Nitrogen oxides (NOx)	SINGLE(0.2276)
Odour Units (Predicted)	#UNDEFINED?
PAH (reported as Naphthalene)	SINGLE(0.059)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	SINGLE(0.069)
Pentane	SINGLE(0.1999)
Pentene (all isomers)	SINGLE(0.1999)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.071)
Phenol	#UNDEFINED?
PM10s	#UNDEFINED?
Propane	#UNDEFINED?
Propanethiol	#UNDEFINED?
Sulphide, total simulations with H2S	#UNDEFINED?
Sulphide, total simulations without H2S	#UNDEFINED?
Sulphur dioxide	SINGLE(0.1289)
t-1,2-Dichloroethene	#UNDEFINED?
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	SINGLE(0.071)
Tetrachloroethylene (Tetrachloroethene)	SINGLE(0.072)
Toluene	SINGLE(0.087)
Total non-methane volatile organic compounds (NMVOCs)	#UNDEFINED?
Total volatile organic compounds (VOCs)	#UNDEFINED?
Trichlorobenzene (all isomers)	SINGLE(0.03)
Trichloroethylene (trichloroethene)	SINGLE(0.079)
Trichlorofluoromethane	#UNDEFINED?
Trichlorotrifluoroethane	#UNDEFINED?
Trimethylbenzene (all isomers)	SINGLE(0.0619)
Vinyl chloride (chloroethene, chloroethylene)	SINGLE(0.1126)
Xylene (all isomers)	SINGLE(0.0684)
Justification: [Default]	Default Value

ProjectDetails

Project Name	Bryn Posteg 2018
Client	Potters Waste Management
Model	S:\Public\Clients\P\Potters Waste Management\3428 Bryn Posteg Notice 2 Response\5-Documentation\5-Calculations\2-WiP\Gas\2 LFGRA\bp 2018 pv Scenario
Model Date	09/04/2018 15:58:08
Comments	permit variation LFGRA 2018 Scenario 2 - 'wet' moisture content
Start Year	1982
Operation Period	38
Simulation Period	150
Iterations	201

Confined Migration Pathway

Waste Composition

Year	Composition
1982	Wales 2000-2010 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(21.0)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(2.8)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(1.8)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(2.3)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(7.0)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)

Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(12.7)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(17.8)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(5.2)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(29.4)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)
Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)
Recycling Schemes	TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge	TRIANGULAR(0.3, 4.8, 8.2)

Industrial Liquid Waste	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3	TRIANGULAR(0.3, 4.8, 8.2)
1983	Wales 2000-2010 waste streams - Bryn Posteg
1984	Wales 2000-2010 waste streams - Bryn Posteg
1985	Wales 2000-2010 waste streams - Bryn Posteg
1986	Wales 2000-2010 waste streams - Bryn Posteg
1987	Wales 2000-2010 waste streams - Bryn Posteg
1988	Wales 2000-2010 waste streams - Bryn Posteg
1989	Wales 2000-2010 waste streams - Bryn Posteg
1990	Wales 2000-2010 waste streams - Bryn Posteg
1991	Wales 2000-2010 waste streams - Bryn Posteg
1992	Wales 2000-2010 waste streams - Bryn Posteg
1993	Wales 2000-2010 waste streams - Bryn Posteg
1994	Wales 2000-2010 waste streams - Bryn Posteg
1995	Wales 2000-2010 waste streams - Bryn Posteg
1996	Wales 2000-2010 waste streams - Bryn Posteg
1997	Wales 2000-2010 waste streams - Bryn Posteg
1998	Wales 2000-2010 waste streams - Bryn Posteg
1999	Wales 2000-2010 waste streams - Bryn Posteg
2000	Wales 2000-2010 waste streams - Bryn Posteg
2001	Wales 2000-2010 waste streams - Bryn Posteg
2002	Wales 2000-2010 waste streams - Bryn Posteg
2003	Wales 2000-2010 waste streams - Bryn Posteg
2004	Wales 2000-2010 waste streams - Bryn Posteg
2005	Wales 2000-2010 waste streams - Bryn Posteg
2006	Wales 2000-2010 waste streams - Bryn Posteg
2007	Wales 2000-2010 waste streams - Bryn Posteg
2008	Wales 2000-2010 waste streams - Bryn Posteg
2009	Wales 2000-2010 waste streams - Bryn Posteg
2010	Wales 2010-2013 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(15.8)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(2.1)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(1.4)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)

Disposable nappies	
Domestic	SINGLE(1.7)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(5.3)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(9.5)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(13.4)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(3.9)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(46.9)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)

Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)
Recycling Schemes	TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Industrial Liquid Waste	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2	TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3	TRIANGULAR(0.3, 4.8, 8.2)
2011	Wales 2010-2013 waste streams - Bryn Posteg
2012	Wales 2010-2013 waste streams - Bryn Posteg
2013	Wales 2010-2013 waste streams - Bryn Posteg
2014	Wales 2013-2020 waste streams - Bryn Posteg
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(10.5)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(13.0, 17.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Domestic	SINGLE(1.4)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(21.0)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Textiles	
Domestic	SINGLE(0.9)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(0.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(1.2)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(6.0, 12.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(3.5)
Civic Amenity	SINGLE(4.2)

Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(6.4)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(8.9)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(12.0, 20.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(2.6)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	UNIFORM(23.0, 34.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(64.6)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Domestic	TRIANGULAR(0.2, 0.35, 2.3)
Civic Amenity	TRIANGULAR(0.2, 0.35, 2.3)
Composted Organic Material	TRIANGULAR(0.2, 0.35, 2.3)
Incinerator Ash	TRIANGULAR(0.2, 0.35, 2.3)
Residues from MRF	TRIANGULAR(0.2, 0.35, 2.3)
Recycling Schemes	TRIANGULAR(0.2, 0.35, 2.3)
Chemical Sludge	TRIANGULAR(0.2, 0.35, 2.3)
Industrial Liquid Waste	TRIANGULAR(0.2, 0.35, 2.3)
Iron (%)	
Domestic	TRIANGULAR(0.3, 4.8, 8.2)
Civic Amenity	TRIANGULAR(0.3, 4.8, 8.2)
Commercial	TRIANGULAR(0.3, 4.8, 8.2)
Industrial	TRIANGULAR(0.3, 4.8, 8.2)
Inert	TRIANGULAR(0.3, 4.8, 8.2)
Liquid Inert	TRIANGULAR(0.3, 4.8, 8.2)
Sewage Sludge	TRIANGULAR(0.3, 4.8, 8.2)
Composted Organic Material	TRIANGULAR(0.3, 4.8, 8.2)
Incinerator Ash	TRIANGULAR(0.3, 4.8, 8.2)
Residues from MRF	TRIANGULAR(0.3, 4.8, 8.2)

Recycling Schemes		TRIANGULAR(0.3, 4.8, 8.2)
Chemical Sludge		TRIANGULAR(0.3, 4.8, 8.2)
Industrial Liquid Waste		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 1		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 2		TRIANGULAR(0.3, 4.8, 8.2)
User Defined 3		TRIANGULAR(0.3, 4.8, 8.2)
2015		Wales 2013-2020 waste streams - Bryn Posteg
2016		Wales 2013-2020 waste streams - Bryn Posteg
2017		Wales 2013-2020 waste streams - Bryn Posteg
2018		Wales 2013-2020 waste streams - Bryn Posteg
2019		Wales 2013-2020 waste streams - Bryn Posteg
Justification:	[Changed]	default Wales waste streams w added MRF stream defined

Trace Gases

No Combustion Products Selected

Cell 1

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1982		TRIANGULAR(1.50E+04, 2.00E+04, 2.50E+04)
1983		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1984		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
Justification:	[Changed]	Data from previous GasSim model

Waste Breakdown

1982		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1983		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1984		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)

Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.5)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 2

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1983		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1984		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
1985		TRIANGULAR(1.25E+04, 1.50E+04, 1.75E+04)
Justification:	[Changed]	data from old GasSim model

Waste Breakdown

1983		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1984		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1985		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)

Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.5)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 3a

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year	AmountDepositied (t)
1986	TRIANGULAR(2.50E+04, 3.00E+04, 3.50E+04)
1987	TRIANGULAR(3.50E+04, 4.00E+04, 4.50E+04)
1988	SINGLE(0.0)
1989	SINGLE(0.0)
1990	SINGLE(0.0)
1991	SINGLE(0.0)
1992	SINGLE(0.0)
1993	SINGLE(0.0)
1994	SINGLE(0.0)
1995	SINGLE(0.0)
1996	SINGLE(0.0)

1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		UNIFORM(4.75E+04, 5.25E+04)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1986		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1987		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1988		
1989		
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)

Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	data from 2009/2010 GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model

Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 3B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1987		SINGLE(0.0)
1988		TRIANGULAR(3.70E+04, 4.00E+04, 4.50E+04)
1989		TRIANGULAR(3.70E+04, 4.00E+04, 4.50E+04)
1990		SINGLE(0.0)
1991		SINGLE(0.0)
1992		SINGLE(0.0)
1993		SINGLE(0.0)
1994		SINGLE(0.0)
1995		SINGLE(0.0)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		TRIANGULAR(2.25E+04, 2.50E+04, 2.75E+04)
Justification:	[Changed]	data from old GasSim model and Potters

Waste Breakdown

1987		
1988		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1989		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases		Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane		LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane		LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane		LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane		LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene		LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane		SINGLE(0.0)
1,2-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol		LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane		LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol		LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane		LOGUNIFORM(0.05, 1.5)
2-Propanol		LOGTRIANGULAR(0.005, 2.0, 34.0)

Acetalehyde (ethanal)		LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone		LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile		LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic		LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene		LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane		SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)		LOGUNIFORM(1.00E-30, 2.00E-02)
Butane		LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid		LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide		LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide		LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)		LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide		LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane		LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane		LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment

Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	data from 2009/2010 GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 3C

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1990		TRIANGULAR(3.50E+04, 4.00E+04, 4.50E+04)
1991		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
Justification:	[Changed]	Data from old GasSim model

Waste Breakdown

1990		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1991		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)

Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap	Composite
First Layer:	
Cap Thickness	UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity	LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:	
Cap 2 Thickness	SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity	LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications	

Cap	[Changed]	data from old GasSim model
Cap Thickness	[Changed]	data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	data from 2009/2010 GasSim model
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.5)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	data from old GasSim model
Liner Thickness	[Changed]	data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 4A

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1992		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
1993		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1994		SINGLE(0.0)
1995		SINGLE(0.0)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		SINGLE(0.0)
2009		SINGLE(0.0)
2010		TRIANGULAR(3.50E+04, 3.75E+04, 4.00E+04)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1992		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1993		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
2009		
2010		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)

2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Actual capping phasing (Potters data)
Cap Thickness	[Changed]	Data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model
Liner Thickness	[Changed]	Data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 4B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1994		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1995		TRIANGULAR(4.50E+04, 5.00E+04, 5.50E+04)
1996		SINGLE(0.0)
1997		SINGLE(0.0)
1998		SINGLE(0.0)
1999		SINGLE(0.0)
2000		SINGLE(0.0)
2001		SINGLE(0.0)
2002		SINGLE(0.0)
2003		SINGLE(0.0)
2004		SINGLE(0.0)
2005		SINGLE(0.0)
2006		SINGLE(0.0)
2007		SINGLE(0.0)
2008		SINGLE(0.0)
2009		SINGLE(0.0)
2010		SINGLE(0.0)
2011		SINGLE(0.0)
2012		SINGLE(9.30E+03)
Justification:	[Changed]	Data from old GasSim model and Potters

Waste Breakdown

1994

Domestic	TRIANGULAR(55.0, 65.0, 70.0)
Commercial	TRIANGULAR(30.0, 35.0, 45.0)

1995

Domestic	TRIANGULAR(55.0, 65.0, 70.0)
Commercial	TRIANGULAR(30.0, 35.0, 45.0)

1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

2009
2010
2011
2012

Domestic		SINGLE(40.1)
Commercial		UNIFORM(8.0, 12.0)
Residues from MRF		SINGLE(49.7)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 3.3, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(1.6, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.9, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.6, 3.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 2.60E+00, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 3.70E+00, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.9, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 1.45, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)

Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 5.45, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 3.61E+00, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Actual capping phasing (Potters data)
Cap Thickness	[Changed]	Data from old GasSim model
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model
Liner Thickness	[Changed]	Data from old GasSim model
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 5

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1996		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
1997		TRIANGULAR(6.50E+04, 7.00E+04, 7.50E+04)
Justification:	[Changed]	Potters (incl MRF residues)

Waste Breakdown

1996		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
1997		
Domestic		TRIANGULAR(55.0, 65.0, 70.0)
Commercial		TRIANGULAR(30.0, 35.0, 45.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)

1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Propane	LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol	LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S	LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S	LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene	LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane	LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)

Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Composite
First Layer:		
Cap Thickness		UNIFORM(0.7, 0.9)
Cap Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Second Layer:		
Cap 2 Thickness		SINGLE(1.00E-03)
Cap 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-12, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Single Clay
Liner Thickness		UNIFORM(0.8, 1.2)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-08)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 6

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
1998		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
1999		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2000		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
Justification:	[Changed]	Potters (incl MRF residues)

Waste Breakdown

1998		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
1999		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2000		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases		Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane		LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane		LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane		LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane		LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene		LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane		SINGLE(0.0)
1,2-Dichlorotetrafluoroethane		LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol		LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane		LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol		LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane		LOGUNIFORM(0.05, 1.5)
2-Propanol		LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)		LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone		LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile		LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic		LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)

Benzene		LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane		SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)		LOGUNIFORM(1.00E-30, 2.00E-02)
Butane		LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid		LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide		LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide		LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)		LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide		LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane		LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane		LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value

Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 7

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2000		SINGLE(0.0)
2001		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2002		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
Justification:	[Changed]	POtters (incl MRF residues)

Waste Breakdown

2000		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2001		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2002		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)

Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane		LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane		LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane		LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane		LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane		LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters

Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		
Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	Data from old GasSim model/Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 8

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2003		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2004		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2005		SINGLE(7.51E+04)
Justification:	[Changed]	Data from Potters

Waste Breakdown

2003		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2004		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2005		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)

Diethyl disulphide		LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide		LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane		LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)		LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol		LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate		LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene		LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Data from old GasSim model/Potters
Cap Thickness	[Changed]	Data from old GasSim model/Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		SINGLE(0.002)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Second Layer:		
Liner 2 Thickness		UNIFORM(0.05, 0.1)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-11, 1.00E-10)
Justifications		

Liner	[Changed]	Data from old GasSim model/Potters
Liner Thickness	[Changed]	Data from old GasSim model/Potters
Liner Hydraulic Conductivit	[Changed]	no temp cap
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

CELL 9A

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2006		SINGLE(7.51E+04)
2007		SINGLE(8.17E+04)
2008		SINGLE(0.0)
Justification:	[Changed]	Data from Potters

Waste Breakdown

2006		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2007		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2008		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)

Ethylene dibromide		SINGLE(0.0)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113		LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan		LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hexane		LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310

Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 9B

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2009		TRIANGULAR(7.00E+04, 7.50E+04, 8.00E+04)
2010		TRIANGULAR(3.50E+04, 3.75E+04, 4.00E+04)
2011		SINGLE(6.48E+04)
Justification:	[Changed]	Actual tonnages and breakdown (waste returns, Potters)

Waste Breakdown

2009		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2010		
Domestic		UNIFORM(40.0, 50.0)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		UNIFORM(40.0, 50.0)
2011		
Domestic		SINGLE(51.3)
Commercial		UNIFORM(5.0, 10.0)
Residues from MRF		SINGLE(38.1)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)

Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Hydrogen sulphide		LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene		LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury		LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)		LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)		LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone		LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Cell 9C

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year	AmountDepositied (t)
2012	SINGLE(4.00E+04)

2013		SINGLE(6.12E+04)
Justification:	[Changed]	Actual tonnages and waste breakdown (Potters waste returns)

Waste Breakdown

2012		
Domestic		SINGLE(40.1)
Commercial		UNIFORM(8.0, 12.0)
Residues from MRF		SINGLE(49.7)
2013		
Domestic		SINGLE(36.9)
Commercial		SINGLE(23.8)
Residues from MRF		SINGLE(39.3)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 0.1, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 1.0, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.0, 1.8)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 1.00E-03, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 1.00E-01, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)
Nitric acid	SINGLE(0.0)
Odour Units (Predicted)	TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)

Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 50.0, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.1)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Potters data/HRA
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)		323
Water Table (mAOD)		310
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)

Cell 9D

Infiltration		NORMAL(236.8, 23.6)
Justification:	[Changed]	Met Office data

Waste Input

Year		AmountDepositied (t)
2014		SINGLE(6.01E+04)
2015		SINGLE(1.03E+05)
2016		SINGLE(7.67E+04)
2017		TRIANGULAR(9.50E+04, 1.00E+05, 1.05E+05)
2018		TRIANGULAR(4.02E+04, 4.36E+04, 4.53E+04)
2019		TRIANGULAR(6.03E+04, 6.54E+04, 6.79E+04)
Justification:	[Changed]	Info from Potters (Actual tonnages, waste returns until end 2017; 2018 -19 tonnages estimated from remaining void to proposed profile and range of density between 0.8 and 0;9

Waste Breakdown

2014		
Domestic		SINGLE(36.0)
Commercial		SINGLE(28.2)
Residues from MRF		SINGLE(35.8)
2015		
Domestic		SINGLE(19.0)
Commercial		SINGLE(17.0)

Residues from MRF		SINGLE(64.0)
2016		
Domestic		SINGLE(25.0)
Commercial		SINGLE(15.5)
Residues from MRF		SINGLE(59.5)
2017		
Domestic		SINGLE(28.0)
Commercial		SINGLE(20.0)
Residues from MRF		SINGLE(52.0)
2018		
Domestic		UNIFORM(20.0, 30.0)
Commercial		UNIFORM(17.0, 20.0)
Residues from MRF		UNIFORM(40.0, 60.0)
2019		
Domestic		UNIFORM(20.0, 30.0)
Commercial		UNIFORM(17.0, 20.0)
Residues from MRF		UNIFORM(40.0, 60.0)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(0.002, 0.2, 2.0)
1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(0.005, 0.4, 8.0)
1,1,2-Trichloroethane	LOGTRIANGULAR(0.004, 1.0, 10.0)
1,1-Dichloroethane	LOGTRIANGULAR(0.02, 0.28, 3.9)
1,1-Dichloroethene	LOGTRIANGULAR(0.03, 2.8, 19.0)
1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.05, 0.25, 6.4)
1,2-Dichloropropane	SINGLE(0.0)
1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(0.01, 9.8, 300.0)
1-butanethiol	LOGUNIFORM(1.00E-30, 8.00E-02)
1-Chloro-1,1-difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31.0)
2-butoxy ethanol	LOGUNIFORM(1.00E-30, 5.00E-02)
2-Chloro-1,1,1-trifluoroethane	LOGUNIFORM(0.05, 1.5)
2-Propanol	LOGTRIANGULAR(0.005, 2.0, 34.0)
Acetalehyde (ethanal)	LOGTRIANGULAR(0.015, 0.038, 0.08)
Acetone	LOGTRIANGULAR(0.005, 11.0, 50.0)
Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38.0)
Arsenic	LOGTRIANGULAR(1.00E-04, 7.40E-03, 4.30E-01)
Benzene	LOGTRIANGULAR(3.1, 25.0, 73.0)
Bromodichloromethane	SINGLE(0.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butane	LOGTRIANGULAR(0.19, 6.6, 709.0)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Butyric acid	LOGTRIANGULAR(1.00E-30, 1.00E-01, 1.75E+01)
Carbon disulphide	LOGTRIANGULAR(0.015, 1.6, 3.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Carbonyl sulphide	LOGTRIANGULAR(0.006, 0.2, 4.4)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900.0)
Chloroethane	LOGTRIANGULAR(0.01, 0.023, 0.2)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chlorofluoromethane	LOGTRIANGULAR(0.008, 0.2, 110.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49.0)
Dichlorodifluoromethane	LOGTRIANGULAR(0.01, 9.0, 790.0)
Dichlorofluoromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 6.02E+02)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.20E+01, 1.52E+03)
Diethyl disulphide	LOGTRIANGULAR(1.00E-03, 2.00E-02, 2.60E+00)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 1.3, 12.0)
Dimethyl sulphide	LOGTRIANGULAR(0.005, 2.0, 3.2)
Ethane	LOGTRIANGULAR(0.005, 6.25, 200.0)
Ethanethiol (ethyl mercaptan)	LOGUNIFORM(1.00E-30, 8.00E-02)
Ethanol	LOGTRIANGULAR(0.005, 0.2, 810.0)
Ethyl butyrate	LOGUNIFORM(0.41, 42.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylbenzene	LOGTRIANGULAR(1.00E-03, 2.60E+00, 8.75E+02)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dibromide	SINGLE(0.0)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Fluorotrichloromethane	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Freon 113	LOGTRIANGULAR(0.013, 4.8, 125.0)
Furan	LOGTRIANGULAR(0.02, 0.82, 6.2)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hexane	LOGTRIANGULAR(1.00E-03, 9.60E+00, 4.40E+01)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Hydrogen sulphide	LOGTRIANGULAR(0.01, 8.3, 564.0)
Limonene	LOGTRIANGULAR(1.00E-03, 2.30E+00, 2.40E+02)
Mercury	LOGUNIFORM(1.70E-04, 1.33E-03)
Methanethiol (methyl mercaptan)	LOGUNIFORM(1.00E-30, 3.00E-01)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
Methyl ethyl ketone (2-butanone)	LOGTRIANGULAR(0.005, 0.005, 73.0)
Methyl isobutyl ketone	LOGTRIANGULAR(0.005, 0.2, 9.9)

Nitric acid		SINGLE(0.0)
Odour Units (Predicted)		TRIANGULAR(5.00E+04, 1.25E+05, 2.50E+05)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 2.5, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.002, 0.005, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Propane		LOGTRIANGULAR(1.00E-03, 1.90E+00, 1.29E+01)
Propanethiol		LOGUNIFORM(1.00E-30, 9.00E-02)
Sulphide, total simulations with H2S		LOGTRIANGULAR(1.00E-03, 2.40E+00, 5.58E+03)
Sulphide, total simulations without H2S		LOGTRIANGULAR(5.00E-04, 8.00E-03, 3.50E+00)
t-1,2-Dichloroethene		LOGTRIANGULAR(0.02, 0.24, 2.6)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 8.1, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 3.1, 88.0)
Trichlorofluoromethane		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.00E+03)
Trichlorotrifluoroethane		LOGTRIANGULAR(1.00E-03, 4.80E+00, 2.40E+01)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 3.70E+00, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Degradation rate - after change		Wet
Justification:	[Changed]	Scenario - wet MC assessment
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Clay
Cap Thickness		UNIFORM(1.0, 1.3)
Cap Hydraulic Conductivity		LOGUNIFORM(5.00E-10, 1.00E-08)
Justifications		
Cap	[Changed]	Projected capping phasing
Cap Thickness	[Changed]	Data from Potters
Cap Hydraulic Conductivity	[Changed]	Data from Potters
liner		Composite
First Layer:		
Liner Thickness		UNIFORM(0.5, 0.6)
Liner Hydraulic Conductivity		LOGUNIFORM(1.00E-10, 1.00E-09)
Second Layer:		
Liner 2 Thickness		SINGLE(0.002)
Liner 2 Hydraulic Conductivity		LOGUNIFORM(1.00E-14, 1.00E-12)
Justifications		
Liner	[Changed]	Data from Potters
Liner Thickness	[Changed]	Data from Potters
Liner Hydraulic Conductivit	[Changed]	Data from Potters
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		SINGLE(12.0)

Geosphere

Ground Surface (mAOD)	323
Water Table (mAOD)	310
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)

Site Characteristics

Proportion to CO2 [%]		TRIANGULAR(32.0, 35.5, 39.0)
Justification:	[Changed]	Typical values at BP
Proportion to CH4 [%]		TRIANGULAR(50.0, 55.0, 57.0)
Justification:	[Changed]	Typical values at BP

Cellulose Decay Rates

		Slow	Moderate	Fast
Dry		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
Average		SINGLE(0.046)	SINGLE(0.076)	SINGLE(0.116)
Wet		SINGLE(0.076)	SINGLE(0.116)	SINGLE(0.694)
Saturated		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
User Defined 1		SINGLE(0.046)	UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)
User Defined 2		UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)	UNIFORM(0.116, 0.694)
Justification:	[Default]	Default Value		

Gas Plant

CAT 3516TA		Spark Ignition Engine	
January 2003 to December 2050		300 to 600	Downtime [%]: UNIFORM(1.0, 5.0)
Justification:	[Changed]	Finnings UK	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	Finnings UK	
CAT 3516 A+		Spark Ignition Engine	
June 2013 to December 2050		300 to 600	Downtime [%]: UNIFORM(1.0, 5.0)
Justification:	[Changed]	Gwynt Cymru engine	
Destruction Efficiency CH4	[Changed]	Default	
Destruction Efficiency H2	[Changed]	Default	
Properties	[Changed]	Gwynt Cymru specification	
Organics SC750		Flare	
January 2000 to December 2012		100 to 750	Downtime [%]: NORMAL(2.0, 10.0)
Justification:	[Changed]	Organics Ltd	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	Organics Ltd	
GTS		Flare	
January 2013 to December 2132		400 to 2000	Downtime [%]: UNIFORM(3.0, 5.0)
Justification:	[Changed]	Flare specification	
Destruction Efficiency CH4	[Changed]	Not Justified	
Destruction Efficiency H2	[Changed]	Not Justified	
Properties	[Changed]	Flare specification	
Engine/Flare Order	[Changed]	Engines first	

Trace Gas Plant

1,1,1,2-Tetrafluorochloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1,1-Trichlorotrifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1,2-Trichloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichloroethene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,1-Dichlorotetrafluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,2-Dichloropropane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1,2-Dichlorotetrafluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1-butanethiol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
1-Chloro-1,1-difluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-butoxy ethanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-Chloro-1,1,1-trifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)

Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
2-Propanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acetalehyde (ethanal)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acetone		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Acrylonitrile		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Arsenic		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzo(a)pyrene		
Spark Ignition Engine:	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Dual Fuel Engine:	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(1.00E-06, 6.00E-04)
Bromodichloromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butadiene (modelled as 1,3-Butadiene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butene isomers		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butyric acid		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon monoxide		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(508.0, 1046.92, 1800.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(26.0, 49.12, 2178.0)
Carbon tetrachloride (tetrachloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbonyl sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorobenzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)

Flare:	non-combustion products	SINGLE(99.0)
Chlorodifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chloroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorofluorocarbons (CFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chloroform (trichloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorotrifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichlorodifluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichloromethane (methylene chloride)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Diethyl disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dimethyl disulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dimethyl sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dioxins and furans (modelled as 2,3,7,8-TCDD)		
Spark Ignition Engine:	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Dual Fuel Engine:	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(9.00E-09, 3.10E-08, 3.60E-07)
Ethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethanethiol (ethyl mercaptan)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethanol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethyl butyrate		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Ethyl toluene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylbenzene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene dibromide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene dichloride		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Fluorotrichloromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Formaldehyde (methanal)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Freon 113		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Furan		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Halons		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hexachlorocyclohexane (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hexane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrochlorofluorocarbons (HCFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrofluorocarbons (HFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrogen chloride, or (Total chloride (reported as HCl))		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(5.00E-04, 1.00E+01, 5.84E+02)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.5, 36.0)
Hydrogen fluoride, or (Total fluoride (reported as HF))		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(2.00E-04, 7.00E+00, 4.50E+01)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.4, 21.0)
Hydrogen sulphide		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Limonene		

Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Mercury		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methanethiol (methyl mercaptan)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl chloride (chloromethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl chloroform (1,1,1-Trichloroethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl ethyl ketone (2-butanone)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl isobutyl ketone		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Nitric acid		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Nitrogen dioxide (NO2)		
Spark Ignition Engine:	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Nitrogen monoxide (NO)		
Spark Ignition Engine:	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Nitrogen oxides (NOx)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(330.0, 435.0, 1000.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	TRIANGULAR(43.0, 78.19, 149.0)
Odour Units (Predicted)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
PAH (reported as Naphthalene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Perfluorocarbons (PFCs) (Total)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Phenol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)

Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
PM10s		
Spark Ignition Engine:	combustion products	TRIANGULAR(1.2, 4.6, 12.5)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	UNIFORM(1.0, 10.0)
Propane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Propanethiol		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphide, total simulations with H2S		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphide, total simulations without H2S		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Sulphur dioxide		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(18.0, 83.0, 402.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGTRIANGULAR(0.01, 2.81, 482.0)
t-1,2-Dichloroethene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Tetrachloroethylene (Tetrachloroethene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Toluene		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Total non-methane volatile organic compounds (NMVOCs)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(0.0118, 0.5, 90.0)
Dual Fuel Engine:	combustion products	TRIANGULAR(0.0118, 18.1, 90.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(0.1, 30.0)
Total volatile organic compounds (VOCs)		
Spark Ignition Engine:	combustion products	LOGTRIANGULAR(0.0118, 18.1, 1643.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(4.6, 10.0)
Trichlorobenzene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichloroethylene (trichloroethene)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichlorofluoromethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichlorotrifluoroethane		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trimethylbenzene (all isomers)		
Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)

Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Vinyl chloride (chloroethene, chloroethylene)

Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Xylene (all isomers)

Spark Ignition Engine:	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)

Justification: [Changed] Site specific data trace gas monitoring in Jan 2011, April 2014, December 2015 and Jan 20

Global Impact

Bulk Gases

Global Warming Potential

Carbon Dioxide [t]: 1

Methane [t carbon dioxoide]: 25

Hydrogen [t carbon dioxide]: 0

Justification: [Default] Default Value

Ozone Depletion Potential

Carbon Dioxide [t trichlorofluoromethane]: 0

Methane [t trichlorofluoromethane]: 0

Hydrogen [t trichlorofluoromethane]: 0

Justification: [Default] Default Value

Trace Gases

Gas	Global Warming Potential	Ozone Depletion Potential
1,1,1,2-Tetrafluorochloroethane	609	0.02
1,1,1-Trichlorotrifluoroethane	6130	1
1,1,2-Trichloroethane	0	0
1,1-Dichloroethane	0	0
1,1-Dichloroethene	0	0
1,1-Dichlorotetrafluoroethane	10000	0.94
1,2-Dichloropropane	0	0
1,2-Dichlorotetrafluoroethane	0	0
1-butanethiol	0	0
1-Chloro-1,1-difluoroethane	2310	0.07
2-butoxy ethanol	0	0
2-Chloro-1,1,1-trifluoroethane	0	0
2-Propanol	0	0
Acetalehyde (ethanal)	1.3	0
Acetone	0.5	0
Acrylonitrile	0	0
Arsenic	0	0
Benzene	0	0
Benzo(a)pyrene	0	0
Bromodichloromethane	1300	1890
Butadiene (modelled as 1,3-Butadiene)	0	0
Butane	4	0
Butene isomers	0	0
Butyric acid	0	0
Carbon disulphide	0	0
Carbon monoxide	0	0
Carbon tetrachloride (tetrachloromethane)	1400	0.73
Carbonyl sulphide	0	0
Chlorobenzene	0	0
Chlorodifluoromethane	1810	0.05
Chloroethane	0	0
Chlorofluorocarbons (CFCs) (Total)	0	0
Chlorofluoromethane	0	0
Chloroform (trichloromethane)	30	0
Chlorotrifluoromethane	14400	0
Dichlorodifluoromethane	10900	1
Dichlorofluoromethane	210	0
Dichloromethane (methylene chloride)	9	0
Diethyl disulphide	0	0
Dimethyl disulphide	0	0
Dimethyl sulphide	0	0
Dioxins and furans (modelled as 2,3,7,8-TCDD)	0	0
Ethane	5.5	0
Ethanethiol (ethyl mercaptan)	0	0
Ethanol	0	0
Ethyl butyrate	0	0
Ethyl toluene (all isomers)	0	0
Ethylbenzene	0	0
Ethylene	3.7	0
Ethylene dibromide	0	0
Ethylene dichloride	0	0
Fluorotrichloromethane	4750	1
Formaldehyde (methanal)	0	0
Freon 113	6130	1
Furan	0	0
Halons	0	0
Hexachlorocyclohexane (all isomers)	0	0

Hexane	0	0
Hydrochlorofluorocarbons (HCFCs) (Total	0	0
Hydrofluorocarbons (HFCs) (Total)	0	0
Hydrogen chloride, or (Total chloride (reported as HCl))	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF))	0	0
Hydrogen sulphide	0	0
Limonene	0	0
Mercury	0	0
Methanethiol (methyl mercaptan)	0	0
Methyl chloride (chloromethane)	146	0
Methyl chloroform (1,1,1-Trichloroethane)	0	0
Methyl ethyl ketone (2-butanone)	0	0
Methyl isobutyl ketone	0	0
Nitric acid	0	0
Nitrogen dioxide (NO2)	0	0
Nitrogen monoxide (NO)	0	0
Nitrogen oxides (NOx)	0	0
Odour Units (Predicted)	0	0
PAH (reported as Naphthalene)	0	0
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	0	0
Pentane	0	0
Pentene (all isomers)	0	0
Perfluorocarbons (PFCs) (Total)	0	0
Phenol	0	0
PM10s	0	0
Propane	3.3	0
Propanethiol	0	0
Sulphide, total simulations with H2S	0	0
Sulphide, total simulations without H2S	0	0
Sulphur dioxide	0	0
t-1,2-Dichloroethene	0	0
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	0	0
Tetrachloroethylene (Tetrachloroethene)	0	0
Toluene	2.7	0
Total non-methane volatile organic compounds (NMVOCs)	0	0
Total volatile organic compounds (VOCs)	0	0
Trichlorobenzene (all isomers)	0	0
Trichloroethylene (trichloroethene)	0	0
Trichlorofluoromethane	4750	1
Trichlorotrifluoroethane	6130	1
Trimethylbenzene (all isomers)	0	0
Vinyl chloride (chloroethene, chloroethylene)	0	0
Xylene (all isomers)	0	0

Lateral Migration

Bulk Gases

Air Diffusion Coefficients		
CO2 Dispersivity		SINGLE(0.1613)
CH4 Dispersivity		SINGLE(0.2192)
H2 Dispersivity		#UNDEFINED?
Justification:	[Default]	Default Value

Geosphere

Cell	Cell 1
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 2
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3a
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3B
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 3C
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 4A
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 4B
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 5
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 6
Geosphere Moisture Content	UNIFORM(20.0, 30.0)
Geosphere Porosity	LOGUNIFORM(0.5, 10.0)
Cell	Cell 7

Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Cell		Cell 8
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Cell		CELL 9A
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Cell		Cell 9B
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Cell		Cell 9C
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Cell		Cell 9D
Geosphere Moisture Content		UNIFORM(20.0, 30.0)
Geosphere Porosity		LOGUNIFORM(0.5, 10.0)
Justification:	[Changed]	Geosphere properties interpreted as per HRA for Bryn Posteg, reflecting migration through fractures rather than intergranular migration

Trace Gases

Gas	Air Diffusion Coefficient
1,1,1,2-Tetrafluorochloroethane	SINGLE(0.071)
1,1,1-Trichlorotrifluoroethane	#UNDEFINED?
1,1,2-Trichloroethane	#UNDEFINED?
1,1-Dichloroethane	SINGLE(0.0742)
1,1-Dichloroethene	#UNDEFINED?
1,1-Dichlorotetrafluoroethane	#UNDEFINED?
1,2-Dichloropropane	#UNDEFINED?
1,2-Dichlorotetrafluoroethane	#UNDEFINED?
1-butanethiol	#UNDEFINED?
1-Chloro-1,1-difluoroethane	#UNDEFINED?
2-butoxy ethanol	#UNDEFINED?
2-Chloro-1,1,1-trifluoroethane	#UNDEFINED?
2-Propanol	#UNDEFINED?
Acetalehyde (ethanal)	SINGLE(0.1235)
Acetone	#UNDEFINED?
Acrylonitrile	#UNDEFINED?
Arsenic	#UNDEFINED?
Benzene	SINGLE(0.088)
Benzo(a)pyrene	SINGLE(0.043)
Bromodichloromethane	#UNDEFINED?
Butadiene (modelled as 1,3-Butadiene)	SINGLE(0.102)
Butane	#UNDEFINED?
Butene isomers	SINGLE(0.0977)
Butyric acid	#UNDEFINED?
Carbon disulphide	SINGLE(0.108)
Carbon monoxide	SINGLE(0.2013)
Carbon tetrachloride (tetrachloromethane)	SINGLE(0.078)
Carbonyl sulphide	#UNDEFINED?
Chlorobenzene	SINGLE(0.073)
Chlorodifluoromethane	#UNDEFINED?
Chloroethane	SINGLE(0.1085)
Chlorofluorocarbons (CFCs) (Total)	SINGLE(0.0826)
Chlorofluoromethane	#UNDEFINED?
Chloroform (trichloromethane)	SINGLE(0.104)
Chlorotrifluoromethane	#UNDEFINED?
Dichlorodifluoromethane	#UNDEFINED?
Dichlorofluoromethane	#UNDEFINED?
Dichloromethane (methylene chloride)	SINGLE(0.099)
Diethyl disulphide	#UNDEFINED?
Dimethyl disulphide	SINGLE(0.0898)
Dimethyl sulphide	SINGLE(0.0898)
Dioxins and furans (modelled as 2,3,7,8-TCDD)	SINGLE(0.104)
Ethane	#UNDEFINED?
Ethanethiol (ethyl mercaptan)	#UNDEFINED?
Ethanol	#UNDEFINED?
Ethyl butyrate	#UNDEFINED?
Ethyl toluene (all isomers)	SINGLE(0.0796)
Ethylbenzene	#UNDEFINED?
Ethylene	SINGLE(0.0796)
Ethylene dibromide	#UNDEFINED?
Ethylene dichloride	SINGLE(0.104)
Fluorotrichloromethane	#UNDEFINED?
Formaldehyde (methanal)	SINGLE(0.1591)
Freon 113	#UNDEFINED?
Furan	#UNDEFINED?
Halons	SINGLE(0.0754)
Hexachlorocyclohexane (all isomers)	#UNDEFINED?
Hexane	#UNDEFINED?
Hydrochlorofluorocarbons (HCFCs) (Total	SINGLE(0.0967)
Hydrofluorocarbons (HFCs) (Total)	#UNDEFINED?
Hydrogen chloride, or (Total chloride (reported as HCl))	SINGLE(0.1763)
Hydrogen fluoride, or (Total fluoride (reported as HF))	SINGLE(0.2081)

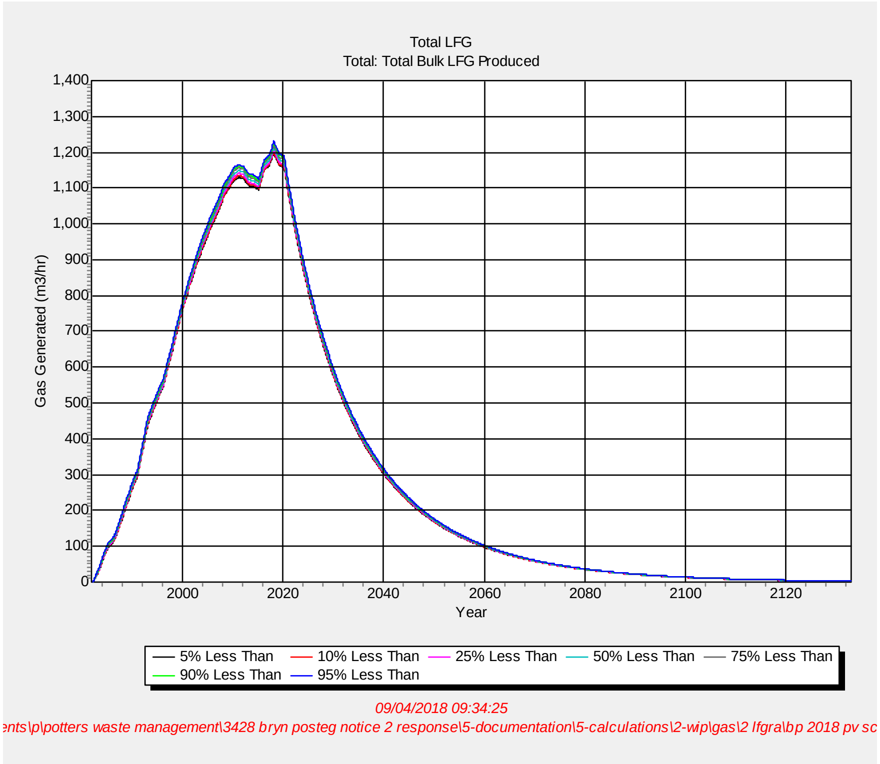
Hydrogen sulphide	SINGLE(0.1623)
Limonene	#UNDEFINED?
Mercury	#UNDEFINED?
Methanethiol (methyl mercaptan)	#UNDEFINED?
Methyl chloride (chloromethane)	SINGLE(0.1724)
Methyl chloroform (1,1,1-Trichloroethane)	SINGLE(0.078)
Methyl ethyl ketone (2-butanone)	#UNDEFINED?
Methyl isobutyl ketone	#UNDEFINED?
Nitric acid	#UNDEFINED?
Nitrogen dioxide (NO2)	SINGLE(0.2276)
Nitrogen monoxide (NO)	SINGLE(0.2276)
Nitrogen oxides (NOx)	SINGLE(0.2276)
Odour Units (Predicted)	#UNDEFINED?
PAH (reported as Naphthalene)	SINGLE(0.059)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	SINGLE(0.069)
Pentane	SINGLE(0.1999)
Pentene (all isomers)	SINGLE(0.1999)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.071)
Phenol	#UNDEFINED?
PM10s	#UNDEFINED?
Propane	#UNDEFINED?
Propanethiol	#UNDEFINED?
Sulphide, total simulations with H2S	#UNDEFINED?
Sulphide, total simulations without H2S	#UNDEFINED?
Sulphur dioxide	SINGLE(0.1289)
t-1,2-Dichloroethene	#UNDEFINED?
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	SINGLE(0.071)
Tetrachloroethylene (Tetrachloroethene)	SINGLE(0.072)
Toluene	SINGLE(0.087)
Total non-methane volatile organic compounds (NMVOCs)	#UNDEFINED?
Total volatile organic compounds (VOCs)	#UNDEFINED?
Trichlorobenzene (all isomers)	SINGLE(0.03)
Trichloroethylene (trichloroethene)	SINGLE(0.079)
Trichlorofluoromethane	#UNDEFINED?
Trichlorotrifluoroethane	#UNDEFINED?
Trimethylbenzene (all isomers)	SINGLE(0.0619)
Vinyl chloride (chloroethene, chloroethylene)	SINGLE(0.1126)
Xylene (all isomers)	SINGLE(0.0684)
Justification: [Default]	Default Value

APPENDIX 2

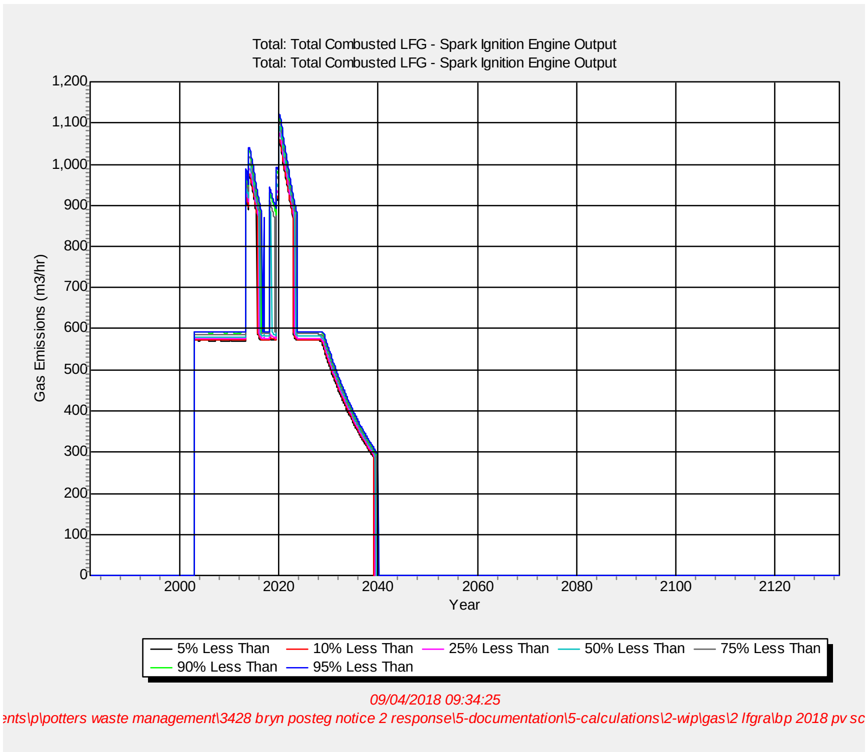
Graphs showing GasSim results

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS

Scenario 1 Results

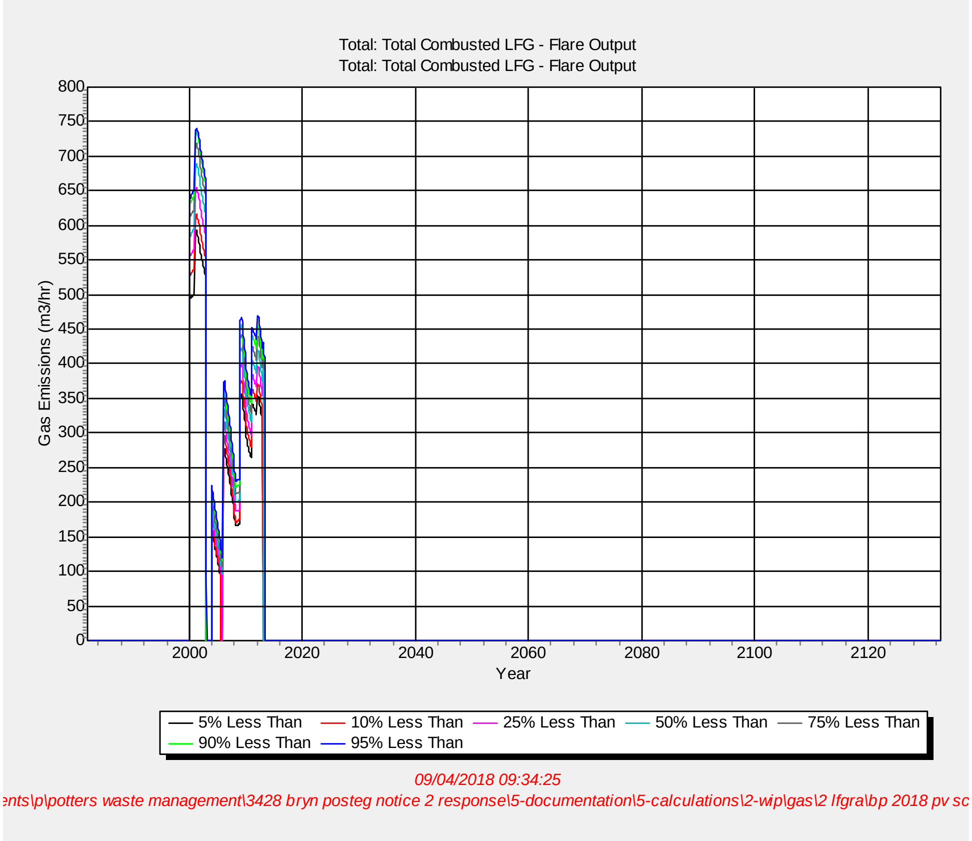


Graph 1: Total bulk landfill gas generation rates

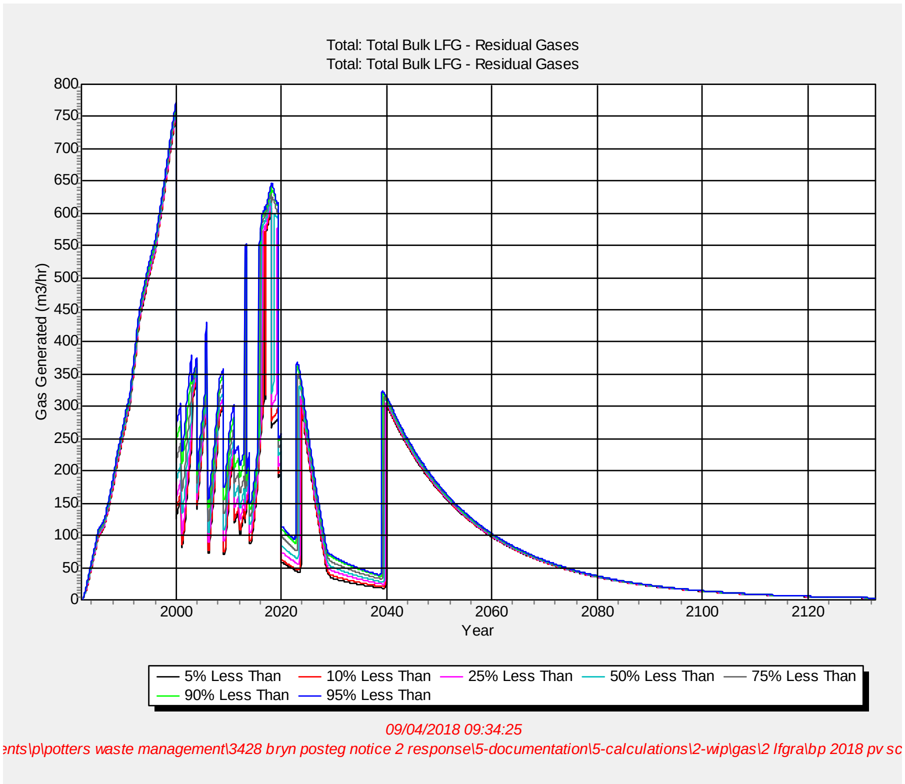


Graph 2: Total bulk landfill gas combusted by the engines

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS

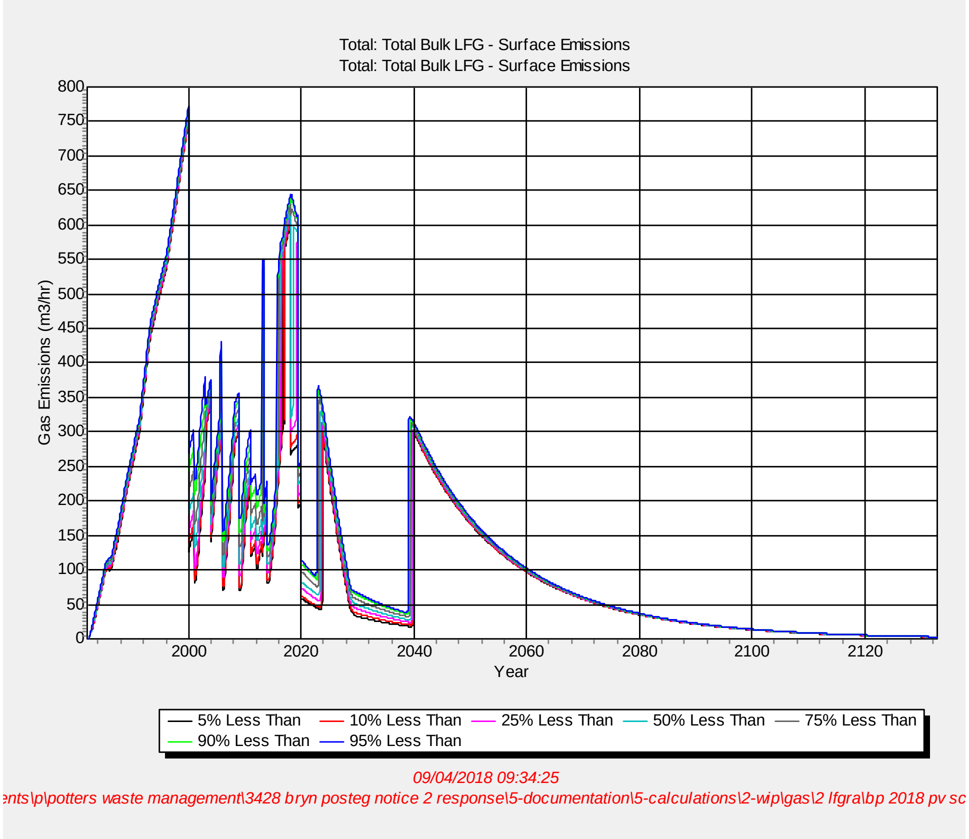


Graph 3: Total bulk landfill gas combusted by the flare

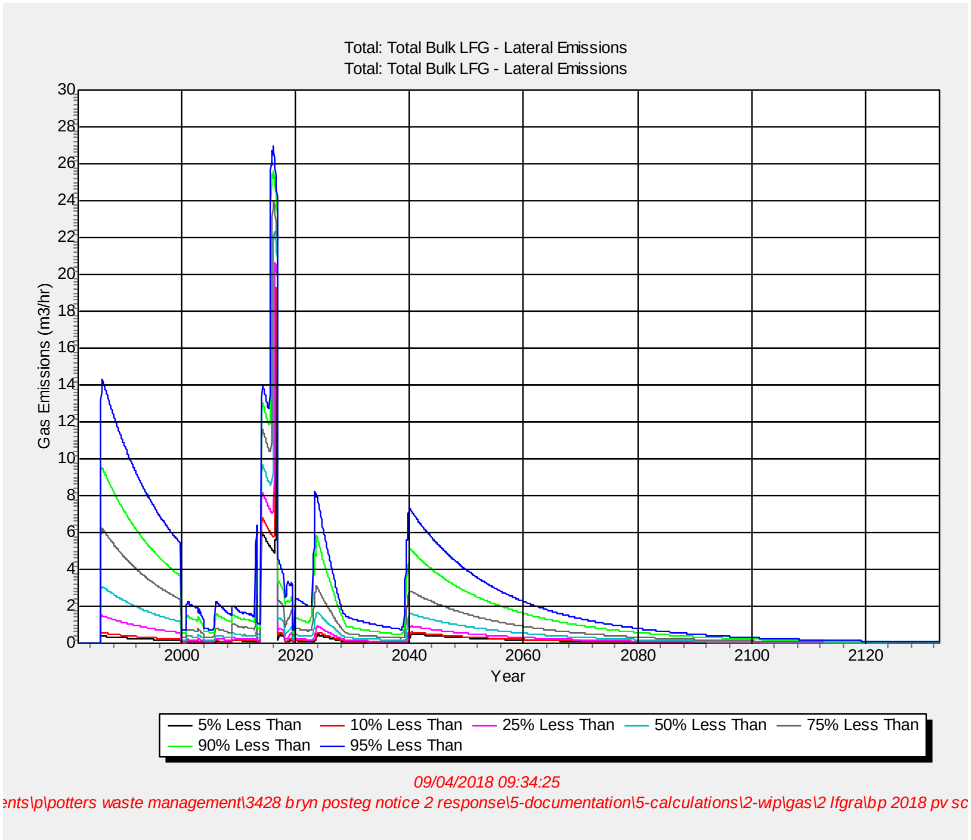


Graph 4: Residual landfill gas (total bulk landfill gas)

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS



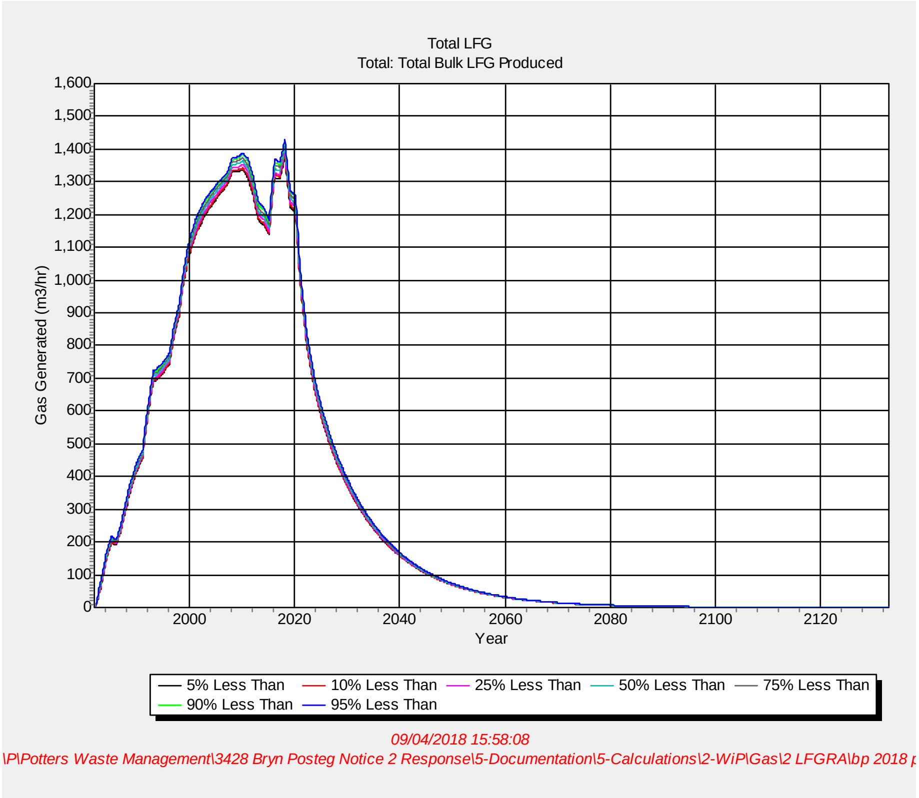
Graph 5: Surface emissions (total bulk landfill gas)



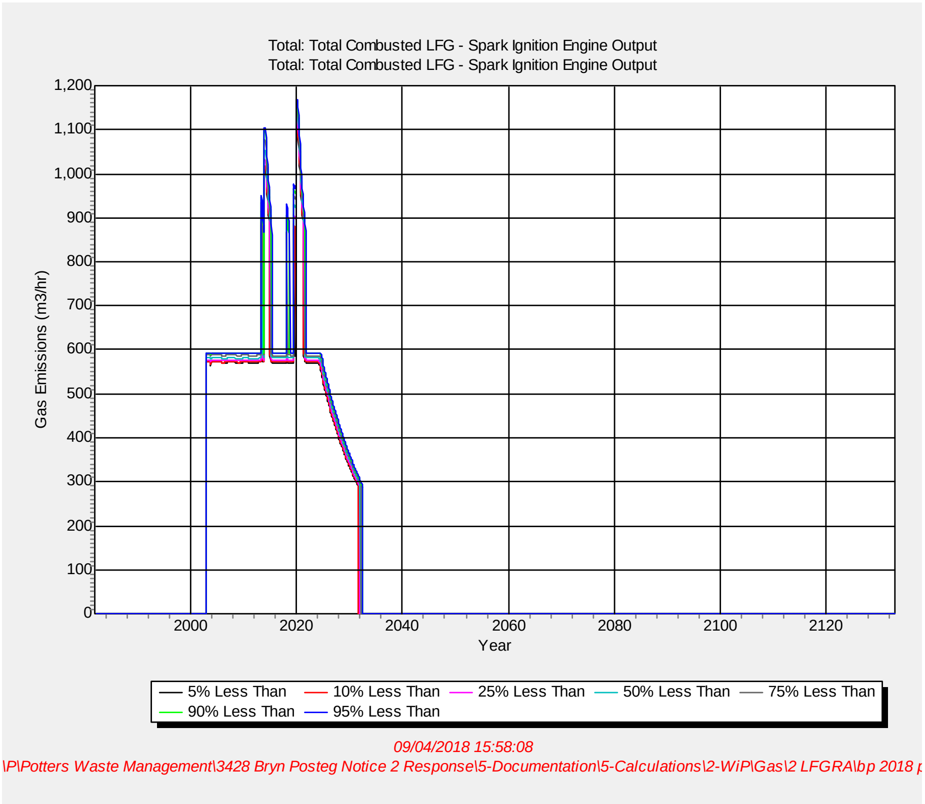
Graph 6: Lateral emissions (total bulk landfill gas)

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS

Scenario 2 Landfill Gas Generation Curve

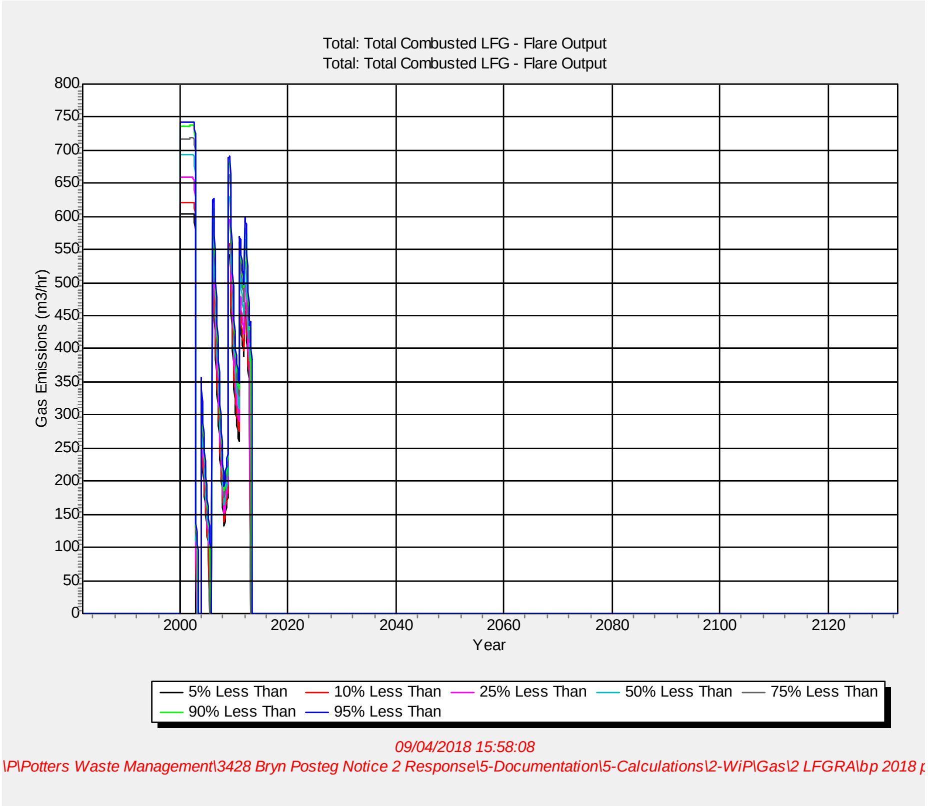


Graph 7: Total bulk landfill gas generation rates

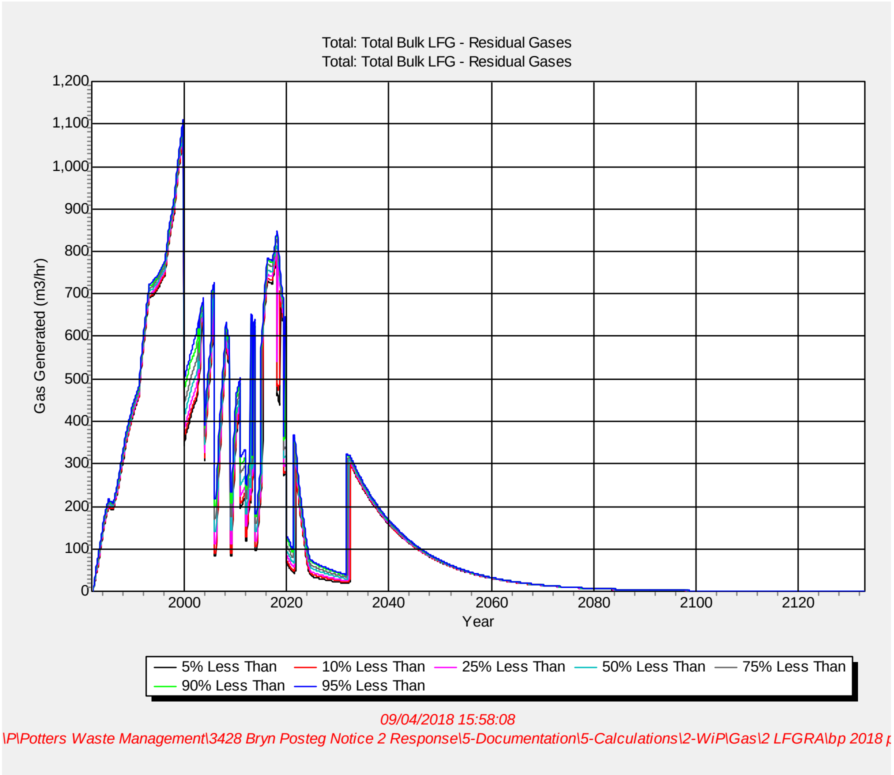


Graph 8: Total bulk landfill gas combusted by the engines

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS

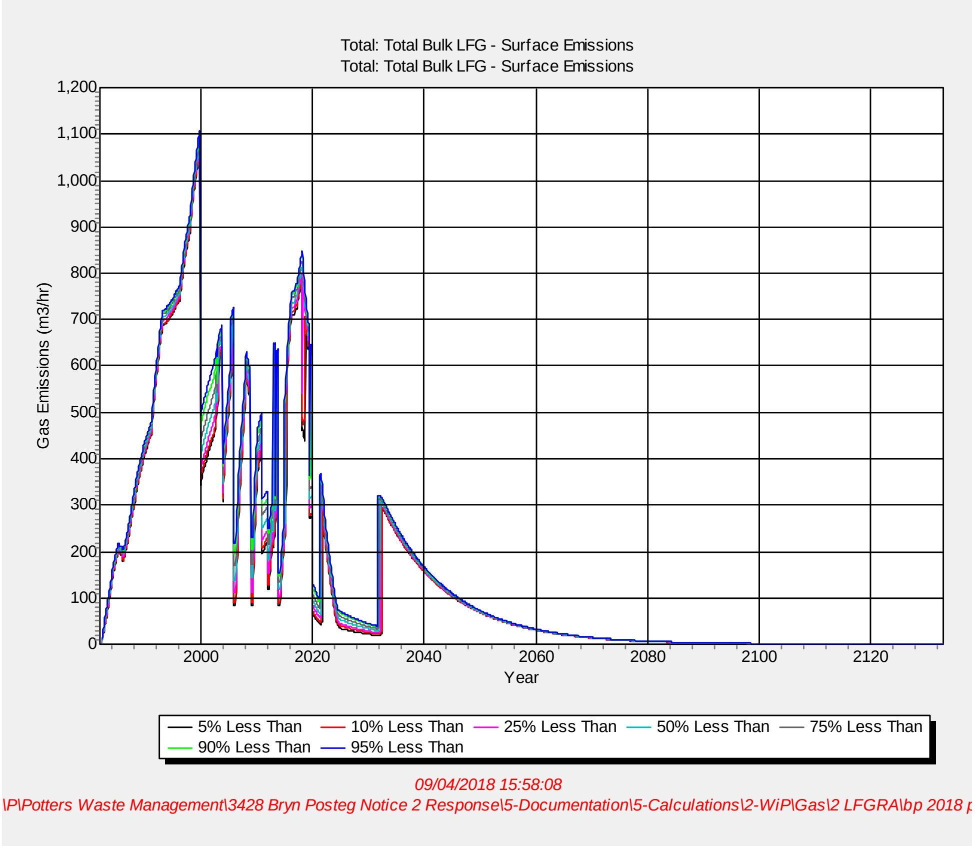


Graph 9: Total bulk landfill gas combusted by the flare

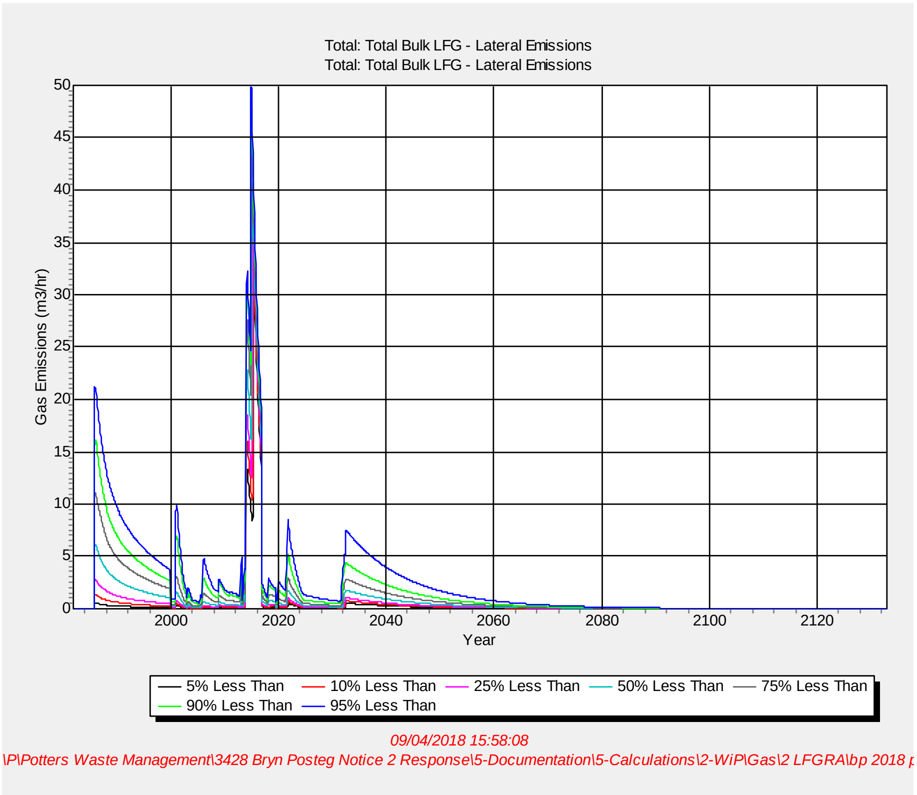


Graph 10: Residual landfill gas (total bulk landfill gas)

APPENDIX 2 – LANDFILL GAS GENERATION RATE AND OUTPUTS



Graph 11: Surface emissions (total bulk landfill gas)



Graph 12: Lateral emissions (total bulk landfill gas)

APPENDIX 3

Print out of Tier 1 modelling

Year of Interest: All

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Acrylonitrile - surface	1997	264	8.8	0
Acrylonitrile - surface	1998	264	8.8	0
Acrylonitrile - surface	1999	264	8.8	0
Acrylonitrile - surface	2008	264	8.8	0
Acrylonitrile - surface	2017	264	8.8	0
Acrylonitrile - surface	2018	264	8.8	0
Arsenic - surface	1982	0.003	0	0
Arsenic - surface	1983	0.003	0	0
Arsenic - surface	1984	0.003	0	0
Arsenic - surface	1985	0.003	0	0
Arsenic - surface	1986	0.003	0	0
Arsenic - surface	1987	0.003	0	0
Arsenic - surface	1988	0.003	0	0
Arsenic - surface	1989	0.003	0	0
Arsenic - surface	1990	0.003	0	0
Arsenic - surface	1991	0.003	0	0
Arsenic - surface	1992	0.003	0	0
Arsenic - surface	1993	0.003	0	0
Arsenic - surface	1994	0.003	0	0
Arsenic - surface	1995	0.003	0	0
Arsenic - surface	1996	0.003	0	0
Arsenic - surface	1997	0.003	0	0
Arsenic - surface	1998	0.003	0	0
Arsenic - surface	1999	0.003	0	0
Arsenic - surface	2000	0.003	0	0
Arsenic - surface	2001	0.003	0	0
Arsenic - surface	2002	0.003	0	0
Arsenic - surface	2003	0.003	0	0

	Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Arsenic - surface 2004	0.003	0	0
Arsenic - surface 2005	0.003	0	0
Arsenic - surface 2006	0.003	0	0
Arsenic - surface 2007	0.003	0	0
Arsenic - surface 2008	0.003	0	0
Arsenic - surface 2009	0.003	0	0
Arsenic - surface 2010	0.003	0	0
Arsenic - surface 2011	0.003	0	0
Arsenic - surface 2012	0.003	0	0
Arsenic - surface 2013	0.003	0	0
Arsenic - surface 2014	0.003	0	0
Arsenic - surface 2015	0.003	0	0
Arsenic - surface 2016	0.003	0	0
Arsenic - surface 2017	0.003	0	0
Arsenic - surface 2018	0.003	0	0
Arsenic - surface 2019	0.003	0	0
Arsenic - surface 2020	0.003	0	0
Arsenic - surface 2021	0.003	0	0
Arsenic - surface 2022	0.003	0	0
Arsenic - surface 2023	0.003	0	0
Arsenic - surface 2024	0.003	0	0
Arsenic - surface 2025	0.003	0	0
Arsenic - surface 2026	0.003	0	0
Arsenic - surface 2027	0.003	0	0
Arsenic - surface 2028	0.003	0	0
Arsenic - surface 2029	0.003	0	0
Arsenic - surface 2030	0.003	0	0
Arsenic - surface 2031	0.003	0	0
Arsenic - surface 2032	0.003	0	0
Arsenic - surface 2033	0.003	0	0
Arsenic - surface 2039	0.003	0	0
Arsenic - surface 2040	0.003	0	0
Arsenic - surface 2041	0.003	0	0
Arsenic - surface 2042	0.003	0	0
Arsenic - surface 2043	0.003	0	0
Arsenic - surface 2044	0.003	0	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Arsenic - surface	2045	0.003	0	0
Benzene - surface	1983	0	5	0
Benzene - surface	1984	0	5	0
Benzene - surface	1985	0	5	0
Benzene - surface	1986	0	5	0
Benzene - surface	1987	0	5	0
Benzene - surface	1988	0	5	0
Benzene - surface	1989	0	5	0
Benzene - surface	1990	0	5	0
Benzene - surface	1991	0	5	0
Benzene - surface	1992	0	5	0
Benzene - surface	1993	0	5	0
Benzene - surface	1994	0	5	0
Benzene - surface	1995	0	5	0
Benzene - surface	1996	0	5	0
Benzene - surface	1997	0	5	0
Benzene - surface	1998	0	5	0
Benzene - surface	1999	0	5	0
Benzene - surface	2000	0	5	0
Benzene - surface	2001	0	5	0
Benzene - surface	2002	0	5	0
Benzene - surface	2003	0	5	0
Benzene - surface	2004	0	5	0
Benzene - surface	2005	0	5	0
Benzene - surface	2006	0	5	0
Benzene - surface	2007	0	5	0
Benzene - surface	2008	0	5	0
Benzene - surface	2009	0	5	0
Benzene - surface	2010	0	5	0
Benzene - surface	2011	0	5	0
Benzene - surface	2012	0	5	0
Benzene - surface	2013	0	5	0
Benzene - surface	2014	0	5	0
Benzene - surface	2015	0	5	0
Benzene - surface	2016	0	5	0
Benzene - surface	2017	0	5	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Benzene - surface	2018	0	5	0
Benzene - surface	2019	0	5	0
Benzene - surface	2023	0	5	0
Benzene - surface	2024	0	5	0
Benzene - surface	2025	0	5	0
Benzo(a)pyrene - flare	2000	0	0.00025	0
Benzo(a)pyrene - flare	2001	0	0.00025	0
Benzo(a)pyrene - flare	2002	0	0.00025	0
Benzo(a)pyrene - flare	2006	0	0.00025	0
Benzo(a)pyrene - flare	2007	0	0.00025	0
Benzo(a)pyrene - flare	2008	0	0.00025	0
Benzo(a)pyrene - flare	2009	0	0.00025	0
Benzo(a)pyrene - flare	2010	0	0.00025	0
Benzo(a)pyrene - flare	2011	0	0.00025	0
Benzo(a)pyrene - flare	2012	0	0.00025	0
Carbon monoxide - engine	2014	10000	0	0
Carbon monoxide - engine	2015	10000	0	0
Carbon monoxide - engine	2020	10000	0	0
Carbon monoxide - engine	2021	10000	0	0
Carbon monoxide - engine	2022	10000	0	0
Ethylene dichloride - surface	1986	700	42	0
Ethylene dichloride - surface	1987	700	42	0
Ethylene dichloride - surface	1988	700	42	0
Ethylene dichloride - surface	1989	700	42	0
Ethylene dichloride - surface	1990	700	42	0
Ethylene dichloride - surface	1991	700	42	0
Ethylene dichloride - surface	1992	700	42	0
Ethylene dichloride - surface	1993	700	42	0
Ethylene dichloride - surface	1994	700	42	0
Ethylene dichloride - surface	1995	700	42	0
Ethylene dichloride - surface	1996	700	42	0
Ethylene dichloride - surface	1997	700	42	0
Ethylene dichloride - surface	1998	700	42	0
Ethylene dichloride - surface	1999	700	42	0
Ethylene dichloride - surface	2002	700	42	0
Ethylene dichloride - surface	2003	700	42	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Ethylene dichloride - surface	2004	700	42	0
Ethylene dichloride - surface	2005	700	42	0
Ethylene dichloride - surface	2008	700	42	0
Ethylene dichloride - surface	2016	700	42	0
Ethylene dichloride - surface	2017	700	42	0
Ethylene dichloride - surface	2018	700	42	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2014	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2015	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2020	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2021	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2022	750	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2000	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2001	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2002	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2003	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2004	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2005	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2006	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2006	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2007	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2008	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2009	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2009	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2010	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2010	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2011	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2011	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2012	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2012	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2013	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2014	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2015	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2016	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2017	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2018	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2019	160	16	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2020	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2021	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2022	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2023	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2024	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2025	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2026	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2027	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2028	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2029	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2030	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2031	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2032	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2033	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2034	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2035	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2036	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2037	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2038	160	16	0
Hydrogen sulphide - surface	1986	150	140	0
Hydrogen sulphide - surface	1987	150	140	0
Hydrogen sulphide - surface	1988	150	140	0
Hydrogen sulphide - surface	1989	150	140	0
Hydrogen sulphide - surface	1990	150	140	0
Hydrogen sulphide - surface	1991	150	140	0
Hydrogen sulphide - surface	1992	150	140	0
Hydrogen sulphide - surface	1993	150	140	0
Hydrogen sulphide - surface	1994	150	140	0
Hydrogen sulphide - surface	1995	150	140	0
Hydrogen sulphide - surface	1996	150	140	0
Hydrogen sulphide - surface	1997	150	140	0
Hydrogen sulphide - surface	1998	150	140	0
Hydrogen sulphide - surface	1999	150	140	0
Hydrogen sulphide - surface	2000	150	140	0
Hydrogen sulphide - surface	2001	150	140	0
Hydrogen sulphide - surface	2002	150	140	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Hydrogen sulphide - surface	2003	150	140	0
Hydrogen sulphide - surface	2004	150	140	0
Hydrogen sulphide - surface	2005	150	140	0
Hydrogen sulphide - surface	2007	150	140	0
Hydrogen sulphide - surface	2008	150	140	0
Hydrogen sulphide - surface	2010	150	140	0
Hydrogen sulphide - surface	2011	150	140	0
Hydrogen sulphide - surface	2013	150	140	0
Hydrogen sulphide - surface	2015	150	140	0
Hydrogen sulphide - surface	2016	150	140	0
Hydrogen sulphide - surface	2017	150	140	0
Hydrogen sulphide - surface	2018	150	140	0
Hydrogen sulphide - surface	2019	150	140	0
Nitrogen oxides (NOx) - flare	2000	200	40	4.30145
Nitrogen oxides (NOx) - flare	2001	200	40	4.30145
Nitrogen oxides (NOx) - flare	2002	200	40	4.30145
Nitrogen oxides (NOx) - engine	2003	200	40	4.30145
Nitrogen oxides (NOx) - engine	2004	200	40	4.30145
Nitrogen oxides (NOx) - flare	2004	200	40	4.30145
Nitrogen oxides (NOx) - engine	2005	200	40	4.30145
Nitrogen oxides (NOx) - engine	2006	200	40	4.30145
Nitrogen oxides (NOx) - flare	2006	200	40	4.30145
Nitrogen oxides (NOx) - engine	2007	200	40	4.30145
Nitrogen oxides (NOx) - flare	2007	200	40	4.30145
Nitrogen oxides (NOx) - engine	2008	200	40	4.30145
Nitrogen oxides (NOx) - flare	2008	200	40	4.30145
Nitrogen oxides (NOx) - engine	2009	200	40	4.30145
Nitrogen oxides (NOx) - flare	2009	200	40	4.30145
Nitrogen oxides (NOx) - engine	2010	200	40	4.30145
Nitrogen oxides (NOx) - flare	2010	200	40	4.30145
Nitrogen oxides (NOx) - engine	2011	200	40	4.30145
Nitrogen oxides (NOx) - flare	2011	200	40	4.30145
Nitrogen oxides (NOx) - engine	2012	200	40	4.30145
Nitrogen oxides (NOx) - flare	2012	200	40	4.30145
Nitrogen oxides (NOx) - engine	2013	200	40	4.30145
Nitrogen oxides (NOx) - engine	2014	200	40	4.30145

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Nitrogen oxides (NOx) - engine	2015	200	40	4.30145
Nitrogen oxides (NOx) - engine	2016	200	40	4.30145
Nitrogen oxides (NOx) - engine	2017	200	40	4.30145
Nitrogen oxides (NOx) - engine	2018	200	40	4.30145
Nitrogen oxides (NOx) - engine	2019	200	40	4.30145
Nitrogen oxides (NOx) - engine	2020	200	40	4.30145
Nitrogen oxides (NOx) - engine	2021	200	40	4.30145
Nitrogen oxides (NOx) - engine	2022	200	40	4.30145
Nitrogen oxides (NOx) - engine	2023	200	40	4.30145
Nitrogen oxides (NOx) - engine	2024	200	40	4.30145
Nitrogen oxides (NOx) - engine	2025	200	40	4.30145
Nitrogen oxides (NOx) - engine	2026	200	40	4.30145
Nitrogen oxides (NOx) - engine	2027	200	40	4.30145
Nitrogen oxides (NOx) - engine	2028	200	40	4.30145
Nitrogen oxides (NOx) - engine	2029	200	40	4.30145
Nitrogen oxides (NOx) - engine	2030	200	40	4.30145
Nitrogen oxides (NOx) - engine	2031	200	40	4.30145
Nitrogen oxides (NOx) - engine	2032	200	40	4.30145
Nitrogen oxides (NOx) - engine	2033	200	40	4.30145
Nitrogen oxides (NOx) - engine	2034	200	40	4.30145
Nitrogen oxides (NOx) - engine	2035	200	40	4.30145
Nitrogen oxides (NOx) - engine	2036	200	40	4.30145
Nitrogen oxides (NOx) - engine	2037	200	40	4.30145
Nitrogen oxides (NOx) - engine	2038	200	40	4.30145
Nitrogen oxides (NOx) - engine	2039	200	40	4.30145
Nitrogen oxides (NOx) - engine	2040	200	40	4.30145
PM10s 24 hour - flare	2000	50		8.56818
PM10s 24 hour - flare	2001	50		8.56818
PM10s 24 hour - flare	2002	50		8.56818
PM10s 24 hour - flare	2009	50		8.56818
PM10s 24 hour - flare	2011	50		8.56818
PM10s 24 hour - flare	2012	50		8.56818
PM10s 24 hour - engine	2014	50		8.56818
PM10s - engine	2020	0	40	8.56818
PM10s 24 hour - engine	2020	50		8.56818
PM10s 24 hour - engine	2021	50		8.56818

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide - flare	2000	350	0	0
Sulphur dioxide 15 min - flare	2000	266		0
Sulphur dioxide 24 hour - flare	2000	125		0
Sulphur dioxide - flare	2001	350	0	0
Sulphur dioxide 15 min - flare	2001	266		0
Sulphur dioxide 24 hour - flare	2001	125		0
Sulphur dioxide - flare	2002	350	0	0
Sulphur dioxide 15 min - flare	2002	266		0
Sulphur dioxide 24 hour - flare	2002	125		0
Sulphur dioxide - engine	2003	350	0	0
Sulphur dioxide 15 min - engine	2003	266		0
Sulphur dioxide 24 hour - engine	2003	125		0
Sulphur dioxide - engine	2004	350	0	0
Sulphur dioxide 15 min - engine	2004	266		0
Sulphur dioxide 24 hour - engine	2004	125		0
Sulphur dioxide - engine	2005	350	0	0
Sulphur dioxide 15 min - engine	2005	266		0
Sulphur dioxide 24 hour - engine	2005	125		0
Sulphur dioxide - engine	2006	350	0	0
Sulphur dioxide 15 min - engine	2006	266		0
Sulphur dioxide 24 hour - engine	2006	125		0
Sulphur dioxide 15 min - flare	2006	266		0
Sulphur dioxide 24 hour - flare	2006	125		0
Sulphur dioxide - engine	2007	350	0	0
Sulphur dioxide 15 min - engine	2007	266		0
Sulphur dioxide 24 hour - engine	2007	125		0
Sulphur dioxide 15 min - flare	2007	266		0
Sulphur dioxide 24 hour - flare	2007	125		0
Sulphur dioxide - engine	2008	350	0	0
Sulphur dioxide 15 min - engine	2008	266		0
Sulphur dioxide 24 hour - engine	2008	125		0
Sulphur dioxide - engine	2009	350	0	0
Sulphur dioxide 15 min - engine	2009	266		0
Sulphur dioxide 24 hour - engine	2009	125		0
Sulphur dioxide - flare	2009	350	0	0
Sulphur dioxide 15 min - flare	2009	266		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide 24 hour - flare	2009	125		0
Sulphur dioxide - engine	2010	350	0	0
Sulphur dioxide 15 min - engine	2010	266		0
Sulphur dioxide 24 hour - engine	2010	125		0
Sulphur dioxide 15 min - flare	2010	266		0
Sulphur dioxide 24 hour - flare	2010	125		0
Sulphur dioxide - engine	2011	350	0	0
Sulphur dioxide 15 min - engine	2011	266		0
Sulphur dioxide 24 hour - engine	2011	125		0
Sulphur dioxide - flare	2011	350	0	0
Sulphur dioxide 15 min - flare	2011	266		0
Sulphur dioxide 24 hour - flare	2011	125		0
Sulphur dioxide - engine	2012	350	0	0
Sulphur dioxide 15 min - engine	2012	266		0
Sulphur dioxide 24 hour - engine	2012	125		0
Sulphur dioxide - flare	2012	350	0	0
Sulphur dioxide 15 min - flare	2012	266		0
Sulphur dioxide 24 hour - flare	2012	125		0
Sulphur dioxide - engine	2013	350	0	0
Sulphur dioxide 15 min - engine	2013	266		0
Sulphur dioxide 24 hour - engine	2013	125		0
Sulphur dioxide - engine	2014	350	0	0
Sulphur dioxide 15 min - engine	2014	266		0
Sulphur dioxide 24 hour - engine	2014	125		0
Sulphur dioxide - engine	2015	350	0	0
Sulphur dioxide 15 min - engine	2015	266		0
Sulphur dioxide 24 hour - engine	2015	125		0
Sulphur dioxide - engine	2016	350	0	0
Sulphur dioxide 15 min - engine	2016	266		0
Sulphur dioxide 24 hour - engine	2016	125		0
Sulphur dioxide - engine	2017	350	0	0
Sulphur dioxide 15 min - engine	2017	266		0
Sulphur dioxide 24 hour - engine	2017	125		0
Sulphur dioxide - engine	2018	350	0	0
Sulphur dioxide 15 min - engine	2018	266		0
Sulphur dioxide 24 hour - engine	2018	125		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide - engine	2019	350	0	0
Sulphur dioxide 15 min - engine	2019	266		0
Sulphur dioxide 24 hour - engine	2019	125		0
Sulphur dioxide - engine	2020	350	0	0
Sulphur dioxide 15 min - engine	2020	266		0
Sulphur dioxide 24 hour - engine	2020	125		0
Sulphur dioxide - engine	2021	350	0	0
Sulphur dioxide 15 min - engine	2021	266		0
Sulphur dioxide 24 hour - engine	2021	125		0
Sulphur dioxide - engine	2022	350	0	0
Sulphur dioxide 15 min - engine	2022	266		0
Sulphur dioxide 24 hour - engine	2022	125		0
Sulphur dioxide - engine	2023	350	0	0
Sulphur dioxide 15 min - engine	2023	266		0
Sulphur dioxide 24 hour - engine	2023	125		0
Sulphur dioxide - engine	2024	350	0	0
Sulphur dioxide 15 min - engine	2024	266		0
Sulphur dioxide 24 hour - engine	2024	125		0
Sulphur dioxide - engine	2025	350	0	0
Sulphur dioxide 15 min - engine	2025	266		0
Sulphur dioxide 24 hour - engine	2025	125		0
Sulphur dioxide - engine	2026	350	0	0
Sulphur dioxide 15 min - engine	2026	266		0
Sulphur dioxide 24 hour - engine	2026	125		0
Sulphur dioxide - engine	2027	350	0	0
Sulphur dioxide 15 min - engine	2027	266		0
Sulphur dioxide 24 hour - engine	2027	125		0
Sulphur dioxide - engine	2028	350	0	0
Sulphur dioxide 15 min - engine	2028	266		0
Sulphur dioxide 24 hour - engine	2028	125		0
Sulphur dioxide - engine	2029	350	0	0
Sulphur dioxide 15 min - engine	2029	266		0
Sulphur dioxide 24 hour - engine	2029	125		0
Sulphur dioxide - engine	2030	350	0	0
Sulphur dioxide 15 min - engine	2030	266		0
Sulphur dioxide 24 hour - engine	2030	125		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide - engine	2031	350	0	0
Sulphur dioxide 15 min - engine	2031	266		0
Sulphur dioxide 24 hour - engine	2031	125		0
Sulphur dioxide - engine	2032	350	0	0
Sulphur dioxide 15 min - engine	2032	266		0
Sulphur dioxide 24 hour - engine	2032	125		0
Sulphur dioxide - engine	2033	350	0	0
Sulphur dioxide 15 min - engine	2033	266		0
Sulphur dioxide 24 hour - engine	2033	125		0
Sulphur dioxide - engine	2034	350	0	0
Sulphur dioxide 15 min - engine	2034	266		0
Sulphur dioxide 24 hour - engine	2034	125		0
Sulphur dioxide - engine	2035	350	0	0
Sulphur dioxide 15 min - engine	2035	266		0
Sulphur dioxide 24 hour - engine	2035	125		0
Sulphur dioxide - engine	2036	350	0	0
Sulphur dioxide 15 min - engine	2036	266		0
Sulphur dioxide 24 hour - engine	2036	125		0
Sulphur dioxide - engine	2037	350	0	0
Sulphur dioxide 15 min - engine	2037	266		0
Sulphur dioxide 24 hour - engine	2037	125		0
Sulphur dioxide - engine	2038	350	0	0
Sulphur dioxide 15 min - engine	2038	266		0
Sulphur dioxide 24 hour - engine	2038	125		0
Sulphur dioxide - engine	2039	350	0	0
Sulphur dioxide 15 min - engine	2039	266		0
Sulphur dioxide 24 hour - engine	2039	125		0
Vinyl chloride (chloroethene, chloroethylene) - surface	1996	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1997	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1998	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1999	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2003	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2008	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2016	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2017	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2018	1851	159	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Vinyl chloride (chloroethene, chloroethylene) - surface	2019	1851	159	0
Xylene (all isomers) - surface	1997	66200	4410	0
Xylene (all isomers) - surface	1998	66200	4410	0
Xylene (all isomers) - surface	1999	66200	4410	0
Xylene (all isomers) - surface	2017	66200	4410	0

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Acrylonitrile - surface - 1997	4.28055(5m)	2.55976(160.801m)	Yes	No	0.0882863(5m)	0.0229222(160.801m)	Yes (at receptor)	No
Acrylonitrile - surface - 1998	5.02082(5m)	4.27241(79.8123m)	Yes	No	0.103554(5m)	0.0717469(79.8123m)	Yes (at receptor)	No
Acrylonitrile - surface - 1999	5.02027(5m)	4.27194(79.8123m)	Yes	No	0.103543(5m)	0.0717392(79.8123m)	Yes (at receptor)	No
Acrylonitrile - surface - 2008	5.04402(5m)	5.04402(28.3019m)	Yes	No	0.104033(5m)	0.104033(28.3019m)	No	No
Acrylonitrile - surface - 2017	4.75981(5m)	4.75981(28.3019m)	Yes	No	0.098171(5m)	0.098171(28.3019m)	No	No
Acrylonitrile - surface - 2018	4.72829(5m)	4.72829(28.3019m)	Yes	No	0.0975209(5m)	0.0975209(28.3019m)	No	No
Arsenic - surface - 1982	0.00128283(5m)	0.000625378(210m)	No	Yes	2.64583e-005(5m)	5.29166e-006(210m)	No EAL	No EAL
Arsenic - surface - 1983	0.00540703(5m)	0.00263593(210m)	No	Yes	0.00011152(5m)	2.2304e-005(210m)	No EAL	No EAL
Arsenic - surface - 1984	0.0122918(5m)	0.00599223(210m)	No	Yes	0.000253517(5m)	5.07035e-005(210m)	No EAL	No EAL
Arsenic - surface - 1985	0.0134033(5m)	0.00653413(210m)	No	Yes	0.000276444(5m)	5.52888e-005(210m)	No EAL	No EAL
Arsenic - surface - 1986	0.0146162(5m)	0.0071254(210m)	No	Yes	0.000301459(5m)	6.02918e-005(210m)	No EAL	No EAL
Arsenic - surface - 1987	0.0226738(5m)	0.0110535(210m)	No	Yes	0.000467648(5m)	9.35296e-005(210m)	No EAL	No EAL
Arsenic - surface - 1988	0.0262113(5m)	0.012778(210m)	No	Yes	0.000540608(5m)	0.000108122(210m)	No EAL	No EAL
Arsenic - surface - 1989	0.0275327(5m)	0.0134222(210m)	No	Yes	0.000567862(5m)	0.000113572(210m)	No EAL	No EAL
Arsenic - surface - 1990	0.0331103(5m)	0.0161413(210m)	No	Yes	0.0006829(5m)	0.00013658(210m)	No EAL	No EAL
Arsenic - surface - 1991	0.0306703(5m)	0.0149518(210m)	No	Yes	0.000632574(5m)	0.000126515(210m)	No EAL	No EAL
Arsenic - surface - 1992	0.0374493(5m)	0.019518(191.525m)	No	Yes	0.000772391(5m)	0.000171775(191.525m)	No EAL	No EAL
Arsenic - surface - 1993	0.0445989(5m)	0.0232443(191.525m)	No	Yes	0.000919852(5m)	0.000204569(191.525m)	No EAL	No EAL
Arsenic - surface - 1994	0.0484079(5m)	0.0289478(160.801m)	No	Yes	0.000998414(5m)	0.000259223(160.801m)	No EAL	No EAL
Arsenic - surface - 1995	0.0437651(5m)	0.0261714(160.801m)	No	Yes	0.000902656(5m)	0.000234361(160.801m)	No EAL	No EAL
Arsenic - surface - 1996	0.0440856(5m)	0.0263631(160.801m)	No	Yes	0.000909265(5m)	0.000236077(160.801m)	No EAL	No EAL
Arsenic - surface - 1997	0.0449387(5m)	0.0268732(160.801m)	No	Yes	0.000926861(5m)	0.000240645(160.801m)	No EAL	No EAL
Arsenic - surface - 1998	0.0572085(5m)	0.0486809(79.8123m)	No	Yes	0.00117993(5m)	0.000817503(79.8123m)	No EAL	No EAL
Arsenic - surface - 1999	0.0584145(5m)	0.0497072(79.8123m)	No	Yes	0.0012048(5m)	0.000834737(79.8123m)	No EAL	No EAL
Arsenic - surface - 2000	0.0271515(5m)	0.0231043(79.8123m)	No	Yes	0.00056(5m)	0.000387992(79.8123m)	No EAL	No EAL
Arsenic - surface - 2001	0.0166436(5m)	0.0141627(79.8123m)	No	Yes	0.000343275(5m)	0.000237836(79.8123m)	No EAL	No EAL
Arsenic - surface - 2002	0.0339919(5m)	0.028925(79.8123m)	No	Yes	0.000701083(5m)	0.00048574(79.8123m)	No EAL	No EAL
Arsenic - surface - 2003	0.0444315(5m)	0.0444315(28.3019m)	No	Yes	0.000916399(5m)	0.000916399(28.3019m)	No EAL	No EAL
Arsenic - surface - 2004	0.0315018(5m)	0.0315018(28.3019m)	No	Yes	0.000649725(5m)	0.000649725(28.3019m)	No EAL	No EAL
Arsenic - surface - 2005	0.0506744(5m)	0.0506744(28.3019m)	No	Yes	0.00104516(5m)	0.00104516(28.3019m)	No EAL	No EAL
Arsenic - surface - 2006	0.0101454(5m)	0.0101454(28.3019m)	No	Yes	0.000209249(5m)	0.000209249(28.3019m)	No EAL	No EAL
Arsenic - surface - 2007	0.027767(5m)	0.027767(28.3019m)	No	Yes	0.000572694(5m)	0.000572694(28.3019m)	No EAL	No EAL
Arsenic - surface - 2008	0.0391572(5m)	0.0391572(28.3019m)	No	Yes	0.000807618(5m)	0.000807618(28.3019m)	No EAL	No EAL
Arsenic - surface - 2009	0.00934255(5m)	0.00934255(28.3019m)	No	Yes	0.00019269(5m)	0.00019269(28.3019m)	No EAL	No EAL

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Arsenic - surface - 2010	0.0242365(5m)	0.0242365(28.3019m)	No	Yes	0.000499877(5m)	0.000499877(28.3019m)	No EAL	No EAL
Arsenic - surface - 2011	0.0134726(5m)	0.0134726(28.3019m)	No	Yes	0.000277872(5m)	0.000277872(28.3019m)	No EAL	No EAL
Arsenic - surface - 2012	0.0109427(5m)	0.0109427(28.3019m)	No	Yes	0.000225694(5m)	0.000225694(28.3019m)	No EAL	No EAL
Arsenic - surface - 2013	0.0234534(5m)	0.0234534(28.3019m)	No	Yes	0.000483727(5m)	0.000483727(28.3019m)	No EAL	No EAL
Arsenic - surface - 2014	0.00844624(5m)	0.00844624(28.3019m)	No	Yes	0.000174204(5m)	0.000174204(28.3019m)	No EAL	No EAL
Arsenic - surface - 2015	0.0198118(5m)	0.0198118(28.3019m)	No	Yes	0.000408619(5m)	0.000408619(28.3019m)	No EAL	No EAL
Arsenic - surface - 2016	0.0405663(5m)	0.0405663(28.3019m)	No	Yes	0.00083668(5m)	0.00083668(28.3019m)	No EAL	No EAL
Arsenic - surface - 2017	0.0516682(5m)	0.0516682(28.3019m)	No	Yes	0.00106566(5m)	0.00106566(28.3019m)	No EAL	No EAL
Arsenic - surface - 2018	0.049022(5m)	0.049022(28.3019m)	No	Yes	0.00101108(5m)	0.00101108(28.3019m)	No EAL	No EAL
Arsenic - surface - 2019	0.0316334(5m)	0.0316334(28.3019m)	No	Yes	0.000652438(5m)	0.000652438(28.3019m)	No EAL	No EAL
Arsenic - surface - 2020	0.00475615(5m)	0.00475615(28.3019m)	No	Yes	9.80957e-005(5m)	9.80957e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2021	0.003837(5m)	0.003837(28.3019m)	No	Yes	7.91381e-005(5m)	7.91381e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2022	0.00306779(5m)	0.00306779(28.3019m)	No	Yes	6.32731e-005(5m)	6.32731e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2023	0.0082676(5m)	0.0082676(28.3019m)	No	Yes	0.000170519(5m)	0.000170519(28.3019m)	No EAL	No EAL
Arsenic - surface - 2024	0.00773679(5m)	0.00773679(28.3019m)	No	Yes	0.000159571(5m)	0.000159571(28.3019m)	No EAL	No EAL
Arsenic - surface - 2025	0.00504639(5m)	0.00504639(28.3019m)	No	Yes	0.000104082(5m)	0.000104082(28.3019m)	No EAL	No EAL
Arsenic - surface - 2026	0.00335714(5m)	0.00335714(28.3019m)	No	Yes	6.92411e-005(5m)	6.92411e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2027	0.0020685(5m)	0.0020685(28.3019m)	No	Yes	4.26628e-005(5m)	4.26628e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2028	0.00106153(5m)	0.00106153(28.3019m)	No	Yes	2.18941e-005(5m)	2.18941e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2029	0.000627439(5m)	0.000627439(28.3019m)	No	Yes	1.29409e-005(5m)	1.29409e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2030	0.000522651(5m)	0.000522651(28.3019m)	No	No	1.07797e-005(5m)	1.07797e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2031	0.000435728(5m)	0.000435728(28.3019m)	No	No	8.98689e-006(5m)	8.98689e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2032	0.000363559(5m)	0.000363559(28.3019m)	No	No	7.4984e-006(5m)	7.4984e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2033	0.000303585(5m)	0.000303585(28.3019m)	No	No	6.26145e-006(5m)	6.26145e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2039	0.000468594(5m)	0.000468594(28.3019m)	No	No	9.66475e-006(5m)	9.66475e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2040	0.000836048(5m)	0.000836048(28.3019m)	No	Yes	1.72435e-005(5m)	1.72435e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2041	0.000698243(5m)	0.000698243(28.3019m)	No	Yes	1.44013e-005(5m)	1.44013e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2042	0.000575188(5m)	0.000575188(28.3019m)	No	No	1.18632e-005(5m)	1.18632e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2043	0.000474259(5m)	0.000474259(28.3019m)	No	No	9.78159e-006(5m)	9.78159e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2044	0.000396814(5m)	0.000396814(28.3019m)	No	No	8.18429e-006(5m)	8.18429e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2045	0.000329917(5m)	0.000329917(28.3019m)	No	No	6.80455e-006(5m)	6.80455e-006(28.3019m)	No EAL	No EAL
Benzene - surface - 1983	2.97557(5m)	1.45059(210m)	No EAL	No EAL	0.0613711(5m)	0.0122742(210m)	Yes (at receptor)	No
Benzene - surface - 1984	5.15693(5m)	2.514(210m)	No EAL	No EAL	0.106362(5m)	0.0212723(210m)	Yes (at receptor)	No
Benzene - surface - 1985	7.00918(5m)	3.41698(210m)	No EAL	No EAL	0.144564(5m)	0.0289129(210m)	Yes (at receptor)	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Benzene - surface - 1986	7.01183(5m)	3.41827(210m)	No EAL	No EAL	0.144619(5m)	0.0289238(210m)	Yes (at receptor)	No
Benzene - surface - 1987	9.13871(5m)	4.45512(210m)	No EAL	No EAL	0.188486(5m)	0.0376972(210m)	Yes (at receptor)	No
Benzene - surface - 1988	11.1734(5m)	5.44703(210m)	No EAL	No EAL	0.230451(5m)	0.0460903(210m)	Yes (at receptor)	No
Benzene - surface - 1989	11.824(5m)	5.7642(210m)	No EAL	No EAL	0.24387(5m)	0.048774(210m)	Yes (at receptor)	No
Benzene - surface - 1990	13.0495(5m)	6.36164(210m)	No EAL	No EAL	0.269146(5m)	0.0538293(210m)	No	No
Benzene - surface - 1991	14.8473(5m)	7.23806(210m)	No EAL	No EAL	0.306226(5m)	0.0612451(210m)	No	No
Benzene - surface - 1992	19.7565(5m)	10.2968(191.525m)	No EAL	No EAL	0.407477(5m)	0.0906203(191.525m)	No	No
Benzene - surface - 1993	20.3514(5m)	10.6069(191.525m)	No EAL	No EAL	0.419747(5m)	0.0933491(191.525m)	No	No
Benzene - surface - 1994	19.7685(5m)	11.8215(160.801m)	No EAL	No EAL	0.407725(5m)	0.10586(160.801m)	No	No
Benzene - surface - 1995	19.5606(5m)	11.6972(160.801m)	No EAL	No EAL	0.403438(5m)	0.104747(160.801m)	No	No
Benzene - surface - 1996	21.5888(5m)	12.91(160.801m)	No EAL	No EAL	0.445269(5m)	0.115607(160.801m)	No	No
Benzene - surface - 1997	23.8283(5m)	14.2492(160.801m)	No EAL	No EAL	0.491458(5m)	0.1276(160.801m)	No	No
Benzene - surface - 1998	26.3635(5m)	22.4337(79.8123m)	No EAL	No EAL	0.543747(5m)	0.376732(79.8123m)	No	No
Benzene - surface - 1999	27.4569(5m)	23.3641(79.8123m)	No EAL	No EAL	0.566298(5m)	0.392356(79.8123m)	No	No
Benzene - surface - 2000	9.83471(5m)	8.36873(79.8123m)	No EAL	No EAL	0.202841(5m)	0.140537(79.8123m)	No	No
Benzene - surface - 2001	7.39865(5m)	6.29579(79.8123m)	No EAL	No EAL	0.152597(5m)	0.105726(79.8123m)	No	No
Benzene - surface - 2002	13.014(5m)	11.0741(79.8123m)	No EAL	No EAL	0.268414(5m)	0.185969(79.8123m)	No	No
Benzene - surface - 2003	18.174(5m)	18.174(28.3019m)	No EAL	No EAL	0.374838(5m)	0.374838(28.3019m)	No	No
Benzene - surface - 2004	12.1928(5m)	12.1928(28.3019m)	No EAL	No EAL	0.251477(5m)	0.251477(28.3019m)	No	No
Benzene - surface - 2005	19.1707(5m)	19.1707(28.3019m)	No EAL	No EAL	0.395395(5m)	0.395395(28.3019m)	No	No
Benzene - surface - 2006	5.30939(5m)	5.30939(28.3019m)	No EAL	No EAL	0.109506(5m)	0.109506(28.3019m)	No	No
Benzene - surface - 2007	14.3352(5m)	14.3352(28.3019m)	No EAL	No EAL	0.295663(5m)	0.295663(28.3019m)	No	No
Benzene - surface - 2008	20.4761(5m)	20.4761(28.3019m)	No EAL	No EAL	0.422319(5m)	0.422319(28.3019m)	No	No
Benzene - surface - 2009	5.57012(5m)	5.57012(28.3019m)	No EAL	No EAL	0.114884(5m)	0.114884(28.3019m)	No	No
Benzene - surface - 2010	12.149(5m)	12.149(28.3019m)	No EAL	No EAL	0.250574(5m)	0.250574(28.3019m)	No	No
Benzene - surface - 2011	7.27604(5m)	7.27604(28.3019m)	No EAL	No EAL	0.150068(5m)	0.150068(28.3019m)	No	No
Benzene - surface - 2012	5.35774(5m)	5.35774(28.3019m)	No EAL	No EAL	0.110503(5m)	0.110503(28.3019m)	No	No
Benzene - surface - 2013	10.255(5m)	10.255(28.3019m)	No EAL	No EAL	0.211509(5m)	0.211509(28.3019m)	No	No
Benzene - surface - 2014	4.08417(5m)	4.08417(28.3019m)	No EAL	No EAL	0.0842361(5m)	0.0842361(28.3019m)	No	No
Benzene - surface - 2015	10.2336(5m)	10.2336(28.3019m)	No EAL	No EAL	0.211069(5m)	0.211069(28.3019m)	No	No
Benzene - surface - 2016	20.1713(5m)	20.1713(28.3019m)	No EAL	No EAL	0.416033(5m)	0.416033(28.3019m)	No	No
Benzene - surface - 2017	26.2233(5m)	26.2233(28.3019m)	No EAL	No EAL	0.540855(5m)	0.540855(28.3019m)	No	No
Benzene - surface - 2018	23.8491(5m)	23.8491(28.3019m)	No EAL	No EAL	0.491887(5m)	0.491887(28.3019m)	No	No
Benzene - surface - 2019	16.6387(5m)	16.6387(28.3019m)	No EAL	No EAL	0.343173(5m)	0.343173(28.3019m)	No	No

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Benzene - surface - 2023	4.0019(5m)	4.0019(28.3019m)	No EAL	No EAL	0.0825392(5m)	0.0825392(28.3019m)	No	No
Benzene - surface - 2024	3.82918(5m)	3.82918(28.3019m)	No EAL	No EAL	0.0789768(5m)	0.0789768(28.3019m)	No	No
Benzene - surface - 2025	2.54896(5m)	2.54896(28.3019m)	No EAL	No EAL	0.0525723(5m)	0.0525723(28.3019m)	No	No
Benzo(a)pyrene - flare - 2000	0.000552551(8.60233m)	3.57568e-005(229.103m)	No EAL	No EAL	8.11439e-006(8.60233m)	3.02779e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2001	0.000639598(8.60233m)	4.13898e-005(229.103m)	No EAL	No EAL	9.3927e-006(8.60233m)	3.50477e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2002	0.000596979(8.60233m)	3.86318e-005(229.103m)	No EAL	No EAL	8.76683e-006(8.60233m)	3.27124e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2006	0.000298273(8.60233m)	1.93019e-005(229.103m)	No EAL	No EAL	4.38023e-006(8.60233m)	1.63443e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2007	0.000243437(8.60233m)	1.57533e-005(229.103m)	No EAL	No EAL	3.57495e-006(8.60233m)	1.33395e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2008	0.000195958(8.60233m)	1.26808e-005(229.103m)	No EAL	No EAL	2.8777e-006(8.60233m)	1.07378e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2009	0.000386253(8.60233m)	2.49953e-005(229.103m)	No EAL	No EAL	5.67225e-006(8.60233m)	2.11653e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2010	0.000322039(8.60233m)	2.08399e-005(229.103m)	No EAL	No EAL	4.72925e-006(8.60233m)	1.76466e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2011	0.00038867(8.60233m)	2.51517e-005(229.103m)	No EAL	No EAL	5.70774e-006(8.60233m)	2.12977e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2012	0.000390218(8.60233m)	2.52519e-005(229.103m)	No EAL	No EAL	5.73047e-006(8.60233m)	2.13826e-006(229.103m)	Yes (at receptor)	No
Carbon monoxide - engine - 2014	1080.98(7.2111m)	191.668(208.741m)	Yes (at receptor)	No	48.3598(7.2111m)	19.1668(208.741m)	No EAL	No EAL
Carbon monoxide - engine - 2015	1008.23(7.2111m)	178.769(208.741m)	Yes (at receptor)	No	45.1052(7.2111m)	17.8769(208.741m)	No EAL	No EAL
Carbon monoxide - engine - 2020	1167.46(7.2111m)	207.001(208.741m)	Yes (at receptor)	No	52.2283(7.2111m)	20.7001(208.741m)	No EAL	No EAL
Carbon monoxide - engine - 2021	1088.38(7.2111m)	192.98(208.741m)	Yes (at receptor)	No	48.6908(7.2111m)	19.298(208.741m)	No EAL	No EAL
Carbon monoxide - engine - 2022	1012.21(7.2111m)	179.474(208.741m)	Yes (at receptor)	No	45.2831(7.2111m)	17.9474(208.741m)	No EAL	No EAL
Ethylene dichloride - surface - 1986	20.3888(5m)	9.93956(210m)	Yes	No	0.42052(5m)	0.0841039(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1987	31.5914(5m)	15.4008(210m)	Yes	No	0.651573(5m)	0.130315(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1988	30.7436(5m)	14.9875(210m)	Yes	No	0.634087(5m)	0.126817(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1989	35.4356(5m)	17.2749(210m)	Yes	No	0.73086(5m)	0.146172(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1990	40.7044(5m)	19.8434(210m)	Yes	No	0.839528(5m)	0.167906(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1991	53.4309(5m)	26.0476(210m)	Yes	No	1.10201(5m)	0.220402(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1992	61.8089(5m)	32.2139(191.525m)	Yes	No	1.27481(5m)	0.283509(191.525m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1993	53.9097(5m)	28.097(191.525m)	Yes	No	1.11189(5m)	0.247276(191.525m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1994	53.7427(5m)	32.138(160.801m)	Yes	No	1.10844(5m)	0.287791(160.801m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1995	46.5312(5m)	27.8255(160.801m)	Yes	No	0.959706(5m)	0.249173(160.801m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1996	46.288(5m)	27.6801(160.801m)	Yes	No	0.95469(5m)	0.247871(160.801m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1997	60.1654(5m)	35.9788(160.801m)	Yes	No	1.24091(5m)	0.322184(160.801m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1998	61.3995(5m)	52.2472(79.8123m)	Yes	No	1.26637(5m)	0.877393(79.8123m)	No	No
Ethylene dichloride - surface - 1999	57.6837(5m)	49.0853(79.8123m)	Yes	No	1.18973(5m)	0.824294(79.8123m)	No	No
Ethylene dichloride - surface - 2002	31.5307(5m)	26.8307(79.8123m)	Yes	No	0.650321(5m)	0.45057(79.8123m)	No	No
Ethylene dichloride - surface - 2003	47.0223(5m)	47.0223(28.3019m)	Yes	No	0.969835(5m)	0.969835(28.3019m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Ethylene dichloride - surface - 2004	35.2389(5m)	35.2389(28.3019m)	Yes	No	0.726803(5m)	0.726803(28.3019m)	No	No
Ethylene dichloride - surface - 2005	59.0274(5m)	59.0274(28.3019m)	Yes	No	1.21744(5m)	1.21744(28.3019m)	No	No
Ethylene dichloride - surface - 2008	23.2872(5m)	23.2872(28.3019m)	Yes	No	0.480299(5m)	0.480299(28.3019m)	No	No
Ethylene dichloride - surface - 2016	24.6235(5m)	24.6235(28.3019m)	Yes	No	0.507859(5m)	0.507859(28.3019m)	No	No
Ethylene dichloride - surface - 2017	29.9674(5m)	29.9674(28.3019m)	Yes	No	0.618077(5m)	0.618077(28.3019m)	No	No
Ethylene dichloride - surface - 2018	29.6952(5m)	29.6952(28.3019m)	Yes	No	0.612464(5m)	0.612464(28.3019m)	No	No
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2014	85.5422(7.2111m)	15.1674(208.741m)	Yes (at receptor)	No	3.82689(7.2111m)	1.51674(208.741m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2015	79.7584(7.2111m)	14.1419(208.741m)	Yes (at receptor)	No	3.56814(7.2111m)	1.41419(208.741m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2020	90.7448(7.2111m)	16.0899(208.741m)	Yes (at receptor)	No	4.05963(7.2111m)	1.60899(208.741m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2021	84.6994(7.2111m)	15.018(208.741m)	Yes (at receptor)	No	3.78918(7.2111m)	1.5018(208.741m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2022	78.9024(7.2111m)	13.9901(208.741m)	Yes (at receptor)	No	3.52985(7.2111m)	1.39901(208.741m)	No EAL	No EAL
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2000	23.1438(8.60233m)	1.49768(229.103m)	Yes (at receptor)	No	0.339873(8.60233m)	0.12682(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2001	27.2705(8.60233m)	1.76473(229.103m)	Yes (at receptor)	No	0.400475(8.60233m)	0.149433(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2002	25.4571(8.60233m)	1.64739(229.103m)	Yes (at receptor)	No	0.373846(8.60233m)	0.139496(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2003	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2004	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2005	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2006	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2006	12.731(8.60233m)	0.823853(229.103m)	Yes	No	0.186959(8.60233m)	0.0697616(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2007	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2008	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2009	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2009	16.2435(8.60233m)	1.05116(229.103m)	Yes (at receptor)	No	0.238541(8.60233m)	0.0890089(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2010	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2010	13.6069(8.60233m)	0.880535(229.103m)	Yes	No	0.199822(8.60233m)	0.0745612(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2011	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2011	16.0514(8.60233m)	1.03872(229.103m)	Yes (at receptor)	No	0.23572(8.60233m)	0.0879562(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2012	8.85139(11.6619m)	1.50126(218.497m)	Yes	No	0.395983(11.6619m)	0.150126(218.497m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2012	16.2993(8.60233m)	1.05477(229.103m)	Yes (at receptor)	No	0.239361(8.60233m)	0.0893146(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2013	11.4018(7.2111m)	2.02165(208.741m)	Yes	No	0.510081(7.2111m)	0.202165(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2014	15.2559(7.2111m)	2.70501(208.741m)	Yes	No	0.682501(7.2111m)	0.270501(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2015	10.318(7.2111m)	1.82947(208.741m)	Yes	No	0.461594(7.2111m)	0.182947(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2016	9.71083(7.2111m)	1.72182(208.741m)	Yes	No	0.434432(7.2111m)	0.172182(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2017	9.37851(7.2111m)	1.6629(208.741m)	Yes	No	0.419565(7.2111m)	0.16629(208.741m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2018	9.74613(7.2111m)	1.72808(208.741m)	Yes	No	0.436011(7.2111m)	0.172808(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2019	12.1098(7.2111m)	2.14718(208.741m)	Yes	No	0.541754(7.2111m)	0.214718(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2020	16.8537(7.2111m)	2.98833(208.741m)	Yes (at receptor)	No	0.753983(7.2111m)	0.298833(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2021	15.6896(7.2111m)	2.78192(208.741m)	Yes	No	0.701904(7.2111m)	0.278192(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2022	12.2941(7.2111m)	2.17986(208.741m)	Yes	No	0.549999(7.2111m)	0.217986(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2023	9.74613(7.2111m)	1.72808(208.741m)	Yes	No	0.436011(7.2111m)	0.172808(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2024	9.00496(7.2111m)	1.59666(208.741m)	Yes	No	0.402853(7.2111m)	0.159666(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2025	9.00496(7.2111m)	1.59666(208.741m)	Yes	No	0.402853(7.2111m)	0.159666(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2026	9.00496(7.2111m)	1.59666(208.741m)	Yes	No	0.402853(7.2111m)	0.159666(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2027	9.00496(7.2111m)	1.59666(208.741m)	Yes	No	0.402853(7.2111m)	0.159666(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2028	9.00496(7.2111m)	1.59666(208.741m)	Yes	No	0.402853(7.2111m)	0.159666(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2029	8.7937(7.2111m)	1.55921(208.741m)	Yes	No	0.393403(7.2111m)	0.155921(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2030	8.21666(7.2111m)	1.45689(208.741m)	Yes	No	0.367588(7.2111m)	0.145689(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2031	7.68326(7.2111m)	1.36231(208.741m)	Yes	No	0.343725(7.2111m)	0.136231(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2032	7.18976(7.2111m)	1.27481(208.741m)	Yes	No	0.321647(7.2111m)	0.127481(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2033	6.73278(7.2111m)	1.19378(208.741m)	Yes	No	0.301203(7.2111m)	0.119378(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2034	6.30923(7.2111m)	1.11869(208.741m)	Yes	No	0.282255(7.2111m)	0.111869(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2035	5.91634(7.2111m)	1.04902(208.741m)	Yes	No	0.264678(7.2111m)	0.104902(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2036	5.55157(7.2111m)	0.984345(208.741m)	Yes	No	0.24836(7.2111m)	0.0984345(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2037	5.21262(7.2111m)	0.924247(208.741m)	Yes	No	0.233196(7.2111m)	0.0924247(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2038	3.85375(7.2111m)	0.683307(208.741m)	Yes	No	0.172405(7.2111m)	0.0683307(208.741m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1986	15.2166(5m)	7.41809(210m)	Yes (at receptor)	No	0.313842(5m)	0.0627684(210m)	Yes	No
Hydrogen sulphide - surface - 1987	20.9223(5m)	10.1996(210m)	Yes (at receptor)	No	0.431523(5m)	0.0863046(210m)	Yes	No
Hydrogen sulphide - surface - 1988	25.2835(5m)	12.3257(210m)	Yes (at receptor)	No	0.521472(5m)	0.104294(210m)	Yes	No
Hydrogen sulphide - surface - 1989	31.8164(5m)	15.5105(210m)	No	Yes	0.656213(5m)	0.131243(210m)	Yes	No
Hydrogen sulphide - surface - 1990	37.3381(5m)	18.2023(210m)	No	Yes	0.770099(5m)	0.15402(210m)	Yes	No
Hydrogen sulphide - surface - 1991	39.9924(5m)	19.4963(210m)	No	Yes	0.824842(5m)	0.164968(210m)	Yes	No
Hydrogen sulphide - surface - 1992	56.6885(5m)	29.5453(191.525m)	No	Yes	1.1692(5m)	0.260022(191.525m)	Yes	No
Hydrogen sulphide - surface - 1993	55.976(5m)	29.1739(191.525m)	No	Yes	1.1545(5m)	0.256754(191.525m)	Yes	No
Hydrogen sulphide - surface - 1994	54.6225(5m)	32.6641(160.801m)	No	Yes	1.12659(5m)	0.292502(160.801m)	Yes	No
Hydrogen sulphide - surface - 1995	52.7051(5m)	31.5175(160.801m)	No	Yes	1.08704(5m)	0.282234(160.801m)	Yes	No
Hydrogen sulphide - surface - 1996	45.2334(5m)	27.0494(160.801m)	No	Yes	0.932938(5m)	0.242223(160.801m)	Yes	No
Hydrogen sulphide - surface - 1997	56.6616(5m)	33.8835(160.801m)	No	Yes	1.16865(5m)	0.303421(160.801m)	Yes	No
Hydrogen sulphide - surface - 1998	61.8952(5m)	52.669(79.8123m)	No	Yes	1.27659(5m)	0.884476(79.8123m)	Yes	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Hydrogen sulphide - surface - 1999	60.8007(5m)	51.7377(79.8123m)	No	Yes	1.25402(5m)	0.868836(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2000	28.3668(5m)	24.1384(79.8123m)	No	No	0.585064(5m)	0.405358(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2001	19.2733(5m)	16.4004(79.8123m)	No	No	0.397512(5m)	0.275414(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2002	46.4686(5m)	39.542(79.8123m)	No	Yes	0.958416(5m)	0.664032(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2003	62.7146(5m)	62.7146(28.3019m)	No	Yes	1.29349(5m)	1.29349(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2004	27.4351(5m)	27.4351(28.3019m)	No	No	0.565848(5m)	0.565848(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2005	43.1596(5m)	43.1596(28.3019m)	No	Yes	0.890167(5m)	0.890167(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2007	29.6978(5m)	29.6978(28.3019m)	No	No	0.612518(5m)	0.612518(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2008	46.023(5m)	46.023(28.3019m)	No	Yes	0.949224(5m)	0.949224(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2010	30.5592(5m)	30.5592(28.3019m)	No	Yes	0.630284(5m)	0.630284(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2011	16.7611(5m)	16.7611(28.3019m)	No	No	0.345698(5m)	0.345698(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2013	22.1822(5m)	22.1822(28.3019m)	No	No	0.457509(5m)	0.457509(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2015	23.2204(5m)	23.2204(28.3019m)	No	No	0.478921(5m)	0.478921(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2016	47.6127(5m)	47.6127(28.3019m)	No	Yes	0.982011(5m)	0.982011(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2017	58.3374(5m)	58.3374(28.3019m)	No	Yes	1.20321(5m)	1.20321(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2018	53.0944(5m)	53.0944(28.3019m)	No	Yes	1.09507(5m)	1.09507(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2019	37.6298(5m)	37.6298(28.3019m)	No	Yes	0.776115(5m)	0.776115(28.3019m)	Yes	No
Nitrogen oxides (NOx) - flare - 2000	45.7785(8.60233m)	2.96242(229.103m)	Yes (at receptor)	Yes	1.34454(8.60233m)	0.5017(229.103m)	No	No
Nitrogen oxides (NOx) - flare - 2001	51.8567(8.60233m)	3.35576(229.103m)	Yes (at receptor)	Yes	1.52306(8.60233m)	0.568313(229.103m)	No	No
Nitrogen oxides (NOx) - flare - 2002	48.711(8.60233m)	3.1522(229.103m)	Yes (at receptor)	Yes	1.43067(8.60233m)	0.533839(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2003	169.001(11.6619m)	28.6639(218.497m)	No	Yes	15.1212(11.6619m)	5.73278(218.497m)	No	No
Nitrogen oxides (NOx) - engine - 2004	168.996(11.6619m)	28.663(218.497m)	No	Yes	15.1207(11.6619m)	5.7326(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2004	14.0123(8.60233m)	0.906766(229.103m)	Yes	No	0.41155(8.60233m)	0.153565(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2005	169.001(11.6619m)	28.6639(218.497m)	No	Yes	15.1212(11.6619m)	5.73278(218.497m)	No	No
Nitrogen oxides (NOx) - engine - 2006	168.914(11.6619m)	28.649(218.497m)	No	Yes	15.1133(11.6619m)	5.7298(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2006	25.2864(8.60233m)	1.63634(229.103m)	Yes (at receptor)	No	0.742678(8.60233m)	0.277121(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2007	168.996(11.6619m)	28.6631(218.497m)	No	Yes	15.1207(11.6619m)	5.73261(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2007	20.7813(8.60233m)	1.3448(229.103m)	Yes (at receptor)	No	0.61036(8.60233m)	0.227749(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2008	168.98(11.6619m)	28.6602(218.497m)	No	Yes	15.1192(11.6619m)	5.73204(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2008	16.6503(8.60233m)	1.07748(229.103m)	Yes	No	0.48903(8.60233m)	0.182476(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2009	168.921(11.6619m)	28.6503(218.497m)	No	Yes	15.114(11.6619m)	5.73007(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2009	31.7607(8.60233m)	2.05531(229.103m)	Yes (at receptor)	No	0.932833(8.60233m)	0.348075(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2010	168.988(11.6619m)	28.6617(218.497m)	No	Yes	15.12(11.6619m)	5.73234(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2010	26.4951(8.60233m)	1.71456(229.103m)	Yes (at receptor)	No	0.778178(8.60233m)	0.290368(229.103m)	Yes (at receptor)	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Nitrogen oxides (NOx) - engine - 2011	168.931(11.6619m)	28.652(218.497m)	No	Yes	15.1149(11.6619m)	5.73039(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2011	31.6047(8.60233m)	2.04521(229.103m)	Yes (at receptor)	No	0.92825(8.60233m)	0.346365(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2012	168.942(11.6619m)	28.6538(218.497m)	No	Yes	15.1158(11.6619m)	5.73076(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2012	32.0302(8.60233m)	2.07275(229.103m)	Yes (at receptor)	No	0.940748(8.60233m)	0.351029(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2013	231.238(7.2111m)	41.0007(208.741m)	No	Yes	20.6898(7.2111m)	8.20015(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2014	291.12(7.2111m)	51.6184(208.741m)	No	Yes	26.0476(7.2111m)	10.3237(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2015	271.528(7.2111m)	48.1445(208.741m)	No	Yes	24.2946(7.2111m)	9.6289(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2016	231.525(7.2111m)	41.0516(208.741m)	No	Yes	20.7154(7.2111m)	8.21031(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2017	174.559(7.2111m)	30.951(208.741m)	No	Yes	15.6185(7.2111m)	6.1902(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2018	249.034(7.2111m)	44.1561(208.741m)	No	Yes	22.282(7.2111m)	8.83122(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2019	265.758(7.2111m)	47.1214(208.741m)	No	Yes	23.7784(7.2111m)	9.42429(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2020	314.408(7.2111m)	55.7475(208.741m)	No	Yes	28.1313(7.2111m)	11.1495(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2021	293.113(7.2111m)	51.9717(208.741m)	No	Yes	26.2259(7.2111m)	10.3943(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2022	272.599(7.2111m)	48.3343(208.741m)	No	Yes	24.3904(7.2111m)	9.66687(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2023	239.487(7.2111m)	42.4633(208.741m)	No	Yes	21.4278(7.2111m)	8.49266(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2024	169.327(7.2111m)	30.0232(208.741m)	No	Yes	15.1503(7.2111m)	6.00464(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2025	169.313(7.2111m)	30.0208(208.741m)	No	Yes	15.1491(7.2111m)	6.00416(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2026	169.313(7.2111m)	30.0208(208.741m)	No	Yes	15.1491(7.2111m)	6.00416(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2027	169.313(7.2111m)	30.0208(208.741m)	No	Yes	15.1491(7.2111m)	6.00416(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2028	169.096(7.2111m)	29.9823(208.741m)	No	Yes	15.1296(7.2111m)	5.99645(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2029	163.99(7.2111m)	29.0769(208.741m)	No	Yes	14.6728(7.2111m)	5.81538(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2030	153.69(7.2111m)	27.2507(208.741m)	No	Yes	13.7512(7.2111m)	5.45013(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2031	143.805(7.2111m)	25.4979(208.741m)	No	Yes	12.8667(7.2111m)	5.09959(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2032	134.683(7.2111m)	23.8806(208.741m)	No	Yes	12.0506(7.2111m)	4.77612(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2033	126.245(7.2111m)	22.3844(208.741m)	No	Yes	11.2956(7.2111m)	4.47687(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2034	118.395(7.2111m)	20.9926(208.741m)	No	Yes	10.5933(7.2111m)	4.19852(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2035	111.113(7.2111m)	19.7013(208.741m)	Yes (at receptor)	Yes	9.94166(7.2111m)	3.94026(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2036	104.342(7.2111m)	18.5009(208.741m)	Yes (at receptor)	Yes	9.3359(7.2111m)	3.70018(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2037	98.0436(7.2111m)	17.384(208.741m)	Yes (at receptor)	Yes	8.77232(7.2111m)	3.47681(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2038	92.1786(7.2111m)	16.3441(208.741m)	Yes (at receptor)	Yes	8.24756(7.2111m)	3.26883(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2039	86.7133(7.2111m)	15.3751(208.741m)	Yes (at receptor)	Yes	7.75856(7.2111m)	3.07502(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2040	7.03142(7.2111m)	1.24674(208.741m)	Yes	No	0.629127(7.2111m)	0.249347(208.741m)	Yes (at receptor)	No
PM10s 24 hour - flare - 2000	7.94453(8.60233m)	0.514108(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2001	9.10161(8.60233m)	0.588985(229.103m)	Yes (at receptor)	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
PM10s 24 hour - flare - 2002	8.50739(8.60233m)	0.550532(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2009	5.42289(8.60233m)	0.350927(229.103m)	Yes (at receptor)	No				
PM10s 24 hour - flare - 2011	5.32179(8.60233m)	0.344385(229.103m)	Yes (at receptor)	No				
PM10s 24 hour - flare - 2012	5.35828(8.60233m)	0.346746(229.103m)	Yes (at receptor)	No				
PM10s 24 hour - engine - 2014	5.14194(7.2111m)	0.911715(208.741m)	Yes (at receptor)	No				
PM10s - engine - 2020	9.53799(7.2111m)	1.69117(208.741m)	No EAL	No EAL	0.426699(7.2111m)	0.169117(208.741m)	Yes (at receptor)	No
PM10s 24 hour - engine - 2020	5.62741(7.2111m)	0.997793(208.741m)	Yes (at receptor)	No				
PM10s 24 hour - engine - 2021	5.25185(7.2111m)	0.931203(208.741m)	Yes (at receptor)	No				
Sulphur dioxide - flare - 2000	50.9604(8.60233m)	3.29776(229.103m)	Yes (at receptor)	No	0.74837(8.60233m)	0.279245(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2000	68.2869(8.60233m)	4.419(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2000	30.0666(8.60233m)	1.94568(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2001	57.7267(8.60233m)	3.73562(229.103m)	Yes (at receptor)	No	0.847735(8.60233m)	0.316322(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2001	77.3538(8.60233m)	5.00573(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2001	34.0587(8.60233m)	2.20402(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2002	54.2249(8.60233m)	3.50902(229.103m)	Yes (at receptor)	No	0.79631(8.60233m)	0.297134(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2002	72.6614(8.60233m)	4.70208(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2002	31.9927(8.60233m)	2.07032(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2003	101.805(11.6619m)	17.2668(218.497m)	Yes (at receptor)	Yes	4.55441(11.6619m)	1.72668(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2003	136.418(11.6619m)	23.1375(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2003	60.0647(11.6619m)	10.1874(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2004	101.801(11.6619m)	17.2663(218.497m)	Yes (at receptor)	Yes	4.55427(11.6619m)	1.72663(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2004	136.414(11.6619m)	23.1368(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2004	60.0628(11.6619m)	10.1871(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2005	101.805(11.6619m)	17.2668(218.497m)	Yes (at receptor)	Yes	4.55441(11.6619m)	1.72668(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2005	136.418(11.6619m)	23.1375(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2005	60.0647(11.6619m)	10.1874(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2006	101.752(11.6619m)	17.2578(218.497m)	Yes (at receptor)	Yes	4.55205(11.6619m)	1.72578(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2006	136.347(11.6619m)	23.1255(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2006	60.0335(11.6619m)	10.1821(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 15 min - flare - 2006	37.7193(8.60233m)	2.4409(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2006	16.6078(8.60233m)	1.07472(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2007	101.802(11.6619m)	17.2663(218.497m)	Yes (at receptor)	Yes	4.55428(11.6619m)	1.72663(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2007	136.414(11.6619m)	23.1368(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2007	60.0629(11.6619m)	10.1871(218.497m)	Yes (at receptor)	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 15 min - flare - 2007	30.9991(8.60233m)	2.00602(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2007	13.6489(8.60233m)	0.883249(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2008	101.791(11.6619m)	17.2646(218.497m)	Yes (at receptor)	Yes	4.55382(11.6619m)	1.72646(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2008	136.4(11.6619m)	23.1345(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2008	60.0569(11.6619m)	10.1861(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2009	101.756(11.6619m)	17.2586(218.497m)	Yes (at receptor)	Yes	4.55225(11.6619m)	1.72586(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2009	136.353(11.6619m)	23.1266(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2009	60.0362(11.6619m)	10.1826(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2009	35.3559(8.60233m)	2.28796(229.103m)	Yes (at receptor)	No	0.519213(8.60233m)	0.193738(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2009	47.377(8.60233m)	3.06587(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2009	20.86(8.60233m)	1.3499(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2010	101.797(11.6619m)	17.2655(218.497m)	Yes (at receptor)	Yes	4.55406(11.6619m)	1.72655(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2010	136.407(11.6619m)	23.1357(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2010	60.06(11.6619m)	10.1866(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 15 min - flare - 2010	39.5223(8.60233m)	2.55758(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2010	17.4016(8.60233m)	1.1261(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2011	101.762(11.6619m)	17.2596(218.497m)	Yes (at receptor)	Yes	4.55251(11.6619m)	1.72596(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2011	136.361(11.6619m)	23.1279(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2011	60.0396(11.6619m)	10.1832(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2011	35.1822(8.60233m)	2.27672(229.103m)	Yes (at receptor)	No	0.516662(8.60233m)	0.192786(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2011	47.1442(8.60233m)	3.0508(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2011	20.7575(8.60233m)	1.34326(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2012	101.769(11.6619m)	17.2607(218.497m)	Yes (at receptor)	Yes	4.5528(11.6619m)	1.72607(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2012	136.37(11.6619m)	23.1294(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2012	60.0434(11.6619m)	10.1838(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2012	35.6559(8.60233m)	2.30737(229.103m)	Yes (at receptor)	No	0.523618(8.60233m)	0.195382(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2012	47.7789(8.60233m)	3.09188(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2012	21.037(8.60233m)	1.36135(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2013	139.295(7.2111m)	24.6984(208.741m)	Yes (at receptor)	Yes	6.23163(7.2111m)	2.46984(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2013	186.656(7.2111m)	33.0958(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2013	82.1843(7.2111m)	14.572(208.741m)	No	Yes				
Sulphur dioxide - engine - 2014	175.368(7.2111m)	31.0943(208.741m)	Yes (at receptor)	Yes	7.84539(7.2111m)	3.10943(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2014	234.993(7.2111m)	41.6664(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2014	103.467(7.2111m)	18.3456(208.741m)	No	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide - engine - 2015	163.565(7.2111m)	29.0017(208.741m)	Yes (at receptor)	Yes	7.3174(7.2111m)	2.90017(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2015	219.178(7.2111m)	38.8623(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2015	96.5036(7.2111m)	17.111(208.741m)	No	Yes				
Sulphur dioxide - engine - 2016	139.468(7.2111m)	24.729(208.741m)	Yes (at receptor)	Yes	6.23936(7.2111m)	2.4729(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2016	186.887(7.2111m)	33.1368(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2016	82.2862(7.2111m)	14.5901(208.741m)	No	Yes				
Sulphur dioxide - engine - 2017	105.153(7.2111m)	18.6445(208.741m)	Yes (at receptor)	Yes	4.7042(7.2111m)	1.86445(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2017	140.904(7.2111m)	24.9837(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2017	62.04(7.2111m)	11.0003(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2018	150.015(7.2111m)	26.5991(208.741m)	Yes (at receptor)	Yes	6.71122(7.2111m)	2.65991(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2018	201.021(7.2111m)	35.6429(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2018	88.5091(7.2111m)	15.6935(208.741m)	No	Yes				
Sulphur dioxide - engine - 2019	160.09(7.2111m)	28.3854(208.741m)	Yes (at receptor)	Yes	7.16191(7.2111m)	2.83854(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2019	214.52(7.2111m)	38.0365(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2019	94.453(7.2111m)	16.7474(208.741m)	No	Yes				
Sulphur dioxide - engine - 2020	189.396(7.2111m)	33.5817(208.741m)	Yes (at receptor)	Yes	8.47298(7.2111m)	3.35817(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2020	253.791(7.2111m)	44.9994(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2020	111.744(7.2111m)	19.8132(208.741m)	No	Yes				
Sulphur dioxide - engine - 2021	176.568(7.2111m)	31.3071(208.741m)	Yes (at receptor)	Yes	7.89909(7.2111m)	3.13071(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2021	236.601(7.2111m)	41.9516(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2021	104.175(7.2111m)	18.4712(208.741m)	No	Yes				
Sulphur dioxide - engine - 2022	164.21(7.2111m)	29.116(208.741m)	Yes (at receptor)	Yes	7.34626(7.2111m)	2.9116(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2022	220.042(7.2111m)	39.0155(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2022	96.8842(7.2111m)	17.1785(208.741m)	No	Yes				
Sulphur dioxide - engine - 2023	144.264(7.2111m)	25.5794(208.741m)	Yes (at receptor)	Yes	6.45393(7.2111m)	2.55794(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2023	193.314(7.2111m)	34.2764(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2023	85.1159(7.2111m)	15.0918(208.741m)	No	Yes				
Sulphur dioxide - engine - 2024	102(7.2111m)	18.0856(208.741m)	Yes (at receptor)	Yes	4.56317(7.2111m)	1.80856(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2024	136.68(7.2111m)	24.2347(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2024	60.1802(7.2111m)	10.6705(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2025	101.992(7.2111m)	18.0842(208.741m)	Yes (at receptor)	Yes	4.56281(7.2111m)	1.80842(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2025	136.67(7.2111m)	24.2328(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2025	60.1755(7.2111m)	10.6697(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2026	101.992(7.2111m)	18.0842(208.741m)	Yes (at receptor)	Yes	4.56281(7.2111m)	1.80842(208.741m)	No EAL	No EAL

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 15 min - engine - 2026	136.67(7.2111m)	24.2328(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2026	60.1755(7.2111m)	10.6697(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2027	101.992(7.2111m)	18.0842(208.741m)	Yes (at receptor)	Yes	4.56281(7.2111m)	1.80842(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2027	136.67(7.2111m)	24.2328(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2027	60.1755(7.2111m)	10.6697(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2028	101.861(7.2111m)	18.061(208.741m)	Yes (at receptor)	Yes	4.55696(7.2111m)	1.8061(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2028	136.494(7.2111m)	24.2017(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2028	60.0982(7.2111m)	10.656(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2029	98.7855(7.2111m)	17.5156(208.741m)	Yes (at receptor)	Yes	4.41935(7.2111m)	1.75156(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2029	132.373(7.2111m)	23.4709(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2029	58.2835(7.2111m)	10.3342(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2030	92.581(7.2111m)	16.4155(208.741m)	Yes (at receptor)	Yes	4.14178(7.2111m)	1.64155(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2030	124.059(7.2111m)	21.9967(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2030	54.6228(7.2111m)	9.68513(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2031	86.6264(7.2111m)	15.3597(208.741m)	Yes (at receptor)	Yes	3.87539(7.2111m)	1.53597(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2031	116.079(7.2111m)	20.582(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2031	51.1096(7.2111m)	9.06221(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2032	81.1316(7.2111m)	14.3854(208.741m)	Yes (at receptor)	Yes	3.62957(7.2111m)	1.43854(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2032	108.716(7.2111m)	19.2764(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2032	47.8676(7.2111m)	8.48738(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2033	76.0483(7.2111m)	13.4841(208.741m)	Yes (at receptor)	Yes	3.40216(7.2111m)	1.34841(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2033	101.905(7.2111m)	18.0687(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2033	44.8685(7.2111m)	7.95561(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2034	71.3199(7.2111m)	12.6457(208.741m)	Yes (at receptor)	Yes	3.19063(7.2111m)	1.26457(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2034	95.5687(7.2111m)	16.9452(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2034	42.0788(7.2111m)	7.46096(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2035	66.933(7.2111m)	11.8678(208.741m)	Yes (at receptor)	No	2.99437(7.2111m)	1.18678(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2035	89.6902(7.2111m)	15.9029(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2035	39.4905(7.2111m)	7.00203(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2036	62.8547(7.2111m)	11.1447(208.741m)	Yes (at receptor)	No	2.81192(7.2111m)	1.11447(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2036	84.2253(7.2111m)	14.9339(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2036	37.0843(7.2111m)	6.57539(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2037	59.0603(7.2111m)	10.472(208.741m)	Yes (at receptor)	No	2.64217(7.2111m)	1.0472(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2037	79.1409(7.2111m)	14.0324(208.741m)	Yes (at receptor)	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 24 hour - engine - 2037	34.8456(7.2111m)	6.17845(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2038	55.5273(7.2111m)	9.84551(208.741m)	Yes (at receptor)	No	2.48412(7.2111m)	0.984551(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2038	74.4066(7.2111m)	13.193(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2038	32.7611(7.2111m)	5.80885(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2039	52.2351(7.2111m)	9.26177(208.741m)	Yes (at receptor)	No	2.33683(7.2111m)	0.926177(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2039	69.995(7.2111m)	12.4108(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2039	30.8187(7.2111m)	5.46444(208.741m)	Yes (at receptor)	Yes				
Vinyl chloride (chloroethene, chloroethylene) - surface - 1996	80.7491(5m)	48.2877(160.801m)	Yes	No	1.66545(5m)	0.432409(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1997	93.708(5m)	56.0371(160.801m)	Yes	No	1.93273(5m)	0.501804(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1998	102.85(5m)	87.5187(79.8123m)	Yes	No	2.12127(5m)	1.46971(79.8123m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1999	106.442(5m)	90.5756(79.8123m)	Yes	No	2.19537(5m)	1.52104(79.8123m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2003	83.1344(5m)	83.1344(28.3019m)	Yes	No	1.71465(5m)	1.71465(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2008	79.2769(5m)	79.2769(28.3019m)	Yes	No	1.63509(5m)	1.63509(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2016	106.458(5m)	106.458(28.3019m)	Yes	No	2.19569(5m)	2.19569(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2017	140.262(5m)	140.262(28.3019m)	Yes	No	2.89291(5m)	2.89291(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2018	122.827(5m)	122.827(28.3019m)	Yes	No	2.5333(5m)	2.5333(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2019	90.3724(5m)	90.3724(28.3019m)	Yes	No	1.86393(5m)	1.86393(28.3019m)	No	No
Xylene (all isomers) - surface - 1997	2260.94(5m)	1352.03(160.801m)	Yes	No	46.6318(5m)	12.1072(160.801m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 1998	2194.53(5m)	1867.41(79.8123m)	Yes	No	45.2622(5m)	31.3596(79.8123m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 1999	2282.35(5m)	1942.14(79.8123m)	Yes	No	47.0735(5m)	32.6146(79.8123m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 2017	2168.2(5m)	2168.2(28.3019m)	Yes	No	44.7191(5m)	44.7191(28.3019m)	No	No

Not Modelled:

1,1,1,2-Tetrafluorochloroethane
1,1,1-Trichlorotrifluoroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,1-Dichlorotetrafluoroethane
1,2-Dichloropropane
1,2-Dichlorotetrafluoroethane
1-butanethiol
1-Chloro-1,1-difluoroethane
2-butoxy ethanol
2-Chloro-1,1,1-trifluoroethane
2-Propanol
Bromodichloromethane
Butene isomers
Butyric acid
Carbonyl sulphide
Chlorobenzene
Chlorodifluoromethane
Chloroethane
Chlorofluorocarbons (CFCs) (Total)
Chlorofluoromethane
Chlorotrifluoromethane
Dichlorodifluoromethane
Dichlorofluoromethane
Diethyl disulphide
Dimethyl disulphide
Dimethyl sulphide
Dioxins and furans (modelled as 2,3,7,8-TCDD)
Ethane
Ethanethiol (ethyl mercaptan)
Ethanol
Ethyl butyrate
Ethyl toluene (all isomers)
Ethylene
Ethylene dibromide
Fluorotrichloromethane
Freon 113
Furan
Halons
Hexachlorocyclohexane (all isomers)
Hydrochlorofluorocarbons (HCFCs) (Total)
Hydrofluorocarbons (HFCs) (Total)
Limonene

Not Modelled:

Methanethiol (methyl mercaptan)
Methyl isobutyl ketone
Nitrogen dioxide (NO2)
Nitrogen monoxide (NO)
Odour Units (Predicted)
Pentane
Pentene (all isomers)
Perfluorocarbons (PFCs) (Total)
Propane
Propanethiol
Sulphide, total simulations with H2S
Sulphide, total simulations without H2S
t-1,2-Dichloroethene
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)
Total non-methane volatile organic compounds (NMVOCs)
Total volatile organic compounds (VOCs)
Trichlorofluoromethane
Trichlorotrifluoroethane

Year of Interest: All

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Acrylonitrile - surface	1992	264	8.8	0
Acrylonitrile - surface	1993	264	8.8	0
Acrylonitrile - surface	1994	264	8.8	0
Acrylonitrile - surface	1995	264	8.8	0
Acrylonitrile - surface	1996	264	8.8	0
Acrylonitrile - surface	1997	264	8.8	0
Acrylonitrile - surface	1998	264	8.8	0
Acrylonitrile - surface	1999	264	8.8	0
Acrylonitrile - surface	2000	264	8.8	0
Acrylonitrile - surface	2002	264	8.8	0
Acrylonitrile - surface	2003	264	8.8	0
Acrylonitrile - surface	2004	264	8.8	0
Acrylonitrile - surface	2005	264	8.8	0
Acrylonitrile - surface	2007	264	8.8	0
Acrylonitrile - surface	2008	264	8.8	0
Acrylonitrile - surface	2010	264	8.8	0
Acrylonitrile - surface	2013	264	8.8	0
Acrylonitrile - surface	2015	264	8.8	0
Acrylonitrile - surface	2016	264	8.8	0
Acrylonitrile - surface	2017	264	8.8	0
Acrylonitrile - surface	2018	264	8.8	0
Acrylonitrile - surface	2019	264	8.8	0
Arsenic - surface	1982	0.003	0	0
Arsenic - surface	1983	0.003	0	0
Arsenic - surface	1984	0.003	0	0
Arsenic - surface	1985	0.003	0	0
Arsenic - surface	1986	0.003	0	0
Arsenic - surface	1987	0.003	0	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Arsenic - surface	1988	0.003	0	0
Arsenic - surface	1989	0.003	0	0
Arsenic - surface	1990	0.003	0	0
Arsenic - surface	1991	0.003	0	0
Arsenic - surface	1992	0.003	0	0
Arsenic - surface	1993	0.003	0	0
Arsenic - surface	1994	0.003	0	0
Arsenic - surface	1995	0.003	0	0
Arsenic - surface	1996	0.003	0	0
Arsenic - surface	1997	0.003	0	0
Arsenic - surface	1998	0.003	0	0
Arsenic - surface	1999	0.003	0	0
Arsenic - surface	2000	0.003	0	0
Arsenic - surface	2001	0.003	0	0
Arsenic - surface	2002	0.003	0	0
Arsenic - surface	2003	0.003	0	0
Arsenic - surface	2004	0.003	0	0
Arsenic - surface	2005	0.003	0	0
Arsenic - surface	2006	0.003	0	0
Arsenic - surface	2007	0.003	0	0
Arsenic - surface	2008	0.003	0	0
Arsenic - surface	2009	0.003	0	0
Arsenic - surface	2010	0.003	0	0
Arsenic - surface	2011	0.003	0	0
Arsenic - surface	2012	0.003	0	0
Arsenic - surface	2013	0.003	0	0
Arsenic - surface	2014	0.003	0	0
Arsenic - surface	2015	0.003	0	0
Arsenic - surface	2016	0.003	0	0
Arsenic - surface	2017	0.003	0	0
Arsenic - surface	2018	0.003	0	0
Arsenic - surface	2019	0.003	0	0
Arsenic - surface	2020	0.003	0	0
Arsenic - surface	2021	0.003	0	0
Arsenic - surface	2022	0.003	0	0
Arsenic - surface	2023	0.003	0	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Arsenic - surface	2024	0.003	0	0
Arsenic - surface	2025	0.003	0	0
Arsenic - surface	2026	0.003	0	0
Arsenic - surface	2027	0.003	0	0
Arsenic - surface	2028	0.003	0	0
Arsenic - surface	2029	0.003	0	0
Arsenic - surface	2030	0.003	0	0
Arsenic - surface	2031	0.003	0	0
Arsenic - surface	2032	0.003	0	0
Arsenic - surface	2033	0.003	0	0
Arsenic - surface	2034	0.003	0	0
Arsenic - surface	2035	0.003	0	0
Arsenic - surface	2036	0.003	0	0
Arsenic - surface	2037	0.003	0	0
Arsenic - surface	2038	0.003	0	0
Arsenic - surface	2039	0.003	0	0
Arsenic - surface	2040	0.003	0	0
Arsenic - surface	2041	0.003	0	0
Arsenic - surface	2042	0.003	0	0
Benzene - surface	1983	0	5	0
Benzene - surface	1984	0	5	0
Benzene - surface	1985	0	5	0
Benzene - surface	1986	0	5	0
Benzene - surface	1987	0	5	0
Benzene - surface	1988	0	5	0
Benzene - surface	1989	0	5	0
Benzene - surface	1990	0	5	0
Benzene - surface	1991	0	5	0
Benzene - surface	1992	0	5	0
Benzene - surface	1993	0	5	0
Benzene - surface	1994	0	5	0
Benzene - surface	1995	0	5	0
Benzene - surface	1996	0	5	0
Benzene - surface	1997	0	5	0
Benzene - surface	1998	0	5	0
Benzene - surface	1999	0	5	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Benzene - surface	2000	0	5	0
Benzene - surface	2001	0	5	0
Benzene - surface	2002	0	5	0
Benzene - surface	2003	0	5	0
Benzene - surface	2004	0	5	0
Benzene - surface	2005	0	5	0
Benzene - surface	2006	0	5	0
Benzene - surface	2007	0	5	0
Benzene - surface	2008	0	5	0
Benzene - surface	2009	0	5	0
Benzene - surface	2010	0	5	0
Benzene - surface	2011	0	5	0
Benzene - surface	2012	0	5	0
Benzene - surface	2013	0	5	0
Benzene - surface	2014	0	5	0
Benzene - surface	2015	0	5	0
Benzene - surface	2016	0	5	0
Benzene - surface	2017	0	5	0
Benzene - surface	2018	0	5	0
Benzene - surface	2019	0	5	0
Benzene - surface	2020	0	5	0
Benzene - surface	2021	0	5	0
Benzene - surface	2022	0	5	0
Benzene - surface	2023	0	5	0
Benzo(a)pyrene - flare	2000	0	0.00025	0
Benzo(a)pyrene - flare	2001	0	0.00025	0
Benzo(a)pyrene - flare	2002	0	0.00025	0
Benzo(a)pyrene - flare	2004	0	0.00025	0
Benzo(a)pyrene - flare	2006	0	0.00025	0
Benzo(a)pyrene - flare	2007	0	0.00025	0
Benzo(a)pyrene - flare	2008	0	0.00025	0
Benzo(a)pyrene - flare	2009	0	0.00025	0
Benzo(a)pyrene - flare	2010	0	0.00025	0
Benzo(a)pyrene - flare	2011	0	0.00025	0
Benzo(a)pyrene - flare	2012	0	0.00025	0
Carbon monoxide - engine	2014	10000	0	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Carbon monoxide - engine	2020	10000	0	0
Dichloromethane (methylene chloride) - surface	1999	3000	700	0
Dichloromethane (methylene chloride) - surface	2008	3000	700	0
Ethylene dichloride - surface	1984	700	42	0
Ethylene dichloride - surface	1985	700	42	0
Ethylene dichloride - surface	1986	700	42	0
Ethylene dichloride - surface	1987	700	42	0
Ethylene dichloride - surface	1988	700	42	0
Ethylene dichloride - surface	1989	700	42	0
Ethylene dichloride - surface	1990	700	42	0
Ethylene dichloride - surface	1991	700	42	0
Ethylene dichloride - surface	1992	700	42	0
Ethylene dichloride - surface	1993	700	42	0
Ethylene dichloride - surface	1994	700	42	0
Ethylene dichloride - surface	1995	700	42	0
Ethylene dichloride - surface	1996	700	42	0
Ethylene dichloride - surface	1997	700	42	0
Ethylene dichloride - surface	1998	700	42	0
Ethylene dichloride - surface	1999	700	42	0
Ethylene dichloride - surface	2000	700	42	0
Ethylene dichloride - surface	2001	700	42	0
Ethylene dichloride - surface	2002	700	42	0
Ethylene dichloride - surface	2003	700	42	0
Ethylene dichloride - surface	2004	700	42	0
Ethylene dichloride - surface	2005	700	42	0
Ethylene dichloride - surface	2006	700	42	0
Ethylene dichloride - surface	2007	700	42	0
Ethylene dichloride - surface	2008	700	42	0
Ethylene dichloride - surface	2009	700	42	0
Ethylene dichloride - surface	2010	700	42	0
Ethylene dichloride - surface	2011	700	42	0
Ethylene dichloride - surface	2012	700	42	0
Ethylene dichloride - surface	2013	700	42	0
Ethylene dichloride - surface	2014	700	42	0
Ethylene dichloride - surface	2015	700	42	0
Ethylene dichloride - surface	2016	700	42	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Ethylene dichloride - surface	2017	700	42	0
Ethylene dichloride - surface	2018	700	42	0
Ethylene dichloride - surface	2019	700	42	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2014	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2020	750	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2000	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2001	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2002	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2003	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2004	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2005	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2006	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2006	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2007	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2007	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2008	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2009	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2009	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2010	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2010	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2011	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2011	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2012	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2012	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2013	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2014	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2015	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2016	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2017	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2018	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2019	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2020	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2021	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2022	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2023	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2024	160	16	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2025	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2026	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2027	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2028	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2029	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2030	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2031	160	16	0
Hydrogen sulphide - surface	1983	150	140	0
Hydrogen sulphide - surface	1984	150	140	0
Hydrogen sulphide - surface	1985	150	140	0
Hydrogen sulphide - surface	1986	150	140	0
Hydrogen sulphide - surface	1987	150	140	0
Hydrogen sulphide - surface	1988	150	140	0
Hydrogen sulphide - surface	1989	150	140	0
Hydrogen sulphide - surface	1990	150	140	0
Hydrogen sulphide - surface	1991	150	140	0
Hydrogen sulphide - surface	1992	150	140	0
Hydrogen sulphide - surface	1993	150	140	0
Hydrogen sulphide - surface	1994	150	140	0
Hydrogen sulphide - surface	1995	150	140	0
Hydrogen sulphide - surface	1996	150	140	0
Hydrogen sulphide - surface	1997	150	140	0
Hydrogen sulphide - surface	1998	150	140	0
Hydrogen sulphide - surface	1999	150	140	0
Hydrogen sulphide - surface	2000	150	140	0
Hydrogen sulphide - surface	2001	150	140	0
Hydrogen sulphide - surface	2002	150	140	0
Hydrogen sulphide - surface	2003	150	140	0
Hydrogen sulphide - surface	2004	150	140	0
Hydrogen sulphide - surface	2005	150	140	0
Hydrogen sulphide - surface	2006	150	140	0
Hydrogen sulphide - surface	2007	150	140	0
Hydrogen sulphide - surface	2008	150	140	0
Hydrogen sulphide - surface	2009	150	140	0
Hydrogen sulphide - surface	2010	150	140	0
Hydrogen sulphide - surface	2011	150	140	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Hydrogen sulphide - surface	2012	150	140	0
Hydrogen sulphide - surface	2013	150	140	0
Hydrogen sulphide - surface	2014	150	140	0
Hydrogen sulphide - surface	2015	150	140	0
Hydrogen sulphide - surface	2016	150	140	0
Hydrogen sulphide - surface	2017	150	140	0
Hydrogen sulphide - surface	2018	150	140	0
Hydrogen sulphide - surface	2019	150	140	0
Nitrogen oxides (NOx) - flare	2000	200	40	4.30145
Nitrogen oxides (NOx) - flare	2001	200	40	4.30145
Nitrogen oxides (NOx) - flare	2002	200	40	4.30145
Nitrogen oxides (NOx) - engine	2003	200	40	4.30145
Nitrogen oxides (NOx) - engine	2004	200	40	4.30145
Nitrogen oxides (NOx) - flare	2004	200	40	4.30145
Nitrogen oxides (NOx) - engine	2005	200	40	4.30145
Nitrogen oxides (NOx) - engine	2006	200	40	4.30145
Nitrogen oxides (NOx) - flare	2006	200	40	4.30145
Nitrogen oxides (NOx) - engine	2007	200	40	4.30145
Nitrogen oxides (NOx) - flare	2007	200	40	4.30145
Nitrogen oxides (NOx) - engine	2008	200	40	4.30145
Nitrogen oxides (NOx) - flare	2008	200	40	4.30145
Nitrogen oxides (NOx) - engine	2009	200	40	4.30145
Nitrogen oxides (NOx) - flare	2009	200	40	4.30145
Nitrogen oxides (NOx) - engine	2010	200	40	4.30145
Nitrogen oxides (NOx) - flare	2010	200	40	4.30145
Nitrogen oxides (NOx) - engine	2011	200	40	4.30145
Nitrogen oxides (NOx) - flare	2011	200	40	4.30145
Nitrogen oxides (NOx) - engine	2012	200	40	4.30145
Nitrogen oxides (NOx) - flare	2012	200	40	4.30145
Nitrogen oxides (NOx) - engine	2013	200	40	4.30145
Nitrogen oxides (NOx) - engine	2014	200	40	4.30145
Nitrogen oxides (NOx) - engine	2015	200	40	4.30145
Nitrogen oxides (NOx) - engine	2016	200	40	4.30145
Nitrogen oxides (NOx) - engine	2017	200	40	4.30145
Nitrogen oxides (NOx) - engine	2018	200	40	4.30145
Nitrogen oxides (NOx) - engine	2019	200	40	4.30145

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Nitrogen oxides (NOx) - engine	2020	200	40	4.30145
Nitrogen oxides (NOx) - engine	2021	200	40	4.30145
Nitrogen oxides (NOx) - engine	2022	200	40	4.30145
Nitrogen oxides (NOx) - engine	2023	200	40	4.30145
Nitrogen oxides (NOx) - engine	2024	200	40	4.30145
Nitrogen oxides (NOx) - engine	2025	200	40	4.30145
Nitrogen oxides (NOx) - engine	2026	200	40	4.30145
Nitrogen oxides (NOx) - engine	2027	200	40	4.30145
Nitrogen oxides (NOx) - engine	2028	200	40	4.30145
Nitrogen oxides (NOx) - engine	2029	200	40	4.30145
Nitrogen oxides (NOx) - engine	2030	200	40	4.30145
Nitrogen oxides (NOx) - engine	2031	200	40	4.30145
Nitrogen oxides (NOx) - engine	2032	200	40	4.30145
PM10s 24 hour - flare	2000	50		8.56818
PM10s 24 hour - flare	2001	50		8.56818
PM10s 24 hour - flare	2002	50		8.56818
PM10s 24 hour - flare	2006	50		8.56818
PM10s 24 hour - flare	2009	50		8.56818
PM10s 24 hour - flare	2011	50		8.56818
PM10s 24 hour - flare	2012	50		8.56818
PM10s - engine	2014	0	40	8.56818
PM10s 24 hour - engine	2014	50		8.56818
PM10s - engine	2020	0	40	8.56818
PM10s 24 hour - engine	2020	50		8.56818
Sulphur dioxide - flare	2000	350	0	0
Sulphur dioxide 15 min - flare	2000	266		0
Sulphur dioxide 24 hour - flare	2000	125		0
Sulphur dioxide - flare	2001	350	0	0
Sulphur dioxide 15 min - flare	2001	266		0
Sulphur dioxide 24 hour - flare	2001	125		0
Sulphur dioxide - flare	2002	350	0	0
Sulphur dioxide 15 min - flare	2002	266		0
Sulphur dioxide 24 hour - flare	2002	125		0
Sulphur dioxide - engine	2003	350	0	0
Sulphur dioxide 15 min - engine	2003	266		0
Sulphur dioxide 24 hour - engine	2003	125		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide - engine	2004	350	0	0
Sulphur dioxide 15 min - engine	2004	266		0
Sulphur dioxide 24 hour - engine	2004	125		0
Sulphur dioxide 15 min - flare	2004	266		0
Sulphur dioxide 24 hour - flare	2004	125		0
Sulphur dioxide - engine	2005	350	0	0
Sulphur dioxide 15 min - engine	2005	266		0
Sulphur dioxide 24 hour - engine	2005	125		0
Sulphur dioxide - engine	2006	350	0	0
Sulphur dioxide 15 min - engine	2006	266		0
Sulphur dioxide 24 hour - engine	2006	125		0
Sulphur dioxide - flare	2006	350	0	0
Sulphur dioxide 15 min - flare	2006	266		0
Sulphur dioxide 24 hour - flare	2006	125		0
Sulphur dioxide - engine	2007	350	0	0
Sulphur dioxide 15 min - engine	2007	266		0
Sulphur dioxide 24 hour - engine	2007	125		0
Sulphur dioxide - flare	2007	350	0	0
Sulphur dioxide 15 min - flare	2007	266		0
Sulphur dioxide 24 hour - flare	2007	125		0
Sulphur dioxide - engine	2008	350	0	0
Sulphur dioxide 15 min - engine	2008	266		0
Sulphur dioxide 24 hour - engine	2008	125		0
Sulphur dioxide 15 min - flare	2008	266		0
Sulphur dioxide 24 hour - flare	2008	125		0
Sulphur dioxide - engine	2009	350	0	0
Sulphur dioxide 15 min - engine	2009	266		0
Sulphur dioxide 24 hour - engine	2009	125		0
Sulphur dioxide - flare	2009	350	0	0
Sulphur dioxide 15 min - flare	2009	266		0
Sulphur dioxide 24 hour - flare	2009	125		0
Sulphur dioxide - engine	2010	350	0	0
Sulphur dioxide 15 min - engine	2010	266		0
Sulphur dioxide 24 hour - engine	2010	125		0
Sulphur dioxide - flare	2010	350	0	0
Sulphur dioxide 15 min - flare	2010	266		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide 24 hour - flare	2010	125		0
Sulphur dioxide - engine	2011	350	0	0
Sulphur dioxide 15 min - engine	2011	266		0
Sulphur dioxide 24 hour - engine	2011	125		0
Sulphur dioxide - flare	2011	350	0	0
Sulphur dioxide 15 min - flare	2011	266		0
Sulphur dioxide 24 hour - flare	2011	125		0
Sulphur dioxide - engine	2012	350	0	0
Sulphur dioxide 15 min - engine	2012	266		0
Sulphur dioxide 24 hour - engine	2012	125		0
Sulphur dioxide - flare	2012	350	0	0
Sulphur dioxide 15 min - flare	2012	266		0
Sulphur dioxide 24 hour - flare	2012	125		0
Sulphur dioxide - engine	2013	350	0	0
Sulphur dioxide 15 min - engine	2013	266		0
Sulphur dioxide 24 hour - engine	2013	125		0
Sulphur dioxide - engine	2014	350	0	0
Sulphur dioxide 15 min - engine	2014	266		0
Sulphur dioxide 24 hour - engine	2014	125		0
Sulphur dioxide - engine	2015	350	0	0
Sulphur dioxide 15 min - engine	2015	266		0
Sulphur dioxide 24 hour - engine	2015	125		0
Sulphur dioxide - engine	2016	350	0	0
Sulphur dioxide 15 min - engine	2016	266		0
Sulphur dioxide 24 hour - engine	2016	125		0
Sulphur dioxide - engine	2017	350	0	0
Sulphur dioxide 15 min - engine	2017	266		0
Sulphur dioxide 24 hour - engine	2017	125		0
Sulphur dioxide - engine	2018	350	0	0
Sulphur dioxide 15 min - engine	2018	266		0
Sulphur dioxide 24 hour - engine	2018	125		0
Sulphur dioxide - engine	2019	350	0	0
Sulphur dioxide 15 min - engine	2019	266		0
Sulphur dioxide 24 hour - engine	2019	125		0
Sulphur dioxide - engine	2020	350	0	0
Sulphur dioxide 15 min - engine	2020	266		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Sulphur dioxide 24 hour - engine	2020	125		0
Sulphur dioxide - engine	2021	350	0	0
Sulphur dioxide 15 min - engine	2021	266		0
Sulphur dioxide 24 hour - engine	2021	125		0
Sulphur dioxide - engine	2022	350	0	0
Sulphur dioxide 15 min - engine	2022	266		0
Sulphur dioxide 24 hour - engine	2022	125		0
Sulphur dioxide - engine	2023	350	0	0
Sulphur dioxide 15 min - engine	2023	266		0
Sulphur dioxide 24 hour - engine	2023	125		0
Sulphur dioxide - engine	2024	350	0	0
Sulphur dioxide 15 min - engine	2024	266		0
Sulphur dioxide 24 hour - engine	2024	125		0
Sulphur dioxide - engine	2025	350	0	0
Sulphur dioxide 15 min - engine	2025	266		0
Sulphur dioxide 24 hour - engine	2025	125		0
Sulphur dioxide - engine	2026	350	0	0
Sulphur dioxide 15 min - engine	2026	266		0
Sulphur dioxide 24 hour - engine	2026	125		0
Sulphur dioxide - engine	2027	350	0	0
Sulphur dioxide 15 min - engine	2027	266		0
Sulphur dioxide 24 hour - engine	2027	125		0
Sulphur dioxide - engine	2028	350	0	0
Sulphur dioxide 15 min - engine	2028	266		0
Sulphur dioxide 24 hour - engine	2028	125		0
Sulphur dioxide - engine	2029	350	0	0
Sulphur dioxide 15 min - engine	2029	266		0
Sulphur dioxide 24 hour - engine	2029	125		0
Sulphur dioxide - engine	2030	350	0	0
Sulphur dioxide 15 min - engine	2030	266		0
Sulphur dioxide 24 hour - engine	2030	125		0
Sulphur dioxide - engine	2031	350	0	0
Sulphur dioxide 15 min - engine	2031	266		0
Sulphur dioxide 24 hour - engine	2031	125		0
Sulphur dioxide 15 min - engine	2032	266		0
Sulphur dioxide 24 hour - engine	2032	125		0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Vinyl chloride (chloroethene, chloroethylene) - surface	1987	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1988	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1989	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1990	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1991	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1992	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1993	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1994	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1995	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1996	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1997	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1998	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	1999	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2000	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2001	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2002	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2003	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2004	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2005	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2007	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2008	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2010	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2011	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2013	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2015	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2016	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2017	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2018	1851	159	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2019	1851	159	0
Xylene (all isomers) - surface	1995	66200	4410	0
Xylene (all isomers) - surface	1996	66200	4410	0
Xylene (all isomers) - surface	1997	66200	4410	0
Xylene (all isomers) - surface	1998	66200	4410	0
Xylene (all isomers) - surface	1999	66200	4410	0
Xylene (all isomers) - surface	2003	66200	4410	0
Xylene (all isomers) - surface	2015	66200	4410	0

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Xylene (all isomers) - surface	2016	66200	4410	0
Xylene (all isomers) - surface	2017	66200	4410	0
Xylene (all isomers) - surface	2018	66200	4410	0
Xylene (all isomers) - surface	2019	66200	4410	0

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Acrylonitrile - surface - 1992	4.3259(5m)	2.2546(191.525m)	Yes	No	0.0892216(5m)	0.0198423(191.525m)	Yes (at receptor)	No
Acrylonitrile - surface - 1993	5.68102(5m)	2.96087(191.525m)	Yes	No	0.117171(5m)	0.0260581(191.525m)	Yes (at receptor)	No
Acrylonitrile - surface - 1994	5.64215(5m)	3.37399(160.801m)	Yes	No	0.116369(5m)	0.0302136(160.801m)	Yes (at receptor)	No
Acrylonitrile - surface - 1995	5.10852(5m)	3.05488(160.801m)	Yes	No	0.105363(5m)	0.027356(160.801m)	Yes (at receptor)	No
Acrylonitrile - surface - 1996	5.41424(5m)	3.2377(160.801m)	Yes	No	0.111669(5m)	0.0289931(160.801m)	Yes (at receptor)	No
Acrylonitrile - surface - 1997	8.14009(5m)	4.86775(160.801m)	Yes	No	0.167889(5m)	0.0435899(160.801m)	Yes (at receptor)	No
Acrylonitrile - surface - 1998	9.28169(5m)	7.89815(79.8123m)	Yes	No	0.191435(5m)	0.132634(79.8123m)	No	No
Acrylonitrile - surface - 1999	9.11601(5m)	7.75717(79.8123m)	Yes	No	0.188018(5m)	0.130267(79.8123m)	No	No
Acrylonitrile - surface - 2000	4.28002(5m)	3.64203(79.8123m)	Yes	No	0.0882753(5m)	0.061161(79.8123m)	Yes (at receptor)	No
Acrylonitrile - surface - 2002	6.47762(5m)	5.51206(79.8123m)	Yes	No	0.133601(5m)	0.0925645(79.8123m)	No	No
Acrylonitrile - surface - 2003	7.53288(5m)	7.53288(28.3019m)	Yes	No	0.155366(5m)	0.155366(28.3019m)	No	No
Acrylonitrile - surface - 2004	7.46737(5m)	7.46737(28.3019m)	Yes	No	0.154015(5m)	0.154015(28.3019m)	No	No
Acrylonitrile - surface - 2005	10.344(5m)	10.344(28.3019m)	Yes	No	0.213346(5m)	0.213346(28.3019m)	No	No
Acrylonitrile - surface - 2007	6.78296(5m)	6.78296(28.3019m)	Yes	No	0.139899(5m)	0.139899(28.3019m)	No	No
Acrylonitrile - surface - 2008	8.46079(5m)	8.46079(28.3019m)	Yes	No	0.174504(5m)	0.174504(28.3019m)	No	No
Acrylonitrile - surface - 2010	6.22669(5m)	6.22669(28.3019m)	Yes	No	0.128426(5m)	0.128426(28.3019m)	No	No
Acrylonitrile - surface - 2013	4.98076(5m)	4.98076(28.3019m)	Yes	No	0.102728(5m)	0.102728(28.3019m)	No	No
Acrylonitrile - surface - 2015	4.78986(5m)	4.78986(28.3019m)	Yes	No	0.0987909(5m)	0.0987909(28.3019m)	No	No
Acrylonitrile - surface - 2016	7.40109(5m)	7.40109(28.3019m)	Yes	No	0.152647(5m)	0.152647(28.3019m)	No	No
Acrylonitrile - surface - 2017	8.036(5m)	8.036(28.3019m)	Yes	No	0.165742(5m)	0.165742(28.3019m)	No	No
Acrylonitrile - surface - 2018	7.27512(5m)	7.27512(28.3019m)	Yes	No	0.150049(5m)	0.150049(28.3019m)	No	No
Acrylonitrile - surface - 2019	4.70933(5m)	4.70933(28.3019m)	Yes	No	0.09713(5m)	0.09713(28.3019m)	No	No
Arsenic - surface - 1982	0.00282706(5m)	0.00137819(210m)	No	Yes	5.83081e-005(5m)	1.16616e-005(210m)	No EAL	No EAL
Arsenic - surface - 1983	0.0128919(5m)	0.00628482(210m)	No	Yes	0.000265896(5m)	5.31793e-005(210m)	No EAL	No EAL
Arsenic - surface - 1984	0.024688(5m)	0.0120354(210m)	No	Yes	0.00050919(5m)	0.000101838(210m)	No EAL	No EAL
Arsenic - surface - 1985	0.0261263(5m)	0.0127366(210m)	No	Yes	0.000538856(5m)	0.000107771(210m)	No EAL	No EAL
Arsenic - surface - 1986	0.0219422(5m)	0.0106968(210m)	No	Yes	0.000452558(5m)	9.05116e-005(210m)	No EAL	No EAL
Arsenic - surface - 1987	0.0394584(5m)	0.019236(210m)	No	Yes	0.000813829(5m)	0.000162766(210m)	No EAL	No EAL
Arsenic - surface - 1988	0.0515053(5m)	0.0251088(210m)	No	Yes	0.0010623(5m)	0.000212459(210m)	No EAL	No EAL
Arsenic - surface - 1989	0.0525142(5m)	0.0256007(210m)	No	Yes	0.00108311(5m)	0.000216621(210m)	No EAL	No EAL
Arsenic - surface - 1990	0.0527133(5m)	0.0256977(210m)	No	Yes	0.00108721(5m)	0.000217442(210m)	No EAL	No EAL
Arsenic - surface - 1991	0.068036(5m)	0.0331676(210m)	No	Yes	0.00140324(5m)	0.000280649(210m)	No EAL	No EAL
Arsenic - surface - 1992	0.0726951(5m)	0.0378877(191.525m)	No	Yes	0.00149934(5m)	0.000333443(191.525m)	No EAL	No EAL
Arsenic - surface - 1993	0.0694622(5m)	0.0362027(191.525m)	No	Yes	0.00143266(5m)	0.000318614(191.525m)	No EAL	No EAL

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Arsenic - surface - 1994	0.0637464(5m)	0.0381202(160.801m)	No	Yes	0.00131477(5m)	0.00034136(160.801m)	No EAL	No EAL
Arsenic - surface - 1995	0.0624008(5m)	0.0373155(160.801m)	No	Yes	0.00128702(5m)	0.000334154(160.801m)	No EAL	No EAL
Arsenic - surface - 1996	0.0622279(5m)	0.0372121(160.801m)	No	Yes	0.00128345(5m)	0.000333229(160.801m)	No EAL	No EAL
Arsenic - surface - 1997	0.077008(5m)	0.0460506(160.801m)	No	Yes	0.00158829(5m)	0.000412376(160.801m)	No EAL	No EAL
Arsenic - surface - 1998	0.0851632(5m)	0.0724687(79.8123m)	No	Yes	0.00175649(5m)	0.00121697(79.8123m)	No EAL	No EAL
Arsenic - surface - 1999	0.092184(5m)	0.078443(79.8123m)	No	Yes	0.0019013(5m)	0.0013173(79.8123m)	No EAL	No EAL
Arsenic - surface - 2000	0.0480191(5m)	0.0408613(79.8123m)	No	Yes	0.000990395(5m)	0.000686188(79.8123m)	No EAL	No EAL
Arsenic - surface - 2001	0.0431919(5m)	0.0367537(79.8123m)	No	Yes	0.000890833(5m)	0.000617208(79.8123m)	No EAL	No EAL
Arsenic - surface - 2002	0.10472(5m)	0.0891099(79.8123m)	No	Yes	0.00215984(5m)	0.00149643(79.8123m)	No EAL	No EAL
Arsenic - surface - 2003	0.124199(5m)	0.124199(28.3019m)	No	Yes	0.0025616(5m)	0.0025616(28.3019m)	No EAL	No EAL
Arsenic - surface - 2004	0.0708605(5m)	0.0708605(28.3019m)	No	Yes	0.0014615(5m)	0.0014615(28.3019m)	No EAL	No EAL
Arsenic - surface - 2005	0.0998067(5m)	0.0998067(28.3019m)	No	Yes	0.00205851(5m)	0.00205851(28.3019m)	No EAL	No EAL
Arsenic - surface - 2006	0.0300262(5m)	0.0300262(28.3019m)	No	Yes	0.00061929(5m)	0.00061929(28.3019m)	No EAL	No EAL
Arsenic - surface - 2007	0.094527(5m)	0.094527(28.3019m)	No	Yes	0.00194962(5m)	0.00194962(28.3019m)	No EAL	No EAL
Arsenic - surface - 2008	0.11222(5m)	0.11222(28.3019m)	No	Yes	0.00231453(5m)	0.00231453(28.3019m)	No EAL	No EAL
Arsenic - surface - 2009	0.0228986(5m)	0.0228986(28.3019m)	No	Yes	0.000472283(5m)	0.000472283(28.3019m)	No EAL	No EAL
Arsenic - surface - 2010	0.0674443(5m)	0.0674443(28.3019m)	No	Yes	0.00139104(5m)	0.00139104(28.3019m)	No EAL	No EAL
Arsenic - surface - 2011	0.0314477(5m)	0.0314477(28.3019m)	No	Yes	0.000648609(5m)	0.000648609(28.3019m)	No EAL	No EAL
Arsenic - surface - 2012	0.0204098(5m)	0.0204098(28.3019m)	No	Yes	0.000420953(5m)	0.000420953(28.3019m)	No EAL	No EAL
Arsenic - surface - 2013	0.0421461(5m)	0.0421461(28.3019m)	No	Yes	0.000869264(5m)	0.000869264(28.3019m)	No EAL	No EAL
Arsenic - surface - 2014	0.0163147(5m)	0.0163147(28.3019m)	No	Yes	0.00033649(5m)	0.00033649(28.3019m)	No EAL	No EAL
Arsenic - surface - 2015	0.0659072(5m)	0.0659072(28.3019m)	No	Yes	0.00135934(5m)	0.00135934(28.3019m)	No EAL	No EAL
Arsenic - surface - 2016	0.11094(5m)	0.11094(28.3019m)	No	Yes	0.00228813(5m)	0.00228813(28.3019m)	No EAL	No EAL
Arsenic - surface - 2017	0.124474(5m)	0.124474(28.3019m)	No	Yes	0.00256728(5m)	0.00256728(28.3019m)	No EAL	No EAL
Arsenic - surface - 2018	0.102361(5m)	0.102361(28.3019m)	No	Yes	0.0021112(5m)	0.0021112(28.3019m)	No EAL	No EAL
Arsenic - surface - 2019	0.0637983(5m)	0.0637983(28.3019m)	No	Yes	0.00131584(5m)	0.00131584(28.3019m)	No EAL	No EAL
Arsenic - surface - 2020	0.00695906(5m)	0.00695906(28.3019m)	No	Yes	0.000143531(5m)	0.000143531(28.3019m)	No EAL	No EAL
Arsenic - surface - 2021	0.00956988(5m)	0.00956988(28.3019m)	No	Yes	0.000197379(5m)	0.000197379(28.3019m)	No EAL	No EAL
Arsenic - surface - 2022	0.0112685(5m)	0.0112685(28.3019m)	No	Yes	0.000232413(5m)	0.000232413(28.3019m)	No EAL	No EAL
Arsenic - surface - 2023	0.00560757(5m)	0.00560757(28.3019m)	No	Yes	0.000115656(5m)	0.000115656(28.3019m)	No EAL	No EAL
Arsenic - surface - 2024	0.00239419(5m)	0.00239419(28.3019m)	No	Yes	4.93801e-005(5m)	4.93801e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2025	0.00139065(5m)	0.00139065(28.3019m)	No	Yes	2.86821e-005(5m)	2.86821e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2026	0.00109392(5m)	0.00109392(28.3019m)	No	Yes	2.25621e-005(5m)	2.25621e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2027	0.000867933(5m)	0.000867933(28.3019m)	No	Yes	1.79011e-005(5m)	1.79011e-005(28.3019m)	No EAL	No EAL

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Arsenic - surface - 2028	0.000692089(5m)	0.000692089(28.3019m)	No	Yes	1.42743e-005(5m)	1.42743e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2029	0.000539668(5m)	0.000539668(28.3019m)	No	No	1.11306e-005(5m)	1.11306e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2030	0.000424127(5m)	0.000424127(28.3019m)	No	No	8.74762e-006(5m)	8.74762e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2031	0.000514852(5m)	0.000514852(28.3019m)	No	No	1.06188e-005(5m)	1.06188e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2032	0.00249345(5m)	0.00249345(28.3019m)	No	Yes	5.14273e-005(5m)	5.14273e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2033	0.00224942(5m)	0.00224942(28.3019m)	No	Yes	4.63943e-005(5m)	4.63943e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2034	0.00181631(5m)	0.00181631(28.3019m)	No	Yes	3.74615e-005(5m)	3.74615e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2035	0.00146727(5m)	0.00146727(28.3019m)	No	Yes	3.02624e-005(5m)	3.02624e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2036	0.00119962(5m)	0.00119962(28.3019m)	No	Yes	2.47422e-005(5m)	2.47422e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2037	0.000984237(5m)	0.000984237(28.3019m)	No	Yes	2.02999e-005(5m)	2.02999e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2038	0.000777747(5m)	0.000777747(28.3019m)	No	Yes	1.6041e-005(5m)	1.6041e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2039	0.000627319(5m)	0.000627319(28.3019m)	No	Yes	1.29385e-005(5m)	1.29385e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2040	0.00050772(5m)	0.00050772(28.3019m)	No	No	1.04717e-005(5m)	1.04717e-005(28.3019m)	No EAL	No EAL
Arsenic - surface - 2041	0.000411061(5m)	0.000411061(28.3019m)	No	No	8.47812e-006(5m)	8.47812e-006(28.3019m)	No EAL	No EAL
Arsenic - surface - 2042	0.000336277(5m)	0.000336277(28.3019m)	No	No	6.93572e-006(5m)	6.93572e-006(28.3019m)	No EAL	No EAL
Benzene - surface - 1983	8.1385(5m)	3.96752(210m)	No EAL	No EAL	0.167857(5m)	0.0335713(210m)	Yes (at receptor)	No
Benzene - surface - 1984	12.0428(5m)	5.87087(210m)	No EAL	No EAL	0.248383(5m)	0.0496766(210m)	Yes (at receptor)	No
Benzene - surface - 1985	13.8665(5m)	6.7599(210m)	No EAL	No EAL	0.285996(5m)	0.0571991(210m)	No	No
Benzene - surface - 1986	12.5799(5m)	6.13272(210m)	No EAL	No EAL	0.259461(5m)	0.0518923(210m)	No	No
Benzene - surface - 1987	17.7217(5m)	8.63931(210m)	No EAL	No EAL	0.365509(5m)	0.0731019(210m)	No	No
Benzene - surface - 1988	21.6826(5m)	10.5703(210m)	No EAL	No EAL	0.447205(5m)	0.0894409(210m)	No	No
Benzene - surface - 1989	24.0189(5m)	11.7092(210m)	No EAL	No EAL	0.495391(5m)	0.0990782(210m)	No	No
Benzene - surface - 1990	26.6467(5m)	12.9902(210m)	No EAL	No EAL	0.549587(5m)	0.109917(210m)	No	No
Benzene - surface - 1991	26.6476(5m)	12.9907(210m)	No EAL	No EAL	0.549607(5m)	0.109921(210m)	No	No
Benzene - surface - 1992	33.1631(5m)	17.2842(191.525m)	No EAL	No EAL	0.68399(5m)	0.152115(191.525m)	No	No
Benzene - surface - 1993	38.245(5m)	19.9328(191.525m)	No EAL	No EAL	0.788803(5m)	0.175425(191.525m)	No	No
Benzene - surface - 1994	34.2028(5m)	20.4532(160.801m)	No EAL	No EAL	0.705433(5m)	0.183155(160.801m)	No	No
Benzene - surface - 1995	33.83(5m)	20.2303(160.801m)	No EAL	No EAL	0.697744(5m)	0.181159(160.801m)	No	No
Benzene - surface - 1996	36.1321(5m)	21.6069(160.801m)	No EAL	No EAL	0.745225(5m)	0.193487(160.801m)	No	No
Benzene - surface - 1997	46.1349(5m)	27.5886(160.801m)	No EAL	No EAL	0.951533(5m)	0.247051(160.801m)	No	No
Benzene - surface - 1998	50.9952(5m)	43.3938(79.8123m)	No EAL	No EAL	1.05178(5m)	0.728716(79.8123m)	No	No
Benzene - surface - 1999	52.807(5m)	44.9355(79.8123m)	No EAL	No EAL	1.08914(5m)	0.754606(79.8123m)	No	No
Benzene - surface - 2000	26.5677(5m)	22.6075(79.8123m)	No EAL	No EAL	0.547959(5m)	0.37965(79.8123m)	No	No
Benzene - surface - 2001	24.3397(5m)	20.7116(79.8123m)	No EAL	No EAL	0.502006(5m)	0.347812(79.8123m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Benzene - surface - 2002	37.6558(5m)	32.0428(79.8123m)	No EAL	No EAL	0.776652(5m)	0.538098(79.8123m)	No	No
Benzene - surface - 2003	44.6912(5m)	44.6912(28.3019m)	No EAL	No EAL	0.921757(5m)	0.921757(28.3019m)	No	No
Benzene - surface - 2004	33.3083(5m)	33.3083(28.3019m)	No EAL	No EAL	0.686983(5m)	0.686983(28.3019m)	No	No
Benzene - surface - 2005	46.1712(5m)	46.1712(28.3019m)	No EAL	No EAL	0.95228(5m)	0.95228(28.3019m)	No	No
Benzene - surface - 2006	12.1593(5m)	12.1593(28.3019m)	No EAL	No EAL	0.250785(5m)	0.250785(28.3019m)	No	No
Benzene - surface - 2007	34.1478(5m)	34.1478(28.3019m)	No EAL	No EAL	0.704297(5m)	0.704297(28.3019m)	No	No
Benzene - surface - 2008	40.7507(5m)	40.7507(28.3019m)	No EAL	No EAL	0.840483(5m)	0.840483(28.3019m)	No	No
Benzene - surface - 2009	12.3375(5m)	12.3375(28.3019m)	No EAL	No EAL	0.254462(5m)	0.254462(28.3019m)	No	No
Benzene - surface - 2010	31.2955(5m)	31.2955(28.3019m)	No EAL	No EAL	0.645471(5m)	0.645471(28.3019m)	No	No
Benzene - surface - 2011	15.8551(5m)	15.8551(28.3019m)	No EAL	No EAL	0.327011(5m)	0.327011(28.3019m)	No	No
Benzene - surface - 2012	10.3661(5m)	10.3661(28.3019m)	No EAL	No EAL	0.213801(5m)	0.213801(28.3019m)	No	No
Benzene - surface - 2013	22.5475(5m)	22.5475(28.3019m)	No EAL	No EAL	0.465043(5m)	0.465043(28.3019m)	No	No
Benzene - surface - 2014	8.34105(5m)	8.34105(28.3019m)	No EAL	No EAL	0.172034(5m)	0.172034(28.3019m)	No	No
Benzene - surface - 2015	31.5057(5m)	31.5057(28.3019m)	No EAL	No EAL	0.649805(5m)	0.649805(28.3019m)	No	No
Benzene - surface - 2016	52.3404(5m)	52.3404(28.3019m)	No EAL	No EAL	1.07952(5m)	1.07952(28.3019m)	No	No
Benzene - surface - 2017	58.2444(5m)	58.2444(28.3019m)	No EAL	No EAL	1.20129(5m)	1.20129(28.3019m)	No	No
Benzene - surface - 2018	50.9466(5m)	50.9466(28.3019m)	No EAL	No EAL	1.05077(5m)	1.05077(28.3019m)	No	No
Benzene - surface - 2019	32.6322(5m)	32.6322(28.3019m)	No EAL	No EAL	0.673039(5m)	0.673039(28.3019m)	No	No
Benzene - surface - 2020	3.98146(5m)	3.98146(28.3019m)	No EAL	No EAL	0.0821177(5m)	0.0821177(28.3019m)	No	No
Benzene - surface - 2021	6.04327(5m)	6.04327(28.3019m)	No EAL	No EAL	0.124643(5m)	0.124643(28.3019m)	No	No
Benzene - surface - 2022	6.45611(5m)	6.45611(28.3019m)	No EAL	No EAL	0.133157(5m)	0.133157(28.3019m)	No	No
Benzene - surface - 2023	3.08923(5m)	3.08923(28.3019m)	No EAL	No EAL	0.0637154(5m)	0.0637154(28.3019m)	No	No
Benzo(a)pyrene - flare - 2000	0.000725211(8.60233m)	4.693e-005(229.103m)	No EAL	No EAL	1.065e-005(8.60233m)	3.9739e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2001	0.000725211(8.60233m)	4.693e-005(229.103m)	No EAL	No EAL	1.065e-005(8.60233m)	3.9739e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2002	0.000718004(8.60233m)	4.64636e-005(229.103m)	No EAL	No EAL	1.05441e-005(8.60233m)	3.93441e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2004	0.000244251(8.60233m)	1.5806e-005(229.103m)	No EAL	No EAL	3.5869e-006(8.60233m)	1.33841e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2006	0.000514586(8.60233m)	3.33e-005(229.103m)	No EAL	No EAL	7.55685e-006(8.60233m)	2.81975e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2007	0.000299988(8.60233m)	1.94129e-005(229.103m)	No EAL	No EAL	4.40542e-006(8.60233m)	1.64383e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2008	0.000201603(8.60233m)	1.30462e-005(229.103m)	No EAL	No EAL	2.96061e-006(8.60233m)	1.10472e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2009	0.000576579(8.60233m)	3.73117e-005(229.103m)	No EAL	No EAL	8.46725e-006(8.60233m)	3.15945e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2010	0.000370764(8.60233m)	2.39929e-005(229.103m)	No EAL	No EAL	5.44478e-006(8.60233m)	2.03165e-006(229.103m)	Yes (at receptor)	No
Benzo(a)pyrene - flare - 2011	0.000523907(8.60233m)	3.39032e-005(229.103m)	No EAL	No EAL	7.69374e-006(8.60233m)	2.87083e-006(229.103m)	No	No
Benzo(a)pyrene - flare - 2012	0.000496897(8.60233m)	3.21553e-005(229.103m)	No EAL	No EAL	7.29709e-006(8.60233m)	2.72282e-006(229.103m)	No	No
Carbon monoxide - engine - 2014	1097.27(7.2111m)	194.557(208.741m)	Yes (at receptor)	No	49.0886(7.2111m)	19.4557(208.741m)	No EAL	No EAL

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	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Carbon monoxide - engine - 2020	1164.33(7.2111m)	206.446(208.741m)	Yes (at receptor)	No	52.0883(7.2111m)	20.6446(208.741m)	No EAL	No EAL
Dichloromethane (methylene chloride) - surface - 1999	357.375(5m)	304.104(79.8123m)	No	No	7.37087(5m)	5.10685(79.8123m)	Yes (at receptor)	No
Dichloromethane (methylene chloride) - surface - 2008	367.096(5m)	367.096(28.3019m)	No	No	7.57136(5m)	7.57136(28.3019m)	No	No
Ethylene dichloride - surface - 1984	30.6647(5m)	14.949(210m)	Yes	No	0.632459(5m)	0.126492(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1985	38.9936(5m)	19.0094(210m)	Yes	No	0.804242(5m)	0.160848(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1986	41.2257(5m)	20.0975(210m)	Yes	No	0.850281(5m)	0.170056(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1987	37.3793(5m)	18.2224(210m)	Yes	No	0.770949(5m)	0.15419(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1988	48.6349(5m)	23.7095(210m)	Yes	No	1.0031(5m)	0.200619(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1989	72.1359(5m)	35.1663(210m)	Yes (at receptor)	No	1.4878(5m)	0.297561(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1990	65.8696(5m)	32.1114(210m)	Yes	No	1.35856(5m)	0.271712(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1991	69.4882(5m)	33.8755(210m)	Yes	No	1.43319(5m)	0.286639(210m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1992	78.0972(5m)	40.7032(191.525m)	Yes (at receptor)	No	1.61075(5m)	0.358221(191.525m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1993	81.3226(5m)	42.3843(191.525m)	Yes (at receptor)	No	1.67728(5m)	0.373016(191.525m)	Yes (at receptor)	No
Ethylene dichloride - surface - 1994	85.9178(5m)	51.3786(160.801m)	Yes (at receptor)	No	1.77206(5m)	0.460088(160.801m)	No	No
Ethylene dichloride - surface - 1995	79.5579(5m)	47.5754(160.801m)	Yes (at receptor)	No	1.64088(5m)	0.42603(160.801m)	No	No
Ethylene dichloride - surface - 1996	82.3824(5m)	49.2644(160.801m)	Yes (at receptor)	No	1.69914(5m)	0.441155(160.801m)	No	No
Ethylene dichloride - surface - 1997	124.935(5m)	74.7106(160.801m)	No	No	2.57678(5m)	0.669022(160.801m)	No	No
Ethylene dichloride - surface - 1998	89.778(5m)	76.3956(79.8123m)	No	No	1.85167(5m)	1.28292(79.8123m)	No	No
Ethylene dichloride - surface - 1999	94.5492(5m)	80.4556(79.8123m)	No	No	1.95008(5m)	1.3511(79.8123m)	No	No
Ethylene dichloride - surface - 2000	35.8188(5m)	30.4796(79.8123m)	Yes	No	0.738762(5m)	0.511846(79.8123m)	No	No
Ethylene dichloride - surface - 2001	48.3656(5m)	41.1562(79.8123m)	Yes	No	0.997541(5m)	0.691139(79.8123m)	No	No
Ethylene dichloride - surface - 2002	94.6655(5m)	80.5545(79.8123m)	No	No	1.95248(5m)	1.35276(79.8123m)	No	No
Ethylene dichloride - surface - 2003	116.326(5m)	116.326(28.3019m)	No	No	2.39922(5m)	2.39922(28.3019m)	No	No
Ethylene dichloride - surface - 2004	80.2195(5m)	80.2195(28.3019m)	No	No	1.65453(5m)	1.65453(28.3019m)	No	No
Ethylene dichloride - surface - 2005	111.976(5m)	111.976(28.3019m)	No	No	2.30951(5m)	2.30951(28.3019m)	No	No
Ethylene dichloride - surface - 2006	32.6006(5m)	32.6006(28.3019m)	Yes	No	0.672386(5m)	0.672386(28.3019m)	No	No
Ethylene dichloride - surface - 2007	67.3433(5m)	67.3433(28.3019m)	Yes	No	1.38896(5m)	1.38896(28.3019m)	No	No
Ethylene dichloride - surface - 2008	85.6676(5m)	85.6676(28.3019m)	No	No	1.76689(5m)	1.76689(28.3019m)	No	No
Ethylene dichloride - surface - 2009	46.1062(5m)	46.1062(28.3019m)	Yes	No	0.95094(5m)	0.95094(28.3019m)	No	No
Ethylene dichloride - surface - 2010	90.9267(5m)	90.9267(28.3019m)	No	No	1.87536(5m)	1.87536(28.3019m)	No	No
Ethylene dichloride - surface - 2011	42.4189(5m)	42.4189(28.3019m)	Yes	No	0.87489(5m)	0.87489(28.3019m)	No	No
Ethylene dichloride - surface - 2012	43.5163(5m)	43.5163(28.3019m)	Yes	No	0.897523(5m)	0.897523(28.3019m)	No	No
Ethylene dichloride - surface - 2013	85.065(5m)	85.065(28.3019m)	No	No	1.75447(5m)	1.75447(28.3019m)	No	No
Ethylene dichloride - surface - 2014	26.8296(5m)	26.8296(28.3019m)	Yes	No	0.55336(5m)	0.55336(28.3019m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Ethylene dichloride - surface - 2015	70.6773(5m)	70.6773(28.3019m)	No	No	1.45772(5m)	1.45772(28.3019m)	No	No
Ethylene dichloride - surface - 2016	119.573(5m)	119.573(28.3019m)	No	No	2.4662(5m)	2.4662(28.3019m)	No	No
Ethylene dichloride - surface - 2017	139.808(5m)	139.808(28.3019m)	No	No	2.88354(5m)	2.88354(28.3019m)	No	No
Ethylene dichloride - surface - 2018	110.953(5m)	110.953(28.3019m)	No	No	2.2884(5m)	2.2884(28.3019m)	No	No
Ethylene dichloride - surface - 2019	68.4669(5m)	68.4669(28.3019m)	Yes	No	1.41213(5m)	1.41213(28.3019m)	No	No
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2014	95.9902(7.2111m)	17.02(208.741m)	Yes (at receptor)	No	4.2943(7.2111m)	1.702(208.741m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2020	101.452(7.2111m)	17.9884(208.741m)	Yes (at receptor)	No	4.53866(7.2111m)	1.79884(208.741m)	No EAL	No EAL
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2000	30.6548(8.60233m)	1.98374(229.103m)	Yes (at receptor)	No	0.450176(8.60233m)	0.167978(229.103m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2001	30.6548(8.60233m)	1.98374(229.103m)	Yes (at receptor)	No	0.450176(8.60233m)	0.167978(229.103m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2002	30.565(8.60233m)	1.97793(229.103m)	Yes (at receptor)	No	0.448857(8.60233m)	0.167485(229.103m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2003	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2004	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2005	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2006	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2006	21.8952(8.60233m)	1.41689(229.103m)	Yes (at receptor)	No	0.321538(8.60233m)	0.119978(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2007	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2007	12.683(8.60233m)	0.820742(229.103m)	Yes	No	0.186253(8.60233m)	0.0694981(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2008	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2009	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2009	25.0149(8.60233m)	1.61877(229.103m)	Yes (at receptor)	No	0.367352(8.60233m)	0.137073(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2010	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2010	15.6777(8.60233m)	1.01454(229.103m)	Yes	No	0.230232(8.60233m)	0.0859082(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2011	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2011	22.0329(8.60233m)	1.4258(229.103m)	Yes (at receptor)	No	0.32356(8.60233m)	0.120732(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2012	10.6811(11.6619m)	1.81159(218.497m)	Yes	No	0.477837(11.6619m)	0.181159(218.497m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2012	20.6805(8.60233m)	1.33828(229.103m)	Yes (at receptor)	No	0.3037(8.60233m)	0.113322(229.103m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2013	12.3573(7.2111m)	2.19106(208.741m)	Yes	No	0.552826(7.2111m)	0.219106(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2014	18.5276(7.2111m)	3.28512(208.741m)	Yes (at receptor)	No	0.828868(7.2111m)	0.328512(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2015	11.8933(7.2111m)	2.10879(208.741m)	Yes	No	0.532067(7.2111m)	0.210879(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2016	10.6583(7.2111m)	1.88981(208.741m)	Yes	No	0.476817(7.2111m)	0.188981(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2017	10.6583(7.2111m)	1.88981(208.741m)	Yes	No	0.476817(7.2111m)	0.188981(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2018	10.9551(7.2111m)	1.94244(208.741m)	Yes	No	0.490096(7.2111m)	0.194244(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2019	13.11(7.2111m)	2.32453(208.741m)	Yes	No	0.586502(7.2111m)	0.232453(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2020	20.384(7.2111m)	3.61428(208.741m)	Yes (at receptor)	No	0.911916(7.2111m)	0.361428(208.741m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2021	15.8048(7.2111m)	2.80234(208.741m)	Yes	No	0.707057(7.2111m)	0.280234(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2022	10.6583(7.2111m)	1.88981(208.741m)	Yes	No	0.476817(7.2111m)	0.188981(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2023	10.6583(7.2111m)	1.88981(208.741m)	Yes	No	0.476817(7.2111m)	0.188981(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2024	10.6563(7.2111m)	1.88946(208.741m)	Yes	No	0.476729(7.2111m)	0.188946(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2025	10.0889(7.2111m)	1.78886(208.741m)	Yes	No	0.451345(7.2111m)	0.178886(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2026	9.17814(7.2111m)	1.62737(208.741m)	Yes	No	0.410601(7.2111m)	0.162737(208.741m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2027	8.37717(7.2111m)	1.48535(208.741m)	Yes	No	0.374768(7.2111m)	0.148535(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2028	7.66109(7.2111m)	1.35838(208.741m)	Yes	No	0.342733(7.2111m)	0.135838(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2029	7.01475(7.2111m)	1.24378(208.741m)	Yes	No	0.313818(7.2111m)	0.124378(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2030	6.42812(7.2111m)	1.13977(208.741m)	Yes	No	0.287574(7.2111m)	0.113977(208.741m)	Yes (at receptor)	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2031	5.75644(7.2111m)	1.02067(208.741m)	Yes	No	0.257525(7.2111m)	0.102067(208.741m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1983	17.9427(5m)	8.74706(210m)	Yes (at receptor)	No	0.370068(5m)	0.0740135(210m)	Yes	No
Hydrogen sulphide - surface - 1984	30.3609(5m)	14.8009(210m)	Yes (at receptor)	Yes	0.626194(5m)	0.125239(210m)	Yes	No
Hydrogen sulphide - surface - 1985	33.9779(5m)	16.5642(210m)	No	Yes	0.700795(5m)	0.140159(210m)	Yes	No
Hydrogen sulphide - surface - 1986	27.7895(5m)	13.5474(210m)	Yes (at receptor)	No	0.573158(5m)	0.114632(210m)	Yes	No
Hydrogen sulphide - surface - 1987	34.3588(5m)	16.7499(210m)	No	Yes	0.708651(5m)	0.14173(210m)	Yes	No
Hydrogen sulphide - surface - 1988	44.7116(5m)	21.7969(210m)	No	Yes	0.922176(5m)	0.184435(210m)	Yes	No
Hydrogen sulphide - surface - 1989	47.9968(5m)	23.3984(210m)	No	Yes	0.989934(5m)	0.197987(210m)	Yes	No
Hydrogen sulphide - surface - 1990	49.1442(5m)	23.9578(210m)	No	Yes	1.0136(5m)	0.20272(210m)	Yes	No
Hydrogen sulphide - surface - 1991	64.6445(5m)	31.5142(210m)	No	Yes	1.33329(5m)	0.266659(210m)	Yes	No
Hydrogen sulphide - surface - 1992	81.9614(5m)	42.7172(191.525m)	No	Yes	1.69045(5m)	0.375946(191.525m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1993	90.7274(5m)	47.2859(191.525m)	No	Yes	1.87125(5m)	0.416154(191.525m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1994	85.895(5m)	51.365(160.801m)	No	Yes	1.77158(5m)	0.459965(160.801m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1995	89.3841(5m)	53.4514(160.801m)	No	Yes	1.84355(5m)	0.478649(160.801m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1996	85.9677(5m)	51.4084(160.801m)	No	Yes	1.77308(5m)	0.460354(160.801m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1997	82.6244(5m)	49.4091(160.801m)	No	Yes	1.70413(5m)	0.442451(160.801m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1998	76.348(5m)	64.9675(79.8123m)	No	Yes	1.57468(5m)	1.091(79.8123m)	Yes (at receptor)	No
Hydrogen sulphide - surface - 1999	104.943(5m)	89.2999(79.8123m)	No	Yes	2.16445(5m)	1.49962(79.8123m)	No	No
Hydrogen sulphide - surface - 2000	61.9686(5m)	52.7314(79.8123m)	No	Yes	1.2781(5m)	0.885524(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2001	55.6554(5m)	47.3593(79.8123m)	No	Yes	1.14789(5m)	0.79531(79.8123m)	Yes	No
Hydrogen sulphide - surface - 2002	117.882(5m)	100.31(79.8123m)	No	Yes	2.43132(5m)	1.68452(79.8123m)	No	No
Hydrogen sulphide - surface - 2003	142.485(5m)	142.485(28.3019m)	No	Yes	2.93876(5m)	2.93876(28.3019m)	No	No
Hydrogen sulphide - surface - 2004	107.289(5m)	107.289(28.3019m)	No	Yes	2.21284(5m)	2.21284(28.3019m)	No	No
Hydrogen sulphide - surface - 2005	152.559(5m)	152.559(28.3019m)	No	Yes	3.14654(5m)	3.14654(28.3019m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Hydrogen sulphide - surface - 2006	40.3358(5m)	40.3358(28.3019m)	No	Yes	0.831926(5m)	0.831926(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2007	142.318(5m)	142.318(28.3019m)	No	Yes	2.9353(5m)	2.9353(28.3019m)	No	No
Hydrogen sulphide - surface - 2008	170.119(5m)	170.119(28.3019m)	No	Yes	3.5087(5m)	3.5087(28.3019m)	No	No
Hydrogen sulphide - surface - 2009	31.7623(5m)	31.7623(28.3019m)	No	Yes	0.655098(5m)	0.655098(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2010	72.7427(5m)	72.7427(28.3019m)	No	Yes	1.50032(5m)	1.50032(28.3019m)	No	No
Hydrogen sulphide - surface - 2011	36.9509(5m)	36.9509(28.3019m)	No	Yes	0.762113(5m)	0.762113(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2012	25.2278(5m)	25.2278(28.3019m)	No	No	0.520323(5m)	0.520323(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2013	53.3724(5m)	53.3724(28.3019m)	No	Yes	1.10081(5m)	1.10081(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2014	18.2552(5m)	18.2552(28.3019m)	No	No	0.376514(5m)	0.376514(28.3019m)	Yes	No
Hydrogen sulphide - surface - 2015	69.3847(5m)	69.3847(28.3019m)	No	Yes	1.43106(5m)	1.43106(28.3019m)	No	No
Hydrogen sulphide - surface - 2016	127.678(5m)	127.678(28.3019m)	No	Yes	2.63337(5m)	2.63337(28.3019m)	No	No
Hydrogen sulphide - surface - 2017	149.024(5m)	149.024(28.3019m)	No	Yes	3.07361(5m)	3.07361(28.3019m)	No	No
Hydrogen sulphide - surface - 2018	125.677(5m)	125.677(28.3019m)	No	Yes	2.59209(5m)	2.59209(28.3019m)	No	No
Hydrogen sulphide - surface - 2019	82.949(5m)	82.949(28.3019m)	No	Yes	1.71082(5m)	1.71082(28.3019m)	No	No
Nitrogen oxides (NOx) - flare - 2000	52.3131(8.60233m)	3.3853(229.103m)	Yes (at receptor)	Yes	1.53647(8.60233m)	0.573315(229.103m)	No	No
Nitrogen oxides (NOx) - flare - 2001	52.3105(8.60233m)	3.38513(229.103m)	Yes (at receptor)	Yes	1.53639(8.60233m)	0.573286(229.103m)	No	No
Nitrogen oxides (NOx) - flare - 2002	51.908(8.60233m)	3.35908(229.103m)	Yes (at receptor)	Yes	1.52457(8.60233m)	0.568875(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2003	174.133(11.6619m)	29.5342(218.497m)	No	Yes	15.5803(11.6619m)	5.90685(218.497m)	No	No
Nitrogen oxides (NOx) - engine - 2004	174.163(11.6619m)	29.5394(218.497m)	No	Yes	15.583(11.6619m)	5.90788(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2004	18.9699(8.60233m)	1.22758(229.103m)	Yes	No	0.557158(8.60233m)	0.207897(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2005	174.175(11.6619m)	29.5414(218.497m)	No	Yes	15.5841(11.6619m)	5.90829(218.497m)	No	No
Nitrogen oxides (NOx) - engine - 2006	173.968(11.6619m)	29.5063(218.497m)	No	Yes	15.5656(11.6619m)	5.90126(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2006	38.8631(8.60233m)	2.51492(229.103m)	Yes (at receptor)	Yes	1.14143(8.60233m)	0.425912(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2007	174.164(11.6619m)	29.5395(218.497m)	No	Yes	15.5831(11.6619m)	5.9079(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2007	23.0864(8.60233m)	1.49397(229.103m)	Yes (at receptor)	No	0.678062(8.60233m)	0.253011(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2008	174.098(11.6619m)	29.5284(218.497m)	No	Yes	15.5772(11.6619m)	5.90568(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2008	15.5142(8.60233m)	1.00396(229.103m)	Yes	No	0.455662(8.60233m)	0.170025(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2009	173.975(11.6619m)	29.5076(218.497m)	No	Yes	15.5662(11.6619m)	5.90151(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2009	43.2563(8.60233m)	2.79921(229.103m)	Yes (at receptor)	Yes	1.27047(8.60233m)	0.474059(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2010	174.135(11.6619m)	29.5346(218.497m)	No	Yes	15.5805(11.6619m)	5.90693(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2010	27.771(8.60233m)	1.79712(229.103m)	Yes (at receptor)	No	0.815652(8.60233m)	0.304351(229.103m)	Yes (at receptor)	No
Nitrogen oxides (NOx) - engine - 2011	173.989(11.6619m)	29.5099(218.497m)	No	Yes	15.5675(11.6619m)	5.90198(218.497m)	No	No
Nitrogen oxides (NOx) - flare - 2011	37.7989(8.60233m)	2.44605(229.103m)	Yes (at receptor)	No	1.11018(8.60233m)	0.414249(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2012	174.022(11.6619m)	29.5155(218.497m)	No	Yes	15.5704(11.6619m)	5.9031(218.497m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Nitrogen oxides (NOx) - flare - 2012	37.3478(8.60233m)	2.41686(229.103m)	Yes (at receptor)	No	1.09693(8.60233m)	0.409306(229.103m)	No	No
Nitrogen oxides (NOx) - engine - 2013	225.634(7.2111m)	40.007(208.741m)	No	Yes	20.1883(7.2111m)	8.00139(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2014	306.573(7.2111m)	54.3582(208.741m)	No	Yes	27.4302(7.2111m)	10.8716(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2015	215.379(7.2111m)	38.1887(208.741m)	No	Yes	19.2707(7.2111m)	7.63774(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2016	174.049(7.2111m)	30.8606(208.741m)	No	Yes	15.5728(7.2111m)	6.17212(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2017	174.049(7.2111m)	30.8606(208.741m)	No	Yes	15.5728(7.2111m)	6.17212(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2018	235.111(7.2111m)	41.6874(208.741m)	No	Yes	21.0363(7.2111m)	8.33748(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2019	229.057(7.2111m)	40.6139(208.741m)	No	Yes	20.4946(7.2111m)	8.12279(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2020	325.307(7.2111m)	57.68(208.741m)	No	Yes	29.1064(7.2111m)	11.536(208.741m)	No	Yes
Nitrogen oxides (NOx) - engine - 2021	254.901(7.2111m)	45.1963(208.741m)	No	Yes	22.8069(7.2111m)	9.03926(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2022	174.049(7.2111m)	30.8606(208.741m)	No	Yes	15.5728(7.2111m)	6.17212(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2023	174.049(7.2111m)	30.8606(208.741m)	No	Yes	15.5728(7.2111m)	6.17212(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2024	172.914(7.2111m)	30.6592(208.741m)	No	Yes	15.4712(7.2111m)	6.13184(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2025	161.241(7.2111m)	28.5895(208.741m)	No	Yes	14.4268(7.2111m)	5.7179(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2026	146.598(7.2111m)	25.9932(208.741m)	No	Yes	13.1167(7.2111m)	5.19864(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2027	133.755(7.2111m)	23.7161(208.741m)	No	Yes	11.9676(7.2111m)	4.74322(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2028	122.293(7.2111m)	21.6836(208.741m)	No	Yes	10.942(7.2111m)	4.33672(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2029	111.956(7.2111m)	19.8508(208.741m)	Yes (at receptor)	Yes	10.0171(7.2111m)	3.97017(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2030	102.58(7.2111m)	18.1883(208.741m)	Yes (at receptor)	Yes	9.17818(7.2111m)	3.63767(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2031	94.0452(7.2111m)	16.6751(208.741m)	Yes (at receptor)	Yes	8.41457(7.2111m)	3.33502(208.741m)	No	No
Nitrogen oxides (NOx) - engine - 2032	50.5558(7.2111m)	8.96402(208.741m)	Yes (at receptor)	Yes	4.52342(7.2111m)	1.7928(208.741m)	No	No
PM10s 24 hour - flare - 2000	9.13917(8.60233m)	0.591416(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2001	9.13917(8.60233m)	0.591416(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2002	9.02782(8.60233m)	0.58421(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2006	6.47718(8.60233m)	0.419153(229.103m)	Yes (at receptor)	No				
PM10s 24 hour - flare - 2009	7.23576(8.60233m)	0.468242(229.103m)	Yes (at receptor)	Yes				
PM10s 24 hour - flare - 2011	6.27182(8.60233m)	0.405863(229.103m)	Yes (at receptor)	No				
PM10s 24 hour - flare - 2012	6.35227(8.60233m)	0.411069(229.103m)	Yes (at receptor)	No				
PM10s - engine - 2014	9.31796(7.2111m)	1.65216(208.741m)	No EAL	No EAL	0.416856(7.2111m)	0.165216(208.741m)	Yes (at receptor)	No
PM10s 24 hour - engine - 2014	5.4976(7.2111m)	0.974775(208.741m)	Yes (at receptor)	No				
PM10s - engine - 2020	10.2473(7.2111m)	1.81694(208.741m)	No EAL	No EAL	0.458432(7.2111m)	0.181694(208.741m)	Yes (at receptor)	No
PM10s 24 hour - engine - 2020	6.04591(7.2111m)	1.072(208.741m)	Yes (at receptor)	No				
Sulphur dioxide - flare - 2000	83.0681(8.60233m)	5.37552(229.103m)	Yes (at receptor)	Yes	1.21988(8.60233m)	0.455184(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2000	111.311(8.60233m)	7.2032(229.103m)	Yes (at receptor)	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 24 hour - flare - 2000	49.0102(8.60233m)	3.17156(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2001	83.0639(8.60233m)	5.37525(229.103m)	Yes (at receptor)	Yes	1.21982(8.60233m)	0.455161(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2001	111.306(8.60233m)	7.20283(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2001	49.0077(8.60233m)	3.1714(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2002	82.4247(8.60233m)	5.33389(229.103m)	Yes (at receptor)	Yes	1.21043(8.60233m)	0.451659(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2002	110.449(8.60233m)	7.14741(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2002	48.6306(8.60233m)	3.14699(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2003	97.8486(11.6619m)	16.5959(218.497m)	Yes (at receptor)	Yes	4.37744(11.6619m)	1.65959(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2003	131.117(11.6619m)	22.2385(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2003	57.7307(11.6619m)	9.79156(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2004	97.8657(11.6619m)	16.5988(218.497m)	Yes (at receptor)	Yes	4.3782(11.6619m)	1.65988(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2004	131.14(11.6619m)	22.2423(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2004	57.7408(11.6619m)	9.79327(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 15 min - flare - 2004	40.3639(8.60233m)	2.61204(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2004	17.7722(8.60233m)	1.15008(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2005	97.8724(11.6619m)	16.5999(218.497m)	Yes (at receptor)	Yes	4.3785(11.6619m)	1.65999(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2005	131.149(11.6619m)	22.2439(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2005	57.7447(11.6619m)	9.79394(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2006	97.756(11.6619m)	16.5802(218.497m)	Yes (at receptor)	Yes	4.3733(11.6619m)	1.65802(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2006	130.993(11.6619m)	22.2174(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2006	57.6761(11.6619m)	9.78229(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2006	61.7108(8.60233m)	3.99344(229.103m)	Yes (at receptor)	No	0.906242(8.60233m)	0.338153(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2006	82.6925(8.60233m)	5.35121(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2006	36.4094(8.60233m)	2.35613(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2007	97.866(11.6619m)	16.5988(218.497m)	Yes (at receptor)	Yes	4.37821(11.6619m)	1.65988(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2007	131.14(11.6619m)	22.2424(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2007	57.7409(11.6619m)	9.79329(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2007	36.6589(8.60233m)	2.37228(229.103m)	Yes (at receptor)	No	0.538348(8.60233m)	0.200878(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2007	49.123(8.60233m)	3.17886(229.103m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - flare - 2007	21.6288(8.60233m)	1.39965(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2008	97.8293(11.6619m)	16.5926(218.497m)	Yes (at receptor)	Yes	4.37657(11.6619m)	1.65926(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2008	131.091(11.6619m)	22.2341(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2008	57.7193(11.6619m)	9.78962(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 15 min - flare - 2008	33.0109(8.60233m)	2.13621(229.103m)	Yes (at receptor)	No				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 24 hour - flare - 2008	14.5347(8.60233m)	0.940569(229.103m)	Yes (at receptor)	No				
Sulphur dioxide - engine - 2009	97.7602(11.6619m)	16.5809(218.497m)	Yes (at receptor)	Yes	4.37348(11.6619m)	1.65809(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2009	130.999(11.6619m)	22.2184(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2009	57.6785(11.6619m)	9.78271(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2009	68.6868(8.60233m)	4.44487(229.103m)	Yes (at receptor)	No	1.00869(8.60233m)	0.376379(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2009	92.0403(8.60233m)	5.95613(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2009	40.5252(8.60233m)	2.62247(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2010	97.8499(11.6619m)	16.5961(218.497m)	Yes (at receptor)	Yes	4.3775(11.6619m)	1.65961(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2010	131.119(11.6619m)	22.2388(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2010	57.7315(11.6619m)	9.79169(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2010	44.0976(8.60233m)	2.85366(229.103m)	Yes (at receptor)	No	0.647588(8.60233m)	0.24164(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2010	59.0908(8.60233m)	3.8239(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2010	26.0176(8.60233m)	1.68366(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2011	97.768(11.6619m)	16.5822(218.497m)	Yes (at receptor)	Yes	4.37383(11.6619m)	1.65822(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2011	131.009(11.6619m)	22.2201(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2011	57.6831(11.6619m)	9.78349(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2011	60.0209(8.60233m)	3.88409(229.103m)	Yes (at receptor)	No	0.881426(8.60233m)	0.328893(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2011	80.428(8.60233m)	5.20467(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2011	35.4123(8.60233m)	2.29161(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2012	97.7865(11.6619m)	16.5853(218.497m)	Yes (at receptor)	Yes	4.37466(11.6619m)	1.65853(218.497m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2012	131.034(11.6619m)	22.2243(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2012	57.694(11.6619m)	9.78534(218.497m)	Yes (at receptor)	Yes				
Sulphur dioxide - flare - 2012	59.3047(8.60233m)	3.83774(229.103m)	Yes (at receptor)	No	0.870908(8.60233m)	0.324969(229.103m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2012	79.4683(8.60233m)	5.14257(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - flare - 2012	34.9898(8.60233m)	2.26426(229.103m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2013	126.788(7.2111m)	22.4807(208.741m)	Yes (at receptor)	Yes	5.67209(7.2111m)	2.24807(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2013	169.896(7.2111m)	30.1241(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2013	74.8049(7.2111m)	13.2636(208.741m)	No	Yes				
Sulphur dioxide - engine - 2014	172.269(7.2111m)	30.5449(208.741m)	Yes (at receptor)	Yes	7.70678(7.2111m)	3.05449(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2014	230.841(7.2111m)	40.9302(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2014	101.639(7.2111m)	18.0215(208.741m)	No	Yes				
Sulphur dioxide - engine - 2015	121.026(7.2111m)	21.459(208.741m)	Yes (at receptor)	Yes	5.4143(7.2111m)	2.1459(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2015	162.174(7.2111m)	28.755(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2015	71.4051(7.2111m)	12.6608(208.741m)	No	Yes				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide - engine - 2016	97.8017(7.2111m)	17.3412(208.741m)	Yes (at receptor)	Yes	4.37534(7.2111m)	1.73412(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2016	131.054(7.2111m)	23.2372(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2016	57.703(7.2111m)	10.2313(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2017	97.8017(7.2111m)	17.3412(208.741m)	Yes (at receptor)	Yes	4.37534(7.2111m)	1.73412(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2017	131.054(7.2111m)	23.2372(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2017	57.703(7.2111m)	10.2313(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2018	132.114(7.2111m)	23.425(208.741m)	Yes (at receptor)	Yes	5.91034(7.2111m)	2.3425(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2018	177.032(7.2111m)	31.3895(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2018	77.947(7.2111m)	13.8207(208.741m)	No	Yes				
Sulphur dioxide - engine - 2019	128.711(7.2111m)	22.8217(208.741m)	Yes (at receptor)	Yes	5.75814(7.2111m)	2.28217(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2019	172.473(7.2111m)	30.5811(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2019	75.9398(7.2111m)	13.4648(208.741m)	No	Yes				
Sulphur dioxide - engine - 2020	182.796(7.2111m)	32.4115(208.741m)	Yes (at receptor)	Yes	8.17773(7.2111m)	3.24115(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2020	244.947(7.2111m)	43.4314(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2020	107.85(7.2111m)	19.1228(208.741m)	No	Yes				
Sulphur dioxide - engine - 2021	143.234(7.2111m)	25.3967(208.741m)	Yes (at receptor)	Yes	6.40782(7.2111m)	2.53967(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2021	191.933(7.2111m)	34.0315(208.741m)	No	Yes				
Sulphur dioxide 24 hour - engine - 2021	84.5079(7.2111m)	14.984(208.741m)	No	Yes				
Sulphur dioxide - engine - 2022	97.8017(7.2111m)	17.3412(208.741m)	Yes (at receptor)	Yes	4.37534(7.2111m)	1.73412(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2022	131.054(7.2111m)	23.2372(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2022	57.703(7.2111m)	10.2313(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2023	97.8017(7.2111m)	17.3412(208.741m)	Yes (at receptor)	Yes	4.37534(7.2111m)	1.73412(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2023	131.054(7.2111m)	23.2372(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2023	57.703(7.2111m)	10.2313(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2024	97.1635(7.2111m)	17.228(208.741m)	Yes (at receptor)	Yes	4.34679(7.2111m)	1.7228(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2024	130.199(7.2111m)	23.0855(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2024	57.3265(7.2111m)	10.1645(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2025	90.6042(7.2111m)	16.065(208.741m)	Yes (at receptor)	Yes	4.05335(7.2111m)	1.6065(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2025	121.41(7.2111m)	21.5271(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2025	53.4565(7.2111m)	9.47834(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2026	82.3763(7.2111m)	14.6061(208.741m)	Yes (at receptor)	Yes	3.68526(7.2111m)	1.46061(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2026	110.384(7.2111m)	19.5722(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2026	48.602(7.2111m)	8.61759(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2027	75.1598(7.2111m)	13.3265(208.741m)	Yes (at receptor)	Yes	3.36241(7.2111m)	1.33265(208.741m)	No EAL	No EAL

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide 15 min - engine - 2027	100.714(7.2111m)	17.8576(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2027	44.3443(7.2111m)	7.86265(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2028	68.7185(7.2111m)	12.1844(208.741m)	Yes (at receptor)	No	3.07425(7.2111m)	1.21844(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2028	92.0828(7.2111m)	16.3271(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2028	40.5439(7.2111m)	7.18882(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2029	62.9102(7.2111m)	11.1546(208.741m)	Yes (at receptor)	No	2.8144(7.2111m)	1.11546(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2029	84.2997(7.2111m)	14.9471(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2029	37.117(7.2111m)	6.58119(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2030	57.6415(7.2111m)	10.2204(208.741m)	Yes (at receptor)	No	2.5787(7.2111m)	1.02204(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2030	77.2396(7.2111m)	13.6953(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2030	34.0085(7.2111m)	6.03002(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide - engine - 2031	52.8458(7.2111m)	9.37005(208.741m)	Yes (at receptor)	No	2.36415(7.2111m)	0.937005(208.741m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2031	70.8134(7.2111m)	12.5559(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 24 hour - engine - 2031	31.179(7.2111m)	5.52833(208.741m)	Yes (at receptor)	Yes				
Sulphur dioxide 15 min - engine - 2032	38.0671(7.2111m)	6.74966(208.741m)	Yes (at receptor)	No				
Sulphur dioxide 24 hour - engine - 2032	16.7609(7.2111m)	2.97186(208.741m)	Yes (at receptor)	No				
Vinyl chloride (chloroethene, chloroethylene) - surface - 1987	91.3523(5m)	44.5342(210m)	Yes	No	1.88414(5m)	0.376828(210m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1988	109.554(5m)	53.4075(210m)	Yes	No	2.25955(5m)	0.45191(210m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1989	112.206(5m)	54.7004(210m)	Yes	No	2.31425(5m)	0.46285(210m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1990	118.22(5m)	57.6322(210m)	Yes	No	2.43828(5m)	0.487657(210m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1991	133.833(5m)	65.2437(210m)	Yes	No	2.76031(5m)	0.552062(210m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1992	189.302(5m)	98.6616(191.525m)	Yes (at receptor)	No	3.90435(5m)	0.868302(191.525m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1993	216.42(5m)	112.795(191.525m)	Yes (at receptor)	No	4.46366(5m)	0.992688(191.525m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1994	200.803(5m)	120.08(160.801m)	Yes (at receptor)	No	4.14156(5m)	1.07529(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1995	168.791(5m)	100.936(160.801m)	Yes	No	3.48131(5m)	0.90387(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1996	158.401(5m)	94.7236(160.801m)	Yes	No	3.26703(5m)	0.848235(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1997	231.835(5m)	138.637(160.801m)	Yes (at receptor)	No	4.7816(5m)	1.24147(160.801m)	Yes (at receptor)	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1998	269.638(5m)	229.445(79.8123m)	No	No	5.56128(5m)	3.8531(79.8123m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 1999	254.718(5m)	216.749(79.8123m)	No	No	5.25355(5m)	3.63989(79.8123m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2000	147.575(5m)	125.578(79.8123m)	Yes	No	3.04374(5m)	2.10884(79.8123m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2001	115.895(5m)	98.6197(79.8123m)	Yes	No	2.39034(5m)	1.65613(79.8123m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2002	169.395(5m)	144.144(79.8123m)	Yes	No	3.49376(5m)	2.42063(79.8123m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2003	204.539(5m)	204.539(28.3019m)	No	No	4.21861(5m)	4.21861(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2004	169.081(5m)	169.081(28.3019m)	Yes	No	3.48729(5m)	3.48729(28.3019m)	No	No

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Vinyl chloride (chloroethene, chloroethylene) - surface - 2005	233.051(5m)	233.051(28.3019m)	No	No	4.80667(5m)	4.80667(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2007	215.408(5m)	215.408(28.3019m)	No	No	4.44279(5m)	4.44279(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2008	254.726(5m)	254.726(28.3019m)	No	No	5.25373(5m)	5.25373(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2010	166.504(5m)	166.504(28.3019m)	Yes	No	3.43416(5m)	3.43416(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2011	84.91(5m)	84.91(28.3019m)	Yes	No	1.75127(5m)	1.75127(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2013	136.274(5m)	136.274(28.3019m)	Yes	No	2.81066(5m)	2.81066(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2015	110.956(5m)	110.956(28.3019m)	Yes	No	2.28846(5m)	2.28846(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2016	184.74(5m)	184.74(28.3019m)	Yes	No	3.81027(5m)	3.81027(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2017	211.03(5m)	211.03(28.3019m)	No	No	4.35249(5m)	4.35249(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2018	183.741(5m)	183.741(28.3019m)	Yes	No	3.78965(5m)	3.78965(28.3019m)	No	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2019	115.045(5m)	115.045(28.3019m)	Yes	No	2.3728(5m)	2.3728(28.3019m)	No	No
Xylene (all isomers) - surface - 1995	3051.61(5m)	1824.85(160.801m)	Yes	No	62.9394(5m)	16.3413(160.801m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 1996	3800.77(5m)	2272.85(160.801m)	Yes	No	78.3909(5m)	20.353(160.801m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 1997	3181.03(5m)	1902.24(160.801m)	Yes	No	65.6087(5m)	17.0343(160.801m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 1998	3396.27(5m)	2890.02(79.8123m)	Yes	No	70.0482(5m)	48.5324(79.8123m)	No	No
Xylene (all isomers) - surface - 1999	3048.71(5m)	2594.27(79.8123m)	Yes	No	62.8797(5m)	43.5658(79.8123m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 2003	3082.06(5m)	3082.06(28.3019m)	Yes	No	63.5676(5m)	63.5676(28.3019m)	No	No
Xylene (all isomers) - surface - 2015	3850.34(5m)	3850.34(28.3019m)	Yes	No	79.4133(5m)	79.4133(28.3019m)	No	No
Xylene (all isomers) - surface - 2016	6236.15(5m)	6236.15(28.3019m)	Yes	No	128.621(5m)	128.621(28.3019m)	No	No
Xylene (all isomers) - surface - 2017	6676.6(5m)	6676.6(28.3019m)	No	No	137.705(5m)	137.705(28.3019m)	No	No
Xylene (all isomers) - surface - 2018	5956.7(5m)	5956.7(28.3019m)	Yes	No	122.857(5m)	122.857(28.3019m)	No	No
Xylene (all isomers) - surface - 2019	3594.93(5m)	3594.93(28.3019m)	Yes	No	74.1455(5m)	74.1455(28.3019m)	No	No

Not Modelled:

1,1,1,2-Tetrafluorochloroethane
1,1,1-Trichlorotrifluoroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,1-Dichlorotetrafluoroethane
1,2-Dichloropropane
1,2-Dichlorotetrafluoroethane
1-butanethiol
1-Chloro-1,1-difluoroethane
2-butoxy ethanol
2-Chloro-1,1,1-trifluoroethane
2-Propanol
Bromodichloromethane
Butene isomers
Butyric acid
Carbonyl sulphide
Chlorobenzene
Chlorodifluoromethane
Chloroethane
Chlorofluorocarbons (CFCs) (Total)
Chlorofluoromethane
Chlorotrifluoromethane
Dichlorodifluoromethane
Dichlorofluoromethane
Diethyl disulphide
Dimethyl disulphide
Dimethyl sulphide
Dioxins and furans (modelled as 2,3,7,8-TCDD)
Ethane
Ethanethiol (ethyl mercaptan)
Ethanol
Ethyl butyrate
Ethyl toluene (all isomers)
Ethylene
Ethylene dibromide
Fluorotrichloromethane
Freon 113
Furan
Halons
Hexachlorocyclohexane (all isomers)
Hydrochlorofluorocarbons (HCFCs) (Total)
Hydrofluorocarbons (HFCs) (Total)
Limonene

Not Modelled:

Methanethiol (methyl mercaptan)
Methyl isobutyl ketone
Nitrogen dioxide (NO2)
Nitrogen monoxide (NO)
Odour Units (Predicted)
Pentane
Pentene (all isomers)
Perfluorocarbons (PFCs) (Total)
Propane
Propanethiol
Sulphide, total simulations with H2S
Sulphide, total simulations without H2S
t-1,2-Dichloroethene
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)
Total non-methane volatile organic compounds (NMVOCs)
Total volatile organic compounds (VOCs)
Trichlorofluoromethane
Trichlorotrifluoroethane

APPENDIX 4

Tier 2 results

AS 2018 95%ile

	averaging period	air quality standard	percentile	receptor	x coordinate	y coordinate	process contribution	predicted environmental concentration
Worst annual mean	1 year		100	BR001	296918	281990	0.004	0.004
Short term EAL	1 hour	0.003 µg/m³.	100	BR001	296952	281958	0.37	0.37
Discrete receptor	x cooridnate	y coordinate	PC annual mean	PC worst hour	PEC annual mean	PEC worst hour		
DR001	296887	282199	0.00012	0.04	0.00012	0.04		
DR002	296733	282277	0.000041	0.03	0.000041	0.03		
DR003	297587	282244	0.0000363	0.01	0.0000363	0.01		
DR004	297632	282322	0.0000276	0.01	0.0000276	0.01		
DR005	296478	282134	0.000029	0.01	0.000029	0.01		
DR006	297208	282758	0.00001	0.00654	0.00001	0.00654		
DR007	296977	282852	0.0000086	0.00819	0.0000086	0.00819		
DR008	296621	281813	0.0000633	0.02	0.0000633	0.02		
DR009	297680	281909	0.0000405	0.01	0.0000405	0.01		
Boundary receptor	x cooridnate	y coordinate	PC annual mean	PC worst hour	PEC annual mean	PEC worst hour		
BR001	296897	282178	0.000163	0.05	0.000163	0.05		
BR001	296943	282196	0.000164	0.04	0.000164	0.04		
BR001	296957	282229	0.000119	0.04	0.000119	0.04		
BR001	296942	282277	0.0000773	0.03	0.0000773	0.03		
BR001	296946	282316	0.0000583	0.02	0.0000583	0.02		
BR001	296990	282340	0.0000523	0.03	0.0000523	0.03		
BR001	297034	282363	0.0000441	0.02	0.0000441	0.02		
BR001	297079	282387	0.0000406	0.02	0.0000406	0.02		
BR001	297123	282410	0.0000364	0.02	0.0000364	0.02		
BR001	297167	282434	0.0000323	0.02	0.0000323	0.02		
BR001	297209	282445	0.0000293	0.02	0.0000293	0.02		
BR001	297241	282407	0.0000336	0.01	0.0000336	0.01		
BR001	297274	282369	0.0000422	0.02	0.0000422	0.02		
BR001	297306	282331	0.000049	0.02	0.000049	0.02		
BR001	297339	282293	0.0000513	0.02	0.0000513	0.02		
BR001	297371	282255	0.0000561	0.02	0.0000561	0.02		
BR001	297364	282217	0.0000684	0.02	0.0000684	0.02		
BR001	297331	282179	0.0000912	0.02	0.0000912	0.02		
BR001	297299	282140	0.000128	0.02	0.000128	0.02		
BR001	297267	282102	0.00019	0.04	0.00019	0.04		
BR001	297235	282064	0.000282	0.06	0.000282	0.06		
BR001	297200	282029	0.000361	0.07	0.000361	0.07		
BR001	297164	281994	0.000441	0.07	0.000441	0.07		
BR001	297128	281959	0.000484	0.11	0.000484	0.11		
BR001	297092	281924	0.000477	0.06	0.000477	0.06		
BR001	297047	281927	0.000729	0.09	0.000729	0.09		
BR001	296999	281942	0.00154	0.2	0.00154	0.2		
BR001	296952	281958	0.00377	0.37	0.00377	0.37		
BR001	296918	281990	0.004	0.35	0.004	0.35		
BR001	296905	282038	0.00282	0.2	0.00282	0.2		
BR001	296898	282088	0.000838	0.11	0.000838	0.11		
BR001	296897	282137	0.000285	0.07	0.000285	0.07		

H2S 2018 95%ile

	Averaging period	Air quality standard	percentile	receptor	x coordinate	y coordinate	PC	PEC
Long term EAL	1 year	140 µg/m³.	100	BR001	296918	281990	5.22	5.22
Short term EAL	1 hour	150 µg/m³.	100	BR001	296952	281958	488.79	488.79
Discrete receptor	x coordinate	y coordinate	PC annual mean	PC worst hour	PEC annual mean	PEC worst hour		
DR001	296887	282199	0.16	54.5	0.16	54.5		
DR002	296733	282277	0.05	35.99	0.05	35.99		
DR003	297587	282244	0.05	14.43	0.05	14.43		
DR004	297632	282322	0.04	17.97	0.04	17.97		
DR005	296478	282134	0.04	15.73	0.04	15.73		
DR006	297208	282758	0.01	8.52	0.01	8.52		
DR007	296977	282852	0.01	10.71	0.01	10.71		
DR008	296621	281813	0.08	29.43	0.08	29.43		
DR009	297680	281909	0.05	13.69	0.05	13.69		
Boundaryreceptor	x coordinate	y coordinate	PC annual mean	PC worst hour	PEC annual mean	PEC worst hour		
BR001	296897	282178	0.21	63	0.21	63		
BR001	296943	282196	0.22	58.2	0.22	58.2		
BR001	296957	282229	0.16	52.14	0.16	52.14		
BR001	296942	282277	0.1	34.88	0.1	34.88		
BR001	296946	282316	0.08	31.59	0.08	31.59		
BR001	296990	282340	0.07	33.43	0.07	33.43		
BR001	297034	282363	0.06	25.99	0.06	25.99		
BR001	297079	282387	0.05	20.54	0.05	20.54		
BR001	297123	282410	0.05	26.74	0.05	26.74		
BR001	297167	282434	0.04	24.39	0.04	24.39		
BR001	297209	282445	0.04	22.24	0.04	22.24		
BR001	297241	282407	0.04	19.15	0.04	19.15		
BR001	297274	282369	0.05	23.95	0.05	23.95		
BR001	297306	282331	0.06	27.17	0.06	27.17		
BR001	297339	282293	0.07	21.38	0.07	21.38		
BR001	297371	282255	0.07	23.57	0.07	23.57		
BR001	297364	282217	0.09	28.28	0.09	28.28		
BR001	297331	282179	0.12	31.35	0.12	31.35		
BR001	297299	282140	0.16	29.52	0.16	29.52		
BR001	297267	282102	0.23	51.04	0.23	51.04		
BR001	297235	282064	0.34	77.81	0.34	77.81		
BR001	297200	282029	0.45	90.4	0.45	90.4		
BR001	297164	281994	0.56	96.55	0.56	96.55		
BR001	297128	281959	0.62	137.83	0.62	137.83		
BR001	297092	281924	0.61	73.75	0.61	73.75		
BR001	297047	281927	0.94	117.13	0.94	117.13		
BR001	296999	281942	2	259.55	2	259.55		
BR001	296952	281958	4.92	488.79	4.92	488.79		
BR001	296918	281990	5.22	451.64	5.22	451.64		
BR001	296905	282038	3.68	259.06	3.68	259.06		
BR001	296898	282088	1.1	146.54	1.1	146.54		
BR001	296897	282137	0.37	85.44	0.37	85.44		

Odour 2018 95

	Averaging period	Air quality standard	Percentile	Receptor	x coordinate	y coordinate	PC
Worst Hour	1 hour		100	BR001	296952	281958	835.51
176th Worst Hour	1 hour	98th percentile	98	BR001	296952	281958	54.12
Discrete receptor	x coordinate	y coordinate	worst hour	98th %ile hour			
DR001	296887	282199	93.74	2.22			
DR002	296733	282277	61.78	0.74			
DR003	297587	282244	25.31	0.52			
DR004	297632	282322	31.22	0.37			
DR005	296478	282134	27.11	0.57			
DR006	297208	282758	14.72	0.17			
DR007	296977	282852	18.43	0.15			
DR008	296621	281813	50.75	0.98			
DR009	297680	281909	23.74	0.87			
Discrete receptor	x coordinate	y coordinate	worst hour	98th %ile hour			
BR001	296897	282178	108.51	2.88			
BR001	296943	282196	100.62	2.87			
BR001	296957	282229	89.65	2.04			
BR001	296942	282277	59.94	1.34			
BR001	296946	282316	54.33	1.04			
BR001	296990	282340	57.67	0.97			
BR001	297034	282363	44.87	0.8			
BR001	297079	282387	35.67	0.65			
BR001	297123	282410	46.05	0.54			
BR001	297167	282434	42.07	0.44			
BR001	297209	282445	38.31	0.4			
BR001	297241	282407	33.22	0.43			
BR001	297274	282369	41.42	0.48			
BR001	297306	282331	46.97	0.59			
BR001	297339	282293	37.11	0.64			
BR001	297371	282255	40.86	0.75			
BR001	297364	282217	48.96	0.91			
BR001	297331	282179	54.81	1.21			
BR001	297299	282140	51.95	1.59			
BR001	297267	282102	91.56	2.59			
BR001	297235	282064	138.48	4.18			
BR001	297200	282029	159.69	5.68			
BR001	297164	281994	170.13	7.15			
BR001	297128	281959	239.68	8.53			
BR001	297092	281924	127.69	8.36			
BR001	297047	281927	204.82	12.45			
BR001	296999	281942	446.4	24.77			
BR001	296952	281958	835.51	54.12			
BR001	296918	281990	772.34	52.86			
BR001	296905	282038	443.64	35.06			

BR001	296898	282088	250.61	12.95			
BR001	296897	282137	146.72	4.8			

	averaging per	air quality standard	percentile	receptor	x coordinate	y coordinate	process contr	predicted env
Worst annual mean	1 year		100	BR001	296918	281990	0.000318	0.000318
Short term EAL	1 hour	0.003 µg/m³.	100	BR001	296952	281958	0.03	0.03
Discrete receptor	x cooridnat	y coordinate	PC annual	PC worst h	PEC annual	PEC worst hour		
DR001	296887	282199	0.00000926	0.0033	0.00000926	0.0033		
DR002	296733	282277	0.00000322	0.00219	0.00000322	0.00219		
DR003	297587	282244	0.0000028	0.000878	0.0000028	0.000878		
DR004	297632	282322	0.00000214	0.00109	0.00000214	0.00109		
DR005	296478	282134	0.00000228	0.000959	0.00000228	0.000959		
DR006	297208	282758	7.84E-07	0.000517	7.84E-07	0.000517		
DR007	296977	282852	6.74E-07	0.000648	6.74E-07	0.000648		
DR008	296621	281813	0.00000499	0.00179	0.00000499	0.00179		
DR009	297680	281909	0.00000316	0.000834	0.00000316	0.000834		
Boundary receptor	x cooridnat	y coordinate	PC annual	PC worst h	PEC annual	PEC worst hour		
BR001	296897	282178	0.0000124	0.00381	0.0000124	0.00381		
BR001	296943	282196	0.0000123	0.0035	0.0000123	0.0035		
BR001	296957	282229	0.00000887	0.00315	0.00000887	0.00315		
BR001	296942	282277	0.00000578	0.00211	0.00000578	0.00211		
BR001	296946	282316	0.00000445	0.0019	0.00000445	0.0019		
BR001	296990	282340	0.00000401	0.00201	0.00000401	0.00201		
BR001	297034	282363	0.00000335	0.00156	0.00000335	0.00156		
BR001	297079	282387	0.0000032	0.00124	0.0000032	0.00124		
BR001	297123	282410	0.00000285	0.00162	0.00000285	0.00162		
BR001	297167	282434	0.00000252	0.00148	0.00000252	0.00148		
BR001	297209	282445	0.00000228	0.00135	0.00000228	0.00135		
BR001	297241	282407	0.0000026	0.00116	0.0000026	0.00116		
BR001	297274	282369	0.00000325	0.00145	0.00000325	0.00145		
BR001	297306	282331	0.00000374	0.00165	0.00000374	0.00165		
BR001	297339	282293	0.00000388	0.0013	0.00000388	0.0013		
BR001	297371	282255	0.00000424	0.00143	0.00000424	0.00143		
BR001	297364	282217	0.00000518	0.00172	0.00000518	0.00172		
BR001	297331	282179	0.00000685	0.0019	0.00000685	0.0019		
BR001	297299	282140	0.00000946	0.00179	0.00000946	0.00179		
BR001	297267	282102	0.0000137	0.00307	0.0000137	0.00307		
BR001	297235	282064	0.00002	0.00471	0.00002	0.00471		
BR001	297200	282029	0.0000266	0.0055	0.0000266	0.0055		
BR001	297164	281994	0.0000338	0.00589	0.0000338	0.00589		
BR001	297128	281959	0.0000375	0.00841	0.0000375	0.00841		
BR001	297092	281924	0.0000372	0.0045	0.0000372	0.0045		
BR001	297047	281927	0.0000573	0.00713	0.0000573	0.00713		
BR001	296999	281942	0.000122	0.02	0.000122	0.02		
BR001	296952	281958	0.0003	0.03	0.0003	0.03		
BR001	296918	281990	0.000318	0.03	0.000318	0.03		
BR001	296905	282038	0.000224	0.02	0.000224	0.02		
BR001	296898	282088	0.0000661	0.00893	0.0000661	0.00893		
BR001	296897	282137	0.0000218	0.00518	0.0000218	0.00518		

NOx 2020 95%ile

	averaging period	air quality standard	percentile	receptor	x coordinate	y coordinate	PC	PEC
Annual Objective	1 year	40 µg/m³.	100	BR001	297079	282387	47.98	52.28
Hourly Objective	1 hour	200 µg/m³. 18 exceedances	99.79	BR001	296990	282340	332.48	341.09
Discrete receptor	x coordinate	y coordinate	PC annual mean	PC worst hour	PC 19th worst hour	PEC annual mean	PEC worst hour	PEC 19th Worst Hour
DR001	296887	282199	6.01	76.81	69.66	10.31	85.41	78.26
DR002	296733	282277	3.22	44.72	38.07	7.52	53.33	46.67
DR003	297587	282244	2.36	25.17	23.43	6.66	33.78	32.03
DR004	297632	282322	2.74	23.55	21.59	7.04	32.16	30.19
DR005	296478	282134	1.07	21.75	17.32	5.38	30.35	25.92
DR006	297208	282758	1.7	30.21	19.1	6	38.81	27.7
DR007	296977	282852	1.12	26.3	17.74	5.42	34.9	26.34
DR008	296621	281813	1.28	21.09	18.16	5.58	29.7	26.76
DR009	297680	281909	0.92	18.26	15.21	5.22	26.87	23.81
Boundary receptor	x coordinate	y coordinate	PC annual mean	PC worst hour	PC 19th worst hour	PEC annual mean	PEC worst hour	PEC 19th Worst Hour
BR001	296897	282178	5.83	73.1	67.33	10.13	81.7	75.93
BR001	296943	282196	7.23	90.74	84.1	11.53	99.34	92.71
BR001	296957	282229	9.39	116.13	104.69	13.69	124.74	113.29
BR001	296942	282277	11.45	144.23	131.39	15.75	152.84	139.99
BR001	296946	282316	15.34	186.46	167.75	19.64	195.06	176.36
BR001	296990	282340	27.61	346.54	332.48	31.91	355.15	341.09
BR001	297034	282363	0.55	38.03	26.21	4.85	46.63	34.81
BR001	297079	282387	47.98	304.24	297.23	52.28	312.84	305.83
BR001	297123	282410	28.56	166.92	156.35	32.86	175.52	164.95
BR001	297167	282434	17.26	110.03	100.6	21.56	118.63	109.2
BR001	297209	282445	12.97	79.82	72.52	17.27	88.42	81.12
BR001	297241	282407	13.47	76.29	69.08	17.77	84.89	77.68
BR001	297274	282369	10.7	66.66	61.84	15	75.27	70.44
BR001	297306	282331	7.44	56.35	53.84	11.74	64.96	62.44
BR001	297339	282293	5.03	49.67	45.11	9.33	58.27	53.72
BR001	297371	282255	3.58	43.92	37.5	7.88	52.53	46.11
BR001	297364	282217	2.9	43.32	37.32	7.2	51.92	45.92
BR001	297331	282179	2.7	44.89	39.69	7	53.49	48.29
BR001	297299	282140	2.72	45.26	39.95	7.03	53.86	48.55
BR001	297267	282102	2.78	45.14	37.26	7.08	53.74	45.87
BR001	297235	282064	2.81	43.71	37.12	7.11	52.31	45.72
BR001	297200	282029	2.89	42.07	37.03	7.19	50.67	45.63
BR001	297164	281994	2.92	40.01	34.71	7.22	48.62	43.31
BR001	297128	281959	2.77	37.4	33.07	7.08	46	41.68
BR001	297092	281924	2.47	34.81	30.55	6.77	43.41	39.15
BR001	297047	281927	2.31	35.45	30.83	6.61	44.06	39.43
BR001	296999	281942	2.15	35.88	30.9	6.45	44.49	39.5
BR001	296952	281958	2.06	34.51	30.43	6.36	43.12	39.03
BR001	296918	281990	2.29	40.3	33.77	6.59	48.91	42.37
BR001	296905	282038	2.86	45.32	39.69	7.16	53.92	48.29
BR001	296898	282088	3.7	51.64	48.66	8	60.24	57.27
BR001	296897	282137	4.78	61.97	57.76	9.08	70.57	66.37

SO2 95%ile

	averaging period	air quality standard	percentile	receptor	x coordinate	y coordinate	PV	PEC		
Worst annual mean	1 year		100	BR001	297079	282387	13.48	13.48		
Hourly Objective	1 hour	350 $\mu g/m^3$. 24 exceedances	99.73	BR001	296990	282340	180.99	180.99		
15 minute mean objective	15 minutes	266 $\mu g/m^3$. 35 exceedances	99.9	BR001	296990	282340	232.53	232.53		
24 hour mean objective	24 hours	125 $\mu g/m^3$. 3 exceedances	99.18	BR001	296990	282340	98.35	98.35		
Discrete receptor	x coordinate	y coordinate	pc annual mean	PC worst hour	PC 25th worst hour	PEC annual mean	PEC worst hour	PEC 25th worst hour	PC 4th worst 24hr mean	PC 36th worst 15 min mean
DR001	296887	282199	1.69	43.16	38.36	1.69	43.16	38.36	14.25	49.42
DR002	296733	282277	0.91	25.13	19.87	0.91	25.13	19.87	6.95	25.03
DR003	297587	282244	0.66	14.15	12.91	0.66	14.15	12.91	4.28	15.71
DR004	297632	282322	0.77	13.23	11.93	0.77	13.23	11.93	3.61	15.14
DR005	296478	282134	0.3	12.22	9.37	0.3	12.22	9.37	2.4	11.31
DR006	297208	282758	0.48	16.98	10.48	0.48	16.98	10.48	3.54	12.8
DR007	296977	282852	0.31	14.78	9.12	0.31	14.78	9.12	2.58	10.61
DR008	296621	281813	0.36	11.85	9.89	0.36	11.85	9.89	2.73	12.57
DR009	297680	281909	0.26	10.26	8.29	0.26	10.26	8.29	2.35	10.73
Boundary receptor	x coordinate	y coordinate	pc annual mean	PC worst hour	PC 25th worst hour	PEC annual mean	PEC worst hour	PEC 25th worst hour	PC 4th worst 24hr mean	PC 36th worst 15 min mean
BR001	296897	282178	1.64	41.08	37.01	1.64	41.08	37.01	15.24	48.6
BR001	296943	282196	2.03	50.99	46.8	2.03	50.99	46.8	17.89	60.25
BR001	296957	282229	2.64	65.26	57.95	2.64	65.26	57.95	26.52	75.55
BR001	296942	282277	3.22	81.05	72.12	3.22	81.05	72.12	33.95	92.32
BR001	296946	282316	4.31	104.77	91.27	4.31	104.77	91.27	45.94	118.85
BR001	296990	282340	7.76	194.73	180.99	7.76	194.73	180.99	98.35	232.53
BR001	297034	282363	0.16	21.37	13.63	0.16	21.37	13.63	2.11	14.94
BR001	297079	282387	13.48	170.96	165.98	13.48	170.96	165.98	82.14	220.24
BR001	297123	282410	8.02	93.79	87.23	8.02	93.79	87.23	40.97	111.04
BR001	297167	282434	4.85	61.83	54.54	4.85	61.83	54.54	23.35	67.65
BR001	297209	282445	3.64	44.85	39.72	3.64	44.85	39.72	17.25	51.42
BR001	297241	282407	3.79	42.87	38.4	3.79	42.87	38.4	17.13	50.91
BR001	297274	282369	3.01	37.46	34.24	3.01	37.46	34.24	14.77	44.59
BR001	297306	282331	2.09	31.67	29.45	2.09	31.67	29.45	11.48	38.32
BR001	297339	282293	1.41	27.91	24.3	1.41	27.91	24.3	8.1	30.89
BR001	297371	282255	1.01	24.68	20.17	1.01	24.68	20.17	6.63	25.94
BR001	297364	282217	0.81	24.34	19.69	0.81	24.34	19.69	6.4	24.6
BR001	297331	282179	0.76	25.22	21.15	0.76	25.22	21.15	5.61	27.3
BR001	297299	282140	0.77	25.43	21.71	0.77	25.43	21.71	5.91	26.93
BR001	297267	282102	0.78	25.36	20.65	0.78	25.36	20.65	5.64	25.9
BR001	297235	282064	0.79	24.56	19.94	0.79	24.56	19.94	5.18	25.33
BR001	297200	282029	0.81	23.64	19.92	0.81	23.64	19.92	4.73	25.61
BR001	297164	281994	0.82	22.48	19.04	0.82	22.48	19.04	6.07	24.52
BR001	297128	281959	0.78	21.02	18.29	0.78	21.02	18.29	6.56	23.82
BR001	297092	281924	0.69	19.56	17.03	0.69	19.56	17.03	5.28	22.4
BR001	297047	281927	0.65	19.92	16.97	0.65	19.92	16.97	4.43	21.71
BR001	296999	281942	0.6	20.16	16.71	0.6	20.16	16.71	3.96	21.26
BR001	296952	281958	0.58	19.39	16.37	0.58	19.39	16.37	3.59	20.62
BR001	296918	281990	0.64	22.65	17.63	0.64	22.65	17.63	5.01	22.14
BR001	296905	282038	0.8	25.46	21.51	0.8	25.46	21.51	5.95	27.63
BR001	296898	282088	1.04	29.02	26.17	1.04	29.02	26.17	8.25	33.86
BR001	296897	282137	1.34	34.82	31.69	1.34	34.82	31.69	10.85	41.4

APPENDIX 5

Global Impact

Global Impact Results: 50th percentile [Sum of all years]

Species	Gas released (tonnes)	Global warming potential (tonnes of Carbon Dioxide)	Ozone depletion potential (tonnes of trichlorofluoromethane)
Methane - 'Surface'	63900	1600000	0
Methane - 'Engine'	841	21000	0
Methane - 'Flare'	173	4320	0
Carbon Dioxide - 'Surface'	147000	147000	0
Carbon Dioxide - 'Engine'	379000	379000	0
Carbon Dioxide - 'Flare'	78400	78400	0
Chloroform (trichloromethane)	0.0895	2.68	0
Dichloromethane (methylene chloride)	2.35	21.1	0
Hydrofluorocarbons (HFCs) (Total)	0	0	0
Perfluorocarbons (PFCs) (Total)	0	0	0
Total CH4	64900	1620000	0
Total CO2	605000	605000	0
Trace Gases	2.44	24.5	0
Total	670000	2230000	0
	Engines	Flares	Total
CH4 Burned (t)	84100	17300	101000
GWP Reduction (t CO2)	1870000	384000	2250000
Bulk LFG CH4 percentage	60.4		
Bulk LFG CO2 percentage	39.6		
Lo (t CH4)	173000		

Global Impact Results: 50th percentile [Sum of all years]			
Species	Gas released (tonnes)	Global warming potential (tonnes of Carbon Dioxide)	Ozone depletion potential (tonnes of trichlorofluoromethane)
Methane - 'Surface'	78900	1970000	0
Methane - 'Engine'	649	16200	0
Methane - 'Flare'	199	4990	0
Carbon Dioxide - 'Surface'	182000	182000	0
Carbon Dioxide - 'Engine'	294000	294000	0
Carbon Dioxide - 'Flare'	90400	90400	0
Chloroform (trichloromethane)	0.206	6.19	0
Dichloromethane (methylene chloride)	4.47	40.2	0
Hydrofluorocarbons (HFCs) (Total)	0	0	0
Perfluorocarbons (PFCs) (Total)	0	0	0
Total CH4	79800	1990000	0
Total CO2	567000	567000	0
Trace Gases	4.69	48.6	0
Total	646000	2560000	0
	Engines	Flares	Total
CH4 Burned (t)	64900	19900	84700
GWP Reduction (t CO2)	1440000	444000	1890000
Bulk LFG CH4 percentage	60.3		
Bulk LFG CO2 percentage	39.7		
Lo (t CH4)	173000		

APPENDIX 6

Trace gas and emissions monitoring results

Concept Reference: 708572
Customer Reference: P3334

Tube (Tenax/Carbon/Molecular Sieve) Analysed as Tube (Tenax/Carbon/Molecular Sieve)

Trace Landfill Gas Suite

				Concept Reference	**708572 018**	**708572 021**	**708572 022**
				Customer Sample Reference	**ECL/18/0086**	**ECL/18/0089**	**ECL/18/0090**
				Test Sample	**AR**	**AR**	**AR**
				Volume l	**0.238**		
				Date Sampled	**11-JAN-2018**	**11-JAN-2018**	**11-JAN-2018**
Determinand	**Method**	**LOD**	**Units**	**Symbol**			
1 Pentene	GC/MS (TD SIR)	10	ng	U	(68) **46**	(68) **30**	(68) **23**
	Calc	Calc	mg/m3	N	**0.19**		
	Calc	Calc	ppm	N	**0.067**		
1,1-Dichloroethane	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.010		
1,1-Dichloroethylene	GC/MS (TD SIR)	10	ng	U	**280**	**240**	<10
	Calc	Calc	mg/m3	N	**1.2**		
	Calc	Calc	ppm	N	**0.30**		
1,2-Dichloroethane	GC/MS (TD SIR)	10	ng	N	(175) **1600**	<10	<10
	Calc	Calc	mg/m3	N	**6.7**		
	Calc	Calc	ppm	N	**1.7**		
1,2-Dichloroethylene	GC/MS (TD SIR)	30	ng	U	<30	<30	**300**
	Calc	Calc	mg/m3	N	<0.13		
	Calc	Calc	ppm	N	<0.032		
1,3-Butadiene	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) **82**
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.019		
1,4 epoxy 1,3-butadiene	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.015		
1-Propanethiol	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.013		
2-butoxyethanol	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.0087		
Benzene	GC/MS (TD SIR)	10	ng	U	(175) **5900**	(175) **2100**	<10
	Calc	Calc	mg/m3	N	**25**		
	Calc	Calc	ppm	N	**7.8**		
Butyric acid	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.012		
Carbon disulphide	GC/MS (TD SIR)	10	ng	N	**440**	<10	<10
	Calc	Calc	mg/m3	N	**1.8**		
	Calc	Calc	ppm	N	**0.59**		
Carbon tetrachloride	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.0067		
Chloroethane	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
	Calc	Calc	mg/m3	N	<0.13		
	Calc	Calc	ppm	N	<0.048		
Dichloromethane	GC/MS (TD SIR)	10	ng	N	(175) **5300**	<10	<10
	Calc	Calc	mg/m3	N	**22**		
	Calc	Calc	ppm	N	**6.4**		
Dimethyl disulphide	GC/MS (TD SIR)	10	ng	N	**320**	<10	<10
	Calc	Calc	mg/m3	N	**1.3**		
	Calc	Calc	ppm	N	**0.35**		
Dimethyl sulphide	GC/MS (TD SIR)	10	ng	U	**750**	**12**	**21**
	Calc	Calc	mg/m3	N	**3.2**		
	Calc	Calc	ppm	N	**1.2**		
Ethyl butyrate	GC/MS (TD SIR)	25	ng	N	<25	<25	<25
	Calc	Calc	mg/m3	N	<0.11		
	Calc	Calc	ppm	N	<0.022		
Ethyl Mercaptan	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.017		
Hydrogen sulphide	GC/MS (TD SIR)	60	ng	N	<60	<60	<60

Concept Reference: 708572
Customer Reference: P3334

Tube (Tenax/Carbon/Molecular Sieve) Analysed as Tube (Tenax/Carbon/Molecular Sieve)

Trace Landfill Gas Suite

				Concept Reference	708572 018	708572 021	708572 022
				Customer Sample Reference	ECL/18/0086	ECL/18/0089	ECL/18/0090
				Test Sample	AR	AR	AR
				Volume l	0.238		
				Date Sampled	11-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**			
	Calc	Calc	mg/m3	N	<0.25		
	Calc	Calc	ppm	N	<0.18		
Methyl Mercaptan	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
	Calc	Calc	mg/m3	N	<0.13		
	Calc	Calc	ppm	N	<0.064		
N-Butyl Mercaptan	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.011		
Styrene	GC/MS (TD SIR)	10	ng	N	**260**	<10	<10
	Calc	Calc	mg/m3	N	**1.1**		
	Calc	Calc	ppm	N	**0.26**		
Toluene	GC/MS (TD SIR)	10	ng	N	**(27) 12000**	**31**	<10
	Calc	Calc	mg/m3	N	**50**		
	Calc	Calc	ppm	N	**13**		
Trichloroethylene	GC/MS (TD SIR)	10	ng	U	**730**	**250**	<10
	Calc	Calc	mg/m3	N	**3.1**		
	Calc	Calc	ppm	N	**0.57**		
Vinyl chloride monomer	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) <10
	Calc	Calc	mg/m3	N	<0.042		
	Calc	Calc	ppm	N	<0.016		

Concept Reference: 708572
Customer Reference: P3334

Tube (Charcoal) Analysed as Tube (Charcoal 226-01)

Siloxanes

				Concept Reference	708572 025	708572 026
				Customer Sample Reference	ECL/18/0093	ECL/18/0094
				Test Sample	AR	AR
				Date Sampled	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Decamethylcyclopentasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Decamethyltetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethylcyclotrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethyldisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethylcyclotetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethyltrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1

Index to symbols used in Supplement to 708572-1

Value	Description
AR	As Received
27	Result should be considered as a minimum due to detector saturation.
13	Results have been blank corrected.
175	Results should be viewed with caution due to being outside of the instrument calibration range
68	Outside scope of UKAS accreditation
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited
C	Calculation

Notes

Supplemental report issued to include air concentration units for Sample 018 as this was missing from the original report.
The results for 1 Pentene, 1,3-Butadiene & Vinyl Chloride Monomer are outside the scope of our UKAS accreditation as the standards expired on the 13/01/18.

EMISSIONS MONITORING SURVEY

Prepared for:

Potters Waste
Brynposteg Landfill Site
Llandidloes
SY18 6JJ

Permit Number	**: TP3736SQ**
Variation Number	**: …**
Installation	**: Engine 1 & 2**
Visit Details	**: Annual Compliance**
Job Number	**: P3334**
Report Number	**: R001**
Report Issue Date	**: 31st January 2018**
Survey Dates	**: 10th & 11th January 2018**

Prepared by:

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<table>
<tr><td colspan="2">Report Issue:</td><td colspan="2">FINAL</td></tr>
<tr><td colspan="2">Report Prepared by:</td><td colspan="2">Report Reviewed & Approved by
MCERTS Level Two
Technical Endorsements TE1, TE2, TE3 & TE4</td></tr>
<tr><td rowspan="3">Name:</td><td rowspan="3">Mike Mullett</td><td>Name:</td><td>Sam Brookes</td></tr>
<tr><td>MCERTS No:</td><td>MM 06 755</td></tr>
<tr><td>Signature:</td><td></td></tr>
<tr><td>Date:</td><td>29/01/2018</td><td>Date:</td><td>31/01/2018</td></tr>
</table>

This report is not to be used for contractual or engineering purposes unless this approval sheet is signed where indicated by the approver and the report is designated "FINAL".

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Opinions and Interpretation expressed within this report are outside the scope of the UKAS accreditation.

MCERTS requirements mean that comparison of results with emissions limit values is not permitted within this report.

TABLE OF CONTENTS

PART 1 - EXECUTIVE SUMMARY

1 Monitoring Objectives

Environmental Compliance Ltd (ECL) was commissioned by **Potters Waste** to undertake an emission monitoring survey at their **Brynposteg Landfill site**. This report presents the findings of the study.

The monitoring at this installation was carried out in accordance with our quotation reference **DHFB/P3334/Q001**, for compliance check monitoring of emissions to air. The substances requested for monitoring at each emissions point are listed below:

Substances to be monitored	Emission Point Identification	
	Ref No: Engine 1	Ref No: Engine 2
Velocity / Flowrate	● U	● U
Oxides of Nitrogen (as NO_2)	● U	● U
Sulphur Dioxide	● U	● U
Carbon Monoxide	● U	● U
Oxygen	● U	● U
Carbon Dioxide	● U	● U
Total Organic Carbon (TVOC)	● U	● U
Non-methane VOCs	● U	● U

● Denotes the substances to be monitored.

U **Denotes UKAS accreditation is held for monitoring that substance, but does not mean that it has been claimed which will depend on whether the testing could be completed in accordance with the Standard Reference Method.**

Special Requirements: *"Normal operating conditions."*

1.1 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty %	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Tick if non-conforming test (see Sections 2 & 5)	Operating Status
Engine 1	Volumetric Flowrate	...	4.45007	m^3/sec	4	Stack Conditions	10/01/2018	12:28 – 12:38	BS EN 16911-1:2013 & MID	NU	✔	Normal
	Volumetric Flowrate	...	1.10789	m^3/sec	8	Dry & 5% O_2				NU	✔	
	TVOC as Carbon	1750	1639.12	mgC/m^3	3			12:51 – 13:50	BS EN 12619:2013	NU	✔	
	Oxides of Nitrogen (as NO_2)	441.18	439.21	mg/m^3	3			12:30 – 13:29	BS EN 14792: 2017	UKAS / MCERTS	✔	
	Carbon Monoxide	1500	1062.54	mg/m^3	4				BS EN 15058: 2017	UKAS / MCERTS	✔	
	Oxygen (Zirconia Cell)	...	7.18	%	6	Dry			BS EN 14789: 2017	UKAS / MCERTS	✔	
	Carbon Dioxide	1448.7	11.51	%	3	Dry			ISO 12039:2001	UKAS / MCERTS	✔	
	Non-Methane VOC $	150	0.73	mg/m^3	20	Dry & 5% O_2		13:56 – 14:36	CEN/TS 13649:2014	NU	✔	
	Sulphur Dioxide $	...	72.11	mg/m^3	13			12:43 – 13:43	BS EN 14791:2017	NU	✔	

The volumetric flowrate shown above is that from the initial pitot traverse.
Any other flow measurements made during isokinetic sampling and/ or repeat traverses are shown later in the tables section.

For additional Notes see page 6.

Potters Waste			**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**		**Visit Details**	**: Annual Compliance**
Variation No	**: ...**		**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334**	**: R001**	**Report Issue Date**	**: 31st January 2018**

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty %	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Tick if non-conforming test (see Sections 2 & 5)	Operating Status
Engine 2	Volumetric Flowrate	...	4.62948	m^3/sec	5	Stack Conditions	10/01/2018	15:00 – 15:20	BS EN 16911-1:2013 & MID	UKAS / MCERTS		Normal
	Volumetric Flowrate	...	1.18792	m^3/sec	9	Dry & 5% O_2				UKAS / MCERTS		
	TVOC as Carbon	1750	1648.33	mgC/m^3	3			15:33 – 16:32	BS EN 12619:2013	UKAS / MCERTS		
	Oxides of Nitrogen (as NO_2)	441.18	430.48	mg/m^3	3			16:23 – 17:22	BS EN 14792: 2017	UKAS / MCERTS		
	Carbon Monoxide	1500	1061.30	mg/m^3	4				BS EN 15058: 2017	UKAS / MCERTS		
	Oxygen (Zirconia Cell)	...	8.08	%	6	Dry			BS EN 14789: 2017	UKAS / MCERTS		
	Carbon Dioxide	1448.7	10.24	%	3	Dry			ISO 12039:2001	UKAS / MCERTS		
	Non-Methane VOC $	150	0.20	mg/m^3	18	Dry & 5% O_2		16:23 – 17:23	CEN/TS 13649:2014	NU	✓	
	Sulphur Dioxide $	...	93.72	mg/m^3	13			15:14 – 16:14	BS EN 14791:2017	UKAS / MCERTS		

The volumetric flowrate shown above is that from the initial pitot traverse.
Any other flow measurements made during isokinetic sampling and/ or repeat traverses are shown later in the tables section.

Notes

The uncertainty figures presented in Table 1.1 for NO_x, CO, SO_2, O_2 & TVOC are "measurement uncertainty" figures, which do not take into account the variability of the measured sample values. The "uncertainty of measurement results" figures, which do include this contribution, are presented in the appendices of the report for these determinands.

Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value.
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval. The Uncertainty results **DO NOT** take into account the effect of the sample location limitations.
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency.
Accreditation for use of Method	**The details indicate the accreditation for the use of the complete monitoring method, e.g. MCERTs, UKAS. If use of the method is not accredited " NA" is stated.**
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring.
$	Chemical Analysis on sample reagents was performed by an External Laboratory as detailed in Section 4
NU	UKAS Accreditation Held but UKAS Accreditation cannot be claimed for the test as sampling did not comply with the Standard Reference Method (SRM), see section 2 & 5
NA	**Method is NOT UKAS Accredited.**

1.2 Operating Information

Emission Point Reference	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results					
							Parameter	Date	Time	CEMS Results	Periodic Monitoring Results	Units
Engine 1	Continuous	Dependent on gas supply	Landfill Gas	N/A	N/A	85%	...	...	...	NP	...	...
Engine 2	Continuous		Landfill Gas	N/A	N/A	100%	...	...	...	NP	...	...

Notes:

Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the normal load, throughput or rating of the plant
CEMS Data	Enter this data for each CEM installed if it is has been provided by operator otherwise state “NP” (NOT PROVIDED)

2 Monitoring Deviations

The objective of the survey was to measure the concentrations of pollutants from the processes / locations as detailed in Section 1. This survey meets the requirements of the site's **PPC Permit Number: TP3736SQ** where UKAS and MCERTS accreditation has and could be claimed for the testing in the monitoring results table.

There was a modification to the sampling procedures (TPDs) listed in Section 4 as follows:

- **Non Methane VOC –** ECL/TPD/84 is specifically for the monitoring of dry ambient gas. Testing of the flare stack required the modification of the TPD, to cool and dry the sample gas prior to passing it through the capture media (sorbent tube). Due to the high stack temperature, and the modifications required to facilitate sampling, all Non-Methane VOC tests are non-conforming and UKAS/MCERTS accreditation has not been claimed.

There were no substance deviations from the original and agreed emissions monitoring schedule.

Non-conforming tests are as follows:

- All extractive tests and the volumetric flowrate tests on Gas Engine 1 are non-conforming as they were sampled on the stack exit. Please note that no alternative sample location is currently available.
- In order to facilitate sampling, a sample extension line (un-heated PTFE line) was used from the back of the filtered probe to the impinger train during the wet chemistry SO2 test on Gas Engine 1. Consequently, the moisture test is not in compliance with ECL/TPD/082 and not accredited.
- Analytical laboratory Concept Life Sciences (CLS) do not hold UKAS accreditation for the analysis of total NMVOCs. Consequently, all Non-Methane VOC tests are non-conforming and UKAS/MCERTS accreditation has not been claimed.

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

Homogeneity tests have not been completed for pollutants at the following locations:

- Gas Engine 1 - Not applicable to this location as the duct area is $<1m^2$.
- Gas Engine 2 - Not applicable to this location as the duct area is $<1m^2$.

PART 2 – SUPPORTING INFORMATION

3 SAMPLING STAFF DETAILS

Site Sampling Team

Names of Site Team	Dates on Site	MCERTS No.	LEVEL	Technical Endorsements
Sam Brookes	10-11/01/2018	MM 06 775	2	TE1, TE2, TE3, TE4
Peter Brockway		MM 17 1459	Trainee	...

Report Reviewer

Name	MCERTS No.	LEVEL	Technical Endorsements
Sam Brookes	MM 06 775	2	TE1, TE2, TE3, TE4

Technical Endorsement Key:-

TE1 – **Isokinetic** Particulates, Temperature & Velocity Profiles, Oxygen.
TE2 – **Isokinetic** Extractive Pollutants:- Metals, Dioxin & Furans, PAHs, PCBs, HCl, HF.
TE3 – **Non-Isokinetic** Extractive Pollutants:- Speciated VOCs, HF, HCl, Cyanide.
TE4 – **Continuous Analysers** (Combustion Gases):- TVOC, CO, NOx, SO2.

4 SAMPLING PROTOCOLS / METHODOLOGIES

Any required modifications to the Technical Procedure Documents (TPDs) specified below will be detailed in section 2 of this report.

Stand alone velocity measurements and those made to support isokinetic sampling are conducted using BS EN 16911-1:2013 & MID.

Pressure, Temperature and Velocity

Testing was carried out using a sampling system in accordance with **BS EN ISO 16911-1:2013 & MID** and In-house technical procedure **ECL/TPD/022A.**

Temperature was recorded using a thermocouple and digital temperature reader.

Velocity and pressure were recorded using an "L" pitot and digital manometer, data being recorded in Pascals.

Water Vapour

Testing was carried out using a Universal Stack Sampling system in accordance with **BS EN 14790:2017** and In-house technical procedure **ECL/TPD/082**.

In this method the stack gases are filtered (in-stack unheated filter or out-stack heated filter) to remove particulate matter. The gases are then passed through a **heated probe** and then to a cooled moisture trapping unit. All unheated parts of the sample train (outside the sample port) which come into contact with stack gas are weighed pre and post sampling in order to determine the weight gain.

After each test, a visual inspection of the last impinger is made to confirm that at least 50% of the silica gel column has not changed colour. This indicates satisfactory collection of water vapour.

Combustion Gases (NO_x, CO & CO_2)

Measurements of combustion gases were carried out using an MCERTS Certified **Horiba PG 250** stack gas analyser. Continuous monitoring of emissions was undertaken over each test period recording minute averaged data (one measurement every 60 seconds). The measurement techniques for each determinand are as follows:

Determinand	Technique	SRM
• NO_x	Chemiluminescence	BS EN 14792: 2017
• CO	Non-dispersive infrared	BS EN 15058: 2017
• CO_2	Non-dispersive infrared	ISO 12039:2001

The analyser was set up with reference to the manufacturer's operator handbook and the in-house technical procedure **ECL/TPD/033c**. The analyser was calibrated on site using certified gases which are traceable to ISO 17025 (with uncertainty <2%). Zero measurements were performed using Nitrogen. The analyser was calibrated directly into the sample inlet and then checked through the entire sampling system (including sampling probe, heated & unheated gas transport lines and gas drying/ conditioning system).

Data is presented graphically in the Figures Section, and the minute averaged data is given in the Tables Section.

Oxygen

Measurements of Oxygen were carried out using a Testo 350XL electrochemical cell combustion gas analyser which has been validated to meet the performance requirements of **BS EN 14789:2017** Continuous monitoring of emissions was undertaken over each test period recording minute averaged data.

The analyser was set up with reference to the manufacturer's operator handbook and the in-house technical procedure **ECL/TPD/086**. The analyser was calibrated on-site using certified gases which are traceable to ISO 17025 (with uncertainty <2%), (for emissions streams where oxygen is above 15%, dry ambient air can be used to calibrate the analyser). Zero measurements were performed using Nitrogen. The analyser was calibrated directly into the sample inlet (which is up-stream of the built-in chiller system) and then checked through the entire sampling system (including sampling probe, short heated/ unheated gas transport lines and external gas conditioning systems as required).

TVOC as Carbon

Testing was carried out using an MCERTS Certified Signal 3030PM FID and heated gas sample line, with reference to the manufacturer's operation handbook, **BS EN 12619:2013** and in-house technical procedure **ECL/TPD/032A**.

The analyser was calibrated on site using certified propane span gases, (made up in synthetic air) which are traceable to ISO 17025 standard (with uncertainty $<2\%$).

Zero measurements were performed using synthetic air zero gas, with TVOC content less than 0.2 mg/m^3 (or purity greater than 99.998%).

The analyser was calibrated directly into the sample inlet and then checked through the entire sampling system (including sampling probe, heated filter and heated gas transport lines). Data was corrected by molecular weight to TVOCs as total carbon.

Data was recorded as minute averages over each test period. The data is presented in the Figures Section and the minute averaged data is detailed in the Tables Section.

Sulphur Dioxide

Testing was carried out non-isokinetically using a Universal Stack Sampling system in accordance with **BS EN 14791:2017** and In-house technical procedure **ECL/TPD/039**. Non-isokinetic sampling can only take place if there are no droplets present in the stack gas.

In this method the stack gases are filtered to remove particulate matter then the gases are passed through a series of impingers. The first three impingers each contain 140ml of 3% Hydrogen Peroxide (3% H_2O_2). The fourth impinger is left empty and the final impinger contains a measured quantity of silica gel.

The first three impingers containing the 3% Hydrogen Peroxide are analysed for concentrations of Sulphur Dioxide by IC (Ion Chromatography).

Concept Life Sciences Ltd (CLS) who are situated in Manchester carried out the analysis of the samples. **CLS** is UKAS accredited for this analysis. In addition to the survey samples, appropriate field blanks and efficiency checks are submitted as part of the technical procedure.

Non-Methane VOC

Non-continuous sampling for **Non-Methaane VOC** was carried out in accordance with **CEN/TS 13649:2014** and In-house technical procedure **ECL/TPD/084.** In this method a metered volume of stack gas is extracted through a standard charcoal sorbent tube.

Concept Life Sciences Ltd (CLS) who are situated in Manchester carried out the analysis of the samples. **CLS** are **not UKAS accredited** for this analysis. In addition to the survey samples, appropriate field blanks and efficiency checks are submitted as part of the technical procedure.

Due to restrictions set out in CEN/TS 13649:2014, MCERTS/UKAS accreditation can only be claimed when the target parameters are organic compounds, the sorbent tube used is a standard charcoal tube/ thermal desorption tube and when laboratory analysis is UKAS accredited and carried out by GC. If other tubes are used, or if analysis is by other means than GC, then usually only UKAS accreditation can be claimed, as long as the laboratory analysis is UKAS accredited. (MCERTS accreditation may still be claimed if prior approval is given for the modifications by the Environment Agency – details will be given in section 2 of this report).

Laboratory analysis cannot be UKAS accredited for "Total VOC" or "TOP 10 compounds".

For the subcontract laboratory to claim UKAS accreditation for analysis, the internal recovery of a spiking compound (desorption efficiency from tube) needs to be above 80%. If it falls below 80% this will be noted on the analysis certificate.

If greater than 5% of the total amount of any of the target species is found in the back up portion of the sorbent tube, this will be noted on the analysis certificate.

5 SAMPLE POINT DESCRIPTIONS

The homogeneity test is applicable to combustion processes. This includes but is not restricted to, those regulated under the Waste Incineration Directive (**WID**) and the Large Combustion Plant Directive (**LCPD**).

Homogeneity testing has not been completed at these locations in accordance with the mandatory requirements of the regulatory authority.

The test is not usually required for stacks with sampling plane areas of $<1m^2$ (below 1.13m in diameter for circular ducts).

The sample locations that were monitored are detailed below:-

Landfill Gas Engine 1

The exhaust diameter is 0.3m and sampling was performed from the exit of the duct approximately 1.25m above the Engine Room roof.

As a result of the sampling point being on the exit of the duct and immediately after a bend it does not currently meet the requirements detailed in *Technical Guidance Note (Monitoring) M1"Sampling requirements for stack-emission monitoring" Environment Agency,* and BS EN 13284-1. The sampling probes were inserted down into the duct exit and positioned at a central location within the ducting.

Access to the sample location was attained by means of temporary scaffolding complete with an in date scafftag accessed from outside the engine one control building. The scaffolding provided 1.8m of width back from the stack exit to facilitate sampling.

A 240V power supply was available inside the engine one control room building directly below the sampling location.

All tests are non-conforming as they had to be conducted on the stack exit.

In addition and in order to facilitate sampling, a sample extension line (un-heated PTFE line) was used from the back of the filtered probe to the impinger train during the wet chemistry SO2 test. Consequently, the moisture test is not in compliance with ECL/TPD/082 and not accredited.

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of these non-conformities or sample location limitations.

Landfill Gas Engine 2

The sampling platform does not currently meet the requirements detailed in *Technical Guidance Note (Monitoring) M1"Sampling requirements for stack-emission monitoring" Environment Agency,* and BS EN 13284-1 due to a lack of space however both ports could be accessed in this survey and no isokinetic tests were required.

The stack diameter is 0.4m and the sample platform width back from the sample port is only 0.4m.

Two sample ports are located on the stack at 90 degrees to each other and are located on the same plane.

These sample ports are located at a height of approximately 1.15m from the working sample platform.

Access to the sample location was attained by means of temporary scaffolding complete with an in date scafftag accessed from outside the engine two control building.

A 240V power supply was available inside the engine two control room building directly below the sampling location.

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

EQUIPMENT IDs
(Pre site checklist from SSP)

PRE SITE EQUIPMENT CHECKLIST/ EQUIPMENT USED

(Completed before departure to site and when on site in full)

Equipment	Equip. Type	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:
MST console/pump	E001	U001							
MST Nozzle set									
MST "S" Type Pitot									
MST Probe									
MST Hot Box		978							
MST Impinger Arm		401							
		660							
Barometer		627							
Site Balance		088							
Site Check weights		276							
		277							
Horiba	E002	511							
Heated Probe / Filter		920							
Chiller		972							
Sonimix / MFC									
Heated Line		1013	1014						
FID	E003	269							
Heated Line		517	518						
Heated Probe / Filter		919							
Testo	E004	350							
FTIR	E005								
Heated Probe / Filter									
Heated Line									
Stackmite	E006								
"L" Type Pitot		489							
Digital Manometer		421							
Stack Thermocouple		866							
Thermocouple Reader		1112							
Nozzle Set									
Workhorse Pumps	E007								
Low Flow Pumps									
Tube Thermocouple		1041							

Quantity of Ice Required / Used for Survey	6	Bags (2kg bags)

FIGURES

Figure 1: Engine 1 TVOCs

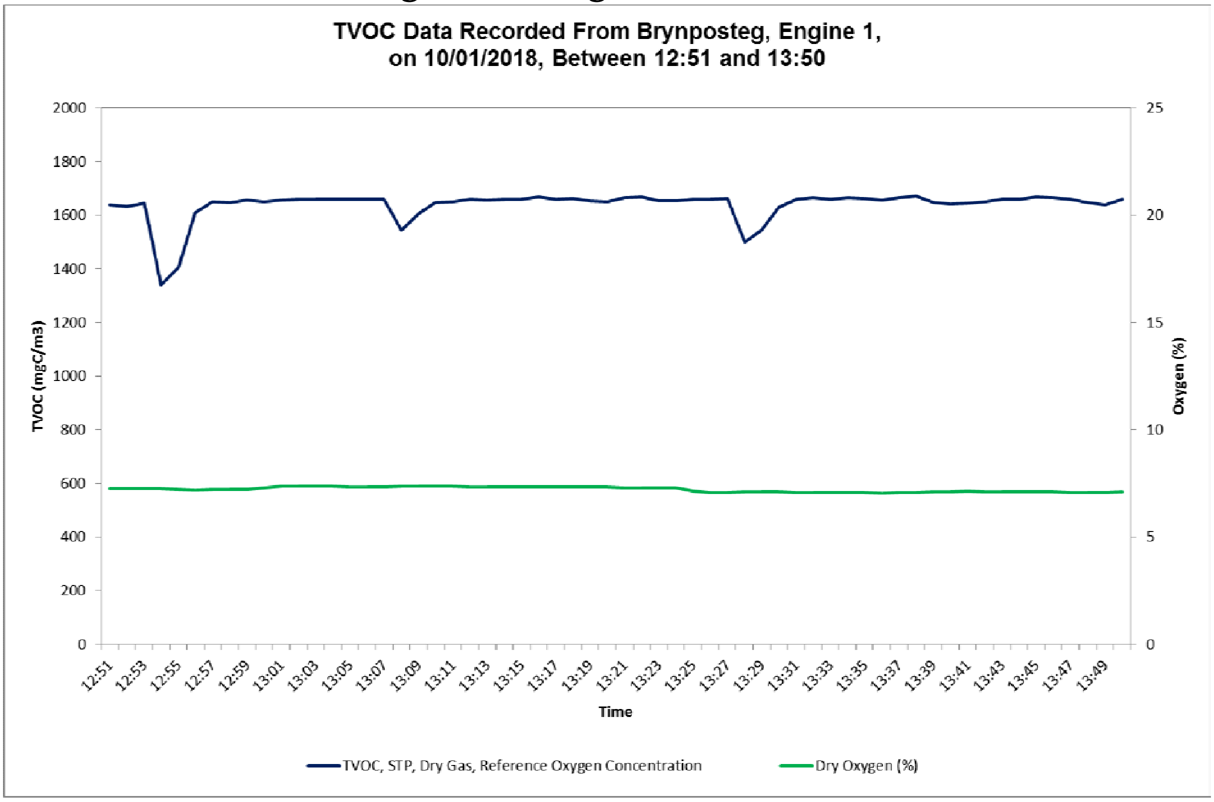


Figure 2: Engine 1 Combustion Gases

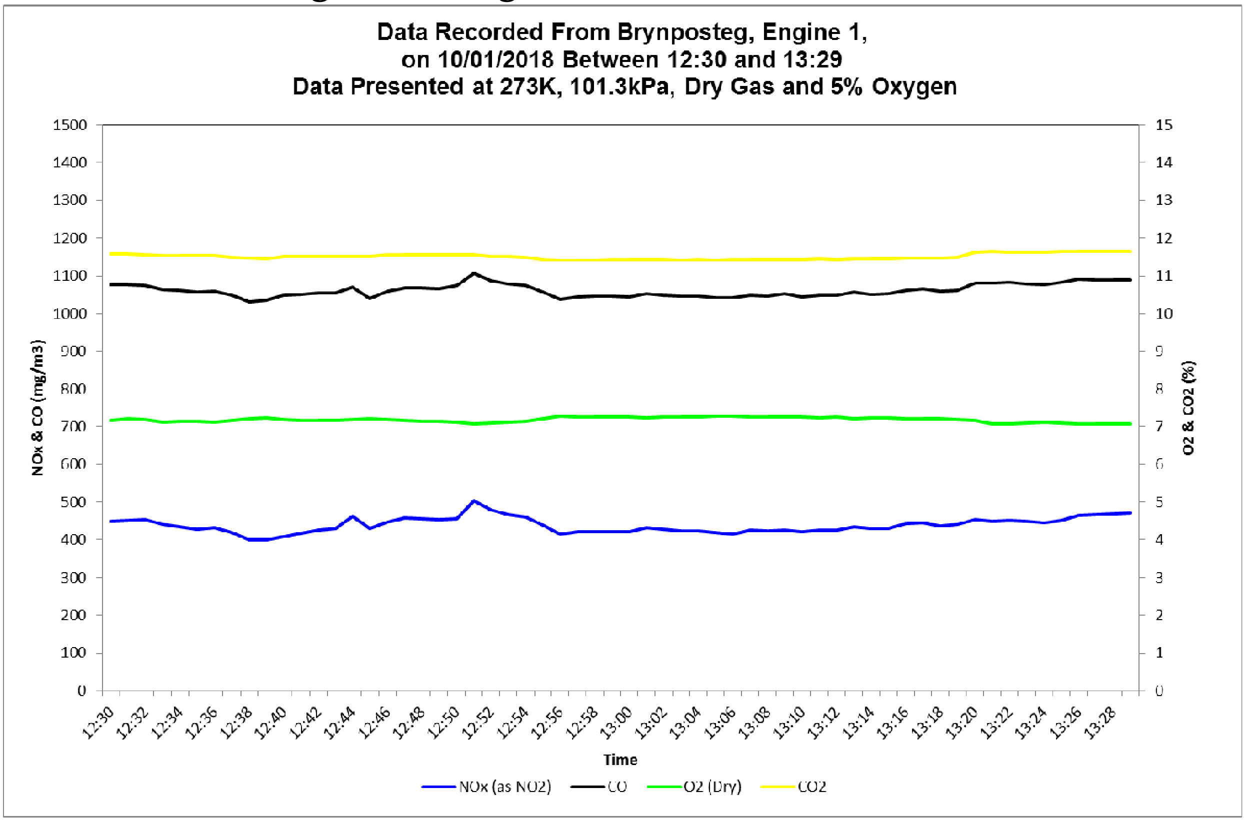


Figure 3: Engine 2 TVOCs

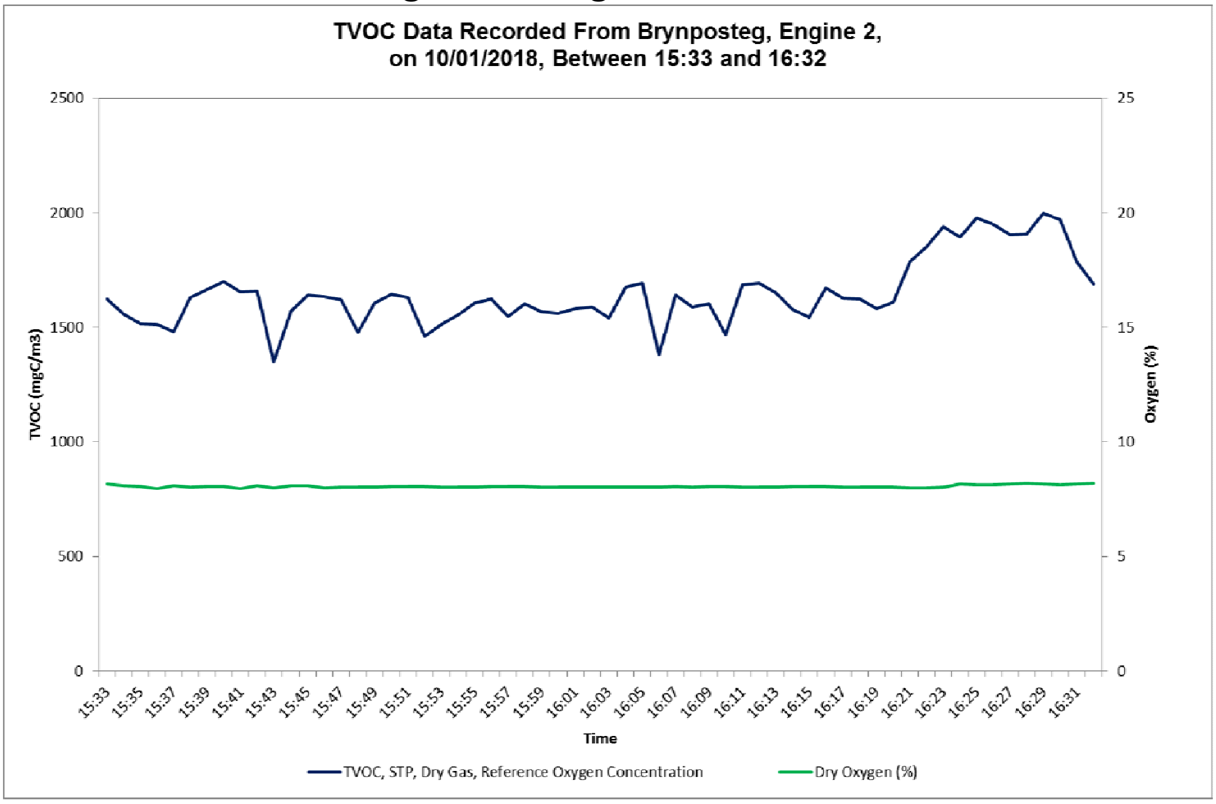
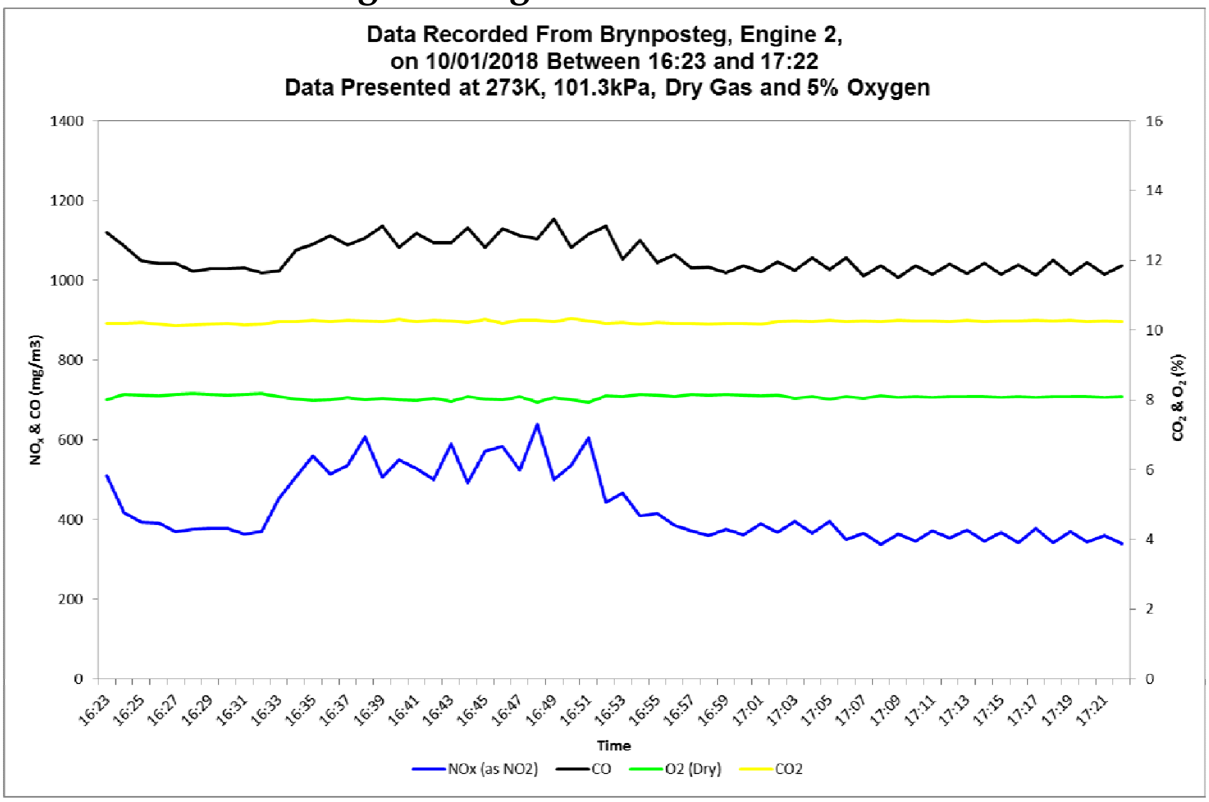


Figure: Engine 2 Combustion Gases



TABLES

Table 1 – TVOC

Data Recorded Engine 1

Sample Period: 12:51 – 13:50 on the 10th January 2018

Volumetric Flowrate (Reference Conditions) = 1.10789 m^3/sec *

	Average	Emission Rate
	mg/m³	Kg/hr
TVOC (as carbon)*	1639.12	6.537

* Reference Conditions (273K, 101.3 kPa, 5% Oxygen & Dry Gas)

Table 2 – Gases

Data Recorded from Engine 1

Sample Period: 12:30 – 13:29 on the 10th January 2018

Volumetric Flowrate (Reference Conditions) = 1.10789 m^3/sec *

	Average	Emission Rate
	mg/m³	Kg/hr
Oxides of Nitrogen (as NO_2) *	439.21	1.752
Carbon Monoxide *	1062.54	4.238
Carbon Dioxide (%) **	11.51	...
Oxygen (%) **	7.18	...

* Reference Conditions (273K, 101.3 kPa, 5% Oxygen & Dry Gas)
** Dry Gas

Table 3 – SO_2

Data Recorded from Engine 1 - Landfill

Emission Parameter	Units	One - SO2	Blank
Stack Diameter	metres	0.40	
Area of Sample Plane	m^2	0.126	
Moisture Content	%	13.25	
Oxygen Content	%	7.23	
Stack Temperature	°C	505	
Gas Velocity (as Measured)	m/sec	62.96	
Gas Velocity (Reference Conditions)	m/sec*	15.68	
Volumetric Flowrate (as Measured)	m^3/sec	7.91	
Volumetric Flowrate (Reference Conditions)	m^3/sec*	1.97	
Dry Gas Molecular Weight	g/gmole	30.13540327	
Sample Date	...	10/01/2018	
Sample Period	...	12:43 - 13:43	
Sample Volume (reference Conditions)	m^3*	0.339	0.339
Sample Reference	ECL/18/	0070 & 0071	0072
Mass of Sulphur Dioxide Collected	mg	24.42	0.14
Concentration of Sulphur Dioxide	mg/m^3*	**72.11**	0.41
Emission Rate of Sulphur Dioxide	kg/hr	0.51	...
Expanded Uncertainty (% Relative)	%	13	...
Impinger Collection Efficiency	%	99	...

*Reference Conditions (273K, 101.3kPa, 5% Oxygen, Dry Gas)

Table 4 – Non-Methane TVOCs

Potters Waste

Brynposteg Landfill Engine 1

Emission Parameter	Units	Value		
Stack Diameter	mm	300		
Area of Sample Plane	m^2	0.071		
Moisture Content	%	10.15		
Expanded Uncertainty of Moisture (%Relative)	%	14.57		
Measured Oxygen (Dry)	%Vol	7.19		
Meter Temperature	°C	10.33		
StackTemperature	°C	509.17		
Sample Date	...	10/01/2018		
Sample Period	...	13:56 - 14:56		
Sample Volume (as Measured)	m^3	0.10		
Sample Volume (reference Conditions)	m^3*	0.081		
Sample Tube Results		One		Blank
Sample Reference ECL/18/80	Units	Concentration*	Uncertainty	Concentration
Concentration of Non Methane VOCs	mg/m^3	0.73	19.97%	0.012

***Reference Conditions: 273 K, 101.3 kPa, 5% Oxygen & Dry Gas**

Table 5 – TVOC

Data Recorded from Engine 2

Sample Period: 15:33 - 16:32 on the 10th January 2018

Volumetric Flowrate (Reference Conditions) = 1.18792 **m^3/sec ***

	Average	Emission Rate
	mg/m^3	Kg/hr
TVOC (as carbon)*	**1648.33**	**6.59**

*** Reference Conditions (273K, 101.3 kPa, 5% Oxygen & Dry Gas)**

Table 6 – Gases

Data Recorded from Engine 2

Sample Period: 16:23 – 17:22 on the 10th January 2018

Volumetric Flowrate (Reference Conditions) = 1.18792 **m^3/sec ***

	Average	Emission Rate
	mg/m^3	Kg/hr
Oxides of Nitrogen (as NO_2) *	**430.48**	**1.841**
Carbon Monoxide *	**1061.30**	**4.539**
Carbon Dioxide (%) **	**10.24**	...
Oxygen (%) **	**8.08**	...

*** Reference Conditions (273K, 101.3 kPa, 5% Oxygen & Dry Gas)**
**** Dry Gas**

Table 7 – SO_2

Data Recorded from Engine 2 - Landfill

Emission Parameter	Units	One - SO2	Blank
Stack Diameter	metres	0.40	
Area of Sample Plane	m^2	0.126	
Moisture Content	%	10.31	
Oxygen Content	%	8.07	
Stack Temperature	^oC	459	
Gas Velocity (as Measured)	m/sec	36.82	
Gas Velocity (Reference Conditions)	m/sec*	9.45	
Volumetric Flowrate (as Measured)	m^3/sec	4.63	
Volumetric Flowrate (Reference Conditions)	m^3/sec*	1.19	
Dry Gas Molecular Weight	g/gmole	29.95981639	
Sample Date	...	10/01/2018	
Sample Period	...	15:14 - 16:14	
Sample Volume (reference Conditions)	m^3*	0.265	0.265
Sample Reference	ECL/18/	0073 & 0074	0075
Mass of Sulphur Dioxide Collected	mg	24.84	0.15
Concentration of Sulphur Dioxide	mg/m^3*	**93.72**	0.58
Emission Rate of Sulphur Dioxide	kg/hr	0.40	...
Expanded Uncertainty (% Relative)	%	13	...
Impinger Collection Efficiency	%	100	...

*Reference Conditions (273K, 101.3kPa, 5% Oxygen, Dry Gas)

Table 8 – Non-Methane TVOCs

Potters Waste

Brynposteg Landfill Engine 2

Emission Parameter	Units	Value		
Stack Diameter	mm	400		
Area of Sample Plane	m^2	0.126		
Moisture Content	%	6.60		
Expanded Uncertainty of Moisture (%Relative)	%	16.73		
Measured Oxygen (Dry)	%Vol	8.08		
Meter Temperature	°C	10.17		
StackTemperature	°C	460.00		
Sample Date	...	10/01/2018		
Sample Period	...	16:23 - 17:23		
Sample Volume (as Measured)	m^3	0.099		
Sample Volume (reference Conditions)	m^3*	0.073		
Sample Tube Results		One - NMVOC		Blank
Sample Reference ECL/18/81	Units	Concentration*	Uncertainty	Concentration
Concentration of Non Methane VOC	mg/m^3	0.20	18.30%	0.014

***Reference Conditions: 273 K, 101.3 kPa, 5% Oxygen & Dry Gas**

VELOCITY TRAVERSE PROFILES

Environmental Compliance Limited

Potters Waste			**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**		**Visit Details**	**: Annual Compliance**
Variation No	**: ...**		**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334**	**: R001**	**Report Issue Date**	**: 31st January 2018**

Environmental Compliance Limited	Traverse Data Profoma	Date of Measurement	10/01/2018

Company	Potters Waste	Stack Diameter Port A (mm)	300	Average Stack Diameter (mm)	300	Pitot tube coefficient	0.99
Site	Brynposteg	Stack Diameter Port B (mm)		Port Length (mm)	0	Pitot Id	489
Location	Landfill	Duct Length Port A (mm)		Average Duct Length (mm) L		Stack Thermocouple ID	866
Stack	Engine 1	Duct Length Port B (mm)		Duct width (mm) B		Stack Temp Reader ID	1112
Job No	P3334	Duct Length Port C (mm)		Barometric Pressure. (mb)	964	Manometer ID	421
Operators	SEB + PB	Duct Length Port D (mm)		Ave Static Press. (mm H_2O)	34.25	Barometer ID	627

Pre - Traverse Checks Carried Out	Time	Pass/ Fail
Pre - Traverse PITOT Visual Inspection	12:28:00	Pass
Pre - Traverse PITOT Leak Check	12:30:00	Pass

Smooth Walls

Static Pressure Readings (Pascals)			
Port A	Port B	Port C	Port D
336.00			

Port/ Point	Distance to Point (mm)	Time	Temperature Readings (°C) 1	2	3	(ΔP) Pitot Readings (Pa) 1	2	3	Average Temp. (°C)	Average (ΔP) (Pa)	Swirl Test ° From Reference
A1	150	12:32:00	508.0	508.0	508.0	872.0	866.0	867.0	508.0	868.3	0
Blockage Check @ A1 (L-Type Pitot Only)		n/a	508.0	509.0	509.0	872.0	870.0	869.0	508.0	868.3	Total
			Mean		508.7	Mean		870.3	508.0	868.3	Max
			Difference <5% from Initial ?		0.09	Difference <5% from Initial ?		0.23	508.0	868.3	Min
									508.0	868.3	Average

Post - Traverse Checks Carried Out	Time	Pass/ Fail
Post - Traverse Visual Inspection	12:36:00	Pass
Post - Traverse PITOT Leak Check	12:38:00	Pass

Stagnation Check (S-type Pitot Only)	Time	Reading
Static Pressure Via Positive Leg (Pa)	.	.
Static Pressure Via Negative Leg (Pa)	.	.
Difference (Pa) < 10Pa ?		#VALUE!

Average temp (K)	781.000

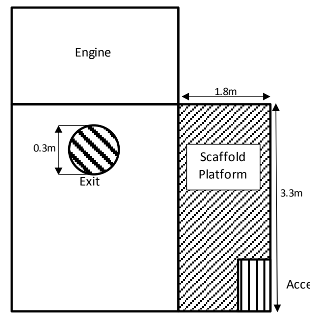
Suitability of Sampling Position	Actual Stack Conditions
Highest:lowest flow pressure ratio < 9:1?	1:1
Maximum deviation of flow from axis < 15°?	0
X-sectional area for stacks = πr2	0.07 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	no - but no alternative

Stack Moisture	13.25	%	Gas Velocity (as Measured) Adjusted for Smooth Walls	62.95555	m/sec
Measured Oxygen	7.23	%	Gas Velocity (Reference Conditions) Adjusted for Smooth Walls	15.67342	m/sec*
Measured Carbon Dioxide	11.54	%	Volumetric Flowrate (as Measured) Adjusted for Smooth Walls	4.45007	m^3/sec
Dry Gas Molecular Weight	30.13560	g/g mole	Volumetric Flowrate (Ref Cond) Adjusted for Smooth Walls	1.10789	m^3/sec*

*Reference Conditions: 273K, 101.3kPa, 5% Oxygen, Dry Gas

NOTE: Velocity / volume flowrate calculations exclude contributions from the measurement point(s) where swirl > 15°

Diagram/ Description of Cross Section of Stack/Duct



Notes
Including expected or actual deviations from procedures / non-conformities

Sample in exit

Not possible to measure swirl

Compliance With Positional Requirements?

Height of sample ports from Platform	1.25m
Number of sample ports	n/a
Width of platform (port back to handrail)	1.8m

Nearest downstream disturbance	Exit	0m
Nearest upstream disturbance	Bend	0.5m
Disturbances are classed as bends, fans or diameter variations		

Environmental Compliance Limited

Potters Waste			**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**		**Visit Details**	**: Annual Compliance**
Variation No	**: ...**		**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334**	**: R001**	**Report Issue Date**	**: 31st January 2018**

Environmental Compliance Limited	Traverse Data Profoma	Date of Measurement	10/01/2018

Company	Potters Waste	Stack Diameter Port A (mm)	400	Average Stack Diameter (mm)	400	Pitot tube coefficient	0.99
Site	Brynposteg	Stack Diameter Port B (mm)	400	Port Length (mm)	90	Pitot Id	489
Location	Landfill	Duct Length Port A (mm)		Average Duct Length (mm) L		Stack Thermocouple ID	866
Stack	Engine 2	Duct Length Port B (mm)		Duct width (mm) B		Stack Temp Reader ID	1112
Job No	P3334	Duct Length Port C (mm)		Barometric Pressure. (mb)	964	Manometer ID	421
Operators	SEB + PB	Duct Length Port D (mm)		Ave Static Press. (mm $H_2$0)	-7.65	Barometer ID	627

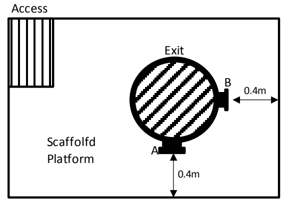
Pre - Traverse Checks Carried Out	Time	Pass/ Fail
Pre - Traverse PITOT Visual Inspection	15:00:00	Pass
Pre - Traverse PITOT Leak Check	15:02:00	Pass

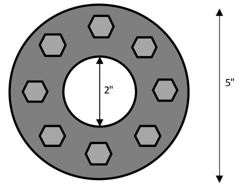
Smooth Walls

Static Pressure Readings (Pascals)

Port A	Port B	Port C	Port D
-75.00	-75.00		

Diagram/ Description of Cross Section of Stack/Duct





Port/ Point	Distance to Point (mm)	Time	Temperature Readings (°C) 1	2	3	(ΔP) Pitot Readings (Pa) 1	2	3	Average Temp. (°C)	Average (ΔP) (Pa)	Swirl Test ° From Reference
A1	59	15:05:00	459.0	460.0	459.0	325.0	330.0	321.0	459.3	325.3	5
A2	341	15:07:00	460.0	460.0	460.0	300.0	304.0	318.0	460.0	307.3	10
B1	59	15:10:00	458.0	458.0	458.0	320.0	324.0	331.0	458.0	325.0	10
B2	341	15:12:00	459.0	459.0	460.0	306.0	314.0	324.0	459.3	314.7	10
Blockage Check @ A1 (L-Type Pitot Only)		15:16:00	459.0	459.0	459.0	330.0	326.0	329.0	1836.7	1272.3	Total
			Mean		459.0	Mean		328.3	460.0	325.3	Max
			Difference <5% from Initial ?		-0.05	Difference <5% from Initial ?		0.92	458.0	307.3	Min
									459.2	318.1	Average

Notes
Including expected or actual deviations from procedures / non-conformities

100% load

Narrow platfrom but both ports can be reached

Post - Traverse Checks Carried Out	Time	Pass/ Fail
Post - Traverse Visual Inspection	15:18:00	Pass
Post - Traverse PITOT Leak Check	15:20:00	Pass

Average temp (K)	732.167

Stagnation Check (S-type Pitot Only)	Time	Reading
Static Pressure Via Positive Leg (Pa)	.	.
Static Pressure Via Negative Leg (Pa)	.	.
Difference (Pa) < 10Pa ?		#VALUE!

Suitability of Sampling Position	Actual Stack Conditions
Highest:lowest flow pressure ratio < 9:1?	1.08:1
Maximum deviation of flow from axis <15°?	10
X-sectional area for stacks= $\pi r2$	0.13 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	OK

Compliance With Positional Requirements?

Height of sample ports from Platform	1.15m
Number of sample ports	5
Width of platform (port back to handrail)	0.4m

Stack Moisture	10.31	%	Gas Velocity (as Measured) Adjusted for Smooth Walls	36.84027	m/sec
Measured Oxygen	8.07	%	Gas Velocity (Reference Conditions) Adjusted for Smooth Walls	9.45320	m/sec*
Measured Carbon Dioxide	10.23	%	Volumetric Flowrate (as Measured) Adjusted for Smooth Walls	4.62948	m^3/sec
Dry Gas Molecular Weight	29.95960	g/g mole	Volumetric Flowrate (Ref Cond) Adjusted for Smooth Walls	1.18792	m^3/sec*

Nearest downstream disturbance	exit	2.0m
Nearest upstream disturbance	bend	1.5m
Disturbances are classed as bends, fans or diameter variations		

*Reference Conditions: 273K, 101.3kPa, 5% Oxygen, Dry Gas NOTE: Velocity / volume flowrate calculations exclude contributions from the measurement point(s) where swirl >15°

FIELD CALIBRATION AND SAMPLING DATA

Engine 1 - Combustion Gases

	Horiba PG 250 Measurement Ranges:			
	NO as NO_2	CO	O_2	CO_2
	1025	2500	25	20
Units	mg/m^3	mg/m^3	%Vol	%Vol
	Zero Values (Direct)			
Mean Initial Direct Zero	0.30	0.00	-0.01	0.00
Mean Confirmation Direct Zero	0.28	0.24	-0.03	0.00
Difference in Direct Zero	0.02	0.24	0.02	0.00
Repeatability at Zero	4.10	2.50	0.20	0.20
<2 x Repeatability at Zero?	YES	YES	YES	YES
	Pre Zero Values (System)			
Mean Pre Test Zero	0.24	-0.03	-0.03	0.00
% of Measurement Range?	0.02%	0.00%	-0.13%	0.00%
Detection Limit (LOD)	0.16	0.12	0.20	0.00
	Applied Span:			
	NO	CO	O_2	CO_2
Actual Applied Span Concentration	526.44	1271.25	14.84	17.73
	Pre Test System Zero Values			
Mean Pre Test System Zero	0.24	-0.03	-0.03	0.00
Difference ≤ ± 2% of Span Value (5% for SO_2)?	0.05%	0.00%	0.22%	0.00%
	Post Test Zero Values			
Mean Post Test Zero	1.06	1.53	-0.04	0.02
% of Certified Range?	0.10%	0.06%	-0.16%	0.10%
Zero Drift ≤ ± 5% of Applied Span?	0.15%	0.12%	0.20%	0.11%
	Pre Test System Span Values			
Mean Pre Test System Span	520.19	1262.67	14.86	17.63
Difference ≤ ± 2% of Span Value (5% for SO_2)?	1.19%	0.67%	0.13%	0.55%
	Post Test Span Values			
Mean Post Test Span	508.92	1222.29	14.67	17.58
Span Drift ≤ ± 5% Span Value?	3.33%	3.85%	1.12%	0.83%
	3.33%	3.85%	1.12%	0.83%
	See Note 2	See Note 2	See Note 3	See Note 3

NOTE 1: Data Invalid! Contact Quality Manager!
NOTE 2: Correct test data for drift!
NOTE 3: No drift correction required.

NB: NOx and CO data drift corrected prior to calculation of periodic monitoring results

Engine 1 - TVOCs Calibrations Summary

TVOC - FIELD DATA SHEET

Client	Potters Waste	Barometric Pressure mb	964
Site	Brynposteg	Barometer ID	ECL/ID/ 627
Date	10/01/2018	Analyser ID	ECL/ID/ 269
Location	Landfill	Sonimix/ MFC ID	ECL/ID/
Stack ID	Engine 1	Heated Line/ Controller ID	ECL/ID/ 517 + 518
Stack Temp °C	923	Heated Line Set Temp °C	180 YES
Ambient Temp (sampling)	1 = 11 2 = 13 3 = 15	Heated Line Length	10 m
Ambient Temp (sampling)	4 = 17 5 = 16 6 = 15	Heated Probe Filter ID	ECL/ID/ 919
Job No	P3334	Heated Filter Set Temp °C	180 YES
Operators	SEB + PB	Logger ID	926

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/ 1771	...	...
Hydrogen / Helium	Gas/ 1869	...	...
Propane (In Air)	Gas/ 1770	924.8 ppm	1%

	Analyser Range	Span Gas value used
Propane	4000 ppm	924.8 ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	11:05	11:10	11:15	11:20	11:22	11:27

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
9	8	Start Time	End Time	Start Time	End Time
ZERO / SPAN		11:29	11:34	11:36	11:41

Response Time		
SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
11:35:00	11:35:12	Y

	Start Time	End Time	Location	Production Details
Sample Period	12:00	14:56	Enigine 1	Normal
Sample Period				
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
10	6	Start Time	End Time	Start Time	End Time
ZERO / SPAN		17:32	17:34	17:37	17:39

Process Details / Comments

Engine 1 - TVOCs Data Sheet

Calibration Summary		TVOC ppm
Analyser Range		**4000**
Repeatability at Zero		2
Span Gas Concentration Applied		**924.8**
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	924.8
	Zero	-0.12
Difference (Zero)		0.1249
< 2 × Repeatability @ Zero?		**YES**
Pre Test (System)	Zero	0.00
	Span	926.9
Difference (Zero)		0.0000
< 2% Relative to Direct Span		YES
Difference (Span)		2.0927
< 2% Relative to Direct Span		**YES**
Post Test (System)	Zero	2.92
	Span	908.9
Difference (Zero)		2.9152
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		17.9600
Span Drift < 2% of Applied Span?		**YES**
Zero and Span Drift < 5% of Applied Span?		**YES**

Engine 1 - SO2 Field Data Sheet

Environmental Compliance Limited	NON ISOKINETIC SAMPLING PROFORMA	Date of Measurement	10/01/2018

If moisture was not measured see detailed notes below.

ECL/TPD/	39	Time taken to change Ports?	0	Start Time	12:43
				Test Duration	60 mins
End Time	13:43				

Client	Potters Waste	Stack Profile	Circular	Console id	U001	Barometer id	627
Site	Brynposteg	Stack Area (m^2)	0.13	Pump id	U001	Nozzle Id	n/a
Location	Landfill	Barometric Pressure (mb)	964	Probe id	Sinter probe	Nozzle size	n/a
Stack ID	Engine 1	Static Pres. (mm H_20)	33.6	DGM Yd	0.9764	Filter Id	Sinter in-stack
Test No.	One - SO2	Pitot coefficient	n/a	ΔH@	38.2	Pitot ID	n/a
Job No	P3334	Probe Heater Setting (^OC)	N/A	Impinger Id	660	Hot Box ID	N/A
ECL Site Staff	SEB + PB	Hot Box Setting (^OC)	N/A	Balance Id	88		

Required Sample Flowrate l/min	Suggested ΔH Entered Below
3	1
6	3
10	10
15	25
25	50
Initial ΔH	3
Reference Oxygen Percentage	5

	Sample	Leak 1	Leak 2	Leak 3	Leak 4	Leak 5	Total
Start Volume	2850830.0						
Final Volume	2851268.0						
Total Volume	438.0	0.0	0.0	0.0	0.0	0.0	438.0
Leak Check	First	Second	Third	Fourth	Fifth		
Leak rate l/min	0				0		
Vaccum "Hg	12				12		
Time of Check	12:40				13:48		
Set Rate l/min	6				7.3		
Leak <2%?	YES				YES		

Dry O_2 (☐ Atmospheric)	7.23
Dry Carbon Dioxide %	11.54
Dry Carbon Monoxide ppm	

Traverse Point	A1	A1	A1	A1	A1	A1			Total
Time/Point (mins)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60			
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)	3.00	3.00	3.00	3.00	3.00	3.00			3.00
Meter (Tm in)	9.00	10.00	10.00	11.00	11.00	10.00			10.17
Meter (Tm out)	8.00	8.00	9.00	9.00	9.00	9.00			8.67
Stack Temp (Ts)	505.00	505.00	506.00	505.00	505.00	505.00			505.17
Impinger T Outlet	8.00	8.00	9.00	9.00	9.00	10.00			8.83
Vaccum (" Hg)	10.00	10.00	11.00	11.00	11.00	11.00			10.67

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Impinger 1	3% H2O2
SOL/	3362
Start Weight (g)	729.3
End Weight (g)	767.2
Total weight (g)	37.9
Impinger 2	3%H2O2
SOL/	3362
Start Weight (g)	748.3
End Weight (g)	750.9
Total weight (g)	2.6
Impinger3	3%H2O2
SOL/	3362
Start Weight (g)	760.6
End Weight (g)	762.3
Total weight (g)	1.7
Impinger 4	Empty
SOL/	...
Start Weight (g)	490.5
End Weight (g)	491.2
Total weight (g)	0.7
Impinger 5	Silica
SOL/	...
Start Weight (g)	904.3
End Weight (g)	909.7
Total weight (g)	5.4
Impinger 6	
SOL/	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 7	
SOL/	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 8	
SOL/	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Total (g)	48.30
Silica <50% used at End of Test? Y/N	YES

Rinse Solutions used	
Solution	SOL NO
DI Water	3356
Acetone	...
3%H2O2	3362

Additional Moisture Weighings	
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Item Name	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights may be included to produce a nominal 0.1% moisture value.

Engine 1 - Non-methane TVOCs Field Data Sheet

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA

Client	Potters Waste	◉ Circular ○ Rectangular ○ Elipse		Pump ID	n/a
Site	Brynposteg	Stack Diameter (mm)	300	Meter ID	U001
Location	Landfill			MST Probe ID	Sinter in-stack
Stack ID	Engine 1	Stack Area (m^2)	0.071	MST Probe Heating Temp (C)	180
Test No	One	Barometric Pressure (mb)	964	DGM Yd or ml/count	0.9746
Job No	P3334	Stack Thermocouple ID	866	MST Hot Box ID	978
ECL Site Staff	SEB + PB	Tube Thermocouple ID	1041	MST Hot Box Heating Temp (C)	180
Barometer ID	627	Meter Thermocouple ID	U001	Workhorse Set Sample Rate (%)	n/a
		In-Stack Sinter Used (Y/N)	Y	MST Delta H Sampling Rate	0.5 - 1

Date of Test	10/01/2018
Sample Start Time	13:56
Sample End Time	14:56
Duration	60
Measured O2	7.19
O2 Uncertainty %Vol	0.43

Meter Units ○ ml ◉ litres	Sample	Leak 1	Time (start/ end) (minimum 1 minute)	Leak 2	Time (start/ end) (minimum 1 minute)	Total
Start Volume	2851334.2	2851324.2	13:53:00	2851449.2	14:58:00	
Final Volume	2851440.0	2851324.2	13:54:00	2851449.2	14:59:00	
Total Volume	104.6	0.0		0.0		104.6
Sample Train Internal Volume	1.2447	Litres				

Impinger 1	Empty
Start Weight (g)	526.7
End Weight (g)	534.6
Total weight (g)	7.9

Sample Point	A1	A1	A1	A1
Time/ point (mins)	0-10	10 -- 20	20-30	30-40
Tube Temp °C	11	11	12	13
Stack Temp °C	507	508	510	510
Meter Temp In °C	10	10	11	11
Meter Temp Out °C	10	10	10	10

Impinger 2	Empty
Start Weight (g)	617.8
End Weight (g)	618.4
Total weight (g)	0.6

Sample Point	A1	A1		
Time/ point (mins)	40-50	50-60		
Tube Temp °C	14	15		
Stack Temp °C	510	510		
Meter Temp In °C	11	11		
Meter Temp Out °C	10	10		

Impinger3	Silica
Start Weight (g)	761.4
End Weight (g)	761.6
Total weight (g)	0.2

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp In °C				
Meter Temp Out °C				

Silica	(IF USED)
<50% Spent at end Y/N?	YES
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	no

NB: Non-conforming test due to high temperature and moisture, see Section 2 “Monitoring Deviations”.

Engine 2 - Combustion Gases

	Horiba PG 250 Measurement Ranges:			
	NO as NO_2	CO	O_2	CO_2
Units	1025 mg/m^3	2500 mg/m^3	25 %Vol	20 %Vol
	Zero Values (Direct)			
Mean Initial Direct Zero	0.30	0.00	-0.01	0.00
Mean Confirmation Direct Zero	0.28	0.24	-0.03	0.00
Difference in Direct Zero	0.02	0.24	0.02	0.00
Repeatability at Zero	4.10	2.50	0.20	0.20
<2 x Repeatability at Zero?	YES	YES	YES	YES
	Pre Zero Values (System)			
Mean Pre Test Zero	0.24	-0.03	-0.03	0.00
% of Measurement Range?	0.02%	0.00%	-0.13%	0.00%
Detection Limit (LOD)	0.16	0.12	0.20	0.00
	Applied Span:			
	NO	CO	O_2	CO_2
Actual Applied Span Concentration	526.44	1271.25	14.84	17.73
	Pre Test System Zero Values			
Mean Pre Test System Zero	0.24	-0.03	-0.03	0.00
Difference ≤ ± 2% of Span Value (5% for SO_2)?	0.05%	0.00%	0.22%	0.00%
	Post Test Zero Values			
Mean Post Test Zero	1.06	1.53	-0.04	0.02
% of Certified Range?	0.10%	0.06%	-0.16%	0.10%
Zero Drift ≤ ± 5% of Applied Span?	0.15%	0.12%	0.20%	0.11%
	Pre Test System Span Values			
Mean Pre Test System Span	520.19	1262.67	14.86	17.63
Difference ≤ ± 2% of Span Value (5% for SO_2)?	1.19%	0.67%	0.13%	0.55%
	Post Test Span Values			
Mean Post Test Span	508.92	1222.29	14.67	17.58
Span Drift ≤ ± 5% Span Value?	3.33%	3.85%	1.12%	0.83%
	3.33%	3.85%	1.12%	0.83%
	See Note 2	See Note 2	See Note 3	See Note 3

NOTE 1: Data Invalid! Contact Quality Manager!
NOTE 2: Correct test data for drift!
NOTE 3: No drift correction required.

NB: NOx and CO data drift corrected prior to calculation of periodic monitoring results

Engine 2 - TVOCs Calibrations Summary

TVOC - FIELD DATA SHEET

Client	Potters Waste	Barometric Pressure mb	964	
Site	Brynposteg	Barometer ID	ECL/ID/ 627	
Date	10/01/2018	Analyser ID	ECL/ID/ 269	
Location	Landfill	Sonimix/ MFC ID	ECL/ID/	
Stack ID	Engine 2	Heated Line/ Controller ID	ECL/ID/ 517 + 518	
Stack Temp °C	923	Heated Line Set Temp °C	180	YES
Ambient Temp (sampling)	1 = 11 2 = 13 3 = 15	Heated Line Length	10	m
Ambient Temp (sampling)	4 = 17 5 = 16 6 = 15	Heated Probe Filter ID	ECL/ID/ 919	
Job No	P3334	Heated Filter Set Temp °C	180	YES
Operators	SEB + PB	Logger ID	926	

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/ 1771	...	...
Hydrogen / Helium	Gas/ 1869	...	...
Propane (In Air)	Gas/ 1770	924.8 ppm	1%

	Analyser Range	Span Gas value used
Propane	4000 ppm	924.8 ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	11:05	11:10	11:15	11:20	11:22	11:27

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
9	8	Start Time	End Time	Start Time	End Time
ZERO / SPAN		11:29	11:34	11:36	11:41

Response Time		
SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
11:35:00	11:35:12	Y

	Start Time	End Time	Location	Production Details
Sample Period	15:30	17:25	Eigine 2	Normal
Sample Period				
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
10	6	Start Time	End Time	Start Time	End Time
ZERO / SPAN		17:32	17:34	17:37	17:39

Process Details / Comments

Engine 1 - TVOCs data Sheet

Calibration Summary		TVOC ppm
Analyser Range		**4000**
Repeatability at Zero		2
Span Gas Concentration Applied		**924.8**
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	924.8
	Zero	-0.12
Difference (Zero)		0.1249
< 2 × Repeatability @ Zero?		**YES**
Pre Test (System)	Zero	0.00
	Span	926.9
Difference (Zero)		0.0000
< 2% Relative to Direct Span		YES
Difference (Span)		2.0927
< 2% Relative to Direct Span		**YES**
Post Test (System)	Zero	2.92
	Span	908.9
Difference (Zero)		2.9152
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		17.9600
Span Drift < 2% of Applied Span?		**YES**
Zero and Span Drift < 5% of Applied Span?		**YES**

Environmental Compliance Limited

Potters Waste			Installation Name	: Engine 1 & 2
Permit No	: TP3736SQ		Visit Details	: Annual Compliance
Variation No	: ...		Survey Dates	: 10th & 11th January 2018
Report Ref	: P3334	: R001	Report Issue Date	: 31st January 2018

Engine 2 - SO2 Field Data Sheet

Environmental Compliance Limited	NON ISOKINETIC SAMPLING PROFORMA	Date of Measurement	10/01/2018

If moisture was not measured see detailed notes below.

ECL/TPD/	39	Time taken to change Ports?	0	Start Time	15:14	
				Test Duration	60	mins
				End Time	16:14	

Client	Potters Waste	Stack Profile	Circular	Console id	U001	Barometer id	627
Site	Brynposteg	Stack Area (m^2)	0.13	Pump id	U001	Nozzle Id	n/a
Location	Landfill	Barometric Pressure (mb)	964	Probe id	Sinter probe	Nozzle size	n/a
Stack ID	Engine 2	Static Pres. (mm H_20)	-7.645259939	DGM Yd	0.9746	Filter Id	Sinter in-stack
Test No.	One - SO2	Pitot coefficient	n/a	ΔH@	38.2	Pitot ID	n/a
Job No	P3334	Probe Heater Setting (^OC)	n/a	Impinger Id	660	Hot Box ID	978
ECL Site Staff	SEB + PB	Hot Box Setting (^OC)	120	Balance Id	88		

Required Sample Flowrate l/min	Suggested ΔH Entered Below
3	1
6	3
10	10
15	25
25	50
Initial ΔH	3
Reference Oxygen Percentage	5

	Sample	Leak 1	Leak 2	Leak 3	Leak 4	Leak 5	Total
Start Volume	2851723.4						
Final Volume	2852090.6						
Total Volume	367.2	0.0	0.0	0.0	0.0	0.0	367.2

Leak Check	First	Second	Third	Fourth	Fifth
Leak rate l/min	0				0
Vaccum "Hg	8				13
Time of Check	15:10				16:19
Set Rate l/min	6				6.12
Leak <2%?	YES				YES

Dry O_2 Atmospheric)	8.07
Dry Carbon Dioxide %	10.23
Dry Carbon Monoxide ppm	

Traverse Point	A1	A1	A1	A1	A1	A1			Total
Time/Point (mins)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60			
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)	3.00	3.00	3.00	3.00	3.00	3.00			3.00
Meter (Tm in)	12.00	12.00	11.00	11.00	10.00	10.00			11.00
Meter (Tm out)	11.00	11.00	10.00	10.00	9.00	9.00			10.00
Stack Temp (Ts)	458.00	460.00	459.00	460.00	460.00	459.00			459.33
Impinger T Outlet	10.00	10.00	10.00	11.00	10.00	9.00			10.00
Vaccum (" Hg)	12.00	12.00	12.00	12.00	12.00	12.00			12.00

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

	Impinger 1	Impinger 2	Impinger3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
Contents	3% H2O2	3% H2O2	3% H2O2	Empty	Silica			
SOL/	3362	3362	3362	...	...			
Start Weight (g)	731.4	751.8	765.8	491.3	909.7			
End Weight (g)	756.7	840.6	679.4	491.7	911.9			
Total weight (g)	25.3	88.8	-86.4	0.4	2.2	0	0	0

Total (g)	30.30
Silica <50% used at End of Test? Y/N	YES

Rinse Solutions used	
Solution	SOL NO
DI Water	3356
Acetone	...
3% H2O2	3362

Additional Moisture Weighings

Item Name										
Start Weight (g)										
End Weight (g)										
Total weight (g)	0	0	0	0	0	0	0	0	0	0

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights may be included to produce a nominal 0.1% moisture value.

Potters Waste			Installation Name	: Engine 1 & 2
Permit No	: TP3736SQ		Visit Details	: Annual Compliance
Variation No	: ...		Survey Dates	: 10th & 11th January 2018
Report Ref	: P3334	: R001	Report Issue Date	: 31st January 2018

Engine 2 - Non-methane TVOCs Field Data Sheet

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA

Client	Potters Waste	◉ Circular ○ Rectangular ○ Elipse		Pump ID	n/a	Date of Test	10/01/2018
Site	Brynposteg	Stack Diameter (mm)	400	Meter ID	U001	Sample Start Time	16:23
Location	Landfill			MST Probe ID	n/a	Sample End Time	17:23
Stack ID	Engine 2	Stack Area (m^2)	0.126	MST Probe Heating Temp (C)	Sinter in-stack	Duration	60
Test No	One - NMVOC	Barometric Pressure (mb)	964	DGM Yd or ml/count	0.9746	Measured O2	8.08
Job No	P3334	Stack Thermocouple ID	866	MST Hot Box ID	978	O2 Uncertainty %Vol	0.48
ECL Site Staff	SEB + PB	Tube Thermocouple ID	1041	MST Hot Box Heating Temp (C)	180		
Barometer ID	627	Meter Thermocouple ID	U001	Workhorse Set Sample Rate (%)	n/a		
		In-Stack Sinter Used (Y/N)	Y	MST Delta H Sampling Rate	0.5 - 1		

Meter Units ○ ml ◉ litres	Sample	Leak 1	Time (start/ end) (minimum 1 minute)	Leak 2	Time (start/ end) (minimum 1 minute)	Total
Start Volume	2852118.0	2852117.0	16:21:00	2852222.2	17:26:00	
Final Volume	2852221.0	2852117.0	16:22:00	2852222.2	17:27:00	
Total Volume	101.8	0.0		0.0		101.8
Sample Train Internal Volume	1.2447	Litres				

Impinger 1	Empty
Start Weight (g)	526.7
End Weight (g)	529.7
Total weight (g)	3

Sample Point	A1	A1	A1	A1
Time/ point (mins)	0-10	10--20	20-30	30-40
Tube Temp ^{O}C	17	16	16	17
Stack Temp ^{O}C	460	460	460	460
Meter Temp In ^{O}C	9	10	10	11
Meter Temp Out ^{O}C	9	10	10	11

Impinger 2	Empty
Start Weight (g)	618.4
End Weight (g)	618.9
Total weight (g)	0.5

Sample Point	A1	A1		
Time/ point (mins)	40-50	50-60		
Tube Temp ^{O}C	17	18		
Stack Temp ^{O}C	460	460		
Meter Temp In ^{O}C	11	10		
Meter Temp Out ^{O}C	11	10		

Impinger3	Silica
Start Weight (g)	761.6
End Weight (g)	763.4
Total weight (g)	1.8

Sample Point				
Time/ point (mins)				
Tube Temp ^{O}C				
Stack Temp ^{O}C				
Meter Temp In ^{O}C				
Meter Temp Out ^{O}C				

Silica	(IF USED)
<50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	no

LABORATORY ANALYSIS RESULTS

CONCEPT LIFE SCIENCES

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Concept Life Sciences

Certificate of Analysis

Hadfield House
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Tel : 0161 874 2400
Fax : 0161 874 2404

Report Number: 708572-1

Date of Report: 24-Jan-2018

Customer: Environmental Compliance Ltd
Unit G1
Main Avenue
Treforest Industrial Estate
Pontypridd
CF37 5BF

Customer Contact: Mr Sam Brookes

Customer Job Reference: P3334
Customer Purchase Order: E7497
Date Job Received at Concept: 15-Jan-2018
Date Analysis Started: 15-Jan-2018
Date Analysis Completed: 24-Jan-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING 1549

Report checked
and authorised by :
Kathryn Gleaves
Customer Service Advisor

Issued by :
Emma Spear
Customer Service Advisor

ESpear

Concept Reference: 708572
Customer Reference: P3334

Impinger(peroxide) Analysed as Impinger(peroxide)
Sulphur Dioxide & Volume

				Concept Reference	708572 001	708572 002	708572 003	708572 004	708572 005
				Customer Sample Reference	ECL/18/0070	ECL/18/0071	ECL/18/0072	ECL/18/0073	ECL/18/0074
				Test Sample	AR	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	10-JAN-2018	10-JAN-2018	10-JAN-2018	10-JAN-2018
Determinand	Method	LOD	Units	Symbol					
Sulphur Dioxide	IC	0.05	mg/l	U	(13) 54	(13) 0.54	(13) 0.48	(13) 56	(13) 0.69
Volume	Vol	1	ml	U	460	230	300	460	180

Concept Reference: 708572
Customer Reference: P3334

Impinger(peroxide) Analysed as Impinger(peroxide)
Sulphur Dioxide & Volume

				Concept Reference	708572 006	708572 007	708572 008	708572 009
				Customer Sample Reference	ECL/18/0075	ECL/18/0076	ECL/18/0077	ECL/18/0078
				Test Sample	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	11-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	Method	LOD	Units	Symbol				
Sulphur Dioxide	IC	0.05	mg/l	U	(13) 0.43	(13) 0.76	(13) 0.38	(13) 0.76
Volume	Vol	1	ml	U	360	420	220	280

Concept Reference: 708572
Customer Reference: P3334

Tube (Charcoal 226-09) Analysed as Tube (Charcoal 226-09)
VOC (Total)

				Concept Reference	708572 011	708572 012	708572 013	708572 014	708572 015
				Customer Sample Reference	ECL/18/0080	ECL/18/0081	ECL/18/0082	ECL/18/0083	ECL/18/0084
				Test Sample	AR	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	10-JAN-2018	10-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	Method	LOD	Units	Symbol					
Volatile Organic Compounds (Total)	GC/MS	1	µg	N	69	16	<1	3	<1

Concept Reference: 708572
Customer Reference: P3334

Tube (Tenax/Carbon/Molecular Sieve) Analysed as Tube (Tenax/Carbon/Molecular Sieve)

Trace Landfill Gas Suite

				Concept Reference	708572 018	708572 021	708572 022
				Customer Sample Reference	ECL/18/0086	ECL/18/0088	ECL/18/0080
				Test Sample	AR	AR	AR
				Date Sampled	11-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**			
1 Pentene	GC/MS (TD SIR)	10	ng	U	(68) 48	(68) 30	(68) 23
1,1-Dichloroethane	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
1,1-Dichloroethylene	GC/MS (TD SIR)	10	ng	U	280	240	<10
1,2-Dichloroethane	GC/MS (TD SIR)	10	ng	N	(175) 1800	<10	<10
1,2-Dichloroethylene	GC/MS (TD SIR)	30	ng	U	<30	<30	300
1,3-Butadiene	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) 82
1,4 epoxy 1,3-butadiene	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
1-Propanethiol	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
2-butoxyethanol	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Benzene	GC/MS (TD SIR)	10	ng	U	(175) 6800	(175) 2100	<10
Butyric acid	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Carbon disulphide	GC/MS (TD SIR)	10	ng	N	440	<10	<10
Carbon tetrachloride	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
Chloroethane	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
Dichloromethane	GC/MS (TD SIR)	10	ng	N	(175) 6800	<10	<10
Dimethyl disulphide	GC/MS (TD SIR)	10	ng	N	320	<10	<10
Dimethyl sulphide	GC/MS (TD SIR)	10	ng	U	760	12	21
Ethyl butyrate	GC/MS (TD SIR)	25	ng	N	<25	<25	<25
Ethyl Mercaptan	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Hydrogen sulphide	GC/MS (TD SIR)	60	ng	N	<60	<60	<60
Methyl Mercaptan	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
N-Butyl Mercaptan	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
Styrene	GC/MS (TD SIR)	10	ng	N	260	<10	<10
Toluene	GC/MS (TD SIR)	10	ng	N	(27) 12000	31	<10
Trichloroethylene	GC/MS (TD SIR)	10	ng	U	730	250	<10
Vinyl chloride monomer	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) <10

Concept Reference: 708572
Customer Reference: P3334

Tube (Charcoal) Analysed as Tube (Charcoal 226-01)

Siloxanes

				Concept Reference	708572 025	708572 026
				Customer Sample Reference	ECL/18/0083	ECL/18/0084
				Test Sample	AR	AR
				Date Sampled	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Decamethylcyclopentasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Decamethyltetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethylcyclotrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethyldisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethylcyclotetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethyltrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1

Index to symbols used in 708572-1

Value	Description
AR	As Received
27	Result should be considered as a minimum due to detector saturation.
13	Results have been blank corrected.
68	Outside scope of UKAS accreditation
175	Results should be viewed with caution due to being outside of the instrument calibration range
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

The results for 1 Pentene, 1,3-Butadiene & Vinyl Chloride Monomer are outside the scope of our UKAS accreditation as the standards expired on the 13/01/18.

UNCERTAINTY CALCULATIONS

Engine 1 - Volumetric Flowrate Uncertainty

Measurement Uncertainty Calculations - Velocity at Stack Conditions

Contribution From	Standard u/c (Pa)	
Pitot Calibration Uncertainty Contribution	4.34	A
Manometer Calibration Uncertainty Contribution	4.341666667	B
Variation in Actual Pitot reading at sample points	3.00	C
Combined u/c (Pa) =	**Combined u/c (Pa)**	
SQRT $(A/\sqrt{3})^2 + (B/\sqrt{3})^2 + (C/\sqrt{3})^2)$	3.95	
Expanded Uncertainty of Flow Measurements Pa	**7.89**	
	Standard u/c (K)	
Temperature Calibration (K)	3.91	D
Variation in Actual Temp reading at sample points	0.00	E
Combined u/c of Temp (K)	**Combined u/c (K)**	
SQRT $((D/\sqrt{3}^2) + (E/\sqrt{3})^2)$	2.25	
Expanded Uncertainty of Temp Measurements (K)	**4.51**	
Measured Average Velocity (m/s) at Stack Conds	63.27	
Maximum Average Velocity (m/s) at Stack Conds	63.74	
Standard Uncertainty Velocity at Stack Conditions (%)	0.74	
Expanded Uncertainty Velocity (at Stack Conditions)	**1.49**	**(%)**

Measurement Uncertainty Calculations - Flowrate at Stack Conditions

Contribution From	Standard u/c (m^2)	
Area (m2)	0.00071	
Measured Average Flowrate (m^3/s) at Stack Conds	4.47	
Maximum Average Flowrate (m^3/s) at Stack Conds	4.55	
Standard Uncertainty Flowrate (m^3/s) at Stack Conditions (%)	1.75	
Expanded Uncertainty Flowrate (m^3/s) at Stack Conditions	**3.50**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Wet Gas

Contribution From	Standard u/c (%)	
Temperature Calibration (K)	0.5	
Barometer Calibration	0.5	
Measured Average Flowrate (m^3/s) at STP Wet	1.49	
Maximum Average Flowrate (m^3/s) at STP Wet	1.52	
Standard Uncertainty Flowrate (m^3/s) at STP Wet	1.93	
Expanded Uncertainty Flowrate (m^3/s) at STP Wet	**3.86**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Dry Gas

Contribution From	Standard u/c (%)	
Moisture Uncertainty (% v/v)	0.24	
Measured Average Flowrate (m^3/s) at STP Dry	1.29	
Maximum Average Flowrate (m^3/s) at STP Dry	1.32	
Standard Uncertainty Flowrate (m^3/s) at STP Dry	2.21	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry	**4.42**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP, Dry Gas & Ref Oxygen

Contribution From	Standard u/c (%)	
Oxygen Uncertainty (% v/v)	0.217	
Measured Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	1.11	
Maximum Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	1.15	
Standard Uncertainty Flowrate (m^3/s) at STP Dry & Ref Oxygen	3.82	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry & Ref O_2	**7.64**	**(%)**

Engine 1 Combustion Gases Uncertainty of Measurement

Uncertainty of Measurement Results - Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Minimum Certified Range (R_i)			
				NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit[1]	u_{lof}	Rectangular	$\sqrt{3}$	0.40	0.40	0.13	0.60
Span drift[2]	$u_{\text{d,s}}$			0.27	0.29	0.029	0.24
Losses / leakage in the sample system[4]	u_{loss}			5.00	9.03	0.080	0.49
Temperature dependant span drift[5]	u_{t}			0.18	0.050	0.070	0.040

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.29	0.22	0.019	0.069
Span drift	$u_{d,s}$			0.20	0.16	0.0041	0.028
Temperature dependant span drift	u_t			1.41	0.30	0.11	0.0092
Interferents	u_i			0.87	1.59	0.081	...

Uncertainty of Measurement Results - Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Losses / leakage in the sample system	u_{loss}	10/01/18 12:30 - 13:29	21.97	94.85	0.0057	0.056
Standard Error of Measured Value	u_{SE}	10/01/18 12:30 - 13:29	2.23	1.79	0.0078	0.0099

Effect on Uncertainty Caused by Oxygen $uCorr"_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x\, Uncertainty\ of\ O_2\ Measurement =$ 0.025

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 2.2131 \qquad uf_{O_2} = \frac{uCorr"_{O_2}}{f_{O_2}} x100 = \quad 1.15\ \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore\ u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

Uncertainty of Measurement Results - Calculations Part 3

Horiba PG 250 Uncertainty	Date & Time	NOx (as NO2) 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Measured Concentration	10/01/18 12:30 - 13:29	439.21	1062.54	7.18	11.51
Expanded Uncertainty as Percentage of Measured Concentration		10%	18%	4%	2%

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{sym}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of Moisture is taken as the standard error of the time averaged value used to correct to Dry Conditions
7 If no value for uncertainty is presented above, the uncertainty is considered to be > 100%

Engine 1 - Combustion Gases Measurement Uncertainty

Measurement Uncertainty Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distributiuon	Minimum Certified Range (R_i) NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit[1]	u_{lof}	Rectangular (Divisor = √3)	0.40	0.40	0.13	0.60
Span drift[2]	$u_{d,s}$	Rectangular (Divisor = √3)	0.27	0.29	0.029	0.24
Repeatability Standard Deviation (span)[3]	u_r	Normal (Divisor = 1)	4.95	23.31	0.42	0.14
Losses / leakage in the sample system[4]	u_{loss}	Rectangular (Divisor = √3)	5.00	9.03	0.080	0.49
Temperature dependant span drift[5]	u_t	Rectangular (Divisor = √3)	0.18	0.050	0.070	0.040
Interferents[1]	u_i	Rectangular (Divisor = √3)	1.20	2.90	0.56	0.010
Uncertainty of Reference Gas[6]	u_{ref}	Rectangular (Divisor = √3)	9.12	22.02	0.15	0.31

Note:

$$when \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then \; u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m^3 / %Vol inc additional uncertainty of 2% for gas blending
7 Data not available so not included

Measurement Uncertainty Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty	Value of Standard Uncertainty	NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.29	0.22	0.019	0.07
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.20	0.16	0.0041	0.0280
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	4.95	23.31	0.42	0.14
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	3.61	4.95	0.012	0.06
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max}-x_{adj})^2 + (x_{i,min}-x_{adj})(x_{i,max}-x_{adj}) + (x_{i,min}-x_{adj})^2}{3}}$	0.26	0.055	0.020	0.009
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.87	1.59	0.081	0.01
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	5.26	12.71	0.086	0.18
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	8.14	27.05	0.43	0.25
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	16.27	54.11	0.87	0.49
Applied Span Concentration			526.44	1271.25	14.84	17.73
Measured Span Concentration, STP Dry Gas			514.55	1242.48	14.77	17.61
Expanded measurement uncertainty as % of Applied Span			3%	4%	6%	3%

Engine 1 - TVOCs Uncertainty of Measurement

Engine 1 - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range	
				O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	0.13	0.73
Span drift(2)	$u_{d,s}$			0.029	0.35
Losses / leakage in the sample system(4)	u_{loss}			1.00	0.23
Temperature dependant span drift(5)	u_t			0.070	0.30
Interferents(1)	u_i			0.56	4.39
Effect of Voltage Fluctuation(7)	u_v			...	1.80
Effect of Oxygen Synergism(7)	u_{syn}			...	

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.019	0.064
Span drift	$u_{d,s}$			0.0041	0.031
Temperature dependant span drift	u_t			0.053	0.14
Interferents	u_i			0.081	0.38
Effect of Voltage Fluctuation (See Note)	u_v			...	0.16

Engine 1 - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Losses / leakage in the sample system	u_{loss}	10/01/18 12:51 - 13:50	0.072	3.71
Standard Error of Measured Value	u_{SE}	10/01/18 12:51 - 13:50	0.015	5.63

Effect on Uncertainty Caused by Oxygen

$$uCorr''_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

0.03

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.1624$$

$$uf_{o_2} = \frac{uCorr''_{o_2}}{f_{o_2}} x100 = \quad 2.19 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

Engine 1 - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	O_2 0 - 25 %Vol	*TVOC 0 - 15 mgC/m^3
Measured Concentration	10/01/18 12:51 - 13:50	7.22	1639.12
Expanded Uncertainty as Percentage of Measured Concentration		3 %	2 %

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Engine 1 - TVOCs Measurement Uncertainty

Engine 1 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m³
Lack of fit[1]	u_{lof}	Rectangular (Divisor = √3)	0.73
Span drift[2]	$u_{d,s}$	Rectangular (Divisor = √3)	0.35
Repeatability Standard Deviation (span)[3]	u_r	Normal (Divisor = 1)	82.16
Losses / leakage in the sample system[4]	u_{loss}	Rectangular (Divisor = √3)	13.95
Temperature dependant span drift[5]	u_t	Rectangular (Divisor = √3)	0.30
Interferents[1]	u_i	Rectangular (Divisor = √3)	4.39
Uncertainty of Reference Gas[6]	u_{ref}	Rectangular (Divisor = √3)	25.74
Effect of Voltage Fluctuation[7]	u_v	Rectangular (Divisor = √3)	1.80
Effect of Oxygen Synergism[7]	u_{syn}	Rectangular (Divisor = √3)	4.60

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ \ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³ / %Vol taking account of an additional uncertainty of 2% for gas blending
7 Expressed as a percentage of the certified range

Engine 1 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	*TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.064
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.031
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	12.32
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	1.21
Temperature dependant span drift	u_t	$u(x_i)=\frac{u_t}{100}\times R_i\times\sqrt{\frac{(x_{i,max}-x_{adj})^2+(x_{i,min}-x_{adj})(x_{i,max}-x_{adj})+(x_{i,min}-x_{adj})^2}{3}}$	0.052
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.38
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	14.86
Effect of Voltage Fluctuation	u_v	$u(x_i) = \frac{u_v \times R_i}{\sqrt{3}} =$	0.16
Effect of Oxygen Synergism	u_{syn}	$u(x_i) = \frac{u_{syn} \times R_i}{\sqrt{3}} =$	0.40
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	19.35
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	38.71
Applied Span Concentration			1486.15
Measured Span Concentration, STP Dry Gas			1480.90
Expanded measurement uncertainty as % of Applied Span			3 %

* Signal 3030 FID

Potters Waste			**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**		**Visit Details**	**: Annual Compliance**
Variation No	**: ...**		**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334**	**: R001**	**Report Issue Date**	**: 31st January 2018**

Engine 1 - SO2 Uncertainty

Site: Brynposteg
Location: Engine 1

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert (%) K = 2 Filter mg	LAB Method Uncert (%) K = 2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
			One - SO2					
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
Sulphur Dioxide	...	24.42	24.42	...	3.18	...	1.59	1.59
...	...	...	...	...	...	...	...	...
			...					
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...

	One - SO2		Standard Uncertainty @ 95%			
Sampled Volume (V_m)	0.44	m^3	uV_m	0.001	m^3	
Meter Correction Factor (Yd)	0.98	...		...	...	
Meter Temperature (T_m)	282.42	k	uT_m	1.5	k	
Average Differential Pressure (ΔH)	3.00	mmH_2O	uΔH	0.25	mmH_2O	
Barometric Pressure (ρ_b)	723.06	mmHg	$u\rho_b$	3.8	mmHg	
ΔH + ρs (ρ_m)	96.43	kPa		...	...	
Oxygen content ($O_{2,m}$)	7.23	% by volume	$uO_{2,m} = \sigma / \sqrt{n}$	0.0146		% by volume
Moisture Content (H_2O)	13.25	% by volume	uH_2O	0.48		% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. $i = uV_m$, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

One - SO2:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured ΔH uncertainty component (uΔH), measured stack pressure uncertainty component ($u\rho_s$) & measured temperature of dry gas uncertainty component ($uT_{m\,Dry}$)

One - SO2:

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = \quad 0.898$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.90	0.90	0.0000913	0.0000228
$u\rho_b$	0.90	0.89	0.00124	0.00466
uT_m	0.90	0.89	0.00318	0.00477
H_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00604$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uV_{std}) & volume uncertainty component (uV_m)

One - SO2:

$$V_{std} = V_{measured} \times f_s = \quad 0.393$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	0.40	0.39	0.44	0.00265
Effect of uV_m	0.39	0.39	0.90	0.000898

Combined Standard Uncertainty

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00141$$

Uncertainty of Oxygen Correction Factor (%):-

One - SO2:

$$f_{o_2} = \frac{20.9\% - O_{2,\,ref}}{20.9\% - O_{2,\,measured}} = \quad 1.16$$

$$uCorr^{n}{}_{o_2} = \frac{20.9\% - O_{2,\,ref}}{(20.9\% - O_{2,\,measured})x(20.9\% - O_{2,\,measured})} x\, Uncertainty\ of\ O_2\ Measurement = \quad 0.0255$$

$$uf_{o_2} = \frac{uCorr^{n}{}_{o_2}}{f_{o_2}} x100 = \quad 2.19\ \%$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM)

Determinand	one:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uM mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	76.88	67.49	2.96	4.69
...	...	...	...	...

Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

Determinand	one:
	uL mg/Nm^3
...	...
...	...
Sulphur Dioxide	0.83
...	...

Uncertainty in final measurement @ Reference Conditions due to uVstp

Determinand	one:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uVstp mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	72.45	71.93	183.48	0.26
...	...	...	...	...

Combined Uncertainty excluding oxygen contribution

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Determinand	one:			
	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	4.77	9.55	72.19	13.22
...	...	...	...	...

Combined Uncertainty including oxygen contribution

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrn Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (Ucombined)
...	...	...	...
...	...	...	...
Sulphur Dioxide	13.22	2.19	13.40
...	...	...	...

Engine 1 - Non-methane TVOCs Uncertainty

Site: Potters Waste, Brynposteg
Location: Landfill, Stack ID:Engine 1

				Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.10456	m^3	uV_m	0.000	m^3
Meter Correction Factor or ml/count	Yd	0.9746	...	...	...	...
Meter Temperature	T_m	283.33	k	uT_m	1.5	k
Barometric Pressure	ρ_b	964.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	7.19	%Vol	$uO_{2,m}$	0.43	%Vol
Moisture	H_2O	10.15	%Vol	uH_2O	1.48	%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Engine 1	59.00	µg	uM	5.90	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standa and i is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data fro meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (uρb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.92$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.47	0.46	0.000484	0.00484
uT_m	0.92	0.91	0.00324	0.00485
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00634$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.0934$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.0941	0.0928	0.10	0.000646
Effect of uV_m	0.0934	0.0934	0.89	8.936E-06

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00952$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Engine 1	0.00729	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOCs	0.66	0.60	10.70	0.0316
Condensate Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOCs				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOCs	0.70	0.57	6.83	0.0650

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
Non Methane VOCs	0.0726	0.15	0.73	19.85

Engine 2 - Volumetric Flowrate Uncertainty

Measurement Uncertainty Calculations - Velocity at Stack Conditions

Contribution From	**Standard u/c (Pa)**	
Pitot Calibration Uncertainty Contribution	1.59	A
Manometer Calibration Uncertainty Contribution	1.590416667	B
Variation in Actual Pitot reading at sample points	7.00	C
Combined u/c (Pa) =	**Combined u/c (Pa)**	
SQRT $(A/\sqrt{3})^2 + (B/\sqrt{3})^2 + (C/\sqrt{3})^2$	4.24	
Expanded Uncertainty of Flow Measurements Pa	**8.49**	
	Standard u/c (K)	
Temperature Calibration (K)	3.66	D
Variation in Actual Temp reading at sample points	0.25	E
Combined u/c of Temp (K)	**Combined u/c (K)**	
SQRT $((D/\sqrt{3}^2) + (E/\sqrt{3})^2)$	2.12	
Expanded Uncertainty of Temp Measurements (K)	**4.24**	
Measured Average Velocity (m/s) at Stack Conds	37.01	
Maximum Average Velocity (m/s) at Stack Conds	37.60	
Standard Uncertainty Velocity at Stack Conditions (%)	1.62	
Expanded Uncertainty Velocity (at Stack Conditions)	**3.24**	**(%)**

Measurement Uncertainty Calculations - Flowrate at Stack Conditions

Contribution From	**Standard u/c (m^2)**	
Area (m2)	0.00126	
Measured Average Flowrate (m^3/s) at Stack Conds	4.65	
Maximum Average Flowrate (m^3/s) at Stack Conds	4.77	
Standard Uncertainty Flowrate (m^3/s) at Stack Conditions (%)	2.63	
Expanded Uncertainty Flowrate (m^3/s) at Stack Conditions	**5.27**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Wet Gas

Contribution From	**Standard u/c (%)**	
Temperature Calibration (K)	0.5	
Barometer Calibration	0.5	
Measured Average Flowrate (m^3/s) at STP Wet	1.65	
Maximum Average Flowrate (m^3/s) at STP Wet	1.70	
Standard Uncertainty Flowrate (m^3/s) at STP Wet	2.83	
Expanded Uncertainty Flowrate (m^3/s) at STP Wet	**5.65**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Dry Gas

Contribution From	**Standard u/c (%)**	
Moisture Uncertainty (% v/v)	0.25	
Measured Average Flowrate (m^3/s) at STP Dry	1.48	
Maximum Average Flowrate (m^3/s) at STP Dry	1.53	
Standard Uncertainty Flowrate (m^3/s) at STP Dry	3.11	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry	**6.22**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP, Dry Gas & Ref Oxygen

Contribution From	**Standard u/c (%)**	
Oxygen Uncertainty (% v/v)	0.179	
Measured Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	1.12	
Maximum Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	1.17	
Standard Uncertainty Flowrate (m^3/s) at STP Dry & Ref Oxygen	4.64	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry & Ref O_2	**9.28**	**(%)**

Engine 2 - Combustion Gases Uncertainty of Measurement

Uncertainty of Measurement Results - Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Minimum Certified Range (R_i) NO 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	0.40	0.40	0.13	0.60
Span drift(2)	$u_{d,s}$			0.27	0.29	0.029	0.24
Losses / leakage in the sample system(4)	u_{loss}			5.00	9.03	0.080	0.49
Temperature dependant span drift(5)	u_t			0.18	0.050	0.070	0.040

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	NO 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.29	0.22	0.019	0.069
Span drift	$u_{d,s}$			0.20	0.16	0.0041	0.028
Temperature dependant span drift	u_t			1.41	0.30	0.11	0.0092
Interferents	u_i			0.87	1.59	0.081	...

Uncertainty of Measurement Results - Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	NO 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Losses / leakage in the sample system	u_{loss}	10/01/18 16:23 - 17:22	21.98	92.34	0.0065	0.050
Standard Error of Measured Value	u_{SE}	10/01/18 16:23 - 17:22	8.98	4.07	0.0079	0.0059

Effect on Uncertainty Caused by Oxygen $uCorr''_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})x(20.9\% - O_{2,measured})} x\,Uncertainty\ of\ O_2\ Measurement =$ 0.029

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.9681 \qquad uf_{O_2} = \frac{uCorr''_{O_2}}{f_{O_2}} x100 = \quad 1.47\ \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore\ u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

Uncertainty of Measurement Results - Calculations Part 3

Horiba PG 250 Uncertainty	Date & Time	NOx (as NO2) 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Measured Concentration	10/01/18 16:23 - 17:22	430.48	1061.30	8.08	10.24
Expanded Uncertainty as Percentage of Measured Concentration		11%	18%	4%	2%

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of Moisture is taken as the standard error of the time averaged value used to correct to Dry Conditions
7 If no value for uncertainty is presented above, the uncertainty is considered to be > 100%

Engine 2 - Combustion Gases Measurement Uncertainty

Measurement Uncertainty Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distributiuon	Minimum Certified Range (R_i) NO 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit[1]	u_{lof}	Rectangular (Divisor = √3)	0.40	0.40	0.13	0.60
Span drift[2]	$u_{d,s}$	Rectangular (Divisor = √3)	0.27	0.29	0.029	0.24
Repeatability Standard Deviation (span)[3]	u_r	Normal (Divisor = 1)	4.95	23.31	0.42	0.14
Losses / leakage in the sample system[4]	u_{loss}	Rectangular (Divisor = √3)	5.00	9.03	0.080	0.49
Temperature dependant span drift[5]	u_t	Rectangular (Divisor = √3)	0.18	0.050	0.070	0.040
Interferents[1]	u_i	Rectangular (Divisor = √3)	1.20	2.90	0.56	0.010
Uncertainty of Reference Gas[6]	u_{ref}	Rectangular (Divisor = √3)	9.12	22.02	0.15	0.31

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³ / %Vol inc additional uncertainty of 2% for gas blending
7 Data not available so not included

Measurement Uncertainty Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty	Value of Standard Uncertainty	NO 0 - 125 mg/m³	CO 0 - 95 mg/m³	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.29	0.22	0.019	0.07
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.20	0.16	0.0041	0.0280
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	4.95	23.31	0.42	0.14
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	3.61	4.95	0.012	0.06
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max}-x_{adj})^2 + (x_{i,min}-x_{adj})(x_{i,max}-x_{adj}) + (x_{i,min}-x_{adj})^2}{3}}$	0.26	0.055	0.020	0.009
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.87	1.59	0.081	0.01
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	5.26	12.71	0.086	0.18
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	8.14	27.05	0.43	0.25
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	16.27	54.11	0.87	0.49
Applied Span Concentration			526.44	1271.25	14.84	17.73
Measured Span Concentration, STP Dry Gas			514.55	1242.48	14.77	17.61
Expanded measurement uncertainty as % of Applied Span			3%	4%	6%	3%

Potters Waste		**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**	**Visit Details**	**: Annual Compliance**
Variation No	**: ...**	**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334 : R001**	**Report Issue Date**	**: 31st January 2018**

Engine 2 - TVOCs Uncertainty of Measurement

Engine 2 - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	0.13	0.73
Span drift(2)	$u_{d,s}$			0.029	0.35
Losses / leakage in the sample system(4)	u_{loss}			1.00	0.23
Temperature dependant span drift(5)	u_t			0.070	0.30
Interferents(1)	u_i			0.56	4.39
Effect of Voltage Fluctuation(7)	u_v			...	1.80
Effect of Oxygen Synergism(7)	u_{syn}			...	

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.019	0.064
Span drift	$u_{d,s}$			0.0041	0.031
Temperature dependant span drift	u_t			0.053	0.14
Interferents	u_i			0.081	0.38
Effect of Voltage Fluctuation (See Note)	u_v			...	0.16

Engine 2 - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Losses / leakage in the sample system	u_{loss}	10/01/18 15:33 - 16:32	0.081	3.73
Standard Error of Measured Value	u_{SE}	10/01/18 15:33 - 16:32	0.0069	13.55

Effect on Uncertainty Caused by Oxygen

$$uCorr^n_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})x(20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

0.03

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.2377$$

$$uf_{O_2} = \frac{uCorr^n_{O_2}}{f_{O_2}} x100 = \quad 2.34 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore\ u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

Engine 2 - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	O_2 0 - 25 %Vol	*TVOC 0 - 15 mgC/m^3
Measured Concentration	10/01/18 15:33 - 16:32	8.05	1648.33
Expanded Uncertainty as Percentage of Measured Concentration		3 %	3 %

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is >100%

Engine 2 - TVOCs Measurement Uncertainty

Engine 2 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m³
Lack of fit(1)	u_{lof}	Rectangular (Divisor = √3)	0.73
Span drift(2)	$u_{d,s}$	Rectangular (Divisor = √3)	0.35
Repeatability Standard Deviation (span)(3)	u_r	Normal (Divisor = 1)	82.16
Losses / leakage in the sample system(4)	u_{loss}	Rectangular (Divisor = √3)	13.95
Temperature dependant span drift(5)	u_t	Rectangular (Divisor = √3)	0.30
Interferents(1)	u_i	Rectangular (Divisor = √3)	4.39
Uncertainty of Reference Gas(6)	u_{ref}	Rectangular (Divisor = √3)	25.74
Effect of Voltage Fluctuation(7)	u_v	Rectangular (Divisor = √3)	1.80
Effect of Oxygen Synergism(7)	u_{syn}	Rectangular (Divisor = √3)	4.60

Note:

$$when \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then \ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³ / %Vol taking account of an additional uncertainty of 2% for gas blending
7 Expressed as a percentage of the certified range

Engine 2 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	*TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.064
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.031
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	12.32
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	1.21
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max}-x_{adj})^2+(x_{i,min}-x_{adj})(x_{i,max}-x_{adj})+(x_{i,min}-x_{adj})^2}{3}}$	0.052
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.38
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	14.86
Effect of Voltage Fluctuation	u_v	$u(x_i) = \frac{u_v \times R_i}{\sqrt{3}} =$	0.16
Effect of Oxygen Synergism	u_{syn}	$u(x_i) = \frac{u_{syn} \times R_i}{\sqrt{3}} =$	0.40
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	19.35
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	38.71
Applied Span Concentration			1486.15
Measured Span Concentration, STP Dry Gas			1480.90
Expanded measurement uncertainty as % of Applied Span			3 %

* Signal 3030 FID

Engine 2 - SO2 Uncertainty

Site: Brynposteg
Location: Engine 2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert (%) K=2 Filter mg	Solution mg	Standard Uncertainty Filter mg	Solution mg	Combined Uncertainty mg
				One - SO2				
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
Sulphur Dioxide	...	24.84	24.84	...	3.23	...	1.61	1.61
...	...	...	...	...	...	...	...	...
				...				
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...

	One - SO2		Standard Uncertainty @ 95%			
Sampled Volume (V_m)	0.37	m^3	uV_m	0.001	m^3	
Meter Correction Factor (Yd)	0.97	...		...	...	
Meter Temperature (T_m)	283.50	k	uT_m	1.5	k	
Average Differential Pressure (ΔH)	3.00	mmH_2O	$u\Delta H$	0.25	mmH_2O	
Barometric Pressure (ρ_b)	723.06	mmHg	$u\rho_b$	3.8	mmHg	
ΔH + ρs (ρ_m)	96.43	kPa		...	...	
Oxygen content ($O_{2,m}$)	8.07	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00823		% by volume
Moisture Content (H_2O)	10.31	% by volume	uH_2O	0.50		% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \dfrac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. $i = uV_m$, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

One - SO2 :

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured ΔH uncertainty component ($u\Delta H$), measured stack pressure uncertainty component ($u\rho_s$) & measured temperature of dry gas uncertainty component ($uT_{m\ Dry}$)

One - SO2 :

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = \quad 0.893$$

	Maximum	Minimum	Sensitivity	ufstp
$u\Delta H$	0.89	0.89	0.0000908	0.0000227
$u\rho_b$	0.90	0.89	0.00123	0.00463
uT_m	0.90	0.89	0.00315	0.00473
H_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00595$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uV_{std}) & volume uncertainty component (uV_m)

One - SO2 :

$$V_{std} = V_{measured} \times f_s = \quad 0.328$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	0.33	0.33	0.37	0.00219
Effect of uV_m	0.33	0.33	0.89	0.000893

Combined Standard Uncertainty

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00113$$

Uncertainty of Oxygen Correction Factor (%):-

One - SO2 :

$$f_{o_2} = \frac{20.9\% - O_{2,\ ref}}{20.9\% - O_{2,\ measured}} = \quad 1.24$$

$$uCorr^n{}_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})x(20.9\% - O_{2,measured})} x\, Uncertainty\ of\ O_2\ Measurement = \quad 0.0290$$

$$uf_{o_2} = \frac{uCorr^n{}_{o_2}}{f_{o_2}} x100 = \quad 2.34\ \%$$

Environmental Compliance Limited

Potters Waste			**Installation Name**	**: Engine 1 & 2**
Permit No	**: TP3736SQ**		**Visit Details**	**: Annual Compliance**
Variation No	**: ...**		**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334**	**: R001**	**Report Issue Date**	**: 31st January 2018**

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM)

Determinand	one:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uM mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	99.81	87.63	3.77	6.09
...	...	...	...	...

Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

Determinand	one:
	uL mg/Nm^3
...	...
...	...
Sulphur Dioxide	1.08
...	...

Uncertainty in final measurement @ Reference Conditions due to uVstp

Determinand	one:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uVstp mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	94.04	93.40	285.76	0.32
...	...	...	...	...

Combined Uncertainty excluding oxygen contribution

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Determinand	one:			
	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	6.20	12.39	93.72	13.22
...	...	...	...	...

Combined Uncertainty including oxygen contribution

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrn Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (Ucombined)
...	...	...	...
...	...	...	...
Sulphur Dioxide	13.22	2.33	13.43
...	...	...	...

Engine 2 - Non-methane TVOCs Uncertainty

Site: Potters Waste, Brynposteg
Location: Landfill, Stack ID:Engine 2

				Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.10176	m^3	uV_m	0.000	m^3
Meter Correction Factor or ml/count	**Yd**	0.9746	...	...	...	...
Meter Temperature	T_m	283.17	k	uT_m	1.5	k
Barometric Pressure	ρ_b	964.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	8.10	%Vol	$uO_{2,m}$	0.49	%Vol
Moisture	H_2O	4.21	%Vol	uH_2O	0.89	%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Engine 2	15.00	µg	**uM**	1.50	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ **where** C **is the sensitivity coefficient,** u **is the standa and** i **is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data fro meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.92$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.47	0.46	0.000485	0.00485
uT_m	0.92	0.91	0.00324	0.00486
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00635$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.0910$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.0916	0.0904	0.0992	0.000630
Effect of uV_m	0.0910	0.0910	0.89	8.942E-06

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00902$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Engine 2	0.00190	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC	0.17	0.16	10.99	0.00824
Condensate Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC	0.18	0.15	1.83	0.0165

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
Non Methane VOC	0.0186	0.0371	0.20	18.15

EMISSIONS MONITORING SURVEY

Prepared for:

Potters Waste
Brynposteg Landfill Site
Llandidloes
SY18 6JJ

Permit Number	**: BU7766IC**
Variation Number	**: EPR/BU7766IC/V004**
Installation	**: Flare Stack**
Visit Details	**: Annual Compliance**
Job Number	**: P3334**
Report Number	**: R002**
Report Issue Date	**: 31st January 2018**
Survey Dates	**: 10th & 11th January 2018**

Prepared by:

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Report Issue:		**FINAL**	
Report Prepared by:		**Report Reviewed & Approved by** **MCERTS Level Two** **Technical Endorsements TE1, TE2, TE3 & TE4**	
Name:	Mike Mullett	***Name:***	Sam Brookes
		MCERTS No:	MM 06 755
		Signature:	
Date:	29/01/2018	***Date:***	31/01/2018

This report is not to be used for contractual or engineering purposes unless this approval sheet is signed where indicated by the approver and the report is designated "FINAL".

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MCERTS requirements mean that comparison of results with emissions limit values is not permitted within this report.

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PART 1 - EXECUTIVE SUMMARY

1 Monitoring Objectives

Environmental Compliance Ltd (ECL) was commissioned by **Potters Waste** to undertake an emission monitoring survey at their **Brynposteg Landfill site**. This report presents the findings of the study.

The monitoring at this installation was carried out in accordance with our quotation reference **DHFB/P3334/Q001**, for compliance check monitoring of emissions to air. The substances requested for monitoring at each emissions point are listed below:

Substances to be monitored	Emission Point Identification Ref No: Flare Stack
Velocity / Flowrate	● U
Oxides of Nitrogen (as NO_2)	● U
Sulphur Dioxide	● U
Carbon Monoxide	● U
Oxygen	● U
Carbon Dioxide	● U
Total Organic Carbon (TVOC)	● U
Non-methane VOCs	● U

● Denotes the substances to be monitored.

U **Denotes UKAS accreditation is held for monitoring that substance, but does not mean that it has been claimed which will depend on whether the testing could be completed in accordance with the Standard Reference Method.**

Special Requirements: *"Normal operating conditions"*

1.1 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty %	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Tick if non-conforming test (see Sections 2 & 5)	Operating Status
Flare Stack	Volumetric Flowrate	...	36.16668	m^3/sec	17	Stack Conditions	11/01/2018	10:35 – 10:46	BS EN 16911-1:2013 & MID	UKAS / MCERTS	✔	Normal
	Volumetric Flowrate	...	4.74322	m^3/sec	23	STP Dry 3% O_2				UKAS / MCERTS	✔	
	TVOC as Carbon	10	4.60	mgC/m^3	5			13:38 – 14:37	BS EN 12619:2013	UKAS / MCERTS		
	Oxides of Nitrogen (as NO_2)	150	78.19	mg/m^3	2			13:54 – 14:53	BS EN 14792: 2017	UKAS / MCERTS		
	Carbon Monoxide	50	49.12	mg/m^3	3				BS EN 15058: 2017	UKAS / MCERTS		
	Oxygen (Testo)	...	9.87	%	6	Dry			BS EN 14789: 2017	UKAS / MCERTS		
	Carbon Dioxide (Horiba)	...	8.67	%	3				ISO 12039:2001	UKAS / MCERTS		
	Sulphur Dioxide	...	2.81	mg/m^3	13	STP Dry 3% O_2		13:12 – 14:12	BS 14791:2017	UKAS / MCERTS	✔	
	Non-methane VOCs	5	0.092	mg/m^3	10			14:24 – 15:24	CEN/TS 13649:2014	NU	✔	

Notes

The volumetric flowrate shown above is that from the initial pitot traverse.
Any other flow measurements made during isokinetic sampling and/ or repeat traverses are shown later in the tables section.

The uncertainty figures presented in Table 1.1 for NO_x, CO, O_2, CO_2 & TVOC are "measurement uncertainty" figures, which do not take into account the variability of the measured sample values. The "uncertainty of measurement results" figures, which do include this contribution, are presented in the appendices of the report for these determinands.

Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value.
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval. The Uncertainty results **DO NOT** take into account the effect of the sample location limitations.
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency.
Accreditation for use of Method	**The details indicate the accreditation for the use of the complete monitoring method, e.g. MCERTs, UKAS. If use of the method is not accredited "NA" is stated.**
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring.
$	Chemical Analysis on sample reagents was performed by an External Laboratory as detailed in Section 4
NU	UKAS Accreditation Held but UKAS Accreditation cannot be claimed for the test as sampling did not comply with the Standard Reference Method (SRM), see section 2 & 5
NA	**Method is NOT UKAS Accredited.**

1.2 Operating Information

Emission Point Reference	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results					
							Parameter	Date	Time	CEMS Results	Periodic Monitoring Results	Units
Flare Stack	Batch	N/A	Gas	Landfill Gas	None	Normal	…	…	…	NP	…	…

Notes:

Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the normal load, throughput or rating of the plant
CEMS Data	Enter this data for each CEM installed if it is has been provided by operator otherwise state “NP” (NOT PROVIDED)

2 Monitoring Deviations

The objective of the survey was to measure the concentrations of pollutants from the processes / locations as detailed in Section 1. This survey meets the requirements of the site's **PPC Permit Number: BU7766IC** where UKAS and MCERTS accreditation has and could be claimed for the testing in the monitoring results table.

There was a modification to the sampling procedures (TPDs) listed in Section 4:

- **Non Methane VOC –** ECL/TPD/84 is specifically for the monitoring of dry ambient gas. Testing of the flare stack required the modification of the TPD, to cool and dry the sample gas prior to passing it through the capture media (sorbent tube). Due to the high stack temperature, and the modifications required to facilitate sampling, UKAS accreditation has not been claimed for Non-Methane VOCs.

There were no substance deviation from the original and agreed emissions monitoring schedule.

Non-conforming tests are as follows:

- Due to Health & Safety restrictions only a single sampling point was traversed, see also Section 5. Due to the high stack temperatures and the limited access, it was not possible to fully traverse the duct. Consequently, all flowrate measurements are non-conforming.
- Impinger collection efficiency is less than 95% for the Sulphur Dioxide tests. However, please note that there is no ELV in place. If an ELV of 50mg/m3 is used (the same as CO) then the concentration is less than 30% of the ELV and the impinger collection efficiency is not applicable.

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

Homogeneity tests have not been completed for pollutants at the following locations:

- Flare stack – Not requested by client

PART 2 – SUPPORTING INFORMATION

3 SAMPLING STAFF DETAILS

Site Sampling Team

Names of Site Team	Dates on Site	MCERTS No.	LEVEL	Technical Endorsements
Sam Brookes	10-11/01/2018	MM 06 775	2	TE1, TE2, TE3, TE4
Peter Brockway		MM 17 1459	Trainee	...

Report Reviewer

Name	MCERTS No.	LEVEL	Technical Endorsements
Sam Brookes	MM 06 775	2	TE1, TE2, TE3, TE4

Technical Endorsement Key:-

TE1 – **Isokinetic** Particulates, Temperature & Velocity Profiles, Oxygen.
TE2 – **Isokinetic** Extractive Pollutants:- Metals, Dioxin & Furans, PAHs, PCBs, HCl, HF.
TE3 – **Non-Isokinetic** Extractive Pollutants:- Speciated VOCs, HF, HCl, Cyanide.
TE4 – **Continuous Analysers** (Combustion Gases):- TVOC, CO, NOx, SO2.

4 SAMPLING PROTOCOLS / METHODOLOGIES

Any required modifications to the Technical Procedure Documents (TPDs) specified below will be detailed in section 2 of this report.

Stand alone velocity measurements and those made to support isokinetic sampling are conducted using BS EN 16911-1:2013 & MID.

Pressure, Temperature and Velocity

Testing was carried out using a sampling system in accordance with **BS EN ISO 16911-1:2013 & MID** and In-house technical procedure **ECL/TPD/022A.**

Temperature was recorded using a thermocouple and digital temperature reader.

Velocity and pressure were recorded using an "L" type and digital manometer, data being recorded in Pascals.

Water Vapour

Testing was carried out using a Universal Stack Sampling system in accordance with **BS EN 14790:2017** and In-house technical procedure **ECL/TPD/082**.

In this method the stack gases are filtered (in-stack unheated filter or out-stack heated filter) to remove particulate matter. The gases are then passed through a **heated probe** and then to a cooled moisture trapping unit. All unheated parts of the sample train (outside the sample port) which come into contact with stack gas are weighed pre and post sampling in order to determine the weight gain.

After each test, a visual inspection of the last impinger is made to confirm that at least 50% of the silica gel column has not changed colour. This indicates satisfactory collection of water vapour.

Combustion Gases (NO_x, CO & CO_2)

Measurements of combustion gases were carried out using an MCERTS Certified **Horiba PG 250** stack gas analyser. Continuous monitoring of emissions was undertaken over each test period recording minute averaged data (one measurement every 60 seconds). The measurement techniques for each determinand are as follows:

Determinand	Technique	SRM
• NO_x	Chemiluminescence	BS EN 14792: 2017
• CO	Non-dispersive infrared	BS EN 15058: 2017
• CO_2	Non-dispersive infrared	ISO 12039:2001

The analyser was set up with reference to the manufacturer's operator handbook and the in-house technical procedure **ECL/TPD/033c**. The analyser was calibrated on site using certified gases which are traceable to ISO 17025 (with uncertainty <2%). Zero measurements were performed using Nitrogen. The analyser was calibrated directly into the sample inlet and then checked through the entire sampling system (including sampling probe, heated & unheated gas transport lines and gas drying/ conditioning system).

Data is presented graphically in the Figures Section, and the minute averaged data is given in the Tables Section.

Oxygen

Measurements of Oxygen were carried out using a Testo 350XL electrochemical cell combustion gas analyser which has been validated to meet the performance requirements of **BS EN 14789:2017** Continuous monitoring of emissions was undertaken over each test period recording minute averaged data.

The analyser was set up with reference to the manufacturer's operator handbook and the in-house technical procedure **ECL/TPD/086**. The analyser was calibrated on-site using certified gases which are traceable to ISO 17025 (with uncertainty <2%). (for emissions streams where oxygen is above 15%, dry ambient air can be used to calibrate the analyser). Zero measurements were performed using Nitrogen. The analyser was calibrated directly into the sample inlet (which is up-stream of the built-in chiller system) and then checked through the entire sampling system (including sampling probe, short heated/ unheated gas transport lines and external gas conditioning systems as required).

TVOC as Carbon

Testing was carried out using an MCERTS Certified Signal 3030PM FID and heated gas sample line, with reference to the manufacturer's operation handbook, **BS EN 12619:2013** and in-house technical procedure **ECL/TPD/032A**.

The analyser was calibrated on site using certified propane span gases, (made up in synthetic air) which are traceable to ISO 17025 standard (with uncertainty $<2\%$).

Zero measurements were performed using synthetic air zero gas, with TVOC content less than 0.2 mg/m^3 (or purity greater than 99.998%).

The analyser was calibrated directly into the sample inlet and then checked through the entire sampling system (including sampling probe, heated filter and heated gas transport lines). Data was corrected by molecular weight to TVOCs as total carbon.

Data was recorded as minute averages over each test period. The data is presented in the Figures Section and the minute averaged data is detailed in the Tables Section**.**

Sulphur Dioxide

Testing was carried out non-isokinetically using a Universal Stack Sampling system in accordance with **BS EN 14791:2017** and In-house technical procedure **ECL/TPD/039**. Non-isokinetic sampling can only take place if there are no droplets present in the stack gas.

In this method the stack gases are filtered to remove particulate matter then the gases are passed through a series of impingers. The first three impingers each contain 140ml of 3% Hydrogen Peroxide (3% H_2O_2). The fourth impinger is left empty and the final impinger contains a measured quantity of silica gel.

The first three impingers containing the 3% Hydrogen Peroxide are analysed for concentrations of Sulphur Dioxide by IC (Ion Chromatography).

Concept Life Sciences Ltd (CLS) who are situated in Manchester carried out the analysis of the samples. **CLS** is UKAS accredited for this analysis. In addition to the survey samples, appropriate field blanks and efficiency checks are submitted as part of the technical procedure.

Non-methane VOCs

Non-continuous sampling for **Non-methane VOCs** was carried out in accordance with **CEN/TS 13649:2014** and In-house technical procedure **ECL/TPD/084.** In this method a metered volume of stack gas is extracted through a standard charcoal sorbent tube/ thermal desorption tube.

Concept Life Sciences Ltd (CLS) who are situated in Manchester carried out the analysis of the samples. **CLS are not UKAS** accredited for this analysis. In addition to the survey samples, appropriate field blanks and efficiency checks are submitted as part of the technical procedure.

Due to restrictions set out in CEN/TS 13649:2014, MCERTS/UKAS accreditation can only be claimed when the target parameters are organic compounds, the sorbent tube used is a standard charcoal tube/ thermal desorption tube and when laboratory analysis is UKAS accredited and carried out by GC. If other tubes are used, or if analysis is by other means than GC, then usually only UKAS accreditation can be claimed, as long as the laboratory analysis is UKAS accredited. (MCERTS accreditation may still be claimed if prior approval is given for the modifications by the Environment Agency – details will be given in section 2 of this report).

Laboratory analysis **cannot** be UKAS accredited for "Total VOC" or "TOP 10 compounds".

For the subcontract laboratory to claim UKAS accreditation for analysis, the internal recovery of a spiking compound (desorption efficiency from tube) needs to be above 80%. If it falls below 80% this will be noted on the analysis certificate.

If greater than 5% of the total amount of any of the target species is found in the back up portion of the sorbent tube, this will be noted on the analysis certificate.

5 SAMPLE POINT DESCRIPTIONS

The homogeneity test is applicable to combustion processes. This includes but is not restricted to, those regulated under the Waste Incineration Directive (**WID**) and the Large Combustion Plant Directive (**LCPD**).

Homogeneity testing has not been completed at this location in accordance with the mandatory requirements of the regulatory authority.

The test is not usually required for stacks with sampling plane areas of $<1m^2$ (below 1.13m in diameter for circular ducts).

The sample location that was monitored is detailed below:-

Flare Stack

As a result of the sampling point being located in close proximity to the exit of the stack the sampling location does not currently meet the requirements detailed in *Technical Guidance Note (Monitoring) M1"Sampling requirements for stack-emission monitoring" Environment Agency, January 2007, Version 4.1,* and BS EN 13284-1 but there is no alternative sampling location.

In addition, due to health and safety considerations, the flare was turned off in order to set up equipment and then turned back on again after the probe had been inserted into the stack and the monitoring team had descended from the sampling platform.

The stack diameter is 2.3m and sampling was performed using one of the four 4-inch flange ports located close to the exit of the stack.

These ports are positioned at a height of 0.3m above the scaffold platform and the distance back from the port is 1m.

Access to the stack was gained by means of three temporary ladders secured to the side of temporary scaffolding complete with an in-date scafftag.

Due to Health & Safety restrictions only a single sampling point was traversed, see also Section 5. Due to the high stack temperatures and the limited access, it was not possible to fully traverse the duct. Furthermore, the velocity that was measured at a single point in the duct was near to the lower limit of detection. Consequently, all flowrate measurements are non-conforming.

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

EQUIPMENT IDs
(Pre site checklist from SSP)

PRE SITE EQUIPMENT CHECKLIST/ EQUIPMENT USED

(Completed before departure to site and when on site in full)

Equipment	Equip. Type	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:
MST console/pump	E001	U001							
MST Nozzle set									
MST "S" Type Pitot									
MST Probe									
MST Hot Box		978							
MST Impinger Arm		401							
		660							
Barometer		627							
Site Balance		088							
Site Check weights		276							
		277							
Horiba	E002	511							
Heated Probe / Filter		920							
Chiller		972							
Sonimix / MFC									
Heated Line		1013	1014						
FID	E003	269							
Heated Line		517	518						
Heated Probe / Filter		919							
Testo	E004	350							
FTIR	E005								
Heated Probe / Filter									
Heated Line									
Stackmite	E006								
"L" Type Pitot		489							
Digital Manometer		421							
Stack Thermocouple		866							
Thermocouple Reader		1112							
Nozzle Set									
Workhorse Pumps	E007								
Low Flow Pumps									
Tube Thermocouple		1041							

Quantity of Ice Required / Used for Survey	6	Bags (2kg bags)

FIGURES

Figure 1 – Flare Stack Combustion Gases

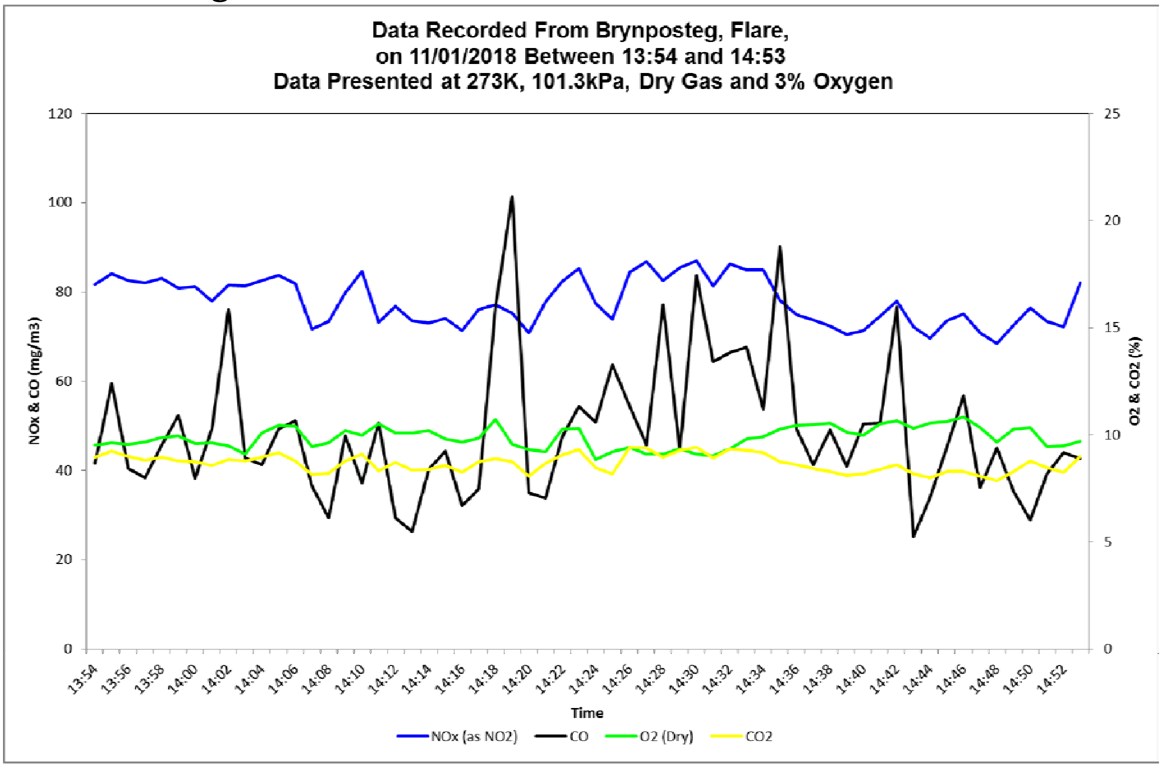
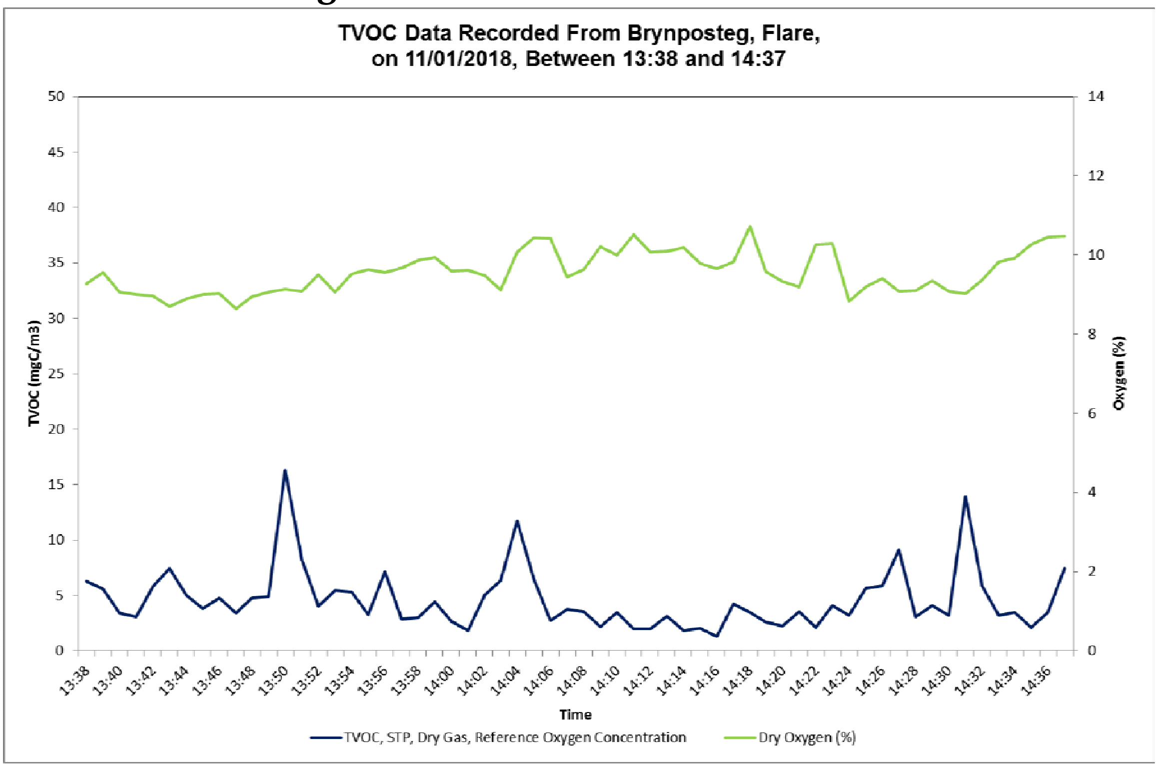


Figure 2 – Flare Stack TVOCs



TABLES

Table 1 – TVOC

Data Recorded from Flare Stack

Sample Period: 13:38 – 14:47 on the 11th January 2018

Volumetric Flowrate (Reference Conditions) = 4.74322 m^3/sec *

	Average	Emission Rate
	mg/m^3	Kg/hr
TVOC (as carbon)*	4.60	0.0785

*** Reference Conditions (273K, 101.3 kPa, 3% Oxygen & Dry Gas)**

Table 2 – Combustion Gases

Data Recorded from Flare Stack

Sample Period: 13:54 – 14:53 on the 11th January 2018

Volumetric Flowrate (Reference Conditions) = 4.74322 m^3/sec *

	Average	Emission Rate
	mg/m^3	Kg/hr
Oxides of Nitrogen (as NO_2) *	78.19	1.335
Carbon Monoxide *	49.12	0.839
Carbon Dioxide (%) **	8.67	...
Oxygen (%) **	9.87	...

*** Reference Conditions (273K, 101.3 kPa, 3% Oxygen & Dry Gas)**
**** Dry Gas**

Table 3 – SO_2

Data Recorded from Flare - Landfill

Emission Parameter	Units	One	Blank
Stack Diameter	metres	2.30	
Area of Sample Plane	m^2	4.155	
Moisture Content	%	7.55	
Oxygen Content	%	9.40	
Stack Temperature	°C	930	
Gas Velocity (as Measured)	m/sec	8.66	
Gas Velocity (Reference Conditions)	m/sec*	1.14	
Volumetric Flowrate (as Measured)	m^3/sec	35.99	
Volumetric Flowrate (Reference Conditions)	m^3/sec*	4.72	
Dry Gas Molecular Weight	g/gmole	29.82680874	
Sample Date	...	11/01/2018	
Sample Period	...	13:12 - 14:12	
Sample Volume (reference Conditions)	m^3*	0.143	0.143
Sample Reference	ECL/18/	0076 0077	0078
Mass of Sulphur Dioxide Collected	mg	0.40	0.21
Concentration of Sulphur Dioxide	mg/m^3*	**2.81**	1.48
Emission Rate of Sulphur Dioxide	kg/hr	0.05	...
Expanded Uncertainty (% Relative)	%	13	...
Impinger Collection Efficiency	%	79	...

*Reference Conditions (273K, 101.3kPa, 3% Oxygen, Dry Gas)

NB: No ELV for SO_2, please note if 50mg/m^3 ELV used then the concentration is <30% ELV and therefore impinger collection efficiency is not applicable.

Table 4 – NMVOCs

Potters Waste

Brynposteg Landfill Flare

Emission Parameter	Units	Value
Stack Diameter	mm	2300
Area of Sample Plane	m^2	4.155
Moisture Content	%	9.20
Expanded Uncertainty of Moisture (%Relative)	%	17.99
Measured Oxygen (Dry)	%Vol	9.82
Meter Temperature	°C	13.25
StackTemperature	°C	925.50
Sample Date	...	11/01/2018
Sample Period	...	14:24 - 15:24
Sample Volume (as Measured)	m^3	0.057
Sample Volume (reference Conditions)	m^3*	0.033

Sample Tube Results		One		Blank
Sample Reference ECL/18/83	Units	Concentration*	Uncertainty	Concentration
Concentration of Non Methane VOC	mg/m^3	0.092	9.65%	0.031

***Reference Conditions: 273 K, 101.3 kPa, 3% Oxygen & Dry Gas**

VELOCITY TRAVERSE PROFILES

Environmental Compliance Limited

Potters Waste		**Installation Name**	**: Flare Stack**
Permit No	**: BU7766IC**	**Visit Details**	**: Annual Compliance**
Variation No	**: EPR/BU7766IC/V004**	**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334 : R002**	**Report Issue Date**	**: 31st January 2018**

Environmental Compliance Limited	Traverse Data Profoma	Date of Measurement	11/01/2018

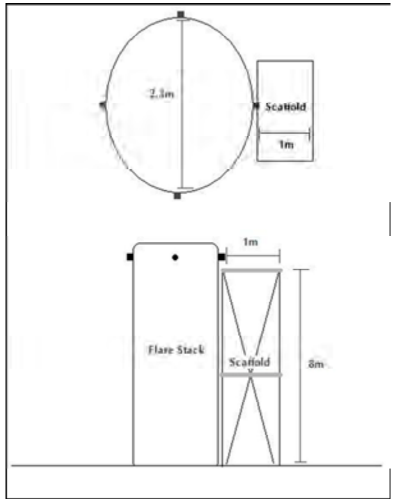
Company	Potters Waste	Stack Diameter Port A (mm)	2300	Average Stack Diameter (mm)	2300	Pitot tube coefficient	0.98
Site	Brynposteg	Stack Diameter Port B (mm)		Port Length (mm)	90	Pitot Id	489
Location	Landfill	Duct Length Port A (mm)		Average Duct Length (mm) L		Stack Thermocouple ID	866
Stack	Flare	Duct Length Port B (mm)		Duct width (mm) B		Stack Temp Reader ID	1112
Job No	P3334	Duct Length Port C (mm)		Barometric Pressure. (mb)	980	Manometer ID	421
Operators	SEB + PB	Duct Length Port D (mm)		Ave Static Press. (mm H_20)	-0.82	Barometer ID	627

Pre - Traverse Checks Carried Out	Time	Pass/ Fail
Pre - Traverse PITOT Visual Inspection	10:35:00	Pass
Pre - Traverse PITOT Leak Check	10:37:00	Pass

Smooth Walls

Static Pressure Readings (Pascals)			
Port A	Port B	Port C	Port D
-8.00			

Diagram/ Description of Cross Section of Stack/Duct



Port/ Point	Distance to Point (mm)	Time	Temperature Readings (°C) 1	2	3	(ΔP) Pitot Readings (Pa) 1	2	3	Average Temp. (°C)	Average (ΔP) (Pa)	Swirl Test ° From Reference
A1	1150	10:40:00	923.0	923.0	923.0	10.1	12.9	11.1	923.0	11.4	1
Blockage Check @ A1 (L-Type Pitot Only)		10:42:00	926.0	928.0	928.0	11.2	12.1	11.0	923.0	11.4	Total
			Mean		927.3	Mean		11.4	923.0	11.4	Max
			Difference <5% from Initial ?		0.36	Difference <5% from Initial ?		0.59	923.0	11.4	Min
									923.0	11.4	Average

Notes

Including expected or actual deviations from procedures / non-conformities

Only one point measured due to access and temperature

Site thermocouple readings 1026C

Post - Traverse Checks Carried Out	Time	Pass/ Fail
Post - Traverse Visual Inspection	10:44:00	Pass
Post - Traverse PITOT Leak Check	10:46:00	Pass

Average temp (K)	1196.000

Stagnation Check (S-type Pitot Only)	Time	Reading
Static Pressure Via Positive Leg (Pa)		.
Static Pressure Via Negative Leg (Pa)		.
Difference (Pa) < 10Pa ?		#VALUE!

Suitability of Sampling Position	Actual Stack Conditions
Highest:lowest flow pressure ratio < 9:1?	1.13:1
Maximum deviation of flow from axis <15° ?	1
X-sectional area for stacks= πr2	4.15 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	OK

Compliance With Positional Requirements?

Height of sample ports from Platform	03.m
Number of sample ports	4
Width of platform (port back to handrail)	1m

Stack Moisture	7.55	%	Gas Velocity (as Measured) Adjusted for Smooth Walls	8.70489	m/sec
Measured Oxygen	9.4	%	Gas Velocity (Reference Conditions) Adjusted for Smooth Walls	1.14164	m/sec*
Measured Carbon Dioxide	9.07	%	Volumetric Flowrate (as Measured) Adjusted for Smooth Walls	36.16668	m^3/sec
Dry Gas Molecular Weight	29.82720	g/g mole	Volumetric Flowrate (Ref Cond) Adjusted for Smooth Walls	4.74322	m^3/sec*

Nearest downstream disturbance	exit	0.5m
Nearest upstream disturbance	bend	5m
Disturbances are classed as bends, fans or diameter variations		

*Reference Conditions: 273K, 101.3kPa, 3% Oxygen, Dry Gas   NOTE: Velocity / volume flowrate calculations exclude contributions from the measurement point(s) where swirl >15°

FIELD CALIBRATION AND SAMPLING DATA

Combustion Gases Field Calibration Sheet

	Horiba PG 250 Measurement Ranges:			
	NO as NO_2	CO	O_2	CO_2
Units	1025 mg/m^3	625 mg/m^3	25 %Vol	20 %Vol
	Zero Values (Direct)			
Mean Initial Direct Zero	0.20	-0.59	-0.01	0.02
Mean Confirmation Direct Zero	0.30	-0.44	-0.02	0.02
Difference in Direct Zero	0.10	0.15	0.01	0.00
Repeatability at Zero	4.10	2.50	0.20	0.20
<2 x Repeatability at Zero?	YES	YES	YES	YES
	Pre Zero Values (System)			
Mean Pre Test Zero	-0.20	0.82	-0.01	0.02
% of Measurement Range?	-0.02%	0.13%	-0.04%	0.11%
Detection Limit (LOD)	0.05	0.11	0.20	0.01
	Applied Span:			
	NO	CO	O_2	CO_2
Actual Applied Span Concentration	526.44	252.75	14.84	17.73
	Pre Test System Zero Values			
Mean Pre Test System Zero	-0.20	0.82	-0.01	0.02
Difference ≤ ± 2% of Span Value (5% for SO_2)?	0.04%	0.32%	0.07%	0.13%
	Post Test Zero Values			
Mean Post Test Zero	-0.21	0.66	-0.02	0.02
% of Certified Range?	-0.02%	0.11%	-0.09%	0.10%
Zero Drift ≤ ± 5% of Applied Span?	0.08%	0.49%	0.11%	0.00%
	Pre Test System Span Values			
Mean Pre Test System Span	521.25	253.49	14.87	17.67
Difference ≤ ± 2% of Span Value (5% for SO_2)?	0.99%	0.29%	0.19%	0.33%
	Post Test Span Values			
Mean Post Test Span	519.94	251.51	14.67	17.74
Span Drift ≤ ± 5% Span Value?	1.24%	0.49%	1.15%	0.04%
	1.24%	0.49%	1.15%	0.04%
	See Note 3	See Note 3	See Note 3	See Note 3

NOTE 1: Data Invalid! Contact Quality Manager!
NOTE 2: Correct test data for drift!
NOTE 3: No drift correction required.

TVOC - FIELD DATA SHEET

Client	Potters Waste	Barometric Pressure mb	980	
Site	Brynposteg	Barometer ID	ECL/ID/ 627	
Date	11/01/2018	Analyser ID	ECL/ID/ 269	
Location	Landfill	Sonimix/ MFC ID	ECL/ID/	
Stack ID	Flare	Heated Line/ Controller ID	ECL/ID/ 517 518	
Stack Temp °C	1000	Heated Line Set Temp °C	180	YES
Ambient Temp (sampling)	1= 6 2= 7 3= 8	Heated Line Length	10	m
Ambient Temp (sampling)	4= 8 5= 8 6= 7	Heated Probe Filter ID	ECL/ID/ 919	
Job No	P3334	Heated Filter Set Temp °C	180	YES
Operators	SEB + PB	Logger ID	926	

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/ 1771	...	...
Hydrogen / Helium	Gas/ 1869	...	...
Propane (In Air)	Gas/ 1895	29.91 ppm	1%

	Analyser Range	Span Gas value used
Propane	40 ppm	29.91 ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	09:20	09:25	09:21	09:36	09:41	09:46

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
6	5	Start Time	End Time	Start Time	End Time
ZERO / SPAN		10:43	10:48	10:50	10:55

Response Time SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
10:49:00	10:49:18	Y

	Start Time	End Time	Location	Production Details
Sample Period	10:21	15:07	Flare	Normal
Sample Period				
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
7	7	Start Time	End Time	Start Time	End Time
ZERO / SPAN		15:34	15:39	15:41	15:46

Process Details / Comments

TVOCs Field Calibration Sheet

Calibration Summary		TVOC ppm
Analyser Range		**40**
Repeatability at Zero		0.8
Span Gas Concentration Applied		**29.91**
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	29.9
	Zero	0.14
Difference (Zero)		0.1425
< 2 × Repeatability @ Zero?		**YES**
Pre Test (System)	Zero	0.52
	Span	29.9
Difference (Zero)		0.5157
< 2% Relative to Direct Span		YES
Difference (Span)		0.0440
< 2% Relative to Direct Span		**YES**
Post Test (System)	Zero	0.25
	Span	30.2
Difference (Zero)		0.2620
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		0.3228
Span Drift < 2% of Applied Span?		**YES**
Zero and Span Drift < 5% of Applied Span?		**YES**

Potters Waste		Installation Name	: Flare Stack
Permit No	: BU7766IC	Visit Details	: Annual Compliance
Variation No	: EPR/BU7766IC/V004	Survey Dates	: 10th & 11th January 2018
Report Ref	: P3334 : R002	Report Issue Date	: 31st January 2018

SO_2 Field Data Sheet

Environmental Compliance Limited	NON ISOKINETIC SAMPLING PROFORMA	Date of Measurement	11/01/2018
ECL/TPD/ 39	Time taken to change Ports? 0	Start Time 13:12	End Time 14:12
		Test Duration 60 mins	

If moisture was not measured see detailed notes below.

Client	Potters Waste	Stack Profile	Circular	Console id	U001	Barometer id	627
Site	Brynposteg	Stack Area (m^2)	4.15	Pump id	U001	Nozzle Id	n/a
Location	Landfill	Barometric Pressure (mb)	980	Probe id	Sinter probe	Nozzle size	n/a
Stack ID	Flare	Static Pres. (mm H_20)	-0.8	DGM Yd	0.9746	Filter Id	Sinter in-stack
Test No.	One	Pitot coefficient	n/a	ΔH@	38.2	Pitot ID	n/a
Job No	P3334	Probe Heater Setting (°C)	n/a	Impinger Id	660	Hot Box ID	978
ECL Site Staff	SEB + PB	Hot Box Setting (°C)	120	Balance Id	88		

Required Sample Flowrate l/min	Suggested ΔH Entered Below
3	1
6	3
10	10
15	25
25	50
Initial ΔH	3
Reference Oxygen Percentage	3

	Sample	Leak 1	Leak 2	Leak 3	Leak 4	Leak 5	Total
Start Volume	2852245.0						
Final Volume	2852488.0						
Total Volume	243.0	0.0	0.0	0.0	0.0	0.0	243.0
Leak Check	First	Second	Third	Fourth	Fifth		
Leak rate l/min	0				0	Dry O_2 (Atmospheric)	9.40
Vaccum "Hg	8				16	Dry Carbon Dioxide %	9.07
Time of Check	13:10				14:17	Dry Carbon Monoxide ppm	
Set Rate l/min	6				4		
Leak < 2%?	YES				YES		

Traverse Point	A1	A1	A1	A1	A1	A1			Total
Time/Point (mins)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60			
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)	3.00	3.00	3.00	3.00	3.00	3.00			3.00
Meter (Tm in)	7.00	7.00	8.00	8.00	9.00	9.00			8.00
Meter (Tm out)	7.00	7.00	8.00	8.00	9.00	9.00			8.00
Stack Temp (Ts)	923.00	926.00	928.00	930.00	934.00	938.00			929.83
Impinger T Outlet	6.00	6.00	6.00	7.00	7.00	9.00			6.83
Vaccum (" Hg)	14.00	12.00	12.00	12.00	12.00	12.00			12.33

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

Traverse Point									Total
Time/Point(mins)									
ΔP (mm H20)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
K factor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ΔH (Orifice)									
Meter (Tm in)									
Meter (Tm out)									
Stack Temp (Ts)									
Impinger T Outlet									
Vaccum (" Hg)									

	Impinger 1	Impinger 2	Impinger3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
(contents)	3% H2O2	3% H2O2	3% H2O2	Empty	Silica			
SOL/	3362	3362	3362	...	...			
Start Weight (g)	740.5	751.4	772.5	490	909.5			
End Weight (g)	748	753.1	773.9	491.2	912.3			
Total weight (g)	7.5	1.7	1.4	1.2	2.8	0	0	0

Total (g)	14.60
Silica < 50% used at End of Test? Y/N	YES

Rinse Solutions used	
Solution	SOL NO
DI Water	3356
Acetone	...

Additional Moisture Weighings

	1	2	3	4	5	6	7	8	9	10
Item Name										
Start Weight (g)										
End Weight (g)										
Total weight (g)	0	0	0	0	0	0	0	0	0	0

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights may be included to produce a nominal 0.1% moisture value.

Non-methane TVOCs Field Data Sheet

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA

Client	Potters Waste	◉ Circular ○ Rectangular ○ Elipse		Pump ID	n/a
Site	Brynposteg	Stack Diameter (mm)	2300	Meter ID	U001
Location	Landfill			MST Probe ID	n/a
Stack ID	Flare	Stack Area (m^2)	4.155	MST Probe Heating Temp (C)	180
Test No	One	Barometric Pressure (mb)	980	DGM Yd or ml/count	0.9746
Job No	P3334	Stack Thermocouple ID	866	MST Hot Box ID	978
ECL Site Staff	SEB + PB	Tube Thermocouple ID	1041	MST Hot Box Heating Temp (C)	180
Barometer ID	627	Meter Thermocouple ID	U001	Workhorse Set Sample Rate (%)	n/a
		In-Stack Sinter Used (Y/N)	Y	MST Delta H Sampling Rate	0.5

Date of Test	11/01/2018
Sample Start Time	14:24
Sample End Time	15:24
Duration	60
Measured O2	9.82
O2 Uncertainty %Vol	0.59

Meter Units ○ ml ◉ litres	Sample	Leak 1	Time (start/ end) (minimum 1 minute)	Leak 2	Time (start/ end) (minimum 1 minute)	Total
Start Volume	2852464.0	2852454.9	14:21:00	2852532.1	15:30:00	
Final Volume	2852523.8	2852454.9	14:22:00	2852532.1	15:31:00	
Total Volume	58.6	0.0		0.0		58.6
Sample Train Internal Volume	1.2447	Litres				

Sample Point	A1	A1	A1	A1
Time/ point (mins)	0-10	10--20	20-30	30-40
Tube Temp °C	11	11	11	12
Stack Temp °C	917	923	927	929
Meter Temp In °C	16	16	15	15
Meter Temp Out °C	11	11	12	12

Sample Point	A1	A1		
Time/ point (mins)	40-50	50-60		
Tube Temp °C	12	13		
Stack Temp °C	930	927		
Meter Temp In °C	14	14		
Meter Temp Out °C	12	11		

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp In °C				
Meter Temp Out °C				

	Impinger 1	Impinger 2	Impinger3
(contents)	Empty	Empty	Silca
Start Weight (g)	527.7	617.1	760.4
End Weight (g)	529.7	618	761.9
Total weight (g)	2	0.9	1.5

Silica	(IF USED)
<50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	no

NB: Non-conforming test due to high temperature and moisture, see Section 2 "Monitoring Deviations".

LABORATORY ANALYSIS RESULTS

CONCEPT LIFE SCIENCES

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

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Report Number: 708572-1

Date of Report: 24-Jan-2018

Customer: Environmental Compliance Ltd
Unit G1
Main Avenue
Treforest Industrial Estate
Pontypridd
CF37 5BF

Customer Contact: Mr Sam Brookes

Customer Job Reference: P3334
Customer Purchase Order: E7497
Date Job Received at Concept: 15-Jan-2018
Date Analysis Started: 15-Jan-2018
Date Analysis Completed: 24-Jan-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING 1549

Report checked
and authorised by :
Kathryn Gleaves
Customer Service Advisor

Issued by :
Emma Spear
Customer Service Advisor

ESpear

Page 1 of 4
708572-1

Concept Reference: 708572
Customer Reference: P3334

Impinger(peroxide) Analysed as Impinger(peroxide)
Sulphur Dioxide & Volume

				Concept Reference	708572 001	708572 002	708572 003	708572 004	708572 005
				Customer Sample Reference	ECL/18/0070	ECL/18/0071	ECL/18/0072	ECL/18/0073	ECL/18/0074
				Test Sample	AR	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	10-JAN-2018	10-JAN-2018	10-JAN-2018	10-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Sulphur Dioxide	IC	0.05	mg/l	U	(13) 64	(13) 0.64	(13) 0.48	(13) 66	(13) 0.59
Volume	Vol	1	ml	U	460	230	300	460	160

Concept Reference: 708572
Customer Reference: P3334

Impinger(peroxide) Analysed as Impinger(peroxide)
Sulphur Dioxide & Volume

				Concept Reference	708572 006	708572 007	708572 008	708572 009
				Customer Sample Reference	ECL/18/0075	ECL/18/0076	ECL/18/0077	ECL/18/0078
				Test Sample	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	11-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Sulphur Dioxide	IC	0.05	mg/l	U	(13) 0.43	(13) 0.76	(13) 0.38	(13) 0.76
Volume	Vol	1	ml	U	380	420	220	280

Concept Reference: 708572
Customer Reference: P3334

Tube (Charcoal 226-09) Analysed as Tube (Charcoal 226-09)
VOC (Total)

				Concept Reference	708572 011	708572 012	708572 013	708572 014	708572 015
				Customer Sample Reference	ECL/18/0080	ECL/18/0081	ECL/18/0082	ECL/18/0083	ECL/18/0084
				Test Sample	AR	AR	AR	AR	AR
				Date Sampled	10-JAN-2018	10-JAN-2018	10-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Volatile Organic Compounds (Total)	GC/MS	1	µg	N	59	15	<1	3	<1

Concept Reference: 708572
Customer Reference: P3334

Tube (Tenax/Carbon/Molecular Sieve) Analysed as Tube (Tenax/Carbon/Molecular Sieve)

Trace Landfill Gas Suite

				Concept Reference	708572 018	708572 021	708572 022
				Customer Sample Reference	ECL/18/0088	ECL/18/0089	ECL/18/0090
				Test Sample	AR	AR	AR
				Date Sampled	11-JAN-2018	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**			
1 Pentene	GC/MS (TD SIR)	10	ng	U	(68) 48	(68) 30	(68) 23
1,1-Dichloroethane	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
1,1-Dichloroethylene	GC/MS (TD SIR)	10	ng	U	280	240	<10
1,2-Dichloroethane	GC/MS (TD SIR)	10	ng	N	(175) 1800	<10	<10
1,2-Dichloroethylene	GC/MS (TD SIR)	30	ng	U	<30	<30	300
1,3-Butadiene	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) 82
1,4 epoxy 1,3-butadiene	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
1-Propanethiol	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
2-butoxyethanol	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Benzene	GC/MS (TD SIR)	10	ng	U	(175) 5900	(175) 2100	<10
Butyric acid	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Carbon disulphide	GC/MS (TD SIR)	10	ng	N	440	<10	<10
Carbon tetrachloride	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
Chloroethane	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
Dichloromethane	GC/MS (TD SIR)	10	ng	N	(175) 6300	<10	<10
Dimethyl disulphide	GC/MS (TD SIR)	10	ng	N	320	<10	<10
Dimethyl sulphide	GC/MS (TD SIR)	10	ng	U	750	12	21
Ethyl butyrate	GC/MS (TD SIR)	25	ng	N	<25	<25	<25
Ethyl Mercaptan	GC/MS (TD SIR)	10	ng	N	<10	<10	<10
Hydrogen sulphide	GC/MS (TD SIR)	60	ng	N	<60	<60	<60
Methyl Mercaptan	GC/MS (TD SIR)	30	ng	N	<30	<30	<30
N-Butyl Mercaptan	GC/MS (TD SIR)	10	ng	U	<10	<10	<10
Styrene	GC/MS (TD SIR)	10	ng	N	280	<10	<10
Toluene	GC/MS (TD SIR)	10	ng	N	(27) 12000	31	<10
Trichloroethylene	GC/MS (TD SIR)	10	ng	U	730	250	<10
Vinyl chloride monomer	GC/MS (TD SIR)	10	ng	U	(68) <10	(68) <10	(68) <10

Concept Reference: 708572
Customer Reference: P3334

Tube (Charcoal) Analysed as Tube (Charcoal 226-01)

Siloxanes

				Concept Reference	708572 026	708572 028
				Customer Sample Reference	ECL/18/0093	ECL/18/0094
				Test Sample	AR	AR
				Date Sampled	11-JAN-2018	11-JAN-2018
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Decamethylcyclopentasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Decamethyltetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethylcyclotrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Hexamethyldisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethylcyclotetrasiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1
Octamethyltrisiloxane	GC/MS (Solvent Desorption)	1	µg	U	<1	<1

Index to symbols used in 708572-1

Value	Description
AR	As Received
27	Result should be considered as a minimum due to detector saturation.
13	Results have been blank corrected.
68	Outside scope of UKAS accreditation
175	Results should be viewed with caution due to being outside of the instrument calibration range
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

The results for 1 Pentene, 1,3-Butadiene & Vinyl Chloride Monomer are outside the scope of our UKAS accreditation as the standards expired on the 13/01/18.

UNCERTAINTY CALCULATIONS

Potters Waste		Installation Name	: Flare Stack
Permit No	: BU7766IC	Visit Details	: Annual Compliance
Variation No	: EPR/BU7766IC/V004	Survey Dates	: 10th & 11th January 2018
Report Ref	: P3334 : R002	Report Issue Date	: 31st January 2018

Volumetric Flowrate Uncertainty

Measurement Uncertainty Calculations - Velocity at Stack Conditions

Contribution From	**Standard u/c (Pa)**	
Pitot Calibration Uncertainty Contribution	0.06	A
Manometer Calibration Uncertainty Contribution	0.056833333	B
Variation in Actual Pitot reading at sample points	1.40	C
Combined u/c (Pa) =	**Combined u/c (Pa)**	
SQRT $(A/\sqrt{3})^2 + (B/\sqrt{3})^2 + (C/\sqrt{3})^2)$	0.81	
Expanded Uncertainty of Flow Measurements Pa	**1.62**	
	Standard u/c (K)	
Temperature Calibration (K)	5.98	D
Variation in Actual Temp reading at sample points	0.00	E
Combined u/c of Temp (K)	**Combined u/c (K)**	
SQRT $((D/\sqrt{3}^2) + (E/\sqrt{3})^2)$	3.45	
Expanded Uncertainty of Temp Measurements (K)	**6.91**	
Measured Average Velocity (m/s) at Stack Conds	8.71	
Maximum Average Velocity (m/s) at Stack Conds	9.33	
Standard Uncertainty Velocity at Stack Conditions (%)	7.19	
Expanded Uncertainty Velocity (at Stack Conditions)	**14.39**	**(%)**

Measurement Uncertainty Calculations - Flowrate at Stack Conditions

Contribution From	**Standard u/c (m^2)**	
Area (m2)	0.04155	
Measured Average Flowrate (m^3/s) at Stack Conds	36.17	
Maximum Average Flowrate (m^3/s) at Stack Conds	39.16	
Standard Uncertainty Flowrate (m^3/s) at Stack Conditions (%)	8.27	
Expanded Uncertainty Flowrate (m^3/s) at Stack Conditions	**16.53**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Wet Gas

Contribution From	**Standard u/c (%)**	
Temperature Calibration (K)	0.5	
Barometer Calibration	0.5	
Measured Average Flowrate (m^3/s) at STP Wet	7.99	
Maximum Average Flowrate (m^3/s) at STP Wet	8.66	
Standard Uncertainty Flowrate (m^3/s) at STP Wet	8.39	
Expanded Uncertainty Flowrate (m^3/s) at STP Wet	**16.78**	**(%)**

Measurement Uncertainty Calculations - Flowrate at STP & Dry Gas

Contribution From	**Standard u/c (%)**	
Moisture Uncertainty (% v/v)	0.33	
Measured Average Flowrate (m^3/s) at STP Dry	7.62	
Maximum Average Flowrate (m^3/s) at STP Dry	8.29	
Standard Uncertainty Flowrate (m^3/s) at STP Dry	8.76	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry	**17.53**	**(%)**

easurement Uncertainty Calculations - Flowrate at STP, Dry Gas & Ref Oxyge

Contribution From	**Standard u/c (%)**	
Oxygen Uncertainty (% v/v)	0.141	
Measured Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	4.91	
Maximum Average Flowrate (m^3/s) at STP Dry & Ref Oxygen	5.41	
Standard Uncertainty Flowrate (m^3/s) at STP Dry & Ref Oxygen	10.09	
Expanded Uncertainty Flowrate (m^3/s) at STP Dry & Ref O_2	**20.17**	**(%)**

Potters Waste		**Installation Name**	**: Flare Stack**
Permit No	**: BU7766IC**	**Visit Details**	**: Annual Compliance**
Variation No	**: EPR/BU7766IC/V004**	**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334 : R002**	**Report Issue Date**	**: 31st January 2018**

Combustion Gases Measurement Uncertainty

Uncertainty of Measurement Results - Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Minimum Certified Range (R_i) NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit[1]	u_{lof}	Rectangular	$\sqrt{3}$	0.40	0.40	0.13	0.60
Span drift[2]	$u_{\text{d,s}}$			0.27	0.29	0.029	0.24
Losses / leakage in the sample system[4]	u_{loss}			4.15	0.78	0.11	0.30
Temperature dependant span drift[5]	u_{t}			0.18	0.050	0.070	0.040

Notes:

For rectangular distributions, $u(x_i)=\dfrac{u\times R_i}{\sqrt{3}}$

For $u(x_i)=\Delta x_i\sqrt{\dfrac{(x_{i,\max}-x_{i,adj})^2+(x_{i,\min}-x_{i,adj})(x_{i,\max}-x_{i,adj})+(x_{i,\min}-x_{i,adj})^2}{3}}$, when $\left|(x_{i,\max}-x_{i,adj})\right|=\left|(x_{i,\min}-x_{i,adj})\right|$, then $u(x_i)=\dfrac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i)=\dfrac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma=\sqrt{\dfrac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}}$

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.29	0.22	0.019	0.069
Span drift	$u_{d,s}$			0.20	0.16	0.0041	0.028
Temperature dependant span drift	u_{t}			0.26	0.055	0.020	0.0092
Interferents	u_{i}			0.87	1.59	0.081	...

Uncertainty of Measurement Results - Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	NO 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Losses / leakage in the sample system	u_{loss}	11/01/18 13:54 - 14:53	3.24	0.38	0.011	0.026
Standard Error of Measured Value	u_{SE}	11/01/18 13:54 - 14:53	0.42	1.27	0.065	0.053

Effect on Uncertainty Caused by Oxygen $uCorr^{n}{}_{o_2}=\dfrac{20.9\%-O_{2,\,ref}}{(20.9\%-O_{2,\,measured})x(20.9\%-O_{2,\,measured})}\,x\,Uncertainty\ of\ O_2\ Measurement=$ 0.027

$$f_{o_2}=\frac{20.9\%-O_{2,\,ref}}{20.9\%-O_{2,\,measured}}= \quad 1.8127 \qquad uf_{o_2}=\frac{uCorr^{\,n}{}_{o_2}}{f_{o_2}}x100= \quad 1.46\ \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined}=\sqrt{\sum(uf_{o_2})^2+(Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore\ u(x_i)=C_i u_i$ where $C_i=\dfrac{\partial f}{\partial x_i}$

Uncertainty of Measurement Results - Calculations Part 3

Horiba PG 250 Uncertainty	Date & Time	NOx (as NO2) 0 - 125 mg/m^3	CO 0 - 95 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol
Measured Concentration	11/01/18 13:54 - 14:53	78.19	49.12	9.87	8.67
Expanded Uncertainty as Percentage of Measured Concentration		9%	9%	3%	3%

Combined Standard Uncertainty $u_c=\sqrt{u_{lof}^2+u_{d,s}^2+u_r^2+u_{loss}^2+u_t^2+u_i^2+u_{ref}^2+u_v^2+u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp}=2\times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of Moisture is taken as the standard error of the time averaged value used to correct to Dry Conditions
7 If no value for uncertainty is presented above, the uncertainty is considered to be > 100%

Combustion Gases Uncertainty of Measurements

Measurement Uncertainty Calculations Part 1

Horiba PG 250 Performance Characteristics	Standard Uncertainty (% of Range)	Distributiuon	Minimum Certified Range (R_i)										
			NO 0 - 125 mg/m^3	NO_2 mg/m^3	N_2O mg/m^3	SO_2 mg/m^3	CO 0 - 95 mg/m^3	HCl mg/m^3	NH_3 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol	H_2O %Vol	*TOC mgC/m^3
Lack of fit(1)	u_{lof}	Rectangular (Divisor = √3)	0.40				0.40			0.13	0.60		
Span drift(2)	$u_{d,s}$	Rectangular (Divisor = √3)	0.27				0.29			0.029	0.24		
Repeatability Standard Deviation (span)(3)	u_r	Normal (Divisor = 1)	0.58				1.16			0.42	0.20		
Losses / leakage in the sample system(4)	u_{loss}	Rectangular (Divisor = √3)	4.15				0.78			0.11	0.30		
Temperature dependant span drift(5)	u_t	Rectangular (Divisor = √3)	0.18				0.050			0.070	0.040		
Interferents(1)	u_i	Rectangular (Divisor = √3)	1.20				2.90			0.56	0.010		
Uncertainty of Reference Gas(6)	u_{ref}	Rectangular (Divisor = √3)	9.12				4.38			0.15	0.31		
Effect of Voltage Fluctuation(7)	u_v	Rectangular (Divisor = √3)	...				...			...	...		
Effect of Sample Gas Flow/ Pressure(7)	u_{sg}	Rectangular (Divisor = √3)	...				...			...	...		

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m^3 / %Vol inc additional uncertainty of 2% for gas blending
7 Data not available so not included

Measurement Uncertainty Calculations Part 2

Horiba PG 250 Performance Characteristics	Uncertainty	Value of Standard Uncertainty	NO 0 - 125 mg/m^3	NO_2 mg/m^3	N_2O mg/m^3	SO_2 0 - 460 mg/m^3	CO 0 - 95 mg/m^3	HCl mg/m^3	NH_3 mg/m^3	O_2 0 - 25 %Vol	CO_2 0 - 20 %Vol	H_2O %Vol	*TOC mgC/m^3
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.29				0.22			0.019	0.07		
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.20				0.16			0.0041	0.0280		
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	0.58				1.16			0.42	0.20		
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	3.00				0.43			0.016	0.03		
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max} - x_{adj})^2 + (x_{i,min} - x_{adj})(x_{i,max} - x_{adj}) + (x_{i,min} - x_{adj})^2}{3}}$	0.13				0.027			0.010	0.005		
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.87				1.59			0.081	0.01		
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	5.26				2.53			0.086	0.18		
Effect of Voltage Fluctuation(7)	u_v	$u(x_i) = \frac{u_v \times R_i}{\sqrt{3}} =$	...				...			...	...		
Effect of Sample Gas Flow/ Pressure(7)	u_{sg}	$u(x_i) = \frac{u_{syn} \times R_i}{\sqrt{3}} =$	...				...			...	...		
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	6.16				3.24			0.44	0.28		
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	12.31				6.49			0.87	0.56		
Applied Span Concentration			526.44				252.75			14.84	17.73		
Measured Span Concentration, STP Dry Gas			520.59				252.50			14.79	17.70		
Expanded measurement uncertainty as % of Applied Span			2%				3%			6%	3%		

TVOCs Measurement Uncertainty

Flare - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m³
Lack of fit[(1)]	u_{lof}	Rectangular (Divisor = √3)	0.73
Span drift[(2)]	$u_{d,s}$	Rectangular (Divisor = √3)	0.35
Repeatability Standard Deviation (span)[(3)]	u_r	Normal (Divisor = 1)	5.50
Losses / leakage in the sample system[(4)]	u_{loss}	Rectangular (Divisor = √3)	0.29
Temperature dependant span drift[(5)]	u_t	Rectangular (Divisor = √3)	0.30
Interferents[(1)]	u_i	Rectangular (Divisor = √3)	4.39
Uncertainty of Reference Gas[(6)]	u_{ref}	Rectangular (Divisor = √3)	0.83
Effect of Voltage Fluctuation[(7)]	u_v	Rectangular (Divisor = √3)	1.80
Effect of Oxygen Synergism[(7)]	u_{syn}	Rectangular (Divisor = √3)	4.60

Note:

$$when \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then \; u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the certified range
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³ / %Vol taking account of an additional uncertainty of 2% for gas blending
7 Expressed as a percentage of the certified range

Flare - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	*TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.064
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.031
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	0.82
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	0.025
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max} - x_{adj})^2 + (x_{i,min} - x_{adj})(x_{i,max} - x_{adj}) + (x_{i,min} - x_{adj})^2}{3}}$	0.026
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.38
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	0.48
Effect of Voltage Fluctuation	u_v	$u(x_i) = \frac{u_v \times R_i}{\sqrt{3}} =$	0.16
Effect of Oxygen Synergism	u_{syn}	$u(x_i) = \frac{u_{syn} \times R_i}{\sqrt{3}} =$	0.40
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	1.12
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	2.23
Applied Span Concentration			48.07
Measured Span Concentration, STP Dry Gas			48.19
Expanded measurement uncertainty as % of Applied Span			5 %

* **Signal 3030 FID**

TVOCs Uncertainty of Measurements

Flare - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range	
				O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	0.13	0.73
Span drift(2)	$u_{\text{d,s}}$			0.029	0.35
Losses / leakage in the sample system(4)	u_{loss}			1.00	0.15
Temperature dependant span drift(5)	u_{t}			0.070	0.30
Interferents(1)	u_{i}			0.56	4.39
Effect of Voltage Fluctuation(7)	u_{v}			...	1.80
Effect of Oxygen Synergism(7)	u_{syn}			...	

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.019	0.064
Span drift	$u_{d,s}$			0.0041	0.031
Temperature dependant span drift	u_t			0.020	0.052
Interferents	u_i			0.081	0.38
Effect of Voltage Fluctuation (See Note)	u_v			...	0.16

Flare - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	O_2 0 - 25 %Vol	TVOC 0 - 15 mgC/m^3
Losses / leakage in the sample system	u_{loss}	11/01/18 13:38 - 14:37	0.096	0.0066
Standard Error of Measured Value	u_{SE}	11/01/18 13:38 - 14:37	0.068	0.21

Effect on Uncertainty Caused by Oxygen

$$uCorr^n_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})x(20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

0.03

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.5792$$

$$uf_{O_2} = \frac{uCorr^n_{O_2}}{f_{O_2}} x100 = \quad 1.59 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

Flare - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	O_2 0 - 25 %Vol	*TVOC 0 - 15 mgC/m^3
Measured Concentration	11/01/18 13:38 - 14:37	9.57	4.46
Expanded Uncertainty as Percentage of Measured Concentration		3 %	20 %

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the certified range
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Potters Waste		**Installation Name**	**: Flare Stack**
Permit No	**: BU7766IC**	**Visit Details**	**: Annual Compliance**
Variation No	**: EPR/BU7766IC/V004**	**Survey Dates**	**: 10th & 11th January 2018**
Report Ref	**: P3334 : R002**	**Report Issue Date**	**: 31st January 2018**

SO2 Uncertainty

Site: Brynposteg
Location: Flare

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert (%) K = 2 Filter mg	LAB Method Uncert (%) K = 2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
				One				
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
Sulphur Dioxide	...	0.40	0.40	...	0.0524	...	0.0262	0.0262
...	...	...	...	...	...	...	...	...
				...				
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...

	One		Standard Uncertainty @ 95%			
Sampled Volume (V_m)	0.24	m^3	uV_m	0.001	m^3	
Meter Correction Factor (Yd)	0.97	...		...	...	
Meter Temperature (T_m)	281.00	k	uT_m	1.5	k	
Average Differential Pressure (ΔH)	3.00	mmH_2O	uΔH	0.25	mmH_2O	
Barometric Pressure (ρ_b)	735.06	mmHg	$u\rho_b$	3.8	mmHg	
ΔH + ρs (ρ_m)	98.03	kPa		...	...	
Oxygen content ($O_{2,m}$)	9.40	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.0639		% by volume
Moisture Content (H_2O)	7.55	% by volume	uH_2O	0.66		% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. $i = uV_m$, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

One:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured ΔH uncertainty component (uΔH), measured stack pressure uncertainty component (up_s) & measured temperature of dry gas uncertainty component ($uT_{m\,Dry}$)

One:

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = \quad 0.916$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.92	0.92	0.0000916	0.0000229
$u\rho_b$	0.92	0.91	0.00125	0.00467
uT_m	0.92	0.91	0.00326	0.00489
H_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00621$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uV_{std}) & volume uncertainty component (uV_m)

One:

$$V_{std} = V_{measured} \times f_s = \quad 0.223$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	0.22	0.22	0.24	0.00151
Effect of uV_m	0.22	0.22	0.92	0.000916

Combined Standard Uncertainty

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000916$$

Uncertainty of Oxygen Correction Factor (%):-

One:

$$f_{o_2} = \frac{20.9\% - O_{2,\,ref}}{20.9\% - O_{2,\,measured}} = \quad 1.56$$

$$uCorr^{n}_{o_2} = \frac{20.9\% - O_{2,\,ref}}{(20.9\% - O_{2,\,measured})x(20.9\% - O_{2,\,measured})} x\,Uncertainty\ of\ O_2\ Measurement = \quad 0.0244$$

$$uf_{o_2} = \frac{uCorr^{n}_{o_2}}{f_{o_2}} x100 = \quad 1.57\ \%$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM)

Determinand	One:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uM mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	3.00	2.63	6.99	0.18
...	...	...	...	...

Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

Determinand	One:
	uL mg/Nm^3
...	...
...	...
Sulphur Dioxide	0.0325
...	...

Uncertainty in final measurement @ Reference Conditions due to uVstp

Determinand	One:			
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	uVstp mg/Nm^3
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	2.83	2.81	12.65	0.0116
...	...	...	...	...

Combined Uncertainty excluding oxygen contribution

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Determinand	One:			
	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
...	...	...	...	...
...	...	...	...	...
Sulphur Dioxide	0.19	0.37	2.82	13.23
...	...	...	...	...

Combined Uncertainty including oxygen contribution

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrn Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (Ucombined)
...	...	...	...
...	...	...	...
Sulphur Dioxide	13.23	1.57	13.32
...	...	...	...

Potters Waste		**Installation Name**	**: Flare Stack**
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Non-methane VOCs Uncertainty

Site: Potters Waste, Brynposteg
Location: Landfill, Stack ID:Flare

				Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.05856	m^3	uV_m	0.000	m^3
Meter Correction Factor or ml/count	Yd	0.9746	...	...	...	...
Meter Temperature	T_m	286.25	k	uT_m	1.5	k
Barometric Pressure	ρ_b	980.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	9.82	%Vol	$uO_{2,m}$	0.59	%Vol
Moisture	H_2O	9.20	%Vol	uH_2O	1.66	%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Flare	3.00	µg	uM	0.30	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standa and i is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data fro meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.92$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.48	0.47	0.000482	0.00482
uT_m	0.93	0.92	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00626$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.0527$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.0530	0.0523	0.0571	0.000357
Effect of uV_m	0.0527	0.0526	0.90	8.992E-06

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00300$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm^3	Condensate uL mg/Nm^3
Flare	0.000658	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC	0.0598	0.0541	18.99	0.00285
Condensate Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Non Methane VOC	0.0604	0.0539	1.09	0.00326

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
Non Methane VOC	0.00438	0.0088	0.0921	9.52

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