

SUPPLEMENT 1: GasSim2 Release Version 2.00.0054

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1. REVISIONS TO GASSIM2

This supplement to the GasSim2 manual covers revisions to the model in release version 2.00.0054. The previous released version number was 2.00.0052. Version 2.00.0053 was an internal test version trialled before releasing this latest version. These revisions are small in number. They are associated with minor bug fixes, information on error trapping, and improvements to the functionality of the model in response to users' requests.

Bug Fixes

- Cap and liner hydraulic conductivities now remain displayed as hydraulic conductivities and not as gas dispersivities. Gas dispersivity is used within the model, and in the previous version, dispersivities were subsequently displayed. Any calculations made with previous versions should not be unduly affected;
- The justifications table column 3 is now fully editable;
- Bulk gas concentrations are presented in the Gas Plant screen as percent v/v and not as a proportion of total LFG where total LFG = 1.0;
- Bulk gas destruction efficiencies are now set at 99% in the Gas Plant screen;
- A bug which deselected all trace gases when the user reset to the default trace gas database has been fixed;
- A bug associated with the adding of a new trace gas species has been fixed;
- The Tier 1 screening printout now shows the correct headings and prints correctly; and
- The Export Results CSV file in the atmospheric dispersion model is now laid out with the x-co-ordinate, y-co-ordinate and z-value correctly labelled.

Error Trapping

The following information is provided to help users when developing GasSim2 models.

- The number of vertices for the waste cell boundaries is now limited to no more than 20 vertices. This is in order to stop the air dispersion module crashing due to too many vertices being represented in the surface emission area sources;
- Cell boundaries need to be within 10m of the landfill boundary or adjacent cell boundaries for GasSim to correctly apportion lateral and surface emissions. GasSim uses the proximity of different cell boundary types to decide whether a cell face is adjacent to the lateral liner (lateral emissions), another waste-filled cell (no emissions), or the open face of an as yet unfilled quarry (surface emissions). This value is a compromise between absolute accuracy on the plan and the ability of users to draw the cells and boundaries on the dxf plan; and
- Base plans (dxf files) should be simplified as much as possible (the level of detail in the Greendale example is considered appropriate) and the dxf file dimensions should be specified in metric (SI) units.

Improvements to the Program Functionality

Landfill Design

- Landfill boundaries (e.g. the waste boundary and the site ownership boundary) can now be colour coded.

Trace Gas Database

- The trace gas database is cell specific. This means that users can represent a different trace gas composition in each cell that is created, should that level of detail be available. This functionality is intended to enable, for example, a different H₂S concentration to be represented in individual cells, reflecting the co-disposal of sulphate waste with household waste in a particular cell, and allowing this approach as an alternative to using the H₂SSim routine which is selected on the Project Details menu.
- Previously, the cell specific trace gas database was accessed from the waste input screen for each cell. By default, the trace gas label on the pull down menu would take the user to the first cell created in the model. This functionality has now been improved. Users can access the trace gas database for each cell by using the pull down menu as well as via the waste input screen for each cell. This is illustrated in Figure 1.

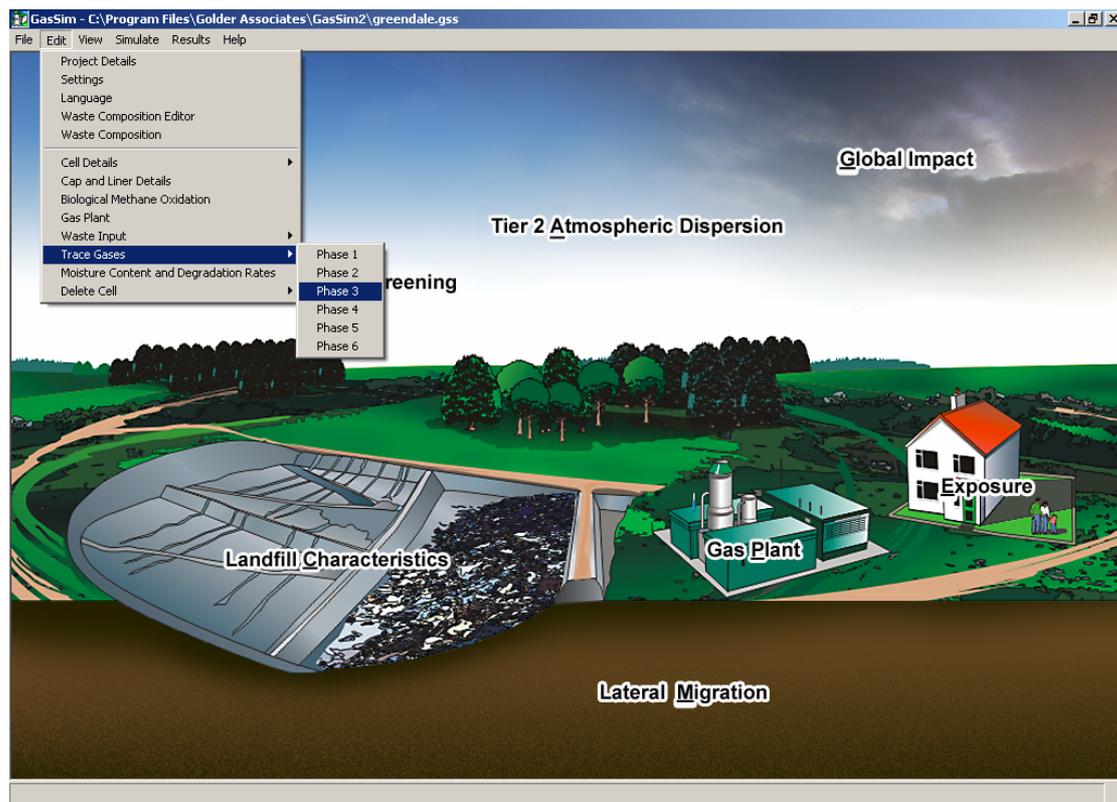


Figure 1: Accessing the Trace Gas Database from the Pull Down Menu

Atmospheric Dispersion

- A new Receptor Concentrations results table for atmospheric dispersion results now clarifies the reporting of the highest values in the modelled domain. These values are now reported with the averaging period for the relevant air quality standards, the percentile which applies to this standard, the receptor code, x-coordinate and y-co-ordinate, and the relevant Process Contribution and Predicted Environmental Concentration (see Figure 2 below).

Receptor Concentrations
 Pollutant: Nitrogen oxides. All concentration values in the table in µg/m³.

Highest values in modelled domain

	Averaging Period	Air Quality Standard	Percentile	Receptor	x coordinate [m]	y coordinate [m]	Process Contribution (PC)	Predicted Environmental Concentration (PEC)
Annual Objective	1 year	40 µg/m³	100	BR001	754649	415908	3.56	23.56
Hourly Objective	1 hour	200 µg/m³, 18 exceedances	99.79	BR001	754881	415918	79.90	119.90

Discrete Receptor	x coordinate [m]	y coordinate [m]	PC Annual Mean	PC Worst Hour	PC 19thWorst Hour	PEC Annual Mean	PEC Worst Hour	PEC 19thWorst
DR001	754520	415718	1.30	27.77	20.04	21.30	67.77	60.04
DR002	754127	416540	0.16	16.95	6.01	20.16	56.95	46.01
DR003	753921	416134	0.18	13.85	6.60	20.18	53.85	46.60
DR004	755222	415766	1.22	30.05	24.73	21.22	70.05	64.73

Boundary Receptor	x coordinate [m]	y coordinate [m]	PC Annual Mean	PC Worst Hour	PC 19thWorst Hour	PEC Annual Mean	PEC Worst Hour	PEC 19thWorst
BR001	754566	416269	0.35	18.33	8.08	20.35	58.33	48.08
BR001	754601	416233	0.41	17.63	8.84	20.41	57.63	48.84
BR001	754637	416198	0.50	15.32	8.37	20.50	55.32	48.37
BR001	754675	416166	0.64	12.14	7.11	20.64	52.14	47.11
BR001	754713	416133	0.88	11.94	6.24	20.88	51.94	46.24
BR001	754752	416104	1.33	11.31	9.78	21.33	51.31	49.78
BR001	754785	416067	2.00	36.76	35.78	22.00	76.76	75.78
BR001	754823	416034	0.91	65.45	32.44	20.91	105.45	72.44
BR001	754858	415999	3.01	73.65	44.57	23.01	113.65	84.57
BR001	754889	415960	2.95	118.50	61.81	22.95	158.50	101.81
BR001	754881	415918	2.53	101.91	79.90	22.53	141.91	119.90
BR001	754855	415875	2.25	88.47	51.45	22.25	128.47	91.45
BR001	754830	415832	2.13	68.34	37.20	22.13	108.34	77.20
BR001	754806	415788	1.87	54.76	30.22	21.87	94.76	70.22

Note: to view all grid receptors, use the export facility

Passed Relevant EQS or EAL
 Failed Relevant EQS or EAL
 No Relevant EQS or EAL

Done

Figure 2: Receptor Concentrations Table within the Atmospheric Dispersion Module

- The atmospheric dispersion results map now shows colour coding on the receptor grids for passes and failures. This colour coding (red = fail, green = pass) is set in relation to the long term Air Quality Standard for the substance which was selected on the Simulation Parameters screen immediately before running the atmospheric dispersion model.
- The model will have to be re-run if different substances are to be examined on the receptor grid.