**How to use the SCAIL Combustion screening tool for medium combustion plant that is also a specified generator or Part B activity**

To use the SCAIL Combustion screening tool, you need specialist knowledge of air quality assessment and dispersion modelling so you may need to use a consultant to complete this for you.

[You can [find a consultant in ENDS Directory](https://www.endsdirectory.com/).](https://www.endsdirectory.com/)

This guidance explains how to use the tool for Medium Combustion Plant (MCP), Specified Generator (SG) and Part B bespoke permit screening. There is also a general SCAIL Combustion user guide available on the CEH website.

**Run mode**

SCAIL Combustion has three run modes:

* Hybrid Mode – calculates the highest impact from nine receptor points over an 80 degree arc centred on the selected receptor
* Conservative Mode – assumes the selected receptor is in the prevailing wind direction
* Realistic Mode – uses the actual position of each selected receptor to make predictions

You should only use ‘Hybrid Mode’ for MCP bespoke permit screening in support of permit applications to Natural Resources Wales.

The SCAIL Combustion screening tool will automatically search and identify protected habitat sites within the specified search radius. The nearest point of the protected habitat site to the MCP is selected as the receptor location.

The SCAIL Combustion screening tool automatically suggests the ‘Search Radius’ once you have selected ‘Plant Capacity’ and ‘Sulphurous’ or ‘non-Sulphurous’ fuel. Do not use the suggested values. You will need to manually enter the appropriate minimum screening distance relevant to your MCP from the table below (in metres).

|  |  |  |  |
| --- | --- | --- | --- |
| **Fuel type used** | **Rated thermal input (MWth) of any MCP** | **Minimum distance from MCP to a Site of Special Scientific Interest (SSSI) or marine conservation zone (metres)** | **Minimum distance from MCP to a Special Conservation Area (SAC), Special Protection Area (SPA) or Ramsar wetland (metres)** |
| **Natural gas, gas oil and woody solid biomass** | 1 to 2 | 750 | 750 |
| **Natural gas, gas oil and woody solid biomass** | 2 to 5 | 1,000 | 1,000 |
| **Natural gas, gas oil and woody solid biomass** | 5 to 10 | 1,500 | 1,500 |
| **Natural gas, gas oil and woody solid biomass** | 10 to 20 | 2,000 | 2,500 |
| **Natural gas, gas oil and woody solid biomass** | 20 to 50 | 2,000 | 5,000 |
| **Gas other than natural gas** | 1 to 2 | 1,000 | 1,000 |
| **Gas other than natural gas** | 2 to 5 | 1,500 | 1,500 |
| **Gas other than natural gas** | 5 to 10 | 2,000 | 4,000 |
| **Gas other than natural gas** | 10 to 20 | 2,000 | 5,000 |
| **Gas other than natural gas** | 20 to 50 | 2,000 | 10,000 |
| **Solid and liquid heavy fuel oil** | 1 to 2 | 2,000 | 2,000 |
| **Solid and liquid heavy fuel oil** | 2 to 5 | 2,000 | 4,000 |
| **Solid and liquid heavy fuel oil** | 5 to 10 | 2,000 | 8,000 |
| **Solid and liquid heavy fuel oil** | 10 to 50 | 2,000 | 10,000 |

If your MCP is also a Specified Generator you will need to manually input human receptor locations into the SCAIL Combustion screening tool.

**Emission parameters**

To run the SCAIL Combustion screening tool you need the:

* MCP stack location
* stack height
* stack exit diameter
* stack exit temperature
* stack exit velocity
* pollutant emission rates
* operating hours

You also need to select whether your MCP is a new or existing MCP:

* new – if it’s put into operation on or after 20 December 2018
* existing – if it’s put into operation before 20 December 2018

**MCP stack location**

The SCAIL Combustion screening tool has two location fields; ‘Installation Location’ and ‘Stack Grid Reference’. You will need to enter the National Grid Reference (NGR) of the MCP in the ‘Installation Location’ field. If you have multiple MCPs then use a National Grid Reference that is located approximately at a centre point of all sources. For each individual stack enter the National Grid Reference in the ‘Stack Grid Reference’ field.

‘Installation Location’ is the location used to search for SACs, SPAs and SSSIs within a specified search radius in the ‘Designated Site details’ section of the tool. Where a large installation has several sources distributed across the site, the Installation Location coordinates used should ensure that all SACs, SPAs and SSSIs within the screening distance from all sources are included. This may require increasing the Search Radius.

The SCAIL Combustion screening tool allows for multiple MCP (sources) to be entered, but it is not suitable for those which are not close together. Where sources are a significant distance apart, one alternative approach is to model them separately and sum the results for each receptor location. If you are unsure on the approach to take, please contact NRW for further guidance (link to email address).

**Stack height and how to treat buildings**

You should measure stack height from the ground. The SCAIL Combustion screening tool does not model the effect of buildings on stack emissions. You may need to calculate a lower effective height of release instead of using the actual stack height.

You should use an effective height of release instead of the actual stack height in the SCAIL Combustion screening tool where the actual stack height is less than 2.5 times the height of nearby buildings that are within a distance that’s five times ‘L’.

‘L’ is the lowest of either:

* the height of the building
* the greatest width between two points at the same height of the building (for example between two opposing corners of a roof)

You can follow these steps to estimate the effective height of release to use in the SCAIL Combustion screening tool:

1. Take the actual stack height in metres.
2. Take the height of the nearest large building structure to the stack in metres.
3. Subtract the height of the building from the actual stack height to get the clearance.
4. If the clearance from step 3 is less than or equal to one metre, the effective height of release is 1.66 metres.
5. If the clearance from step 3 is greater than one, multiply the clearance by 1.66 to get the effective height of release in metres.

**Stack exit diameter and velocity**

For vertical non-capped stacks you do not need to alter the diameter and velocity from the actual values.

You should avoid non-vertical or impeded/capped stacks. If your MCP has horizontal or impeded/capped stacks you need to artificially reduce the exit velocity input into SCAIL to 0.01 m/s.

You also need to estimate an equivalent stack diameter using the following formula:

$$D\_{effective} = \sqrt{V\_{actual} ×D\_{Actual}^{2}×100}$$

Where

$D\_{effective}$ = Effective stack diameter

$V\_{actual}$ = Original unimpeded exit velocity

$D\_{actual}$ = Original unmodified stack diameter

**Emission rates**

You should calculate the emission rates from the emission limit values (ELVs) relevant to your MCP. The ELVs are set at reference conditions. You need to make sure your emission rates are derived from volumetric flow rates normalised to the same reference conditions. To do this you will need the actual:

* temperature
* oxygen content percentage
* moisture content percentage

Once the ELV and normalised volumetric flow rate are at the same reference conditions you can calculate the emission rate in grams per second. You will need to multiply the ELV in milligrams per cubic metre by the normalised volumetric flow rate in cubic metres per second and divide by 1,000.

**Operating hours**

The SCAIL Combustion screening tool can scale long-term predictions by the number of operating hours in a year.

For continuous MCP emissions you should set this to 8,760 hours.

For discontinuous, intermittent MCPs you can set the operating hours to the maximum number of hours needed for all operational scenarios.

**Assessing the results of the SCAIL Combustion screening tool**

The SCAIL Combustion screening tool will calculate the process contribution (PC) and the predicted environmental concentration (PEC) of annual NOx, annual SO2, nutrient nitrogen deposition and acid deposition at identified protected habitat sites, as a percentage of the relevant standard.

The SCAIL Combustion screening tool will also calculate the PC and PEC of long and short-term  NO2, SO2 and PM10 at defined human receptor locations sites, as a percentage of the relevant standards. The short-term NO2, SO2 and PM10 PCs are calculated and presented based on the relevant percentiles.

The SCAIL Combustion screening tool will ‘screen out’ your MCP where all the following criteria are met:

* For impact at habitat sites within the minimum screening distance and for annual NOₓ, annual SO₂, nutrient nitrogen deposition and acid deposition, either:
	+ the PC as a percentage of the relevant standard is less than 1%, or
	+ the PC as a percentage of the relevant standard is greater than 1%, but the PEC is less than 70% of the relevant standard.
* For long-term (annual NO2, annual SO2 and annual PM10) impact at human receptors, either:
	+ the PC as a percentage of the relevant standard is less than 1%, or
	+ the PC as a percentage of the relevant standard is greater than 1%, but the PEC is less than 70% of the relevant standard.
* For short-term (hourly NO2, 15-minute SO2, hourly SO2, daily SO2 and daily PM10) impact at human receptors:
	+ the PC as a percentage of the relevant standard is less 10%

**MCP/SGs that ‘screen out’ using the SCAIL Combustion screening tool**

If your MCP ‘screens out’ both; protected habitat sites and human receptors, it is considered low risk and you do not need to carry out an air quality modelling assessment to support your application. You can apply now using the MCP/SG/Part B application form (link to standalone MCP/SG/Part B application form).

**MCP/SGs that ‘screen in’ using the SCAIL Combustion screening tool**

If your MCP ‘screens in’ either human receptors or protected habitat sites, it is considered high risk and you will need to carry out a site-specific air quality modelling assessment that assesses the risks to human health and the protected habitats close to your MCP and submit that with your permit application.

You must also provide information on any actions you are taking to reduce air emissions impacts to prevent harm to all receptors that ‘screen in’.

Air quality modelling assessments requires specialist knowledge so you will need to use an environmental consultant to do this for you. This may take a few weeks to complete, so you may wish to do that before making your application.

You can find a consultant in ENDS Directory. They will charge for their services.

Please contact Natural Resources Wales if you want to do your own detailed modelling.

You will need to use the MCP/SG/Part B application form (link to standalone MCP/SG/Part B application form) to apply for your permit.

## How to present your SCAIL Combustion screening tool results with your application

### For MCPs that have screened out using the SCAIL Combustion screening tool, you will need to complete the SCAIL results template and submit that with your application. The information required in the SCAIL results template is listed below:

* Process Contribution (PC)
* Background concentration or deposition rate
* Predicted Environmental Concentration (PEC)
* Critical levels for NOₓ and SO₂ (for habitat sites)
* Critical loads for nutrient nitrogen and acid deposition (for habitat sites)
* PC as a percentage of the relevant standard
* PEC as a percentage of the relevant standard
* Whether the result screens in or out

The SCAIL Combustion screening tool provides a saveable results file in comma-separated values (CSV) format which contains most of this required information. You will need to extract this data along with the provided values that show the percentage of relevant standards and input this into the SCAIL results template.

You will also need to provide the following information for each MCP within the SCAIL results template.

* rated thermal input in megawatts
* grid references (Installation Location and Stack Grid Reference(s))
* actual exit diameter
* actual stack height
* actual exit temperature
* actual exit velocity
* pollutant emission rates
* ELVs
* volumetric flow rate normalised to the ELV reference conditions
* actual oxygen content
* actual moisture content
* how the MCP operates and their maximum operating hours
* location, height and other dimensions of nearby building structures

### For MCPs that have screened in using the SCAIL Combustion screening tool, [the Environmental permitting: air dispersion modelling reports](https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports) guidance should be followed to carry out the air quality modelling assessment and explains what information you need to provide in your report.