H1 Software Tool User Guide
Version 8.0

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Executive summary

When compiling permit application under the Environmental Permitting Regulations in England and Wales, and the Pollution Prevention and Control Regulations in Scotland and Northern Ireland, operators are required to undertake a series of risk assessments to reveal the intended impact of their releases upon the local environment. Guidance to help operators complete this task is available in a series of web pages listed on the appropriate Government's website. This guidance is part of the horizontal guidance series known as 'H1'. The current software tool, based upon the Microsoft Excel format, helps operators identify which of their releases to air, water or land present an insignificant environmental impact, thereby enabling a focus on the more harmful releases from their activity. It replaces and supersedes the previous Microsoft Access version of the H1 tool.

It should be recognised that risk assessments relating to groundwater, landfilling activities and critical loads are not included in the software tool.

H1 Software Tool User Guide

1. Introduction

This document is provided to help users of the H1 Software Tool, Version 8.0. It reflects the latest updates to the software tool which includes modifications necessary to enable the tool to work in Microsoft Excel.

The H1 tool enables calculation of the impact of proposed substance releases to various media. It screens out from detailed assessment those releases described as ‘insignificant’ emissions to air or deposition onto land, and for discharges to water or to sewer of effluent streams containing substances which are not 'liable to cause pollution'.

However, for releases to air the calculation of the predicted ground level concentration is pessimistic and should not be used to determine a stack height to produce an insignificant environmental impact. Detailed modelling should be employed for this purpose. Before use, the tool should be downloaded to the user’s computer hard drive, unzipped, saved and then opened using Microsoft Excel. The tool contains a series of macros which must be enabled before use by clicking the “Enable Macros” button at the top of the screen.

1.1. Screening

Screening criteria are provided for short term and long-term releases for air and water. These are set at a small percentage of the relevant environmental benchmark such that, even in cases where the existing environmental concentration of a substance already exceeds the relevant benchmark, any additional small contribution from the process is unlikely to have a significant effect. Note that if an emission is not screened out using this test, it does not necessarily follow that it will have a significant effect, or that it will result in an adverse environmental impact.

Such a judgement can only be made by consideration of the total concentration of a substance (ie including the existing background contribution from other sources) in relation to an environmental benchmark, and is carried out as a subsequent step of this methodology. For many well-managed industrial processes, the contribution from the installation is often an order of magnitude below benchmarks established for the protection of the environment.

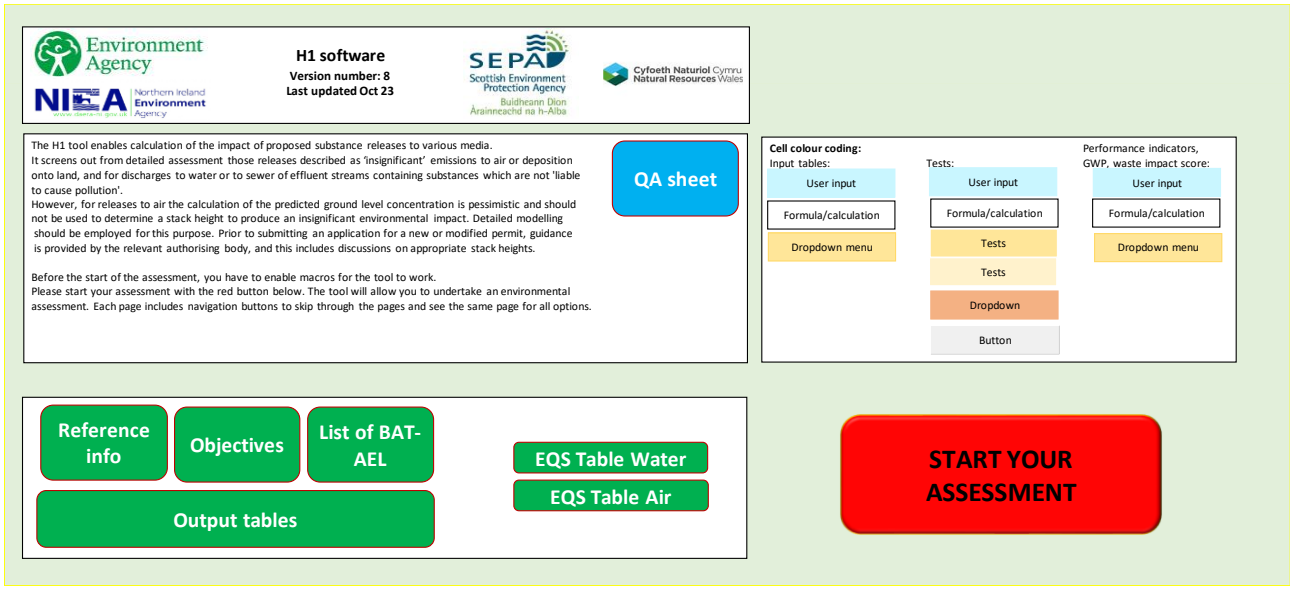
It should also be noted that the method for estimating process contributions adopts a precautionary approach, in that the assumption of worst-case conditions throughout tends to result in process contributions that are an overestimate of the actual contributions. Note that a substance could exceed the screening criterion for one medium but not for another or exceed the screening criterion with respect to long term effects but not short term, and vice versa. Releases that fall below the screening threshold do not require any further impact assessment within this methodology. However, the Operator should still have regard to Best Available Techniques (BAT) for the prevention or control of all emissions and ensure that techniques are employed where costs are reasonable to do so.

2. Using the tool

Guidance on using the tool is available at the following locations:

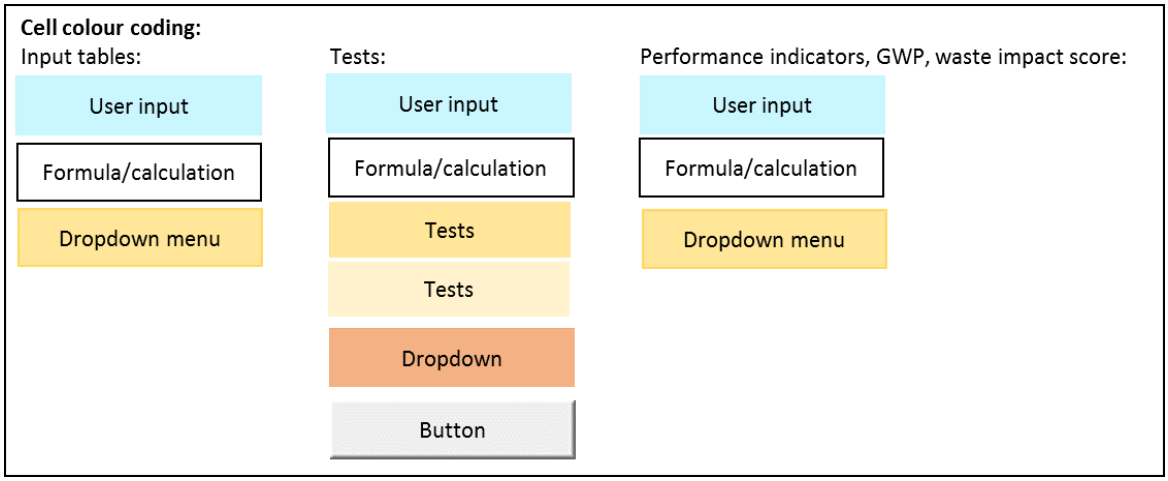
1. General instructions on the opening page
2. Instructions and hyperlinks on each page of the tool,
3. Within this user guide, and
4. By contacting the relevant environment agency (EA, SEPA, NRW and NIEA).

On opening the tool, the front screen below appears. In normal use, the user needs to save the file (and therefore the data entries). Should further scenarios require assessment the user is recommended to make copies of the tool before entering any data.



This first page includes the following:

- General instructions
- Cell colour coding key:



- Links (in red above) to:
  - Reference information: This is also accessible when you start the assessment. That page contains the information on your installation, including its industrial sector.
  - Objectives: This is also accessible when you start your assessment. The objectives page defines the assessment (more information below).
  - List of Best Available Techniques Associated Emission Levels (BAT-AELs).
  - Output tables: Note that these will not be populated until the assessment data is entered in the tool.
  - Raw data (Water and air): This contains reference data on the available pollutants for air and water, including the thresholds for the tests performed by the tool and other information.
  - Addition of pollutants (air and water): The link redirects users to a section of the table with raw data where they can add new pollutants with their reference values and thresholds.

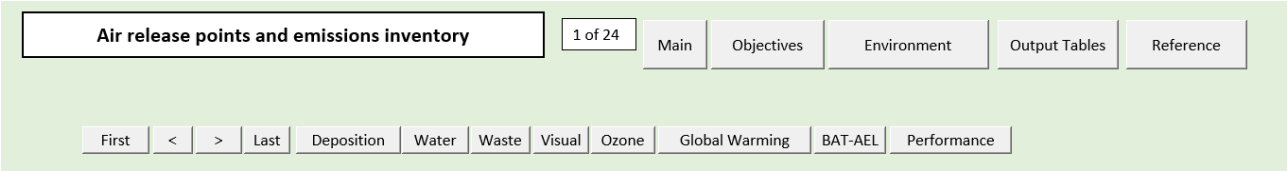
The following links: EA[1], SEPA, NRW, NIEA[2] take the user to the page where any updates may be found and /or access or links to the H1 Software Tool are given. For each application, these websites should be checked to ensure the latest version number of the Tool is used.

2.1 General navigation

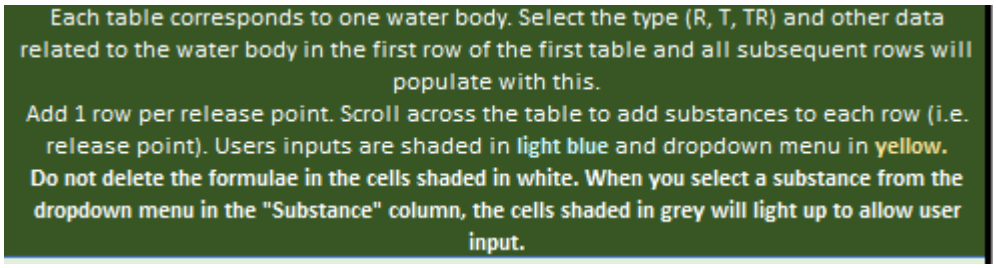
The tool consists of various groups of pages:

- **Facility reference information:** Information about the facility.
- **Objectives:** Definition of assessment. The user can select their environmental assessment or clear the assessment and start again.
- **Input pages:** These pages will allow users to identify relevant releases from their installation to the environment and populate relevant information on the pollutants released.
- **'Identify' page:** This page allows users to select whether they intend to assess the emissions from the facility to the different environmental media (i.e. air, water, land).
- **Output pages:** These present the various screening tests and information on ozone creation potential, performance indicators, global warming potential, visual impact and waste impact.
- **Results:** A summary of the results of the screening tests.

Once you start your assessment, there are arrows at the top of each page to navigate through the following or previous page. Alongside these arrows, each page also contains a link to the opening page ('Main') to return to the main menu as desired. In most pages, these buttons will also allow you to navigate through your options (if it is an option appraisal) and through the different parts of the assessment.



Each page also contains a box with instructions, such as the example below:



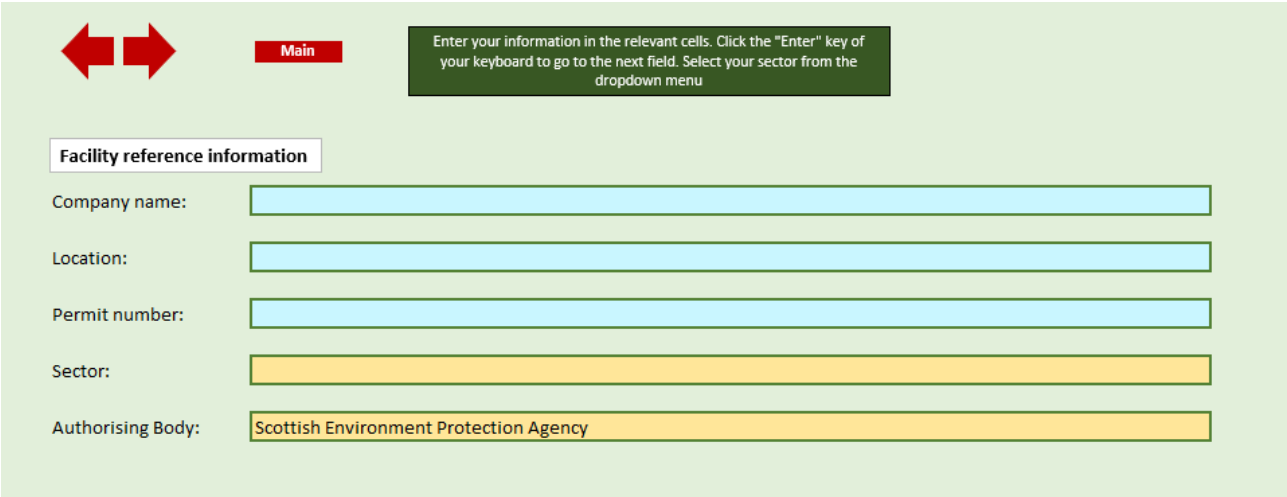
3 Start your assessment

This section includes a description of the different pages that you will find when using the tool.

[1] https://www.gov.uk/government/collections/risk-assessments-for-specific-activities-environmental-permits
[2] Horizontal guidance for environmental assessment and appraisal of Best Available Techniques (BAT) | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)

3.1 Facility reference information

Once you start your assessment, the tool will show the facility reference information. Please enter your company name, location and permit number in the blue cells. If you tab with your keyboard, the tool will automatically select the next cell that requires an input. Next there is a dropdown menu with industrial sectors which you can choose the appropriate sector from, leave this field blank if your sector is not listed. Finally, you need to select the **relevant authorising body** for your permit and select from the scroll down options, this is important so the tool can automatically select the EALs relevant for the country where your application is located (England, Scotland, Wales or Northern Ireland). Then press the right arrow to move on to the next section.



The pages that follow are aimed to complete the following steps:

Step 1 – Define the objective of the assessment and start the Environmental Assessment

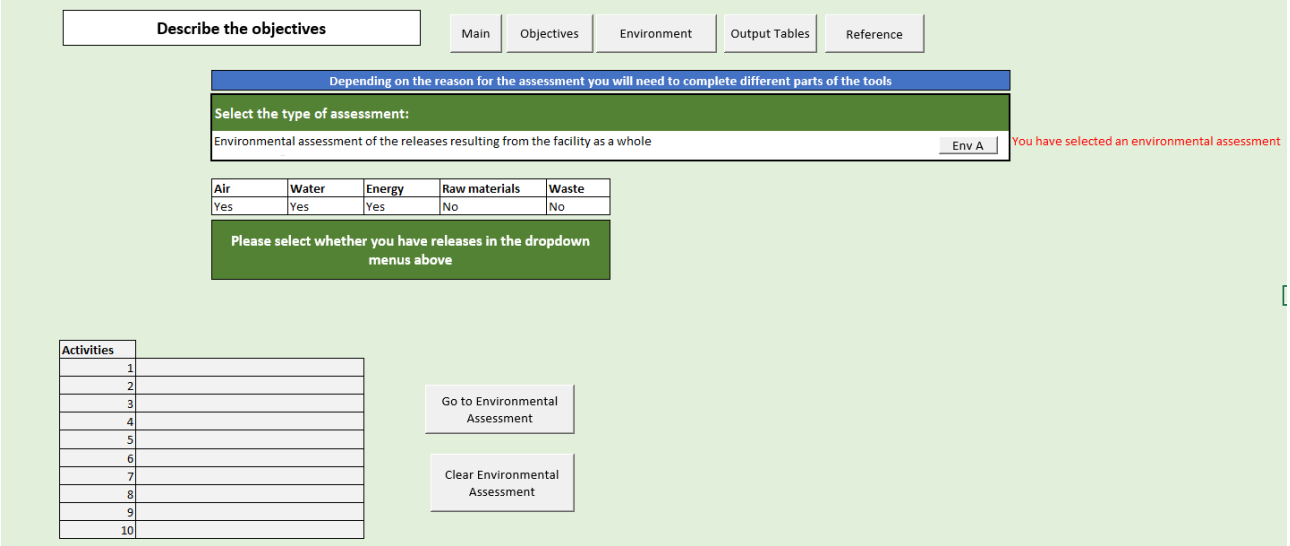
Step 2 – Quantify the emissions

Step 3 – Quantify the environmental impacts resulting from the emissions

3.2 Objectives

When the Environmental Assessment button is chosen, the tool requests the user to describe the activities and then moves on to Step 2 on pressing the “go to environmental assessment” button. This page is described below. Note that you can access step 2 from this page.

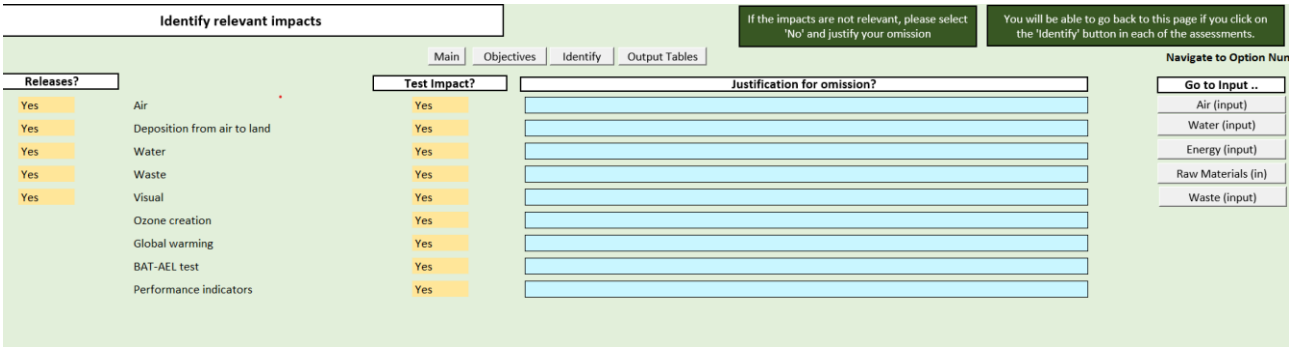
Objectives page in “environmental assessment mode”:



4 Quantify the emissions - Step 2

The aim of this step is to produce an inventory of sources and releases of polluting substances. This is used as the basis for the subsequent evaluation of environmental impacts. The first page of Step 2 is the “Identify” page where the user identifies the various categories in their assessment by selecting “Yes” or “No” in the relevant box under “Releases?”. This page is described below.

“Identity” page in “environmental assessment mode”:



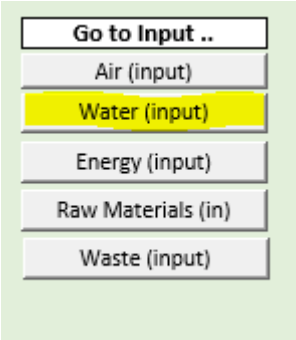
If there are releases but you do not believe that there is an impact, select “No” in that column. Note that you will have to justify this omission in the available space. Depending on your selection, there will be several hyperlinks (buttons) on the right-hand side that will lead you to the relevant screening tests and outputs. These buttons will ‘disappear’ if you select that the impact is not relevant.

This page can also be used as a general root for navigating through all the parts of the tool, as you will be able to access the pages in Step 2 and Step 3, as well as the objectives page, the main menu and the output tables from here.

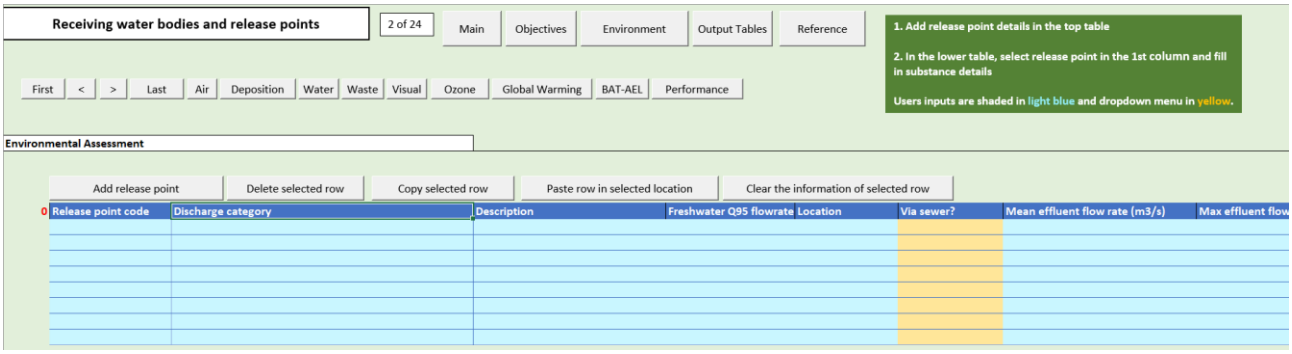
4.1 Receiving water bodies and release points

From the “Identify” page, the page where you enter the information on receiving water bodies and release points can be accessed using the ‘Water (input)’ button showed below.

Water (input) button in “Identify”:

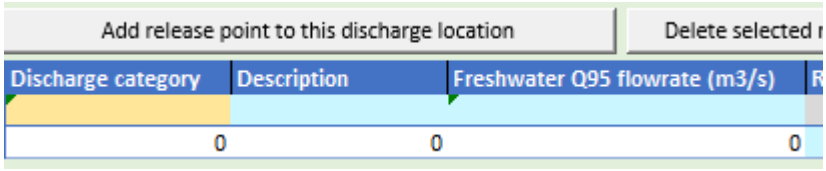


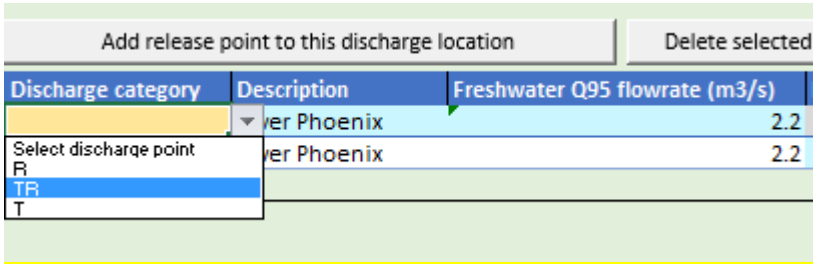
This page is the input page for water:



Each table represents a discharge location, which is classified as ‘R’ (freshwater rivers), ‘TR’ (TRaC (Transitional and Coastal) - Riverine) and ‘T’ (TRaC (Transitional and Coastal) – Estuarine and Coastal). The first row of each table (i.e. discharge location) includes a dropdown list to select the discharge category, the description of the discharge location and the freshwater Q95 flowrate (m^3/s) (rate equalled or exceeded for 95% of the year).

Once you populate the blue cells in the first row of each table, the rest of the rows of the table will populate automatically.

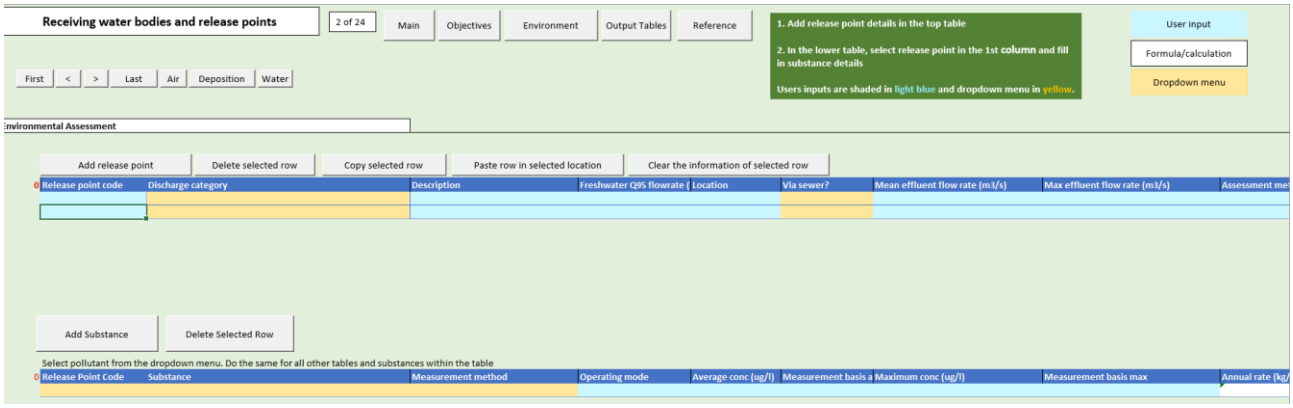




The second row of each table shall include the information on the first release point, its location, whether there is a sewer, its mean effluent flow rate (m^3/s), its maximum effluent flow rate and the assessment method. Users should enter the mean flow rate (in cubic metres per second) before the maximum flow rate. If the mean flow entered is greater than the maximum flow an error message appears prompting a correction.

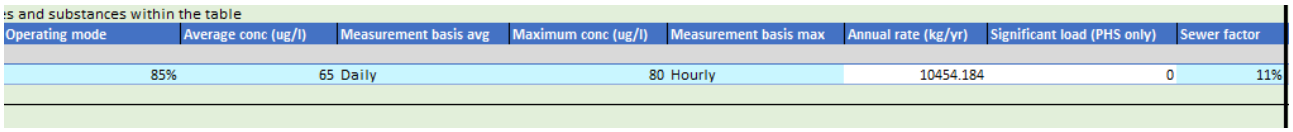
The so-called “release point code” is a code used to identify each release point. As long as the code is different for each release point, anything is accepted. Formats such as *W1, W2, W3* etc are common.

The following columns of the first row enable the user to include information on the pollutants that are released via that release point. Click on the cell in the second row of the “Substance” column to unveil a dropdown menu. Once the pollutant is selected, the cells related to that substance will be active. As stated in the colour coding table, blue cells are for user inputs, yellow cells are dropdown lists and white cells are calculated formulas. The maximum number of pollutants per release point is 30.



Additional release points can be added to each discharge location by clicking on the “Add release point to this discharge location” button. If you wish to delete a row that you have created, you can also do this by selecting the row (the cursor has to be inside the table and in the row you intend to delete). The first two rows cannot be deleted.

The user has the option to choose ‘Discharge to Sewer’. This has the effect of passing the effluent through a treatment plant or sewage works before the discharge reaches the environment. As a reference, a factor of 0 means that there is no abatement and a factor of 100% means 100% abatement. In the example below, the removal factor is 11%. This means that 11% is entered as the proportion of the substance concentration that is removed after passage through the effluent treatment process:



It is possible to copy a row and paste it somewhere else. When you click on “copy”, the row that is going to be copied (‘origin row’) is highlighted in red. Each time you click on “paste” again, the origin row will be pasted. Once you do not wish to paste it anymore, you should click on “copy selected row” outside of the table and the origin row will return to its original colour format.

Note that for Priority Hazardous Substances (PHS), which are the most polluting substances considered, the tool picks up the 'Significant Load' annual limit that may be released from a site in kilogrammes per year. The tool calculates the release to compare with this figure (5 kg in the case of Cadmium) using mean concentrations and mean effluent flows. If a substance is discharged from more than one release point on a site, the mass releases are combined to compare against this annual limit.

The percentage Operating Mode enables data entry for activities that do not operate continuously throughout the year. If an activity operates for six months the operating mode is set to 50%.

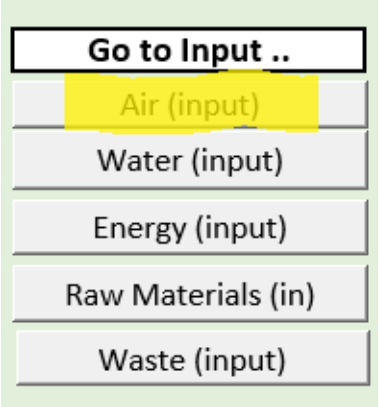
It is important to note that each discharge location has to be in a different table. Release points within the same discharge location have to be in the same table. It is also important to provide a different name for each discharge location (i.e. for each table). Should you want to delete the number of tables due to having less discharge locations, these can be deleted using the “Delete selected table” button. Also, tables can be added clicking on the “Add discharge location” button. The page can have up to 6 tables in total.

After completing these tables, use the navigation panel to go the next page, go back to the main menu, go to ‘identify’ or switch between options.

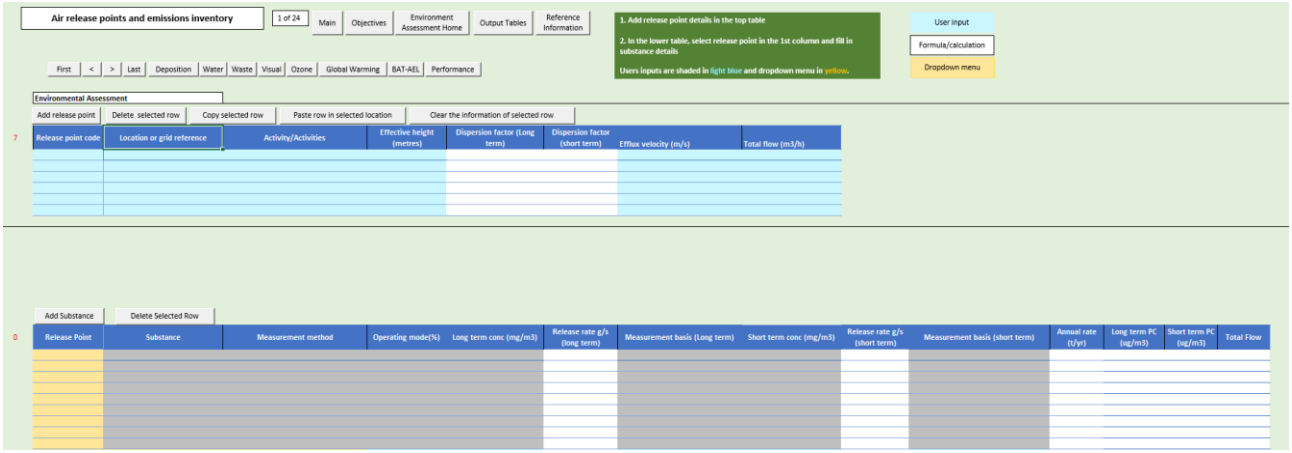
4.2 Air release points and emissions inventory

From the “Identify” page, the page where you enter the information on air release points and emissions inventory can be accessed using the ‘Air (input)’ button showed below.

Air (input) button in “Identify”:



This page appears once the Air (input) option is selected.



The first data to enter goes in the first table and includes the location, activities and effective height (m) of each release point. The effective height of releases can, in many cases, be assumed as the point of discharge to the atmosphere, i.e. top of the stack or vent. However, if either of the following circumstances apply, then the effective height of releases should be assumed as described below:

- The effective height of release could be considered as zero where the point of discharge:
    - is less than 3m above the ground or building on which it is located, or;
    - is greater than 3m above the ground or building on which it is located, but less than the height of any building within a distance 5L from the point of discharge (where L is the lesser of the building height and the maximum projected width between two points the same height in the building).
- When the effective height of release is more than 3 metres above the ground or building, but less than 2.5 times the building’s height, estimate it by following these steps.
    - Take the actual height of release.
    - Subtract the height of the tallest building within a distance 5 times L (this can be the building where the emissions are coming from, if it’s the tallest).
    - Multiply the figure that’s left by 1.66.

The tool will calculate the dispersion factors (long and short term) automatically. Please add the information on each release point in subsequent columns (efflux velocity, total flow).

Then, in the second table, for each release point, users are required to enter details of long and short-term substance concentrations and the percentage Operating Mode for the year. Using the annual mean concentration and operating mode data the tool calculates the annual release of each substance in tonnes.

The way in which pollutants are added to each release point is similar to that for the water pollutants. There are buttons for adding air release points (i.e. rows). Note that "release point codes" are also needed here. These are typically expressed as *A1, A2, A3 […]* but as long as all codes are different, any reference code or name can be used.

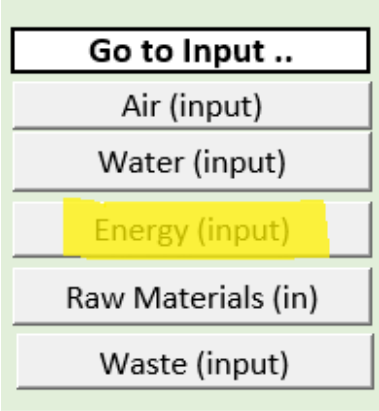
After completing these table use the navigation panel to go the next page, go back to the main menu, go to 'identify' or switch between options.

Appendix A identifies the calculations undertaken at this stage in detail, under section "Calculate Process Contributions of Emissions to Air".

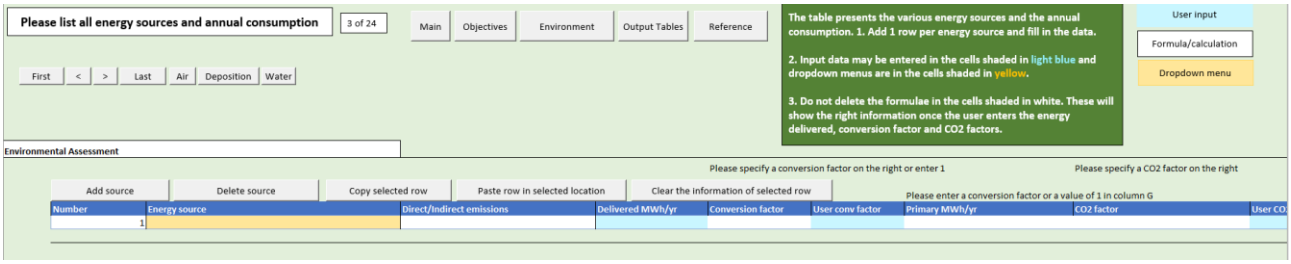
4.3 Energy consumption

From the "Identify" page, the page where you enter the information on energy sources and annual consumption can be accessed using the 'Energy (input)' button showed below.

Energy (input) button in "Identify":



This page appears once the Energy (input) option is selected.



Please select the energy sources from the dropdown list in the "Energy source" column. Enter the energy delivered ("Delivered MWh/yr") and your conversion factor (otherwise enter 1). The CO_2 emission factor is calculated by the tool. The user can enter a different CO_2 emission factor.

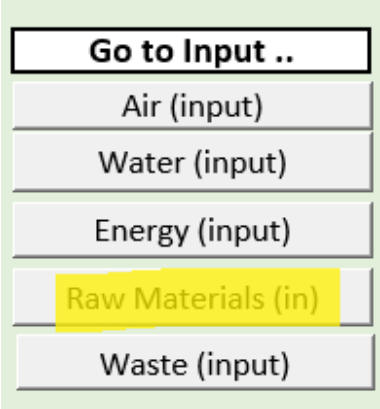
As in previous input tables, you can add, delete or copy multiple energy sources by clicking on the relevant button.

After completing this table use the navigation panel to go the next page, go back to the main menu, go to 'identify' or switch between options.

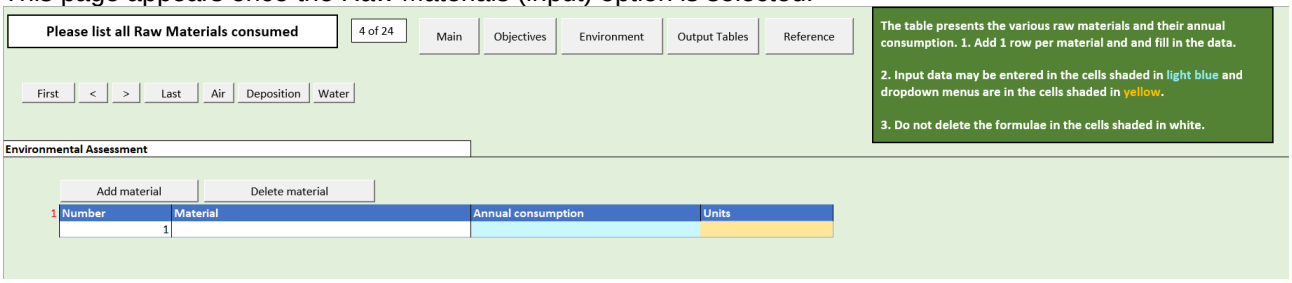
4.4 Raw materials

From the “Identify” page, the page where you enter the information on raw materials consumed can be accessed using the ‘Raw Materials (input)’ button showed below.

Raw Materials (input) button in “Identify”:



This page appears once the Raw Materials (input) option is selected.



Please add each raw material and associated annual consumption. A dropdown list will allow you to select the relevant units. You can add, delete and/or copy sources.

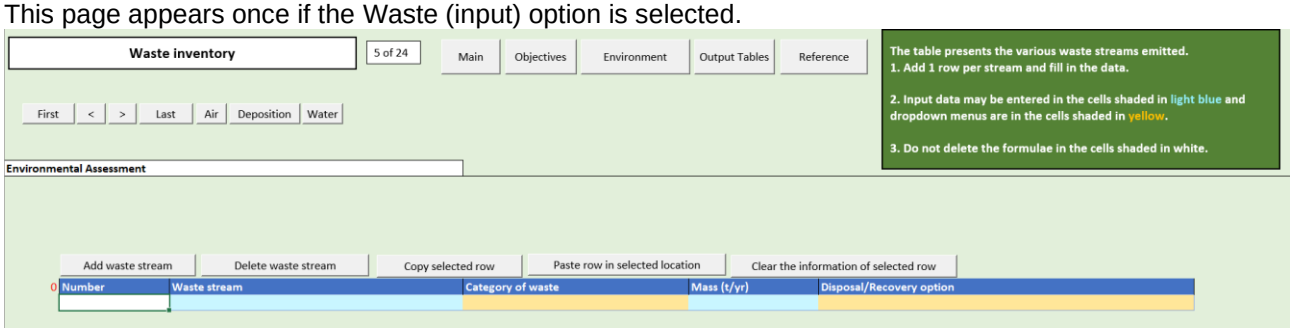
After completing this table use the navigation panel to go the next page, go back to the main menu, go to ‘identify’ or switch between options.

4.5 Waste inventory

From the “Identify” page, the page where you enter the information on waste inventory can be accessed using the ‘Waste (input)’ button showed below.

Waste (input) button in “Identify”:

This page appears once if the Waste (input) option is selected.



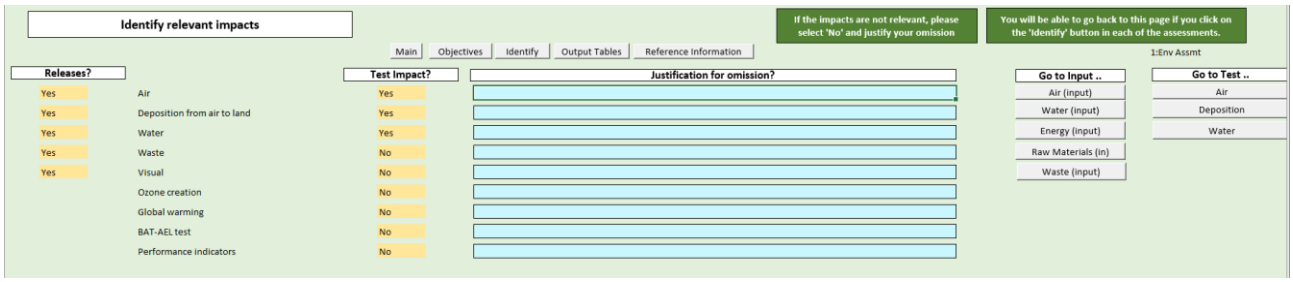
Please add your waste streams. Enter the name of your stream in the “Waste stream” column. The category of waste and disposal option can be selected from a dropdown list. Enter the mass in tonnes per year that is produced from each stream. As in previous input tables, you can add or delete waste streams.

After completing this table use the navigation panel to go the next page, go back to the main menu, go to ‘identify’ or switch between options.

5 Quantify Impacts - Step 3

The results of the assessment are presented in Step 3. This enables identification of those releases which present an insignificant impact to the local environment. The remaining releases may need a more detailed assessment, depending on the outcome of the relevant screening process. Substances which are not screened out are highlighted in red.

The first page of Step 3 is the “Identify” page where users should select each of the relevant impacts under the “Go to test” column, The page is showed below.



This page can also be used as a general root for navigating through all the parts of the tool, as you will be able to access the pages in Step 2 and Step 3, as well as the objectives page, the main menu and the output tables from here.

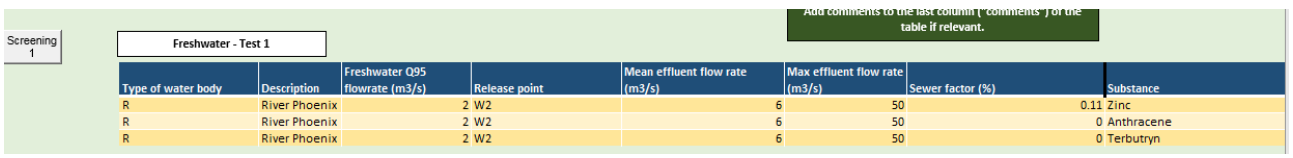
5.1 Water impacts

These pages appear once “Water” is selected under the “Go to Test..” option.

If you change anything in the “Receiving water bodies and release points”, you must repeat each test sequentially to update the results of the screening tests with the new values.

Freshwater

For discharges to freshwater we see the following:



Click on the “screening 1” button to perform Screening Test 1. (You may need to scroll to the right to see all the columns of the table).

Substance	Release conc (ug/l)	Annual EQS (ug/l)	Test 1: Release conc <10% EQS avg	Max release conc (ug/l)	MAC (ug/l)	Test: Release conc <10% EQS max	Comments
Zinc	65	10.9	Fail	80	0	N/A	
Anthracene	0.2	0.1	Fail	0.5	0.1	Fail	
Terbutryn	0.066	0.065	Fail	0.07	0.34	Fail	

For all the substances that 'fail' Test 1, then for Test 2 freshwater you will see the following after clicking on the button to run the test:

Screening 2 | Freshwater - Test 2

Type of water body	Description	Freshwater Q95 flowrate (m3/s)	Release point	Mean effluent flow rate (m3/s)	Max effluent flow rate (m3/s)	Substance	Release conc (ug/l)	Max release conc (ug/l)	Annual EQS (ug/l)	PC (ug/l)
R	River Phoenix	2	W2	6	50	Zinc	65	80	10.9	48.75
R	River Phoenix	2	W2	6	50	Anthracene	0.2	0.5	0.1	0.15
R	River Phoenix	2	W2	6	50	Terbutryn	0.066	0.07	0.065	0.0495

If you scroll to the right, you will be able to see the following:

Annual avg EQS					MAC EQS				
Annual EQS (ug/l)	PC (ug/l)	Modelled PC (ug/l)	%PC of EQS%	Test 2: PC<4% of EQS?	MAC EQS (ug/l)	PC (max) (ug/l)	Modelled PC (max) (ug/l)	%PC of MAC	Test 2: PC<4% of MAC?
10.9	48.75			fail	0	76.92308			
0.1	0.15			fail	0.1	0.480769		481%	fail
0.065	0.0495			fail	0.34	0.067308		20%	fail

The process contribution (PC) values are calculated. If you wish to enter PC values calculated from separate modelling, they can be entered in the "Modelled PC" column.

In the example above, all three substances fail Test 2 and are carried forward to Tests 3, 4a and 4b.

Screening 3,4 | Freshwater - Tests 3, 4a and 4b

Type of water body	Description	Freshwater Q95 flowrate (m3/s)	Release point	Mean effluent flow rate (m3/s)	Max effluent flow rate (m3/s)	Substance	Release conc (ug/l)	Max release conc (ug/l)	Background conc (ug/l)	PC (ug/l)
R	River Phoenix	2	W2	6	50	Zinc	65	80		48.75
R	River Phoenix	2	W2	6	50	Anthracene	0.2	0.5		0.15
R	River Phoenix	2	W2	6	50	Terbutryn	0.066	0.07		0.0495

As with previous cases, scroll to the right to see all the data of Screening Tests 3, 4a and 4b.

Max release conc (ug/l)	Background conc (ug/l)	PC (ug/l)	PEC (ug/l)	Annual EQS (ug/l)	(PEC-BC)/EQS	Test 3 - (PEC-BC)/EQS>10% annual EQS	%PEC EQS %	Test 4a - PEC >100% EQS	MAC EQS	PC (max) (ug/l)	PEC Max (ug/l)	PEC of MAC	Test 4b: PEC>100% MAC
80	0.5	48.75	48.875	10.9	4.438073394	fail	448%	fail	0	76.9231	76.942308		pass
0.5	3	0.15	0.9	0.1	-21	pass	900%	fail	0.1	0.48077	0.5961538	5.9615385	fail
0.07	0.7	0.0495	0.2245	0.065	-7.315384615	pass	345%	fail	0.34	0.06731	0.0942308	0.2771493	pass

Background concentrations are added and the results of Test 3 and 4a & 4b are displayed. To screen out at this stage all three tests must pass.

TRaC waters

TraC water assessments includes releases to both upper estuarine environments, described here as 'TraC Riverine', and lower estuarine and coastal environments. In this example releases to W1 (River Nene) which is TraC Riverine and W3 (Camel Estuary) which is TraC Estuary and coastal are included. (You may need to use the arrow on the right-hand margin to see all the information). Once you click on the "Screening 1" button, you will see the following:

Screening 1 | TRAC Waters - Test 1

Type of water body	Description	Freshwater Q95 flowrate (m3/s)	Release point	Mean effluent flow rate (m3/s)	Max effluent flow rate (m3/s)	Sewer factor (%)	Substance
TR	River Nene	1.5	W1	2.5	5	0	2,4-Dichlorophenol
TR	River Nene	1.5	W1	2.5	5	0	Benzene
T	Camel estuary	0	W3	1.6	2	0	Cyanide
T	Camel estuary	0	W3	1.6	2	0	Bromine

If you scroll to the right, you will see the rest of the table:

Substance	Release conc (ug/l)	Annual EQS (ug/l)	Test 1: Release conc <100% EQS avg	Max release conc (ug/l)	MAC (ug/l)	Test 1: Release conc <100% EQS max	Comments
2,4-Dichlorophenol	0.5	0.42	fail	1	6	Pass	
Benzene	0.1	8	Pass	5	50	Pass	
Cyanide	3.5	1	fail	4	5	Pass	
Bromine	2	0	N/A	4	10	Pass	

Benzene is screened out as the release concentration is less than the Environmental Quality Standard (EQS) in salt water.

From the other substances, the usual screening approach applies with substances that fail being carried forward to Test 2, and then to Test 3-4b. Tests 2, 3, 4a and 4b is only carried out to substances in 'TR' discharge locations:

Screening 2

TRAC Waters - Test 2

Type of water body	Description	Freshwater Q95 flowrate (m3/s)	Sewer factor (%)	Substance
TR	River Nene	1.5	0	2,4-Dichlorophenol

	Annual avg EQS					MAC EQS				
Substance	Annual EQS (ug/l)	PC (ug/l)	Modelled PC (ug/l)	%PC of EQS%	Test 2: PC<4% of EQS?	MAC EQS (ug/l)	PC (max) (ug/l)	Modelled PC (max) (ug/l)	%PC of MAC	Test 2: PC<4% of MAC?
2,4-Dichlorophenol	0.42	0.3125		74%	fail	6	0.769230769		13%	fail

As 2,4 Dichlorophenol fails test 2, it is carried forward to tests 3, 4a and 4b:

Screening 3, 4

TRAC Waters - Tests 3, 4A and 4B

Type of water body	Description	Freshwater Q95 flowrate (m3/s)	Sewer factor (%)	Substance
TR	River Nene	1.5	0	2,4-Dichlorophenol

If you scroll to the right, you will see the rest of the tests:

Background conc (ug/l)	PC (ug/l)	PEC (ug/l)	Annual EQS (ug/l)	(PEC-BC)/EQS	Test 3 - (PEC-BC)/EQS>10% annual EQS	%PEC EQS %	Test 4a - PEC >100% EQS	MAC EQS (ug/l)	PC (max) (ug/l)	PEC Max (ug/l)	%PEC of MAC %	Test 4b: PEC>100% MAC
0.8	0.3125	1.1125	0.42	74%	fail	265%	fail	6	0.76923	1.56923	0.26154	pass

It is seen that detailed modelling of 2,4 Dichlorophenol is required, as it fails Tests 3 and 4a.

The tool then reverts back to TraC water assessment for the TraC (Estuarine & Coastal) release and applies Test 5A. This test contains questions that assess the physical geography of the discharge location and the surrounding environment. Any response other than "No" means that detailed modelling of the discharge is required. If modelling is not required, the Test of the Effective Volume Flux (EVF) follows (Test 5B).

Screening 5B

TRAC Waters - Step 5B

Type of water body	Description	TRaC water release depth (m)	Release point	Mean effluent flow rate (m3/s)	Max effluent flow rate (m3/s)	Sewer factor (%)	Substance
T	Camel estuary	3	W3	1.6	2	0	Cyanide
T	Camel estuary	3	W3	1.6	2	0	Bromine

As with other tests, please scroll to the right to read the rest of the table:

Substance	Release conc (ug/l)	Max release conc (ug/l)	Background conc (ug/l)	EQS (ug/l)	EVF (annual)	MAC EQS (ug/l)	EVF (max)	Allowable EVF	Test 5
Cyanide	3.5	4	0.1	1	6.222222222	5	1.632653061	3	fail
Bromine	2	4	0.1	0	-32	10	0.808080808	3	pass

Note here that the discharge of one substance (Bromine) into the salt water environment is screened out. The effect of the sewage treatment reduction factor is activated on each row once the background concentration is entered. The TraC water release depth below chart datum is the screening criteria used in

Test 5B and represents the available EVF. The calculated EVF must be less than the available EVF for the discharged substance to be screened out from modelling.

Significant load test

For any priority hazardous substance (PHS) in the discharge, the Significant Load test follows. By comparing the annual release against the substance significant load, the tool identifies those substances which will require modelling of their discharge to decide if a limit is required in the permit. In this example, anthracene is not screened out from the Significant Load tests and therefore a permit limit may be required:

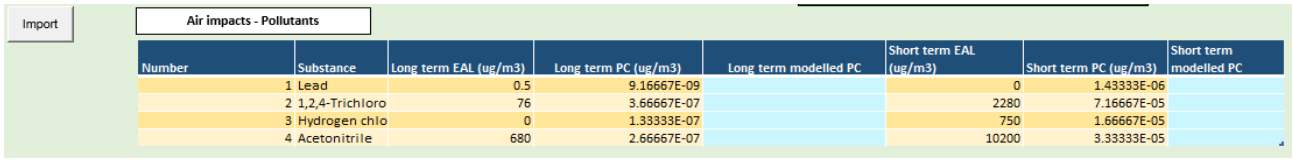
Run SigL Test

Water - Significant load test

Type of water body	Description	Substance	Annual rate (kg/yr)	Significant load (PHS only) kg	Significant load test
R	River Phoenix	Anthracene	37.8432	1	Fail

5.2 Air releases

For air releases, Step 3 begins with the 'Air Impacts Page' which appear when "Air" is selected under the "Go to Test.." option in the "Identify" page, which takes you to the page identified below. When you click on **"import"**, the tool will copy the relevant information from the air inventory so that tests can be carried out in subsequent pages.

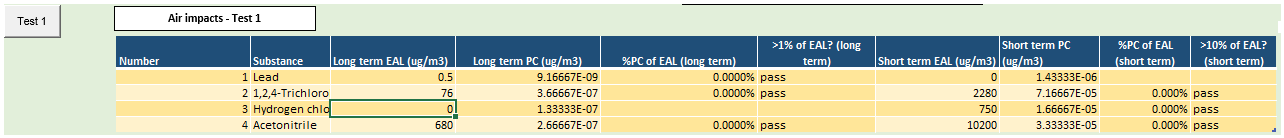


Import

Air impacts - Pollutants

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Lead	0.5	9.16667E-09		0	1.43333E-06	
2	1,2,4-Trichloro	76	3.66667E-07		2280	7.16667E-05	
3	Hydrogen chlo	0	1.33333E-07		750	1.66667E-05	
4	Acetonitrile	680	2.66667E-07		10200	3.33333E-05	

Please continue to the next page using the across arrow and run Test 1 by clicking on **"Test 1"**:



Test 1

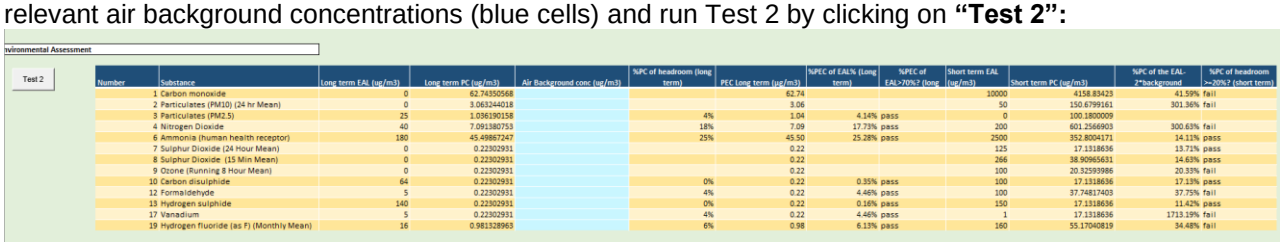
Air impacts - Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Lead	0.5	9.16667E-09	0.0000%	pass	0	1.43333E-06		
2	1,2,4-Trichloro	76	3.66667E-07	0.0000%	pass	2280	7.16667E-05	0.000%	pass
3	Hydrogen chlo	0	1.33333E-07			750	1.66667E-05	0.000%	pass
4	Acetonitrile	680	2.66667E-07	0.0000%	pass	10200	3.33333E-05	0.000%	pass

Here the resulting process contribution (PC) is compared to the substance Environmental Assessment Level (EAL). To screen out a PC for any substance so that no further assessment of it is required, the PC must meet both of the following criteria:

the short term PC is less than 10% of the short term environmental standard
the long term PC is less than 1% of the long term environmental standard

If both of these criteria are met, no further assessment of the substance is required. If any substances are not screened out (those highlighted as "fail"), please continue to the next page using the across arrow, input relevant air background concentrations (blue cells) and run Test 2 by clicking on **"Test 2":**



vironmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long term)	PEC Long term (ug/m3)	%PEC of EAL% (Long term)	%PEC of EAL>70%? (long	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom >=20%? (short term)
1	Carbon monoxide	0	62.74350568			62.74			10000	4158.83423	41.59%	fail
2	Particulates (PM10) (24 hr Mean)	0	3.063244018			3.06			50	150.6799161	301.36%	fail
3	Particulates (PM2.5)	25	1.036190158		4%	1.04	4.14%	pass	0	100.1800009		
4	Nitrogen Dioxide	40	7.091380753		18%	7.09	17.73%	pass	200	601.2566903	300.63%	fail
6	Ammonia (human health receptor)	180	45.49867247		25%	45.50	25.28%	pass	2500	352.8004171	14.11%	pass
7	Sulphur Dioxide (24 Hour Mean)	0	0.22302931			0.22			125	17.1318636	13.71%	pass
8	Sulphur Dioxide (15 Min Mean)	0	0.22302931			0.22			266	38.90965631	14.63%	pass
9	Ozone (Running 8 Hour Mean)	0	0.22302931			0.22			100	20.32593986	20.33%	fail
10	Carbon disulphide	64	0.22302931		0%	0.22	0.35%	pass	100	17.1318636	17.13%	pass
12	Formaldehyde	5	0.22302931		4%	0.22	4.46%	pass	100	37.74817403	37.75%	fail
13	Hydrogen sulphide	140	0.22302931		0%	0.22	0.16%	pass	150	17.1318636	11.42%	pass
17	Vanadium	5	0.22302931		4%	0.22	4.46%	pass	1	17.1318636	1713.19%	fail
19	Hydrogen fluoride (as F) (Monthly Mean)	16	0.981328963		6%	0.98	6.13%	pass	160	55.17040819	34.48%	fail

Here the resulting Predicted Environmental Concentration (PEC) is compared to the relevant EAL.

You can find out about background concentrations from:

- your local council
- background concentration maps from the government
- the Air Pollution Information System (APIS) (for Special Protected Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs)

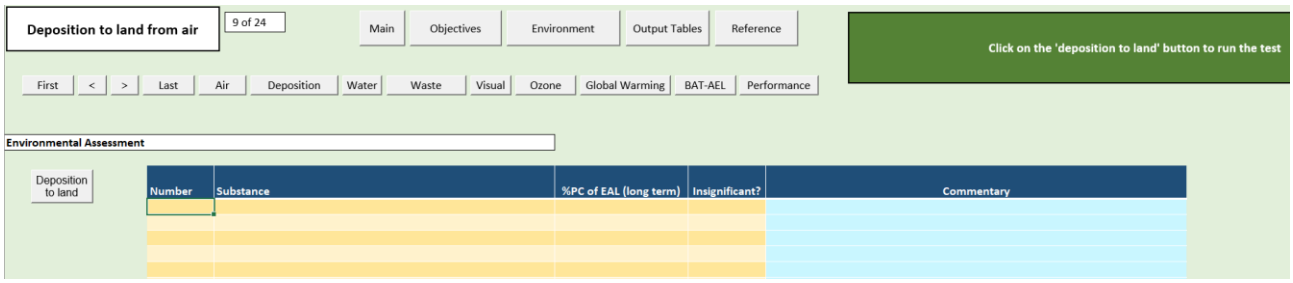
This information will usually be shown as a long term (annual) average concentration.
Background concentrations may already include PCs from your site. To avoid your PCs being double-counted, use a background concentration from a source that is not affected by the direction that the wind

predominantly blows from (that is the prevailing wind direction). For example, if the prevailing wind comes from the west, do not use a background concentration from a source to your east.

Appendix A identifies the calculations undertaken at this stage in detail under sections: “Screen Out Insignificant Emissions to Air” and “Identify Need for Detailed Modelling or Emissions to Air”.

5.3 Deposition to land from air

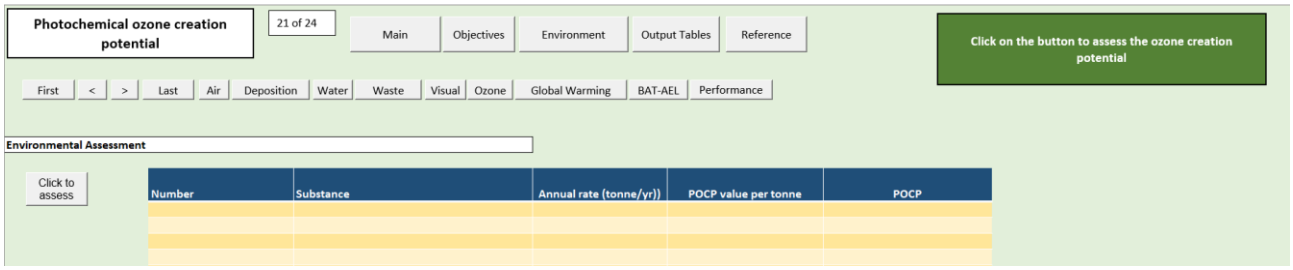
After Tests 1 and 2 for air, you can assess the impacts of air emissions on land. Click on the button to run the test. The information is displayed as follows.



For the majority of industrial activities, direct releases of polluting substances to land should be avoided by the use of appropriate preventative techniques. There are certain activities covered by the Environmental Permitting Regulations (EPR) in England and Wales, and the Pollution Prevention and Control (PPC) Regulations in Scotland and Northern Ireland, where direct releases are unavoidable, such as slurry spreading in the intensive livestock sector and landfill operations. In these cases, other risk assessment guidance more appropriate to the consideration of direct releases from these specific activities is identified in the relevant Sector Guidance Notes (these may differ depending on the UK country where the activity is being carried out). The assessment of impacts to land in the H1 guidance considers only those substances that are deposited to land via air emissions.

5.4 Photochemical ozone creation potential

Photochemical ozone potential (PCOP) is calculated on the ‘Ozone’ page and shows the relative contribution of each substance. The PCOP values are entered automatically by the tool and the total potential for an operating scenario is given. Click on the button to assess it.

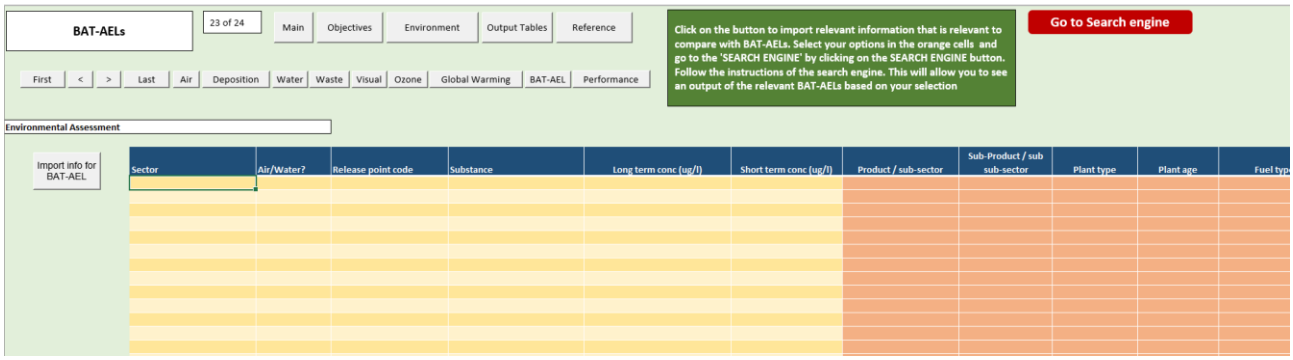


5.5 BAT-AEL assessment

We are in the process of developing databases in the H1 Tool containing the applicable BAT-AELs for each sector. Once this part of the tool is complete, you will be able to undertake the assessment described below. Currently, this part of the tool is turned off.

The following test allows users to have a list of release points for air and water alongside the pollutants released and their concentration. With this, once the BAT-AEL database is turned on, you will be able to search the applicable BAT-AELs from the database embedded in the tool. If your sector does not have adopted BAT conclusions at this stage, you can skip this step.

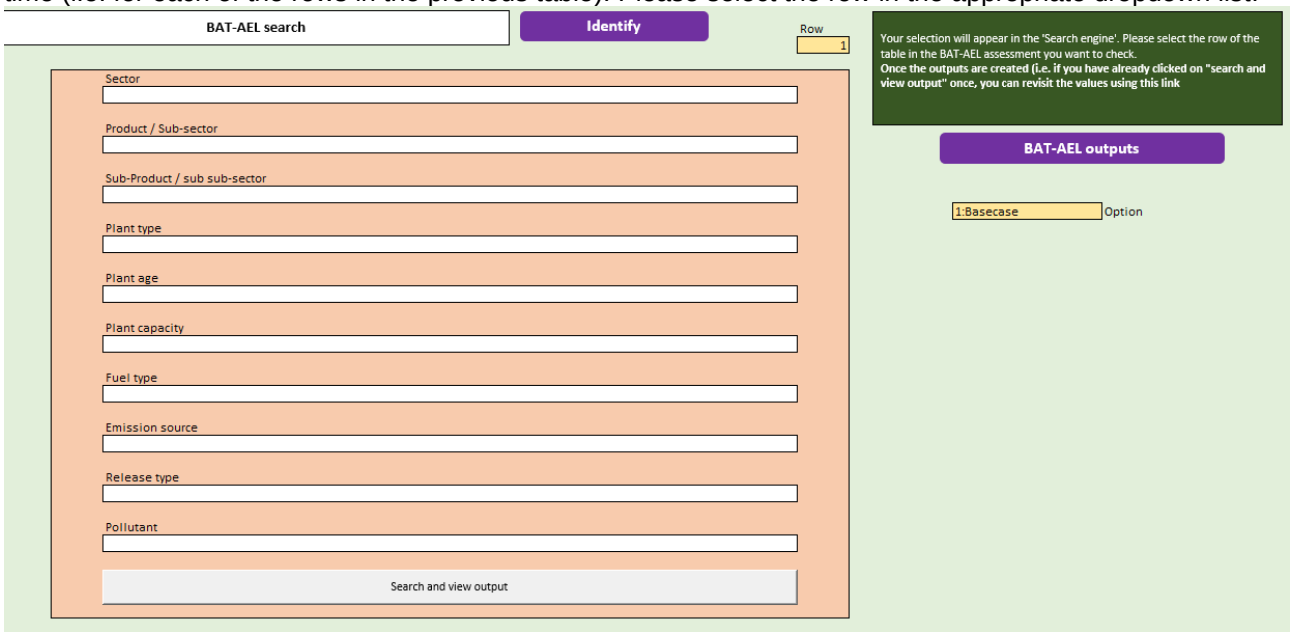
Once the BAT AEL database is turned on, please click on “Import info for BAT-AEL” to import the information.



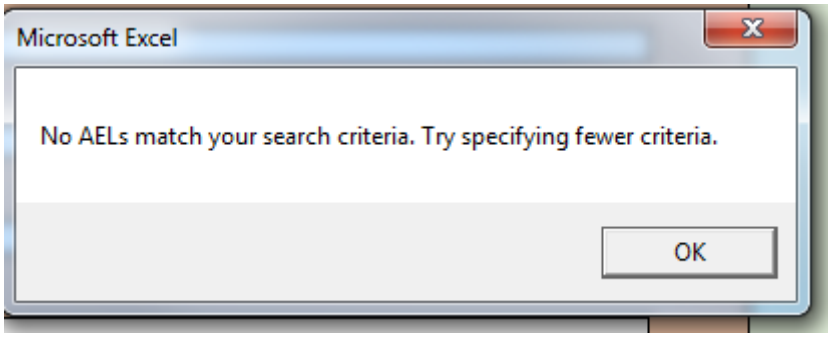
Use the dropdown lists of the unpopulated columns to refine your search. With these lists, you can specify product, sub product, plant type, plant age, fuel type, plant capacity and emission source. Once you make your selection, click on “Go to search engine”.

Search engine

Once the BAT-AEL database is turned on, the search engine will be automatically populated with the information available in the page described above. You will need to select the option that you want to access in the dedicated dropdown menu below the “BAT-AEL outputs” button. If you are undertaking an environmental assessment, it will be set to Option 1 by default. The search needs to be done one row at a time (i.e. for each of the rows in the previous table). Please select the row in the appropriate dropdown list.



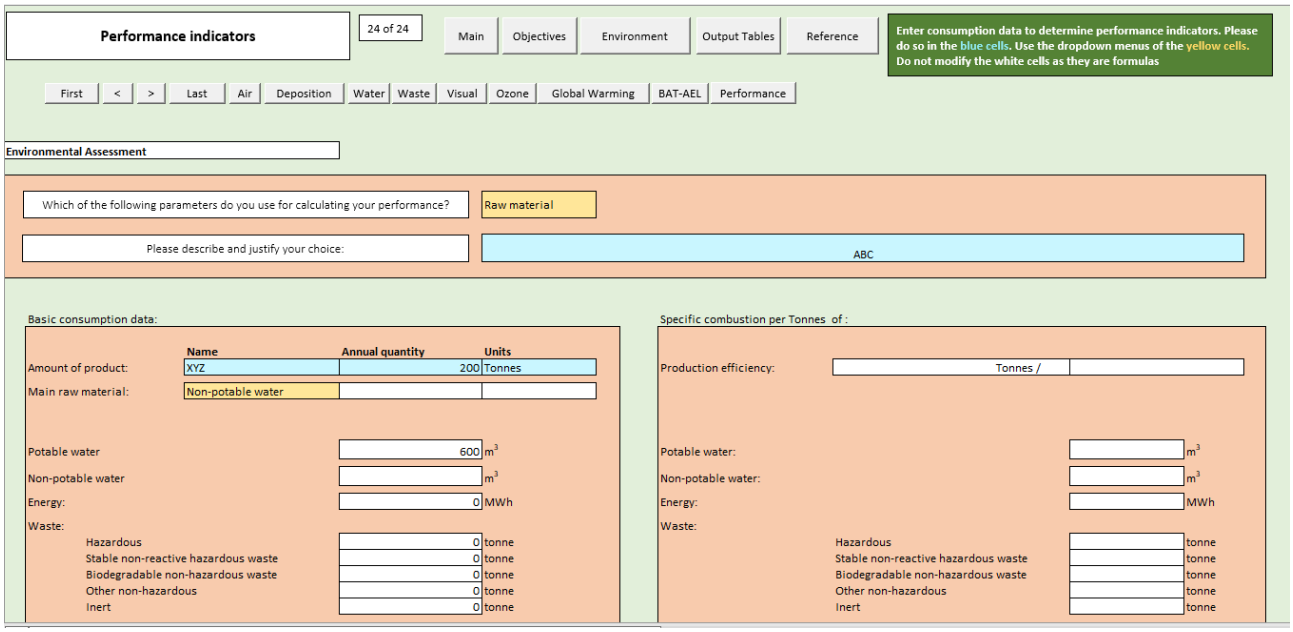
Click on “search and view output” and the tool will automatically select the BAT-AEL that are relevant to your search terms and will populate a table with the information. You can use that to go back to the BAT-AEL test and populate cells with the appropriate BAT names and BAT-AEL. If your search terms are too specific and the combination of search terms does not exist in our database (i.e. there is not a BAT-AEL for that particular sector, pollutant, product etc), you will receive the following error message:



In order to go back to the BAT-AEL test from the “Search engine” or the “BAT-AEL outputs”, click on the link to the “Identify” page. You will eventually be able to access the BAT-AEL for any option there.

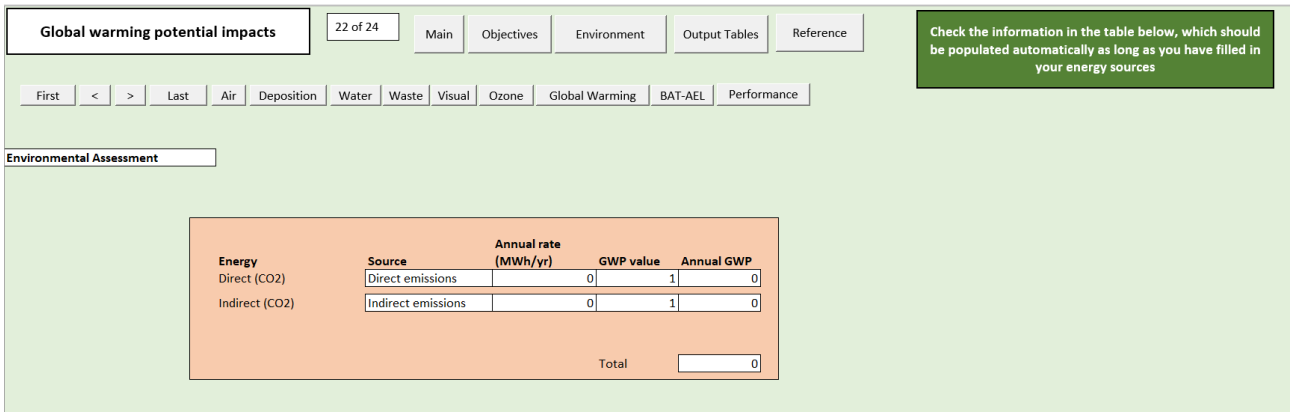
5.6 Performance indicators

This page will be automatically populated with the relevant data you have included in the ‘raw materials’ page. If operators want to use their product to calculate their performance, they are prompted to select ‘Product’ from the first dropdown menu and justify their choice. The user is expected to fill in data on the product produced at the facility and the tool. Performance can also be calculated as per the raw material or intermediate product.



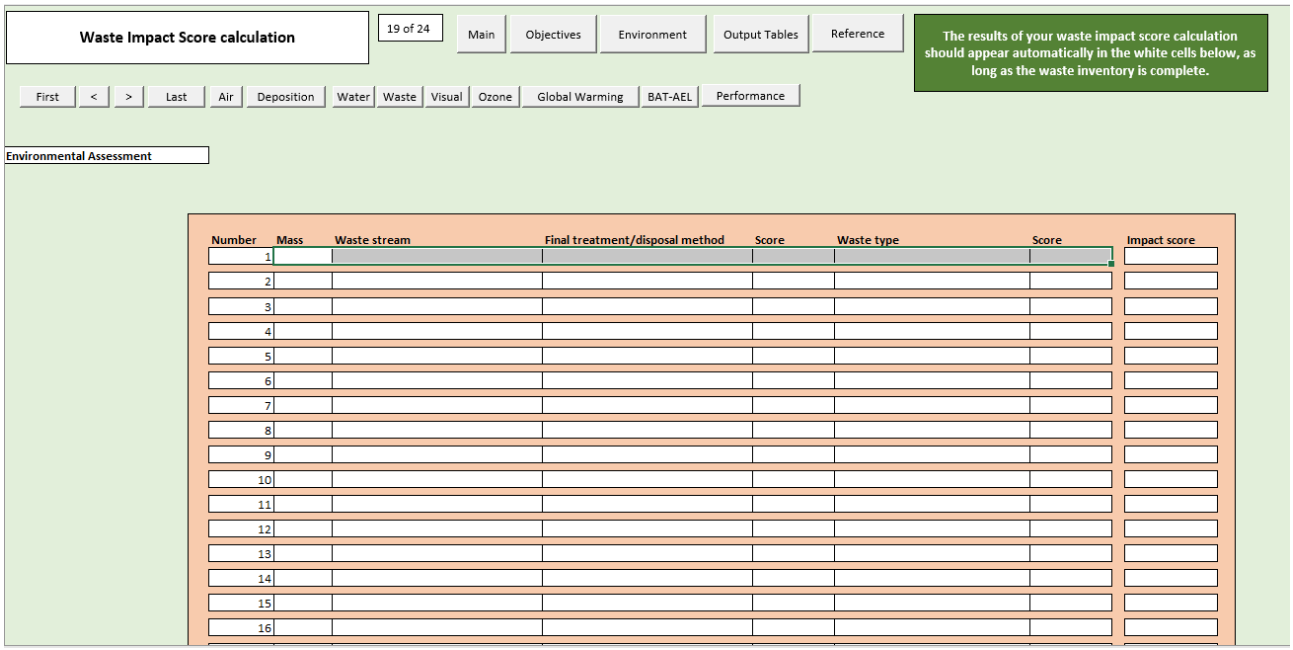
5.7 Global warming potential impacts

Global warming potential impacts are displayed after PCOP and the total effect of the releases of carbon dioxide are presented for each scenario.



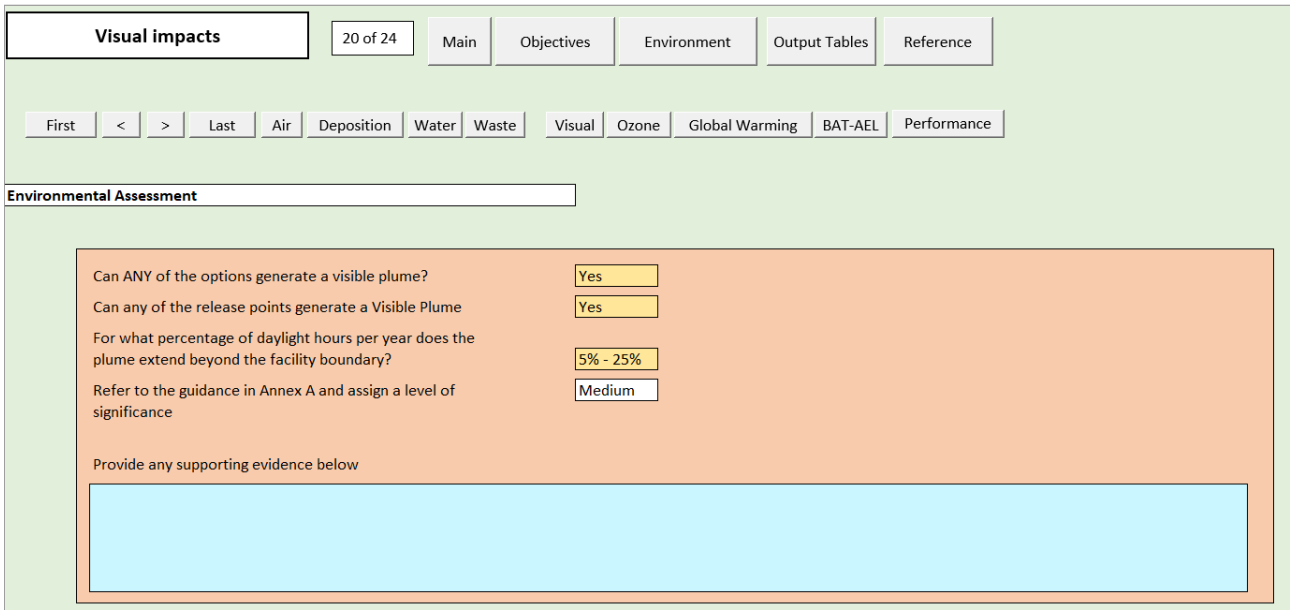
5.8 Waste impact score

The waste impact score calculation follows and takes the data entered from Step 2 for the operating scenario considered. If more than one option is selected at the front of the tool, there will be one page for each option.



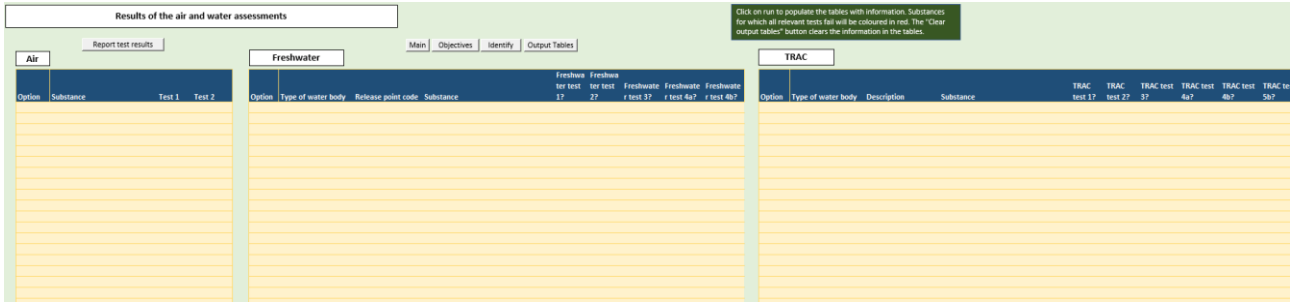
5.9 Visual impacts

Visual Impacts are assessed qualitatively in the tool by reference to the number of days a visible plume is seen off-site. Depending upon the significance of the impact the user can enter supporting evidence in the comments box below the display.



6 Output tables

Once you click on “report test results”, the tables will display information on air and water, with basic information showing whether the screening tests have been passed.



1 List of abbreviations

BAT	Best Available Technique
BAT-AEL	Best Available Technique Associated Emissions Level
EAL	Environmental Assessment Level
EQS	Environmental Quality Standard
H	Horizontal (Guidance)
PC	Process Contribution
PEC	Predicted Environmental Concentration
PHS	Priority Hazardous Substance
PCOP	Photochemical ozone potential
Q95	Freshwater flow equalled or exceeded for 95% of the year
TRaC	Transitional and Coastal
TRaC Riverine	Upper estuary

Appendix A

Calculations used in tool:

Calculate Process Contributions of Emissions to Air

1. When calculating an estimate of both the long term and short term Process Contributions (PC)[3] of all substances released to air, you can use the following simplified calculation method. Data may be entered into the H1 software tool, which performs these calculations and does not need the user to complete them. Note: If you already have detailed dispersion modelling data available that is valid for the activities in the assessment, then the process contribution derived from modelling should be used instead of the method below. The Operator should identify where this is the case by inputting the modelled data into the software as prompted. Where detailed modelled data is not available, estimate the process contribution using the formula below:

$$PC_{air} = DF \times RR$$

where:

PC = process contribution (µg/m^3)

RR = release rate of substance in g/s

DF = dispersion factor, expressed as the maximum average ground level concentration per unit mass release rate (µg/m^3 /g/s), based on annual average for long term releases and hourly average for short term releases.

A table of dispersion factors is provided below.

Effective height of release (m)	Dispersion Factor[4] (µg/m^3 /g/s)	
	long term: maximum annual average	short term: maximum hourly average
0	148	3900
10	32	580
20	4.6	161
30	1.7	77
50	0.52	31
70	0.24	16
100	0.11	8.6
150	0.048	4
200	0.023	2.3

The dispersion factors for long term and short-term releases assume “worst case” conditions. The factors are derived from a mathematical dispersion model and are presented as maximum average ground level

[3] Different process options may lead to variations on the pattern of releases. For example, a process operated intermittently may give lower annual concentrations compared to one run continuously but an increased frequency of short-term peaks may be the result. Furthermore, although the long-term average concentration may have been rendered acceptable by generally good dispersion there may, on occasions, be unacceptable short term peaks

[4] The dispersion factors for long term and short-term releases assume “worst case” conditions. The factors are derived from a mathematical dispersion model and are presented as maximum average ground level concentrations for unit mass emission rates, at different effective stack heights. Note that as these factors assume worst case dispersion conditions, no allowance is made for thermal or momentum plume rise, the process contributions calculated are likely to be an overestimate of the actual concentrations.

concentrations for unit mass emission rates, at different effective stack heights. Note that as these factors assume worst case dispersion conditions, with no allowance is made for thermal or momentum plume rise, the process contributions calculated are likely to be an overestimate of the actual concentrations

For long-term releases the dispersion factors are presented as maximum annual averages, and for short-term releases, as maximum hourly averages. The factors for long term emissions are calculated using ADMS3, a roughness length of 0.1m. Short-term factors are also calculated with ADMS3 and roughness length 0.1m. For releases at ground level, meteorological conditions corresponding to PG Class F are used, and Class B for releases above ground level.

Note that these factors are already built into the software tool and are shown here for general reference. Linear interpolation is recommended for stacks of different height than those given in the table.

2. The tool will provide a summary of long-term and short-term predicted concentrations of substances. Where there is more than one release point, the PCs for each substance will be shown for each release point and also added together to calculate the total PC for the activities for that substance. Adding the PCs from all release points assumes a worst case situation which will tend to overestimation of the actual contribution. However, this is consistent with the precautionary approach of the initial screening process.

Screen Out Insignificant Emissions to Air

The tool identifies the emissions that warrant further investigation of their impacts, by screening out those which are emitted in such small quantities that they are unlikely to cause a significant impact on the receiving environment. This is done using the method below:

1. Compare the short-term and long-term process contributions (PC) of substances emitted to air against the relevant short term and long term environmental benchmarks for emissions to air[5].

2. Identify which emissions warrant further assessment by applying the criteria below:

$PC_{long\ term}$ > 1% of the long term environmental benchmark

$PC_{short\ term}$ > 10% of the short term environmental benchmark

Ensure that the same statistical basis for mass concentration as the environmental benchmarks is used.

Benchmarks, particularly those for statutory EQS, are often expressed on different time bases. Conversion factors for different averaging times are provided below:

Conversion factors for Different Averaging Periods

From ⇩ To ⇨	15 minutes	1 hour	8 hours	24 hours	1 week
1 hour	**1.34**	**1**	**0.7**	**0.59**	**0.31**

3. The calculations can be performed by the software tool and presented as a summary of the following information:

- short-term and long-term benchmarks for each substance
- process contribution of short-term and long-term emissions
- process contribution as a percentage of the relevant benchmark
- identification of insignificant emissions

[5] The most appropriate environmental benchmark will be selected by the tool for each substance. Most of the environmental benchmarks available for releases to air are based on occupational exposure data for human receptors. There are, in addition, a few benchmarks derived for critical levels for sensitive vegetation.

Identify Need for Detailed Modelling of Emissions to Air

The tool identifies the emissions that require detailed dispersion modelling in order to assess the potential risk of breaching an environmental benchmark. This is done using the method below:

1. Calculate the short and long term total Predicted Environmental Concentration (PEC) of PCs to air not screened out in the previous step should be calculated by summing the background concentration and the process contribution:

$$PEC_{air} = PC_{air} + \text{background concentration}_{air}$$

2. Identify which emissions warrant further assessment by applying the criteria below:

$PEC_{long\ term}$ > 70% of the long term environmental benchmark

$PC_{short\ term}$ > 20% of the short term environmental benchmark – 2X background $\text{concentration}_{long\text{-}term}$

Quantify Impacts of Emissions Deposited from Air to Land

There are no Environmental Quality Standards in the UK for releases to land by deposition and very little information is available to date from any source on suitable benchmarks.

The method used in the tool consists of two stages:

- qualitative and quantitative screening guidelines, to identify emissions that present a potential risk of environmental impact; followed by
- guidelines for the assessment of those emissions, to estimate their potential effects.

Screen out Emissions to Air that are Insignificant when Deposited to Land

1. Identify those substances released to air that warrant further investigation of deposition impacts, using the following guidelines. All other emissions to air can be screened from further assessment as they can be considered to be unlikely to cause an impact from deposition.

- Substances that are highly toxic, bioaccumulative or persistent should be investigated further.
- Emissions that contribute to acidification and eutrophication effects should be further investigated, where these are released by the installation in substantial quantities[6].
- For substances where a maximum deposition rate (MDR) is available, emissions that result in a process contribution (PC) that is greater than 1% of the MDR should be further investigated. The calculation below can be used to estimate PC_{ground}.

$$PC_{ground} = \frac{(PC_{air} \times RR \times DV \times 3 \times 86400)}{1000}$$

Where:

PC_{ground} = process contribution to daily deposition rate (mg/m^2 /day)

RR = release rate (g/s)
DV = deposition velocity (taken to be 0.01m/s)[7]

[6] Certain substances released to air result in acidification and eutrophication effects as they are deposited to land. These effects are usually a result of long-range transport of pollutants and there are several measures proposed which are intended to reduce these impacts: The National Emissions Ceilings Directive, the Large Combustion Plant Directive and the Directive on Sulphur Content of Liquid Fuels. The main industrial contributions are from large point sources such as power stations, refineries and integrated iron and steelworks. Operators of these major emitters should consult the Regulator over the circumstances when such effects might need to be determined and how to quantify and present any such effects.

[7] Dry deposition is affected by a number of factors including the characteristics of the atmosphere, the nature of the receiving surface and depositing material. The resistance to transfer from the atmosphere to receiving surface in the lowest layers of the atmosphere

The value of 3 is a nominal factor to convert dry deposition to total deposition and the value 86,400 is a correction factor from days to seconds.

PC_{air} = Process contribution to air, based on maximum annual average ground level concentration for unit mass release rate (µg/m^3 /g/s). Deposition from air to land is a long-term effect and values should be taken from derived values or from detailed dispersion models.

- For substances where no maximum deposition rate is available, emissions that result in a process contribution (PC) that is greater than 1% of the long term EAL or EQS to air should be considered for further investigation.
- Emissions that may have an effect on sensitive receptors within 10km of the installation should be considered for further investigation.

Calculate Process Contribution of Substances Discharged to Sewer

1. Estimate the corrected release rate of substances discharged to sewer, taking into account any further reduction taking place in the sewage treatment works[8]. This can be estimated from:

$$RC_{corr} = RC_{act} \times STRF$$

where:

RC_{corr} = corrected release concentration allowing for any attenuation of pollutant during sewage treatment (mg/l)

RC_{act} = actual release rate of pollutants discharged to sewer (mg/l)

STRF = sewage treatment reduction factor representing the remaining proportion of the pollutant in the effluent following treatment. Values for the sewage treatment reduction factor, STRF should be selected from the Table below, or where Operators have access to specific data regarding attenuation this may be used. In the latter case, the Operator should also provide details of the derivation of the attenuation factors used.

Substance	Sewage treatment reduction factor (STRF)
Substances not attenuated during sewage treatment (e.g. Cl, K, Na)	1 (i.e. no reduction)
other pollutants (e.g. biodegradable organics, insoluble metals)	0.6

2. The H1 software tool will calculate and present this information. This information should then be used in one of the following sections, depending on the final point of discharge from the sewage treatment works.

Calculate Process Contribution of Substances Released to Rivers

1. Calculate the process contribution of substances released to inland rivers from:

$$PC_{water} = \frac{(EFR \times RC)}{(EFR + RFR)} \times 1000$$

where:

PC = process contribution (µg/l)

imposes an upper limit on the value of the deposition velocity. In stable conditions this is 0.01m/s [ref Jones, 1983] and this value could be used to calculate the predicted concentration. A deposition velocity of this magnitude is generally appropriate for particles of less than 10mm and will be conservative for particles smaller than this.

[8] Where a release takes place first to sewer and is then treated at a sewage treatment works, the release rate can be modified to take account of pollutants removed during treatment. The pollutant may undergo physical, chemical and biological changes, which affect its form and concentration in the effluent and subsequent environmental impact on the receiving water. The extent of removal during sewage treatment will depend on the interaction between the properties of the substance, the degree of treatment and operational characteristics of the works.

EFR = effluent flow rate (m^3 /s)

RC = release concentration; concentration of the pollutant in the effluent[9] (mg/l)

RFR = river flow rate (m^3 /s)[10].

Note: If you already have detailed dispersion/dilution modelling data available that is valid for the activities in the assessment, then this should be used to derive the appropriate process contribution instead of the method above. The Operator should identify where this is the case by inputting the modelled data into the software as prompted.

2. Provide a summary table of the process contribution of releases to water for each option[11]. The H1 software tool will calculate and present this information.

Calculate Process Contribution of Substances Released to (non-Saline) Estuaries

1. Identify whether the conditions at the point of discharge are freshwater or saline dominated[12]. If freshwater dominated, follow the procedure below. If saline dominated, the method for coastal waters should be used in the following section.

2. If the conditions are freshwater dominated, estimate the process contribution from:

$$PC_{water} = \frac{EFR \times RC}{DR_e} \times 1000$$

where

PC = process contribution (µg/l)

EFR = effluent flow rate from the process (m^3 /s)[13]

RC = concentration of pollutant in the effluent (mg/l)

DR_e = dispersion rate (estuary) (m^3 /s)

Where available, site-specific values for dispersion rate should be used (consult the local Regulator for advice). However, where these data are unknown, an appropriate value from those shown in the Table below may be used. These values are representative of typical conditions in UK estuaries. This does not take into account the flushing time of the estuary, negatively buoyant plumes and changes to the dispersion during the tidal cycle.

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[9] Where a release takes place to sewer and is then treated at an inland sewage treatment works, the release concentration (RC) should be modified by the factor calculated. Note that where water is abstracted from non-mains supply, it is any additional increase in emission concentration for a given substance over the background level, which should be used to calculate the environmental impact in this methodology.

[10] Site specific values for river flows should be used. Where river flows are subject to significant seasonal fluctuations in flow, the assessment should consider the low flow situation as the worst case. Information on river flow rates can be obtained from the UK Hydrometric Register [Ref ISBN 0948540842], the Institute of Hydrology (CEH Wallingford) http://www.nwl.ac.uk, or the Northern Ireland Rivers Agency (02890 253 379).

[11] Where the same substance is released into the same receiving watercourse from different discharge points, the individual process contributions can be combined. This methodology assumes, for simplification purposes, that the contribution of the diluted effluent from discharge points that are in reasonable proximity can be regarded as being diluted within the same volume of water. Where discharges are made to different watercourses, the assessment should be carried out separately.

[12] Estuaries are considered to extend as far upstream as the tidal limit. The dispersion of substances within the estuary environment is complex and will be highly site-specific. However, for this calculation procedure developed for simple screening purposes, it has been assumed that estuaries are of two types, those dominated by freshwater flows and those, which are predominantly saline. In the case of freshwater estuaries, dispersion is assumed to occur mainly as a result of the effects of current. However, for saline dominated estuaries dispersion may occur either through buoyancy (assuming the effluent is freshwater) or current effects. If the conditions for current dominated dispersion are not satisfied, buoyancy dominated dilution applies and the calculation procedure for coastal waters should be used. Estuaries in England and Wales are typically current dominated. Information on the nature of estuarine conditions may be obtained from the Regulator at the relevant local office.

[13] If releases are discharged to sewer prior to treatment in an estuary sewage treatment works, then the estimated release rate should be modified by the factor calculated.

Estuary Type	Nominal Dilution Conditions	Dispersion Rate (estuary), DRe (m^3 /s)
Freshwater	Low	2.4
	Medium	5
	High	10

Note: If you already have detailed dispersion/dilution modelling data available that is valid for the activities in the assessment, then this should be used to derive the appropriate process contribution instead of the method above. The Operator should identify where this is the case by inputting the modelled data into the software as prompted.

3. Provide a summary table of process contributions of releases to water[14]. The H1 software tool will calculate and present this information.

Calculate Process Contribution of Substances Released to Coastal Waters

1. If the releases are to coastal waters or a saline-dominated estuary, estimate the predicted concentration of substances releases from:

$$PC_{water} = \frac{(EFR2/3 \times RC)}{DR_c} \times 1000$$

where:

PC = process contribution (µg/l)

EFR = effluent flow rate (m^3 /s)[15]

RC = concentration of pollutant in the effluent (µg/l)

DR_c = dispersion rate (coastal waters) (m^2 /$s^{2/3}$).

Where available, site-specific values for dispersion rates should be used. However, where these data are unknown, an appropriate dispersion rate for those given in the Table below may be used, depending on whether the discharge is to a saline estuary or coastal waters. Advice may be sought from the Regulator at the relevant local office.

Estuary Type	Nominal Dilution Conditions	Dispersion Rate (coastal waters) , DRc (m^2 /$s^{2/3}$)
Coastal waters	Low	2.5
	Medium	8
	High	25
Saline estuaries	Low	2.4
	Medium	5
	High	15

These represent the initial dilution, which takes place between the point of discharge at depth (5 - 20m) and the water surface. No allowance has been made for any subsequent dispersion.

Note: If you already have detailed dispersion/dilution modelling data available that is valid for the activities in the assessment, then this should be used to derive the appropriate and process contribution instead of the

[14] Information on ambient current speed can be obtained from the Regulators at the relevant local office.

[15] Where a release takes place to a coastal sewerage system then the estimated release rate should be modified by the factor calculated.

method above. The Operator should identify where this is the case by inputting the modelled data into the software as prompted.

2. Provide a summary table of process contribution of releases to coastal waters. The H1 software tool will calculate and present this information.

Screen out Insignificant Releases to Water

1. Identify the emissions that warrant further investigation of their impacts, by screening out those which are emitted in such small quantities that they are unlikely to cause a significant impact on the receiving water. This should be done using the method below:

- Compare the process contribution (PC) of each substance emitted against the relevant environmental benchmark for the substance.[16]
- Identify which releases can be screened by applying the criterion below: an emission may be screened out where PC < 1% of the environmental benchmark[17].

This should be carried out for long term and short-term emissions, where relevant, ensuring that the same statistical basis for mass concentration as the environmental benchmarks is used. For some substances EALs are available as annual average concentrations and 95 percentile or maximum allowable concentrations (MAC). Annual average criteria should be used for long term releases. Where appropriate information on the flow regime and ambient pollutant concentrations is available to judge whether short term releases are relevant, then the 95 percentile and MAC criteria should be used to assess the short-term impact of these releases. Note also that some EALs are specific to water hardness

2. Present the information for each option according to the format provided in the H1 software tool.

[16] The most appropriate environmental benchmark should be selected for each substance. The environmental benchmarks available for releases to water are based on a variety of sources. In selecting the appropriate benchmark or standard the Operator should consider first the type of receiving water, i.e. whether it is inland, estuarine or coastal. EALs for inland water are provided for designated fisheries and more generally for aquatic life. Environmental criteria listed under aquatic life refer to salmonid and cyprinid use. Where more than one requirement might be applied to a particular stretch of water, the most stringent should be applied. Where EALs are not available for substances, the Operator should discuss this requirement with the local Regulator who, if necessary, can obtain appropriate advice.

[17] A criterion of 1% is suggested for screening of releases to water. Note that the screening test does not take the existing environmental quality into account, which can be the dominant contribution for long-term releases rather than the long-term process contribution itself. Nonetheless, a criterion of 1% is two orders of magnitude below the maximum acceptable concentration for the protection of the environment, building in a substantial margin of safety. Even if the existing ambient quality meant that an EQS or other benchmark was already at risk due to releases from other sources, a contribution from the process of less than 1% (which is in itself likely to be an overestimate) is only a small proportion of the total. It should also be noted that the setting of this criterion is to a certain extent pragmatic, taking into account the accuracy of the estimated process contributions and an analysis of the level at which emissions do not tend to influence BAT decisions. To date there is insufficient information for releases to water to justify selecting a less stringent screening criterion. However, ongoing work being conducted by the Regulators may provide evidence to justify revision of this criterion in future.