Environment Agency

H1 Software Tool User Guide

Version 2.74

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The Environment Agency. Out there, making your environment a better place.

Published by:

Environment Agency
Horizon house, Deanery Road
Bristol BS1 5AH
Tel: 0117 934 4000
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

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Executive summary

Operators of activities listed under the Environmental Permitting Regulations use the Environment Agency's horizontal guidance series H1 in support of their permit applications. The H1 series of documents guides operator's through a series of risk assessments which enables them to demonstrate how their activities will be managed so that the impact on their local environment is acceptable to the Environment Agency. The H1 series is supported by a database tool that enables operator's to quantify the environmental risk posed by their activities against a series of defined parameters. This user guide is written to assist operators in the use of that tool.

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1 H1 Software Tool user guide

1.1 Introduction

This document is provided to help users of the Environment Agency's H1 Software Tool, version 2.7.4. This guide reflects the latest updates to the software tool which includes changes made following the 2013 public consultation and in the value of Environmental Quality Standards which are applicable in the assessment of discharges to surface waters from 15th December 2015.

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, for deposition onto land, or for discharges to water 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. Prior to submitting an application for a new or modified permit, guidance is provided by Environment Agency area teams and this includes discussions on appropriate stack heights.

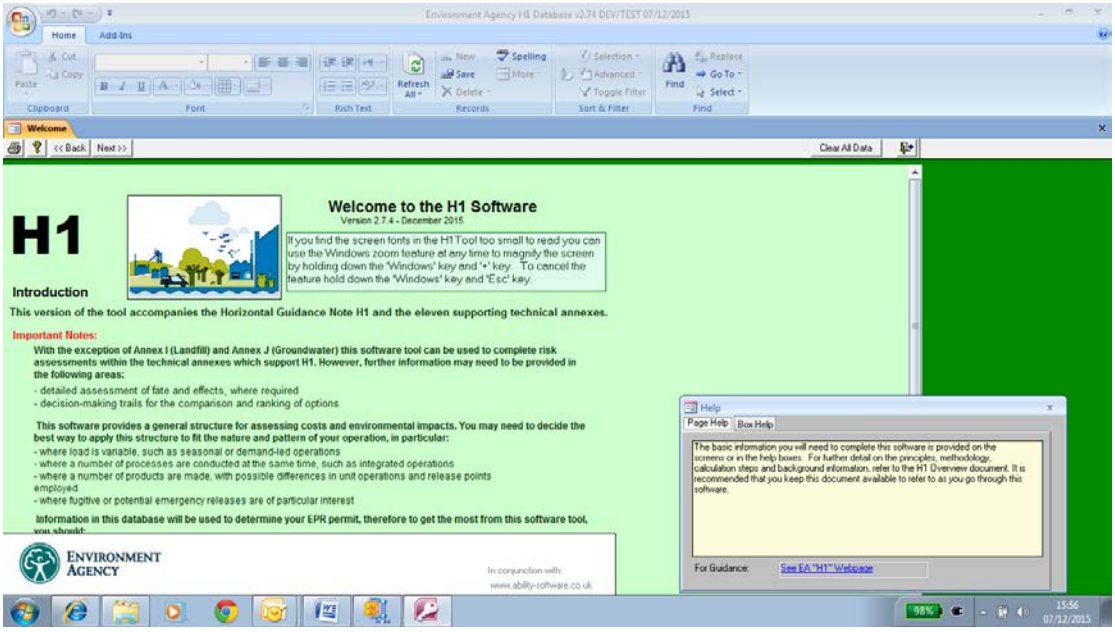
Before use the tool should be downloaded to the user's computer hard drive, unzipped, saved and then opened using Microsoft Access. The tool contains a series of macros which must be enabled before use. The tool is based on Microsoft Access 2007. If the user possesses a later version the link to a Microsoft file converter may be required to enable the tool to open and function correctly. We can provide a copy of this file converter should you need it. Again ask the NCCC for assistance. Telephone 03708 506 506 or email enquiries@environment-agency.gov.uk

1.2 Using the tool

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

1. ‘help’ pages on each page of the tool,
2. within this user guide, and
3. by contacting the Environment Agency.

On opening the tool the front screen below appears. The front screen includes a new ‘clear all data’ key which enables a new start should the user require it. In normal use the tool saves data entries when the user moves onto the next page. Should further scenarios require assessment the user is recommended to make copies of the tool before entering any data.

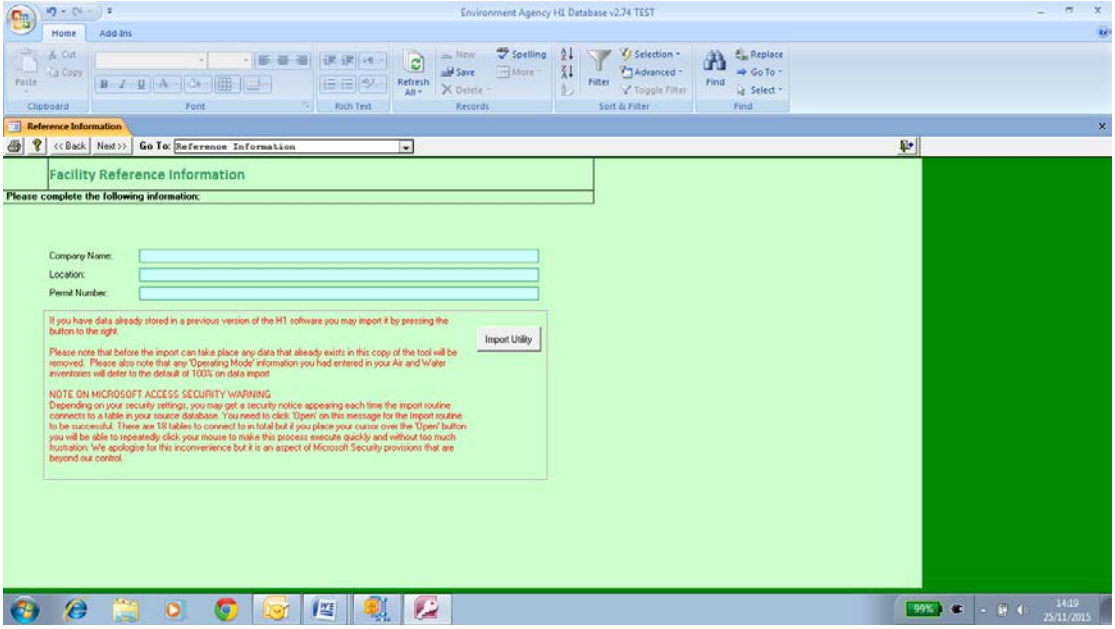


Blue cells within the tool highlight the need for data entry by the user.

‘Box’ help within the Help pages gives advice on the specifics of what should be entered in each blue cell. Within each ‘Help’ window the user is pointed towards the government’s web page Gov.UK. By clicking within the window a scroll bar appears which may reveal more text lower down. The Help window may be cancelled using the ‘X’ on the window and restored using the ‘question mark’ key on the top toolbar.

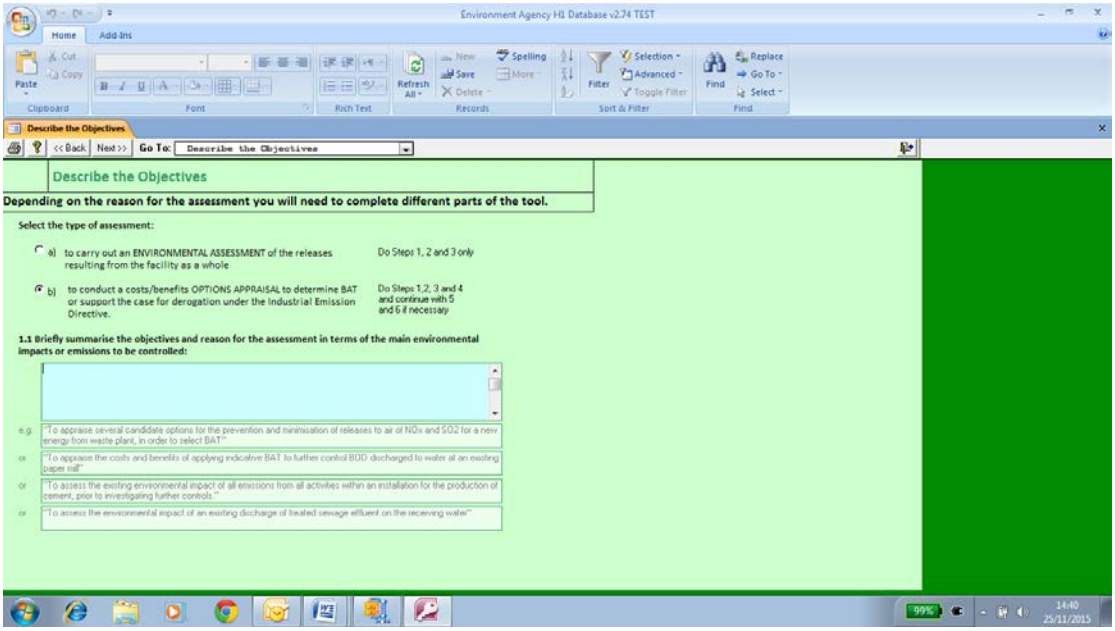
Comment boxes are available at the bottom of each data entry page enabling the user to clarify any points they wish to make.

An ‘Import utility’ button on the Reference Information page enables the user to upload a previous tool dataset. This can save the user time if wanting to simply modify a previous entry, for example in support of a permit variation application.

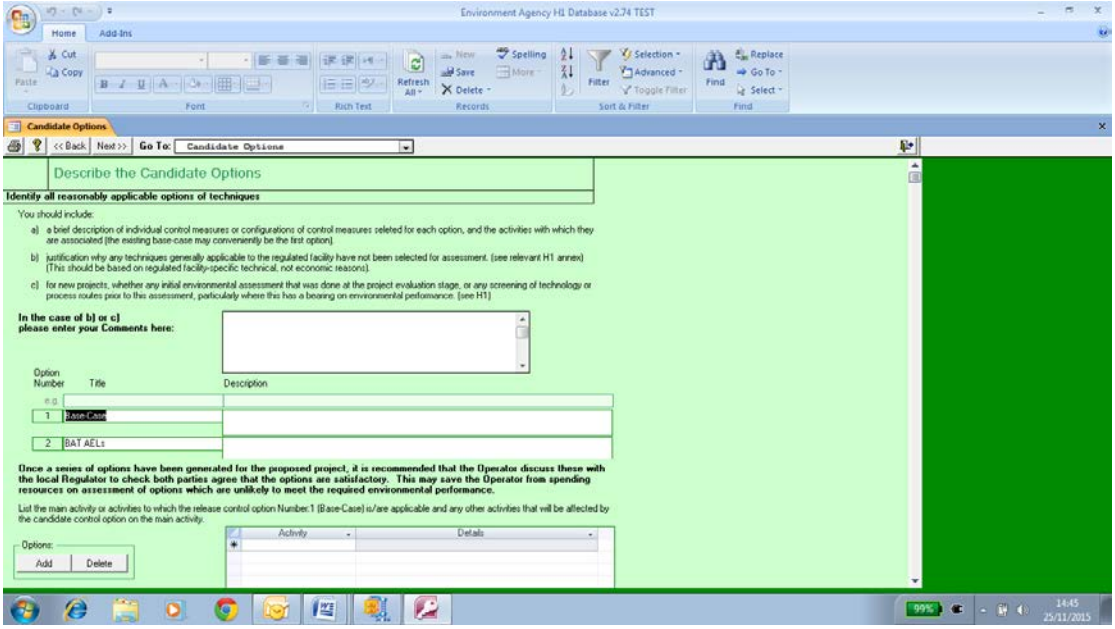


By selecting the appropriate button in the page ‘Describe the Objectives’ the user is required to choose between a simple assessment and a more detailed evaluation. Called the ‘Options Appraisal’ this enables users to include more than one option to secure environmental protection and each option can then be ranked on the basis of cost effectiveness. This enables the Best Available Technique (BAT) to be identified, but is not suitable to support a case for derogation from the BAT Achievable Emission Levels (AELs) specified in BAT Conclusions documents. Such assessments should be progressed by reference to H1 Annex K.

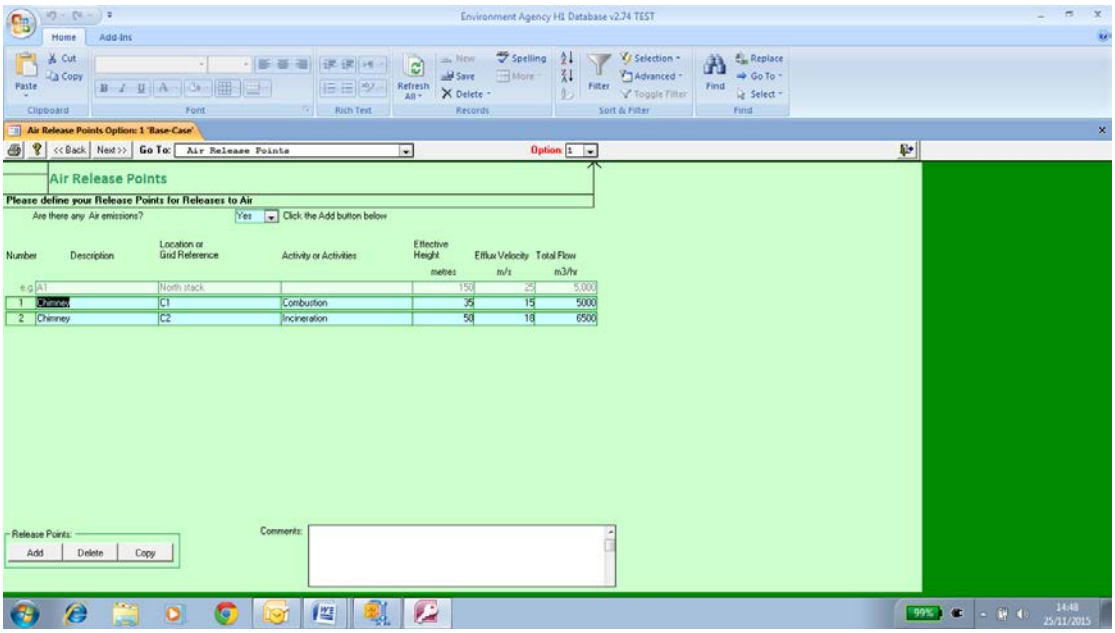
Please note that whichever option is chosen Steps 1, 2 and 3 of the tool are common with screening results presented graphically at the end of Step 3. It is only when more than one option is being evaluated that Steps 4, 5 and 6 come into play.



If the ‘Options Appraisal’ button is selected the user has the opportunity to add different options to their assessment. Where this relates to an existing site the present mode of operation is called the ‘Base Case’.



If the Environmental Assessment button is chosen the tool moves on to 'Scope of the Environmental Assessment' and then Step 2. The first part of Step 2 is 'Air release points'. Note in this example the 'Option' button is highlighted at the top of the window.

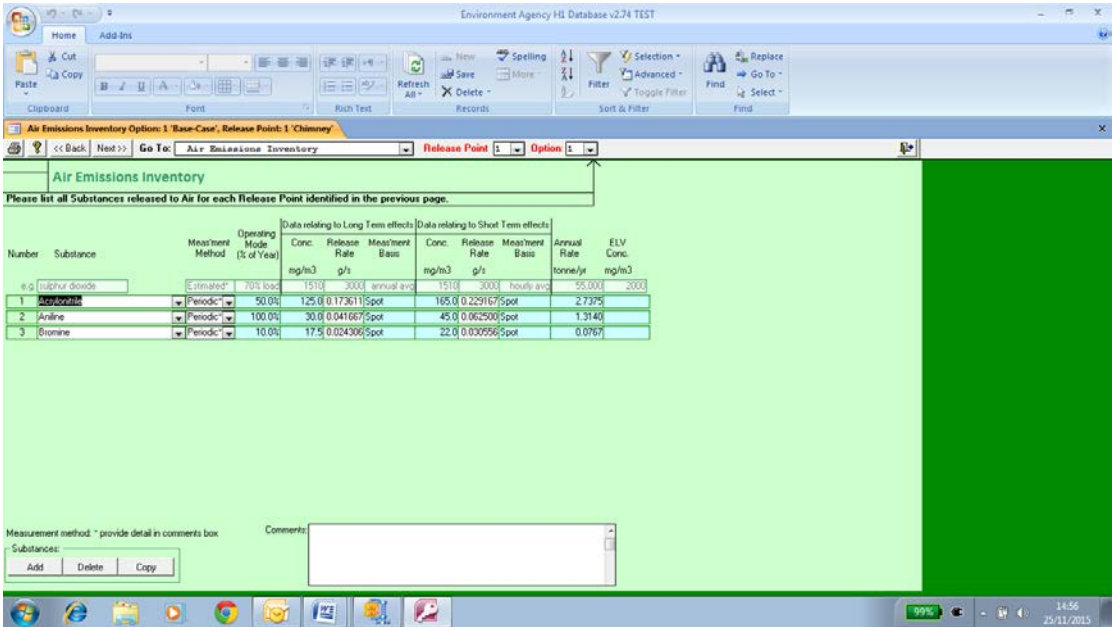


Users may find the 'Go To' drop down menu on the top tool bar useful in navigating across different pages within the tool. This is particularly useful when more than one option is being considered.

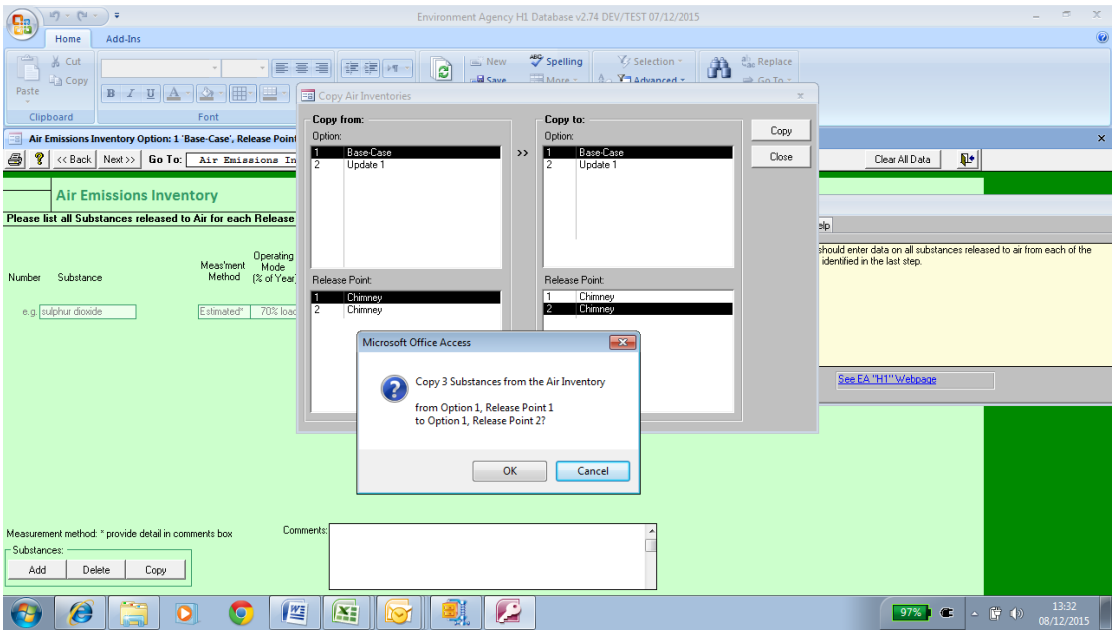
This page enables release points to be added using the 'Add' button in the bottom left corner of the page. To identify the effective height of release users are referred to air emissions guidance Annex F which explains how the effective height of release may be determined.

On the following 'Air Emissions Inventory' page 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

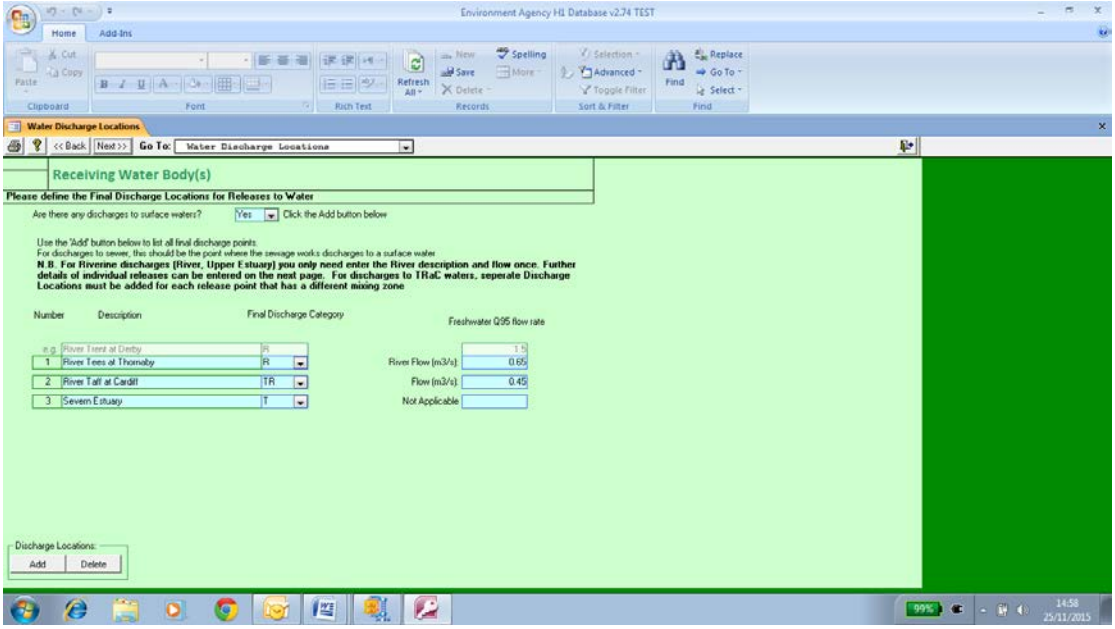
operating mode data the tool calculates the annual release of each substance in tonnes.



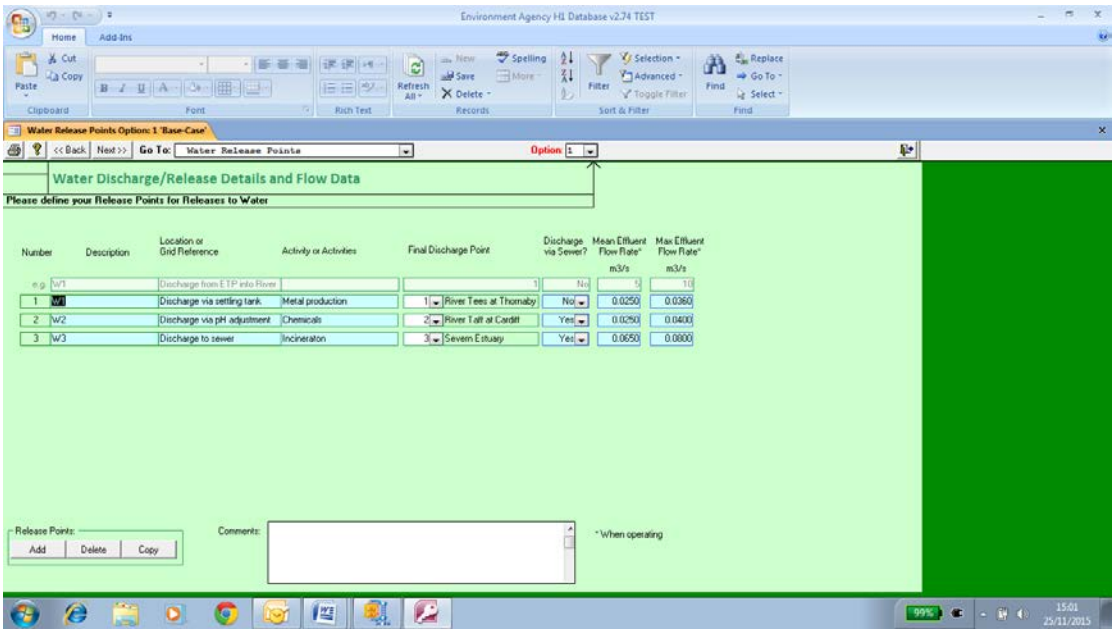
If you have more than one release point you can copy the substances from one release point to another if that would help your data entry. The screen shot below shows the outcome.



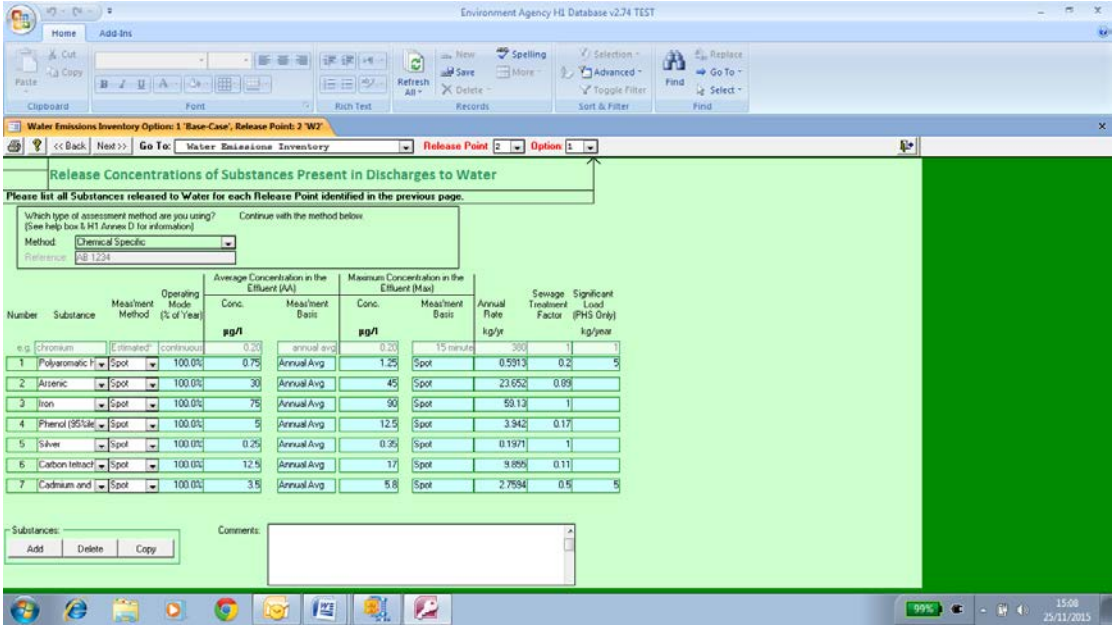
The following page starts the data entry for surface water releases. In entering 'water discharge locations' the user must select the 'final discharge category' to trigger the subsequent calculations and selection of the relevant Environmental Quality Standards (EQS). Freshwater locations require entry of the freshwater flow rate.



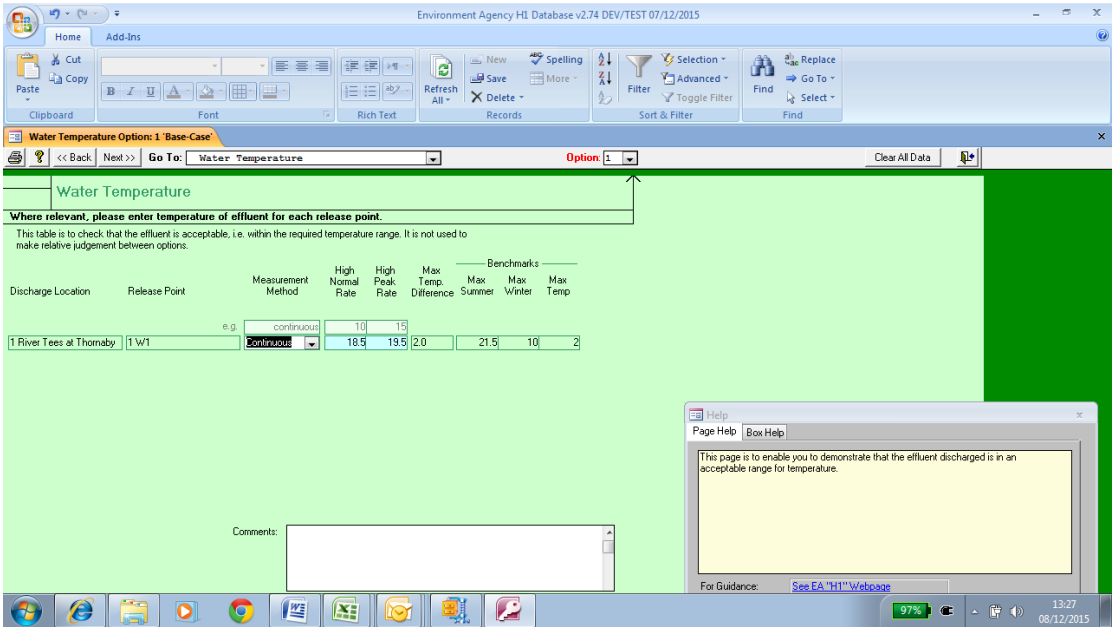
Within the 'Water Release Points' page new locations are added using the 'Add' button at the bottom left corner of the page. The user selects the relevant discharge location to which each release point refers. Data on mean and peak effluent flow rates are required for entry here. To avoid confusion users are recommended to enter the mean flow rate before the maximum flow rate. If the mean flow entered is greater than the maximum flow an error message appears prompting a correction.



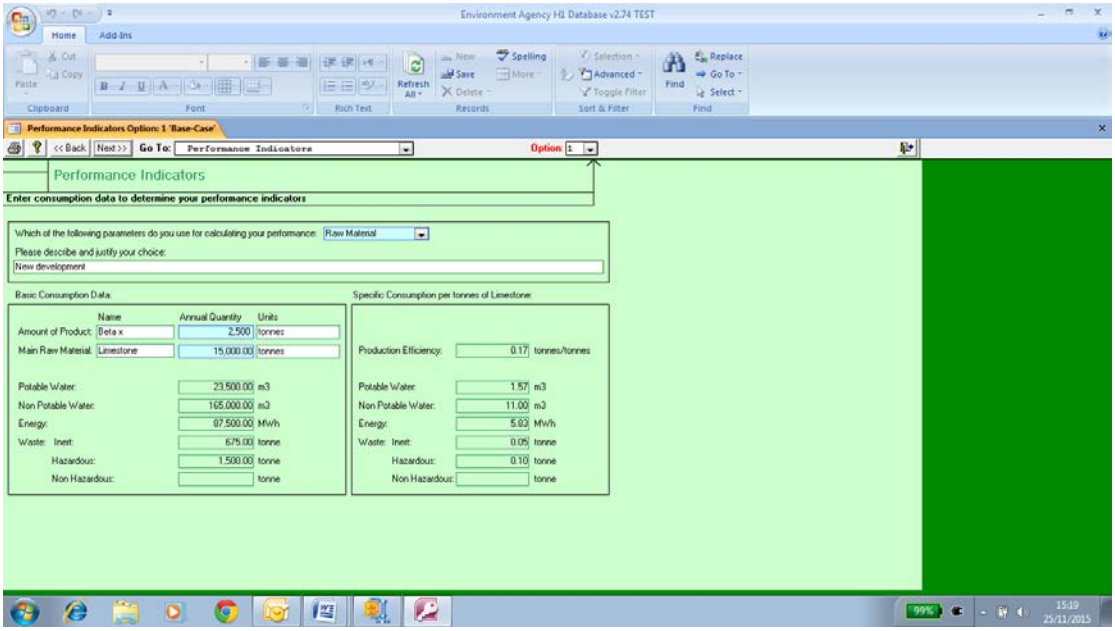
The user has the option to choose 'discharge to sewer'. This enables the effect of passing the effluent through a treatment plant or sewage works before the discharge reaches the environment. Substance retention factors are given for the majority of substances in Annex D1 of the H1 series of documents. By reference to Annex D1 the user should enter the amount of substance remaining after treatment. For example, for Arsenic the removal factor is 11% and so 0.89 is entered as the proportion of the substance remaining after passage through the effluent treatment process.



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%. The ‘annual rate’ is calculated by the tool from the mean flow rate and mean effluent concentration entered by the user. If a Priority Hazardous Substance (PHS) if selected the tool displays the significant load in kg/yr. ‘Water temperature’ and ‘Water pH’ are available to enable the user to demonstrate the proposed impact of their discharge on surface fresh waters.



Data entry for pages on ‘Energy Consumption’, ‘Raw Materials’ and ‘Waste Inventory’ can be made using the ‘Add’ button in the bottom left corner of the page. Taken together with data on annual releases, calculations can be made in terms of the performance of the proposal. This display is limited to the ‘environmental assessment’ option.

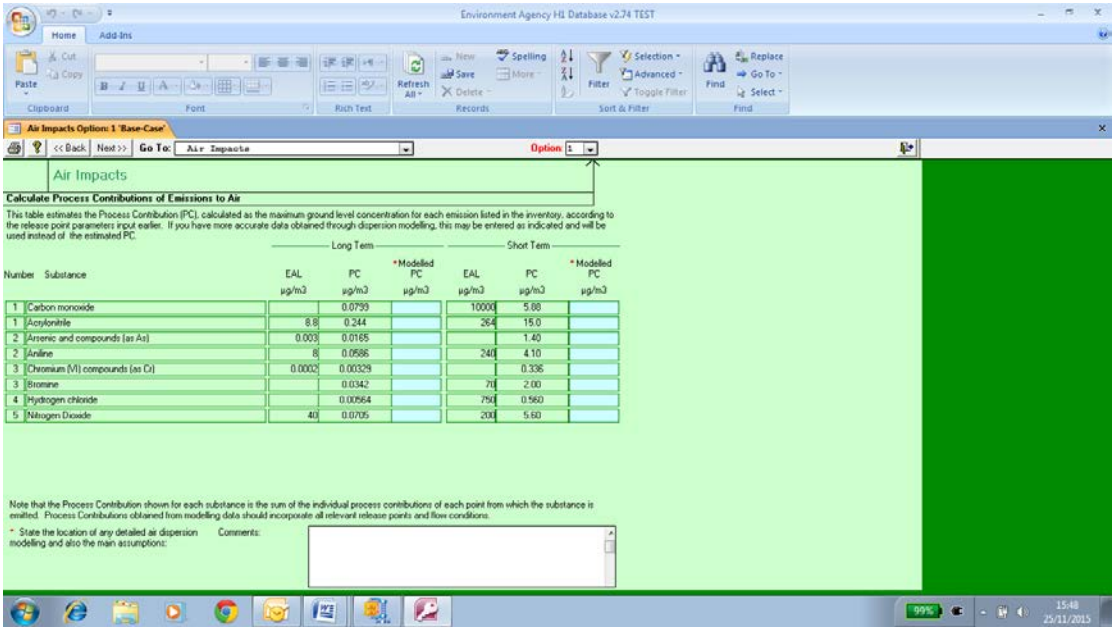


Raw material use, energy consumption and Waste Inventory data may be entered at the end of Step 2 to enable comparison between options later on.

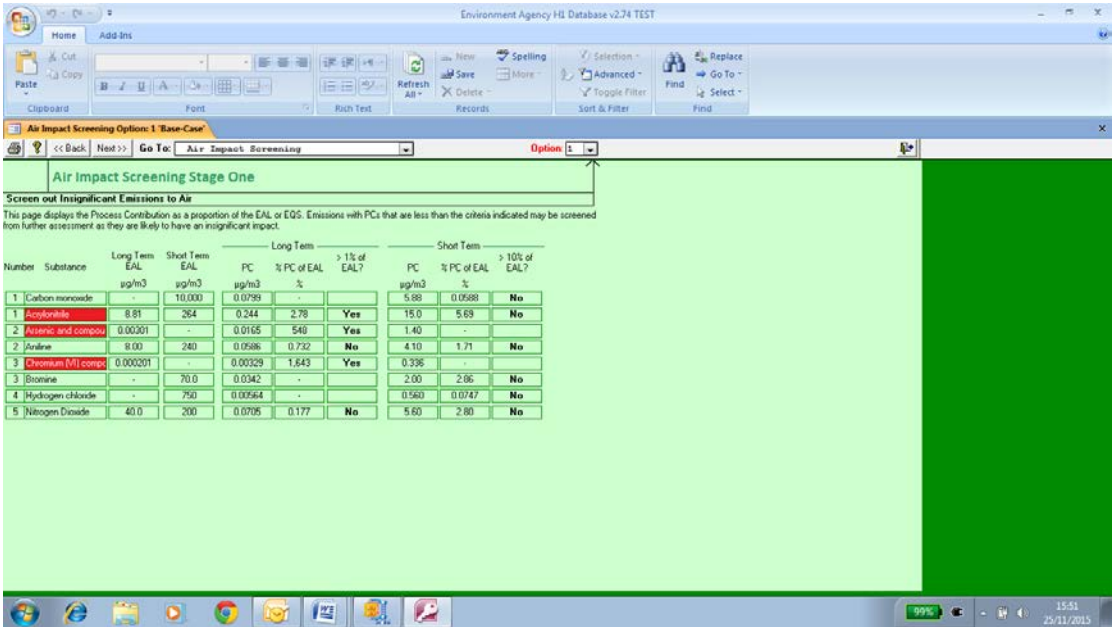
The results of the assessment are presented in Step 3. This enables identification of those releases which present an insignificant impact to the local environment. The remaining releases may need to be subjected to a more detailed assessment, depending on the outcome of the relevant screening process. As a general principle those substances which are not screened out have their identity cells coloured red.

The first part of Step 3 is where the various assessment categories are identified by placing a tick in the relevant box. If releases to a particular category are included in the assessment and not ticked on this page a justification is required.

For air releases Step 3 begins with the 'Air Impacts Page'. Here the resulting PC is compared to the substance EAL.

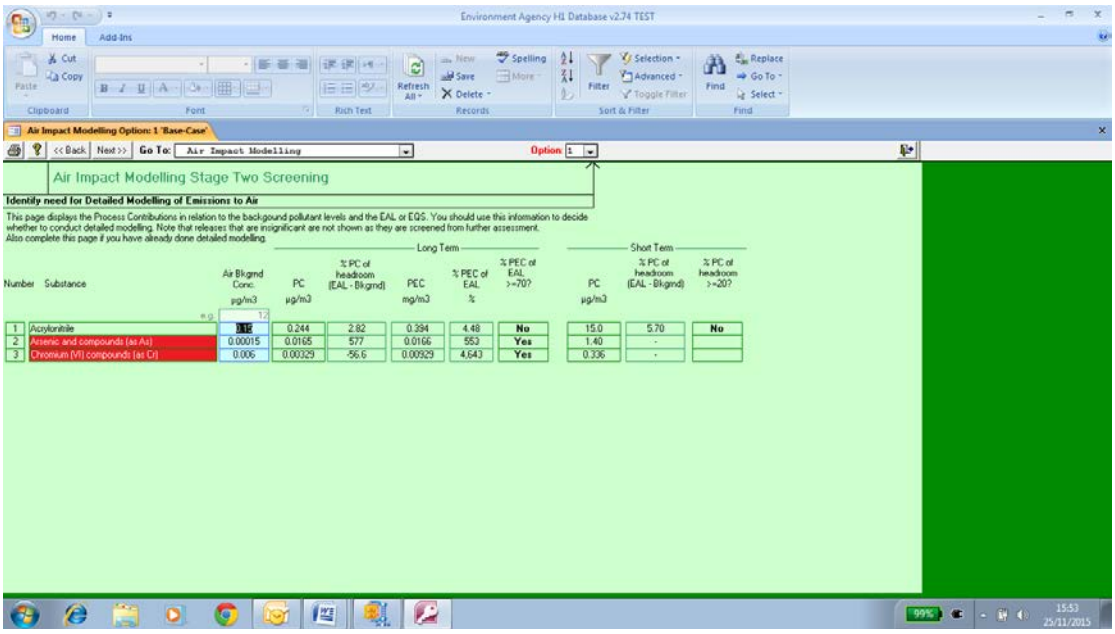


The following two pages display the calculation of the process contribution (PC) and the predicted environmental concentration (PEC).



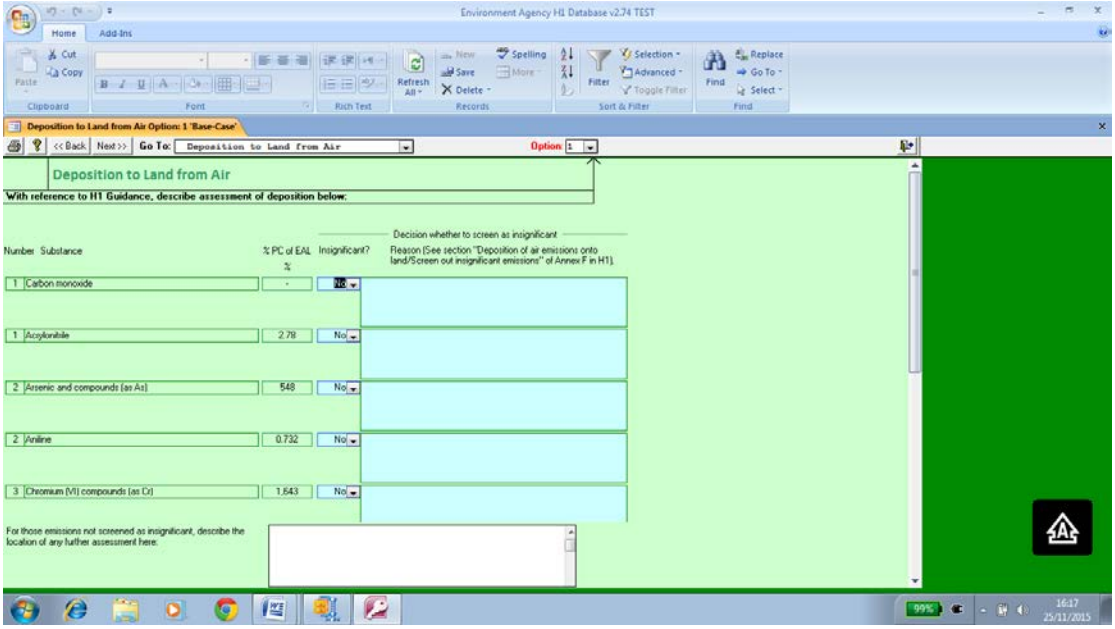
Number	Substance	Long Term EAL µg/m3	Short Term EAL µg/m3	Long Term PC µg/m3	Long Term % PC of EAL %	Long Term > 1% of EAL?	Short Term PC µg/m3	Short Term % PC of EAL %	Short Term > 10% of EAL?
1	Carbon monoxide	-	10,000	0.0799	-		5.88	0.0588	No
1	Acrylonitrile	8.81	264	0.244	2.78	Yes	15.0	5.69	No
2	Arsenic and compou	0.00301	-	0.0165	549	Yes	1.40	-	
2	Aniline	8.00	240	0.0586	0.732	No	4.10	1.71	No
3	Chromium (VI) compo	0.000201	-	0.00329	1,643	Yes	0.336	-	
3	Bromine	-	70.0	0.0342	-		2.00	2.86	No
4	Hydrogen chloride	-	750	0.00564	-		0.560	0.0747	No
5	Nitrogen Dioxide	40.0	200	0.0705	0.177	No	5.60	2.80	No

Operation of the two stage screening process to identify insignificant releases requires comparison with the environmental assessment level (EAL) for the substance in question. The value of the substance EALs is hidden within the tool and automatically activated when the substance is selected at the Air Emissions Inventory Page. Note that only those substances with red identity cells are carried forward to stage two of the screening process. Hence only the release of those substances coloured red at this stage require more detailed assessment of their environmental impact.

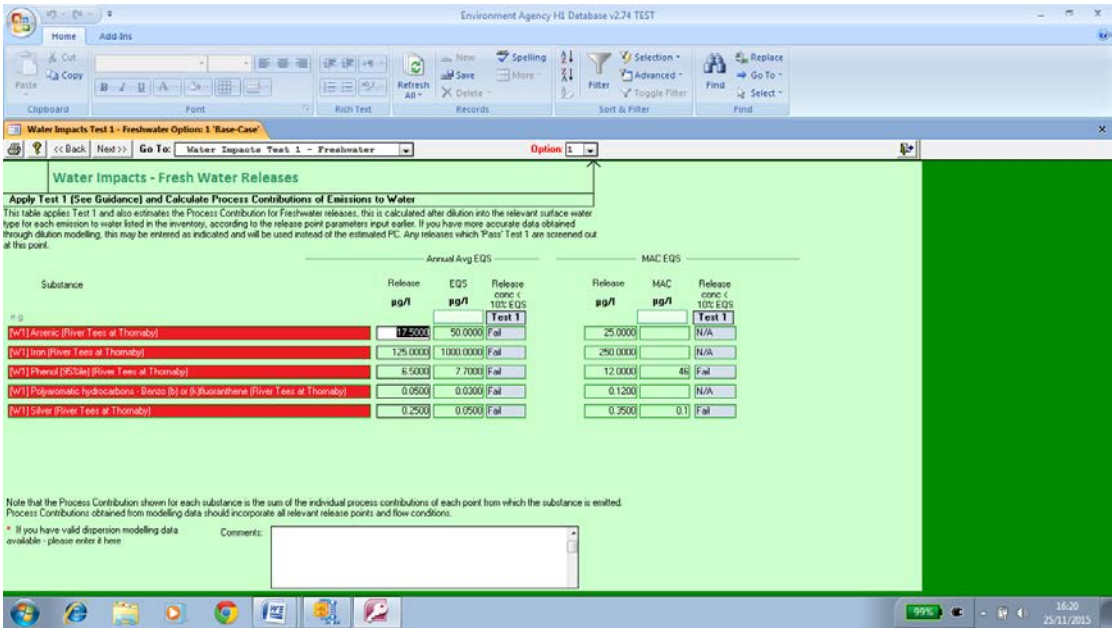


Number	Substance	Air Bkgrnd Conc. µg/m3	Long Term PC µg/m3	Long Term % PC of headroom (EAL - Bkgrnd)	Long Term PEC mg/m3	Long Term % PEC of EAL %	Long Term % PEC of EAL >=70?	Short Term PC µg/m3	Short Term % PC of headroom (EAL - Bkgrnd)	Short Term % PC of headroom >=20?
		e.g. 12								
1	Acrylonitrile	12	0.244	2.82	0.394	4.48	No	15.0	5.70	No
2	Arsenic and compounds (as As)	0.00015	0.0165	577	0.0166	553	Yes	1.40	-	
3	Chromium (VI) compounds (as Cr)	0.006	0.00329	-56.6	0.00929	4,643	Yes	0.336	-	

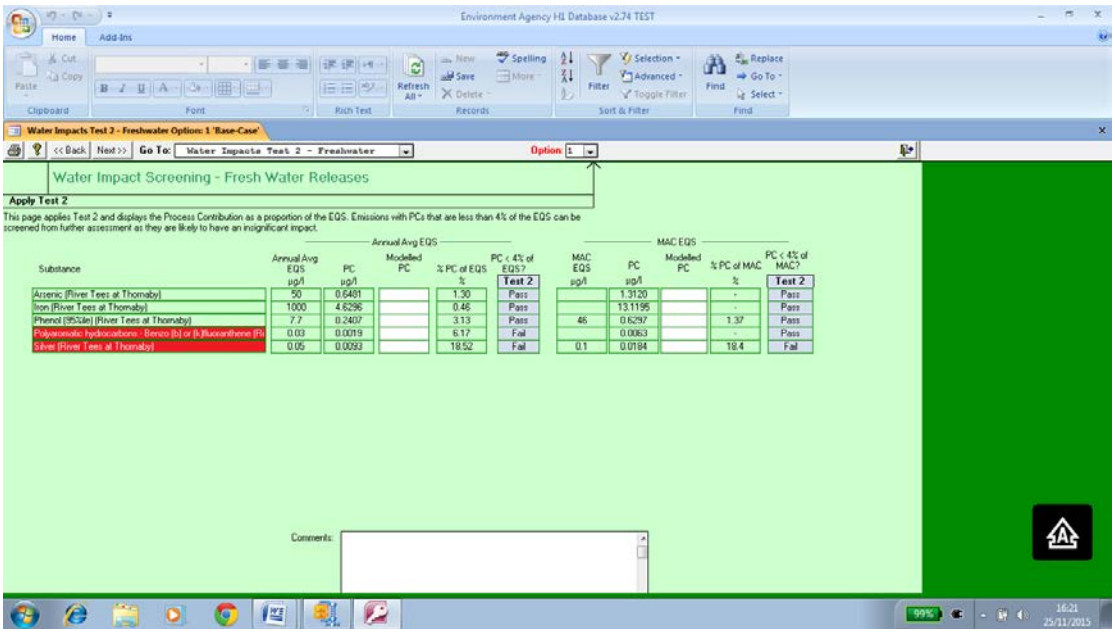
Assessment of the impact of deposition of substances from air to land is summarised below. The PC is carried forward from the Stage One screening process and the user identifies insignificant releases by reference to Annex F.


Environment Agency H1 Database v2.74 TEST
Home
Add-Ins
Deposition to Land from Air Option: 1 'Base-Case'
<< Back
Next >>
Go To:
Deposition to Land from Air
Option
Deposition to Land from Air
With reference to H1 Guidance, describe assessment of deposition below:
Decision whether to screen as insignificant
Number
Substance
% PC of EAL
Insignificant?
Reason (See section "Deposition of air emissions onto land/Screen out insignificant emissions" of Annex F in H1).
1 Carbon monoxide
1 Acrylonitrile
2.78
2 Arsenic and compounds (as As)
548
2 Aniline
0.732
3 Chromium (VI) compounds (as Cr)
1.643
For those emissions not screened as insignificant, describe the location of any further assessment here:

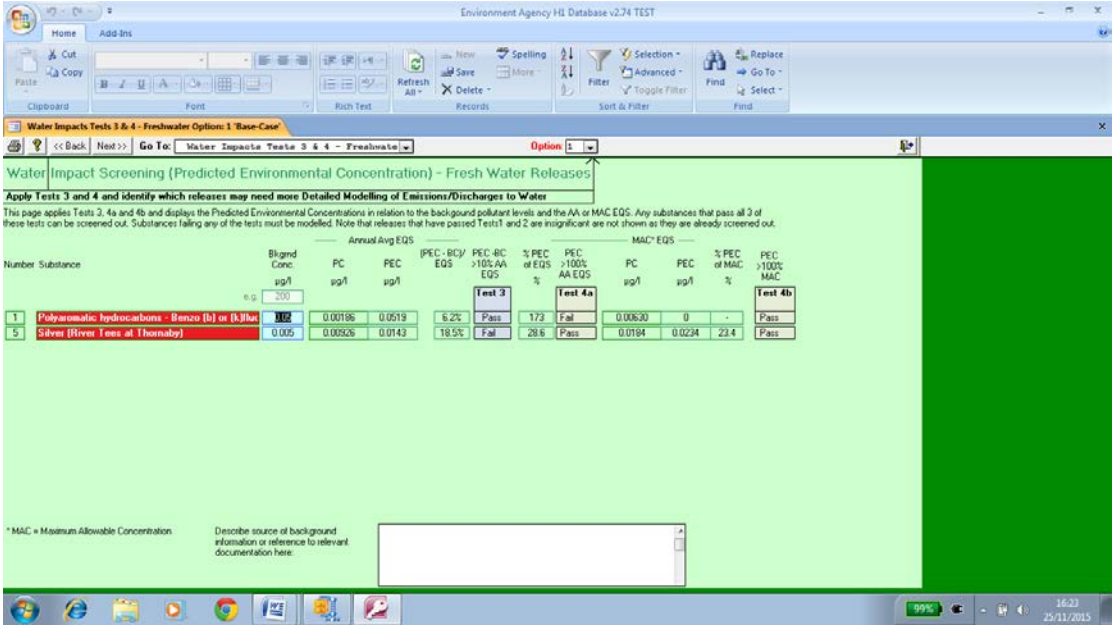
Fresh water releases are the first part of the water impacts assessment. In Test one the concentration of the substance in the release is compared to 10% EQS and those substances not screened out see their name cells coloured red.



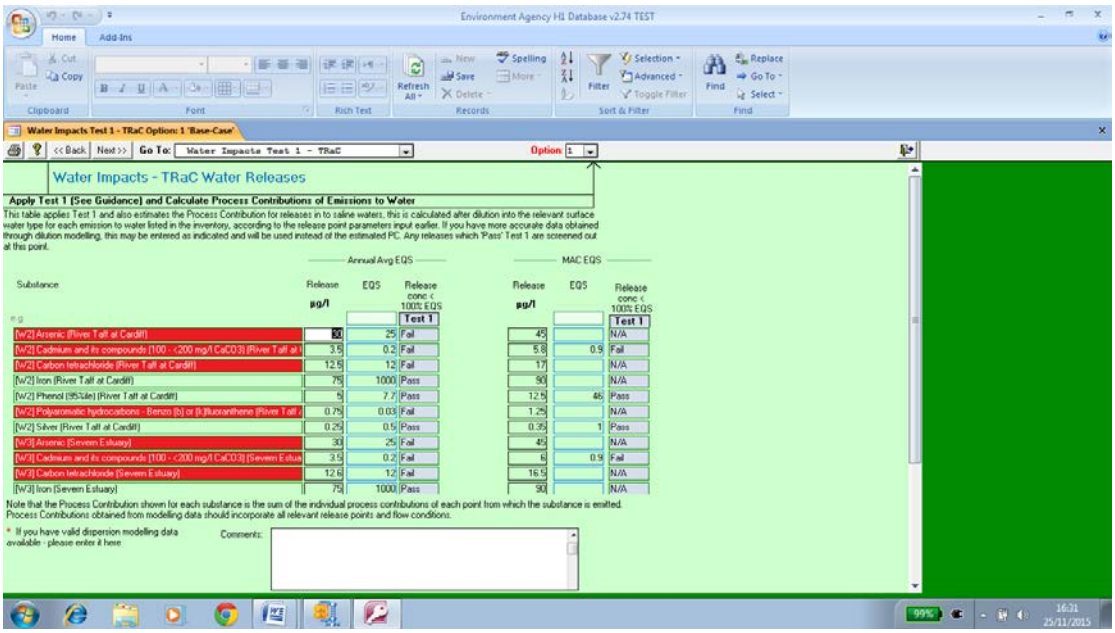
Test two follows comparing the PC with 4% EQS. This test is carried out for EQS expressed as annual average (AA) and maximum allowable concentration (MAC).



Finally, the PEC is assessed in Test 3 and Test 4. Test 4 determines whether the PEC exceeds the EQS for AA and MAC. In this example the release of PAH and Silver need detailed assessment.

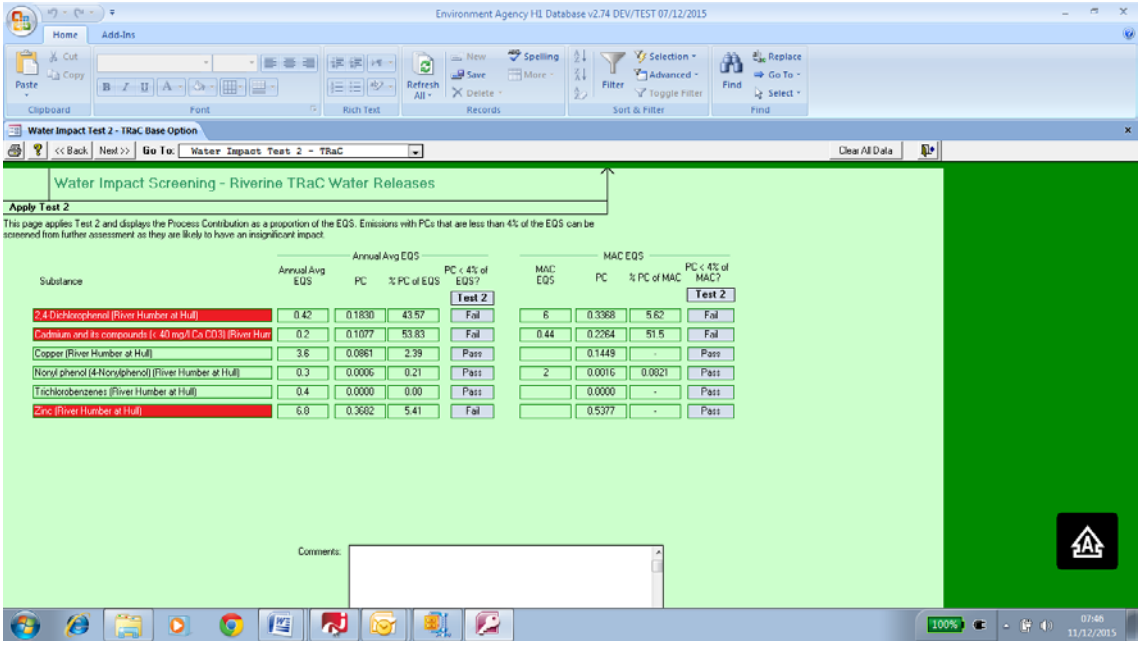


TraC water assessments includes releases to both upper estuarine environments, described here as 'TraC Riverine', and lower estuarine and coastal environments. So in this example releases to W2 (River Taff at Cardiff) and W3 (Severn Estuary) are included. Depending on your screen resolution you may need to use the travel arrow on the right hand margin to see all the substances listed.

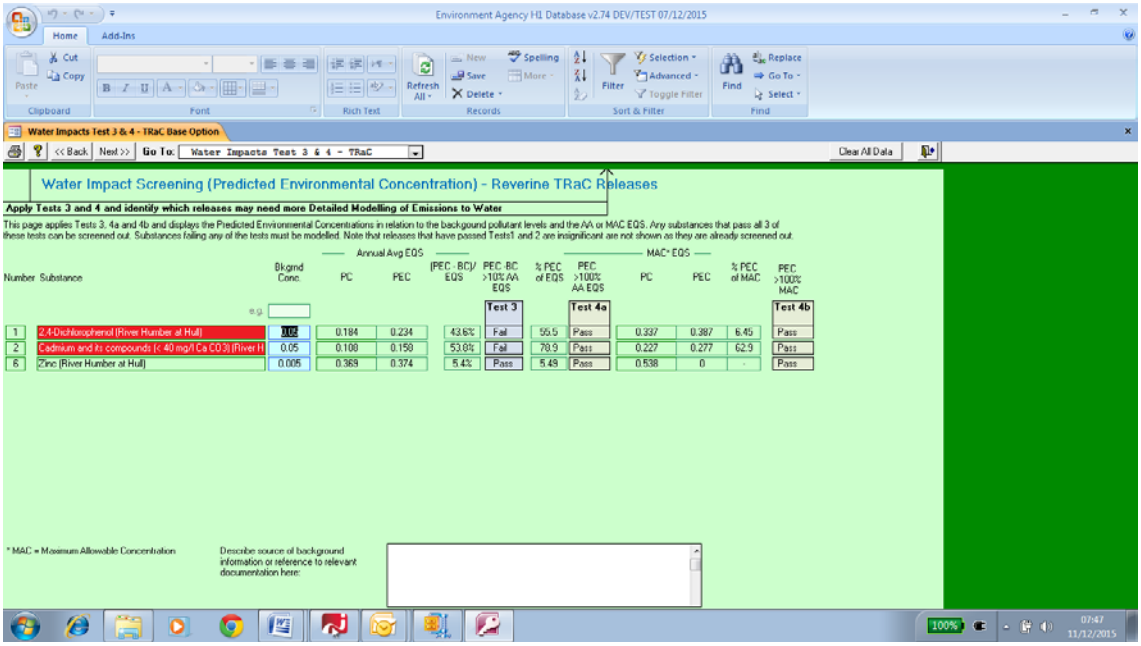


The substance release concentration is compared to the EQS. Screened out substances retain uncoloured name cells.

Test 2 for 'Riverine TraC' discharges takes the assessment back to freshwater assessments where the PC is compared to 4% of the EQS.

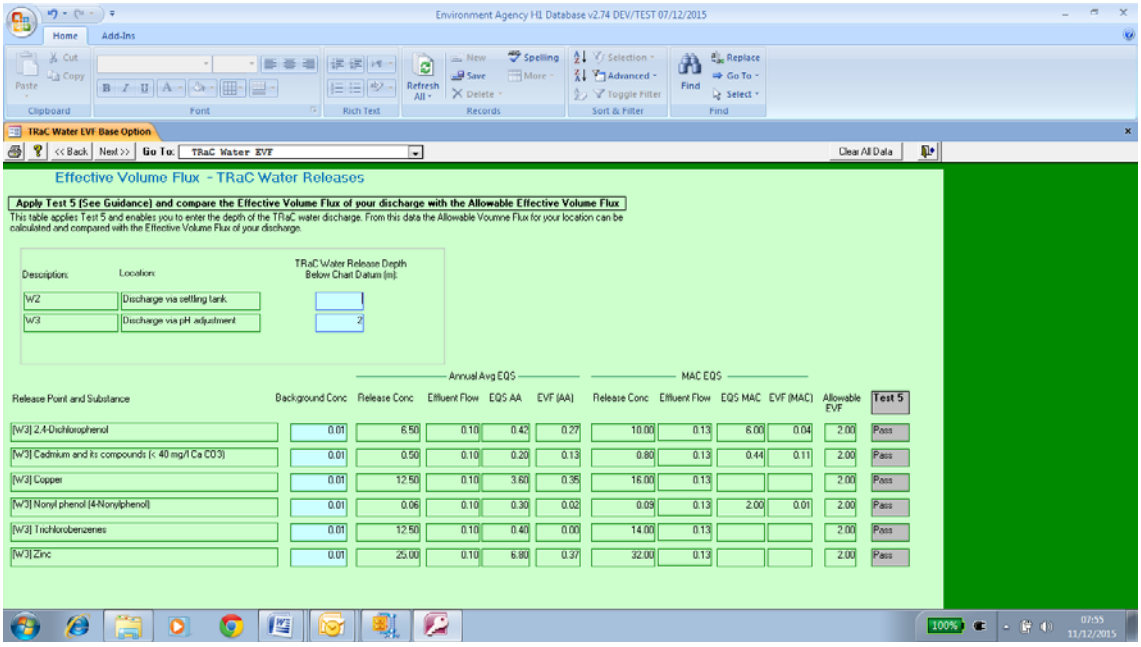


The usual screening approach applies with red cells being carried forward to Tests 3 and 4.



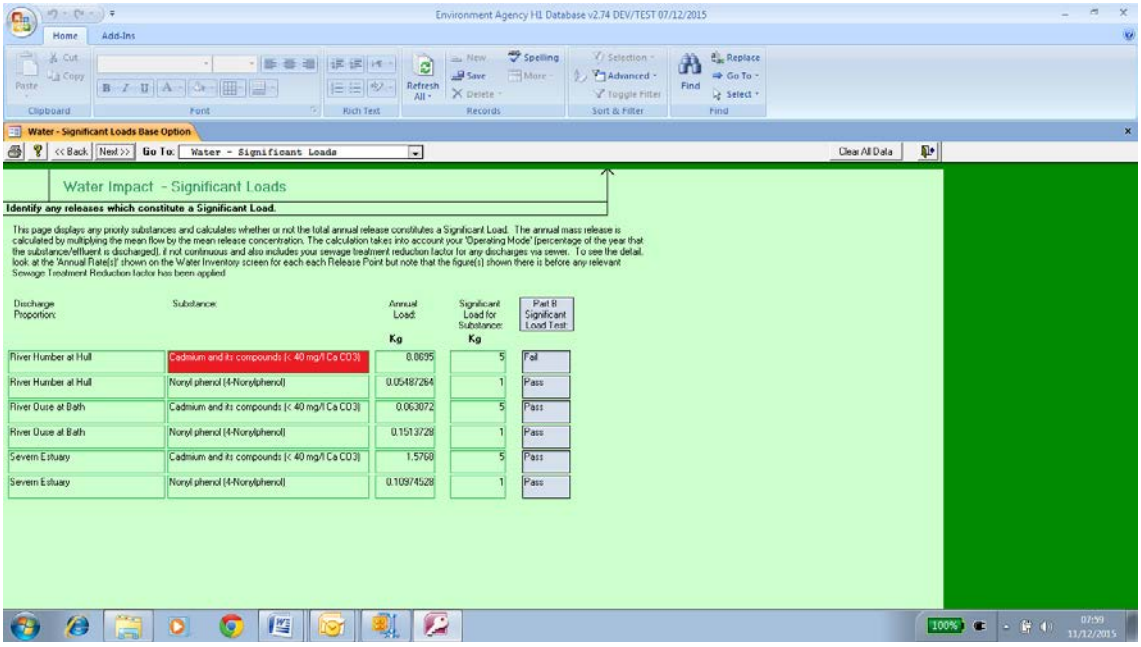
For a substance to be screened out all components of this page must pass. In this example zinc is screened out and the remaining substances require detailed assessment or modelling of their discharge.

The tool then reverts back to TraC water assessment and applies Test 3 and 4. These tests are an assessment of the physical geography of the discharge location and the surrounding environment. Any response other than "No" means that modelling of the discharge is required. If modelling is not required the Test of the Effective Volume Flux (EVF) follows.

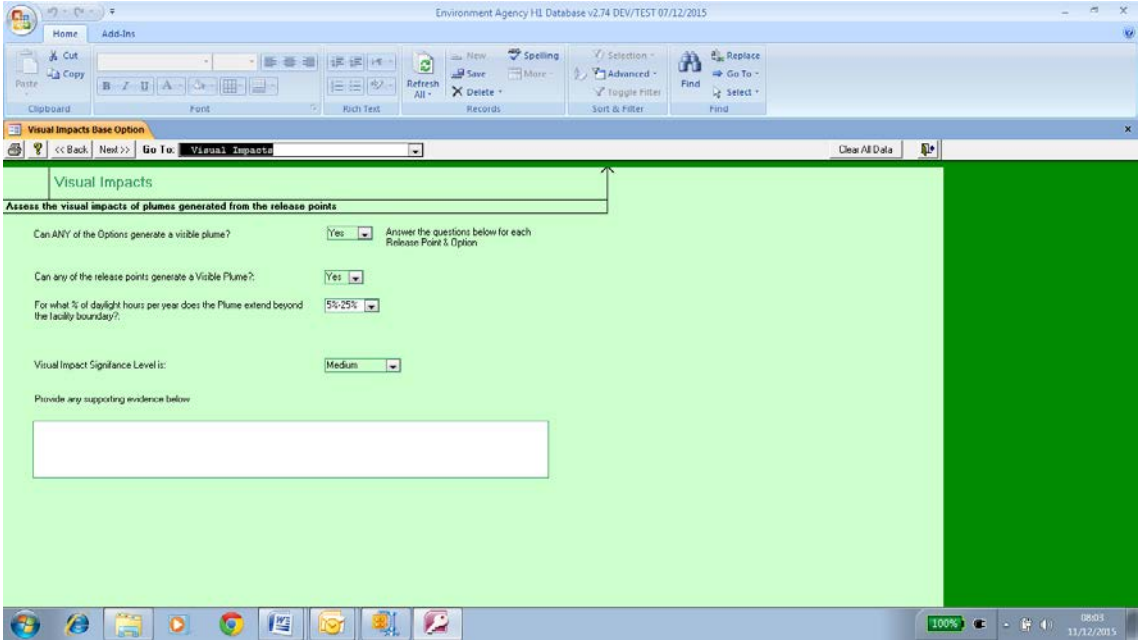


The effect of the sewage treatment reduction factor is activated on each row once the background concentration is entered. The TraC water release depth below chart datum is the screening criteria used in this test and represents the available EVF. The calculated EVF must be less than the available EVF for the discharged substance to be screened out from modelling.

For any 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.



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 information in the comments box below the display.



Photochemical ozone potential is calculated on the following page and shows the relative contribution of each substance. The POCP values are entered automatically by the tool and the total potential for an operating scenario is given.

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

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 this calculation is repeated and results are presented with the base case being the basis for a normalised comparison of waste recovery and disposal options.

Summary Tables enable presentation of all data entry and tool calculations. Relevant releases may be downloaded into an OPRA spreadsheet. Input and output data may be extracted to a spreadsheet which can be submitted in support of a permit application. There is no longer any need to print off every page of the tool.

An array of graphs is available to enable visual comparison of the substance impacts to various media. The section is completed by a summary of the environmental assessment undertaken by the user.

Only if an options appraisal has been undertaken will the tool progress beyond this point. The Environment Agency has recently made available from NCCC on request a cost and benefits analysis tool. Although designed originally with the aim of supporting an operator's case for derogation from the best available techniques (BAT) associated emissions levels (AELs), it has the capacity to enable financial calculations to be undertaken in support of a BAT assessment. Crucially it includes provision to assess the effects of spending varying amounts of cash across different years of a project's life, without being constrained by any averaging that may be applied in a cost effectiveness assessment of a proposed upgrade.

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