Environmental Permit Variation Application

Reference:	PAN-026441
Applicant:	Dow Silicones UK Ltd
Permit number:	BR9685IX
Variation number:	V011
Installation name:	Barry Silicon Based Manufacturing
Date:	11th December 2025
Author:	Judith Sartor, Environmental Manager

Application Contents

List of tables/figures

Acronyms used in this application

Acronym	Meaning
BAT	Best Available Technique
BREF	BAT reference
CCA	Climate Change Agreement
CHP	Combined Heat and Power
COMAH	Control of Major Accident Hazards
CRU	Chlorosilane Recovery Unit
CWG	Common Waste Gas
CWW	Common Waste Water
DPR	Direct Process Residue
EPR	Environmental Permitting Regulations
ERU	Energy Recovery Unit
FBR	Fluidised Bed Reactor
HCl	Hydrogen Chloride / Hydrochloric acid
IVF	Intermediate Viscosity Fluid
LEV	Local exhaust ventilation
LVIC	Large Volume Inorganic Chemicals
MeCl	Methyl Chloride / Chloromethane
ODMS	Operational Discipline Management System
PDMS	Polydimethylsiloxane
PWWT	Primary waste water treatment
STC	Silicon Tetra Chloride
SWWT	Secondary waste water treatment
TCS	Tri Chlorosilane
VLVF	Very Low Viscosity Fluid
WFD	Waste Framework Directive
WWT	Waste water treatment

1 Non Technical summary

1.1 Overview

This facility is located in the town of Barry on the South Wales coast.

Grid ref: ST 13971 68834

Eastings: 313971, Northings 168834

Lat,Long: 51.411976,-3.2383759

The facility is part of a larger industrial complex, but Dow Silicones UK Ltd is the largest area of the complex. The Navigator and Cabot facilities, also in the complex are linked to the Dow Silicones UK Ltd installation via pipelines.

The River Cadoxton runs through the complex before discharging to the Severn Estuary.

The site location and boundary are shown in Appendix I – this map is in the existing permit and this variation does not make any change to the map or boundary.

The site manufactures a large variety of silicone intermediates and finished products using raw materials brought in via road, rail and sea. The majority of the products made at the Barry site are exported for further processing or use by customers.

1.2 Site processes

The site processes operate in a very integrated manner. The stages involved in the manufacture of methyl silicones and intermediates are described below.

1.2.1 Grinding (Main Activities, Section 1)

Silicon is delivered to the site in lump form. The silicon is finely ground by passing through one of two ball mills W424, or W940.

1.2.2 Fluid Bed Reactors (Main Activities, Section 2)

Ground silicon is conveyed with nitrogen to the fluid bed reactor W930. In the fluid bed reactor silicon is reacted with methyl chloride to produce chlorosilanes. Unreacted methyl chloride is compressed and recirculated to the reactor. The product from the reactor consists of a mixture of methyl chlorosilane monomers which are transferred to bulk storage for further processing.

1.2.3 Distillation (Main Activities, Section 4)

In order to further process the chlorosilanes it is necessary to separate them into useful monomers. Separation is achieved using distillation. The distillation processes (W941/W707 / W717) consist of a number of distillation columns configured to purify the crude chlorosilane into its various pure components. Products from the distillation stages are used internally, shipped to other sites for further processing, or sold to other industrial organisations.

1.2.4 Rearranger (Main Activities, Section 4)

The balance of individual chlorosilane species manufactured in the fluid bed reactors does not always correspond to the requirements of the downstream customers. The W343 rearranger is used to adjust the monomer balance by redistributing the undesired chlorosilanes into desirable products. The balance of individual chlorosilane species manufactured in the fluid bed reactors does not always correspond to the requirements of the downstream customers. The W343 rearranger is used to adjust the monomer balance by redistributing the undesired chlorosilanes into desirable products.

1.2.5 Dimethyl Hydrolysis (Main Activities, Section 5)

Dimethyldichlorosilane is hydrolysed in three plants, W705 and W716 and W920 to produce polydimethylsiloxane (PDMS) (a mixture of linear and cyclic siloxanes). W920 process also incorporates a splitting stage which splits the PDMS product into cyclic and linear siloxane species. The hydrolysate product and other siloxane species are either shipped off-site or transferred to other parts of the Barry Site for further processing. Hydrogen chloride is produced as a byproduct from the hydrolysis reaction and is used as a feed for the methyl chloride processes.

1.2.6 Methyldichlorosilane Hydrolysis (Main Activities, Section 5)

Methyldichlorosilane is hydrolysed in W922 to produce methylhydrogen cyclic siloxanes. The methylhydrogen cyclic siloxanes are transferred to W306 building in which they are polymerised into methylhydrogen siloxane fluids.

1.2.7 Methyl Chloride (Main Activities, Section 6)

By-product hydrogen chloride produced by the hydrolysis processes, and hydrogen chloride returned from the adjacent Cabot facility, is converted into methyl chloride by reaction with methanol, in the methyl chloride plant (W931).

1.2.8 Vent Abatement Systems (Main Activities, Sections 9 and 10)

The main process vents from the fluid bed reactors and the methyl chloride plants, containing hydrocarbons, including methyl chloride, are normally burnt in an energy recovery unit (ERU), W949 in which the organic species are destroyed. Chloride containing species are scrubbed in a water scrubber before the vent is discharged to atmosphere.

Vents containing silanes and chlorosilane material (distillation and tank farm vents) are minimised and treated in several stages. They are first passed through a chilled chlorosilane absorption unit (600 absorber on W709, Main Activities, Section 3) which removes most of the chlorosilanes and some methyl chloride. This stream then passes to a chlorosilane recovery unit (W946 CRU) which uses hydrogen chloride to chlorinate any silanes, producing chlorosilanes, before being recycled to the fluidised bed process. Here, the chlorosilanes are recovered and the remaining vent stream is passed through a condensation recovery system before finally passing to the ERU for final vent abatement and heat recovery. For times when the CRU is unavailable, the stream from the absorber will be neutralised in a water scrubber.

1.2.9 W1205/W1206 Quench operations (Main Activities, Section 11)

Currently unusable chlorosilane material (DPR) and spent bed, which is produced in the fluid bed reactors, is quenched using slaked lime at W1206. The resultant non-hazardous DPR silicone gel is currently landfilled while spent bed is sent for copper recovery. Alternative processes/outlets are under development.

1.2.10 W348 TCS Process (Main Activities, Section 12)

The TCS Plant (W348) manufactures a mixture of trichlorosilane (TCS) and silicon tetrachloride (STC) from powdered silicon metal and recovered anhydrous HCl from Cabot. A fluidised bed process similar to the Methyl FBR (W930) is used, with the MeCl replaced by HCl.

The product mixture of TCS/STC is blended with $MeSiCl_3$ before being piped to Cabot's fence line silica plant. By-product hydrogen is produced in the TCS process and after separation from the product stream, it is also sent to Cabot as a fuel source for their burners.

Cabot Corporation produces high quality silica by burning the mixed chlorosilane supplied by Dow Silicones UK Ltd. The chloride content of the feed sent to Cabot is returned the form of HCl which is consumed in the TCS or MeCl processes. Silica is piped directly to Dow Silicones UK Ltd's Elastomers manufacturing plant, where it is a principle ingredient of silicone rubber.

1.2.11 W410 Speciality processes (Main Activities, Section 13)

The W410 multi-purpose production facility houses a variety of process operations for the manufacture of speciality silicone-based polymers, siloxanes and silanes. W410 is operated continuously (24hrs a day, 7 days a week) and contains both batch and continuous process operations.

1.2.12 W307/309 Multipurpose Development/Pilot Plant (Main Activities, Section 14)

W307/9 is a multi-purpose batch plant. It is used as both a manufacturing and a pilot plant.:

W307 and W309 production plants are used to manufacture saleable products and intermediates. The chemistry of these products is well defined.

1.2.13 W115/W204 Elastomers Processes (Main Activities, Section 15)

The W115/204 process comprises of a number of mainly batch mixing and blending operations to produce a range of different silicone gums and elastomeric products with different properties. The plant receives fumed silica from Cabot as one of its main feed sources.

1.2.14 W306/W406/W422/W405 Fluids Processes (Main Activities, Section 16)

The fluids processes use the main polydimethylsiloxane (PDMS) product from the hydrolysis processes as its main feed source. A number of different batch and continuous operations are then carried out to convert the PDMS feed into a range of different siloxane fluid intermediates and products for on and off-site use.

1.2.15 Site Utilities (Main Activities, Section 17)

The main site utilities include steam, nitrogen, process water and compressed air.

There are three fired oil heaters described within the application. W420 is used in support of W348 fluid bed reactor, W948 is used in support of W930 FBR and W322 hot oil unit serves a number of finishing plant operations.

1.2.16 Site Effluent Collection and Waste Water Treatment (Main Activities, Section 17)

A range of process effluent streams pass to the site waste water treatment facility. The waste water treatment plant serves the entire Barry site. Further, small effluent streams from the nearby Cabot plant, and the Cogen combined heat and power plant, are also processed in the Dow Silicones UK Ltd treatment plant. The process includes a primary water treatment process which neutralises acidic materials and precipitates out dissolved metals as well as a secondary biological treatment process (also operated by Dow Silicones UK Ltd) to remove organic species.

1.2.17 Waste Management Centre (Main Activities, Section 18)

The waste management centre is managed by the site environmental team. Wastes are segregated according to hazard and prepared for safe shipment offsite for recycling or disposal. In future it is also intended to be used to receive valuable customer waste to aid the recycling of downstream products.

2 Applicable technical reference documents

The following standard and guidance documents have been used in the preparation of this variation package.

- "How to comply with your Environmental Permit" – Version 8, October 2014
- "Formal Draft: BAT Conclusions for Common Waste Gas Management and Treatment Systems in the Chemical Sector"
- "Draft Interpretation Guidance and Supporting Information for the Common Waste Gas Management and Treatment Systems in the Chemical Sector"
- Large Volume Inorganic Chemicals BREF

2.1 How to Comply Guidance

This application has been prepared with reference to the relevant sections of the "How to comply" guidance.

2.2 CWG BAT (DRAFT)

The data and guidance referred to in these documents "draft Common Waste Gas Management and Treatment Systems in the Chemical Sector" has been used, as the emission levels in the LVIC BREF are outdated. Specifically BAT 8 and 14 apply to this variation.

2.3 Large volume inorganic chemicals BREF

The current Large Volume Inorganic Chemicals BREF is very old – the relevant information in here will be superseded by the CWG BREF.

3 Reason for variation application

This variation application has been made due to the change in future operations at the site. In the coming years there will be future variations required to remove operating units from the permit as they cease operation.

This first part of this variation is to install silica silos, to enable fumed silica to be transported from offsite suppliers in road tankers / sea containers and loaded directly into the silos for use on site. Previously silica produced at Cabot (Main activities Section 12 (see 1.2.10)) was transferred directly to W115 (Main activities Section 12 (see 1.2.13)) without the need for interim storage silo. As the operations in 1.2.10 will cease to operate mid-2026, an alternative source of fumed silica must be installed.

The second part of this variation is to add a new authorised release point at W115 for an upgrade being carried out on a local exhaust ventilation system. Previously this point has not been included in the permit, but at the request of the site inspector and COMAH inspector it is included it in the variation.

3.1 Section of permit to be varied

This variation changes the Main Activities Section 15 – referred to in section 1.2.13 of this document. The complete updated Section is included in Appendix B.

3.2 Variation BAT assessment

Both items in this variation include addition of authorised air release points on particulate containing streams, with filtration units. They have both been selected in line with BAT 14 of “draft Common Waste Gas Management and Treatment Systems in the Chemical Sector”

3.2.1 W351 silica silos

The filtration units on the silica silo filters are fabric filters: – pulse jet filters, with a reverse pulse jet for cleaning and differential pressure measurement to monitor condition and cleanliness.

3.2.2 W115 LEV upgrade

The filtration unit on the W115 LEV unit is an absolute filter: a HEPA 13 filter with an efficiency of 99.95% particulate removal.

4 Activities

4.1 Existing activities at the facility

Table S1.1 activities (as per existing permit)

Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity and WFD Annex I and II operations	Limits of specified activity and waste types
A1	S4.2 A(1)(a)(i) Producing inorganic chemicals such as gases (for example ammonia, hydrogen chloride, hydrogen fluoride, hydrogen cyanide, hydrogen sulphide, oxides of carbon, sulphur compounds, oxides of nitrogen, hydrogen, oxides of sulphur, phosgene).	Natural gas steam reformer for hydrogen production	Receipt of fuel to production and storage of hydrogen, associated cooling system and emission of combustion gases.
A2	S3.1 B(c) Slaking lime for the purpose of making calcium hydroxide or calcium magnesium hydroxide.	W806 and W1206 lime slakers	Receipt of raw materials and storage, production of slaked lime, storage, associated emissions.
A3	S4.1 A(1)(a)(vi) Producing organic chemicals such as organic compounds containing halogens (for example halocarbons, halogenated aromatic compounds and acid halides).	W931 and W718 methyl chloride plant	Receipt and storage of reactants, chemical processing and associated abatement plant, product storage, associated emissions.
A4	S4.2 A(1)(a)(iv) Producing inorganic chemicals such as salts (for example ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate).	W307 and W308 phosphonitrile chloride process	Receipt and storage of reactants, chemical processing and associated abatement plant, product storage, associated emissions. The Pilot Plant (W308) has been physically decommissioned and the material is no longer produced.
A5	S4.2 A(1)(a)(v) – Producing inorganic chemicals such as - non-metals, metal oxides, metal carbonyls or other inorganic compounds (for example calcium carbide, silicon, silicon carbide, titanium dioxide).	W343 rearranger unit, W813 chlorocarbon reactor, W930/W714 fluidised bed reactors, W348 TCS/STC process, W930 DPR hydrogenolysis, W922 methylhydrogen cyclics, W410 continuous hydrolysis unit, W410/W407 vinyl polymer processes, W705/W716/W920 hydrolysis, W306/W406/W405 silicone fluids plant, W309 silicone fluid process, W410 acetoxysilane process, W115 gum rig process, W422 polymerisation reactor process, W410 release modifier process and paper coating blenders, W410 amino polymer process, W307/W308 pilot plant, W115 catalyst unit	The Pilot Plant (W308) has been physically decommissioned.

A6	S4.7 A(1)(a) - Any activity for the manufacture of a chemical which may result in the release of ammonia into the air, other than an activity in which ammonia is only used as a refrigerant.	W115 Mixing plant	Receipt and storage of reactants, chemical processing and abatement plant, product storage, associated emissions.
A7	S5.1 A(1)(c) – The incineration, other than incidentally in the course of burning landfill gas or solid or liquid waste, of any gaseous compound containing halogens.	W949 Energy Recovery Unit	Receipt of waste gases, combustion, abatement plant, associated emissions.
A8	S5.4 A(1)(a)(i) – Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment facility is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC concerning urban waste-water treatment – biological treatment.	W806 Effluent treatment process	Receipt, storage and treatment of process effluent and contaminated surface water, discharge to the River Cadoxton.
DIRECTLY ASSOCIATED ACTIVITIES			
A9	W424 and W940	Silicon grinders	Receipt of raw materials, grinding, associated abatement and emissions.
A10	W948, W420 and W322	Hot oiler heaters <20MW thermal input	Production of hot oil for site and emission of combustion gases.
A11	W404, W406, W408, W414, W708, W801, W802, W810	Tanks farms	Storage of raw materials, intermediates and products, associated emissions.
A12	W911, W342	Cooling towers	Site cooling towers and associated emissions
A13	W413 and W411	Storm water collection sump and river water filtration unit	Un-contaminated storm water run-off from site and discharge to the River Cadoxton.
A14	W1205 and W1206 W805	Quench process Medusa process	Receipt of material for quenching/encapsulation, treatment, product storage and associated emissions.
A15	W946	Chlorosilane recovery unit	Receipt of silanes, treatment with HCl, despatch of chlorosilanes and associated emissions
A16	W709	Absorber and fridge	Absorption of Chlorosilanes.
A17	W945	Basics refrigeration unit	Refrigeration capacity for W930 and W941.
A18	W707, W717, W941	Distillation process	Receipt of crude feedstock, distillation and despatch of refined product.

4.2 Updates to listed activities

This variation is an update to Activity Reference A6 in the Table S1.1 activities in the existing permit (W115 mixing plant). No wording change is needed in this table as the words storage and abatement already appear here.

4.3 Updates to Directly Associated Activities

There are no changes to the directly associated activities as a result of this variation.

5 Emissions

5.1 Emissions to Air

This variation includes 5 new authorised air release points.

- A126, A127, A128 and A129 – on each of the four new Silica silos at W351
- A130 on the upgraded LEV at W115 Mixing plant

5.2 Emissions to water

There are no emissions to water generated or affected by this variation.

5.3 Emissions to land and groundwater

There are no emissions to land or groundwater generated or affected by this variation.

6 Operating Techniques

This variation includes updates to the Main Activities Section 15 – Summary in 1.2.13 of this document. The full updated Section 15 is included in Appendix B.

7 Management System

Dow has a global combined management system called ODMS (Operational Discipline Management System). ODMS combines quality, environmental and safety management systems in one. The management system incorporates the different elements of ISO 9001:2015, ISO14001:2015, RCMS:2023 and IATF 16949:2016. Each year this is audited by LRQA, it is then stated that “the ODMS manual continues to incorporate and satisfy the requirements of the listed standards and provided direction for conformance at the operational level” (Letter of confirmation in Appendix G)

7.1 Summary of Management System

A summary of the elements of ODMS is included in Appendix G.

7.2 Management system Updates

No specific updates will be needed to the global ODMS.

Once the new permit is issued, required monitoring and reporting will be added to the "How we comply with our Environmental permit" document, which is maintained at a facility level as a controlled document.

All operational updates and operating procedures will be added / amended in the management system as the project installation progresses and commissioning is carried out.

Where deemed necessary the new items will be added to the COMAH report / accident management plan.

8 Resource efficiency

8.1 Energy efficiency

Form C3 Section 6a – Describe the basic measures for improving how energy efficient your activities are

The newly installed silos will utilise air driven pumps for transferring the silica into the silos from the containers and tankers. Silica will also be conveyed from the silos into the process using air (as is done now from a fenceline operation)
Air will be automatically isolated when not in use.
Air will be supplied from an on-site air plant which is operational for use by the whole site for instrumentation and control. No additional equipment is needed.
Energy efficient lighting will be installed inside the unloading shed and around the area local to the silos where needed.
Electricity at the site is supplied by the onsite Combined Heat and Power plant, which is CHPQA certified.

8.2 Energy usage

Form C3 Section 6b – Provide a breakdown of any changes to the energy your activities use and create

There will be additional electricity usage as a result of the project for:

- energy saving lighting local to the unloading area
- production of pressurised air for silica conveying.

The electricity will be supplied from the on-site CHP unit.

8.3 Climate change agreement

Form C3 Section (6c – Have entered into, or will you enter into, a climate change agreement?)

CCA available in Appendix E

8.4 Raw materials

Form C3 Section 6d – Tell us about, and justify your reasons for, the raw and other materials, substances and water you will use

There is no change in raw materials as a result of this variation, just the route in which they take into the process. Air will be used for conveying the silica. The instrument air is generated on-site using electricity from the CHP process.

8.5 Waste

Form C3 Section 6e – Describe how you avoid producing waste in line with Council Directive 2008/98/EC)

Dow Silicones UK Ltd applies the waste hierarchy to all wastes on site.
There will be a small amount of waste created as a result of this permit variation.
Wastes will be:

- Periodic filter changes from the filtration units on top of the silos which will either go to landfill or be sent for energy recovery. These units have been designed with a back pulse. A back pulse in a filter is a short, high-pressure burst of compressed air, that is directed from the clean side of the filter to the dirty side to dislodge accumulated dust or foulants from the filter media, thereby regenerating it and extending its life and thus reducing waste.
- Residual powder from connection and disconnection of the bags – this will be included in our existing powder waste stream and go for incineration. The process for connection and disconnection is being designed to create as little waste as possible and the operational procedures will be written to further minimise this by fully blowing clear the lines prior to disconnection.
- The bags used inside the sea containers for the transportation of silica are intended to be multi use and where possible will be returned to the supplier for refilling once emptied.
- Periodic filter changes from the filtration units on the LEV in W115. These are expected to have an extended life due to being self-cleaning.
- Powder waste from the LEV filtration unit - this will be included in our existing powder waste stream and go for incineration.

9 Noise

The new LEV unit at W115 has a silencer installed to ensure the noise levels are below 80dB. The unit will also be installed 100m from the fenceline and behind a building which will provide a shielding. This is not considered to be a risk from a noise point of view.

The W351 silica silos are being installed 200m from the fenceline. At W351 the filter units on the top of the four silos are lined with noise insulation material to ensure the noise levels are below 80dB.

Noise monitoring will be carried out during commissioning to confirm that noise levels are acceptable.

10 H1 Risk Assessment

10.1 W351 Silica Silos – A126, A127, A128 and A129

10.1.1 Information

Each silo is 4.36m diameter and 35 m high. The silos are installed as individual tanks not contained within a building. There will be ladders and open mesh flooring for maintenance and sampling access. There is a small shelter at the bottom to provide shelter for the offloading operations.

The H1 assessment has been carried out using different parameters, to assess the proposed vents during different operational modes.

1. Unloading Road tankers
2. Unloading Seabulk containers
3. Transferring material out of the silos
4. Idle operation
5. Annualised average of the above activities

V9.2 of the H1 tool has been used and the outputs are below

10.1.2 Calculation of effective height of release

The effective height of release should be calculated due the proximity of other buildings within the 5L range of the release point.

Actual height of release = 35m

Tallest building within 5L (175m) = 20m

Effective height of release = (35-20) * 1.66 = 24.9m

10.1.3 Assumptions

1. Vent height to be approximately 35m high – but effective height of release used in calculation.
2. Filter is designed to emit no more than 5mg/Nm3.
3. Vent diameter = 0.25m
4. Only one silo will be venting at any time
5. Air is used as a conveying media during offloading and transfers.
6. Scenario 1 – 724 m^3/hr - unloading road tankers, this equates to 0.1% online time across the 4 release points (0.026% per silo)
7. Scenario 2 – 373.3 m^3/hr - unloading sea bulk containers – equates to 8.33% online time per silo
8. Scenario 3 – 207.6 m^3/hr – silica transfers, equates to 6.25% online time per silo
9. Scenario 4 – 37.6 m^3/hr – silo in idle operation with air to prevent nozzle blockages – this is on 85.39% of the time.
10. Scenario 5 – 76.38 m^3/hr - taking into account all the flows and online times

10.1.4 Scenario 1 - Tanker

Figure 1 Scenario 1 - Inventory

Air release points and emissions inventory | 1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information | View Air Tests

Select a test to view: First | < | > | Last | Water

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details

Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A126	W351	Silica storage tank filter vent	25	3.15	119	4.25	4.10039	724
A127	W351	Silica storage tank filter vent	25	3.15	119	4.25	4.10039	724
A128	W351	Silica storage tank filter vent	25	3.15	119	4.25	4.10039	724
A129	W351	Silica storage tank filter vent	25	3.15	119	4.25	4.10039	724

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A126	Particulates (PM2.5)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.12	724.00
A127	Particulates (PM2.5)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.12	724.00
A128	Particulates (PM2.5)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.12	724.00
A129	Particulates (PM2.5)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.12	724.00
A126	Particulates (PM10)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.07	724.00
A127	Particulates (PM10)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.07	724.00
A128	Particulates (PM10)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.07	724.00
A129	Particulates (PM10)	Estimated	0%	5	0.00		5	0.00		0.00	0.00	0.07	724.00

Figure 2 Scenario 1 - Pollutants

Air impacts - Pollutants | 6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

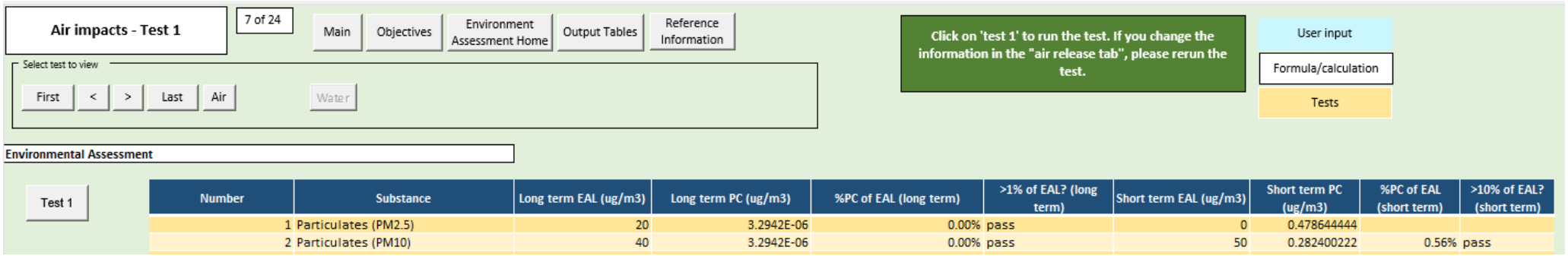
Natural Resources Wales

Environmental Assessment

Import

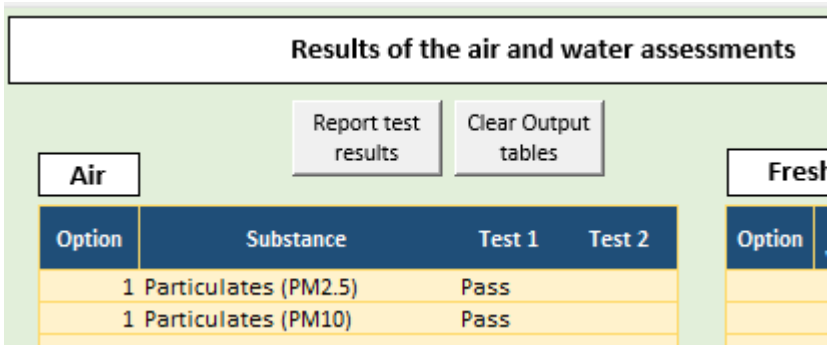
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	3.2942E-06		0	0.478644444	
2	Particulates (PM10)	40	3.2942E-06		50	0.282400222	

Figure 3 Scenario 1 – 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	Particulates (PM2.5)	20	3.2942E-06	0.00%	pass	0	0.478644444		
2	Particulates (PM10)	40	3.2942E-06	0.00%	pass	50	0.282400222	0.56%	pass

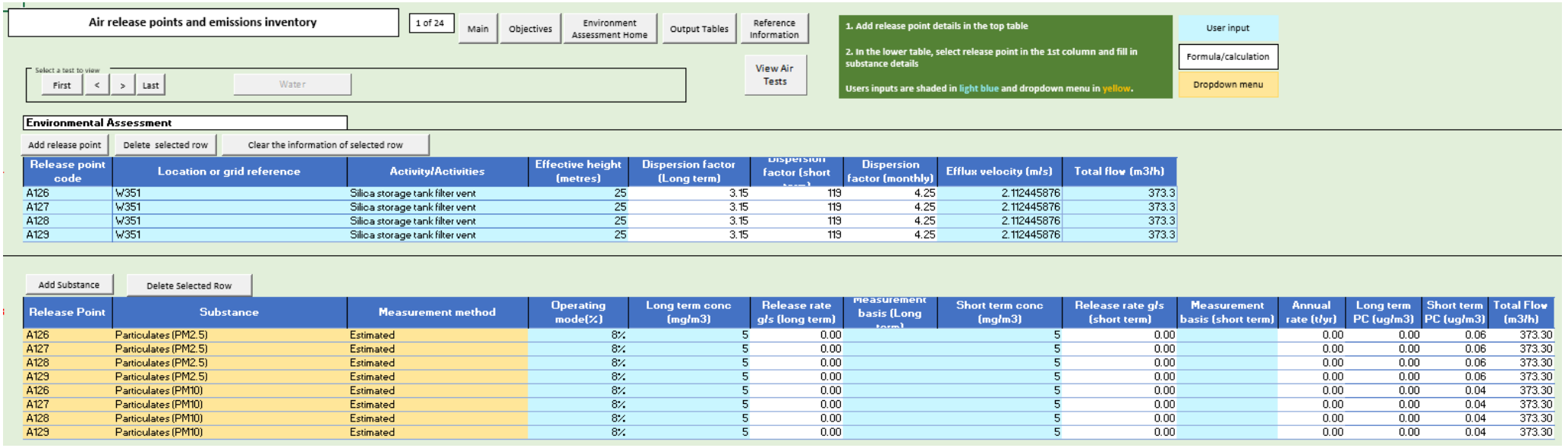
Figure 4 Scenario 1 - Outputs



Option	Substance	Test 1	Test 2
1	Particulates (PM2.5)	Pass	
1	Particulates (PM10)	Pass	

10.1.5 Scenario 2 - Seabulk

Figure 5 Scenario 2 - Inventory



Air release points and emissions inventory | 1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information | View Air Tests

Select a test to view: First | < | > | Last | Water

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details
Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

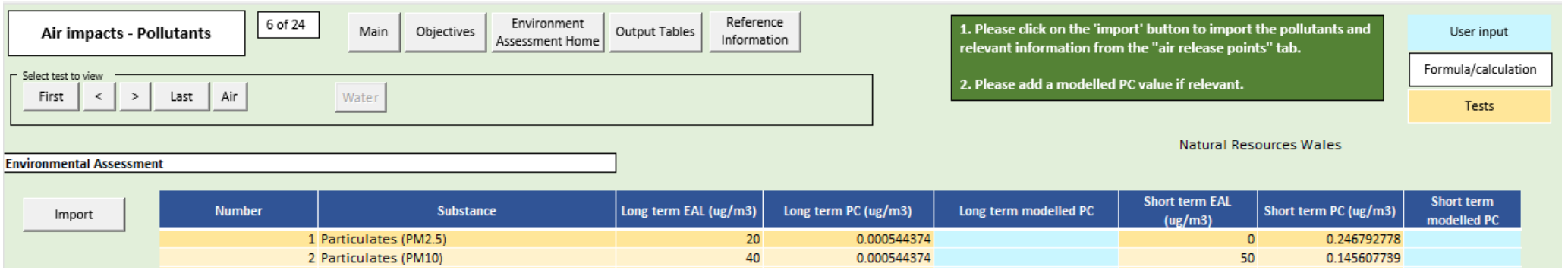
Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A126	W351	Silica storage tank filter vent	25	3.15	119	4.25	2.112445876	373.3
A127	W351	Silica storage tank filter vent	25	3.15	119	4.25	2.112445876	373.3
A128	W351	Silica storage tank filter vent	25	3.15	119	4.25	2.112445876	373.3
A129	W351	Silica storage tank filter vent	25	3.15	119	4.25	2.112445876	373.3

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A126	Particulates (PM2.5)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.06	373.30
A127	Particulates (PM2.5)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.06	373.30
A128	Particulates (PM2.5)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.06	373.30
A129	Particulates (PM2.5)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.06	373.30
A126	Particulates (PM10)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.04	373.30
A127	Particulates (PM10)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.04	373.30
A128	Particulates (PM10)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.04	373.30
A129	Particulates (PM10)	Estimated	8%	5	0.00		5	0.00		0.00	0.00	0.04	373.30

Figure 6 Scenario 2 - Pollutants



Air impacts - Pollutants | 6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

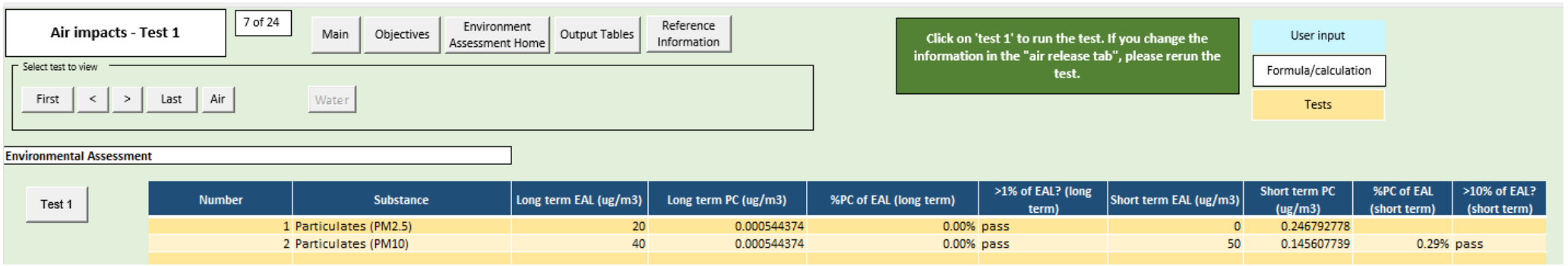
Natural Resources Wales

Environmental Assessment

Import

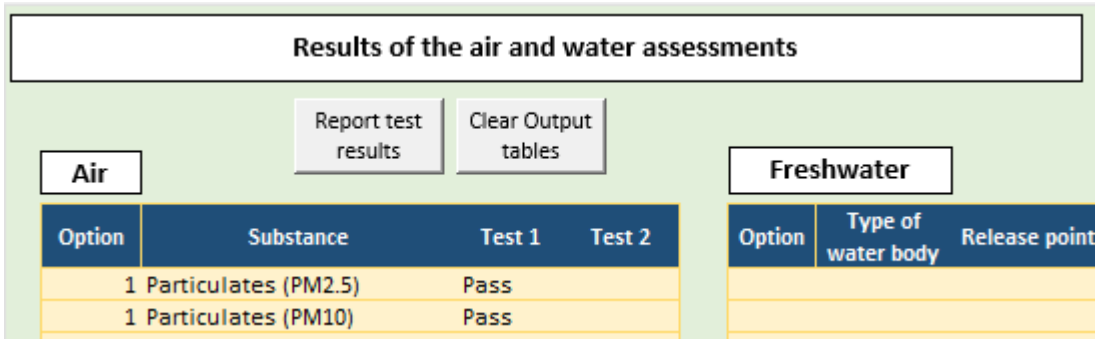
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	0.000544374		0	0.246792778	
2	Particulates (PM10)	40	0.000544374		50	0.145607739	

Figure 7 Scenario 2 – 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	Particulates (PM2.5)	20	0.000544374	0.00%	pass	0	0.246792778		
2	Particulates (PM10)	40	0.000544374	0.00%	pass	50	0.145607739	0.29%	pass

Figure 8 Scenario 2 - Outputs



Option	Substance	Test 1	Test 2
1	Particulates (PM2.5)	Pass	
1	Particulates (PM10)	Pass	

Option	Type of water body	Release point

10.1.6 Scenario 3 - Transfer

Figure 9 Scenario 3 - Inventory

Air release points and emissions inventory | 1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information | View Air Tests

Select a test to view: First | < | > | Last | Water

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details
Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

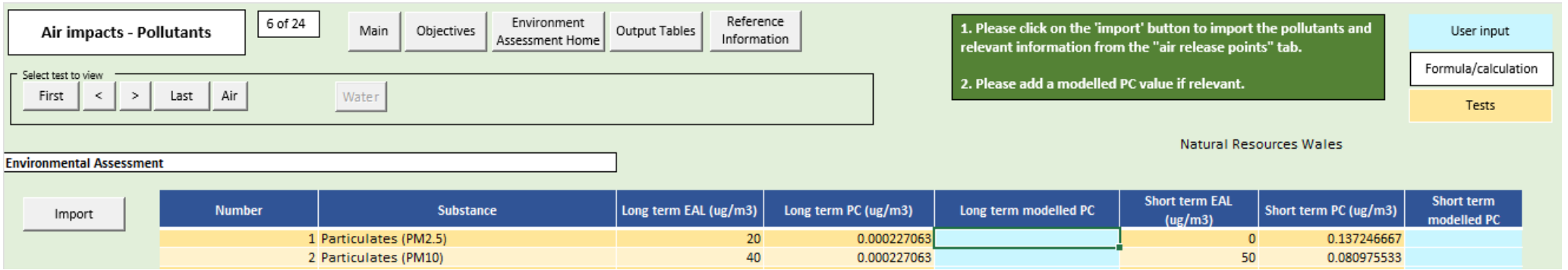
Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A126	W351	Silica storage tank filter vent	25	3.15	119	4.25	1.174775687	207.6
A127	W351	Silica storage tank filter vent	25	3.15	119	4.25	1.174775687	207.6
A128	W351	Silica storage tank filter vent	25	3.15	119	4.25	1.174775687	207.6
A129	W351	Silica storage tank filter vent	25	3.15	119	4.25	1.174775687	207.6

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A126	Particulates (PM2.5)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.03	207.60
A127	Particulates (PM2.5)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.03	207.60
A128	Particulates (PM2.5)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.03	207.60
A129	Particulates (PM2.5)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.03	207.60
A126	Particulates (PM10)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.02	207.60
A127	Particulates (PM10)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.02	207.60
A128	Particulates (PM10)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.02	207.60
A129	Particulates (PM10)	Estimated	6%	5	0.00		5	0.00		0.00	0.00	0.02	207.60

Figure 10 Scenario 3 - Pollutants



Air impacts - Pollutants | 6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

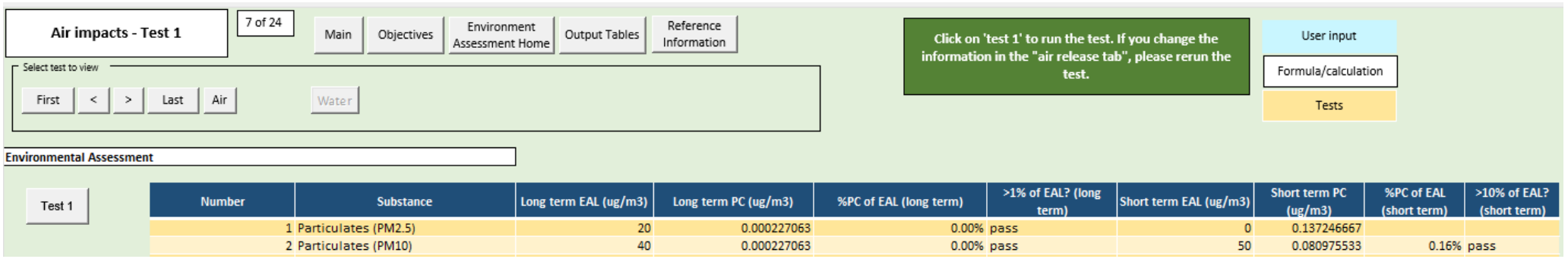
Natural Resources Wales

Environmental Assessment

Import

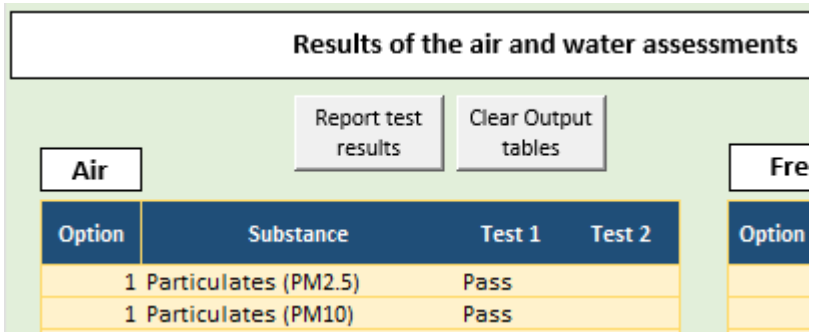
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	0.000227063		0	0.137246667	
2	Particulates (PM10)	40	0.000227063		50	0.080975533	

Figure 11 Scenario 3 – 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	Particulates (PM2.5)	20	0.000227063	0.00%	pass	0	0.137246667		
2	Particulates (PM10)	40	0.000227063	0.00%	pass	50	0.080975533	0.16%	pass

Figure 12 Scenario 3 - Outputs



Option	Substance	Test 1	Test 2
1	Particulates (PM2.5)	Pass	
1	Particulates (PM10)	Pass	

10.1.7 Scenario 4 - Idle

Figure 13 Scenario 4 - Inventory

Air release points and emissions inventory

1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information | View Air Tests

Select a test to view: First | < | > | Last | Water

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details
Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

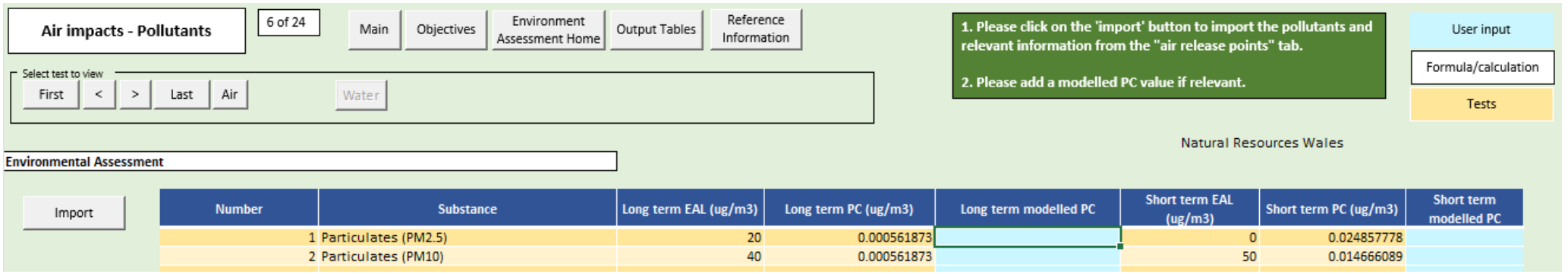
Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A126	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.212772475	37.6
A127	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.212772475	37.6
A128	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.212772475	37.6
A129	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.212772475	37.6

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A126	Particulates (PM2.5)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.01	37.60
A127	Particulates (PM2.5)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.01	37.60
A128	Particulates (PM2.5)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.01	37.60
A129	Particulates (PM2.5)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.01	37.60
A126	Particulates (PM10)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.00	37.60
A127	Particulates (PM10)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.00	37.60
A128	Particulates (PM10)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.00	37.60
A129	Particulates (PM10)	Estimated	85%	5	0.00		5	0.00		0.00	0.00	0.00	37.60

Figure 14 Scenario 4 - Pollutants



Air impacts - Pollutants

6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

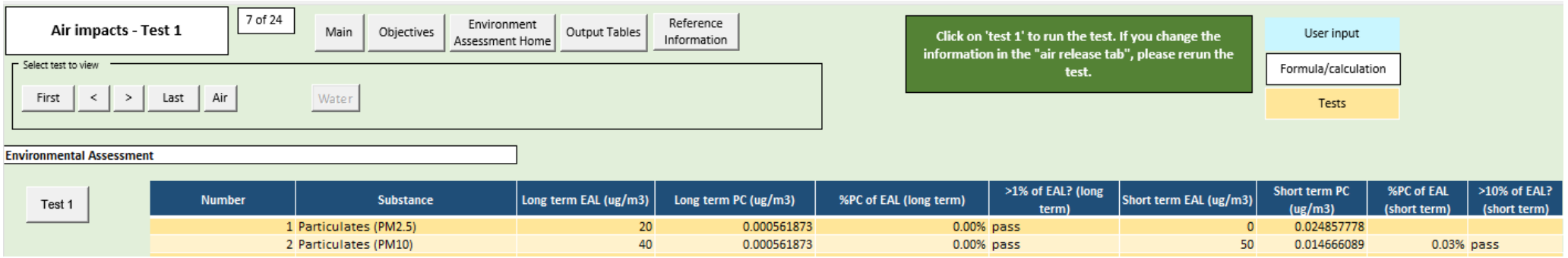
Natural Resources Wales

Environmental Assessment

Import

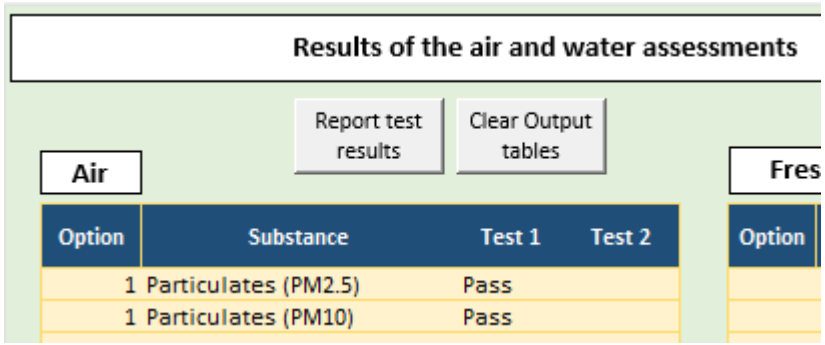
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	0.000561873		0	0.024857778	
2	Particulates (PM10)	40	0.000561873		50	0.014666089	

Figure 15 Scenario 4 – Test 1



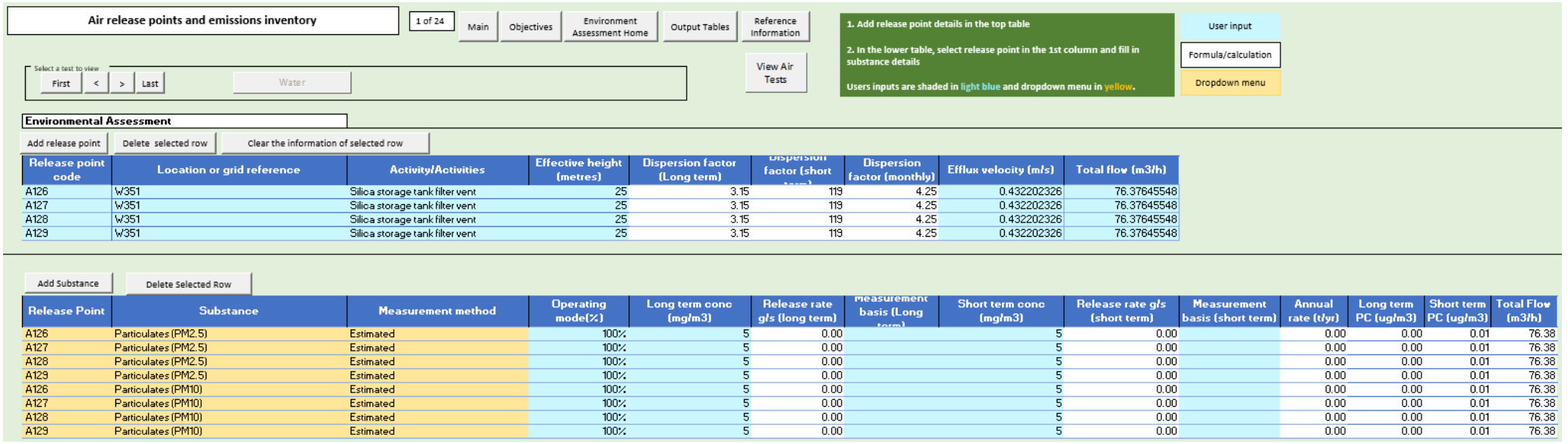
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Particulates (PM2.5)	20	0.000561873	0.00%	pass	0	0.024857778		
2	Particulates (PM10)	40	0.000561873	0.00%	pass	50	0.014666089	0.03%	pass

Figure 16 Scenario 4 - Outputs



10.1.8 Scenario 5 – Annualised average

Figure 17 Scenario 5 - Inventory



Air release points and emissions inventory

1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information | View Air Tests

Select a test to view: First | < | > | Last | Water

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details

Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

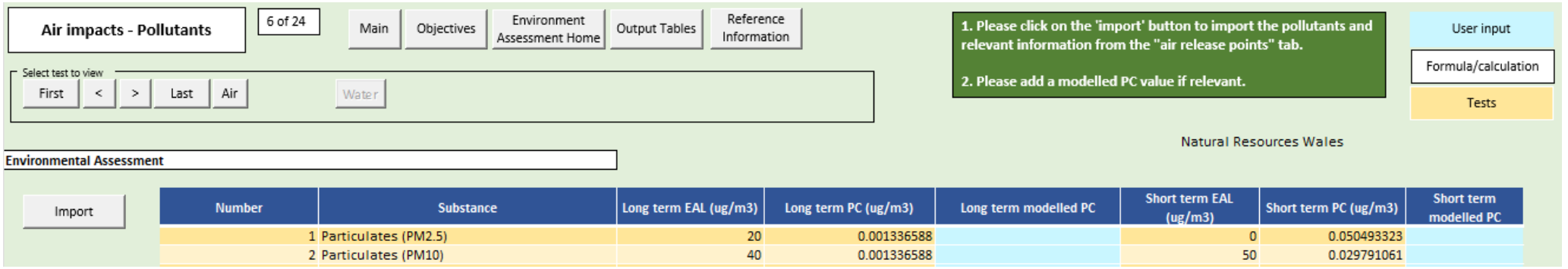
Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A126	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.432202326	76.37645548
A127	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.432202326	76.37645548
A128	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.432202326	76.37645548
A129	W351	Silica storage tank filter vent	25	3.15	119	4.25	0.432202326	76.37645548

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A126	Particulates (PM2.5)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A127	Particulates (PM2.5)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A128	Particulates (PM2.5)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A129	Particulates (PM2.5)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A126	Particulates (PM10)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A127	Particulates (PM10)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A128	Particulates (PM10)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38
A129	Particulates (PM10)	Estimated	100%	5	0.00		5	0.00		0.00	0.00	0.01	76.38

Figure 18 Scenario 5 - Pollutants



Air impacts - Pollutants

6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

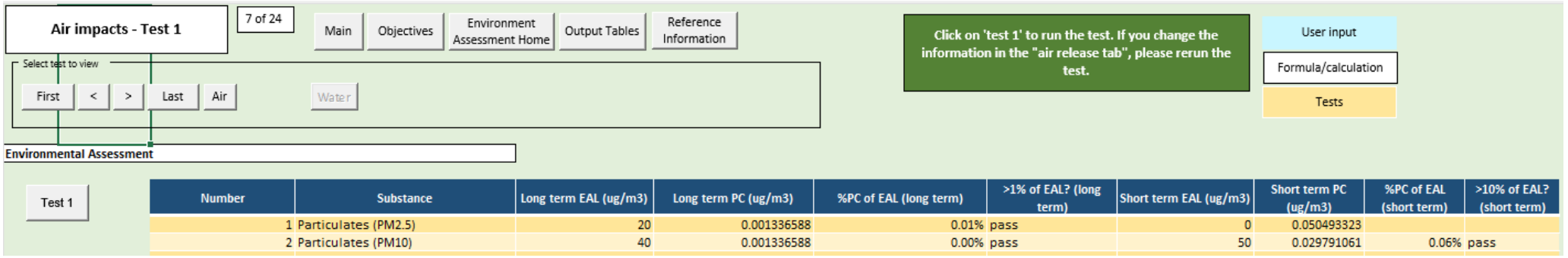
Natural Resources Wales

Environmental Assessment

Import

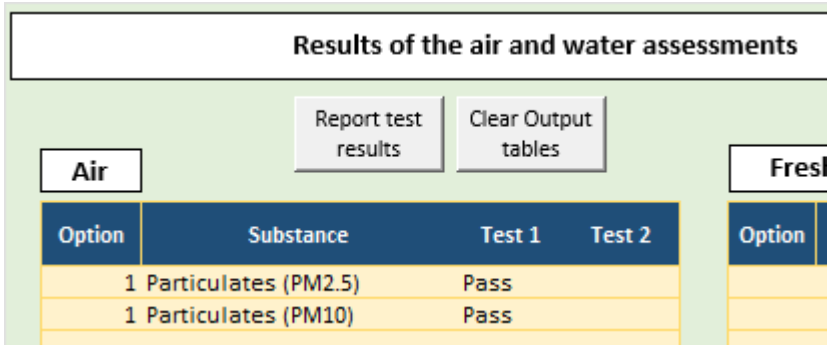
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	0.001336588		0	0.050493323	
2	Particulates (PM10)	40	0.001336588		50	0.029791061	

Figure 19 Scenario 5 – 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	Particulates (PM2.5)	20	0.001336588	0.01%	pass	0	0.050493323		
2	Particulates (PM10)	40	0.001336588	0.00%	pass	50	0.029791061	0.06%	pass

Figure 20 Scenario 5 - Outputs



10.1.9 W351 H1 conclusions

Having carried out the H1 screening for the silica silos at W351 they pass the screening for all scenarios and therefore do not require further modelling, even when considering the proximity of other buildings in the area. However an ADMS model has been developed to show the influence of the local meteorology on the show the image. This is demonstrated in the following section.

10.1.10 ADMS model image

This has also been modelled in ADMS using 5 years of local weather data to visually show the impact and low ground concentration levels (Maximum scale = 0.006 ug/m^3)

The green dotted line shows the site boundary – the highest ground level concentrations are at which is just outside the site boundary on unused ex-industrial ground.

10.2 W115 Mixer LEV - A130

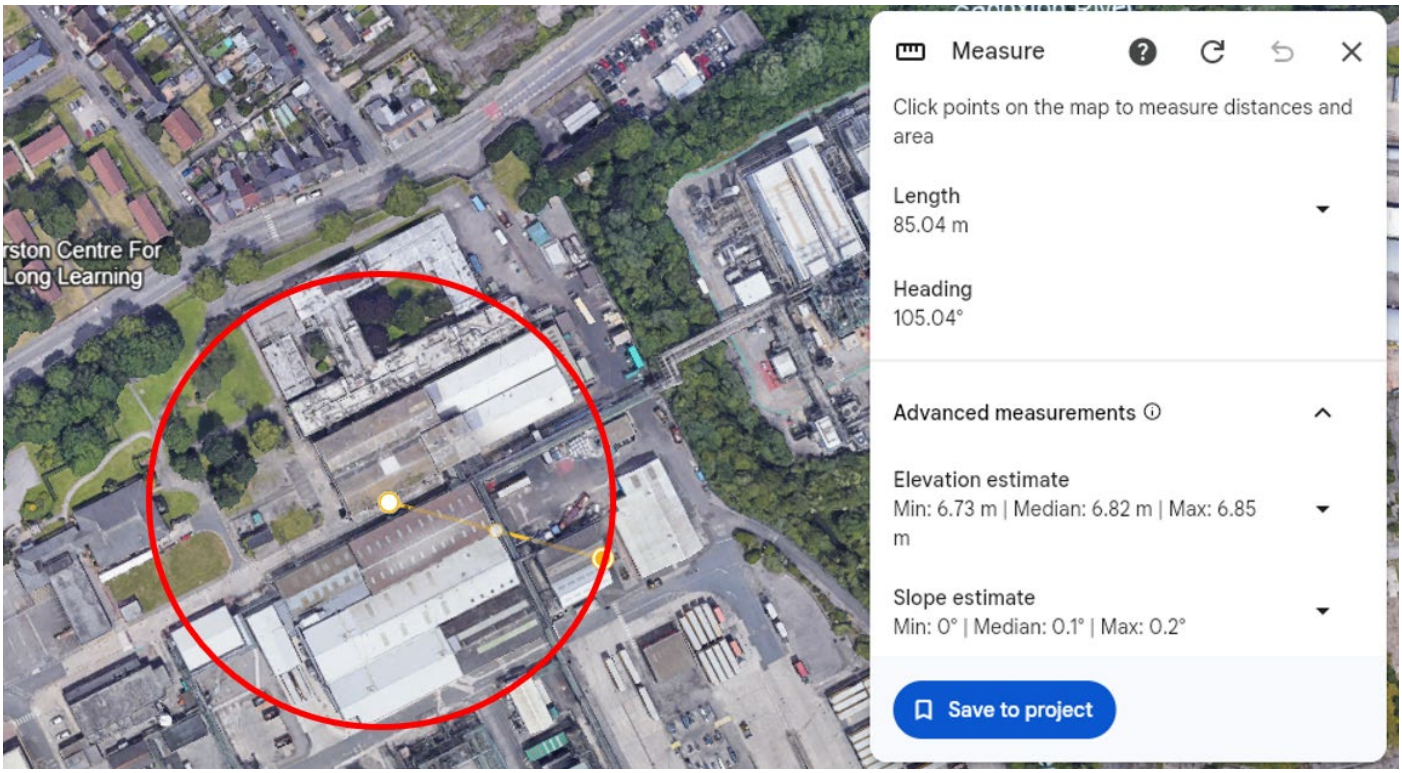
10.2.1 Information

The LEV at W115 is being upgraded to provide a higher level of protection to the personnel working inside the building whilst loading bags of crystalline silica material in via the open lid of the 137 and 157 mixers. The filter on this unit is HEPA 13 and the powder collection system is self-contained to remove exposure risk.

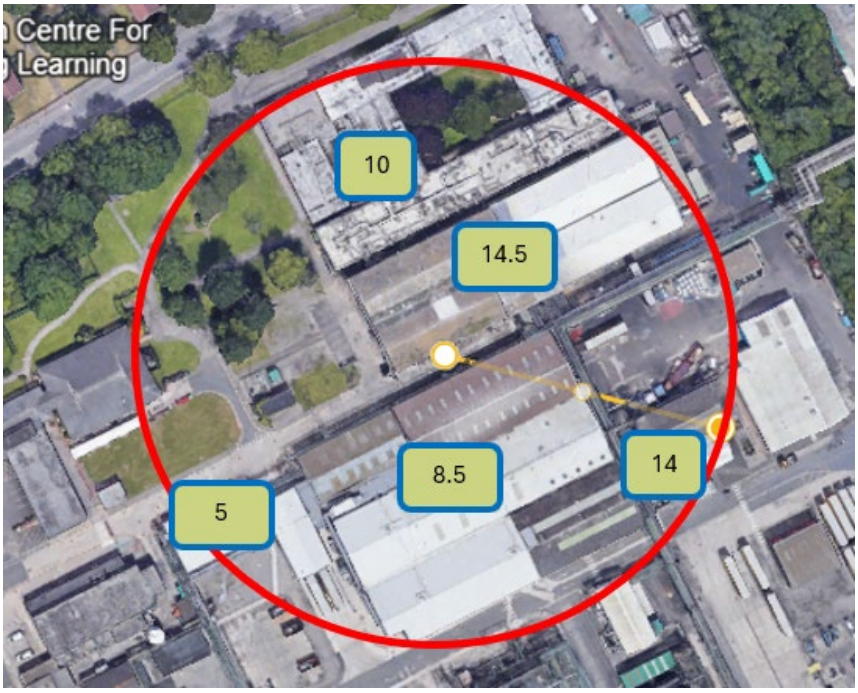
10.2.2 Calculation of Effective Height of release

The effective height of release should be calculated using the proximity of other buildings within the 5L range of the release point.

Actual height of release = 17.5m



Tallest building within 5L (85m) = 14.5m



Effective height of release = (17.5-14.5) * 1.66 = 4.98m

10.2.3 Assumptions

An effective height of release of 5m was used.

LEV will be online 100% of the time, but loose powder will only be present during addition with the lid of the mixer open or if the mixer seal were to leak. A filtration online value of 10% has been used.

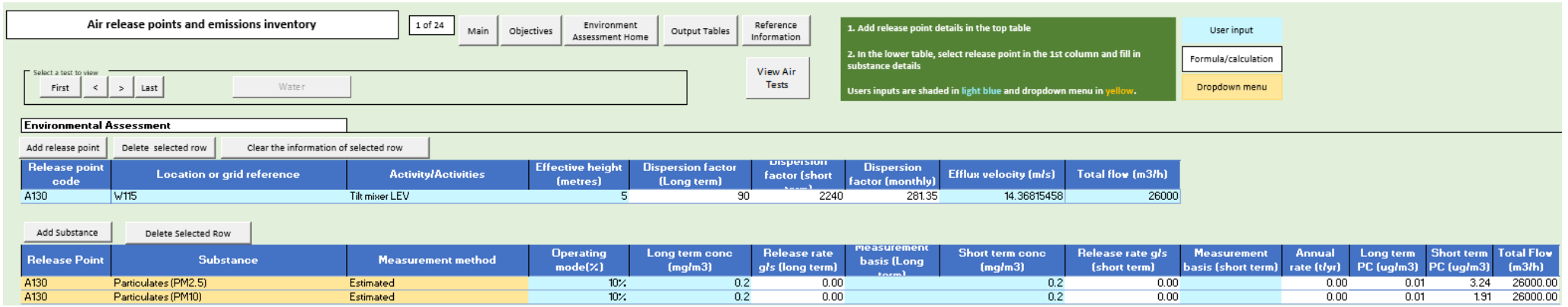
The release rate used in the H1 calculation is 0.2mg/m^3, but realistically this will be significantly less as HEPA 13 filters are rated to capture at least 99.95% of all particles. At this rate of capture 0.2mg/m^3 back calculates to suggest 10kg of powder enters the filtration system per hour, which is unrealistic, it is more likely to be in the realms of <1 kg.

Flow = 26,000 m^3/hr

Diameter of vent = 0.8m

10.2.4 W115 LEV

Figure 21 W115 LEV Inventory



Air release points and emissions inventory | 1 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select a test to view: First | < | > | Last | Water | View Air Tests

1. Add release point details in the top table
2. In the lower table, select release point in the 1st column and fill in substance details
Users inputs are shaded in light blue and dropdown menu in yellow.

User input | Formula/calculation | Dropdown menu

Environmental Assessment

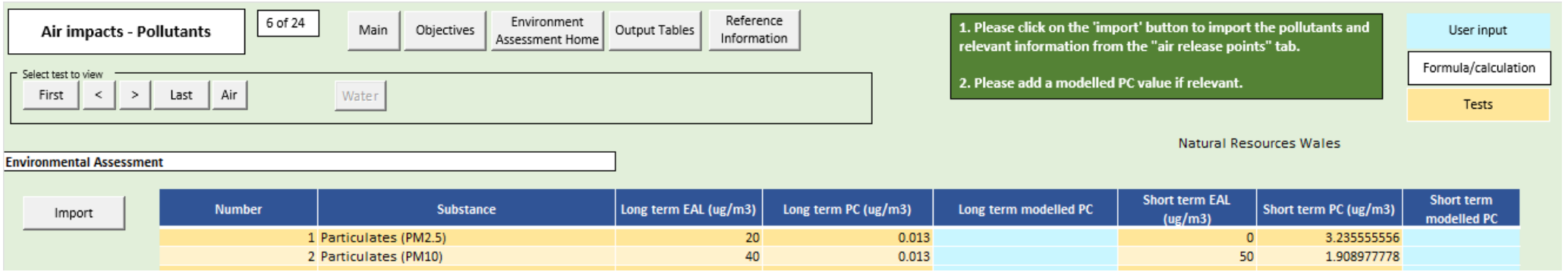
Add release point | Delete selected row | Clear the information of selected row

Release point code	Location or grid reference	Activity/Activities	Effective height (metres)	Dispersion factor (Long term)	Dispersion factor (short term)	Dispersion factor (monthly)	Efflux velocity (m/s)	Total flow (m3/h)
A130	W115	Tilt mixer LEV	5	90	2240	281.35	14.36815458	26000

Add Substance | Delete Selected Row

Release Point	Substance	Measurement method	Operating mode(%)	Long term conc (mg/m3)	Release rate g/s (long term)	Measurement basis (Long term)	Short term conc (mg/m3)	Release rate g/s (short term)	Measurement basis (short term)	Annual rate (t/yr)	Long term PC (ug/m3)	Short term PC (ug/m3)	Total Flow (m3/h)
A130	Particulates (PM2.5)	Estimated	10%	0.2	0.00		0.2	0.00		0.00	0.01	3.24	26000.00
A130	Particulates (PM10)	Estimated	10%	0.2	0.00		0.2	0.00		0.00	0.01	1.91	26000.00

Figure 22 W115 LEV Pollutants



Air impacts - Pollutants | 6 of 24 | Main | Objectives | Environment Assessment Home | Output Tables | Reference Information

Select test to view: First | < | > | Last | Air | Water

1. Please click on the 'import' button to import the pollutants and relevant information from the "air release points" tab.
2. Please add a modelled PC value if relevant.

User input | Formula/calculation | Tests

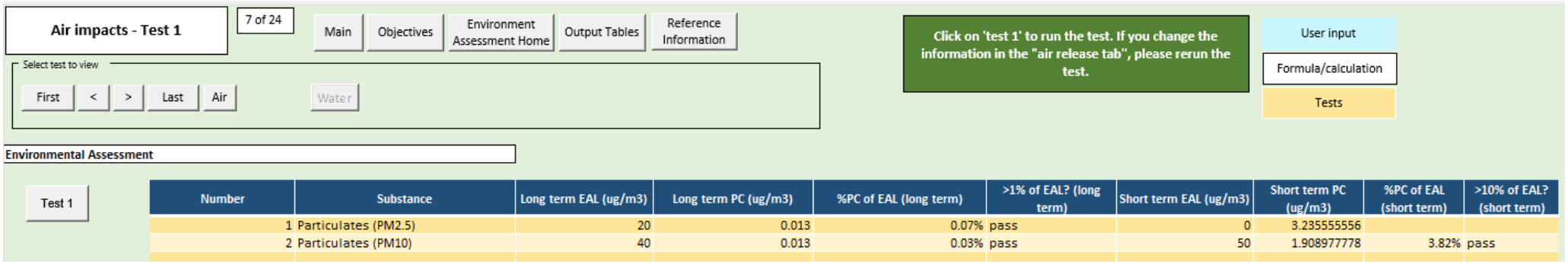
Natural Resources Wales

Environmental Assessment

Import

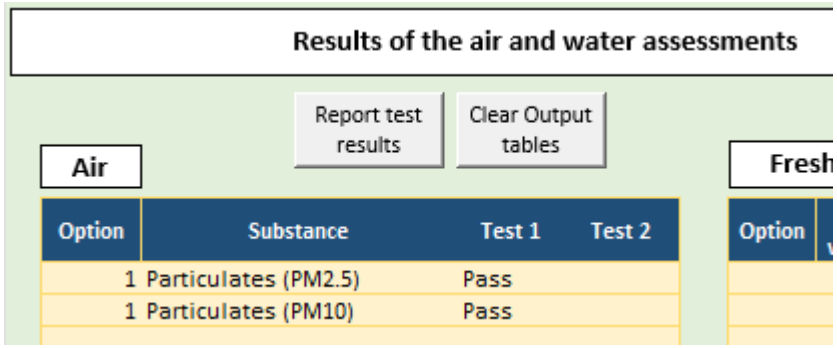
Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Long term modelled PC	Short term EAL (ug/m3)	Short term PC (ug/m3)	Short term modelled PC
1	Particulates (PM2.5)	20	0.013		0	3.235555556	
2	Particulates (PM10)	40	0.013		50	1.908977778	

Figure 23 W115 LEV 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	Particulates (PM2.5)	20	0.013	0.07%	pass	0	3.235555556		
2	Particulates (PM10)	40	0.013	0.03%	pass	50	1.908977778	3.82%	pass

Figure 24 W115 LEV Outputs



Option	Substance	Test 1	Test 2
1	Particulates (PM2.5)	Pass	
1	Particulates (PM10)	Pass	

Option

10.2.5 W115 H1 conclusions

Having carried out the H1 screening for the LEV system at W115, it passes the screening and therefore does not require further modelling, even when considering the proximity of other buildings in the area. However an ADMS model has been developed to show the influence of the local meteorology on the show the image. This is demonstrated in the following section.

10.2.6 ADMS model image

This has also been modelled in ADMS using 5 years of local weather data to visually show the impact and low ground concentration levels (Maximum scale = 0.03 ug/m^3)

The green dotted line shows the site boundary – the highest ground level concentrations are at which is just outside the site boundary on unused ex-industrial ground.

11 Monitoring

11.1 Emissions to air

Monitoring requirements for these particulate (dust) containing vents, as taken from BAT 8 of "Formal Draft: BAT Conclusions for Common Waste Gas Management and Treatment Systems in the Chemical Sector" would be annual using method BS EN 13284 as these vents all have a dust flow rate of less than 3kg/hr.

The dust flow from W351 silica silos will be a maximum of 3.7 g/hr when at the maximum flow scenario.

The dust low from W115 LEV will be a maximum of 5 g/hr, but this may contain crystalline silica which is a CMR1 material.

Table 16 of BAT 14 from "Formal Draft: BAT Conclusions for Common Waste Gas Management and Treatment Systems in the Chemical Sector" contains note 2 – which states *"The BAT-AEL does not apply when the dust mass flow is below approx 50 g/h if no CMR substances are identified as relevant in the dust based on the inventory given in BAT 2"*

11.2 Emissions to water

There is no monitoring for emissions to water relevant to this application.

12 Environmental Risk Assessment

12.1 Scope of risk assessment

An environmental risk assessment has been undertaken for the changes included under this variation.

This is specifically air emissions resulting from – offloading and operating silica silos at W351 and operating LEV in W115. Noise and odour will also be considered in the risk assessment.

12.2 Risk Matrix

The risk assessment matrix below and explanations have been taken from an Environment Agency tool and will be used for this Risk Assessment

		PROBABILITY			
		Very Low	Low	Medium	High
CONSEQUNCE	Very Low	Very Low	Low	Low	Low
	Low	Low	Low	Medium	Medium
	Medium	Low	Medium	Medium	High
	High	Medium	Medium	High	High

Probability has been classed as follows:

- Very Low - Rarely encountered, never reported or highly unlikely within sector
- Low - Infrequent, occasional, very few occurrences within sector
- Medium - Occurs several times per year within sector
- High - Repeated occurrences at a location

Consequence of the impact of a hazard to environmental and people has been classed as follows:

- Very Low - Slight environmental effect but doesn't exceed a regulatory standard
- Low - Minor environmental effect which may reach a regulatory standard, localised to point of release with no significant impact on the environment or for health
- Medium - Moderate, localised effect on ecosystems and people in the vicinity of an incident or release
- High - Major environmental incident resulting in damage to ecosystems and or harm to health

12.3 Risk Assessment

Source	Receptor	Harm	Pathway	Probability of exposure	Consequence	Calculated risk	Mitigation in place
What is the agent or process with potential to cause harm?	**What is at risk? What do I wish to protect?**	**What are the harmful consequences if things go wrong?**	**How might the receptor come into contact with the source?**	**How likely is this contact?**	**How severe will the consequences be if this occurs?**	**What is the overall risk?**	**What has already been done to reduce the risk?**
Releases of particulate matter (dusts) from W351 silica silo during offloading (fumed silica)	Local human population	Harm to human health - respiratory irritation and illness.	Air transport then inhalation.	Low	Very Low	Low	Probability of exposure low due to high integrity filter. Consequence Very Low due to low mass release from vent, good dispersion due to high vent, minimal offsite impact into an unpopulated area.
Releases of particulate matter (dusts) from W351 silica silo during offloading (fumed silica) due to failure of the filtration system	Local human population	Harm to human health - respiratory irritation and illness.	Air transport then inhalation.	Low	Low	Low	There will be pressure monitoring on the filtration unit which will identify a failure and stop the offloading process. A small duration of localised particulate release may be possible if the filter were to fail catastrophically.
Releases of particulate matter (dusts) from W115 LEV filter (crystalline silica)	Local human population	Harm to human health - respiratory irritation and illness.	Air transport then inhalation.	Low	Low	Low	Probability of exposure low due to high integrity filter. Consequence Low due to low mass release from vent, good dispersion due to high vent, minimal offsite impact into an unpopulated area. Not Low due to CMR1 dust.

Source	Receptor	Harm	Pathway	Probability of exposure	Consequence	Calculated risk	Mitigation in place
What is the agent or process with potential to cause harm?	**What is at risk? What do I wish to protect?**	**What are the harmful consequences if things go wrong?**	**How might the receptor come into contact with the source?**	**How likely is this contact?**	**How severe will the consequences be if this occurs?**	**What is the overall risk?**	**What has already been done to reduce the risk?**
Releases of particulate matter (dusts) from W115 LEV filter (crystalline silica) due to failure of filtration system	Local human population	Harm to human health - respiratory irritation and illness.	Air transport then inhalation.	Low	Medium	Low	There will be pressure monitoring on the filtration unit which will identify a failure and stop the offloading process. A small duration of localised particulate release may be possible if the filter were to fail catastrophically. Consequence has been put as Medium for this one due to the dust being a CMR
Releases of particulate matter (dusts) from W351 silica silo during offloading	Local human population	Nuisance - dust on cars, clothing etc.	Air transport then deposition	Low	Very Low	Low	Probability of exposure low due to high integrity filter. Consequence Very Low due to low mass release from vent, good dispersion due to high vent, minimal offsite impact into an unpopulated area.
Releases of particulate matter (dusts) from W115 LEV filter	Local human population	Nuisance - dust on cars, clothing etc.	Air transport then deposition	Low	Very Low	Low	Probability of exposure low due to high integrity filter. Consequence Very Low due to low mass release from vent, good dispersion due to high vent, minimal offsite impact into an unpopulated area.
Odour	Local human population	Nuisance, loss of amenity	Air transport then inhalation.	Very Low	Very Low	Very Low	No odorous emissions

Source	Receptor	Harm	Pathway	Probability of exposure	Consequence	Calculated risk	Mitigation in place
What is the agent or process with potential to cause harm?	**What is at risk? What do I wish to protect?**	**What are the harmful consequences if things go wrong?**	**How might the receptor come into contact with the source?**	**How likely is this contact?**	**How severe will the consequences be if this occurs?**	**What is the overall risk?**	**What has already been done to reduce the risk?**
Noise and vibration - from W351 silica offloading	Local human population	Nuisance, loss of amenity, loss of sleep.	Noise through the air and vibration through the ground.	Low	Low	Low	Low noise equipment being installed, 200 m from fenceline
Noise and vibration - from W115 LEV	Local human population	Nuisance, loss of amenity, loss of sleep.	Noise through the air and vibration through the ground.	Low	Low	Low	Low noise equipment being installed, 100m from fenceline and shielded by buildings
Spill of material to surface / groundwater	Surface / groundwater contamination	Increased suspended solids	Spill directly onto the ground or into the river	Very Low	Very Low	Very Low	Site is contained and material can easily be contained before reaching surface or groundwater. All site effluent is treated using primary and secondary wastewater treatment processing prior to discharge.

Appendices

Appendix B – Main Activities – Section 15

Appendix C – Contents for Main Activities

Appendix E – Climate Change agreement documentation

Appendix F – Authorised release point map

Appendix G – ODMS Overview

Appendix H – Dow Silicones UK Ltd Companies House registration

Appendix I - Site boundary map (no change from existing permit)

Forms also required

Part A

Part C2

Part C3

Part F1