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Radnor Hills Mineral Water Company Ltd.

Environmental Permit - Application Supporting Document

November 2016

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Authorisation Sheet

Client: Radnor Hills Mineral Water Company Ltd.

Project: *Environmental Permit - Application Supporting Documentation*

Version: Issued version 2.0

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Date: 17th November 2016

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Date: 17th November 2016

AUTHORISED FOR ISSUE

Signature:

Name: John Henry Looney

Position: Director

Date: 17th November 2016

DISTRIBUTION

Radnor Hills Mineral Water Company Ltd.

Natural Resources Wales

Sustainable Direction Ltd.

Executive Summary

1.1 About the Project

This Environmental Permit application is for an environmental permit to be held by Radnor Hill Mineral Water Company Ltd (Radnor Hills), which operates a soft drink production facility near Knighton, Powys. The Permit application and supporting documentation, including this report, were prepared by Sustainable Direction Ltd (SDL) working with and on behalf of Radnor Hills.

The application is for a soft drink production facility located in Heartsease, Knighton, Powys, LD7 1LU. The site entrance sits at grid reference SO344725, Easting = 334466, Northing = 272509.

The operations on the site include two activities listed within the Environmental Permitting Regulations.

Section 6.8 A (1) (d) (ii) *Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or unprocessed, intended for the production of food or feed (where the weight of the finished product excludes packaging) – only vegetable materials with a finished production capacity greater than 300 tonnes per day or 600 tonnes per day where the installation operated for a period of no more than 90 consecutive days in any year;*

Section 5.4 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 activity 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;*

The facility has been operational since 1996, and due to expansion and increased production capacity since this time now requires an Environmental Permit to operate. The process involves the abstraction and bottling of mineral and spring waters, and the blending of syrups and juices to create a range of still and sparkling soft drinks.

The facility abstracts water locally from the ground and, after mixing with a range of syrups and juices, bottles this water into a variety of products.

Water is pumped from seven boreholes and is filtered prior to use in products. The abstraction of water is not included in this environmental permit application as it is covered under a separate set of regulations.

Flavours are provided by syrups, which are mixed in the syrup room. A wide range of ingredients are mixed and diluted with water until there is a straightforward syrup:water ratio needed on the bottling lines themselves. Citric acid is used in the syrups to bring their acidity down to within regulation levels for soft drinks.

There are seven bottling lines (RV 1 – 7), one of which uses glass bottles and the rest plastic. Many of the bottles used by Radnor Hills are blown on site. Delivered as preforms, the bottles are filled with compressed air within a mould to give them their shape, and rinsed. Bottles are then filled with still / sparkling water or flavoured drink, capped and labelled. Due to the abstraction capacity of the boreholes, the plant has an overall production capacity of 1,680 m^3 per day, however in total the production of the existing seven lines is <350 m^3 per day.

Although changes are planned to the site, including the commissioning of new lines and decommissioning of older ones, operations will continue within the 1,680 m^3

envelope capacity.

This application was prepared with input and oversight from Julia Frost of NRW and Nick Rukin of RUKHYDRO.

2 "About You" – Form A

2.1 About you

The entity applying to hold the Environmental Permit is Radnor Hills Mineral Water Company Ltd (hereafter "Radnor Hills").

Radnor Hills is a registered company (company registration number 3258542). The registered address is Heartsease, Knighton, Powys, LD7 1LU.

The contact details for the application are:

Table 1 - Contact details

Applicant	**Agent**
William Watkins	John Henry Looney
Radnor Hills Mineral Water Company Ltd Heartsease Knighton Powys LD7 1LU Tel: 01547 530220 Mob: 07971 977285 Email: william@radnorhills.co.uk	Sustainable Direction Ltd 6 Twigworth Court Business Centre Twigworth Gloucestershire GL2 9PG Tel: 01452 382218 Mob: 07817 809018 Email: jh.looney@sustainabledirection.com

The operational contact is William Watkins at Radnor Hills.

The billing and invoice contact is William Watkins at Radnor Hills.

Correspondence relating to the Environmental Permit application should be directed to John Henry Looney.

3 General Bespoke Permit – Form B2

3.1 About the permit

A Natural Resources Wales (NRW) case number has not been assigned to this project.

Previous discussions with the NRW about this project have included a pre-application meeting which took place at the Radnor Hills site with Regulatory and Community Liaison Officer Julia Frost on 14th June 2016 at 12:30pm. This confirmed the listed and directly associated activities occurring at the site that will be included in the environmental permit, and the versions of forms to be filled out.

3.2 About the site

The Radnor Hills site is located on the A4113, around 4 miles east of Knighton, Powys. The postcode of the facility is LD7 1LU. The grid reference at the entrance to the site is SO344725, Easting = 334466, Northing = 272509.

The type of regulated facility being applied for is known as an 'Installation', and is an OPRA-charged activity. There are two listed activities at the site; the manufacturing process itself and the effluent treatment plant.

The first listed activity falls under the following Schedule 1 paragraph:

Section 6.8 A (1) (d) (ii) *Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or unprocessed, intended for the production of food or feed (where the weight of the finished product excludes packaging) – only vegetable materials with a finished production capacity greater than 300 tonnes per day or 600 tonnes per day where the installation operated for a period of no more than 90 consecutive days in any year;*

The second listed activity is the effluent treatment plant, which falls under the following Schedule 1 paragraph:

Section 5.4 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 activity 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;*

The installation is not a low impact installation, nor will it be treating batteries. This is not a multi-operator installation.

3.3 Your ability as an operator

Neither Radnor Hills, nor any relevant person, has committed or has been convicted of any relevant offences.

Neither Radnor Hills, nor any relevant person, has ever been made bankrupt or had insolvency proceedings taken against them.

3.4 Management System

Radnor Hills operates an Environmental Management System (EMS) which complies with ISO 14001:2015, however this has not been certified by a UKAS-accredited auditing body.

The EMS provides the framework by which Radnor Hills manages the environmental impact of its site, operations and value chain where possible. It is an evolving system as aspects of site operations change. A key change in the site's future will be the installation of the new effluent treatment system, which, as Radnor Hills' main emission source, will have the ability to have a significant environmental impact. Risk assessments will be carried out as per the EMS, and full management procedures put in place to control these risks.

A summary of the management system is provided in Appendix A, in the form of the Environmental Management System Manual.

3.5 Consultation (installations only)

There will not be any releases to sewer.

There will not be any releases into any harbours.

There will not be any releases into territorial waters or coastal waters.

A nuclear site licence is not needed for the site.

The Control of Major Accident Hazards Regulations (COMAH) 1999 do not apply as none of the dangerous substances listed in column 1 of Parts 2 or 3 of Schedule 1 is present in the quantities specified (see Section 4.7 for more information on the raw materials used and kept onsite).

3.6 Supporting information

Plans for the site are enclosed as Appendix B. Please note that one of the buildings on the site is excluded from the scope of the permit as it is not used by the installation at Radnor Hills but as a grain storage building by another operation. Although it appears from the map that this building is an island with no access, the portion of the boundary between it and the road simply covers Radnor Hills' subterranean pipelines and access to the storage building is therefore free. Radnor Hills understands that there is risk of environmental impact by vehicles crossing its permit boundary in order to access the storage building. There is an agreement between Radnor Hills and the other operator surrounding this, and activities are managed in the same way as any other external contractor on site, as per the Environmental Management System.

The Site Condition Report is enclosed as Appendix C.

3.7 Non-technical Summary

This Environmental Permit application is being made by Radnor Hill Mineral Water Company Ltd (Radnor Hills), which operates a soft drink production facility near Knighton, Powys.

The facility has been operational since 1996, and due to expansion and increased production capacity since this time now requires an Environmental Permit to operate. The process involves the abstraction and bottling of mineral and spring waters, and the blending of syrups and juices to create a range of still and sparkling soft drinks. The site became aware of its need for an environmental permit in 2015, and has been in discussion with Natural Resources Wales since this time to prepare this application.

Production and bottling of water and soft drinks

The facility abstracts water locally from the ground and, after mixing with a range of syrups and juices, bottles this water into a variety of products.

Water is pumped from seven boreholes and is filtered prior to use in products. The abstraction of water is not included in this environmental permit application as it is covered under a separate set of regulations.

Flavours are provided by syrups, which are mixed in the syrup room. A wide range of ingredients are mixed and diluted with water until there is a straightforward syrup:water ratio needed on the bottling lines themselves. Citric acid is used in the syrups to bring their acidity down to within regulation levels for soft drinks.

There are seven bottling lines (RV 1 – 7), one of which uses glass bottles and the rest plastic. Many of the bottles used by Radnor Hills are blown on site. Delivered as preforms, the bottles are filled with compressed air within a mould to give them their shape, and rinsed. Bottles are then filled with still / sparkling water or flavoured drink, capped and labelled. The plant has a capacity of 1,680 m^3 per day. Although changes are planned to the site, including the commissioning of new lines and decommissioning of older ones, operations will continue within this envelope capacity.

Pasteurisation occurs on many of the lines, where product is heated to kill pathogenic bacteria.

Cleaning

A combination of manual and automatic cleaning-in-place (CIP) systems are used on the production lines. Both manual and automatic systems have three types of clean.

Firstly, there is a simple flush with water. Secondly, a wash with peracetic acid (PAA), which occurs on each line every 48 hours. A clean with sodium hydroxide (caustic) occurs once every 96 – 108 hours on each line. After running one particular product on RV 3, a hydrogen peroxide solution is used in the clean to remove a more persistent flavour.

All effluent from cleaning drains to the effluent treatment plant.

Energy consumption

There are four boilers on site which run off Calor gas. RV3 boiler heats the pasteurisers on RV2 and RV3, and two hot water tanks. RV5 boiler provides heat to the CIP set on RV5 and 6, the pasteurisers on RV5 and 6 and the RV4 hot fill line. A further boiler provides heat for the CIP on the remaining lines. Salt is used as a softener for the boiler water, as well as a range of boiler chemicals. Blowdown from the boilers drains to the effluent treatment plant. A single gas oil fired heater provided heat to a bottle blower.

Treatment of process effluent

The effluent treatment system is not yet in place and operational. When in place, the process will be a biological one – using microorganisms to digest the contaminants in the effluent – and will work as follows:

A 300 m^3 tank will be used to balance the effluent. This is important because the raw effluent straight from the factory is very variable in nature. The balancing tank homogenises the mixture to provide a more consistent flow to the next stages. The effluent will then pass into a bioreactor tank. This tank will have air blowers to oxygenate the water, nutrient dosing and caustic dosing to raise the pH if the effluent becomes too acidic. The purpose of all this is to allow microorganisms to grow in the effluent, which will digest the sugars and other contaminants in the water.

Following this, effluent will pass through a membrane separation bank, which looks like a series of tubes and contains thousands of filter straws. A pump at the far end of the bank will draw the effluent through the straws, however the straws will retain the solid mass of microorganisms which have grown in the bioreactor tank. This will produce a clean 'permeate'. The microorganism biomass will be returned to the bioreactor tank.

This type of system is referred to as a 'membrane bioreactor' or MBR.

The treated permeate will be discharged to the environment based on its quality falling within discharge limits that will be set by the environmental permit. An automatic system will test the quality of the effluent and recirculate it through the system if the quality is not high enough. The systems will also alert the operator, which can use the computer telemetry system to discern the cause of any problem.

Up to 43% of the permeate will be diverted from the discharge, treated further, and reused onsite.

Passing the effluent through the filters will form a sludge of solid material left behind. When the level of sludge in the tank reaches a preset level, a valve will automatically open and the surplus sludge will be pumped into a sludge tank, from which it can be collected by tanker and disposed of appropriately.

The system is designed to treat an average of 193.5 m^3 per day, with a peak capacity of 290 m^3 per day. This is seen as covering potential medium-term expansion of the production facility.

Effluent discharge

Treated permeate will be discharged to two locations; the River Teme as a surface water discharge, and through the wetland system as a groundwater discharge. The

permeate cannot be discharged only to the river because during the summer the Teme often dries up, and a purely groundwater discharge would not work as in wet conditions the water table is too high to allow soakaway. Under normal conditions, the discharge will be split 50/50 between the two locations. Monitoring of the river and groundwater level will be used to determine when the discharge should be moved to up to 100% to the river, or the wetland. This will be done manually by an operator, and the EMS will contain a procedure to control this.

Foul water treatment

Sewage from the offices onsite is kept separate from the process effluent system until the point of final discharge, and is treated by a Klargester sewage treatment system. This passes through the existing Reed Bed, which is being reinstated, and is discharged via a soakaway lagoon. This is subject to a separate environmental permit application (see Radnor Hills Form Part B6).

3.8 Environmental Risk Assessment

The objective of this H1 environmental risk assessment is to assess the environmental impact of the soft drinks bottling and associated effluent treatment takin place at Radnor Hills' Heartsease site, the subject of this environmental permit application. Activities included in this include raw materials handling, bottling of water, production of syrups, blending of soft drinks, packing of product, dispatch of product, cleaning, waste treatment.

Air Release Points

There are five air release points, from boilers run on natural gas used for the generation of steam in the process and also a single oil-fired heater providing heat for bottle blowing. These are shown below.

Table 2 - Air release points

Number	Description	Location or Grid Reference	Activity or Activities	Effective Height	Efflux Velocity	Total Flow
				metres	m/s	m3/hr
e.g.	A1	North stack		150	25	5,000
1	B1	SO 34307 72464	Steam generation	4	0.0005	0.54
2	B2	SO 34401 72466	Steam generation	5	0.0006	1.12
3	B3	SO 34391 72464	Steam generation	4	0.0008	0.27
4	B4	SO 34324 72458	Steam generation	4	0.0008	0.88
5	O1	SO 34366 72429	Heat for bottle blowing	4	0.02	4

The boilers were reported by the boiler manufacturer to produce emissions of <230 mg/m^3 oxides of nitrogen. This maximum was used to calculate the release rate of nitrous oxides from the boilers, shown in the table below:

Table 3.1 - Air releases of nitrous oxides from the 4x gas boilers

Emission point	Measurement method	Release concentration (mg/m^3)	Release rate (g/s)	Annual rate (tonne/yr)
B1	Estimated	230	0.000035	0.001

Emission point	Measurement method	Release concentration (mg/m^3)	Release rate (g/s)	Annual rate (tonne/yr)
B2	Estimated	230	0.000072	0.002
B3	Estimated	230	0.000017	0.0005
B4	Estimated	230	0.000056	0.002

Specific technical data on emissions could not be sourced for the oil heater, however generic gas oil data for a heater of that size have been used for the sake of modelling, and are shown in the table below:

Table 3.2 – Air releases for heater O1

Number	Substance	Meas'ment Method	Operating Mode (if relevant)	Data relating to Long Term effects			Data relating to Short Term effects			Annual Rate	ELV Conc.
				Conc. mg/m3	Release Rate g/s	Meas'ment Basis	Conc. mg/m3	Release Rate g/s	Meas'ment Basis	tonne/yr	mg/m3
e.g.	sulphur dioxide	Estimated*	70% load	1510	3000	annual avg	1510	3000	hourly avg	55,000	2000
1	Sulphur Dioxide (1 Hour Mean)	Estimate		2770	0.00308		2770	0.00308	1 Hr Mean	0.09	
2	Nitrous oxide	Estimate		8865	0.00985		8865	0.00985		0.3	
3	Carbon monoxide	Estimate		2355	0.00262		2355	0.00262		0.08	
4	Particulates (PM10) (24 hr Mean)	Estimate		277	0.00031		277	0.00031	24 hr Mean	0.009	

Air Impact Screening

Air impact in terms of Sulphur Dioxide, Carbon monoxide and Particulates is not in excess of 10% of the EAL, therefore further modelling of these substances is not required.

Table 3.3 – Air Impact screening table

Number	Substance	Long Term EAL	Short Term EAL	Long Term			Short Term		
				PC	% PC of EAL	> 1% of EAL?	PC	% PC of EAL	> 10% of EAL?
		µg/m3	µg/m3	µg/m3	%		µg/m3	%	
1	Sulphur Dioxide (1 H	-	350	0.313	-		7.92	2.27	**No**
3	Carbon monoxide	-	10,000	0.266	-		6.74	0.0674	**No**
4	Particulates (PM10) (	40.0	50.0	0.0313	0.0782	**No**	0.792	1.59	**No**

Water Discharge Locations

Treated trade effluent (permeate) is discharged at two locations; into the River Teme and to groundwater via a soakaway lagoon.

Table 4 - Water discharge location

Number	Description	Final Discharge Category	Flow Rate or Mean ID*	Min ID (Salt Water Discharges)
e.g.	River Trent at Derby	R	400	400
1	River Teme	R	River Flow (m3/s): 2.29	
2	Groundwater	N	0.0097	0

Water Release Points

There is one release point into each discharge location. Under normal conditions 50% of the permeate will discharge to each point. However, under certain conditions (very wet / dry weather) all discharge will be routed to one of the discharge points. It is this maximum flow that has been used as the effluent flow rate, to show a worst-case scenario.

Table 5 - Water release points

Number	Description	Location or Grid Reference	Activity or Activities	Final Discharge Point	Discharge via Sewer?	Mean Effluent Flow Rate m3/s	Effluent Flow Rate (5% Exceeded)
e.g.	W1	Discharge from ETP into River		1	No	4.000	
1	ES1	SO 34391 72960	Discharge from ETP to river	1 River Teme	No	0.0034	0.0034
2	Pond	SO 34637 72862	Discharge from ETP to ground	2 Groundwater	No	0.0034	0.0034

Water Emissions Inventory

Of the substances contained within the H1 tool, only ammonia will be discharged, at a maximum rate of 5 mg/l (1.45 kg/yr). More detailed modelling of impact on surface water and groundwater has been conducted, which includes substances not specified in the H1 tool. Please see Appendices E and F.

Water Temperature

Permeate will be discharged at an average temperature of 18.17°C, with the potential of a high peak rate of 25°C.

Water pH

The pH of the discharge will be between 6 and 9 pH units. The normal rate will be 7.5.

Water Impact Screening

Table 5.1 – Water impact screening

Substance	Long Term EQS µg/l	Short Term MAC µg/l	Long Term PC µg/l	Long Term % PC of EQS %	Long Term > 4% of EQS?	Short Term PC µg/l	Short Term % PC of MAC %	Short Term > 4% of MAC?
Ammonia CaCO3 >50mg/l (90 %ile) (River	200		7.41	3.71	**No**	7.41	-	

Water impact in terms of ammonia is not in excess of 4% of the EQS, therefore further modelling of this substances is not required. However, more detailed modelling of impact on surface water and groundwater has been conducted, which includes substances not specified in the H1 tool. Please see Appendices E and F.

Energy Consumption

Three energy sources are used onsite; electricity from public supply, liquid petroleum gas and gas oil. The CO_2 emissions in tonnes per year from this is shown below.

Table 6 - Energy consumption

Number	Energy Sources		Delivered MWh/yr	Conversion Factor	Primary MWh/yr	CO2 Factor	CO2 tonne/yr
e.g.	natural gas		70,000				
1	Electricity from public supply	indirect emissions	6600	2.40	15,840	0.17	2,629
2	Liquid Petroleum Gas	direct emissions	4282	1.00	4,282	0.23	985
3	Gas oil	direct emissions	61	1.00	61	0.25	15

Raw Materials

The main raw material is water, of which 182,277 tonnes are used per year. Additionally, some hundreds of types of flavourings and sugars are used, totalled here as 'ingredients' as 2,000 tonnes per year.

Table 7 - Raw materials

Number	Material	Annual Consumption	Units
e.g.		50,000	
1	Potable Water	182277	tonnes/year
2	Ingredients	2000	tonnes/year

Noise Sources

Stationary noise sources such as production lines and compressors are sealed within soundproofed buildings and therefore do not create noise emissions on the site. Mobile plant (i.e. forklifts) are used onsite which have a noise emission associated with them of around 85dB. Because site operations are 24 hours, these emissions are released during the day and night.

Odour Inventory

There are no sources of odour.

Waste Inventory

The waste inventory is as follows. Over 90% of waste produced onsite is sent for reuse or recycling.

Table 8 - Waste inventory

Number	Waste Stream	Mass tonne/yr	Category of Waste	Disposal/Recovery Option
e.g.	ETP sludge		non-hazardous	
1	ETP sludge	2,555	biodegradable non-hazardous w	Chemical recovery (R2 to R9)
2	Baled plastic	1,600	other non-hazardous	Other Recycling (R3:R4:R5:R11 and F
3	Pallets	112	other non-hazardous	Other Recycling (R3:R4:R5:R11 and F
4	Spent drums	31	stable non-reactive hazardous v	Other Recycling (R3:R4:R5:R11 and F
5	Waste preforms	31	other non-hazardous	Other Recycling (R3:R4:R5:R11 and F
6	Off-spect product	171	other non-hazardous	Other Recycling (R3:R4:R5:R11 and F
7	Glass	19	inert	Other Recycling (R3:R4:R5:R11 and F
8	Cardboard	68	biodegradable non-hazardous w	Other Recycling (R3:R4:R5:R11 and F
9	Mixed plastic and cardboard	138	other non-hazardous	Other Recycling (R3:R4:R5:R11 and F
10	General waste	149	other non-hazardous	Landfill (D5)
11	Oil	1	hazardous	Landfill (D5)

Identify Relevant Impacts

The following impacts were assessed using the H1 tool as being relevant:

Table 9 - Relevant Impacts

Emissions in Module 2?		Justification for omission
Yes	☑ Air	
Yes	☑ Deposition from Air to Land	
Yes	☑ Water	
Yes	☑ Noise	
No	☐ Odour	assessment of this impact should be carried out according to sector guidance
Yes	☑ Waste	
-	☐ Accidents	assessment of this impact should be carried out according to sector guidance
Yes	☑ Visual	
Yes	☑ Ozone Creation	
Yes	☑ Global Warming	

Local Environmental Quality

There are no local environmental quality standards relating to air quality or Air Quality Management Zones, as confirmed by local records.

In terms of water quality, the site sits on an aquifer used for drinking water and is therefore a groundwater vulnerable zone.

Public annoyance from noise, odour or plume visibility is unlikely due to the remote location of the installation and the minor intensity of potential emissions.

The River Teme, receptor of water emissions, is a Site of Special Scientific Interest.

Air Impacts

The Air Impact Modelling within the H1 tool screens out air emissions as having too low a process contribution to be of concern. No further modelling work is

required. Air deposition to land is deemed to be insignificant.

Water Impacts

The process contribution of ammonia in the water discharge is 3.71% of the EQS. This is below the 4% significance threshold and therefore no further modelling has been conducted.

Noise Impacts

This has been screened out due to the remote location of the site. The nearest receptors not associated with the installation are around 200m away, on the other side of a main road. The site cannot be significantly heard from this location.

Visual Impacts

The four air release points can generate a visible plume on some cold days, however the no plume extends beyond the installation boundary for more than 5% of the time and therefore this impact is insignificant.

Photochemical and Ozone Creation Impacts

Number	Substance	Annual Rate tonne/yr	POCP Value per tonne	POCP
e.g.				
3	Carbon monoxide	0.08	2.7	0.22

Global Warming Impacts

The global warming impacts of activities onsite are shown below:

Substance	Source	Annual Rate tonne/yr	GWP Value per tonne	Annual GWP
C02 Energy: direct	direct emissions	4,343.00	1.00	1,000.11
C02 Energy: indirect	indirect emissions	6,600.00	1.00	2,629.44
Nitrous oxide Process: direct	B1	0.00	310.00	0.31
Nitrous oxide Process: direct	B2	0.00	310.00	0.62
Nitrous oxide Process: direct	B3	0.00	310.00	0.16
Nitrous oxide Process: direct	B4	0.00	310.00	0.62
Nitrous oxide Process: direct	01	0.30	310.00	93.00

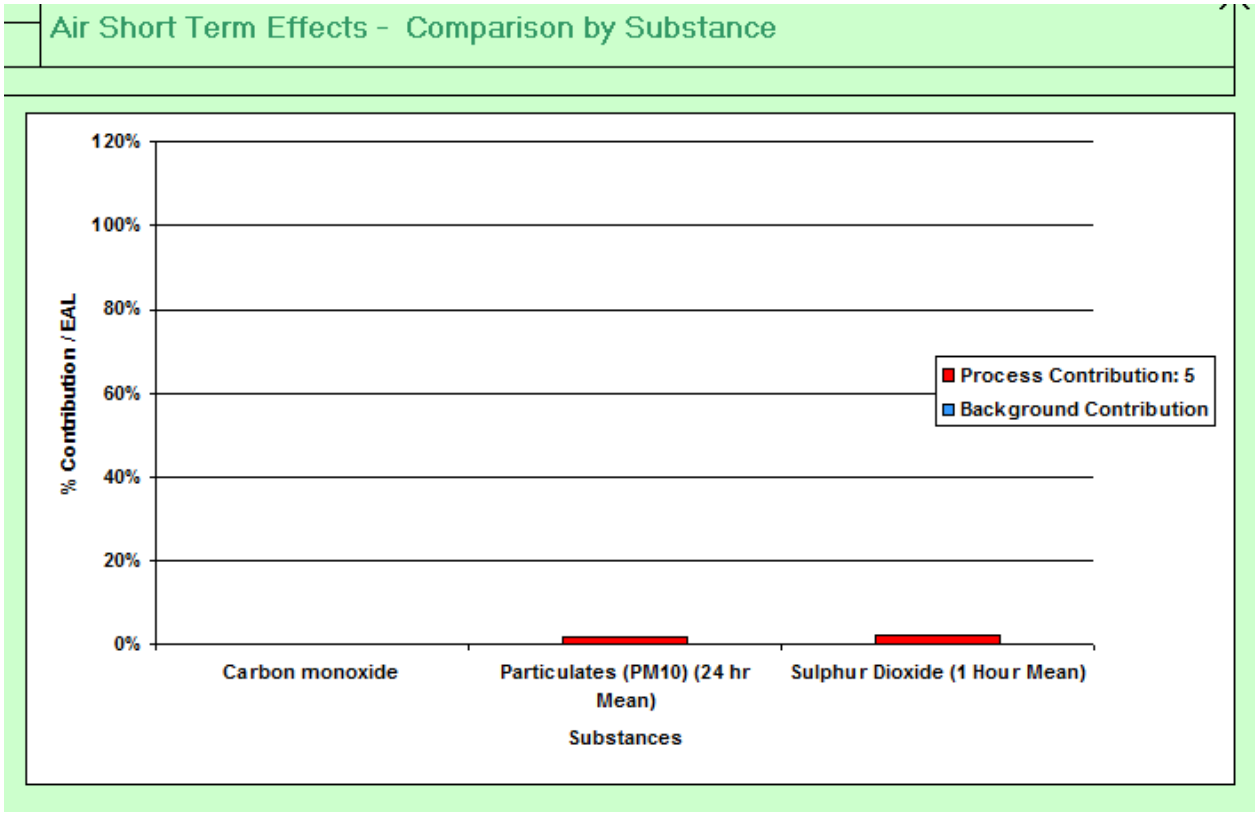
Waste Impacts

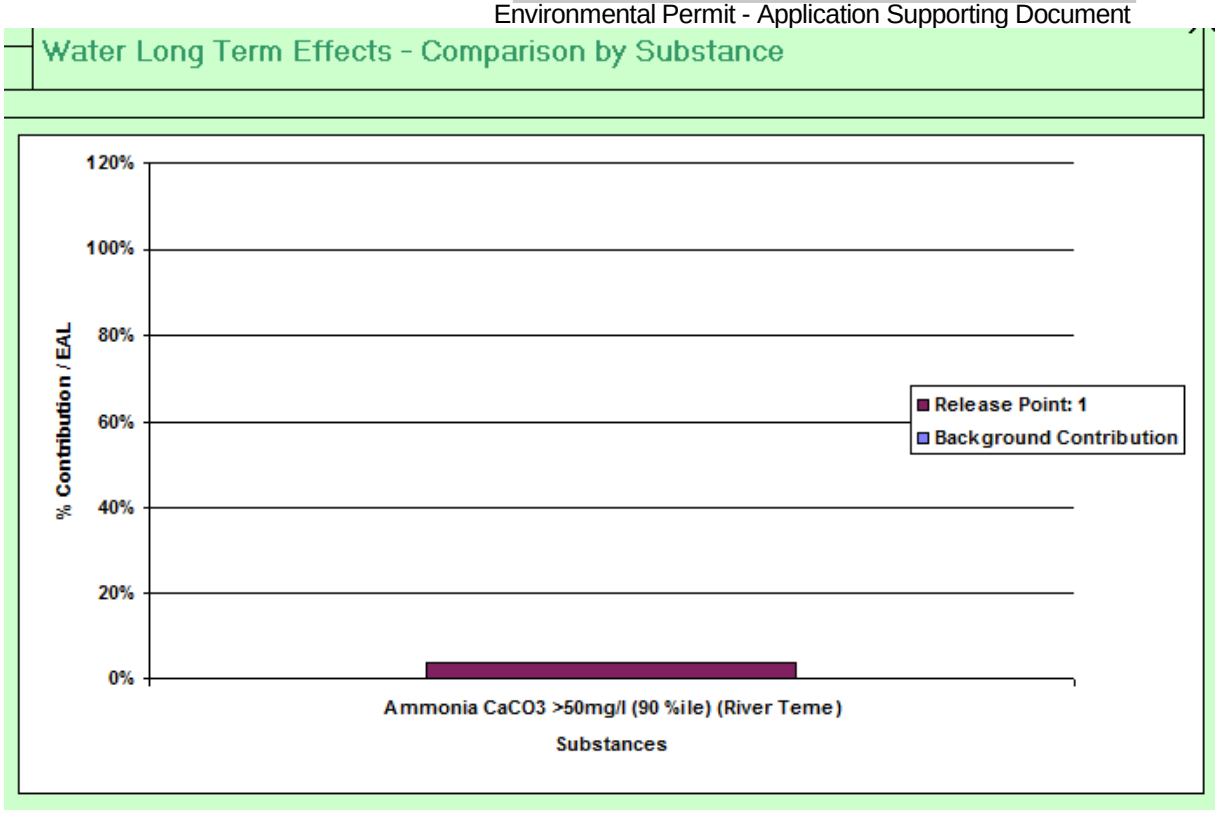
Waste impact scores were generated as follows:

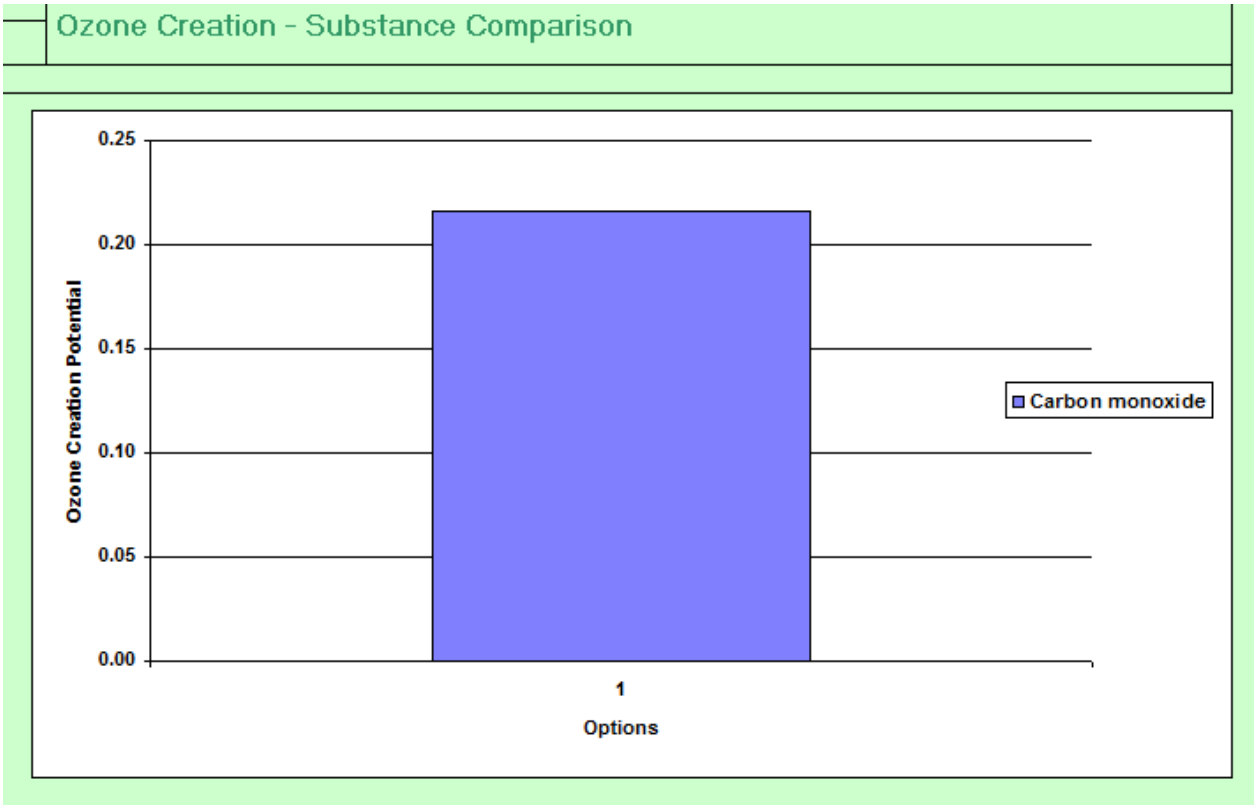
Table 11 - Waste impacts

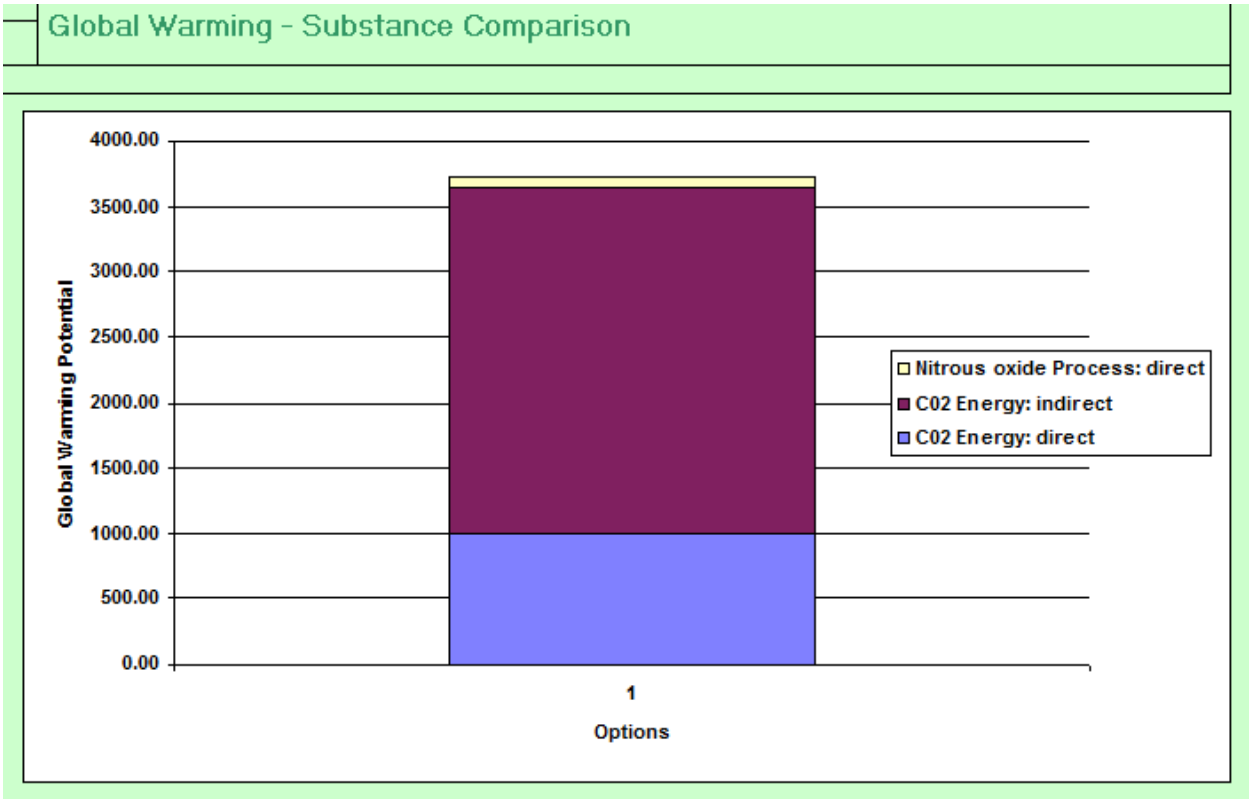
Number	Waste Stream	Mass	Final treatment or disposal method	(Score)	Waste Type	(Score)	Impact Score
e.g.	ETP sludge	1300	non-inert landfill		non-hazardous		
2	Baled plastic	1,600	Other Recycling (R3:R4:R5:R11 and R12)	3	other non-hazardous	2	9600
8	Cardboard	68	Other Recycling (R3:R4:R5:R11 and R12)	3	biodegradable non-hazard	4	816
1	ETP sludge	2,555	Landspreading (R10)	4	biodegradable non-hazard	4	40880
10	General waste	149	Landfill (D5)	30	other non-hazardous	2	8940
7	Glass	19	Other Recycling (R3:R4:R5:R11 and R12)	3	inert	1	57
9	Mixed plastic and cardboard	138	Other Recycling (R3:R4:R5:R11 and R12)	3	other non-hazardous	2	828
6	Off-spect product	171	Other Recycling (R3:R4:R5:R11 and R12)	3	other non-hazardous	2	1026
11	Oil	1	Landfill (D5)	30	hazardous	10	300
3	Pallets	112	Other Recycling (R3:R4:R5:R11 and R12)	3	other non-hazardous	2	672
4	Spent drums	31	Other Recycling (R3:R4:R5:R11 and R12)	3	stable non-reactive hazard	8	744
5	Waste preforms	31	Other Recycling (R3:R4:R5:R11 and R12)	3	other non-hazardous	2	186

Graphs




Water Long Term Effects - Comparison by Substance
120%
100%
80%
60%
40%
20%
0%
% Contribution / EAL
Release Point: 1
Background Contribution
Ammonia CaCO3 >50mg/l (90 %ile) (River Teme)
Substances


Ozone Creation - Substance Comparison
0.25
0.20
0.15
0.10
0.05
0.00
Ozone Creation Potential
Carbon monoxide
1
Options



No emissions exceed Statutory Emission limit values, Environmental Quality Standards or Environmental Assessment Levels.

4 New Bespoke Installation – Form B3

4.1 What activities are you planning for?

Table 14 - Schedule 1 Listed Activities

Installation Name	Activity Listed in Schedule 1 of the Regulations / Associated Activity	Description of Specified Activity	Activity Capacity
Radnor Hills	Section 6.8 A (1) (d) (ii) Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or unprocessed, intended for the production of food or feed (where the weight of the finished product excludes packaging) – only vegetable materials with a finished production capacity greater than 300 tonnes per day or 600 tonnes per day where the installation operated for a period of no more than 90 consecutive days in any year;	Production and bottling of water and soft drinks. Additional details below.	1,680 m^3 per day
Radnor Hills	Schedule 5.4 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 activity 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;	Treatment of process effluent.	290 m^3 per day

Table 15 - Directly associated activities

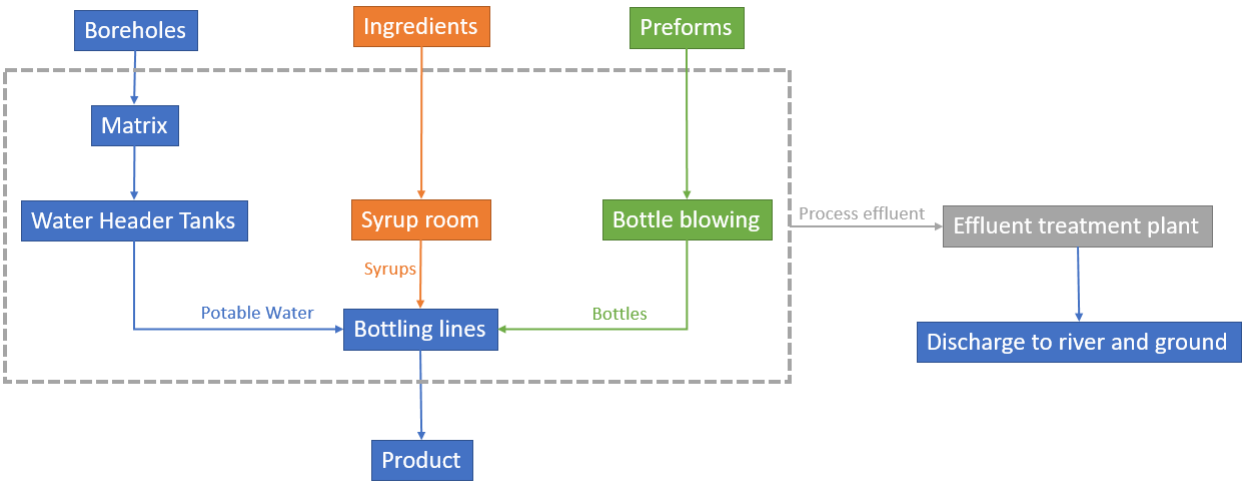
Name of DAA	Description of the DAA
Treatment of domestic sewage	A Klargester is used to treat domestic sewage produced in the offices that support the Section 6.8 A (1) (d) (ii) activity listed above. Please note that this is the subject of a separate environmental permit or discharge application (see Radnor Hills Form Part B6).
Combustion plant	4x natural gas boilers and 1x oil-fired heater are used to support the Section 6.8 A (1) (d) (ii) activity listed above.

Production and bottling of water and soft drinks

The main listed activity at the facility is defined as a Section 6.8 A (1) (d) (ii) activity under the Environmental Permitting (England and Wales) (Amendment) Regulations 2013[1].

The facility abstracts water locally from the ground and, after mixing with a range of syrups and juices, bottles this water into a variety of products. A basic product flow (minus services) is shown below:

Figure 1- Basic process flow



Water is pumped from seven boreholes (the abstraction of water is excluded from the scope of the environmental permitting regulations as it is covered by separate abstraction legislation), and is passed through an air filter and food grade polyethersulfone (PES) membrane filter. This then travels to a matrix, where it is directed to one of nine water header tanks, connected to the production lines themselves. At the header tanks, the water is filtered through 0.2um membranes.

Bottles are blown on site at Radnor Hills. There are two older bottle blowing lines and three newer blowers on the bottling lines themselves. 13.5g preforms are delivered in boxes of 24,000, passed through a mould, and blown with 40 bar pressurised air. Each of the older lines can produce 4,500 bottles per hour, and run seven days a week. The newer blowers are designed to produce bottles at a rate to match the production of that line.

Flavours are provided by syrups, which are mixed in the syrup room. 0.2µm filtered water from one of the header tanks dilutes the syrup mixtures to a level where there is a straightforward syrup:water ratio for the bottling line itself (1:5, 1:8 etc.). The amount of water therefore varies depending on the specific syrup. Citric acid is added in powder form to reduce the pH of the syrups.

[1] http://www.legislation.gov.uk/ukdsi/2013/9780111532126

There are currently seven production lines, denoted RV1-7. Bottles, whether blown on site or bought in, are rinsed with air or ozonated water, filled, capped and labelled, and packaged in each of these lines. RV3, 5, 6 and 7 can produce carbonated as well as still products. RVs 2-7 have pasteurisers on the lines which raise the temperature of the product significantly before chilling it back down. RV 4 is a hot-fill line, where the product is heated to 92°C before being cooled to around 80°C for bottling. This removes the need for preservatives to be added. RV3 is unique in that it fills glass bottles rather than plastic. RV3 has a cooling tower to provide cooling in the pasteuriser. Process water from the lines drains to the effluent treatment plant, as does bleed-off from the cooling tower. Recirculation is used where possible within processes and water is only dumped once it cannot be used further.

RV1, 2 and 3 have a manual CIP system with three types of clean. Firstly, there is a simple water flush. Secondly, there is a wash with peracetic acid (PAA), which occurs for each line approximately every 48 hours. A caustic clean occurs once every 96-108 hours on each line, depending on what products are being run. After running one particular product on RV3, a hydrogen peroxide solution is also used in the clean to remove the persistent flavour.

RV4, 5, 6, 7 and the syrup room have an automatic CIP set. This also performs water, PAA and caustic cleans. A cleaning effluent drains to the effluent treatment plant.

All water used by the installation is taken from Radnor Hills' own boreholes.

There are four boilers on site which run off Calor gas. RV3 boiler heats the pasteurisers on RV2 and RV3, and two hot water tanks. RV5 boiler provides heat to the CIP set on RV5 and 6, the pasteurisers on RV5 and 6 and the RV4 hot fill line. A further boiler provides heat for the CIP on the remaining lines. Salt is used as a softener for the boiler water, as well as a range of boiler chemicals. Blowdown from the boilers drains to the effluent treatment plant. There is a single gas oil-fired heater used to provide heat for bottle blowing.

Treatment of process effluent

The second listed activity at the site is defined as a Section 5.4 A (1) (a) (i) activity under the Environmental Permitting (England and Wales) (Amendment) Regulations 2013.

The effluent treatment system is not yet in place and operational, with the approximate date of commissioning expected to be summer 2017. The current system is an aerated equalisation tank with an approximately three-day retention period and automatic pH neutralisation, followed by a reedbed and series of lagoons, the last of which drains to groundwater. This system is to be replaced, however.

The existing balance tank will remain, however the current pH correction system will not be used. Effluent from the balancing tank will be pumped into the bioreactor tank, via a 0.8mm strainer to prevent debris from entering the tank. This is an aerobic tank, oxygenated by two air blowers operating on a duty/assist basis to create the conditions for biological treatment. Dissolved oxygen levels within the tank will be monitored, and the assist blower will be activated automatically when required. Nutrient dosing will be in place to aid the growth of microorganism

populations, as well as caustic dosing to raise the pH of the effluent, which is naturally acidic.

From the bioreactor tank, the effluent will be passed, via a basket strainer, through the membrane biomass separation banks. There will be two identical membrane units operating in parallel. A pump at the far end of the membrane banks draws effluent through a series of membrane straws, with filtered permeate passing onwards and biomass being retain within the straws. Biomass is returned to the bioreactor tank, and the clean permeate goes to a holding tank, ready for further treatment and reuse onsite (43% of permeate) or discharge.

A sludge tank will hold surplus sludge from the bioreactor tank. The sludge from this tank will be disposed of at offsite anaerobic digestion facilities, or spread to land depending upon its quality.

The whole treatment system is automatically controlled by a SCADA system.

The system is designed to treat an average of 193.5 m^3 per day, with a peak capacity of 290 m^3 per day. This is seen as covering potential medium-term expansion of the production facility. Up to 43% of the permeate is passed through a reverse osmosis (RO) plant and reused onsite. The final 57% is discharged.

A plant layout plan can be found in Appendix B, RH 9 – Aquabio Plant Layout.

The discharge quality of the permeate (without RO) is shown in the table below.

Table 16 – Water discharge quality

Parameter	Design average	Minimum	Maximum	Units
Instantaneous flow rate	7.6	-	12.1	m^3 / hr
Daily flow rate	193.5	-	290	m^3 / d
Temperature	18.17	15	25	^oC
pH	7.5	6.0	9.0	pH
TSS concentration	5	<1	10	mg / l
BOD concentration	5	<1	10	mg / l
Ammonia as NH_4	0.5	<0.5	5	mg / l
Phosphorus as PO_4	0.2	<0.2	1	mg / l

Foul water treatment

A Klargester sewage treatment system is present, the discharge from which is the subject of a separate environmental permit discharge application (see Radnor Hills Form Part B6).

Sewage from the offices on site is treated by the Klargester, passed through a reedbed and discharged through a wetland area, where it soaks away to ground.

4.2 Emissions to Air

There are no major emissions to air.

There are 4 boilers onsite which run off Calor gas of the following capacities:

- 1 no. 1,200 kg steam / hr (1.2 MWth input)
- 1 no. 2,500 kg steam / hr (2.2 MWth input)
- 1 no. 600 kg steam / hr (0.57 MWth input)
- 1 no. 1,950 kg steam /hr (1580 MWth input)

The releases from the flues of these boilers contain oxides of nitrogen.

Table 17 - Air emissions

Emission point reference and location	Source	Parameter	Quantity	Unit
B1 SO 34307 72464 B2 SO 34401 72466 B3 SO 34391 72464 B4 SO 34324 72458	Boiler	Oxides of nitrogen	<230	mg/m^3

There is also a single oil-fired heating unit with a net heat input of 0.09 MWth. The releases to air from this unit are as follows:

Emission point reference and location	Source	Parameter	Quantity	Unit
O1 SO 34366 72429	Heating unit	Oxides of nitrogen	8,865	mg/m^3
		Sulphur dioxide	2,770	mg/m^3

	Carbon monoxide	2,355	mg/m^3
	Particulates	277	mg/m^3

4.3 Emissions to Water

The nearest public sewer connection is approximately 1,000 metres from the site. Severn Trent Water was contacted to find out whether it would be possible for Radnor Hills to discharge all or some of its effluent to the sewer. However, this was confirmed in writing not to be possible due to lack of treatment and in particular hydraulic capacity in the local system (Appendix D). **This is therefore not a viable option.** All effluent must therefore be discharged to the local water environment.
Four options were considered for the discharge location:

- 100% discharge to river – due to the contiguous nature of the surface- and groundwater in the valley, the River Teme where it passes the factory is prone to dry up during the summer. In these instances, surface discharge would not be possible. **This is therefore not a viable single option.**
- 100% discharge to groundwater (through existing soakaway system) – as the lagoons are close to river level, the water table is often too high for discharge to be able to go to ground. **This is therefore not a viable single option.**
- Split discharge – this would mean that during dry periods more / all of the discharge could be routed to the reedbed and soakaway lagoon, and during wet period more / all of the discharge could be routed to the river. Under normal conditions, the discharge would be split 50/50 between discharge points. This would have the benefit of supporting the wetland habitat that has been created at the reedbed, and also act to recharge the aquifer downstream of where Radnor Hills is abstracting from it. A control mechanism would be put in place to decide where to discharge at a particular time. This would be in the form of monitoring equipment in the river, and in a piezometer close to the soakaway area, and a procedure within the EMS to interpret the results and determine the most appropriate discharge location. This has been discussed with NRW Officer Julia Frost as being a potentially acceptable route for discharge.
- All to Lingen Bridge for discharge into the River Teme – this was discounted as the river cannot be guaranteed to have a sufficient dry level flow to be available for the volume of discharge year around. It is also Radnor Hills' desire instead to have a significant groundwater recharge contribution, and to create a wetland area to enhance the local environment.

Treated storm water (which goes to surface drains) and trade effluent are to be discharged at this point.

The effluent treatment plant has been specified to treat the process effluent to the following standard:

Table 18 - Water discharge quality

Parameter	Design average	Minimum	Maximum	Units
Instantaneous flow rate	7.6	-	12.1	m^3 / hr
Daily flow rate	193.5	-	290	m^3 / d
Temperature	18.17	15	25	^oC
pH	7.5	6.0	9.0	pH
TSS concentration	5	<1	10	mg / l
BOD concentration	5	<1	10	mg / l
Ammonia as NH_4	0.5	<0.5	5	mg / l
Phosphorus as PO_4	0.2	<0.2	1	mg / l

43% of the treated effluent is to be treated further and reused on site, meaning that daily average discharge quantity will be 110m^3. When discharged to ground, further polishing of the effluent will occur in the reedbed, and the concentrations shown are therefore maximums. The table below shows the maximum emissions to water.

Table 19 - Water discharge quality

Emission point reference and location	Source	Parameter	Maximum Quantity	Unit
River SO 34391 72960	Permeate from MBR	Daily flow rate (average)	110	m^3/d
Groundwater SO 34537 72798		BOD concentration	10	mg/l
		TSS concentration	10	mg/l
		Ammonia as NH_4	5	mg/l
		Phosphorus as PO_4	1	mg/l
		pH	9.0	pH

The stormwater system picks up any runoff exterior to the buildings; from roofs and hardstanding areas. This drains to a small stream, which ultimately drains to the Teme. The Teme is a SSSI and therefore the stormwater system is designed so that only rainwater runoff could enter the stream, with any spillages being contained and diverted.

A chemical inventory and containment risk assessment was conducted for the site in February 2016, and found the inventory to mostly have a 'low' hazard rating, with a number of 'moderate' hazard materials. Therefore, chemicals and ingredients are to be

stored in a bunded area, roofed to keep out rainwater. This bunded area will drain into a 30m^3 tank, also used for containment of off-spec syrups, which can slowly be bled into the main equalisation tank of the effluent treatment plant. This means that any spills would be contained, channelled and treated so as not to damage the local water environment. Work is already underway onsite to put this in place.

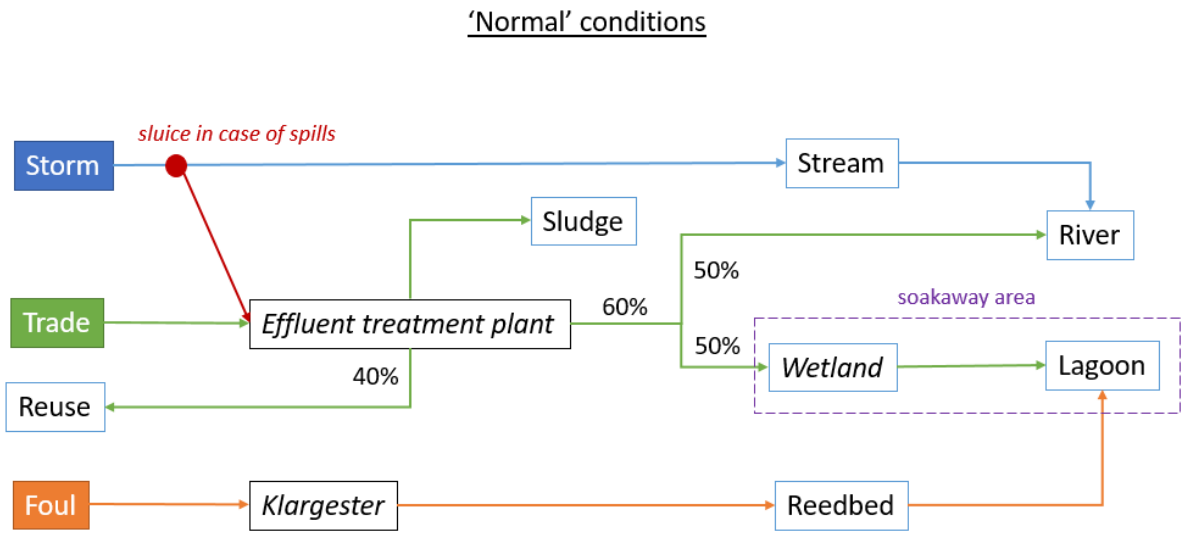
There is a chance that inventory could be spilled whilst being transferred outside of the bunded area and enter the stormwater drains. For this reason, a sluice gate is to be put in place at the culvert where the drain meets the stream. In the event of a spill or fire, this sluice would be closed manually and a divert pipe take any runoff straight to the effluent treatment plant. This will be included within the emergency procedures prescribed by the EMS.

In the event of a fire, water from the effluent treatment plant's balancing tank would be used for firefighting. The run-off would also return here, allowing recirculation of firefighting water. The suitability of this has been confirmed by Powys Fire and Rescue Service.

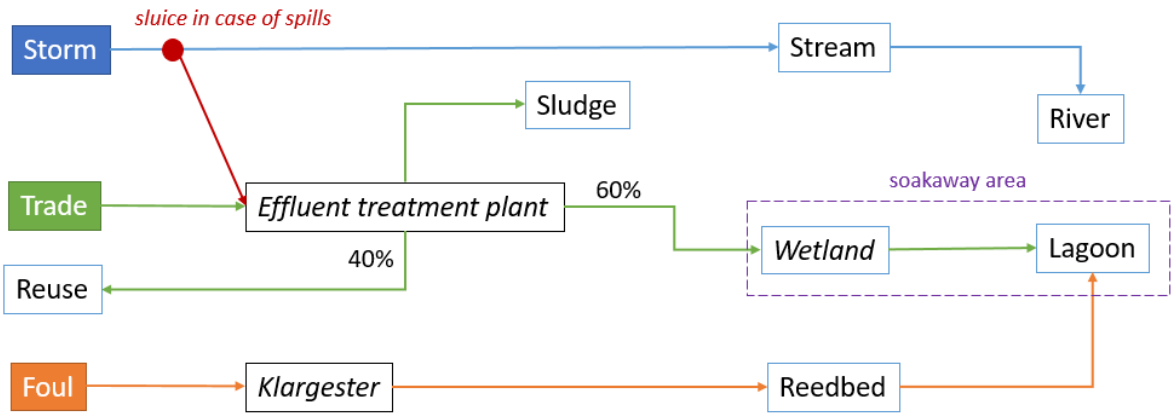
Sewage from the offices on site is treated by the Klargester, and discharged through a reedbed and wetland area, where they soakaway to ground.

The potential flow pathways and discharge options are shown below. Items in italics are those that will be new infrastructure, whereas items not in italics are already extant however may be improved (for example desludging or replacing reeds).

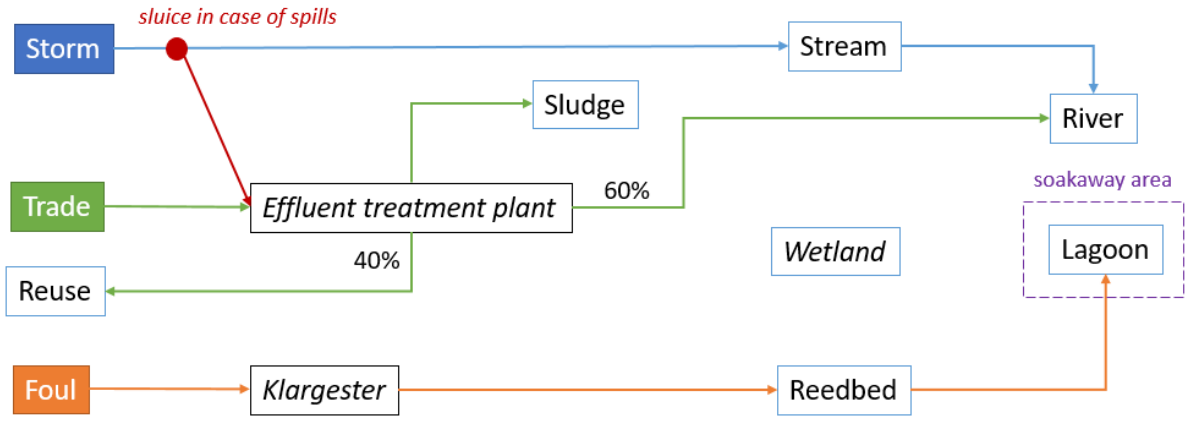
Figure 2 - Potential effluent treatment and discharge pathways



'Dry' conditions



'Wet' conditions



Modelling has been undertaken to predict the impact of these discharges on surface and groundwater quality. For groundwater this can be found in Appendix E, and for surface water in Appendix F.

4.4 Emissions to Land

There will be no direct emissions to land. Sludge produced by the MBR will be transported offsite for landspreading elsewhere, subject to suitability testing.

4.5 Operating techniques

In preparing this permit application reference has been made to the following technical guidance notes:

- Natural Resources Wales: How to comply with your environmental permit, Version 8
- Environment Agency: How to comply with your environmental permit additional guidance for the Food and Drink Sector (EPR 6.10)
- European Commission: Integrated Pollution Prevention and Control, Reference Document on Best Available Techniques in the Food, Drink and Milk Industries

How to Comply with your Environmental Permit, Version 8

General management

Radnor Hills manages and operates its activities in accordance with its written Environmental Management System that identifies and minimises risks of pollution. This includes risks from operations, maintenance, accidents, incidents and nonconformances. Radnor Hills uses only sufficient competent persons and resources. The EMS is in line with ISO 14001:2015, however is not currently certified to that International Standard and is instead run as an in-house system.

The EMS identifies enables Radnor Hills to manage its compliance obligations, such as legal requirements, requirements of interested parties, and an environmental permit.

Training forms an integral part of the EMS. All staff regularly undertake a review of their training needs. Where specific training needs are identified, appropriate training is provided and recorded. Consequently, staff will be aware and understand their roles and responsibilities and know how to respond appropriately, such as during abnormal events. As part of the site training, staff are informed of their responsibilities under the environmental permit and understand how to obtain a copy of the permit for reference. They are also trained in those aspects which could lead to pollution and they know how to deal with accidents. Any contractors are made aware of site risks as they enter the site.

The EMS runs on a Plan Do Check Act (PDCA) cycle, which represents a continual process of review and improvement of performance.

Equipment is designed and installed to a current standard, and operation and maintenance of equipment is within manufacturer's and supplier's specifications. Potential accidents are anticipated by the management system and appropriate measures have been put in place to 1) minimise the chances of accidents and 2) minimise their impacts if they do occur.

The site maintains a range of operation procedures detailing how the site is operated under normal operating conditions, and takes into account the potential environmental impact of the processes and how these are managed and minimised.

The site operates a routine preventative maintenance programme to maintain the efficiency of the production lines and to minimise the likelihood of equipment failure. This includes all plant and equipment including the effluent treatment plant.

The site will has an accident management plan that comprises risk assessments of potential incidents (including those with environmental consequences) and details how these are minimised. Incidents and non-conformances are investigated to determine their cause and to implement measures to prevent their future occurrence.

Appropriate storage will be provided for all materials, in line with CIRIA guidance C736. This includes the provision of impermeable ground covering that is maintained in a good condition to prevent infiltration of materials in the event of an incident. Bunds are provided, designed in line with recognised standards, such as the Oil Storage Regulations, to provide secondary containment in the event of an incident occurring.

As the building drainage system leads to the effluent treatment plant, any spillages within the building would lead there. Some chemicals and ingredients are stored externally. These are positioned within bunded areas which are roofed to exclude rainwater. These areas are able to be drained to a 30 m^3 holding tank and then to the effluent treatment plant. Any spills would therefore be contained, channelled and treated so as not to damage the local water environment.

There is a chance that inventory could be spilled whilst being transferred outside of the bunded area and enter the stormwater drains. For this reason, a sluice gate is in place at the culvert where the drain meets the stream. In the event of a spill or fire, this sluice would be closed manually and a divert pipe take any runoff straight to the effluent treatment plant.

In the event of a fire, water from the effluent treatment plant's balancing tank would be used for firefighting. The run-off would also return here, allowing recirculation of firefighting water. The suitability of this has been confirmed by Powys Fire and Rescue Service.

Reliable records are kept as an essential part of the management system. The management team will refer to the appropriate section of the environmental permit, and the EMS for guidance on which and how to keep the record, as per Section 0 of this document.

Staff or contractors whose work may impact the environment will be required to be familiar with the environmental permit as well as site rules. The permit will be available electronically to relevant staff, and the site manager will be responsible for paper copies of the permit available at all times.

The operator will only carry out Schedule 1 activities as specified under the environmental permit.

Point source emissions to water will be limited to those regulated under the environmental permit. Routine monitoring of discharge quality will be carried out as per section 4.9 of this document.

Point source emissions to air are limited to those from the small boilers on site.

Fugitive emissions to water and air will be prevented through a mixture of the design of the plant and the operation of the management system.

Due to the remote location of the site, noise nuisance is not a significant environmental impact. All factory buildings are insulated, and compressor rooms – the loudest equipment onsite – are fully soundproofed. There is no noisy external equipment other than forklifts, which have been chosen to run off LPG and electricity rather than diesel, which is a quieter option. If a noise complaint were to be received this would be picked up by the EMS and corrective action would be taken.

Records required to be made by the environmental permit shall be legible, made as soon as reasonably practicable, and amendments made clear with previous versions available for retrieval. Records will be retained for at least 6 years from the date when the records were made.

How to comply with your environmental permit additional guidance for the Food and Drink Sector (EPR 6.10)

This section presents the Radnor Hills operation in the context of the additional sector guidance notes (SGN), namely Guidance for the Food and Drink Sector. There is a requirement on Radnor Hills to operate within the parameters of the indicative BAT detailed in the document.

A separate BAT Assessment has been conducted. A summary of the main ways Radnor Hills meets the key BAT requirements can be found below. For full details please see the BAT Assessment in Appendix G.

Table 20 - BAT Summary

EPR 6.10 identified key issues	Summary of system at Radnor Hills
Accident management – many materials used by the sector have high oxygen demand, and spills and leaks into the water environment can be serious events. In addition to preventing spills and process leaks, you should take particular care to avoid overfilling vessels, failure of containment, wrong drainage connections and blocked drains.	Radnor Hills' Environmental Management System (EMS) has procedures for handling emergency situations. All processes have interlocking alarms, designed to act as a failsafe. The effluent system will monitor pH, ammonia and suspended solids continuously at the point of discharge. The system will be alarmed and effluent recirculated within the system if discharge is above specified discharge quality. A manual sluice is in place as part of the stormwater system, which drains to a stream, in case of spillage.
Releases associated with energy use – the industry is a major energy user. There remain significant opportunities for reduction of emissions caused by energy use and choice of energy source (CO_2 , SO_x, NO_x etc., contributing in particular to global warming and acidification).	The site has four boilers, all of which have been switched from diesel to natural gas in recent years. Diesel-powered forklifts have been replaced with electric and LPG forklifts. Heat is recovered from pasteurisers, which have built-in heat regenerations systems. On the Glass Line, water from cooling can be used for gradual heating, and vice versa. All boilers have condensate return to preheat the boiler water, which reduces energy consumption. This also has the impact of reducing the need for oxygen-scavenging chemicals. Very little refrigeration is used. There is a cold store that is thermally insulated, with insulated doors and a strip curtain for when the doors are open.
Water use – the sector uses large volumes of water for moving, cleaning and processing materials. By reducing water use, you will often make it easier to handle the resulting water waste. There are a number of opportunities to either re-use water (for example low-grade wash waters) or to recycle water from, for example, membrane systems (also see Hygiene and food safety below).	As the main raw ingredient, water consumption is a key issue at Radnor Hills. Recirculation of water occurs where possible, for example in the pasteurisers, boilers and cooling tower. The production system itself is a closed one, meaning that losses through leakage or spillage are minimal.

EPR 6.10 identified key issues	Summary of system at Radnor Hills
Waste minimisation – commercial considerations mean that parameters affecting process yield and product wastage are usually understood. These parameters are also key pollution prevention for a significant proportion of the sector's environmental impact.	A weekly production plan is in place, which reduces both the frequency of cleans and also the wastage of bottles and labels as product changeover. The site has limited unrecyclable solid waste, as it is mostly plastics, cardboard and wood. Pallets and cardboard are reused within the process onsite, for example cardboard being reused as packaging for outgoing products. Other wastes are sold / given to other companies for reuse or recycling.
Emissions to air – Many food and drink processes emit volatile organic compounds (VOCs) and odour, for example, from cooking and drying processes. Emissions of dust and particulate can also be a factor from activities such as mixing, grinding, milling and transfer of materials. Odour can be problematic because emissions tend to be fugitive. Refrigeration and cooling systems can also give rise to fugitive emissions.	There are limited emissions to air from the site. The site has four boilers, all of which run on natural gas. Diesel-powered forklifts have been replaced with electric and LPG forklifts to reduce particulate emissions.
Emissions to water – other than the predominantly "dry" activities, for example milling, most food and drink processes generate wastewaters. The composition of the effluent is highly variable, dependent on the activity, working patterns, product wastage and cleaning systems. It is very important that you keep raw materials, intermediates, product and by-product out of the wastewaters as far as practicable by controlling product wastage and cleaning processes.	An effluent treatment system has been specified to treat the volumes and loadings of Radnor Hills' effluent. This will be operated as per the manufacturer's instructions to ensure optimum performance. The discharge quantity and quality will be specified in the environmental permit, and monitoring will be in place to maintain the high standard.
Hygiene and food safety – Hygiene and food safety is of fundamental importance to the food and drink sector. It will sometimes restrict your choice or technique, especially in measures relating to water use, cleaning, re-use and recycling of water.	Radnor Hills considers hygiene and food safety in every decision and operation. HACCP, VACCP and TACCP systems are in place, and the company is BRC certified.

4.6 General Requirements

The H1 assessment has not shown that emissions of substances not controlled by emission limits (fugitive emissions) will be an important issue.

The H1 assessment has not shown than odour will be an important issue.

The H1 assessment has not shown than noise and vibration will be an important issue.

Fire Risk

Fire risk has also been considered onsite. With a water-based process and product, fires within the production lines themselves are unlikely, however the quantities of plastic stored onsite do present a potential for fire. These are stored within specific areas of the site, in separate buildings, so a site-wide fire is very unlikely. In a Risk Assessment and Review of Containment systems, side-wide fires were considered to be of 'low' likelihood (less than 1 in 1,000,000 or no known occurrence) and localized fires of 'moderate' likelihood (between 1 in 100 and 1 in 1,000,000).

Without run-off containment, in the event of a fire run-off from fire-fighting would have the potential to enter both the local groundwater and the River Teme SSSI in large quantities. Therefore, as described in section 4.3 above, a sluice gate is to be put in place in the culvert where site surface drainage meets the stream. In the event of a fire, this sluice would be manually closed (provision for this would be included in the emergency procedure held within the EMS) and all water would be returned, by gravity, to the effluent balancing tank. There would be capacity for this as the contents of the tank would be used as firefighting water, as described below.

Both Powys and Herefordshire Fire and Rescue services have been brought on to site to discuss the quantities of water that would be required in a site-wide fire and also a more realistic scenario fire. It was advised by these bodies that water from the effluent balancing tank would be suitable for use as firefighting water. The Fire Service has advised that it could use Radnor Hills' boreholes as a water source, and also the river in the event that this is required. However, due to the nature of the materials onsite, firefighting runoff would be suitable to be recirculated in further firefighting, meaning that a very large quantity of water would not be required.

In conclusion, the risk of a fire on site is not high, the containment that will be put in place, i.e. the sluice gate and divert to effluent balancing tank, will mitigate the risk to the environment. Consideration has been given to the potential sources of firefighting water, and two fire services have been consulted and agreed on the plans.

4.7 Types and amounts of raw materials

The main raw material used at Radnor Hills is water. 182,277 tonnes were consumed in the 12 months following 1st September 2015.

The other ingredients used by Radnor Hills are listed in Appendix H. Approximately 2,000 tonnes of ingredients are used per year.

In addition to ingredients for the products, a range of cleaning and boiler chemicals are used onsite. These are accounted for in the Chemical Inventory and Risk Assessment contained within Appendix H.

4.8 Questions for Specific Sectors

None of the questions for specific sectors listed are relevant to the activity at Radnor Hills.

4.9 Monitoring

Appropriate monitoring of effluent quality will be undertaken to ensure that no emissions occur outside the discharge quality limits set in the environmental permit. The frequency of monitoring and reporting will be specified by the environmental permit, however Radnor Hills expects to follow BAT[1], as shown below:

Table 21 - Suggested water discharge monitoring

Suggested Parameter	Suggested Monitoring Frequency	Suggested Monitoring Method
Flow rate	Continuous and integrated daily flow rate	MCERTS certified equipment, method as per M18
pH	Continuous	MCERTS certified equipment, method as per M18
Temperature	Continuous	MCERTS certified equipment, method as per M18
COD / BOD	Flow weighted sample or composite sample, weekly analysis, reported as flow weighted monthly averages	MCERTS certified equipment, method as per M18 COD – ISO 6060 1989 BOD – SCA blue book 130
TOC	Continuous	MCERTS certified equipment, method as per M18
Turbidity	Continuous	MCERTS certified equipment, method as per M18
Dissolved oxygen	Continuous	MCERTS certified equipment, method as per M18

It is proposed that this measurement occurs on the outflow from the treatment plant, marked as ES1 on the maps in Appendix B.

The only point source emissions to air are from 4x Calor gas boilers and 1x oil-fired heating unit. Emissions from these are monitored during boiler services, which occur at least annually and conducted by an MCERTS certified external contractor.

[1] Environment Agency: How to comply with your environmental permit, Additional guidance for: The Food and Drink Sector (EPR 6.10).

Table 22 – Suggested air discharge monitoring

Suggested Parameter	Suggested Monitoring Frequency	Suggested Monitoring Method
Oxides of nitrogen	Annual	MCERTS certified contractor and equipment, method to follow M1
Oxides of sulphur	Annual	MCERTS certified contractor and equipment, method to follow M1
Carbon monoxide	Annual	MCERTS certified contractor and equipment, method to follow M1
Particulates	Annual	MCERTS certified contractor and equipment, method to follow M1

4.10 Environmental Impact Assessment

An Environmental Impact Assessment under Council Directive 85/337/EEC has not been required.

4.11 Resource Efficiency and Climate Change

Energy Efficiency

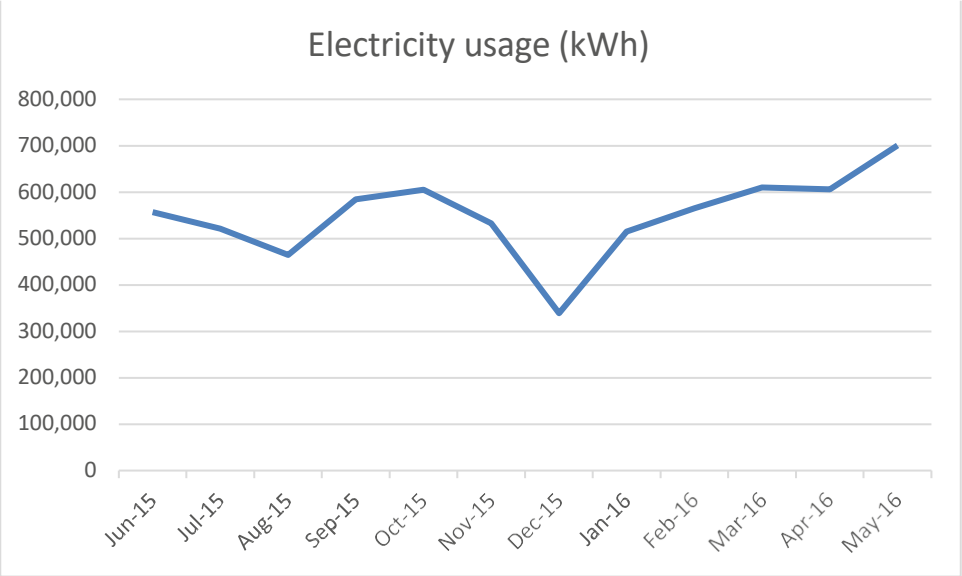
The normal operations of the plant are conducted with energy efficiency in mind, meeting the basic requirements of Environment Agency permit guidance EPR 6.10. Heating / cooling systems on the bottling lines are recirculated, for example on the Glass Line cool water is used to cool pasteurised product. This warms the water which is then used for gradual pre-heating prior to pasteurisation. All boilers have condensate return to preheat the boiler water, which reduces energy consumption. Pipework is lagged to prevent heat loss. More detail on energy efficiency this scan be found in the separates BAT Assessment.

Several changes have been made to reduce the energy consumption of the production facility. One major change has been the move from diesel to natural gas boilers. Forklift trucks onsite have also been switched from diesel to LPG and electricity. In 2015 the electrical shed was updated to better distribute power, which has allowed more machines to run off the same amount of power. A ring main for high pressure air was installed, allowing 3 compressors to run 4 bottle blowers, rather than a compressor per blower. As part of the growth of the business, old production lines are being replaced with new, efficient lines, which will reduce the per unit products energy consumption.

Energy Consumption

Radnor Hills' electricity consumption for the period June 2015 – May 2016 was 6,600 MWh. This is broken down as follows:

Figure 3 - Annual electricity usage



Annual consumption of Calor gas is 648,843 litres (approximately 4,282 MWh). This runs the boilers.

Approximately 6,000 litres per year gas oil is used (approximately 61 MWh), running a single heating tank for bottle blowing.

Climate Change Levy Agreement

Radnor Hills has not, and does not intend to enter into a Climate Change Levy Agreement.

Raw Material Consumption

The control of raw material consumption is described in the Radnor Hills BAT Assessment. As the key raw material is water, prevention of water loss through the bottling process is the main way to reduce consumption.

Waste Management

Wherever possible, Radnor Hills attempts to reuse onsite any waste materials, for example taking cardboard packaging from incoming materials, cutting to size, and using to package outgoing materials. A large quantity of the wastes (>90%) which are sent offsite are recyclable or reusable in nature, such as glass, plastic, and wooden pallets. Details on how waste is reduced can be found in the Radnor Hills BAT Assessment.

Table 23 - Waste streams

Waste stream	Hazard Category	Mass tonnes/yr	Disposal method	Distance away from site (km)	Will there need to be pre or post treatment of the wastes? Put details here
Baled plastic	Non-hazardous	830	Offsite recycling and landfill	161	
Pallets	Non-hazardous	112	Offsite reuse	224	
Spent ingredient drums	Hazardous	31	Offsite reuse	39	
Waste preforms	Non-hazardous	31	Offsite recycling and landfill	24	
Off-spec product	Non-hazardous	171	Secure destruction and recycling of bottles	127	
Glass	Non-hazardous	19	Offsite recycling	40	
Cardboard	Non-hazardous	68	Offsite recycling	56	
Mixed plastic and cardboard skips	Non-hazardous	138	Offsite recycling	183	
General waste	Non-hazardous	149	Landfill	40	
Oil	Hazardous	0.7	Landfill	48	
Sludge from effluent treatment plant	Non-hazardous	2555	Offsite reuse	<10	

5 OPRA Charges and Declarations – Form F1

The OPRA spreadsheet is available as Appendix I.

The total calculated application fee is **£16,686.**

Figure 4 - OPRA spreadsheet scoring summary

Organisation Name: Radnor Hills Mineral Water Co **Case Number:** 0

EPR Installations Application Charge Calculation
(excludes Compliance Rating)
Scoring Summary - Financial

Cyfoeth Naturiol Cymru Natural Resources Wales

Attribute	Band		Score	Total Score
Complexity	A	0	2	0
	B	1	15	15
	C	0	45	0
	D	0	82	0
	E	0	110	0
Emissions to Air	-			0
Emissions to Water	-			0
Emissions to Land	-			0
Emissions to Sewer	-			0
Emissions to Off-site Waste	A			1
Emissions - Waste Input	-			0
Location	D			40
Operator Performance	B			25
			Total Opra charging score	**81.00**

Transfer scores & calculate fees

Clear Scores

Indicative Fees & Charges

Application Fee	€ 16,686.00
Subsistence Charge*	€ 8,100.00
Substantial Variation	€ 9,153.00
Standard Variation	€ 4,617.00
Partial Surrender	€ 7,938.00
Full Surrender	€ 10,287.00
Closure	€ -

*Does not take into account Compliance Rating

Part A(2) and Part B Activities
Please ensure that you have completed these entries in the Listed Activities sheet. The charge shown will not include any charges associated with Local Authority Part A (2) or Part B activities that form part of the installation.
Refer to Installations Charging Scheme for further details.

Opra Charge Multipliers	
Application	206
Subsistence	100
Substantial Variation	113
Standard Variation	57
Partial Surrender	98
Full Surrender	127
Closure (Landfill only)	