WATER EMISSIONS SCREENING ASSESSMENT

HyBont Limited

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Appendices

1 INTRODUCTION

1.1.1 This emissions screening assessment has been carried out in support of an application a low impact environmental permit for a Green Hydrogen Production Facility on land south of Attlee Street, Brynmenyn Industrial Estate, Brynmenyn, Bridgend CF32 9TQ. The site will be operated by HyBont Limited.

1.1.2 Section 3 sets out the methodology and data inputs used in the screening assessment of point source 'Emissions to Water' and is supported by the H1 assessment software tool, which can be found in the Appendix A to this screening assessment.

2 RECEPTORS

2.1.1 The green hydrogen production facility will be located on cleared land located to the southeast of Brynmenyn Industrial Estate. The site is currently owned by Bridgend Borough Council BCBC. The National Grid Ref is SS910843.

2.1.2 A site location plan showing the proposed permit boundary is provided as Drawing 1. The permitted area of the site is approximately 1.0 ha.

2.1.3 The surrounding land is occupied by industrial land use immediately to the north west, and residential land use to the east. The closest residential properties are located approximately 50 m to the east of the site, east of the A4065.

2.1.4 There will be no direct discharge of aqueous waste within 10km upstream of a European Site, or a SSSI; within 100 metres upstream of a National Nature Reserve, Local Nature Reserve or Ancient Woodland; or within a National Park.

2.1.5 Screening for designated sites indicates Blackmill Woodlands SSSI and SAC is located 1,500 m NE of the site. Cefn Cribwr Grasslands SSSI and SAC is located 3900 m SW of the proposed hydrogen site.

3 EMISSIONS TO SURFACE WATER AND SEWER

3.1.1 There will be no direct process emissions to surface water from the facility. The process waste waters will be discharged to sewer and following treatment ultimately to surface water.

3.1.2 A screening assessment of the release of process wastewater has been carried out using the H1 software tool[1].

3.2 Overview

3.2.1 The H1 methodology applies a sequence of screening tests to establish the environmental effect of whether a discharge is considered insignificant. For discharges to water there are four screenings tests as follows:

- **Test 1** screens out any substances as insignificant where the release concentration is less than 10% of the Environmental Quality Standard (EQS).
- **Test 2** screens out any substances as insignificant where the Process Contribution (PC) is less than 4% of the EQS.
- **Test 3 and Test 4** are only required where substances have not been screened out in Test 2. For releases where the screening criterion in Test 2 is exceeded, the predicted environmental concentration (PEC) shall be determined. To identify which releases may need more detailed modelling, the PEC shall be assessed in relation to the background pollutant levels and the Annual Average EQS (EQS-AA) and the Maximum Allowable Concentration (EQS-MAC).

3.2.2 The discharge has been modelled as TRaC Riverine as the discharge point is an upper estuarine environment.

3.3 Process Wastewater Discharge

3.3.1 The only waste produced on site will be aqueous waste from the onsite water treatment process which comprises reverse osmosis. The reverse osmosis unit treats towns water to generate high quality water for electrolysis and an aqueous wastewater stream. This wastewater contains the same compounds that are present in the original Welsh Water towns water supply that have been concentrated up by circa 4 times[2].

3.3.2 To establish the clean water quality published data on the Welsh Water website has been used and then all concentrations have been increased by a factor of 4.

3.3.3 A copy of this analysis can be found in Appendix B.

3.3.4 The assessment has been undertaken on the basis that the hydrogen facility produces a maximum of 27.82 m^3/day aqueous waste, which equates to 0.000321991 m3/s. The average discharge rate is expected to be 16.7 m^3/day (0.0001933 m^3/s).

[1] Note that Version 2.78 of the H1 software has been used for this assessment due to issues producing outputs with the new Version 8. The EA have been notified of this and have agreed Version 2.78 can be used in the interim.

[2] In Your Area (digdat.co.uk)

3.4 Sewage Treatment Works

3.4.1 The process wastes will be discharged into Merthyr Mawr Sewage Treatment Works. The H1 assessment has applied standard sewage treatment reduction factors to those components in the discharge that will be removed by the treatment works..

3.5 Receiving Water

3.5.1 The Merthyr Mawr Sewage Treatment Works discharges into the River Ogmore. The location of the discharge point is in the upper estuarine section of the River. The nearest flow gauge obtained from the National River Archive[3] is the Ogmore at Bridgend, which is located upstream of Merthry Mawyr Sewage Treatment Works. The records for this station indicate a Q95 of 1.014 m^3/s.

3.6 H1 Assessment

3.6.1 The parameters used in H1 are:

- Arsenic
- Ammonia
- Iron
- Copper
- Cadmium
- Chromium
- Nickel
- Lead
- Fluoranthene
- Benzo 1,2 perylene
- Benzo 11,12 fluoranthene
- Heptachlor
- Trichloromethane
- Mecocrop

3.6.2 The assessment has used the maximum and average of the concentrations for all analysis for the purpose of this assessment (see Appendix B). It should be noted that the Welsh Water analysis includes other species, however these are not identified within the lists of hazardous chemicals and elements identified within the data sets in the environmental risk assessment guidance and therefore associated environmental quality standards (EQS) to assess the releases against are not available. Given the release only contains species that are contained in the drinking water supply and no additional chemicals are introduced by the process, those species that are not listed and do not have a recognised EQS have been excluded from the assessment. The concentrations in the discharge for species that have been excluded from H1 assessment are within Drinking Water Standards.

3.6.3 Given the discharge is to sewer consideration of pH and temperature is not necessary.

[3] NRFA Station Mean Flow Data for 58001 - Ogmore at Bridgend (ceh.ac.uk)

Test 1 Emission Screening

3.6.4 The following parameters exceeds 10% of the EQS and are assessed further by Test 2:

- Ammonia
- Benzo 1,2 perylene
- Benzo 11,12 fluoranthene
- Copper
- Fluoranthene
- Heptachlor
- Trichochloromethane

Figure 3-1: H1 Test 1 Results

his table applies Test 1 and also estimates the Process Contribution for releases in to saline waters, this is calculated after dilution into the relevant surface ater type for each emission to water listed in the inventory, according to the release point parameters input earlier. If you have more accurate data obtained rough dilution modelling, this may be entered as indicated and will be used instead of the estimated PC. Any releases which 'Pass' Test 1 are screened out at is point.

	Annual Avg EQS			MAC EQS		
Substance	Release µg/l	EQS	Release conc < 100% EQS	Release µg/l	EQS	Release conc < 100% EQS
e.g.			Test 1			Test 1
[1] Ammonia (un-ionised) (River Ogmore)	33.6	20	Fail	36		N/A
[1] Arsenic (River Ogmore)	0.67	25	Pass	0.88		N/A
[1] Benzo (ghi) perylene (River Ogmore)	0.0048	0.00017	Fail	0.0048	0.00082	Fail
[1] Benzo (k) fluoranthene (River Ogmore)	0.004	0.00017	Fail	0.004	0.017	Pass
[1] Cadmium and its compounds (< 40 mg/l Ca CO3) (River Ogmore)	0.08	0.2	Pass	0.08	0.44	Pass
[1] Chromium III (95%ile) (dissolved) (River Ogmore)	0.37		N/A	0.48		N/A
[1] Copper (River Ogmore)	260	3.6	Fail	260		N/A
[1] Fluoranthene (River Ogmore)	0.0288	0.0063	Fail	0.0312	0.12	Pass
[1] Glyphosate (River Ogmore)	0.0084	196	Pass	0.012	398	Pass
[1] Heptachlor (River Ogmore)	0.01	0.00000001	Fail	0.01	0.00003	Fail
[1] Iron (dissolved) (River Ogmore)	########	1000	Pass	440		N/A
[1] Lead and it's compounds (River Ogmore)	0.3052	1.3	Pass	0.92	14	Pass
[1] Mecoprop (95%ile) (River Ogmore)	0.0104	18	Pass	0.0104	187	Pass
[1] Nickel and its compounds (River Ogmore)	2.51	8.6	Pass	7.6	34	Pass
[1] Trichloromethane (River Ogmore)	57.35	2.5	Fail	76		N/A

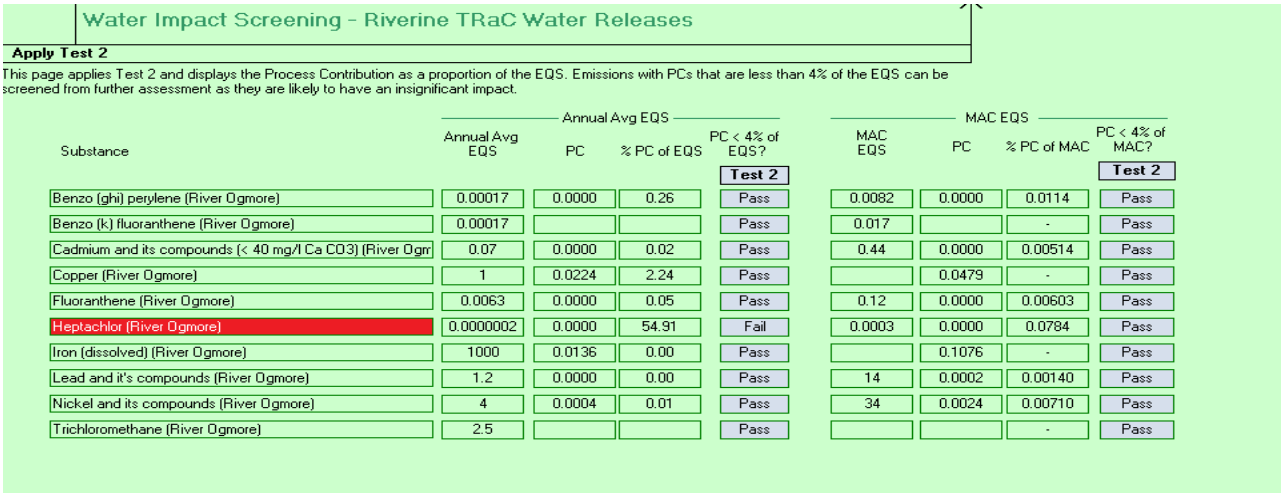
Test 2 Emission Screening

3.6.5 For Test 2 the Process Contributions (PCs) is calculated, which is the concentration of a discharged substance in the receiving water after dilution. The resulting diluted concentrations are screened out against the relevant EQS. If the PC exceeds 4% of the EQS or MAC, it is not screened as insignificant and should be carried to Test 3.

3.6.6 The result of test 2 indicates the following parameter fails Test 2 and is screened in Test 3 and 4:

- Heptachlor

Figure 3-2: H1 Test 2 Results



Water Impact Screening - Riverine TRaC Water Releases

Apply Test 2

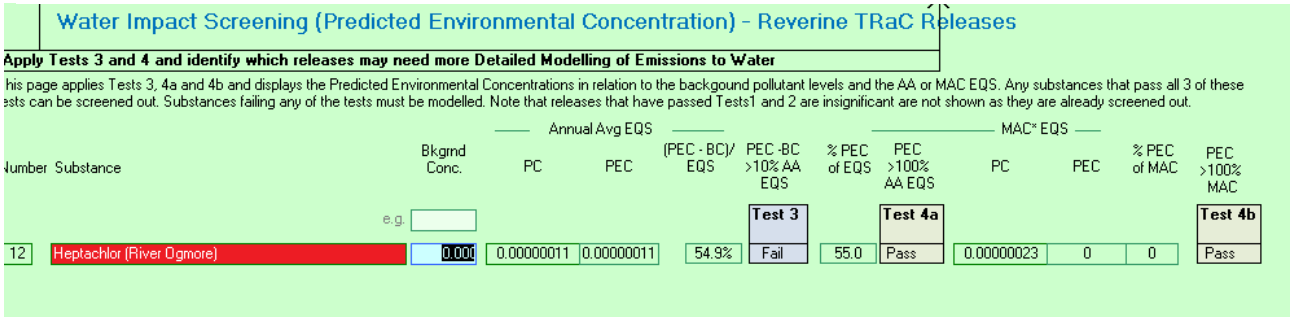
This page applies Test 2 and displays the Process Contribution as a proportion of the EQS. Emissions with PCs that are less than 4% of the EQS can be screened from further assessment as they are likely to have an insignificant impact.

Substance	Annual Avg EQS	Annual Avg EQS PC	Annual Avg EQS % PC of EQS	Annual Avg EQS PC < 4% of EQS? Test 2	MAC EQS	MAC EQS PC	MAC EQS % PC of MAC	MAC EQS PC < 4% of MAC? Test 2
Benzo (ghi) perylene (River Ogmore)	0.00017	0.0000	0.26	Pass	0.0082	0.0000	0.0114	Pass
Benzo (k) fluoranthene (River Ogmore)	0.00017			Pass	0.017		-	Pass
Cadmium and its compounds (< 40 mg/l Ca CO3) (River Ogm	0.07	0.0000	0.02	Pass	0.44	0.0000	0.00514	Pass
Copper (River Ogmore)	1	0.0224	2.24	Pass		0.0479	-	Pass
Fluoranthene (River Ogmore)	0.0063	0.0000	0.05	Pass	0.12	0.0000	0.00603	Pass
Heptachlor (River Ogmore)	0.0000002	0.0000	54.91	Fail	0.0003	0.0000	0.0784	Pass
Iron (dissolved) (River Ogmore)	1000	0.0136	0.00	Pass		0.1076	-	Pass
Lead and it's compounds (River Ogmore)	1.2	0.0000	0.00	Pass	14	0.0002	0.00140	Pass
Nickel and its compounds (River Ogmore)	4	0.0004	0.01	Pass	34	0.0024	0.00710	Pass
Trichloromethane (River Ogmore)	2.5			Pass			-	Pass

Test 3 Emission Screening

3.6.7 Heptachlor fails at Test 3 as the difference between the Predicted Environmental Concentrations and Background Concentration (assumed 50% of EQS) is greater than 10% of the Annual Average EQS.

Figure 3-3: H1 Test 3 & 4 Results



Water Impact Screening (Predicted Environmental Concentration) - Reverine TRaC Releases

Apply Tests 3 and 4 and identify which releases may need more Detailed Modelling of Emissions to Water

his page applies Tests 3, 4a and 4b and displays the Predicted Environmental Concentrations in relation to the backgound pollutant levels and the AA or MAC EQS. Any substances that pass all 3 of these ests can be screened out. Substances failing any of the tests must be modelled. Note that releases that have passed Tests1 and 2 are insignificant are not shown as they are already screened out.

			Annual Avg EQS						MAC* EQS			
Number	Substance	Bkgrnd Conc.	PC	PEC	(PEC - BC)/ EQS	PEC -BC >10% AA EQS	% PEC of EQS	PEC >100% AA EQS	PC	PEC	% PEC of MAC	PEC >100% MAC
	e.g.					Test 3		Test 4a				Test 4b
12	Heptachlor (River Ogmore)	0.000	0.00000011	0.00000011	54.9%	Fail	55.0	Pass	0.00000023	0	0	Pass

3.6.8 Note that the incoming water supply from Welsh Water for heptachlor (0.0025 ug/l) exceeds the EQS (0.00000001 ug/l) and fails the H1 assessment at Test 3 before the onsite water treatment process which comprises reverse osmosis. The reverse osmosis process does not add any more heptachlor to the towns water, it concentrates what is already present in the water supply by a factor of 4.

3.6.9 This wastewater contains the same compounds that are present in the original Welsh Water towns water supply which meets the drinking water standards for heptachlor (0.03 ug/l). Both the annual average and maximum concentration of heptachlor in the discharge are well below the drinking water standard and on this basis the impacts are not considered significant and further assessment is not required.

Appendix A
H1 ASSESSMENT

Appendix B
WELSH WATER QUALITY

WATER EMISSIONS SCREENING ASSESSMENT

HyBont Limited

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