APPENDIX 11

Form HR01: Proforma for new applications within Stage 2 criteria.

ENVIRONMENT AGENCY

Environment Agency Record of Assessment of Likely Significant Effect On A European Site (Stage 2)

The new application for an Environmental Permit detailed below is within the Stage 1 criteria of 10km, and in order to progress the application a Stage 2 assessment and consultation with Natural England is required.

PART A

To be completed by relevant technical/project officer in consultation with Conservation/Ecology section and Natural England/CCW

1.	Type of permission/activity:	Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2007
2.	**Agency reference no:**	EPR/GP3433GH/A001
3.	**National Grid reference:**	SW9443057130
4.	Site reference:	Cornwall Energy Recovery Centre at St Dennis
5.	Brief description of proposal:	The application being considered is an application for a new mass-burn incinerator for municipal waste made in accordance with the Environmental Permitting Regulations (England and Wales) 2007. The main listed activities fall under Section 5.1 Part A(1)(c) – The incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour. The following substances are emitted to air: NOx, SO_2, CO, particulate, volatile organic compounds HCl and HF, and, at trace levels, metals, dioxins and furans, dioxin-like PCBs and polycyclic aromatic hydrocarbons. Any small volumes of process waste water will be tankered off-site for disposal. Clean rainwater run-off will be discharged to the Bodella Brook. Some of the rainwater falling on the installation will be collected and used in the process ("rainwater harvesting"). The potential effect of the installation on the interest features of the Habitat sites is considered in detail below.
6.	**European site name(s) and status**:	**St Austell Clay Pits SAC** **Breney Common and Goss & Tregoss Moors SAC** **River Camel SAC**

7.	**List of interest features:**	Breney Common and Goss & Tregoss Moors 1.1 Fens & wet habitats (not sensitive to acidification) (Northern Altlantic wet heaths with Erica tetralix 1.2 Bogs & wet habitats (sensitive to acidification) (Transition mires and quaking bogs 1.8 Dry heathland habitats (Dry heaths (all subtypes) 2.2 Vascular plants lower plants and invertebrates of wet habitats (Marsh fritillary butterfly) River Camel 1.1 Fens & wet habitats (not sensitive to acidification) (Residual alluvial forests (Priority Feature) 1.6 Dry Woodlands & scrub (Old oak woods with Ilex and Blechnum in the British Isles 1.8 Dry heathland habitats (Dry heaths (all subtypes) 2.5 Anadromous fish (Atlantic salmon 2.6 Non-migratory fish & invertebrates of rivers (Bullhead 2.9 Mammals of riverine habitats (Otter) St Austell Clay Pits 2.4 Mosses and Liverworts (Western rustwort (Priority Feature))
8.	**Is the proposal directly connected with or necessary to the management of the site for nature conservation?**	~~Yes~~ / No

9. **What potential hazards are likely to affect the interest features?** (Refer to relevant sensitivity matrix and only include those to which the interest features are sensitive). **Are the interest features potentially exposed to the hazard?**

Sensitive Interest Feature:	**Potential hazard:**	**Potential exposure to hazard and mechanism of effect/impact if known:**
Breney Common and Goss & Tregoss Moors SAC		
1.1 Fens & wet habitats (not sensitive to acidification) (Northern Altlantic wet heaths with Erica tetralix)	Change in salinity	No effect – only discharge is rainwater
	Habitat Loss	Potential exposure to hazard through rainwater harvesting. See impact assessment below.
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Siltation	No effect – The installation will only release clean surface water to the Bodella Brook
	Turbidity	No effect – only discharge is rainwater
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
	Changes in thermal regime	No effect – only discharge is rainwater

1.2 Bogs & wet habitats (sensitive to acidification) (Transition mires and quaking bogs)	Habitat Loss	Potential exposure to hazard through rainwater harvesting. See impact assessment below.
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
	Changes in thermal regime	No effect – only discharge is rainwater
1.8 Dry heathland habitats (Dry heaths (all subtypes))	Habitat Loss	No effect - distant
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
2.2 Vascular plants lower plants and invertebrates of wet habitats (Marsh fritillary butterfly)	Habitat Loss	Potential exposure to hazard through rainwater harvesting. See impact assessment below.
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Siltation	No effect – The installation will only release clean surface water to the Bodella Brook
	Turbidity	No effect – only discharge is rainwater
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
River Camel SAC		

1.1 Fens & wet habitats (not sensitive to acidification) (Residual alluvial forests (Priority Feature))	Habitat Loss	No effect - distant
	Change in salinity	No effect – only discharge is rainwater
	Nutrient Enrichment	APIS states that this feature is not sensitive to eutrophication
	Physical damage	No effect - distant
	Siltation	No effect – The installation will only release clean surface water to the Bodella Brook
	Turbidity	No effect – only discharge is rainwater
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	APIS states that this feature is not sensitive to acidification
	Changes in thermal regime	No effect – only discharge is rainwater
	Toxic contamination	Potential exposure to hazard. See impact assessment below
1.6 Dry Woodlands & scrub (Old oak woods with Ilex and Blechnum in the British Isles)	Habitat Loss	No effect - distant
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
1.8 Dry heathland habitats (Dry heaths (all subtypes))	Habitat Loss	No effect - distant
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below
	Toxic contamination	Potential exposure to hazard. See impact assessment below
2.5 Anadromous fish (Atlantic salmon)	Nutrient Enrichment	No effect – see below
	Change in salinity	No effect – only discharge is rainwater
	Habitat Loss	No effect - distant

	Physical damage	No effect - distant
	Siltation	No effect – The installation will only release clean surface water to the Bodella Brook
	Turbidity	No effect – only discharge is rainwater
	Acidification	The River Camel freshwater features have been assessed as sensitive to acidification, however monitoring 'strongly suggests that the only tributary at risk is the De Lank River'. ref: Freshwater Screening and Assessment Based on Freshwater Critical Loads. R&D report number 12094: Technical Report. The De Lank River is located at >10km from the installation.
	Changes in thermal regime	No effect – only discharge is rainwater
	Entrapment	No effect - distant
	Toxic contamination	No effect – see below
2.6 Non-migratory fish & invertebrates of rivers (Bullhead)	Change in salinity	No effect – only discharge is rainwater
	Habitat Loss	No effect - distant
	Nutrient Enrichment	No effect – see below
	Physical damage	No effect - distant
	Siltation	No effect – The installation will only release clean surface water to the Bodella Brook
	Turbidity	No effect – only discharge is rainwater
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	As above
	Changes in thermal regime	No effect – only discharge is rainwater
	Entrapment	No effect - distant
	Toxic contamination	No effect – see below

2.9 Mammals of riverine habitats (Otter)	Disturbance (e.g Access, Noise, Gulls)	No effect - distant
	Change in salinity	No effect – only discharge is rainwater
	Habitat Loss	No effect - distant
	Nutrient Enrichment	No effect – see below
	Physical damage	No effect - distant
	Acidification	No effect – see below
	Changes in thermal regime	No effect – only discharge is rainwater
	Entrapment	No effect - distant
	Toxic contamination	No effect – see below
2.4 Mosses and Liverworts (Western rustwort (Priority Feature))	Habitat Loss	No effect - distant
	Nutrient Enrichment	Potential exposure to hazard. See impact assessment below
	Physical damage	No effect - distant
	Toxic contamination	Potential exposure to hazard. See impact assessment below
	Smothering	Potential exposure to hazard. See impact assessment below
	Acidification	Potential exposure to hazard. See impact assessment below

10. Is the potential scale or magnitude of any effect likely to be significant?

a) Alone? (explain conclusion, e.g. in relation to de minimis criteria)	See full impact assessment below <u>Habitat loss</u> Rainwater harvesting will remove <1% of the rain falling on the catchment of the Bodella Brook and St Dennis tributary which feed the SAC close to the installation. <u>Acidification</u> The PC for N and S is <1% CL (minCLmaxN and minCLmaxS) at each European site <u>Nutrient Enrichment</u> The PC for nutrient-N is <1% of the minimum CL at each European site <u>Toxic Contamination – long term effect</u> Toxic contaminates have been assessed as insignificant (<1% Cle), with the exception of As and Ni when assessed against EU targets due for implementation from 31/12/2012 Ni: 2% EAL As: 7% EAL It should be noted that this is based upon maximum ground level concentrations, and not at the European sites <u>Toxic Contamination – short term effect</u> Toxic contaminants have been assessed as insignificant at <10% short-term EAL <u>Toxic Contamination – assessed against MDR</u> The PCs for Cu, Cr and Pb are <1% MDR and are insignificant The following substances were not screened at this step: As: PC 6% MDR Cd: 1% MDR Hg: 3% MDR Ni: 1% MDR <u>Dioxins, PCBs and PAHs</u> Assessed as not likely to result in a significant effect, see below <u>Smothering</u> Particulate deposition assessed as trivial.

b) In combination with other Environment Agency permissions and/or other plans or projects? (Explain conclusion and which plans/projects have been included, including those associated with other functions).	No – see full impact assessment below <u>Habitat loss</u> There is no potential for an in combination effect with Environment Agency permissions as rainwater harvesting will remove <1% of the rain falling on the catchment of the Bodella Brook and St Dennis tributary which feed the SAC close to the installation. In addition the Stage 2 Review of Consents screened out all relevant abstraction licences <u>Acidification</u> There is no potential for an in combination effect with Environment Agency permissions as the PC is insignificant at <1% CL <u>Nutrient Enrichment</u> There is no potential for an in combination effect with Environment Agency permissions as the PC is insignificant at <1% CL <u>Toxic Contamination – long term</u> For the substances with a PC <1% Cle it is possible to conclude no likely significant effect in combination with other permissions. Ni and As have been assessed in combination with background levels (PEC), which will include inputs from other Environment Agency sources Ni PEC: 3% EAL As PEC: 11% EAL It is therefore possible to conclude no likely significant effect in combination as the PEC < 70% EAL. <u>Toxic Contamination – short term</u> There is no potential for an in combination effect with Environment Agency permissions as the PC is insignificant at <10% EAL <u>Toxic Contamination – assessed against MDR (maximum deposition rate)</u> For the substances with a PC <1% MDR it is possible to conclude no likely significant effect in combination with other permissions. Ni and As have been assessed in combination with background levels (PEC), which will include inputs from other Environment Agency sources As PEC: 9% Cd PEC: 4% Hg PEC: 11% Ni PEC: 5% It is therefore possible to conclude no likely significant effect in combination as the PEC < 70% Cle. <u>Dioxins, PCBs and PAHs</u> Assessed as not likely to result in a significant effect, see below <u>Smothering</u> Particulate deposition assessed as trivial.

c) In combination with permissions and/or plans/projects of other Competent Authorities? (Explain conclusion and which plans/projects have been included. See Appendix 23 for further information). Include list of other Competent Authorities that have been consulted and what their comments were in relation to the decision on likely significant effect.	Habitat loss There is no potential for an in combination effect with other regulated sources as rainwater harvesting will remove <1% of the rain falling on the catchment of the Bodella Brook and St Dennis tributary which feed the SAC close to the installation. Acidification There is no potential for an in combination effect with emissions from other regulated sources as the PC is insignificant at <1% CL Nutrient Enrichment There is no potential for an in combination effect with other Competent Authority permissions as the PC is insignificant at <1% CL Toxic Contamination – long term For the substances with a PC <1% Cle it is possible to conclude no likely significant effect in combination with permissions issued by other competent authorities. Ni and As have been assessed in combination with background levels (PEC), which will include inputs from other Environment Agency sources Ni PEC: 3% EAL As PEC: 11% EAL It is therefore possible to conclude no likely significant effect in combination as the PEC < 70% EAL. Toxic Contamination – short term There is no potential for an in combination effect with other Competent Authority permissions as the PC is insignificant at <10% EAL Toxic Contamination – assessed against MDR (maximum deposition rate) For the substances with a PC <1% MDR it is possible to conclude no likely significant effect in combination with other permissions. Ni and As have been assessed in combination with background levels (PEC), which will include inputs from other regulated sources As PEC: 9% Cd PEC: 4% Hg PEC: 11% Ni PEC: 5% It is therefore possible to conclude no likely significant effect in combination as the PEC < 70% Cle. Dioxins, PCBs and PAHs Assessed as not likely to result in a significant effect, see below Smothering Particulate deposition assessed as trivial. Conclusion As a result of its risk assessment, the Agency can conclude that this application could not act in combination with permissions and/or plans/projects of other competent authorities, consultation has not been necessary and our conclusion is as follows. The Appendix 7 guidance states that where the PC is **not** <1% or <10% of the relevant CL or long-/short-term Cle consideration should be given to the PC in combination with background levels (including emissions from other Regulated sources) (PEC). Where the PEC is <70% the emission is not likely to have a significant effect. There are no emissions where the PEC is >70%, therefore the application is not of a scale that would result in an in combination effect with other Regulated emissions, or with plans and projects that have been assessed as likely to have a significant effect by other Competent Authorities

11. Conclusion: Is the proposal likely to have a significant effect 'alone or in combination' on a European site? (Justification – attach any relevant supporting information and the reasons for coming to the particular conclusion)	No The proposed operation of the CERC has been fully assessed in line with Appendix 7 of the Habitats Guidance (Stage 1 & 2 Assessment of new PIR permissions under the Habitats Regulations) and AQTAG02 on the minimum requirements for an Appendix 11. This guidance states that where the PC is <1% or <10% of the relevant CL or long-/short-term Cle it is possible to conclude no likely significant effect alone and in combination. Where the PC is **not** <1% or <10% of the relevant CL or long-/short-term Cle consideration should be given to the PC in combination with background levels (including prevailing environmental conditions, regulated and non-regulated sources) (PEC). Where the PEC is <70% the emission is not likely to have a significant effect. Rainfall harvesting will not affect the hydrology of the Breney Common and Goss & Tregoss Moors SAC. The emissions from this proposed installation have been assessed as insignificant, in line with the guidance set out above. It is therefore possible to conclude that this application will not result in a likely significant effect at the Breney Common and Goss & Tregoss Moors SAC, River Camel SAC and St Austell Clay Pits SAC. This conclusion is both alone and in combination with permissions issued by the Environment Agency and other competent authorities.	
12. Justification for Consultation review process : A brief justification should be written outlining why each application is thought to be minor or large/complex, and thus why you are sending to Natural England for either information or consultation.	Due to the type of installation being applied for it has been determined that it falls within the category of 'large or novel', and therefore requires full consultation with Natural England See the impact assessment given below	
13. Name of EA Officer:	Penny Gadd	Date: 26/03/09
14. Natural England/CCW comment on assessment: (If the NE/CCW officer disagrees with the conclusion of 10c, please include details of the other Competent Authorities which should be consulted).	For use when the Appendix 11 is to be sent to Natural England /CCW **for consultation**.	
15. Name of NE/CCW Officer:		Date:
IF THE PROPOSAL IS LIKELY TO HAVE A SIGNIFICANT EFFECT AN APPROPRIATE ASSESSMENT WILL BE REQUIRED (see part B for suggested scope).		

Impact assessment

This assessment has been completed in line with AQTAG02 Minimum information requirements for Form HR01: Proforma for new applications within Stage 2 criteria (Appendix 11)

The sensitivity matrix in section 9 shows that the interest features of the European site are sensitive to, and may be potentially exposed to habitat loss through rainwater harvesting, toxic contamination, nutrient enrichment, acidification and smothering. The following significance assessment has been conducted using the methods outlined in Technical Guidance Note H1, and the Habitats Directive Handbook Appendix 7. There is no specific guidance for habitat loss due to water harvesting,, and so a similar methodology has been used.

The Breney Common and Goss & Tregoss Moors SAC could potentially lose habitat at the point where the Bodella Brook enters the SAC. The SAC receives water from the combined flow of the Bodella Brook and St Dennis tributary. There is only limited hydraulic continuity between the groundwater below the proposed installation and the SAC (see section below 'Impact on groundwater').
The potential impact on the SAC has been assessed by comparing the reduction in flow due to the proposed rainwater harvesting against the water reaching the SAC from the flow of the Bodella Brook and St Dennis tributary.
The Flood Risk Assessment submitted with the planning application states there is a potential rainwater harvesting consumption of 22.6 m^3/day. In order to screen for the significance of harvesting this volume it has been expressed annually and compared against the following:

- rainfall discharging from the site;
- rainfall falling on the Bodella Brook catchment;
- rainfall falling over the catchment contributing to flow at the point at which the Bodella Brook enters the Breney Cmmon and Goss and Tregoss Moors SAC.

Standard Annual Average Rainfall for the area [FEH CD-rom] = 1250mm.
Annual water harvesting, at a consumption of 22.6 m^3/day = 22.6 x 365 = 8,250 m^3

Table 1

Location	Area of catchment (ha)	Annual rainfall on catchment (m^3)	Water harvesting as % falling on catchment
CERC site	6.6	82,500	10
Bodella Brook catchment	56	700,000	1.2
Bodella Brook/St Dennis tributary, upstream of SAC	254	3,175,000	0.3

The reduction in water available to maintain the condition of the SAC is less than 1% of the total. We do not consider this likely to have a likely significant effect on the SAC.

Influence on frequency of flows from the site

Volume 2, Figure 7.2 of the environmental permit application shows the *Preliminary Water Flow Diagram*. This provides a schematic of the proposed rainwater harvesting system. The schematic indicates that the first 15 minutes of each rainfall event that drains to the surface water system will be directed via the surface water lagoon to the Bodella Brook. Therefore rainwater harvesting will not impact the frequency with which waters discharge to the Bodella Brook.
We have recommended that the detailed design be subject to condition in the planning process. In order to discharge the condition the applicant would demonstrate that the rate and volume of surface water discharge would not have a negative impact on the water environment.

This could result in periods when water will not be harvested. The Environmental Statement and Regulation 19 information states that there is capacity within the local water mains to supply the CERC without negatively impacting the supply.

The Flood Risk Assessment indicates that clean surface water will be discharged at greenfield runoff rates. While this is correct it is important to note that discharges will be capped at the 10 year event. This is a measure to mitigate the flood risk impact. There should be no discharge from the site above this storm magnitude up to the 100 year event. The installation will not have an impact on the hydrological features of the sites.

Impact on groundwater

The Flood Risk Assessment (FRA) submitted with the planning application indicates in section 6.2.1 that of the 6.6 hectare site, the proposed impermeable area is 3.25 hectares, with the rest of the site remaining soft landscaping. Therefore approximately 50% of the site will be able to discharge to ground.

The planning Environmental Statement, Hydrogeological Assessment and FRA state that there is limited hydraulic connectivity between the water table and the stream and, importantly, between the water table and the perched aquifer at Breney Common and Goss and Tregoss Moors SAC.

The comparatively small reduction in groundwater recharge from the site would further support the conclusion that the proposed development will not result in a likely significant effect at the Breney Common and Goss and Tregoss Moors SAC.

Effects via emissions to air

Predicted atmospheric concentrations were determined using air dispersion modelling by ADMS Version 4.1. Meteorological data used in the modelling was taken from the UK Meteorological Office observing station at Camborne, which is 36 km to the south-west of the installation at E 162721, N 040678. The modelling used hourly sequential data from the years 2002 – 2006 inclusive. The modelling assumed 100% conversion of nitric oxide to nitrogen dioxide. This means that the ground level concentration of nitrogen dioxide is likely to be over-estimated at the nearest site (Breney Common and Goss & Tregoss Moors SAC). The deposition velocities used are tabulated below.

Table 2

Chemical species	Deposition velocity (m/s)
NO_2	0.0015
SO_2	0.012
NH_3	0.02

Cornwall Energy Recovery Centre (CERC) is located 210m from the Breney Common and Goss & Tregoss Moors SAC, 6189m from the River Camel SAC and 1964m from St Austell Clay Pits SAC. For acid deposition and nutrient N enrichment, the maximum ground level concentrations at the protected sites have been used. However, for simplicity, assessment of toxicity, both direct and indirect, has been based on the maximum ground level concentration at any point. This is equal to the greatest impact on Breney Common and Goss & Tregoss Moors SAC, and considerably higher than the impact on the other two SACs. Analysis is based on authorised limits, therefore represent a worst case scenario.

The only process emissions from the installation will be to air. Accordingly, the effect of emissions to air on the interest features of the site are considered.

Substances covered by the assessment

The WID specifies monitoring for a wide range of substances. These are substances that are likely to be present in waste and that could potentially have a significant effect. The waste to be burned by the CERC incinerator is standard municipal waste. There is no intention of

burning waste that may contain significant levels of other hazardous substances. Accordingly the assessment is restricted to those substances covered by WID monitoring.

Hazard assessment

The potential hazards are considered below for all sensitive features of the relevant sites.

The maximum process contribution (PC) is calculated for each site and each sensitive interest feature, and expressed as a percentage of the critical load (deposition) or environmental standard (effect of toxicity of the substance acting directly). If the maximum PC is less than 1% of the critical load or environmental standard it is insignificant and will have no significant effect, either alone or in combination. If it is more than 1% , the effect of background concentration is taken into account[1]. The maximum PC is added to the background concentration to give the predicted environmental concentration (PEC). This is compared against the critical load or environmental standard. If it is less than 70% of the relevant standard it will have no significant effect in combination. If it is more than 70% an appropriate assessment is required.

Note that when short-term exposure is being assessed (as it is in the section on toxic contamination) a maximum PC <10% of the critical load/environmental standard is insignificant.

Acidification

The effects of acidification due to sulphur and nitrogen are considered separately against the relevant critical loads. The critical loads are taken from the APIS website and are tabulated below in Tables 3 and 4.

Table 3 - acidification due to nitrogen

Habitat	Critical Load (minCLmaxN) keq/ha/year	Process Contribution (PC) keq/ha/year	PC as % of CL	<1%?	Insignificant?
Breney Common and Goss & Tregoss Moors SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Northern Atlantic wet heaths with Erica Tetralix)	0.96	0.0027 Note 1	0.28	Yes	Yes
1.2 Bogs and wet habitats (sensitive to acidification) (Transition mires and quaking bogs)	0.67	0.0027 Note 1	0.40	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	0.96	0.0027 Note 1	0.28	Yes	Yes
2.2 Vascular plants, lower plants and invertebrates of wet habitats (Marsh fritillary butterfly)	0.69 Note 2	0.0027 Note 1	0.39	Yes	Yes
River Camel SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Residual alluvial forests (Priority Feature))	N/A	N/A	N/A	N/A	N/A
1.6 Dry woodlands and scrub (Old oak woods with Ilex and Blechnum in the British Isles)	1.68	0.0009 Note 1	0.05	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	1.17	0.0009 Note 1	0.08	Yes	Yes

[1] Appendix 7 Guidance: Stage 1 & 2 Assessment of new PIR permissions under the Habitats Regulations

St Austell Clay Pits SAC					
2.4 Mosses and liverworts(Western Rushwort (Priority Feature))	See below	0.0015 Note 2			Yes

Note 1: From Table D7.8 of Application Volume 4
Note 2: Agency calculated by pro-rating figure for Breney Common given in Table D7.8 of Application Volume 4. Factor used was 0.568, which is the factor between the two sites for nutrient deposition.

Table 4 - acidification due to sulphur

Habitat	Critical Load (minCLmaxS) keq/ha/year	Process Contribution (PC) keq/ha/year	PC as % of CL	<1%?	Insignificant?
Breney Common and Goss & Tregoss Moors SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Northern Atlantic wet heaths with Erica Tetralix)	0.25	0.0017 Note 1	0.68	Yes	Yes
1.2 Bogs and wet habitats (sensitive to acidification) (Transition mires and quaking bogs)	0.34	0.0017 Note 1	0.50	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	0.25	0.0017 Note 1	0.68	Yes	Yes
2.2 Vascular plants, lower plants and invertebrates of wet habitats (Marsh fritillary butterfly)	0.25	0.0017 Note 1	0.68	Yes	Yes
River Camel SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Residual alluvial forests (Priority Feature))	N/A	N/A	N/A	N/A	N/A
1.6 Dry woodlands and scrub (Old oak woods with Ilex and Blechnum in the British Isles)	1.44	0.00053 Note 1	0.04	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	0.52	0.00053 Note 1	0.10	Yes	Yes
St Austell Clay Pits SAC					
2.4 Mosses and liverworts(Western Rushwort (Priority Feature))	See below	0.00097 Note 2			Yes

Note 1: From Table D7.8 of Application Volume 4
Note 2: Agency calculated by pro-rating figure for Breney Common given in Table D7.8 of Application Volume 4. Factor used was 0.568, which is the factor between the two sites for nutrient deposition.

The process contribution towards acid deposition at Breney Common and Goss & Tregoss Moors SAC and at the River Camel SAC is less than 1% of the site critical load for all interest features for both nitrogen and sulphur. There will be no significant effect on any interest feature either alone or in combination due to acid deposition from the process.

Although the St Austell Clay Pits SAC is listed as being sensitive to acidification in the Environment Agency's habitats database, this is not borne out by the APIS website, which does not list a critical load for the site. The pH of the site soil is between 4.5 and 5.6. The interest feature, *Marsupella profunda* is thus an acidophile, and it is reasonable to assume that it is not sensitive to acidification. Furthermore, the rate of acid deposition attributable to the installation is extremely low. Acid deposition will have no significant impact either alone or in combination on the interest features of the St Austell Clay Pits SAC.

Concerns raised by Natural England on the *Marsupella profunda* are considered at the end of this assessment.

Nutrient Enrichment

Table 5

Habitat	Critical Load (CL) kgN/ha/year	Process Contribution (PC) kgN/ha/year	PC as % of CL	<1%?	Insignificant?
Breney Common and Goss & Tregoss Moors SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Northern Atlantic wet heaths with Erica Tetralix)	10 - 25	0.037 Note 1	0.37	Yes	Yes
1.2 Bogs and wet habitats (sensitive to acidification) (Transition mires and quaking bogs)	5 - 10	0.037 Note 1	0.75	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	10 - 20	0.037 Note 1	0.37	Yes	Yes
2.2 Vascular plants, lower plants and invertebrates of wet habitats (Marsh fritillary butterfly)	15 - 25	0.037 Note 1	0.25	Yes	Yes
River Camel SAC					
1.1 Fens and wet habitats (not sensitive to acidification) (Residual alluvial forests (Priority Feature))	10 - 25	0.013 Note 2	0.13	Yes	Yes
1.6 Dry woodlands and scrub (Old oak woods with Ilex and Blechnum in the British Isles)	10 - 25	0.013 Note 2	0.13	Yes	Yes
1.8 Dry heathland habitats (Dry heaths, all sub-types)	10 - 25	0.013 Note 2	0.13	Yes	Yes
2.5 Anadromous fish (Atlantic salmon)	10 - 25	0.013 Note 2	0.13	Yes	Yes
2.6 Non-migratory fish & invertebrates of rivers (Bullhead)	10 - 25	0.013 Note 2	0.13	Yes	Yes
2.9 Mammals of riverine habitats (Otter)	10 - 25	0.013 Note 2	0.13	Yes	Yes
St Austell Clay Pits SAC					
2.4 Mosses and liverworts(Western Rushwort (Priority Feature))	5	0.021 Note 2	0.42	Yes	Yes

Note 1: From Table D7.5 of Application Volume 4
Note 2: From Table D7.6 of Application Volume 4

The maximum PC for nutrient nitrogen enrichment is below 1% of the critical loads for all interest features of all sites. Nutrient nitrogen will have no significant effect on the interest features of any of the sites, either alone or in combination.

Smothering

Calculated deposition rate of PM_{10} at Breney Common and Goss and Tregoss Moors is 0.224 $mg/m^2/day$. (Calculated by pro-rating arsenic deposition rate in Table 5 below in the ratio of the WID ELVs [10 mg/m^3 : 0.5 mg/m^3]). Deposition rates at other sites will be lower, as they are more distant.

APIS states that there is no threshold against which to assess the impact of particulate deposition. There is little published information on dust deposition rates. Andrew Wallace Hayes in "Principles and Methods of Toxicology" (published by CRC Press) records that the deposition rate of dust in rural (USA) environments is about 0.012 $mg/cm^2/day$, which is 120

mg/m^2/day. This is 500 times as great as the calculated deposition rate at Breney Common and Goss and Tregoss Moors.

This level of deposition is trivial in terms of smothering. (The possibility of a toxic effect is considered below).

Toxic contamination

Toxic contamination of the relevant sites can arise via two routes

1. Direct effect of the pollutant in the air
2. Deposition of persistent pollutants which can be ingested. Because they are persistent these will accumulate over the working life of the incinerator. Even if the annual deposition is comparatively low, deposition over a long period may lead to a hazard. The relevant persistent pollutants are the metals and dioxins.

Direct effect of the pollutant in the air

The environmental standards used are for the protection of human health, except where specific limit values for the protection of vegetation are available (namely the effect of SO_2 and NO_2 on general vegetation, and the effect of ammonia on sensitive lichen communities and bryophytes).

Annual mean

Values for process contribution in Table 6 are taken from Table D5.1 of Application Volume 4, except where otherwise specified in footnotes. They are the maximum ground level concentration, not the ground level concentration at the Habitat sites and as such they are conservative.

Gaseous substances (NO_2, SO_2, TOC, CO, NH_3, HCl) may have a direct effect on vegetation, as is shown by the existence of limit values for NO_2, SO_2 and NH_3. Ammonia may have a direct effect upon lichens and bryophytes associated with the heath and mire features of the Breney Common and Goss & Tregoss Moors SAC and dry heath features of the River Camel SAC.

They may have a direct effect on mammals, in this case the otter. This screening has assumed that the otter will be roughly as sensitive as humans to these pollutants. They will not have a direct effect on fish, as the pollutants will need to deposit and dissolve in water before they can affect them.

Table 6

Pollutant	Assessment criterion µg/m^3	Process contribution (PC) µg/m^3	PC as % of criterion	<1%?	Insignificant?
PM_{10}	40	0.0087	0.022	Yes	Yes
TOC (treated as benzene)	5	0.0087 Note 1	0.17	Yes	Yes
HCl	20	0.0087	0.044	Yes	Yes
SO_2	20 Note 2	0.017	0.085	Yes	Yes
NO_2	30 Note 3	0.13	0.43	Yes	Yes
CO	350	1.6	0.46	Yes	Yes
NH_3	1 Note 4	0.0057 Note 1	0.57	Yes	Yes
Cd	0.005	0.000044 Note 5	0.88	Yes	Yes
Tl	1	0.000044 Note 1	0.0044	Yes	Yes
Hg	0.25	0.000044	0.018	Yes	Yes
Sb	5	0.000435 Note 6	0.0087	Yes	Yes

Pollutant	Assessment criterion µg/m3	Process contribution (PC) µg/m3	PC as % of criterion	<1%?	Insignificant?
As (from 31/12/2012)	0.006 Note 7	0.000435 Note 6	7.25	No	No
As (current)	0.2	0.000435 Note 6	0.218	Yes	Yes
Cr	0.1	0.000435 Note 6	0.435	Yes	Yes
Co	0.2	0.000435 Note 6	0.218	Yes	Yes
Cu	2	0.000435 Note 6	0.022	Yes	Yes
Mn	1	0.000435 Note 6	0.0435	Yes	Yes
Ni (from 31/12/2012)	0.02 Note 7	0.000435 Note 6	2.175	No	No
Ni (current)	1	0.000435 Note 6	0.0435	Yes	Yes
Pb	0.5	0.000435 Note 6	0.087	Yes	Yes
V	5	0.000435 Note 6	0.0087	Yes	Yes

Note 1: Calculated by the Agency on the same basis as the SITA figures. The Critical Level of 1ug/m3 is only applicable to the heath and bog features of the Breney Common and Goss & Tregoss Moors SAC
Note 2: Annual mean for protection of vegetation
Note 3: Annual mean for protection of vegetation
Note 4: Annual mean for sensitive lichen communities and bryophytes
Note 5: From Table 1.1 of "Response to AQMAU interim report January 2009"
Note 6: From Table 1.3 of "Response to AQMAU interim report January 2009"
Note 7: EU Target values, due for implementation 31/12/2012

The process contribution for all gaseous substances <1% of the environmental standard. Consequently none of them will have a significant direct effect on any interest feature, and no appropriate assessment is required.

Solid substances (PM_{10}, metals) will not have a direct effect on vegetation, although they may affect it by deposition and subsequent uptake (dealt with below). Likewise they will not have a direct effect upon fish, as they will need to deposit and dissolve first.

The possibility that they will have a direct effect upon otters must be examined further. The maximum process contribution for all solid substances is <1% of current limits. However, it is >1% of the EU target values for arsenic and nickel, which are due to come into force 31/12/2012. These target values have been set as low as reasonably practicable because the substances have been shown to have no lower threshold of harm to human health.

The process contribution of arsenic and nickel is well below the target values. The background concentration of arsenic is 0.24 ng/m^3 and that of nickel is 1.53 ng/m^3 (figures from Table D3.1 Application Volume 4, which has taken them from the UK rural monitoring network). The PEC of arsenic (process contribution + background) is 0.000675 µg/m^3, which is 11.25% of the target value. The PEC of nickel is 0.000588 µg/m^3, which is 2.94% of the target value. Both these levels are well below 70% of the target values and there will be no effect either alone or in combination.

The long-term effect of PM_{10}, or metals by direct inhalation will have no significant effect either alone or in combination on any interest features of the protected sites.

Short term exposure

Values for process contribution in Table 7 are double those listed in Table D5.1 of Application Volume 4 (reference para. 1.1.1 of "Response to AQMAU interim report January 2009" for the reason for this).

Table 7

Pollutant	Averaging period	Assessment criterion µg/m^3	Process contribution (PC) µg/m^3	PC as % of criterion	<10%?	Insignificant?
PM_{10}	24 hr (90.41st %ile)	50	0.07	0.14	Yes	Yes
TOC (treated as benzene)	1 hr	208	1.0	0.48	Yes	Yes
HCl	1 hr	800	1.0	0.125	Yes	Yes
HF	1 hr	250	0.1	0.04	Yes	Yes
SO_2	24 hr (99.18th %ile)	125	0.82	0.65	Yes	Yes
SO_2	1 hr (99.73rd %ile)	350	3.14	0.9	Yes	Yes
SO_2	15' (99.90th %ile)	266	4.08	1.53	Yes	Yes
NO_2	1 hr (99.79th %ile)	200	13.2	6.6	Yes	Yes
CO	8 hr	10,000	1.6	0.016	Yes	Yes
Cd	1 hr	1.5	0.0024	0.16	Yes	Yes
Tl	1 hr	30	0.0024	0.008	Yes	Yes
Hg	1 hr	7.5	0.005	0.067	Yes	Yes
Sb	1 hr	150	0.0249	0.017	Yes	Yes
As	1 hr	15	0.0249	0.17	Yes	Yes
Cr	1 hr	3	0.0249	0.83	Yes	Yes
Co	1 hr	6	0.0249	0.41	Yes	Yes
Cu	1 hr	60	0.0249	0.041	Yes	Yes
Mn	1 hr	1500	0.0249	0.002	Yes	Yes
Ni	1 hr	30	0.0249	0.083	Yes	Yes
Pb	1 hr	None	n/a	n/a	n/a	n/a
V	24 hr	1	0.00634	0.63	Yes	Yes

No substance has a process contribution that exceeds 10% of its assessment criterion. Accordingly there are no substances whose short term emissions will have a significant effect on any interest feature of the protected sites either alone or in combination, and no appropriate assessment is needed for this.

Deposition of persistent pollutants

Environment Agency Guidance Note H1 gives the following guidelines for screening substances that are deposited to soil.

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

- Substances that are highly toxic, bioaccumulative or persistent should be investigated further. An indicative list is provided in APPENDIX B.
- Emissions that contribute to acidification and eutrophication effects should be further investigated, where these are released by the installation in substantial quantities.
- For substances where a maximum deposition rate (MDR) is available (see APPENDIX B Table B11 *{misprint in H1; actually Table B12}*), emissions that result in a process contribution (PC) that is greater than 1% of the MDR should be further investigated.

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

These guidelines are implemented by this assessment as follows:

- The following substances could potentially have an effect by deposition on sensitive receptors within 10km of the site: dust, nitrogen oxides, sulphur dioxide, metals, dioxins, PCBs and PAHs.
- Table B12 in Appendix B lists the following substances for which the WID specifies monitoring: arsenic, cadmium, cobalt, copper, lead, mercury, nickel, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). The potential impact of each of these substances will be assessed.
- Emissions that could contribute to acidification and eutrophication (nitrogen oxides, sulphur dioxide and hydrogen chloride) have been assessed above.
- Table B12 lists MDRs for the following substances: arsenic, cadmium, chromium, copper, lead, mercury, nickel. The potential impact of each of these substances is assessed below against its MDR. No MDRs are listed for dust, cobalt, PAHs or PCBs.
- There are long term EALs for antimony, manganese, thallium, vanadium, cobalt and dust in air. The potential impact of emissions is assessed above against these *(see "Direct effect of the pollutant in air").*
- Dioxins are not listed in Table B12, but are a subject of concern and are assessed below, together with PAHs and PCBs.

Assessment against MDRs

The maximum deposition rates for the substances listed in Table 8 were derived from those given in Table D 5.1 Volume 4 of the Application by applying the method described in Section 3.2 of Guidance Note H1 for calculating deposition rate from airborne concentrations. The concentrations used were the maximum concentrations calculated by the air quality modelling domain and not those predicted at the SACs (i.e. they apply on a precautionary basis to all three SACs). Note that the annual average concentrations calculated by the Applicant have been scaled upwards as follows.

- As, Cu, Cr, Pb, and Ni were multiplied by 9 as the most precautionary approach (it assumes that instead of the 9 Group 3 metals being emitted in equal amounts, the entire emission is made up of a single metal at the WID limit).
- Cd was multiplied by 2 as the most precautionary approach (it assumes that instead of the 2 Group 1 metals being emitted in equal amounts, the entire emission is made up of a single metal at the WID limit).

Table 8

Pollutant	Max. allowed deposition rate (MADR) ($mg/m^2/d$)	Max. PC_{air} ($\mu g/m^3$)	Max. deposition rate ($mg/m^2/d$)	Max deposition rate as %age of MADR	<1%	Insignificant?
Arsenic	0.02	0.000432	0.00112	5.60	No	No
Cadmium	0.009	0.000044	0.000114	1.27	No	No
Copper	0.25	0.000432	0.00112	0.45	Yes	Yes
Chromium	1.5	0.000432	0.00112	0.07	Yes	Yes
Lead	1.1	0.000432	0.00112	0.10	Yes	Yes
Mercury	0.004	0.000044	0.000114	2.85	No	No
Nickel	0.11	0.000432	0.00112	1.02	No	No

The maximum process deposition rate exceeds 1% of the maximum allowed deposition rate given in Environment Agency Guidance Note H1 for arsenic, cadmium, mercury and nickel. The predicted environmental concentration must be calculated.

Table 9

Pollutant	Max. allowed deposition rate (MADR) ($mg/m^2/d$)	Max. process deposition rate(PC) ($mg/m^2/d$)	Background deposition rate ($mg/m^2/d$)	Max predicted environmental concentration ($mg/m^2/d$)	PEC as % of MADR	<70%?	No significant effect?
Arsenic	0.02	0.00112	0.000622	0.00174	8.7	Yes	Yes
Cadmium	0.009	0.000114	0.000233	0.000347	3.9	Yes	Yes
Mercury	0.004	0.000114	0.000337	0.000451	11.3	Yes	Yes
Nickel	0.11	0.00112	0.00397	0.00509	4.6	Yes	Yes

The maximum predicted environmental concentration is well below 70% of the standard for the protection of soils given in Guidance Note H1. There will therefore be no significant effect either alone or in combination.

Assessment of dioxins, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs)

There are no recognised assessment criteria for the long term exposure of features of interest such as otters and fish to dioxins (PCCD/PCDFs), PCBs and PAHs. It is recognised that these animals are high up the food chain and therefore potentially at risk from the bioaccumulation of persistent organochlorine compounds (such as PCBs and dioxins).

In order to consider the likelihood of an impact at the neighbouring SAC, in particular the River Camel where otters and fish are the features of interest, the additional deposition of these pollutants into the uppermost 15 cm of soil over a period of 50 years has been compared with recently reported background concentrations of these substances in rural soils in England. The comparison is shown in Table 9 below. When considering these values, it should be noted that they are based on the maximum airborne concentration, rather than those predicted for the SACs. The values for the process contribution at the River Camel will be at least an order of magnitude lower.

The use of soil concentrations as a proxy for the environmental burden on fish and otters will be an overestimation of the likely impact to 'target features' in the aquatic environment, such as fish and otters. Dioxins bind to soil particles and are generally insoluble in water. Further, any dioxins present in the rivers and streams will tend to be washed downstream and not tend to accumulate in the local aquatic environment.

Because there are no published critical loads for these substances, the addition to soil concentration aggregated over 50 years has been compared against the current background concentration. Where the percentage increase is less than 1% of the current background concentration, the effect has been assessed as insignificant. In view of the assumptions made in calculating the figures, this is a very precautionary approach.

Table 10

Pollutant	Max PC ($\mu g\ m^{-3}$)	Max. deposition rate[3] ($mg/m^2/d$)	Addition to soil concentration over 50 years[4] ($ng\ kg^{-1}$)	Background concentration in rural soils[5] ($ng\ kg^{-1}$)	%age increase	Insignificant?
PCCDs/PCDFs	8.71×10^{-11}	2.26×10^{-10}	0.020	2.53	0.80%	Yes
PCBs[1]	8.71×10^{-10}	2.26×10^{-9}	0.2	973	0.02%	Yes
PAHs[2]	$1.7x\ 10^{-6}$	4.42×10^{-6}	397	721,000	0.06%	Yes

Note 1: PCBs assumed to be emitted at ten times the permitted concentration of PCCDs/PCDFs, ie a concentration for PCBs of 1 ng m^{-3}

Note 2: Total PAH emission taken to be at a concentration of 2 ng m^{-3}, at the upper end of concentrations reported at modern EfW plant. Value presented in SITA response to EA's "Provisional Assessment of CERC Air Quality Modelling" submitted September 2008.

Note 3: Deposition rate calculated using the screening formula given in the H1 guidance note.

Note 4: Pollutants assumed to accumulate in the upper 15 cm of soil, with no losses, over a period of 50 years. Soil density taken as 1350 kg m^{-3}.

Note 5: Background concentrations taken as the median value reported for rural soils in England taken form the UK soil and Herbage Pollutant Survey, published by the Environment Agency in June 2007.

Deposition of dioxins, PCBs and PAHs is less than 1% of the background concentration, and will therefore have no significant effect either alone or in combination on the River Camel SAC.

Concern raised by Natural England

Natural England sent an email to the Environment Agency 09/02/09 which contained the following:

"We have recently received advice from our National bryophyte specialist in relation to potential impacts on *Marsupella profunda* and would like the following advice to be taken account of in relation to the St Austell Clay Pits SAC:

Firstly, pH investigations of the superficial clay surfaces on which *Marsupella profunda* occurs show it to be acid. David Holyoak, the expert on this plant, has determined mean pH values at different sites where Mp occurs and the results are: pH5.56, 5.45, 4.94, 5.14, 4.51, 4.87. Thus Mp is an acidophile. The associated plants such as Calluna, Ulex and various grasses as well as associated bryophytes in the vicinity (not necessarily close associates) indicate the general acidity of the sites. Mp has a restricted and more or less predictable preference for sheltered and relatively humid locations (often near water) combined with crumbling granite or free draining firm clay on low mounds or ridges, and it is also an early coloniser. If we are considering 'acidification' from pollutants it may be reasonable to infer that Mp would not be adversely affected. However, the nature of the pollutants are unknown, and it is possible that Mp could be directly affected (given that all bryophytes absorb water/pollutants through their (thin) cuticle). This could be manifest in terms of necrosis to the gametophores, or a more subtle effect on the reproductive ability.

Saying that.....until more is known about the pollutants within the 'gases' it is currently difficult to evaluate any potential impact; and it should be noted that even if we did know what the chemical constituents are it is unlikely we could give a categorical answer since the information is not out there and plant responses are often species-specific."

This Appendix 11 assessment has taken account of the concern raised by Natural England in the following way:

- ammonia, to which bryophytes are known to be sensitive, will have no significant effect (Table 6 above)
- sulphur dioxide and nitrogen dioxide, to which vegetation in general is sensitive, will have no significant effect (Table 6 above)
- heavy metals, which can affect plants, are deposited at a rate which is either less than 1% of the maximum deposition rate set by Guidance Note H1 (Table 8 above) or, when considered in the context of existing background deposition, substantially below the maximum deposition rate, and in most cases, lower than existing background deposition (Table 9 above).

Conclusion

It is possible to conclude no likely significant effect alone and/or in combination (in the context of prevailing environmental effects) on any interest feature of any of the protected sites.