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Ein cyf/Our ref: EPR/AP3990LR

Eich cyf/Your ref:

Dyddiad/Date: 25 September 2013

Dear Ms Chan

Interim Comments on Capping of Crymlyn Tip – Construction Quality Assurance Plan

Following receipt of the Capping of Crymlyn Tip - Construction Quality Assurance Plan in accordance with condition 2.5.1, please find our comments below. These comments are based on the information that has been provided in the Capping of Crymlyn Tip – Construction Quality Assurance Plan and Environmental Settings and Installation Design (ESID) Report.

Stability Calculations

Please could clarification be provided on the following:

The shear box testing has been derived from samples under different normal stress loads 50, 100 and 200 kPa. Why were these normal stress loads chosen as the material will only endure the self weight of the soils and plant/machinery. A more applicable range of 30, 50 and 70 kPa may have derived slightly different values for effective shearing strength parameters (ϕ') and cohesion (c'). Only peak shear strengths have been used.

The report states that the residual shear strengths are not applicable and that the stability analysis identifies slopes of 1v:3h ($\sim 18^\circ$) having adequate factors of safety. It is note that materials analysed from Batches 01 and 02 are identified by the lab as non plastic with very low dry densities. However, the sampling methodology at the Batches is not explained. This is important to discuss in order to appreciate whether the samples are representative and accommodate the inherent variability of waste.

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The report refers to peat being present under the existing waste and being compressed with the potential to form a natural geological barrier beneath the site. The ESID document identifies till (sands, clays and gravels). The values used are a bulk density of 2.2Mg/m^3 , peak effective shear strength parameters of ϕ' of 31° and c' of 12kPa . Please provide further clarification as to why these are considered conservative if peat is prevalent.

It was noted that based on the hydraulic conductivity results Atkins consider, with the PSD tests on Batches 01 and 02, the fine fractions are probably under represented in the soil sample selected. In Appendix D2 there is also a requirement that slopes greater than 1v:6h or $\sim 9^\circ$ must not be trafficked.

There are potential concerns over the material properties, its quality when laid and compacted or another factor that there is some inherent instability. We would like to seek an assessment of slope stability using residual shear strength parameters, particularly for access haul routes onto the tip where deformation in wet weather is feasible. Please ensure calculations accommodate the loading of plant and machinery. Veneer assessments should also be considered.

Import Volumes & Material Characterisation

In Appendix E, reference is made to requiring $45,000 - 50,000\text{m}^3$ of restoration materials. Material at Area 1 was being treated and was expected to yield approximately $10,000\text{m}^3$ of granular material (a power station ash containing up to 200ppm asbestos or ACM), $25,000\text{m}^3$ silty soils and $10,000\text{m}^3$ of weathered rock. Please could you provide clarification on whether Batch 1 relates to Area 1 or if the treatment of Area 1, ongoing in 2007, yielded the three products that are stored at Batches 01 and 02. Please could you clarify if the silty soils or weathered rock contain contaminants such as asbestos.

Appendix D identifies that Batch 01 and 02 will be used within the capping project, however, there is no description of what these contain other than the geotechnical parameters obtained in Appendix B.

Within Section 1.2.6 reference is made to waste and post restoration profiles, which indicate the following:

Base Surface	Comparison Surface	Cut m^3	Fill m^3	Net m^3
Topo Survey	Top of Waste	3,725	36,736	33,010
Top of waste	Top of cap	0	18,581	18,581
Top of cap	Top of Restoration	0	19,319	19,319
			Σ	70,910

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In the absence of other figures being provided, it is assumed that circa 21,000 - 26,000m³ of materials will be brought onto site. Please include a reasoned generic background to the origin, volume and quality of materials being used.

Within Section 4.2 of the CQA Reporting it would be beneficial to include isopachyte drawings. The drawings will include the upper and lower topographical surveys for each of the three layers, waste profiling, cap and restoration soils to indicate thickness of materials added. These will be particularly helpful in demonstrating thickness of added layers. This should also be supported by traditional methods in case of query due to waste mass settlement/movement.

Reference is made to Drawing 5041216 – RAP DRWG – 0001081 in Section D1.3.3, however this drawing has not been provided.

Validation / Verification

With regard to chemical conformance of materials, Section 3.1.5 refers to Appendix D, which itself refers to Appendix D, Table 3 and Table 4. Please could you provide clarification on whether there is verification of the source material prior to accepting at the site (Crymlyn Tip) and then validation sampling once deployed or received. Please could the report include text explaining what Plan 5041216-RAP-DWG-0001086 on CQA Testing Location Reference relates to. Is it just to topographic survey locations? The conformance sampling strategy is particularly relevant should St Modwens Development Ltd look to accept and receive materials from external sources.

It is clear that materials brought on to develop the cap either for waste profiling, capping or restoration soils, each require conformance samples at 1/5000m³. If on site materials have already been categorised on the basis of leachable metals, asbestos and TPH, the need for ongoing laboratory analysis of on-site sources becomes questionable, except for asbestos, for the presumably cleaner silts or crushed rock.

Table D4 is also only really of assistance if used prior to accepting materials ie from off site. If used on site after materials are deployed, it will be problematic if failures occur due to the length of time taken for analysis. The use of visual and olfactory evidence plus a portable PID on site would seem to satisfy most elements for site won materials assuming Batches 01 and 02 were derived from Area 1. What is the reason for having 2 columns, as the values appear the same?

The frequency of off-site sampling appears very small. It is our understanding that the long term aim for the containment area is for it to be open for public access. Subsequently, would it be more protective for the Minimum Validation Testing Frequencies in Table 4 of the Section 106 to be applied? Verification and validation

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samples should also be sought. Will the import of material be managed through the site wide materials management plan?

The use of Table D3 for off-site materials is a concern and we would seek an alternative table for this. Why is Lead value set at 1mg/kg and mercury 75mg/kg, is this a typographical error? The Risk Based Screening Level for Lead is 337 mg/kg in recreational and Mercury is set at 1 mg/kg for recreational. Clarity for the asbestos content for off-site materials is sought, as I am presuming Neath Port Talbot have given consent on the basis of this site already having ACMs. It would be preferable for off-site sources to be identified as zero or as not present for asbestos. Vanadium should be reduced or removed, it is not a ubiquitous metal in traditional landscapes and is present here because of bespoke use. A value should also be used for polycyclic aromatic hydrocarbons and benzo(a)pyrene. The correspondence between URS and EAW pre-dates the sale of the site to St Modwen, so the Section 106 agreement was not in place. Clarification should be sought on whether the Section 106 agreement supercedes any previous agreements for contamination levels agreed between EAW and Jacobs. As stated previous, it is our understanding the Crymlyn Tip forms part of the wider development.

Whilst we are content with the upper limit for TPH, the analysis should be specified, as it is intended to be protective of controlled waters, EPH analysis would be suggested. The perverse aspect here is that for TPH, Atkins are suggesting a limit of 8,500mg/kg, the same as ethylbenzene. It should be noted that the BTEX substances will be odourous at these concentrations and we would suggest that for off-site materials the BTEX values are reduced. The analysis for 1,2-Dichloroethane is only warranted if the source indicates it is likely to be present, this would be evident from the desk top study and site investigation

Landfill Directive Compliance

It is currently unclear the volume of waste/materials already covering the asbestos graves. This would help with the site setting and with establishing the parameters required for the cap. The only mention of construction of the cap is within section 2.2.4 of the main ESID Report. Information on the construction of the cap should be provided. This should be provided and explained as Annex 1, paragraph 3.3 of the Landfill Directive identifies surface sealing requirements for landfills. It is accepted that the competent authority can accept a reduction in standards, however we are unaware of previous discussions.

Section 2.2.5 of the ESID identifies the planting of trees on completion of the landfilling. We would not support the planting of trees, due to the proposed thickness of the cap. Further to this there could be issues for installing new wells if there are trees on site.

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Surface Water Management

Other than surface water being shed over the restored surface towards the existing interceptor trenches and thence to South Bay and Crymlyn Bog Lagoon, or via infiltration through the surface, there doesn't appear to be any surface water management on the restored area of some 45,700m². This appears anomalous even for the purposes of erosion control. However, in relation to stability and pore water pressures the absence of surface water management could indicate that extreme pore water pressure conditions can prevail.

Appendix A

It would be preferable that all non conformances are included in a table that can be attached to the CQA Verification Report. An example/pro forma could be included.

Sampling record forms are included for both the stockpile and each layer. It would be helpful in the comment column if olfactory and for example PID readings were included.

The daily record sheet, does not include a summary of construction activity or plant being used. This would be helpful and good practice.

In light of the above comments written approval cannot be provided for the Crymlyn Tip – Construction Quality Assurance Plan in accordance with 2.5.1.

If you have any questions or wish to discuss any of the points raised above, then please do not hesitate to contact me via the details below.

Yours sincerely



Gareth M Davies

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