Doc 5b

Review of Best Available Techniques for Waste Water at BTG Facility

Blaenwaun
Ffostrasol,Llandysul
Ceredigion SA44 5JT

Date: 20th January 2014
To: Nicholas Jenkins (Environment Agency)
Copies: Jason Mainwaring & Paul Gaunt

Executive Summary

This review updates a previous review dated November 2012. The earlier review concluded that connection to local water treatment would be the most likely BAT solution for the site, with evaporation and water recovery as the next best alternative.

The following studies have been conducted since the November 2012, review.

1. Detailed assessment of the options to connect to the local water treatment facility, in conjunction with Welsh Water (WW).
2. Detailed assessment of water electrolysis options conducted with Hydro Industries, (suggested by the Environment Agency (EA)).
3. Detailed analysis and assessment of the possibilities to segregate the most polluting waste streams at source with a view to separate treatment.

Assessment of the options to connect to local showed the following. The nearest treatment facility, (Ffostrasol), was,

A. Too small to take the site effluent.
B. Phosphate would need to be removed on site.
C. Would require a new discharge consent for the works.

Connection to the next nearest treatment works (Llandysul), was also investigated. This connection however would require intermediate pumping stations as well as requiring phosphate treatment on site.

Assessment of the electrolysis options concluded that it would not be technically possible to reduce effluent contamination such that direct discharge the adjacent stream (Cwerchyr), would not be possible without additional treatment.

Analysis was conducted of the most polluting waste streams from the process. This concluded however that, the collection systems required and the volumes gave no advantage over a single end of pipe treatment. This solution would also result in possible changes to the pharmaceutical manufacturing license, which would be prohibitively expensive.

As a result the recommendation for this analysis is to now install a water evaporation plant (see figure 1).

This review has been conducted using the following guidance:

European Commission Best Available Techniques (BAT) Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector 2003 (& Draft update of this document 20th July 2011).

Recommendations

1. Design and install a water evaporation with following criteria:
   Maximise water recovery for reuse in facility.
   Concentrated effluent sludge to be removed from site to a suitable effluent treatment facility.
   Sludge must remain in a state to enable pumping and transport from site i.e. must not solidify.

4. Design and build buffer capacity to feed effluent to MBTP, ensure positive release systems.
   The ability to design and build buffer capacity within a new system remains. Since the options to connect to local treatment works are uneconomic then design of the buffer capacity becomes irrelevant.

5. Amend permit to work system to include, identification of waste materials and designation disposal measures.
   This is included in a revision of the permit to work which is currently being implemented.

Discussion of Options Analysed Since November 2012

Analysis and discussion of the options for connection to a local effluent treatment facility have been covered in the section above. When it became clear that the option to connect to a local effluent treatment facility would not be feasible investigations, commenced with Hydro industries to evaluate whether or not an advanced oxidation process could be employed.

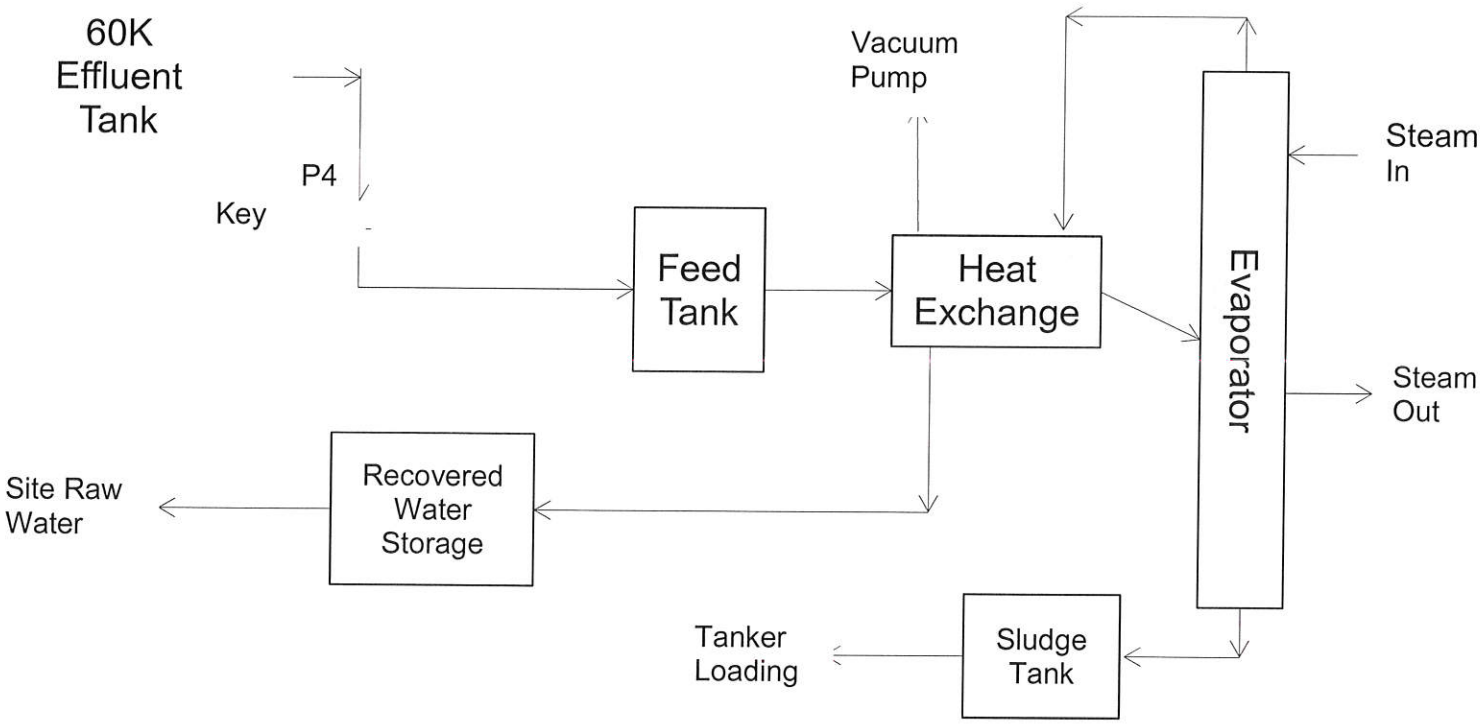
Studies commenced in April 2013 and continued through to September 2013. Although results for BOD and TSS removal were promising, however removing ammonia to achieve the discharge consent of 5mg/l proved impossible for the oxidation process. Several 2 stage processes were attempted using several effluent samples for each combination of process. The results however were, variable and non could reliably achieve ammonia levels below 5mg/l. The work concluded with an email from Hydro Industries on 16/9/13 to Paul Gaunt.
Here is an extract of that email: 'I had the chance to go through the laboratory test results with her today - unfortunately the results show variable reaction rates for ammonia removal - which is the prime target contaminant that we want to treat. At this point in time I think we have to say that the current AOP (advanced oxidation processes) that we are employing are not appropriate. Accordingly i propose we bow out of the project.'

In parallel with investigations into the advanced oxidation process, work was also instigated to identify individual waste streams from the process. The idea here was to attempt to identify streams that may have high concentrations of, BOD, TSS and ammonia, but with low volumes which could be intercepted and segregated from the rest of the plant effluent.
Samples began to be taken in July 2013 and continued until November 2013. The studies were delayed due to several production interruptions.
As sampling the product stream was easier than sampling the effluent stream, losses to effluent were calculated by difference between the respective product changes.

Table 1. Segregated Effluent Stream Results

Product Stages	Volume (l)	BOD (kg)	TSS (kg)	Ammonia (kg)
3-12	1602	23	0	0
12-35	735	0	68	0
Final Effluent (Veolia 23/3/11).	51400	37	2	6.3

For stages 35 onwards the volume increases rapidly. This makes collection of the effluent impractical. Studies of streams after this stage where therefore not undertaken.
As can be seen from the above analysis as no significant ammonia is removed in the two streams analysed, this will not achieve a discharge of ammonia below the 5 mg/l target.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