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Report for Natural Resources Wales - review of fugitive emissions for 2014

INTRODUCTION

This report has been drafted in order to comply with clause 4.1.4 of the company's EP permit, number BU 2357 (as varied):

4.1 .4

The Operator shall review fugitive emissions, having regard to the application of Best Available Techniques, on an annual basis, or such other period as shall be agreed in writing by the Agency, and a summary report on this review shall be sent to the Agency detailing such releases and the measures taken to reduce them within 3 months of the end of such period.

BACKGROUND

The issue of fugitive emissions is high on the list of company concerns as failure to address these early enough can result in a greater loss of containment, potential environmental problems, neighbourhood complaints and the associated financial implications with all of these issues.
Historically there had been a number of complaints from the local inhabitants about particular smells that had been attributed to accidental releases (fugitive emissions) from the site. Considerable work has been put into rectifying these problems with the result that there has been a significant reduction in the number of complaints over the past seventeen years.
There have been no external complaints regarding chemicals reported to Warwick Chemicals in 2014.

The company's primary concern is with VOC's as this potentially represents a greater impact on the environment as well as health and safety although there are several other areas where fugitive emissions can occur (cooling tower discharge and particulates from boiler stacks)
It is felt that the particulate release from the boiler stacks is minimal as the primary fuel, gas, is very clean. The testing of the boilers on the stand-by diesel fuel is no longer carried out. The boilers are on a regular maintenance regime (every two weeks) to ensure that they operate as efficiently as possible.
The operating cooling towers are cleaned at least once a year, are equipped with continual dosing systems and are tested every two weeks. This maintenance regime is suitable for keeping any emissions to a minimum. The cooling towers have recently been replaced with more efficient stainless steel ones ensuring that the operation is more effective and efficient.

REVIEW

Once again the manufacturing plants were operating at near full capacity for the greater part of the year.

The operation of the incinerator has been more efficient but, although there were some mechanical problems some of the distillation residue feed material had to be stored in tankers. This material was then pumped back into the storage tank and burnt. No residue material was sent off site for disposal.
Work is still on-going to reduce the quantity of residues produced during the process.

Six main areas were reviewed and considerations made for each area:

1. Acetic Acid & Acetic Anhydride
2. Ethylene diamine
3. Diesel

4. VOC's from gas combustion or incineration of residues
5. VOC's from paints or solvents
6. Thermal transfer fluid

1 ACETIC ACID & ACETIC ANHYDRIDE

In the production plant and tank farm areas fugitive emissions of acetic acid/acetic anhydride generally come from leaking pipe work, pump seals/glands, and any spillage incident. There are also emissions that originate from scrubber systems that have not been able to effectively cope with the quantity of acid gas passing through the system, consent breaches.
Since the introduction of new operating standards for the drying unit (with respect to vacuum) several monitoring trials have generated "within the consent" emission data for all scrubber units under various operating conditions.
The successful operation of the AED Recycle plant will allow Plant 3, Plant 6 and the wiped film evaporator to shut down reducing the quantity of air emissions.

The loss of containment incident in Tank farm 2 in September leading to the release of approximately 10 tonne of acetic anhydride/acetic acid mixture will have produced some fugitive emissions. The spillage was quickly recovered with the use of a vacuum tanker and the material was recycled back through the distillation unit

2 ETHYLENE DIAMINE

There has been no change to the EDA offloading/storage/circulation system. Any emissions from the offloading procedure are still passed through the wet scrubber system. The only destination for EDA is still the DAED production plant; the pipework to all other plants has been removed.
Calculations of the emissions based on raw material offloading frequency for this year has been about the same as last year at 50kgs.

3 DIESEL

The use of diesel on site is still of concern to the company as any release of this material into the river will have a significant environmental impact. The use of 'pigs' for surface oil removal is on-going. These are lowered into the central collection chamber to remove any oil that has become entrained in the water from the production areas. These are changed on a regular basis. The large diesel storage tank (25,000 litres) located by the DAED hot oil building remains empty. There are no plans at present to remove this tank.

There has been no use of diesel as a back-up fuel in the boilers at all this year. The decision to remove diesel for use in the boilers remains in place and the diesel storage tanks have now been emptied as far as possible. The final empty and clean out is being scheduled for 2015.

The scheduled activities, involving diesel, are still carried out:

- running the stand-by hydraulic pump for the waste water treatment plant. This is now only carried out when the central collection chamber is cleaned out (every eight to ten weeks) and is part of a maintenance activity. The test running has been phased out.
- test running the circulation pump for the deluge system once a week. This has to be carried out for 30 minutes to allow the diesel engine to reach its designed operating temperature. There is now an additional pump in this building to provide a back-up for the

original pump. The deluge system has been extended and the system required greater integrity.

All these activities will produce VOC's (and particulates) but are necessary to ensure that these systems will operate on demand. The operation of this equipment has been reviewed and the revised frequency of operation is thought to be suitable.

The removal of the use of diesel for the boilers and the stand-by generator has reduced the overall VOC emissions.

4 VOC'S FROM GAS COMBUSTION

The primary use of gas on this site is for combustion for steam generation. The main steam boilers are maintained and checked every two weeks to ensure that they are running at peak efficiency.
The other gas usage is on the incinerator unit where it is used to heat up the unit to operating temperature before the residue fuel is ignited. The operating regime of the incinerator has changed slightly to optimise operations. The unit is now run at a slightly lower throughput with the effect that the continual run times are longer and the overall down time is less. This has the effect of reducing the quantity of gas used as there are fewer start-ups. It has also meant that the operation has been more stable with a slight reduction in overall emission levels.

Calculations for the amount of VOC's produced from gas combustion in the boilers and incinerator are based on spot monitoring carried out by REC Environmental Monitoring. Some assumptions have been made with the calculations but the final figure is around 3kgs. This is a significant decrease on previous figures.

5 VOC'S FROM PAINTS & SOLVENTS

The quantity of painting carried out in 2014 has been approximately the same as last year with a similar amount of emissions, calculated to be around 220kgs (a slight reduction from last year)

The quantity of solvents used on site by the Engineering Department, R & D Department and Analytical Department is relatively small and work has been done to look for suitable alternatives.
The solvents currently used will be the ones most suitable for that particular duty and until an alternative is available the situation will remain the same.
The procedures for the use of and disposal of solvents are reviewed and audited with any suggested improvements being implemented as soon as possible.

The polymer plant is no longer operational and the emissions from the use of hexane have ceased.

6 THERMAL TRANSFER FLUID

There has been an increase in the quantity of thermal fluid in use as a result of the AED recycle plant installation. However, this is just an internal volume increase – the operation of the hot oil heating system is the same and the running hours for the system remains very similar.

Calculations for the amount of VOC's produced by the operation of the hot oil system has remained the same this year and amounts to ~ 5kg

CONCLUSION

There are a number of projects that have been carried out (some still to be completed) that will reduce the possibility of fugitive emissions from the raw material storage and production areas on site.
The push to get the staff to report any problems is now showing some results with repairs being carried out sooner, resulting in the reduction of any fugitive emissions. This push will continue through the next year. This coupled with increased instrumentation and safety systems will allow for a process that is better managed which in turn should improve the response time for repairs and recovery.

The drawback this year has been the problems encountered during the commissioning of the AED recycle plant and this has led to the continual operation of Plants 3, 6 and the Luwa plant. These three plants continue to use steam and will produce a quantity of fugitive emissions.
The site does follow a process of continual improvement and so there are processing, production and engineering improvements year on year. These changes, however small, will provide some reduction in the fugitive emissions from the site.

Peter Bryant
HSE Manager
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