Cyfoeth Naturiol Cymru
Natural Resources Wales

Compliance Assessment Report

Report ID:
CAR_NRW0025275

This form will report compliance with your permit as determined by an NRW officer

Site	Newport Chemical Complex EPR/BR9715IB	Permit Ref	BR9715IB		
Operator/Permit holder	Solutia UK Ltd				
Regime	Installations				
Date of assessment	19/07/2016	Time in	09:00	Out	17:00
Assessment type	Report/Data Review				
Parts of the permit assessed	routine and annual monitoring, inspections, improvement items				
Lead officer's name	Kemp, Andi				
Accompanied by					
Recipient's name/position	Steve Thomas/ Environment Specialist	Date issued	16/08/2016		

Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations. A detailed explanation is captured in "Compliance Assessment Report Detail" (Section 2) and any actions you may need to take are given in the "Action(s)" (section 4). This summary details where we believe any non-compliance with the permit has occurred, the relevant condition and how the non-compliance has been categorised using our Compliance Classification Scheme (CCS). CCS Scores can be consolidated or suspended where appropriate, to reflect the impact of some non-compliances more accurately. For more details of our CCS scheme, contact your local office.

Permit conditions and compliance summary	CCS Category	Condition(s) breached
KEY: See Section 5 for breach categories, suspended scores will be indicated as such. **A** = Assessed or assessed in part (no evidence of non-compliance), **X** = Action only, **O** = Ongoing non-compliance, not scored.		

Number of breaches recorded	0	**Total compliance score** (see section 5 for scoring scheme)	0

If the Number of breaches recorded is greater than zero, please see Section 3 for our proposed enforcement response

Section 2 – Compliance Assessment Report Detail
This section contains a report of our findings and will usually include information on: ➢ The part(s) of the permit that were assessed (eg. Maintenance, training, combustion plant, etc) ➢ Where the type of assessment was 'Data Review' details of the report/results triggering the assessment ➢ Any non-compliances identified ➢ Any non-compliances with directly applicable legislation ➢ Details of any multiple non-compliances ➢ Information on the compliance score accrued inc. ➢ Details of advice given ➢ Any other areas of concern ➢ Any actions requested ➢ Any examples of good practice ➢ A reference to photos taken

Eastman Compliance Assessment 19th July 2016

This compliance assessment covers:

- Responses to improvement conditions set in the V006 Aug 2014 permit variation
- Update on the NOx emissions post removal of the CHP unit from the main site boiler
- Routine monitoring data and annual submissions
- Potential permit variation
- TH3 Commissioning update
- Recent notifications from the operator and guidance off the regulator
- Summary of recent compliance visits

Improvement Conditions

Over the years since the original permit and including the Improvement Conditions (ICs) from that original permit, there have been 29 ICs up to the V006 variation. The four ICs in variation V006 (IC30, IC31, IC32, IC33) and the operator responses to these are assessed separately below.

From looking at NRW paper files the following ICs (from IC1 – IC29) have been formally signed off as complete:

IC1, IC2, IC4, IC5, IC6, IC7, IC8, IC9, IC14, IC18, IC19, IC22, IC23, IC24, IC26, IC27, IC28, IC29 – some of these were signed off on the basis that certain actions were to be carried out and / or improvements implemented. Collectively these accepted responses are part of the operating techniques of the installation and therefore are legally part of the permit – some outcomes may need to be varied into the permit.

The following ICs have partial responses, some pending further work or are in some other way unclear in terms of their status and therefore require a review before they can be formally signed off as complete:

IC3, IC10, IC11, IC12, IC13, IC15, IC16, IC17, IC20, IC21, IC25

With regard to the ICs with potentially unclear status above, some of the key areas associated with these ICs that, either relate to other completed ICs, or ongoing significant aspects at the installation, are listed below. Next to the unclear ICs in italics are the related ICs that have been deemed complete. It is important to know, when looking at broad topics covered by the whole IC programme, such as effluent assessment and treatment, monitoring, boilers, etc., which ICs in total are linked to a particular operational / compliance aspect:

Environmental impact of releases of (formally) R50, R51 & R53 substances; assess impact of PCBs on the estuary from W1 & W2; Techniques for segregation and treatment of aqueous streams of complex effluent; Toxicity study of effluent post installation of biological treatment plant – IC10, IC15, IC21, IC25; *Separate surface water discharge to W2 control; Details of pollutants in W2 surface water discharge (COD, Hg, Cd, PCP, PCP, TCB); Assessment of efficiency of biological treatment plant; Commissioning report for biological treatment plant and biomass sludge residue options for treatment; Environmental impact assessment of benzene, biphenyl, triphenyl released to estuary; – IC9, IC18, IC23, IC24, IC27; S2075 packed bed scrubber to reduced TEG in effluent – IC7*

Reduction of chloromethane – IC11; *reduction of formaldehyde from Dequest Amino – IC6;*

Various aspects of monitoring, e.g. MCERTS accreditation for monitoring equipment – IC13; *determination of uncertainty in monitoring – IC14*

Fence line monitoring of benzene and biphenyl – IC16, IC17

Commissioning of boiler 16 – IC20; *commissioning of boiler 14 to run on kerosene; Commissioning of boiler 16 to run in gas turbine and CHP mode – IC22, IC28*

In the V006 variation IC30, IC31, IC32 and IC33 were added and are assessed below. Of these four ICs, the ones that relate to the broad 5 topic areas above are: IC31 – review of BTP for phenol removal; IC32 – an update on the response for IC23 previously – assessment of efficiency of BTP; IC33 options for further reduction of PCP to water. These three all link to effluent treatment and discharges to water. IC30 concerned a carbon water exchange system trial and the provision of a report after completion of stage 2. There may be information referenced in or pertinent to the submissions for IC31 – IC33 that can be found in documents submitted for the earlier ICs.

IC30: *The operator shall provide a written report to NRW upon completion of stage 2 of the Carbon Water Exchange System trial. The report shall describe the outcome of this phase of the trial and include an evaluation of predicted verses actual emissions to air.*

AK has in NRW files email correspondence describing how this trail was included in the Therminol V006

variation. The DECC rules around these type of trials required the dismantling of the trial equipment at the end of the trial. The operator has also supplied a Stage 1 Completion Report, Mar 2013. AK has no record of the report post stage 2. **Eastman to provide an update on this trial.**

IC31: *The Operator shall notify Natural Resources Wales in writing upon completion of a review of the biological treatment plant phenol removal performance, details of any improvements required and the date from which the phenol emission limit value for release point W1 shall reduce to 10 mg/l as an weekly composite sample.*

This IC is also linked to IC23 (BTP review) and IC24 (biosolids sludge treatment).

The operator submitted a response in May 2015. This included monitoring data pre and post installation of the BTP. The levels of phenol and the indicative treatment efficiency appear to be reasonably consistent post installation (2009), taking on board fluctuations in effluent composition, heating element implemented and introduction of Santoprene plastic diffusers. The data shows results below the 10mg/l target emission limit throughout 2014 and 2015. The operator, however, has requested that the emission limit value and reference period be based on the average result from 12 or 13 weekly composite samples in a quarter, with the limit for this average to be 10mg/l.

The different chemical properties of phenol, compared to benzene and biphenyl could mean that such a proposal would still be protective of the aquatic environment. Such properties used to evaluate environmental impact are: *significant aquatic toxicity of biphenyl; larger octanol / water partition coefficient of benzene and biphenyl – i.e. bioaccumulation; much greater solubility and reduced (relative to biphenyl and benzene) ecotoxicity of phenol; rapid volatilisation of benzene from water; resistance to biodegradation of biphenyl, more biodegradability for benzene and greatest biodegradation (therefore bio-treatment removal efficiency) for phenol.*

Consideration has to be given to the basis upon which the composite sample is taken. If the flow varies significantly (typically batch processes), the sampler should be set up to withdraw each aliquot on a flow proportional basis. If the effluent volume is stable, the sampler will provide a representative sample if set up on a time proportional basis, e.g. every hour over 24hrs. This will need discussion with the operator as the set up at Eastman is believed to be on a time proportional basis, inferring that effluent volume and quality is relatively stable. If the composite sampling basis is appropriate for the discharge, then this is less likely to lead to loss of reporting of elevated or reduced concentration sampling results if a quarterly average of a weekly composite is submitted as the compliance value. This proposal, if it were to be accepted, in line with Sector Guidance Notes, would need to be caveated on the following basis, because as the sampling is a time based 24hr composite for each day, then a weekly composite from the seven days individual composites, then an average of the weekly composites: *that no single weekly composite shall exceed the ELV by more than 50%, i.e. a ceiling of 15mg/l.*

The Water Framework Directive EQS for phenol in coastal and transitional waters is an annual mean of 7.7ug/l. So it should (and probably has already been done by the operator as part of previous IC work) be straightforward to perform a simple H1 screen by comparing the process contribution (based on

concentrations of say 10mg/l and of 15mg/l), after initial dilution (ref. to H1 Annex D) and comparing this figure to the EQS above, to see how significant the PC is.

Note c from Table 2.2.5 of the V006 variation states that upon completion of IC9 - proposals and implementation of surface water segregation from main ETP - the discharge window at W1 should increase from 2 hours either side of low tide, up to 3 hours either side of low tide – due to more concentrated effluent (minus surface water) being discharged – the 3 hours window would lead to a greater initial dilution. However, as the outcome of IC9 is (currently) not to segregate surface water from process effluent, the window remains acceptable at 2 hours either side of low tide.

IC31 is deemed complete on the basis that the revised limit and reference period for the 10mg/l (weekly composite) phenol ELV is processed through a permit variation.

IC32: *The Operator shall review and update their response to improvement condition IC23 which was originally included as part of variation JP3132XJ issued on 24/12/2008.*

IC23 originally required an evaluation of the newly installed BTP. A variety of submissions and updates have be submitted by the operator and the IC was signed off as complete in June 2011.

In pursuit of completion of IC32, the operator submitted a response on 16th Dec 2015 against a 31st Dec 2015 deadline. It is noted that the response introductory text states that in Oct 2015 the phenol limit was changed to 10ppm / averaged over a quarter – *AK has not seen a record of agreement to this change in NRW files.* In Aug 2014 the permit was varied (V006) and in Table 2.2.5 phenol ELV is 40mg/l subject to note e – which is, the limit will be lowered to 10mg/l post the completion of IC32. This 10mg/l is a weekly composite, not a weekly composite averaged over the quarter – see paragraph 4 under IC31 above.

Some improvements have already been mentioned above in the reduction in phenol submission for IC31. Improvements have been necessary due to a combination of operational aspects of the plant that were seemingly not foreseen and changes in the Santicizer batch frequency and resultant effluent loading. As reported by this review Santicizer batch frequency has been slowed; a weak sodium phenate solution is produced on plant shutdown to keep a feed to the bio plant; Santoprene diffusers have been installed as they have a better performance life than the previous diffusers; steam jacketed pipework recirculation tank heating has been installed.

A slight increasing trend for COD is explained as being due to other site effluent streams that don't go through the BTP, contributing COD loading to W1 final effluent. The overall COD removal efficiency is reported as above 50% (the design specification) overall. Taking total effluent concentration of COD in 2015 reported as 889mg/l and applying the 25,000m3 total W1 effluent flow limit, a potential total COD released of 22,225kg/week could occur, compared to a permit limit of 65,000kg/week, i.e. just over a third of the overall weekly mass limit.

The former R50/53 (now acute aquatic toxicity cat 1, H400) triphenyl phosphate figures are less clear. Referring to the sign off submission of 27th May 2011, a graph showing the triphenyl phosphate weekly mass discharged, shows a marked decreasing trend from pre BTP installation around Sep 2008, decreasing to a more or less consistent <50kg/week Jan 2009 – Jan 2011. Then there is a small peak of just over 100kg/week, around May 2011. This drops again to below 50kg/week until Dec 2013 and Jul 2014, with peaks of >50kg/week. Another noticeable peak occurs around Aug 2015 at just under 40kg/week. No data for 2012 is given on these graphs. Taking into account the different mass scales on the ordinate of the May 2011 and Dec 2015 triphenyl phosphate graphs, the overall trend is a decreasing one from peak values between 250 – 600kg/week (Feb 2008 – Nov 2008) to a more consistent <10 – 40kg/week (Sep 2009 – present). This overall trend it seems is a result of the effective functioning of the BTP, although minor fluctuations between Oct 2013 – Jul 2014, amongst others are not explained.

IC32 is deemed complete on the basis that improvements to the BTP installation equipment (diffusers, heated pipework etc.) and to the process control (trickle feed to the bio plant of a substrate, finer control of Santicizer batches and communications from control room to BTP and manufacturing personnel), are implemented and ongoing performance to the most recent reported levels and review against BAT is maintained.

IC33: *The operator shall submit to NRW in writing a report upon completion of a review of the costs and benefits of further measures to reduce emissions to water of pentachlorophenol, including details of any beneficial improvements identified and the data by which these improvement will be implemented.*

This item had been extended until 31st Mar 2016 on the basis that the operator provide an interim report as agreed with the previous RO. The presence of PCP is due to historical manufacturing activities and leaching of legacy contaminants into the surface water system and out to the estuary via the combined effluent system and W2 and W1. Previous ICs have covered releases of substances such as PCP to the estuary, e.g. IC9, IC10 and IC18. As mentioned above there is uncertainty with regard to the status of IC10 and it appears with IC9 segregation of surface water was not progressed, hence the no release window remains at 2 hrs +/- low tide on the basis that the effluent with surface water is more dilute.

The operator has provided a letter in response to IC33 dated 29th June 2015, followed by an interim report on 3rd Sep 2015. It is these two items that are assessed below in relation to closing out IC33. The Jun 2015 letter sought to extend the IC deadline on the basis of further work needed to work out the best solution to treat residual PCP, such as reductive dechlorination using molasses. Consultants tasked with assessing the options recommended lab tests to look at the feasibility of this treatment. Removal of the contaminated soil (in and around the former Santobrite area) wasn't counted as an option to develop due to the presence of physical equipment and infrastructure on the site. Further capping alone was also discounted as an appropriate option. There has been capping previously which has led to some retardation of PCP leaching into the surface water drains, due to less mobilising rainfall infiltration, but in isolation it is not effective long term and perched groundwater can make the PCP more mobile. PCP isn't very soluble, but an elevated mobile water phase can move the PCP by advection. PCP doesn't have much tendency to bind to the organic carbon fraction of soil, so can be flushed through soil.

In situ anaerobic reductive dechlorination is a known technique to remove the chlorine as chloride ions from

PCP, eventually resulting in phenol and has developed partly because PCB isn't volatile and poor combustion (e.g. from incineration) can lead to the formation of dioxins. There is usually a small amount of dioxins, furans and other types of chlorinated phenols present from the original manufacturing of PCP. Other options exist and the operator in their Sep 2015 submission outlined the aforementioned technique along with other methods of in situ remediation. The conclusion from the operator is that their consultants recommend extensive field and lab trials to ascertain the likely suitability for reductive dechlorination to turn the PCP sequentially into phenol.

PCP is subject to biodegradation by both anaerobic and to a lesser extent aerobic bacteria, leading to complete removal of PCP in anything from 28 – 56 days, although the concentration of PCP is an important factor in both removal rate and % removal and potential biological inhibition.

Taken from the last four quarters of monitoring data, the concentration of PCP leaving the site in treated effluent has been min. 8ug/l, max. 12.5 ug/l (as a weekly composite) with quarterly averages of the weekly composites being 6ug/l, 4ug/l, 6.7ug/l and 7.2ug/l. The weekly results have all been reported as being compliant with the 15ug/l ELV. According to the original permit decision document the amount in kg that was released from the site into the Severn estuary was 47kg in 1994, decreasing year on year to 3kg (projected) in 2003. PCP also has a weekly total mass limit of 250g and the last four quarters have been 198g, 181g, 242g, 230g – maximum results from the weekly composites. *Question 1: Eastman July 14th 2016: How is the current weekly average mass released and weekly composite concentrations, related to the project annual mass released, i.e. av. concentration of say 6ug/l, av. weekly mass of say 200g, against a declining annual mass to 2003 (projected) of just 3kg.*

The concentration is clearly declining, although AK doesn't have much information on the source term: location, hot spots, plume movement, bulk mass in soil etc. The annual average EQS is 0.4ug/l, so a minimum initial dilution factor of 37.5 is required to ensure a 15ug/l release concentration does not breach the EQS. Although dilution is not a BAT technique for abatement, the dilution provided by the estuary will be considerably higher than 37.5. Bearing this in mind a question has to be raised on the additional environmental benefit gained against costs associated with in situ treatment and monitoring.

In addition to assessing the overall environmental benefit of reducing the concentration of PCP leached and discharged from the site further, IED will introduce mandatory permit conditions requiring the monitoring of groundwater every 5 years and soil every 10 years, as a minimum. In the permit review process for implementing IED, the site will have to produce a baseline site condition report. Such a report may draw on existing information (e.g. the original IPPC application site report) and / or be supplemented by more recent data, in this case new monitoring data that illustrates the declining concentrations of known legacy contaminants and no deterioration from currently used, stored or manufactured relevant hazardous substances. NRW will do this by issuing a notice requiring the submission of the baseline SCR for us to assess in the permit variation process or by varying your permit and putting in an IC requiring the submission of the baseline SCR by a certain date.

The RO is therefore extending the deadline for IC33 and expanding the scope:

Action 1 Eastman 14th July 2016: *The operator is to provide the following information to the NRW RO: plan showing location of PCP contaminated area and associated drainage channels that transport; details of the shallow aquifer level; information showing the concentration of PCP from a number of representative*

samples of GW and soil; any information from hydrogeological studies showing plume / contamination dimensions and geometry. ***Due: 30th Sep 2016***

Upon assessing this information a discussion between regulator and operator will take place to decide on the status of IC33 and next steps.

Update on Potential NOx Issues post CHP Removal

The issue of potentially breaching the NOx ELV from the main boiler 16 (emission point A4) materialised due to the operator reversing the integration of a CHP unit (gas turbine, compressor, generator, waste heat recovery boiler (WHRB) and bypass stack A1) which was introduced by permit variation V004, 31st Mar 2011, by way of retrofitting a second hand gas turbine to existing boiler 16. This was communicated to NRW by the operator in a letter dated 12th Mar 2015; followed by a table of monitoring results emailed on 19th Mar 2015; another update email on 17th Jun 2015; and finally an email on 17th Aug 2015. With the permit variation application the operator submitted the Solutia CHP variation application report, 22nd Dec 2010. The issued V004 variation set *IC28: commissioning report verifying emissions compared to figures used in the variation application.....amongst other requirements.*

The CHP set up was configured such that the exhaust gases from the combustion of natural gas in the gas turbine pass through the turbine blades to rotate a shaft connected to the generator for electricity generation. With the turbine exhaust gases used in the waste heat recovery boiler (formerly boiler 16) to raise steam, emitting via boiler 16 stack, A4. Alterations to process conditions could be adapted to run the backup boiler 14 on kerosene if there is a natural gas interruption, with emissions routed through stack A2; bypass the WHRB and exhaust gases released from the gas turbine via the bypass stack if the WHRB was out of action, at stack A1; or if the gas turbine is on downtime, the WHRB can be run in auxiliary (fresh air[KA1]) mode, with supplementary burners, emitting via stack A4.

Prior to the V004 variation introducing the CHP set up, the NOx limits were:

- A4 – 150mg/m3, with reference conditions of: dry air, 273K, 101.3kPa, 3% O2
- combined NOx annual mass limit from A1 – A4 of 70,000kg

The original permit decision document showed levels of NOx (different set up of boilers then) marginally above the LT significance H1 screening threshold. In all, it was decided that a permit limit of 150mg/m3 NOx for boiler 16, when commissioned, against a benchmark range of 50 – 200mg/m3, would not threaten the AQS.

IC20 required a commissioning report post installation of boiler 16 (without the CHP set up, which came in the V004 variation); giving typical and maximum NOx levels, due 6 months after commissioning. A response was received off the operator on 6th Oct 2004, stating that monitoring of the newly commissioned boiler 16

showed a NOx range of 59 – 109mg/m3 against the ELV for A4 (boiler 16) of 150mg/m3.

The V004 variation amended the boiler 16, point A4, NOx ELV to 75mg/m3 post CHP installation. The combined annual mass of NOx released was also changed to 20,000kg, from 70,000kg. Reference conditions changed from 3% O2 to 15% O2 for gas turbines. The variation decision document assessed the operator's emissions for NOx and the (then) AQMAU department of the EA used their screening tool and the output of this was that the short term NOx PEC was 22% of the EQS and therefore low risk; and the long term NOx PEC was 51% of the EQS and considered medium risk – this higher LT PEC is likely to be due to a high existing background concentration of NOx, as the process contribution was determined as only 2% of the EQS. The Process Contribution (PC) is derived from the release rate and a dispersion factor in H1 (based on effective stack height) and the Predicted Environmental Concentration (PEC) is the PC plus background (depending whether LT or ST is being assessed). It is the PEC that is ultimately compared to the Environmental Quality Standard. Note 6 in Table 2.2.2 requires that monitoring be undertaken at A4 when both gas turbine and supplementary firing and operating at a single load point, with the turbine load point in excess of 70% of its maximum continuous rating and the WHRB operating at typical levels.

IC28, as mentioned above, required a commissioning report and emissions comparison, post CHP installation. The response to IC28 was submitted 27th Jan 2012. Data from three rounds of monitoring once the CHP unit was operating as intended, showed a maximum NOx concentration of 62.6mg/m3. This IC was accepted.

The operator did not appear to foresee an increase in the NOx emissions post CHP removal, forecasting emissions averaging 63mg/m3 – ref. email off Keith Agnew, 19th Mar 2015. The reference conditions for monitoring data reporting also change when boiler 16 is on auxiliary mode to 3% O2. A June 2015 update then reversed this prediction as some recent monitoring suggested that the limits for NOx (and CO) could be breached.

The annual NOx result for boiler 16 at A4 taken in compliance year 2014 was 60.1mg/m3 against the ELV of 75mg/m3. The result taken during compliance year 2015 (post GT removal) was declared as 200mg/m3. This is a significant breach (as clearly the emissions are likely to be in this order throughout routine operation) and is higher even than the previous boiler 16 pre GT/CHP limit of 150mg/m3. However the total mass of NOx from all boilers in 2015 was reported as 9577kg against a limit of 20,000kg. The original permit decision document, as mentioned earlier, declared the NOx LT PC as marginally above the LT significance H1 screening criteria, so the EQS / AQS for NOx is highly unlikely to be breached, even at this 200mg/m3 concentration. However the sector guidance note benchmark for combustion for boilers pre 2005 on natural gas for NOx is 150mg/m3.

The Jun 2015 update also states that an external engineering firm, Wulffe, were being engaged to assess the situation and to optimise the combustion conditions in boiler 16 as the main boiler with no GT. An initial assessment by Wulffe has concluded that there is an area(s) where air is getting into the combustion system, affecting the emissions profile. NOx here is likely to be mainly thermal NOx and some prompt NOx from interaction of rapid forming nitrogen oxides with carbon from the fuel combustion. Therefore air (nitrogen) presence and combustion temperature and stages of burning are key in thermal NOx formation and / or prevention. The Wulffe engineer was due to return after the July 2015 shutdown.

An Aug 2015 update from Eastman discusses the monitoring results from Jun 2015 (as mentioned above),

which were around 200mg/m3, along with tweaks Eastman have made and a rescheduling of another Wulffe visit, then further monitoring post optimisation. NRW is awaiting an update from this work. This is something that would have to be addressed by an environmental impact assessment as part of a permit variation.

Action 2 Eastman 19th July 2016: *The operator is to provide an update to NRW with regard to the progress of returning boiler 16 NOx emissions to permit compliance limits, 75mg/3. This update should include, but not necessarily be limited to: (i) identify the key parameters that are affecting NOx emissions at boiler 16 (e.g. burner types, positions, combustion air, temperature etc.); (ii) options for bringing the boiler NOx emissions back to 75mg/m3 or lower; (iii) a BAT assessment of the options.* ***Due: 30th September 2016***

Summary of monitoring and reporting requirements

The original permit BR9715 (issued 28/01/04) included emission points and limits to air and water; there are also annual mass limits for certain parameters released to air. The reporting requirements are still extant from the original permit. Several permit variations have amended some of these original conditions and tables.

- Table 2.2.1 of the V006 variation lists the current air emission points – see plan in Schedule 4.
- Table 2.2.2 of the V006 variation lists the current substances, limits and monitoring frequencies for releases to air; with notes.
- Table 2.2.4 of the original permit lists the current two emission points to water.
- Table 2.2.5 of the V006 variation lists the current substances, limits and monitoring frequencies for releases to water; with notes.
- Table 2.2.3 and condition 2.2.1.4 of the V004 variation lists the current annual mass release limits of listed parameters to air.
- Permit condition 6.1.3.1 of the V004 variation amends the reference conditions for combustion processes, with non combustion process reference conditions in original permit, permit condition 6.1.3.2.

The original permit specified the reporting requirements for certain annual requirements:

- Fugitive emissions (p.c. 4.1.4) – by 3 months of reporting period – this is taken as Jan – Dec, report due 31st Mar.
- EMS Improvements and Targets (p.c. 4.1.5) – by 31st Mar.
- Annual performance parameters (p.c. 4.1.3, annual production, effluent COD, effluent toxicity, VOCs, POCP) – by 31st Jan.
- Other annual performance parameters (p.c. 4.1.2.3, information required by forms in Table S3, Schedule 3: Waste Return, Water Usage, Energy consumption, Performance Indicators) – by 28th Jan.
- Annual mass releases to air (p.c. 4.1.2.3, information required by forms in Table S3, Schedule 3: Annual Air Releases) – by 28th Jan.

The routine monitoring data is required (p.c. 4.1.2.1, 4.1.2.2, Table S2 Schedule 2) to be reported for certain emissions:

- To air annually from A1 - A4, A6, A12, A15, A16 – note A30 benzene tank is not included, but as benzene tank points A15 and A16 are, and all three have limits (Table 2.2.2 V006), the operator has reported the rate released.
- Or quarterly for a variety of parameters released to water via W1 and W2 combined and others via W1 or W2 separately.

The monitoring received and assessed here covers Oct – Dec 2014, Jan – Mar 2015, Apr – Jun 2015, Jul – Sep 2015, Oct – Dec 2015, Jan – Mar 2016. In addition to annual performance indicators for 2015, energy, water and waste performance 2015 and annual mass emissions to air along with the annual reporting of air emission concentrations for 2015.

Surface water releases via W1 and W2.

Originally there was going to be a segregated site surface water discharge via W2 only and a treated process effluent via W1 only, however the site generally discharge a combined effluent of main site process effluent and surface water, which pass through a flow meter and monitoring point at W1 and ultimately leave site downstream of W1. Site surface water is measured at W2, before it is combined with site process effluent and ultimately measured as combined at W1, before leaving site. Table 2.2.5 will likely need to be varied to clarify the position and reasons and basis for limits at each point. For this assessment a simple comparison to the ELVs in Table 2.2.5 V006 has been made based on the submitted W1 value for the W1 only ELV and for W1 & W2 combined ELVs and the submitted W2 value only compared to the W2 only ELVs: COD and pH. This came about from information from the operator upon reviewing a draft version of this CAR1 form, where the operator stated that W1 values represent W2 and W1 combined (as per permit table), as W2 surface water flows into the west lagoon, sometimes via pH correction, and then is measured as combined SW and effluent via W1. W2 is only measured separately, if there is a direct discharge, bypassing W1, straight to the estuary in the event of a flood or some such event. In which case the separately measured W2 values bypass W1 measurement point, albeit being discharged into the estuary via the same effluent long sea outfall.

On the reporting forms for Oct 2014 – Sep 2015, the PCP concentration limit is incorrectly stated as 150ug/l; it should be 15ug/l. From Oct 2015 – Mar 2016, a second table of parameters for W2 only is submitted along with W1 only and W1 & W2 combined. The ELVs listed correspond to Table 2.2.5 except for the W2 only PCP limit, which is incorrectly listed as 150ug/l, instead of 15ug/l. It appears the site have three sets of measurements, one for W1, one for W2 and then in some cases W1 & W2 combined. There are also different reference periods quoted on the monitoring forms.

The ELVs in permit table 2.2.5 (except pH) are weekly composites, which the site produce from daily composites. Therefore the measurement of compliance is based upon each weekly composite not exceeding the weekly ELV over the quarter, either as a mass limit or a concentration limit, except for the weekly mass limits for benzene and biphenyl. These two parameters are based on the average of the weekly composites compared to the ELV. It is unclear why cadmium has a monthly reference period and monitoring frequency, but reading the reporting forms, it appears that compliance is determined by three monthly samples, each based on a weekly composite, no single sample to exceed the ELV. It is also assumed that the concentration value for comparison to the weekly concentration ELV is based on the final concentration derived from each daily composite making the weekly composite and that the weekly mass is derived from multiplying the final weekly concentration composite value to the total flow discharged that week.

Apparent breaches, to be discussed with the operator:

July – Sept 2015:

W2 COD – reported value: 534mg/l max; ELV: 500mg/l

Action 3 Eastman 19th July 2016: *Eastman to provide a response to this breach, based on confirmation of the reporting uncertainties and assumptions mentioned above.* ***Due: 30th Sep 2016.***

Potential CCS non compliances pending response to Action 3.

Air Emissions Reporting for 2015

All results compliant except:

NOx at A4: two 6 monthly results of 200mg/m3 and 229mg/m3 against a limit of 75mg/m3. The root cause of this issue is due for an update from Eastman.

Potential CCS non compliances pending response to Action 2.

Annual Reporting: EMS, Fugitive Emissions 2014 & 2015 and Performance Data for 2015

Fugitive Emissions

The sites approach to fugitive emissions has traditionally been based around information and studies submitted as part of the original permit application and these tended to focus on losses of benzene (and acetone, but use of acetone has stopped) from pump seals, flanges etc. and the known legacy substances being flushed into the site surface water drainage system. The permit decision document and permit application do not show how the candidates for fugitive emissions (in air terms) have been identified, except for benzene and acetone – other substances are not mentioned. Quantification or estimation has been based on mass balance calculations and measurements at risk points such as valves, seals, manways etc. AK does not know whether the absence of any other sources of fugitive emissions is because they have been ruled out or just not included for assessment. There were several ICs that related to fugitive emission sources not mentioned in the application: IC8 and losses of phenol at the off load point through the carbon bed filter; IC11 and measures to reduce emissions of chloromethane; IC16 & IC17 ambient monitoring of benzene and biphenyl at the fence line. The latter three items are in the "uncertain status" class as described in the opening of this CAR1 form. Submissions relating to all these ICs may inform future work required on fugitive emissions.

The permit conditions require the operator to use the most recent BAT techniques to prevent or reduce fugitive emissions. This aspect of environmental compliance hasn't been looked at in detail for some time, so referring to the latest EPR Sector Guidance Notes, NRW recommend that discussions are held with the operator around these points concerned with fugitive emission management:

- Run through the current substance inventory (incl. waste, raw materials, products and any substances held and used on site)
- Look at activities that involve these substances
- Assess, based on type of substance, phase, physio – chemical properties and activities involving the substance, where losses may occur
- Use recognised methods to quantify or estimate emissions and rank their significance in terms of volume and / or environmental harm
- Apply, where relevant, based on above, typical BAT techniques, such as:
    - Choice of valve and packing type at design or replacement stage
    - Minimise flange connections and use appropriate gasket material
    - Conservation vents, pressure or vacuum valves to minimise breathing losses, floating roof tanks
    - Vapour return for tanker loading and off-loading and filling tanks from the bottom
    - Canned, magnetic or double mechanical seal pumps
    - Low solar absorbent paint
    - Prevention of process fluids entering cooling water systems
    - Bunds with no pipe runs through them, sealed and with a collection sump
    - Leak detection devices
    - Moving to above ground tanks and pipework
    - Regular surveillance of integrity of underground pipes, channels and sumps
    - Packing dusty materials should be done indoors with conveyors and dryers exhausted to bag filters

In terms of the fugitive emissions assessment for 2014 & 2015, figures from monitoring and points monitored are given for benzene and are stated as all below 10ppm. HSE document EH40/2005, give a long term work place exposure as 1ppm and the UK ambient air quality standard is 1.54ppb. Future regulatory

work should look at three aspects of fugitive emissions:

- Screening all relevant substances
- Estimating / quantifying (e.g. using emission factors) and ranking their significance
- Benchmarking the releases in terms of losses against BAT

The 2014 & 2015 submissions list monitored results across a variety of points – all results under 10ppm, most under 5ppm. NRW accepts the submissions and will discuss future work with the operator.

Annual EMS targets and progress

NRW received a submission for 2014 and 2015. Some highlights were:

- Zero hazardous waste to landfill
- Contaminated land investigations
- Reduced energy used per tonne of product (2015)
- CO2 carbon / water exchange trial ongoing
- Bio-treatment plant reducing phenol to effluent

NRW accepts these responses, but suggests the operator keep a rolling programme of items and their status: complete, rescheduled / delayed or cancelled. The operator should also explain how they use their EMS to select areas to assess for improvement and at what frequencies an aspect is revisited: one off, every 5 years for example, or annually – these should be linked to the sites significant environmental aspects.

Annual performance parameters for 2015

The annual air emissions (form A2) show measurements significantly below the annual limits.

The waste returns are on form R1 and shows a slight increase on last year, but takes into account 800kg of spoil from construction activities, although the overall trend suggested by the waste per unit output metric is increasing – general resource efficiency and waste minimisation and adoption of the waste hierarchy is an area of work to be revisited in the near future. At that time previous waste and water audits will be taken into account.

Water use appears to be lower than the previous 5 years, although there isn't a water use (m3) per unit product figure to gauge actual overall efficiency. The production output may be lower.

The environmental performance indicators on form P1 seem stable; of course boiler 16 is in permanent auxiliary mode at the moment.

On Energy 1 form, the energy seems to be increasing – I suspect this figure and indeed the other metrics, are influenced somewhat by the individual campaigns running across the product range throughout the production year.

Potential Permit Variation

A number of items may need to be reassessed and the many individual variation documents consolidated into one. This may be dependent on the IED permit review timetable and the urgency of the individual item. Some things that should be looked at are:

- General BAT assessment of activities (IED review)
- Clarification of emission points (is TH3 benzene (A30) taken into account in the mass limit?)
- Measurement basis and limits at certain emission points (joint flow at W1 and W2 etc.)
- Discharge either side of low water and segregation of surface water
- Outputs of ICs and unclear ICs to be built into a reviewed permit
- NOx ELVs and boiler 16 operating basis
- The OPRA profile has been reviewed following advice from NRW and a new profile was submitted in Feb 2016 – overall the score of 455 didn't change, but importantly document references were put into the Operator Performance tab and an increase in Location tab score, although remaining in Band D, has moved up from 13 points to 15 points – only two points below Band E.

The NOx issue will need to be looked at urgently – see Action 2 above.

TH3 Commissioning Update

V006 permit variation amended permit condition 1.6.1 and associated Table S1.6.1 and required a TH3 commissioning plan. NRW received the commissioning plan dated Oct 2014. A fugitive emissions monitoring programme for TH3 was supplied in May 2015. NRW raised a couple of questions around the fugitive emissions monitoring and this two way correspondence took place between 28th May 2015 and 17th August 2015. A TH3 update was supplied on 4th August 2015. These records form part of the NRW compliance files

and permit operating techniques.

Action 4 Eastman19th July 2016: *Eastman to provide the latest update on TH3 and expected production start and operation mode in terms of TH3 operating in place of or in addition to TH2.* ***Due: 31st Aug 2016***

Recent Notifications

On 19th Jan 2016 AK sent ST an email seeking to clarify what events required to be formally notified to NRW in accordance with permit conditions 5.1.1 and 5.1.2, using the form (parts A and B) in Schedule 1 of the permit. This was a result of several notifications from Eastman and conversations about other events – see list below.

Basically this guidance covered potential scenarios where the operator should notify the regulator using Part A and a follow up into root cause and measures taken in Part B as soon as practicable. The main point being that a new regulation has introduced an implied condition into all permits, requiring additional things to be notified on top of the section in the permit covering notifications, i.e. all permit breaches. Another crucial point is that notifications cover notifying when there is the chance of significant potential pollution and that notifications may not all lead to permit non compliances. When considering potential pollution, the regulator does not simply disregard the incident if protection measures such as bunds and sumps or deluge systems operated accordingly – the root cause could have been inadequate maintenance, leading to a pipe leak – this is why all events like this should be notified. In the end the operator may not be scored a non compliance based on pollution, but on management or maintenance or not at all.

One of the notifications received recently concerns a leak of glacial acetic acid on 11th Jan 2016 – this is covered under a separate COMAH investigation.

A second event occurred over sometime Monday 14th Sep 2015 to Tues 15th Sep 2015. A combination of the site needing to release the surface water system contents to allow maintenance work on the surface water pits, heavy rainfall prior and the need to discharge from the cooling water system, led to sporadic release of surface water direct into the south lagoon and then discharged during the cease discharge period – see permit condition 2.2.2.4 and associated Table 2.2.5, where the site is restricted to no discharge from W1, 2 hrs either side of low tide, for dilution and dispersion reasons. A similar event occurred on 28th Nov 2015 for approximately 95 minutes. Sample evidence for the Sept discharge indicated that no permit ELVs were breached.

Recommendation 1 Eastman 19th July 2016: *A more formalised agreement needs to be discussed with the operator, better defining under what circumstances NRW would permit discharges during the cease discharge period to ensure site safety (not production per se) is maintained. This should cover recording and forecasting weather events that may affect discharges of site SW, recording volume and times and effluent quality of discharges. To be put on regulatory agenda.*

No non compliances will be raised for these events and this decision is influenced by the fact that there was no impact to the estuary; but future events will be assessed under the output of Recommendation 1 above.

On the 4th January 2016 a Schedule 1 notice Part A was submitted concerning a Dequest 2010 catch vent and the loss of <10kg of HCl / acetic acid vapour over a period of 2 minutes. Part B was submitted on 21st Jan 2016 and contained a detailed explanation. A bursting disc ruptured as a result of measures carried out to control an out of specification reaction. Two complaints were received from the local housing estate. Other response measures (process control and deluge abatement) were operated effectively to minimise effects. The plant was off line for 4 days while investigations took place. **A suspended CCS3 minor non compliance will be allocated based on the necessity to modify the control system to prevent this happening again and that there was an off-site impact, albeit minimal. The score will be levied or removed after further discussions around the root cause.**

Suspended Minor non compliance CCS3.

Recommendation 2 Eastman 19th July 2016: *This to be discussed at the next (non OMA) regulatory visit.*

On 23rd Feb 2016 a bellows failed on the Dequest 2010 process. The site notified in accordance with the permit requirements, but there was no environmental release form this event. The bellows unit concerned was within the operational age / number of cycles and installed and maintained in accordance with the manufacturers instructions. The unit was sent back to the manufacturer as it is on a 3 year site based maintenance intervention, the last inspection being 2015, so the reasons for premature failure need to be discussed with the manufacturer.

Recommendation 3 Eastman 19th July 2016: *This to be discussed at the next (non OMA) regulatory visit.*

The last notification covered in this assessment form is for another discharge during cease discharge period on 26th Jan 2016. 1500m3 of SW / effluent were discharged throughout the 4 hour cease discharge period. Heavy rainfall and an electrical failure on a pump led to a build-up of water / effluent needing to be discharged. This was mainly surface water, although surface water contains legacy contaminants. Using one of the holding lagoons was prevented due to the alignment of the factors mentioned (heavy rainfall, tide and pump failure) and so a discharge had to be made. See recommendation 1 above. It will be necessary to look at the sites worst case holding capacity and to explore potential improvements and / or seek to conduct more work on legacy contaminant concentrations and look to vary the permit on the basis of discharging segregated surface water, with or without a cease discharge period. This situation is foreseeable and therefore can either be prevented or additional proposals made and justified for varying the permit.

Non Compliance: *On that basis a minor non compliance of CCS3 will be applied for a breach of condition 2.2.2.4.*

Summary of Inspections

An initial handover inspection took place with Tony Leakey (NRW) on 11th May 2015. Several ongoing items were discussed and a site tour followed. Some of the items discussed were around changes to the Dequest 2010 operation; CaCl2 ISO tanker transfer connection; potential variation around this change; detection of leaks and process control around this change. pH changes would be noticed, advised the operator, in the event of a catastrophic failure of D2010 containment from the HEDP ISO tanker, the CaCl2 transfer system and reactor vessel D2047, as D2010 has a pH of 1; additionally COD levels would not be breached. This change was agreed on the basis that it was a temporary series of batches to meet a short term order.

Following the 11th May 2015 site meeting, NN (Eastman) sent an update, which included the latest position on the temporary D2010 process alteration and leak prevention measures.

- see email attached

Action 5 Eastman 19th July 2016: *Eastman to provide an up to date situation report on whether the changes agreed on a temporary basis in Oct 2014 are in fact still extant.* ***Due: 31st Aug 2016*** → see CAR Jan 2017

A second site visit took place on the 4th August 2015. Where an overview of the ETP and an update on the NOx issues were discussed. An inspection took place of the TH3 plant. These items are covered better in separate headings earlier on in the assessment form. On the 6th August 2015 AK sent an email to NN covering the points discussed on the 4th and a response concerning boiler 16 and TH3 was received from the operator on 17th Aug 2015.

A third visit purely to look at the ETP configuration took place on the 19th August 2015. This served to equip AK with a better understanding of the setup, with a view to understanding monitoring data and in relation to ICs concerned with effluent treatment.

An investigation inspection took place for the glacial acetic acid leak of 11th Jan 2016, on 4th Feb 2016. This is covered under COMAH, therefore see separate COMAH investigation report.

On the 1st April 2016 AK visited the site with ST to scope out the forthcoming OMAs in terms of water and air emission points and sampling locations – this aided the planning and carrying out of the actual audit. The OMA for water was actually conducted on the 4th May 2016 and an email requesting further information was sent on the 5th May 2016. This is written up separately. The air side of the audit is scheduled for 15th Sep 2016.

END

[KA1]

Cyfoeth Naturiol Cymru Natural Resources Wales	EPR Compliance Assessment Report	Report ID: CAR_NRW0025275

This form will report compliance with your permit as determined by an NRW officer

Site	Newport Chemical Complex EPR/BR9715IB	Permit Ref	BR9715IB
Operator/Permit holder	Solutia UK Ltd	Date	19/07/2016

Section 3 – Enforcement Response

You must take immediate action to rectify any non-compliance and prevent repetition.
Non-compliance with your permit conditions constitutes an offence and can result in criminal prosecutions and/or suspension or revocation of a permit. Please read the detailed assessment in Section 2 and the steps you need to take in Section 4 below.

Other than the provision of advice and guidance, at present we do not intend to take further enforcement action in respect of the non-compliance identified above. This does not preclude us from taking enforcement action if further relevant information comes to light or advice isn't followed.

Section 4 – Action(s)

This section summarises the actions identified during the assessment along with the timescales for when they will need to be completed.

Criteria Ref.	CCS Category	Action required/advised	Due Date
See Section 1 above			

Section 5 – Compliance notes for the Operator

To ensure you correct actual or potential non-compliance we may

- Advise on corrective actions verbally or in writing
- Require you to take specific actions verbally or in writing
- Issue a notice
- Require you to review your procedures or management system
- Change some of the conditions of your permit
- Decide to undertake a full review of your permit

Any breach of a permit condition is an offence and we may take legal action against you

- We will normally provide advice and guidance to assist you to come back into compliance either after an offence is committed or where we consider that an offence is likely to be committed. This is without prejudice to any other enforcement response that we consider may be required.
- Enforcement action can include the issue of a formal caution, prosecution, the service of a notice and/or suspension or revocation of the permit.

See our Enforcement and Civil Sanctions guidance for further information

This report does not relieve the site operator of the responsibility to

- Ensure you comply with the conditions of the permit at all times and prevent pollution of the environment
- Ensure you comply with other legislative provisions which may apply

Non-compliance scores and categories

CCS category	Description	Score
C1	A non-compliance that could have a major environmental effect	60
C2	A non-compliance which could have a significant environmental effect	31
C3	A non-compliance which could have a minor environmental effect	4
C4	A non-compliance which has no potential environmental effect	0.1

Operational Risk Appraisal (Opra) - Compliance assessment findings may affect your Opra score and/or your charges. This score influences the resource we use to assess permit compliance.

Section 6 – General information

Data protection notice

The information on this form will be processed by the Natural Resources Wales (NRW) to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s). The NRW may also use and/or disclose it in connection with:

- Offering/providing you with its literature/services relating to environmental matters
- Consulting with the public, public bodies and other organisations (eg. Health and Safety Executive, local authorities) on environmental issues
- Carrying out statistical analysis, research and development on environmental issues
- Providing public register information to enquirers
- Investigating possible breaches of environmental law
- Assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Regulations request

The NRW may pass it on to its agents/representatives to do these things on its behalf. You should ensure that any persons named on this form are informed of the contents of this data protection notice.

Disclosure of information

The NRW will provide a copy of this report to the public register(s). However, if you consider that any information contained in this reports should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within twenty working days of receipt of this form indicating which information it concerns and why it should not be released, giving your reasons in full.

Customer charter

What can I do if I disagree with this compliance assessment report?

If you are unable to resolve the issue with your site officer, you should firstly discuss the matter with officer's line managers using the informal appeals procedure. If you wish to raise your dispute further through our official Complaints and Commendations procedure, phone our general enquiry number 0300 065 3000 (Mon to Fri 08.00 – 18.00) and ask for the Customer Contact team or send an email to enquiries@naturalresourceswales.gov.uk. If you are still dissatisfied you can make a complaint to the Public Services Ombudsman for Wales. For advice on how to complain to the Ombudsman phone their helpline on 0845 607 0987.

Welsh Language
If you would like this form in Welsh please contact your Regulatory Officer.