Cyfoeth Naturiol Cymru / Natural Resources Wales	**EPR Compliance Assessment Report**	Report ID: 6092

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

Site	**Valero Refinery Pembrokeshire**			Permit Ref	QP3033LW (as amended)		
Operator/ Permit holder	Valero Energy Limited						
Date	1 February 2016			Time in	09.30	Out	16.30
What parts of the permit were assessed	See below						
Assessment	EPR - inspection	EPR Activity:	Installation X	Waste Op		Water Discharge	
Recipient's name/position	Neil White, Environmental Engineering Manager, Valero Energy Limited						
Officers names	DMP Broom			Date issued	16/2/16		

Section 1 - Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations. A detailed explanation and any action you may need to take are given in the "Detailed Assessment of Compliance" (section 3). 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				Condition(s) breached
a) Permitted activities	**1**. Specified by permit	A		
b) Infrastructure	**1.** Engineering for prevention & control of pollution	N		
	2. Closure & decommissioning	N		
	3. Site drainage engineering (clean & foul)	N		
	4. Containment of stored materials	N		
	5. Plant and equipment	A		
c) General management	**1**. Staff competency/ training	N		
	2. Management system & operating procedures	A		
	3. Materials acceptance	N		
	4. Storage handling, labelling, segregation	N		
d) Incident management	**1**. Site security	N		
	2. Accident, emergency & incident planning	A		
e) Emissions	**1.** Air	A		
	2. Land & Groundwater	N		
	3. Surface water	N		
	4. Sewer	N		
	5. Waste	N		
f) Amenity	**1**. Odour	N		
	2. Noise	A		
	3. Dust/fibres/particulates	A		
	4. Pests, birds & scavengers	N		
	5. Deposits on road	N		
g) Monitoring and records, maintenance and reporting	**1**. Monitoring of emissions & environment	A		
	2. Records of activity, site diary, journal & events	A		
	3. Maintenance records	N		
	4. Reporting & notification	A		
h) Resource efficiency	**1**. Efficient use of raw materials	N		
	2. Energy	N		

KEY: **C1, C2, C3, C4** = CCS breach category **(* suspended scores are marked with an asterisk),**
A = Assessed or assessed in part (no evidence of non-compliance), **N** = Not assessed, **NA** = Not Applicable

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

If the Total No Breaches is greater than zero, then please see Section 3 for details of 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 (e.g. 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 suspended or consolidated scores.
- details of advice given
- any other areas of concern
- all actions requested
- any examples of good practice.
- a reference to photos taken

Site description

Valero produce a variety of petroleum products from crude oil. The products range from liquid gases such as propane and butane through gasolines to gas oils and kerosenes through to heavier products such as fuel oils. To produce these products they use a number of unit processes such as distillation, fractionation, isomerisation, cracking and alkylation to produce products that meet the required specification. The site also removes sulphur from the raw materials by conversion to hydrogen sulphide and its subsequent conversion to solid sulphur. The aqueous effluent processed within the refinery is treated with oil separation and biological treatment to reduce the impact of the refinery on the receiving Haven waterway. Some gases and oils are burnt on site to produce power to operate the refinery.

Purpose of visit/assessment

To review the various Bat conclusions for the refining sector.

Person(s) present (Office based)

VEL Neil White
Clare James
Tom Day (BAT)
Gary Neville (Projects)

NRW Mark Broom
Jeremy Walters

Each of the Bat Conclusions for the refining sector were reviewed in turn to see where Valero currently are and if they will be compliant by October 2018. The conclusions are presented in a table below showing the reference number, a summary of the conclusion, a resume of where VEL are, a comment or action if relevant, if they are compliant now and if they will be compliant by October 2018.

BATc reference	BATc summary	VEL position	Actions and /or Comment	Compliant	
				Now	October 2018
1	Formal EMS	One in place due for recertification during 2017	None	✓	✓
2	Energy efficiency and use	Preheat on crude in use, monitoring in place and Waste heat boilers on FCCU	CHP under consideration	✓	✓
3	Storage of solids	FCCU silos & powder tankers used, And bags stored in warehouse	None	✓	✓
4	Air Monitoring	Various monitoring methods used but two main ones do not meet the BATc SO_3 and Ds&Fs	Ds & Fs may be difficult to monitor	×	✓
5	Monitoring process parameters	Sulphur in RFG is monitored as well as the FCCU feeds	-	✓	✓
6	VOC monitoring	Optical, source and fence line monitoring all carried out Quantification correlation?	Consider correlating fence line and optical monitoring	?	✓
7	Reducing acid gases	Two SRU trains with plans in place for reducing releases at shutdowns and emergencies	-	✓	✓

8	SCR and denox	Not carried out at Pembroke	-	-	N/A
9	Recovery of SWS into ARU and SRU	Now all routed to ARU and SRU	Just completed	✓	✓
10	Water Monitoring	Various monitoring methods used but some do not meet the BATc	Review water methods & correlate to BATc	×	✓
11	Water and effluent segregation	Separate oily and surface water systems at Pembroke	-	✓	✓
12	Water treatment	Insoluble, soluble oil separated and biological treatment	-	✓	✓
13	Water BATEALS	Looks OK but Total nitrogen may be an issue	Total nitrogen a problem?	?	✓
14	Waste management plan	In place using the waste hierarchy	-	✓	✓
15	Sludges	Sludges pre-treated and reused if possible	-	✓	✓
16	Waste catalysts	Catalysts recovered and reused	-	✓	✓
17	Noise	NMP controls in place	-	✓	✓
18	VOC diffuse controls	Carried out at Pembroke	-	✓	✓
19	HF neutralisation before acid flare	Carried out at Pembroke	-		
20	HF alkylation	Neutralisation carried out at Pembroke using sodium not Potassium and precipitation off site	-	✓	✓
21	H_2SO_4 alkylation	Not carried out at Pembroke	-	-	N/A
22	Base oil production	Not carried out at Pembroke	-	-	N/A
23	Bitumen production	Not carried out at Pembroke	-	-	N/A
24	FCCU - NOx	Antimony used as a passivator but see BATc57	-	✓	✓
25	FCCU - dust	Cyclones used	-	✓	✓
26	FCCU - SO_2	Additives used but see BATc 58	-	✓	✓
27	FCCU - CO	Full burn used so no EAL	-	✓	✓
28	Reducing the formation of Ds&Fs in the reforming units	The issue of Ds&Fs is new for this site and some work is required	Looking at catalyst promoter	×	?
29	Coking plants	Not carried out at Pembroke	-	-	N/A
30	Green coke plant	Not carried out at Pembroke	-	-	N/A
31	Coke calciners - SO_2	Not carried out at Pembroke	-	-	N/A
32	Coke calciners - dust	Not carried out at Pembroke	-	-	N/A
33	Desalting water issues	Two stage desalting carried out with water recycling	-	✓	✓
34	Combustion plant - NOx	LNB installed on the steam plant but not everywhere, generally gases have replaced Liquid fuels – NOx bubble to be used – BATc 57	See BATc 57	-	-
35	Combustion plant - dust	Generally gases have replaced Liquid fuels with fuel atomisation when liquids burnt	annex V ELVs to be used	✓	✓
36	Combustion plant – SO_2	RFG treated to remove acid gases, generally gases have replaced Liquid fuels – SO_2 bubble to be used – BATc 58	See BATc 58	-	-
37	Combustion plant – CO	CO monitoring shows no problems	-	✓	✓

38	Etherification	Not carried out at Pembroke	-	-	N/A
39	Etherification	Not carried out at Pembroke	-	-	N/A
40	Isomerisation process	Optimise catalyst or find non-chlorinated catalytic system	Optimise catalyst used	✓	✓
41	Natural gas refinery –SO_2	Not carried out at Pembroke	-	-	N/A
42	Natural gas refinery – NOx	Not carried out at Pembroke	-	-	N/A
43	Natural gas refinery – Hg	Not carried out at Pembroke	-	-	N/A
44	Distillation process - water	Surface condensers used	-	✓	✓
45	Distillation process - SW	Sour water routed to SWS	-	✓	✓
46	Distillation process – off gas	Off gases routed to ARUs - Refinery configuration makes this impracticable for the VDU overheads stream	-	✓	✓
47	Product treatment - off gases	VDU overheads routed to a combustion unit for destruction	-	✓	✓
48	Product treatment - Caustic	Cascading caustic used for treating products which reduces releases to WWTP and elsewhere	-	✓	✓
49	Storage – VOC releases	High efficiency seals and fixed roof tanks used across the refinery	-	✓	✓
50	Storage Tank cleaning	Closed loop and sludge removal are used across the tank estate at the refinery	-	✓	✓
51	Storage Tank floors	Maintenance program in place and the tanks are bunded and in some cases with impervious floors	CDOIF risk assessment also being used	✓	✓
52	VOC recovery from loading/unloading	Internal movements	-	-	N/A
		Road tankers > 5K m^3/year	-	✓	✓
		Ship loading > 1M m^3/year/berth 3 berths at the refinery meet this threshold	Options being assessed	×	✓
53	Visbreaker effluent	Treated in WWTP	-	✓	✓
54	Waste gas treatment	The indicative BATs & BATEAPL met – SOx bubble to be used – BATc 58	-	?	✓
55	Flares – use for safety reasons	Flares used for safety reasons and non- routine operation conditions	-	✓	✓
56	Flares – design & operation	Flare design and operation meet the indicative BAT	-	✓	✓
57	NOx bubble	Based on including the combustion plant and the FCCU (with Sb additives), the BAT bubble not currently in place but will be met by 2018	Need to 'model' the NOx bubble for the refinery		✓
58	SO_2 bubble	Based on including the combustion plant, SRU (BATAEPL) and the FCCU, the BAT bubble not currently in place but will be met by 2018	Need to 'model' the SO_2 bubble for the refinery		✓

Continued overleaf

For the two bubble conclusions the component BATEALs flow rates will need to be combined to produce a BAT Bubble ELV and then the actual performances of the component plants will then need to be used together with the flow rates to calculate the performance concentrations and the BAT bubble limits compared to show compliance.

For example for NOx

Plant	Fuel	BATEAL (mg/m^3 mm)	Flow rate m^3/month	'ELV' (mg/m^3 mm)	Actual performance(mg/m^3 mm)	Performance (mg/m^3 mm)
LCP1	RFG	150 (ELV1)	F1	ELV1 * F1	P1	P1 * F1
LCP2	RFG/RFO	150 - 300 (ELV2) #	F2	ELV2 * F2	P2	P2 * F2
LCP3	RFG/VDU	150 (ELV3)	F3	ELV3 * F3	P3	P3 * F3
FCCU	-	700 (ELV4)	F4	ELV4 * F4	P4	P4 * F4
BAT Bubble	-	-	-	∑ ELVn*Fn/∑ Fn	-	∑ Pn*Fn/∑ Fn

Multifuelled ELV calculated using Article 40(2) of IED

Compliance for the BAT bubble for NOx (BATc 57) is therefore ∑ Pn*Fn/∑ Fn and compared to the BAT bubble ELV of ∑ELVn*Fn/∑ Fn. However the various P1, P2 and P3 will also need to be compared to and reported against the Annex V ELVs as well (300; 300 – 450#; 300).

For example for SO_2

Plant	Fuel	BATEAL (mg/m^3 mm)	Flow rate m^3/month	BAT 'ELV' (mg/m^3 mm)	Actual performance(mg/m^3 mm)	Performance (mg/m^3 mm)
LCP1	RFG	35 (ELV1)	F1	ELV1 * F1	P1	P1 * F1
LCP2	RFG/RFO	35 -600 (ELV2)#	F2	ELV2 * F2	P2	P2 * F2
LCP3	RFG/VDU	35 -600 (ELV3)#	F3	ELV3 * F3	P3	P3 * F3
FCCU	-	800 (ELV4)	F4	ELV4 * F4	P4	P4 * F4
SRU	-	98.5%	F5	[SRU in]* (SRU flow in)* 1.5/100	P5	P5 * F5
Bubble	-	-	-	∑ ELVn*Fn+SRU above/∑ Fn	-	∑ Pn*Fn/∑ Fn

Multifuelled ELV calculated using Article 40(2) of IED

Where the inlet and outlet sulphur balance is continuously monitored, the 98.5% compliance is therefore {100-(P5*F5/ [SRU in]* (SRU flow in)}*100) and compliance for the BAT bubble for SO_2 (BATc 58) is therefore –

(∑ Pn*Fn + [SRU in]*(SRU flow in)*(100-98.5)/100)/∑ Fn)

Where [SRU in] is the sulphur dioxide equivalent of the sulphur loading into the [SRU H_2S in]*64/34. However the various P1, P2 and P3 will also need to be compared to and reported against the Annex V ELVs as well (35; 35 – 1000#; 1000).

Currently NRW sees these two bubble limits as dynamic or flexing and responding to the different operating conditions within the normal refinery operational envelope.

Continued overleaf

Regarding BAT 10 and 13 the table overleaf shows the interactions between the current permitted levels and the BATc conclusions for water monitoring (BATc10) and the BATEALs for water (BATc 13).

Current EPR permit					BATc requirements			
Parameter	Limit	Reference period	Monitoring frequency	Method	BATEAL	Averaging period	Method	Monitoring frequency
Flow	25000 m^3/day	Weekly average of daily flow	Daily	-	-	-	-	-
Temperature	35 °C	Daily average	Continuous	-	-	-	-	-
pH	9 Max	24 hour proportional sample	Daily	300	-	-	-	-
	6 Min				-	-	-	-
Oil	17 mg/l			315	0.1 – 2.5 mg/l	Annual	EN 9377-2	Daily
Ammoniacal Nitrogen	20 mg/l			335	-	-	-	-
Total nitrogen expressed as N	-			-	1 – 25 mg/l	Annual	-	Daily
COD	270 mg/l			316	30 – 125 mg/l	Annual	-	Daily
Phenols	3 mg/l			395	-	-	-	-
Phenol index	-		-	-	None	-	EN 14402	Monthly
Suspended solids	85 mg/l		Weekly average of daily samples	312	5 – 25 mg/l	Annual	-	Daily
Sulphides	1 mg/l			343	-	-	-	-
Fluoride	7 mg/l			320	-	-	-	-
Cyanide	0.25 mg/l			309	-	-	-	-
Iron	4 mg/l	7 day composite sample	Quarterly	-	-	-	-	-
Copper	80 µg/l			-	-	-	-	-
Zinc	560 µg/l			-	-	-	-	-
Nickel	85 µg/l			-	5 – 100 µg/l	Annual	-	Quarterly
Arsenic	No limit			-	-	-	-	-
Chromium	No limit			-	-	-	-	-
Lead	No limit			-	5 – 30 µg/l	Annual	-	Quarterly
Total Mercury	No limit			-	0.1 – 1 µg/l	Annual	-	Quarterly
Total Cadmium	No limit			-	2 – 8 µg/l	Annual	-	Quarterly
Vanadium	-	-	-	-	-	-	-	Quarterly
Benzene toluene, ethyl benzene xylene (BTEX)	-	-	-	-	Benzene 1 - 50 µg/l	Annual	-	Monthly
					TEX no BATAEL	-	-	Monthly

Projects – VRU and power generation

Valero are looking at two main options for vapour 'recovery' – a true vapour recovery where the vapours are condensed or absorbed into a liquid stream and destruction. Their problems are compounded by the fact that there are three berths that need this capability, berths 2, 7 and 8. The latter two berths are quite remote and getting material back (recovery) or gas there for destruction. Valero have looked at using a modified gas engine to generate electricity but they could not find much information on this technology for refineries.

The power generation project is in its infancy – it is rated at around 40MwW but it was not clear if this was input or output. If it is 40MWthermal input then no Infrastructure application would be needed to the Planning Inspectorate but if the 40MW is electrical output then almost certainly a National Infrastructure Project (NISP) project because the thermal input is more than 50MW and electrical power is being generated so an NISP application would be needed.

Conclusions

Based on the information discussed, investing in and installing VOC recovery for ship loading/unloading, Valero should be compliant with all the refinery BAT conclusions by the 2018 deadline. The bubble limits (BATc 57 and 58) may be a challenge to operate and regulate against until experience has been obtained but the current site Sulphur dioxide bubble limit provides an example of how a refinery bubble limit can work. It is not clear how the water framework directive (WFD) could affect the limits on the water effluent releases. The VRU and power generation projects are at early stages of being scoped and if it is likely that an NISP application would be needed the relevant project timescales could be affected.

[END OF SECTION 2]

Cyfoeth Naturiol Cymru Natural Resources Wales	**EPR Compliance Assessment Report**	Report ID**:** 6092

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

Site	**Valero Refinery Pembrokeshire**	Permit	QP3033LW (as amended)
Operator/ Permit	Valero Energy Limited	Date	16/2/16

Section 3- Enforcement Response **Only one of the boxes below should be ticked**

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.	n/a
In respect of the above non-compliance you have been issued with a warning. At present we do not intend to take further enforcement action. This does not preclude us from taking additional enforcement action if further relevant information comes to light or offences continue.	n/a
We will now consider what enforcement action is appropriate and notify you, referencing this form.	n/a

Section 4- Action(s)

Where a non - compliance has been detected and an enforcement response has been selected above, this section summarises the steps you need to take to return to compliance and also provides timescales for this to be done.

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 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 which 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 Natural Resources Wales (NRW) to fulfill its regulatory and monitoring functions and to maintain the relevant public register(s). 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 (e.g. 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 and taking any resulting action
- preventing breaches of environmental law
- assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Information Regulations request.

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

NRW will provide a copy of this report to the public register(s). However, if you consider that any information contained in this report 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 the officer's line managers. 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) 601 0987.