# Compliance Assessment Report

**Report ID:**
**CAR_NRW0032259**

| This form will report compliance with your permit as determined by an NRW officer | | | | | |
|---|---|---|---|---|---|
| Site | Margam Gases | Permit Ref | BV9713IU | | |
| Operator/Permit holder | BOC Limited | | | | |
| Regime | Installations | | | | |
| Date of assessment | 28/09/2017 | Time in | 10:00 | Out | 14:00 |
| Assessment type | Audit | | | | |
| Parts of the permit assessed | Primary and secondary containment - Permit condition 3.3.2 | | | | |
| Lead officer's name | Jenkins, Nicholas | | | | |
| Accompanied by | | | | | |
| Recipient's name/position | Robert Warren/ SHEQ Manager | Date issued | 09/11/2017 | | |

## Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations or the licence under the Water Resources Act 1991 as amended by the Water Act 2003. 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** |
|---|---|---|
| B4 - Infrastructure - Containment of stored materials | A | |

**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

Attendees

Robert Warren - SHEQ Manager, BOC Ltd

Richard Francis - Mechanical Maintenance Foreman BOC Gases (only present during the discussion around bunding and tank specification), BOC Ltd

Nick Jenkins - Pollution Prevention Control Officer, Natural Resources Wales

Agenda

1. Maintenance of Critical Environmental Kit - Primary and Secondary Containment
2. Groundwater & Soil Sampling
3. Recommendations/Actions for recent internal and external audits
4. AOB

1. Maintenance of Critical Environmental Kit - Primary and Secondary Containment

**Background** - Natural Resources Wales adopts a sector approach to regulation whereby Schedule 1 operations as defined by the Environmental Permitting (England and Wales) Regulations are divided into relevant areas that best represent the activities. BOC Limited (BOC) produces hydrogen by steam reformation of natural gas which means that it sits in the chemicals sector and because of this the operator must have consideration of this sector in how it provides evidence of compliance with its environmental permit. NRW must also ensure that the objectives driven by the appropriate sector group are cascaded to the operator and are audited.

One of the principal objective for the chemical sector for 2017/18 is to audit the maintenance of critical environmental kit i.e. sewers, bunds, abatement, alarms, tanks, pumps etc. This audit will focus on primary and secondary containment and will be assessed against relevant guidance. For this assessment, the following guidance/good practice notes will be used: how to comply with your environmental permit; CIRIA C736 (containment of polluting substances) and HSE guidance on tank storage.

**How to comply with your environmental permit** (version 8) describes the standards and measures the operator must use to control the most common risks of pollution from onsite activities and how to comply with the conditions of the permit. The permit condition to which we will assess is 3.2.3 which states that:

All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container. This condition includes your measures to prevent any leaks or accidental releases from tanks, sumps, bunds and containers. All above-ground tanks containing liquids whose spillage could be harmful to the environment **must** be bunded.

The guidance notes states that bunds must be:

- impermeable and resistant to the stored materials
- have no outlet (no drains or taps) and drain to a blind collection point
- have pipework routed within bunded areas with no penetration of contained surfaces
- be designed to catch leaks from tanks or fittings
- have a capacity greater than 110 percent of the largest tank or 25 percent of the total tankage, whichever is the larger. When you calculate this do not use the design capacity of the tank or tanks, instead use the maximum physical capacity of the tanks or tanks - assuming it is/they are over-filled to the point of spillage.
- be looked at regularly and any contents removed after checking for contamination
- be fitted with a high-level probe and an alarm, where not frequently inspected
- have tanker connection points within the bund where possible (otherwise adequate containment should be provided at the connection point)
- be regularly inspected for their condition (normally visual, but extending to hydraulic testing where structural integrity is in doubt).
- Make sure all above-ground tanks containing liquids whose spillage could be harmful to the environment are bunded.

**CIRIA 736** has been developed to assist owners and operators of industrial and commercial facilities storing substances that may be hazardous to the environment. It is applicable to the containment of a wide range of substances and to all sizes of sites from small commercial premises with a single storage tank, through to large chemical or petrochemical sites. The guidance is provided for the design, and construction of new secondary containment systems and the inspection, maintenance, repair, extension and upgrading of existing installations.

CIRIA guidance outlines a 3-tier risk assessment methodology which considers the associated risks from the pollution hierarchy of source receptor pathway and suggests a suitable containment system to minimise the pollution risk. The same risk methodology will be applied to each substance under investigation at the Sensient installation.

It also states that:

Any gaps between the recommendations presented here [in the guidance] (or other specific codes etc agreed between regulators and industry) and the situation at a specific site should be dealt with in a manner that satisfies the relevant legal requirements (including risk and cost-benefit factors in deciding whether to upgrade). It is recognised in the guidance that the costs of upgrading existing facilities might outweigh the environmental benefit, and therefore not be viable, or that other equally effective risk reduction measures to those suggested in the guidance may be implemented.

There is a limited amount of information within this guidance note regarding the use of thermoplastic tanks at industrial installations.
**The Health and Safety Executive** has published guidance on the storage of substances which may be hazardous to health. Many of the publications have been produced following the Buncefield disaster 2005 and relate to above ground tanks. These include Guidance note PM75 -Glass reinforced plastic vessels and tanks; HSG176 - Storage of flammable liquids in tanks and HSG235 – Bulk storage of acids; **PM86 - Thermoplastic tank integrity management**. HSE guidance note PM86 identifies the misconception that these types of tanks cannot be 'fitted and forgotten' as they are frequently portrayed as having good chemical resistance with no need for maintenance or examination up to their design life. This is **not** the case and as the owner of the tank there are suitable measures to make sure that these tanks are correctly specified, examined and maintained throughout their life. Clause 46 of the guidance states that:

- Routine (eg daily, weekly, monthly) visual external checks of thermoplastic tanks and their secondary containment area represent good practice. Check records should be kept at least on a monthly basis. Such checks may be carried out by operating staff trained to identify early indicators of integrity problems. Routine checks enable prompt corrective action to be taken in the event that a weep or leak is identified.

A suitable checklist is provided in clauses 53 and 54 for both external and internal inspection.

HSE states that the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law.

The installation sits upon the south wales middle coal measures bedrock aquifer which is designated as a minor groundwater vulnerability zone. Any point source effluent discharges from the operations are directed to the onsite effluent tanks which in turn are pumped into the Dwr Cymru Welsh Water network before being discharged into Swansea Bay via Afan Sewage Treatment Works. Within Swansea bay are several designated sites including: Special Sites of Scientific Interest; a Special Area of Conservation; two designated bathing waters and four Water Framework Directive coastal and transitional waterbodies.

**Primary and secondary containment of inventory substances** - In its application for its environmental permit BOC specified a small section within its site boundary as the permitted area. This section is approximately 15% of the total site area and contains only a small proportion of BOC activities at Margam. Considering this, the polluting substances as outlined in its permit application are not only limited in numbers but also in volume. BOC identified the following substances which are stored in the boiler water treatment enclosure:

- Hydrochloric acid
- Sodium Hydroxide
- Boiler water treatment chemicals

During the determination of the permit, we considered that there was a lack of information submitted by BOC to control these polluting substances and placed two improvement conditions to have greater confidence that this was addressed. Improvement Condition 1 (IC1) requested a maintenance, inspection and integrity testing programme of impervious surfaces and containment kerbs to be submitted. IC2 required BOC to demonstrate that all bund constructions for the storage of acids were compliant with relevant guidance. Both the ICs were to be submitted 01/11/07.
An improvement programme was also received 01/11/07 Ref WE31/10/07 and in this document BOC provided an indication of the substances stored and the associated primary and secondary containment. It also considered the sub surface effluent pit which contains the boiler water treatment waste which is located within the permitted boundary. In addition, the report highlighted other substances stored on site but BOC clarified in this audit, that these are not within the permitted boundary i.e. fuel oil; emergency generators; vehicle fuelling point; cooling towers and fire pump house.
We acknowledged receipt of the programme which satisfied the requirements of the ICs but also acknowledged there was a lack of information regarding the specifics of the tanks, bunding, sealant etc which was a requirement of the IC.

The polluting substance will be discussed below:

Hydrochloric acid - MHCL100 25-30% and Sodium Hydroxide - MCSS550 5-50% (11-106$^{o}$TW)

BOC currently store a nominal 1500 litres of Hydrochloric acid (HCl) and 1500 litres of Sodium Hydroxide (NaOH) which are used for the regeneration of its demineralisation plant resin beds. The substances are stored in identical 6mm thickness, black polypropylene, twin skinned tank designed to code BS EN 12573:2000. These were supplied by Flocktons 15/08/14 and were hydrostatically tested 08/08/14. Flocktons specified that the tanks are 'designed to a lifespan of 20 years' and 'as they are absent of any moving parts, no regular maintenance schedule is required'. The volumes within the tanks are monitored remotely at the onsite control room using Wonderware to allow reordering.

Both tanks are within the boiler water treatment enclosure and are therefore not subject to extremes of atmospheric conditions. BOC advised that the tanks are inspected daily and six weekly under the Planned Workplace Inspection (PWI) as employees are encouraged to get out on site and look at their operation. Limited records were provided to substantiate this although the overarching Linde document '**PLM-13-06-RUK** - **GRP and Thermoplastic Storage Tank - Inspection Requirements**' outlines that the tanks **must** be subject to the following inspections:

• Initial inspection: at completion of installation – Undertaken using checklist PLA-1 which is a very detailed inspection report but no completed reports were shown. BOC informed that a third party contractor R&AK will conduct retrospective examinations. Once completed these will be reviewed and signed off by BOCs technical authority for GRP/thermoplastic tanks and the completed reports sent to NRW.

• Routine inspections (covered by LLF or PGI every 4/6 weeks) – Undertaken using the checklist specified in PLA-2, which were submitted to NRW. BOC did not provide a completed report for the relevant tanks but did provide a PWI checklist for the Howmar area. It is assumed that the tanks are checked under the heading 'check all vessels for condition and leaks' but no link to PLA-2 checklist.

• One-off inspection from commissioning
  • 12 months (Thermoplastic tanks) – Again a detailed checklist to inspect the tanks under PLA-3.

There is also the inclusion of bund inspection but no specific completed forms were provided.

• 24 months (GRP tanks)

• Periodic inspection: up to 72 months maximum interval - BOC provided evidence that the 72 month interval inspection is planned, as work orders for the T4 and T5 tanks (HCl and NaOH respectively) were presented.

BOC subsequently provided periodic inspection reports for the HCl, NaOH and Effluent tanks using forms PLA-4. The inspections were undertaken 26/10/17 by RAK Inspection Services Ltd (RAK). No concerns were identified for the HCl or the NaOH tanks but these were limited to an external, visual inspection.

PLM-13-06-RUK also suggests that either a competent BOC person or an approved third party should carry out the inspections. A competent BOC person must have:

1. understanding of storage tank construction and deterioration mechanisms and how to identify these;
2. ability to properly carry out the inspection and produce accurate inspection reports;
3. knowledge of the inspection chapter of the procedure

BOC advised that:

'With respect to in house competence it is assured through the BOC technical authorities programme, and Mike Phillips is the company technical authority for plastic and GRP tanks. The third-party inspection organisation that we employ, RAK are centrally approved through the BOC procurement system and are certified to BS EN ISO/IEC 17020:2004.'

**Bunding** - Figure 1 was presented by BOC following the audit and provides an overview of the boiler water treatment enclosure bund. Although no specification of the bund was provided, subjectively it appears to be constructed of a concrete floor and concrete lintels skimmed to form the approx. 6-inch perimeter bund. BOC advised that it is likely to have been constructed in 1998-1999. There are several other tanks stored within the enclosure including, but not limited to: treated water and raw water. These have been excluded from the calculations based on the permit condition i.e. all liquids, whose emissions to water or land **could cause pollution**.

We agree with this exclusion and we also agree that the bund is likely to be sufficiently sized to comply with the requirement within 'How to comply with your environmental permit'. However, BOC has incorrectly assumed that 25% of the total volume of hazardous liquid stored in the bund is sufficient to satisfy the guidelines. This is a consideration but an assessment of the largest tank is required. The guidelines states that the bund should be sized to 110% of the largest tank (2.42m3) or 25% of the total volume stored (1.6m3), whichever is the largest. Although unlikely to change significantly, the calculation of the bund volume must be made on the **absolute** and not the nominal capacity of the tanks.

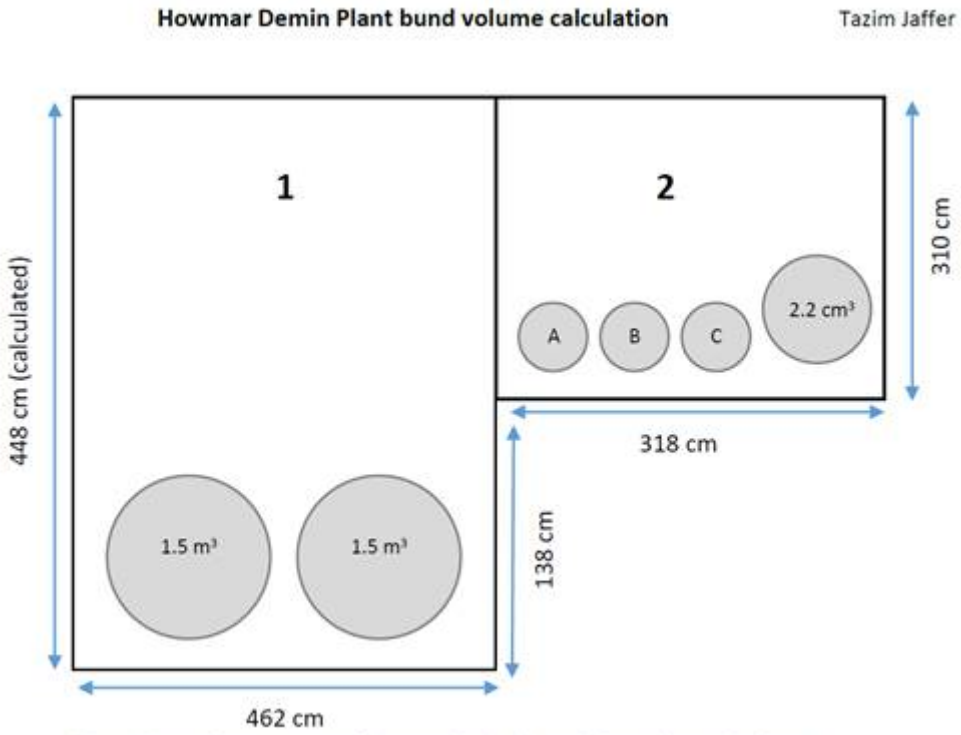

Figure 1 General arrangement of Howmar Demin Plant with hazardous tanks shown

We identified a section of the bund that had been damaged and had exposed the construction of the bund. It is unclear how this has been damaged and we were not aware that this had been identified to be repaired. There was also evidence of liquid within the bund but BOC informed us that this had emanated from a steam leak on the ion resin cylinders which had been raised in the PWI checklist for the Howmar plant undertaken 05/09/17. It is worth noting that any existing liquid within the bund will reduce the overall capacity. Clause 47 of HSE guidance PM86 states that:

- The secondary containment around the tanks should be inspected to make sure that it has not collected rainwater that would reduce the secondary containment capacity in the event of a spillage. The secondary containment should also be examined for any product leakage. Where it is not possible to visually inspect for liquid levels in the secondary containment, provision should be made for monitoring liquid levels, checked on at least a weekly basis.

We were not provided with any completed inspection forms of the bund at the demin plant.
It was also noted that:

- sections of pipework that ran on top of the bund which is not considered good practice;
- an oil spill kit was located outside of the enclosure. We didn't consider the contents as to whether the oil spill kit included appropriate chemical spill items.

Areas of concern include:

1. There appears to be no link between the PLA forms specified in PLM-13-06-RUK and the work undertaken in the PWI inspections.
2. There was deterioration of render along bund that hadn't been repaired (see photo 1 below)
3. There was a volume of leaked liquid stored within the bunded area
4. Pipework ran on the top of some sections of the bund

**Compliant – Yes but with recommendations to improve.**

Photo 1 – Deterioration of demin plant bund

Effluent tank (DT-001)

Boiler water blow-down and the demineralisation plant regeneration wastewaters are discharged to the installation's effluent tank (release point S1) from where the effluent is pumped to the BOC site drainage system which in turn discharges to municipal sewer under a Welsh Water Consent.

The effluent tank is located externally within the permitted area and was moved as a subsurface to an above ground tank. The tank is a $10m^3$ double skinned, polypropylene tank constructed to BS EN 12573 by Chem Resist Europe in February 2011. The second skin has a capacity of $1m^3$ thus in compliance with its permit condition 3.3.2 i.e. secondary containment. The tank sits upon a concrete plinth and treated effluent from the boiler house enclosure is pumped here before being pH treated, transferred once within limits to be diluted in BOCs successive catch pits.

There is no bunding around this tank and the plinth falls off to adjacent unmade ground which would create a pathway to allow any breach of effluent through the secondary skin to potentially flow. There are no surface water drains across the site. 'How to comply with your environmental permit' states that 'all above-ground tanks containing liquids whose spillage could be harmful to the environment must be bunded'.

As discussed above retrospective inspection was undertaken 26/10/17 by RAK. Two notifications were identified, one which is mandatory and the second is a recommendation:

- **Mandatory** - There was an accumulation of rainwater on the roof which is causing it to bulge inwards. As a result of this the roof nozzles were leaning inwards. RAK placed a completion date 26/01/18 - Following the completion of this action we would also recommend further inspection of the nozzles and roof to assess whether there has been any additional damage
- **Recommendation** - There are no holding down bolts installed to anchor the tank to the concrete plinth. Guidance note HSE PM75 states that tanks should be anchored and although RAK has not specified a completion date we would recommend that BOC address this issue as soon as practicable.

2. Groundwater & Soil Sampling

The Environmental Permitting Regulations require every Part A installation which involves the use, production or release of a relevant hazardous substance to undertake periodic soil and groundwater monitoring, where there is a possibility of soil and/or groundwater contamination, subject to a systematic assessment of risk. Usually, the Initial Site Condition Reports, will generate much of the information required to determine monitoring conditions.
The Industrial Emissions Directive (IED) introduces the requirements in relation to the protection of soil and groundwater from relevant hazardous substances (RHS). These requirements are triggered by:

- New permit applications:
- Permit variations at substantial change (operator led) where relevant, e.g. substantial changes which require the submission of a baseline report
- Permit review in the circumstances

The requirements include:

- a baseline report (Article 22 IED)
- upon definitive cessation, where significant pollution has been caused, to return the site to the initial state (Article 22 IED)
- periodic monitoring of soil and groundwater for relevant hazardous substances, having regard to the possibility for contamination (Article 14 and 16 IED)

- regular maintenance and surveillance of measures in place to prevent emissions. (Article 14 IED)
- all appropriate preventive measures taken against pollution (Article 11 IED) and to ensure protection of soil and groundwater (Article 14 IED)
- that no significant pollution is caused (Article 11 IED)

BOC have requested further information regarding the requirement of IED:

*(b)periodic monitoring of—*
*(i)groundwater must be carried out at least every 5 years, and*
*(ii)soil must be carried out at least every 10 years,*

*unless such monitoring is based on a systematic appraisal of the risks of contamination of groundwater and soil.*

The indicative timescales of 5 years for water and 10 years for soil suggest that this is not relating to catastrophic incidents that are easily detectable during the routine operations, but for more gradual releases that are not readily detected at the site surface or by site monitoring equipment (leak detection systems, alarms). This could include:

- leaks from below or partially below ground tanks, sumps, process pipework, drains etc
- leaks from the base of tanks which are sat directly on the ground,
- slow seepages through joints in concrete or other surfacing as a result of surface activities e.g. uncontained storage of materials or wastes, washing/ hosing down of materials on hard surfacing etc.

Where monitoring is required, the frequency of monitoring will be determined from a systematic appraisal of the risk of contamination occurring. The 5 yearly (groundwater) and 10 yearly (soil) monitoring is expected to apply to most low risk circumstances, but EPR does not preclude both longer and shorter monitoring frequencies. In most circumstances, it is not expected that a longer frequency than 5 years for groundwater and 10 years for soil will be determined.

Additional information will be supplied to BOC.

BOC have requested additional information and has submitted hydrological maps to assist in its verification of its sampling. This will be discussed with NRW's geoscience team and we will inform BOC of any findings.

3. Recommendations/Actions for recent internal and external audits

Section 4.3.1(b)(i) of the environmental permit requires that in the event of a breach of a permit condition the operator must notify NRW immediately and ensure that measures are taken to restore compliance.
BOC is subject to inspection by the HSE along with periodic internal audits inspections and it is the intention of this part of the audit to consider any breaches that may have been highlighted during these audits. Although there were legal compliance issues raised by the HSE these did not relate to the permitted area but all actions are in the process of being closed out of have been closed (6 actions and 3 currently outstanding).
The most recent internal audit was undertaken 10/02/17 but once again all issues were closed out.

4. AOB

No AOB raised.

[END]

| Cyfoeth Naturiol Cymru Natural Resources Wales | **EPR Compliance Assessment Report** | **Report ID: CAR_NRW0032259** |
|---|---|---|

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

| | | | |
|---|---|---|---|
| Site | Margam Gases | Permit Ref | BV9713IU |
| Operator/Permit holder | BOC Limited | Date | 28/09/2017 |

## 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.

## 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 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 fifteen 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.