

Compliance Assessment Report CAR_NRW0046560

Permit being assessed: BU2349IL.
For: Alyn Works, **held by:** Synthite Limited
At: Denbigh Road, Mold, Flintshire, CH7 1BT.

Type of assessment: Site Inspection,
Reason: Routine.
On: 13/02/2025 between 10:15 and 12:00.
Parts of permit assessed: See Below.

NRW Lead Officer: Philip Harper, accompanied by Kathryn Bradshaw.
Report sent to: Technical Manager, Technical Manager, on 04/04/2025.

1. Summary of our findings (full details in section 4)

Part of permitted activity assessed (compliance criteria)	Assessment result	Permit condition
IR3A(1) - Installations - Emissions and monitoring - Emissions to water	C3 Minor	3.1.1
IR4C - Installations - Information - Notification	C3 Minor	4.3.1
IR2C - Installations - Operations - Operating techniques	C3 Minor	2.3.1
IR1A - Installations - Management - General Management	C3 Minor	1.1.1
IR1A - Installations - Management - General Management	C2 Significant	1.1.1

Result types are explained in more detail in the 'Important Information' section below.

Total non-compliances recorded	Total non-compliance score
5	47

How we use the non-compliance score to calculate your annual fee is explained in the 'Important Information' section below.

2. What action is required?

Criteria	Action needed	Complete by
IR3A(1)	See actions in main text	31/05/2025

Criteria	Action needed	Complete by
IR4C	See actions in main text.	31/05/2025
IR2C	See actions in main text	30/06/2025
IR1A	See actions in main text.	31/05/2025
IR1A	See Actions on main text.	30/06/2025

Compliance criteria codes are listed in the 'Important information' section below.

3. What will happen next?

Any non-compliance we have identified and recorded on this form is an offence. It can result in criminal prosecution and/or suspension or revocation of your permit.

You are non-compliant with your permit.

We are currently considering taking enforcement action against you for the non-compliance recorded above. We will contact you in due course.

4. Details of our assessment

At 10:15 on the 13th February 2025 a site inspection was undertaken by NRW officers Phil Harper and Kathryn Bradshaw, Senior Industry & Waste Regulation.

This was an announced site inspection. The site was operational at the time of the inspection.

Groundwater Monitoring Wells

The operator undertakes a monitoring program at Alyn Works in which ground water samples are removed from site groundwater monitoring wells on a regular basis. A site visit which was undertaken on the 15th January 2024 found that site monitoring wells were in a poor state of repair. Lacking surface completions to prevent contaminated water from entering the monitoring wells and causing pollution to ground water, full details can be found in compliance assessment report reference CAR_NRW0043271.

As part of the investigation into the fire which occurred at Synthite in April 2024, groundwater monitoring data was requested from the operator.

Data was provided to NRW and shows that formaldehyde and ammonia levels have become elevated under the site.

The environmental quality standard for formaldehyde in controlled waters is 50 µg per litre or 0.05 mg per litre. The operator currently undertakes a Site Protection and Monitoring Programme (SPMP) in pursuance of permitted improvement condition IC24. Analysis results which have arisen from samples taken by the operator as part of the SPMP for 2023 through to 2025 were made available to NRW and show that formaldehyde concentrations above the environmental quality standard occurred at the following groundwater monitoring wells;

BH7 (0.29 mg/L in January 2024),

BH6 (0.16 mg/L in February 2023, 0.12 mg/L in December 2024).

BH9 (0.06 mg/L in February 2024 and 0.08 mg/L in October 2024),

MWB1 (0.12 mg/L in July 2023, 270 mg/L in January 2024 and 838 mg/L in January 2025),
MWC1 (1.08 mg/L in May 2023, 0.65 mg/L in August 2023, 0.07 mg/L in January 2024),
MWC2 (1.07 mg/L in May 2024, 0.15 mg/L in January 2024 and 0.61 mg/L in December 2024),
MWD1 (1.90 mg/L in March 2023, 6.38 mg/L in May 2023, 2.43 mg/L in September 2023, 3.49 mg/L in March 2024 and 0.96 mg/L in December 2024),
MWF2 (1.94 mg/L in August 2023, 0.31 mg/L in January 2024 and 0.38 mg/L in December 2024),
MWF4 (0.73 mg/L in March 2023, 2.44 mg/L in May 2023, 4.74 mg/L in March 2024 and 0.40 mg/L in November 2024),
MWF6 (1.95 mg/L in May 2023, 3.79 mg/L in July 2023),

During the site inspection NRW took a confirmatory sample from **MWB1** which had been purged during the site inspection, the samples were analysed by NRW's laboratory service for ammonia and formaldehyde. Results were as follows **Ammonia** 0.5 mg/L, **Formaldehyde** 96.8 mg/L.

To provide context, the environmental quality standard (EQS) limit for formaldehyde in controlled water is 50 µg/L or 0.05 mg/L, therefore, a value greater than 0.05 mg/L can be considered as having the potential to be detrimental to the environment. Results from the internal sampling and monitoring indicate that the formaldehyde levels in groundwater under the site are regularly over 0.10 mg/L.

As borehole MWB1 was sampled during the visit, results for MWB1 will be discussed in more detail and are repeated below as an aid to discussion.

MWB1 (0.12 mg/L in July 2023, 270 mg/L in January 2024 and 838 mg/L in January 2025) **96.8 mg/L 13th February 2025 (NRW sample).**

Internal results for MWB1 shows a significant increase in formaldehyde levels in January 2024 with a value of 270 mg/L and then an increase to 838 mg/L in January 2025. Borehole MWB1 is located within the paraformaldehyde storage area and was positioned beneath the fire which occurred at the site in April 2024, preventing access until the recovery operation had been completed. High formaldehyde levels in borehole MWB1 are attributable to the infiltration of surface water which has been contaminated with paraformaldehyde.

Increases of formaldehyde levels in MWB1 is an indicator that ground water pollution has occurred or is occurring from the site activities.

Permit condition 3.1.1 states that "*There shall be no point source emissions to water, air, or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.*"

The provided data shows that an emission to groundwater has occurred from site activities.

A category 3 score has been applied against permit condition 3.1.1 under subheading IR3A(1) Emissions to Water.

Permit condition 4.3.1. provides the following instruction

4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must

immediately—

- (i) inform Natural Resources Wales,
 - (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and
 - (iii) take the measures necessary to prevent further possible incidents or accidents;
- (b) in the event of a breach of any permit condition the operator must immediately—
- (i) inform Natural Resources Wales, and
 - (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

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- (c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

Internal data analysis for borehole MWB1 from January 2024 shows that pollution to groundwater had occurred. The operator has not notified NRW that these levels of formaldehyde were detected during internal groundwater monitoring.

A category 3 score has been applied against permit condition 4.3.1 under subheading IR4C Notification.

Action 1: Provide Synthites internal trigger values that indicate that groundwater contamination has occurred and that would prompt action from Synthite by the 31st May 2025.

Action 2: Advise whether any actions have been taken in response to the groundwater monitoring data, detailing any taken actions by the 31st May 2025.

Action 3: Provide formaldehyde analysis results for Synthites share of the split sample which was served onto the operator on the 13th February 2025 to allow for the results to be compared by the 31st May 2025.

Please note that further scores may be applied on receipt and review of the requested information.

Note: Site boreholes were redeveloped and improved surface completions were installed as observed by NRW in September 2024, this provides an increased level of environmental protection.

Emission Point A15 Tanker Loading Scrubber

The scrubber liquor at A15 for tanker loading was sampled for ammonia. Permitted operating techniques specify that the tanker loading scrubber will be operated using ammonia solution to aid in the removal formaldehyde vapours. In 2023 it was identified that the operator is not using ammonia solutions in site

scrubbers and that is using water only. Quarterly monitoring data shows that emission point A15 is regularly over its formaldehyde compliance limit, in some cases significantly over the permitted limit. Monitoring results from 2023 are tabulated below to aid discussion, the permitted limit for formaldehyde at emission point A15 is 5 mg/m³.

		Quarter			
		Q1 (JAN-MAR)	Q2 (APR - JUN)	Q3 (JUL - SEP)	Q4 (OCT - DEC)
Year	2023	40.6 mg/m ³	59.9 mg/m ³	8.6 mg/m ³	<0.39 mg/m ³
	2024	11 mg/m ³	7.5 mg/m ³	8.5 mg/m ³	28.8 mg/m ³

Changes in tanker loading practices appears to have reduced the overall emission of formaldehyde from emission point A15. The operator has claimed that there is only a load on the scrubber at A15 during tanker loading and that when a tanker is not being filled with formaldehyde no breach occurs.

Tanker movements and an approximate loading time have been provided to NRW for Q4 2024, the data shows that formaldehyde tankers were being loaded and a load applied to the tanker filling scrubber for approximately 25 % of the time between October and December 2024.

The lack of ammonia in scrubbers was discussed with the operator in compliance assessment reports CAR_NRW0042010 and CAR_NRW0042463. A formal warning letter was also issued to the operator regarding the issue in July 2023.

Compliance assessment report CAR_NRW0042010 provides the following information.

“During the site visit the following investigation was agreed by the operator and NRW.

All present scrubbers will be charged with the corresponding scrubber liquors with immediate effect apart from scrubbers A11 and A15 where further instruction is shown below.

Scrubber A11

Prior to the next two monitoring campaigns the scrubber will be charge with water and analysed, then charged with an ammonium salt solution to determine if there is a notable difference in scrubbing efficiency.

Scrubber A15

Scrubber A15 will be charged with ammonia solution with immediate effect. An ammonium salt solution may be trialled prior to later monitoring campaign as a scrubbing agent which is easier to handle.”

The operator has objected to the use of ammonia in scrubbers claiming that an increase of ammonia in the raw effluent lagoons causes quality issues for the effluent discharge at the permitted emission to sewer point S1.

Internal lagoon monitoring data has previously been supplied to NRW which provides lagoon ammonia levels between September 2022 and September 2023. The data shows that ammonia levels within the lagoons vary between 0.4 mg/L and 839 mg/L. Monitoring data for ammonia levels in the S1 emission point between October 2022 and October 2023 has been reviewed and no correlation can be observed between the ammonia levels in the raw effluent lagoons and the ammonia levels in the final effluent.

The operator has presented an argument that the use of ammonia in scrubber A11 did not have the desired effect on emissions. However, the abatement must be returned to the operating parameters as set out by the permit and associated documentation and a monitoring round undertaken to inform next steps.

Action 4: Provide evidence supported by monitoring data which shows that the use of ammonia in scrubbers has a detrimental effect on the quality of discharged effluent at emission point S1. The data should include calculations for how the ammonia concentration in the lagoons is affected by the discharge of the scrubber. This information should be provided to NRW by the 31st May 2025.

A category 3 score has been applied under subheading IR2C Operating Techniques .

Action 5. Provide monitoring data for A15 for when no tanker loading is taking place by the 30th June 2025.

Action 6. Reintroduce the use of ammonia scrubber liquor at emission point A15 by the 30th April 2025.

Investigation into Noise Complaints.

An investigation relating to reports of noise from the site is ongoing. The permit application document discusses a noise survey which was undertaken in February 1996. The survey identifies that the boiler house and the TO plant cooling tower as the biggest contributors of noise at the site. The assessment continues to discuss that noise levels can be managed by ensuring that the items of plant concerned are maintained regularly.

Boilers

Recent service history which was associated with the boilers was available for review during the inspection. However, NRW notes that the boiler house lacks acoustic cladding. Site operatives also indicated that the current boilers had been in operation since the 1970's.

Site monitoring data has shown regular permit breaches for the boilers which use the A16 and A17 emission point. Including increased formaldehyde levels at A16 and increased NO_x levels for natural gas fired boilers at A17. Scores for breaches have been applied in corresponding compliance assessment reports.

NRW is concerned that due to their age, the boilers at Synthite may not satisfy the requirements of BAT (Best Available Technique).

From the **Best Available Techniques (BAT) Reference Document for the Production of Large Volume Organic Chemicals.**

BAT 4. In order to reduce NOX emissions to air from process furnaces/heaters, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a.	Choice of fuel	See Section 12.3. This includes switching from liquid to gaseous fuels, taking into account the overall hydrocarbon balance	The switch from liquid to gaseous fuels may be restricted by the design of the burners in the case of existing plants
b.	Staged combustion	Staged combustion burners achieve lower NO _x emissions by staging the injection of either air or fuel in the near burner region. The division of fuel or air reduces the oxygen concentration in the primary burner combustion zone, thereby lowering the peak flame temperature and reducing thermal NO _x formation	Applicability may be restricted by space availability when upgrading small process furnaces, thus limiting the retrofit of fuel/air staging without reducing capacity For existing EDC crackers, the applicability may be restricted by the design of the process furnace
c.	Flue-gas recirculation (external)	Recirculation of part of the flue-gas to the combustion chamber to replace part of the fresh combustion air, with the effect of reducing the oxygen content and therefore cooling the temperature of the flame	For existing process furnaces/heaters, the applicability may be restricted by their design. Not applicable to existing EDC crackers
d.	Flue-gas recirculation (internal)	Recirculation of part of the flue-gas within the combustion chamber to replace part of the fresh combustion air, with the effect of reducing the oxygen content and therefore reducing the temperature of the flame	For existing process furnaces/heaters, the applicability may be restricted by their design
e.	Low-NO _x burner (LNB) or ultra-low-NO _x burner (ULNB)	See Section 12.3	For existing process furnaces/heaters, the applicability may be restricted by their design
f.	Use of inert diluents	'Inert' diluents, e.g. steam, water, nitrogen, are used (either by being premixed with the fuel prior to its combustion or directly injected into the combustion chamber) to reduce the temperature of the flame. Steam injection may increase CO emissions	Generally applicable
g.	Selective catalytic reduction (SCR)	See Section 12.1	Applicability to existing process furnaces/heaters may be restricted by space availability
h.	Selective non-catalytic reduction (SNCR)	See Section 12.1	Applicability to existing process furnaces/heaters may be restricted by the temperature window (900–1 050 °C) and the residence time needed for the reaction. Not applicable to EDC crackers

Further to this, the operator is reminded that permit condition 1.2 discusses the efficient use of energy at the site. Permit condition 1.2 goes on to state that

The operator shall:

- (a) take appropriate measures to ensure that energy is used efficiently in the activities;
- (b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
- (c) take any further appropriate measures identified by a review.

NRW is of the view that there is scope to reduce emissions, reduce noise and improve energy efficiency at the site by reviewing older components of the plant.

Action 7: Review the boilers against the relevant BREF (Bat Reference) Document to determine whether the boilers at Synthite are conducive with the requirements set out by BAT by the 31st May 2025.

Thermal Oxide (TO) Plant Cooling Tower

Site operatives reported that maintenance was carried out on the TO plant cooling tower as and when required, however, no records were available to show what maintenance has been undertaken on the equipment and when. NRW has taken the view that the operator was unable to demonstrate that maintenance was undertaken on an item of plant that has been evaluated by the operator as having the potential to cause offsite noise and that maintenance is the main mitigating factor in ensuring that noise levels are managed.

NRW takes the view that this is a breach against permit condition 1.1.1a.

A score has been applied under subheading IR1A Management.

Action 8: Ensure that maintenance records are maintained for items of plant which have the potential to cause pollution, including but not limited to amenity issues such as noise by the 31st May 2025.

Action 9: Provide documentation which details the planned preventative maintenance for the TO plant cooling tower by the 31st May 2025.

The investigation into offsite noise continues.

IR1A General Management.

The site visit and following review of information has found that the operator has failed to demonstrate that parts of the process which have been identified to be environmentally critical are being maintained as required by the permitted operating techniques. In addition appropriate scrubber liquors are not being used as described by the sites permitted operating techniques, despite previous communications regarding the issue.

A review of internal data shows that pollution to groundwater occurred at Synthite prior to the fire in April 2024, a permit breach which the operator did not report to NRW as required by the environmental permit.

The breaches discussed within the compliance assessment report show that the site is not being managed in accordance with a robust environmental management system and with a lack of regard to the protection of the environment.

**A category 2 score has been applied against permit condition 1.1.1 under subheading IR1A Management.
A category 3 score has been applied under subheading IR1A Management.**

Action 10: Review the sites environmental management system to ensure that environmentally critical plant is operated and maintained in a manner which is agreeable with BAT and the sites permit and associated permitted operating techniques by the 31st May 2025.

Kind Regards

Phil Harper

Senior Industry and Waste Regulation Officer NE

03000 65 3717/ 07890025506

philip.harper@cyfoethnaturiolcymru.gov.uk

If you have any queries about this report, or to discuss completion of any actions, please contact the NRW Officer named above.

Important information

Legal status of this report

Your permit is issued to you under the Environmental Permitting Regulations. You have a responsibility to comply with the conditions of your permit and prevent pollution/harm of the environment. You must also ensure that you comply with any other relevant legislation that may apply to your site's operations.

This report explains the findings of our assessment and any action you are required to take. We categorise non-compliance using our guidance for assessing non-compliance at regulated sites.

When we find potential non-compliance/s we will normally give you advice on how to maintain compliance.

To correct non-compliance, we may:

- require you to take specific actions
- issue a notice
- review the conditions of your permit.

Any advice and guidance we give will be without prejudice to any other enforcement response that we consider may be required.

Assessment results and non-compliance categories (used in section 1):

Assessment result	Description
Assessed (A)	Assessed or assessed in part, no evidence of non-compliance found
Action only (X)	Action only relating to the activity assessment
Ongoing (O)	Ongoing non-compliance, not scored

Non-compliance category	Description	Score
C1 Major	Potential to have a major, serious, persistent and/or extensive impact or effect on the environment, people and/or property	60
C2 Significant	Potential to have a significant impact or effect on the environment, people and/or property	31
C3 Minor	Potential to have a minor or minimal impact or effect on the environment, people and/or property	4
C4 No environmental impact	Non-compliance at a regulated site that cannot foreseeably have any impact on the environment, people and/or property	0.1

How we use assessment scores

The number and severity of non-compliances recorded in a year will affect your annual subsistence fee the following year. A non-compliance factor is added to your site's Operator

Performance Risk Appraisal (OPRA) score when we calculate your fee to reflect the additional resource we use to assess permit compliance.

If your assessment result in Section 1 is suspended, what does this mean?

In line with our guidance, we may suspend scores for up to six months to allow time for remedial action to be taken. Suspended scores will be re-instated if the action is not completed.

Full list of Industry compliance criteria (used in section 1 and 2):

1. Management

- IR1A – General management
- IR1B – Finance (only applicable to Landfill)
- IR1C – Energy efficiency
- IR1D - Efficient use of raw materials
- IR1E - Avoidance, recovery and disposal of wastes produced by the activities
- IR1F - Multiple operator installations

2. Operations

- IR2A – Permitted activities
- IR2B – The site
- IR2C – Operating techniques
- IR2D – Technical requirements
- IR2E – Improvement programme
- IR2F – Pre-operational conditions
- IR2G – Landfill engineering (only applicable to Landfill)
- IR2H – Waste acceptance (only applicable to Landfill)
- IR2I – Leachate levels (only applicable to Landfill)
- IR2J – Closure and aftercare (only applicable to Landfill)
- IR2K – Landfill gas management (only applicable to Landfill)

3. Emission and Monitoring

- IR3A – Emissions to water, air or land
- IR3B – Emissions of substances not controlled by emission limits
- IR3C – Odour
- IR3D – Noise and vibration
- IR3E – Monitoring
- IR3F – Pests
- IR3G – Air quality management plans
- IR3H – Monitoring for the purposes of the Industrial Emissions Directive (this heading includes Large Combustion Plants)
- IR3I – Fire

4. Information

- IR4A – Records
- IR4B – Reporting
- IR4C – Notification

Enforcement response

Any non-compliance with a permit condition is an offence and we may take legal action against you. Action we take can include prosecution, serving a notice on you and/or

suspension or revocation of your permit. See our Enforcement and Sanctions Guidance for further information.

Data protection notice

You should make sure that anyone named in this report knows that the information it contains will be processed by Natural Resources Wales to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s).

We may also use and/or disclose the report in connection with:

- offering or providing you with our literature or 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
- assessing customer service satisfaction and improving our service
- Freedom of Information Act or Environmental Information Regulations requests.

We may also pass it on to our agents or representatives to do these things on our behalf.

Disclosure of information – this report will be available to view on-line

If you think this report contains commercially confidential information that should not be placed on our public register, you must contact your local Natural Resources Wales office within **fifteen working days** of receiving this report, using the contact details in the accompanying email or letter. You must give a full explanation of why it should not be added to our public register, including specifying which information is commercially confidential. We will assess your request and respond to you within twenty working days to let you know if we agree to your request.

What do I do if I disagree with the report or have a complaint?

If you disagree with this compliance assessment report, you should contact the lead officer without delay to discuss your concerns.

If you are unable to resolve the issue with the lead officer or their line manager you should contact our Customer Contact team on 0300 065 3000 (Monday to Friday 08:00 to 18:00), or email enquiries@naturalresourceswales.gov.uk for details of how to raise your dispute further through our Complaints and Commendations procedure.

If you are dissatisfied with our response, you can contact the Public Services Ombudsman for Wales by phone on 0300 7900203 or by email at ask@ombudsman.wales

Welsh Language Standards

We are committed to establishing Natural Resources Wales as a naturally bilingual organisation. We will provide compliance reports in your preferred language.