

Compliance Assessment Report CAR_NRW0048236

Permit being assessed: BU2349IL.

For: Alyn Works, **held by:** Synthite Limited

At: Denbigh Road, Mold, Flintshire, CH7 1BT.

Type of assessment: Report/Data Review,

Reason: Routine.

On: 31/03/2025.

Parts of permit assessed: See Below.

NRW Lead Officer: Philip Harper.

Report sent to: Technical Manager, Technical Manager, on 16/07/2025.

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	Assessed (A)	
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	Action only (X)	
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2
IR1A - Installations - Management - General Management	C3 Minor	1.1.1a
IR1A - Installations - Management - General Management	C2 Significant	1.1.1a

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

Total non-compliances recorded	Total non-compliance score
6	51

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(2)	Continue to monitor air emissions at A8 and investigate any trends.	Already completed
IR3A(2)	See actions in main text	01/09/2025
IR3A(2)	See actions in main text.	01/09/2025
IR3A(2)	See actions in main text	01/09/2025
IR3A(2)	See actions in main text	01/09/2025
IR1A	See actions in main text.	01/09/2025
IR1A	See actions in main text.	01/09/2025

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

Quarterly Monitoring of Results- Q1 (January – March), due 31st March 2025.

Quarter 1 monitoring data for Synthite Limited, Mold Chemicals (Alyn Works), Denbigh Road, Mold, Flintshire, CH7 1BF was submitted to Natural Resources Wales in accordance with permit condition 4.2.3.

This compliance assessment report will also discuss responses from compliance assessment report CAR_NRW0046560 where relevant within this report.

Emissions to Water W1

Monitoring for water emissions has been undertaken in accordance with the environmental permit, the following observations have been made;

Volumetric Flow Rate

A maximum discharge volume of 850 m³ at W1 was reported against the permitted emission limit of 700 m³ per day, which was recorded on the 13th January 2025.

A corresponding schedule 5 notification states that essential dewatering work was undertaken during this time to prevent flooding of local properties.

No compliance scores have been applied.Formaldehyde

A reported formaldehyde value of 0.27 mg/l has been reported for W1 for a sample which was taken on the 12th February 2025. This value is over the permitted limit of 0.25 mg/l but is in compliance when the measurement uncertainty of 30 % is applied.

No compliance scores have been applied.**Emissions to Sewer S1**

Monitoring for emissions to sewer at S1 has been undertaken in accordance with the environmental permit.

No permitted emissions limit breaches have been identified.**Emissions to Air****Emission Point A8- Wet Scrubber – RV10, AR2 and AR1 reactors- formaldehyde derivatives**Total Volatile Organic Carbon (TVOC)

Monitoring for TVOC was undertaken at emission point A8 on the 19th February 2025. A result of 31 mg/m³ was provided that exceeds the permitted ELV of 30 mg/m³. However, the emission is compliant when the 1.8 % measurement uncertainty is applied.

No compliance scores have been applied.**Action 1: Continue to monitor emissions at A8 and investigate any trends.****Emission Points A10 and A11**

No data has been provided for emission points A10 and A11. These emission points are associated with the paraformaldehyde grinding process and are no longer operated.

Emission Point A12- Fabric Filters Paraformaldehyde ProductionFormaldehyde

Monitoring for formaldehyde at A12 was undertaken on the 17th January 2025. A result of 15.8 mg/m³ was provided. This is a breach against the permitted limit of 5 mg/m³.

A category 3 score has been applied against permit condition 3.1.2 (IR3A(2)) Emissions to water, air or land.

A schedule 5 notification was received for breach on the 27th January 2025, which provided the following information;

“The bag filter pressure sensor was reading 1.4 inches of water at 10:25 on 27/01/2025. This reading was within the permitted values of 1 to 2 inches of water.”

Part B of the notification describes an intention to trial the use of a different type of filter.

Action 2: Provide a time frame for the trial to be completed by the **1st September 2025**.

Sublimation of Paraformaldehyde

The permitted test method which is used to monitor stack A12 requires a heated probe to extract air from within the duct. To avoid condensation the probe is heated to approximately 120 °C. The operator has claimed that this could be causing the sublimation of paraformaldehyde to formaldehyde which in turn is giving a false high reading.

NRW has taken the view that the monitoring method is giving a reading for the total amount of formaldehyde which is being emitted from emission point A12 and that the operator should continue make effort towards permit compliance. However, the operator is encouraged to perform monitoring trials whereby probe temperatures are altered to determine if there is an effect of formaldehyde concentrations.

Emission Point A15- Wet Scrubber, Tanker Loading of Formalin

Formaldehyde

Monitoring for formaldehyde at A15 was undertaken on the 17th January 2025. A result of 24.9 mg/m³ was provided. This in breach of the permitted limit of 5 mg/m³.

A category 3 score has been applied against permit condition 3.1.2 (IR3A(2)) Emissions to water, air or land

Actions relating to emission point A15 were included with compliance assessment report CAR_NRW0046560. These were as follows:

- Provide monitoring data for A15 when no tanker loading is taking place. This action is understood to be in progress and will be included with the quarter 2 monitoring data.
- Reintroduce the use of ammonia scrubber liquor at emission point A15 by the 30th April 2025. For this action the following response has been received from the operator;

"Acceptable influent analyte concentrations are defined in the Effluent Treatment Plant Manual. The combined effects of the reaction products of formaldehyde and ammonia producing hexamine limit the ability of the nitrification process. Historically, the hexamine produced would have been used in hexamine product when that part of the business was active. 200 mg/L NH₃-N is the maximum influent concentration permitted based on a set feed rate, necessary to manage lagoon volumes. The average influent NH₃ concentration is approximately 50 mg/L (41 mg/L NH₃-N). Partial pressures of aqueous formaldehyde solutions (J. Frederic Walker (1964: 113) Formaldehyde, 3rd edition, London: Chapman & Hall Ltd) can be used to estimate the formaldehyde in the headspace is approximately 2,500 mg/m³ for a 50 % formaldehyde solution. The gas volumetric flowrate in A15 is approximately 1,100 m³/hr. Worse case, 50 % tankers would be loaded 25 % of the time. 16.5 kg formaldehyde

would be introduced to the wet scrubber per day. 4 moles ammonia react with 6 moles formaldehyde to form 1 mole hexamine. Assuming a safety factor, 25 kg NH₃ (as 100 %) per day is required. Approximately 5 % of the lagoon capacity is treated daily. 95 % of the ammonia in the lagoon would remain, and the cumulative addition of the scrubber liquor would cause the ammonia influent concentration to reach the maximum permitted concentration. Initially, the effluent treatment plant may appear to be effective, but it would become necessary to reduce the treatment rate/retreat the effluent, causing the lagoons to fill (that would be if the treatment plant had not suffered a toxic shock due to the introduction of ammonia). Previously, caustic, ammonium chloride, and ammonia solution have been trialled in a wet scrubber and had shown no beneficial effect to water alone."

Based on the response NRW has concerns that the current effluent treatment plant is not compatible with permitted site activities and that other options are available to the operator for the disposal of scrubber liquors.

It is also apparent that other scrubbers operating at Synthite appear to be capable of remaining within their permitted emission limit values whilst removing formaldehyde.

Action 3: Review the site's effluent treatment plant and review whether it can be upgraded to allow for the treatment of all waste water streams (including scrubber liquors) when taking into account the activities when operating the site in accordance with the environmental permit and its associated permitted operating techniques by the **1st September 2025**.

Action 4: Review the scrubber at emission point A15 against the relevant BREF (Bat Reference) Document and compare with other scrubbers on site to see if improvements can be made. Findings should be send to NRW by the **1st September 2025**.

Further actions may be included following submission of the monitoring data for the A15 whilst no tanker loading is taking place.

NRW is aware that an application has been submitted by the operator for a new thermal oxidiser which will treat waste gas streams from A15. The operator should be reminded that there is no guarantee that this change will be permitted and that it should be actively seeking compliance at A15 in the short term.

Emission Point A16- Combustion of Silver Process Exit Gas (no abatement).

Formaldehyde

Monitoring for formaldehyde at A16 was undertaken on the 17th January 2025. A result of 13.9 mg/m³ was provided. This in breach of the permitted limit of 5 mg/m³.

A category 3 score has been applied against permit condition 3.1.2 (IR3A(2)) Emissions to water, air or land.

Total Volatile Organic Carbon (TVOC)

Monitoring for TVOC at A16 was undertaken on the 17th January 2025. A result of 70.4 mg/m³ was provided. This value is in breach of the permitted limit of 40 mg/m³.

A category 3 score has been applied against permit condition 3.1.2 ((IR3A) Emissions to water, air or land.

These emission limit value exceedances indicate that full combustion of silver plant tail gas is not being achieved by the boiler at A16.

Action 5: Ensure that the silver plant tail gas boiler combustion conditions achieve compliance with permitted emission limit values. Report findings to NRW by the 1st September 2025.

Action 6: Review the boiler at A16 against the relevant BREF (Bat Reference) Document to determine whether it is conducive to the requirements of BAT and report findings to NRW by the 1st September 2025.

NRW is aware that an application has been submitted by the operator for a new thermal oxidiser which will treat waste gas streams from A16. The operator should be reminded that there is no guarantee that this change will be permitted and that it should be actively seeking compliance at A16 in the short term.

Emission Point A17- Three Natural Gas Fired Boilers (no abatement)

Actions relating to emission point A17 were included with compliance assessment report CAR_NRW0046560. These were as follows:

- 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. The response for this action is shown below;

“Low NOx burners were considered, but since 2024 the NOx emissions from A17 have been within the emission limit value and the burner management systems are serviced by an external company every 6-months.”

As previously established, the boiler NOx reduction measures are not in accordance with BAT. This is a permit breach with respect to permit condition 1.1.1a.

These boilers have regularly exceeded the NOx ELV during quarterly testing, the operator has made reference to a single compliant monitoring value.

The operator is reminded that relevant BAT should be implemented even where emissions limit values are not breached.

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

Action 7: Send a date for the completion for the upgrade of the natural gas boilers to reduce NOx emissions at emission point A17 by the 1st September 2025.

Other Matters Covered by Compliance Assessment Report CAR_NRW0046560.

Groundwater.

Compliance assessment report CAR_NRW0046560 discusses formaldehyde trends in groundwater monitoring data.

The following actions were provided within the compliance assessment report;

- Provide formaldehyde analysis results for Synthite's share of the split sample which was served onto the operator on the 13th February 2025.

A water sample was taken from MWB1 on the 13th February 2025. The sample was split with half being analysed by Synthite and the other half being analysed in NRW's laboratory in Swansea. The results of the analysis are as follows.

NRW's laboratory service for ammonia and formaldehyde as 0.5 mg/L, and 96.8 mg/L.

Synthite's analysis of the split sample as 1 mg/L, and 694 mg/L respectively.

There is a clear disparity between the results, however, both datasets show ammonia and formaldehyde above their respective EQS limits.

- Provide Synthite's internal trigger values that indicate that groundwater contamination has occurred and that would prompt action from Synthite by the 31st May 2025 and Advise whether any actions have been taken in response to the groundwater monitoring data, detailing any taken actions by the 31st May 2025.

The response below was received from the operator on the 16th May 2025.

"Internal procedures AW HSEQ 02 (Procedure for SPMP), and EGTM.10 (Reporting Procedure for SPMP Groundwater Analysis) describes how analyte concentrations that show significant deviations compared to previous baseline studies should be investigated by the relevant Plant Manager.

Comparison of formaldehyde concentrations against the Environmental Quality Standard may be unsuitable because elevated formaldehyde concentrations in groundwater are often detected in areas of agricultural use. Formaldehyde solution is commonly used in footbaths for cattle to help prevent the spread of diseases like digital dermatitis. Approximately 75 % of the site is surrounded by agricultural land. Formaldehyde concentrations, upstream of the aquifer, located in agricultural areas used for grazing, exceed the formaldehyde EQS."

The operator is reminded that a trigger is set to require action to be taken by the operator to check whether or not their operations are causing pollution to groundwater regardless of other possible sources of formaldehyde in the environment. Synthite has the potential to be a significant source of formaldehyde, therefore the operator has a duty to check that the site is not causing pollution. NRW is of the opinion that this has been missed through the response from the operator.

Whilst NRW agrees that formaldehyde concentrations which are above the relative EQS levels are

present within groundwater points which are upstream of the aquifer, formaldehyde concentrations in groundwater increase under the site. Further information regarding the behaviour of groundwater under site will be available following the submission the new SPMP review. However, review of the available data indicates that groundwater is being or has been contaminated below the site. This is due to an increase in formaldehyde concentrations in groundwater under the site.

If the operator believes that other sources of formaldehyde contamination are present, then these should be investigated.

The referenced documents AQ HSEQ 02 (Procedure for SPMP) and EGTM.10 (Reporting Procedure for SPMP Groundwater Analysis) have been received and reviewed by NRW in line with the most recent version of the SPMP. Whilst this version of the SPMP has not been accepted by NRW its it referenced by the operator and should be used to determine the trends of contaminants in groundwater and to determine whether groundwater pollution has taken place.

Through following correspondence with the operator it was established that actions are taken unless a falling trend is noted within the analysis data. It should noted that significant increases of formaldehyde concentration have been noted in groundwater monitoring results when compared to the historical values provided within the operator's own SPMP and prior to the fire at Synthite in 2024.

The operator has submitted the following as a list of improvements that have been made in response to groundwater monitoring.

"The boreholes were conditioned in August 2024 by an external company. The report should be available in Q4 2025. Initially the monitoring frequency will be quarterly to gather 4 sets of data, and then revert back to the original SPMP frequency of twice per year, with a 4-6 month gap in between. Improvements to secondary containment include increasing the height of the barrier wall to the lower end of the site, installation of a gate with rubber seals by MWD1, raised curbing and a sleeping police man at top site, a new bund for Chemicals IBC storage, and the renewal of hardstanding and jointing around site."

Whilst these new measures provide additional protection to groundwater, site compliance history demonstrates that these improvements have been driven by NRW's regulatory activity at the site. The operator cannot demonstrate that these actions have been taken in response to groundwater monitoring data.

Documents AQ HSEQ 02 (Procedure for SPMP) and EGTM.10 (Reporting Procedure for SPMP Groundwater Analysis) discuss how the monitoring data should be handled and how it should be combined with information from weekly infrastructure inspections. The operator has not been able to show that these tasks are taking place in accordance with its environmental management systems or that data is being used in a robust manner to inform where there may be pollution from site activities.

Management System

Synthite undertakes various types of emissions monitoring. Deficiencies have been noted in various areas.

- Groundwater. Synthite has failed to provide evidence that groundwater data is being reviewed with corrective actions taken in a robust manner as per its environmental management systems.
- Air Emissions. Continued permitted air emissions level exceedances indicate that data is not being reviewed adequately in turn indicating that the operator is not committed resolving abatement issues at the site. Some air emissions points have seen levels over their permitted limit for over 12 months.

Continued emissions breaches and failure to properly review data in accordance with the environmental management system can lead significant environmental effects.

This has attracted a category 2 score under subheading IR1a for management.

Action 8: Continue to monitor and investigate any trends.

Action 9: Review environmental management system and ensure that data review is documented any being undertaken as required by the sites environmental management system by the 1st September 2025.

Natural Resources Wales will now consider its enforcement position in relation to these findings.

Synthite Noise.

NRW has reviewed documentation which includes sound level data associated with Synthite's operations. These documents were the original Synthite permit application from 2003, the noise assessment for a new formaldehyde production plant which was undertaken by Peninsular Acoustics and dated October 2023 and a noise impact assessment for the new housing development at Gwernaffield Road, Mold undertaken by e3p consultants and dated October 2023.

The sound level data indicates that levels have reduced since 2003. However, the data within the report by Peninsula Acoustics shows that there is still a potential for nuisance noise from the site with sound levels greater than 40.0 dB being detected near receptors whilst the site is in operation.

Noise and vibration is discussed within section 3.4 of the sites environmental permit which states the following;

“3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to

minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales."

At this stage, noise has not been assessed by an NRW officer. No permit breaches have been applied.

It is recommended that the operator undertakes a review of review site infrastructure against the relevant BREF (Bat Reference) document(s) which deal with noise management and ensure that infrastructure which produces noise is compliant.

Kind Regards

Phil Harper

Industry and Waste Regulation Officer NW

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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.