

Compliance Assessment Report CAR_NRW0050183

Permit being assessed: LP3030XA.

For: Cardiff Energy Recovery Facility, **held by:** Viridor Trident Park Limited

At: Trident Park, Glass Avenue, Cardiff, CF24 5EN.

Type of assessment: Audit,

Reason: Routine.

On: 05/11/2025 between 09:30 and 16:00.

Parts of permit assessed: 1.1.1 and 1.2 and 1.3 and 1.4 and 3.1.2 and 4.3.1(b).

NRW Lead Officer: Geraint Harris.

Report sent to: Plant Manager, Plant Manager, on 07/01/2026.

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

Part of permitted activity assessed (compliance criteria)	Assessment result	Permit condition
IR1C - Installations - Management - Energy Efficiency	Assessed (A)	
IR1D - Installations - Management - Efficient use of raw materials	Assessed (A)	
IR1E - Installations - Management - Avoidance, recovery and disposal of wastes produced by the activities	Assessed (A)	
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2
IR1A - Installations - Management - General Management	Ongoing (O)	1.1.1(a)
IR1A - Installations - Management - General Management	Action only (X)	
IR1A - Installations - Management - General Management	Action only (X)	
IR1A - Installations - Management - General Management	C3 Minor	1.1.1(a)
IR4C - Installations - Information - Notification	Assessed (A)	

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

Total non-compliances recorded	Total non-compliance score
2	8

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)	Bring CO emissions back into compliance	Already completed
IR1A	<p>With regards to the root causes of the CO exceedance in Q3 please provide responses to the following actions: 1. Provide an overview of the processes applied prior to returning Line 2 to operation, including MoC steps and any start-up/recommissioning planning or validation checks.</p> <p>2. Confirm whether Viridor's MoC process includes a formal requirement to review and update operating and commissioning procedures when changes are made, and whether this requirement was applied during the recent shutdown.</p> <p>3. Explain whether preventative measures introduced post-incident (e.g., logic synchronisation checks, reduced-load restart with close monitoring) were part of the original start-up plan or added reactively after the exceedance.</p> <p>4. Supply copies of any updated procedures or instructions issued following the incident to embed these measures into standard practice.</p> <p>5. Describe how Viridor ensures procedural updates—whether arising from MoC or start-up planning—are communicated, implemented, and verified on site (including training or briefing records where relevant).</p>	02/02/2026
IR1A	With regards to the downtime in Q3 please respond to Action 2 : Have Viridor's post-incident reviews considered opportunities to minimise future blockages? If so, what has been considered and implemented and what else could be considered to reduce their likelihood? Due 2nd February.	02/02/2026
IR1A	With regards to the downtime in Q3 please respond to Action 3: Have Viridor's post-incident reviews considered any further improvement opportunities to limit the number of future grate repairs ? If so, what has been considered and implemented and what else could be considered to reduce their likelihood? Due 2nd February.	02/02/2026
IR1A	with regards to the VOC exceedance in Q2 please provide a response to Action 4: NRW notes that an agency crane driver was used during the night shift at a critical stage of the start-up process. As part of our root cause investigation, we require confirmation of how agency staff are integrated into	02/02/2026

Criteria	Action needed	Complete by
	Viridor's management system. Specifically, please provide details of the induction and site-specific training provided, how competency is assessed and documented, and what supervision arrangements were in place during start-up. This information is necessary to demonstrate compliance with permit condition 1.1.1(b), which requires activities to be managed using sufficient competent persons and resources. Due 2nd February.	

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

Permit Conditions 1.2, 1.3 and 1.4 (4-Yearly Reviews)

Viridor is required to undertake reviews every four years to identify opportunities for improving the use of raw materials and energy, as well as to assess whether appropriate measures for the avoidance, recovery and disposal of wastes can be enhanced. A submission for each of these permit conditions has been received and reviewed. There were some follow up queries that were addressed through in-person meeting on the 6th of November 2025.

Energy Efficiency

Viridor has maintained an ISO 50001-accredited Energy Management System (EnMS) since 2013. This system provides a structured framework for continual improvement in energy performance across all operational activities. External audits by BSI every three years confirm compliance and effectiveness, while internal audits by their SHEQ team ensure ongoing alignment with regulatory and corporate objectives. The EnMS is supported by a documented Energy Management Policy integrated into the Environmental Management System (EMS). Top management commitment is demonstrated through regular reviews of objectives and targets, embedding energy efficiency within Viridor's broader sustainability strategy.

Viridor's energy management approach is delivered through five-year Energy Reduction Plans. The first two iterations focused on absolute reductions in energy consumption, while the current third iteration (commenced FY2024) targets relative reductions in parasitic energy use per tonne of waste processed. This shift reflects operational realities: throughput at Energy Recovery Facilities (ERFs) will likely be increasing as their sites move toward higher Maximum Continuous Ratings (MCR), enabling more waste to be processed and more energy exported. While this growth inevitably raises

overall energy consumption, the majority of power supplied to motors and site systems is derived from parasitic (self-generated) energy. The plan aims for a minimum 1% relative reduction in parasitic energy use over five years, measured against tonnage processed. Other energy streams, such as furnace flame fuel, natural gas, and diesel for mobile plant are also monitored.

Strategic governance ensures progress against these objectives. Quarterly multidisciplinary energy review meetings bringing together operations, engineering, ECI, and mechanical teams track performance, identify improvement opportunities, and review Energy Review Indicators (ERIs). These indicators are updated annually to maintain alignment with corporate ESG targets, which are externally verified by Lucideon for transparency and accountability. Energy efficiency initiatives and additional opportunities are logged and tracked centrally, ensuring visibility across all sites.

Monitoring and measurement practices are comprehensive. All major energy streams, including electricity, gas, and steam, are metered, with sub-metering for significant processes. Diesel consumption for mobile plant and burners, as well as parasitic loads, are metered. Quarterly energy data reviews support proactive management and are reported regularly to senior management.

Operational controls are optimised to minimise energy waste. Efficient start-up and shutdown procedures, reduced idle periods, and the installation of high-efficiency motors, pumps, and fans with variable speed drives are standard practice. Preventive maintenance programmes (PPM) cover all plant aspects, including reviews of all engineering, operational, safety and compliance PPM's. ISO 50001 non-compliances are logged in their COMET system, assigned to responsible persons, and reviewed. Previous non-compliance are reviewed as the first agenda item in audit meetings to ensure items are not forgotten about.

The Energy Review and Action Plan for Trident Park ERF illustrates Viridor's commitment to site-level improvements. Completed actions include replacing high-bay lighting in tipping halls, waste bunkers, and turbine halls with LED systems. A rolling upgrade programme is underway to replace approximately 1,200 fluorescent lights across boiler halls and associated areas by 2028. Significant energy users such as Induced Draft (ID) fans and boiler feed water pumps have been upgraded with high-efficiency motors and variable frequency drives (VFDs) as part of MCR enhancement works completed in July 2025. Additional measures include improved ventilation for air compressors, optimisation of ACC fan performance through enhanced cleaning schedules and air ingress testing, and technology reviews to mitigate wind shear impacts. Bulky waste shredders are to be replaced with electric-drive models featuring energy recovery systems, reducing power consumption compared to hydraulic units. For mobile plant, auto shut-off systems have been installed to minimise idling, and future procurement will consider fuel efficiency. Burner performance is under review following major overhauls, with further efficiency improvements planned. Verification of improvements is achieved through DCS trend analysis, VFD data, weighbridge records, and fuel consumption monitoring.

Employee engagement is a key enabler. Energy champions are appointed at each site, and an Energy Savings Board hosted on MS Teams facilitates knowledge sharing and opportunities for improvement. Energy efficiency forms part of induction training, and ongoing awareness campaigns encourage staff participation in energy-saving initiatives. Energy-saving suggestions are reviewed regularly through the Site Improvement Plan (SIP) process, ensuring alignment with ESG priorities and operational

objectives.

The Martin combustion system inspection at Viridor's Trident Park facility forms part of a periodic review by Martin GmbH and was carried out under the terms of the maintenance contract. Their deployment has more recently focused on optimising combustion stability, air flow distribution, and instrumentation accuracy critical factors for energy recovery and overall plant efficiency. Key actions, such as calibrating O₂ sensors, reducing secondary air booster pressure, and harmonizing primary air curves, align with Best Available Techniques (BAT). These measures improve thermal efficiency, minimise excess air losses, and enhance boiler performance, ensuring maximum energy recovery from waste. By implementing these recommendations, Viridor strengthens compliance with permit conditions and demonstrates a proactive approach to continuous improvement in energy management.

Viridor demonstrates full compliance with permit conditions on energy efficiency, consistently submits required reports to regulators, and maintains comprehensive records for review. Energy performance is transparently communicated to stakeholders through externally verified ESG reporting. The company's ISO 50001 certification, structured governance framework, and commitment to continual improvement reflect the standards expected of a responsible operator. In conclusion, Viridor's energy management practices align with Best Available Techniques (BAT) principles and regulatory expectations.

Efficient Use of Raw Materials and Water

This audit was undertaken on 6th November 2025 to supplement Viridor's response to Permit Condition 1.3, which requires operators to ensure efficient use of raw materials and water, maintain records, review alternatives every four years, and implement any further measures identified by such reviews.

Viridor demonstrates several good practices in this area. Efficiency reviews are led by the site management team and tracked through the ESG framework. While these reviews are not part of quarterly environmental meetings, raw material and water usage is integrated into monthly financial meetings through forecasting and trend analysis. Procurement plays a key role in driving improvements due to significant cost implications associated with large volumes of materials.

For raw materials, the key reagents used include hydrated lime, activated carbon, and urea. A notable improvement has been achieved in lime usage following a supplier change, reducing excess lime in air pollution control residues (APCR) from 3.4% to 2.2%. Raw material usage is compared for optimisation, and Viridor employs waste homogenisation techniques to improve combustion stability and reduce reagent demand. Records include reagent consumption as a percentage of waste burned, which is a robust compliance measure.

Water usage is metered in four areas: the demineralisation plant, weighbridge, mains, and sewer, with monthly reviews of water meters conducted. Boiler blowdown water is reused for bottom ash quenching, and although town water is available, it is not used. These are positive steps toward resource efficiency. However, surface water is not captured, whereas Viridor's Beddington site utilises runoff water for toilets, a practice that could be considered at Trident Park. Additionally, blowdown frequency is not currently tracked, which presents an opportunity to trend this data and identify

potential increases in water wastage.

Viridor's Efficient Use of Raw Materials Action Plan (Issue 2, May 2024) outlines current saving functions and monitoring methods for significant raw materials and water uses. Key points include:

- Water: Showers, sinks, and urinals fitted with controls to prevent excessive use; eco-mode settings for washing machines; and monitoring of site cleaning water use.
- Process Raw Materials: Hydrated lime, activated carbon, and urea dosing is automated and controlled by the DCS system, adaptive to CEMS readings, supported by regular calibration and maintenance.

These measures reflect strong alignment with Best Available Techniques (BAT) for reagent dosing and water control. Improvements in lime usage demonstrate effective procurement-led initiatives. However, opportunities remain to strengthen compliance and efficiency further. Water reuse options, such as roof water runoff for onsite facilities and washdown, could be explored. Tracking boiler blowdowns would help identify trends and optimise reuse. Additionally, Sodium Chloride, Amine, and Phosphate remain underexplored, and there is scope to review these chemicals in future audits. It is also recommended that Viridor include justifications for rejected options to maintain transparency and demonstrate continuous improvement.

Viridor's current practices show compliance with WI-BREF benchmarks and BAT conclusions for waste incineration. Automated dosing systems linked to CEMS, regular calibration, and adaptive control strategies for hydrated lime, activated carbon, and urea are consistent with BAT requirements. These measures demonstrate proactive management and cost-driven efficiency improvements. Water efficiency measures, such as metering and blowdown reuse, also align with BAT techniques for resource efficiency.

Overall, Viridor demonstrates an effective commitment to resource efficiency at Trident Park. With ongoing optimisation and transparent review processes, Viridor is well-positioned to maintain compliance and deliver further environmental benefits.

Avoidance, recovery and disposal of wastes produced by the activities

An audit was conducted on 6th November 2025 to support Viridor's compliance with Permit Condition 1.4. This condition requires operators to review and record, at least every four years, the measures in place to ensure that the waste hierarchy set out in Article 4 of the Waste Framework Directive is applied to the generation and treatment of waste arising from their activities. It also requires that, where disposal is unavoidable, it is carried out in a manner that minimises environmental impact. As part of this obligation, operators must assess whether changes to these measures are necessary and implement any further improvements identified during the review.

This report presents the findings of a compliance review of Viridor's four-yearly assessment of waste avoidance, recovery, and disposal measures at Trident Park Energy Recovery Facility, as required under Permit Condition 1.4. The review evaluates whether Viridor's approach aligns with regulatory expectations set out by Natural Resources Wales (NRW) and the principles of the Waste Framework Directive. Viridor has fulfilled the requirement to conduct and record a review within the prescribed timeframe. Discussions with Viridor confirmed that all significant waste streams have been identified;

however, this process could be strengthened through the introduction of trend analysis.

Trend analysis derived from a comprehensive waste inventory offers significant operational, financial, and environmental benefits. By systematically tracking and evaluating patterns in waste generation, Viridor can adopt a proactive strategy that prioritises prevention and resource optimisation. Identifying hotspots and key contributors enables targeted interventions, such as improved maintenance practices to reduce oil leaks or operational adjustments to minimise absorbent use. This approach not only reduces waste volumes but also lowers disposal costs and enhances compliance with the waste hierarchy. From a financial perspective, trend analysis supports cost control by highlighting inefficiencies and opportunities for recovery or reuse, which can offset disposal expenses. Environmentally, it strengthens Viridor's ability to demonstrate continuous improvement and alignment with circular economy principles.

Similarly, duty of care audits are essential for ensuring that waste is managed responsibly throughout its lifecycle. They verify that contractors and downstream facilities operate in compliance with environmental standards, reducing the risk of enforcement action and reputational harm. For Viridor, a structured audit programme would provide assurance for waste streams such as oily rags, waste oil, APCr, and bottom ash, while also identifying opportunities for improved segregation and recovery.

Viridor has visited both OCO and the Day Group within the past three years, demonstrating a proactive approach to verifying recovery routes and providing assurance that key contractors operate responsibly. Building on this, introducing formalised duty of care audits and trend monitoring would enhance oversight and deliver additional benefits. Structured audits would provide documented evidence of compliance, strengthen supply chain integrity, and help identify opportunities for improvement. Similarly, trend analysis would enable Viridor to spot patterns in waste generation, target hotspots, and implement preventative measures reducing costs, improving efficiency, and supporting sustainability goals. Together, these steps could help move Viridor beyond compliance toward best practice and continuous improvement under Permit Condition 1.4.

Q3 Monitoring Returns

Carbon Monoxide Exceedance – Line 2, Trident Park (29th July 2025)

Natural Resources Wales (NRW) has reviewed the Schedule 5 Notification submitted by Viridor Trident Park Limited for a carbon monoxide (CO) exceedance at emission point A2 on Line 2. The breach was detected at 19:20 on 29th July 2025 during the monitoring period from 02:00 on 29th July to 02:00 on 30th July 2025. The permit requires that 95% of all 10-minute average CO readings within any 24-hour period remain below the emission limit value of 150 mg/m³, as set out in Schedule 3, Table S3.1(a).

The submitted dataset included 13 ten-minute average readings above the permitted limit, with the highest recorded value reaching 2,582.54 mg/m³. These readings confirm a breach of permit condition 3.1.2. Viridor explained that the exceedance occurred shortly after Line 2 was returned to operation following a major maintenance shutdown, during which upgrades were made to the Martin combustion control system and the Valmet DCS. A root cause analysis identified that logic signals between the two systems were out of sync, leading to instability in combustion control and elevated

CO emissions.

Immediate actions were taken to remove Line 2 from waste feed, reduce boiler load, and stabilise combustion conditions. These actions successfully returned CO readings to normal levels. Preventative measures have since been implemented, including correcting the logic signal synchronisation issues and restarting the boiler at reduced load with close monitoring to confirm operational stability.

This incident represents a confirmed breach of permit condition 3.1.2, appropriately notified under condition 4.3.1(b). NRW notes that this is the latest in a series of unauthorised emissions over the past 24 months, with previous incidents recorded on 18th September 2023, 23rd February 2024, 13th April 2025, and 27th June 2025. In accordance with NRW's compliance scoring guidance, the categorisation of the CO exceedance is a Category 3 (C3) minor non-compliance.

NRW considers this incident may indicate deficiencies either in Viridor's Management of Change (MoC) process or in start-up/recommissioning planning following major maintenance and system upgrades. The corrective actions taken post-incident, logic synchronisation fixes and reduced-load restart with close monitoring, appear to be measures that might ordinarily have been embedded within pre-start validation and commissioning procedures. This raises questions about whether these measures were planned proactively or introduced reactively.

To clarify this, NRW requests (**Action 1 – Due 2nd February**):

1. Provide an overview of the processes applied prior to returning Line 2 to operation, including MoC steps and any start-up/recommissioning planning or validation checks.
2. Confirm whether Viridor's MoC process includes a formal requirement to review and update operating and commissioning procedures when changes are made, and whether this requirement was applied during the recent shutdown.
3. Explain whether preventative measures introduced post-incident (e.g., logic synchronisation checks, reduced-load restart with close monitoring) were part of the original start-up plan or added reactively after the exceedance.
4. Supply copies of any updated procedures or instructions issued following the incident to embed these measures into standard practice.
5. Describe how Viridor ensures procedural updates, whether arising from MoC or start-up planning, are communicated, implemented, and verified on site (including training or briefing records where relevant).

Q3 Outages

The following outages occurred in Q3 2025:

Line 1 Offline Periods:

- 10:15 to 20:30 6th July for BLP removal
- 10:30 11th July to 15:00 14th July for grate repairs

- 05:20 to 19:30 30th July for grate siftings blockage
- 09:05 to 23:55 2nd August for grate siftings blockage
- 09:40 to 16:00 5th August for grate siftings blockage
- 18:00 24th August to 11:50 27th August for grate repairs
- 21:25 18th September to 06:30 19th September site blackout due to National Grid fault

Line 2 was online for 1435.5 hours, with an availability of waste combustion of 65.01%

Line 2 Offline Periods:

- 11:15 16th June to 19:00 29th July for the planned maintenance outage
- 23:40 11th August to 03:20 12th August for a grate siftings blockage
- 14:10 17th August to 11:00 18th August for a grate siftings blockage
- 22:00 24th August to 09:20 27th August for grate repairs
- 16:20 14th September to 03:20 15th August for grate repairs
- 21:25 18th September to 08:00 19th September site blackout due to National Grid fault

Grate siftings blockages are a recurring cause of downtime (three separate events on Line 1 and two on Line 2 in Q3). Each blockage triggers SU and SD periods, which are compliance-sensitive because combustion stability and oxygen correction make ELV control difficult. NRW would like assurance that these events are being actively reviewed to reduce their occurrences.

Action 2 : Have Viridor's post-incident reviews considered opportunities to minimise future blockages? If so, what has been considered and implemented and what else could be considered to reduce their likelihood? **Due 2nd February.**

Grate repairs have accounted for significant downtime (Line 1: 11–14th July and 24–27th August; Line 2: 24–27th August and 14–15th September). Each repair involves extended start-up and shut-down windows, which EA guidance expects to be tightly defined and managed.

Action 3: Have Viridor's post-incident reviews considered any further improvement opportunities to limit the number of future grate repairs ? If so, what has been considered and implemented and what else could be considered to reduce their likelihood? **Due 2nd February.**

Q2 monitoring Noncompliance

CAR_NRW0049774 Action 1: NRW requests that Viridor share the findings of their internal investigation into the VOC exceedance and start-up process. This should include any identified root causes, corrective actions taken, and proposed improvements to start-up protocols following major maintenance. Due December 1st 2025.

During Q2 monitoring, Viridor reported a VOC exceedance on Line 1 during start-up following major maintenance. The measured VOC concentration was 24.41 mg/m³ against a permit limit of 20 mg/m³. The exceedance occurred between 03:00 and 03:29 hrs on 27th June 2025 and was attributed to

incomplete combustion during boiler stabilisation. Viridor's investigation indicated several contributing factors which included:

Operational Conditions:

- Bunker stock reached 9,578 tonnes (bunker typically kept below 7,000t), limiting the ability to mix and prepare waste fuel effectively.
- Low NCV waste was introduced during boiler stabilisation, leading to incomplete combustion and elevated VOC levels.
- Start-up occurred at 01:05 hrs, a time associated with increased risk of human error.

Human and Organisational Factors:

- Use of an agency crane driver during the night shift.
- Extended outage period (11 days vs. 7 planned) impacting waste composition and bunker management.

NRW's investigation concludes that the exceedance was symptomatic of underlying management and operational deficiencies rather than an isolated technical fault. The root cause relates to general management failures (IR1A), including inadequate fuel preparation due to excessive bunker stock, poor scheduling of start-up during a night shift, and reliance on agency staff during critical operations. These factors indicate weaknesses in planning, resource management, and competency assurance. A contributory factor was identified as operating technique weaknesses (IR2C), where SOPRA-201 start-up protocols did not adequately prevent the introduction of low NCV waste during boiler stabilisation.

Viridor has committed to:

- Reviewing SOPRA-201 to incorporate lessons learned on fuel preparation and boiler stabilisation.
- Analysing previous start-up events to identify timing patterns and considering scheduling initial waste loading during day shifts to reduce human error risk.

Viridor's target completion date for both actions: 31st December 2025.

The root cause non-compliance has been categorised as **Category 3 (Minor) non-compliance against permit condition 1.1.1(a)** based on reasonably foreseeable impact, as deficiencies in management systems and operating techniques increase the risk of future permit breaches and potential environmental harm.

Action 4: NRW notes that an agency crane driver was used during the night shift at a critical stage of the start-up process. As part of our root cause investigation, we require confirmation of how agency staff are integrated into Viridor's management system. Specifically, please provide details of the induction and site-specific training provided, how competency is assessed and documented, and what supervision arrangements were in place during start-up. This information is necessary to demonstrate compliance with permit condition 1.1.1(b), which requires activities to be managed using sufficient

competent persons and resources. **Due 2nd February.**

Permit Condition 2.3.8(h)

A discussion and demonstration were carried out to review the improvements implemented to ensure compliance with permit condition 2.3.8(h). The session focused on technical upgrades, staff training, and operational practices designed to strengthen emissions monitoring and control.

One of the key improvements was the addition of a CEMS waste feeding interlock on the plant's DCS. This interlock prevents waste feeding to the boilers on Lines 1 and 2 if there is no reliable measurement available from either the duty or standby FID, FTIR, particulate monitor, or oxygen probe. The interlock was demonstrated in the control room and shown to be fully operational. It has been active since July 2025, and an example was provided from the 2nd November 2025, when both duty and standby FID units alarmed, triggering the waste feed hopper alarm and activating the interlock. This event confirmed that the system works as intended and provides an additional safeguard for compliance.

Evidence was reviewed for several training and awareness initiatives, including the ERF Toolbox Talk on CEMS Operating Techniques, the Emissions to Air and EA Requirements Toolbox Talk, and the Internal CEMS Compliance (EN14181) Procedure refresher training led by Envea. All sessions had documented sign-off evidence, confirming that staff have received and understood the training. Discussions with operational staff demonstrated improved awareness of permit condition 2.3.8(h) and its practical application. Additionally, the team highlighted the value of in-house daily checks on FID systems, which provide earlier opportunities to identify potential issues before they escalate. All actions relating to permit condition 2.3.8(h) are now considered complete.

Further improvements are planned, including a half-day training session with Ricardo scheduled for January or February 2026. This training will cover all UK plants and reinforce best practices for emissions monitoring and compliance. Onsite training was also shown during the visit, demonstrating Viridor's commitment to continuous improvement.

Martin Combustion Report Updates

2023

If the infrared (IR) temperature set point and the actual value differ for an extended period, this can lead to operational issues such as prolonged fuel feeding or complete stoppage, resulting in load fluctuations. To mitigate this, operators can temporarily adjust the IR temperature set point higher or lower than the actual value to control the on/off signal of the combustion system. This approach helps avoid long feeding or no-feeding periods and is considered a better solution than directly switching off the hydraulic pumps, which carries the risk of operators forgetting to restart them.

To further stabilise operations and counteract load fluctuations, Viridor has been advised to use the three different primary air curves based on waste quality. The curve best suited to the current waste quality should be selected, with the first corrective measure being a change in the air curve. If this does not resolve the issue, other measures can be taken. The recommended settings are:

- Good waste → flat curve
- Normal waste → normal curve
- Poor waste → steep curve

Regular fire checks remain essential for stable and efficient operation. Inspection of the fire provides critical information, including:

- The condition of the fuel bed (for setting the clinker weir)
- The colour of the fire (for adjusting primary air)
- The rear end of the fire (for setting grate run speed and ensuring a free surface)

Viridor confirmed that grate checks are carried out hourly and that operators can visually inspect the grate via a porthole and camera system. Additionally, air curves are used to monitor fluctuations in fuel usage, supporting stable combustion and compliance with emissions requirements. Viridor also confirmed that an IR deviation alarm is in place and that sensors are cleaned regularly as part of a structured maintenance regime. Further operator training, originally planned for December, has been rescheduled for early in the new year. No further action is required.

Historically, Viridor has relied heavily on online cleaning methods to maintain boiler efficiency and prevent fouling. While effective, these methods require frequent manual intervention and can contribute to operational challenges, including boiler tube leaks and increased water usage. The 2022 Martin report recommended evaluating stationary cleaning technologies, such as Shock Pulse Generators (SPG), as a potential alternative to reduce reliance on traditional online cleaning.

In line with these recommendations, Viridor installed three SPGs on Line 1 during the October outage. These were fitted in the third pass and high-temperature superheater sections of the boiler. The decision was based on concerns that the existing explosive cleaning method may have contributed to boiler tube leaks. The SPGs operate by generating controlled shock pulses that dislodge ash and deposits from heat transfer surfaces without the need for water or abrasive cleaning.

Viridor have previously reported that since the installation of SPGs:

- The weekly online cleaning routine is no longer required.
- The shower cleaning system in the second and third passes has been switched off, resulting in significant water savings.
- Reduced water injection has led to less sticky ash formation downstream, improving overall boiler cleanliness and reducing maintenance needs.

After a six-month trial period, Viridor observed a stable temperature profile and confirmed that no additional online cleaning was required for the areas covered by SPGs. However, the economiser section was not included in the trial, and clinker build-up remains an issue there. Viridor has submitted a proposal to its board to extend SPG trials to the economiser section.

Based on industry insights and Viridor's trial results, the adoption of SPGs offers several advantages:

- Reduced reliance on water-based cleaning → lowers water consumption and minimizes corrosion risks.
- Consistent, automated cleaning → reduces manual intervention and operational downtime.
- Improved heat transfer efficiency → maintains optimal boiler performance and reduces fuel consumption.
- Lower risk of boiler tube damage compared to explosive cleaning methods.
- Enhanced sustainability → aligns with goals for resource efficiency and reduced environmental impact.

Viridor should provide an update on the SPG's performance at the next compliance meeting.

2025

The latest Martin Combustion Optimisation report identified the following areas of concern in their latest report:

- IR pyrometer deviation in Line 1 – 150–200 °C difference, affecting secondary air booster logic.
- O₂ measurement devices deviation – 1.7–1.8 % by vol. in Line 2.
- Empty water jacket for feed chute – thermal damage observed in Line 2.
- Melting bottom ash in both lines – more severe in Line 2; indicates insufficient cooling air.
- Grate siftings flaps not sealing properly – causing false air and unstable combustion.
- Oil leaks in some grate driving cylinders – ash escaping at leak points.
- Primary air flow deviation – Line 1 outside tolerance (+10 %), Line 2 within tolerance (+4 %).
- Secondary air flow deviation – Line 2 outside tolerance (+7 %).
- O₂ sensors calibration issues – wet-based devices unreliable without frequent calibration.
- Possible false air leak upstream of right O₂ sensor in Line 2 – suspected cause of persistent deviation.

Viridor should provide an update on the above at the next compliance meeting.

End.

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.