

Compliance Assessment Report CAR_NRW0044300

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: Site Inspection,

Reason: Routine.

On: 27/03/2024 between 10:00 and 13:00.

Parts of permit assessed: Monitoring Returns.

NRW Lead Officer: Geraint Harris.

Report sent to: Tim Stamper, Plant Manager , on 14/05/2024.

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

Part of permitted activity assessed (compliance criteria)	Assessment result	Permit condition
IR3A - Installations - Emissions and monitoring - Emissions to water, air or land	C3 Minor	Permit Condition 3.1.2
IR3E - Installations - Emissions and monitoring - Monitoring	Assessed (A)	
IR4B - Installations - Information - Reporting	Assessed (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
1	4

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	Identify cause of CO exceedance and develop remedial actions to prevent or minimise reoccurrences	Already completed

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.

At this time, we do not intend to take any further action.

This statement does not stop us from taking additional enforcement action if further relevant information comes to light or offences continue.

4. Details of our assessment

Trident Park Reporting Review and Compliance Assessment – 30th April 2024

Site Familiarisation Tour

On the 27th of March 2024, I (Lead Specialist Geraint Harris) visited Trident Park for a discussion on a number of outstanding actions and a familiarisation tour of the incinerator. Having already observed the control room operations at a previous visit, this tour consisted of visiting the remaining operational areas of the plant. During this visit no non-compliances were observed.

Monitoring Returns

The 2024, Q1, monitoring returns have been assessed. All emissions and reports other than the specific issues discussed below, in this report, are compliant with the permit conditions and limits.

Carbon Monoxide Breach

Viridor are required by their permit to ensure that 95% (137 out of 144) of all 10-minute carbon monoxide (CO) averages in any 24-hour period are below the ELV of 150mg/m³. At 03:50h on the 23rd of Feb, 2024, the facility measured their 8th CO reading over the ELV of 150mg/m³. The measured value was 238mg/m³. The highest CO recording for this period was 1707mg/m³. Viridor have identified the root cause to be a result of gas canisters hidden within the waste mass which explode and upset the combustion stability causing CO spikes. In response to this permit breach Viridor have been attempting to identify suppliers of gas canisters including ongoing discussions with local authorities on collection of canisters from parks and other recreational spaces.

ACTION: Viridor to provide an update at the next compliance meeting.

The above result is in exceedance of the emission limits set in the permit for A2 and in breach of condition 3.1.2. **A non-compliance category C3** has been issued against criteria IR3A, emissions to water, air or land, for this exceedance in the Q1 2024, January to March, reporting period. This is in line with NRW's internal guidance for assessing non-compliance at regulated sites.

Waste Returns

The Q1 (Jan to March) Waste return has been received and reviewed. No non compliances found.

CAR NRW0043588

The following text relates the actions and subsequent responses from compliance report CAR_NRW0043588. Discussions regarding these actions were made during my site visit on the 27th of March 2024.

Action1: Was the age-related failure related to the capacitors? if not please provide details on what the age-related components were that failed. **Due 1st of April 2024.**

The root cause for the VOC exceedance on January 11th, 2023, was attributed to aged related components within the power supply unit that had failed. Viridor were subsequently asked, via action 1 of CAR Form NRW0043588, if the age-related components were related to the capacitors. During a site inspection undertaken on the 27th of March 2024, Viridor's Plant Manager explained that there were a number of fatigued and suspect parts such as the forward emitting transistors and the electrolytic capacitors, but it was a blown fuse which had caused the loss of power at the time. As a consequence of this incident, all the power supply units onsite were replaced in June 2023 with additional spares kept onsite. Viridor had initially planned to split the four diesel pumps onto two separate systems, however, it has been considered too great a project and so Viridor instead plan to upgrade and modernise the redundancy within the power supply system for the circuit breakers so that instead of having a single point of failure, they will have a duty and an automatic standby for each circuit breaker. This will be coupled with a new DCS alarm for the control room. Viridor plan to make these changes during the next planned outage.

Action 2: Viridor to complete the flow measurement verification exercise **by the 1st of April 2024**. If an extension is required, please inform NRW before this date, with a new submission timeline.

During the site visit on the 27th of March Viridor reported that SOCOTEC, a third-party testing facility, had been onsite to complete the field work and that a report will be made available in May. **Please forward on the report to NRW at the earliest opportunity.**

Action 3: Please can you explain why the values entered in the R1 assessment are different to the values entered in the annual report? **Due 2nd April 2024.**

It was explained during the onsite visit that the reporting periods for the R1 assessment and the annual report are different. This has therefore caused the subsequent reported data to vary slightly. Action considered closed.

HCL Exceedance (CAR NRW0043588)

A new customer's waste was identified as the potential cause of the HCL exceedance detailed in the previous compliance report. Viridor subsequently placed them on stop and a site visit was undertaken to review operational practices and to reinforce the plant's waste quality requirements. During my site visit on the 27th of March Viridor provided an update stating that on the 18th of October Viridor completed a site inspection of the operator and agreed actions on waste separation. On the 23rd of November the operator was allowed to recommence waste operations with the incinerator and their first load was inspected and found to be acceptable. Viridor did state that this incident had shone a light on their onboarding procedures which are mostly focused on waste acceptance procedures once the waste has arrived at the site. Viridor have now strengthened their waste acceptance procedure to improve the onboarding of new customers which includes:

- Initial desktop review of potential waste streams against the EP to ensure they are acceptable at site.
- Contracts Manager will carry out a site visit with the new customer to view the potential waste stream to ensure that the waste matches with the description and ensure appropriate management is in place at third party facilities.
- Contracts Manager will arrange with the Trident Park ERF operations team a convenient time for the first delivery to allow for the load to be inspected in the waste inspection bay prior to being discharged into the bunker.
- The Contracts Manager shall agree a schedule of targeted waste inspections with the operations

team for the new customer/new waste stream to build confidence in the quality of the waste being delivered.

- In conjunction with the operational staff the Contracts Manager will monitor waste quality and carry out periodic site inspections to ensure third party waste remains compliant with the guidelines set out in their waste acceptance procedures.

NRW consider this incident closed.

Other Outstanding Actions

The following actions were discussed during my site visit on the 27th of March.

IBA assessment (CAR NRW0041088)

The site-specific sampling protocol ERF-TPK-SOP-OPS-912 now includes randomisation of the sampling date/day. This will be verified at the next opportunity.

This protocol was viewed during the site inspection on the 27th of March 2024 which showed randomisation has been built into their procedures. Furthermore, evidence was provided showing that previous samples had been obtained on random days. Action Complete.

Weather Station (CAR NRW0041088)

Viridor to review onsite weather station data after a trial period and update NRW at next review meeting.

A trial location on elevated ground on the south-east corner of the installation was proposed and results were required to be reviewed against other local data sources. During the site tour I observed the weather station on the outer bund in the southeast corner. The subsequent data and graphical representations of this data were shown to me during my visit on the 27th of March. Viridor can no longer obtain the weather data from the Cardiff Bay Barrage and so can only compare their data with that obtained from Cardiff Airport weather station. Discussions on improving the weather station location are continuing.

Lime Blockages (CAR NRW0041088)

Viridor to review operating procedures for operators when dealing with lime blockages to establish if earlier or faster action can be taken to minimise emissions.

This was discussed during the meeting on the 27th of March. Viridor explained that they have adopted unit emergency plans, originally developed for HSE incidents, for such a scenario and are looking to develop them for NOx and CO breaches as well. In addition to this they have also liaised with their insurance company to look at and improve their response and control of upset conditions related to their plant. One physical improvement that has been proposed is the incorporation of a remotely operated valve for the standby lime feed line. Currently the system relies on a manual intervention, whereby an operator must physically attend and operate the valve to switch the feed lines over. This current process is time consuming and can take up to 10 minutes to complete which leaves little time to maintain compliant emissions when considering that there is a 30-minute compliance period for HCL. Viridor are currently evaluating a management of change proposal for changing this valve. In addition to the above, the standby lime feed line is subjected to a weekly PPM to test the lines are working properly and ensure that they are subsequently blown through to ensure they remain clear.

Action: Viridor to provide an update on the installation of this remotely operated valve at the next compliance meeting.

LMI (CAR NRW0041088)

Local Management Instruction (LMI) for Notifications to NRW implementation to be verified at next inspection.

During discussions on the 27th of March the site manager confirmed that this local management instruction was being implemented onsite. Following the meeting this document (ERF-TPK-ENV-LMI-002) was shared with NRW. During future compliance visits NRW will check with operational staff to see if this procedure is actually being implemented.

The Unit Emergency Plan (UEP) for Feed Hopper Fires (CAR NRW0041088)

ACTION: Viridor to review the event, identify learning points and provide an update at the next compliance review meeting.

Following the meeting in March 2024, Viridor subsequently confirmed that they presented their corrective actions relating to the fire on 23/2/22 to the previous site regulator Tony Leakey on 6th of April 2023. They confirmed that “SOPRAs (safe operating procedures) for filling the feed chute and actions to take in the event of a feed chute fire have been reviewed, updated and trained out. Staff have been briefed on the incident and a lessons learned has been shared. UEP (Unit Emergency Plan) for a feed chute fire has been reviewed and updated. UEP for feed chute blockage has been produced and trained out”. The documents listed below were sent to NRW on the 9th of April 2024 and have been reviewed. Action considered complete.

- ERF-TPK-SOPRA-OPS-104 - Feed Hopper& Hopper Deck Activities
- ERF-TPK-SOPRA-OPS-102 - Crane Operations
- ERF-TPK-UEP-032 - UNIT EMERGENCY PLAN - Feed Chute Blockage
- ERF-TPK-UEP-022 - UNIT EMERGENCY PLAN - Feed Chute Fire
- L1-Lessons Learnt – Waste Hopper Fire 230222

Martin Report 2022 (CAR NRW0041088)

- NRW previously noted that there was and is an increased reliance on online cleaning due to poor efficiency of the installed cleaning systems. Minimal effect on emissions occurs because the unit load is reduced when the explosive cleaning charges are detonated. This was subsequently discussed on the 27th of March 2024, where Viridor explained that the use of online cleaning has increased to once a week. However, Viridor are currently planning on trialling a new cleaning system on line 1, using shock pulse generators (SPG) which may help reduce the frequency of explosive cleaning. This is being planned for after the next shutdown and will be situated in the second/third pass of the boiler.
ACTION: Viridor to provide an update at the next compliance meeting.

- Recommendations were made to replace wet oxygen measurement with dry measurement instruments to improve combustion stability. Viridor have decided that since they don't have stability issues, they are not planning on taking this recommendation forward.
- Recommendations were made to increase flue gas oxygen levels to reduce combustion temperatures and slagging. Viridor plan on investigating this further and have plans to review the set O₂ set point in April. **ACTION: Viridor to provide an update at the next compliance meeting.**
- Recommendations were made to update software to improve reliability. Viridor reported that this work has been successfully completed.
- Recommendations were also made to prevent water wastage on the feed chute cooling jackets. Viridor reported that the feed chute cooling jackets were successfully replaced in the outage in 2022.
- Tramp air ingress affecting primary combustion was identified and the grate siftings flaps need to be cleaned and checked for leakage as a priority. Viridor reported that this was undertaken at the earliest

opportunity following the Martin report and all issues have been resolved.

Martin Report 2023

The latest Combustion System Inspection Report (Martin Optimisation Report) for 2023 was reviewed.

The report revealed efficient operation of key components such as hydraulic pumping stations and clinker weirs, but also identified challenges around the ID fan's limited capacity, leading to compromised air flow management and irregularities in cleaning cycles, as well as variation in live steam temperatures across different lines. There were a number of recommendations issued within this report which include:

- Actively use the primary air curves.
- Check the fire on a regular basis as an essential prerequisite for stable and efficient operation.
- Calibrate the measuring devices, such as the 'wet' O₂ instruments, on a regular basis.
- Check the feeder to ensure the IR temperature set points and the actual values correlate well and are not adversely affecting fuel supply.
- Improve the burden on the ID Fan through reduced operational load.
- Air ingress study using IR camera and additional gas analysers for cold spot identification and mitigation.
- Evaluate the adoption of stationary cleaning methods, such as Shock Pulse Generators (SPG), to reduce the reliance on current online cleaning.

ACTION: Viridor to provide an update at the next compliance meeting.

Improvement Conditions

Improvement condition 7

The operator shall perform a study to determine the extent to which the operation of the current systems in place at the plant to minimise NO_x emissions can be further optimised such that emissions are reduced as far as possible below 180 mg/Nm³ as a daily average, without significantly increasing emissions of other pollutants or having a significant negative effect on plant operation, reliability or bottom ash quality. The study shall be based on the results of trials carried out at the installation.

A written report of the study was submitted to NRW on the 29th of September 2023. The trials undertaken at Trident Park ERF showed that when the ELV set points were reduced the current DeNO_x system was able to control NO_x and ammonia emissions to values below the new daily BAT-AEL's of 180mg/m³ for NO_x and 15mg/m³ for ammonia. Throughout the course of the trials, as the NO_x setpoint was lowered, there was a corresponding increase in ammonia slip. At the lowest NO_x setpoint the level of ammonia slip was below the new daily BAT-AEL's of 15mg/m³ for ammonia, peaking at 5mg/m³. Through the course of the trial N₂O emissions were observed to increase as the NO_x setpoint was decreased. No anomalous IBA or APCr sample results were reported during the stages of the trial. No issues were reported to Viridor by offtake partners for IBA and APCr processing during the trial. As the ELV setpoint was lowered at each stage of the trial, there was a corresponding increase in the number of manual interventions required to maintain a consistent flow of urea from the silo to the furnace from the current system. The trial was terminated at the ELV setpoint of 130mg/m³ as the risk of a transport system blockage resulting in a period of abnormal operations or plant shutdown was considered to be too great. Subsequent actions and responses, following review of Viridor's report, are as follows:

Please can you provide more detail on the number and types of interventions that were required for each stage?

Manual interventions were recorded on the shift log for the duration of the trial. The parts of the system

requiring manual intervention were the rotary valves, screws, clogging filters, nozzles, and associated pipework. A summary of manual interventions can be found in the table below:

Daily NOx limit (mg/m ³)	Average no. of manual interventions per shift
200	0.78
175	0.86
165	1.31
150	Denox blockages all shift (typically every 40-45 minutes)
140	Denox blockages all shift (typically every 40-45 minutes)
130	Denox blockages all shift (typically every 40-45 minutes)

Please can you provide more of a justification as to why 165mg/m³ can't be considered an alternative emission level suitable for the DeNOx system?

In order to provide a sufficient margin to achieve the permit ELV the DENOX dosing controller is set 10mg/m³ lower than the ELV. For example, when the permit ELV was 200mg/m³ the controller was set to 190mg/m³, and now the permit ELV is 180mg/m³ the controller is set at 170mg/m³. To achieve an ELV of 165mg/m³ the controller setpoint would have to be circa 155mg/m³ to provide sufficient factor of safety to achieve the ELV and manual interventions required to sustain this ELV for the majority of the operating time would not support this emission level as outlined above.

IC7 accepted and complete.

Improvement condition 8

The operator shall carry out a programme of mercury monitoring over a period and frequency agreed with Natural Resources Wales. The operator shall submit a report to Natural Resources Wales with an analysis of whether the waste feed to the plant can be proven to have a low and stable mercury content.

The UK Waste Incineration Interpretation Document includes protocols for operators to demonstrate that their dioxin and mercury emissions are sufficiently stable/that their waste content has a low and stable mercury content, such that continuous dioxin and mercury samplers/continuous monitors are not required.

Mercury

Following Viridor's initial testing, samples 5 and 6 were above the 0.01mg/m³ threshold and so according to the EA's Mercury Protocol this triggered accelerated testing (2 samples per month for 3 months). The additional testing (tests 7-12) was completed within a three-month period during the months of November 2023, December 2023 and January 2024. The results show six consecutive average results under the 0.01 mg/Nm³ limit. Consequently, Viridor do not need to install continuous mercury monitoring systems.

Table 8: Information on any results above the threshold since testing began to achieve 6-in-a-row results

Date	Result	Uncertainty	Likely reason for result above the threshold	Measures put in place to prevent-recurrence (if applicable)
			<i>E.g. random variation in mercury content of waste</i>	
29/8/23	0.0298	0.0033	Investigation ongoing.	As this result triggers the Hg Protocol then accelerated testing is proposed (2 samples per month for 3 months).
30/8/23	0.0112	0.0035	As above.	As above.

Viridor's investigation, mentioned in the table above, identified inconsistencies with the separate powdered activated carbon (PAC) dosing systems. The flue gas treatment (FGT) original equipment manufacturer (OEM), Lab, were engaged to review the issues identified. Upon review of the system, and in light of the BREF changes to mercury and dioxin emission limits from 3/12/23 the following changes were made to the PAC dosing system:

- Line 1 PAC dosing control loop minimum output setpoint was changed from 20% to 25% (same as line 2).
- Line 1, Line 2 and standby line PAC dosing screws recalibrated from 28kg/h to 35kg/h.
- Line 1, Line 2 and standby line PAC dosing control loop co-efficient changed from 4.5 to 7.5 to increase PAC dosing.

This improvement condition has been accepted and is considered complete.

Dioxin

Viridor recorded 6 results in a row below the 0.06 ng/Nm³ I-TEQ threshold. However, they then experienced an elevated dioxin result within the two years following the 6th and final Dioxin measurement for this exercise. This was caused by the memory effect following shutdown and start up. Viridor then followed the Dioxin protocol and undertook 2 further tests over 1 month which measured below the 0.06 ng/Nm³ I-TEQ threshold. Therefore, Viridor do not need to install continuous Dioxin monitoring systems. This improvement condition has been accepted and is considered complete.

Improvement condition 9

The operator shall submit to Natural Resources Wales for approval a report which demonstrates the viability of implementing CHP by connection to a local district heating network (DHN). If this report concludes that the connection to a local DHN is not viable the report shall be supported by a comprehensive cost benefit analysis.

NRW received a satisfactory response to IC9 which states "In July 2021, Viridor Energy Ltd (VEL) and Cardiff Heat Network Ltd (CHN) entered into a legal 'Bulk Heat Purchase Agreement' where CHN and VEL, as the owner and operator of the Trident Park Energy Recovery Facility (ERF), have agreed that Viridor shall supply CHN with Heat and to carry out the Works in order to enable such Heat Supply. Both parties are committed to the bulk heat purchase agreement and works are currently in progress. Further details are provided in the report and so it is considered that IC9 has been satisfied and is complete.

Improvement condition 10

If following completion of IC9, the operator determines the implementation of CHP to be a viable opportunity, the operator shall submit to Natural Resources Wales for approval a plan for exporting heat as identified in the report as approved by NRW in response to IC9.

NRW have received a report satisfying the requirements of IC10. Should the timeline for the implementation of IC10 change significantly, Viridor must update NRW at the earliest opportunity.

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.