Compliance Assessment Report CAR_NRW0043588

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: Report/Data Review,

Reason: Routine.

On: 31/12/2023.

Parts of permit assessed: Monitoring Returns.

NRW Lead Officer: Geraint Harris.

Report sent to: Gwyn Jones , EHS Manager, on 09/04/2024.

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 3.2.1
IR1A - Installations - Management - General Management	C3 Minor	Permit Condition 1.1.1
IR3A - Installations - Emissions and monitoring - Emissions to water, air or land	C3 Minor	Permit Condition 3.1.2
IR1A - Installations - Management - General Management	C3 Minor	Permit Condition 1.1.1
IR1D - Installations - Management - Efficient use of raw materials	Assessed (A)	
IR1C - Installations - Management - Energy Efficiency	Assessed (A)	
IR4B - Installations - Information - Reporting	Assessed (A)	
IR3E - Installations - Emissions and monitoring - Monitoring	Assessed (A)	

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

Total non-compliances recorded	Total non-compliance score
4	16

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	Viridor to review the event, identify learning points and provide an update at next compliance review meeting.	01/04/2024
IR1A	Action1: Was the age-related failure related to the capacitors? if not please provide details on what the age-related components were that failed.	01/04/2024
IR3A	Undertake a targeted waste inspection for this customer to prevent a re-occurrence.	02/04/2024
IR1A	Proactively visit new waste customers prior to receiving any of their waste, especially if it has the potential to be problematic. Furthermore, schedule the delivery of new waste customers to site at a time when the first few loads can be targeted for waste inspections to allow for unknown and potentially problematic waste to be better controlled.	02/04/2024

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.

At this time, we are issuing you with a warning for the non-compliance recorded above. Warnings may influence future enforcement response for continued or further non-compliance.

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 - 31 December 2023

Monitoring Returns

Q1, Q2, Q3, Q4 2023 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.

Incident Review

11th January 2023, Line 1, VOC (TOC) ELV exceedance of 85.81 mg/Nm^3 against the limit of 20 mg/Nm^3.

At 1724h on the 11th of January 2023, the circuit breaker providing power supply to the common MCC switchboard opened resulting a in a power loss to this common MCC board. The plant's diesel pumps are fed from this common board. Consequently, this disruption to the electrical supply resulted in the diesel pumps being unavailable, resulting in the burners not starting. During this unplanned shutdown, boiler 1 experienced unstable combustion conditions resulting in a short-term spike in TOC emissions which resulted in the TOC half hourly emission measurement exceeding the permitted ELV. An investigation by the on call electrical Technician, the EC&I Engineer and the Principal Electrical Engineer (South) identified that the 110v power supplies to the circuit breaker providing power supply to the common MCC switchboard had failed. Consequently, a replacement power supply was installed. The breaker closed at 2100h, at which point all affected plant and equipment fed from the common MCC switchboard was reset and restarted. Prior to this event, as per the plant design, all 4 fuel pumps were fed from this common MCC board. As a result of this event Viridor is planning to keep 2 of the fuel pumps on this common MCC board and relocate 2 of the fuel pumps to the main 415V Common switchboard to make the system more robust.

This offsite power loss resulted in a VOC 30-minute average (19:00h and 19:30h, Line 1) ELV exceedance of 85.81 mg/Nm^3 against the limit of 20 mg/Nm^3. During the period 0000h to 1900h all 30-minute VOC averages for both lines 1 and 2 were measured below 1 mg/Nm3. This exceedance is approximately 4 times greater than the permitted ELV and so a H1 risk assessment was undertaken to ascertain the level of impact. Formaldehyde was used as the surrogate for the VOC's because it is potentially representative of short-term impacts and has a 30-minute average EAL of 100 ug/m3. Benzene is typically used for VOC scenarios, however, the EAL is a 24-hour mean, so not particularly effective for a short-term event such as this. The H1 risk assessment is a conservative approach that calculates the maximum emissions. During the exceedance on line 1, line 2 measured an average 30minute VOC emission concentration of 0.41 mg/Nm3. Consequently, the Process contribution to air for VOC during this incident works out to be 72 ug/m^3 or 72% of the formaldehyde EAL (100 ug/m3). Furthermore during the 11th of January the TOC daily average ELV (10 mg/m3) wasn't exceeded during this period. The daily TOC for line 1 on the 11th of January was 2.07 mg/Nm^3 and for line 2 was 0.11 mg/Nm^3. Therefore, although 85.81 mg/Nm^3 is much greater than the ELV, during this short 30-minute duration it is reasonable to assume that only minor impacts would have occurred, justifying a **cat.3 actual non-compliance against permit condition 3.2.1.**

Where we find non-compliance, we must identify the root cause and more importantly try to prevent any similar or repeat noncompliance's from occurring in the future. Consequently, Viridor provided a root cause analysis on the 8th of December 2023. The investigation states that "On investigation no protection had been operated but the Common MCC circuit breaker had opened. The Electrical department carried out electrical checks and found the PSU to be at fault. The PSU was disconnected/removed and taken back to the workshop. The PSU was tested and found to be beyond repair. The failed PSU was replaced with a new unit. This was re-connected, powered up and all faults reset, allowing the Common MCC circuit breaker to be closed to re-energise the Common MCC switch board. The faulty PSU was sent off for investigation and report of the failure. The report came back that it was aged related components that had failed". Viridor was subsequently asked what was the manufacturers recommendation for maintenance and inspection of the PSU's and if this was followed? Viridor responded with the following: "On handover of the plant CNIM who were original equipment manufacturer (OEM) provided a list of recommended planned preventative maintenance (PPM) tasks for the plant. The power supply units were not part of this recommended list and as such were considered to be maintenance free."

It is not clear form the RCA what the age-related components were, however, it is well known that some capacitors age and have end of life thus requiring periodical preventive replacement. The field aging of the

capacitor is a slow process which takes place over years but eventually the field aging leads to a capacitor failure unless the capacitors are periodically replaced[1].

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.**

This RCA response suggests that Viridor's PSU's would just be operated until failure with no real mechanisms in place to act before they failed. Therefore, it seems as though this incident was almost inevitable with the site's current practices. Viridor is exploring the feasibility of installing a duty and standby PSU system where if one power supply fails the standby will then supply the control voltage with no disruption to the MCC switch board. An alarm would be generated that a power supply has failed, enabling this to be changed online with no issues/affect to the MCC switch board. This project is currently at the design phase and Viridor is aiming for this system to be installed and commissioned during the next major outage in 2024.

Viridor should be reminded that in the absence of any maintenance procedures, it is essential that operators have back-up systems in place for environmentally critical plant such as support burners. Therefore, the current maintenance free approach coupled with the lack of any back-up systems sufficient to warrant issuing a noncompliance against Viridor's management system for the following points:

- Failure to have a suitable alarm system in place to warn of a power supply failure.
- Failure to have a suitable maintenance or inspection regime on the PSU units.
- Failure to consider the age of key infrastructure and how that may affect permit compliance.
- Failure to have suitable replacements onsite.
- Failure to have back-up systems in place for environmentally critical plant.

Consequently, a minor impact actual and potential **(category 3) non-compliance with permit condition 1.1.1** is being issued

Upon review of the previous compliance assessment reports there have been a number of power system failures at Trident Park. Electrical system resilience at Trident Park will need to be reviewed in the coming year.

Dioxin Emissions

On the 5th of May 2023 NRW received notification that Viridor Trident Park had a Dioxin emission of 0.1083ng/m^3 with an uncertainly value of 0.0166ng/m^3. The permit emission limit value (ELV) for Dioxins is 0.1ng/m^3. If a reported result is above the ELV, we will assess whether it complies by taking account of its measurement uncertainty. We do this by subtracting the measurement uncertainty from the measured value. If after completing the assessment the result is still above the ELV, we are likely to consider this as a breach of the ELV. However, if after completing the assessment the result is below the ELV, we are likely to consider this as approaching but not breaching the ELV. When applying the uncertainty budget to 0.1083 ng/m^3 the result falls within the ELV with a result of 0.0917ng/m^3.

This approach to limit on the 21st of February 2023 followed a short period of abnormal operation when abatement systems failed due to a power loss. Although the abatement systems (carbon dosing and filter bags) were functioning at the time when the sample was taken, this elevated dioxin emission may be the result of "memory effect" when higher dioxin levels in the flue gas accumulated on surfaces in the flue gas path before being desorbed during the periodic emissions testing a few days later. Furthermore, this may have been exacerbated by the specific site-based operations (On-line Cleaning) that took place on Monday

20th and Tuesday 21st of February 2023. The monitoring was undertaken directly after a shutdown (Sunday 19th of February 2023) and start up on Line 1, which did not represent normal operating conditions for the line. Line 2 which had been operating without interruption throughout the preceding period, returned a result of 0.0042ng/m^3 which is in line with normal values for both lines. A re-test was initiated and undertaken on 19th and 20th of April 2023. The result of which were well within compliance (see below).

19 April 2023 0.0255ng/m^3

20 April 2023 0.0180ng/m^3

HCL Exceedance

On the 18th of September 2023, Viridor experienced an increase in HCl emissions resulting in a 30-minute average ELV exceedance of 68.16 mg/Nm^3 against a limit of 60 mg/Nm^3. This is a minor impact actual and potential (**category 3) non-compliance with permit condition 3.1.2** because the original air dispersion modelling report for the facility demonstrates that even at this elevated release level the short-term air quality impacts are not significant. There are no long-term impacts associated with this incident due to the short duration of the increase in emissions. Viridor reported that since the duty lime screw was operating at 100% and the HCl was rising at 18:04H, the operator intervened manually to add additional lime from the standby lime screw to control the HCl emissions. Additionally, the boiler load was reduced, the waste feed stopped, with the grate being run off before reintroducing waste. This had the desired effect of returning the HCl emissions to expected values. Viridor also reported that the DCS control system reacted correctly and the operator followed the correct operational procedure to combat the rising HCl emission. This short-term elevated reading indicated that the cause was due to the content of the waste being processed. Having investigated the waste inputs for the day, Viridor, identified one new customer. This customer has subsequently been placed on stop and a site visit has been undertaken to review operational practices and to reinforce the plant's waste quality requirements.

Where we find non-compliance, we must identify the root cause. A previous incident where the HCL emission exceeded the permitted ELV was attributed to waste containing a high plastic content entering the feed hopper despite attempts to mix it. Subsequently, a minor impact actual and potential (category 3) non-compliance with permit condition 1.1.1 was applied, since a shortfall was identified with the procedures for dealing with problem wastes in the bunker. Regarding this current incident there appears to still be a shortfall with the procedures regarding the mixing of wastes containing increased pollutant loads. As mentioned previously a new customer's wates was identified as the potential source and Viridor have subsequently placed them on stop and a site visit was undertaken to review operational practices and to reinforce the plant's waste quality requirements. Viridor state that "if and when they resume deliveries this customer will be the subject of targeted waste inspections to prevent a re-occurrence". To avoid such scenarios from occurring in the future would it not be more prudent to proactively visit new waste customers prior to receiving any of their waste to try to prevent such scenarios from occurring in the first place. Furthermore, would it not be more advantageous to schedule the delivery of new waste customers to site at a time when the first few loads can be targeted for waste inspections and so potentially allowing for problematic waste to be better controlled. Consequently, a minor impact actual and potential **(category 3) non-compliance with permit condition 1.1.1** is being issued since the scope for significant impact is limited by the limited maximum credible duration of the event.

Pollution Report

NRW received a report from a member of the public via their incident communication centre on the 29th of September 2023 reporting a high pollution rate form the incinerator between the hours of 2300-2400. A screenshot of the plume plotter as well as a picture of an illuminated patch of the sky was sent by the reporter.

The picture wasn't time stamped and it was not possible to tell where the location of the illuminated patch of sky was and if it represented the plume of the incinerator. Nevertheless, I requested the emissions data from the operator and enquired as to whether there were any plant upsets during this period. Viridor reported back that during this period the operator was only operating one of two lines and no operational abnormalities were reported during this period. The CEMs data was subsequently shared and showed no emissions above the permitted emission limit values. This report has therefore been closed.

Abnormal Operations

19/02/23 – line 1 daily average HCl ELV marginally exceeded between 18:00 to 18:59 (78.25 mg/Nm^3 and 84.93 mg/Nm^3). The FGT 415v board 1 tripped on under voltage resulting in the loss of the FGT system on line 1. Viridor were unable to reset and re-energise board due to a failed power supply to breaker, so the boiler was taken off waste (dampers closed 18:37h). The on call electrical team were called out and a spare was fitted and all systems test run before the boiler was brought back on. This has been reported as an Abnormal Operation and the emissions for CO, TOC and particulates were within the ELVs given in Table S3.1a during this event.

06/3/23 – line 1 daily average HCl ELV marginally exceeded due to a blockage in lime dosing line. One elevated 30-minute average value was reported as Abnormal Operation to enable a compliant daily average to be reported (11:30h-11:59h, 144mg/Nm^3). The emissions for CO, TOC and particulates were within the ELVs given in Table S3.1a during this event.

Improvement Conditions

Improvement Condition 7 and 8

NRW received a response to IC7 and IC8 on the 29th of September 2023. An update on these improvement conditions will be provided in a later car form.

Additional Monitoring and Reporting Requirements

Viridor's permit under Schedule 3 (b) requires additional monitoring effective from the 3rd of December 2023 (listed below). The permit, under Schedule 4, requires this additional monitoring to be reported as required by condition 3.6.1. It was previously agreed that that these new parameters didn't need to be reported for the initial reporting period (dec 3rd) as these tables and data may for some energy recovery facilities be problematic to obtain. Despite this, Viridor have provided the data for the period Dec 1st to Dec 31st and no noncompliance's or issues were discovered.

The EA had asked all municipal Energy from Waste (EfW) plant operators who have not already done so to calibrate their flow meters, as well as their CO2 and N2O CEMS (where their existing CEMS are capable of measuring these pollutants which they understand will be the case for the vast majority of plants) by the end of 2021. NRW has adopted the Environment Agency requirement for monitoring of these parameters to EN14181/16911 standard by 2022. The Trident Park CEM system already captures the data for N2O, CO2 and flue gas flow rate. These instruments will need to be calibrated at the next available opportunity, which is expected to be the next QAL2 round or AST. Therefore, Viridor need to undertake a flow measurement verification exercise in accordance with the standards. This is long overdue. We do not require full MCERTS flow measurement systems to be in use, but MCERTS systems should be installed when obsolete systems are replaced, or existing systems are upgraded. The criteria for verifying flue gas flow rate calculations are specified in EN ISO 16911-2: 2013.

Viridor are aware of this requirement from previous CAR Forms and an email has been shared discussing this work between themselves and Socotec. An email was sent to Viridor on the 29th of December 2023 reminding

them of this requirement with a deadline of the 1st of April 2024.

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.

R1 Assessments

Indicative R1 Calculation states 0.75, based on 87% Boiler efficiency +/- 1.5%, which meets the minimum criteria for R1 status.
R1 energy recovery factors for 2019, 2020, 2021, 2022 and 2023 as 0.78, 0.80, 0.80, 0.75 and 0.75 respectively.

Action 3: Please can you explain why the values entered in the R1 assessment are different to the values entered in the Annual report (see tales below)? **Due 2nd April 2024.**

1. Gross electricity meter (Electricity produced at turbine)		299208.34	MWh
2. Electricity exported - Net input/output meter		267264.85	MWh
3. Electricity imported - Net input/output meter		1325.53	MWh
4. Other fuel inputs			
	4.1 Light fuel oil	288094.92	litres

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	79,135	59,040	78,063	80,642	**296,880**	722
Power Exported	MWh	70,842	52,601	69,251	71,762	**264,456**	644
Power Used on site	MWh	8,213	5,219	8,719	8,834	**30,985**	75
Power Imported	MWh	80	1,220	93	46	**1,439**	4
Parasitic Load	%	10.6%	12.7%	11.4%	11.1%	11.4%	
Thermal Energy Produced ***	MWh					-	-
Thermal Energy Exported ***	MWh					-	-
R1 value (if applicable)	R1					0.8	

End.

[1] Emerson Power Network, Customer Technical Notification : Industrial Power, AC and DC Capacitor have end of life and must be replaced preventively.

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.