Compliance Assessment Report CAR_NRW0052671

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: Other,

Reason: Incident Response (Incident number 2501560).

On: 18/08/2026.

Parts of permit assessed: 1.1.1(a) and 2.3.1(a) and 2.3.8(h) and 3.6.1 and 4.3.1(b).

NRW Lead Officer: Geraint Harris, accompanied by Antony Leakey.

Report sent to: Plant Manager, Plant Manager , on 18/08/2026.

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

Part of permitted activity assessed (compliance criteria)	Assessment result	Permit condition
IR2C - Installations - Operations - Operating techniques	C3 Minor	2.3.1(a)
IR2C - Installations - Operations - Operating techniques	C3 Minor	2.3.8(h)
IR3E - Installations - Emissions and monitoring - Monitoring	C3 Minor	3.6.1
IR4C - Installations - Information - Notification	C3 Minor	4.3.1(b)

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
IR2C	Complete the actions proposed by Viridor's own investigation and stipulated in the text below.	Already completed
IR2C	Comply with permit condition 2.3.8(h) at all times.	Already

Criteria	Action needed	Complete by
		completed
IR3E	Ensure that permit condition 3.6.1(a) is complied with at all times.	Already completed
IR4C	Please submit to NRW your root cause investigation explaining why you failed to inform NRW of the contravention of permit conditions 2.3.8(h) and 3.6.1(a) on the 28th September 2023.	30/09/2026

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

On the 11th February 2025, NRW received an allegation from a member of the public (MOP) regarding operations at the site. The member of public alleges that, on the 28th September 2023, actions were taken in relation to the waste hopper limit switches on Line 2, specifically that metal plates were placed over the switches, causing the control system to interpret the chute damper as closed, the line as offline, and the associated emissions data as unreportable. The MOP states that, despite this, waste feeding to the Line 2 hopper continued and that operational data, including steam trends and the continued operation of abatement systems (which they claim normally cease when a line is offline), indicate that the boiler remained in operation. It is further alleged that these actions resulted in a breach of the environmental permit.

Photographic evidence (pictured below) did indeed show metallic scaffolding plates positioned over the limit switches associated with the waste feed chute dampers. On this basis, NRW considered it appropriate to investigate the circumstances surrounding these controls, their purpose at the time, and whether their use was consistent with normal operation and the requirements of the environmental permit. Viridor's subsequent internal investigation independently concluded that scaffold base plates had been used to simulate closed damper feedback, that this was not an approved operational or maintenance practice, and that the resulting signal behaviour was inconsistent with normal feed chute damper operation.




Initial investigations involved a review of the annually submitted R1 dataset, which provides trend information for parameters including steam generation, electricity production and auxiliary fuel (oil) usage. Additional sources of information included evidence obtained through a start-up and

shutdown audit, a Regulation 61 Notice, emails and an in-person meeting with the operator held on the 22nd April 2026 and a review of Viridor's own investigation. This report reviews the available information to determine whether the alleged actions occurred and to assess any implications for compliance with the environmental permit.

28th September 2023

On the 28/09/2023 at 03:30, Viridor took line 2 offline due to an accumulation of ten-minute CO exceedances within the rolling 24-hour period. This is standard practice for the incinerator to ensure compliance with the permit. Prior to this, Viridor's DCS data demonstrates that the dampers had been continuously open since 19/09/2023 at 00:33:05, indicating that the plant had been operating continuously over this period.

Viridor's 10-minute average ELV is based on the "95th percentile". In this case this means that 95% of the 10 minute averages in the calendar day (= 137) must be below 150 mg/m^3, and 5% (= 7) are allowed to be any value above 150 mg/m^3. Whilst expected to minimise CO emissions at all times, it is perfectly acceptable for the value of the maximum 10-minute average to be above 150 mg/m^3, provided the 95th percentile ELV has been met for that period. Between 03:20 on 27/09/2023 and 03:20 on 28/09/2023, there were seven potential ten-minute CO exceedances above the CO ELV, as shown in the Carbon Monoxide Daily Report provided by Viridor.

Viridor's Carbon Monoxide Daily Report shows that between 00:00 and 23:59 on the 27th September there were 4 CO exceedances. Between 00:00 and 23:59 on the 28th September there were 6 CO 10 minute.

During 2023, Viridor received a single Compliance Assessment Report, issued on 31/12/2023, with an overall compliance score of 16 points, corresponding to a Band C rating. The threshold for a Band D rating is 30 points. As such, the addition of a further CO exceedance, even when combined with a potential management system non-compliance, would not, in isolation, have been likely to result in a change to the operator's annual compliance banding for that year.

This context is important when considering the allegation, as it indicates that the potential regulatory consequence of an additional exceedance in 2023 would have been limited in terms of compliance banding outcome. This reduces the likelihood that actions taken during the period in question were driven by an intention to materially alter annual compliance status.

On the 22nd of April 2026, Viridor explained that, during normal operation, there are five DCS damper positions: 0, 1, 2, 3 and 4. Typically, the command sequence progresses from open (1), to closing (4), then to closed (2), and finally to opening (3).

The DCS commands/positions around 03:30 on the 28th September (Appendix 1) show this to be the case:

- 27-SEP-23 23:33:05.0 1 (Open)

- 28-SEP-23 00:33:05.0 1 (Open)
- 28-SEP-23 01:33:05.0 1 (Open)
- 28-SEP-23 02:33:05.0 1 (Open)
- 28-SEP-23 03:15:45.0 4 (Closing)
- 28-SEP-23 03:16:15. 2 (Closed)
- 28-SEP-23 04:16:15. 2 (Closed)
- 28-SEP-23 05:16:15. 2 (Closed)

The DCS commands/positions approaching the restart show:

- 28-SEP-23 07:35:55 – 3 (opening)
- 28-SEP-23 07:36:20 – 1 (open)

By 07:37, the feed chute dampers were fully open. At this point, Viridor's process data indicate that:

- Feed chute dampers 1 and 2 were open,
- The feeders were in operation, and
- The oxygen concentration was below 15%.

Based on the start-up logic set out in ERF-TPK-SOPRA-OPS-201:

"O_2 at boiler outlet <15% vol or steam from waste >48 t/h: end of start-up phase. The information 'incinerator in operation' is sent to the CEMS…"

this appears, at first glance, to represent an OR condition, meaning that achieving O_2 <15% alone should be sufficient to trigger the "incinerator in operation" signal and make emissions data reportable, irrespective of steam flow.

However, Viridor have clarified that the actual incineration logic is reset-dominant, such that:

- Where steam flow is <48 t/h and burners remain in operation, a reset (incineration off) condition is maintained,
- This reset condition overrides the set (incineration on) condition, even if the O_2 criterion is satisfied.

Accordingly, although the O_2 <15% condition was met at approximately 07:37, the emissions data would not yet have been reportable, because the reset condition remained active due to:

- Steam flow being below 48 t/h, and
- Burners still being in service.

Viridor state that the "incinerator in operation" signal was only triggered once steam flow exceeded

48 t/h (around 07:51–07:53), at which point the reset condition was removed and the set logic could take effect.

In relation to grate operation, Viridor confirm that the grate was already operational during this period and that it would not be normal for grate start to lag damper opening. Therefore, it is unlikely that grate status prevented the system from becoming reportable.

While it is recognised that, in general control logic, a grate may need to meet criteria such as:

- Minimum speed (e.g. ~30%),
- Correct control mode, and
- Verified stable motion,

there is no evidence that these factors governed the timing of the "incinerator in operation" signal in this case.

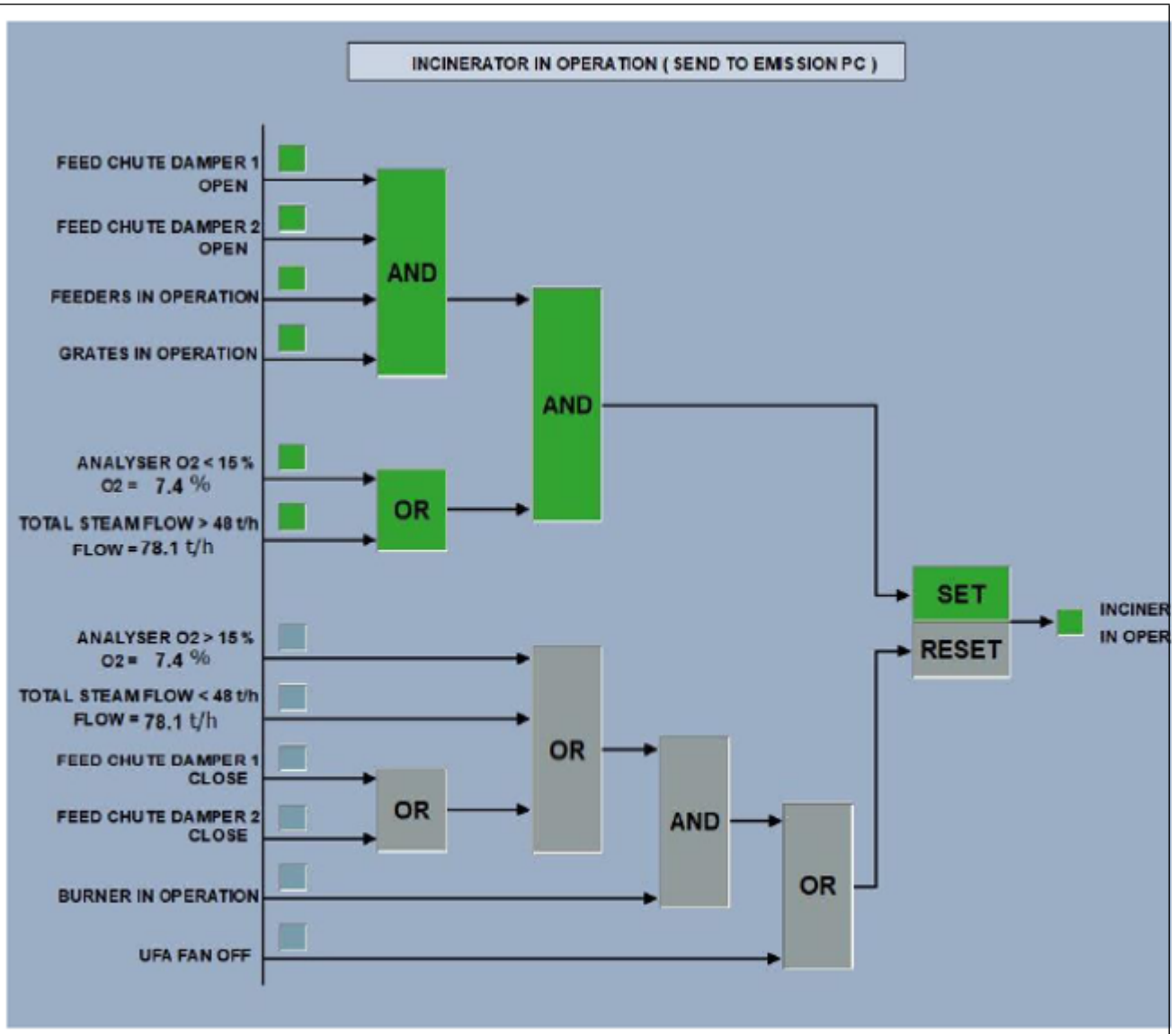
Line 2 DCS Data:

L2 SUSD 280923

Start time: 9/28/2023 5:53:00 AM
End time: 9/28/2023 10:51:00 AM

Time	2HCC10EU001YB09	2HHH90AA051A:s	2HHH91AA051A:s	2EGD30CF001XQ99:av	2EGD40CF001XQ99:av	2HNA10CQY001:av	2LBA20CFY01:av	2HNA10CTY014:av
	INCINERATION ON	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS	OIL FLOW R	OIL FLOW L	MEASURE O2 BOILER	TOTAL STEAM FLOW	AVERAGE 10MM T2S
	I/O			l/h	l/h	%	t/h	°C
9/28/2023 5:53:00 AM	0	2	2	486.850	1041.535	16.309	13.300	524.967
9/28/2023 5:54:00 AM	0	2	2	489.339	1038.154	16.281	13.434	528.026
9/28/2023 5:55:00 AM	0	2	2	490.241	1041.558	16.267	13.520	531.085
9/28/2023 5:56:00 AM	0	2	2	493.804	1045.227	16.247	13.707	534.145
9/28/2023 5:57:00 AM	0	2	2	495.238	1047.238	16.226	13.790	537.205
9/28/2023 7:33:00 AM	0	2	2	1586.963	1586.042	13.134	36.253	865.919
9/28/2023 7:34:00 AM	0	2	2	1589.990	1587.129	12.911	36.935	869.294
9/28/2023 7:35:00 AM	0	2	2	1593.605	1591.244	12.545	37.523	872.874
9/28/2023 7:36:00 AM	0	2	1	1587.080	1573.383	12.122	38.577	878.207
9/28/2023 7:37:00 AM	0	1	1	1367.463	1386.391	11.770	39.528	883.941
9/28/2023 7:38:00 AM	0	1	1	1274.898	1333.427	11.830	39.681	889.808
9/28/2023 7:39:00 AM	0	1	1	1234.268	1282.109	11.697	39.115	896.258
9/28/2023 7:40:00 AM	0	1	1	1116.191	1143.290	11.368	39.451	902.725
9/28/2023 7:41:00 AM	0	1	1	1069.934	1039.889	11.335	39.432	909.699
9/28/2023 7:42:00 AM	0	1	1	1000.131	967.849	11.084	39.470	916.859
9/28/2023 7:43:00 AM	0	1	1	915.919	879.017	11.005	39.417	923.935
9/28/2023 7:44:00 AM	0	1	1	863.908	828.453	10.665	39.423	931.433
9/28/2023 7:45:00 AM	0	1	1	794.987	761.165	9.715	40.060	939.848
9/28/2023 7:46:00 AM	0	1	1	635.499	600.008	9.419	40.459	948.306

Viridor OTNOC Management Plan Logic:



The dampers were opened at 07:37.

07:35:55 3 (Opening)

07:36:20 1 (Open)

07:53 the incineration on signal is activated and the CEMs data has become reportable.

07:50-07:59 the CO emission is 1591.03mg/m^3. This is the 7th 10 minute CO exceedance since 07:50 within the rolling 24 hours.

At 07:59, the waste feed rate was high at 49.754 t/hr. At 08:00, this reduced sharply to 2.28 t/hr, and from 08:01 until 09:33 the recorded feed rate was 0 t/hr. The burners were subsequently switched off at 08:11 (see data below). Consequently, burner support during the transition to stable waste-only combustion was limited to approximately 34 minutes.

Viridor's *Boiler Start-Up & Shutdown Procedure* (ERF-TPK-SOPRA-OPS-201) states:

"When coming onto waste the burners should remain in service during waste fire-up until boiler

stability has been achieved. As a guide, the process from opening dampers to getting the boiler stable on waste should take at least 1–2 hours."

On this occasion, the burners were removed significantly earlier than the indicative minimum period of 1–2 hours.

However, Viridor have stated that this extract reflects combustion optimisation work completed after the 2025 major outage, i.e. after the date of the event in question. Viridor further reported that, at the point the second burner was taken out of service, boiler conditions were:

- T2S ~950°C,
- O_2 ~9%, and
- Steam flow ~62 t/hr,

which were considered by the operating shift to represent stable conditions.

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Start time: 9/28/2023 5:53:00 AM
End time: 9/28/2023 10:51:00 AM

Time	2HCC10EU001YB09 INCINERATION ON I/O	2HHH90AA051A:s FEED CHUTE DAMPER 1 STATUS	2HHH91AA051A:s FEED CHUTE DAMPER 2 STATUS	2EGD30CF001XQ99:av OIL FLOW R l/h	2EGD40CF001XQ99:av OIL FLOW L l/h	2HNA10CQY001:av MEASURE O2 BOILER %	2LBA20CFY01:av TOTAL STEAM FLOW t/h	2HNA10CTY014:av AVERAGE 10MM T2S °C
9/28/2023 5:53:00 AM	0	2	2	486.850	1041.535	16.309	13.300	524.967
9/28/2023 5:54:00 AM	0	2	2	489.339	1038.154	16.281	13.434	528.026
9/28/2023 5:55:00 AM	0	2	2	490.241	1041.558	16.267	13.520	531.085
9/28/2023 5:56:00 AM	0	2	2	493.804	1045.227	16.247	13.707	534.145
9/28/2023 5:57:00 AM	0	2	2	495.238	1047.238	16.226	13.790	537.205
9/28/2023 7:59:00 AM	1	1	1	373.542	0.000	2.638	68.330	1085.167
9/28/2023 8:00:00 AM	1	1	1	373.043	0.000	5.368	70.128	1083.767
9/28/2023 8:01:00 AM	1	1	1	372.842	0.000	7.371	70.379	1075.298
9/28/2023 8:02:00 AM	1	1	1	372.640	0.000	8.731	69.001	1068.874
9/28/2023 8:03:00 AM	1	1	1	372.153	0.000	9.266	67.605	1064.111
9/28/2023 8:04:00 AM	1	1	1	371.226	0.000	7.507	66.865	1054.357
9/28/2023 8:05:00 AM	1	1	1	371.640	0.000	8.158	66.385	1040.796
9/28/2023 8:06:00 AM	1	1	1	372.103	0.000	9.113	65.130	1020.781
9/28/2023 8:07:00 AM	1	1	1	372.377	0.000	8.471	64.134	999.150
9/28/2023 8:08:00 AM	1	1	1	372.170	0.000	8.849	63.137	977.052
9/28/2023 8:09:00 AM	1	1	0	371.941	0.000	9.014	62.179	957.946
9/28/2023 8:10:00 AM	0	0	1	139.419	0.000	8.261	57.787	949.701
9/28/2023 8:11:00 AM	0	1	2	0.000	0.000	7.194	60.434	962.771
9/28/2023 8:12:00 AM	0	2	2	0.000	0.000	7.826	63.051	978.362
9/28/2023 8:13:00 AM	0	2	2	0.000	0.000	7.998	62.715	994.083

For completeness, in order for emissions to transition from CEMS reportable to non-reportable status, the predefined conditions set out in the lower (grey) section of the "incinerator in operation" logic must be satisfied (see logic above). Consequently, the timing of waste feed reduction, damper position and burner status should be assessed alongside the logic state transitions to determine whether the operational sequence was consistent with emissions reporting requirements.

When the control logic is compared directly with the process data, the following observations can be made. The burners remained in service until approximately 08:10, with burner output reducing to zero at 08:11, indicating that they were switched off at this point. Notably, at 08:10, while the burners were still operating, the conditions required to satisfy the lower (grey) section of the shutdown logic had already been met.

In relation to the upper section of the shutdown logic, only one additional condition was required for the CEMS to transition to non-reportable status. Between approximately 08:01 and 08:10, oxygen concentrations remained below 15%, steam flow was consistently above 48 t/h, and the feed chute dampers remained open until approximately 08:08. Therefore, from 08:01 onwards, within the

prevailing logic state, closure of the feed chute dampers alone would have been sufficient to cause the CEMS data to transition to a non-reportable state. This is significant because it isolates damper position as the sole remaining operational parameter capable of changing the emissions reporting status during this period. As such, the timing and manner of damper closure can be directly assessed against operational records and observed actions to determine whether the transition to non-reportable status accurately reflected the operational state of the line. This provides a clear basis for evaluating whether emissions reporting ceased as a result of a legitimate shutdown sequence or whether reporting status changed while conditions indicative of ongoing incineration remained present.

A review of what actually occurred based on the DCS is as follows:

DCS damper command sequence:

Line 2 – Damper 1

- 28-SEP-23 07:36:20 — 1 (Open)
- 28-SEP-23 08:10:15 — 0
- 28-SEP-23 08:11:10 — 2 (Closed)

Line 2 – Damper 2

- 28-SEP-23 07:36:20 — 1 (Open)
- 28-SEP-23 08:09:10 — 0
- 28-SEP-23 08:10:30 — 2 (Closed)

A position of "0" corresponds to a *STOP* condition, which occurs following the removal of an open or close command after expiry of the actuator's internal off-delay (:offdly). A "0" position is typically observed during planned shutdowns, maintenance activities, or power outages, rather than during normal operational damper movements. However, it can occur due to waste blockage instances whereby the actuator's off-delay for that specific command has timed out. Viridor have provided scenarios where position '0' is likely to occur. These are as follows:

- Case 1 - if you try to move from one position to another, and it stops halfway (doesn't reach other limit, but does make it off its original limit), the status of the block will output '0' after 65 seconds
- Case 2 - if you try to move from one position to another, and it doesn't move at all (stays on its original limit), the status of the block goes back to where it started (S:1 for OPEN or S:2 for CLOSED) after 65 seconds
- Case 3 - if the damper is OPEN and you try to close it and the OPEN limit stays stuck on, but the damper also makes it to the CLOSED limit, the clock will output S:2 after 5 seconds (same in reverse order, but you end up at S:1 at the end)
- Case 4 - if the damper is open, you have not asked the damper to move, but both limits become active, the block outputs S:'0' after 5 seconds

- Case 5 - if the damper is already stopped in the OPEN (S:1) or CLOSED (S:2) position and you lose feedback from either limit, the block output stays the same for 60 seconds, then goes to S:'0'

In all cases, you get the watchdog alarm as the status goes to S:'0'

According to data supplied by Viridor, the occurrences at 08:09:10 and 08:10:15 and then later in the day between 12:48:05 and 14:04:30 are the only instances in a five-year dataset where the damper commands transitioned:

- from 1 → 0 → 2, or
- from 2 → 0 → 1,

notably without any intermediate 3 (opening) or 4 (closing) commands. NRW's investigation primarily focused on the morning events of the 28th September 2023, as these formed the basis of the allegation and were supported by photographic evidence of interference with the feed chute damper limit switches. However, Viridor identified further anomalous damper status transitions later the same day which, whilst outside the scope of the original allegation, remain relevant to the assessment of damper signal behaviour.

DCS records show that between approximately 13:37 and 13:38 the damper status changed from 1 → 0 → 2. Viridor has advised that this transition pattern is highly unusual and not representative of normal damper operation. A further sequence occurred between approximately 14:03 and 14:04, when the status changed from 0 → 4 → 2 and then remained at status 2 for the remainder of the day. NRW notes that burner operation commenced at approximately 13:41, shortly after the first status transition, and that the plant subsequently entered a non-reportable CEMS state. Whilst these later events were not the subject of the original allegation, they provide additional evidence of anomalous damper status behaviour on the same day.

A separate event where the damper commands transitioned from 1→ 0 → 2 was identified on the 13th May 2025. Viridor reported that a hydraulic hose failure associated with feed chute damper no. 1 resulted in loss of hydraulic pressure, smoke generation and anomalous damper position signals between approximately 20:39h and 21:54h. The company considers hydraulic creep from the damper limit switch to be the most likely explanation for the observed signal changes. Feed chute damper no. 2 was unaffected.

Other start-up and shutdown DCS data has been reviewed and compared and can be seen in Appendix 2.

Viridor reported that, following a review of DCS data extending back to January 2020 and forward for six months after the event, no comparable instances of feed chute damper proximity switch manipulation or similar signal behaviour were identified. This supports the conclusion that the events of the 28th September 2023 were anomalous rather than representative of normal plant operation.

Viridor has confirmed that the photographs demonstrate:

- distortion of the upper proximity switches, and
- the addition of base plates on the distorted lower proximity switch plates.

In their response to the Regulation 61 Notice, Viridor confirmed:

"The objects (scaffolding plates) made contact with the closed proximity switches which resulted in a closed signal to the DCS when the open proximity switches were misaligned by bending the supporting bracket. The presence of the objects is not an approved practice. The feed chute damper guards are fitted to prevent access to the feed chute damper proximity switches; these guards should only be removed for defect rectification work or maintenance under a permit for work (SSoW). There is no operational or maintenance procedure requiring the placement of plates on the feed chute damper proximity switches."

Viridor's investigation also established that there was no maintenance or defect rectification activity that would have required the placement of metal plates on the proximity switches. No associated defects, work orders or permits for work were identified, and the investigation concluded that there was no operational or maintenance procedure requiring the use of such plates.

Viridor's investigation concluded that the scaffold base plates were placed on the feed chute damper closed proximity switches to provide a false indication that the dampers were closed and that the open proximity switch feedback was defeated through misalignment of the switch bracket. Viridor further concluded that the DCS evidence supported the photographs and showed that the plates influenced the closed-position proximity switches, resulting in false position feedback being presented to the control system. The observed 1→0→2 and 2→0→1 transitions without corresponding opening or closing commands are therefore consistent with simulated damper position signals rather than normal damper movement.

Taken together, the DCS data, photographic evidence and Viridor's own investigation support the conclusion that the dampers were made to appear closed to the control system when they were not physically closed. Viridor concluded that the feed chute level trends observed during the period would have been physically impossible had the dampers genuinely been closed.

The allegation asserts that, on the date in question, physical measures were applied to the waste hopper limit switches on Line 2 such that the control system interpreted the feed chute dampers as closed and the line as offline, with the consequence that emissions monitoring data were classified as non-reportable. It is alleged that this did not reflect the actual operational status of the line and that waste feeding and boiler operation continued. The MOP further contends that this can be inferred from process indicators including waste feed activity, steam generation trends, and the continued operation of abatement systems, which they state would normally cease when a line is genuinely taken out of service. On this basis, the MOP alleges that the operator acted contrary to the requirements of the environmental permit.

In essence, the allegation is that operational or physical interventions were applied to plant controls on Line 2 in order to cause the control system to indicate that the line was offline, thereby rendering emissions data non-reportable, while waste combustion activity allegedly continued. It is alleged that this had the effect of avoiding further reportable emissions exceedances and potential non-compliance.

To assess this allegation, it is helpful to break it down into its constituent claims and examine each against the available evidence.

CO Exceedances

The first claim is:

"When you have an amount of daily emission breaches you have to reduce load and ultimately take the affected boiler off line to invalidate that 24 hours of data."

The witness and interview evidence provided by Viridor, provides important context regarding the CO exceedances observed on the 28th September 2023. Evidence indicates that Line 2 had already accumulated multiple exceedances prior to the start of the day shift, with the plant operating close to the permitted limit for ten-minute CO breaches within a rolling 24-hour period.

Operators described the plant as experiencing sustained instability during this period, including trips affecting feed systems, fans and other key plant components, with repeated shutdowns and restarts. These conditions are well recognised as contributing to combustion instability and elevated CO formation.

Viridor's own Interview and witness evidence, provided retrospectively in relation to the events of the 28th September 2023, indicates that CO exceedances were managed through a staged operational response at the time. Operators described load reduction at approximately three exceedances, with further intervention at four, five and six, before ultimately taking the line off waste as the regulatory threshold was approached. This demonstrates that exceedance management was actively undertaken prior to reaching the formal limit, and that the accumulation of seven potential exceedances represented a significant escalation in operational severity rather than a routine condition. This is corroborated by Viridor's internal investigation, which identified a rolling 24-hour seventh CO ten-minute exceedance occurring at 07:50-07:59 on the 28th September 2023 and recorded that site management discussions had focused on closing the feed chute dampers and stabilising the boiler in an effort to avoid an eighth exceedance.

In addition, there is clear evidence that site management were actively monitoring CO performance. Viridor's investigation records that a meeting took place in the control room at approximately 08:00 and that the discussion likely included the need to close the feed chute dampers and stabilise Line 2 in response to the escalating CO situation. The investigation also concluded that relevant operational staff were aware of the site guidance and actions issued for management of CO exceedances.

Taken together, this evidence indicates that the exceedances observed during the morning of the 28th September 2023 were not isolated events, but formed part of a broader period of sustained combustion instability on Line 2. In this context, operators would have been actively managing emissions performance and aware of the significance of approaching a potential seventh exceedance and the associated operational and reporting consequences. Viridor's review of DCS records back to January 2020 found no comparable examples of feed chute damper proximity switch manipulation and no similar DCS signal patterns during routine operation, start-up or shutdown activities. The events of the 28th September 2023 therefore occurred against a backdrop of unusual operational circumstances

rather than established site practice.

The available operational and emissions data demonstrate that this situation arose on the 28th September 2023. Multiple ten-minute CO exceedances accumulated within the rolling 24-hour period, culminating a potential seventh exceedance during the 07:50–07:59 interval. In response, Line 2 was subsequently taken off waste, consistent with the requirement to prevent further accumulation of breaches within the same reporting period. This confirms that the regulatory trigger described in the allegation was present. The actions taken on Line 2 must therefore be assessed within that operational and regulatory context.

The allegation then asserts that physical interference with the waste hopper or feed chute limit switches was used to create the false appearance that the line was off, thereby rendering emissions non-reportable. As set out earlier in this assessment, the DCS damper command data, combined with photographic evidence and Viridor's own admissions regarding interference with proximity switches, demonstrate that the damper position feedback presented to the control system was unreliable during this period. These findings are supported by Viridor's own investigation, which concluded that the scaffold base plates were placed on the closed proximity switches to provide a false indication of damper closure and that the signal pattern observed was inconsistent with normal DCS-commanded damper operation.

Viridor's investigation concluded that the physical intervention had the effect of changing the "Incineration ON" signal to "OFF" through manipulation of the feed chute damper feedback signals, rather than through a normal damper closure sequence. The key question is therefore not whether the control system registered an incineration-off state, but whether the reported operating state accurately reflected physical plant conditions at the time.

The allegation further suggests that, despite the apparent shutdown, combustion activity associated with line 2, allegedly continued in ways inconsistent with being genuinely off-line, including continued waste handling, steam generation, and operation of abatement plant. These aspects can be objectively tested by examining waste hopper loading data, steam flow trends, and the operational status of abatement systems, which would ordinarily shut down automatically when a line is legitimately taken off service.

At this stage, the evidence supports the conclusion that:

- a regulatory trigger for taking Line 2 off-line existed;
- physical interference with damper position indication occurred; and
- the damper control behaviour observed is inconsistent with normal automated operation or approved maintenance activities and, according to Viridor's investigation, is consistent with simulated damper position feedback rather than genuine damper movement.

Whether these actions were directed by management, and whether they were undertaken with the intent described in the allegation, requires careful distinction between demonstrable facts and inferred motivation. The role of this assessment is therefore to establish what occurred operationally and whether those actions were consistent with the environmental permit and approved operating

procedures.

Waste Feed Behaviour

The DCS data for Line 2 between 07:00 and 13:00 on the 28th September 2023 show a clear pattern of waste introduction, cessation and subsequent restart.

Viridor's *Boiler Start-Up & Shutdown Procedure* (ERF-TPK-SOPRA-OPS-201) describes the controlled sequence for introducing waste at start-up, including pre-loading the hopper, opening the feed chute dampers and establishing waste on the grate to initiate combustion:

"Open the chute flap and fill the chute with required level of waste... Distribute the waste on the grate: self-ignition of the waste should take place."

Consistent with this procedure, waste feeding to Line 2 commenced at approximately 07:27, rising from 3.563 t/hr to 26.1 t/hr by 07:37, when the feed chute dampers were opened, and subsequently reaching 49.754 t/hr at 07:59. Viridor confirmed that approximately 52.042 tonnes of waste were loaded into Line 2 between 07:27 and 08:00.

Viridor has confirmed that the feed chute is designed to be maintained full of waste during operation, forming a compacted column, or "plug", between the combustion chamber and the waste bunker. This waste plug provides an essential seal which prevents the ingress of tramp air, maintains combustion stability and reduces the risk of fire propagation from the furnace into the bunker area.

The observed delay between the commencement of waste feeding at 07:27 and the opening of the dampers at 07:37 is therefore consistent with normal operating practice. From 07:37 onwards both feed chute dampers were recorded as open, allowing waste to enter the feed chute and pass to the grate.

This period coincided with the accumulation of CO exceedances and culminated in a potential seventh ten-minute exceedance during the 07:50-07:59 interval.

At 08:00, the recorded waste feed rate reduced sharply from 49.754 t/hr to 2.288 t/hr and by 08:01 had reduced to 0.000 t/hr. Despite this, both feed chute dampers remained indicated as open until approximately 08:09. This is consistent with waste already present within the hopper and feed chute continuing to move towards the grate following cessation of waste charging. Viridor advised that the dampers cannot be physically closed until the waste level within the feed chute falls below the elevation of the dampers.

The DCS waste feed signal shows that waste charging to the hopper ceased at approximately 08:01. However, Viridor's review of the feed chute level trends identified that the feed chute inventory continued to decrease after the dampers indicated closed. Viridor concluded that this behaviour would not have been possible had the dampers been physically closed, as waste would no longer have been able to pass from the hopper into the feed chute and onto the grate. The continuing reduction in feed chute level was therefore interpreted as evidence that the dampers remained physically open and that waste continued to move through the feed system despite the closed indication presented to the control system.

At approximately 09:34, the recorded waste feed rate began to increase again and the feed

chute level subsequently rose at approximately 09:38. This occurred whilst the incineration signal remained OFF and the feed chute dampers continued to indicate CLOSED despite Viridor's investigation concluding that the dampers were physically open. The increase in feed chute inventory, together with the continuing reduction in chute level thereafter, indicates that waste was being actively charged and combusted during this period. Plant operating data recorded at this time shows combustion conditions consistent with normal waste incineration, including oxygen levels below 15%, steam generation exceeding 48 t/h and secondary combustion chamber temperatures well above 850°C. The available evidence therefore indicates that the line had returned to conditions that would ordinarily be expected to generate reportable emissions data, but continued to be classified by the control system as non-reportable because of the manipulated damper feedback signals.

NRW considers this sequence particularly significant. Whilst the cessation of waste charging at 08:01 may be consistent with an initial decision to come off waste, the subsequent resumption of waste charging and operation under conditions consistent with normal waste incineration occurred whilst the feed chute dampers continued to falsely indicate CLOSED and the incineration signal remained OFF. The evidence suggests that the continued non-reportable status did not reflect the actual operating condition of the plant, but rather arose from the manipulation of the damper feedback signals. As a result, the transition back to reportable operation was not recognised by the control system until approximately 09:51, when the plates were removed and the dampers once again correctly indicated their true position. Consequently, emissions generated between approximately 09:38 and 09:51 were excluded from the reportable CEMS dataset, notwithstanding evidence that the line was operating under conditions that would ordinarily be expected to contribute towards determination of reportable status, including waste charging, oxygen concentrations below 15%, steam generation above 48 t/h and temperatures well above 850°C.

Further evidence is provided by the feed chute low-level switches. Viridor advised that, under typical operating conditions, the feed hopper level sensor would be expected to reach zero approximately 15 to 45 minutes after waste feeding stops, noting that this does not represent the point at which the feed chute itself is fully empty.

In this instance, the recorded waste feed rate remained at zero for approximately 90 minutes between 08:01 and 09:33. Notwithstanding this, Viridor's DCS trend review identified that none of the three independent feed chute low-level switches activated during the period in which the incineration signal remained off. Viridor considered this significant because, later the same day, when the dampers were genuinely closed, the low-level switches activated as waste inventory within the feed chute became depleted.

NRW considers that the absence of low-level switch activation over such an extended period is difficult to reconcile with a scenario in which the feed chute was simply allowed to empty following cessation of waste charging. Given Viridor's evidence regarding the typical rate of inventory depletion and the duration of the incineration-off period, some indication of low-level conditions may reasonably have been expected had feed chute inventory not been maintained. The absence of such indications is therefore consistent with Viridor's assessment that sufficient waste remained available within the feed chute, or was subsequently replenished, such that a low-level condition was not reached. Whilst the available evidence does not permit NRW to determine precisely how feed chute inventory was maintained throughout the period, it supports the conclusion that waste remained

present within the feed system and continued to move towards the grate despite the line being recorded as being in an incineration-off state. The significance of these observations is not simply that waste remained within the feed system, but that the physical indicators of continued waste transfer and combustion appear inconsistent with the control system's classification of the line as being offline and emissions being non-reportable. Viridor's own analysis concluded that the dampers were not physically closed and that the closed indication presented to the DCS was false. Had the true damper position been reflected within the control system, the evidence indicates that waste would have continued to pass through the feed system and combustion would have continued under conditions potentially capable of generating reportable emissions data. This is particularly significant given that additional waste appears to have been introduced to the feed system from approximately 09:34 onwards, whilst the incineration signal remained OFF.

The evidence therefore demonstrates that a deliberate operational decision was taken to cease charging waste to the hopper shortly after the potential seventh CO exceedance. However, the regulatory significance of the event is not limited to whether fresh waste continued to be charged. Rather, it is necessary to consider whether controlled combustion of waste already present within the furnace and feed system continued, and whether the operational state reported by the control system accurately reflected the physical operating conditions at the time.

Regulatory guidance recognises that, following cessation of waste feed, operators remain responsible for maintaining stable combustion and minimising emissions for as long as residual waste remains under controlled combustion conditions. Accordingly, whilst the available evidence indicates that waste charging to the hopper ceased at approximately 08:01, this does not in itself demonstrate that the incineration process had concluded. The key issue is whether the subsequent transition to a non-reportable emissions state accurately reflected the physical state of the process or whether emissions data ceased to be reportable whilst controlled combustion continued. This issue is considered further below.

Abatement

Following the cessation of waste feed to Line 2 at 08:01, it is necessary to assess whether the abatement systems behaved consistently with the line being genuinely taken off-line.

The allegation claims that abatement systems “stop automatically once a line is off” and implies that their continued operation after emissions became CEMS unreportable demonstrates that Line 2 remained operational. While the first point is broadly correct, the second relies on an incorrect assumption that a change in CEMS reportability equates to physical line shutdown including abatement plant.

Viridor’s Boiler Start-Up & Shutdown Procedure makes clear that the SNCR (urea), lime, activated carbon and bag filters are integral air-pollution-control systems, and that their shutdown is addressed explicitly within the controlled shutdown sequence. Importantly, abatement shutdown occurs after incineration has ceased, not at the point emissions become CEMS unreportable.

The procedure states:

“When O_2 > 15% at boiler outlet: Incineration is no longer running, the CEMS PC stops publishing

reports. Gradually reduce burner load to minimum, then STOP the burners."

This confirms that the transition from CEMS reportable to unreportable status is an informational milestone for emissions reporting, not a signal to immediately stop abatement. It precedes further controlled actions, including burner rundown and shutdown, and contains no instruction to cease abatement at that stage.

Only once these steps are completed does the procedure direct shutdown of abatement systems. This sequencing demonstrates that abatement is intentionally ramped down in a controlled manner, supporting safe operation and emissions control, rather than being interlocked to CEMS reportability.

Furthermore, comparative operational data provided by Viridor from other similar events (See table below) show that abatement systems remained in operation continuously following cessation of waste feed and throughout the burn-out phase, until conditions indicative of true shutdown were reached. In all cases, abatement remained active during the period in which residual waste was combusting and combustion conditions were still being controlled.

This demonstrates that continued abatement operation following waste feed cessation is normal operational behaviour and does not, in isolation, demonstrate that a line remains in normal operation. Abatement systems routinely remain in service whilst residual waste is combusted and the plant progresses through a controlled shutdown sequence. Consequently, the continued operation of abatement systems must be considered alongside other process indicators, including waste feed status, damper position, oxygen concentration, steam generation and combustion temperatures

Accordingly:

- abatement systems may continue operating during the shutdown transition;
- abatement shutdown depends on progression through the physical shutdown sequence; and
- CEMS reportability is not a proxy for line off-line status.

This interpretation aligns with the environmental permit, which distinguishes between a line being physically and operationally off line and emissions being classified as non-reportable for CEMS purposes. While abatement systems would normally cease as part of a genuine line shutdown, neither the permit nor the operating procedure states or implies that abatement stops merely because emissions become CEMS unreportable.

CEMS reportability is a monitoring and data classification outcome governed by system logic (e.g. waste feed status, combustion conditions and interlocks). It is not defined as an indicator of physical line shutdown. The permit explicitly recognises start up, shutdown and OTNOC conditions during which emissions treatment and reporting differ, while plant systems, including abatement, may continue to operate as part of a controlled transition.

In summary, although abatement systems stop once a line is genuinely off line, there is no documentary or operational basis to equate a change in CEMS status with that condition. Continued abatement operation at the point emissions become unreportable does not, of itself, demonstrate ongoing incineration or waste feeding, and is consistent with normal controlled shutdown behaviour

observed across multiple events.

From a regulatory perspective, the critical issue is whether Line 2 had been physically and operationally taken off line in accordance with the permit. That determination relies on the combined evidence of waste feed status, feed chute damper position, combustion conditions, burner operation, oxygen levels, steam production and interlocks. CEMS unreportable status alone is insufficient to make that assessment.

L2 29/10/2022 Elapsed Time								
Time	Feed Stop	Level sensor to 0	Damper Close	Incin signal to OFF	Steam flow to 48t/h	O_2 to 15%	T2S to 850°C	Abatement System (2 = in operation)
1252	0	Already 0						2
1333			41					2
1406				74				2
1411						79		2
1412					80			2
1418							86	2
L2 28/9/2023 Elapsed Time								
Time	Feed Stop	Level sensor to 0	Damper Close	Incin signal to OFF	Steam flow to 48t/h	O_2 to 15%	T2S to 850°C	Abatement System (2 = in operation)
0223	0							2
0239		16						2
0316			53					2
0325				62				2
0359					96	96		2
0409							106	2
L2 23/2/2024 Elapsed Time								
Time	Feed Stop	Level sensor to 0	Damper Close	Incin signal to OFF	Steam flow to 48t/h	O_2 to 15%	T2S to 850°C	Abatement System (2 = in operation)
0332	0							2
0418		46						2
0437			65					2
0452				80				2
0542					130			2
0545						133		2
0554							142	2

Table 2 Data analysis from 29/10/22, 28/9/23, 23/2/

Steam

When interpreting the steam data, it is necessary to consider temperature trends, burner operation, and feed chute damper logic together.

Temperature increases during the period under review are consistent with a combination of:

- residual waste continuing to burn on the grate after waste feeding had ceased; and
- auxiliary burner operation used to support combustion stability and boiler recovery.

Permit condition 2.3.13 requires the use of auxiliary burners during start-up, shut-down, and as required during operation to ensure that the minimum combustion temperature is maintained for as long as incompletely burned waste remains in the combustion chamber. This establishes that, following cessation of waste feed, controlled combustion must continue until waste already present on the grate has been adequately burned down, in order to minimise emissions. Accordingly, following cessation of waste feed, residual waste within the feed system and on the grate would be expected to continue burning in a controlled manner. Viridor's own investigation concluded that, during the period in which the incineration signal remained OFF, waste continued to move through the feed system and

onto the grate. The investigation further noted that T2S remained consistently elevated and that oxygen concentrations remained below 15%, conditions which Viridor considered indicative of continuing combustion. Accordingly, whilst the steam trends alone do not demonstrate continued normal operation, they should be interpreted alongside these other process indicators when assessing the true operating condition of the line.

When the decision is taken to bring an incinerator "off-line", there is therefore an inherent lag period before feed chute dampers can be closed, as closure is dependent on the feed system being sufficiently cleared. During this transition period, furnace and boiler temperatures would be expected to remain elevated for a period of time, rather than fall immediately.

The period under review (approximately 08:00 to 09:53) is short in operational terms and does not constitute a prolonged cooling phase. Consequently, there would be limited scope for significant temperature reduction, particularly where residual waste combustion and ongoing (albeit minimal) burner support were still present.

Comparison with planned outage events in 2025 was initially undertaken. In planned shutdowns (e.g. 24/08/2025, 16/06/2025, and 18/05/2025),however, waste feed reductions and grate run-down were managed in advance, resulting in more predictable and often more rapid steam and temperature reductions once dampers were closed and incineration off signals applied. These also don't appear to have any boiler performance issues. In contrast, the events on 28/09/2023 were unplanned and reactive, meaning that waste inventory on the grate had not been deliberately minimised in advance, extending the burnout and stabilisation phase. Therefore, a request was made to Viridor for comparative examples where unpanned shutdowns were experienced.

In response, Viridor provided 3 comparative examples, detailed in the table above. These demonstrated that:

- Steam flow and T2S temperature typically remain relatively stable following cessation of waste feed;
- A noticeable decline in combustion conditions (e.g. T2S dropping below 850°C) occurs approximately 1–2 hours after waste feed cessation;
- During this period, abatement systems remain in operation.

The comparison table supports this behaviour:

Example observations from the table:

- 29/10/2022:
    - Feed stop at time 0
    - Steam >48 t/h maintained until ~80 minutes
    - T2S remains above 850°C until ~86 minutes
    - Abatement systems remain in operation throughout

- 23/02/2024:
    - Steam remains >48 t/h for ~130 minutes after feed stop
    - T2S remain within combustion conditions (>850°C) for 142 minutes
    - Abatement remains active throughout
- 28/09/2023 (event under review):
    - Steam remains >48 t/h for ~96 minutes after feed stop
    - T2S remain within combustion conditions (>850°C) for 106 minutes
    - Abatement remains active throughout

The comparative examples demonstrate that, following cessation of waste feed, combustion typically continues in a controlled manner for a defined burn-out period, after which combustion conditions deteriorate, for example with T2S falling below 850°C. This transition reflects the point at which the plant can no longer sustain controlled combustion and is consistent with a genuine progression into shutdown conditions.

Furthermore, the boiler trips experienced during this period could have potentially reduced the system's ability to remove heat via steam generation. The shift log confirms that, at 08:38, the boiler tripped on low drum level due to feedwater pump issues, followed by subsequent restarts and additional trips of the under-fire and overfire air fans at 09:10 and 09:40 due to high corrected roof temperatures.

These events indicate a period of sustained operational instability affecting both water-side and combustion-side systems. Viridor's review of the DCS data further identifies low feedwater outlet pressure as the initiating cause of the feedwater pump trip, although the root cause could not be determined. The resulting disruption led to repeated pump trips before the system was stabilised.

Under these conditions, steam production would be expected to become intermittent, with each protection trip resulting in a temporary collapse in heat removal capacity. This would reduce the system's ability to dissipate heat from the combustion chamber, allowing temperatures to remain elevated for longer than would be expected under stable operation.

Consistent with this, the combined steam and temperature trends observed are reflective of:

- residual waste burnout;
- burner-supported stabilisation attempts; and
- repeated boiler protection and recovery events,

rather than steady, continuous incineration.

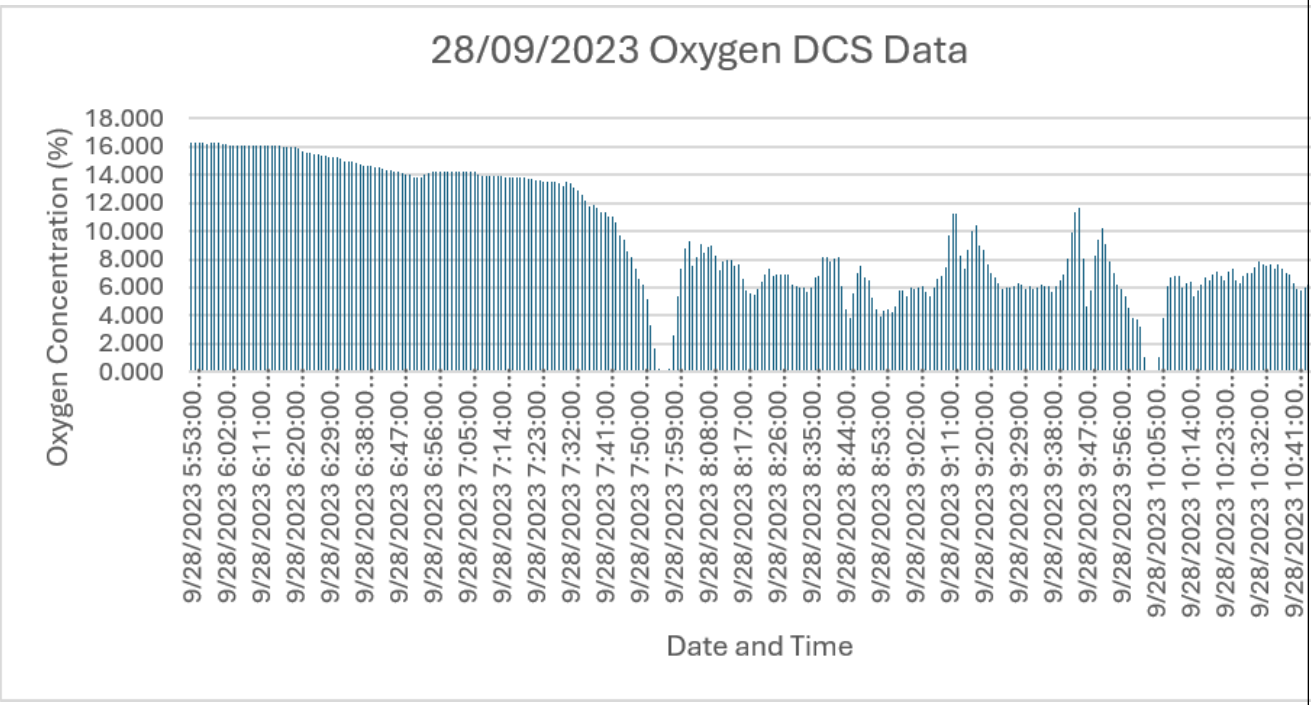
The Line 2 SU-SD DCS data show that total steam flow after 08:00 was intermittent, with distinct reductions corresponding to boiler trips and recovery cycles. Steam trends alone cannot be relied upon as evidence of continuous operation. The presence of steam at other times reflects short periods of

recovery or stabilisation, rather than sustained waste incineration.

These findings are consistent with Viridor's witness accounts describing a highly unstable plant condition, characterised by repeated trips of key systems repeated trips affecting feed systems, combustion air fans and boiler operation, as well as wider issues such as turbine and feed pump reliability. In such conditions, intermittent steam generation and reduced heat removal efficiency would be expected, reinforcing that steam trends cannot be interpreted as evidence of continuous steady incineration.

Overall, the steam and temperature behaviour demonstrates that the plant was experiencing an unstable operating condition characterised by repeated trips, operational interventions and periods of reduced heat removal. Whilst the observed steam and temperature profiles are not indicative of stable, steady-state operation, neither do they demonstrate that combustion ceased immediately following the cessation of waste charging. When considered alongside the continued movement of waste through the feed system, sustained temperatures above 850°C, oxygen concentrations below 15%, and evidence that waste continued to be available for combustion, the available evidence indicates that combustion activity continued for a substantial period after the line transitioned to an incineration-off state within the control system. This issue is relevant to the assessment of whether the non-reportable status accurately reflected the physical state of the plant at the time.

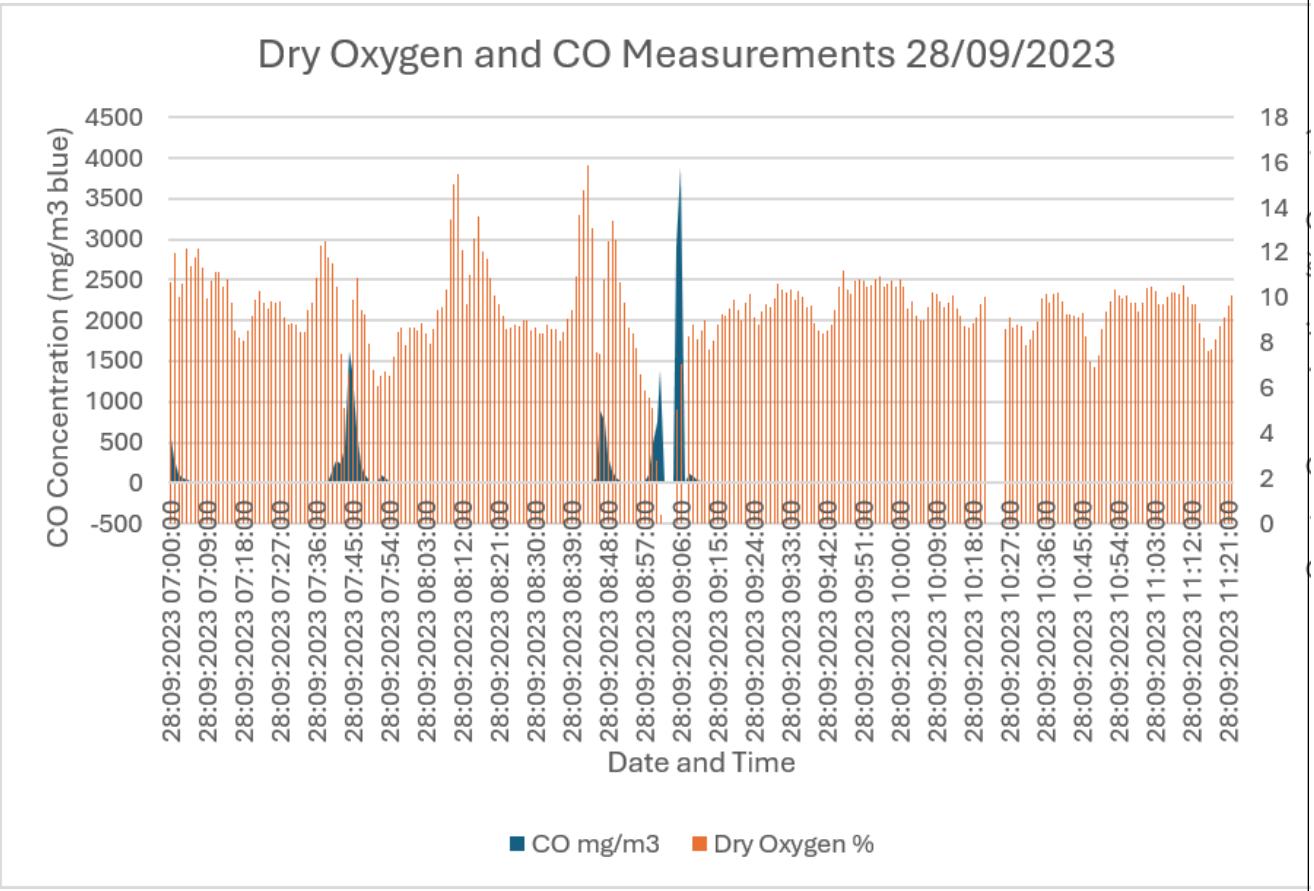
Oxygen



On 28/09/2026, DCS oxygen gradually decreased from 05:53 as the boiler was ramped up on burners. At 07:37, both dampers were opened and waste feeding commenced. At approximately 07:50, the post-combustion oxygen measured by the DCS dropped sharply. This coincides with a pronounced increase in CO concentrations between 07:50 and 07:59, as recorded in the daily CO report (see table below). The incinerator "ON" signal was triggered at 07:53. At 08:00, waste feeding was stopped following a further potential 10-minute CO exceedance (a potential seventh within the rolling 24-hour

period), with the intention of running waste off the grate and stabilising boiler conditions. At approximately 08:10, the dampers were indicated as closed within the DCS and the incinerator 'OFF' signal was triggered. Viridor's subsequent investigation concluded that the damper position feedback did not reflect the physical position of the dampers and that they remained physically open. Consequently, the oxygen behaviour observed after 08:10 should be interpreted alongside the evidence of continued waste movement through the feed system, rather than on the basis that the dampers had physically closed and combustion had ceased.

In contrast, the dry oxygen concentration measured at the stack for compliance purposes remains relatively constant throughout this period (see table below). CO emissions data have been included alongside oxygen data for comparison; however, the relationship between the two is not immediately intuitive. The stack oxygen data appear to be already corrected and/or averaged, which may explain why short-term combustion instability evident in the DCS oxygen signal and CO emissions is not reflected in the compliance oxygen trends. This likely reflects differences in measurement location, time averaging, and data correction between the control (DCS) and compliance monitoring systems, rather than an absence of genuine combustion disturbance during the event.

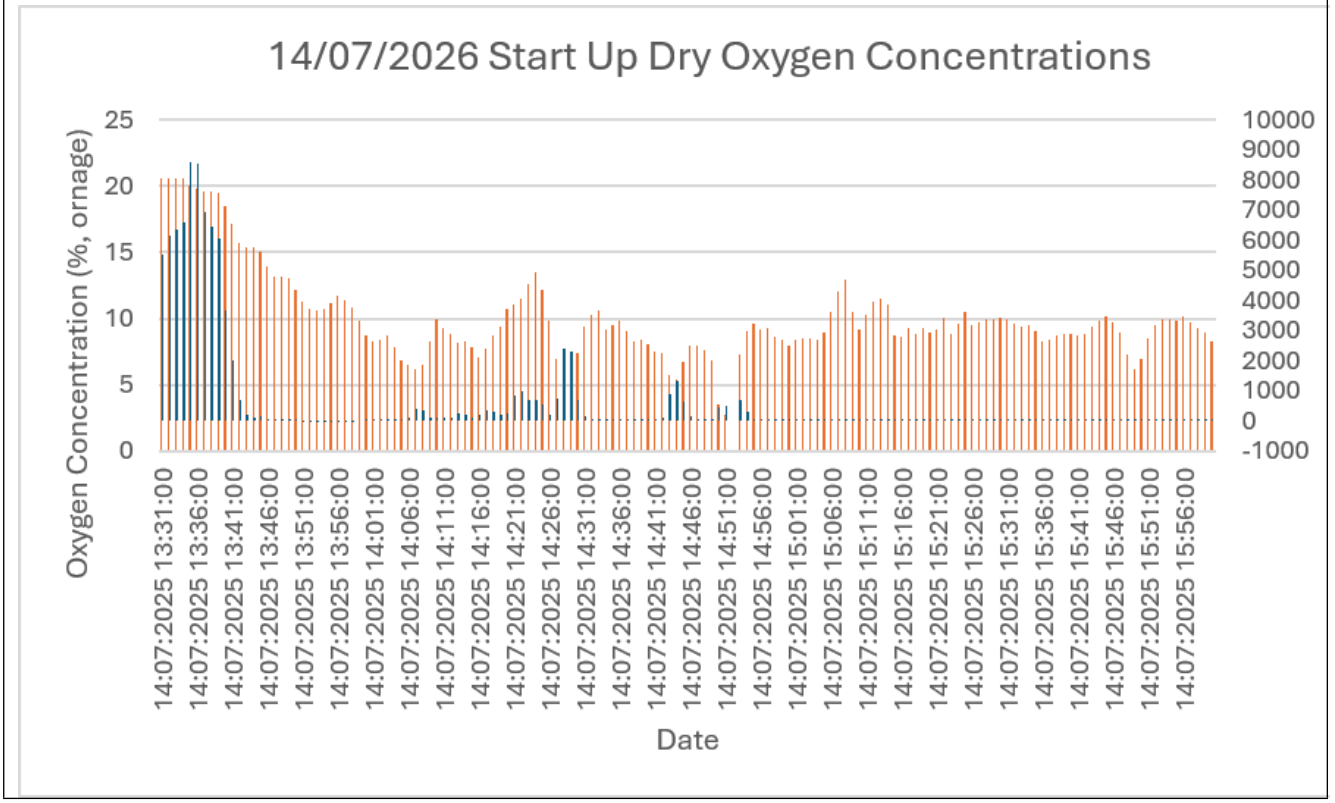


CO vs Dry Oxygen:

File Type	Da	Date	HCl mg/m3	CO mg/m3	CO2 %	NOx mg/m	NO mg/m3	NO2 mg/m	VOC mg/m	Moisture %	Dry Oxygen %	Wet Oxyge
COR	X	28:09:2023 07:47:00	5.32	230.01	9.56	105.17	65.47	1.3	-3.51	14.06	9.47	8.14
COR	X	28:09:2023 07:48:00	5.33	88.43	9.52	140.4	87.4	1.22	-4.26	14.78	9.3	7.93
COR	X	28:09:2023 07:49:00	4.71	30.16	8.67	144.85	90.16	0.85	N/A	15.55	7.95	6.71
COR	X	28:09:2023 07:50:00	4.62	13.17	8.44	175.1	109	1.36	N/A	17.35	6.78	5.6
COR	X	28:09:2023 07:51:00	4.66	10.87	8.82	186	115.78	1.52	-4.08	19.27	6.09	4.91
COR	X	28:09:2023 07:52:00	4.75	88.01	9.75	170.04	105.84	1.27	N/A	20.3	6.53	5.21
COR	X	28:09:2023 07:53:00	4.87	56.47	9.91	191.9	119.45	1.51	N/A	19.99	6.73	5.39
COR	X	28:09:2023 07:54:00	4.9	24.59	9.63	203.27	126.53	1.97	N/A	19.73	6.57	5.27
COR	X	28:09:2023 07:55:00	5.43	12.74	10.31	208.06	129.51	2.21	N/A	19.94	7.39	5.92
COR	X	28:09:2023 07:56:00	5.91	7.73	11.06	229.34	142.76	2.88	N/A	19.38	8.52	6.87
COR	X	28:09:2023 07:57:00	5.72	7.13	10.27	257.23	160.12	2.47	N/A	18.04	8.71	7.14
COR	X	28:09:2023 07:58:00	5.2	6.66	9.23	236.19	147.02	2.03	N/A	17.25	7.9	6.53
COR	X	28:09:2023 07:59:00	5.63	19.46	10.03	222.25	138.34	2.02	N/A	17.7	8.67	7.13
COR	X	28:09:2023 08:00:00	5.67	13.02	9.84	235.77	146.76	2.3	N/A	17.11	8.68	7.19
COR	X	28:09:2023 08:01:00	6.13	9.67	9.59	235.67	146.7	2.28	N/A	16.83	8.56	7.12
COR	X	28:09:2023 08:02:00	6.34	6.8	9.9	247.78	154.24	2.89	N/A	16.98	8.87	7.36
COR	X	28:09:2023 08:03:00	6.27	5.88	9.39	256.59	159.72	2.64	N/A	16.92	8.43	7
COR	X	28:09:2023 08:04:00	6.29	6.91	9.2	266.12	165.65	3.13	N/A	17.62	8	6.59
COR	X	28:09:2023 08:05:00	6.44	6.77	9.94	275.38	171.42	2.87	N/A	18.32	8.61	7.04
COR	X	28:09:2023 08:06:00	6.77	6.23	10.58	300.48	187.04	3.12	N/A	17.99	9.49	7.78
COR	X	28:09:2023 08:07:00	6.61	6.13	10.22	312.89	194.77	3.48	N/A	17.08	9.62	7.98
COR	X	28:09:2023 08:08:00	7.02	5.2	10.69	325.18	202.42	3.53	N/A	16.49	10.39	8.68
COR	X	28:09:2023 08:09:00	9.45	6.67	14.34	421.59	262.43	4.65	N/A	16.01	13.45	11.3

CO Log:

07:00 to 07:09	Off	08:00 to 08:09	72.50
07:10 to 07:19	Off	08:10 to 08:19	Off
07:20 to 07:29	Off	08:20 to 08:29	Off
07:30 to 07:39	Off	08:30 to 08:39	Off
07:40 to 07:49	Off	08:40 to 08:49	Off
07:50 to 07:59	1591.03	08:50 to 08:59	Off



Comparison with the only available startup dataset for reference (14/07/2025), using corrected ("CORR") data, shows a broadly similar oxygen profile. During the 14/07/2025 startup, the waste dampers were opened at 13:54; however, the incineration "ON" signal did not switch to reportable status until 15:25. When compared, the corrected oxygen profiles for 28/09/2023 and 14/07/2025 appear broadly comparable, and no clear distinction can be drawn between the two events based on oxygen behaviour alone. As such, limited inference can be made from the corrected oxygen data regarding the cause of the observed CO exceedance on 28/09/2023.

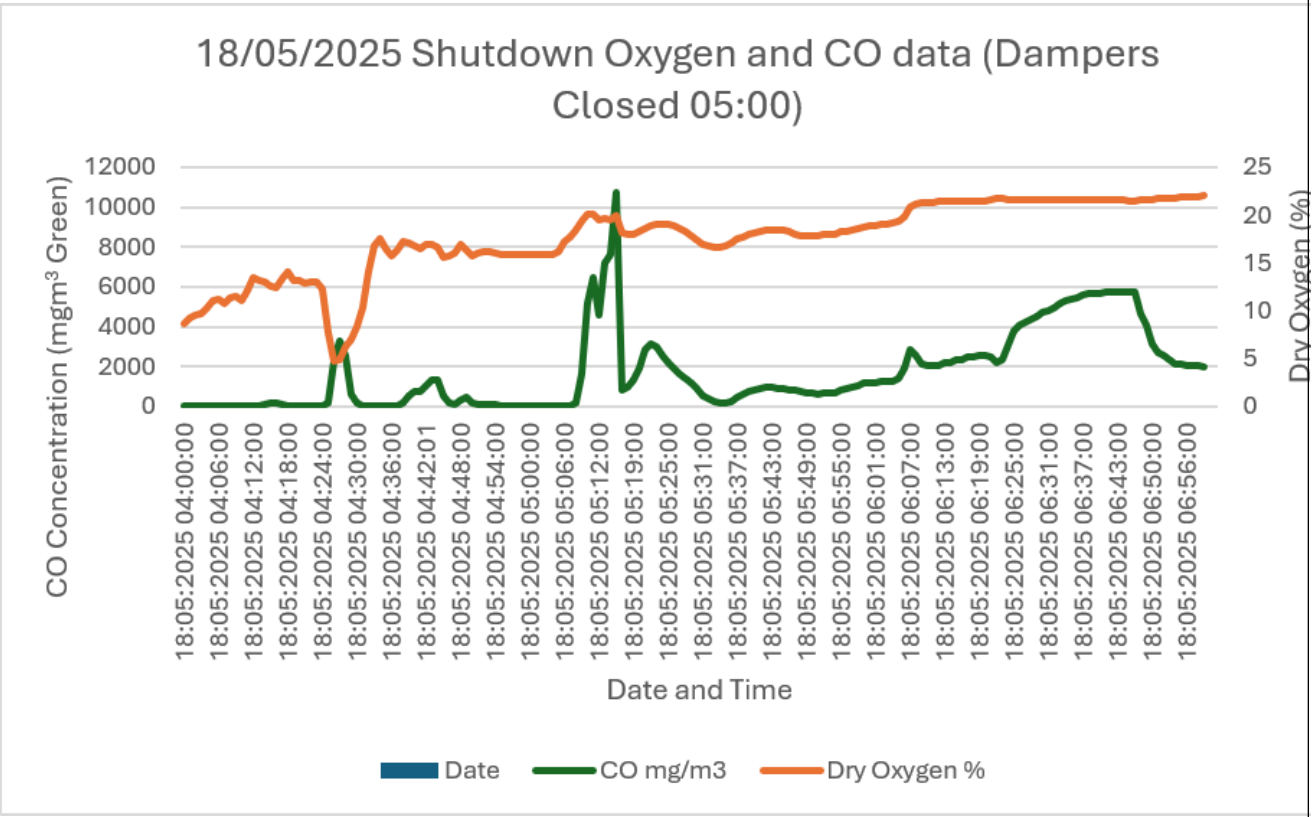
Attempts were also made to compare oxygen behaviour following damper closure with other shutdown scenarios. On 28/09/2023, oxygen concentrations remained consistently low (approximately 8-9%) between damper closure at 08:09 and reopening at 09:49. In contrast, during a planned shutdown on 18/05/2025, oxygen concentrations increased from approximately 10% at 04:00 to greater than 16% by 05:00, when the dampers were closed (see graph below). The refined second-by-second DCS data shows the CEMS switching to non-reportable at approximately 05:08 following the commencement of burner oil flow at approximately 05:07:25. At the time burner operation commenced, T2S remained approximately 987°C and steam generation approximately 75 t/h, indicating combustion conditions remained elevated. Oxygen concentrations continued to increase thereafter.

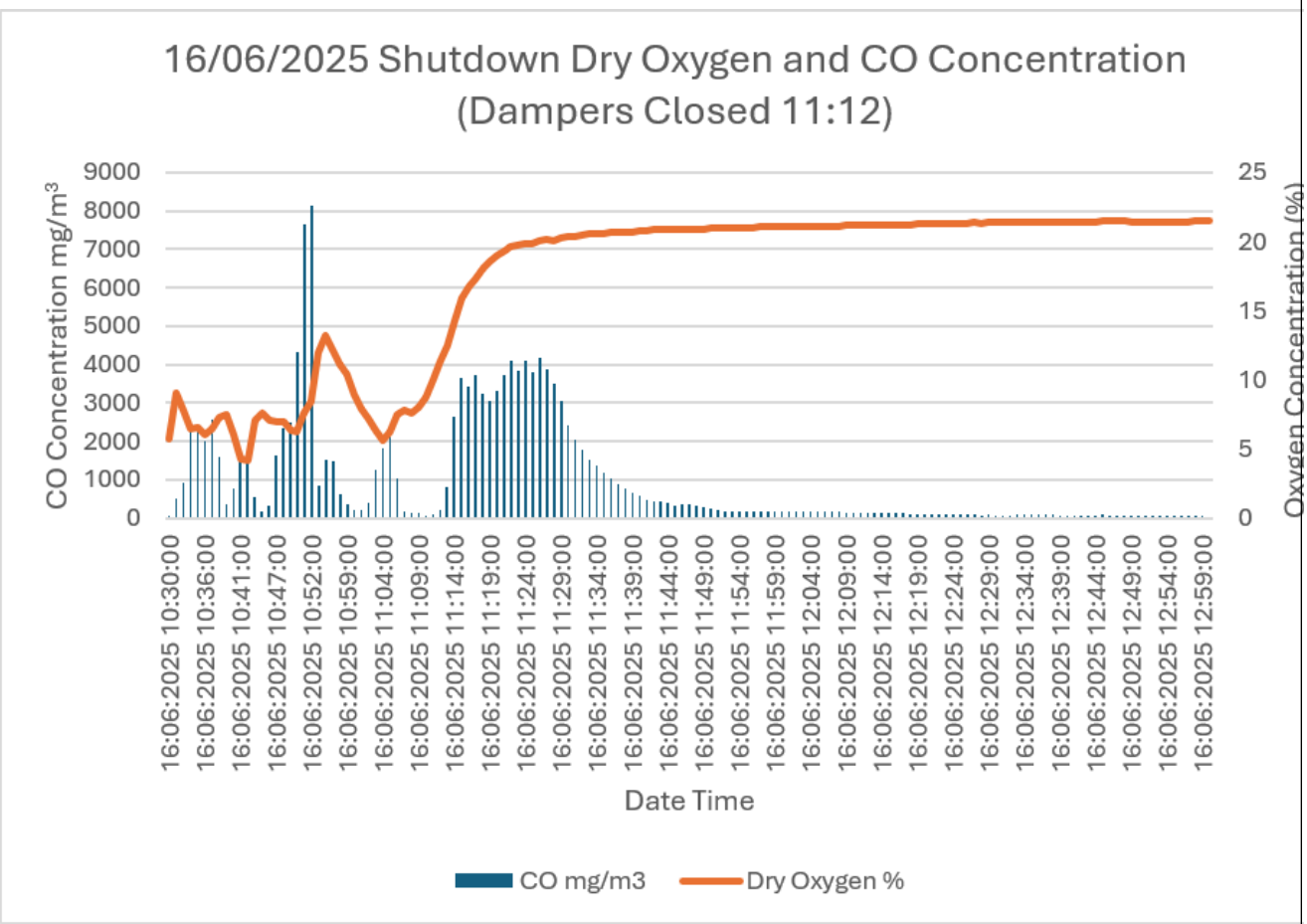
Similarly, on 16/06/2025, oxygen concentrations rose rapidly following damper closure at 11:12 (see graph below). The CEMS again switched to non-reportable when the burner was activated for approximately one minute. Whilst the available 1-minute average temperatures remained above 900°C, the instantaneous temperatures used to initiate burner operation were not available and therefore the precise trigger for burner activation could not be verified. On 24/08/2025, dampers were closed at 17:26 when oxygen concentrations were already elevated (approximately 18%). At 18:00, the CEMS switched to non-reportable when the burners came on and remained in operation.

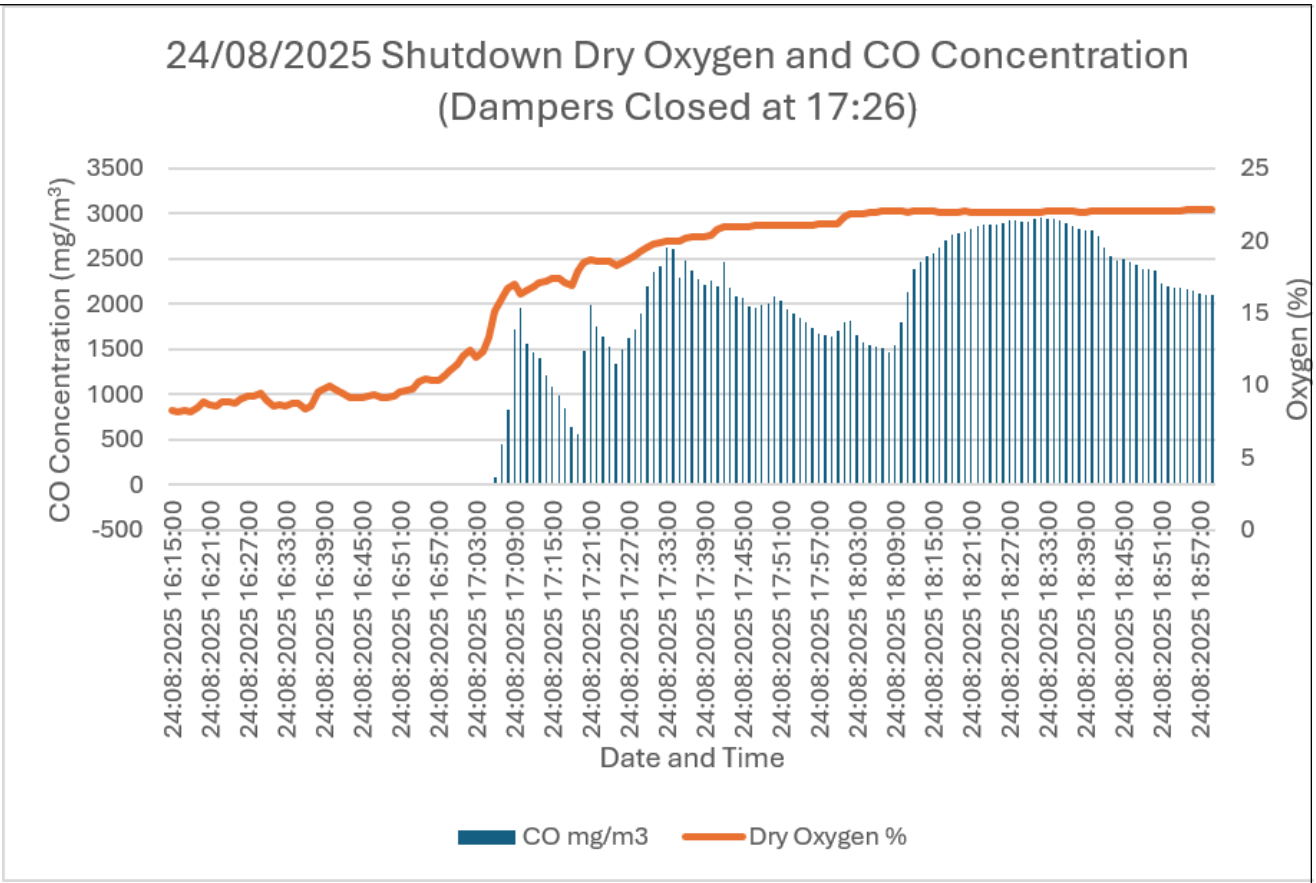
Notwithstanding the limitations associated with comparing planned and unplanned shutdown events, Viridor's own investigation attached particular significance to the oxygen trends observed on the 28th September 2023. The investigation concluded that, during the period when the incineration signal remained OFF, stack oxygen concentrations remained consistently below 15%, which Viridor considered indicative of continuing combustion. This contrasts with the earlier shutdown event commencing at approximately 03:24, where oxygen concentrations gradually increased above 15% following cessation of combustion. Viridor therefore considered the oxygen behaviour during the 08:10-09:49 period to be consistent with ongoing waste combustion, notwithstanding the line's classification within the control system as being in an incineration-off state.

Whilst oxygen concentrations alone cannot definitively determine whether the line remained in operation, they provide an important indicator when considered alongside the wider process data. In particular, the persistence of oxygen concentrations below 15% throughout the period in which the incineration signal remained OFF contrasts with the oxygen increases observed during comparative shutdown events and with the earlier genuine shutdown on 28/09/2023. When considered together with the feed chute level trends, anomalous damper status signals, the absence of feed chute low-level indications, the continued availability of waste for combustion and sustained T2S temperatures, the oxygen data support Viridor's conclusion that combustion continued after the line had transitioned to

a non-reportable state within the control system.







Burner Operations

The Environment Agency guidance on deriving start-up and shut-down definitions, although published after 2023, provides useful context on expected operational practice. It notes that support burners are commonly used during shutdown to maintain the required combustion temperature while residual waste burns out, but that burner status is not typically used as a defining criterion for identifying the transition out of normal operating conditions. Instead, the transition into shutdown is primarily determined by combustion conditions, particularly oxygen behaviour and the ability to maintain stable emissions control.

This is significant because it indicates that, while support burners may legitimately operate during shutdown, their operation alone does not determine whether a plant remains in normal operation for emissions reporting purposes.

At this facility, however, burner operation formed a direct input to the control logic used to determine the "Incineration On/Off" status and, consequently, whether CEMS data remained reportable. As a result, burner status had the potential to influence emissions reportability independently of wider combustion conditions.

While support burners play an essential role in maintaining combustion temperatures during periods of declining combustion, their inclusion within the reportability logic introduces a dual function. Burner activation therefore acts not only as a process-control measure, but also as a condition affecting emissions data classification.

For this reason, burner operation cannot be considered in isolation. It must be assessed alongside other

operational indicators including damper position, oxygen concentration, steam generation and waste feed status, all of which contribute to defining the operational state of the plant.

Where burner activation occurs in circumstances where temperature trends and other process indicators do not indicate a significant deterioration in combustion conditions, its significance extends beyond temperature support and into the area of emissions reportability. Comparison with other shutdown events is therefore necessary to determine whether observed burner behaviour is consistent with normal operational practice or indicative of a pattern affecting emissions reporting.

The permit requires each line to be equipped with at least one auxiliary burner, which must be operated during start-up, shut-down and as necessary during operation to ensure that combustion chamber temperatures are maintained while incompletely burned waste is present. The permit also prohibits the charging of waste where the combustion chamber temperature is below 850°C. Taken together, these requirements establish the regulatory purpose of the burners as maintaining adequate combustion conditions and preventing operation below the minimum combustion temperature, rather than determining emissions reporting status in their own right.

The recent site procedure (ERF-TPK-SOPRA-OPS-201) similarly indicates that burner operation is intended to support combustion temperature control during shutdown:

"...manually decrease the burner loads... Monitor T2S to ensure stability... burners... may be required should T2S drop in temperature (905°C)."

Although the 905°C reference is taken from a more recent operational procedure and may not necessarily represent the exact burner trigger settings that applied during all historical events reviewed, it provides a useful indication of the temperatures at which burner support would normally be expected to become necessary.

Event Comparison – August 2025:

On 24/08/2025, shutdown behaviour followed an expected sequence:

- Dampers closed while combustion conditions remained stable.
- Oxygen rose (18.46%) while steam generation remained relatively high (77 t/h).
- Burners initially remained off.
- CEMS data remained reportable.

Only later, as the 1-minute average T2S temperature declined towards the apparent control threshold (approximately 909°C), did the burners activate. At this point, and in conjunction with other shutdown conditions, the CEMS transitioned to non-reportable status.

Importantly, T2S remained above the permit minimum temperature of 850°C at the point of transition, demonstrating that burner activation occurred in advance of complete combustion decline but formed part of a logical and progressive shutdown sequence.

Event Comparison – June 2025:

The event on 16/06/2025 presents a broadly similar scenario.

At 11:12-11:13:

- Dampers closed.
- Steam generation approximately 49 t/h.
- Oxygen approximately 11-14%.
- T2S approximately 926-952°C.
- Burners off.
- CEMS reportable.

At 11:14:

- Burner activated.
- CEMS immediately became non-reportable.

Subsequent trends show:

- T2S increasing to approximately 988°C and above.
- Steam generation increasing.
- Oxygen rising later to above 20%.
- Combustion continuing without sustained burner support.

Viridor has noted that burner activation is triggered using instantaneous temperature values rather than the 1-minute averages available to NRW. Consequently, it has not been possible to verify the precise temperature that initiated burner operation. If burner activation occurred in accordance with the operational control philosophy, an instantaneous temperature excursion below the relevant trigger threshold may have occurred during the period between 11:13 and 11:14.

Following burner activation, temperatures recovered and subsequently exceeded 1000°C for a sustained period. The activation of the burner nevertheless coincides with the transition of the CEMS from reportable to non-reportable status.

Event Comparison – May 2025:

A different pattern is observed on 18/05/2025. At approximately 05:00, both feed chute dampers closed while combustion conditions remained strong, with T2S exceeding 1050°C, steam generation approximately 81 t/h and the burners off. The plant remained classified as "Incineration On".

The refined DCS data shows burner oil flow commencing at approximately 05:07:25. At this time, T2S was approximately 987°C and steam generation remained approximately 75 t/h. These conditions do not, on their face, indicate a significant deterioration in combustion conditions and remained substantially above both the permit minimum temperature of 850°C and the 905°C temperature

referenced in the current shutdown procedure as the point at which burner support may be required.

Following burner initiation, T2S increased rapidly, exceeding 1100°C by approximately 05:08:03 while steam generation remained above 74 t/h. The "Incineration On" signal subsequently changed from 1 to 0 at approximately 05:08:04, coinciding with burner operation rather than any obvious deterioration in the recorded combustion indicators.

This indicates that, for this event, burner operation formed a significant input to the logic determining incineration status and emissions reportability. Whilst the available data cannot determine the instantaneous temperatures used by the burner control system, the recorded temperatures immediately prior to burner initiation remained substantially above the temperatures at which burner support would ordinarily be expected to become necessary under the current shutdown procedure.

Subsequent trends show that sustained burner engagement was not required at this stage. It was not until approximately 05:42, when T2S had declined to around 973°C and steam generation had reduced significantly to approximately 36 t/h, that burner operation became more readily aligned with an identifiable temperature-support function, at which point burners remained in service as combustion conditions continued to decline.

Taken together, this sequence indicates that the initial burner activation shortly after damper closure was not clearly associated with a sustained operational requirement for temperature support. Instead, the timing of burner activation closely coincides with the transition of CEMS data to a non-reportable state and is consistent with burner status forming an input to the control logic governing emissions reportability. This matter will require further consideration as part of the continued SU and SD audit planned for later in the year.

The circumstances on 28/09/2023 differ materially from the planned shutdown events discussed above because the burners were already operating legitimately as part of the start-up sequence.

At approximately 08:08, both feed chute dampers were open, oxygen concentrations were below 15%, steam production exceeded 48 t/h and burners were in service. Under these conditions, CEMS data appropriately remained reportable, as reflected in the DCS records.

Beyond this point, CEMS data could only transition to a non-reportable state if one or more of the following conditions were met:

- Closure of the feed chute dampers;
- Oxygen concentration exceeding 15%; or
- Steam flow falling below the 48 t/h reporting threshold.

Oxygen concentrations remained below 15% until at least 10:50, the end of the available dataset, while steam generation remained above the reporting threshold until approximately 08:41. Accordingly, feed chute damper closure represented the only remaining mechanism capable of triggering a transition to non-reportable status during this period. Viridor's own investigation reached a similar conclusion from its review of the process data. The investigation noted that T2S remained consistently elevated between approximately 08:10 and 09:50 despite the absence of burner activity, and that oxygen concentrations remained below 15% throughout much of this period. Viridor considered these

conditions indicative of continuing combustion after the incineration signal had transitioned to OFF. This is relevant because it demonstrates that, notwithstanding the loss of reportable status within the control system, key combustion indicators continued to suggest an active stable combustion process

When the planned shutdown events are compared with the circumstances on 28/09/2023, an important structural difference emerges. During planned shutdowns, multiple control logic pathways were available to facilitate a transition of CEMS data to non-reportable status, including short-duration burner activation following damper closure. On 28/09/2023, by contrast, the shutdown was reactive and occurred during a start-up sequence in which burners were already operating, whilst oxygen concentration and steam generation remained within ranges indicative of ongoing incineration.

As a result, the control logic conditions that had facilitated non-reportable transitions during planned shutdowns were not available. Under these circumstances, alteration of the feed chute damper status represented the only remaining mechanism capable of triggering a change in CEMS reportability.

Oxygen Corrections on CO Emissions

A review of CEMS data from planned shutdown events indicates that carbon monoxide concentrations typically increase following physical closure of the feed chute dampers (see graphs and tables below). This behaviour is consistent with known combustion dynamics during shutdown, where airflow restriction, altered mixing, and residual waste burnout can transiently degrade combustion quality before temperatures and emissions stabilise.

On 28/09/2023, such an increase in CO was not observed immediately following the point at which the dampers were recorded as closed (see table below). This divergence is readily explained by the subsequently established fact that the dampers were not physically closed at that time, but were instead made to appear closed to the control system through manipulation of proximity switch feedback. As a result, airflow and combustion conditions were not disrupted in the manner normally associated with damper closure.

28/09/2025		
Date	CO mg/m3	Dry Oxygen %
28:09:2023 08:09:00	6.67	13.45
28:09:2023 08:10:00	6.6	15.02
28:09:2023 08:11:00	5.52	15.51
28:09:2023 08:12:00	3.8	12.1
28:09:2023 08:13:00	4.86	9.71
28:09:2023 08:14:00	5.88	11
28:09:2023 08:15:00	6.14	12.65
28:09:2023 08:16:00	6.89	13.6
28:09:2023 08:17:00	6.57	12.04
28:09:2023 08:18:00	7.21	11.72
28:09:2023 08:19:00	6.1	10.9
28:09:2023 08:20:00	4.76	10.13
28:09:2023 08:21:00	3.76	9.71
28:09:2023 08:22:00	3.24	9.23
28:09:2023 08:23:00	3.18	8.64
28:09:2023 08:24:00	3.34	8.69
28:09:2023 08:25:00	3.77	8.8
28:09:2023 08:26:00	3.43	8.77
28:09:2023 08:27:00	3.23	9
28:09:2023 08:28:00	3.27	9.03
28:09:2023 08:29:00	2.93	8.57

Given that the shutdown on 28/09/2023 was reactive and occurred in the context of elevated CO and approaching or achieved compliance thresholds, it is foreseeable that operators would have been aware that a compliant, physical shutdown sequence carried a risk of further reportable CO exceedances during the transitional period to when the CEM's data becomes unreportable. In this context, the alteration of damper feedback had the effect of transitioning CEMS data to a non-reportable state without inducing the combustion instability typically associated with physical damper closure.

While this does not demonstrate intent to conceal emissions, it highlights a critical vulnerability within the shutdown logic, whereby emissions reporting status can be altered independently of physical plant condition at a point of known emissions sensitivity. Viridor have since implement a 2-hour delay on the feed chute dampers in the incineration signal logic to prevent damper closure generating an instantaneous incineration off signal.

Although the Environment Agency guidance on deriving start-up and shut-down definitions for waste incinerators and co-incinerators post-dates the incident of 28/09/2023, it is directly relevant to understanding the underlying technical and regulatory issues in this case. The guidance does not introduce new emissions behaviour; rather, it articulates established

principles concerning combustion stability, oxygen correction, and the point at which emissions data cease to be meaningful for compliance purposes.

The guidance is therefore used here interpretatively, to provide context for assessing whether the control logic and reporting outcomes observed in 2023 and 2025 align with the physical realities of incineration and the regulator's stated intent. In particular, it clarifies the circumstances under which oxygen-corrected emissions values become unreliable and the expected role of various process indicators, including oxygen concentration and support burner operation, in defining the transition from normal operating conditions (NOC) to shutdown (SD).

The guidance explicitly highlights a fundamental limitation of oxygen-corrected emissions at elevated oxygen concentrations. As oxygen concentration approaches ambient conditions (~21% O_2), the oxygen correction factor increases non-linearly, tending towards infinity. As a result, relatively modest measured CO concentrations can be transformed into extremely large corrected values.

18/05/2025			16/06/2025			24/08/2025		
Date	CO mg/m3ry	Oxygen	Date	CO mg/m3ry	Oxygen	Date	CO mg/m3	Dry Oxyg
18:05:2025 05:00:00	11.77	15.87	16:06:2025 11:12:00	228.35	11.33	24:08:2025 17:26:00	1499.8	
18:05:2025 05:01:00	10.63	15.87	16:06:2025 11:13:00	811.32	12.46	24:08:2025 17:27:00	1617.44	
18:05:2025 05:02:00	9.9	15.84	16:06:2025 11:14:00	2629.01	14.27	24:08:2025 17:28:00	1721.41	
18:05:2025 05:03:00	11.85	15.84	16:06:2025 11:15:00	3647.92	15.91	24:08:2025 17:29:00	1892.3	
18:05:2025 05:04:00	11.01	15.81	16:06:2025 11:16:00	3420.74	16.75	24:08:2025 17:30:00	2191.03	
18:05:2025 05:05:00	10.85	15.87	16:06:2025 11:17:00	3715.26	17.38	24:08:2025 17:31:00	2358.42	
18:05:2025 05:06:00	14.39	16.11	16:06:2025 11:18:00	3224.4	18.1	24:08:2025 17:32:00	2423.43	
18:05:2025 05:07:00	16.36	17.16	16:06:2025 11:19:00	3037.01	18.6	24:08:2025 17:33:00	2624.17	
18:05:2025 05:08:00	16.65	17.73	16:06:2025 11:20:00	3301.15	19.01	24:08:2025 17:34:00	2607.65	
18:05:2025 05:09:00	190.19	18.43	16:06:2025 11:21:00	3722.94	19.32	24:08:2025 17:35:00	2288.46	
18:05:2025 05:10:00	1623.3	19.4	16:06:2025 11:22:00	4083.4	19.61	24:08:2025 17:36:00	2486.43	
18:05:2025 05:11:00	5139.41	20.11	16:06:2025 11:23:00	3846.82	19.72	24:08:2025 17:37:00	2368.39	
18:05:2025 05:12:00	6449.23	20.16	16:06:2025 11:24:00	4080.6	19.85	24:08:2025 17:38:00	2280.14	
18:05:2025 05:13:00	4609.73	19.42	16:06:2025 11:25:00	3790.28	19.86	24:08:2025 17:39:00	2211.13	
18:05:2025 05:14:00	7174.86	19.63	16:06:2025 11:26:00	4165.63	20.03	24:08:2025 17:40:00	2261.7	
18:05:2025 05:15:00	7607.62	19.49	16:06:2025 11:27:00	3885.2	20.11	24:08:2025 17:41:00	2198.42	
18:05:2025 05:16:00	10698.74	19.9	16:06:2025 11:28:00	3505.68	20.09	24:08:2025 17:42:00	2461.6	
18:05:2025 05:17:00	N/A	N/A	16:06:2025 11:29:00	3034.43	20.29	24:08:2025 17:43:00	2177.94	
18:05:2025 05:18:00	815.7	18.08	16:06:2025 11:30:00	2428.93	20.39	24:08:2025 17:44:00	2077.19	
18:05:2025 05:19:00	991.98	17.96	16:06:2025 11:31:00	2051.09	20.4	24:08:2025 17:45:00	2063.98	
18:05:2025 05:20:00	1298.49	17.94	16:06:2025 11:32:00	1763.46	20.51	24:08:2025 17:46:00	1973.14	

Review of the corrected CO data for planned shutdowns, particularly the event on 24/08/2025 (Appendix 3), demonstrates this effect clearly. During this period, oxygen concentrations rise steadily above approximately 15% as waste combustion winds down. In parallel, corrected CO concentrations escalate rapidly into the hundreds and thousands of mg/m³ (table above), leading to multiple reported 10-minute average exceedances within a short time window.

These exceedances occur during periods when:

- waste feed has ceased,
- combustion is declining but still ongoing,
- oxygen levels are increasing towards ambient conditions, and

- the mathematical validity of oxygen correction is rapidly deteriorating.

This strongly suggests that a proportion of these exceedances during shutdown periods are artefacts of the correction methodology rather than indicators of a loss of controllable combustion performance. This is precisely the problem that the guidance seeks to address by recommending an oxygen-based threshold for defining the start of shutdown, typically around 15% dry oxygen.

The data indicates that the shutdown logic in place during the reviewed periods allowed the plant to remain in reportable (NOC) status well beyond the point at which oxygen concentrations exceeded levels regarded by the guidance as reliable for corrected emissions reporting.

By maintaining reportable status during high-oxygen conditions:

- corrected CO values become increasingly dominated by mathematical amplification rather than combustion behaviour; and
- operators are exposed to repeated, rapid compliance exceedances during a phase of operation where emissions stability is inherently diminishing and increasingly uncontrollable.

This creates a structural compliance risk during shutdown that is not driven by operator negligence or poor combustion control, but by the interaction between process physics and the reporting framework. In effect, the logic configuration allows the plant to remain subject to ELVs during a period where the correction methodology is known to be unreliable.

NRW also notes that, unlike the planned shutdown events used for comparison, Viridor's investigation concluded that oxygen concentrations remained below 15% throughout much of the period in which the line was classified as "Incineration OFF". Viridor considered this indicative of continuing combustion. This distinction is important because the oxygen-correction effects discussed above principally arise once oxygen concentrations increase towards ambient conditions. Accordingly, whilst oxygen-correction may explain elevated corrected CO concentrations during some planned shutdown events, they do not fully explain the circumstances observed on 28/09/2023, where combustion indicators remained consistent with ongoing combustion despite the line being classified as non-reportable.

Within this context, the operational data suggest that support burner status had, in practice, assumed a role beyond that envisaged by regulatory guidance. In one planned shutdown (18/05/2025) a brief activation of burners at high furnace temperatures and under stable combustion conditions appears closely aligned with the transition of CEMS data from reportable to non-reportable status.

The guidance makes clear that support burners:

- may legitimately operate during shutdown to maintain minimum temperatures while waste burns out; but
- are not normally required to be included as a defining criterion for shut-down.

However, where shutdown definitions and control logic rely heavily on burner status, burner activation becomes a convenient mechanism to satisfy logic conditions and exit an increasingly compliance-sensitive reporting regime. This is particularly relevant where oxygen-based thresholds

are set too high, or where oxygen is not the primary determinant of shutdown status.

The evidence does not require an assumption of deliberate intent. Rather, it demonstrates how the configuration of the logic can drive operational behaviour by making certain actions disproportionately effective in managing reporting outcomes, even where those actions are not driven by combustion necessity.

Further evidence of the significance of reportability logic was identified during NRW's review of a subsequent incident in 2024 (CAR_NRW0045070). During that investigation, Viridor identified that the oxygen threshold used within the "Incineration in Operation" logic had been incorrectly configured at 20% rather than 15%. This resulted in the plant remaining erroneously classified as "Incineration in Operation" and associated emissions being reported when, according to the intended logic, the incineration status should have been "Off". While unrelated to the circumstances of 28/09/2023, the incident demonstrates that relatively small configuration errors within the reportability logic were capable of materially affecting whether emissions were classified as reportable or non-reportable. This reinforces the importance of examining the interaction between process conditions, logic inputs and reporting outcomes when assessing the events of 28/09/2023.

Against this background, the circumstances of 28/09/2023 can be better understood. Unlike the planned shutdowns examined, this event was reactive and occurred during a startup sequence in which:

- support burners were already operating legitimately,
- oxygen concentrations remained below 15%,
- steam generation remained above the reporting threshold, and
- combustion indicators continued to reflect normal operating conditions.

As a result, the logic pathways that appear to have facilitated transitions to non-reportable status during planned shutdowns, most notably burner activation, were not available. Oxygen and steam conditions also remained within ranges that preserved reportable status.

Under these constraints, feed chute damper status represented the only remaining logic input capable of triggering a transition of CEMS data to non-reportable status. Normal physical damper closure would be expected to take time and, based on evidence from planned shutdowns, would likely introduce combustion instability and elevated corrected CO during a period of acute compliance sensitivity.

The manipulation of damper feedback, rather than physical damper position, therefore had the effect of achieving an immediate logic transition without disrupting combustion conditions or inducing the CO behaviour typically associated with genuine shutdown actions. This does not, of itself, demonstrate intent to conceal emissions, but it highlights a critical vulnerability in the shutdown logic whereby reporting status can be decoupled from physical plant condition at precisely the point where emissions compliance risk is highest. Again, this is something that will be addressed in the up and coming SU& SD audit later this year.

Viridor's investigation identified two further 10-minute CO exceedances occurring between 08:40-08:49 and 09:40-09:49 whilst the line was classified as "Incineration OFF". As the line was considered

non-reportable during this period, these exceedances were not included within compliance reporting. NRW notes that the significance of these exceedances cannot be considered in isolation, as the period was also characterised by boiler trips and wider operational instability. Accordingly, the regulatory status of the emissions during this period depends not only on the reportability logic, but also on the assessment of plant operating conditions and whether any part of the event may be considered within the context of OTNOC or shutdown activities.

Damper Operations

Feed chute damper operation is constrained by the requirement for the waste level within the feed chute to fall below the elevation of the dampers before closure can physically occur. This means that following cessation of waste feed, there is an inherent delay while waste already present within the hopper and chute continues to discharge to the grate. Once this condition is met, physical closure of the dampers can be achieved rapidly, typically within approximately 30 seconds following a manual operator command.

Analysis of comparable shutdown events demonstrates that this clearance period typically results in a delay of approximately 40 to 65 minutes between cessation of waste feed and damper closure. This behaviour is consistent across multiple events and reflects the physical constraints of the feed system rather than operator action.

When the incident on the 28th September 2023 is considered, it is important to distinguish between two separate events on that day. An earlier shutdown occurring at approximately 02:23 follows this expected pattern, with a delay of approximately 53 minutes between feed cessation and damper closure. This aligns with other comparable events and confirms the validity of the expected timing range.

By contrast, during the incident under investigation (approximately 07:37 to 08:11), waste feed ceased at approximately 08:01, and the damper status was recorded as “closed” at approximately 08:10. This represents a transition of approximately 9 minutes, which is significantly shorter than the time required for normal feed chute clearance and therefore inconsistent with the physical behaviour of the system.

On its own, this discrepancy indicates that the reported damper position is unlikely to reflect the true physical state of the dampers. This conclusion is independently supported by Viridor’s response to the Regulation 61 Notice, which confirms the manipulation of the feed chute damper closed proximity switches between 08:09:10 and 08:10:15. These plates were used to simulate a “closed” signal to the DCS, resulting in a change in damper status without any corresponding DCS command or physical damper movement.

Taken together, the timing evidence and Viridor’s confirmation demonstrate that the damper position recorded within the control system during this period did not represent the actual physical position of the dampers. Instead, the system response arose from deliberate interference with the damper limit switches. This conclusion is further supported by Viridor's review of the feed chute level trends. The investigation found that feed chute inventory continued to decrease whilst the dampers were indicated as closed. Viridor concluded that this behaviour would not have been possible had the dampers been physically closed, as waste could no longer have passed from the hopper into the feed chute and onto the grate. The continued reduction in feed chute level was therefore considered independent evidence

that the dampers remained physically open despite the closed status presented to the DCS

In this context, it is important to consider whether such intervention could be explained by operational necessity. Given that damper closure occurs rapidly once the feed chute has cleared, and that the controlling factor for timing is the physical reduction in waste level, interference with damper feedback would not be required simply to manage the timing of closure. The manipulation cannot therefore be readily attributed to normal operational constraints associated with feed chute clearance. Viridor's review of historic DCS data also identified the observed signal behaviour as highly anomalous. The transitions from 1→0→2 and subsequently 2→0→1 occurred without any intervening opening or closing command signals and were not representative of normal damper operation. The investigation reported that no comparable examples of damper proximity switch manipulation were identified during its review of operational data from January 2020 to six months after the event.

Witness evidence does not indicate that the feed chute dampers were stuck, malfunctioning, or otherwise unable to operate on the 28th September 2023. While it was acknowledged that damper reliability issues can occasionally arise, for example due to distortion of feed chutes following fire events, no interviewee identified such issues as being present at the time. It should be noted that these accounts were provided retrospectively, with witnesses recalling events from 2023 sometime after they occurred, and therefore some uncertainty remains. However, the available evidence does not suggest that the dampers were subject to a known or widely recognised defect requiring intervention.

Operators also described limited routine interaction with the damper drive and sensor assemblies, indicating that these components would not normally be accessed during standard operation. Taken together, this evidence does not support an explanation whereby interference with damper position signals arose from an identified mechanical issue or operational workaround. Viridor's investigation also noted that the feed chute damper guards are specifically designed to prevent routine access to the proximity switches and should only be removed for maintenance or defect rectification activities undertaken under an authorised safe system of work. No maintenance activity, defect records, work orders or permits were identified which would explain access to, or interference with, the damper proximity switch arrangements on the 28th September 2023.

Viridor's investigation further concluded that the timing of the damper status changes between the two dampers was itself inconsistent with normal operation. Under normal conditions, both dampers would be expected to operate together and indicate open or closed simultaneously. On the 28th September 2023, however, the status changes occurred sequentially, with delays between the two dampers. Viridor considered this pattern consistent with physical intervention at each individual proximity switch rather than with genuine damper movement commanded by the control system.

Accordingly, the most plausible interpretation is that the intervention, if undertaken, was directed not at overcoming a physical limitation in damper operation, but at influencing the system’s representation of damper status within the control logic. This distinction is critical because damper position forms a key input to the determination of whether the incinerator is considered to be “in operation”, and therefore whether emissions data are treated as reportable within the CEMS.

The divergence between the physical state of the plant and the status represented within the control

system is therefore central to understanding the classification of emissions data during this period.

The observations set out above describe how burner and damper status functioned within the control logic and how reporting transitions aligned with operational data; consideration of why particular actions may have been taken is addressed separately in the assessment of potential motive.

Electricity

Upon review of the R1 electrical generation data it can be inferred that both lines were operational prior to 02:30. The shift log records that at 02:30 waste feeding was stopped, with the note “bringing boiler off due to high CO readings.” From this point, electricity output dropped by approximately 50%, which is consistent with one incineration line being taken offline.

At 08:00, waste feeding was again stopped following a further 10-minute CO exceedance (the seventh within the rolling 24-hour period), with the intention of running waste off the grate and re-stabilising boiler and combustion conditions. Electricity generation data show a corresponding reduction in output shortly after 08:00, falling to zero by approximately 09:00, indicating that both lines were offline by this point.

The incinerator is recorded as coming back online at 09:51; however, electricity generation did not resume until approximately 12:30. Electricity output then increased temporarily before declining again from around 13:30, suggesting ongoing operational instability or further interruptions following restart.

Time	Avg (0BBA03GS001XQ19:av)		Avg (0BBA01GS001XQ19:av)		Works Pow	Export kw IF Export kw >0	Imported Kw IF Export kw <0
28/09/2023 01:00:00	37101.4	Good	33217.5	Good	-3,883.90	33,217.46	0.00
28/09/2023 01:30:00	36713.2	Good	32821.2	Good	-3,892.05	32,821.16	0.00
28/09/2023 02:00:00	36822.7	Good	32917.7	Good	-3,905.03	32,917.69	0.00
28/09/2023 02:30:00	35041.1	Good	31176.3	Good	-3,864.80	31,176.31	0.00
28/09/2023 03:00:00	33910.7	Good	29994	Good	-3,916.72	29,994.01	0.00
28/09/2023 03:30:00	28564.4	Good	24709.1	Good	-3,855.35	24,709.09	0.00
28/09/2023 04:00:00	16788.7	Good	13360.6	Good	-3,428.13	13,360.61	0.00
28/09/2023 04:30:00	15901.5	Good	12712.1	Good	-3,189.46	12,712.08	0.00
28/09/2023 05:00:00	17134.9	Good	13976.4	Good	-3,158.53	13,976.35	0.00
28/09/2023 05:30:00	17066.3	Good	13835	Good	-3,231.29	13,834.97	0.00
28/09/2023 06:00:00	16937.7	Good	13676.5	Good	-3,261.28	13,676.45	0.00
28/09/2023 06:30:00	16550.5	Good	13194.1	Good	-3,356.41	13,194.13	0.00
28/09/2023 07:00:00	15869.8	Good	12523.3	Good	-3,346.47	12,523.30	0.00
28/09/2023 07:30:00	15459.3	Good	12066.3	Good	-3,392.98	12,066.33	0.00
28/09/2023 08:00:00	16496.1	Good	13076.9	Good	-3,419.17	13,076.93	0.00
28/09/2023 08:30:00	8339.83	Good	5691.36	Good	-2,648.47	5,691.36	0.00
28/09/2023 09:00:00	0	Good	-3228.2	Good	-3,228.23	0.00	-3,228.23
28/09/2023 09:30:00	0	Good	-3579.6	Good	-3,579.65	0.00	-3,579.65
28/09/2023 10:00:00	0	Good	-4155.5	Good	-4,155.46	0.00	-4,155.46
28/09/2023 10:30:00	0	Good	-4053	Good	-4,052.97	0.00	-4,052.97
28/09/2023 11:00:00	0	Good	-4012.6	Good	-4,012.60	0.00	-4,012.60
28/09/2023 11:30:00	0	Good	-4102.6	Good	-4,102.59	0.00	-4,102.59
28/09/2023 12:00:00	120.418	Good	-4028.8	Good	-4,149.17	0.00	-4,028.75
28/09/2023 12:30:00	7668.23	Good	3563.84	Good	-4,104.39	3,563.84	0.00
28/09/2023 13:00:00	23512.9	Good	19267.8	Good	-4,245.02	19,267.83	0.00
28/09/2023 13:30:00	33541.7	Good	29590.5	Good	-3,951.23	29,590.50	0.00
28/09/2023 14:00:00	12958.5	Good	9743.73	Good	-3,214.77	9,743.73	0.00
28/09/2023 14:30:00	0	Good	-3716.1	Good	-3,716.13	0.00	-3,716.13
28/09/2023 15:00:00	0	Good	-3856	Good	-3,856.01	0.00	-3,856.01
28/09/2023 15:30:00	0	Good	-3604.1	Good	-3,604.11	0.00	-3,604.11
28/09/2023 16:00:00	0	Good	-3384.9	Good	-3,384.87	0.00	-3,384.87

Viridor internal investigation and consideration of motive

Following receipt of the Regulation 61 Notice dated the 13th January 2026, Viridor undertook an internal investigation into the events of the 28th September 2023. The stated purpose of the investigation was to establish the operational sequence of events, understand the reasons for actions taken on the day, and identify any procedural, technical or organisational learning arising from the incident.

Viridor advised that the investigation team was drawn from across its wider operational network rather than relying solely on personnel based at Trident Park. Where practicable, individuals from other sites were seconded to the investigation in order to provide operational expertise whilst maintaining a degree of independence from local management arrangements. According to Viridor, this approach was intended to:

- reduce the potential for local managerial influence; and

- allow interviews to be conducted without perceived pressure or interference from senior staff based at Trident Park.

A number of current operational personnel were interviewed as part of the investigation. However, several individuals who held key roles at, or around, the time of the incident were no longer employed by Viridor and were therefore unavailable for interview. These included the Day Shift Team Leader, members of the night shift operational team, and former engineering and management personnel whose knowledge of events could not be explored further.

Members of Viridor's investigation team attended a pre-planned meeting with NRW on the 22nd April 2026. During that meeting, Viridor was asked whether the internal investigation had identified any motivational factors that may have influenced an individual to undertake the physical intervention with the feed chute damper proximity switches. Viridor stated that no specific motivational factors had been identified.

NRW also asked whether operational staff were subject to incentives linked to environmental performance or plant operation. In response, Viridor provided details of relevant FY24 objectives, which included:

- delivery of zero Category 1 and Category 2 Compliance Classification Scheme (CCS) scores, to support achievement of Band A-C regulatory status;
- contribution to operational EBITDA through achieving a budgeted plant availability of 91.5%; and
- delivery against budgeted Maximum Continuous Rating (MCR) and associated electricity export targets.

Whilst these objectives are typical of energy recovery facility operations, they collectively demonstrate that plant performance, availability and regulatory compliance formed key organisational priorities.

Despite extensive interviews, Viridor's investigation was unable to identify the individual responsible for placing the scaffold base plates on the feed chute damper proximity switches or defeating the open-position feedback. None of the personnel interviewed admitted involvement or stated that they had knowledge of the intervention. Nevertheless, Viridor concluded that the actions would have required knowledge of the feed chute damper control system, the proximity switch arrangements and the manner in which the associated control logic determined incineration status. Viridor therefore considered that the timing and execution of the intervention would have required a degree of operational and control-system understanding.

Viridor further concluded that there was no legitimate operational or maintenance explanation for the intervention. The investigation identified no maintenance activities, defect rectification work, work orders or permits for work that would have required access to the feed chute damper proximity switches. Viridor also reported that there was no approved operational or maintenance procedure requiring scaffold base plates to be placed on the switches or the associated open-position feedback to be defeated.

The investigation also reviewed DCS records from January 2020 through to six months after the incident. Viridor reported that no comparable examples of feed chute damper proximity switch manipulation or similar signal behaviour were identified during that review period. The events of the 28th September 2023 were therefore considered anomalous and not representative of normal plant operation.

NRW has not identified evidence demonstrating that the organisational objectives described above directly motivated the actions observed on the 28th September 2023. However, Viridor's investigation was likewise unable to identify any legitimate technical, operational or maintenance justification for the manipulation of damper position feedback. Accordingly, whilst the purpose of the intervention remains unresolved, the available evidence indicates that it was a deliberate action undertaken by a person with sufficient knowledge of the plant and its control logic to influence the status presented to the Distributed Control System.

Viridor's Position on Potential Motivation

In its response to the Regulation 61 Notice, Viridor provided its position on the possible motivation for the placement of metallic plates on the feed chute damper proximity switches.

Viridor confirmed that the plates were used to simulate a "closed" damper position within the control system and that this resulted in a closed signal being received by the DCS without any corresponding operator command or physical damper movement. Viridor further concluded that the associated open-position feedback had been defeated, resulting in false damper position information being presented to the control system.

The company further stated that:

- the placement of the plates was not authorised;
- it was in direct contravention of site safety rules and safe systems of work; and
- there were no operational or maintenance procedures that would require or permit such an action.

Viridor advised that it had been unable to identify the individual or individuals responsible. However, following its review of DCS records, maintenance records, work orders, permits and witness evidence, the company concluded that there was no legitimate operational, maintenance or technical explanation for the intervention. Viridor also reported that no comparable examples of feed chute damper proximity switch manipulation were identified during its wider review of historic plant data.

Viridor further expressed the view that the intervention was likely to have been a deliberate act carried out by an individual or individuals with knowledge of the plant and its control logic. The company's interpretation was that the action may have been undertaken with the intention of creating an environmental non-compliance and obtaining evidence of that non-compliance. However, Viridor acknowledged that it was unable to identify those responsible and no direct evidence establishing motive was identified during the investigation.

Accordingly, whilst Viridor's investigation concluded that the intervention was deliberate and

inconsistent with any authorised operational activity, the underlying motivation remains unconfirmed. The available evidence supports the conclusion that the intervention was intentional and designed to influence the damper status presented to the control system, but does not conclusively establish the purpose for which that action was undertaken

Assessing Potential Motive

Viridor's response to the Regulation 61 Notice suggests that the placement of metallic plates on the feed chute damper proximity switches was undertaken deliberately by an individual with the intention of creating a permit breach and subsequently recording evidence of that breach.

Whilst this explanation cannot be discounted, it is not supported by direct evidence identifying the individual responsible or confirming their intent. Although there has been some suggestion and speculation regarding possible individual involvement, no such attribution is substantiated by the available evidence. It therefore remains one possible interpretation rather than an established finding.

The nature of the intervention indicates that it was unlikely to have been accidental. Placement of the scaffold base plates required access to guarded equipment and a working understanding of the feed chute damper proximity switches and their interaction with the control logic governing incineration status. Viridor's own investigation concluded that the observed actions would have required knowledge of the feed chute damper control arrangements and the role of those signals within the DCS.

The investigation further established that there was no legitimate operational, engineering or maintenance explanation for the intervention. Viridor identified no maintenance activities, defect rectification work, work orders or permits for work that would have required access to the proximity switches on the day in question. The company also confirmed that no approved operational or maintenance procedure required or permitted the placement of plates on the switches or the defeat of the associated open-position feedback.

By contrast, the operational context at the time provides an alternative perspective. Witness evidence and operational records describe a period of significant plant instability, including repeated boiler and combustion-air-related trips, together with escalating CO exceedances approaching the regulatory limit. These conditions required rapid and reactive decision-making in an attempt to stabilise the plant and avoid further reportable exceedances.

Within this context, feed chute damper status represented the final remaining parameter capable of transitioning the plant to an "Incineration OFF" state within the control logic. Manipulation of the damper signal therefore had a clear and immediate operational effect, namely changing the emissions reporting status at a point when other plant indicators continued to suggest ongoing combustion.

This does not establish that the intervention was undertaken for that purpose. However, it demonstrates that the intervention produced a direct and tangible operational outcome which aligned with the circumstances prevailing at the time.

There is no evidence of a mechanical fault affecting the dampers, and no witness identified any operational requirement to bypass, defeat or override normal damper operation. The intervention was

not part of any recognised procedure and was explicitly confirmed by Viridor to be unauthorised.

Viridor's wider review of DCS records extending from January 2020 to six months after the incident identified no comparable examples of feed chute damper proximity switch manipulation or similar signal behaviour. The company therefore concluded that the events of the 28th September 2023 were anomalous and not representative of normal plant operation.

Accordingly, two broad explanations remain:

- the intervention was undertaken deliberately for reasons unrelated to plant operation, as suggested by Viridor, potentially involving intentional misconduct by an individual acting outside normal operational processes; or
- the intervention occurred during a period of significant operational stress and reflects poor decision-making or actions taken to influence plant status under pressure.

Whilst other explanations may be conceivable, including the possibility of intentional actions aimed at creating or exposing a perceived compliance issue, there is no direct evidence to substantiate such interpretations. Equally, there is no direct evidence establishing that the intervention was undertaken specifically to avoid further reportable emissions exceedances.

The available evidence does not allow a definitive conclusion to be drawn as to motive. However, it does demonstrate that the intervention was deliberate, unnecessary from either an operational or maintenance perspective, and had the effect of altering control system feedback in a manner that directly influenced emissions reporting status.

Overall Conclusion

The investigation has established that the feed chute damper position signals on Line 2 were deliberately manipulated on the 28th September 2023, resulting in the control system indicating that the dampers were closed when Viridor's investigation concluded they remained physically open. This caused the line to transition to an "Incineration OFF" state and emissions data to become non-reportable.

The available evidence demonstrates a divergence between the physical condition of the plant and the status represented within the control system. Feed chute level trends, oxygen concentrations, temperature data and other operational indicators are consistent with continued combustion after the transition to a non-reportable state. However, the evidence does not establish who undertook the intervention or why it was carried out. Viridor's investigation was unable to identify the individual responsible and NRW has found no evidence demonstrating that the intervention was directed by plant management.

Accordingly, whilst the investigation confirms unauthorised interference with a control-system input that directly affected emissions reportability, the available evidence does not allow a definitive conclusion regarding motive or management involvement. The principal regulatory issue is therefore the integrity of the incineration status logic and the extent to which the resulting emissions classification accurately reflected the physical operating condition of the plant at the time.

Actions Taken Post Investigation

Following the internal investigation and the Regulation 61 Notice, Viridor implemented a series of corrective and preventative measures addressing control system robustness, physical security, operational governance, and staff awareness. These are summarised as follows:

Control System and Logic Changes:

- A 2-hour delay has been introduced into the feed chute damper logic to prevent immediate transition to an "incineration off" state upon damper closure.
- Alarms have been configured to trigger where damper position signals change without a corresponding DCS command, or move to an invalid ("stop") position.

Physical Security and Access Controls:

- Enhanced inspection regimes have been implemented, including daily and weekly checks to ensure guards remain in place and show no signs of tampering.
- Safety-critical guards have been reviewed and further secured, including the use of locking arrangements and controlled key access where required.
- Improvements have been made to site access control systems, including restoration of restricted access doors and tighter management of access cards.

Operational Controls and Governance:

- A Shift Technician Log has been introduced to ensure clearer recording of plant conditions, actions, and operational decisions.
- Requirements have been strengthened to ensure management instructions are formally recorded and traceable, including written follow-up where appropriate.
- Regular management safety walkdowns have been formalised to verify that safeguards remain in place.

Maintenance and Procedural Improvements:

- Requirements for function testing of safety-critical signals following maintenance have been reinforced and incorporated into maintenance routines.
- Controls around permit-to-work systems and guard removal have been strengthened, including additional training and supervision.

Training and Awareness:

- Site-wide toolbox talks and training have been delivered covering:
    - the risks and consequences of tampering with safety-critical and environmental control systems;
    - the importance of compliance with the environmental permit; and

- expected operational standards.

The unauthorised manipulation of feed chute damper proximity switch signals resulted in the installation not being operated in accordance with the approved operating techniques and control arrangements relied upon to determine plant operating status and emissions reportability.

Permit Condition 2.3.1(a) requires the activities to be operated using the techniques and in the manner described in the documentation specified in Schedule 1, Table S1.2, unless otherwise agreed in writing by Natural Resources Wales. Table S1.2 incorporates the Environmental Permit Application Operating Techniques document (SLR Ref. 407.0036.00321/OT) (section 7). That document describes the use of a Distributed Control System (DCS) to monitor process variables affecting plant performance and environment. It also requires environmentally critical equipment to be maintained through planned preventative maintenance arrangements, abnormal operations and non-conformances to be investigated and corrected.

The investigation has established that feed chute damper position signals were deliberately altered to create a false indication of damper closure within the control system when the dampers remained physically open. This action caused the control system to respond to an apparent plant condition that did not exist and resulted in a transition of the "Incineration On" signal to an off state. In doing so, the intervention undermined the approved process monitoring, control and shutdown arrangements described within the operating techniques and created a disconnect between the physical condition of the plant and the condition represented within the DCS. The activity was therefore not being operated in the manner described by the approved operating techniques and control philosophy.

Viridor's investigation identified no maintenance activities, defect rectification work, permits for work or recorded equipment defects that could explain access to, or intervention with, the feed chute damper proximity switches on the 28th September 2023. The company concluded that the observed manipulation was neither an approved operational practice nor a recognised maintenance activity. This is significant as the approved operating techniques require plant and equipment associated with environmental protection to be subject to planned maintenance and controlled management arrangements rather than unauthorised intervention.

Viridor also reviewed DCS records extending back to January 2020 and forward for six months after the event and reported that no comparable instances of feed chute damper proximity switch manipulation or similar signal behaviour were identified. The company therefore considered the events of the 28th September 2023 to be anomalous and not representative of normal plant operation.

The approved operating techniques state that the Distributed Control System (DCS) will enable process variables which could have an effect on facility performance and environmental emissions to be monitored. Feed chute damper position was a critical process variable used within the site's control philosophy to determine plant operating status and emissions reportability. The investigation identified that the manipulated damper status changes were not challenged at the time they occurred. The Shift Technician acknowledged that he should have observed the damper status changes on the DCS but stated that he may not have been at the desk at the time and that the dampers had "played up" previously. In addition, shift logs had not been completed fully and contained no environmental records relevant to the event, and there was no dedicated Shift Technician Log in place at Trident Park

at the time of the incident. Consequently, the anomalous changes in damper status were not effectively identified, recorded or escalated through operational controls despite being visible within the DCS. These circumstances further demonstrate that the approved DCS monitoring and operational governance arrangements relied upon by the permit were not operating as intended during the event.

Following the internal investigation and the Regulation 61 process, Viridor implemented a series of corrective and preventative measures, including modification of the damper logic, installation of additional alarms, improvements to physical security arrangements, enhanced inspection regimes, strengthened operational controls and additional staff training. These measures improve the robustness of the control system and reduce the likelihood of a recurrence. Several of the corrective actions implemented by Viridor directly address vulnerabilities identified during the investigation. These include preventing immediate loss of reportability following damper status changes, introducing alarms for anomalous damper signal transitions, restricting physical access to proximity switches and improving the recording of operational decisions. Collectively, these measures are intended to strengthen the safeguards described within the approved operating techniques and reduce the risk of a disconnect arising between the physical state of the plant and the condition represented within the control system.

Whilst the event revealed opportunities to strengthen safeguards around environmentally critical control system inputs, the available evidence does not demonstrate a systemic failure of the operator's environmental management system. The approved operating techniques include arrangements for incident investigation, corrective action, preventative maintenance and site security, and the evidence indicates that the event arose from unauthorised actions undertaken contrary to those established procedures, management expectations and approved operating techniques rather than from a wholesale failure of the documented management system.

The manipulation of control system signals interfered with a key operational input used to determine plant operating status and emissions reportability and was inconsistent with the approved DCS monitoring and control arrangements relied upon by the permit. However, the event was of relatively short duration, occurred during shutdown conditions, with abatement systems remaining in operation and secondary combustion temperatures maintained above the minimum permit requirement of 850°C. The reasonably foreseeable environmental impact is therefore considered to have been limited.

In accordance with NRW's compliance classification scheme, this non-compliance has therefore been assessed as a **Category 3 (minor) non-compliance against permit condition 2.3.1(a).**

VOC Non-compliance

Operator data indicates that on the 28th September 2023 the Line 2 incinerator “incinerator in operation” signal was ‘ON’ from 09:51, indicating that waste was being charged at this time. Review of CEMS data confirms that the VOC (TOC) analyser associated with Line 2 was unavailable for an extended period on the same date.

CEMS records show that from 07:54, VOC 1-minute data was unavailable and recorded as “N/A”. Review of the RAW data indicates that VOC readings was frozen at -4.91 mg/m³, confirming that the data was invalid and not representative of stack concentrations. Further interrogation of the CEMS alarm log (20230928.LOG) identified an alarm for “H_2/He Bottle 2 Pressure”, indicating a fault or

depletion affecting the hydrogen/helium fuel gas supply to the Flame Ionisation Detector (FID) analyser.

The hydrogen/helium gas supply is essential for correct operation of the FID analyser used to monitor VOC (TOC) emissions. Loss or instability of this fuel gas supply results in the FID being unable to produce valid measurements. On this basis, the analyser fault resulted in missing VOC monitoring data from approximately 08:08 to 11:26.

Permit condition 2.3.8(h) states that waste must not be charged if continuous emission monitors used to demonstrate compliance with emission limit values for particulates, TOC or CO are unavailable, unless alternative techniques, agreed in writing with Natural Resources Wales, are used to demonstrate compliance. To date, no such written agreement has been made between the operator and NRW.

During the period 09:51 to at least 11:26, waste was being charged while VOC (TOC) emissions were not being continuously monitored, and no approved alternative technique was in place. This represents a direct contravention of permit condition 2.3.8(h).

NRW notes that loss of VOC monitoring due to a failure in the hydrogen/helium fuel gas supply to an FID analyser may, in principle, constitute a technically unavoidable failure of a measurement device. However, classification as technically unavoidable depends on:

- the underlying cause of the failure;
- how alarms were managed and acted upon;
- the adequacy of cylinder supply, redundancy and changeover arrangements; and
- whether the operator took appropriate and timely steps to prevent continuation of waste charging during monitoring unavailability.

Review of the available CEMS alarm logs indicates that an alarm associated with hydrogen/helium bottle pressure was present during the period of VOC monitoring unavailability. However, the initial fault or trigger event that led to degradation or loss of valid FID measurements could not be definitively established from the alarm data alone.

A review was undertaken of the CEMS service and maintenance reports covering the relevant period in 2023, to identify any recorded diagnostic findings, fault reports, or corrective actions relating specifically to the FID analyser or its fuel gas supply. This review did not identify a confirmed root cause for the analyser failure, nor any contemporaneous service intervention that conclusively explains the loss of VOC data.

Accordingly, while the hydrogen/helium cylinder pressure alarm indicates an issue with the FID fuel gas supply, the underlying cause of the analyser malfunction remains unconfirmed.

The hydrogen/helium cylinder supplying the FID analyser is fitted with a low pressure alarm, with the alarm setpoint configured at 300 bar.

No separate “low-low” pressure alarm is configured for the hydrogen supply. The 300 bar alarm therefore represents the primary indication of declining cylinder pressure requiring operator action.

Based on system configuration and operational experience, activation of the 300 bar low-pressure alarm corresponds to approximately three days of remaining hydrogen supply, assuming normal analyser consumption rates.

This indicates that, under normal circumstances, the alarm provides a reasonable window for operator response, cylinder changeover, or other corrective action before complete depletion of the fuel gas supply

In this case, the available evidence confirms that waste charging continued for a sustained period while TOC monitoring was unavailable. This undermines the effectiveness of the permit safeguard provided by condition 2.3.8(h), irrespective of the initiating cause of the analyser failure.

The contravention of permit condition 2.3.8(h) on the 28th September 2023 constitutes a Category 3 non-compliance, based on reasonably foreseeable environmental risk rather than actual observed impact.

TOC monitoring functions as a critical backstop parameter required under the Industrial Emissions Directive to detect incomplete combustion and releases of unburned organic compounds, particularly during periods of operational instability. While other process indicators (such as CO) may suggest generally stable operation during parts of the period, CO cannot currently be used as a surrogate for TOC compliance under permit condition 2.3.8(h). The permit explicitly requires continuous TOC monitoring, and no written agreement exists to substitute CO or other parameters. CO and TOC measure different aspects of combustion and can behave independently; therefore, low CO levels cannot reliably rule out elevated TOC emissions.

The facility has a documented history of VOC/TOC exceedances, including exceedances associated with burner and power-related events. This establishes that elevated TOC emissions are not merely theoretical at this installation. Furthermore, reasonably foreseeable risk during periods of unmonitored operation arises from:

- variability in waste composition;
- the potential for combustion instability during startup, shutdown and recovery phases; and
- the inability to detect and respond to elevated TOC emissions when monitoring is unavailable.

During the period of VOC monitoring unavailability on the 28th September 2023, the operator would have been unable to identify exceedances of the TOC emission limit value or take corrective action if required. This creates a genuine risk of undetected emissions that the permit condition is specifically designed to prevent.

In summary:

- VOC (TOC) monitoring on Line 2 was unavailable for an extended period on the 28th September 2023 due to an FID fuel gas supply issue.
- Waste charging continued while TOC monitoring was unavailable and no alternative techniques had been agreed with NRW.

- This represents a Category 3 non-compliance with permit condition 2.3.8(h).
- The classification reflects a proportionate response, recognising the absence of evidence of significant environmental impact, while acknowledging the clear and foreseeable risk created by operating without a critical emissions monitoring safeguard.

The loss of valid VOC (TOC) monitoring data also represents a breach of permit condition 3.6.1(a), which requires continuous monitoring of emissions. As no valid TOC data was recorded during the period of analyser fault, this constitutes a Category 3 non-compliance, reflecting the reasonably foreseeable risk associated with loss of a critical emissions monitoring parameter.

Permit condition 2.3.8(h), which prohibits waste charging when TOC monitors are unavailable unless alternative techniques have been agreed in writing with NRW is operational in nature, whereas the breach of 3.6.1(a) is an equipment/maintenance failure. These are fundamentally different types of non-compliance and must be treated separately under NRW's compliance guidance. This is a recognition of distinct regulatory failures with different root causes and remedial actions. **NRW has therefore applied Category 3 non-compliances for permit conditions 2.3.8(h) and 3.6.1(a).**

While this incident predates those assessed in CAR_NRW0048572, it demonstrates a comparable operational failure whereby waste charging continued during a period of TOC monitoring unavailability. NRW has therefore applied a Category 3 non-compliance for permit condition 2.3.8(h) and 3.6.1 only.

Notification Failure

Viridor failed to notify NRW of the permit breaches associated with the loss of TOC (VOC) monitoring and continued waste charging on the 28th September 2023, contrary to permit condition 4.3.1(b), which requires the operator to immediately inform NRW in the event of a breach of any permit condition. Despite these breaches occurring on the 28th September 2023, NRW was not notified at the time and only became aware of the matter through subsequent regulatory investigations.

Condition 4.3.1(b) establishes a clear procedural requirement that operates independently of the severity of any environmental impact. The purpose of the notification requirement is to ensure that NRW is able to assess permit breaches promptly, determine whether further regulatory intervention is necessary, and maintain an accurate understanding of the compliance status of the installation.

Although there is no evidence that the failure to notify resulted in significant environmental harm, the omission prevented NRW from assessing the circumstances surrounding the monitor failure, the continuation of waste charging and the associated permit breaches at the time they occurred. This reduced NRW's ability to undertake timely regulatory oversight and to determine whether any immediate corrective actions were required.

The failure to notify is particularly relevant given that the monitoring failure persisted for an extended period and involved a monitoring parameter specifically identified within permit condition 2.3.8(h) as critical to determining whether waste charging may continue. The absence of notification meant that NRW was denied the opportunity to review the circumstances contemporaneously, including the nature of the analyser fault, the operator's response and any measures taken to minimise the risks

associated with continued operation.

NRW's identification of the breach through its own investigation further demonstrates that the permit notification process did not function as required in this instance. While the evidence does not indicate deliberate concealment, it does demonstrate a failure to recognise, record and report permit breaches in accordance with the requirements of condition 4.3.1(b).

NRW notes that following a similar notification failure relating to permit conditions 2.3.8(h) and 3.6.1(a) on the 14th February 2025 (CAR_NRW0049774), Viridor undertook a review of its notification arrangements. Viridor's investigation concluded that the failure arose from human factors, with the permit breach not being identified or communicated by the relevant personnel. In response, the company reviewed and revised its Local Management Instruction relating to regulator notifications, introduced additional internal checks of daily emissions reports by the operational team, retrained site personnel, and implemented automatic transfer of CEMS data to a third-party database to allow wider scrutiny across the organisation. These improvements demonstrate that Viridor has taken steps to strengthen its breach identification and notification processes. However, they do not alter the fact that NRW was not informed of the September 2023 permit breaches at the time they occurred, as required by permit condition 4.3.1(b).

In accordance with NRW's Compliance Classification Scheme, this failure to notify has therefore been assessed as a **Category 3 non-compliance against permit condition 4.3.1(b)**. The score reflects the procedural nature of the breach and the reasonably foreseeable regulatory risk arising from the loss of timely regulatory oversight, whilst recognising the absence of evidence of significant environmental impact.

Appendix

Appendix 1 - 28th September 2023

Two datasets were used in this assessment:

- High-resolution DCS command data, shown in the first table below, which records individual damper commands at sub-minute resolution. and
- Base Report DCS data, which records damper status as one-minute averaged values.

The damper status coding used consistently across both datasets is as follows:

- 1 – Open
- 2 – Closed
- 3 – Opening
- 4 – Closing

Line 2, Damper 1 (2HHH90AA051A:s)

28-SEP-23 14:03:35.0	0
28-SEP-23 13:38:00.0	2
28-SEP-23 13:37:00.0	0
28-SEP-23 12:48:05.0	1
28-SEP-23 11:48:05.0	1
28-SEP-23 10:48:05.0	1
28-SEP-23 09:48:05.0	1
28-SEP-23 09:47:05.0	0
28-SEP-23 09:11:10.0	2
28-SEP-23 08:11:10.0	2
28-SEP-23 08:10:15.0	0
28-SEP-23 07:36:35.0	1
28-SEP-23 07:35:55.0	3
28-SEP-23 07:30:40.0	2
28-SEP-23 07:30:10.0	4
28-SEP-23 07:29:50.0	1
28-SEP-23 07:29:30.0	3
28-SEP-23 07:16:15.0	2
28-SEP-23 06:16:15.0	2
28-SEP-23 05:16:15.0	2
28-SEP-23 04:16:15.0	2
28-SEP-23 03:16:15.0	2
28-SEP-23 03:15:45.0	4
28-SEP-23 02:32:45.0	1
28-SEP-23 01:32:45.0	1
28-SEP-23 00:32:45.0	1
27-SEP-23 23:32:45.0	1
27-SEP-23 22:32:45.0	1
27-SEP-23 21:32:45.0	1

07:35:55 3 (Opening)

07:36:35 1 (Open)

L2 SUSD 280923

Start time: 9/28/2023 5:53:00 AM
End time: 9/28/2023 10:51:00 AM

Time	2HCC10EU001YB09	2HHH90AA051A:s	2HHH91AA051A:s	2EGD30CF001XQ99:av	2EGD40CF001XQ99:av	2HNA10CQY001:av	2LBA20CFY01:av	2HNA10CTY014:av
	INCINERATION ON	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS	OIL FLOW R	OIL FLOW L	MEASURE O2 BOILER	TOTAL STEAM FLOW	AVERAGE 10MM T2S
	I/O			l/h	l/h	%	t/h	°C
9/28/2023 5:53:00 AM	0	2	2	486.850	1041.535	16.309	13.300	524.967
9/28/2023 5:54:00 AM	0	2	2	489.339	1038.154	16.281	13.434	528.026
9/28/2023 7:27:00 AM	0	2	2	1571.855	1570.973	13.488	34.453	845.669
9/28/2023 7:28:00 AM	0	2	2	1577.381	1570.944	13.489	34.786	849.044
9/28/2023 7:29:00 AM	0	2	2	1580.967	1580.731	13.386	35.333	852.419
9/28/2023 7:30:00 AM	0	2	3	1585.375	1587.109	13.146	35.424	855.794
9/28/2023 7:31:00 AM	0	2	2	1591.136	1590.578	13.549	35.610	859.169
9/28/2023 7:32:00 AM	0	2	2	1593.076	1590.725	13.403	35.794	862.544
9/28/2023 7:33:00 AM	0	2	2	1586.963	1586.042	13.134	36.253	865.919
9/28/2023 7:34:00 AM	0	2	2	1589.990	1587.129	12.911	36.935	869.294
9/28/2023 7:35:00 AM	0	2	2	1593.605	1591.244	12.545	37.523	872.874
9/28/2023 7:36:00 AM	0	2	1	1587.080	1573.383	12.122	38.577	878.207
9/28/2023 7:37:00 AM	0	1	1	1367.463	1386.391	11.770	39.528	883.941
9/28/2023 7:38:00 AM	0	1	1	1274.898	1333.427	11.830	39.681	889.808
9/28/2023 7:39:00 AM	0	1	1	1234.268	1282.109	11.697	39.115	896.258

08:10:15 0

08:11:10 2 (Closed)

No closing (4) command. This is the point where the plates are placed.

L2 SUSD 280923

Start time: 9/28/2023 5:53:00 AM
End time: 9/28/2023 10:51:00 AM

Time	2HCC10EU001YB09	2HHH90AA051A:s	2HHH91AA051A:s	2EGD30CF001XQ99:av	2EGD40CF001XQ99:av	2HNA10CQY001:av	2LBA20CFY01:av	2HNA10CTY014:av
	INCINERATION ON	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS	OIL FLOW R	OIL FLOW L	MEASURE O2 BOILER	TOTAL STEAM FLOW	AVERAGE 10MM T2S
	I/O			l/h	l/h	%	t/h	°C
9/28/2023 5:53:00 AM	0	2	2	486.850	1041.535	16.309	13.300	524.967
9/28/2023 5:54:00 AM	0	2	2	489.339	1038.154	16.281	13.434	528.026
9/28/2023 8:05:00 AM	1	1	1	371.640	0.000	8.158	66.385	1040.796
9/28/2023 8:06:00 AM	1	1	1	372.103	0.000	9.113	65.130	1020.781
9/28/2023 8:07:00 AM	1	1	1	372.377	0.000	8.471	64.134	999.150
9/28/2023 8:08:00 AM	1	1	1	372.170	0.000	8.849	63.137	977.052
9/28/2023 8:09:00 AM	1	1	0	371.941	0.000	9.014	62.179	957.946
9/28/2023 8:10:00 AM	0	0	1	139.419	0.000	8.261	57.787	949.701
9/28/2023 8:11:00 AM	0	1	2	0.000	0.000	7.194	60.434	962.771
9/28/2023 8:12:00 AM	0	2	2	0.000	0.000	7.826	63.051	978.362
9/28/2023 8:13:00 AM	0	2	2	0.000	0.000	7.998	62.715	994.083
9/28/2023 8:14:00 AM	0	2	2	0.000	0.000	7.969	62.102	1008.764
9/28/2023 8:15:00 AM	0	2	2	0.000	0.000	7.507	61.207	1023.665
9/28/2023 8:16:00 AM	0	2	2	0.000	0.000	7.660	60.431	1039.187
9/28/2023 8:17:00 AM	0	2	2	0.000	0.000	6.615	60.509	1056.512
9/28/2023 8:18:00 AM	0	2	2	0.000	0.000	5.828	61.325	1075.846
9/28/2023 8:19:00 AM	0	2	2	0.000	0.000	5.564	62.557	1097.244
9/28/2023 8:20:00 AM	0	2	2	0.000	0.000	5.482	63.539	1114.507

09:11:10 2 (Closed)

09:47:05 0

09:48:05 1 (Open)

This is the point where the plates are removed. Note no opening command (4).

L2 SUSD 280923

Start time: 9/28/2023 5:53:00 AM
End time: 9/28/2023 10:51:00 AM

Time	2HCC10EU001YB09	2HHH90AA051A:s	2HHH91AA051A:s	2EGD30CF001XQ99:av	2EGD40CF001XQ99:av	2HNA10CQY001:av	2LBA20CFY01:av	2HNA10CTY014:av
	INCINERATION ON	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS	OIL FLOW R	OIL FLOW L	MEASURE O2 BOILER	TOTAL STEAM FLOW	AVERAGE 10MM T2S
	I/O			l/h	l/h	%	t/h	°C
9/28/2023 5:53:00 AM	0	2	2	486.850	1041.535	16.309	13.300	524.967
9/28/2023 5:54:00 AM	0	2	2	489.339	1038.154	16.281	13.434	528.026
9/28/2023 9:42:00 AM	0	2	2	0.000	0.000	8.007	72.025	1195.321
9/28/2023 9:43:00 AM	0	2	2	0.000	0.000	9.907	67.951	1192.780
9/28/2023 9:44:00 AM	0	2	2	0.000	0.000	11.379	61.818	1186.493
9/28/2023 9:45:00 AM	0	2	2	0.000	0.000	11.629	56.556	1177.344
9/28/2023 9:46:00 AM	0	2	1	0.000	0.000	8.048	54.851	1168.819
9/28/2023 9:47:00 AM	0	0	0	0.000	0.000	4.649	55.589	1167.139
9/28/2023 9:48:00 AM	0	0	1	0.000	0.000	5.762	57.087	1166.970
9/28/2023 9:49:00 AM	0	1	1	0.000	0.000	8.235	57.951	1162.418
9/28/2023 9:50:00 AM	0	1	1	0.000	0.000	9.415	57.984	1153.047
9/28/2023 9:51:00 AM	1	1	1	0.000	0.000	10.174	58.083	1128.850
9/28/2023 9:52:00 AM	1	1	1	0.000	0.000	9.125	58.875	1102.625
9/28/2023 9:53:00 AM	1	1	1	0.000	0.000	7.884	60.076	1081.413
9/28/2023 9:54:00 AM	1	1	1	0.000	0.000	7.024	61.325	1064.593
9/28/2023 9:55:00 AM	1	1	1	0.000	0.000	6.193	63.085	1052.711

Line 2, Damper 2 (2HHH91AA051A:s):

28-SEP-23 16:04:30.0	2
28-SEP-23 15:04:30.0	2
28-SEP-23 14:04:30.0	2
28-SEP-23 14:04:00.0	4
28-SEP-23 14:03:45.0	0
28-SEP-23 13:38:15.0	2
28-SEP-23 13:37:15.0	0
28-SEP-23 12:47:40.0	1
28-SEP-23 11:47:40.0	1
28-SEP-23 10:47:40.0	1
28-SEP-23 09:47:40.0	1
28-SEP-23 09:46:40.0	0
28-SEP-23 09:10:30.0	2
28-SEP-23 08:10:30.0	2
28-SEP-23 08:09:10.0	0
28-SEP-23 07:36:20.0	1
28-SEP-23 07:35:55.0	3
28-SEP-23 07:30:40.0	2
28-SEP-23 07:30:10.0	4
28-SEP-23 07:29:30.0	3
28-SEP-23 07:16:15.0	2
28-SEP-23 06:16:15.0	2
28-SEP-23 05:16:15.0	2
28-SEP-23 04:16:15.0	2
28-SEP-23 03:16:15.0	2
28-SEP-23 03:15:45.0	4
28-SEP-23 02:33:05.0	1
28-SEP-23 01:33:05.0	1
28-SEP-23 00:33:05.0	1

07:35:55 3 (Opening)

07:36:20 1 (Open)

And

08:09:10 0

08:10:30 2 (Closed)

No closing (4) command. This is the point where the plates are placed.

and

09:10:30 2 (Closed)

09:46:40 0

09:47:40 1 (Open)

This is the point where the plates are removed. Note no opening command (4).

-

Appendix 2

Line 1 - 14th July 2025 Start Up (Damper 2, 1HHH91AA051A:s)

14-JUL-25 23:53:35.0	1
14-JUL-25 22:53:35.0	1
14-JUL-25 21:53:35.0	1
14-JUL-25 20:53:35.0	1
14-JUL-25 19:53:35.0	1
14-JUL-25 18:53:35.0	1
14-JUL-25 17:53:35.0	1
14-JUL-25 16:53:35.0	1
14-JUL-25 15:53:35.0	1
14-JUL-25 14:53:35.0	1
14-JUL-25 13:53:35.0	1
14-JUL-25 13:52:55.0	3
14-JUL-25 13:38:15.0	2
14-JUL-25 13:37:45.0	4
14-JUL-25 13:36:35.0	1
14-JUL-25 13:36:20.0	3
14-JUL-25 13:35:40.0	2
14-JUL-25 13:35:10.0	4
14-JUL-25 13:32:10.0	1
14-JUL-25 13:31:40.0	3
14-JUL-25 13:31:20.0	4
14-JUL-25 13:31:05.0	1
14-JUL-25 13:30:30.0	3
14-JUL-25 12:49:10.0	2
14-JUL-25 11:49:10.0	2
14-JUL-25 10:49:10.0	2
14-JUL-25 09:49:10.0	2
14-JUL-25 08:49:10.0	2
14-JUL-25 07:49:10.0	2
14-JUL-25 06:49:10.0	2
14-JUL-25 05:49:10.0	2
14-JUL-25 04:49:10.0	2
14-JUL-25 03:49:10.0	2
14-JUL-25 02:49:10.0	2
14-JUL-25 01:49:10.0	2

14TH July 2025 Start-up DCS:

Base Report

Start time: 7/14/2025 12:00:00 AM
End time: 7/14/2025 6:00:00 PM

Time	1LBA20CFY01:av TOTAL STEAM FLOW t/h	1HNA10CTY014:av AVERAGE 10MM T2S °C	1HCC10EU001YB09 INCINERATION ON I/O	1EGD30CF001XQ99:av OIL FLOW R l/h	1EGD40CF001XQ99:av OIL FLOW L l/h	1HHH90AA051A:s FEED CHUTE DAMPER 1 STATUS	1HHH91AA051A:s FEED CHUTE DAMPER 2 STATUS
7/14/2025 12:00:00 AM	0.000	-62.456	0	0.000	0.000	2	2
7/14/2025 12:01:00 AM	0.000	-62.468	0	0.000	0.000	2	2
7/14/2025 12:02:00 AM	0.000	-62.480	0	0.000	0.000	2	2
7/14/2025 12:03:00 AM	0.000	-62.492	0	0.000	0.000	2	2
7/14/2025 12:04:00 AM	0.000	-62.504	0	0.000	0.000	2	2
7/14/2025 1:30:00 PM	19.838	832.066	0	1241.097	1189.044	2	2
7/14/2025 1:31:00 PM	23.933	835.312	0	1237.766	1199.978	2	2
7/14/2025 1:32:00 PM	30.541	838.446	0	1247.661	1215.673	1	1
7/14/2025 1:33:00 PM	30.817	839.101	0	1270.117	1235.111	1	1
7/14/2025 1:34:00 PM	31.861	838.741	0	1288.751	1256.949	1	1
7/14/2025 1:35:00 PM	32.874	838.382	0	1288.281	1284.842	2	3
7/14/2025 1:36:00 PM	33.091	836.993	0	1310.957	1330.629	1	2
7/14/2025 1:37:00 PM	32.920	834.575	0	1325.271	1343.044	1	1
7/14/2025 1:38:00 PM	32.251	832.158	0	1339.746	1352.297	2	2
7/14/2025 1:39:00 PM	28.225	830.050	0	1355.906	1379.881	2	2
7/14/2025 1:40:00 PM	42.849	829.323	0	1382.400	1411.389	2	2
7/14/2025 1:41:00 PM	45.293	829.722	0	1401.749	1425.218	2	2
7/14/2025 1:42:00 PM	28.699	832.328	0	1411.193	1418.311	2	2
7/14/2025 1:43:00 PM	35.229	838.558	0	1413.081	1427.981	2	2

Any apparent discrepancies between command data and Base Report values reflect the averaging methodology applied to the Base Report and do not indicate conflicting control behaviour. Prior to approximately 13:30, Damper 2 is recorded as Closed (Status 2) in both the high-resolution command data and the minute-averaged DCS Base Report.

At approximately 13:30:30, commands are issued to open Damper 2. The high-resolution command log records the following sequence between 13:30:30 to 13:32:10 :

- 3 (Opening)
- 1 (Open)
- 4 (Closing)
- 3 (Opening)
- 1 (Open)

These rapid transitions occur within the same short time window. As a result, the Base Report, which applies a one-minute averaging period, records Damper 2 as Open (Status 1) between approximately 13:32 and 13:34. Between 13:32 and 13:34, the Base Report consistently shows Damper 2 as Open (Status 1). This aligns with the command data, which indicates that the damper is predominantly in the open position during this interval. Between 13:35:10 and 13:38:15, the command data shows further operational cycling, with the following sequence observed:

- 4 (Closing)
- 2 (Closed)
- 3 (Opening)
- 1 (Open)
- 4 (Closing)
- 2 (Closed)

The Base Report reflects this behaviour as follows:

- Around 13:34 – Open (Status 1)
- 13:35 – Opening (Status 3)
- 13:36 – Closed (Status 2)
- 13:37 – Open (Status 1)
- 13:38 – Closed (Status 2)

These values represent the dominant damper state within each one-minute averaging period and are consistent with the higher-resolution command data.

From approximately 13:38 until 13:52, both datasets indicate that Damper 2 remains Closed (Status 2) with no further opening commands issued during this period. At approximately 13:52:55, the command status transitions from:

- 2 (Closed) to
- 3 (Opening), followed by
- 1 (Open) at approximately 13:53:35.

This transition is reflected in the Base Report, which records Damper 2 as Open (Status 1) shortly thereafter, consistent with the minute-averaging methodology.

The review confirms that the operation of Damper 2 during start-up on 14 July 2025 is consistent across both high-resolution DCS command logs and minute-averaged Base Report data. Apparent short-term differences between the two datasets are attributable to data averaging and do not indicate any malfunction or inconsistency in damper control. The damper behaviour observed is consistent with expected start-up operational sequences.

14th July 2025 Start Up (Damper 1 1HHH90AA051A:s

14-JUL-25 18:53:15.0	1
14-JUL-25 17:53:15.0	1
14-JUL-25 16:53:15.0	1
14-JUL-25 15:53:15.0	1
14-JUL-25 14:53:15.0	1
14-JUL-25 13:53:15.0	1
14-JUL-25 13:52:55.0	3
14-JUL-25 13:38:15.0	2
14-JUL-25 13:37:45.0	4
14-JUL-25 13:36:55.0	1
14-JUL-25 13:36:25.0	3
14-JUL-25 13:36:15.0	0
14-JUL-25 13:35:10.0	4
14-JUL-25 13:32:10.0	1
14-JUL-25 13:31:40.0	3
14-JUL-25 13:31:20.0	4
14-JUL-25 13:31:05.0	1
14-JUL-25 13:30:30.0	3
14-JUL-25 12:49:15.0	2
14-JUL-25 11:49:15.0	2
14-JUL-25 10:49:15.0	2

13:30:30 → 3 (Opening)

13:31:05 → 1 (Open)

13:31:20 → 4 (Closing)

13:31:40 → 3 (Opening)

13:32:10 → 1 (Open)

13:35:10 → 4 (Closing) 13:36:15 → 0

13:36:25 → 3 (Opening)

13:36:55 → 1 (Open)

13:37:45 → 4 (Closing)

13:38:15 → 2 (Closed)

From approximately 13:38 until 13:52, both datasets indicate that Damper 1 remains Closed (Status 2) with no further opening commands issued during this period. At approximately 13:52:55, the command status transitions from:

- 2 (Closed) to
- 3 (Opening), followed by
- 1 (Open) at approximately 13:53:35.

The minute-averaged Base Report is consistent with high-resolution DCS data for all damper actions; apparent direct transitions reflect data aggregation rather than missing or instantaneous control actions.

The apparent direct transition from Open to Closed in the Base Report is fully explained by minute-level averaging. High-resolution DCS data confirms that the damper always passes through a Closing state and that physical movement takes approximately 30 seconds.

Line 2- Start-up 27/06/2025 (Damper 2, 1HHH91AA051A:s)

27-JUN-25 10:08:20.0	1
27-JUN-25 09:08:20.0	1
27-JUN-25 08:08:20.0	1
27-JUN-25 07:08:20.0	1
27-JUN-25 06:08:20.0	1
27-JUN-25 05:08:20.0	1
27-JUN-25 04:08:20.0	1
27-JUN-25 03:08:20.0	1
27-JUN-25 02:08:20.0	1
27-JUN-25 01:08:20.0	1
27-JUN-25 01:07:40.0	3
27-JUN-25 01:07:20.0	0
27-JUN-25 01:06:20.0	4
27-JUN-25 01:06:10.0	1
27-JUN-25 01:05:35.0	3
27-JUN-25 00:07:30.0	2
26-JUN-25 23:07:30.0	2
26-JUN-25 22:07:30.0	2
26-JUN-25 21:07:30.0	2

Base Report

Start time: 6/26/2025 3:00:00 AM
End time: 6/27/2025 3:00:00 AM

Time	1LBA20CFY01:av	1HNA10CTY014:av	1HCC10EU001YB09	1EGD30CF001XQ99:av	1EGD40CF001XQ99:av	1HHH90AA051A:s	1HHH91AA051A:s
	TOTAL STEAM FLOW	AVERAGE 10MM T2S	INCINERATION ON	OIL FLOW R	OIL FLOW L	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS
	t/h	°C	I/O	l/h	l/h		
6/26/2025 3:00:00 AM	4.600	290.909	0	647.682	52.935	0	2
6/26/2025 3:01:00 AM	4.591	292.449	0	624.962	492.845	0	2
6/26/2025 3:02:00 AM	4.288	294.902	0	460.005	457.134	0	2
6/26/2025 3:03:00 AM	3.656	300.465	0	506.023	18.105	0	2
6/26/2025 3:04:00 AM	3.130	306.919	0	538.550	0.000	0	2
6/26/2025 3:05:00 AM	2.856	311.826	0	587.958	0.000	0	2
6/27/2025 12:58:00 AM	44.151	892.661	0	1611.564	1627.318	2	2
6/27/2025 12:59:00 AM	44.299	896.799	0	1614.620	1624.878	2	2
6/27/2025 1:00:00 AM	44.392	901.014	0	1606.420	1624.379	2	2
6/27/2025 1:01:00 AM	44.679	905.287	0	1615.796	1623.879	2	2
6/27/2025 1:02:00 AM	44.590	909.768	0	1593.311	1611.005	2	2
6/27/2025 1:03:00 AM	44.676	914.391	0	1605.186	1607.743	2	2
6/27/2025 1:04:00 AM	44.454	918.657	0	1592.077	1607.243	2	2
6/27/2025 1:05:00 AM	44.463	921.763	0	1602.511	1604.715	2	2
6/27/2025 1:06:00 AM	44.516	924.771	0	1586.992	1600.336	3	3
6/27/2025 1:07:00 AM	44.601	926.421	0	1608.732	1610.300	2	2
6/27/2025 1:08:00 AM	44.733	927.088	0	1606.783	1623.673	1	1
6/27/2025 1:09:00 AM	44.958	928.144	0	1616.590	1625.657	1	1
6/27/2025 1:10:00 AM	45.178	929.410	0	1613.474	1626.803	1	1
6/27/2025 1:11:00 AM	45.346	931.217	0	1608.987	1620.029	1	1
6/27/2025 1:12:00 AM	45.489	933.564	0	1610.202	1616.002	1	1
6/27/2025 1:13:00 AM	45.547	935.912	0	1604.578	1617.648	1	1
6/27/2025 1:14:00 AM	45.675	938.265	0	1618.494	1621.851	1	1

From the Base Report and command log:

- From 26/06/2025 ~21:07 to after midnight, Damper 2 is consistently:
    - Base Report: Status 2 (Closed)
    - Command log: Status 2 (Closed)

Both datasets show Damper 2 remaining closed prior to the start-up sequence.

High-resolution command log sequence

The following command pattern is recorded:

- 00:07:30 – Status 2 (Closed)
- 01:05:35 – Status 3 (Opening)
- 01:06:10 – Status 1 (Open)
- 01:06:20 – Status 4 (Closing)
- 01:07:20 – Status 0
- 01:07:40 – Status 3 (Opening)
- 01:08:20 onward – Status 1 (Open) (repeated)

This shows multiple rapid command changes within a short time window, characteristic of damper positioning logic stabilising during start-up.

The Base Report reflects this behaviour as follows:

- Up to 01:05 → Status 2 (Closed)
- 01:06 → Status 3 (Opening)
- 01:07 → Status 2 (Closed)
- 01:08 onward → Status 1 (Open)

The minute-averaged values correspond to the dominant damper condition within each minute, smoothing out the rapid command transitions seen in the second-by-second data.

From 01:08 to at least 10:08:

- Command log: Repeated Status 1 (Open)
- Base Report: Continuous Status 1 (Open) for Damper 2
- Process indicators (temperature ~920–940 °C, high oil flows) support that the plant is in a stable operating condition.
- The Damper 2 operation on 27 June 2025 is fully consistent between high-resolution DCS command data and minute-averaged Base Report records. Short-duration transitions during start-up are appropriately smoothed in the Base Report and do not indicate abnormal operation. The behaviour observed matches expected start-up damper control logic.

Damper 1 (1HHH90AA051A:s) reflects the same actions as damper 2 and is consistent with the minute-averaged Base Report records

Line 1 - 18th May 2025 Shutdown (Damper 2, 1HHH91AA051A:s)

18-MAY-25 17:00:25.0	2
18-MAY-25 16:00:25.0	2
18-MAY-25 15:00:25.0	2
18-MAY-25 14:00:25.0	2
18-MAY-25 13:00:25.0	2
18-MAY-25 12:00:25.0	2
18-MAY-25 11:00:25.0	2
18-MAY-25 10:00:25.0	2
18-MAY-25 09:00:25.0	2
18-MAY-25 08:00:25.0	2
18-MAY-25 07:00:25.0	2
18-MAY-25 06:00:25.0	2
18-MAY-25 05:00:25.0	2
18-MAY-25 04:59:55.0	4
18-MAY-25 04:16:55.0	1
18-MAY-25 03:16:55.0	1
18-MAY-25 02:16:55.0	1
18-MAY-25 01:16:55.0	1
18-MAY-25 00:16:55.0	1

Base Report

Start time:	5/18/2025	3:00:00 AM
End time:	5/18/2025	7:00:00 AM

Time	1LBA20CFY01:av	1HNA10CTY014:av	1HCC10EU001YB09	1EGD30CF001XQ99:av	1EGD40CF001XQ99:av	1HHH90AA051A:s	1HHH91AA051A:s
	TOTAL STEAM FLOW	AVERAGE 10MM T2S	INCINERATION ON	OIL FLOW R	OIL FLOW L	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS
	t/h	°C	I/O	l/h	l/h		
5/18/2025 3:00:00 AM	81.700	1061.895	1	0.000	0.000	1	1
5/18/2025 3:01:00 AM	81.569	1059.543	1	0.000	0.000	1	1
5/18/2025 3:02:00 AM	81.579	1057.536	1	0.000	0.000	1	1
5/18/2025 3:03:00 AM	81.209	1056.083	1	0.000	0.000	1	1
5/18/2025 3:04:00 AM	80.719	1054.662	1	0.000	0.000	1	1
5/18/2025 3:05:00 AM	80.505	1053.087	1	0.000	0.000	1	1
5/18/2025 4:55:00 AM	79.878	1034.678	1	0.000	0.000	1	1
5/18/2025 4:56:00 AM	79.878	1036.323	1	0.000	0.000	1	1
5/18/2025 4:57:00 AM	79.874	1037.969	1	0.000	0.000	1	1
5/18/2025 4:58:00 AM	80.501	1039.615	1	0.000	0.000	1	1
5/18/2025 4:59:00 AM	81.223	1041.202	1	0.000	0.000	1	1
5/18/2025 5:00:00 AM	81.213	1042.587	1	0.000	0.000	2	2
5/18/2025 5:01:00 AM	80.706	1042.417	1	0.000	0.000	2	2
5/18/2025 5:02:00 AM	80.440	1040.531	1	0.000	0.000	2	2
5/18/2025 5:03:00 AM	79.848	1038.317	1	0.000	0.000	2	2
5/18/2025 5:04:00 AM	78.977	1035.282	1	0.000	0.000	2	2
5/18/2025 5:05:00 AM	77.537	1030.736	1	0.000	0.000	2	2
5/18/2025 5:06:00 AM	76.337	1026.156	1	0.000	0.000	2	2
5/18/2025 5:07:00 AM	75.397	1021.577	1	320.579	0.000	2	2
5/18/2025 5:08:00 AM	80.141	1024.703	0	23.925	0.000	2	2
5/18/2025 5:09:00 AM	75.904	1034.030	0	0.000	0.000	2	2

High-resolution command data:

From 00:16:55 to 04:16:55 on 18 May 2025, Damper 2 is repeatedly logged as:

- Status 1 (Open)

Base Report:

This period corresponds with:

- Damper 2 = 1 (Open)
- Incineration ON
- High combustion temperature (~1030–1060 °C)
- Stable steam flow

Both datasets confirm the damper is fully open during normal operating conditions prior to shutdown.

High-resolution command data

At approximately 04:59:55, the damper command changes to:

- Status 4 (Closing)

This indicates the initiation of the shutdown sequence and active closure of Damper 2.
High-resolution command data From 05:00:25 onward, Damper 2 is consistently recorded as:

- Status 2 (Closed)

This closed status persists continuously through the remainder of the day, up to 23:07:50.

The Base Report reflects the same operational outcome:

- At 05:00, Damper 2 transitions from 1 (Open) to 2 (Closed)
- From 05:00 through 07:00, Damper 2 remains Closed
- Process indicators show:
    - Falling steam flow
    - Incineration transitioning off
    - Oil flows reducing to zero

The Base Report shows a clean, single-step transition rather than transient states due to minute averaging.

From ~05:00 until at least 23:07:

- Command log: Continuous Status 2 (Closed)
- Base Report: Continuous Status 2 (Closed)

There is no evidence of reopening, cycling, or control instability during this period.

The shutdown sequence for Damper 2 on 18 May 2025 is fully consistent across both high-resolution DCS command data and minute-averaged Base Report records. The damper transitions directly from Open to Closing, and then to a sustained Closed state, with no subsequent movement. This behaviour is consistent with a controlled and orderly plant shutdown.

Damper 1 (1HHH90AA051A:s) reflects the same actions as damper 2 and is consistent with the minute-averaged Base Report records

Line 1 - 24th August 2025 Shutdown (Damper 2, 1HHH91AA051A:s)

24-AUG-25 22:27:00.0	2
24-AUG-25 21:27:00.0	2
24-AUG-25 20:27:00.0	2
24-AUG-25 19:27:00.0	2
24-AUG-25 18:27:00.0	2
24-AUG-25 17:27:00.0	2
24-AUG-25 17:26:30.0	4
24-AUG-25 17:01:45.0	1
24-AUG-25 16:01:45.0	1
24-AUG-25 15:01:45.0	1
24-AUG-25 14:01:45.0	1
24-AUG-25 13:01:45.0	1
24-AUG-25 12:01:45.0	1
24-AUG-25 11:01:45.0	1

Base Report

Start time: 8/24/2025 3:00:00 PM
End time: 8/24/2025 8:00:00 PM

Time	1LBA20CFY01:av	1HNA10CTY014:av	1HCC10EU001YB09	1EGD30CF001XQ99:av	1EGD40CF001XQ99:av	1HHH90AA051A:s	1HHH91AA051A:s
	TOTAL STEAM FLOW	AVERAGE 10MM T2S	INCINERATION ON	OIL FLOW R	OIL FLOW L	FEED CHUTE DAMPER 1 STATUS	FEED CHUTE DAMPER 2 STATUS
	t/h	°C	I/O	l/h	l/h	1	1
8/24/2025 3:00:00 PM	88.497	977.353	1	0.000	0.000	1	1
8/24/2025 3:01:00 PM	88.449	978.154	1	0.000	0.000	1	1
8/24/2025 3:02:00 PM	88.608	979.059	1	0.000	0.000	1	1
8/24/2025 3:03:00 PM	87.654	980.021	1	0.000	0.000	1	1
8/24/2025 3:04:00 PM	87.358	980.994	1	0.000	0.000	1	1
8/24/2025 3:05:00 PM	87.247	981.968	1	0.000	0.000	1	1
8/24/2025 5:17:00 PM	80.816	998.789	1	0.000	0.000	1	1
8/24/2025 5:18:00 PM	80.301	996.483	1	0.000	0.000	1	1
8/24/2025 5:19:00 PM	79.797	994.228	1	0.000	0.000	1	1
8/24/2025 5:20:00 PM	79.665	992.043	1	0.000	0.000	1	1
8/24/2025 5:21:00 PM	79.457	989.858	1	0.000	0.000	1	1
8/24/2025 5:22:00 PM	79.219	987.673	1	0.000	0.000	1	1
8/24/2025 5:23:00 PM	79.032	985.489	1	0.000	0.000	1	1
8/24/2025 5:24:00 PM	78.666	983.304	1	0.000	0.000	1	1
8/24/2025 5:25:00 PM	78.183	980.877	1	0.000	0.000	1	1
8/24/2025 5:26:00 PM	77.756	977.686	1	0.000	0.000	2	2
8/24/2025 5:27:00 PM	77.219	974.953	1	0.000	0.000	2	2
8/24/2025 5:28:00 PM	77.026	972.433	1	0.000	0.000	2	2
8/24/2025 5:29:00 PM	77.704	970.149	1	0.000	0.000	2	2
8/24/2025 5:30:00 PM	78.070	969.875	1	0.000	0.000	2	2
8/24/2025 5:31:00 PM	78.559	970.062	1	0.000	0.000	2	2

High-resolution command data

From the 24th August 2025 11:01:45 through 17:01:45, Damper 2 is consistently recorded as:

- Status 1 (Open)

Base Report confirmation

Over the same period (15:00–17:00 Base Report window):

- Damper 2 = 1 (Open)
- Incineration ON
- Stable combustion temperatures (~970–990 °C)
- Stable steam flow (~78–88 t/h)
- Zero oil support firing

Both datasets confirm stable, normal operation with Damper 2 fully open.

High-resolution command sequence

The following transitions are recorded:

- 17:26:30 – Status 4 (Closing)
- 17:27:00 onward – Status 2 (Closed)

This indicates the intentional initiation of damper closure as part of the shutdown sequence.

Post-closure condition (17:27 onward)

High-resolution command data

From 17:27:00 through at least 22:27:00, Damper 2 is repeatedly logged as:

- Status 2 (Closed)

There are no subsequent opening or cycling commands during this period.

Base Report correlation

The Base Report reflects the same operational outcome:

- Up to 17:26 – Damper 2 remains Open (1)
- From 17:27 onwards – Damper 2 recorded as Closed (2) on a minute-averaged basis

The Base Report shows a single clean transition from open to closed, as expected given one-minute averaging.

- The active closing state (Status 4) appears briefly at 17:26:30 in the command log
- This transient state is not explicitly visible in the Base Report because:
    - The closing action occurs within a single minute
    - The dominant condition for that minute is “closed”

This behaviour is fully consistent with previous examples and standard DCS averaging logic.

- The damper follows a clear and logical shutdown sequence: Open → Closing → Closed
- There is no evidence of oscillation, instability, or unintended re-opening
- Both datasets independently confirm the same final damper position and timing

The data for 24 August 2025 demonstrates a controlled and orderly shutdown of Feed Chute Damper 2. High-resolution DCS command records and minute-averaged Base Report data are fully consistent. The brief appearance of a “closing” state in the command data is accurately represented as a direct transition to “closed” in the averaged report. The observed behaviour aligns with expected shutdown logic and mirrors previously reviewed shutdown sequences.

Damper 1 (1HHH90AA051A:s) reflects the same actions as damper 2 and is consistent with the minute-averaged Base Report records.

Damper 1 & 2 Line 1:

High-resolution DCS command data

- There are no confirmed instances where the damper command transitions directly from 1 (Open) to 2 (Closed).
- Wherever a closure occurs, the command record always includes at least one of:
  - 4 (Closing), and sometimes
  - 3 (Opening) during transient or corrective movement
- This holds true for:
  - Shutdown events (e.g. 18-May-25, 24-Aug-25)
  - Transitional cycling events (e.g. 27-Jun-25, 15-Dec-25, 05-Dec-25 within Appendix D)

Review of high-resolution DCS command data indicates that Feed Chute Damper 2 typically takes approximately 30–60 seconds to transition from the Open state to the Closed state. All observed closures include an intermediate "Closing" command, with apparent direct transitions in minute-averaged data attributable solely to data aggregation rather than instantaneous damper movement.

Line 2 - Start up 26th August 2025 Damper 1 (2HHH90AA051A:s)

26-AUG-25 10:22:30.0	1
26-AUG-25 09:22:30.0	1
26-AUG-25 08:22:30.0	1
26-AUG-25 07:22:30.0	1
26-AUG-25 06:22:30.0	1
26-AUG-25 05:22:30.0	1
26-AUG-25 04:22:30.0	1
26-AUG-25 04:21:50.0	3
26-AUG-25 04:02:10.0	2
26-AUG-25 03:02:10.0	2
26-AUG-25 02:02:10.0	2
26-AUG-25 01:02:10.0	2
26-AUG-25 00:02:10.0	2

Base Report

Start time: 8/25/2025 9:00:00 AM
End time: 8/26/2025 9:00:00 AM

Time	2LBA20CFY01:av TOTAL STEAM FLOW t/h	2HNA10CTY014:av AVERAGE 10MM T2S °C	2HCC10EU001YB09 INCINERATION ON I/O	2EGD30CF001XQ99:av OIL FLOW R l/h	2EGD40CF001XQ99:av OIL FLOW L l/h	2HHH90AA051A:s FEED CHUTE DAMPER 1 STATUS	2HHH91AA051A:s FEED CHUTE DAMPER 2 STATUS
8/25/2025 9:00:00 AM	2.047	-30.243	0	0.000	0.000	2	2
8/25/2025 9:01:00 AM	2.026	-30.358	0	0.000	0.000	2	2
8/25/2025 9:02:00 AM	2.006	-30.438	0	0.000	0.000	2	2
8/25/2025 9:03:00 AM	1.985	-30.517	0	0.000	0.000	2	2
8/25/2025 9:04:00 AM	1.965	-30.595	0	0.000	0.000	2	2
8/26/2025 4:17:00 AM	32.591	848.963	0	1590.401	1597.367	2	2
8/26/2025 4:18:00 AM	32.780	850.738	0	1593.762	1597.161	2	2
8/26/2025 4:19:00 AM	33.140	852.513	0	1596.358	1596.956	2	2
8/26/2025 4:20:00 AM	33.612	854.620	0	1596.287	1597.867	2	2
8/26/2025 4:21:00 AM	34.011	858.713	0	1601.622	1604.510	2	2
8/26/2025 4:22:00 AM	34.420	863.148	0	1592.753	1602.423	1	1
8/26/2025 4:23:00 AM	34.872	868.014	0	1589.608	1594.428	1	1
8/26/2025 4:24:00 AM	34.940	873.528	0	1581.525	1584.817	1	1
8/26/2025 4:25:00 AM	35.262	879.345	0	1559.981	1564.830	1	1
8/26/2025 4:26:00 AM	35.327	885.364	0	1547.166	1552.633	1	1
8/26/2025 4:27:00 AM	35.284	891.905	0	1535.909	1536.790	1	1
8/26/2025 4:28:00 AM	35.139	898.255	0	1516.334	1524.240	1	1
8/26/2025 4:29:00 AM	34.562	903.079	0	1501.990	1509.191	1	1

-

For 26 August 2025, the Base Report and high-resolution command data are fully consistent, with the Base Report accurately reflecting the outcome of the damper opening action observed in the command-level data.

What the high-resolution data shows

From your command log:

- 00:02 → 03:02 → Status 2 (Closed)
- 04:21:50 → Status 3 (Opening)
- 04:22:30 onward → Status 1 (Open) and remains open for the rest of the day

This is a normal 2 → 3 → 1 opening sequence.

What the Base Report shows

In the Base Report:

- Up to 04:22 → Feed Chute Dampers reported as 2 (Closed)
- From 04:23 onward → Feed Chute Dampers reported as 1 (Open)

The Base Report records:

- Closed during the minute before movement
- Open in the first full minute after movement completes

The brief Opening (3) state is not shown because the Base Report is minute-averaged.

Damper 2:

26-AUG-25 08:22:20.0	1
26-AUG-25 07:22:20.0	1
26-AUG-25 06:22:20.0	1
26-AUG-25 05:22:20.0	1
26-AUG-25 04:22:20.0	1
26-AUG-25 04:21:50.0	3
26-AUG-25 04:02:05.0	2
26-AUG-25 03:02:05.0	2
26-AUG-25 02:02:05.0	2
26-AUG-25 01:02:05.0	2

Both sets of data match each other for damper 2.

Line 2 - Shutdown16/06/2025 Damper 1 (2HHH90AA051A:s)

16-JUN-25 13:12:55.0	2
16-JUN-25 12:12:55.0	2
16-JUN-25 11:12:55.0	2
16-JUN-25 11:12:25.0	4
16-JUN-25 10:43:10.0	1
16-JUN-25 09:43:10.0	1
16-JUN-25 08:43:10.0	1
16-JUN-25 07:43:10.0	1
16-JUN-25 06:43:10.0	1

Base Report
Start time: 6/16/2025 8:00:00 AM
End time: 6/16/2025 2:00:00 PM

Time	2LBA20CFY01:av TOTAL STEAM FLOW t/h	2HNA10CTY014:av AVERAGE 10MM T2S °C	2HCC10EU001YB09 INCINERATION ON I/O	2EGD30CF001XQ99:av OIL FLOW R l/h	2EGD40CF001XQ99:av OIL FLOW L l/h	2HHH90AA051A:s FEED CHUTE DAMPER 1 STATUS	2HHH91AA051A:s FEED CHUTE DAMPER 2 STATUS
6/16/2025 8:00:00 AM	80.635	1025.824	1	0.000	0.000	1	1
6/16/2025 8:01:00 AM	80.582	1024.492	1	0.000	0.000	1	1
6/16/2025 8:02:00 AM	80.425	1024.095	1	0.000	0.000	1	1
6/16/2025 8:03:00 AM	80.232	1023.808	1	0.000	0.000	1	1
6/16/2025 8:04:00 AM	80.753	1023.521	1	0.000	0.000	1	1
6/16/2025 11:07:00 AM	44.719	979.137	1	0.000	0.000	1	1
6/16/2025 11:08:00 AM	42.244	956.348	1	0.000	0.000	1	1
6/16/2025 11:09:00 AM	42.092	942.820	1	0.000	0.000	1	1
6/16/2025 11:10:00 AM	43.507	936.256	1	0.000	0.000	1	1
6/16/2025 11:11:00 AM	46.848	931.051	1	0.000	0.000	1	1
6/16/2025 11:12:00 AM	48.958	926.371	1	0.000	0.000	2	2
6/16/2025 11:13:00 AM	51.587	929.098	1	0.000	0.000	2	2
6/16/2025 11:14:00 AM	53.861	952.268	0	366.518	0.000	2	2
6/16/2025 11:15:00 AM	55.534	988.971	0	0.000	0.000	2	2
6/16/2025 11:16:00 AM	56.303	1024.118	0	0.000	0.000	2	2
6/16/2025 11:17:00 AM	63.255	1054.915	0	0.000	0.000	2	2

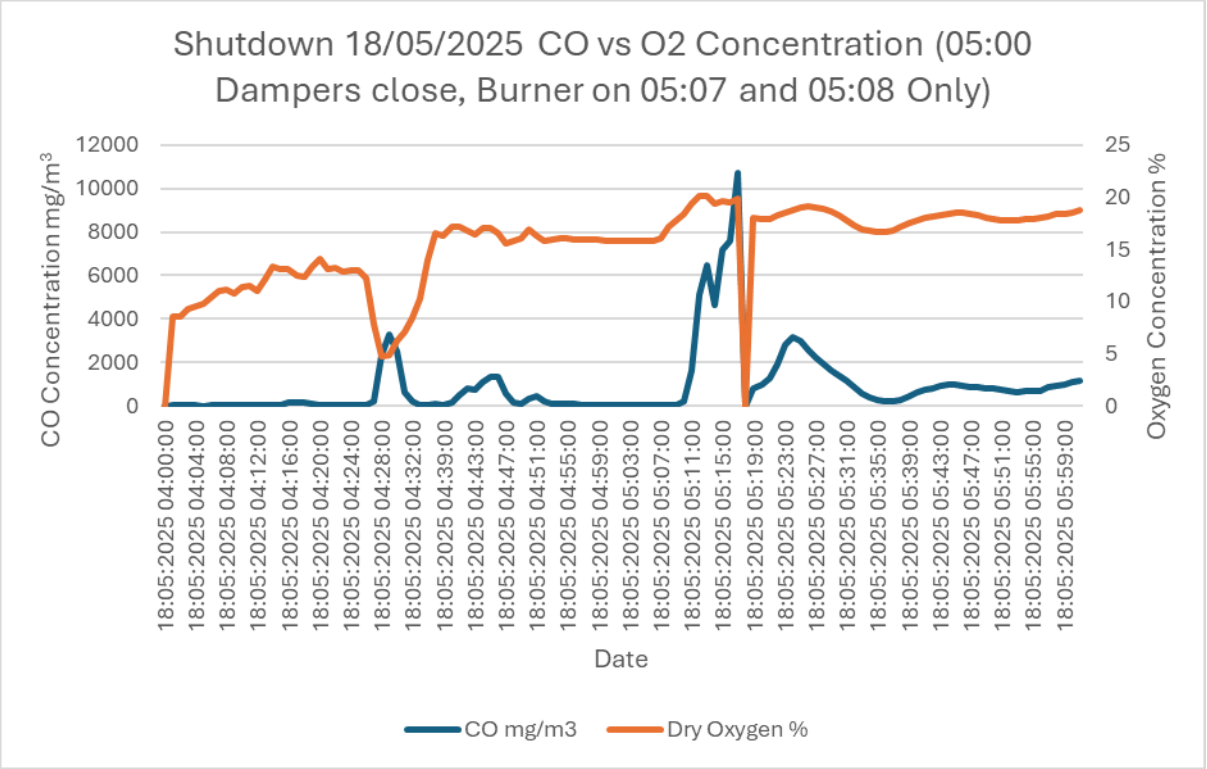
Both sets of data match each other.

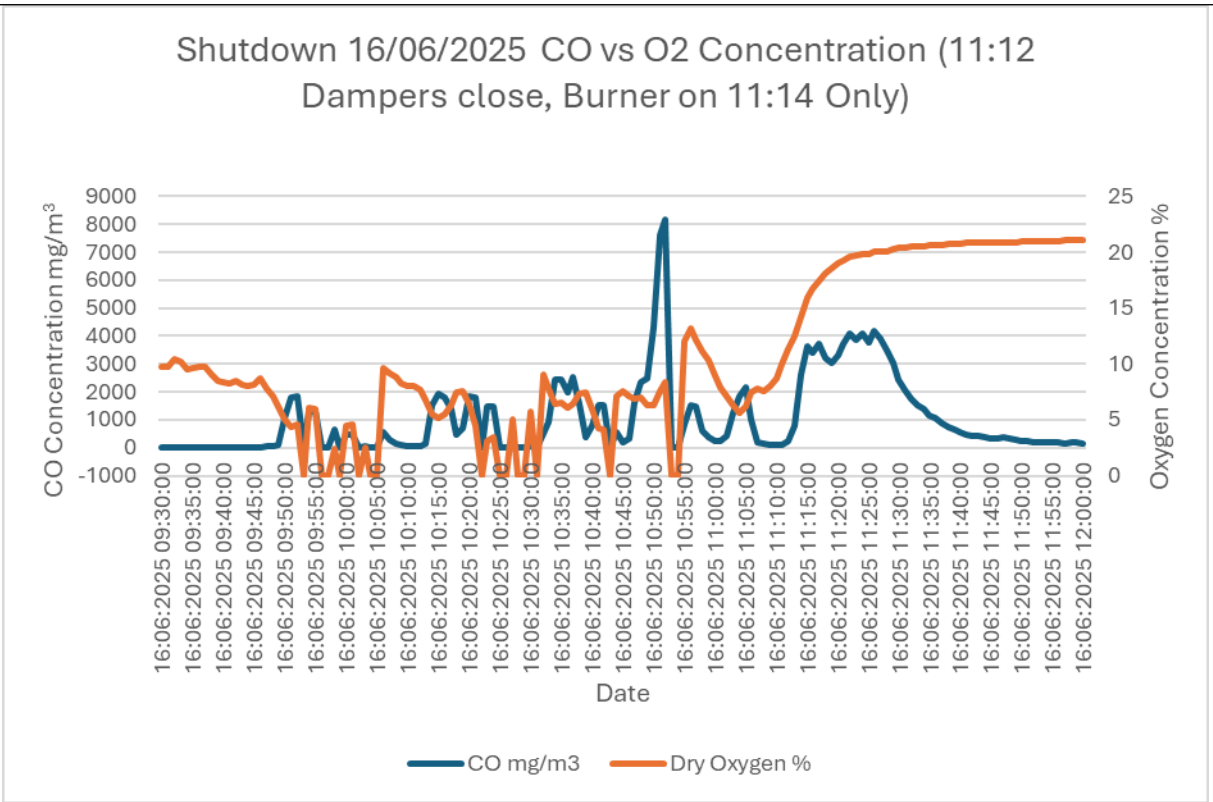
Damper 2:

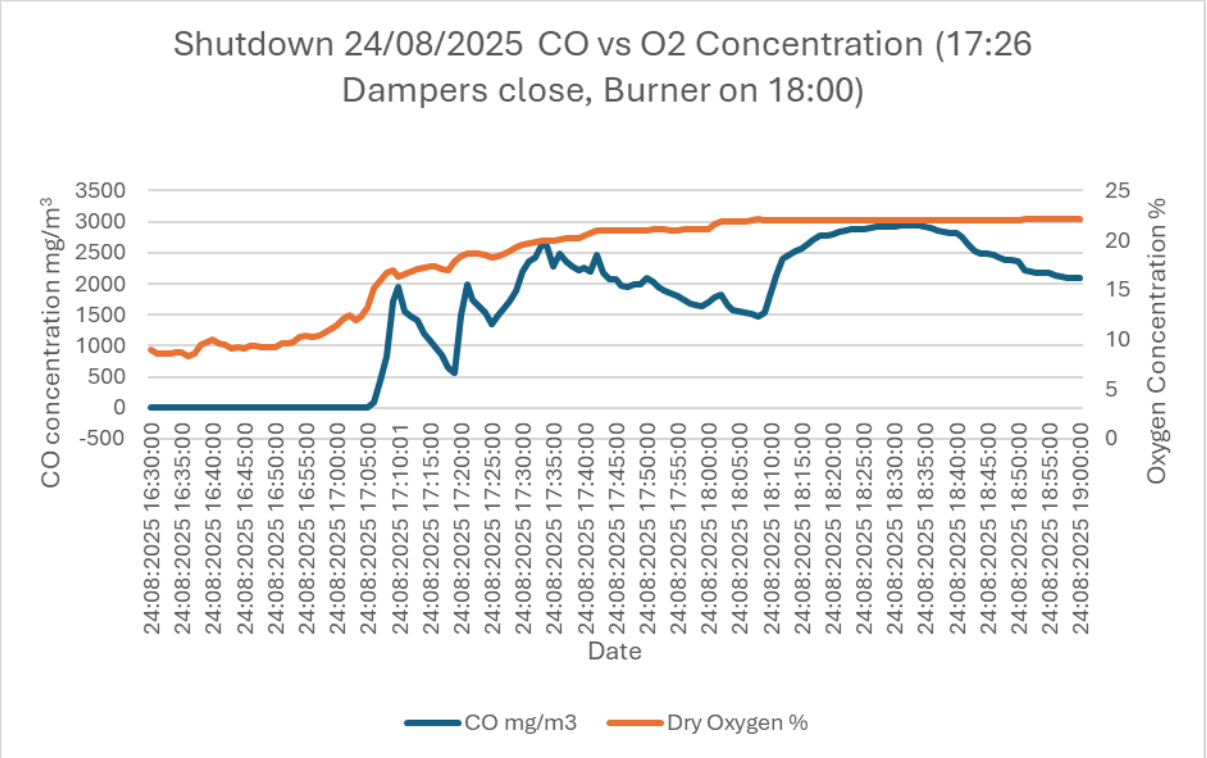
16-JUN-25 14:12:55.0	2
16-JUN-25 13:12:55.0	2
16-JUN-25 12:12:55.0	2
16-JUN-25 11:12:55.0	2
16-JUN-25 11:12:25.0	4
16-JUN-25 10:43:05.0	1
16-JUN-25 09:43:05.0	1
16-JUN-25 08:43:05.0	1
16-JUN-25 07:43:05.0	1

Both sets of data match each other for damper 2.

Appendix 3




Shutdown 16/06/2025 CO vs O2 Concentration (11:12 Dampers close, Burner on 11:14 Only)
CO Concentration mg/m3
Oxygen Concentration %
Date
CO mg/m3
Dry Oxygen %


Shutdown 24/08/2025 CO vs O2 Concentration (17:26 Dampers close, Burner on 18:00)
CO concentration mg/m3
Oxygen Concentration %
Date
CO mg/m3
Dry Oxygen %

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 required for the permit condition assessed to avoid non-compliance. No non-compliance scored at this time
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(1) – Emissions to water
- IR3A(2) – Emissions to air
- IR3A(3) – Emissions to 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.

Disputing the Content of this Compliance Assessment Report Form
If you disagree with the content of this Compliance Assessment Report form, you should submit your concerns, in writing, to the regulating officer who issued it within **15 working days** of its issue. This will be treated as a **Stage 1 review**.

If you are not satisfied with the outcome of the stage 1 review, you may request a **Stage 2 appeal**. This request must be submitted **within 21 working days** of receiving the response from the stage 1 review.

Further details on our review and appeal process are available at: Natural Resources Wales / Appeal a regulatory decision from Natural Resources Wales

Concerns Not Related to the Content of this Compliance Assessment Report Form
If your concerns do not relate to the content of the Compliance Assessment Report form, you should first attempt to resolve the issue with the regulating officer or their line manager.

If the issue remains unresolved, please contact our **Customer Contact Team**:

- **Telephone**: 0300 065 3000 (Monday to Friday, 09:00–17:00)
- **Email**: enquiries@naturalresourceswales.gov.uk

They will provide details on how to escalate your concerns through our **Complaints and Commendations procedure**.

If you are dissatisfied with our response, you may contact the **Public Services Ombudsman for Wales**:

- **Telephone**: 0300 790 0203
- **Email**: 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.