Veolia Water Services (ANZ) Pty Ltd

MOA POINT WASTEWATER TREATMENT PLANT –

ANNUAL SMOKE TESTING, NOVEMBER 2024

Issue

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Veolia Water Services (ANZ) Pty Ltd

MOA POINT WASTEWATER TREATMENT PLANT ANNUAL – SMOKE TESTING, NOVEMBER 2024

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Contents

1. Executive Summary

Source Testing New Zealand Limited (STNZ) was commissioned by Veolia Water Services (ANZ) Pty Ltd (Veolia) to conduct the annual smoke testing of the Moa Point Wastewater Treatment Plant (Moa Pt WWTP), Wellington odour control system. The objective of the smoke testing was to demonstrate compliance with Condition 10. of the Company's Resource Consent (WGN08000[26183]). The following report presents the findings of the smoke testing conducted on 23 November 2024

The Moa Pt WWTP Inlet Pump Station (IPS) is currently in the process of being decommissioned and incorporated into the new Sludge Minimisation Facility (SMF). The IPS is also being up graded requiring routine access to the wet wells. As a result, most of the seals have either been removed or in such a poor condition that the odour control system is no longer able to maintain the wet wells under negative pressure, significantly increasing the risk of fugitive odour emissions. This was demonstrated by the smoke testing as multiple leaks were identified.

In summary, the work on the IPS has resulted in the odour extraction system no longer being able to maintain a negative pressure within the system, allowing foul air to be released leading to the light moderate sewage odour on site. Unfortunately, this will be an ongoing issue until the IPS is fully contained within the structure of the SMF.

The assessment of the primary treatment room identified that the flow control baffle at the junction of the covered inlet channels and the primary treatment extraction ducting was so severely degraded that it is no longer fit for purpose and will be adversely affecting the ventilation rate. Hence,

It is recommended that the primary treatment flow control baffle be replaced and the associated ducting repaired.

The ducting has six ventilation grills to capture foul air from the process which are currently covered in a thick coating of grim, restricting the flow, hence

It is recommended that the primary treatment extraction grill undergo a deep clean to remove the excessive fouling.

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Smoke testing of the primary treatment room on 23 November 2024 found no visible smoke being emitted from the exterior of the building indicating that despite the issues with the extraction ducting, the building was being maintained under negative pressure thereby minimising the potential for fugitive odour emissions.

However, the estimated buildings ventilation rate was only 1.5-room changes per hour which was low for this type of process. The ventilation rate has continued to decline and is now at the point where it is no longer suitable for routine access. Hence,

It is recommended that the primary treatment odour control extraction ducting be repaired to ensure adequate ventilation for operators to routinely work in the area.

The assessment of the secondary treatment process found that the refurbishment of the northern MBBR tank in 2023 resulted in some minor damage to the covers, in particular the latches and seal. Hence,

It is recommended that the all the seals and latches of the northern MBBR tank covers be repaired to prevent potential fugitive odour emissions.

Inspection of the remaining covers found a large portion of the seals for the covers and floor plates to be in a poor condition with the potential for fugitive odour emissions. One area of particular concern were the floor plates located by the stairs from the northern MBBR to RAT with a discernible sewage odour present on the day of the assessment and routinely detected by STNZ. Hence,

It is recommended that high priority be given to the repair of the floor plate seals in the vicinity of the transition from the northern MBBRs to the RATs.

Several of the access ports identified in the January 2024 assessment needing repair have been fixed, however, there were still some significant gaps such as those depicted in Figure 12. Hence,

It is recommended that all access ports be suitably sealed.

The MBBR and RATs /SCRTs flow control baffles were both degraded adversely affecting the ventilation rate of not only the secondary treatment process but also the primary treatment room and covered inlet channels. Hence,

It is recommended the MBBR and RATs/ SCRTs flow control baffles be repaired or replaced.

The smoke testing of the secondary treatment tanks on 23 November 2024 did not identify any visible emissions indicating that despite the condition of the seals the building was being maintained under negative pressure thereby minimising the potential fugitive emissions

In summary, the generally poor condition of the sealing of the secondary treatment containment system will increase the risk of fugitive odour emission as indicated by the discernible odour detected on numerous occasions by STNZ. Hence,

It is recommended that the secondary treatment containment system be upgraded to rectify the poor condition of the seals, baffles and all access ports to minimise the risk of fugitive odour emissions.

In summary, the annual smoke testing of the Moa Pt WWTP odour control system conducted on 23 November 2024 demonstrates **Compliance** with Condition 10. of the Company's Resource Consent (WGN08000[26183]). The assessment identified that while the containment system is degraded with several components requiring repair, the system appears to continue to provide sufficient extraction to minimise the potential for fugitive odour emissions.

2. Introduction

Source Testing New Zealand Limited (STNZ) was commissioned by Veolia Water Services (ANZ) Pty Ltd (Veolia) to conduct the annual smoke testing of the Moa Point Wastewater Treatment Plant (Moa Pt WWTP), odour control ventilation system. The objective of the smoke testing was to demonstrate compliance with Condition 10. of the Company's Resource Consent (WGN08000[26183]) which stipulates:

The permit holder shall undertake smoke testing of the Moa Point wastewater treatment plant and ventilation system. The smoke tests are to be carried out on an annual basis between the months of August and November.

The results of the smoke testing shall be submitted to the manager, environmental regulation, Wellington Regional Council within one month of the testing being carried out by the permit holder. A copy of the analysed results shall be provided to the Community Liaison Group, if requested.

The smoke testing of the Moa PT WWTP odour control system was performed on 23 November 2024 and involved saturating odorous process areas with smoke and then observing the exterior of the containment system to identify any visible leaks which could potentially result in fugitive odour emissions. The location of any leaks was investigated to determine the possible cause and solutions to rectify the situation.

The absences of any visible discharges confirm the odour control system was providing sufficient extraction to maintain process areas under negative pressure thereby minimising the potential for fugitive odour emissions. The smoke testing also allows an estimate of the building ventilation rate to be determined by timing how long it takes to evacuate the smoke.

The following process areas at the Moa Pt WWTP were assessed:

- Inlet Pump Station (IPS),
- Primary Treatment Room,
- Secondary Treatment including Moving Bed Bioreactors (MBBR), Re-Aerations Tanks (RAT), and Solids Contact Reaction Tanks (SCRT),

Matthew Newby, Senior Air Quality Scientist with STNZ conducted the annual smoke testing of the Moa Pt WWTP odour control system. Matthew has over 25 year's air quality monitoring and consulting experience and is a Certified Air Quality Professional (CAQP) under the Clean Air Society of Australia and New Zealand (CASANZ) certification programme.

The following report presents the findings of the annual smoke testing of the Moa PT WWTP odour control system conducted on 23 November 2024 and demonstrates **Compliance** with Condition 10. of the Company's Resource Consent (WGN08000[26183]).

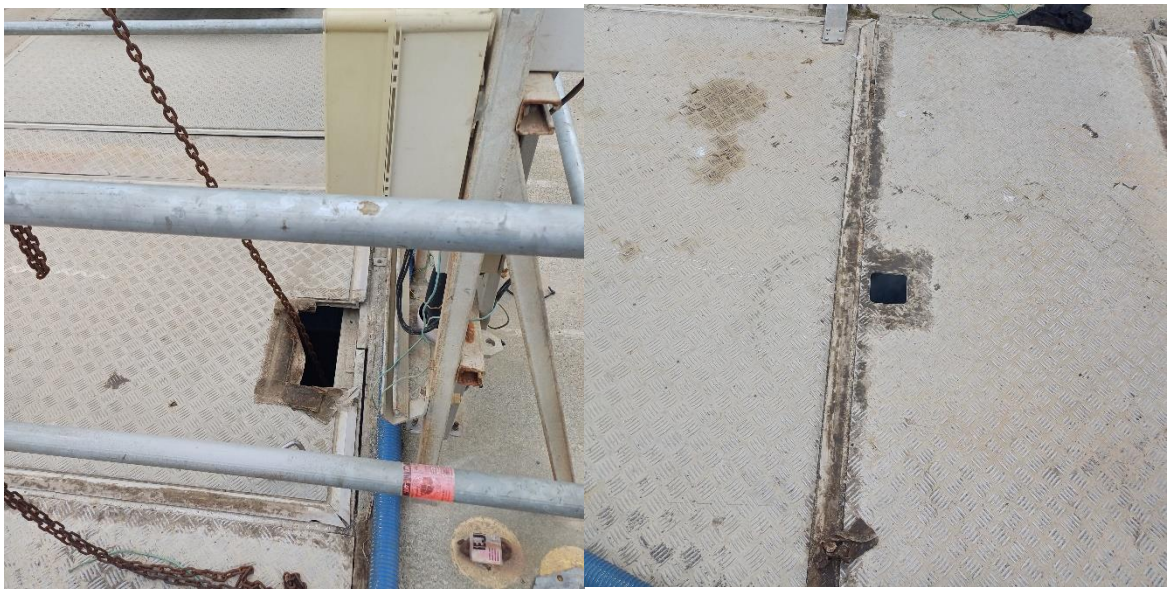
3. Inlet Pump Station Smoke Testing

3.1 Visual Assessment

On 23 November 2024, the annual smoke testing of the Moa Pt WWTP IPS odour control system was carried out to identify any potential sources of fugitive odour emissions.

The IPS is currently in the process of being incorporated into the new Sludge Minimisation Facility (SMF) and at the same time is being upgraded which requires routine access to the wet wells.

The ongoing construction and upgrades to the IPS has resulted in most of the seals being either completely removed or in such a poor condition that the covers are no longer able to contains the foul air within the inlet works (see Figure 1). Furthermore, the condition of the seals has degraded further since the last assessment in January 2024 when there were no visible emissions, as multiple leaks were observed emitting from the gaps between covers, cable flanges and other unsealed access ports.



- **Figure 1: Moa Pt IPS Seals, 23 November 2024**

Unfortunately, the observed smoke leaks were too light to be capture in a photo, but a short video clip of the emissions has been provided with this document to demonstrates the potential magnitude of fugitive odour discharge.

In summary, the work on the IPS has resulted in the odour extraction system no longer being able to maintain a negative pressure within the system, allowing foul air to be released leading to the light moderate sewage odour on site. Unfortunately, this will be an ongoing issue until the IPS is fully contained within the structure of the SMF.

3.2 Smoke Testing

Smoke testing of the Moa Pt IPS was performed on a Saturday to minimise the amount of activity on the wet wells and was performed by inserting an industrial smoke machine into an inspection hatch above of one of the wet well to fill the chamber for approximately 30-minutes (see Figure 2). During previous smoke testing, visible emissions from the IPS scrubber were normally observed within a few minutes, however, the for the current assessment this took over 20 minutes.

- **Figure 2: Moa Pt IPS Smoke Machine, 23 November 2024**

The current work at the IPS required scaffolding to access the wet wells which prevented the covers from being closed for the assessment (see Figure 3). During the week however, the covers will often be open and ventilated as was the case on 23 December 2024 (see Figure 4) when STNZ was on site for other testing. There is currently a light raw sewage odour routinely detected on site which is most likely due to with the open covers and active ventilation of the wet wells.

- **Figure 3: Moa Pt IPS Wet Well Access Scaffolding, 23 November 2024**

- **Figure 4: Moa Pt IPS Ventilation of Wet Well, 23 December 2024**

4. Primary Treatment Room

4.1 Visual Assessment

On 23 November 2024, the annual smoke testing of the Moa Pt WWTP primary treatment room was carried out to identify any potential sources of fugitive odour emissions. Effluent received at the Moa Pt IPS is pumped to the inlet works of the main treatment plant which is located within the pre-treatment area. Here it is screened prior to primary treatment where initial sedimentation and scrum removal occurs. As the inlet works// pre-treatment area is not actively extracted to the odour control system, so no smoke testing was required.

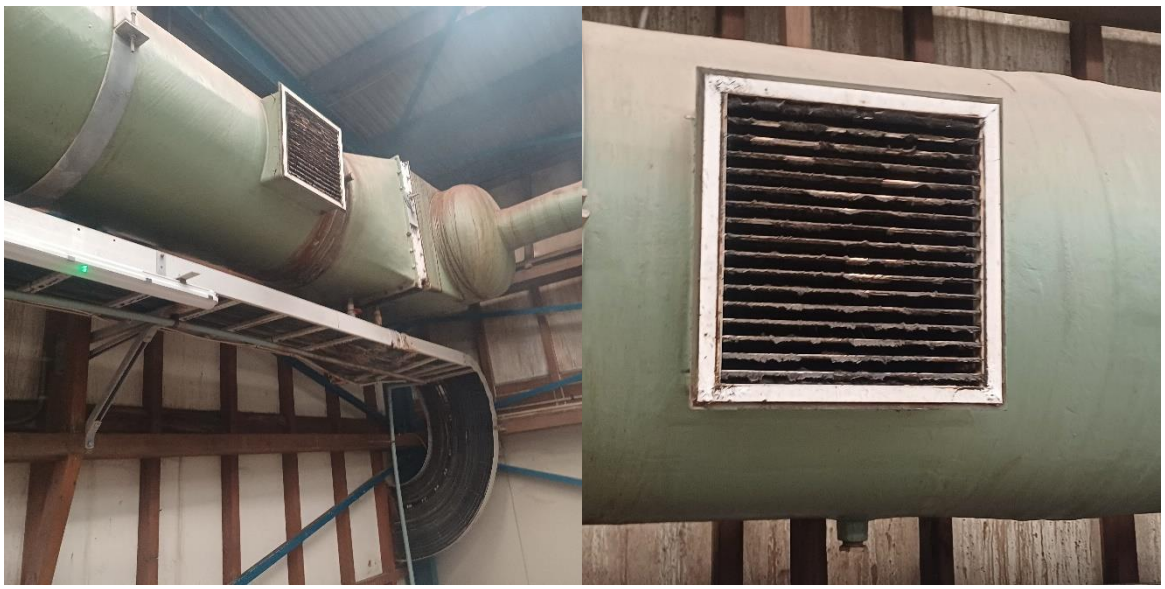
The primary treatment room is actively ventilated via a ceiling level duct above the outlet of the process channels. The extraction ducting from the primary treatment room combines with duct from the covered inlet channels immediately prior to exiting the building. At this junction a flow control baffle enables the extraction rates to be adjusted, however, the baffle is so severely degraded that it is no longer fit for purpose and will be adversely affect the building ventilation rates (see Figure 5). Hence,

It is recommended that the primary treatment flow control baffle be replaced and the associated ducting repaired.

- **Figure 5: Primary Treatment Room Baffle, 23 November 2024**

The extraction ducting has six ventilation grills to capture foul from the process and are currently covered in a thick coating that will be acting to restrict the flow (see Figure 6). Hence,

It is recommended that the primary treatment extraction grill undergo a deep clean remove the excessive fouling.



- **Figure 6: Primary Treatment Room Extraction Grills, 23 November 2024**

The combination of the damaged baffle and the dirty grills will act to limit the effective ventilation of extraction primary treatment room as air will preferentially be drawn from the immediate vicinity of the baffle, reducing the extraction rate for the remainder of the building, furthermore, the ventilation of the covered inlet channels will also be adversely affected.

4.2 Smoke Testing

Smoke testing of the Moa Pt WTP primary treatment room was performed by placing an industrial smoke machine at the inlet end of the primary treatment room (see Figure 7) and allowing the space to fill for approximately 45-minutes. Once the building was full of smoke, the exterior of the building, including the roof, was visually assessed to identify any leaks which could indicate potential sources of fugitive odour emissions.

- **Figure 7: Moa Pt Primary Tanks, 23 November 2024**

On 23 November 2024, no visible smoke was observed emitting from the exterior of the building indicating that despite the issues with the extraction ducting, the building was being maintained under negative pressure thereby minimising the potential for fugitive odour emissions.

In addition to identifying any potential leak, the smoke testing also provides an indication of the buildings ventilation rate by determining the time taken to clear 95 % of the smoke, which for the current assessment was approximately 40-minutes and indicates a ventilation rate of 1.5-room changes per hour. Engineering guidelines for this type of process are in the range 3 to 5 room changes per hour, up to 10 room changes in cases where workers are required to routinely enter the area.

In January 2024, the estimated ventilation rate was 2-room changes per hour, while in November 2022 it was 3- room changes per hour with the decline indicating the performance of the extraction system is deteriating and is no longer suitable for routine access. Hence,

It is recommended that the primary treatment odour control extraction ducting be repaired to ensure adequate ventilation for operators to routinely work in the area.

5. Secondary Treatment Processes

5.1 Visual Assessment

The annual smoke testing of the Moa Pt WWTP secondary treatment processes was carried out to identify any potential sources of fugitive odour emissions. The effluent from the primary treatment process travels via three lanes through the secondary treatment which consists of Moving Bed Bioreactors (MBBR), Re-Aerations Tanks (RATs) with the final stage being the Solids Contact Reaction Tanks (SCRTs) before flowing to the plant's clarifiers. The secondary treatment tanks are fully encapsulated with discrete extraction from the MBBR tanks and a combined duct capturing the RATs and SCRTs.

The visual assessment of the secondary treatment odour containment system found the fibre glass enclosures and ducting to be weathered and showing its age (see Figure 8) but were generally still fit for purpose.

- **Figure 8: Secondary Treatment Covers & Ducting Weathering, 23 November 2024**

In mid-2023, the northern MBBR tank was refurbished which required the covers to be removed which caused some minor damage to the structure, in particular the latches and seals as depicted in Figures 9 and 10 respectively. Hence,

It is recommended that the all the seals and latches of the MBBR tanks covers be repaired to prevent potential fugitive odour emissions.

- **Figure 9: MBBR Latches, 23 November 2024**

- **Figure 10: MBBR Cover Seals, 23 November 2024**

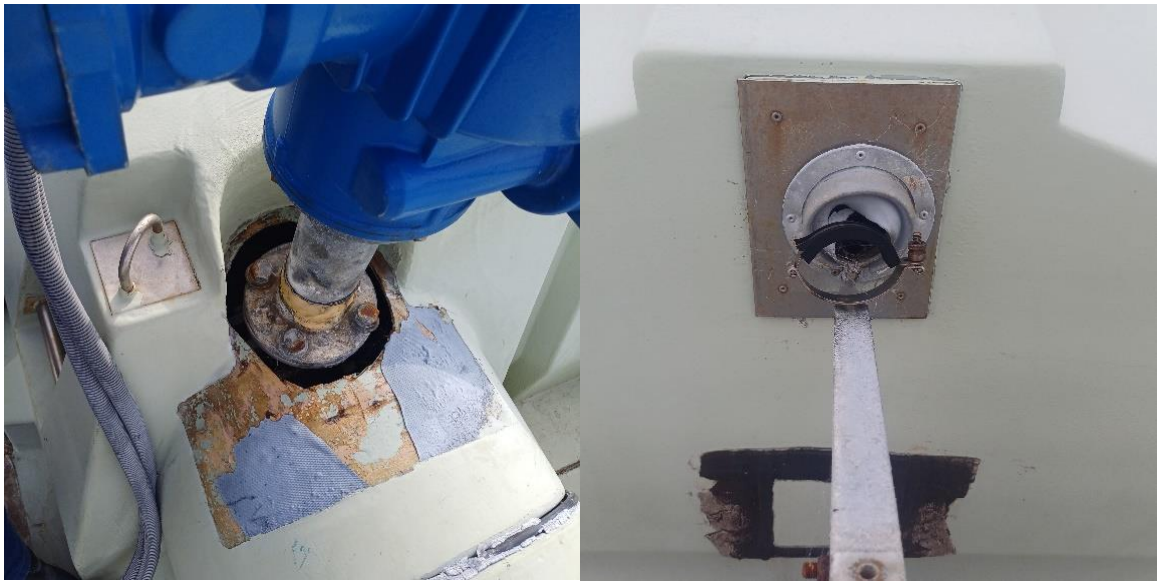
Inspection of the remaining covers found a large portion of the seals for the covers and floor plates to be in a poor condition with the potential for fugitive odour emissions (see Figure 11). One area of particular concern were the seals for the floor plates located by the stairs from the northern MBBR to RAT where the seals were in particularly poor condition and there was a discernible odour sewage odour present on the day of the assessment and has routinely been detected by STNZ. Hence,

It is recommended that high priority be given to the repair of the floor plate seals in the vicinity of the transition from the northern MBBRs to the RATs

- **Figure 11: Secondary Treatment Seals, 23 November 2024**

Several of the access ports identified in the January 2024 assessment needing repair have been fixed, however, there were still some significant gaps such as those depicted in Figure 12. Hence,

It is recommended that all access ports be suitably sealed.



- **Figure 12: Unsealed Access Hole, 23 November 2024**

The flow control baffle located at the junction of the primary extraction duct and the MBBR covers was highly degraded with the connection almost completely rusted off (see Figure 13) which will be adversely affecting the extraction from not only the MBBRs but also the primary treatment and covered inlet channels as air will preferentially be drawn in from the leaks in the baffle.

The flow control baffle for the RATs and SCRTs extraction ducting was also degraded with substantial rust and the drain line has completely detached since the last assessment (see Figure 14). Hence,

It is recommended the MBBR and RATs/ SCRTs flow control baffles be repaired or replaced.

- **Figure 13: MBBR Flow Control Baffle, 23 November 2024**

- **Figure 14: RAT and SCRT Flow Control Baffle, 23 November 2024**

In summary, the secondary treatment containment system is showing its age and the maintenance of the northern MBBR tank in 2023 damaged the latches and seals, increasing the risk of fugitive odour emissions. The seals of the remaining covers are also in need of repair along with the unsealed access ports. The baffle connecting the MBBR extraction to the primary ducting is highly degraded, adversely affecting the ventilation of the MBBRs, primary treatment room and inlet channels.

Overall, the generally poor condition of the sealing of the secondary treatment containment system increases the risk of fugitive odour emission with a discernible odour detected on numerous occasions by STNZ. Hence,

It is recommended that the secondary treatment containment system be upgraded to rectify the poor condition of the seals, baffles and all access ports to minimise the risk of fugitive odour emissions.

5.2 Smoke Testing

The smoke testing of the MBBR tanks on 23 November 2024 was conducted by inserting the smoke machine into an access hatch of the MBBR tanks (see Figure 15) and allowed to fill the chambers for approximately 30-minutes. During previous assessments of the MBBRs, light but still visible smoke was generally observed exiting the main scrubber stack. However, on this occasion there was no visible discharge which was likely a combination of low ventilation rates and the difficulties in viewing the smoke in overcast conditions.

The process was subsequently repeated for the RAT's and SCRTs with the outlet of the smoke machine inserted into a hatch (see Figures 16 and 17) and after approximately 30-minites there was no smoke observed indicating that despite the condition of the seals, the odour control system was providing sufficient extraction to minimise the potential for fugitive odour emissions.

- **Figure 15: MBBR Tanks Smoke Test, 23 November 2024**

Figure 16: RATs Smoke Test, 23 November 2024

Figure 17: SCRTs Smoke Test, 23 November 2024