2024 Annual Air Monitoring Report for WIN Waste Innovations - Saugus

Town of Saugus, Massachusetts

March 2025

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2024 ANNUAL
AIR MONITORING REPORT FOR
WIN WASTE INNOVATIONS SAUGUS

Submitted to:

Town of Saugus Board of Health
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EXECUTIVE SUMMARY

As part of a program for the Saugus Board of Health, Tech Environmental, Inc. (Tech) monitors and reports on various aspects of the WIN Waste Innovations Saugus (WIN Waste) facility, located at 100 Salem Turnpike in Saugus, Massachusetts. This report presents the results of the monitoring program for 2024. In addition to a description of the facility and the control equipment, this report presents a review of environmental reporting that WIN Waste is routinely and periodically required to submit to the Massachusetts Department of Environmental Protection (MassDEP) and the United States Environmental Protection Agency (EPA). This includes a description and review of the Continuous Emissions Monitoring Systems (CEMS), landfill operations and inspections, stack emissions testing, air quality dispersion modeling analysis, and a general facility review.

The air quality dispersion modeling analysis review was conducted using actual stack test data from July 2024. Tech reviewed the reports and compared the modeling results to health-based air quality standards for toxic substances developed by the MassDEP's Office of Research and Standards, and to the Massachusetts and National Ambient Air Quality Standards. The maximum predicted air toxics concentrations were predicted to be safely in compliance with the air quality guidelines. The results demonstrate that even under the worst-case meteorological conditions, the emissions from the WIN Waste facility will not cause adverse effects on air quality.

In the course of the monitoring program for calendar year 2024, all evidence suggests that the facility was in compliance with its permitted conditions. That is not to say there were not specific deviations or operational challenges over the course of the operating year. However, the WIN Waste Innovations team has consistently reported all deviations to the MassDEP, the Town Board of Health and Tech, filed the required reporting documentation, taken targeted mitigation measures to address operational deficiencies and addressed staffing roles through incident reviews in order to improve future performance results. In addition, WIN Waste hired a well-respected, professional stack testing firm to conduct the required emissions testing. WIN Waste has been diligent in reporting any concerns to the MassDEP, the Saugus BOH, and Tech, so that concerned parties can obtain information in a timely manner.

1.0 INTRODUCTION

As part of a program for the Saugus Board of Health (BOH), Tech Environmental, Inc. (Tech) monitors and evaluates aspects of the WIN Waste Innovations Saugus Inc. (WIN Waste) facility and its operations, located at 100 Salem Turnpike in Saugus, Massachusetts. This annual report, which describes our work on this monitoring program in 2024 (January – December), was prepared to present results and conclusions of the program to Town officials and the general public.

This monitoring program began in July 2011 as a result of a settlement between the Attorney General's office and the WIN Waste Innovations Saugus facility. Since July 2011, Tech has worked for the town as an independent third-party reviewer. Over the past thirteen (13) years, Tech has visited WIN Waste extensively, conducted file reviews at the Massachusetts Department of Environmental Protection (MassDEP), and reviewed reports in order to investigate and report on facility compliance. Tech's review is particularly related to air quality concerns, the landfill ash and cover material and the impact of facility emissions upon public health, since we understand that these are areas of great concern for the town.

Section 2 contains a description of the facility. Section 3 contains the results of the review of different reports. Section 4 describes quarterly monitoring of stack testing and compliance testing reports. Section 5 describes the annual monitoring results and a review of the WIN Waste files. Section 6 presents our conclusions regarding facility compliance. This report also contains Appendices A through C, which present the monitoring plan timeline, reporting requirements reviewed as part of this program, and examples of the stack testing observation sheets from our testing observation period.

2.0 FACILITY DESCRIPTION

The WIN Waste Innovations Saugus (WIN Waste) facility is located on approximately 300 acres of land at 100 Salem Turnpike in Saugus. The site includes the WIN Waste facility, adjacent ash landfill, and the 200 acre Bear Creek Wildlife Sanctuary. The facility has been in operation since 1975 and has two (2) municipal waste combustors (MWCs) outfitted with air pollution control equipment. Each combustor has the capacity to burn up to 750 tons per day of municipal solid waste (MSW) from communities on the North Shore of Massachusetts. In addition to the ability to reduce the volume of MSW through combustion, the facility can generate 38 megawatts of electricity in its capacity as a waste-to-energy (WTE) plant.

2.1 Waste to Energy Plants

WTE plants have the potential to produce significant amounts of air pollution. However, WTE facilities produce less pollution than most existing fossil fuel power plants in the United States. This is due in part to stringent air pollution control standards for large units at municipal waste combustion facilities, introduced by the United States Environmental Protection Agency (EPA) as part of the 1990 Clean Air Act mandates.[1] EPA adopted Emission Guidelines for existing MWCs,[2] which were later promulgated by Massachusetts.[3] To comply with the EPA's tougher standards, the WIN Waste facility underwent major renovations to add additional air pollution control systems, which were required by the end of 2000. The air pollution control systems added to the WIN Waste facility greatly reduce the emissions of gaseous and solid pollutants, such as carbon

[1] Regulations/standards for WTE facilities were required to be promulgated under the 1990 Clean Air Act Amendments, Sections 111(d) and 129.
[2] EPA's Emission Guidelines, which apply to WIN Waste, are in 40 CFR 60, Subpart Cb. At the same time, EPA also promulgated New Source Performance Standards (NSPS), which apply to new facilities. Both apply to large MWC units, which combust greater than 250 tons per day of MSW.
[3] Massachusetts rules for MWCs are in 310 CMR 7.08(2).

monoxide, nitrogen oxides, sulfur dioxide, hydrogen chloride, metals (such as mercury), organic pollutants (such as dioxins/furans) and particulate matter (or soot). However, careful monitoring of operations and controls is critical, given these complex new air pollution controls. A description of the air pollution control system is presented in Section 2.2.

At WIN Waste and other WTE facilities, waste is used as a fuel to generate electricity and/or produce steam. WTE plants are generally considered to be a form of renewable energy, because the fuel these plants use is both sustainable and indigenous; WTE plants convert waste into useful energy forms.[4] In addition to producing energy, WTE facilities can help to reduce pollution. For example, in 1993, Los Angeles District Sanitation Department officials concluded that less pollution was created by their local WTE facility than by the trucks, which would have been used to take the waste to a nearby landfill.[5] The MassDEP has estimated that combustion of waste reduces the material being disposed of by 90% (by volume) or by 75% (by weight), so less waste is buried in landfills as a result.[6]

2.2 Emissions and Emissions Control

Carbon monoxide (CO) emissions are generated as a product of incomplete combustion. Emissions of CO are typically reduced by combustion controls: for example, the maintenance of proper air/fuel mixing and proper excess air levels. The WIN Waste facility reduces emissions of CO by attempting to achieve complete combustion; no additional control technology is used for this pollutant.

The WIN Waste facility also utilizes combustion control to control emissions of nitrogen oxides (NO_x).[7] A post-combustion control technology known as Selective Non-Catalytic Reduction (SNCR) is also employed at WIN Waste. Reducing NO_x emissions is important because NO_x reacts with volatile organic compounds (VOCs) in the atmosphere to produce ozone (smog). The SNCR system reduces NO_x through the controlled injection of urea into the exhaust gases of the unit. The urea

[4] Department of Energy's National Renewable Energy Laboratory
[5] Waste-to-Energy Industry fact sheet, Integrated Waste Services Association, August 14, 2000.
[6] https://www.mass.gov/guides/municipal-waste-combustors
[7] Nitrogen oxides, abbreviated as "NO_x", are a mixture of nitrogen oxide (NO) and nitrogen dioxide (NO_2).

reacts selectively in the presence of oxygen to reduce the NO_x to harmless molecular nitrogen (N_2) and water (H_2O). This equation shows the reduction of nitrogen oxide (NO):

$$CO(NH_2)_2 + 2NO + \frac{1}{2} O_2 \rightarrow 2N_2 + CO_2 + 2H_2O$$

Urea + Nitrogen Oxide + Oxygen → Nitrogen + Carbon Dioxide + Water

Emissions of sulfur dioxide (SO_2) and hydrogen chloride (HCl) are acidic and are sometimes referred to as "acid gases". The air pollution control equipment for these acid gases, called a spray dryer absorber or a scrubber, introduces a wet solution of lime into the exhaust stream. Lime is chemically basic and serves to neutralize the acidic SO_2 and HCl in much the same way that lime is used in gardens to neutralize acidic soil. The scrubber system also helps to control mercury present in the exhaust.

Mercury is further captured by a powdered activated carbon injection system (PACIS) at WIN Waste that blows charcoal (carbon) into the exhaust stream to adsorb mercury; the charcoal/mercury is then removed with other solid pollutants (including particulate matter) by a fabric filter. The PACIS also helps to reduce organic pollutants such as dioxins/furans. The level of control achieved for these compounds is impressive when you consider that a four-person family burning trash in their backyard could potentially emit as much dioxins/furans as a well-controlled municipal waste incinerator serving tens of thousands of households.[8,9]

The fabric filter (or "baghouse") removes solid pollutants, such as particulate matter, lime salts, activated charcoal (with adsorbed mercury), and metals. The baghouse works like a vacuum cleaner equipped with hundreds of fabric filter bags to capture solid particles in the hot flue gases (often called "fly ash"). The bags are cleaned by bursts of compressed air that dislodge any deposits, which are then collected into a collection hopper. Ash is then removed from the hoppers for off-site disposal.

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[8] Lemieux, Paul M., Abbott, Judith A., and Aldous, Kenneth M. "Emissions of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from the Open Burning of Household Waste in Barrels", *Environmental Science & Technology*, Web Release Date: January 4, 2000.

[9] Gullett, Brian K., Lemieux, Paul M., Lutes, Christopher C., Winterrowd, Chris K., and Winters, Dwain L. "PCDD/F Emissions from Uncontrolled, Domestic Waste Burning", *Organohalogen Compounds*, Volume 41: 27-30, 1999.

The current emissions limits set forth in EPA regulations are much more stringent than those in place before WIN Waste's air pollution control system retrofits were completed in 2000. The MassDEP has adopted the federal emission limits for most pollutants, with the exception of mercury, for which MassDEP has imposed a more stringent limit than the federal emission limit.[10] MassDEP has imposed the mercury limit of 0.050 milligrams per dry standard cubic meter (mg/dscm) for an average of tests in any quarterly or 9-month compliance test. And MassDEP imposes a more stringent requirement for the four-quarter average, lowering the emission limit for mercury to 0.028 mg/dscm.

[10] CMR 7.08(2)(f)(2)

3.0 REPORT REVIEW AND FACILITY OVERSIGHT

As required by the MassDEP and the EPA, the WIN Waste Innovations Saugus (WIN Waste) facility is required to submit various environmental monitoring reports on a bi-monthly, quarterly, semi-annual, or annual basis. These reports may be related to different environmental regulations related to air quality, water quality, or proper operation of the landfill. Tech's scope on this project includes reviewing many of these reports, as discussed below.

3.1 Reporting Related to CEMS

Continuous Emissions Monitoring Systems (CEMS) are used to monitor and record facility emissions. This includes pollutants, such as NO_x, SO_2, and CO emissions, exhaust gas opacity, and facility and air pollution control system operating parameters such as carbon feed, fabric filter inlet temperature, and steam load.[11] Tech checks the CEMS reports, which WIN Waste is required to prepare and submit on a quarterly and semi-annual basis in submittals to the MassDEP. These reports summarize quarterly tests conducted to check the accuracy of the CEMS and semi-annual reports which confirm that the CEMS demonstrate that the facility is operating in compliance with all federal and state air quality requirements. Our review of these reports demonstrated that the units are working well and that the facility has been in compliance with the regulations and requirements.

The WIN Waste CEMS are located at both inlet and outlet locations of the two (2) flues and consist of four (4) systems. The inlet systems monitor oxygen (O_2) and SO_2 emissions from the two (2) flues in the ductwork leading to the spray dryer absorber (SDA). The outlet systems monitor NO_x, CO, O_2, SO_2, and carbon dioxide (CO_2) emissions from each of the two (2) flues in the ductwork, which lead to the single stack.

Although emissions are monitored "continuously", Massachusetts regulations do allow for some CEMS downtime. WIN Waste's permit[12] stipulates that valid CEMS data be obtained for 75% of

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[11] Carbon dioxide (CO_2) and oxygen (O_2) are also monitored by the CEMS, but there are no permit limits for these compounds.
[12] Administrative Amendment to Final Operating Permit, MassDEP Transmittal No. X268200, November 19, 2015.

the operating hours per day (i.e. 18 hours/day) for 75% of the days per month (23 days/month for a 30-day month) that an MSW is combusting solid waste continuously (24 hours/day) and that valid CEMS data must be obtained for 90% of the operating hours each quarter. During operational changes, when the boiler is shut down for maintenance or taken offline due to an electrical or mechanical problem, the data shown on the charts may appear to be out of compliance. As a practical matter, however, the facility is allowed time during start-up to bring the combustion process up to a stable operating condition before being required to meet emissions limits.

By continuously monitoring the emissions of NO_x, the facility is able to control the feed of urea to the combustor as part of the SNCR system briefly described in Section 2.0. The exhaust concentration limit for NO_x is 205 parts per million by volume on a dry basis (ppmvd) (corrected to 7% oxygen)[13]; as emissions approaching the limit are detected by the CEMS, more urea is fed to the SNCR system. In turn, the monitored emissions of SO_2 help determine the amount of lime necessary for the scrubbers. The exhaust concentration limit for SO_2 is 29 ppmvd (corrected to 7% oxygen) or 75% reduction (whichever is less stringent), but not both. As increased emissions are detected by the CEMS, more lime is fed to the scrubbers.

The CEMS also monitor and record opacity, or visible emissions, which is reported as a 6-minute average. Opacity is a measure of how much soot or smoke is being emitted, as measured by continuous opacity monitors, located at the outlet of the stack after the air pollution control equipment. The opacity levels are required to be less than 10%.

Critical operating parameters, related to the operation of the air pollutant control devices and air pollutant emissions, are also monitored continuously. The CEMS track and record operating parameters such as carbon feed (part of the PACIS), the inlet temperature for the fabric filter or baghouse, and steam load. The PACIS and fabric filter were described in Section 2.0. The steam load is the amount of steam sent to a turbine-generator to produce electricity. The steam, generated

[13] Since emissions in parts per million (ppm) represent concentrations, the concentration will vary depending on the oxygen content of the stack gas. To avoid confusion when reporting emissions in ppm, the emissions are standardized by specifying that the limit is corrected to a specific oxygen content, such as 3% or 7% O_2. Without this correction, the stack gases could be diluted with extra air to reduce the concentration.

by the combustion of MSW, powers the turbine-generator to produce the electricity in a waste-to-energy facility. The load is recorded as pounds per hour; the maximum allowable steam load is variable. According to the facility's permit, the maximum allowable steam load cannot be greater than 110% of the maximum load, as demonstrated during the most recent dioxins/furans emission test.

According to Massachusetts state regulations, WIN Waste is required to submit semiannual and annual reports[14] that include: 1) the highest emission level recorded by the CEMS for the year; 2) the number of operating hours and days when valid data were collected and reported; 3) the dates when data were excluded, the reason for the exclusion and the corrective action taken (such as a unit being down for preventative maintenance), and 4) data regarding start-ups, shut-downs, or facility malfunctions. Quarterly emission reports are also required by federal regulations.[15] These reports include information on any excess emissions, the reason for the emissions, and a performance summary for the CEMS, which includes any downtime and an explanation. Several examples of CEMS downtime for WIN Waste in 2024 were for startups, shutdowns, and Quality Assurance/Quality Control (QA / QC) calibrations, analyzer adjustments or maintenance.

The review of the CEMS reports demonstrates that the facility was in compliance with emissions limits for NO_x (205 ppmvd, 7% O_2), SO_2 (29 ppmvd, 7% O_2), CO (100 ppmvd, 7% O_2), and opacity (10%) in 2024. The monitored operating parameters were also in compliance.

The two (2) types of quarterly tests on the CEMS are the Relative Accuracy Test Audits (RATA) and the Calibration Gas Audits (CGA). WIN Waste has hired CEM Services of Norton, Massachusetts to conduct these quarterly tests.

The accuracy of the opacity CEMS is also checked quarterly in an "opacity audit".[16] In these tests, the opacity monitor, which measures opacity by a sensor that monitors the intensity of the projected light, is calibrated using optical filters of known opacity. During the tests, the opacity will appear

[14] 310 CMR 7.08(2)(i).
[15] 40 CRF 60.7
[16] 40 CFR 60, Appendix B, Specification 1.

to exceed the limit when the optical filter is changed or when an optical filter of greater than 10% opacity is placed in the path of the monitor. Readings for the facility are typically about 3%, which is generally as low as the opacity monitors can accurately measure. In general, the human eye cannot detect opacity levels that are less than 5%.

In the case of an exceedance, an apparent exceedance, or a disruption in facility operations that affects the CEMS data collection, WIN Waste notifies MassDEP in a quarterly, semi-annual or annual report. Tech also reviews these reports when they are received.

Emissions of CO are generated as a product of combustion and are reduced by maintaining proper air/fuel mixing and proper excess air levels. Increased CO emissions are typical during periods of startup and shutdown. Emissions of NO_x are also generated as the products of combustion, with the rate of NO_x and CO generation being inversely proportional and a function of the O_2 content in the system. In general, as the concentration of O_2 increases, NO_x emissions will increase and CO emissions will decrease. Decreasing the O_2 concentration in the exhaust has the opposite effect. According to the facility's permit, emissions limits do not apply during periods of startup and shutdown, allowing time for the combustion system and CEMS to stabilize. The facility has a three-hour window to startup/shutdown the units in which the emission limits do not apply; if the emissions cannot be reduced in that window, an exceedance of CO has occurred. An exceedance of CO or NO_x should not cause residents concern about health effects (as demonstrated by the criteria pollutant modeling analysis presented in Section 4.4).

Slight exceedances of opacity, or visible emissions, are also possible when a malfunction occurs that leads to the shutdown of a unit. Most opacity "exceedances" are really the result of the analyzer being tested during an opacity audit, as explained earlier. If an exceedance over the opacity standard does occur, this should not trigger concerns about health effects from opacity, which is generally not a health hazard. Even if a link between opacity and particulate matter (PM_{10} and $PM_{2.5}$) emissions were assumed, which is rare, there would not be a health concern from the highest opacity levels at WIN Waste (demonstrated by the PM_{10} and $PM_{2.5}$ modeling analysis presented in Section 4.4).

As described in Section 3.1, WIN Waste's permit stipulates that valid CEMS data be obtained for 75% of the operating hours per day (i.e. 18 hours/day) for 75% of the days per month (23 days/month for a 30-day month) that a municipal solid waste combustor is combusting solid waste continuously (24 hours/day) and that valid CEMS data must be obtained for 90% of the operating hours per quarter. In 2024, sufficient data were collected for each MWC for every month and pollutant, and sufficient data were also collected for every quarter for both MWCs.

3.2 Review Landfill Reports and Operations

In addition to the MWCs at WIN Waste, the site also includes an ash landfill where the residual ash from the combustion of the municipal solid waste (MSW) is disposed of. As mentioned in the introduction, MassDEP has estimated that combustion of waste reduces the material being disposed of by 90% (by volume) or by 75% (by weight). This is a large reduction, but still leaves material that needs to be disposed. WIN Waste moves the ash to the adjacent landfill for disposal. Although the overall site is quite large (approximately 300 acres), only a very small portion of the landfill area, about 3 – 4 acres, is active at a time.

As part of the review of the landfill and its operations, Tech reviews the "Semi-Annual Gas Monitoring Report" for monitoring the landfill gases, the bi-monthly "Landfill Operational Inspection Report", and the annual "Landfill Progress Report". Those inspections and associated reports are conducted by a third-party reviewer, which is Brown and Caldwell, and the bi-monthly landfill inspection must be unannounced. Tech also reviews the WIN Waste quarterly "Unannounced Facility Inspection Reports." These reports are generated by a third-party inspector, also Brown and Caldwell, who reviews documents and permits as well as performance standards related to storm water controls, unloading of refuse, special wastes, banned/restricted wastes, etc.

These reports have concluded that the waste was being processed efficiently and that the facility was well kept.

According to MassDEP, the landfill is allowed to use soil regulated under MassDEP Policy No. COMM-97-001 as a cover material.[17] This Policy provides guidance on the requirements, standards, and approvals for testing and reuse or disposal of contaminated soil at Massachusetts landfills. Provided that the soil is tested by a Licensed Site Professional (LSP) and does not exceed the contaminant levels of Table 1 in the Policy, the soil can be used. According to the Bimonthly Landfill Operational Inspection Reports from 2024,[18] WIN Waste received no construction soil regulated under MassDEP Policy No. COMM-97-001 (i.e., 0 tons) in 2024. That amount represents a 100% decrease from that received in 2022 (i.e., 2,005 tons). And no notifications were received that the WIN Waste landfill would receive COMM-97 soils in 2024. The Landfill Operational Inspection Reports are required by a 1989 Consent Order (CO) between the MassDEP and WIN Waste concerning the landfill and are basically a review of the changes and updates made to the landfill during the previous two (2) month period in accordance with the Engineering Plan. These reports also indicated that the landfill was being properly maintained.

Tech also performed an on-site inspection and compliance check of facility records in July, 2024. While on-site for the stack testing (discussed in Section 4.1), Tech checked the ash handling areas and found that the surrounding area was clean and free of fugitive ash. Tech also observed the wall around the ash handling area near the facility stacks, which was constructed to address concerns about the potential for ash releases.

Tech staff attended six (6) 2024 bi-monthly landfill operations inspections that include staff interviews, records reviews and a complete tour of the operations. These dates were February 14, April 25, June 12, August 14, October 22 and December 18. The inspections and subsequent report reviews indicated that the landfill was being properly operated and maintained. The ash being

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[17] Policy #COMM-97-001: Reuse & Disposal of Contaminated Soil at Massachusetts Landfills can be found on the MassDEP website at: https://www.mass.gov/info-details/re-use-and-disposal-of-soil-at-massachusetts-landfills

[18] "Saugus RESCO Landfill, Operational Bi-monthly Inspection Reports" Nos. 201 (Feb. '24), 202 (April '24), 203 (June '24), 204 (Aug. '24), 205 (Nov. '24) and 206 (Dec. '24).

disposed of in the landfill had an operational cover. The operational area of the landfill (both active area receiving and filling in with incinerator ash and composting operations) is relatively small and is well set back from Route 107.

Tech reviewed the 2024 Annual Progress Report for the landfill.[19] As of October 11, 2024, there were approximately 95,000 cubic yards of permitted disposal capacity remaining. This translates to approximately 1.02 to 3.80 years of permitted site life remaining at the landfill, based on the October 11, 2024 topographic survey and the projected range of future usage/disposal, which is determined from the past three (3) years of disposal, and which changes from year-to-year. Please note that the permitted site life remaining is an estimate based on current filling rates and may change. The range in the prediction of the landfill life remaining is due to using different methods to calculate the estimate. Several factors may affect the significance of site volume and life calculations that include Monofill settlement, varying densities of in-place materials, the amount of ash shipped transported off-site, and the accuracy of aerial survey and topographic mapping.

WIN Waste Innovations began construction of the Valley Fill Project in December 2020. The Valley Fill Project allows for the existing cap in Valleys 1 and 2 to be removed in stages to allow for the placement of ash to achieve new interior slopes and grades. Tech witnessed the progression of the project during bi-monthly landfill operations inspections since 2020, and the project had bi-weekly oversight by Brown and Caldwell with no concerns reported to MassDEP. The 2024 Landfill Annual Progress Report provided that ongoing and expected upcoming activities in six (6) working areas of the landfill will include final cover being removed and stockpiled, those areas being graded or will accept ash, and final cover will be re-installed upon completion of filling. Those activities are expected to occur through the Fall of 2029. Tech will plan to witness future progressions of the project during bi-monthly landfill operations inspections in 2025.

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[19] "Annual Progress Report No. 40, Saugus Ash Monofill", dated January 31, 2025, Brown and Caldwell.

4.0 MONITORING OF STACK TESTING & RELATED

WIN Waste Innovations Saugus (WIN Waste) is required to conduct stack testing for emissions every nine months. Tech witnessed the most recent testing, as discussed in Section 4.1. The emissions testing reports and on-site records were reviewed, as discussed in Sections 4.2 and 4.3. As part of the testing program, WIN Waste also conducts an air quality analysis using dispersion modeling. The modeling analysis is used to assess the ambient impact of emissions using actual stack test data. The dispersion modeling review and comparison to air quality standards are described in Section 4.4.

4.1 Witness Stack Testing

Every nine months, WIN Waste is required to conduct stack testing for emissions of dioxins/furans (generally abbreviated as PCDD/PCDF),[20] metals,[21] namely mercury, cadmium, and lead; visual emissions, namely opacity[22]; fugitive emissions;[23] ash collection;[24] and particulate matter (PM),[25] HCl[26] and ammonia (NH_3).[26] As part of this testing program, the stack testing firm also monitors the O_2 and CO_2 concentrations,[27] gas stream moisture content,[28] and volumetric flow rate.[29]

When a testing program is scheduled, the stack testing firm arrives on site and sets up their equipment, then begins testing the next day. Testing is conducted on both of the two (2) identical units, at two (2) locations on each unit, the "inlet" and the "outlet". The inlet location is before the spray dryer absorbers, and the outlet location is after the fabric filters, before leading

[20] Using EPA Method 23
[21] Using EPA Method 29
[22] Using EPA Method 9
[23] Using EPA Method 22
[24] Collected using Arthur D. Little Method S007 (during the Method 23 dioxin/furan testing)
[25] Using EPA Method 5
[26] Using EPA Method 26A
[27] Using EPA Method 3 / 3A
[28] Using EPA Method 4
[29] Using EPA Methods 1 and 2

to a single stack for the two units. Testers are usually stationed at the two (2) different testing locations and in a trailer where someone works to remove samples from tests which have already been conducted and to prepare equipment for the next set of tests. Each test run lasts from one (1) to four (4) hours, depending on which pollutant is being sampled.

In 2024, the stack testing program was conducted July 23rd to July 25th by DEECO of Raleigh, North Carolina. Tech witnessed the stack testing program in 2024, which occur every-nine-months. Since stack tests for hazardous air pollutants are usually conducted in triplicate, Tech witnessed a one-day spectrum of testing on July 23rd to verify the setup, methodologies and test run validations in use. Tech has included our stack testing observation records from the July 23rd testing period we observed as Appendix C. The FINAL emissions test report from DEECO includes all activities and observations from all testing periods.[30]

While onsite, Tech has an opportunity to ask questions about the facility operations and to identify any potential areas of concern and issues to watch for during future testing programs. From our observations in 2024, we found that WIN Waste was diligent in conducting emissions testing and hired a professional stack testing firm. The next emissions testing event is scheduled to occur in April 2025, and those results will be incorporated into the 2025 Annual Report.

[30] DEECO Inc., “Stationary Source Sampling Report, Reference No. 24-3352, Wheelabrator Saugus, Test Dates: July 23 to 25, 2024.”

4.2 Review Reports

Reports of the stack testing are due within 90 days after the completion of the testing program. After the report was issued, Tech obtained copies directly from WIN Waste and then conducted a review of the test reports. Tech reviewed testing procedures and confirmed that the emission limits in the facility's air permit, shown in Table 4-1, were met. The stack testing demonstrated that WIN Waste was in compliance with the permit limits.

Table 4-1. Emission Limits, WIN Waste Facility

Pollutant	Emission Limit / Standard	Units	Time Period
Particulate Matter	≤ 25 *	mg/dscm @ 7% O_2, dry	
Opacity	≤ 10	%	6 minute block average
Cadmium (Cd)	≤ 0.035 *	mg/dscm @ 7% O_2, dry	
Lead (Pb)	≤ 0.400 *	mg/dscm @ 7% O_2, dry	
Mercury, elemental (Hg)	≤ 0.028	mg/dscm @ 7% O_2, dry	(average of 4 quarters)
	≤ 0.05 *	mg/dscm @ 7% O_2, dry OR 85% reduction [1]	(single test)
Sulfur dioxide (SO_2)	≤ 29	ppmv @ 7% O_2, dry OR 75% reduction [1]	24-hour geometric mean
Hydrogen Chloride (HCl)	≤ 29	ppmv @ 7% O_2, dry OR 95% reduction [1]	
Dioxin/Furan (PCDD/PCDF)	≤ 30	ng/dscm @ 7% O_2, dry	
Carbon monoxide (CO)	≤ 100	ppmv @ 7% O_2, dry	4-hour block average
Ammonia (NH_3)	≤ 10	ppmv @ 7% O_2	
Nitrogen oxides (NO_x)	≤ 205	ppmv @ 7% O_2, dry	24-hour daily average
	≤ 185 *	ppmv @ 7% O_2, dry	30-day rolling average
Sulfuric Acid (H_2SO_4)	≤ 0.02	lb/MMBtu	
Fugitive Ash	≤ 9	minutes of visible emissions	3-hour period

[1] Whichever is less stringent.

* New or updated limits based on update to 40 CFR 60, Subpart Cb, May 10, 2006; adopted for WS May 10, 2011 as stated in Emission Control Plan Modified Final Approval from MassDEP to WS, March 14, 2012.

4.3 Review On-Site Records

The review of records was conducted across multiple site visits that included the July stack testing observations in addition to the six (6) bi-monthly landfill inspections attended. While on-site for testing, we met with Joe Brady of WIN Waste to review paper and electronic records that include the facility maintenance tracking system. We reviewed records of Continuous Emission Monitoring Systems (CEMs), including maintenance records of the weekly equipment checks and preventative maintenance. These records were found to be in order with all evidence that the CEMS units are being properly maintained and that the reports are being properly prepared in a timely manner. All of this FINAL reporting is sent in copy to Tech in concert with each regulatory filing submitted to MassDEP and or USEPA.

4.4 Dispersion Modeling Review

As part of the facility's major testing program every nine (9) months, WIN Waste conducts an air toxics air quality analysis, using dispersion modeling and actual stack test data to assess the ambient impact of emissions on the surrounding area. The most recent analysis was conducted using a scaling analysis to confirm that the dispersion modeling conducted in September 2015 from July/August 2015 stack test data was still representative of the facility. Conducting this analysis, rather than a full modeling report, was approved by MassDEP on May 23, 2016. In the analysis, the conditions at the time of the July 2024 were similar enough that the previously conducted dispersion modeling could be applied to the current stack test results.

The air quality modeling summary analysis associated with the testing programs was included in the stack test reports from July 2024.[31] The dispersion modeling analyses were conducted using the EPA's approved modeling program, AERMOD, and stack parameters from July 2024. The actual pollutant emission rates were used from July 2024 to represent modeled pollutant concentrations which were compared to MassDEP health guidelines. Tech also performed a separate criteria pollutant air quality analysis for comparing to the Massachusetts and National Ambient Air Quality Standards (MAAQS / NAAQS). Each modeling analysis is described below.

Modeling Results – Air Toxics

The dispersion model is a computer program that uses actual meteorological data with actual stack parameters and pollutant emissions data to predict the pollutant impacts or off-site pollutant

[31] DEECO Inc., "Stationary Source Sampling Report, Reference No. 24-3352, Wheelabrator Saugus, Test Dates: July 23 to 25, 2024."

concentrations at "receptors" around the facility. Receptors are the locations where the model is instructed to make air pollutant concentration predictions. Each receptor is identified by its elevation and by its location or distance from the stack. The plant emissions impacts are modeled using what is referred to as a "unit emission rate" (1 gram/second), which is then scaled by the actual pollutant emission rates determined during the stack test program to obtain the actual emissions. Epsilon Associates, Inc. performed the most recent full air quality dispersion modeling analysis for WIN Waste.[32]

Tech compared the results to air quality guidelines for toxic substances developed by the MassDEP's Office of Research and Standards. The 24-hour and annual average air quality impacts for each pollutant were compared to the MassDEP's 24-hour average Threshold Effects Exposure Limits (TELs) and annual average Allowable Ambient Limits (AALs) for Ambient Air. The TELs and AALs guidelines have been established by the MassDEP as concentrations that a source of air pollution should not exceed to protect public health. The maximum predicted air toxics concentrations are predicted to be safely in compliance with the AAL and TEL guidelines and will not have an adverse impact on public health as shown in Table 4-2. These results are conservatively based on the facility operating 100% of the time each year.

Table 4-2. Air Toxics Modeling Results for WIN Waste, July 2024 Testing Data

Pollutant	Emission Rate (g/s)	24-hour Conc ($\mu g/m^3$)	TEL ($\mu g/m^3$)	Complies with TEL?	Annual Conc ($\mu g/m^3$)	AAL ($\mu g/m^3$)	Complies with AAL?
Cadmium (Cd)	0.0000651	0.0000274	0.002	**Yes**	0.00000224	0.0002	**Yes**
Lead(Pb)	0.000567	0.000239	0.03	**Yes**	0.0000196	0.03	**Yes**
Mercury, elemental (Hg)	0.000065	0.0000276	0.06	**Yes**	0.00000226	0.06	**Yes**
Hydrogen Chloride (HCl)	0.26	0.11	20	**Yes**	0.0089	20	**Yes**
Ammonia (NH_3)	0.2763	0.1164	500	**Yes**	0.00953	500	**Yes**
PCDD/PCDF, Toxic Equiv. ("dioxins")	0.0000000867	0.0000000365	0.00000040	**Yes**	0.000000003	0.000000020	**Yes**

[32] Epsilon Associates, Inc., "Air Quality Modeling Analysis of the Wheelabrator Saugus Facility Using the July/August 2015 Performance Certification Test Data, September 17, 2015".

Modeling Results – Criteria Pollutants

Tech performed an additional analysis related to the air dispersion modeling for WIN Waste. This work focused on the criteria air pollutants (i.e. regulated air pollutants that are not air toxics) that are regulated under NAAQS. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and coarse and fine particulate matter (PM_{10} and $PM_{2.5}$). WIN Waste is not required to perform modeling for criteria air pollutants emitted from the facility. Tech, however, looked at these compounds to provide a more complete evaluation of the facility's air quality impacts and its potential for health effects.

The NAAQS are air pollutant concentration limits that have been established by the US EPA to protect the public's health and welfare in outdoor air, with a margin for safety. Table 4-3 shows the NAAQS for each pollutant and averaging period. For averaging periods of 24 hours or less, one exceedance of the NAAQS is allowed each year; therefore, the dispersion model was set to predict the second-highest concentration for these short-term averaging periods for each year. This is EPA's standard procedure for dispersion modeling of criteria air pollutants. On February 7, 2024 the EPA reduced the level of the primary (health-based) annual $PM_{2.5}$ NAAQS from 12.0 micrograms per cubic meter to 9.0 micrograms per cubic meter to provide increased public health protection and that new standard is included herein.

Table 4-3. Massachusetts and National Ambient Air Quality Standards (MAAQS/NAAQS)

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)
Carbon Monoxide (CO)	1-hour	40,000
	8-hour	10,000
Nitrogen Dioxide (NO_2)	1-hour	188
	Annual	100
Sulfur Dioxide (SO_2)	1-hour	196
Particulate Matter (PM_{10})	24-hour	150
Particulate Matter ($PM_{2.5}$)	24-hour	35
	Annual [1]	9

1 Updated as of Februrary 7, 2024.

The results of the dispersion modeling for each air pollutant and averaging period only represent the impacts from the facility. Background concentrations, representing all other sources of each pollutant, were added to the dispersion modeling results to predict the total air quality impacts from the facility. Background air quality information was obtained from MassDEP air quality monitoring stations that are most representative, or conservatively representative, of the Saugus area for the most recent 3-year period for which data are available (2021 – 2023).[33] The MassDEP monitoring station on Harrison Avenue in Boston was used to establish the 1-hour and 8-hour background concentrations for CO, to establish the 1-hour background concentrations for SO_2, and to establish the background concentration for PM_{10}. The Parkland Avenue Lynn station was used for 1-hour and annual background concentrations for NO_2, and for the 24-hour and annual background concentrations for $PM_{2.5}$. The background concentrations selected are shown in Table 4-4.

[33] Background air quality data can be found on the MassDEP website in the annual air quality reports: https://www.mass.gov/lists/massachusetts-annual-air-quality-reports

Table 4-4. Ambient Air Background Data

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)				DATA ENTRY FROM MassDEP ANNUAL REPORTING		
		2023	2022	2021	Selected Background	Bkground per yr	Selected bkground	
Carbon Monoxide (CO)	1-hour	1,313.3	1,795.4	1,716.4	1,795.4	2nd max	max	Boston, Harrison Avenue
	8-hour	1,030.5	1,145.0	1,145.0	1,145.0	2nd max	max	Boston, Harrison Avenue
Nitrogen Dioxide (NO_2)	1-hour	62.6	64.5	56.4	61.2	98th%	average	Lynn, Parkland Ave
	Annual	8.6	10.2	7.7	10.2	mean	max	Lynn, Parkland Ave
Sulfur Dioxide (SO_2)	1-hour	4.2	8.1	5.5	5.9	99th percentile	average	Boston, Harrison Avenue
Particulate Matter (PM_{10})	24-hour	47.0	34.0	30.0	47.0	2nd max	max	Boston, Harrison Avenue
Particulate Matter ($PM_{2.5}$)	24-hour	17.3	13.6	14.5	15.1	98th percentile	average	Lynn, Parkland Ave
	Annual	5.93	5.24	5.78	5.7	mean	average	Lynn, Parkland Ave

The emission rates used for modeling PM_{10} are from the July 2024 test reports. The emissions of $PM_{2.5}$ were conservatively assumed to be the same as for PM_{10} since WIN Waste is not required to test for $PM_{2.5}$. The emission rates used for modeling CO, NO_2, and SO_2 represent worst-case operating conditions, obtained from the highest concentration measured by the CEMS during the year 2023. Because these emission rates are significantly larger than typical emission rates from the facility, this air quality analysis is conservative and overestimates the potential air quality impacts from the facility. Tech used the most recent MassDEP-approved air modeling results to estimate criteria pollutant concentration impacts from the facility. Tech used the normalized predicted concentrations based on a 1 gram per second (g/s) emission rate to calculate the maximum short-term and annual maximum predicted concentrations. An example is presented below showing how Tech calculated the maximum one-hour concentration of CO.

$$\textit{1-hour CO concentration} = 18.2\ g/s * \frac{1.74525\ ug/m^3}{1 g/s} = 31.7\ ug/m^3$$

Table 4-5 shows the maximum predicted air quality impacts for the criteria air pollutants in 2024 based on the CEMS emissions data from WIN Waste's annual report to the MassDEP and the July 2024 stack testing reports. The predicted concentrations from the facility were added to the background concentrations and the total air quality concentrations were compared to the MAAQS/NAAQS. The results demonstrate that the facility did not cause adverse effects on air quality, even when using the worst-case operating emission rates.

Table 4-5. Criteria Pollutant Modeling Results for WIN Waste Annual Report & July 2024 Testing Data

Pollutant	Averaging Period	Emission Rate (g/s)	Predicted Conc (μg/m³)	Background Conc (μg/m³)	Total Conc (μg/m³)	NAAQS (μg/m³)	Complies with NAAQS?
Carbon Monoxide (CO)	1-hour	19.5	34.0	1,795.4	1,829.4	40,000	**Yes**
	8-hour	19.5	12.0	1,145.0	1,157.0	10,000	**Yes**
Nitrogen Dioxide (NO_2) [1]	1-hour	62.3	86.9	61.2	148.1	188	**Yes**
	Annual	62.3	1.7	10.2	11.9	100	**Yes**
Sulfur Dioxide (SO_2)	1-hour	6.8	11.8	5.9	17.8	196	**Yes**
Particulate Matter (PM_{10})	24-hour	0.138	5.81E-02	47.0	47.1	150	**Yes**
Particulate Matter ($PM_{2.5}$) [2]	24-hour	0.138	5.81E-02	15.1	15.2	35	**Yes**
	Annual	0.138	4.76E-03	5.7	5.7	9	**Yes**

[1] Assumes 80% NOx to NO_2 conversion.

[2] Emissions of $PM_{2.5}$ are conservatively assumed to be the same as emissions of PM_{10}.

5.0 ANNUALLY-BASED MONITORING AND REPORTING

Tech reviews reports related to WIN Waste Innovations Saugus (WIN Waste). These reports are summarized in Section 5.1. Tech also review MassDEP files through the Energy & Environmental Affairs (EEA) or ePlace Public Access Portals electronic submittal platforms to check permit data and reporting related to the WIN Waste facility and to confirm facility compliance. Based on prior MassDEP file reviews and availability of reports filed through the MassDEP regional office and copied to Tech Environmental, this file review technique has shown to be an effective method of triangulating what reports have been submitted, what air quality and solid waste activities have been proposed/executed and status of compliance activities. In addition to this file review, all regulatory filings are directly copied to Tech and the Town upon their physical or electronic filing with MassDEP.

5.1 General Facility Review

WIN Waste Innovations facilities, including Saugus, received negative publicity in late 2010 and early 2011 and had been the subject of an investigation by the Attorney General's (AG's) office.[34] The investigation alleged that there were releases of fly ash into the atmosphere through a hole in a building roof and that the facility also released water contaminated by ash into the surrounding marsh. The ash is generated as a result of the combustion of the waste at the site and is disposed of in the adjacent landfill. Other municipal waste combustors ship ash off-site in trucks and send it to landfills where it is used as a cover material. The AG's investigation found that there was never a harm or a threat of harm to either human health or the environment. Therefore, the AG determined that the health of the citizens of Saugus was not adversely impacted during this period. Recent inspections of the ash handling capability at

[34] "Operator of Municipal Waste Incinerators to Pay $7.5 Million to Resolve Multiple Environmental Violations", May 2, 2011 Press Release by Melissa Karpinsky, Amie Breton, and Ed Coletta (MassDEP).

WIN Waste by MassDEP and Tech have found that the area is well maintained and well-sealed and that ash is not being released into the atmosphere. WIN WASTE has continued on a series of improvement projects, designed to reduce the environmental impact of the facility and to assuage any fears of people in the community.

Facility improvements have continued, and historically have included building a wall around the ash house and making improvements to the air pollution control device for the ash conveying system, namely the wet scrubbers, which were modified, so that they vent outside the combustor and ash buildings. This change was made to help alleviate problems with high humidity inside the building.

WIN Waste Innovations Saugus is also a participant in the Occupational Safety and Health Administration's (OSHA) Voluntary Protection Programs (VPP). The VPP are programs that are designed to promote workplace safety and health. As part of the VPP, the facility management, workers, and OSHA work together to establish cooperative relationships at workplaces which have implemented a comprehensive safety and health management system.

5.2 File Reviews of Direct Filings from WIN Waste Innovations

The WIN Waste Innovations facility files in excess of 100 reports annually that include both routine reporting, incident reporting and application materials for planned or unplanned solid waste management and combustion facility alterations. Depending on the various permit compliance requirements and subject matter, reporting frequencies are monthly, bi-monthly, quarterly, semi-annual, annual and of course as necessary for unplanned events. As previously noted, we also consult MassDEP's ePlace and EEA Public Access Portal and Tech is party to all electronic communications/filings made to MassDEP, USEPA, Town of Saugus and sometimes also other surrounding towns.

When Tech has historically completed a physical file review at MassDEP, Tech requests files related to general facility compliance, inspections, notices of non-compliance, notifications of new projects and facility upgrades, the dispersion modeling review, and waste ban inspections. Again, these filings typically come to us directly from WIN Waste Innovations as they are filed. Using these fixed records access points, Tech can verify the body of work that has been formally submitted, the substance of each filing and what conclusions and or actions are stipulated to within each record. While the regulatory agency file review is a time-tested due diligence method, Tech has found that triangulating all sources of files presents the most comprehensive review of annual facility operations and compliance conditions met.

Examples of relevant filings from 2024 include those most associated with air quality and landfill operations such as: Title V compliance monitoring and certification; excess emissions reports; cooling water intake modifications; emissions testing protocols and results; landfill operations and waste ban inspections; landfill closure and post-closure cost estimates; facility inspection reports; hazardous waste manifesting; landfill gas and leachate monitoring; CEMS cylinder gas, relative accuracy tests and opacity jig audits; emergency condition notifications and notifications of plant outages.

6.0 CONCLUSIONS

As part of a program for the Saugus Board of Health, Tech Environmental (Tech) monitors and reports on various aspects of the WIN Waste Innovations Saugus (WIN Waste) facility; this report presents the results of the monitoring program for 2024. In the course of the monitoring program for calendar year 2024, all evidence suggests the facility was in compliance with daily operating permit requirements, recordkeeping/reporting procedures, routine monitoring, calibration checks, new permit acquisition, reporting excess emissions-related equipment malfunctions and return to compliance measures. WIN Waste hired a well-respected, professional stack testing firm to conduct the required emissions testing. WIN Waste has been diligent in reporting any concerns to the MassDEP, the Saugus BOH, and Tech, so that concerned parties can obtain information in a timely manner.

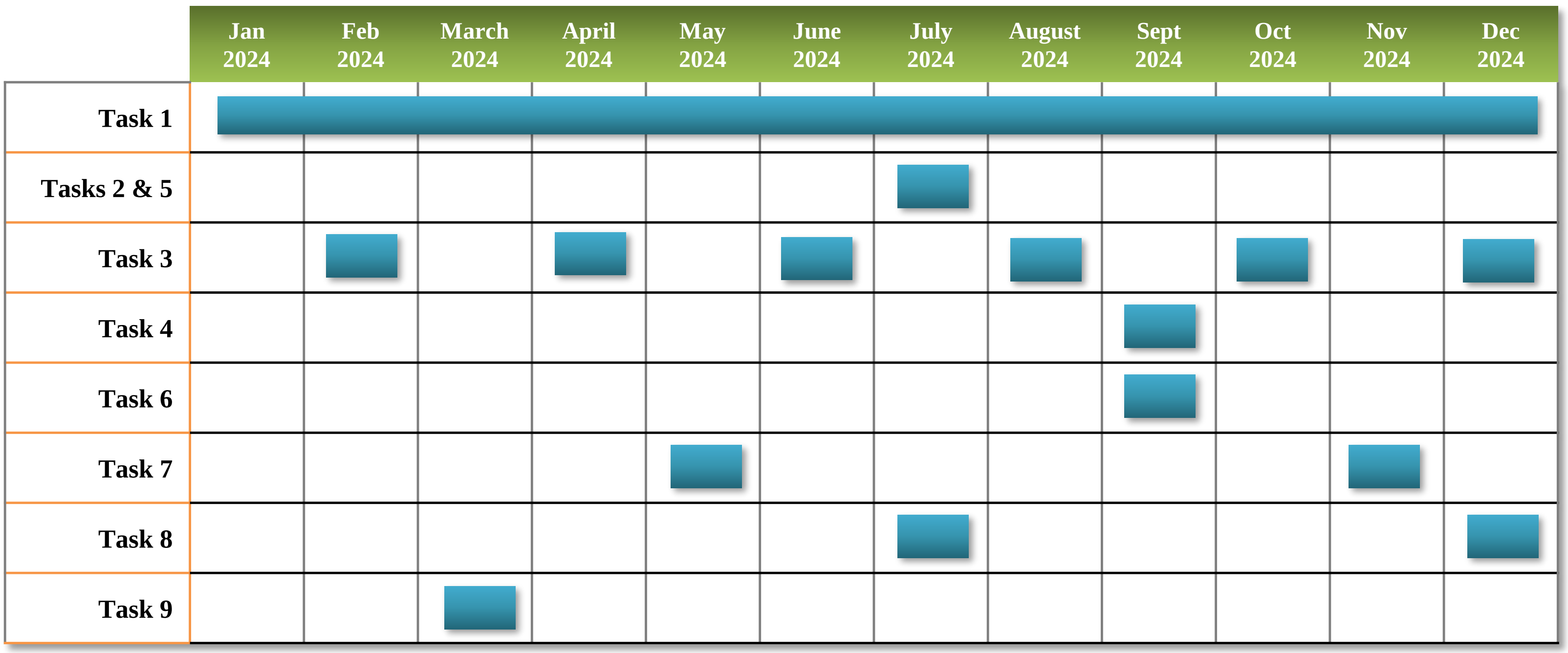
Tech reviewed WIN Waste's air quality dispersion modeling analysis, which was conducted using actual stack test data from July 2024. Tech compared the modeling results to health-based air quality standards for toxic substances developed by the MassDEP, AALs and TELs. The maximum predicted air toxics concentrations were predicted to comply with the air quality guidelines. In a separate analysis performed by Tech, the facility was also found to comply with the Massachusetts and National Ambient Air Quality Standards (MAAQS / NAAQS). The results of both modeling analyses demonstrate that even under the worst-case meteorological conditions, the emissions from the WIN Waste facility will not cause adverse effects on air quality.

APPENDIX A

MONITORING PLAN TIMELINE

Wheelabrator-Saugus Monitoring Plan & Timeline
2024 Monitoring & Reporting Year

January 2024 – December 2024



Task 1:	Evaluate CEMS & Emissions Data - Monthly
Tasks 2 & 5:	Witness Stack Testing & Review On-site Records - Every 9-months
Task 3:	Review Landfill Reports and Operations - Bi-monthly
Task 4:	Review Stack testing Report - Every 9-months (w/in 60 Days after testing completion)
Task 6:	Review of Dispersion Modeling Report (Based on every 9-month stack testing; date based on receipt of report.)
Task 7:	Review Gas Monitoring for Landfill (Semi-annual)
Task 8:	Conduct MassDEP file reviews (Semi-annual), Annual Review w/Site Compliance Managers
Task 9:	Annual report to Town of Saugus Board of Health.

APPENDIX B

REPORTING REQUIREMENTS

WIN Waste Saugus Reporting Requirements - 2024

Task	Report Type	Time Period Covered	Date Conducted (if relevant)	Due (90 days after testing)	Received?	On time?
1	Quarterly CEM Audit: RATA or Cal Gas *(AIR 3421)*	Jan - Mar	Feb-24	May-24	Yes	Yes
		Apr - Jun	Jun-24	Sep-24	Yes	Yes
		Jul - Sept	Aug-24	Nov-24	Yes	Yes
		Oct -Dec	Nov-24	Feb-25	Yes	Yes
	Quarterly Opacity Monitor Performance Audit *(AIR 3421)*	Jan - Mar	Feb-24	May-24	Yes	Yes
		Apr - Jun	Jun-24	Sep-24	Yes	Yes
		Jul - Sept	Aug-24	Nov-24	Yes	Yes
		Oct -Dec	Nov-24	Feb-25	Yes	Yes
	Quarterly Emission Report (Summary Report of Gaseous and Opacity Excess Emissions and Monitoring System Performance) *(AIR 3410)*	Jan - Mar	NR	Apr-24	Yes	Yes
		Apr - Jun	NR	Jul-24	Yes	Yes
		Jul - Sept	NR	Oct-24	Yes	Yes
		Oct -Dec	NR	Jan-25	Yes	Yes
	Semi-Annual report (310 CMR 7.08(2)(i)2) *(AIR 3320)*	Jan - Jun	NR	Jul-24	Yes	Yes
		Jul - Dec	NR	Feb-25	Yes	Yes
	Annual Report (310 CMR 7.08(2)(i)1) *(AIR 3260)*	Jan - Dec	NR	Feb-25	Yes	Yes
	Semi-Annual Compliance Monitoring Summary and Certification (Title V Operating Permit) *(AIR 3310)*	Jan - Jun	NR	Jul-24	Yes	Yes
		Jul - Dec	NR	Jan-25	Yes	Yes
	Annual Compliance Certification and Report (Title V Operating Permit) *(AIR3220)*	Jan - Dec	NR	Jan-25	Yes	Yes
3	Landfill Operational Inspection Report (Bi-monthly Reports) *(WST 3910)*	Jan - Feb	Feb-24	May-24	Yes	Yes
		Mar - Apr	Apr-24	Jul-24	Yes	Yes
		May - Jun	Jun-24	Sep-24	Yes	Yes
		Jul - Aug	Aug-24	Nov-24	Yes	Yes
		Sept - Oct	Oct-24	Jan-25	Yes	Yes
		Nov - Dec	Dec-24	Mar-25	Yes	Yes
(Added to Task 3)	Unannounced Quarterly Facility Inspection Report (3rd Party Inspection) *(WST 1730)*	Jan - Mar	Mar-24	Jun-24	Yes	Yes
		Apr - Jun	Jun-24	Sep-24	Yes	Yes
		Jul - Sept	Sep-24	Dec-24	Yes	Yes
		Oct -Dec	Oct-24	Jan-25	Yes	Yes
4	Nine-Month Compliance Stack Test Report	Jan - Dec	Jul-24	Oct-24	Yes	Yes
6	Dispersion Modeling Analysis	Jan - Dec	Jul-24	Oct-24	Yes	Yes
7	Landfill Gas Monitoring Report (Brown and Caldwell) *(AIR 3330, LFG 3300)*	Jan - Jun	Apr-24	Jul-24	Yes	Yes
		Jul - Dec	Oct-24	Jan-25	Yes	Yes
Adder	Annual Landfill Progress Report *(WST 3230)*	Jan - Dec	NR	Jan-25	Yes	Yes
	Review of COMM-97 Soil Deliveries	Jan - Dec	NR	NR	Yes	Yes

APPENDIX C

STACK TESTING OBSERVATION SHEETS

RECORD OF STACK TESTING OBSERVATIONS - MANUAL METHODS

Test Location	UNIT 1 FF OUTLET
Sampling Train ID	
Date	7/23/2024
Start/Finish Time	7:56 /
Test ID	M23-1

Sampling Train setup

Nozzle	
Probe	8' GLASS
Filter[4]	OUT OF STACK
Filter Temp Loc[5]	IN BOX
Setup[3]	
Pitot edge inspection	
Pitot alignment	

Sampling Train Leak Checks (pump pressure, in. wc)/(rate, cfm)

		Witnessed? Yes	No
Pre-test	7:56 / 0.001		✓
Intermediate[1,2]	/		
Post-test	/		

Time/Various Observations[2]

Time/Pump Vacuum	/			
Time/Pump Vacuum	/			
Time/Pump Vacuum	/			
Time/Δp*	7:56 / 0.98 INWC	✓		11:25 0.65 ✓
Time/Δp*	8:51 / 0.67	✓		
Time/Δp*	10:23 / 0.81	✓		
Time/Box Level	7:56 /	✓		11:25 OK ✓
Time/Box Level	8:51 /	✓		
Time/Box Level	10:23 /	✓		
Time/Condenser OK?	/			
Time/Condenser OK?	/			
Time/Condenser OK?	/			11:25 OK ✓
Time/Field Data Sheet OK?	7:56 / OK	✓		
Time/Field Data Sheet OK?	8:51 / OK	✓		
	10:23 OK	✓		

*Follow Δp reading with an "S" if steady, "U" if unsteady

COMMENTS

REVIEWED ASH SAMPLING PROCEDURES W/ SAK ENVIRONMENTAL ✓

[1]Note time in Comments box
[2]Note any additional observations in Comments box
[3]Setup: C = cyclone, F = filter, G = Greenburg-Smith tipped impinger, S = standard-tipped impinger (I = impinger, unkn. tip)
[4]Enter either "in" for in-stack filter or temperature of out-of-stack filter
[5]Location of filter box thermocouple: B = in box, F = finger behind filter, D = direct contact

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: WIN SAUGUS　Unit: 1　Observer: M. RIEGERT
Test No. / Description: M-23-1　Run No.: 1　Date: 7/23/24
Run Start Time: 7:56　Run Stop Time:

Observation / Requirement	YES	NO	Comment
Did the train components appear to be clean and were all glassware openings covered with Teflon* film, aluminum foil, or non-contaminating caps before the train was assembled?	✓		
Was the aluminum foil pre-rinsed with hexane?			
Was the train assembled by personnel in a manner that minimized contamination potential?	✓		
Was the train constructed of the components and materials identified in Method 23 (*See Figure 23: nozzle, heated probe, particulate filter, one condenser and recirculating cooler water system, XAD-2 resin trap, five impingers, control console, etc.)?*	✓		
Was the dry gas meter, thermocouples, nozzle and critical orifice devices calibrated prior to the test? If yes, provide the calibration date in the Comment column. If available, attach a copy of the calibration records.			Dry gas meter Thermocouples Critical orifice Nozzle

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: W/N SAUGUS　Unit: 1　Observer: M. RIEGERT
Test No. / Description: M23-1　Run No.: 1　Date: 7/23/24
Run Start Time: 7:56　Run Stop Time:

Observation / Requirement	YES	NO	Comment
Were weather conditions adverse to sampling (rain, snow, etc.)? If so, describe the measures taken to protect the sampling equipment in the Comment column.		✓	
Was the sampling area (i.e. platform) kept clean and orderly during the run?	✓		
Were the traverse sample points determined in accordance with Method 1?	✓		
Was a cyclonic flow check performed before the start of testing? If yes, record the date and time the check was completed in the Comment column.			
Was stack gas oxygen, carbon dioxide, and carbon monoxide concentration measured by orsat, fyrite, or CEMS?	✓		CEMS
Was the manometer leveled and zeroed before the start of sampling? Were periodic checks made by the operator during the test run?	✓		
Was the probe marked or alternative provisions made to ensure nozzle placements at the traverse	✓		

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: WIN SAUGUS Unit: 1 Observer: M. RIEGER
Test No. / Description: M23-1 Run No.: 1 Date: 7/23/2024
Run Start Time: 7156 Run Stop Time: ______

Observation / Requirement	YES	NO	Comment
point locations determined by Method 1?	✓		
Was the XAD-2 resin prepared within the last four weeks? Indicate the preparation date in the Comment column.			
Was the resin trap covered with aluminum foil and the openings sealed with glass stoppers?	✓		
Was HPLC grade water used for in the impingers?			
Was the filter tared and inspected before being placed in the filter holder? Was the filter made of glass fiber?	✓		
Was the filter supported with a Teflon* frit or Teflon* coated wire?			
Was a leak check of the sample train performed before and after each port change? *(Note: Allowable leak rate is 0.02 cfm or 4% of the average sampling rate, whichever is less, at 15 inches Hg vacuum or lower if not exceeded during*	✓		Time / Result / Vacuum Traverse # 1 7150 0.001 Traverse # 2 Traverse # 3 Traverse # 4

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: WIN SAUGUS Unit: 1 Observer: M. RIEGER
Test No. / Description: M23-1 Run No.: 1 Date: 7/23/2024
Run Start Time: 7:56 Run Stop Time: ______

Observation / Requirement	YES	NO	Comment
the run.)			
Were pretest and post test leak checks conducted on the Pitot tube?	✓		
Was silicone grease used on any connections of the sample train?			
Was the nozzle tip positioned at the proper traverse sample point throughout the test run?	✓		
Did operators make timely adjustments to sampling rates to maintain iso-kinetic conditions throughout the run?	✓		
Was the annulus between the probe and the sampling port sealed during sampling?	✓		
Was the sample gas temperature entering the resin trap maintained at or below 68EF throughout the test run?			
Was the sample gas temperature exiting the last impinger maintained at or below 68EF throughout			

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: WIN-SAUGUS Unit: 7 Observer: M. RIEGERT
Test No. / Description: M23-1 Run No.: 1 Date: 7/23/2024
Run Start Time: 7:56 Run Stop Time:

Observation / Requirement	YES	NO	Comment
the test run?			
Was the stack static pressure properly measured? At what traverse point was this determined?	✓		
Was the sampling time uniform at each traverse sample point?	✓		
Was the total sampling time at least 120 minutes?	✓		
Were at least 3 dry standard cubic meters of gas sample collected during the run?			
Were the sample train and console adequately monitored by operators and did the operators properly log sampling data on field data sheets during the test run?	✓		
Were dry gas meter readings recorded at each traverse sample point?	✓		
Was the nozzle sealed with Teflon* film, aluminum foil, or a non-contaminating cap after being removed from the stack at the completion of the run?	✓		

METHOD 23 PCDD/PCDF SAMPLING CHECKLIST

Facility Name: WIN SAUGUS Unit: 1 Observer: M. RIEGERT
Test No. / Description: M23-1 Run No.: 1 Date: 7/23/2024
Run Start Time: 7:56 Run Stop Time:

Observation / Requirement	YES	NO	Comment
Was particulate matter carefully wiped from the external surfaces of the probe at the completion of the run?			
Was the temperature of the filter box and sample probe maintained at 248± 25BF throughout the test run?			
Did protracted or frequent Aholds@ occur during the sampling run? If so, describe the apparent cause and duration in the Comment column			
Inspect the field data sheets. Are they clear and completely filled out?	✓		

GENERAL OBSERVATION AND COMMENTS

26A

RECORD OF STACK TESTING OBSERVATIONS - MANUAL METHODS

Test Location	UNIT 1 - FF OUTLET
Sampling Train ID	
Date	7/23/2024
Start/Finish Time	8:24 / 9:24 ✓
Test ID	M26A - 1

Sampling Train setup

Nozzle	
Probe	
Filter[4]	
Filter Temp Loc[5]	
Setup[3]	
Pitot edge inspection	
Pitot alignment	

Sampling Train Leak Checks (pump pressure, in. wc)/(rate, cfm)

		Witnessed? Yes	No
Pre-test	/		
Intermediate[1,2]	/	✓	
Post-test	/	✓	

Time/Various Observations[2]

Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Pump Vacuum	/	✓	
Time/Δp*	8:46 / 1.6 IN WC	✓	
Time/Δp*	9:06 / 1.6 INWC	✓	
Time/Δp*	/	✓	
Time/Box Level	8:46 / OK	✓	
Time/Box Level	9:06 / OK	✓	
Time/Box Level	/	✓	
Time/Condenser OK?	8:46 / OK	✓	
Time/Condenser OK?	9:06 / OK	✓	
Time/Condenser OK?	/	✓	
Time/Field Data Sheet OK?	8:46 / OK	✓	
Time/Field Data Sheet OK?	9:06 / OK	✓	

*Follow Δp reading with an "S" if steady, "U" if unsteady

COMMENTS

[1]Note time in Comments box
[2]Note any additional observations in Comments box
[3]Setup: C = cyclone, F = filter, G = Greenburg-Smith tipped impinger, S = standard-tipped impinger (I = impinger, unkn. tip)
[4]Enter either "in" for in-stack filter or temperature of out-of-stack filter
[5]Location of filter box thermocouple: B = in box, F = finger behind filter, D = direct contact

[redacted] Source Test Observers Checklist - EPA Methods 1-5 & 26A (Hydrogen Halides and Halogens)

Facility Name / Location: WIN SAUGUS

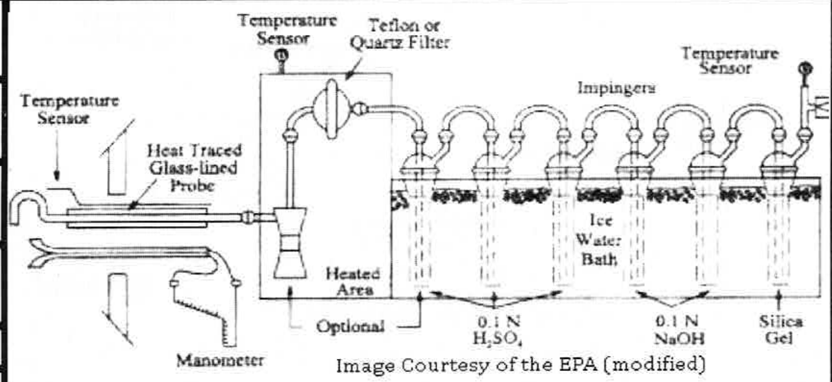
Source Contact / Phone #: JOE BRADY

Testing Firm / Contact: DEECO

Facility ID / Source Tested: UNIT 1

Tracking Number: M26A-1

Test Date: 7/23/2024



Run #	Start Time	End Time	DGM Start	DGM End	Vm	Ave. Δp	Nozzle ø	Filter No.	H_2O Coll.	Post leak
1	8:24	9:24								

Ask for an explanation to any question answered "No" and attach comments to this form or in your report.

METHOD 1 - Sample and Velocity Traverses for Stationary Sources	Yes	No
1.1) Method 1 calculated correctly (see reverse side)?		
1.2) Cyclonic flow check completed during test day? (Average of absolute value of all angles <20 degrees?)		
METHOD 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate	**Yes**	**No**
2.1) Pitot tube leak check completed after each run?		
2.2) Visual check of pitot tube heads - good condition?		
2.3) Manometer level and zeroed correctly?		
2.4) Static pressure measured during the test day? Static Pressure: inches H_20		
2.5) Barometric pressure recorded and adjusted for elevation? (see page 3)		
2.6) Pitot tube heads oriented to axis of flue? / Pitot tube perpendicular to axis of stack?		
2.7) Temperature recorded at each sampling point?		
2.8) Minimum sample of 30 dscf collected (or per applicable subpart?)(see Vm above)		
METHOD 3 - Gas analysis for O_2, CO_2, and Dry Molecular Weight	**Yes**	**No**
3.1) Is molecular weight being assumed? (If yes, and allowed, skip rest of Method 3)(see page 3)		
3.2) Multi point integrated sample / Bag evacuated and leak free (if applicable)		
3.3) Electronic Analyzer; or Orsat (performed in triplicate, analysis consistent?) (circle)(see page 3)		
3.4) Calculate F_0 / Within Range?		
METHOD 4 - Determination of Moisture Content in Stack Gases	**Yes**	**No**
4.1) See Page 2 (Method 26A) for impinger requirements		
4.2) Temperature at the exit of impingers / condenser <68 F? (see page 3)		
4.3) Silica gel in good condition? - Blue-new, Pink-spent (unable to absorb more H_2O)		
METHOD 5 - Determination of Particulate Emissions from Stationary Sources	**Yes**	**No**
5.1) Methods 2 - 5, 26A run concurrently? Test team accurately recording meterbox data at each sampling point?		
5.2) Visually inspect sample nozzle for damage / nozzle opening facing direction of flow?		
5.3) Pre run leak check, optional (watch) Leak Rate ≤0.02cfm?		
5.4) Post run leak check, mandatory (watch) Leak Rate ≤0.02cfm? Conducted ≥ highest vacuum during run?		
5.5) Isokinetic rates between 90% and 110%? (see reverse side) K factor:		
5.6) Filter and probe temperatures - see Page 2 (Different Requirements for Method 26A than Method 5)		
5.7a) During a run, was any equipment changed (ie. filter, nozzle, impinger) Why? (Do not explain a "No")		
5.7b) Was a leak check performed prior to the equipment change? (May not be applicable)		
5.8) Meterbox calibration values - ΔH@: Y: Date Calibrated:		
5.9a) Front-half particulate sample clean-up: acetone used? (or water if required by CFR such as MACT MM)?		
5.9b) Inside of nozzle, probe, and glassware (before the filter) rinsed and brushed in triplicate (minimum)?		
5.9c) Is filter holder disassembled on site or transported to lab intact? (circle)		
5.9d) 200 ml acetone blank prepared? Volume of acetone used for cleanup:		

[redacted]O Source Test Observers Checklist - EPA Methods 1-5 & 26A (Hydrogen Halides and Hal[redacted]

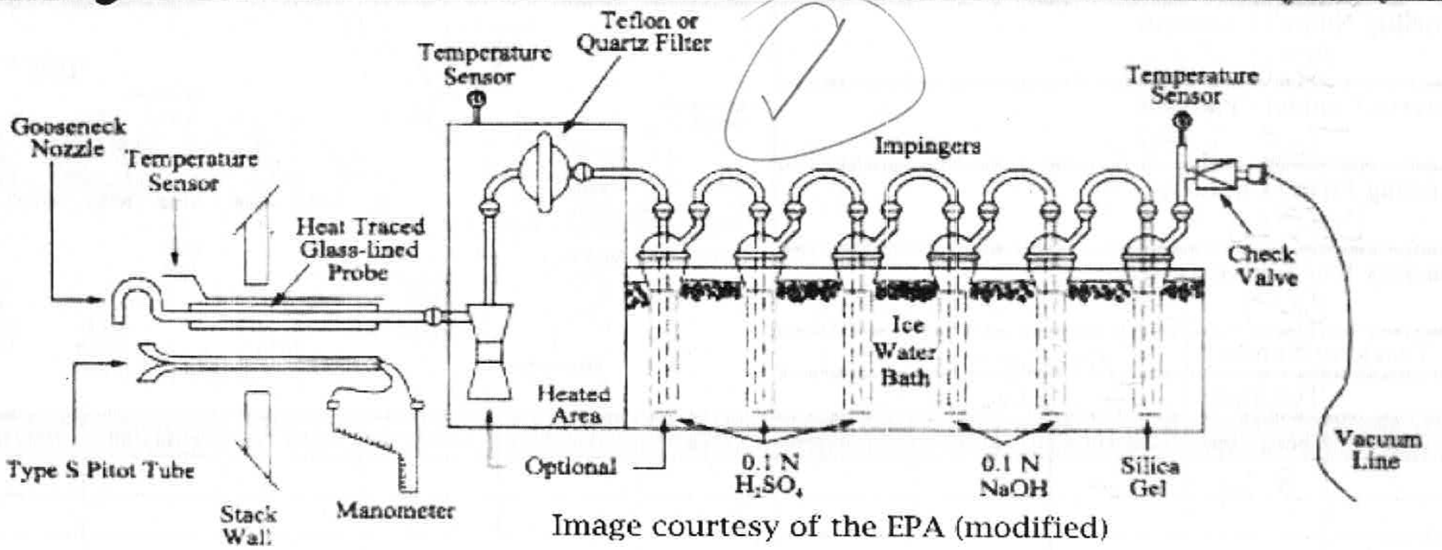


Image courtesy of the EPA (modified)

METHOD 26A - DETERMINATION OF HYDROGEN HALIDES AND HALOGENS

26A.1) Equipment and Reagents per Method 26A? (Impingers 4 & 5 optional if testing only for HCl & HF)	Yes	No
26A.1a) Probe nozzle and probe liner borosilicate or quartz glass?		
26A.1b) Cyclone (optional) between probe liner and filter holder?		
26A.1c) Teflon mat filter used?		
26A.1d) Stack temp > 410 Deg F? If so, quartz filter may be used and one-piece glass nozzle/liner mandatory	NA	
26A.1e) Impinger #1 (Optional knockout or condensate impinger; shortened stem) 50 ml of 0.1 N H_2SO_4	✓	
26A.1f) Impinger #2 (Greenburg-Smith Standard Tip & 100 ml of 0.1 N H_2SO_4) (Acid Impinger)	✓	
26A.1g) Impinger #3 (Greenburg-Smith Standard Tip & 100 ml of 0.1 N H_2SO_4) (Acid Impinger)	✓	
26A.1h) Impinger #4 (Modified Greenburg-Smith & 100 ml of 0.1 N NaOH) (Alkaline Impinger)	✓	
26A.1i) Impinger #5 (Modified Greenburg-Smith & 100 ml of 0.1 N NaOH) (Alkaline Impinger)	✓	
26A.1j) Impinger #6 - silica gel (See item 4.3 on page 1)		
26A.1k) Acidic and Alkaline absorbing solutions prepared per Method?		
26A.2) Sampling Train Operation per Method 26A?	**Yes**	**No**
26A.2.a) Probe and filter temperatures between 248 and 273 Deg F?		✓ (*)
26A.3) Post-run Sample Recovery, Cleanup, Blank Preparation, and Optional Moisture Purge	**Yes**	**No**
26A.3.a) 200 ml blanks prepared for each absorbing solution? (250 ml of acidic sol. if optional impinger used)		
26A.3.b) Blanks diluted to same volume of field samples (see d,e below) using blank sample of DI rinse water?		
26A.3.c) Post-test moisture removal (optional and typically not conducted) - required when the optional cyclone is used or when liquid is visible on the filter at the end of the sample run.		
26A.3.d) Acid Impinger Catch - Measure liquids from impingers #'s 1-3; rinse impingers and connecting glassware with DI water; and add all liquids (impinger catch and rinse water) to one storage container.		
26A.3.e) Alkaline Impinger Catch - Measure liquids from impingers #4 & #5; rinse impingers and connecting glassware with DI water; and add all liquids (impinger catch and rinse water) to one container.		
26A.3.f) Sodium thiosulfate added to alkaline impinger catch per Method 26A?		
26A.3.g) DI rinse water blank prepared?		
26A.3.h) Is the rinse water deionized, distilled water that conforms to American Society of Testing and Materials (ASTM) Specification D 1193-77 or 91, Type 3?		
26A.3.i) Record the analytical lab to be used for analysis:		
26A.3.j) Audit sample obtained (if required and commercially available)?		

REMARKS: (*) WIN SAUGUS MODIFIED APPROACH TO USE LARGER IMPINGERS TO MAINTAIN HIGHER TEMPS TO PREVENT CONDENSATION

[redacted]

5/29 + 202

RECORD OF STACK TESTING OBSERVATIONS - MANUAL METHODS

Test Location	UNIT 2 FF OUTLET
Sampling Train ID	
Date	7/23/2024
Start/Finish Time	8:33 /
Test ID	M5/29-1 + M202-1

Sampling Train setup

Nozzle	
Probe	8' GLASS
Filter[4]	OUT OF STACK
Filter Temp Loc[5]	IN BOX
Setup[3]	
Pitot edge inspection	
Pitot alignment	

Sampling Train Leak Checks (pump pressure, in. wc)/(rate, cfm)		Witnessed? Yes	No
Pre-test	/		
Intermediate[1,2]	/		
Post-test	(202) 11:10 / 0.001 (5/29) 11:12 0.001	✓ ✓	

Time/Various Observations[2]		Yes	No
Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Δp* (5/29)	8:38 / 0.51 IN WC	✓	
Time/Δp*	/		
Time/Δp*	/		
Time/Box Level (5/29)	8:38 /	✓	
Time/Box Level (5/29)	10:29 /	✓	
Time/Box Level	/		
Time/Condenser OK?	/		
Time/Condenser OK?	/		
Time/Condenser OK?	/		
Time/Field Data Sheet OK?	8:38 / BOTH OK	✓	
Time/Field Data Sheet OK?	10:29 / BOTH OK	✓	

*Follow Δp reading with an "S" if steady, "U" if unsteady

COMMENTS

[1]Note time in Comments box
[2]Note any additional observations in Comments box
[3]Setup: C = cyclone, F = filter, G = Greenburg-Smith tipped impinger, S = standard-tipped impinger (I = impinger, unkn. tip)
[4]Enter either "in" for in-stack filter or temperature of out-of-stack filter
[5]Location of filter box thermocouple: B = in box, F = finger behind filter, D = direct contact

Date: 7/23/2024
Observer: M. RIEGERT

Observer Checklist – Method 29 – Metals Emissions

Facility Name / Location : WIN SAUGUS UNIT 2 FF OUTLET	
Facility Contact / Phone : JOE BRADY	
Testing Firm / Contact : DEECO	
Permit #:	
Source Tested: TURBINE #2	
Applicable Regulation(s) / Pollutant(s) : PARTICULATE / MULTIMETALS (AND CONDENSIBLES)	
Process Data / Production Rate :	

Method 29 – Metal Emissions from Stationary Sources		YES	NO
If the answer is NO to any questions, provide comment below.			
§8.1.3	Was the sampling train set up correctly? (see Figure M29-1)	✓	
§8.1.4	Did the sampling train pre-test leak check pass? (optional) Leak rate:		
§8.1.4	Did the sampling train post-test leak check pass? (mandatory) Leak rate:		
§8.1.5	Was the temperature of the gas flow through the filter during the run at 120 ± 14 °C (248 ± 25 °F)?	✓	
§8.1.5	For a stack with significant negative pressure, sampling pumps can be started prior to going into the stack.		
§8.1.5	Is the port properly sealed around the sample probe?	✓	
§8.1.5	Is the sampling train being traversed per Method 1?	✓	
§8.1.5	Is the temperature of the gas exiting the sampling train <20 °C (68° F)?	✓	
§8.1.5	Was the test run completed without changing out the filter?	✓	
§8.1.5	Was the test run completed without changing out the sampling train?	✓	
§8.1.6	Was the sampling train operated isokinetically (100 ± 10%)?	✓	

Date: 7/23/2024
Observer: M. RIEGERT

Observer Checklist – Method 29 – Metals Emissions (continued)

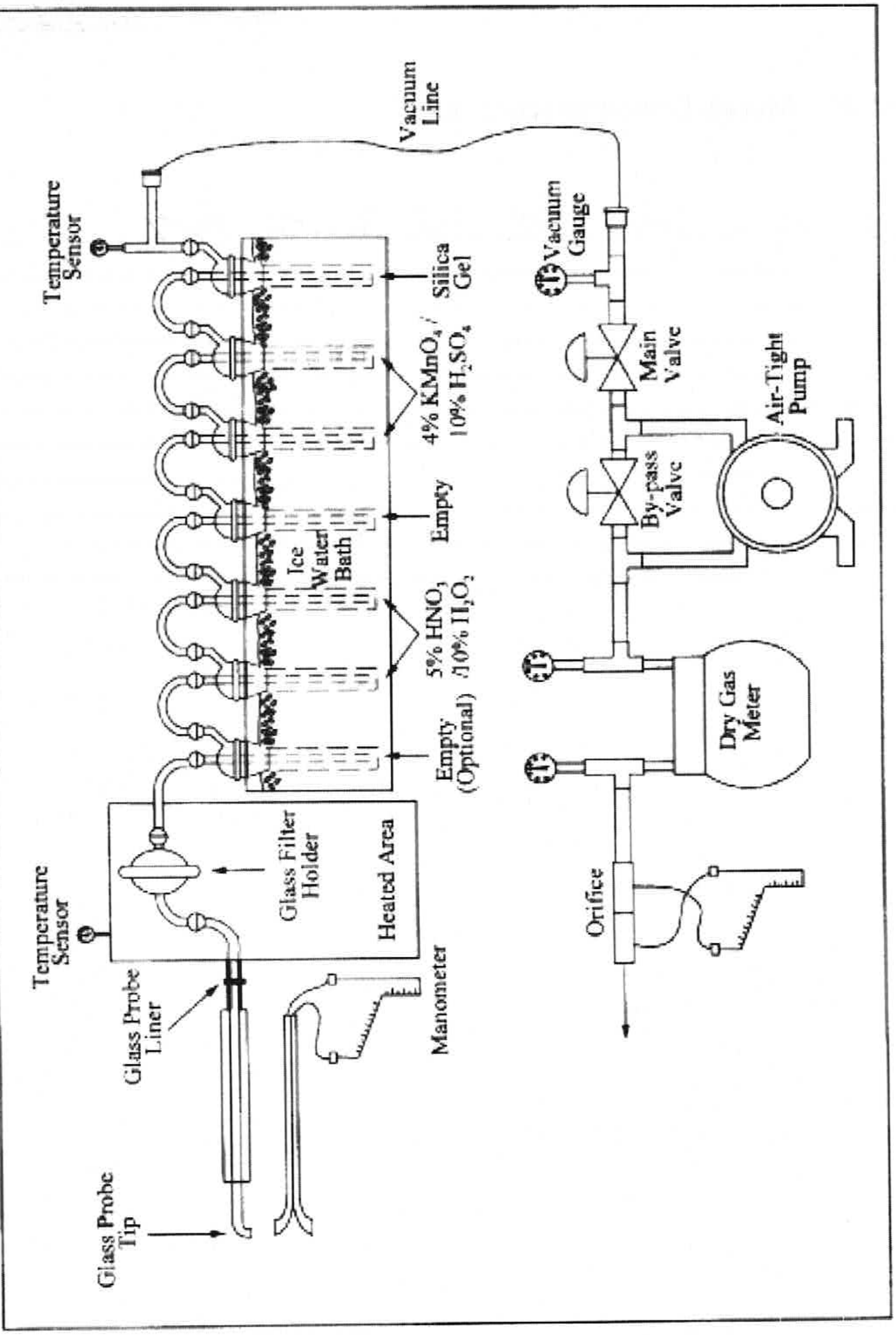
If the answer is NO to any questions, provide comment below.		YES	NO
§8.2.5	Container 1. Was the filter carefully transferred into a petri dish?		
§8.2.6	Container 2. If PM is being measured, was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls of acetone?		
§8.2.7	Container 3. Was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls 0.1N HNO_3?		
§8.2.8	Container 4. Were impingers 1 through 3 weighed and then emptied into container 4?		
§8.2.8	Was the moisture content for the test run determined using the impingers' weight gain?		
§8.2.8	Container 4. Was the back half of the filter holder and all glassware through impinger 3 rinsed with 100mls 0.1N HNO_3?		
§8.2.9.1	Container 5A. If mercury (Hg) is being measured, was impinger 4 weighed and emptied into container 5A?		
§8.2.9.1	Container 5A. If Hg is being measured, was impinger 4 rinsed with 100mls of 0.1N HNO_3?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6 weighed and emptied into container 5B?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6, and the connecting glassware triple rinsed with 100mls of fresh acidified $KMnO_4$ solution followed with 100mls of reagent grade H_2O?		
§8.2.9.3	Container 5C. If Hg is being measured, were impingers 5 and 6 rinsed the 8N HCl?		
§8.2.10	Container 6. Was the silica gel impinger weighed and in good condition?		
§8.2.11	Container 7. If PM is being measured, was a 100ml acetone blank taken?		
§8.2.12	Container 8A. Was a 300ml 0.1N HNO_3 blank taken?		
§8.2.13	Container 8B. Was a 100ml reagent water blank taken?		
§8.2.14	Container 9. Was a 200ml 5% HNO_3/10% H_2O_2 blank taken?		
§8.2.15	Container 10. If Hg is being measured, was a 100ml acidified $KMnO_4$ solution blank taken?		
§8.2.16	Container 11. If Hg is being measured, was a 25ml 8N HCl blank in 200ml of reagent H_2O taken?		
§8.2.17	Container 12. Was a filter blank taken?		
§10.1	Is the nozzle free of nicks, dents, or corrosion?	✓	
§10.1	Are the pitot tubes free of nicks, dents, or corrosion?	✓	

Date: 7/23/2024
Observer: M. RIEGERT

Observer Checklist – Method 29 – Metals Emissions (continued)

Comments: OBSERVATIONS ALSO MADE AT THE BOILER EXIT

Figure M29-1. Metals Sampling Train.



29

RECORD OF STACK TESTING OBSERVATIONS - MANUAL METHODS

Test Location	UNIT 2 BOILER EXIT
Sampling Train ID	
Date	7/23/2024
Start/Finish Time	8:33 /
Test ID	1 M29 -1

Sampling Train setup

Nozzle	
Probe	8' GLASS
Filter[4]	OUT OF STACK
Filter Temp Loc[5]	IN BOX
Setup[3]	
Pitot edge inspection	
Pitot alignment	

Sampling Train Leak Checks (pump pressure, in. wc)/(rate, cfm)

		Witnessed? Yes	No
Pre-test	/		
Intermediate[1,2]	/		
Post-test	/		

Time/Various Observations[2]

		Yes	No
Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Pump Vacuum	/	✓	
Time/Δp*	9:46 / 0.35	✓	
Time/Δp*	/		
Time/Δp*	/	✓	
Time/Box Level	9:46 /		
Time/Box Level	/		
Time/Box Level	/		
~~Time/Condenser OK?~~	/		
~~Time/Condenser OK?~~	/		
~~Time/Condenser OK?~~	/	✓	
Time/Field Data Sheet OK?	9:46 / OK		
Time/Field Data Sheet OK?	/		

*Follow Δp reading with an "S" if steady, "U" if unsteady

COMMENTS

9:46 PORT CHANGE 90°

[1]Note time in Comments box
[2]Note any additional observations in Comments box
[3]Setup: C = cyclone, F = filter, G = Greenburg-Smith tipped impinger, S = standard-tipped impinger (I = impinger, unkn. tip)
[4]Enter either "in" for in-stack filter or temperature of out-of-stack filter
[5]Location of filter box thermocouple: B = in box, F = finger behind filter, D = direct contact

Date: 7/23/2024
Observer: M. RIEGERT

Observer Checklist – Method 29 – Metals Emissions

Facility Name / Location : WIN SAUGUS UNIT 2 BOILER EXIT	
Facility Contact / Phone : JOE BRADY	
Testing Firm / Contact : DEECO	
Permit #:	
Source Tested: TURBINE #2	
Applicable Regulation(s) / Pollutant(s) : MERCURY	
Process Data / Production Rate :	

Method 29 – Metal Emissions from Stationary Sources		YES	NO
If the answer is NO to any questions, provide comment below.			
§8.1.3	Was the sampling train set up correctly? (see Figure M29-1)	✓	
§8.1.4	Did the sampling train pre-test leak check pass? (optional) Leak rate:		
§8.1.4	Did the sampling train post-test leak check pass? (mandatory) Leak rate:		
§8.1.5	Was the temperature of the gas flow through the filter during the run at 120 ± 14 °C (248 ± 25 °F)?	✓	
§8.1.5	For a stack with significant negative pressure, sampling pumps can be started prior to going into the stack.		
§8.1.5	Is the port properly sealed around the sample probe?	✓	
§8.1.5	Is the sampling train being traversed per Method 1?	✓	
§8.1.5	Is the temperature of the gas exiting the sampling train <20 °C (68° F)?	✓	
§8.1.5	Was the test run completed without changing out the filter?	✓	
§8.1.5	Was the test run completed without changing out the sampling train?	✓	
§8.1.6	Was the sampling train operated isokinetically (100 ± 10%)?	✓	

Date: 7/23/2024
Observer: M. RUEGERT

Observer Checklist – Method 29 – Metals Emissions (continued)

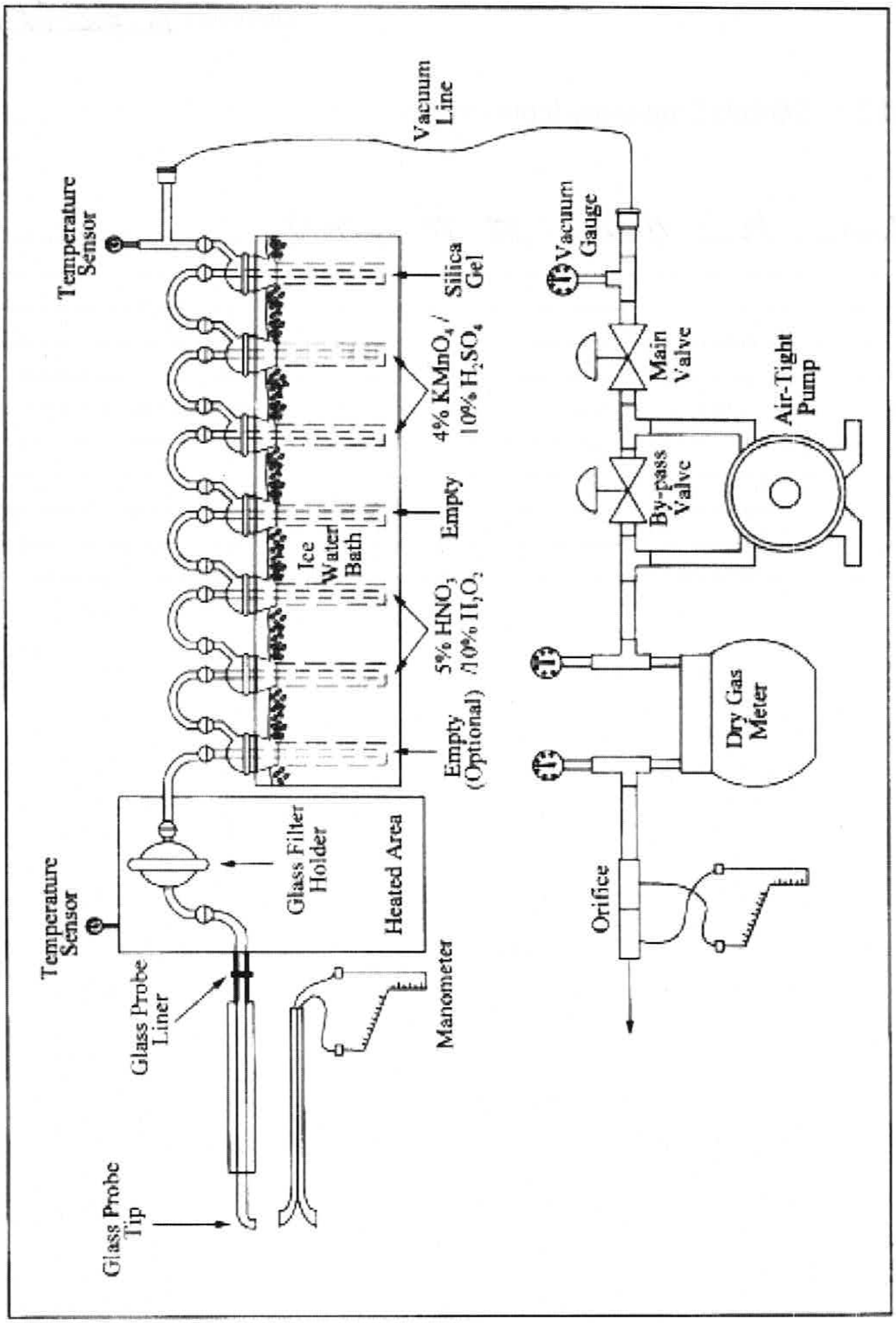
If the answer is NO to any questions, provide comment below.		YES	NO
§8.2.5	Container 1. Was the filter carefully transferred into a petri dish?		
§8.2.6	Container 2. If PM is being measured, was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls of acetone?		
§8.2.7	Container 3. Was the front half of the sampling train (nozzle to front half of the filter holder) properly rinsed with 100mls 0.1N HNO_3?		
§8.2.8	Container 4. Were impingers 1 through 3 weighed and then emptied into container 4?		
§8.2.8	Was the moisture content for the test run determined using the impingers' weight gain?		
§8.2.8	Container 4. Was the back half of the filter holder and all glassware through impinger 3 rinsed with 100mls 0.1N HNO_3?		
§8.2.9.1	Container 5A. If mercury (Hg) is being measured, was impinger 4 weighed and emptied into container 5A?		
§8.2.9.1	Container 5A. If Hg is being measured, was impinger 4 rinsed with 100mls of 0.1N HNO_3?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6 weighed and emptied into container 5B?		
§8.2.9.2	Container 5B. If Hg is being measured, were impingers 5 and 6, and the connecting glassware triple rinsed with 100mls of fresh acidified $KMnO_4$ solution followed with 100mls of reagent grade H_2O?		
§8.2.9.3	Container 5C. If Hg is being measured, were impingers 5 and 6 rinsed the 8N HCl?		
§8.2.10	Container 6. Was the silica gel impinger weighed and in good condition?		
§8.2.11	Container 7. If PM is being measured, was a 100ml acetone blank taken?		
§8.2.12	Container 8A. Was a 300ml 0.1N HNO_3 blank taken?		
§8.2.13	Container 8B. Was a 100ml reagent water blank taken?		
§8.2.14	Container 9. Was a 200ml 5% HNO_3/10% H_2O_2 blank taken?		
§8.2.15	Container 10. If Hg is being measured, was a 100ml acidified $KMnO_4$ solution blank taken?		
§8.2.16	Container 11. If Hg is being measured, was a 25ml 8N HCl blank in 200ml of reagent H_2O taken?		
§8.2.17	Container 12. Was a filter blank taken?		
§10.1	Is the nozzle free of nicks, dents, or corrosion?	✓	
§10.1	Are the pitot tubes free of nicks, dents, or corrosion?	✓	

Date: 7/23/2024
Observer: M. RIEGERT

Observer Checklist – Method 29 – Metals Emissions (continued)

Comments: OBSERVATIONS ALSO MADE AT FF CATCH

Figure M29-1. Metals Sampling Train.



26A

RECORD OF STACK TESTING OBSERVATIONS - MANUAL METHODS

Test Location	UN17 | FF outlet
Sampling Train ID	
Date	7/23/2024
Start/Finish Time	11:15 /
Test ID	M26A - 2

Sampling Train setup

Nozzle	
Probe	
Filter[4]	
Filter Temp Loc[5]	
Setup[3]	
Pitot edge inspection	
Pitot alignment	

Sampling Train Leak Checks (pump pressure, in. wc)/(rate, cfm)

		Witnessed? Yes	No
Pre-test	/		
Intermediate[1,2]	/		
Post-test	/		

Time/Various Observations[2]

		Yes	No
Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Pump Vacuum	/		
Time/Δp*	11:15 / 1.6	✓	
Time/Δp*	/		
Time/Δp*	/		
Time/Box Level	11:15 / ok	✓	
Time/Box Level	/		
Time/Box Level	/		
Time/Condenser OK?	11:15 / ok	✓	
Time/Condenser OK?	/		
Time/Condenser OK?	/		
Time/Field Data Sheet OK?	11:15 / ok	✓	
Time/Field Data Sheet OK?	/		

*Follow Δp reading with an "S" if steady, "U" if unsteady

COMMENTS

[1]Note time in Comments box
[2]Note any additional observations in Comments box
[3]Setup: C = cyclone, F = filter, G = Greenburg-Smith tipped impinger, S = standard-tipped impinger (I = impinger, unkn. tip)
[4]Enter either "in" for in-stack filter or temperature of out-of-stack filter
[5]Location of filter box thermocouple: B = in box, F = finger behind filter, D = direct contact

[redacted] Source Test Observers Checklist - EPA Methods 1-5 & 26A (Hydrogen Halides and Halogens)

Facility Name / Location: WIN WASTE SAUGUS

Source Contact / Phone #: JOE BRADY

Testing Firm / Contact: DEECO

Facility ID / Source Tested: UNIT #1

Tracking Number: M26A-2

Test Date: 7/23/2024

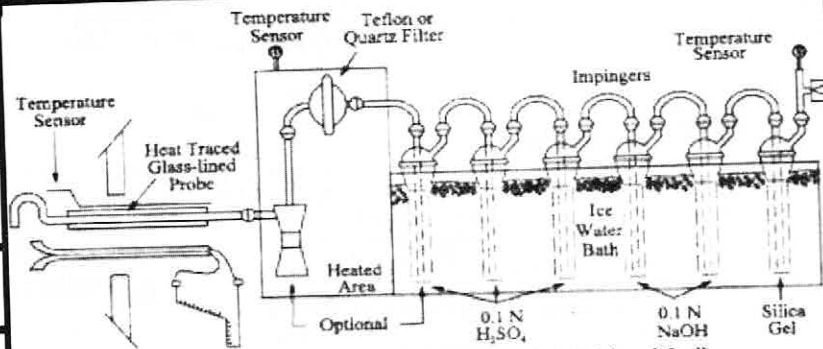


Image Courtesy of the EPA (modified)

Run #	Start Time	End Time	DGM Start	DGM End	Vm	Ave. Δp	Nozzle ø	Filter No.	H_2O Coll.	Post leak
2	11:15									

Ask for an explanation to any question answered "No" and attach comments to this form or in your report.

METHOD 1 - Sample and Velocity Traverses for Stationary Sources	Yes	No
1.1) Method 1 calculated correctly (see reverse side)?		
1.2) Cyclonic flow check completed during test day? (Average of absolute value of all angles <20 degrees?)		
METHOD 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate	**Yes**	**No**
2.1) Pitot tube leak check completed after each run?		
2.2) Visual check of pitot tube heads - good condition?		
2.3) Manometer level and zeroed correctly?		
2.4) Static pressure measured during the test day? Static Pressure: inches H_20		
2.5) Barometric pressure recorded and adjusted for elevation? (see page 3)		
2.6) Pitot tube heads oriented to axis of flue? / Pitot tube perpendicular to axis of stack?		
2.7) Temperature recorded at each sampling point?		
2.8) Minimum sample of 30 dscf collected (or per applicable subpart?)(see Vm above)		
METHOD 3 - Gas analysis for O_2, CO_2, and Dry Molecular Weight	**Yes**	**No**
3.1) Is molecular weight being assumed? (If yes, and allowed, skip rest of Method 3)(see page 3)		
3.2) Multi point integrated sample / Bag evacuated and leak free (if applicable)		
3.3) Electronic Analyzer; or Orsat (performed in triplicate, analysis consistent?) (circle)(see page 3)		
3.4) Calculate F_0 / Within Range?		
METHOD 4 - Determination of Moisture Content in Stack Gases	**Yes**	**No**
4.1) See Page 2 (Method 26A) for impinger requirements		
4.2) Temperature at the exit of impingers / condenser <68 F? (see page 3)		
4.3) Silica gel in good condition? - Blue-new, Pink-spent (unable to absorb more H_2O)		
METHOD 5 - Determination of Particulate Emissions from Stationary Sources	**Yes**	**No**
5.1) Methods 2 - 5, 26A run concurrently? Test team accurately recording meterbox data at each sampling point?		
5.2) Visually inspect sample nozzle for damage / nozzle opening facing direction of flow?		
5.3) Pre run leak check, optional (watch) Leak Rate ≤0.02cfm?		
5.4) Post run leak check, mandatory (watch) Leak Rate ≤0.02cfm? Conducted ≥ highest vacuum during run?		
5.5) Isokinetic rates between 90% and 110%? (see reverse side) K factor:		
5.6) Filter and probe temperatures - see Page 2 (Different Requirements for Method 26A than Method 5)		
5.7a) During a run, was any equipment changed (ie. filter, nozzle, impinger) Why? (Do not explain a "No")		
5.7b) Was a leak check performed prior to the equipment change? (May not be applicable)		
5.8) Meterbox calibration values - ΔH@: Y: Date Calibrated:		
5.9a) Front-half particulate sample clean-up: acetone used? (or water if required by CFR such as MACT MM)?		
5.9b) Inside of nozzle, probe, and glassware (before the filter) rinsed and brushed in triplicate (minimum)?		
5.9c) Is filter holder disassembled on site or transported to lab intact? (circle)		
5.9d) 200 ml acetone blank prepared? Volume of acetone used for cleanup:		

[redacted] Source Test Observers Checklist - EPA Methods 1-5 & 26A (Hydrogen Halides and Halogens)

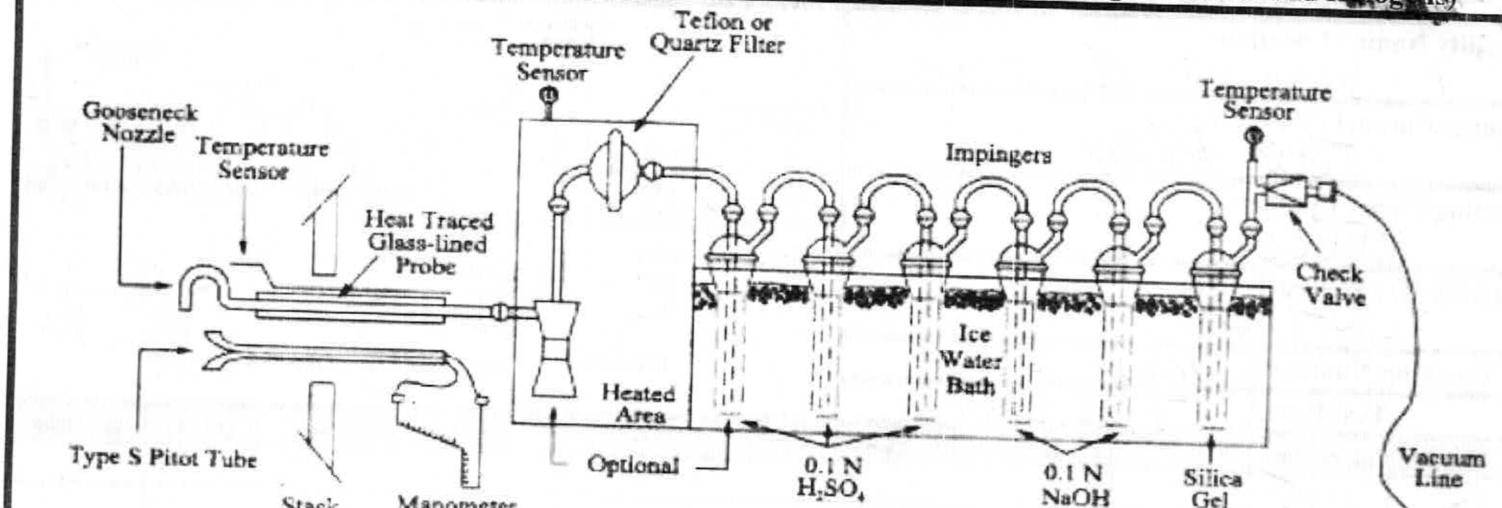


Image courtesy of the EPA (modified)

METHOD 26A - DETERMINATION OF HYDROGEN HALIDES AND HALOGENS

26A.1) Equipment and Reagents per Method 26A? (Impingers 4 & 5 optional if testing only for HCl & HF)	Yes	No
26A.1a) Probe nozzle and probe liner borosilicate or quartz glass?		
26A.1b) Cyclone (optional) between probe liner and filter holder?		
26A.1c) Teflon mat filter used?		
26A.1d) Stack temp > 410 Deg F? If so, quartz filter may be used and one-piece glass nozzle/liner mandatory	NA	
26A.1e) Impinger #1 (Optional knockout or condensate impinger; shortened stem) 50 ml of 0.1 N H_2SO_4	✓	
26A.1f) Impinger #2 (Greenburg-Smith Standard Tip & 100 ml of 0.1 N H_2SO_4) (Acid Impinger)	✓	
26A.1g) Impinger #3 (Greenburg-Smith Standard Tip & 100 ml of 0.1 N H_2SO_4) (Acid Impinger)	✓	
26A.1h) Impinger #4 (Modified Greenburg-Smith & 100 ml of 0.1 N NaOH) (Alkaline Impinger)	✓	
26A.1i) Impinger #5 (Modified Greenburg-Smith & 100 ml of 0.1 N NaOH) (Alkaline Impinger)	✓	
26A.1j) Impinger #6 - silica gel (See item 4.3 on page 1)		
26A.1k) Acidic and Alkaline absorbing solutions prepared per Method?		✓ (✱)
26A.2) Sampling Train Operation per Method 26A?	**Yes**	**No**
26A.2.a) Probe and filter temperatures between 248 and 273 Deg F?		
26A.3) Post-run Sample Recovery, Cleanup, Blank Preparation, and Optional Moisture Purge	**Yes**	**No**
26A.3.a) 200 ml blanks prepared for each absorbing solution? (250 ml of acidic sol. if optional impinger used)		
26A.3.b) Blanks diluted to same volume of field samples (see d,e below) using blank sample of DI rinse water?		
26A.3.c) Post-test moisture removal (optional and typically not conducted) - required when the optional cyclone is used or when liquid is visible on the filter at the end of the sample run.		
26A.3.d) Acid Impinger Catch - Measure liquids from impingers #'s 1-3; rinse impingers and connecting glassware with DI water; and add all liquids (impinger catch and rinse water) to one storage container.		
26A.3.e) Alkaline Impinger Catch - Measure liquids from impingers #4 & #5; rinse impingers and connecting glassware with DI water; and add all liquids (impinger catch and rinse water) to one container.		
26A.3.f) Sodium thiosulfate added to alkaline impinger catch per Method 26A?		
26A.3.g) DI rinse water blank prepared?		
26A.3.h) Is the rinse water deionized, distilled water that conforms to American Society of Testing and Materials (ASTM) Specification D 1193-77 or 91, Type 3?		
26A.3.i) Record the analytical lab to be used for analysis:		
26A.3.j) Audit sample obtained (if required and commercially available)?		

REMARKS: (✱) W/N SANGUS MODIFIED APPROACH TO PREVENT CONDENSATION

** [redacted] **