



Source Test Plan
Revised April 27, 2020

Prepared for:
Chemical Waste Management of the Northwest, Inc.
18177 Cedar Springs Ln.
Arlington, OR 97812

Located at:
Chemical Waste Management of the Northwest, Inc.
18177 Cedar Springs Ln.
Arlington, OR 97812
ODEQ Oregon PERMIT #11-0002-SI-01

Submitted to:
Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon, 97232
giska.jonathan@odeq.state.or.us

Prepared by:
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GENERAL INFORMATION

Source Owner:	Chemical Waste Management of the Northwest, Inc. 18177 Cedar Springs Ln Arlington, OR 97812
Source Location:	Chemical Waste Management of the Northwest, Inc. 18177 Cedar Springs Ln Arlington, OR 97812
Source Contact:	James Denson (PNW/BC) Environmental Protection Manager 602-757-3352 jdenson@wm.com Bob Mulholland (District Manager)
Regional Contact:	ODEQ-Attn: Jonathan Giska 503-229-5178 Department of Environmental Quality 700 NE Multnomah Street, Suite 600 Portland, Oregon, 97232 giska.jonathan@odeq.state.or.us
Federal Contact:	USEPA Region 10 N/A
Source Description:	Organic Recovery Unit 2 (ORU2)
Permit:	11-0002-SI
Regulation Requirements:	Clean Air Oregon Rules Oregon DEQ Letter Dated Aug 8, 2019
Source Testing Company:	BLUE SKY ENVIRONMENTAL, Inc. 624 San Gabriel Ave Albany, CA 94706
Contact:	Guy Worthington 510-525-1261 or 510-508-3469
Scheduled Test Date(s):	TBD

The ODEQ requires the following statements (from Oregon Source Sampling manual Section A-1) must be included in the test plan:

1. We are requesting ODEQ to allow sampling replicate(s) if separated by a time duration of seventy-two (72) hours or less as we are proposing a three-day testing event.
2. This compliance source test will be performed while the emission unit(s) are operating at normal operating rates. Unless defined by permit condition or applicable rule, normal operating rate is defined as the 90th percentile of the average hourly operating rates during a 12-month period immediately preceding the source test.
3. The ODEQ will be notified of any changes in the source test plan and/or the specified methods prior to testing. Significant changes not acknowledged by the ODEQ could be the basis for invalidating a test run and potentially the entire testing program. Documentation of any deviations must include an evaluation of the impact of the deviation on the test data.
4. Method-specific quality assurance/quality control (QA/QC) procedures will be performed to ensure that the data is valid for determining source compliance. Documentation of the procedures and results shall be presented in the source test report for review. Critical information will be included, to avoid rejection of the data, requiring a retest.
5. Only regular operating staff may adjust the combustion system or production process and emission control parameters during the source performance tests and within two (2) hours prior to the tests. Any operating adjustments made during the source performance tests, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source performance test invalid.
6. Source test reports will be submitted to ODEQ within thirty (30) days of the test dates, unless another deadline has been stipulated, either by permit condition, or by ODEQ written approval. The ODEQ has stated that 60 days to submit the report is acceptable.

1.0 Introduction

This testing is planned to comply with the ODEQ emission test requirements stated in communications from Jonathan Giska of ODEQ to Jim Denson of Chemical Waste Management of the Northwest (CWM-NW) dated August 8th, 2019. Testing will produce emissions data from the Organic Recovery Unit #2 (ORU2) to be used in Air Dispersion Modelling and Risk Assessment under the Cleaner Air Oregon rule.

Specified Testing Pollutants
Metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ag, Tl, Zn)+Al and V
Particulates + Hydrogen Halides (HCl)
Polycyclic Aromatic Hydrocarbons, Dioxins and Furans
TOU (exhaust) & (inlets) for Total Volatile Organic Compounds
Specific Toxic Organic Compounds at Thermal Oxidizer Unit TOU <u>Inlet & Outlet</u>

The methods used for testing these pollutants are described in Section 3.0 below.

2.0 Emission Source Information

The ORU2 process was manufactured by RLC Technologies, Inc., located in Glen Allen, Virginia, and was installed in 2018. The ORU2 processes and recycles refinery tank bottom wastes at a rate of approximately 1.7 tons per hour. These wastes are processed in an indirect fired Rotary Kiln operated at 900-950°F, which is fired with propane. The gases are directed to the Vapor Recovery Unit (VRU, ME-1301) where water is sprayed into the gas stream, followed by a venturi scrubber with demisters to knock out fine particulates and soluble and condensable organic and inorganic gases. The gases proceed through a chiller to further remove moisture and condensable materials, before entering the Thermal Oxidizer Unit (TOU) operated at 1600-1650°F.

Ports will be installed at each of the two inlet waste gas streams feeding the TOU (one from the conveyors and hoppers including inside Building B5, and the other from the Rotary Kiln emissions). These ports will be used to measure the inlet organics by U.S. Environmental Protection Agency (EPA) Method 25 and EPA Method TO-15, fixed gases by American Society for Testing and Materials (ASTM) Method 1945 and volumetric flowrate by pitot tube. The inlet gases are close to ambient temperature and will be assumed to be at 100% humidity for moisture determination.

No ports currently exist on the TOU stack (~ 60" inner diameter, ID), however plans are underway to provide four 6" diameter ports with a platform, located 5-8 diameters downstream and >2 diameters upstream of the exit, which will require a stack extension and platform construction, which is being designed and will be constructed prior to testing.

3.0 Source Testing Program Description

Test Location	No. Runs & Duration	Methods	Parameters
Stack Gas	3 x 1-hr simultaneously with isokinetic tests	EPA 1, 2, 4 EPA 3A, 10 EPA 25A/ALT-097	Flowrate & H ₂ O % CO, CO ₂ , O ₂ THC, NMHC
Stack Gas	3 x 1-hr Isokinetic	EPA 5/26A	Filterable Particulates, Hydrogen Halides (HCl)
Stack Gas	3 x 3 hr Isokinetic	EPA 29	Metals - Sb, AS, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ag, Tl, Zn,+Al & V

Test Location	No. Runs & Duration	Methods	Parameters
Stack Gas	3 x 3 hr Isokinetic	EPA 23	Dioxins/Furans & PAH's
Stack Gas	3 x 3 hr Isokinetic	EPA 23	Dioxins/Furans & PAH's
Stack Gas	3 x 1 hr simultaneously with THC and NMHC	EPA TO-15	Volatile Organic Species

TOU 2 Inlet streams	3 x 1 hr simultaneously with Stack Gas TO-15	EPA TO-15	Volatile Organic Species
TOU 2 Inlet streams	3 x 1 hr simultaneously with Stack Gas THC and NMHC	EPA 25 & ASTM 1945	NMHC & Fixed Gases
TOU 2 Inlet streams		EPA 1, 2C, 3A or 3C	Flowrate %CO, CO ₂ , O ₂
Solid Feed Material	15 -minute grabs (1-hr composites)	SW-846 Metals by ICPEs 60100B and 7471 for Hg Chlorine, Methods 5050 & 9056A	Metals – Ag, As, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, V, Zn, Hg and BTEX

Reporting units			Gases in ppmvd, ppbv PM in gr/dscf Metals in ug/dscm Dioxins etc in ng/dscm
Operating Parameters	15-min intervals		Time, TDU Feed Rate, TOU Temperature, TDU propane flow rate

Sampling Methods: The following Source Test Methods of the EPA and ASTM are used:

Exhaust Gas Analysis	
EPA Method 3A	CO ₂ & O ₂ Continuous Monitoring
EPA Method 10	CO Continuous Monitoring
EPA Method 25A/ALT-097	THC/NMHC/CH ₄
EPA Method 1, 2, 3, 4	Traverse Point, Velocity, Volumetric Flowrate & Moisture
EPA Method 29	Multiple Metals (all plus Al and V)
EPA Method 5/26A	Filterable Particulate Matter & Hydrogen Halides (HCl)
EPA Method 23	Dioxins and Furans & PAH's
https://www.govinfo.gov/content/pkg/FR-2020-01-14/pdf/2019-27842.pdf	
EPA TO-15	Volatile Organic Compound (VOC) Species
Inlet Gas Analysis	
ASTM 1945	Gas Analysis for CH ₄ , CO ₂ , O ₂ , CO, H ₂ , C ₂ -C ₆ +
EPA 25	NMHC as Methane
EPA TO-15	VOC species
Inlet Raw Feed Analysis	
SW846	Metals—Ag, As, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, V, Zn, Hg BTEX

Sampling & Traverse Points Selection by EPA Method 1, 1A. This method is used to determine the duct or stack area and appropriate traverse points that represent equal areas of the duct for sampling and velocity measurements.

Stack Gas Velocity & Flow Rate by EPA Method 2. This method is used to determine stack gas velocity using a standard or S-type pitot tube and inclined manometer. Temperature is monitored using a K-type thermocouple and calibrated Omega temperature meter. QA/QC procedures include leak checks before and after each traverse to validate the results. Thermometer calibrations are performed using an Omega Model CL-300 calibrator. Geometric calibrations of S-type pitots are performed every 6 months or following modification according to EPA guidelines. The absence of Cyclonic Flow will be confirmed.

Gas Analysis for the Determination of Dry Molecular Weight EPA Method 3, 3A, 3C. A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent CO₂ and percent O₂. For dry molecular weight determination, either an Orsat or a Fyrite analyzer may be used for the analysis. EPA 3A employs a continuous emission analyzer. EPA 3C employs a GC to analyze a grab or integrated sample in a Tedlar Bag or SUMMA Canister.

Stack Gas Moisture by EPA Method 4. This method is used to determine the moisture content in the gas stream by extracting a sample and condensing the moisture in Greenburg-Smith impingers immersed in an ice bath and in a final impinger silica gel trap. The moisture is condensed in a solution of de-ionized water, or solutions of another type of sampling train if the moisture is being determined as part of another sampling method, such as EPA Method 5 or EPA 29. The moisture gain in the impinger solutions and silica gel is determined volumetrically and gravimetrically respectively. QA/QC procedures require that a minimum of 21 cubic feet of sample is pulled using a leak tight pump. The sample volume is measured with a calibrated dry gas

meter. The impingers are immersed in an ice bath to maintain a gas outlet temperature of $<68^{\circ}\text{F}$. Pre-test leak checks are performed for each run at least 15 inches of mercury vacuum. Post-test leak checks are performed at the highest sample vacuum or greater. The leak test is acceptable if the leak rate is less than 0.02 cubic feet per minute or 4% of the average sampling rate, whichever is less. If the final leak check exceeds the criteria, then the volume is corrected based on the leak rate, or the run is voided and repeated.

EPA Method 5/26A. (Particulate Matter and Halides Halogens (HCl). This method will be used to determine the emissions of acid gases that pass through the probe/filter assembly maintained between $248 - 273^{\circ}\text{F}$. The sampling equipment consists of Method 5 type heated glass probe with glass nozzle, heated filter box with Teflon mat filter, (Teflon filter may be replaced with Quartz if stack temperatures exceed 410°F), Teflon® 3/8" umbilical, four Greenburg-Smith impingers immersed in ice, and a meter control module. Particulate matter is collected in the nozzle/probe and on the heated filter maintained between $248 - 273^{\circ}\text{F}$. Condensable gaseous and particulate emissions that pass through the filter (rated at 99.95% efficient for $0.3\mu\text{m}$ particles) are collected and recovered from the back-half of the filter holder, the sample line and finally the impingers (two containing an acidic absorbing solution of 0.1 N H_2SO_4 for Halides and two containing an alkaline absorbing solution of 0.1 N NaOH for Halogens) and the final impinger contains silica gel desiccant). The impinger solutions will be analyzed using ion chromatography for: HCl and Chlorine. The filter is discarded unless part of particulate determination. Sampling QA/QC: consists of pitot leak checks performed by pressurizing each leg of the pitot separately to a pressure greater than 3" H_2O . The leak check is passed when no movement in the manometer fluid occurs over 15 seconds. Sampling system leak checks are performed before and after each test run. The sampling system leak checks are performed by capping the nozzle and pulling a vacuum greater than 15 inches of mercury, and observing the meter rate. The leak check is passed when the leak rate is less than 0.02CFM or 4% of the average sample rate, whichever is less. The final leak check is performed at a vacuum at least as high as the highest vacuum pulled during the run. The impingers are kept in ice to maintain the temperature of the gas exiting the last impinger to below 68°F . No silicone grease is used in the components of the sampling train. The dry gas meter, pitot, thermocouples, gauges and nozzles are all calibrated according to the methods and with a frequency of between 6 to 12 months as specified in CARB QA/QC Volume VI, Table 3. Nozzles are calibrated to within 0.001" diameter and are inspected for damage prior to each test. Field train blanks are collected using identical equipment, reagents, proportions and techniques as the test samples. Analytical QA/QC consists of a field train blank, laboratory blanks, duplicates and spikes.

Multiple Metals by EPA Method 29. This method is used to determine the emissions of antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorous (P), selenium (Se), silver (Ag), thallium (Tl) and zinc (Zn). For this test program all the listed metals are analyzed plus Aluminum (Al) and Vanadium (V). The sampling equipment consists of a Method 5 arrangement with a borosilicate glass nozzle, heated glass probe and heated quartz glass fiber filter, followed by a Teflon® line to a series of five Greenburg-Smith impingers immersed in ice. Particulate matter is collected in the nozzle/probe and on the heated filter. Condensable gaseous and particulate emissions that pass through the filter (rated at 99.95% efficient for $0.3\mu\text{m}$ particles) are collected and recovered from the sample line, the back half of the filter holder, and the impingers. The first two impingers contain a solution of 5% HNO_3 /10% H_2O_2 , the third is empty, the fourth contains a solution of 4% KMnO_4 /10% H_2SO_4 and the final impinger contains silica gel desiccant.

Analysis for metals is performed by ICPMS and Cold Vapor AAS (CVAAS). Sampling QA/QC: consists of pitot leak checks that are performed by pressurizing each leg of the pitot separately to a pressure greater than 3" H_2O . The leak check is passed when no movement in the manometer fluid occurs over 15 seconds. Sampling system leak checks are performed before and after each test run. The sampling system leak check is performed by, capping the nozzle and pulling a vacuum greater than 15 inches of mercury while observing the meter rate. The leak check passes when the leak rate is less than 0.02CFM, or 4% of the average sample rate, whichever is less. The final leak check is performed at a vacuum at least as high as the highest vacuum pulled during the run. The impingers are kept in ice to maintain the temperature of the gas exiting the last impinger to below 68°F .

The acidified KMnO_4 solution is prepared fresh daily and is protected from daylight. During testing the solution is observed to detect any discoloration due to mercury. No silicone grease is used in the components of the sampling train. The dry gas meter, pitot, thermocouples, gauges and nozzles are all calibrated according to the methods and with a frequency of between 6 to 12 months as specified in CARB QA/QC Volume VI, Table 3. Nozzles are calibrated in the field to within 0.001" diameter and are inspected for damage prior to each test. Field train blanks are collected using identical equipment, reagents, proportions and techniques as the test samples. Analytical QA/QC consists of a field train blank, laboratory blanks, duplicates and spikes.

Hexavalent Chromium Methods for Hexavalent Chromium (CRVI or Cr^{6+}) have not been validated by the EPA for temperatures above 300°F. Robin Segall and staff (EPA-RTP) do not advise using this method and acknowledge the technical issues and unknown chemical states that performing Method 0061 at flare temperatures would difficult to impossible to consider, see Appendix G email correspondence. Robin's advice was to use EPA 29 to measure total Chromium and base the Hexavalent Chromium on that. Published Scientific study by the National Risk Management Research Laboratory in RTP of the effect of high temperature incineration and flaring specifically address the formation of Hexavalent Chromium at high temperature and clearly indicate that 2% of Total Chromium is converted into Hexavalent. Using 2% of the Total Chromium is therefore the practical and scientifically supported basis for performing the CRVI risk assessment.

https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRI&dirEntryId=128563

EPA Method 23 Dioxins/Furans & Polycyclic Aromatic Hydrocarbons (PAHs) is used to determine the emissions of polychlorinated dibenzo-p-dioxins (PCDD's) and polychlorinated dibenzofurans (PCDFs). The sampling equipment consists of a glass nozzle, a Stainless Steel sheathed heated glass-lined probe, heated filter box and filter holder with teflon-coated, toluene-rinsed, glass-fiber filter, followed by a Teflon® line to a condenser and XAD sorbent module that sits directly on-top of the first of four modified Greenburg-Smith impingers. The first impinger (optional) has a short stem and is empty, the second and third contain 100 ml each of De-Ionized water, and the fourth is empty. A fifth impinger contains 200-plus gm of silica gel to remove any remaining moisture. The sample is drawn through the sample train using a vacuum pump and the volume is measured by a dry gas meter in an isokinetic metering control module.

Sampling is performed isokinetically. Sampling QA/QC: consists of pitot leak checks which are performed by pressurizing each leg of the pitot separately to a pressure greater than 3" H_2O . The leak check is passed when no movement in the manometer fluid occurs over 15 seconds. Sampling system leak checks are performed before and after each test run. The sampling system leak checks are performed by capping the nozzle and pulling a vacuum greater than 15 inches of mercury, and observing the meter rate. The leak check is passed when the leak rate is less than 0.02CFM or 4% of the average sample rate, whichever is less. The final leak check is performed at a vacuum at least as high as the highest vacuum pulled during the run. The impingers are kept in ice to maintain the temperature of the gas exiting the last impinger to below 68°F. No silicone grease is used in the components of the sampling train.

Sample recovery is performed in a clean enclosed area or at the laboratory. The nozzle/probe sample is recovered with acetone, then methylene chloride and finally a toluene rinse. The filter is carefully removed and placed in a labeled petri-dish. The transfer line between the filter and condenser, the condenser and the first impinger are rinsed three times, first with acetone followed by toluene. The sorbent module is capped. The volume of the contents of the first, second and third impingers are measured or weighed for moisture determination and are saved and rinsed with acetone and Toluene for PAH analysis. The silica gel is recovered and weighed.

Equipment QA/QC includes the following: The dry gas meter, pitot, thermocouples, gauges and nozzles are all calibrated according to the methods and with a frequency of between 6 to 12 months as specified in CARB QA/QC Volume VI, Table 3. Nozzles are calibrated to within 0.001" diameter and are inspected for damage

prior to each test. Reagent and Field blanks are collected using identical equipment, reagents, proportions and techniques as the test samples. Analytical QA/QC consists of at least one field blank, which is a sample train assembled tested and recovered in the same manner as the samples without drawing any sample. A chain of custody is completed for all samples, and the samples are packaged and shipped to the laboratory according to the method.

Ref: <https://www.govinfo.gov/content/pkg/FR-2020-01-14/pdf/FR-2020-01-14.pdf>

EPA Method 3A (O₂, CO₂) & 10 (CO) describes continuous monitoring techniques using instrumental analyzers. Sampling is performed by extracting exhaust flue gas from the stack, conditioning the sample and analyzing it by continuous monitoring gas analyzers in a CEM test van. The sampling system consists of a stainless-steel sample probe, teflon sample line, glass-fiber particulate filter, glass moisture-knockout condensers in ice, followed by thermoelectric coolers (optional), teflon sample transfer tubing, diaphragm pump and a stainless steel/teflon manifold and flow control/delivery system. A constant sample and calibration gas supply pressure of 5 PSI is provided to each analyzer to avoid pressure variable response differences. The entire sampling system is leak checked prior to and at the end of the sampling program.

The sampling and analytical system (for EPA Methods) is checked for linearity with zero, mid (40-60% of span) and span (80-100% of range) calibrations and is checked for system bias at the beginning and end of each run. System bias is determined by introducing calibration gas to the probe and pulling it through the entire sampling system. Individual test run calibrations usually use the calibration gas that most closely matches the stack gas effluent. Along with the Sampling System Bias, the Zero and Calibration Drift values will be determined for each test. Methods 3A, 7E and 10 all defer to EPA Method 7E for the calculations of effluent concentration, Span, Calibration Gas, Analyzer Calibration Error (Linearity), Sampling System Bias, Zero Drift, Calibration Drift and Response Time. If NO_x is being measured, then the NO_x analyzer NO₂ to NO conversion efficiency check is performed according to EPA Method 20 section 5.6 criteria and procedures.

All calibration gases are EPA Protocol #1. The analyzer data recording system consists of Honeywell DPR3000 or Omega 3 channel strip chart recorders, which are supported by a Data Acquisition System (DAS).

CEM Reference Method System Performance Criteria

Instrument Linearity (25A)	≤±5% Span Gas
Instrument Linearity	≤± 2% Span (high Cal Gas value)
Instrument Bias	≤± 5% Span (high Cal Gas value)
System Response Time	≤± 2 minutes
Instrument Zero Drift (EPA 7E)	≤± 3% Span (high Cal Gas value)
Instrument Span Drift (EPA 7E)	≤± 3% Span (high Cal Gas value)

EPA 25A/EPA Method ALT-097: Sampling for Total Hydrocarbons, Methane and Non-Methane Hydrocarbons. EPA Method ALT-097 (FID/GC Method) employs a heated TECO 55C FID with GC column, heated Teflon sample gas transfer lines to provide a continuous sample to the heated FID/GC Hydrocarbon Analyzer. Heated lines are used at temperatures required to avoid any moisture or hydrocarbon condensation. Methane is determined by the calibrated GC method in the TECO 55C NMHC/CH₄/THC Analyzer. Calibration gases are selected to fall within 25-35%, 45-55% and 80-90% of Range for Methane, Total Hydrocarbon and Non-Methane Hydrocarbons. The stack is traversed with the monitoring probe at 3 points per diameter, per EPA Method 1A to measure stratification.

Calibrations are performed through the probe and entire sample system. The system linearity check is performed prior to testing and during testing and calibration drift checks are performed after every run. All data is corrected

Blue Sky Environmental,
according to EPA Method 25A.

Instrumentation: The following continuous emission monitors or equivalents are used:

Instrument	Analyte	Principle
Servomex 1440	O ₂	Paramagnetic
Servomex 1440	CO ₂	NDIR
TEI 55C	THC/NMHC	FIDGC
TECO 48C	CO	NDIR

The following calibration ranges and EPA Protocol gases are proposed. Gases may be substituted depending on changes of analyzer range and availability at the time of testing.

	Expected Concentration	Analyzer Range	Hi Span	Mid Span	Low Span / Zero
NMHC	0-25 ppm	100	85	45	22 / ZERO
CO	0-500 ppm	500	450	225	ZERO
O ₂	11-16 %	25	20.5	14	ZERO
CO ₂	4-8%	15	12	8	ZERO

EPA TO-15 Volatile Organics by SUMMA® Canister. Sampling consists of collecting gases in pre-evacuated 6-Liter SUMMA canisters with pre-set flow controllers set to integrate over the desired test duration. The SUMMA® passivated canisters allow holding times up to 14 days for the TO-15 Method list of volatile organics. The sample gas is drawn by the canister vacuum through a micro-filter, pre-set orifice flow controller and on/off valve into the canister. The canister vacuum is monitored with a vacuum gauge to verify sample collection. The samples are analyzed for volatile organics by EPA Method TO-15 using GC/MS (gas chromatography/mass spectroscopy).

NMHC and CH₄ by EPA Method 25. Oxidizer Inlet sampling. This method is particularly suited to high VOC sources >50 ppm. Samples are collected using a short 1/8th SS sample line leading to a moisture trap in dry-ice, followed by the 6L SUMMA evacuated canister that provided the draw for the sample and collected the non-condensable volatile organic compounds. An orifice on the canister is used to regulate the flow rate, and the sample vacuum will be monitored during the test using an inline vacuum gauge. The samples are analyzed by GC-FID for CH₄ and non-CH₄ hydrocarbons. The EPA Method 25 analysis injects the sample through a column that holds back everything except CH₄, CO and CO₂. The CH₄ is detected, the CO and CO₂ pass, and then the column is back-flushed to an oxidizer that converts all HC's to CO₂. The CO₂ is then reduced to CH₄ and injected into the same detector as the sample CH₄. In this way the CH₄ and NMHC are measured on the same basis with the same detector. Oxygen and Carbon Dioxide and Carbon Monoxide are all quantified. With this technique there are no response factor inconsistencies for concern.

Feed Material: The feed material to the ATDU Kiln will be sampled at intervals of 15-minutes for 1-hr tests and 30-minutes for 3-hr tests and composited into samples for analysis of the Metals and BTEX.

Process Data: The following information will be collected during every test run, at intervals of approximately 15-minute, Time, Thermal Destruction Unit (TDU) feed rate, TDU temperature, and TDU propane flow rate. The objective will be to test the process will be operated at the normal sustainable operating rate of ~1.7 TPH.

4.0 Reporting, QA & QC Procedures

The referenced sampling methods describe the QA/QC procedures and documentation that will be followed in implementing and executing this Source Test Program.

Responsibility for all QA/QC is that of the onsite Project Manager. The Project Manager will be Chuck Arrivas, supported by Jeramie Richardson, Adam Ashlin and Guy Worthington. Mr. Worthington has over 33 years of experience in source emissions testing, most of that time in the position of a senior Project Manager. Jeramie Richardson (QSTi), Adam Ashlin and Chuck Arrivas (QSTi) all have greater than 12 years' experience each.

All Labs shall be Accredited and ultimately ODEQ approved. The specific Labs have yet to be finalized. Probable Labs are Chester (Metals), Bureau Veritas (Metals & M23), Vista (M23) and Atmospheric Analysis and Consulting (Organics including 25, 25C, TO-15).

Data collection, reduction and reporting are performed using Word and Excel software, and HP basic programmable calculators. The report will contain all raw data and calculations, with equations shown. The final report is normally submitted within 4 weeks of the test completion, or 2 weeks following the completion of any laboratory analysis. The ODEQ has granted the reporting period to be extended from 30 days to 60 days for this project. A ODEQ Source Test Audit Report (STAR) for all applicable test Methods will be prepared to accompany the submittal of the final source test report. Three copies of the report are submitted to the client, and it is their responsibility to forward a copy to the appropriate agency.

Expected Timeline

Day 0 Setup

Flare Gas Sampling & Analysis

Day 1	3 x 1hr M5/26A	+ 3 x 1 hr TO-15	+ 3 x 1hr THC, O ₂ , CO, CO ₂
Day 2	1 x 3hr M29	+ 1 x 3hr M23	+ 3 x O ₂ and CO ₂
Day 3	2 x 3hr M29	+ 2 x 3hr M23	+ 3 x O ₂ and CO ₂

Inlet Gas Analysis *On both the 4" and 6" inlets*

Day 1	3 x 1 hr EPA 25 for NMHC and EPA TO-15 VOC species
Day 1	3 x 1 hr ASTM 1945 for Gas Analysis for CH ₄ , CO ₂ , O ₂ , CO, H ₂ , C2-C6+ Methods 1-4
Day 2	1 x 1 hr ASTM 1945 for Gas Analysis for CH ₄ , CO ₂ , O ₂ , CO, H ₂ , C2-C6+ Methods 1-4
Day 3	2 x 1 hr ASTM 1945 for Gas Analysis for CH ₄ , CO ₂ , O ₂ , CO, H ₂ , C2-C6+ Methods 1-4

Inlet Feed Analysis

Metals – Ag, As, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, V, Zn, Hg and BTEX

5.0 Plant Entry and Safety

For this site, personnel shall be OSHA Hazwoper trained to work within the area. All visitors to site must sign in at the office trailer and complete a safety orientation be trained on basic procedures for the facility. While on site all personnel must where appropriate P P E safety gear as needed including hard-hat, safety glasses, safety shoes and appropriate clothing (suits), respirators etc. All work performed on site must be approved by site manager and documented in a work permit.

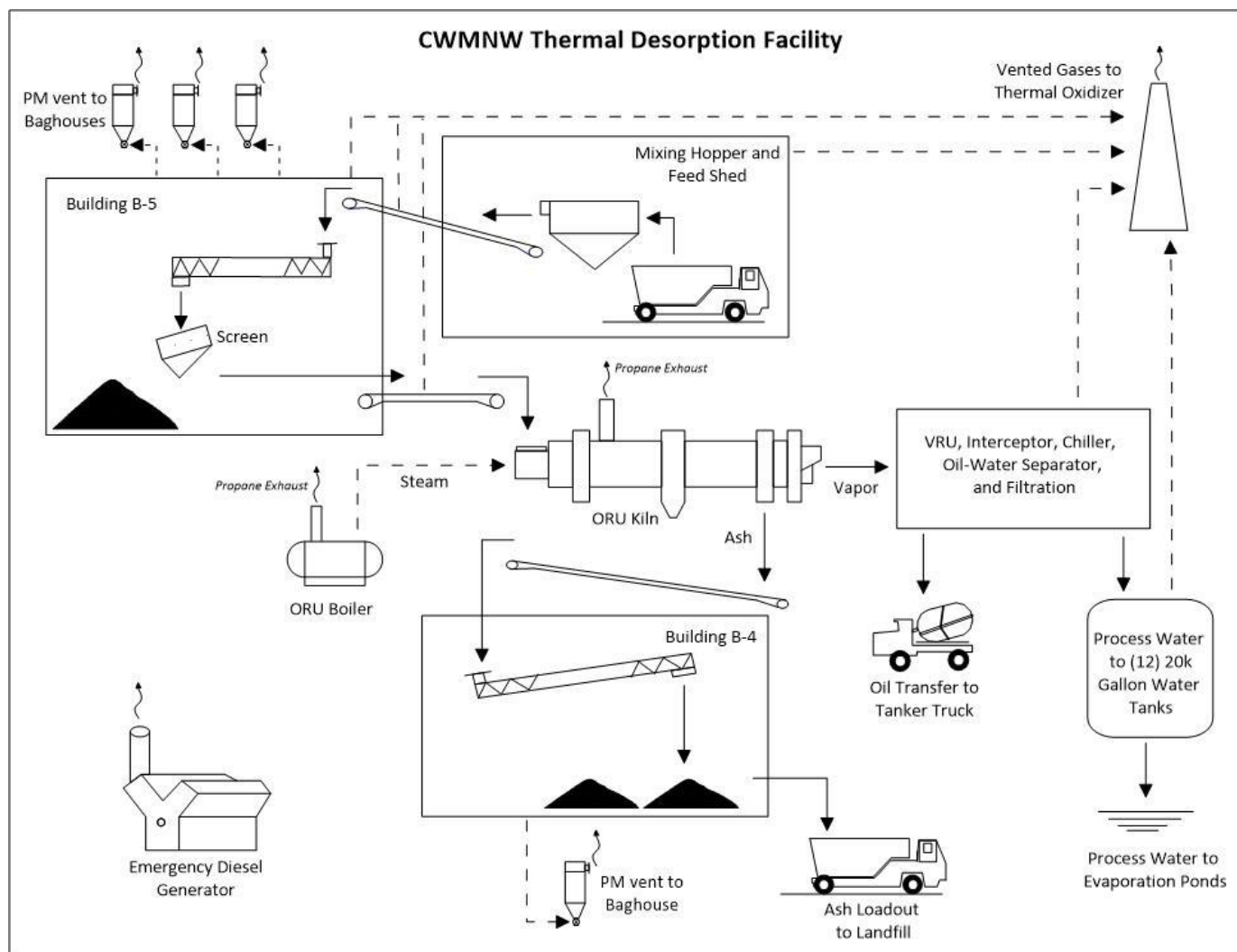
If there are any questions concerning this Source Test Plan, please contact Guy Worthington at 510-525-1261 or 510-508-3469 or Chuck Arrivas at 925-338-4875.

Submitted by,

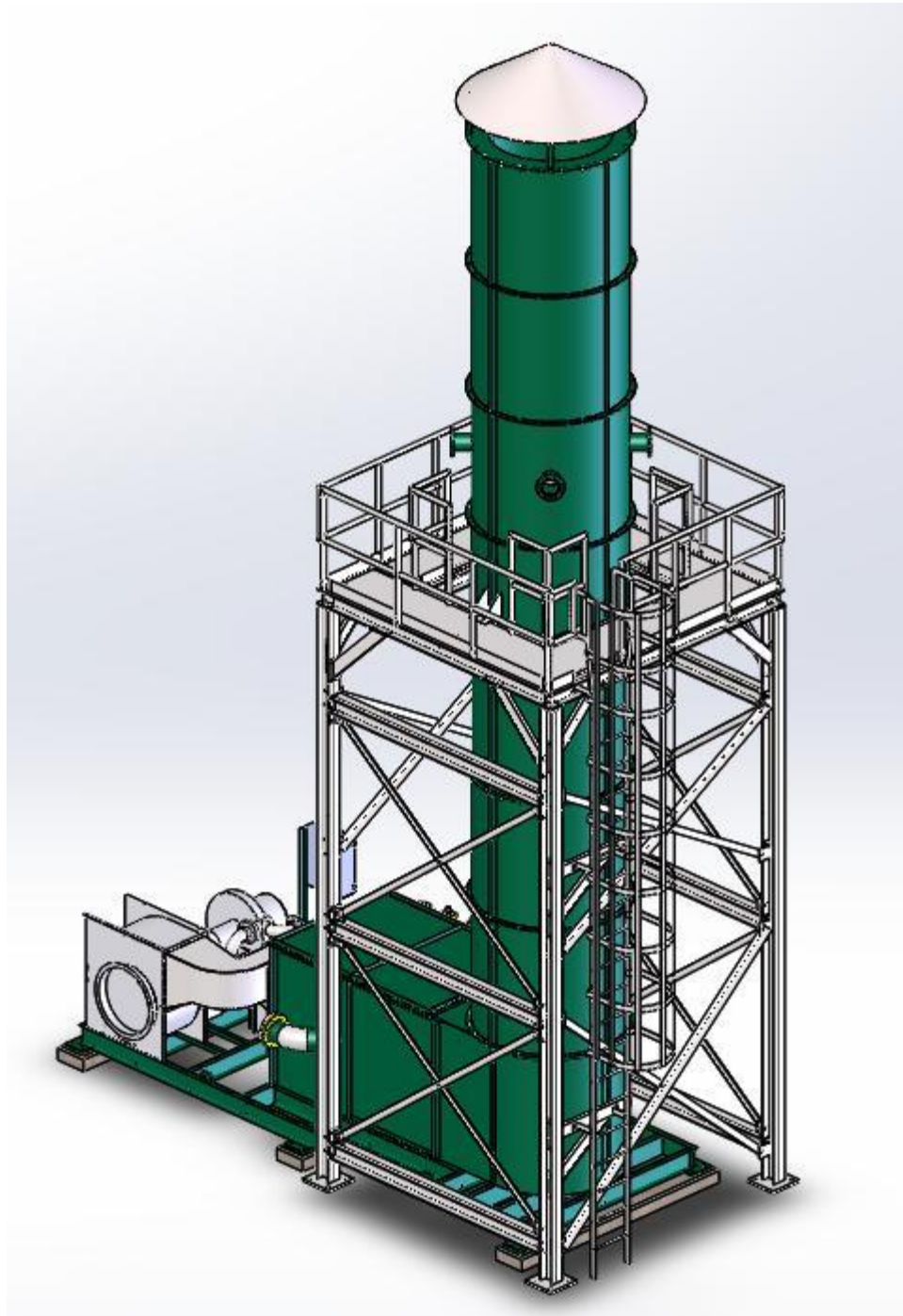
Guy Worthington

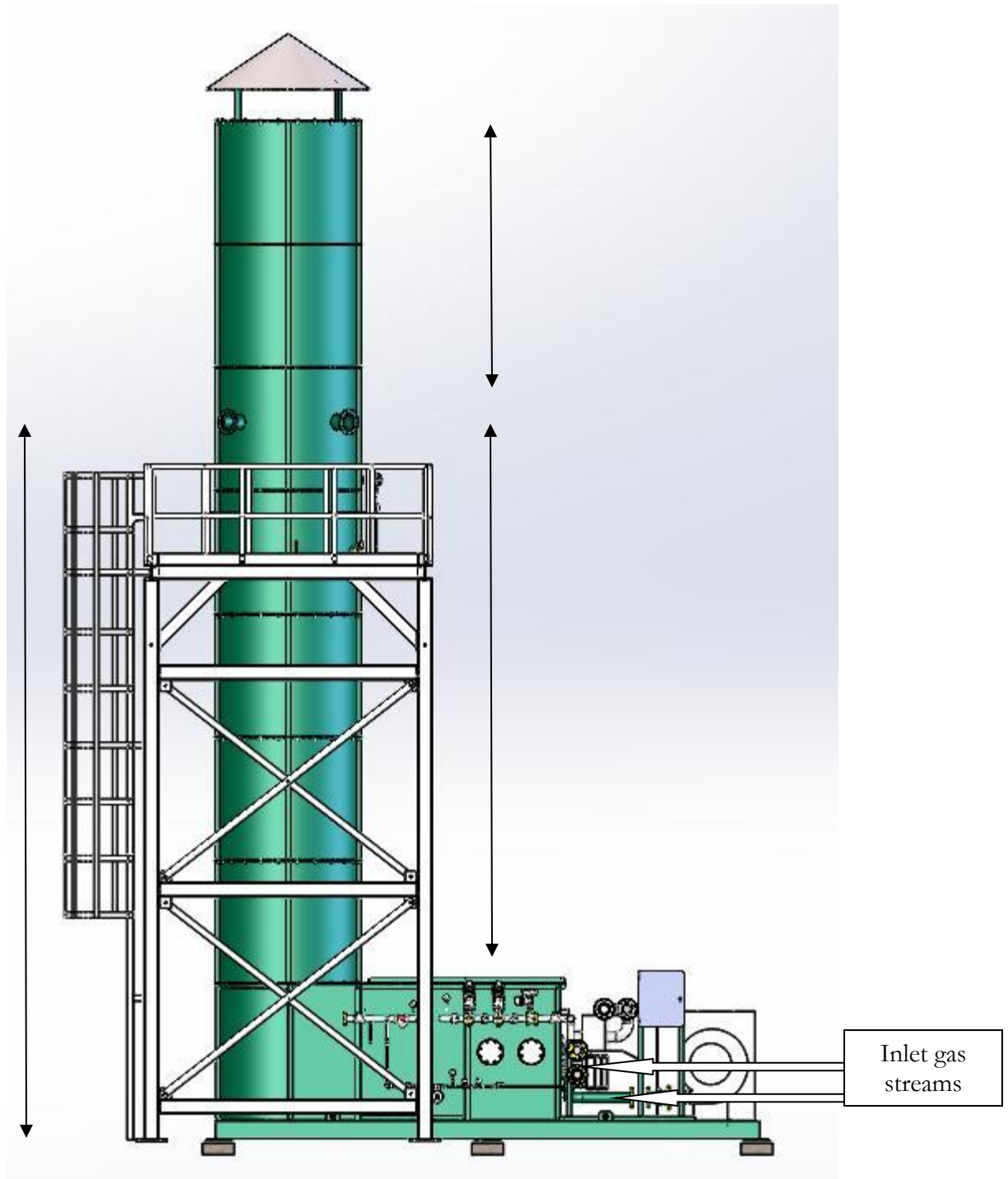
Appendix A	Process Flow Diagram
Appendix B	Stack and Port Location & Configuration
Appendix C	Sample Detection Limits, lbs/hr
Appendix D	Sample TO-15 Analysis List
Appendix E	ALT 097 (modification to 25A) for flares
Appendix F	M23 sample and lab analysis chart
Appendix G	Robin Segall and staff (EPA-RTP) emails

APPENDIX A
Process Flow Diagram



APPENDIX B
Stack and Port Location Configuration







Top Inlet line ~ 6"



Lower Inlet Line ~4"

APPENDIX C
Sample Detection Limits, lbs/hr

		Annual	sample SCF 30scf/1hr 60scf/2hr 90scf/3hr 180scf/6hr				updated 3/29/2020
		MW	SRL ppb	SRL ug/sample	90 ug/cf	lb/cf	lb/hr DSCFM*60 7200*60
Toxics Compound	CAS						
TO-15	1,2,4-Trichlorobenzene	120-82-1	181.5	1.70E+01		8.63E-09	3.46E-03
TO-15	1,2,4-Trimethylbenzene	95-63-6	120.2	1.70E+01		5.72E-09	2.29E-03
TO-15	1,2-Dichlorobenzene	95-50-1	147.0	1.70E+01		6.99E-09	2.80E-03
TO-15	1,3,5-Trimethylbenzene	108-67-8	120.2	1.70E+01		5.72E-09	2.29E-03
TO-15	1,3-Dichlorobenzene	541-73-1	147.0	1.70E+01		6.99E-09	2.80E-03
PAH	2-Methyl naphthalene	91-57-6	142.2	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Acenaphthene	83-32-9	154.2	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Acenaphthylene	208-96-8	152.2	0.01	1.11E-04	2.45E-13	1.06E-07
TO-15	Acetone	67-64-1	58.1	1.70E+01		2.76E-09	1.11E-03
M29	Aluminum	7429-90-5	27.0	90	1.00E+00	2.20E-09	9.52E-04
PAH	Anthracene	120-12-7	178.2	0.01	1.11E-04	2.45E-13	1.06E-07
M29	Antimony	7440-36-0	121.8	6	6.67E-02	1.47E-10	6.35E-05
M29	Arsenic	7440-38-2	74.9	1.6	1.78E-02	3.92E-11	1.69E-05
M29	Barium	7440-39-3	137.3	2.4	2.67E-02	5.88E-11	2.54E-05
PAH	Benz[a]anthracene	56-55-3	228.3	0.01	1.11E-04	2.45E-13	1.06E-07
TO-15	Benzene	71-43-2	78.1	1.70E+01		3.72E-09	1.49E-03
PAH	Benzo[a]pyrene	50-32-8	252.3	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Benzo[b]fluoranthene	205-99-2	252.3	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Benzo[g,h,i]perylene	191-24-2	276.3	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Benzo[j]fluoranthene	205-82-3	252.3	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Benzo[k]fluoranthene	207-08-9	252.3	0.01	1.11E-04	2.45E-13	1.06E-07
M29	Beryllium	7440-41-7	9.0	0.36	4.00E-03	8.82E-12	3.81E-06
M29	Cadmium	7440-43-9	112.4	0.36	4.00E-03	8.82E-12	3.81E-06
TO-15	Carbon disulfide	75-15-0	76.1	1.70E+01		3.62E-09	1.45E-03
TO-15	Chloromethane (Methyl chloride)	74-87-3	50.5	1.70E+01		2.40E-09	9.62E-04
M29	Chromium	7440-47-3	52.0	6	6.67E-02	1.47E-10	6.35E-05
PAH	Chrysene	218-01-9	228.3	0.01	1.11E-04	2.45E-13	1.06E-07
M29	Cobalt	7440-48-4	58.9	0.36	4.00E-03	8.82E-12	3.81E-06
M29	Copper	7440-50-8	63.5	3.6	4.00E-02	8.82E-11	3.81E-05
PAH	Dibenz[a,h]anthracene	53-70-3	278.3	0.01	1.11E-04	2.45E-13	1.06E-07
M23	Dibenzofuran (total PCDF)	132-64-9	168.2	?	0.000025	2.78E-07	2.65E-10
M23	PCDD Total			?	0.000025	2.78E-07	2.65E-10
TO-15	Dichloromethane (Methylene chloride)	75-09-2	84.9	1.70E+01		4.04E-09	1.62E-03
TO-15	Ethyl benzene	100-41-4	106.2	1.70E+01		5.05E-09	2.02E-03
PAH	Fluoranthene	206-44-0	202.3	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Fluorene	86-73-7	166.2	0.01	1.11E-04	2.45E-13	1.06E-07
PAH	Indeno[1,2,3-cd]pyrene	193-39-5	276.3	0.01	1.11E-04	2.45E-13	1.06E-07
TO-15	Isopropylbenzene (Cumene)	98-82-8	120.2	1.70E+01		5.72E-09	2.29E-03
M29	Lead	7439-92-1	207.2	1.2	1.33E-02	2.94E-11	1.27E-05
M29	Manganese, Mn	7439-96-5	54.9	2.4	2.67E-02	5.88E-11	2.54E-05
M29	Mercury	7439-97-6	200.6	0.6	6.67E-03	1.47E-11	6.35E-06
TO-15	Methyl tert-butyl ether	1634-04-4	88.2	1.70E+01		4.19E-09	1.68E-03
PAH	Naphthalene	91-20-3	128.2	0.01	1.11E-04	2.45E-13	1.06E-07
M29	Nickel	7440-02-0	58.7	2	2.22E-02	4.90E-11	2.12E-05
TO-15	p-Dichlorobenzene (1,4-Dichlorobenzene)	106-46-7	147.0	1.70E+01		6.99E-09	2.80E-03
PAH	Phenanthrene	85-01-8	178.2	0.0375	4.17E-04	9.19E-13	3.97E-07
PAH	Pyrene	129-00-0	202.3	0.0124	1.38E-04	3.04E-13	1.31E-07
M29	Selenium	7782-49-2	79.0	4	4.44E-02	9.80E-11	4.23E-05
M29	Silver	7440-22-4	107.9	0.48	5.33E-03	1.18E-11	5.08E-06
TO-15	Tetrachloroethene (Perchloroethylene)	127-18-4	165.8	1.70E+01		7.89E-09	3.16E-03
M29	Thallium	7440-28-0	204.4	0.48	5.33E-03	1.18E-11	5.08E-06
TO-15	Toluene	108-88-3	92.1	1.70E+01		4.38E-09	1.76E-03
TO-15	trans-1,2-Dichloroethene	156-60-5	97.0	1.70E+01		4.61E-09	1.85E-03
TO-15	Trichloroethene (TCE, Trichloroethylene)	79-01-6	131.4	1.70E+01		6.25E-09	2.50E-03
M29	Vanadium	7440-62-2	50.9	1.2	1.33E-02	2.94E-11	1.27E-05
TO-15	Vinyl chloride	75-01-4	62.5	1.70E+01		2.97E-09	1.19E-03
TO-15	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	106.2	3.40E+01		1.01E-08	4.05E-03
M29	Zinc	7440-66-6	65.4	20	2.22E-01	4.90E-10	2.12E-04
5/26A	HCl	based on 1 hr Sample		400	1.33E+01	2.94E-08	1.27E-02
5/26A	HF			100	3.33E+00	7.35E-09	3.17E-03
5/26A	HBr			100	3.33E+00	7.35E-09	3.17E-03
	CRVI	change to 2% of Cr DL		0.12	4.00E-03	8.82E-12	3.81E-06
25A	NMOC THC 25A/ALT-097		16	2000		8.96E-08	3.59E-02
M5	Particulate			800	2.67E+01	5.88E-08	2.54E-02

APPENDIX D
Sample TO-15 Analysis List

Analyte:	RL ppbV
ChlorodiFluoromethane(Freon22) (75-45-6)	0.50
Propene (115-07-1)	1.00
DiChlorodiFluoromethane(Freon12) (75-71-8)	0.50
Chloromethane (74-87-3)	0.50
1,2-DiCl-1,1,2,2-TetraFlethane(Freon114) (76-14-2)	0.50
Vinyl Chloride (75-01-4)	0.50
Methanol (67-56-1)	5.00
1,3-Butadiene (106-99-0)	0.50
Bromomethane (74-83-9)	0.50
Chloroethane (75-00-3)	0.50
DiChloroFluoromethane(Freon21) (75-43-4)	0.50
Ethanol (64-17-5)	2.00
Vinyl Bromide (593-60-2)	0.50
Acetone (67-64-1)	2.00
TriChloroFluoromethane(Freon11) (75-69-4)	0.50
Isopropyl Alcohol (67-63-0)	2.00
Acrylonitrile (107-13-1)	1.00
1,1-DiChloroethene (75-35-4)	0.50
Methylene Chloride (75-09-2)	0.50
Allyl Chloride(3-Clpropene) (107-05-1)	0.50
Carbon Disulfide (75-15-0)	0.50
1,1,2-TriCl-1,2,2-TriFlethane(Freon113) (76-13-1)	0.50
trans-1,2-DiChloroethene (156-60-5)	0.50
1,1-DiChloroethane (75-34-3)	0.50
Methyl tert-butyl ether (MTBE) (1634-04-4)	0.50
Vinyl Acetate (108-05-4)	1.00
2-Butanone (MEK) (78-93-3)	0.50
cis-1,2-DiChloroethene (156-59-2)	0.50
Hexane (110-54-3)	0.50
Chloroform (67-66-3)	0.50
Ethyl Acetate (141-78-6)	0.50
Tetrahydrofuran (109-99-9)	0.50
1,2-DiChloroethane (107-06-2)	0.50
1,1,1-TriChloroethane (71-55-6)	0.50
Benzene (71-43-2)	0.50
Carbon Tetrachloride (56-23-5)	0.50
Cyclohexane (110-82-7)	0.50

1,2-DiChloropropane (78-87-5)	0.50
Bromo-di-Chloromethane (75-27-4)	0.50
1,4-Dioxane (123-91-1)	0.50
TriChloroethene (79-01-6)	0.50
2,2,4-Trimethylpentane (540-84-1)	0.50
Heptane (142-82-5)	0.50
cis-1,3-DiChloropropene (10061-01-5)	0.50
4-Methyl-2-Pentanone (MiBK) (108-10-1)	0.50
trans-1,3-DiChloropropene (10061-02-6)	0.50
1,1,2-TriChloroethane (79-00-5)	0.50
Toluene (108-88-3)	0.50
2-Hexanone (591-78-6)	0.50
DibromoChloromethane (124-48-1)	0.50
1,2-Dibromoethane (106-93-4)	0.50
TetraChloroethene (127-18-4)	0.50
Chlorobenzene (108-90-7)	0.50
Ethylbenzene (100-41-4)	0.50
m- & p-Xylenes (1330-20-7)	0.50
Bromoform (75-25-2)	0.50
Styrene (100-42-5)	0.50
1,1,2,2-TetraChloroethane (79-34-5)	0.50
o-Xylene (95-47-6)	0.50
4-Ethyltoluene (622-96-8)	0.50
1,3,5-Trimethylbenzene (108-67-8)	0.50
1,2,4-Trimethylbenzene (95-63-6)	0.50
Benzyl Chloride (100-44-7)	0.50
1,3-DiChlorobenzene (541-73-1)	0.50
1,4-DiChlorobenzene (106-46-7)	0.50
1,2-DiChlorobenzene (95-50-1)	0.50
1,2,4-TriChlorobenzene (120-82-1)	0.50
HexaChlorobutadiene (87-68-3)	0.50
Custom Additions	
Acetaldehyde (75-07-0)	2.00
Acrolin (107-02-8)	1.00
Tert Butanol (75-65-0)	0.50
Methyl Methacrylate (80-62-6)	0.50
Isopropylbenzene(Cumene)* (98-82-8)	0.50
2-Chlorotoluene (95-49-8)	0.50
Naphthalene (91-20-3)	0.50

APPENDIX E
ALT 097 (modification to 25A) for flares



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

RESEARCH TRIANGLE PARK, NC 27711

DEC 11 2012

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Timothy J. Senger, Sr. Project Manager
TRC Environmental Corporation (TRC)
Wannalancit Mills
650 Suffolk Street, Suite 200
Lowell, MA 01854

Dear Mr. Senger:

This letter is a revision to our alternative test method approval (Alt-97 dated November 8, 2012) in response to your request of September 6, 2012. In that request, you asked for approval of an alternative to the use of Method 25A in combination with Method 18 to measure methane and non-methane organic compounds (NMOC) at Municipal Solid Waste Landfills under 40 CFR 60, Subpart WWW, Sections 60.752 (b)(2) (iii)(B) and 60.754(d). More specifically, your request addressed the measurement of flare outlet emissions following Section 60.754(d) where the rule states Method 25A may be used "in cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane)." With today's letter, we are clarifying the broadly applicable approval to use the TECO-55C to measure methane and NMOC under 40 CFR 60, Subpart WWW with detailed references to the requirements for calibration and quality control when this alternative is used.

The alternative testing approach you requested involves use of the Thermo-Environmental Model 55C (TECO-55C) methane/non-methane analyzer to measure and quantify the NMOC emissions from bypass flares burning landfill gas, digester gas, or pipeline natural gas. You noted that the TECO 55C uses gas chromatography (GC) to separate methane from the NMOC in the emissions gas stream, and flame ionization to measure methane separately from NMOC. You cited EPA's approval of alternative testing approaches (ALT-066 and ALT-078) related to NMOC and methane measurement requirements under 40 CFR Part 60, Subpart JJJJ for internal combustion engines as similar applications to your request related to Subpart WWW.

We have reviewed your request and the associated rule language and we agree that an alternative testing approach using GC to separate and measure methane and GC back-flush procedures to measure NMOC in post combustion emissions gas from bypass flares is acceptable. With this letter, we are approving the use of GC to separate and measure methane and GC back-flush for measurement of methane and NMOC from these bypass flares exhaust emissions under 40 CFR 60, Subpart WWW with the following caveats:

- You must heat all sampling components leading to the analyzer to greater than 110°C (220°F) throughout the sampling period, unless safety reasons are cited as required in Section 5.2 of Method 25A.
- You must calibrate your instrument with methane and the required NMOC hydrocarbon in Method 25A or the applicable rule.

- You must also follow the appropriate procedures in Sections 8, 9, and 10 of Method 25A to ensure linearity, calibration drift error, and drift are within Method 25A limits.
- You must report your calibration results including demonstration of methane to nonmethane organic separation.

This approval does not include or approve using the GC to separate and measure methane and GC back-flush procedures to measure methane and/or NMOC at inlet locations as required in 40 CFR 60, Subpart WWW for the purpose of determining destruction efficiency.

We will announce on EPA's website (at <http://www.epa.gov/ttn/emc/approalt.html>) that our approval of this alternative to Method 25A and Method 18 for NMOC and methane measurement is broadly applicable to testing of bypass flare exhaust emissions under 40 CFR 60, Subpart WWW.

If you need further assistance, please contact Ray Merrill of my staff at (919) 541-5225 or merrill.raymond@epa.gov.

Sincerely,

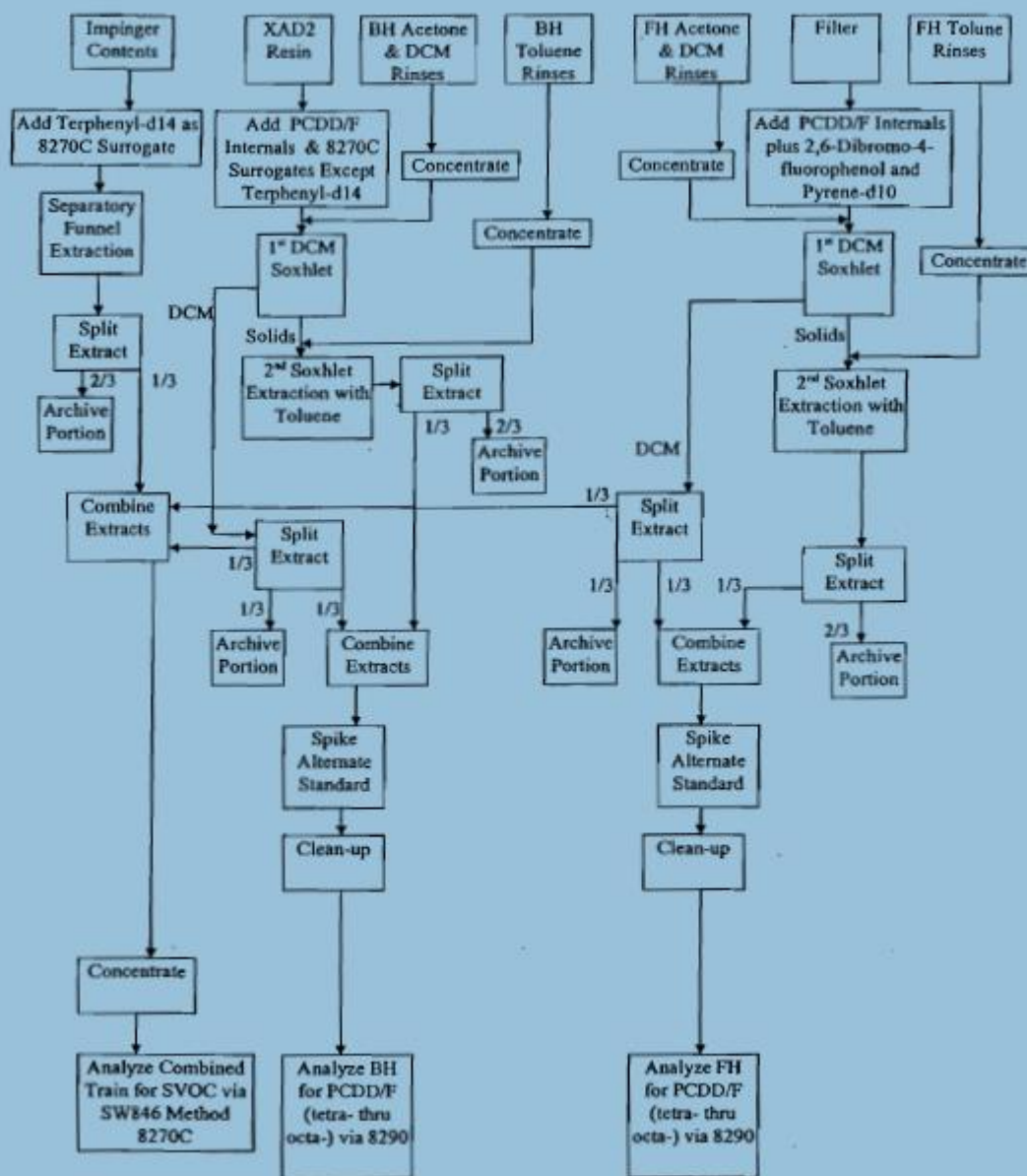


Conniesue B. Oldham, Ph.D., Group Leader
Measurement Technology Group

cc: Carol Lynes, EPA Region 2
Michael Klein, New Jersey Department of Environmental Protection

APPENDIX F
M23 sample and lab analysis chart

Typical Method 0010/Method 23 Sampling Train Analysis Flowchart:



APPENDIX G
Robin Segall and staff (EPA-RTP) emails

Blue Sky Environmental,

----- Forwarded Message -----

From: Dewees, Jason <dewees.jason@epa.gov>
To: Segall, Robin <segall.robin@epa.gov>; blueskyenvironmental@yahoo.com
<blueskyenvironmental@yahoo.com>
Cc: Shappley, Ned <shappley.ned@epa.gov>
Sent: Wednesday, March 18, 2020, 1:21:24 PM PDT
Subject: RE: M0061 Testing at 1600 Degrees F

I agree. I don't see a scenario that the 0061 methodology could be adapted for those temperatures.

Jason

From: Segall, Robin <Segall.Robin@epa.gov>
Sent: Wednesday, March 18, 2020 4:18 PM
To: blueskyenvironmental@yahoo.com
Cc: Dewees, Jason <Dewees.Jason@epa.gov>; Shappley, Ned <Shappley.Ned@epa.gov>
Subject: M0061 Testing at 1600 Degrees F

Guy,

After our discussion Monday, I went back to some past emails I had on M0061 testing at high temperatures. Based on those, I think it may be difficult to impossible to test at temperatures around 1600 F. You would have to use an air cooled probe and be able to get the gas coming into the probe cooled down enough so as not to vaporize the recirculating solution. Obviously keeping the recirculating solution as cold as possible would also be key. If you sampled at a single point close to the stack wall that would give you more probe outside the stack and help with cooling. As we discussed, you would need a quartz probe and likely teflon-lined impingers.

I am copying two of my colleagues that have conducted M0061 several times in the past and they may have some additional insights or may be able to confirm if it is not possible to run the method at these temperatures,

Robin

.

[Robin R. Segall](#) Senior Environmental Scientist

Measurement Technology Group|Office of Air Quality Planning & Standards

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