MARYLAND DEPARTMENT OF THE ENVIRONMENT

AIR AND RADIATION ADMINISTRATION
APPLICATION FOR A PERMIT TO CONSTRUCT

DOCKET #03-24

COMPANY:	Brandywine Green, LLC dba Agape Pet Services
LOCATION:	19712 Shepherdstown Pike Boonsboro, Maryland 21713
APPLICATION:	Installation of five (5) animal crematories to replace three (3) existing crematories.

ITEM	DESCRIPTION
1	Notice of Application and Opportunity to Request an Informational Meeting
2	Environmental Justice (EJ) Information - EJ Fact Sheet and MDE Score and Screening Report
3	Permit to Construct Application Forms - Form 5T, Form 10, Form 5EP, Form 27; Vendor/manufacturer specifications/guarantees; Evidence of Workman's Compensation Insurance; Process flow diagrams with emission points; Site plan including the location of the proposed source and property boundary; Material balance data and emissions calculations, testing data and modeling report
4	Zoning Approval

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

NOTICE OF APPLICATION AND
OPPORTUNITY TO REQUEST AN INFORMATIONAL MEETING

The Maryland Department of the Environment, Air and Radiation Administration (ARA) received a permit-to-construct application from Brandywine Green, LLC dba Agape Pet Services on February 26, 2024 for the installation of five animal crematories to replace three existing animal crematories. The proposed installation will be located at 19712 Shepherdstown Pike, Boonsboro, Maryland 21713.

In accordance with HB 1200/Ch. 588 of 2022, the applicant provided an environmental justice (EJ) Score for the census tract in which the project is located using the MDE EJ Screening Tool. The EJ Score, expressed as a statewide percentile, was shown to be 37.7%, which the Department has verified. This score considers three demographic indicators, minority population above 50%, poverty rate above 25% and limited English proficiency above 15%, to identify underserved communities. Multiple environmental health indicators are used to identify overburdened communities.

Copies of the application, the MDE EJ Screening Tool Report (which includes the score), and other supporting documents are available for public inspection on the Department's website at https://mde.maryland.gov/programs/Permits/AirManagementPermits/Pages/index.aspx (click on Docket Number 03-24). Any applicant-provided information regarding a description of the environmental and socioeconomic indicators contributing to that EJ score can also be found at the listed website. Such information has not yet been reviewed by the Department. A review of the submitted information will be conducted when the Department undertakes its technical review of all documents included in the application.

Pursuant to the Environment Article, Section 1-603, Annotated Code of Maryland, the Department will hold an informational meeting to discuss the application and the permit review process if the Department receives a written request for a meeting within 10 working days from the date of the second publication of this notice. A requested informational meeting will be held virtually using teleconference or internet-based conferencing technology unless a specific request for an in-person informational meeting is received. All requests for an informational meeting should be directed to the attention of Ms. Shannon Heafey, Air Quality Permits Program by email to shannon.heafey@maryland.gov or by mail to the Air and Radiation Administration, 1800 Washington Boulevard, Baltimore, Maryland 21230. Further information may be obtained by calling Ms. Shannon Heafey at 410-537-4433.

Christopher R. Hoagland, Director
Air and Radiation Administration

Maryland
Department of
the Environment

The Applicant's Guide to Environmental Justice and Permitting

What You Need to Know

This fact sheet is designed to provide guidance to applicants on incorporating environmental justice screening requirements pursuant to House Bill 1200, effective October 1, 2022.

What is Environmental Justice?

The concept behind the term environmental justice (EJ) is that regardless of race, color, national origin, or income, all Maryland residents and communities should have an equal opportunity to enjoy an enhanced quality of life. How to assess whether equal protection is being applied is the challenge.

Communities surrounded by a disproportionate number of polluting facilities puts residents at a higher risk for health problems from environmental exposures. It is important that residents who may be adversely affected by a proposed source be aware of the current environmental issues in their community in order to have meaningful involvement in the permitting process. Resources may be available from government and private entities to ensure that community health is not negatively impacted by a new source located in the community.

Extensive research has documented that health disparities exist between demographic groups in the United States, such as differences in mortality and morbidity associated with factors that include race/ethnicity, income, and educational attainment. House Bill 1200 adds to MDE's work incorporating diversity, equity and inclusion into our mission to help overburdened and underserved communities with environmental issues.

What is House Bill 1200 and what does it require?

Effective October 1, 2022, House Bill 1200 requires a person applying for a permit from the Department under §1-601 of the Environment Article of the Annotated Code of Maryland or any permit requiring public notice and participation to include in the application an EJ Score for the census tract where the applicant is seeking the permit; requiring the Department, on receiving a certain permit application to review the EJ Score; and requiring notices to include information related to EJ Scores and generally relating to environmental permits and environmental justice screenings.

What is a "Maryland EJ Tool"?

The term "Maryland EJ Tool" means a publicly available state mapping tool that allows users to: (1) explore layers of environmental justice concern; (2) determine an overall EJ score for census tracts in the state; and (3) view additional context layers relevant to an area. The MDE EJ Screening Tool is considered a Maryland EJ Tool.

What is an "EJ Score"?

The term "EJ Score" means an overall evaluation of an area's environment and environmental justice indicators, as defined by MDE in regulation, including: (1) pollution burden exposure; (2) pollution burden environmental effects; (3) sensitive populations; and (4) socioeconomic factors.

The MDE EJ Screening Tool considers three demographic indicators, minority population above 50%, poverty rate above 25% and limited English proficiency above 15%, to identify underserved communities, and multiple environmental health indicators to identify overburdened communities. The tool uses these indicators to calculate a

Final EJ Score Percentile, statewide. It is that score, linked to the census tract where the project is to be located, that needs to be reported to MDE as part of your permit application.

What does the application require?

The link for the MDE EJ Screening Tool is located on the Department's website, www.mde.maryland.gov. Click on the Environmental Justice header at the top of the Department's home page, then select EJ Screening Tool from the menu on the left. Click on Launch the EJ Screening Tool. After you open the tool, click okay on the opening screen. At the top right, please click the first button for the MDE Screening Report. Input the address of the proposed installation in the address bar. Click on the Report button. Once the report has been generated select the print icon and save it in a .pdf format.

The applicant needs to include the MDE Screening Report with the EJ Score from the MDE EJ Screening Tool as part of the permit application upon submission. An application will not be considered complete without the report.

The applicant is encouraged to provide the Department with a discussion about the environmental exposures in the community. This will provide pertinent information about how the applicant should proceed with engaging with the community. Residents of a community with a high indicator score and a high degree of environmental exposure should be afforded broader opportunities to participate in the permit process and understand the impacts a project seeking permit approval may have on them.

Questions

For air quality permits, please call 410-537-3230.
For water permits, please call 410-537-4145.
For land permits pertaining to Solid Waste, please call 410-537-3098. For land permits pertaining to Oil Control, please call 410-537-3483.
For land permits pertaining to Animal Feeding Operations, please call 410-537-4423.
For land permits pertaining to Biosolids, please call 410-537-3403.

MDE Screening Report

Area of Interest (AOI) Information

Area : 3.14 mi²

Feb 19 2024 17:06:49 Central Standard Time

Summary

Name	Count	Area(mi²)	Length(mi)
MDE Final EJ Score (%ile score)	2	3.14	N/A
Overburdened Communities Combined Score	2	3.14	N/A
Overburdened Pollution Environmental Score (%ile score)	2	3.14	N/A
Overburdened Exposure Score (%ile score)	2	3.14	N/A
Overburdened Sensitive Population (%ile score)	2	3.14	N/A
Socioeconomic/Demographic Score 2020 (Percentile score) (Underserved Community)	2	3.14	N/A
Air Emissions Facilities	1	N/A	N/A
Sulfur Dioxide (2010)	0	0	N/A
Ozone (2015)	1	3.14	N/A
Fine Particles (2012)	1	3.14	N/A
Biosolids FY 2020 and Current Permit Details	0	N/A	N/A
Biosolids FY2010 - 2014 Permit Details	0	N/A	N/A
Biosolids FY2009 Expired Permit Details	0	N/A	N/A
Biosolids FY 2020 and Current Permits Distribution By Acreage	1	3.14	N/A
Biosolids FY2015 - 2019 Permits Distribution By Acreage	1	3.14	N/A
Biosolids FY2010 - 2014 Permits Distribution By Acreage	1	3.14	N/A
Biosolids FY2009 Permits Expired Distribution By Acreage	1	3.14	N/A
Biosolids FY 2020 and Current Permit Distribution By Percent Coverage	1	3.14	N/A
Biosolids FY2015 - 2019 Permit Distribution By Percent Coverage	1	3.14	N/A
Biosolids FY2010 - 2014 Permit Distribution By Percent Coverage	1	3.14	N/A
Biosolids FY2009 Expired Permit Distribution By Percent Coverage	1	3.14	N/A

Concentrated Animal Feeding Operations (CAFOs)	0	N/A	N/A
Composting Facilities	0	N/A	N/A
Food Scrap Acceptors	0	N/A	N/A
Landfills	0	N/A	N/A
Correctional Facilities	0	N/A	N/A
Industrial Food Suppliers	0	N/A	N/A
Residential Colleges	0	N/A	N/A
Non-Residential Colleges	0	N/A	N/A
Hospitals	0	N/A	N/A
High Schools	0	N/A	N/A
Grocery Stores	0	N/A	N/A
10 Miles from Landfill	1	0.26	N/A
10 Miles from Composting Facility	0	0	N/A
General Composting Facilities Tier 2 (MD)	0	N/A	N/A
Commercial Anaerobic Digester (MD)	0	N/A	N/A
Out of State Facilities	0	N/A	N/A
30 mile buffer (Maryland)	1	3.14	N/A
30 Mile Buffer (Out of State)	0	0	N/A
Land Restoration Facilities	0	N/A	N/A
Determinations (points)	0	N/A	N/A
Determinations (areas)	0	0	N/A
Entities	0	N/A	N/A
Active Coal Mine Sites	0	N/A	N/A
Historic Mine Facilities	0	N/A	N/A
All Permitted Solid Waste Acceptance Facilities	1	N/A	N/A
Municipal Solid Waste Acceptance Facilities	0	N/A	N/A
Maryland Dam Locations	0	N/A	N/A
Maryland Pond Locations	1	N/A	N/A
Surface Water Intakes	0	N/A	N/A

Wastewater Discharge Facilities	1	N/A	N/A
Drinking Water	0	N/A	N/A
Clean Water	0	N/A	N/A

MDE Final EJ Score (%ile score)

#	Census tract identifier	Geographic Area Name	Total Population	Final EJ Score Percent (for this tract)	Final EJ Score Percentile (Distribution across Maryland)	Area(mi²)
1	24043011501	Census Tract 115.01, Washington County, Maryland	4508	27.73	37.73	2.91
2	24043011400	Census Tract 114, Washington County, Maryland	6516	26.75	32.40	0.22

Overburdened Communities Combined Score

#	GEOID20	Geographic_Area_Name	TotalPop	Overburd_Exposure_Percent	Overburd_Exposure_Percentile	Overburd_Poll_Enviro_Percent	Overburd_Poll_Enviro_Percentile	Sensitive_Population_Percent
1	24043011501	Census Tract 115.01, Washington County, Maryland	4,508	41.65	23.17	5.66	37.59	78.22
2	24043011400	Census Tract 114, Washington County, Maryland	6,516	39.70	13.94	5.61	37.39	66.08

#	Sensitive_Population_Percentile	OverburdenedAllPercent	OverburdenedAllPercentile	Area(mi²)
1	89.41	70.68	44.63	2.91
2	64.80	54.07	54.27	0.22

Overburdened Pollution Environmental Score (%ile score)

#	GEOID20	Geographic_Area_Name	RentalsOccupiedPre79Percent	Percentile	PercentRMP	PercentRMPEJ	PercentHazWaste	PercentHazWasteEJ
1	24043011501	Census Tract 115.01, Washington County, Maryland	12.52	51.54	1.52	2.13	0.40	2.18
2	24043011400	Census Tract 114, Washington County, Maryland	9.62	58.92	2.41	6.15	1.34	7.26

#	PercentSuperFundNPL	PercentSuperFundNPLEJ	PercentHazWW	PercentHazWWEJ	BrownFPercent	Percentile_1	PercentPowerPlants	Percentile_12
1	3.76	5.50	32.73	14.88	0.00	0.00	0.00	0.00
2	4.42	10.15	32.73	23.80	0.00	0.00	0.00	0.00

#	PercentCAFOS	Percentile_12_13	PercentActiveMines	Percentile_12_13_14	PollutionEnvironmentalPercent	PollnEnvironmentalPercentile	Area(mi²)
1	0.00	0.00	0.00	0.00	5.66	37.59	2.91
2	0.00	0.00	0.00	0.00	5.61	37.39	0.22

Overburdened Exposure Score (%ile score)

#	GEOID20	Geographic_Area_Name	Total_Pop	PercentNATA_Cancer	Percentile_NATA_Cancer	PercentNATA_Resp_HI	Percentile_NATA_Resp_HI	PercentNATA_Diesel
1	24043011501	Census Tract 115.01, Washington County, Maryland	4,508.00	60.00	9.46	60.00	6.25	16.09
2	24043011400	Census Tract 114, Washington County, Maryland	6,516.00	60.00	15.73	60.00	10.40	16.16

#	Percentile_NATA_Diesel	PercentNATA_PM25	PercentileNATA_PM25	PercentOzone	PercentileOzone	PercentTraffic	PercentileTraffic	PercentTRI
1	3.86	92.44	6.94	87.93	4.93	0.07	0.58	0.00
2	6.42	92.43	11.54	88.57	8.62	0.46	3.66	0.00

#	PercentileTRI	PercentHazWasteLF	Percentile_HazWasteLF	PollutionExposurePercent	PollutionExposurePercentile	Area(mi²)
1	0.00	16.67	95.49	41.65	23.17	2.91
2	0.00	0.00	0.00	39.70	13.94	0.22

Overburdened Sensitive Population (%ile score)

#	GEOID20	Geographic_Area_Name	PerAstma	PercentileAst	PerMyo	PercentileMyo	PerLow	PercentileLow
1	24043011501	Census Tract 115.01, Washington County, Maryland	90.73	87.15	90.53	85.10	39.87	50.10
2	24043011400	Census Tract 114, Washington County, Maryland	82.20	95.97	82.70	95.69	19.00	33.90

#	PercentBroad	PercentileBroad	PercentSens	PercentileSens	Area(mi²)
1	7.80	43.61	57.23	66.49	2.91
2	19.59	97.20	50.87	80.69	0.22

Socioeconomic/Demographic Score 2020 (Percentile score) (Underserved Community)

#	Census tract identifier	Geographic Area Name	Total Population	Percent Poverty	Percent Minority	Percent Limited English Proficiency	Demographic Score (Percent for this tract)	Demographic Score (Percentile Distribution acoss Maryland)	Area(mi²)
1	24043011501	Census Tract 115.01, Washington County, Maryland	4,508	16.40	2.75	0.00	6.38	5.28	2.91
2	24043011400	Census Tract 114, Washington County, Maryland	6,516	23.84	8.01	0.55	10.80	19.60	0.22

Air Emissions Facilities

#	Agency Interest ID	Facilty Name	Agency Interest Alt Name	Premises ID	Emission Year	Air Code	NAIC Code	NAIC Description
1	31943	Agape Pet Services	Agape Pet Services-31943	043-0468	2021	SOP	812,220	Cemeteries and Crematories

#	Physical Address	Physical City	Physical State	Physical Zip Code	County	Carbon Monoxide (CO)	Nitrous Oxide	Particulate Matter (PT)
1	19712 Shepherdstown Pike	Boonsboro	MD	21,713	Washington	12.50	15.13	3.36

#	Particulate Matter (10 Filterable)	Particulate Matter (2.5 Filterable)	PM Condensables	Volatile Organic Compounds (VOC)	Sulphur Dioxide (SOx)	Carbon Dioxide	Mercury	Methane
1	0.00	0.00	0.62	7.89	5.26	7,739.25	0.00	0.15

#	Billable Criteria Pollutants (BCRI)	Billiable Hazardous Pollutants (BHAP)	Total Billable and Non-Bilable Hazardous Air Pollutant Emissions (HAPS)	Count
1	28.90	0.00	0.00	1

Ozone (2015)

#	STATEFP10	COUNTYFP10	COUNTYNS10	GEOID10	NAME10	Ozone NAA Area	8-Hr Ozone (2015) Designation	8-HR Ozone (2015) Classification	8-Hr Ozone (2015) Status	Area(mi²)
1	24	043	01714220	24043	Washington	*No Data*	Attainment/Unclassifiable	*No Data*	*No Data*	3.14

Fine Particles (2012)

#	STATEFP10	COUNTYFP10	COUNTYNS10	GEOID10	NAME10	PM2.5 (2012) Status	Area(mi²)
1	24	043	01714220	24043	Washington	Attainment/Unclassifiable	3.14

Biosolids FY 2020 and Current Permits Distribution By Acreage

#	County Name	FY2020andAfter	Area(mi²)
1	Washington	158.10	3.14

Biosolids FY2015 - 2019 Permits Distribution By Acreage

#	County Name	FY2015to2019	Area(mi²)
1	Washington	97.30	3.14

Biosolids FY2010 - 2014 Permits Distribution By Acreage

#	County Name	FY2010to2014	Area(mi²)
1	Washington	289.10	3.14

Biosolids FY2009 Permits Expired Distribution By Acreage

#	County Name	FY2009	Area(mi²)
1	Washington	*No Data*	3.14

Biosolids FY 2020 and Current Permit Distribution By Percent Coverage

#	County Name	FY2020andAfter	Area(mi²)
1	Washington	158.10	3.14

Biosolids FY2015 - 2019 Permit Distribution By Percent Coverage

#	County Name	FY2015to2019	Area(mi²)
1	Washington	97.30	3.14

Biosolids FY2010 - 2014 Permit Distribution By Percent Coverage

#	County Name	FY2010to2014	Area(mi²)
1	Washington	289.10	3.14

Biosolids FY2009 Expired Permit Distribution By Percent Coverage

#	County Name	FY2009	Area(mi²)
1	Washington	*No Data*	3.14

10 Miles from Landfill

#	County	Type	Facility_N	ADDRESS	FILL	SITE__ACRE	AI_No_	Owner_Type
1	WASHINGTON	WRF	Washington Co. RubbleLandfill	11112 Kemps Mill Rd, Williamsport MD 21740.	75	100.00	23,096.00	CTY

#	MD_GRID__E	PERMITNUMB	EXPIRATION	Area(mi²)
1	568 /652	2014-WRF-0270	10/27/2019, 7:00 PM	0.26

30 mile buffer (Maryland)

#	Facility_Name_1	Facility_Contact_1	Contact_Phone	Contact_Email_1	Contact_2	Contact_2_Phone	Contact_2_Email	URL	Area(mi²)
1	Key City Compost at Utica Bridge Farm	Phil Westcott	(240) 608-0283	info@keycompost.com	*No Data*	*No Data*	*No Data*	https://www.keycompost.com/	3.14

All Permitted Solid Waste Acceptance Facilities

#	county	AI_ID	master_ai_name	Facility_Type	OwnerType	permit_number	ai_physical_address	permit_class	Count
1	Washington	31,943	Agape Pet Services	Transfer Station	Private (Commercial)	2015-WTS-0672	19712 Shepherdstown Pike, Boonsboro, MD 21713	New	1

Maryland Pond Locations

#	Facility Type	DAM HEIGHT	County	HAZARD CLASS	6 DIGIT WATERSHED	8 DIGIT WATERSHED	Count

Wastewater Discharge Facilities

#	AID	FAC_NAME	Comments	ValidateCo	GIS_Action	GIS_Comments	Corrective	ZipCodeCom
1	21,826	Boonsboro Lagoon-WWTL	*No Data*	Data Verified Accurate Against Federal HUC 8 Digit Watershed	*No Data*	*No Data*	*No Data*	*No Data*

#	CBSEG_92	BAY_TRIB	MD12DIG	County	MDMajorTrib	HUC	Tier2Catchments_yn	Tier2Catchments
1	POTTF_MD	02140502	021405020191	22	1	020700041008	0	*No Data*

#	Tier3Catchments_yn	Tier3Catchments	SSPRA_yn	SSPRA	Impaired_yn	Impaired	WQA_yn	WQA
1	0	*No Data*	0	*No Data*	1	Habitat, Nutrients(Phosphorous), Sediments, Stream Modification, Bacteria, Ions, (DO)	1	Nutrients

#	T3038Dig_yn	T3038Dig	TMDL8Dig_yn	TMDL8Dig	MHTArcheo_yn	MHTArcheo	Facility_Type	State_Num
1	1	Ions	1	Nutrients(Phosphorous), Sediments, Bacteria, (DO)	0	*No Data*	*No Data*	*No Data*

#	WatershedYear	WatershedQuarter	WatershedCode	WatershedName	SimplePermittingAction	PermitAge	CycleYear	PreDraftComplete
1	*No Data*	*No Data*	*No Data*	*No Data*	*No Data*	*No Data*	*No Data*	*No Data*

#	DatePreDraftComplete	DraftPermitCompleteBy	IssueBy	AppFee	Bill	Amount	DSCHG_RATE	SW_AUTH_ROD
1	*No Data*	*No Data*	*No Data*	*No Data*	0	0.00	0.00	0

#	P2_OR_C_Bay_2000	District	SurWellName	SurWellSource	SurWellDist	CommWellName	CommWellSource	CommWellDist
1	0	2A	*No Data*	*No Data*	-99.00	*No Data*	*No Data*	-99.00

#	CommWellProtect	Active	Include	ManualActive	Count
1	0	1	1	1	1

GATEWAY
Built on Trust

February 20, 2024

Air Quality Permits Program
Air and Radiation Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

Re: State Permit to Operate 043-0468 Amendment, Renewal, and Change of Ownership Application

Brandywine Green, LLC dba Agape Pet Services (Agape) respectfully submits this State Permit to Operate Permit Amendment, Renewal, and Change of Ownership Application to the Maryland Department of the Environment for Permit Number 043-0468.

Brandywine Green, LLC was previously named Agape Pet Services, LLC. Agape Pet Services, LLC took ownership of Agape Pet Services. The business is currently registered with the Secretary of State as Brandywine Green, LLC.

Agape is applying to renew Permit 043-0468 and increase the allowed throughput of pets. Agape is seeking to remove the three BLP750M5 machines on site and add 5 new machines.

We appreciate your consideration of this request. If you have any comments or concerns, please contact us at (316) 402-8265 or elarkin@gatewayservicesinc.com.

Sincerely,

Emily Larkin

Emily Larkin
Environmental Permitting Manager
Brandywine Green, LLC

Brandywine Green, LLC
Application Contents

SECTION I

AIR QUALITY PERMIT TO CONSTRUCT APPLICATION CHECKLIST

OWNER OF EQUIPMENT/PROCESS	
COMPANY NAME:	Brandywine Green LLC
COMPANY ADDRESS:	2 Daniels Way Cranston, RI 02921
LOCATION OF EQUIPMENT/PROCESS	
PREMISES NAME:	Agape Pet Services
PREMISES ADDRESS:	19712 Shepherdstown Pike Boonsboro MD 21713
CONTACT INFORMATION FOR THIS PERMIT APPLICATION	
CONTACT NAME:	Emily Larkin
JOB TITLE:	Environmental Permitting Manager
PHONE NUMBER:	316.402.8265
EMAIL ADDRESS:	elarkin@gatewayservicesinc.com
DESCRIPTION OF EQUIPMENT OR PROCESS	
Pet Crematory	

Application is hereby made to the Department of the Environment for a Permit to Construct for the following equipment or process as required by the State of Maryland Air Quality Regulation, COMAR 26.11.02.09.

Check each item that you have submitted as part of your application package.

☒ Application package cover letter describing the proposed project

☒ Complete application forms (Note the number of forms included or NA if not applicable.)

No. NA Form 5
No. X Form 5T
No. X Form 5EP
No. NA Form 6
No. X Form 10

No. NA Form 11
No. NA Form 41
No. NA Form 42
No. NA Form 44

☒ Vendor/manufacturer specifications/guarantees

☒ Evidence of Workman's Compensation Insurance

☒ Process flow diagrams with emission points

☒ Site plan including the location of the proposed source and property boundary

☒ Material balance data and all emissions calculations

☐ Material Safety Data Sheets (MSDS) or equivalent information for materials processed and manufactured.

☐ Certificate of Public Convenience and Necessity (CPCN) waiver documentation from the Public Service Commission (1)

☒ Documentation that the proposed installation complies with local zoning and land use requirements (2)

(1) Required for emergency and non-emergency generators installed on or after October 1, 2001 and rated at 2001 kW or more.

(2) Required for applications subject to Expanded Public Participation Requirements.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Management Administration ▪ Air Quality Permits Program
1800 Washington Blvd ▪ Baltimore, Maryland 21230
(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

APPLICATION FOR FUEL BURNING EQUIPMENT

Information Regarding Public Outreach

For Air Quality Permit to Construct applications subject to public review, applicants should consider the following information in the initial stages of preparing a permit application.

If you are not sure at the time you are applying for a permit whether public review of your application is required or for information on steps you can take to engage the surrounding community where your planned project will be located, please contact the Air Quality Permits Program at 410-537-3225 and seek their advice.

Communicating and engaging the local community as early as possible in your planning and development process is an important aspect of your project and should be considered a priority. Environmental Justice or "EJ" is a movement to inform, involve, and engage communities impacted by potential and planned environmental projects by affording citizens opportunities to learn about projects and discuss any concerns regarding impacts.

Although some permit applications are subject to a formal public review process prescribed by statute, the Department strongly encourages you to engage neighboring communities separate from and well ahead of the formal permitting process. Sharing your plans by way of community meetings, informational outreach at local gatherings or through local faith-based organizations can initiate a rewarding and productive dialogue that will reduce anxiety and establish a permanent link with your neighbors in the community.

All parties benefit when there is good communication. The Department can assist applicants in developing an outreach plan that fits the needs of both the company and the public.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Blvd ▪ Baltimore, Maryland 21230
(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

Air and Radiation Management Administration ▪ Air Quality Permits Program

Application for Incinerators

Permit to Construct ☒ Registration ☐

1. Owner of Installation or Company Name: Brandywine Green, LLC

Date of Application: 1/8/2024

Mailing Address: 2 Daniels Way RI

Telephone: 226.962.0718

City: Cranston State: RI Zip Code: 02921

2A. Premises Name if Different from Above: Agape Pet Services

2B. Incinerator Location if Different From Above (give Street Address, City, County and Zip Code):
19712 Shepherdstown Pike Boonsboro MD 21713

3. Owner, Agent or Authorized Company Official
Kevin Beveridge
(Print/Type Name)

(Signature)
2 Daniels Way, Cranston, RI, 02921
(Mailing Address, City/Town, State, Zip Code)

4A. New Construction Only
Begin June 1, 2024
Date Construction Completed ____________

4B. Existing Installation Initial Operation Date ____________
(14-15)

DO NOT WRITE IN THIS SPACE

Date Rec. Local Date Red. State

Acknowledgement Sent
Date ____________
By ____________

Reviewed
Name ____________
Date ____________

Local
State

Returned to Local Jurisdiction
Date ____________
By ____________

Application Returned to Applicant
Date ____________
By ____________

Premises Number
☐☐ ☐☐☐☐
1 2 3 4 5 6

Registration Number
☐ ☐☐☐☐ ☐☐
7 8 9 10 11 12 13

5. Installation or Contractor (New or Replacement Only)
Matthews Environmental
(Name or Company Title)
2045 Spirit Blvd, Apopka, FL, 32707
(Mailing Address, City/Town, State, Zip Code, Telephone Number)

6. Equipment Manufacturer: Matthews
Manufacturer's Serial or Catalog No.: IEB PPJr, SN TBD

7. Total Number of Incinerators of Identical Design and Capacity at this Location: 1

8. Major Activity at this Location-Auto Dealer, Hospital, Apartment House, etc.
Pet Crematorium

9. Rated Capacity of Incinerator in lb/hr:
__75__________ 16-19

10. Incinerator Type (Mark only one with X)
Single Chamber ☐ 20-1 Multiple Chamber ☒ 20-2 Auxiliary Burner ☐ 21 Other ☐ 22 ____________ Specify

11. Frequency of Burning
Hours/Day 2 4 (23 24) Days/Year 3 6 5 (25 26 27)

12. Amount of Waste Burned Per Operating Day: 1800
____________ ☐ 32-1 U☑ 32-2 tons ☐ 32-3 lbs. gal.

13. Method of Charging Waste into Unit: Manual ☒ Automatic ☐

14. Type of Waste/Refuse Incinerated. Mark major type with ✗ -- all others with Check ✓.

Trash 100% Dry ☐	Refuse 20% Garbage ☐	Refuse 50% Garbage ☐	Garbage ☐	Animal or Animal Parts ☒	Municipal Refuse ☐	Infectious/ Pathological ☐
33	34	35	36	37	38	39

Does this waste contain Carcinogenic or Toxic Material? Y/N N

Industrial Process Waste ☐ 40 ______________

Other ☐ 41 _____ ________

15. Total Annual Auxiliary Fuels Used

Oil ______________ (gallons) ______________ Natural Gas ______________ (ft^3)
42-47 (Grade) 48 49-55

LP Gas 191,576 (gallons) Other ☐ ______________ specify fuel & units required
56-59 90-92

16. Stack Information: Height Above Ground (ft) 21 Inside Diameter at Top (in) 20
94-96 97-99

Exit Temperature (°F) 1100 Gas Exit Velocity (ft/min) 0.33
100-103 104-107

17. Emission Control Devices

Gas Cleaning Form AMA-6 Must be Completed for Each Device Used and Attached to this Application.

None ☐	Settling Chamber or Baffles ☐	Simple Cyclone ☐	Multiple Cyclone ☐	Scrubber ☐	Venturi Scrubber ☐	Electrostatic Precipitator ☐	Bag-house ☐	After-burner ☑
108	109	110	111	112	113	114	115	116

Other ☐ ______________ 117-118 Specify Type

DO NOT WRITE BELOW THIS LINE

18. Actual Stack Emissions in Pounds per Operating Day

Particulate Matter ☐☐☐☐☐☐ 119 124 Oxides of Sulfur ☐☐☐☐☐☐ 125 130 Oxides of Nitrogen ☐☐☐☐☐☐ 131 136

Carbon Monoxide ☐☐☐☐☐☐ 137 142 Volatile Organic Compounds ☐☐☐☐☐☐ 143 148

Other Pollutants Specify ______________ Type/Amount

19. Inventory Date ☐☐☐☐ 180 183

20. Method Used to Determine Emissions

	Estimate	Emission Factor	Stack Test	Other
Particulate matter	☐ 184-1	☐ -2	☐ -3	☐ -4
Oxides of Nitrogen	☐ 186-1	☐ -2	☐ -3	☐ -4
Volatile Organics	☐ 188-1	☐ -2	☐ -3	☐ -4
Oxides of Sulfur	☐ 185-1	☐ -2	☐ -3	☐ -4
Carbon Monoxide	☐ 187-1	☐ -2	☐ -3	☐ -4

21. Premises Information Premises Name ______________

Census Tract ☐☐☐☐☐☐ 243 248 SIC No. ☐☐☐☐ 249 252 MD Grid East ☐☐☐☐ 253 256 MD Grid North ☐☐☐ 257 259

Owner	Private	Local	State	Federal
	☐ 260-0	☐ 260-1	☐ 260-2	☐ 260-3

Date Completed ______________

Completed By ______________

AIR QUALITY PERMIT TO CONSTRUCT APPLICATION CHECKLIST

OWNER OF EQUIPMENT/PROCESS	
COMPANY NAME:	Brandywine Green LLC
COMPANY ADDRESS:	2 Daniels Way Cranston, RI 02921
LOCATION OF EQUIPMENT/PROCESS	
PREMISES NAME:	Agape Pet Services
PREMISES ADDRESS:	19712 Shepherdstown Pike Boonsboro MD 21713
CONTACT INFORMATION FOR THIS PERMIT APPLICATION	
CONTACT NAME:	Emily Larkin
JOB TITLE:	Environmental Permitting Manager
PHONE NUMBER:	316.402.8265
EMAIL ADDRESS:	elarkin@gatewayservicesinc.com
DESCRIPTION OF EQUIPMENT OR PROCESS	
Pet Crematory	

Application is hereby made to the Department of the Environment for a Permit to Construct for the following equipment or process as required by the State of Maryland Air Quality Regulation, COMAR 26.11.02.09.

Check each item that you have submitted as part of your application package.

☒ Application package cover letter describing the proposed project

☒ Complete application forms (Note the number of forms included or NA if not applicable.)

No. NA Form 5
No. X Form 5T
No. X Form 5EP
No. NA Form 6
No. X Form 10
No. NA Form 11
No. NA Form 41
No. NA Form 42
No. NA Form 44

☒ Vendor/manufacturer specifications/guarantees

☒ Evidence of Workman's Compensation Insurance

☒ Process flow diagrams with emission points

☒ Site plan including the location of the proposed source and property boundary

☒ Material balance data and all emissions calculations

☐ Material Safety Data Sheets (MSDS) or equivalent information for materials processed and manufactured.

☐ Certificate of Public Convenience and Necessity (CPCN) waiver documentation from the Public Service Commission (1)

☒ Documentation that the proposed installation complies with local zoning and land use requirements (2)

(1) Required for emergency and non-emergency generators installed on or after October 1, 2001 and rated at 2001 kW or more.

(2) Required for applications subject to Expanded Public Participation Requirements.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Management Administration ▪ Air Quality Permits Program
1800 Washington Blvd ▪ Baltimore, Maryland 21230
(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

APPLICATION FOR FUEL BURNING EQUIPMENT

Information Regarding Public Outreach

For Air Quality Permit to Construct applications subject to public review, applicants should consider the following information in the initial stages of preparing a permit application.

If you are not sure at the time you are applying for a permit whether public review of your application is required or for information on steps you can take to engage the surrounding community where your planned project will be located, please contact the Air Quality Permits Program at 410-537-3225 and seek their advice.

Communicating and engaging the local community as early as possible in your planning and development process is an important aspect of your project and should be considered a priority. Environmental Justice or "EJ" is a movement to inform, involve, and engage communities impacted by potential and planned environmental projects by affording citizens opportunities to learn about projects and discuss any concerns regarding impacts.

Although some permit applications are subject to a formal public review process prescribed by statute, the Department strongly encourages you to engage neighboring communities separate from and well ahead of the formal permitting process. Sharing your plans by way of community meetings, informational outreach at local gatherings or through local faith-based organizations can initiate a rewarding and productive dialogue that will reduce anxiety and establish a permanent link with your neighbors in the community.

All parties benefit when there is good communication. The Department can assist applicants in developing an outreach plan that fits the needs of both the company and the public.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Blvd ▪ Baltimore, Maryland 21230
(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

Air and Radiation Management Administration ▪ Air Quality Permits Program

Application for Incinerators

Permit to Construct ☒ Registration ☐

1. Owner of Installation or Company Name Brandywine Green, LLC	Date of Application 1/8/2024
Mailing Address 2 Daniels Way RI	Telephone 226.962.0718
City Cranston State RI Zip Code 02921	

2A. Premises Name if Different from Above
Agape Pet Services

2B. Incinerator Location if Different From Above (give Street Address, City, County and Zip Code):
19712 Shepherdstown Pike Boonsboro MD 21713

3. Owner, Agent or Authorized Company Official
Kevin Beveridge
(Print/Type Name)
Kevin B Beveridge
(Signature)
2 Daniels Way, Cranston, RI, 02921
(Mailing Address, City/Town, State, Zip Code)

4A. New Construction Only
Begin June 1, 2024
Date Construction Completed

4B. Existing Installation Initial Operation Date
(14-15)

DO NOT WRITE IN THIS SPACE

Date Rec. Local Date Red. State

Acknowledgement Sent
Date
By

Reviewed
Name
Date

Local
State

Returned to Local Jurisdiction
Date
By

Application Returned to Applicant
Date
By

Premises Number
☐☐ ☐☐☐☐
1 2 3 4 5 6
Registration Number
☐ ☐☐☐☐ ☐☐
7 8 9 10 11 12 13

5. Installation or Contractor (New or Replacement Only)
Matthews Environmental
(Name or Company Title)
2045 Spirit Blvd, Apopka, FL, 32707
(Mailing Address, City/Town, State, Zip Code, Telephone Number)

6. Equipment Manufacturer
Therm Tec

Manufacturer's Serial or Catalog No.
S18P6, SN TBD

7. Total Number of Incinerators of Identical Design and Capacity at this Location: 1

8. Major Activity at this Location-Auto Dealer, Hospital, Apartment House, etc.
Pet Crematorium

9. Rated Capacity of Incinerator in lb/hr: 300
16-19

10. Incinerator Type (Mark only one with X)
Single Chamber ☐ 20-1 Multiple Chamber ☒ 20-2 Auxiliary Burner ☐ 21 Other ☐ 22 Specify

11. Frequency of Burning
Hours/Day 2 4 (23 24) Days/Year 3 6 5 (25 26 27)

12. Amount of Waste Burned Per Operating Day: 7200
Units: tons ☐ 32-1 lbs. ☑ 32-2 gal. ☐ 32-3

13. Method of Charging Waste into Unit: Manual ☒ Automatic ☐

14. Type of Waste/Refuse Incinerated. Mark major type with ✗ -- all others with Check ✓.

Trash 100% Dry ☐ 33
Refuse 20% Garbage ☐ 34
Refuse 50% Garbage ☐ 35
Garbage ☐ 36
Animal or Animal Parts ☒ 37
Municipal Refuse ☐ 38
Infectious/ Pathological ☐ 39

Does this waste contain Carcinogenic or Toxic Material? Y/N N
Industrial Process Waste ☐ 40 ________
Other ☐ 41 ________

15. Total Annual Auxiliary Fuels Used
Oil ________ 42-47 (gallons) ________ (Grade) 48
Natural Gas ________ 49-55 (ft^3)
LP Gas 459,782 56-59 (gallons)
Other ☐ ________ 90-92 specify fuel & units required

16. Stack Information: Height Above Ground (ft) 21 94-96
Inside Diameter at Top (in) 36 97-99
Exit Temperature (°F) 1100 100-103
Gas Exit Velocity (ft/min) 0.33 104-107

17. Emission Control Devices
Gas Cleaning Form AMA-6 Must be Completed for Each Device Used and Attached to this Application.

None ☐ 108
Settling Chamber or Baffles ☐ 109
Simple Cyclone ☐ 110
Multiple Cyclone ☐ 111
Scrubber ☐ 112
Venturi Scrubber ☐ 113
Electrostatic Precipitator ☐ 114
Bag-house ☐ 115
After-burner ☑ 116

Other ☐ ________ 117-118 Specify Type

DO NOT WRITE BELOW THIS LINE

18. Actual Stack Emissions in Pounds per Operating Day
Particulate Matter ☐☐☐☐☐☐ 119 124
Oxides of Sulfur ☐☐☐☐☐☐ 125 130
Oxides of Nitrogen ☐☐☐☐☐☐ 131 136
Carbon Monoxide ☐☐☐☐☐☐ 137 142
Volatile Organic Compounds ☐☐☐☐☐☐ 143 148

Other Pollutants Specify ________ Type/Amount

19. Inventory Date ☐☐☐☐ 180 183

20. Method Used to Determine Emissions

	Estimate	Emission Factor	Stack Test	Other
Particulate matter	☐ 184-1	☐ -2	☐ -3	☐ -4
Oxides of Nitrogen	☐ 186-1	☐ -2	☐ -3	☐ -4
Volatile Organics	☐ 188-1	☐ -2	☐ -3	☐ -4
Oxides of Sulfur	☐ 185-1	☐ -2	☐ -3	☐ -4
Carbon Monoxide	☐ 187-1	☐ -2	☐ -3	☐ -4

21. Premises Information Premises Name ________
Census Tract ☐☐☐☐☐☐ 243 248
SIC No. ☐☐☐☐ 249 252
MD Grid East ☐☐☐☐ 253 256
MD Grid North ☐☐☐ 257 259

Owner
Private ☐ 260-0
Local ☐ 260-1
State ☐ 260-2
Federal ☐ 260-3

Date Completed ________
Completed By ________

AIR QUALITY PERMIT TO CONSTRUCT APPLICATION CHECKLIST

OWNER OF EQUIPMENT/PROCESS	
COMPANY NAME:	Brandywine Green LLC
COMPANY ADDRESS:	2 Daniels Way Cranston, RI 02921
LOCATION OF EQUIPMENT/PROCESS	
PREMISES NAME:	Agape Pet Services
PREMISES ADDRESS:	19712 Shepherdstown Pike Boonsboro MD 21713
CONTACT INFORMATION FOR THIS PERMIT APPLICATION	
CONTACT NAME:	Emily Larkin
JOB TITLE:	Environmental Permitting Manager
PHONE NUMBER:	316.402.8265
EMAIL ADDRESS:	elarkin@gatewayservicesinc.com
DESCRIPTION OF EQUIPMENT OR PROCESS	
Pet Crematory	

Application is hereby made to the Department of the Environment for a Permit to Construct for the following equipment or process as required by the State of Maryland Air Quality Regulation, COMAR 26.11.02.09.

Check each item that you have submitted as part of your application package.

☒ Application package cover letter describing the proposed project

☒ Complete application forms (Note the number of forms included or NA if not applicable.)

No. NA Form 5
No. X Form 5T
No. X Form 5EP
No. NA Form 6
No. X Form 10
No. NA Form 11
No. NA Form 41
No. NA Form 42
No. NA Form 44

☒ Vendor/manufacturer specifications/guarantees

☒ Evidence of Workman's Compensation Insurance

☒ Process flow diagrams with emission points

☒ Site plan including the location of the proposed source and property boundary

☒ Material balance data and all emissions calculations

☐ Material Safety Data Sheets (MSDS) or equivalent information for materials processed and manufactured.

☐ Certificate of Public Convenience and Necessity (CPCN) waiver documentation from the Public Service Commission (1)

☒ Documentation that the proposed installation complies with local zoning and land use requirements (2)

(1) Required for emergency and non-emergency generators installed on or after October 1, 2001 and rated at 2001 kW or more.

(2) Required for applications subject to Expanded Public Participation Requirements.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
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(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

APPLICATION FOR FUEL BURNING EQUIPMENT

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Communicating and engaging the local community as early as possible in your planning and development process is an important aspect of your project and should be considered a priority. Environmental Justice or "EJ" is a movement to inform, involve, and engage communities impacted by potential and planned environmental projects by affording citizens opportunities to learn about projects and discuss any concerns regarding impacts.

Although some permit applications are subject to a formal public review process prescribed by statute, the Department strongly encourages you to engage neighboring communities separate from and well ahead of the formal permitting process. Sharing your plans by way of community meetings, informational outreach at local gatherings or through local faith-based organizations can initiate a rewarding and productive dialogue that will reduce anxiety and establish a permanent link with your neighbors in the community.

All parties benefit when there is good communication. The Department can assist applicants in developing an outreach plan that fits the needs of both the company and the public.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

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(410) 537-3230 ▪ 1-800-633-6101 ▪ www.mde.state.md.us

Air and Radiation Management Administration ▪ Air Quality Permits Program

Application for Incinerators

Permit to Construct ☒ Registration ☐

1. Owner of Installation or Company Name
Brandywine Green, LLC

Date of Application
1/8/2024

Mailing Address
2 Daniels Way RI

Telephone
226.962.0718

City
Cranston

State
RI

Zip Code
02921

2A. Premises Name if Different from Above
Agape Pet Services

2B. Incinerator Location if Different From Above (give Street Address, City, County and Zip Code):
19712 Shepherdstown Pike Boonsboro MD 21713

3. Owner, Agent or Authorized Company Official
Kevin Beveridge
(Print/Type Name)
Kevin B Beveridge
(Signature)
2 Daniels Way, Cranston, RI, 02921
(Mailing Address, City/Town, State, Zip Code)

4A. New Construction Only
Begin June 1, 2024
Date Construction
Completed____________

4B. Existing Installation
Initial Operation Date
____
(14-15)

DO NOT WRITE IN THIS SPACE

Date Rec. Local Date Red. State

Acknowledgement Sent
Date____________
By____________

Reviewed
Name____________
Date____________

Local
State

Returned to Local Jurisdiction
Date____________
By____________

Application Returned to Applicant
Date____________
By____________

Premises Number
☐☐ ☐☐☐☐
1 2 3 4 5 6

Registration Number
☐ ☐☐☐☐ ☐☐
7 8 9 10 11 12 13

5. Installation or Contractor (New or Replacement Only)
Matthews Environmental
(Name or Company Title)
2045 Spirit Blvd, Apopka, FL, 32707
(Mailing Address, City/Town, State, Zip Code, Telephone Number)

6. Equipment Manufacturer
Matthews

Manufacturer's Serial or Catalog No.
IEB 56, SN TBD

7. Total Number of Incinerators of Identical Design and Capacity at this Location: 0

8. Major Activity at this Location-Auto Dealer, Hospital, Apartment House, etc.
Pet Crematorium

9. Rated Capacity of Incinerator in lb/hr: 400
16-19

10. Incinerator Type (Mark only one with X)
Single Chamber ☐ 20-1 Multiple Chamber ☒ 20-2 Auxiliary Burner ☐ 21 Other ☐ 22 ____________ Specify

11. Frequency of Burning
Hours/Day 2 4 (23 24) Days/Year 3 6 5 (25 26 27)

12. Amount of Waste Burned Per Operating Day: 9600
Units: tons ☐ 32-1 lbs. ☑ 32-2 gal. ☐ 32-3

13. Method of Charging Waste into Unit: Manual ☒ Automatic ☐

14. Type of Waste/Refuse Incinerated. Mark major type with ✗ -- all others with Check ✓.

Trash 100% Dry ☐ 33
Refuse 20% Garbage ☐ 34
Refuse 50% Garbage ☐ 35
Garbage ☐ 36
Animal or Animal Parts ☒ 37
Municipal Refuse ☐ 38
Infectious/ Pathological ☐ 39

Does this waste contain Carcinogenic or Toxic Material? Y/N N
Industrial Process Waste ☐ 40 ____________
Other ☐ 41 ______ ________

---

15. Total Annual Auxiliary Fuels Used

Oil ____________ 42-47 (gallons) ____________ (Grade) 48
Natural Gas ____________ 49-55 (ft^3)
LP Gas 431,046 56-59 (gallons)
Other ☐ ____________ 90-92 specify fuel & units required

---

16. Stack Information: Height Above Ground (ft) 21 94-96
Inside Diameter at Top (in) 20 97-99
Exit Temperature (°F) 1100 100-103
Gas Exit Velocity (ft/min) 0.33 104-107

---

17. Emission Control Devices

Gas Cleaning Form AMA-6 Must be Completed for Each Device Used and Attached to this Application.

None ☐ 108
Settling Chamber or Baffles ☐ 109
Simple Cyclone ☐ 110
Multiple Cyclone ☐ 111
Scrubber ☐ 112
Venturi Scrubber ☐ 113
Electrostatic Precipitator ☐ 114
Bag-house ☐ 115
After-burner ☑ 116

Other ☐ ____________ 117-118 Specify Type

DO NOT WRITE BELOW THIS LINE

18. Actual Stack Emissions in Pounds per Operating Day

Particulate Matter ☐☐☐☐☐☐ 119 124
Oxides of Sulfur ☐☐☐☐☐☐ 125 130
Oxides of Nitrogen ☐☐☐☐☐☐ 131 136
Carbon Monoxide ☐☐☐☐☐☐ 137 142
Volatile Organic Compounds ☐☐☐☐☐☐ 143 148

Other Pollutants Specify ____________ Type/Amount

---

19. Inventory Date ☐☐☐☐ 180 183

---

20. Method Used to Determine Emissions

	Estimate	Emission Factor	Stack Test	Other
Particulate matter	☐ 184-1	☐ -2	☐ -3	☐ -4
Oxides of Nitrogen	☐ 186-1	☐ -2	☐ -3	☐ -4
Volatile Organics	☐ 188-1	☐ -2	☐ -3	☐ -4
Oxides of Sulfur	☐ 185-1	☐ -2	☐ -3	☐ -4
Carbon Monoxide	☐ 187-1	☐ -2	☐ -3	☐ -4

---

21. Premises Information Premises Name ____________

Census Tract ☐☐☐☐☐☐ 243 248
SIC No. ☐☐☐☐ 249 252
MD Grid East ☐☐☐☐ 253 256
MD Grid North ☐☐☐ 257 259

Owner Private ☐ 260-0 Local ☐ 260-1 State ☐ 260-2 Federal ☐ 260-3

Date Completed ____________
Completed By ____________

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Blvd ● Baltimore, Maryland 21230
(410) 537-3230 ● 1-800-633-6101 ● www.mde.state.md.us

Air and Radiation Management Administration ● Air Quality Permits Program

Application for Permit to Operate Incinerators

1. Premise Identification:

Agape Pet Services
Premise Name or Identification

043-0468
Premise Number

19712 Shepherdstown Pike	Boonsboro	MD	21713	Washington
Premise Address	City	State	Zip	County

2. Equipment Identification

Unit	Type Equipment (By-product waste, municipal, etc.)	lbs/hr (design)	Registration #
1	Renew and change ownership of existing permit. Upon approval and installation of new equipment Reg # 41, 42, and 43 will be removed from the site.	240 350 200	043-0468-2-0039 043-0468-2-0040 043-0468-2-0041
2		200 200	043-0468-2-0042 043-0468-2-0043

3. Amount and Description of Waste Being Incinerated

Unit	Amount (tons/yr)	Description of Waste
1	795 tons/year currently permitted sitewide.	Deceased pets in their containers
2	Seeking approval to increase throughput.	

4. Description of Air Pollution Control Device

Unit	Type of Control Device	Grain Loading (at 12% CO_2)
1	Secondary chamber at a minimum of 1600 degrees fahrenheit	
2		

Signature Kevin B Beveridge

Title VP Central Services

Date **02/22/24**

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Suite 720 • Baltimore, Maryland 21230-1720
410-537-3000 • 800-633-6101 • https://mde.maryland.gov/

Air and Radiation Administration • Air Quality Permits Program

Budget Reconciliation and Financing Act of 2003
(Commonly referred as Maryland House Bill 935)

On July 1, 2003, House Bill 935, Chapter 203 amended § 1-203 of the Environment Article, Annotated Code of Maryland, as follows:

Section 1-203(b).
(1) A license or permit is considered renewed for purposes of this subsection if the license or permit is issued by a unit of State government to a person for the period immediately following a period for which the person previously possessed the same or a substantially similar license.
(2) Before any license or permit may be renewed under this article, **the issuing authority shall verify through the office of the Comptroller (emphasis added)** that the applicant has paid all undisputed taxes and the unemployment insurance contributions payable to the Comptroller or the Secretary of Labor, Licensing, and Regulation or that the applicant has provided for payment in a manner satisfactory to the unit responsible for collection.

In order for the Maryland Department of the Environment (MDE) to verify this compliance, we would need you to provide the following information before we can process or issue your renewal license, permit, or certification:

Current MDE License/Permit No.: 043-0468

Name of Licensee or Permit Holder: Brandywine Green, LLC

Address: 19712 Shepherdstown Pike
Boonsboro MD 21713

Contact Name: Kevin Beveridge **Title:** VP Central Services

Contact Telephone Number: 226.962.0718

Contact Email: kbeveridge@gatewayservicesinc.com

Privacy Act Notice: This Notice is provided pursuant to the Federal Privacy Act of 1974, 5 U.S.C. § 552a. Disclosure of your Social Security or Federal Tax Identification on this form is mandatory pursuant to the provisions of § 1-203 (2003) of Environment Article, Annotated Code of Maryland, which requires MDE to verify that an applicant for a permit or license has paid all undisputed taxes and unemployment insurance. Social Security and Federal Tax Identification Nos. will not be used for any purposes other than those described in this Notice.

Federal Employer Identification Number (FEIN): 23-2855315

Certification: I certify that the above information is true and correct to the best of my knowledge.

Kevin B Beveridge
Signature

02/22/24
Date

Complete and return this form to the above address. If you have any questions, please contact our office at (410) 537-3230.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

Air and Radiation Management Administration ● Air Quality Permits Program
1800 Washington Boulevard ● Baltimore, Maryland 21230
(410)537-3225 ● 1-800-633-6101● www.mde.maryland.gov

FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Brandywine Green LLC

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
IEB56

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
Matthews IEB56 Pet Crematory

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	18	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52	Fall Percent	

4. Emission Point Information

Height above ground (ft):	20	Length and width dimensions at top of rectangular stack (ft):	Length:		Width:
Height above structures (ft):	3				
Exit temperature (ºF):	1100	Inside diameter at top of round stack (ft):			1.67
Exit velocity (ft/min):	20	Distance from emission point to nearest property line (ft):			227
Exhaust gas volumetric flow rate (acfm):	4687	Building dimensions if emission point is located on building (ft)	Height 14	Length 72	Width 69

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. ______

☐ Cyclone No. ______

☐ Elec. Precipitator (ESP) No. ______

☐ Dust Suppression System No. ______

☐ Venturi Scrubber No. ______

☐ Spray Tower/Packed Bed No. ______

☐ Carbon Adsorber No. ______

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. ______

- ☐ Regenerative

☐ Catalytic Oxidizer No. ______

☐ Nitrogen Oxides Reduction No. ______

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. ______
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	See attached			
Particulate Matter (filterable as PM2.5)				
Particulate Matter (condensables)				
Volatile Organic Compounds (VOC)				
Oxides of Sulfur (SOx)				
Oxides of Nitrogen (NOx)				
Carbon Monoxide (CO)				
Lead (Pb)				

Greenhouse Gases (GHG)	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Carbon Dioxide (CO_2)				
Methane (CH_4)				
Nitrous Oxide (N_2O)				
Hydrofluorocarbons (HFCs)				
Perfluorocarbons (PFCs)				
Sulfur Hexafluoride (SF6)				
Total GHG (as CO_2e)				

List individual federal Hazardous Air Pollutants (HAP) below:	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)

(Attach additional sheets as necessary.)

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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Brandywine Green LLC

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:

S18P6 A

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:

ThermTec S18P6 Pet Crematory

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	18	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52	Fall Percent	

4. Emission Point Information

Height above ground (ft):	20	Length and width dimensions at top of rectangular stack (ft):	Length:		Width:
Height above structures (ft):	3				
Exit temperature (ºF):	1100	Inside diameter at top of round stack (ft):			3
Exit velocity (ft/min):	20	Distance from emission point to nearest property line (ft):			180
Exhaust gas volumetric flow rate (acfm):	4687	Building dimensions if emission point is located on building (ft)	Height 14	Length 60	Width 40

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. ______

☐ Cyclone No. ______

☐ Elec. Precipitator (ESP) No. ______

☐ Dust Suppression System No. ______

☐ Venturi Scrubber No. ______

☐ Spray Tower/Packed Bed No. ______

☐ Carbon Adsorber No. ______

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. ______

- ☐ Regenerative

☐ Catalytic Oxidizer No. ______

☐ Nitrogen Oxides Reduction No. ______

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. ______
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	See attached			
Particulate Matter (filterable as PM2.5)				
Particulate Matter (condensables)				
Volatile Organic Compounds (VOC)				
Oxides of Sulfur (SOx)				
Oxides of Nitrogen (NOx)				
Carbon Monoxide (CO)				
Lead (Pb)				

Greenhouse Gases (GHG)	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Carbon Dioxide (CO_2)				
Methane (CH_4)				
Nitrous Oxide (N_2O)				
Hydrofluorocarbons (HFCs)				
Perfluorocarbons (PFCs)				
Sulfur Hexafluoride (SF6)				
Total GHG (as CO_2e)				

List individual federal Hazardous Air Pollutants (HAP) below:	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)

(Attach additional sheets as necessary.)

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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Brandywine Green LLC

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
S18P6 B

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
ThermTec S18P6 Pet Crematory

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	18	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52	Fall Percent	

4. Emission Point Information

Height above ground (ft):	20	Length and width dimensions at top of rectangular stack (ft):	Length:		Width:
Height above structures (ft):	3				
Exit temperature (ºF):	1100	Inside diameter at top of round stack (ft):			3
Exit velocity (ft/min):	20	Distance from emission point to nearest property line (ft):			190
Exhaust gas volumetric flow rate (acfm):	4687	Building dimensions if emission point is located on building (ft)	Height 14	Length 60	Width 40

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None
☐ Baghouse No. ______
☐ Cyclone No. ______
☐ Elec. Precipitator (ESP) No. ______
☐ Dust Suppression System No. ______
☐ Venturi Scrubber No. ______
☐ Spray Tower/Packed Bed No. ______
☐ Carbon Adsorber No. ______
  ☐ Cartridge/Canister
  ☐ Regenerative

☐ Thermal Oxidizer No. ______
  ☐ Regenerative
☐ Catalytic Oxidizer No. ______
☐ Nitrogen Oxides Reduction No. ______
  ☐ Selective ☐ Non-Selective
  ☐ Catalytic ☐ Non-Catalytic
☐ Other No. ______
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	See attached			
Particulate Matter (filterable as PM2.5)				
Particulate Matter (condensables)				
Volatile Organic Compounds (VOC)				
Oxides of Sulfur (SOx)				
Oxides of Nitrogen (NOx)				
Carbon Monoxide (CO)				
Lead (Pb)				

Greenhouse Gases (GHG)	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Carbon Dioxide (CO_2)				
Methane (CH_4)				
Nitrous Oxide (N_2O)				
Hydrofluorocarbons (HFCs)				
Perfluorocarbons (PFCs)				
Sulfur Hexafluoride (SF6)				
Total GHG (as CO_2e)				

List individual federal Hazardous Air Pollutants (HAP) below:	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)

(Attach additional sheets as necessary.)

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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Brandywine Green LLC

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:

PPJr A

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:

Matthews PPJr Pet Crematory

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	18	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52	Fall Percent	

4. Emission Point Information

Height above ground (ft):	20	Length and width dimensions at top of rectangular stack (ft):	Length:		Width:
Height above structures (ft):	3				
Exit temperature (ºF):	1100	Inside diameter at top of round stack (ft):			1.67
Exit velocity (ft/min):	20	Distance from emission point to nearest property line (ft):			220
Exhaust gas volumetric flow rate (acfm):	4687	Building dimensions if emission point is located on building (ft)	Height 14	Length 72	Width 69

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. ______

☐ Cyclone No. ______

☐ Elec. Precipitator (ESP) No. ______

☐ Dust Suppression System No. ______

☐ Venturi Scrubber No. ______

☐ Spray Tower/Packed Bed No. ______

☐ Carbon Adsorber No. ______

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. ______

- ☐ Regenerative

☐ Catalytic Oxidizer No. ______

☐ Nitrogen Oxides Reduction No. ______

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. ______
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Particulate Matter (filterable as PM10)	See attached			
Particulate Matter (filterable as PM2.5)				
Particulate Matter (condensables)				
Volatile Organic Compounds (VOC)				
Oxides of Sulfur (SOx)				
Oxides of Nitrogen (NOx)				
Carbon Monoxide (CO)				
Lead (Pb)				

Greenhouse Gases (GHG)	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Carbon Dioxide (CO_2)				
Methane (CH_4)				
Nitrous Oxide (N_2O)				
Hydrofluorocarbons (HFCs)				
Perfluorocarbons (PFCs)				
Sulfur Hexafluoride (SF6)				
Total GHG (as CO_2e)				

List individual federal Hazardous Air Pollutants (HAP) below:	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**

(Attach additional sheets as necessary.)

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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Brandywine Green LLC

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
PPJr B

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
Matthews PPJr Pet Crematory

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	18	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52	Fall Percent	

4. Emission Point Information

Height above ground (ft):	20	Length and width dimensions at top of rectangular stack (ft):	Length:		Width:
Height above structures (ft):	3				
Exit temperature (ºF):	1100	Inside diameter at top of round stack (ft):			1.67
Exit velocity (ft/min):	20	Distance from emission point to nearest property line (ft):			215
Exhaust gas volumetric flow rate (acfm):	4687	Building dimensions if emission point is located on building (ft)	Height 14	Length 72	Width 69

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. ______

☐ Cyclone No. ______

☐ Elec. Precipitator (ESP) No. ______

☐ Dust Suppression System No. ______

☐ Venturi Scrubber No. ______

☐ Spray Tower/Packed Bed No. ______

☐ Carbon Adsorber No. ______

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. ______

- ☐ Regenerative

☐ Catalytic Oxidizer No. ______

☐ Nitrogen Oxides Reduction No. ______

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. ______
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	See attached			
Particulate Matter (filterable as PM2.5)				
Particulate Matter (condensables)				
Volatile Organic Compounds (VOC)				
Oxides of Sulfur (SOx)				
Oxides of Nitrogen (NOx)				
Carbon Monoxide (CO)				
Lead (Pb)				

Greenhouse Gases (GHG)	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Carbon Dioxide (CO_2)				
Methane (CH_4)				
Nitrous Oxide (N_2O)				
Hydrofluorocarbons (HFCs)				
Perfluorocarbons (PFCs)				
Sulfur Hexafluoride (SF6)				
Total GHG (as CO_2e)				

List individual federal Hazardous Air Pollutants (HAP) below:	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)

(Attach additional sheets as necessary.)

SECTION II

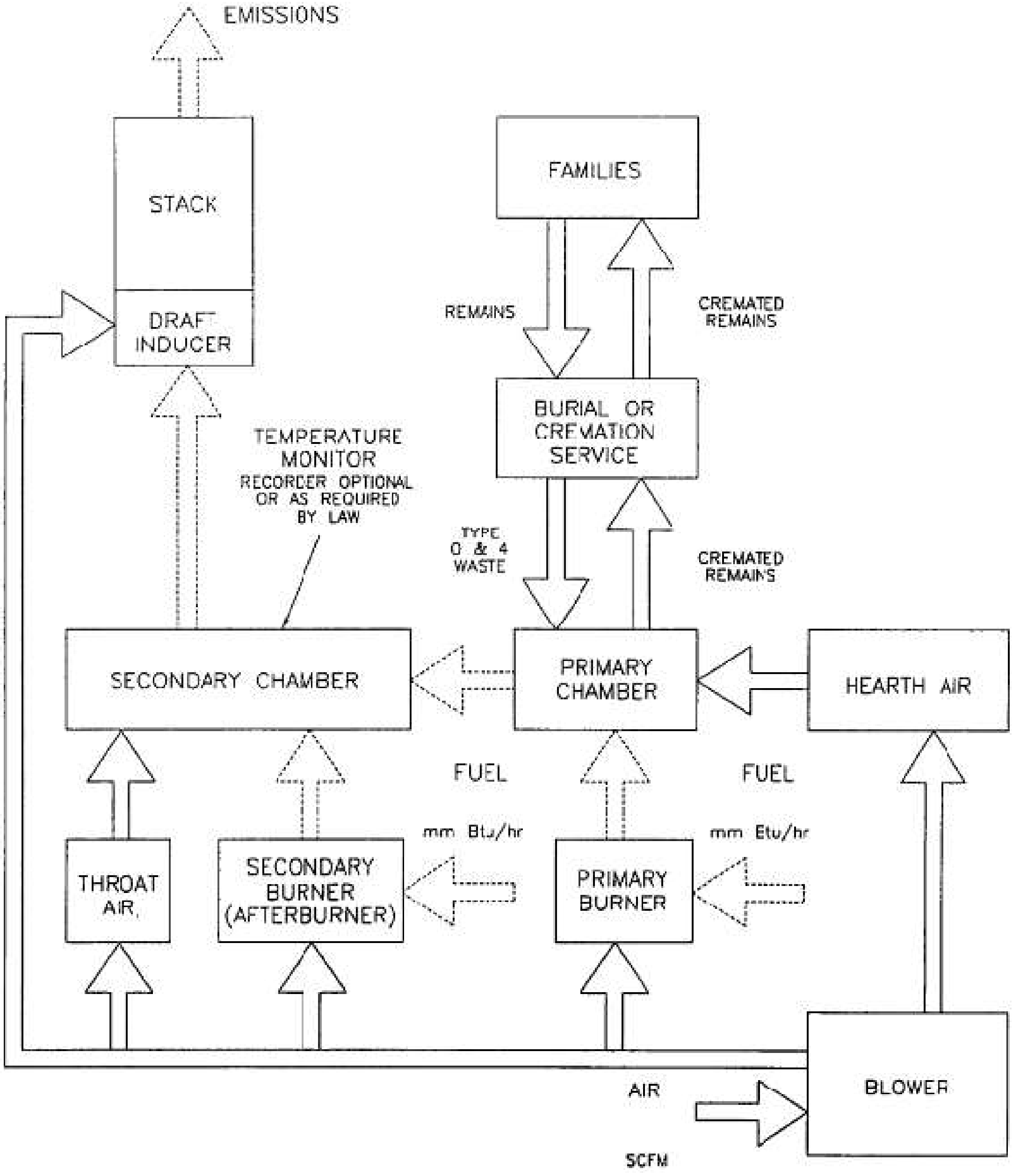

Plot Plan
1 of 2
Legend
Agape Pet Services
Crystal Grottoes Caverns
Custom Landscape Management
Harvest Moon Pet Boarding
Property Line
Agape Pet Services
Agape Pet Services
Custom Landscape Management
Harvest Moon Pet Boarding
Crystal Grottoes Caverns
Shepherdstown Pike
Shepherdstown Pike
34
34
34
Google Earth
Image © 2024 Airbus
N
500 ft

Plot Plan

2 of 2

Number	Make/Model
1	Matthews IEB 56
2	Facultative 1600
3	Matthews PPJr B
4	Matthews PPJr A
5	Matthews IEB 40
6	ThermTec S18P6 B
7	Therm Tec S18P6 A

PROCESS FLOW DIAGRAM
CREMATOR



Throughput								
Incinerator Model		ThermTec S18P6	ThermTec S18P6	Matthews PPJr	Matthews PPJr	Matthews IEB 56	Facultive 1600	Matthews IEB 40
Maximum Hourly Burn Rate	lb/hr	300	300	75	75	400	250	350
Requested Worst Case Annual Burn Rate	TPY	1314	1314	328.5	328.5	1752	1095	1533
Maximum Heat Input	MMBTU/hr	4.8	4.8	2	2	4.5	3.75	5
Propane Usage	gal/hr	52	52	22	22	49	41	55
Operating Schedule	hr/day	24	24	24	24	24	24	24
	day/wk	7	7	7	7	7	7	7
	wk/yr	52	52	52	52	52	52	52
	hrs/yr	8760	8760	8760	8760	8760	8760	8760
Discussion: A extremely conservative worst case is 8,760 at maximum rated capacity for each machine. The machines typically operate 17 hours per day with a much lower burn rate as pet size, cool down times, and cremation type vary (private versus communal cremation)								

Worst Case SitewideThroughput		
averaging period	lb	cremations
1 hr	1750	12
8 hr	14000	93
annual	15330000	102200
Discussion: One creamation is assumed 150 lb. However the average pet is much smaller		

Screen3 Worst Case (ug/m3)/(lb/hr)		
1-hr	8-hr	Annual
70.19	49.13	5.62
Discussion: A screen3 was run for a worst case machine at 1 lb/hr. The distance 180 ft was used as that is the closest machine to the property line. All stacks will be a minimum of 20 ft. The output file is on the following page.		

Worst Case Emissions

				ThermTec S18P6	ThermTec S18P6	Matthews PPJr	Matthews PPJr	Matthews IEB 56	Facultive 1600	Matthews IEB 40	Sitewide	ThermTec S18P6	ThermTec S18P6	Matthews PPJr	Matthews PPJr	Matthews IEB 56	Facultive 1600	Matthews IEB 40	Sitewide
Pollutant	Emission Factor	Units	Source	Maximum (lb/hr)								Maximum (ton/yr)							
Condensed PM	0.01	lb/ton	Stack Test	0.0015	0.0015	0.0004	0.0004	0.0020	0.0013	0.0018	0.0088	0.0066	0.0066	0.0016	0.0016	0.0088	0.0055	0.0077	0.0383
PM10	0.54	lb/ton	Stack Test	0.0810	0.0810	0.0203	0.0203	0.1080	0.0675	0.0945	0.4725	0.3548	0.3548	0.0887	0.0887	0.4730	0.2957	0.4139	2.0696
PM2.5	0.24	lb/ton	Stack Test	0.0360	0.0360	0.0090	0.0090	0.0480	0.0300	0.0420	0.2100	0.1577	0.1577	0.0394	0.0394	0.2102	0.1314	0.1840	0.9198
NOx	13	lb/103 gal	AP 42 1.5	0.6823	0.6823	0.2843	0.2843	0.6397	0.5331	0.7108	3.8168	2.9886	2.9886	1.2452	1.2452	2.8018	2.3348	3.1131	16.7174
CO	7.5	lb/103 gal	AP 42 1.5	0.3936	0.3936	0.1640	0.1640	0.3690	0.3075	0.4101	2.2020	1.7242	1.7242	0.7184	0.7184	1.6164	1.3470	1.7960	9.6446
SO2	1.5	lb/103 gal	AP 42 1.5	0.0787	0.0787	0.0328	0.0328	0.0738	0.0615	0.0820	0.4404	0.3448	0.3448	0.1437	0.1437	0.3233	0.2694	0.3592	1.9289
VOC	1	lb/103 gal	AP 42 1.5	0.0525	0.0525	0.0219	0.0219	0.0492	0.0410	0.0547	0.2936	0.2299	0.2299	0.0958	0.0958	0.2155	0.1796	0.2395	1.2860
Lead	0.000066	lb/body	Stack Test	0.0001	0.0001	0.0000	0.0000	0.0002	0.0001	0.0002	0.0008	0.0006	0.0006	0.0001	0.0001	0.0008	0.0005	0.0007	0.0034
Carbon Dioxide	12500	lb/103 gal	AP 42 1.5	656.0819	656.0819	273.3674	273.3674	615.0768	512.5640	683.4186	3669.9580	2873.6386	2873.6386	1197.3494	1197.3494	2694.0362	2245.0302	2993.3736	16074.4161
Methane	0.2	lb/103 gal	AP 42 1.5	0.0105	0.0105	0.0044	0.0044	0.0098	0.0082	0.0109	0.0587	0.0460	0.0460	0.0192	0.0192	0.0431	0.0359	0.0479	0.2572
Nitrous Oxide	0.9	lb/103 gal	AP 42 1.5	0.0472	0.0472	0.0197	0.0197	0.0443	0.0369	0.0492	0.2642	0.2069	0.2069	0.0862	0.0862	0.1940	0.1616	0.2155	1.1574
CO2 Equivalent				670.4212	670.4212	279.3422	279.3422	628.5199	523.7666	698.3554	3750.1686	2936.4449	2936.4449	1223.5187	1223.5187	2752.9171	2294.0976	3058.7967	16425.7385

Projected Emissions

				ThermTec S18P6	ThermTec S18P6	Matthews PPJr	Matthews PPJr	Matthews IEB 56	Facultive 1600	Matthews IEB 40	Sitewide	ThermTec S18P6	ThermTec S18P6	Matthews PPJr	Matthews PPJr	Matthews IEB 56	Facultive 1600	Matthews IEB 40	Sitewide
Pollutant	Emission Factor	Units	Source	Maximum (lb/hr)								Maximum (ton/yr)							
Condensed PM	0.01	lb/ton	Stack Test	0.0002	0.0002	0.0001	0.0001	0.0003	0.0002	0.0003	0.0013	0.0010	0.0010	0.0002	0.0002	0.0013	0.0008	0.0011	0.0057
PM10	0.54	lb/ton	Stack Test	0.0122	0.0122	0.0030	0.0030	0.0162	0.0101	0.0142	0.0709	0.0532	0.0532	0.0133	0.0133	0.0710	0.0443	0.0621	0.3104
PM2.5	0.24	lb/ton	Stack Test	0.0054	0.0054	0.0014	0.0014	0.0072	0.0045	0.0063	0.0315	0.0237	0.0237	0.0059	0.0059	0.0315	0.0197	0.0276	0.1380
NOx	13	lb/103 gal	AP 42 1.5	0.1023	0.1023	0.0426	0.0426	0.0960	0.0800	0.1066	0.5725	0.4483	0.4483	0.1868	0.1868	0.4203	0.3502	0.4670	2.5076
CO	7.5	lb/103 gal	AP 42 1.5	0.0590	0.0590	0.0246	0.0246	0.0554	0.0461	0.0615	0.3303	0.2586	0.2586	0.1078	0.1078	0.2425	0.2021	0.2694	1.4467
SO2	1.5	lb/103 gal	AP 42 1.5	0.0118	0.0118	0.0049	0.0049	0.0111	0.0092	0.0123	0.0661	0.0517	0.0517	0.0216	0.0216	0.0485	0.0404	0.0539	0.2893
VOC	1	lb/103 gal	AP 42 1.5	0.0079	0.0079	0.0033	0.0033	0.0074	0.0062	0.0082	0.0440	0.0345	0.0345	0.0144	0.0144	0.0323	0.0269	0.0359	0.1929
Lead	0.000066	lb/body	Stack Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0005
Carbon Dioxide	12500	lb/103 gal	AP 42 1.5	98.4123	98.4123	41.0051	41.0051	92.2615	76.8846	102.5128	550.4937	431.0458	431.0458	179.6024	179.6024	404.1054	336.7545	449.0060	2411.1624
Methane	0.2	lb/103 gal	AP 42 1.5	0.0016	0.0016	0.0007	0.0007	0.0015	0.0012	0.0016	0.0088	0.0069	0.0069	0.0029	0.0029	0.0065	0.0054	0.0072	0.0386
Nitrous Oxide	0.9	lb/103 gal	AP 42 1.5	0.0071	0.0071	0.0030	0.0030	0.0066	0.0055	0.0074	0.0396	0.0310	0.0310	0.0129	0.0129	0.0291	0.0242	0.0323	0.1736
CO2 Equivalent				100.5632	100.5632	41.9013	41.9013	94.2780	78.5650	104.7533	562.5253	440.4667	440.4667	183.5278	183.5278	412.9376	344.1146	458.8195	2463.8608

Discussion: Projected Emissions are assumed 15% of the worst case emissions. Stack test results from a Matthews Pet cremation unit are assumed representative for all machines. Propane emission factors are from AP-42 Chapter 1.5 (Tables 1.5-1).

CAS	POLLUTANT	Emission Factor (EPA FIRE) (cremations)	Emission Factor Source	Emission Factor (as number) (Cremations)	Worst Case Sitewide Emissions 1-HOUR (lb)	Ground Level Concentration 1-HOUR (ug/m3)	Ground Level Concentration 8-HOUR (ug/m3)	Ground Level Concentration Annual (ug/m3)	MDE Screening Level 1-HOUR (ug/m3)	MDE Screening Level 8-HOUR (ug/m3)	MDE Screening Level Annual (ug/m3)	Percent of Screen Level 1-HOUR (decimal %)	Percent of Screen Level 8-HOUR (decimal %)	Percent of Screen Level Annual (decimal %)
83329	Acenaphthene	1.11E-07	EPA Fire	1.11E-07	1.30E-06	9.09E-05	6.36E-05	7.27E-06		2.03E+01			3.13E-06	
208968	Acenaphthylene	6.73E-07	EPA Fire	6.73E-07	7.85E-06	5.51E-04	3.86E-04	4.41E-05		2.46E+01			1.57E-05	
75070	Acetaldehyde	0.000139	Stack Test	1.32E-05	1.54E-04	1.08E-02	7.57E-03	8.65E-04	4.50E+02	2.30E+03	5.00E+00	2.40E-05	3.29E-06	1.73E-04
120127	Anthracene	3.24E-07	EPA Fire	3.24E-07	3.78E-06	2.65E-04	1.86E-04	2.12E-05		2.00E+01			9.29E-06	
7440360	Antimony	< 3.020E-5	EPA Fire	3.02E-05	3.52E-04	2.47E-02	1.73E-02	1.98E-03		5.00E+00			3.46E-03	
7440382	Arsenic	6.17E-05	Stack Test	6.03E-07	7.04E-06	4.94E-04	3.46E-04	3.95E-05		1.00E-01	2.00E-03		3.46E-03	1.98E-02
7440393	Barium	2.60E-05	EPA Fire	2.60E-05	3.03E-04	2.13E-02	1.49E-02	1.70E-03		5.00E+00			2.98E-03	
56553	Benzo (a) anthracene	0.00000013	EPA Fire	0.00000013	1.52E-06	1.06E-04	7.45E-05	8.52E-06						
50328	Benzo (a) pyrene	0.00000066	EPA Fire	0.00000066	7.70E-06	5.40E-04	3.78E-04	4.32E-05						
205992	Benzo (b) fluoranthene	0.000000018	EPA Fire	0.000000018	2.10E-07	1.47E-05	1.03E-05	1.18E-06						
191242	Benzo (g,h,i) perylene	4.4055E-08	EPA Fire	4.4055E-08	5.14E-07	3.61E-05	2.53E-05	2.89E-06		2.00E+01			1.26E-06	
207089	Benzo (k) fluoranthene	< 1.420E-8	EPA Fire	1.42E-08	1.66E-07	1.16E-05	8.14E-06	9.30E-07						
7440417	Beryllium	2.60E-06	Stack Test	6.05E-08	7.06E-07	4.95E-05	3.47E-05	3.96E-06		5.00E-04	4.00E-03		6.94E-02	9.91E-04
7440439	Cadmium	2.21E-04	Stack Test	2.95E-07	3.44E-06	2.42E-04	1.69E-04	1.93E-05		2.00E-02	6.00E-03		8.45E-03	3.22E-03
7440473	Chromium	2.99E-05	EPA Fire	2.99E-05	3.49E-04	2.45E-02	1.71E-02	1.96E-03		5.00E+00			3.43E-03	
18540299	Chromium (VI)	1.40E-05	Stack Test	3.05E-07	3.56E-06	2.50E-04	1.75E-04	2.00E-05		1.00E-01	8.00E-04		1.75E-03	2.50E-02
218019	Chrysene	< 5.400E-8	EPA Fire	5.40E-08	6.30E-07	4.42E-05	3.10E-05	3.54E-06						
7440484	Cobalt	0.0000136	EPA Fire	0.0000136	1.59E-04	1.11E-02	7.80E-03	8.91E-04		2.00E-01			3.90E-02	
7440508	Copper	2.93E-05	Stack Test	2.46E-05	2.87E-04	2.01E-02	1.41E-02	1.61E-03		2.00E+00			7.05E-03	
53703	Dibenzo(a,h) anthracene	1.36E-08	EPA Fire	1.36E-08	1.59E-07	1.11E-05	7.80E-06	8.91E-07						
206440	Fluoranthene	2.05E-07	EPA Fire	2.05E-07	2.39E-06	1.68E-04	1.18E-04	1.34E-05		8.20E+01			1.43E-06	
86737	Fluorene	4.17E-07	EPA Fire	4.17E-07	4.87E-06	3.41E-04	2.39E-04	2.73E-05		2.00E+01			1.20E-05	
50000	Formaldehyde	0.000034	Stack Test	8.14E-06	9.50E-05	6.67E-03	4.67E-03	5.33E-04		2.03E+01	8.00E-01		2.30E-04	6.67E-04
7647010	Hydrogen chloride	3.02E-01	Stack Test	2.36E-02	2.75E-01	1.93E+01	1.35E+01	1.55E+00	2.98E+01	1.65E+02	7.00E+00	6.49E-01	8.20E-02	2.21E-01
7664393	Hydrogen fluoride	1.14E-03	Stack Test	7.85E-05	9.16E-04	6.43E-02	4.50E-02	5.14E-03	1.64E+01	4.09E+00		3.92E-03	1.10E-02	
193395	Indeno(1,2,3-cd)pyrene	1.55E-08	EPA Fire	1.55E-08	1.81E-07	1.27E-05	8.88E-06	1.02E-06						
7439921	Lead	1.53E-03	Stack Test	2.68E-05	3.13E-04	2.19E-02	1.54E-02	1.76E-03		5.00E-01			3.07E-02	
7439976	Mercury	5.28E-03	Stack Test	9.40E-09	1.10E-07	7.70E-06	5.39E-06	6.16E-07		1.00E-01			5.39E-05	
7439987	Molybdenum	< 1.670E-5	EPA Fire	1.67E-05	1.95E-04	1.37E-02	9.57E-03	1.09E-03		5.00E+00			1.91E-03	
91203	Naphthalene	0.0000678	EPA Fire	0.0000678	7.91E-04	5.55E-02	3.89E-02	4.44E-03	7.86E+02	5.24E+02		7.06E-05	7.42E-05	
7440020	Nickel	3.83E-05	Stack Test	5.08E-06	5.93E-05	4.16E-03	2.91E-03	3.33E-04		1.00E+00			2.91E-03	
85018	Phenanthrene	2.29E-06	EPA Fire	2.29E-06	2.67E-05	1.88E-03	1.31E-03	1.50E-04		9.80E+00			1.34E-04	
129000	Pyrene	1.62E-07	EPA Fire	1.62E-07	1.89E-06	1.33E-04	9.29E-05	1.06E-05		2.00E+01			4.64E-06	
7782492	Selenium	0.0000449	Stack Test	4.40E-06	5.13E-05	3.60E-03	2.52E-03	2.88E-04		2.00E+00			1.26E-03	
7440224	Silver	7.30E-06	EPA Fire	7.30E-06	8.52E-05	5.98E-03	4.18E-03	4.78E-04		1.00E-01			4.18E-02	
7440280	Thallium	0.0000855	EPA Fire	0.0000855	9.98E-04	7.00E-02	4.90E-02	5.60E-03		2.00E-01			2.45E-01	
7440622	Vanadium	5.79E-05	EPA Fire	5.79E-05	6.76E-04	4.74E-02	3.32E-02	3.79E-03		5.00E-01			6.64E-02	
7440666	Zinc	4.07E-04	Stack Test	3.50E-04	4.08E-03	2.87E-01	2.01E-01	2.29E-02	1.00E+03	5.00E+02		2.87E-04	4.01E-04	
	PM, filterable	8.50E-02	EPA Fire	8.50E-02	9.92E-01	6.96E+01	4.87E+01	5.57E+00						
	Polycyclic aromatic hydrocar	3.76E-06	Stack Test	1.36E-08	1.59E-07	1.11E-05	7.80E-06	8.91E-07						
1746016	Total Dioxins & Furans - TEQ balanced		Stack Test	8.10E-11	9.45E-10	6.63E-08	4.64E-08	5.31E-09		8.20E-04	3.00E-08		5.66E-05	1.77E-01

Discussion: Toxic stack test results for a Matthews Cremation unit cremating pets are in Section III of the application. These are more representative as EPA fire were developed using humans. All toxics fall below screening levels.

```
02/20/24

14:43:55
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 13043 ***

 C:\Users\elarkin\Documents\All\MD\Boonsboro\2024 Renewal
Amendment COO\done\wor

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =     0.125998
    STACK HEIGHT (M)       =       6.0960
    STK INSIDE DIAM (M)    =       0.5000
    STK EXIT VELOCITY (M/S)=       6.0960
    STK GAS EXIT TEMP (K)  =     866.4833
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =       0.0000
    URBAN/RURAL OPTION     =        RURAL
    BUILDING HEIGHT (M)    =       4.2672
    MIN HORIZ BLDG DIM (M) =      12.1920
    MAX HORIZ BLDG DIM (M) =      18.2880

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.


 BUOY. FLUX =    2.473 M**4/S**3;  MOM. FLUX =    0.785 M**4/S**
2.

 *** FULL METEOROLOGY ***

 **********************************
 *** SCREEN AUTOMATED DISTANCES ***
 **********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA
SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)    HT (M)   Y (M)
Z (M)  DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------
------  -----
     55.    70.19        4     8.0    8.0  2560.0    6.77    4.70
4.24    SS
    100.    46.36        4     8.0    8.0  2560.0    7.55    8.20
6.04    SS
    200.    30.35        4     5.0    5.0  1600.0   10.25   15.56
```

```
9.59    SS
    300.    21.82        4     3.5    3.5  1120.0   13.94   22.61
12.65    SS
    400.    17.11        4     3.0    3.0   960.0   16.08   29.45
15.70    SS
    500.    14.07        4     2.5    2.5   800.0   19.12   36.15
18.59    SS
    600.    11.87        4     2.0    2.0   640.0   23.71   42.72
21.32    SS
    700.    10.43        4     2.0    2.0   640.0   23.71   49.19
24.14    SS
    800.    9.098        4     2.0    2.0   640.0   23.71   55.57
26.89    SS
    900.    8.321        4     1.5    1.5   480.0   31.37   61.88
29.47    SS
   1000.    7.585        4     1.5    1.5   480.0   31.37   68.13
32.09    SS
   1100.    6.911        4     1.5    1.5   480.0   31.37   74.31
34.12    SS
   1200.    6.543        6     2.5    2.5 10000.0   26.23   40.01
16.01    SS
   1300.    6.565        6     2.5    2.5 10000.0   26.23   43.04
16.81    SS
   1400.    6.633        6     2.0    2.0 10000.0   28.46   46.05
17.50    SS
   1500.    6.652        6     2.0    2.0 10000.0   28.46   49.03
18.26    SS

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    55. M:
     55.    70.19        4     8.0    8.0  2560.0    6.77    4.70
4.24    SS

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 ****************************************
      *** REGULATORY (Default) ***
     PERFORMING CAVITY CALCULATIONS
   WITH ORIGINAL SCREEN CAVITY MODEL
           (BRODE, 1988)
 ****************************************


  *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2
***
   CONC (UG/M**3)     =    0.000        CONC (UG/M**3)     =
0.000
   CRIT WS @10M (M/S) =    99.99        CRIT WS @10M (M/S) =
99.99
```

```
   CRIT WS @ HS (M/S) =    99.99        CRIT WS @ HS (M/S) =
99.99
   DILUTION WS (M/S)  =    99.99        DILUTION WS (M/S)  =
99.99
   CAVITY HT (M)      =     4.43        CAVITY HT (M)      =
4.29
   CAVITY LENGTH (M)  =    15.45        CAVITY LENGTH (M)  =
12.45
   ALONGWIND DIM (M)  =    12.19        ALONGWIND DIM (M)  =
18.29

 CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET =
0.0

 ****************************************
       END OF CAVITY CALCULATIONS
 ****************************************


      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION         MAX CONC    DIST TO   TERRAIN
   PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
 --------------    -----------   ---------   -------
 SIMPLE TERRAIN       70.19           55.        0.


 ***************************************************
 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
 ***************************************************
```

SPECIFICATIONS- Model Power-Pak Jr.

1. Equipment Type	Model Power-Pak Jr.
A. Model No.	IE43-PPJR
B. Underwriters Laboratories Listing and File No.	87E8; MH14647
2. Dimensions	
A. Footprint	8' – 8 ½" x 6' -8" (2.65 m x 2.03 m)
B. Maximum Length	10' – 10" (3.30 m)
C. Maximum Width	6' -5" (1.96 m)
D. Maximum Height	8' - 4" (2.54 m)
E. Chamber Loading Opening	25 ¾" H x 39 ½" W (654 mm x 1.00 m)
3. Weight	18,000 lbs. (8,165 kg)
4. Utility/Air Requirements	
A. Gross Gas Input, Natural or LP Gas	2,000,000 BTU/hr. (2,110,112 kJ/h)
Running Gas Pressure, Natural Gas	11 inches (279.4 mm) water column or greater
Running Gas Pressure, LP Gas	11 inches (279.4 mm) water column or greater
B. Electrical Supply	230 volt, 3Ø or 1Ø, and 115 volt, 50/60 hz (other available)
C. Air Supply	2,500 cfm (70.8 standard m^3/min)
5. Incineration Capacity	75 lbs./hr. (34 kg/h)
6. Typical Loading Capacity of Waste Types	300 lbs. (136 kg/h)
7. Construction and Safety Standards	Incineration Institute of America, Underwriters Laboratories, Canadian Standards Association
8. Steel Structure Construction	
A. Frame	2" (51 mm) square tubing
B. Front/Rear Plates	3/8" (9.5 mm) plate
C. Floor Plates	3/16" (5 mm) plate
D. Outer Side Casing	12 gauge (3 mm) plate
E. Inner Side Casing	12 gauge (3 mm) plate
9. Stack Construction	
A. Inner Wall	4 1/2" (110 mm) insulating firebrick or castable
B. Outer Wall	12 gauge (3 mm) sheet, 304 s.s., welded seams (unlined stack available)
10. Draft Nozzle Construction	Schedule 40 type 316 s.s. pipe, welded connections
11. Main Chamber Door Construction	
A. Steel Shell	3/16" (5 mm) steel, welded with reinforcement
B. Outer Refractory	1" (25 mm) insulating block
C. Inner Refractory	4½" (110 mm) insulating firebrick

SPECIFICATIONS- Model Power-Pak Jr.

12. Primary Chamber Wall Construction

A. Outer Casing Wall	12 gauge (3 mm) sheet
B. Inner Frame/Air Compartment	2” (51 mm) air compartment
C. Inner Casing Wall	12 gauge (3 mm) sheet
D. Outer Refractory Wall	5” (127 mm) insulating block
E. Inner Refractory Wall	4½” (114 mm) firebrick

13. Secondary Chamber Wall Construction

A. Outer Casing Wall	12 gauge (3 mm) sheet
B. Inner Frame/Air Compartment	2” (51 mm) air compartment
C. Inner Casing Wall	12 gauge (3 mm) sheet
D. Outer Refractory Wall	6” (152 mm) insulating block
E. Inner Refractory Wall	4½” (114 mm) firebrick

14. Refractory Temperature Ratings

A. Standard Firebrick	3,100° F. (1704° C)
B. Insulating Firebrick	2,600° F. (1427° C)
C. Castable Refractory (Hearth)	2,550° F. (1399° C)
D. Castable Refractory	2,550° F. (1399° C)
E. Insulating Block	1,900° F. (1038° C)
F. Bonding Mortar	3,200° F. (1760° C)

15. Chamber Volumes (not including external flues, stacks or chimneys)

A. Primary Chamber	33 cubic feet (0.93 m^3)
B. Secondary Chamber	52 cubic feet (1.47 m^3)

16. Emission Control Features

A. Secondary Chamber with Afterburner	Included
B. Opacity Monitor and Controller with Visual and Audible Alarms	Included
C. Auxiliary Air Control System	Included
D. Microprocessor Temperature Control System	Included

17. Operating Temperatures

A. Primary Chamber	1,200° F. - 1,800° F. (649° C - 982° C)
B. Secondary Chamber	1,400° F. - 1,832° F. (760° C - 1000° C) as required

18. Secondary Chamber Retention Time	> 1 second
19. Ash Removal	Door functions as a heat shield. Sweep out beneath front door into hopper that fills collection pan.

SPECIFICATIONS- Model Power-Pak Jr.

20.	Safety Interlocks	
	A. High Gas Pressure	Optional
	B. Low Gas Pressure	Optional
	C. Blower Air Pressure	Included
	D. Door Position	Included
	E. Opacity	Included
	F. Motor Starter Function	Included
	G. Chamber Temperature	Included
	H. Motor Overload	Included
	I. Flame Quality	Included
	J. Burner Safe Start	Included
22.	Burner Description	The nozzle mix burners used on this cremation equipment are industrial quality and designed for incinerator use.
23.	Ultraviolet Flame Detection	Ultraviolet flame detection has proven to be the most reliable means of flame safety. The system is completely sealed in a quartz capsule to eliminate problems, caused by moisture and dust created in the cremation process, which effect flame rod detectors.
24.	Operating Panel Indicating Lights	
	A. Safe Run	Included
	B. Door Closed	Included
	C. Pollution Alarm	Included
	D. Afterburner On (Secondary Burner)	Included
	E. Cremation Burner On	Included
	F. Low Fire Cremation Burner On	Included
	G. Afterburner (Secondary Burner) Reset	Included
	H. Cremation Burner Reset	Included
	I. Hearth Air	Included
	J. Throat Air Off	Included
25.	Automatic Timer Functions	
	A. Master Cycle	Included
	B. Afterburner (Secondary Burner)	Included
	C. Cremation Burner	Included
	D. Low Fire Cremation Burner	Included
	E. Hearth Air	Included
	F. Throat Air	Included
	G. Pollution Monitoring	Included
	H. Afterburner (Secondary Burner) Prepurge	Included
	I. Cremation Burner Prepurge	Included
	J. Cool Down	Included

SPECIFICATIONS- Model Power-Pak Jr.

26.	Exterior Finish	
	A. Primer	2 coats rust inhibiting
	B. Finish	2 coats textured finish
27.	Start-Up and Training	Startup of cremation equipment and training of operators to properly operate and maintain the equipment is performed on-site under actual operating conditions. Included is a comprehensive owner's manual, with details on the equipment, its components and proper operation.
28.	Environmental Submittals	Complete technical portion of state environmental permits. Engineering calculations, technical data, existing stack test results and equipment blueprints provided.

Therm Tec, Inc.
P.O. Box 1105
Tualatin, Oregon 97062
(503) 625-7575 Fax (503) 625-6161 E-mail tt@thermtec.com

S-18-P6 SIX CELL ANIMAL CREMATORY

SPECIFICATIONS

1. MAIN CHAMBERS (Primary Cells)		S-18-P6
Internal Dimensions Of Primary Cells		26" H, 27" W, 44" L
Volume Of Cell	Cubic Feet	18.50
Burner (1)	Btu's Hr.	400,000
Burner Control	PLC	Off - On
Loading Height	Inches	30"
Charge Opening Into Cell	Inches	26" x 27"
Preheated Combustion Air Surface	Square Feet	13.5
Hearth Area	Square Feet	8.5
Metal Jacket Thickness	Plate	3/16"
Refractory Thickness, Rated @ 2,800 Deg. F.	Inches	4"
Insulation Thickness Rated @ 1,900 Deg.F.	Inches	1.5"
Weight	Pounds	5,200

2. AFTERBURNER (Secondary Chamber)		S-18-P6
Burners (2)	Btu's Hr.	2,400,000
Burner Control	PLC	Full Modulation
Outside	Inches	46"
Diameter - Inside	Inches	36"
Volume Of Chamber	Cubic Feet	38.20
Preheated Comb. Air Surface	Square Feet	30.50
Metal Jacket Thickness (Dual Wall Construction)	Sheet	3/16"
Refractory Thickness, Rated @ 3,000 Deg. F.	Inches	3"
Weight	Pounds	2,980

3. RETENTION SECTION - REFRACTORY LINED		S-18-P6
Number Of Retention	Sections	1
Metal Jacket Thickness	Sheet	10 Gauge
Diameter - Outside	Inches	42"
Diameter - Inside	Inches	36"
Refractory Thickness, Rated @ 2,300 Deg. F.	Inches	3"
Volume Of Chamber	Cubic Feet	42.47
TOTAL RETENTION VOLUME	CUBIC FEET	80.67
Total Weight Of Chamber	Pounds	1,820

FC Industries, inc.
13508 OAK ST. • KANSAS CITY, MISSOURI 64145
(816) 941-2009 • 1-800-345-0847
Fax (816) 941-2199

S-18-P6 SIX CELL ANIMAL CREMATORY

SPECIFICATIONS

4. STACK SECTIONS - REFRACTORY LINED		S-18-P6
Number Of Stacks - 6 ft	Sections	2
Metal Jacket Thickness	Sheet	10 Gauge
Stack Diameter -Outside	Inches	42"
Stack Diameter -Inside	Inches	36"
Refractory Thickness, Rated @ 2,300 Deg. F.	Inches	3"
Weight Each Section	Pounds	1,610
Total Weight Of Stacks	Pounds	3,220

5. OVERALL DIMENSIONS AND WEIGHT OF UNITS :		S-18-P6
Foot Print	Ft / inches	28' 11" x 7' 4"
Width	Ft / inches	28' 11"
Length With Door Closed	Ft / inches	7' 4"
Length With Door Open -90 Deg.	Ft / inches	9' 5"
Height To Top Of A/B	Ft / inches	10' 6"
Height To Top Of Stack	Ft / inches	28' 6"
Total Weight Of System	Pounds	39,100

6. UTILITY Connection To Unit :	S-18-P6
Natural Gas	2" NPT Plumbed to Single Point Connection (Regulator Included)
Electrical	3 Wire To Control Panel Terminal Strip Plus Gound

7. UTILITY REQUIREMENTS :			S-18-P6
Fuel :	Natural Gas Max.	Cubic Feet Per Hour	4,800
	Delivered @	Pounds	2-5 lb.
	Operating @	W.C.	14"

Electrical : 240 Volts, 60 Amps, Single Phase, 4 Wire, 60 Hz.
Total Horse Power , 5.0 H.P. (Hydraulic Doors)

8. DESIGN AND CONSTRUCTION :	S-18-P6
Construction and Safety Standards:	NFPA 86
Oven Construction	
Gas Piping	

S-18-P6 SIX CELL ANIMAL CREMATORY

SPECIFICATIONS

9. CONTROLS PROVIDED WITH MODELS : S-18-P6

Construction and Safety Standards:	UL 508 A
Enclosure	NEMA 12
On-Off Switch	System Power
PLC & Touch Screen Control	Provides Full Control & Monitoring Of Cremation Cycles
Temperature Control	Individual Control For Each Cell
	Burners Off-On
	Afterburner Control
	Burners Full Modulation
Combustion Air	Individual Control For Each Cell
Afterburner Combustion Air	Full Modulation to provide On Ratio Combustion (Energy Efficienc
Door Safety Limit Switch	Each Cell

10. Mechanical Controls On System : S-18-P6

Combustion Air Supply To System - Primary Cells - 2 Each - Adjustable
Combustion Air Supply To System - Afterburner Chamber- Adjustable

11. BURN RATING OF CELLS : Pounds Per Load S-18-P6

Animal Cremations	Load Capacity lb.	150 lb.
	Burn Rate Pounds Per Hour	50 lb.

Cells Loaded 3 To 4 Times Per Day
Burn Rate Is Dependent Upon - Btu Of Material ,Load Rate And Density

12. OPTIONS AVAILABLE AT ADDITIONAL COST S-18-P6

Decorative Facade, Front And Sides
Hydraulic actuated load doors
Temperature Recorders, (Continuous, 7 Day / 24 Hours) Single Pin Or Dual Pin
Opacity Monitor With Alarm
Remote Access For Equipment Monitoring
Data acquisition
Additional Stack Sections
Stack Roof Penetration Rain Shield Does Not Include Roof Jack
Stack Rain Cap
Extra Operational and Maintenance Manuals

SPECIFICATIONS- Model IEB Series 56

1. Equipment Type	Model IEB Series 56
A. Model No.	IE43-IEB 56
B. Underwriters Laboratories Listing and File No.	MH14647
2. Dimensions	
A. Footprint	14’ – 4” x 7’ – 10 1/2” (4.37 m x 2.4 m)
B. Maximum Length	16’ – 8” (5.08 m)
C. Maximum Width	8’ -11 1/2” (2.73 m)
D. Maximum Height	11’ – 3” (3.43 m)
E. Chamber Loading Opening	38 1/2"H x 70”W x 116”L (1.1 m x 1.8 m x 2.9 m)
3. Weight	54,000 lbs. (24,494 kg.)
4. Utility/Air Requirements	
A. Gross Gas Input, Natural or LP Gas	4,500,000 BTU/h max
Running Gas Pressure, Natural Gas	11 inches (279.4 mm) water column or greater
Running Gas Pressure, LP Gas	11 inches (279.4 mm) water column or greater
B. Electrical Supply	230 volt, 3Ø or 1Ø, 60 hz (other available)
C. Air Supply	3,000 cfm (85 standard m^3/min)
5. Incineration Capacity	400 lbs./hr. (181.4 kg/h)
6. Typical Loading Capacity of Waste Types	3000 lbs. (1360.8 kg)
7. Construction and Safety Standards	Incineration Institute of America, Underwriters Laboratories, Canadian Standards Association
8. Steel Structure Construction	
A. Frame	2” (51 mm) square tubing
B. Front/Rear Plates	3/8” (9.5 mm) plate
C. Floor Plates	3/16” (5 mm) plate
D. Outer Side Casing	12 gauge (3 mm) plate
E. Inner Side Casing	12 gauge (3 mm) plate
9. Stack Construction	
A. Inner Wall	4 ½” (114 mm) insulating firebrick or castable
B. Outer Wall	12 gauge (3 mm) sheet, 304 s.s., welded seams (unlined stack available)
10. Draft Nozzle Construction	Schedule 40 type 316 s.s. pipe, welded connections
11. Main Chamber Door Construction	
A. Steel Shell	3/16” (5 mm) steel, welded with reinforcement
B. Outer Refractory	1” (25 mm) insulating block
C. Inner Refractory	4½” (114 mm) insulating firebrick
12. Primary Chamber Wall Construction	
A. Outer Casing Wall	12 gauge (3 mm) sheet
B. Inner Frame/Air Compartment	2” (51 mm) air compartment
C. Inner Casing Wall	12 gauge (3 mm) sheet

SPECIFICATIONS- Model IEB Series 56

	D. Outer Refractory Wall	5” (127 mm) insulating block
	E. Inner Refractory Wall	4½” (114 mm) firebrick
13.	Secondary Chamber Wall Construction	
	A. Outer Casing Wall	12 gauge (3 mm) sheet
	B. Inner Frame/Air Compartment	2” (51 mm) air compartment
	C. Inner Casing Wall	12 gauge (3 mm) sheet
	D. Outer Refractory Wall	6” (152 mm) insulating block
	E. Inner Refractory Wall	4½” (114 mm) firebrick
14.	Refractory Temperature Ratings	
	A. Standard Firebrick	3,100° F. (1704° C)
	B. Insulating Firebrick	2,600° F. (1427° C)
	C. Castable Refractory (Hearth)	2,550° F. (1399° C)
	D. Castable Refractory	2,550° F. (1399° C)
	E. Insulating Block	1,900° F. (1038° C)
	F. Bonding Mortar	3,200° F. (1760° C)
15.	Chamber Volumes (not including external flues, stacks or chimneys)	
	A. Primary Chamber	180 cubic feet (5.12 m^3)
	B. Secondary Chamber	140 cubic feet (3.96 m^3)
16.	Emission Control Features	
	A. Secondary Chamber with Afterburner	Included
	B. Opacity Monitor and Controller with Visual and Audible Alarms	Included
	C. Auxiliary Air Control System	Included
	D. Microprocessor Temperature Control System	Included
17.	Operating Temperatures	
	A. Primary Chamber	1,200° F. - 1,800° F. (649° C - 982° C)
	B. Secondary Chamber	1,400° F. - 1,800° F. (760° C - 982° C) as required
18.	Secondary Chamber Retention Time	> 1 second
19.	Ash Removal	Door functions as a heat shield. Sweep out beneath front door into hopper that fills collection pan.
20.	Safety Interlocks	
	A. High Gas Pressure	Optional
	B. Low Gas Pressure	Optional
	C. Blower Air Pressure	Included
	D. Door Position	Included
	E. Opacity	Included
	F. Motor Starter Function	Included
	G. Chamber Temperature	Included
	H. Motor Overload	Included
	I. Flame Quality	Included
	J. Burner Safe Start	Included

SPECIFICATIONS- Model IEB Series 56

22.	Burner Description	The nozzle mix burners used on this cremation equipment are industrial quality and designed for incinerator use.
23.	Ultraviolet Flame Detection	Ultraviolet flame detection has proven to be the most reliable means of flame safety. The system is completely sealed in a quartz capsule to eliminate problems, caused by moisture and dust created in the cremation process, which effect flame rod detectors.
24.	Operating Panel Indicating Lights	
	A. Safe Run	Included
	B. Door Closed	Included
	C. Pollution Alarm	Included
	D. Afterburner On (Secondary Burner)	Included
	E. Cremation Burner On	Included
	F. Low Fire Cremation Burner On	Included
	G. Afterburner (Secondary Burner) Reset	Included
	H. Cremation Burner Reset	Included
	I. Hearth Air	Included
	J. Throat Air Off	Included
25.	Automatic Timer Functions	
	A. Master Cycle	Included
	B. Afterburner (Secondary Burner)	Included
	C. Cremation Burner	Included
	D. Low Fire Cremation Burner	Included
	E. Hearth Air	Included
	F. Throat Air	Included
	G. Pollution Monitoring	Included
	H. Afterburner (Secondary Burner) Prepurge	Included
	I. Cremation Burner Prepurge	Included
	J. Cool Down	Included
26.	Exterior Finish	
	A. Primer	2 coats rust inhibiting
	B. Finish	2 coats textured finish
27.	Start-Up and Training	Startup of cremation equipment and training of operators to properly operate and maintain the equipment is performed on-site under actual operating conditions. Included is a comprehensive owner's manual, with details on the equipment, its components and proper operation.
28.	Environmental Submittals	Complete technical portion of state environmental permits. Engineering calculations, technical data, existing stack test results and equipment blueprints provided.

SECTION III

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
375 Beale Street, Suite 600
San Francisco, California 94105
(415) 771-6000

Contractor Source Test Supplemental Form

Site name: Bubbling Wells

NST number: 6521

Testing company: BEST ENVIRONMETAL

Test purpose:

☐ Routine compliance testing

☐ Compliance test required after previous source test failure

☑ Start-up test

☐ Other, ex: trial testing for permit changes, engineering studies

Please explain:

☐ Revised report with corrections noted

Revision number:

Preliminary test results:

☐ **Values within range set by rule or regulation**

☐ **Values outside of range set by rule or regulation**

☐ N/A

☐ Please explain:

Source Test Report
Initial Compliance

Bubbling Wells
Napa, CA

Animal Cremator (S-2)
Plant 24712
Permit Application 30522
Condition 27310
NST 6521

Test Date: May 25-27, 2021

Report Date: August 17, 2021

Prepared For:

Bubbling Wells
40 Executive Ct
Napa, CA 94558

Performed and Reported by:

BEST ENVIRONMENTAL
339 Stealth Court
Livermore, CA 94551
Phone: (925) 455-9474
Fax: (925) 455-9479
Email: bestair@best-enviro.com

For Submittal To:

Bay Area Air Quality Management District
375 Beale Street
San Francisco, CA 94105

REVIEW AND CERTIFICATION

Team Leader:

The work performed herein was conducted under my supervision, and I certify that the details and results contained within this report are to the best of my knowledge an authentic and accurate representation of the test program. If this report is submitted for compliance purposes it should only be reproduced in its entirety. If there are any questions concerning this report, please call the Team Leader or Reviewer at (925) 455-9474.

William Johnston
Project Manager

Reviewer:

I have reviewed this report for presentation and accuracy of content, and hereby certify that to the best of my knowledge the information is complete and correct.

Basim (Bobby) Asfour
Principal

Source Test Information

Source Location:
Bubbling Wells
40 Executive Ct
Napa, CA 94558
Plant 1124724712

Source Description:
Animal Cremator, Matthew, Model IEB Series 50, 4.4MMBtu/hr fired on natural gas

Source Number: #2

Condition Number: #27310

Test Parameters:
Dioxins, Furans & PAHs, Hydrogen Chloride & Hydrogen Fluoride, Arsenic, Beryllium, Cadmium, Copper, Lead, Nickel, Selenium, Hexavalent Chromium, Aldehydes

Source Testing Firm:
BEST ENVIRONMENTAL
339 Stealth Court
Livermore, CA 94551
Phone (925) 455-9474
Fax (925) 455-9479
Contact: Regan Best or Bobby Asfour

Test Date: May 25-27, 2021

NST: Number 6521

Analytical Laboratories:
BEST ENVIRONMENTAL
339 Stealth Court
Livermore, CA 94551
Phone (925) 455-9474
Fax (925) 455-9479

Atmospheric Analysis & Consulting
1534 Eastman Avenue
Ventura, CA 93003

ALS Environmental
1435 Norjohn Ct
Burlington, Ontario

TABLE of CONTENTS

SECTION 1. INTRODUCTION

1.1. Test Purpose

BEST ENVIRONMENTAL (BE) was contracted by Bubbling Wells to a perform an initial compliance source test on one animal cremator located at the Bubbling Well facility in Napa, Ca. The purpose of the test was to comply with Bay Area Air Quality Management District (BAAQMD) Condition 27310. The cremator tested is a Matthews IEB 50 designated by BAAQMD as source S-2.

1.2. Test Location

The test was conducted on the Unit IEB 50 which is located at 40 Executive Ct, Napa, CA. The facility is identified by the BAAQMD as Plant 24712.

1.3. Test Date

The test was conducted on May 25-27, 2021.

1.4. Test Parameters and Methods

The following emission parameters were measured.

Parameter	Test Methods	Run time
Dioxins, Furans & PAHs	EPA M23	120 min.
Hydrogen Chloride & Hydrogen Fluoride	EPA M26A	60 min
Arsenic, Beryllium, Cadmium, Copper, Lead, Nickel, Selenium	EPA M29	60 min
Hexavalent Chromium	EPA M306	80 min
Acetaldehyde & Formaldehyde	ARB 430	30 min
Flow Rate	EPA M1-4	Concurrent

1.5. Sampling and Observing Personnel

The test notification was submitted to the BAAQMD on May 14, 2021 by BE and assigned a Notice of Source Test Number 6521. Suhail Asfour, Regan Best Irwin and William Johnston of BE performed the test. David Harberts of Bubbling Wells coordinated the test program. No representative of the BAAQMD was present to witness the test.

SECTION 2. SUMMARY OF RESULTS

2.1. Emission Results

Table 2.1 summarizes the Average Test Results compared to the permit limits. Triplicate runs were performed for all test parameters with the unit operating at typical load. Testing was conducted according to approved California Air Resources Board (CARB) and Environmental Protection Agency (EPA) test methods. Individual run results are presented in Tables 1 through 6 on pages 7-13. A copy of the permit is included in the appendices.

Table 2.1 Average Test Results

Parameter	Average Result lbs/body	Permit Limits lbs/body
Hydrogen Chloride	2.36E-02	**7.2 E-02**
Hydrogen Fluoride	<7.85E-05	**6.60E-04**
Dioxins & Furans	8.10E-11	**1.40E-09**
PAHs	2.37E-05	**4.90E-08**
Arsenic	6.03E-07	**3.00E-05**
Beryllium	<6.05E-08	**1.40E-06**
Cadmium	2.95E-07	**1.10E-05**
Copper	2.46E-05	**2.70E-05**
Lead	2.68E-05	**6.6E-05**
Nickel	5.08E-06	**3.80E-05**
Selenium	4.40E-06	**4.40E-05**
Hexavalent Chromium	3.05E-07	**1.40E-05**
Acetaldehyde	1.32E-05	**1.30E-04**
Formaldehyde	8.14E-06	**3.40E-05**

2.2. Comments: Discussion of Quality Assurance and Errors

Quality assurance procedures listed in the above referenced test methods and referenced in the Source Test Plan were performed and documented. The QA/QC procedures are described in Section 4.3 of the report.

Pretest calculations for Method 23 & Method 29 were performed for run time determinations. These calculations can be found in Appendix A.

Emission factors in units of pounds pollutant per body incinerated was calculated using pounds per hour, the method run time and the number of bodies. The number of bodies was calculated from the total weight divided by 150 lbs (permitted weight equal to a body).

The Dioxin/PAH runs had to be conducted on two separate days due to run time and available incineration time.

Final dioxin results were calculated using EPA toxic equivalency factors.

SECTION 3. SOURCE OPERATION

3.1. Process Description

Bubbling Well offers two types of cremation services, as well as many other memorial options for the pet owners of the Bay Area, Private Cremation and Communal non return cremation from three animal cremators. The cremators are equipped with secondary temperature controls to controls emissions and odor. A continuous temperature chart recorder continuously monitors the chamber temperatures. Cremator IEB 50 is a single batch operation loaded initially and fired continually throughout the day with no additional loads.

3.2. Flow Diagram

A digital image of the stack is contained in Appendix F.

3.3. Process and Control Operating Parameters

The operating temperature of the secondary chamber was kept above 1,650°F during the test series. A continuous temperature chart recorder continuously monitors the chamber temperatures. Temperature charts provided by Bubbling Well are in Appendix D. Process charge weights for each day are presented below.

Process Weights

Test Date	Total Weight (lbs)	Incineration Time (hr)	# Bodies (@150 lbs per)
5-25-21	1,528	5.50	10.2
5-26-21	2,037	6.25	13.6
5-27-21	2,374	6.75	15.8

3.4. Testing or Process Interruptions and Changes

No test or process interruptions occurred during the test.

SECTION 4. SAMPLING AND ANALYSIS PROCEDURES

4.1. Port Location

Emissions from the engine were sampled through a single sample port located on the round stack. The dimensional cross-section of the stack is 25.5 inches.

4.2. Method Description, Equipment, Sampling, Analysis and QA/QC

Sampling and analytical procedures of the EPA Methods are followed as published in the "Quality Assurance Handbook for Air Pollution Measurement Systems" Volume III, US EPA 600/4-77-027b.

The following is an overview of the Testing Performed

Parameter	Test Methods	Run time
Dioxins, Furans & PAHs	EPA M23	120 min.
Hydrogen Chloride & Hydrogen Fluoride	EPA M26A	80 min
Arsenic, Beryllium, Cadmium, Copper, Lead, Nickel, Selenium	EPA M29	80 min
Hexavalent Chromium	EPA M306	80 min
Formaldehyde & Acetaldehyde	ARB 430	30 min
Flow Rate	EPA M1-4	Concurrent

EPA Method 1. 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.

EPA Method 2 is used to determine stack gas velocity using a standard or S-type pitot tube and inclined manometer or magnehelic. Temperature is monitored using a K-type thermocouple and calibrated Omega temperature meter. Leak checks are performed 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 and records are submitted with the report.

EPA Method 3 is used to determine the molecular weight of the stack gas from O2 and CO2 measurements. Concentrations of O2 & CO2 were obtained from EPA Method 3C analysis.

EPA Method 4 is used to determine the moisture content in the gas stream by extracting a sample and condensing the moisture in the impingers and the silica gel trap. The moisture gained is determined volumetrically and gravimetrically. Results are recorded on the field data sheet.

EPA M26A is applicable for determining emissions of hydrogen halides (HX) [HCl, HBr, and HF] and halogens (X2) [Cl2 and Br2] from stationary sources. Gaseous pollutants are withdrawn isokinetically from the source and collected in absorbing solutions. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively. Following sampling. the emissions are solubilized in the acidic solution and form chloride (Cl−), bromide (Br−), and fluoride (F−) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton (H+), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added to the alkaline solution to assure reaction with the hypohalous acid to form a second halide ion, such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC).

EPA M23 is used to determine the Dioxins and Polycyclic Aromatic Hydrocarbon (PAH) emissions. The sampling equipment consists of a glass nozzle, a BEI constructed heated glass-lined probe, heated filter box and filter holder with teflon-coated 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 has a short stem and is empty, the second contains DI water and the third is empty. A fourth impinger contains 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 and a methylene chloride 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 with acetone and methylene chloride. The sorbent module is capped. The second and third impinger contents and silica gel are 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. Acetone, Methylene Chloride and deionized water blanks were 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.

EPA M29 is used to determine the emissions of metal compounds. 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 four Greenburg-Smith impingers immersed in ice. The first two impingers contain a solution of 5%HNO_3/10%H_2O, the third is empty, the fourth contains silica gel desiccant).

Analysis for metals was performed by Inductively Coupled Argon Plasma (ICAP), Atomic Adsorption Spectroscopy (AAS), Graphite Furnace AAS (GFAAS).

EPA Method 306 was used to determine total and hexavalent chromium. An emission sample is extracted isokinetically from the source using an unheated Method 5 sampling train (40 CFR Part 60, Appendix A), with a glass nozzle and probe liner, but with the filter omitted. The sample time shall be at least two hours. The Cr emissions are collected in an alkaline solution containing 0.1 N sodium hydroxide (NaOH). The collected samples are recovered using an alkaline solution and are then transported to the laboratory for analysis. Reagent blanks are collected using the same lot reagents, same proportions and techniques as the test samples. Analytical QA/QC consisted of a reagent blank.

CARB Method 430 is used to determine emissions of Aldehyde and Ketone compounds. Gaseous emissions are drawn through a Teflon sample line and two midget impingers in series, each containing aqueous acidic solution of 2,4-dintrophenyl-hydrazine (DNPH), 10mL per impinger. A pre-test leak check is performed for each run. Sample is drawn at a rate of ~ 0.5 liters per minute for approximately 10 to 58 minutes. Following each run the sample impingers are capped off labeled and prepared for shipment. Also, a field blank is collected for each run by loading the impingers and performing a leak check. The integrity of each sample is maintained by labeling each bottle in correspondence to the chain of custody and shipment in a chilled container. All sampling is performed within 48-hours of pre-sampling reagent blank analysis. After organic solvent extraction, the samples are sent to a laboratory and analyzed using reverse phase HPLC (high performance Liquid Chromatography) where target compounds are quantified and identified by comparison of retention times and area counts of the samples with those of standards. Each impinger is analyzed separately including blanks. For each run, sample C was the field blank.

4.3. Analytical Laboratory

HCl & HF samples were analyzed by AAC lab. Dioxins, furans, PAHs, metals and hexavalent chrome samples were analyzed by ALS Environmental. For more information on the analysis procedure and QA/QC refer to Appendix B

TABLE 1
Bubbling Wells
Acid Emission Results
Crematory Unit IEB 50
Permit #30522

RUN #	1	2	3	AVERAGE	Limits
Test Date	5-25-21	5-25-21	5-25-21		
Run Time	1100-1205	1200-1204	1414-1520		
Total Weight	1,528				
Bodies per Batch	10.2	10.2	10.2		
Run Time, hrs	1.0				
Sample Volume (DSCF)	39.454	37.959	38.340		
Isokinetic (%)	107	100	102	103	
Stack Temp. F	975	983	992	983	
Velocity (ft/sec)	22.34	22.45	22.56	22.45	
Flowrate (ACFM)	4,755	4,777	4,801	4,778	
Flowrate (DSCFM)	1,564	1,617	1,596	1,592	
H_2O (volume %)	11.36	8.31	9.36	9.68	
HCl ug/sample	39,900	50,900	43,500	44,767	
ppm	23.67	31.38	26.55	27.20	
lbs/hr	2.09E-01	2.78E-01	2.35E-01	2.41E-01	
lbs/body	2.06E-02	2.73E-02	2.31E-02	**2.36E-02**	**7.20E-02**
HF ug/sample	<157	<137	153	<149	
ppm	<0.17	<0.15	0.17	<0.16	
lbs/hr	<8.24E-04	<7.47E-04	<8.26E-04	<7.99E-04	
lbs/body	<8.09E-05	<7.34E-05	<8.11E-05	**<7.85E-05**	**6.60E-04**

WHERE:
body = 150 lbs
"Hg = Inches of Mercury
°F = Fahrenheit
ug = micrograms
Molecular Weight
HCL = 36.46
HF = 20.006
lbs/hr = Emission rate, grams per hour
lbs//body = pounds pollutant per bodies per batch

CALCULATIONS:
Vw std = 0.06236 * Vw * (Tstd + 460) / 29.92 / 18
Vm std = Vm * Yd * (Tstd + 460) * (Pb +(ΔH/13.6)) / (Tm + 460) / 29.92
ppm = 1.6085 * (mg / Vm std) * (Tstd + 460) / MW
lbs/body = lbs/hr * hrs/batch * batch/body
Body = 150 pounds

TABLE 2
Bubbling Well
Metals Emission Results
Crematory Unit IEB 50
Permit #30522

RUN #		1	2	3	AVERAGE	Limit
Test Date		5-26-21	5-26-21	5-26-21		
Run Time		1100-1205	1155-1318	1414-1520		
Total Weight		2,037				
Bodies per Batch		13.6	13.6	13.6	13.6	
Run Time, hrs		1.0				
Sample Volume (DSCF)		50.233	47.662	51.077		
Isokinetic (%)		108.4	99.7	99.8	102.6	
Stack Temp. F		1,009	1,087	977	1,024	
Velocity (ft/sec)		22.90	23.20	22.20	22.77	
Flowrate (ACFM)		4,874	4,938	4,724	4,846	
Flowrate (DSCFM)		1,477	1,523	1,632	1,544	
H_2O (volume %)		15.8	9.7	6.1	10.6	
Mass Emissions						
Arsenic	ug/sample	2.72	1.93	1.38	2.0100	
	ug/dscm	1.53E-03	1.15E-03	7.65E-04	1.15E-03	
	ug/dscf	5.41E-02	4.05E-02	2.70E-02	4.06E-02	
	lbs/hr	1.06E-05	8.15E-06	5.83E-06	8.18E-06	
	lb/body	7.78E-07	6.00E-07	4.29E-07	**6.03E-07**	**3.00E-05**
	ppb (MW=74.99)	4.94E-04	3.69E-04	2.47E-04	3.70E-04	
Beryllium	ug/sample	<0.2	<0.2	<0.2	<0.2	
	ug/dscm	<1.13E-04	<1.19E-04	<1.11E-04	<1.14E-04	
	ug/dscf	<3.98E-03	<4.20E-03	<3.92E-03	<4.03E-03	
	lbs/hr	<7.77E-07	<8.45E-07	<8.44E-07	<8.22E-07	
	lb/body	<5.7E-08	<6.2E-08	<6.2E-08	**<6.05E-08**	**1.40E-06**
	ppb (MW=9.0)	<3.02E-04	<3.19E-04	<2.97E-04	<3.06E-04	
Cadmium	ug/sample	1.04	1.11	0.783	0.98	
	ug/dscm	5.86E-04	6.59E-04	4.34E-04	5.60E-04	
	ug/dscf	2.07E-02	2.33E-02	1.53E-02	1.98E-02	
	lbs/hr	4.04E-06	4.69E-06	3.31E-06	4.01E-06	
	lb/body	2.98E-07	3.45E-07	2.43E-07	**2.95E-07**	**1.10E-05**
	ppb (MW=112.4)	1.26E-04	1.42E-04	9.32E-05	1.20E-04	

TABLE 2 continued

Bubbling Well

Metals Emission Results
Crematory Unit IEB 50
Permit #30522

Copper	ug/sample	47.5	108	86.0	80.5	
	ug/dscm	2.68E-02	6.42E-02	4.77E-02	4.62E-02	
	ug/dscf	0.95	2.27	1.68	1.63	
	lbs/hr	1.85E-04	4.56E-04	3.63E-04	3.35E-04	
	lb/body	1.36E-05	3.36E-05	2.67E-05	**2.46E-05**	**2.70E-05**
	ppb (MW=63.55)	1.02E-02	2.44E-02	1.81E-02	1.76E-02	
Lead	ug/sample	42.4	89.0	131	87.47	
	ug/dscm	2.39E-02	5.29E-02	7.26E-02	4.98E-02	
	ug/dscf	8.44E-01	1.87E+00	2.56E+00	1.76E+00	
	lbs/hr	1.65E-04	3.76E-04	5.53E-04	3.65E-04	
	lb/body	1.21E-05	2.77E-05	4.07E-05	**2.68E-05**	**6.6 0E-05**
	ppb (MW=207.2)	2.78E-03	6.16E-03	8.46E-03	5.80E-03	
Nickel	ug/sample	7.42	26.6	15.6	16.54	
	ug/dscm	4.18E-03	1.58E-02	8.65E-03	9.55E-03	
	ug/dscf	1.48E-01	5.58E-01	3.05E-01	3.37E-01	
	lbs/hr	2.88E-05	1.12E-04	6.59E-05	6.90E-05	
	lb/body	2.12E-06	8.27E-06	4.85E-06	**5.08E-06**	**3.80E-05**
	ppb (MW=53.71)	1.88E-03	7.10E-03	3.89E-03	4.29E-03	
Selenium	ug/sample	13.7	25.4	4.46	14.52	
	ug/dscm	7.72E-03	1.51E-02	2.47E-03	8.43E-03	
	ug/dscf	2.73E-01	5.33E-01	8.73E-02	2.98E-01	
	lbs/hr	5.32E-05	1.07E-04	1.88E-05	5.98E-05	
	lb/body	3.92E-06	7.90E-06	1.39E-06	**4.40E-06**	**4.40E-05**
	ppb (MW=78.96)	2.36E-03	5.76E+00	9.44E-01	2.24E+00	

WHERE,

< = Less Than

Velocity = Stack gas velocity in feet per second

DSCFM = Dry Standard cubic feet per minute

ug/dscm = micrograms per dry standard cubic meter
ug/dscf = micrograms per dry standard cubic foot
lbs/hr = Emission rate, grams per hour
lbs//body = pounds pollutant per bodies per batch

CALCULATIONS,

ug/DSCM = ug / DSCF / 35.31

lbs/hr = ((ug/dscf) / 1,000,000 * DSCFM * 600 / 454

ppb @ 60 °F = 24.14 * (ug/dscm) / M.W.

lbs/body = lbs/hr * hrs/batch * batch/body
Body = 150 pounds

TABLE 3
Bubbling Wells
Hexavalent Chromium Emission Results
IEB 50
Permit #30522

RUN #	1	2	3	AVERAGE	Limit
Test Date	5-26-21	5-26-21	5-26-21		
Test Time	918-1041	1155-1318	1359-1520		
Total Weight	2,037				
Bodies per Batch	13.6	13.6	13.6	13.6	
Run Time, hrs	1.3				
Isokinetic (%)	106.7	101.8	98.5		
Sample Volume (DSCF)	50.151	48.882	49.872		
Velocity (ft/sec)	22.80	23.41	22.32	22.84	
Flow Rate (ACFM)	4,852	4,982	4,750	4,861	
Flow Rate (DSCFM)	1,498	1,531	1,614	1,548	
Chromium Emissions					
Hexavalent Chromium, total ug	0.29	0.78	1.21	0.76	
Hexavalent Chromium, (ug/dscm)	1.64E-04	4.52E-04	6.87E-04	4.34E-04	
Hexavalent Chromium, (ug/dscf)	5.78E-03	1.60E-02	2.43E-02	1.53E-02	
Hexavalent Chromium, (lbs/hr)	1.14E-06	3.23E-06	5.17E-06	3.18E-06	
Hexavalent Chromium, (lbs/body)	1.10E-07	3.09E-07	4.95E-07	**3.05E-07**	**1.40E-05**
Hexavalent Chromium, (ppb) (MW=51.996)	7.60E-05	2.10E-04	3.19E-04	2.02E-04	

WHERE,
< = Less Than
Velocity = Stack gas velocity in feet per second
DSCFM = Dry Standard cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
ug/dscf = micrograms per dry standard cubic foot
lbs/hr = Emission rate, grams per hour

CALCULATIONS,
ug/DSCM = ug / DSCF / 35.31
lbs/hr = ((ug/dscf) / 1,000,000 * DSCFM * 600 / 454
ppb @ 60 °F = 24.14 * (ug/dscm) / M.W.
lbs/body = lbs/hr * hrs/batch * batch/body
Body = 150 pounds

TABLE 4

Bubbling Wells
Aldehyde Emissions Results
Crematory Unit IEB 50
Permit #30522

RUN	1	2	3	Average	Limit
Test Date	5-27-21	5-27-21	5-27-21		
Test Time	1006-1036	1044-1114	1120-1150		
Standard Temp., °F	70	70	70		
Total Weight	2,374				
Bodies per batch	15.83	15.83	15.83	15.83	
Run Time, hrs	0.5				
Flow Rate, DSCFM [1]	1,467	1,467	1,467	1,467	
Standard Meter Volume, liters	14.7	14.5	14.5	14.596	
Emissions Data					
Oxygen, %	16.6	18.5	17.5	17.5	
M.W.					
Formaldehyde, ug/sample	0.597	0.670	0.775	0.681	
Formaldehyde, ppb	32.6	37.2	42.9	37.5	
Formaldehyde, gm/hr 30.0	0.10	0.12	0.13	0.12	
Formaldehyde, lbs/hr	2.24E-04	2.55E-04	2.94E-04	2.58E-04	
Formaldehyde, lbs/body	7.07E-06	8.06E-06	9.29E-06	**8.14E-06**	**3.40E-05**
Acetaldehyde, ug/sample	0.138	2.081	1.082	1.100	
Acetaldehyde, ppb	5.1	78.5	40.7	41.5	
Acetaldehyde, gm/hr 44.1	2.34E-02	3.59E-01	1.86E-01	1.89E-01	
Acetaldehyde, lbs/hr	5.17E-05	7.92E-04	4.11E-04	4.18E-04	
Acetaldehyde, lbs/body	1.63E-06	2.50E-05	1.30E-05	**1.32E-05**	**1.30E-04**

1 = flow rate is from the M23 run 3

WHERE:
ppb = parts per billion
M.W. = Molecular Weight
gm/hr = Grams Per Hour
ug/dscm = micrograms per dry standard cubic meter
Formadehyde MW = 30
Acetadehyde MW = 44.1

CALCULATIONS:
ug/dscm = (ug/sample) / dscm
gm/hr = ppb * DSCFM * M.W * 453.6 * 8.223E-5 /(Tstd + 460)
Aldehyde, ppbv = ((ug/sample) / M.W. * (24.14 / sample volume)) * 1000
lbs/body = lbs/hr * hrs/batch * batch/body
Body = 150 pounds

TABLE 5
Bubbling Wells
PAH Emission Results
IEB 50

TEST#	**1**	**2**	**3**	**AVERAGE**
Test Date	5-25-21	5-25-21	5/27/21	
Run Time	952-1156	1304-1508	0907-1110	
Total Weight, lbs	1,528		2,374	
Bodies per Batch	10.2	10.2	15.8	
Run Time, hrs	2.0	2.0	2.0	
Sample Volume (DSCF)	72.882	70.325	66.153	69.786
Sample Volume (DSCM)	2.064	1.992	1.873	1.976
Flow Rate (DSCFM)	1,563	1,616	1,510	1,563
Isokinetic, %	99.1	92.5	93.1	94.9
Naphthalene,				
total ng	19600	5980	27600	17727
(ng/dscm)	9496	3003	14732	9077
(lbs/hr)	5.56E-05	1.82E-05	8.33E-05	5.24E-05
(lbs/body)	**1.09E-05**	**3.57E-06**	**1.05E-05**	**8.34E-06**
ppt, MW = 128	1790	566	2777	1711
Acenaphthylene,				
total ng	405	40.2	132	192.4
(ng/dscm)	196	20	70	96
(lbs/hr)	1.15E-06	1.22E-07	3.98E-07	5.57E-07
(lbs/body)	**2.26E-07**	**2.40E-08**	**5.04E-08**	**1.00E-07**
ppt, MW = 152	31.15	3.20	11.19	15.18
Acenaphthene,				
total ng	122	33.2	86.5	80.57
(ng/dscm)	59.1	16.7	46.2	40.6
(lbs/hr)	3.46E-07	1.01E-07	2.61E-07	2.36E-07
(lbs/body)	**6.80E-08**	**1.98E-08**	**3.30E-08**	**4.03E-08**
ppt, MW = 154	9.26	2.61	7.23	6.37
Fluorene,				
total ng	10300	4610	3700	6203
(ng/dscm)	4990	2315	1975	3093
(lbs/hr)	2.92E-05	1.40E-05	1.12E-05	1.81E-05
(lbs/body)	**5.74E-06**	**2.75E-06**	**1.41E-06**	**3.30E-06**
ppt, MW=166	725.40	336.47	287.09	449.65
Phenanthrene,				
total ng	18800	9120	28900	18940
(ng/dscm)	9108	4579	15426	9705
(lbs/hr)	5.33E-05	2.77E-05	8.72E-05	5.61E-05
(lbs/body)	**1.05E-05**	**5.44E-06**	**1.10E-05**	**8.98E-06**
ppt, MW=178	1234.8	620.8	2091.2	1315.6

TABLE 5 Continued...

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PAH Emission Results

IEB 50

TEST#	1	2	3	AVERAGE
Anthracene,				
total ng	1130	132	178	480
(ng/dscm)	547	66	95	236
(lbs/hr)	3.21E-06	4.01E-07	5.37E-07	1.38E-06
(lbs/body)	**6.29E-07**	**7.88E-08**	**6.79E-08**	**2.59E-07**
ppt, MW=178	74.22	8.98	12.88	32.03
Fluoranthene,				
total ng	992	632	914	846
(ng/dscm)	481	317	488	429
(lbs/hr)	2.81E-06	1.92E-06	2.76E-06	2.50E-06
(lbs/body)	**5.53E-07**	**3.77E-07**	**3.49E-07**	**4.26E-07**
ppt, MW=202	57.41	37.907	58.279	51.200
Pyrene,				
total ng	615	348	1100	688
(ng/dscm)	298	175	587	353
(lbs/hr)	1.74E-06	1.06E-06	3.32E-06	2.04E-06
(lbs/body)	**3.43E-07**	**2.08E-07**	**4.20E-07**	**3.23E-07**
ppt, MW=202	35.59	20.87	70.14	42.202
Benzo(a)Anthracene,				
total ng	47.6	16.9	17.6	27.4
(ng/dscm)	23.1	8.5	9.4	13.6
(lbs/hr)	1.35E-07	5.14E-08	5.31E-08	7.99E-08
(lbs/body)	**2.65E-08**	**1.01E-08**	**6.71E-09**	**1.44E-08**
ppt, MW=228	2.441	0.9	0.994	1.444
Chrysene				
total ng	3210	1330	1510	2017
(ng/dscm)	1555	668	806	1010
(lbs/hr)	9.11E-06	4.04E-06	4.56E-06	5.90E-06
(lbs/body)	**1.79E-06**	**7.94E-07**	**5.76E-07**	**1.05E-06**
ppt, MW=228	164.595	70.676	85.302	106.858
Benzo(b)Fluoranthene,				
total ng	313.0	25.8	32.3	123.7
(ng/dscm)	152	13	17	61
(lbs/hr)	<8.88E-07	<7.84E-08	<9.75E-08	<3.55E-07
(lbs/body)	**1.74E-07**	**1.54E-08**	**1.23E-08**	**<6.74E-08**
ppt, MW=252	14.5	1.2	1.7	5.8
Benzo(k)Fluoranthene,				
total ng	17.2	<0.36	<0.30	<5.95
(ng/dscm)	8.3	<0.18	<0.16	<2.89
(lbs/hr)	4.88E-08	<1.09E-09	<9.06E-10	<1.69E-08
(lbs/body)	**9.58E-09**	**2.15E-10**	**1.14E-10**	**<3.30E-09**
ppt, MW=252	0.8	<0.017	<0.015	<0.277

TABLE 5 Continued...

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PAH Emission Results

IEB 50

TEST#	1	2	3	AVERAGE
Benzo(e)Pyrene,				
total ng	267	18	33	106
(ng/dscm)	129	9	17	52
(lbs/hr)	7.58E-07	5.56E-08	9.87E-08	3.04E-07
(lbs/body)	**1.49E-07**	**1.09E-08**	**1.25E-08**	**5.74E-08**
ppt, MW=252	12.39	0.88	1.67	4.98
Benzo(a)Pyrene,				
total ng	35.8	2.31	3.07	13.7
(ng/dscm)	17.3	1.2	1.6	6.7
(lbs/hr)	<1.02E-07	<7.02E-09	<9.27E-09	<3.93E-08
(lbs/ton)	**1.99E-08**	**1.38E-09**	**1.17E-09**	**<7.50E-09**
ppt, MW=252	1.7	0.1	0.2	0.6
Perylene,				
total ng	3.61	<0.54	2.59	2.2
(ng/dscm)	1.7	<0.27	1.4	1.1
(lbs/hr)	1.02E-08	<1.64E-09	7.82E-09	6.57E-09
(lbs/body)	**2.01E-09**	**3.22E-10**	**9.88E-10**	**1.11E-09**
ppt, MW=252	0.2	<0.026	0.1	0.1
Indeno(1,2,3-cd)Pyrene,				
total ng	47.50	5.8	4.9	19.4
(ng/dscm)	23.0	2.9	2.6	9.5
(lbs/hr)	1.35E-07	1.76E-08	1.49E-08	5.58E-08
(lbs/body)	**2.65E-08**	**3.46E-09**	**1.88E-09**	**1.06E-08**
ppt, MW = 276	2.012	0.3	0.2	0.8
Dibenz(a,h)Anthracene,				
total ng	57.8	2.7	2.0	20.8
(ng/dscm)	28.0	1.3	1.1	10.1
(lbs/hr)	1.64E-07	8.12E-09	5.98E-09	5.94E-08
(lbs/body)	**3.22E-08**	**1.59E-09**	**7.55E-10**	**1.15E-08**
ppt, MW=278	2.4	0.1	0.1	0.9
Benzo(ghi)Perylene,				
total ng	57.8	7.4	10.7	25.303
(ng/dscm)	28.0	3.7	5.7	12.479
(lbs/hr)	1.64E-07	2.25E-08	3.23E-08	7.29E-08
(lbs/body)	**3.22E-08**	**4.42E-09**	**4.08E-09**	**1.36E-08**
ppt, MW = 276	2.448	<0.325	0.499	1.091

		Limit
Total PAHs, lbs/body	**2.37E-05**	**4.90E-08**

Where,

DSCFM = Dry Standard Cubic Feet per Minute
ng/dscm = nanograms per dry standard cubic meter
ng/sec = Emission rate, nanograms per second
ppt = part per trillion
lbs/hr = pounds per hur
lbs/body = pounds per body
body = 150m lbs

Calculations,

ng/dscm = ng / dscm
ng/sec = 0.02832 * DSCFM * ng/dscm / 60
ppt = ng/dscm * 22.4 * (Tstd. + 460) / 492 / M.W.
Emission Rate, lbs/hr = ppm * MW * DSCFM * 60 / 385E6 (Tstd 68^{o}F)
Emission Factor, lbs/body = (lbs/hr *hrs/batch * batch per body

TABLE 6
Bubbling Wells
Dioxin & Furans Emission Results
IEB 50

TEST#	TEF	1	2	3	AVERAGE
Test Date		5-25-21	5-25-21	5/27/21	
Run Time		952-1156	1304-1508	0907-1110	
Total Weight, lbs		1,528		2,374	
Bodies per Batch		10.2	10.2	15.8	
Run Time, hrs		2.0	2.0	2.0	
Sample Volume (DSCF)		72.882	70.325	66.153	69.786
Sample Volume (DSCM)		2.064	1.992	1.873	1.976
Flow Rate (DSCFM)		1,563	1,616	1,510	1,563
Isokinetic, %		99.1	92.5	93.1	94.9
2,3,7,8 TCDD	**1.0**				
total pg		16.9	9.79	<3.20	9.96
total ng		0.017	0.010	<0.0032	0.010
(ng/dscm)		0.0082	0.0049	<0.0017	0.0049
(lbs/hr)		4.80E-11	2.98E-11	<9.66E-12	2.91E-11
(lbs/body)		9.41E-12	5.84E-12	<1.22E-12	5.49E-12
ppt, MW = 128		1.54E-03	9.27E-04	<3.22E-04	9.31E-04
1,2,3,7,8 PeCDD	**1.0**				
total pg		77.7	41.4	25.2	48.1
total ng		0.078	0.041	0.025	0.048
(ng/dscm)		0.0376	0.0208	0.0135	0.0240
(lbs/hr)		2.20E-10	1.26E-10	7.61E-11	1.41E-10
(lbs/body)		4.33E-11	2.47E-11	9.61E-12	**2.59E-11**
ppt, MW = 128		7.10E-03	3.92E-03	2.54E-03	4.52E-03
1,2,3,4,7,8 HxCDD	**0.1**				
total pg		36.3	31.5	<9.4	25.7
total ng		0.036	0.032	<0.0094	0.026
(ng/dscm)		0.0176	0.0158	<0.0050	0.0128
(lbs/hr)		1.03E-10	9.58E-11	<2.84E-11	7.57E-11
(lbs/body)		2.02E-11	1.88E-11	<3.59E-12	**1.42E-11**
ppt, MW = 152		2.79E-03	2.51E-03	<7.97E-04	2.03E-03
1,2,3,6,7,8 HxCDD	**0.1**				
total pg		69.0	<41	<11	40.3
total ng		0.069	<0.041	<0.011	0.040
(ng/dscm)		0.0334	<0.0206	<0.0059	<0.020
(lbs/hr)		1.96E-10	<1.25E-10	<3.32E-11	<1.18E-10
(lbs/body)		3.84E-11	<2.45E-11	<4.20E-12	**<2.24E-11**
ppt, MW = 154		5.24E-03	<3.23E-03	<9.20E-04	<3.13E-03
1,2,3,7,8,9 HxCDD	**0.1**				
total pg		62.7	63.6	<10	45.4
total ng		0.063	0.064	<0.010	0.045
(ng/dscm)		0.0304	0.0319	<0.0053	0.0225
(lbs/hr)		1.78E-10	1.93E-10	<3.02E-11	1.34E-10
(lbs/body)		3.49E-11	3.80E-11	<3.81E-12	**2.56E-11**
ppt, MW=166		4.42E-03	4.64E-03	<7.76E-04	3.28E-03
1,2,3,4,6,7,8 HpCDD	**0.01**				
total pg		210	300	<61	190
total ng		0.210	0.300	<0.061	0.190
(ng/dscm)		0.1017	0.1506	<0.033	0.0950
(lbs/hr)		5.96E-10	9.12E-10	<1.84E-10	5.64E-10
(lbs/body)		1.17E-10	1.79E-10	<2.33E-11	**1.06E-10**
ppt, MW=178		1.38E-02	2.04E-02	<4.41E-03	1.29E-02

TABLE 6 Continued...

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TEST#		1	2	3	AVERAGE
OCDD	**0.0003**				
total pg		154	350	97.9	201
total ng		0.154	0.350	0.098	0.201
(ng/dscm)		0.0746	0.1757	0.0523	0.1009
(lbs/hr)		4.37E-10	1.06E-09	2.96E-10	5.99E-10
(lbs/body)		8.58E-11	2.09E-10	3.73E-11	**1.11E-10**
ppt, MW=178		1.01E-02	2.38E-02	7.08E-03	1.37E-02
2,3,7,8 TCDF	**0.1**				
total pg		124	43.0	82.9	83.3
total ng		0.124	0.043	0.083	0.083
(ng/dscm)		0.0601	0.0216	0.0442	0.0420
(lbs/hr)		3.52E-10	1.31E-10	2.50E-10	2.44E-10
(lbs/body)		6.91E-11	2.57E-11	3.16E-11	**4.21E-11**
ppt, MW=202		7.18E-03	2.58E-03	5.29E-03	5.01E-03
1,2,3,7,8 PeCDF	**0.03**				
total pg		132	61.3	59.7	84.3
total ng		0.132	0.061	0.060	0.084
(ng/dscm)		0.0640	0.0308	0.0319	0.0422
(lbs/hr)		3.75E-10	1.86E-10	1.80E-10	2.47E-10
(lbs/body)		7.35E-11	3.66E-11	2.28E-11	**4.43E-11**
ppt, MW=202		7.64E-03	3.68E-03	3.81E-03	5.04E-03
2,3,4,7,8 PeCDF	**0.3**				
total pg		162	94.2	173	143
total ng		0.162	0.094	0.173	0.143
(ng/dscm)		0.0785	0.0473	0.0923	0.0727
(lbs/hr)		4.60E-10	2.86E-10	5.22E-10	4.23E-10
(lbs/body)		9.02E-11	5.62E-11	6.60E-11	**7.08E-11**
ppt, MW=228		8.31E-03	5.01E-03	9.77E-03	7.70E-03
1,2,3,4,7,8 HxCDF	**0.1**				
total pg		102	80.6	39	73.7
total ng		0.102	0.081	0.039	0.074
(ng/dscm)		0.0494	0.0405	0.0206	0.0368
(lbs/hr)		2.89E-10	2.45E-10	1.16E-10	2.17E-10
(lbs/body)		5.68E-11	4.81E-11	1.47E-11	**3.99E-11**
ppt, MW=228		5.230E-03	4.283E-03	2.175E-03	3.896E-03
1,2,3,6,7,8 HxCDF	**0.1**				
total pg		125	87.5	<41.0	84.5
total ng		0.125	0.088	<0.041	0.085
(ng/dscm)		0.0606	0.0439	<0.0219	0.0421
(lbs/hr)		3.55E-10	2.66E-10	<1.24E-10	2.48E-10
(lbs/body)		6.96E-11	5.22E-11	<1.56E-11	**4.58E-11**
ppt, MW=252		5.80E-03	4.21E-03	<2.10E-03	4.03E-03
1,2,3,7,8,9 HxCDF	**0.1**				
total pg		32.1	23.8	11.1	22.3
total ng		0.032	0.024	0.011	0.022
(ng/dscm)		0.0156	0.0120	0.0059	0.0111
(lbs/hr)		9.11E-11	7.23E-11	3.35E-11	6.56E-11
(lbs/body)		1.79E-11	1.42E-11	4.23E-12	**1.21E-11**
ppt, MW=252		1.49E-03	1.14E-03	5.67E-04	1.07E-03

TABLE 6 Continued...

(page 3 of 3)

TEST#		1	2	3	AVERAGE
2,3,4,6,7,8 HxCDF	**0.1**				
total pg		112	92.4	67.4	90.6
total ng		0.112	0.092	0.067	0.091
(ng/dscm)		0.0543	0.0464	0.0360	0.0455
(lbs/hr)		3.18E-10	2.81E-10	2.03E-10	2.67E-10
(lbs/body)		6.24E-11	5.51E-11	2.57E-11	**4.78E-11**
ppt, MW=252		5.20E-03	4.44E-03	3.44E-03	4.36E-03
1,2,3,4,6,7,8 HpCDF	**0.01**				
total pg		177	237	77.9	164.0
total ng		0.177	0.237	0.078	0.164
(ng/dscm)		0.0858	0.1190	0.0416	0.0821
(lbs/hr)		5.02E-10	7.20E-10	2.35E-10	4.86E-10
(lbs/body)		9.86E-11	1.41E-10	2.97E-11	**8.99E-11**
ppt, MW=252		8.21E-03	1.14E-02	3.98E-03	7.86E-03
1,2,3,4,7,8,9 HpCDF	**0.01**				
total pg		23.7	<18	5.3	15.7
total ng		0.024	<0.018	0.005	<0.02
(ng/dscm)		0.0115	<0.0090	0.0028	0.0078
(lbs/hr)		6.72E-11	<5.47E-11	1.59E-11	4.59E-11
(lbs/body)		1.32E-11	<1.07E-11	2.01E-12	**8.65E-12**
ppt, MW=252		1.10E-03	<8.65E-04	2.69E-04	7.45E-04
OCDF	**0.0003**				
total pg		35.2	75.1	17.5	42.6
total ng		0.035	0.08	0.018	<0.0
(ng/dscm)		0.0171	0.0377	0.0093	0.0214
(lbs/hr)		9.99E-11	2.28E-10	5.28E-11	1.27E-10
(lbs/body)		1.96E-11	4.48E-11	6.68E-12	**2.37E-11**
ppt, MW = 276		1.49E-03	3.30E-03	8.17E-04	1.87E-03

Where,

DSCFM = Dry Standard Cubic Feet per Minute

ng/dscm = nanograms per dry standard cubic meter

ppt = part per trillion

lbs/body = pounds per body

Body = 150 pounds

Calculations,

ng/dscm = ng / dscm

ng/sec = 0.02832 * DSCFM * ng/dscm / 60

ppt = ng/dscm * 22.4 * (Tstd. + 460) / 492 / M.W.

Emission Rate, lbs/hr = ppm * MW * DSCFM * 60 / 385E6 (Tstd 68°F)

Emission Factor, lbs/body = (lbs/hr) * (hrs/batch) * (bodies/batch)

TABLE 7
Bubbling Well
Dioxin & Furans Emission Results
Toxic Equivalent Factors
IEB 50

Parameter	TEF	Avg	TEF Avg	
2,3,7,8 TCDD	**1.0**			
(lbs/body)		5.49E-12	5.49E-12	
1,2,3,7,8 PeCDD	**1.0**			
(lbs/body)		2.59E-11	2.59E-11	
1,2,3,4,7,8 HxCDD	**0.1**			
(lbs/body)		1.42E-11	1.42E-12	
1,2,3,6,7,8 HxCDD	**0.1**			
(lbs/body)		2.24E-11	2.24E-12	
1,2,3,7,8,9 HxCDD	**0.1**			
(lbs/body)		2.56E-11	2.56E-12	
1,2,3,4,6,7,8 HpCDD	**0.01**			
(lbs/body)		1.064E-10	1.06E-12	
OCDD	**0.0003**			
(lbs/body)		1.11E-10	3.32E-14	
2,3,7,8 TCDF	**0.1**			
(lbs/body)		4.21E-11	4.21E-12	
1,2,3,7,8 PeCDF	**0.03**			
(lbs/body)		4.43E-11	1.33E-12	
2,3,4,7,8 PeCDF	**0.3**			
(lbs/body)		7.08E-11	2.12E-11	
1,2,3,4,7,8 HxCDF	**0.1**			
(lbs/body)		3.99E-11	3.99E-12	
1,2,3,6,7,8 HxCDF	**0.1**			
(lbs/body)		4.58E-11	4.58E-12	
1,2,3,7,8,9 HxCDF	**0.1**			
(lbs/body)		1.21E-11	1.21E-12	
2,3,4,6,7,8 HxCDF	**0.1**			
(lbs/body)		4.78E-11	4.78E-12	
1,2,3,4,6,7,8 HpCDF	**0.01**			
(lbs/body)		8.99E-11	8.99E-13	
1,2,3,4,7,8,9 HpCDF	**0.01**			
(lbs/body)		8.65E-12	8.65E-14	
OCDF	**0.0003**			
(lbs/body)		2.37E-11	7.11E-15	
				Limit
Total		**7.36E-10**	**8.10E-11**	**1.40E-09**

APPENDICES

A

APPENDIX A
CALCULATIONS & NOMENCLATURE

A-1

Standard Abbreviations for Reports

Unit	Abbreviation	Unit	Abbreviation
billion	G	microgram	µg
Brake horsepower	bhp	milligram	mg
Brake horsepower hour	bhp-hr	milliliter	ml
British Thermal Unit	Btu	million	MM
capture efficiency	CE	minute	min
destruction efficiency	DE	Molecular Weight	M
Dry Standard Cubic Feet	DSCF	nanogram	ng
Dry Standard Cubic Feet per Minute	DSCFM	Parts per Billion	ppb
Dry Standard Cubic Meter	DSCM	Parts per Million	ppm
Dry Standard Cubic Meter per Minute	DSCMM	pennyweight per firkin	pw/fkn
grains per dry standard cubic foot	gr/DSCF	pound	lb
gram	g	pounds per hour	lbs/hr
grains per Brake horsepower hour	g/bhp-hr	pounds per million Btu	lbs/MMBtu
kilowatt	kW	second	sec
liter	l	Specific Volume, ft^3/lb-mole	SV
Megawatts	MW	Thousand	k
meter	m	watt	W

Common Conversions / Calculations / Constants

1 gram = 15.432 grains

1 pound = 7000 grains

grams per pound = 453.6

bhp = 1.411 * Engine kW, (where Engine kW = Generator kW output / 0.95) @ 95% efficiency

g/bhp-hr = 453*ppm*(MW / (385E6))* 0.00848 * f-factor * (20.9 / (20.9-O_2)); **CARB**

g/bhp-hr = lbs/hr * 453.6 / bhp

2.59E-9 = Conversion factor for ppm to lbs/scf; **EPA 40CFR60.45 @ 68°F**

Correction Multiplier for Standard Temperature = (460 + $T_{std.}$ °F) / 528

F factor: dscf / MMBTU @ **60°F = 8579, @ 68°F = 8710.** @ 70° F = **8743**

Btu/ft^3@ **68°F = 1040** for Natural Gas; **EPA Method 19 @ 70° F = 1044** for Natural gas

lb/hr <u>Part.</u> Emission Rate = 0.00857 * gr/dscf * dscfm; **EPA Method 5**

lbs/hr = ppm / SV x dscfm x M * 60; **CARB Method 100; where SV ≈ 385E^6 @ 68°F or ≈ 379E^6 @ 60°F or ≈ 386E^6 @ 70°F.**

Correction to 12% CO_2 = gr/dscf * 12% / stack CO_2%; **EPA Method 5**

Correction to 3% O_2 = ppm * 17.9 / (20.9 - stack O_2 %); **CARB Method 100**

Correction to 15% O_2 = ppm * 5.9 / (20.9 - stack O_2 %); **CARB Method 100**

dscfm = Gas Fd * MMBtu/min * 20.9 / (20.9 - stack O_2 %); **EPA Method 19**

lb/MMBtu @ **60°F** = Fd * M * ppm * **2.64E-9** * 20.9 / (20.9 - stack O_2 %);
@ **68°F** = Fd * M * ppm * **2.59E-9** * 20.9 / (20.9 - stack O_2 %); **EPA Method 19 @ 70° F = 2.58E-9**

Standard Temperatures by District

EPA	68 °F	NSAPCD - Northern Sonoma	68 °F
CARB	68 °F	PCAPCD - Placer	68 °F
BAAQMD - Bay Area	70 °F	SLOCAPCD - San Luis Obispo	60 °F
SJVUAPCD - San Joaquin	60 °F	SMAQMD - Sacramento	68°F de facto
SCAQMD - South Coast	60 °F	SCAQMD - Shasta County	68 °F
MBUAPCD - Monterey Bay	68 °F	YSAPCD - Yolo-Solano	68 °F
FRAQMD – Feather River	68 °F	AADBAPC – Amador County	68 °F

ACID EMISSION CALCULATIONS
EPA Method 26A

FACILITY:	Bubbling Wells	DATE:	5-25-21	METER BOX NO.:	APEX 1
UNIT:	IEB 50	TIME:	1022-1125	PROBE NO.:	PR 52
CONDITION:	1528 lbs	TEST NO.:	1	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	76	Total H_2O Condensed,	V_w	107.0
Barometric Press., "Hg	P_b	30.07	Meter Press.,"H_2O	ΔH	1.405			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.241			
Stack Pressure, "Hg	P_s	30.07	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	975	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	60.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	38.790			

A) Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$ 39.454 DSCF

B) Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$ 5.056 SCF

C) Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$ 44.510 SCF

D) Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$ 11.358 %

E) Stack Gas Velocity (Vs) $= 85.49\ C_p\ \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$ 22.342 ft/sec

F) * Stack Gas Molecular Wt.$= 30*(1-H_2O\%/100))+18(H_2O\%/100) =$ 28.637 g/g-mole

G) % Isokinetic $(I) = 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$ 107.19 %

H) ACFM $= (V_s)(A_s)60 =$ 4,755 ACFM

I) Stack Gas Vol. Flow Rate, DSCFM $= (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1-\%H_2O/100)*2.005 =$ 1,564 DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

ACID EMISSION CALCULATIONS
M26A

FACILITY:	Bubbling Wells	DATE:	5-25-21	METER BOX NO.:	APEX 1
UNIT:	IEB 50	TIME:	1200-1204	PROBE NO.:	PR 52
CONDITION:	1528 lbs	TEST NO.:	2	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	82	Total H_2O Condensed,	V_w	72.8
Barometric Press., "Hg	P_b	30.07	Meter Press.,"H_2O	ΔH	1.302			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.243			
Stack Pressure, "Hg	P_s	30.07	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	983	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	60.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	37.747			

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	37.959	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E-5*(T_{std}+460)*V_w =$	3.440	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	41.398	SCF
D)	Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$	8.309	%
E)	Stack Gas Velocity (Vs) = $85.49\ C_p \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.447	ft/sec
F) *	Stack Gas Molecular Wt.= $30*(1-H_2O\%/100))+18(H_2O\%/100) =$	29.003	g/g-mole
G)	% Isokinetic (I) = $9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	99.78	%
H)	ACFM = $(V_s)(A_s)60 =$	4,777	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = $(V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1-\%H_2O/100)*2.005 =$	1,617	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

ACIDS EMISSION CALCULATIONS
EPA Method 26A

FACILITY:	Bubbling Wells	DATE:	5-25-21	METER BOX NO.:	APEX 1
UNIT:	IEB 50	TIME:	1334-1438	PROBE NO.:	PR 52
CONDITION:	1528 lbs	TEST NO.:	3	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	80	Total H_2O Condensed,	V_w	83.8
Barometric Press., "Hg	P_b	30.07	Meter Press.,"H_2O	ΔH	1.36			
Static Pressure, "H_2O	P_{stat}	-0.03	Average √ΔP., "H_2O	$\sqrt{\Delta P}$	0.243			
Stack Pressure, "Hg	P_s	30.07	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	992	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	60.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	37.980			

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	38.340	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$	3.959	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	42.300	SCF
D)	Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$	9.360	%
E)	Stack Gas Velocity (Vs) = $85.49\ C_p\ \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.560	ft/sec
F) *	Stack Gas Molecular Wt.= $30*(1\text{-}H_2O\%/100))+18(H_2O\%/100) =$	28.877	g/g-mole
G)	% Isokinetic (I) = $9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	102.11	%
H)	ACFM = $(V_s)(A_s)60 =$	4,801	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = $(V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1\text{-}\%H_2O/100)*2.005 =$	1,596	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

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A-5

METALS EMISSION CALCULATIONS
EPA Method 29

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	Apex 1
UNIT:	IEB 50	TIME:	918-1041	PROBE NO.:	PR 52
CONDITION:	2,037 lbs	TEST NO.:	1	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	73	Total H_2O Condensed,	V_w	199.5
Barometric Press., "Hg	P_b	29.85	Meter Press.,"H_2O	ΔH	1.320			
Static Pressure, "H_2O	P_{stat}	-0.03	Average √ΔP., "H_2O	$\sqrt{\Delta P}$	0.241			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	1009	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	80.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	49.482			

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	50.233	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$	9.426	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	59.659	SCF
D)	Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$	15.800	%
E)	Stack Gas Velocity $(Vs) = 85.49\ C_p\ \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.902	ft/sec
F) *	Stack Gas Molecular Wt.$= 30*(1\text{-}H_2O\%/100))+18(H_2O\%/100) =$	28.104	g/g-mole
G)	% Isokinetic $(I) = 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	108.40	%
H)	$ACFM = (V_s)(A_s)60 =$	4,874	ACFM
I)	Stack Gas Vol. Flow Rate, $DSCFM = (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1\text{-}\%H_2O/100)*2.005 =$	1,477	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

METALS EMISSION CALCULATIONS
EPA Method 29

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	Apex 1
UNIT:	IEB 50	TIME:	1155-1318	PROBE NO.:	PR 52
CONDITION:	2,037 lbs	TEST NO.:	2	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	78	Total H_2O Condensed,	V_w	108.8
Barometric Press., "Hg	P_b	29.85	Meter Press.,"H_2O	ΔH	1.193			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.241			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	1087	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	80.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	47.405			

A) Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$ 47.662 DSCF

B) Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$ 5.141 SCF

C) Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$ 52.803 SCF

D) Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$ 9.736 %

E) Stack Gas Velocity $(Vs) = 85.49\ C_p\ \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$ 23.204 ft/sec

F) * Stack Gas Molecular Wt.$= 30*(1-H_2O\%/100))+18(H_2O\%/100) =$ 28.832 g/g-mole

G) % Isokinetic $(I) = 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$ 99.73 %

H) ACFM $= (V_s)(A_s)60 =$ 4,938 ACFM

I) Stack Gas Vol. Flow Rate, DSCFM $= (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1-\%H_2O/100)*2.005 =$ 1,523 DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

METALS EMISSION CALCULATIONS
EPA Method 29

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	Apex 1
UNIT:	IEB 50	TIME:	1359-1522	PROBE NO.:	PR 52
CONDITION:	2,037 lbs	TEST NO.:	3	NOZZLE NO.:	Q14B

Pitot Factor,	C_p	0.84	Meter Temp., °F	T_m	82	Total H_2O Condensed,	V_w	70.6
Barometric Press., "Hg	P_b	29.85	Meter Press.,"H_2O	ΔH	1.367			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.241			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp., °F	T_s	977	Nozzle Dia., Inches	D_n	0.505			
Sample Time, mins	Θ	80.0	Meter Factor,	Y_d	1.0200			
Std. Temp., °F	T_{std}	70	Sample Volume, Ft^3	V_m	51.157			

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	51.077	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$	3.336	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	54.413	SCF
D)	Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$	6.130	%
E)	Stack Gas Velocity $(Vs) = 85.49\ C_p \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.198	ft/sec
F) *	Stack Gas Molecular Wt.$= 30*(1-H_2O\%/100))+18(H_2O\%/100) =$	29.264	g/g-mole
G)	% Isokinetic $(I) = 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	99.78	%
H)	ACFM $= (V_s)(A_s)60 =$	4,724	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM $= (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1-\%H_2O/100)*2.005 =$	1,632	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

EPA Method 306 CHROMIUM EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	1155-1318	PROBE NO.:	PR48
CONDITION:	2,037 lbs	TEST NO.:	2	NOZZLE NO.:	Q14C

Pitot Factor,	C_p	0.840	Meter Temp. °F	T_m	85	Total H_2O Condensed, ml	V_w	116.6
Barometric Press. "Hg	P_b	29.85	Meter Press. "H_2O	ΔH	1.52			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\surd\Delta P$., "H_2O	$\surd\Delta P$	0.243			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp. °F	T_s	1086	Nozzle Dia. Inches	D_n	0.505			
Sample Time, mins	Θ	80	Meter Factor,	Y_d	0.9920			
Std. Temp. °F	T_{std}	70	Sample Volume, Ft^3	V_m	50.600			

A) Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$ 48.882 DSCF

B) Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$ 5.509 SCF

C) Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$ 54.391 SCF

D) Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$ 10.129 %

E) Stack Gas Velocity (Vs) $= 85.49\ C_p\ \surd(\Delta P)\ (T_s + 460/MW_s\ P_s) =$ 23.408 ft/sec

F) * Stack Gas Molecular Wt.$= 30*(1\text{-}H_2O\%/100))+18(H_2O\%/100) =$ 28.785 g/g-mole

G) % Isokinetic $(I) = 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$ 101.76 %

H) ACFM $= (V_s)(A_s) \times 60 =$ 4,982 ACFM

I) Stack Gas Vol. Flow Rate, DSCFM $= (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1\text{-}\%H_2O/100)*2.005 =$ 1,531 DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

EPA Method 306 CHROMIUM EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	1359-1520	PROBE NO.:	PR48
CONDITION:	2,037 lbs	TEST NO.:	3	NOZZLE NO.:	Q14C

Pitot Factor,	C_p	0.840	Meter Temp. °F	T_m	85	Total H_2O Condensed, ml	V_w	94.8
Barometric Press. "Hg	P_b	29.85	Meter Press. "H_2O	ΔH	1.72			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.242			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp. °F	T_s	968	Nozzle Dia. Inches	D_n	0.505	Stack Gas O_2,	%	14.5
Sample Time, mins	Θ	80	Meter Factor,	Y_d	0.9920	Stack Gas CO_2,	%	3.50
Std. Temp. °F	T_{std}	70	Sample Volume, Ft^3	V_m	51.600	Stack Gas N_2,	%	82.0

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	49.872	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$	4.479	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	54.351	SCF
D)	Moisture Content ($\%H_2O$) $= 100 * (V_w)_{std} / (V_t)_{std} =$	8.241	%
E)	Stack Gas Velocity (Vs) $= 85.49\ C_p \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.317	ft/sec
F) *	Stack Gas Molecular Wt.$= 30*(1-H_2O\%/100))+18(H_2O\%/100) =$	29.011	g/g-mole
G)	% Isokinetic (I) $= 9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	98.52	%
H)	ACFM $= (V_s)(A_s) \times 60 =$	4,750	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM $= (V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1-\%H_2O/100)*2.005 =$	1,614	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

EPA Method 306 CHROMIUM EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5-26-21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	918-1041	PROBE NO.:	PR48
CONDITION:	2,037 lbs	TEST NO.:	1	NOZZLE NO.:	Q14C

Pitot Factor,	C_p	0.840	Meter Temp. °F	T_m	78	Total H_2O Condensed, ml	V_w	164.2
Barometric Press. "Hg	P_b	29.85	Meter Press. "H_2O	ΔH	1.61			
Static Pressure, "H_2O	P_{stat}	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.240			
Stack Pressure, "Hg	P_s	29.85	Stack Area, Ft^2	A_s	3.547			
Stack Temp. °F	T_s	1023	Nozzle Dia. Inches	D_n	0.505			
Sample Time, mins	Θ	80	Meter Factor,	Y_d	0.9920			
Std. Temp. °F	T_{std}	70	Sample Volume, Ft^3	V_m	51.236			

A)	Gas Volume $(V_m)_{std} = (T_{std}+460)*V_m*Y_d*(P_b+\Delta H/13.6)/((T_m+460)*29.92) =$	50.151	DSCF
B)	Volume H_2O collected $(V_w)_{std} = 8.9148E\text{-}5*(T_{std}+460)*V_w =$	7.758	SCF
C)	Total Sample Volume $(V_t)_{std} = (V_m)_{std} + (V_w)_{std} =$	57.909	SCF
D)	Moisture Content $(\%H_2O) = 100 * (V_w)_{std} / (V_t)_{std} =$	13.397	%
E)	Stack Gas Velocity (Vs) = $85.49\ C_p\ \sqrt{(\Delta P)}\ (T_s + 460/MW_s\ P_s) =$	22.799	ft/sec
F) *	Stack Gas Molecular Wt.= $30*(1\text{-}H_2O\%/100))+18(H_2O\%/100) =$	28.392	g/g-mole
G)	% Isokinetic (I) = $9142.88(V_t)(T_s+460)/((D_n^2)(\Theta)(P_s)(V_s)(T_{std}+460)) =$	106.71	%
H)	ACFM = $(V_s)(A_s) \times 60 =$	4,852	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = $(V_s)(A_s)((T_{std}+460)/(T_s+460))(P_s)(1\text{-}\%H_2O/100)*2.005 =$	1,498	DSCFM

* stack gas molecular weigh was not measured and given a value of 30 for fired sources as per EPA Method 3, section 1.3

Bubbling Wells
Formaldehyde Emissions Results
IEB 50

Facility: Bubbling Wells
Unit: IEB 50
Date: 5/27/2021

Time:		1006-1036	1044-1114	1120-1150
		Run 2	**Run 3**	**Run 4**
1. Uncorrected Meter Volume (Vm)	Liters	14.6	14.4	14.5
2. Meter Factor (Yd)		1.0060	1.0060	1.0060
3. Barometric Pressure (Pb)	"Hg	29.90	29.90	29.90
4. Meter Pressure (ΔH)	"H_2O	0.00	0.00	0.00
5. Meter Temperature (Tm)	°F	68	69	71
6. Std. Temperature (Tstd)	°F	70	70	70
Std. Meter Volume (Vm std)	**Liters**	**14.73**	**14.50**	**14.55**
Formaldehyde	**ug/sample**	**0.597**	**0.670**	**0.775**
Formaldehyde(M.W.=30.0)	**ppb**	**32.61**	**37.17**	**42.86**
Acetaldehyde	**ug/sample**	**0.138**	**2.081**	**1.082**
Acetaldehyde (M.W.=44.1)	**ppb**	**5.127**	**78.538**	**40.707**

WHERE:

M.W. = Molecular Weight
"$H_2$0 = Inches of Water
"Hg = Inches of Mercury
°F = Fahrenheit
% = Percent

CALCULATIONS:

Vw std = 0.06236 * Vw * (Tstd + 460) / 29.92 / 18
Vm std = Vm * Yd * (Tstd + 460) * (Pb +(ΔH/13.6)) / (Tm + 460) / 29.92
Stack Moisture H_2O % = 100 * Vw std / (Vw std + Vm std)
Aldehyde, ppmv = ug/sample / M.W. * (24.14 / Vm std)

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EPA METHOD 23 EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5-25-21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	952-1156	PROBE NO.:	PR 48
CONDITION:	1,528 lbs	TEST NO.:	1	NOZZLE NO.:	Q14C

Pitot Factor,	Cp	0.84	Meter Temp., °F	Tm	78	Total H2O Condensed,	Vw	224.0
Barometric Press., "Hg	Pb	30.07	Meter Press.,"H2O	ΔH	1.75			
Static Pressure, "H2O	Pstat	-0.03	Average √ΔP., "H_2O	√ΔP	0.245			
Stack Pressure, "Hg	Ps	30.07	Stack Area, Ft2	As	3.547			
Stack Temp., °F	Ts	989	Nozzle Dia., Inches	Dn	0.505			
Sample Time, mins	Θ	120.0	Meter Factor,	Yd	0.9220			
Std. Temp., °F	Tstd	70	Sample Volume, Ft3	Vm	79.500			

A)	Gas Volume (Vm)std = (Tstd+460)*Vm*Yd*(Pb+DH/13.6)/((Tm+460)*29.92) =	72.882	DSCF
B)	Volume H2O collected (Vw)std = 8.9148E-5*(Tstd+460)*Vw =	10.584	SCF
C)	Total Sample Volume (Vt)std = (Vm)std + (Vw)std =	83.465	SCF
D)	Moisture Content (%H2O) = 100 * (Vw)std / (Vt)std =	12.680	%
E)	Stack Gas Velocity (Vs) = 85.49 Cp Ö(DP) (Ts + 460/MWs Ps) =	22.887	ft/sec
F) *	Stack Gas Molecular Wt.= 30*(1-H_2O%/100))+18(H_2O%/100) =	28.478	g/g-mole
G)	% Isokinetic (I) = 9142.88(Vt)(Ts+460)/((Dn2)(Q)(Ps)(Vs)(Tstd+460)) =	99.07	%
H)	ACFM = (Vs)(As)60 =	4,871	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = (Vs)(As)((Tstd+460)/(Ts+460))(Ps)(1-%H2O/100)*2.005 =	1,563	DSCFM

EPA METHOD 23 EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5-25-21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	1304-1508	PROBE NO.:	PR 48
CONDITION:	1,528 lbs	TEST NO.:	2	NOZZLE NO.:	Q14C

Pitot Factor,	Cp	0.840	Meter Temp., °F	Tm	82	Total H2O Condensed,	Vw	95.0
Barometric Press., "Hg	Pb	30.07	Meter Press.,"H2O	ΔH	1.65			
Static Pressure, "H2O	Pstat	-0.03	Average $\sqrt{\Delta P}$., "H_2O	$\sqrt{\Delta P}$	0.236			
Stack Pressure, "Hg	Ps	30.07	Stack Area, Ft2	As	3.547			
Stack Temp., °F	Ts	958	Nozzle Dia., Inches	Dn	0.505			
Sample Time, mins	Θ	120	Meter Factor,	Yd	0.9220			
Std. Temp., °F	Tstd	70	Sample Volume, Ft3	Vm	77.300			

A)	Gas Volume (Vm)std = (Tstd+460)*Vm*Yd*(Pb+DH/13.6)/((Tm+460)*29.92) =	70.325	DSCF
B)	Volume H2O collected (Vw)std = 8.9148E-5*(Tstd+460)*Vw =	4.489	SCF
C)	Total Sample Volume (Vt)std = (Vm)std + (Vw)std =	74.813	SCF
D)	Moisture Content (%H2O) = 100 * (Vw)std / (Vt)std =	6.000	%
E)	Stack Gas Velocity (Vs) = 85.49 Cp Ö(DP) (Ts + 460/MWs Ps) =	21.508	ft/sec
F) *	Stack Gas Molecular Wt.= 30*(1-H_2O%/100))+18(H_2O%/100) =	29.280	g/g-mole
G)	% Isokinetic (I) = 9142.88(Vt)(Ts+460)/((Dn2)(Q)(Ps)(Vs)(Tstd+460)) =	92.47	%
H)	ACFM = (Vs)(As)60 =	4,577	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = (Vs)(As)((Tstd+460)/(Ts+460))(Ps)(1-%H2O/100)*2.005 =	1,616	DSCFM

EPA METHOD 23 EMISSION CALCULATIONS

FACILITY:	Bubbling Wells	DATE:	5/27/21	METER BOX NO.:	LSI 1
UNIT:	IEB 50	TIME:	0907-1110	PROBE NO.:	PR48
CONDITION:	1,528 lbs	TEST NO.:	3	NOZZLE NO.:	Q14C

Pitot Factor,	Cp	0.840	Meter Temp., °F	Tm	73	Total H2O Condensed,	Vw	225.0
Barometric Press., "Hg	Pb	29.90	Meter Press.,"H2O	ΔH	1.49			
Static Pressure, "H2O	Pstat	-0.03	Average √ΔP., "H_2O	√ΔP	0.246			
Stack Pressure, "Hg	Ps	29.90	Stack Area, Ft2	As	3.547			
Stack Temp., °F	Ts	1064	Nozzle Dia., Inches	Dn	0.505			
Sample Time, mins	Θ	120.0	Meter Factor,	Yd	0.9220			
Std. Temp., °F	Tstd	70	Sample Volume, Ft3	Vm	71.940			

A)	Gas Volume (Vm)std = (Tstd+460)*Vm*Yd*(Pb+DH/13.6)/((Tm+460)*29.92) =	66.153	DSCF
B)	Volume H2O collected (Vw)std = 8.9148E-5*(Tstd+460)*Vw =	10.631	SCF
C)	Total Sample Volume (Vt)std = (Vm)std + (Vw)std =	76.784	SCF
D)	Moisture Content (%H2O) = 100 * (Vw)std / (Vt)std =	13.845	%
E)	Stack Gas Velocity (Vs) = 85.49 Cp Ö(DP) (Ts + 460/MWs Ps) =	23.693	ft/sec
F) *	Stack Gas Molecular Wt.= 30*(1-H_2O%/100))+18(H_2O%/100) =	28.339	g/g-mole
G)	% Isokinetic (I) = 9142.88(Vt)(Ts+460)/((Dn2)(Q)(Ps)(Vs)(Tstd+460)) =	93.12	%
H)	ACFM = (Vs)(As)60 =	5,042	ACFM
I)	Stack Gas Vol. Flow Rate, DSCFM = (Vs)(As)((Tstd+460)/(Ts+460))(Ps)(1-%H2O/100)*2.005 =	1,510	DSCFM

TABLE

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CARB Method 429 PAH Pre-test Emission Calculations
Burning Wells

TEST#	1	2	3	AVERAGE	PT/AP-42
TEST DURATION, minutes	120.0	120.0	120.0		
PRODUCTION RATE (lb)	1800.0	1800.0	1800.0		
STANDARD TEMP., °F	68	68	68		
SAMPLE VOLUME (DSCF)	73.202	74.510	73.115		
SAMPLE VOLUME (DSCM)	2.073	2.110	2.071		
FLOWRATE (DSCFM)	1,551	1,553	1,551		
STACK GAS TEMP. °F	1,000.0	1,000.0	1,000.0		
ISOKINETIC, %	100.3	102.0	100.2		
H_2O, % vol	11.4	11.2	11.4		
Naphthalene,					
total ng	0.600	0.600	0.600	0.600	
(ng/dscm)	0.289	0.284	0.290	0.288	
(ng/sec)	0.212	0.208	0.212	0.211	
(ug/hr)	0.001	0.001	0.001	0.001	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**9.34E-13**	**9.19E-13**	**9.35E-13**	**9.29E-13**	
ppt, MW = 128	0.054	0.053	0.054	0.054	
2-Methylnaphthylene,					
total ng	0.500	0.500	0.500	0.500	
(ng/dscm)	0.241	0.237	0.241	0.240	
(ng/sec)	0.177	0.174	0.177	0.176	
(ug/hr)	0.001	0.001	0.001	0.001	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**7.78E-13**	**7.66E-13**	**7.79E-13**	**7.74E-13**	
ppt, MW = 128	0.045	0.045	0.045	0.045	
Acenaphthylene,					
total ng	<0.200	<0.200	<0.200	<0.200	
(ng/dscm)	<0.096	<0.095	<0.097	<0.096	
(ng/sec)	<0.071	<0.069	<0.071	<0.070	
(ug/hr)	<0.000	<0.000	<0.000	<0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**<3.11E-13**	**<3.06E-13**	**<3.12E-13**	**<3.10E-13**	
ppt, MW = 152	<0.015	<0.015	<0.015	<0.015	
Acenaphthene,					
total ng	0.400	0.400	0.400	0.400	
(ng/dscm)	0.193	0.190	0.193	0.192	
(ng/sec)	0.141	0.139	0.141	0.141	
(ug/hr)	0.001	0.001	0.001	0.001	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**6.23E-13**	**6.13E-13**	**6.23E-13**	**6.20E-13**	
ppt, MW = 154	0.030	0.030	0.030	0.030	
Fluorene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	0.095	0.097	0.096	
(ng/sec)	0.071	0.069	0.071	0.070	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=166	0.014	0.014	0.014	0.014	
Phenanthrene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	<0.096	0.095	0.097	0.096	
(ng/sec)	<0.071	0.069	0.071	0.070	
(ug/hr)	<0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**<3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=178	<0.013	0.013	0.013	0.013	

TABLE Continued...

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CARB Method 429 PAH Emission Results
Burning Wells

TEST#	1	2	3	AVERAGE	
Anthracene,					
total ng	0.400	0.400	0.400	<0.400	
(ng/dscm)	<0.193	<0.190	<0.193	<0.192	
(ng/sec)	<0.141	<0.139	<0.141	<0.141	
(ug/hr)	<0.001	<0.001	<0.001	<0.001	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**<6.23E-13**	**<6.13E-13**	**<6.23E-13**	**<6.20E-13**	
ppt, MW=178	<0.026	<0.026	<0.026	<0.026	
Fluoranthene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	<0.096	0.095	0.097	0.096	
(ng/sec)	<0.071	0.069	0.071	0.070	
(ug/hr)	<0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**<3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=202	<0.011	0.011	0.011	0.011	
Pyrene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	0.095	0.097	0.096	
(ng/sec)	0.071	0.069	0.071	0.070	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=202	0.011	0.011	0.011	0.011	
Benzo(a)Anthracene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	0.095	0.097	0.096	
(ng/sec)	0.071	0.069	0.071	0.070	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=228	0.010	0.010	0.010	0.010	
Chrysene					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	0.095	0.097	0.096	
(ng/sec)	0.071	0.069	0.071	0.070	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=228	0.010	0.010	0.010	0.010	
Benzo(b)Fluoranthene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	0.095	0.097	0.096	
(ng/sec)	0.071	0.069	0.071	0.070	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW=252	0.009	0.009	0.009	0.009	
Benzo(k)Fluoranthene,					
total ng	0.200	0.200	0.200	<0.200	
(ng/dscm)	0.096	<0.095	<0.097	<0.096	
(ng/sec)	0.071	<0.069	<0.071	<0.070	
(ug/hr)	0.000	<0.000	<0.000	<0.000	
(lbs/hr)	0.000000	0.000000	0.000000	0.000000	
(lbs/ton)	**3.11E-13**	**<3.06E-13**	**<3.12E-13**	**<3.10E-13**	
ppt, MW=252	0.009	<0.009	<0.009	<0.009	

TABLE Continued...

(page 3 of 3)

CARB Method 429 PAH Emission Results
Burning Wells

TEST#	1	2	3	AVERAGE	
Benzo(e)Pyrene,					
total ng	0.300	0.300	0.300	0.300	
(ng/dscm)	0.145	0.142	0.145	0.144	
(ng/sec)	0.106	0.104	0.106	0.105	
(ug/hr)	0.000	0.000	0.000	0.000	
(lbs/hr)	8.41E-10	8.27E-10	8.42E-10	8.36E-10	
(lbs/ton)	**4.67E-13**	**4.59E-13**	**4.68E-13**	**4.65E-13**	
ppt, MW=252	0.014	0.014	0.014	0.014	
Benzo(a)Pyrene,					
total ng	0.300	0.300	0.300	0.300	
(ng/dscm)	0.145	<0.142	0.145	0.144	
(ng/sec)	0.106	<0.104	0.106	0.105	
(ug/hr)	0.000	<0.000	0.000	0.000	
(lbs/hr)	8.41E-10	<8.27E-10	8.42E-10	8.36E-10	
(lbs/ton)	**4.67E-13**	**<4.59E-13**	**4.68E-13**	**4.65E-13**	
ppt, MW=252	0.014	<0.014	0.014	0.014	
Perylene,					
total ng	0.200	0.200	0.200	<0.200	
(ng/dscm)	0.096	<0.095	<0.097	<0.096	
(ng/sec)	0.071	<0.069	<0.071	<0.070	
(ug/hr)	0.000	<0.000	<0.000	<0.000	
(lbs/hr)	5.60E-10	<5.51E-10	<5.61E-10	<5.58E-10	
(lbs/ton)	**3.11E-13**	**<3.06E-13**	**<3.12E-13**	**<3.10E-13**	
ppt, MW=252	0.009	<0.009	<0.009	<0.009	
Indeno(1,2,3-cd)Pyrene,					
total ng	0.400	0.400	0.400	<0.400	
(ng/dscm)	0.193	<0.190	<0.193	<0.192	
(ng/sec)	0.141	<0.139	<0.141	<0.141	
(ug/hr)	0.001	<0.001	<0.001	<0.001	
(lbs/hr)	1.12E-09	<1.10E-09	<1.12E-09	<1.12E-09	
(lbs/ton)	**6.23E-13**	**<6.13E-13**	**<6.23E-13**	**<6.20E-13**	
ppt, MW = 276	0.017	<0.017	<0.017	<0.017	
Dibenz(a,h)Anthracene,					
total ng	0.300	0.300	0.300	<0.300	
(ng/dscm)	<0.145	<0.142	<0.145	<0.144	
(ng/sec)	<0.106	<0.104	<0.106	<0.105	
(ug/hr)	<0.000	<0.000	<0.000	<0.000	
(lbs/hr)	<8.41E-10	<8.27E-10	<8.42E-10	<8.36E-10	
(lbs/ton)	**<4.67E-13**	**<4.59E-13**	**<4.68E-13**	**<4.65E-13**	
ppt, MW=278	<0.013	<0.012	<0.013	<0.012	
Benzo(ghi)Perylene,					
total ng	0.200	0.200	0.200	0.200	
(ng/dscm)	0.096	<0.095	0.097	0.096	
(ng/sec)	0.071	<0.069	0.071	0.070	
(ug/hr)	0.000	<0.000	0.000	0.000	
(lbs/hr)	5.60E-10	<5.51E-10	5.61E-10	5.58E-10	
(lbs/ton)	**3.11E-13**	**<3.06E-13**	**3.12E-13**	**3.10E-13**	
ppt, MW = 276	0.008	<0.008	0.008	0.008	

***Half of Lab Reporting Limit used for Non-detects**

Total PAHs, lbs/hr	**7.12E-12**	Limit
Total PAHs, lbs/body (lbs/hr/1800 lbs/12 bodies)	**5.94E-13**	**4.90E-08**

Where,

DSCFM = Dry Standard Cubic Feet per Minute
ng/dscm = nanograms per dry standard cubic meter
ng/sec = Emission rate, nanograms per second
Tstd = Standard Temperature, "&CHAR(176)&"F ="
ppt = part per trillion
lbs/hr = pounds per hour
lbs/ton = pounds per ton
lbs/day = pounds per 10-hr day

Calculations,

ng/dscm = ng / dscm

ng/sec = 0.02832 * DSCFM * ng/dscm / 60
ppt = ng/dscm * 22.4 * (Tstd. + 460) / 492 / M.W.
Emission Rate, lbs/hr = ppm * MW * DSCFM * 60 / 385E6 (Tstd 68°F)
Emission Factor, lbs/ton = (lbs/hr) / (tons/hr)
Emission Rate, lbs/day = lbs/hr * 10

Bubbling Wells
Metals Pre Test Calculation

RUN #	1	2	3	AVERAGE	LIMITS
SAMPLE VOLUME (DSCF)	47.968	47.722	50.373		
DUCT TEMP., (°F)	1000.0	1000.0	1000.0	1000.0	
VELOCITY (ft/sec)	31.00	31.05	31.02	31.02	
FLOW RATE (ACFM)	4,689	4,697	4,692	4,693	
FLOW RATE (DSCFM)	1,592	1,581	1,589	1,587	
Antimony, total ug	0.30	0.30	0.30	0.30	
Antimony, (ug/dscm)	2.21E-01	2.22E-01	2.10E-01	2.18E-01	
Antimony, (gm/hr)	5.98E-04	5.96E-04	5.68E-04	5.87E-04	
Antimony, (lb/hr)	1.32E-06	1.31E-06	1.25E-06	1.29E-06	
Antimony, (ppb) (MW=121.75)	4.38E-02	4.40E-02	4.17E-02	4.32E-02	
Arsenic, total ug	1.20	1.20	1.20	1.20	
Arsenic, (ug/dscm)	8.83E-01	8.88E-01	8.41E-01	8.71E-01	
Arsenic, (gm/hr)	2.39E-03	2.38E-03	2.27E-03	2.35E-03	
Arsenic, (lb/hr)	5.27E-06	5.26E-06	5.01E-06	5.18E-06	**3.00E-05**
Arsenic, (ppb) (MW=74.99)	2.84E-01	2.86E-01	2.71E-01	2.80E-01	
Barium, total ug	5.50	5.50	5.50	5.50	
Barium, (ug/dscm)	4.05E+00	4.07E+00	3.86E+00	3.99E+00	
Barium, (gm/hr)	1.10E-02	1.09E-02	1.04E-02	1.08E-02	
Barium, (lb/hr)	2.42E-05	2.41E-05	2.29E-05	2.37E-05	
Barium, (ppb) (MW=137.34)	7.12E-01	7.15E-01	6.78E-01	7.02E-01	
Beryllium, total ug	<0.30	<0.30	<0.30	<0.30	
Beryllium, (ug/dscm)	2.21E-01	2.22E-01	2.10E-01	2.18E-01	
Beryllium, (gm/hr)	5.98E-04	5.96E-04	5.68E-04	5.87E-04	
Beryllium, (lb/hr)	1.32E-06	1.31E-06	1.25E-06	1.29E-06	**1.40E-06**
Beryllium, (ppb) (MW=9.0)	5.92E-01	5.95E-01	5.64E-01	5.84E-01	
Cadmium, total ug	0.15	0.15	0.15	0.15	
Cadmium, (ug/dscm)	8.86E-05	8.90E-05	8.43E-05	8.73E-05	
Cadmium, (gm/hr)	2.40E-07	2.39E-07	2.28E-07	2.35E-07	
Cadmium, (lbs/hr)	5.28E-10	5.27E-10	5.02E-10	5.19E-10	**1.10E-05**
Cadmium, (ppb) (MW=112.4)	1.90E-05	1.91E-05	1.81E-05	1.88E-05	
Chromium, total ug	1.15	1.15	1.15	1.15	
Chromium, (ug/dscm)	8.47E-01	8.51E-01	8.06E-01	8.35E-01	
Chromium, (gm/hr)	2.29E-03	2.29E-03	2.18E-03	2.25E-03	
Chromium, (lb/hr)	5.05E-06	5.04E-06	4.80E-06	4.96E-06	
Chromium, (ppb) (MW=51.996)	3.93E-01	3.95E-01	3.74E-01	3.87E-01	
Cobalt, total ug	<0.30	<0.30	<0.30	<0.30	
Cobalt, (ug/dscm)	2.21E-01	2.22E-01	2.10E-01	2.18E-01	
Cobalt, (gm/hr)	5.98E-04	5.96E-04	5.68E-04	5.87E-04	
Cobalt, (lb/hr)	1.32E-06	1.31E-06	1.25E-06	1.29E-06	
Cobalt, (ppb) (MW=58.94)	9.04E-02	9.09E-02	8.61E-02	8.92E-02	

TABLE 1 continued.....

RUN #	1	2	3	AVERAGE	LIMITS
Copper, total ug	1.30	1.30	1.30	1.30	
Copper, (ug/dscm)	9.57E-01	9.62E-01	9.11E-01	9.43E-01	
Copper, (gm/hr)	2.59E-03	2.58E-03	2.46E-03	2.54E-03	
Copper, (lb/hr)	5.71E-06	5.70E-06	5.42E-06	5.61E-06	**2.70E-05**
Copper, (ppb) (MW=63.55)	3.64E-01	3.65E-01	3.46E-01	3.58E-01	
Lead, total ug	0.55	0.55	0.55	0.55	
Lead, (ug/dscm)	4.05E-01	4.07E-01	3.86E-01	3.99E-01	
Lead, (gm/hr)	1.10E-03	1.09E-03	1.04E-03	1.08E-03	
Lead, (lb/hr)	2.42E-06	2.41E-06	2.29E-06	2.37E-06	**6.60E-05**
Lead, (ppb) (MW=207.2)	4.72E-02	4.74E-02	4.49E-02	4.65E-02	
Manganese, total ug	0.65	0.65	0.65	0.65	
Manganese, (ug/dscm)	4.78E-01	4.81E-01	4.56E-01	4.72E-01	
Manganese, (gm/hr)	1.29E-03	1.29E-03	1.23E-03	1.27E-03	
Manganese, (lb/hr)	2.85E-06	2.85E-06	2.71E-06	2.80E-06	
Manganese, (ppb) (MW=54.94)	2.10E-01	2.11E-01	2.00E-01	2.07E-01	
Mercury, total ug	0.382	0.524	0.197	0.367	
Mercury, (ug/dscm)	2.25E-04	3.11E-04	1.11E-04	2.16E-04	
Mercury, (gm/hr)	6.10E-07	8.35E-07	2.99E-07	5.81E-07	
Mercury, (lbs/hr)	1.34E-09	1.84E-09	6.59E-10	1.28E-09	
Mercury, (ppb) (MW=200.6)	2.71E-05	3.74E-05	1.33E-05	2.60E-05	
Nickel, total ug	0.30	0.30	0.30	0.30	
Nickel, (ug/dscm)	2.21E-01	2.22E-01	2.10E-01	2.18E-01	
Nickel, (gm/hr)	5.98E-04	5.96E-04	5.68E-04	5.87E-04	
Nickel, (lb/hr)	1.32E-06	1.31E-06	1.25E-06	1.29E-06	**3.80E-05**
Nickel, (ppb) (MW=58.71)	9.08E-02	9.13E-02	8.65E-02	8.95E-02	
Phosphorus, total ug	125.00	125.00	125.00	125.00	
Phosphorus, (ug/dscm)	9.20E+01	9.25E+01	8.76E+01	9.07E+01	
Phosphorus, (gm/hr)	2.49E-01	2.48E-01	2.37E-01	2.45E-01	
Phosphorus, (lb/hr)	5.49E-04	5.48E-04	5.22E-04	5.39E-04	
Phosphorus, (ppb) (MW=30.98)	7.17E+01	7.21E+01	6.83E+01	7.07E+01	
Selenium, total ug	2.10	2.10	2.10	2.10	
Selenium, (ug/dscm)	1.55E+00	1.55E+00	1.47E+00	1.52E+00	
Selenuim, (gm/hr)	4.18E-03	4.17E-03	3.97E-03	4.11E-03	
Selenuim, (lb/hr)	9.22E-06	9.20E-06	8.76E-06	9.06E-06	**4.40E-05**
Selenium, (ppb) (MW=78.96)	4.73E-01	4.75E-01	4.50E-01	4.66E-01	
Silver, total ug	0.30	0.30	0.30	0.30	
Silver, (ug/dscm)	2.21E-01	2.22E-01	2.10E-01	2.18E-01	
Silver, (gm/hr)	5.98E-04	5.96E-04	5.68E-04	5.87E-04	
Silver, (lb/hr)	1.32E-06	1.31E-06	1.25E-06	1.29E-06	
Silver, (ppb) (MW=107.87)	4.94E-02	4.97E-02	4.71E-02	4.87E-02	
Thallium, total ug	0.25	0.25	0.25	0.25	
Thallium, (ug/dscm)	1.84E-01	1.85E-01	1.75E-01	1.81E-01	
Thallium, (gm/hr)	4.98E-04	4.97E-04	4.73E-04	4.89E-04	
Thallium, (lb/hr)	1.10E-06	1.10E-06	1.04E-06	1.08E-06	
Thallium, (ppb) (MW=204.37)	2.17E-02	2.18E-02	2.07E-02	2.14E-02	

Zinc, total ug	6.30	6.30	6.30	6.30	
Zinc, (ug/dscm)	4.64E+00	4.66E+00	4.42E+00	4.57E+00	
Zinc, (gm/hr)	1.25E-02	1.25E-02	1.19E-02	1.23E-02	
Zinc, (lb/hr)	2.77E-05	2.76E-05	2.63E-05	2.72E-05	
Zinc, (ppb) (MW=65.37)	1.71E+00	1.72E+00	1.63E+00	1.69E+00	

Note: Less than (<) signs precede the method detection limit.
All detected levels are corrected for reagent blank

WHERE,

< = Less Than
Velocity = Stack gas velocity in feet per second
DSCFM = Dry Standard cubic feet per minute
ug/dscm = micrograms per dry standard cubic meter
gm/hr = Emission rate, grams per hour

CALCULATIONS,

ug/DSCM = ug / DSCF / 35.31
gm/hr = ((ug/dscm) / 1,000,000) * (DSCFM / 35.31) * 60
ppb @ 70 °F = 24.14 * (ug/dscm) / M.W.

lbs/hr = gm/hr / 453

Bubbling Wells
Aldehyde Emissions Pre Test Calculation

RUN	1	2	3	Average	Limit
Standard Temp., °F	70	70	70		
Total Weight	1,800				
Flow Rate, DSCFM [1]	1,600	1,600	1,600	1,600	
Standard Meter Volume, liters	25.2	25.2	25.1	25.165	
Emissions Data					
M.W.					
Formaldehyde, ug/sample	0.100	0.100	0.100	0.100	
Formaldehyde, ppb	3.2	3.2	3.2	3.2	
Formaldehyde, gm/hr 30.0	0.01	0.01	0.01	0.01	
Formaldehyde, lbs/hr	2.39E-05	2.39E-05	2.40E-05	2.39E-05	**3.40E-05**
Acetaldehyde, ug/sample	0.100	0.100	0.100	0.100	
Acetaldehyde, ppb	2.2	2.2	2.2	2.2	
Acetaldehyde, gm/hr 44.1	1.08E-02	1.08E-02	1.09E-02	1.08E-02	
Acetaldehyde, lbs/hr	2.39E-05	2.39E-05	2.40E-05	2.39E-05	**1.30E-04**

WHERE:
ppb = parts per billion
M.W. = Molecular Weight
gm/hr = Grams Per Hour
ug/dscm = micrograms per dry standard cubic meter
Formadehyde MW = 30
Acetadehyde MW = 44.1

CALCULATIONS:
ug/dscm = (ug/sample) / dscm
gm/hr = ppb * DSCFM * M.W * 453.6 * 8.223E-5 /(Tstd + 460)
Aldehyde, ppbv = ((ug/sample) / M.W. * (24.14 / sample volume)) * 1000

Bubbling Wells

Acid Pre Test Calculations

RUN #	1	2	3	AVERAGE	Limits
Total Weight	1,800				
Sample Volume (DSCF)	45.770	45.252	45.427		
Stack Temp. F	1000	1000	1000	1000	
Velocity (ft/sec)	22.44	22.63	22.62	22.57	
Flowrate (ACFM)	4,776	4,817	4,814	4,802	
Flowrate (DSCFM)	1,579	1,591	1,591	1,587	
H_2O (volume %)	9.36	9.45	9.42	9.41	
HCl ug/sample	100	100	100	100	
ppm	0.05	0.05	0.05	0.05	
lbs/hr	4.57E-04	4.62E-04	4.60E-04	4.60E-04	**7.20E-02**
HF ug/sample	100	100	100	100	
ppm	0.09	0.09	0.09	0.09	
lbs/hr	4.57E-04	4.62E-04	4.60E-04	4.60E-04	**6.60E-04**

WHERE:
"Hg = Inches of Mercury
°F = Fahrenheit
ug = micrograms
Molecular Weight
HCL =
HF = 36.46
lbs/hr = Emiss 20.006

CALCULATIONS:
Vw std = 0.06236 * Vw * (Tstd + 460) / 29.92 / 18
Vm std = Vm * Yd * (Tstd + 460) * (Pb +(ΔH/13.6)) / (Tm + 460) / 29.92
ppm = 1.6085 * (mg / Vm std) * (Tstd + 460) / MW

APPENDIX B
LABORATORY REPORTS

ALS Life Sciences

1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact: Breanne Dusureault
ALS Project ID: BEST100
ALS WO#: L2599663
Date of Report 29-Jul-21
Date of Sample Receipt 9-Jun-21

Client Name: Best Environmental
Client Address: 339 Stealth Court
Livermore, CA 94551
USA
Client Contact: Basim Asfour
Client Project ID: BUBBLING WELLS

COMMENTS:

PAH via modified CARB 429 (HRMS Option)

Note: Cyclopenta[cd]pyrene coelutes with benz[a]anthracene, such that the presence of either may lead to an elevated result for the other.

Certified by:

Ron McLeod, Ph.D.
Director, Air Toxics and Special Chemistries, Life Sciences

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**R1**	**R2**	**R3**	**BLANK**
ALS Sample ID	L2599663-1	L2599663-2	L2599663-3	L2599663-4
Sample Size	1	1	1	1
Sample size units	Sample	Sample	Sample	Sample
Percent Moisture	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack
Sampling Date	25-May-21	25-May-21	27-May-21	27-May-21
Extraction Date	15-Jun-21	15-Jun-21	15-Jun-21	15-Jun-21
Target Analytes	**ng**	**ng**	**ng**	**ng**
Naphthalene	19600	5980	27600	1430
Acenaphthylene	405	40.2	132	<18
Acenaphthene	122	33.2	86.5	68.1
Fluorene	10300	4610	3700	177
Phenanthrene	18800	9120	28900	402
Anthracene	1130	132	178	21.5
Fluoranthene	992	632	914	51.7
Pyrene	615	348	1100	68.0
Benz(a)anthracene	47.6	16.9	17.6	2.53
Chrysene	3210	1330	1510	8.43
Benzo(b)fluoranthene	313	25.7	32.3	2.95
Benzo(k)fluoranthene	17.2	<0.36	<0.30	0.936
Benzo(e)pyrene	267	18.3	32.7	3.86
Benzo(a)pyrene	35.8	2.31	3.07	2.66
Perylene	3.61	<0.54	2.59	0.803
Indeno(1,2,3-cd)pyrene	47.5	5.80	4.92	3.02
Dibenz(a,h)anthracene	57.8	2.67	1.98	<0.58
Benzo(g,h,i)perylene	57.8	7.41	10.7	7.80
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
Naphthalene d8	27	71	78	74
Acenaphthylene d8	112	69	93	73
Phenanthrene d10	40	97	102	90
Anthracene-d10	87	71	91	69
Fluoranthene d10	33	97	117	105
Benz(a)anthracene-d12	70	46	45	49
Chrysene d12	70	43	57	49
Benzo(b)fluoranthene-d12	113	83	99	83
Benzo(k)fluoranthene-d12	102	82	98	74
Benzo(a)pyrene d12	100	80	99	75
Perylene d12	80	76	66	64
Indeno(1,2,3,cd)pyrene-d12	81	83	113	125
Dibenz(a,h)anthracene-d14	80	80	114	126
Benzo(g,h,i)perylene d12	79	87	116	141
Field Spikes				
1-Methylnaphthalene-d10	70	74	85	78
Fluorene-d10	68	84	89	90
p-Terphenyl-d14	99	71	72	69

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Quality Control Summary Report

Sample Name	**Media Blank**	**Method Blank**	**Laboratory Control Sample**
ALS Sample ID	WG3554311-1	WG3554311-4	WG3554311-2
Sample Size	1	1	1
Sample size units	Blank	Blank	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	QC	QC	QC
Sampling Date	n/a	n/a	n/a
Extraction Date	15-Jun-21	15-Jun-21	15-Jun-21
Target Analytes	**ng**	**ng**	**% Rec**
Naphthalene	17.0	7.90	104
Acenaphthylene	0.761	1.01	95
Acenaphthene	0.611	1.12	101
Fluorene	0.933	0.803	96
Phenanthrene	1.80	1.80	97
Anthracene	1.08	1.96	91
Fluoranthene	1.05	0.713	101
Pyrene	1.05	0.805	98
Benz(a)anthracene	1.88	2.50	92
Chrysene	1.98	2.17	104
Benzo(b)fluoranthene	1.84	2.46	89
Benzo(k)fluoranthene	1.74	2.36	108
Benzo(e)pyrene	1.09	<0.92	
Benzo(a)pyrene	1.19	<1.1	91
Perylene	1.52	<1.3	
Indeno(1,2,3-cd)pyrene	2.40	<2.4	95
Dibenz(a,h)anthracene	1.90	3.17	93
Benzo(g,h,i)perylene	1.31	<1.4	92
Extraction Standards	**% Rec**	**% Rec**	**% Rec**
Naphthalene d8	86	76	71
Acenaphthylene d8	101	68	79
Phenanthrene d10	96	69	74
Anthracene-d10	91	61	73
Fluoranthene d10	107	66	78
Benz(a)anthracene-d12	43	24	38
Chrysene d12	39	24	35
Benzo(b)fluoranthene-d12	102	46	82
Benzo(k)fluoranthene-d12	91	41	73
Benzo(a)pyrene d12	102	45	81
Perylene d12	57	36	72
Indeno(1,2,3,cd)pyrene-d12	133	55	94
Dibenz(a,h)anthracene-d14	132	54	91
Benzo(g,h,i)perylene d12	151	66	103

ALS Life Sciences

Sample Analysis Report

Sample Name	**R1**	Sampling Date	25-May-21	
ALS Sample ID	L2599663-1	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
E. Sabljic
--e-signature--
27-Jul-2021

Run Information	**Run 1**	**Run 2**	**Run 3**
Filename	10-210726A23	10-210726A19	10-210726A25
Run Date	27-Jul-21 00:23	26-Jul-21 21:56	27-Jul-21 10:37
Final Volume	1020 uL	1020 uL	1020 uL
Dilution Factor	1	40	40
Analysis Units	ng	ng	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H	HRMS-10 DB5MS#US0423334H	HRMS-10 DB5MS#US0423334H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene						8.68	19600	270		6100					
Acenaphthylene	11.24	405	170		31										
Acenaphthene	11.52	122	14	M	31										
Fluorene						12.34	10300	97		6100					
Phenanthrene						13.92	18800	65		6100					
Anthracene	14.01	1130	37		31										
Fluoranthene						16.10	992	37		6100					
Pyrene						16.56	615	36		6100					
Benz(a)anthracene						19.12	47.6	9.0	M	6100					
Chrysene											19.17	3210	2.8	M,J	1200
Benzo(b)fluoranthene	21.40	313	0.18	M	31										
Benzo(k)fluoranthene	21.44	17.2	0.22	M,J,B	31										
Benzo(e)pyrene	21.94	267	0.28		31										
Benzo(a)pyrene	22.04	35.8	0.33		31										
Perylene	22.21	3.61	0.43	J,B	31										
Indeno(1,2,3-cd)pyrene	24.19	47.5	1.1	M	31										
Dibenz(a,h)anthracene	24.23	57.8	0.64		31										
Benzo(g,h,i)perylene	24.72	57.8	0.84		31										

Extraction Standards	**NG**		**% Rec**	**Limits**		**% Rec**		**% Rec**
Naphthalene d8	300			20-150	8.65	27		
Acenaphthylene d8	300	11.22	112	20-150				
Phenanthrene d10	300			30-150	13.88	40		
Anthracene-d10	300	13.98	87	30-150				
Fluoranthene d10	300			30-150	16.06	33		
Benz(a)anthracene-d12	300			30-150	19.06	70		
Chrysene d12	300			30-150			19.14	70
Benzo(b)fluoranthene-d12	300	21.35	113	30-150				
Benzo(k)fluoranthene-d12	300	21.41	102	30-150				
Benzo(a)pyrene d12	300	21.99	100	30-150				
Perylene d12	300	22.16	80	30-150				
Indeno(1,2,3,cd)pyrene-d12	300	24.13	81	30-150				
Dibenz(a,h)anthracene-d14	300	24.18	80	30-150				
Benzo(g,h,i)perylene d12	300	24.65	79	30-150				
Field Spikes								
1-Methylnaphthalene-d10	300	9.89	70	50-150				
Fluorene-d10	300	12.31	68	50-150				
p-Terphenyl-d14	300	16.93	99	50-150				

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

ALS Life Sciences

Sample Analysis Report

Sample Name	R2	Sampling Date	25-May-21	
ALS Sample ID	L2599663-2	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
E. Sabljic
--e-signature--
27-Jul-2021

Run Information	**Run 1**	**Run 2**
Filename	10-210726A21	10-210726A17
Run Date	26-Jul-21 23:09	26-Jul-21 20:43
Final Volume	1020 uL	1020 uL
Dilution Factor	1	10
Analysis Units	ng	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H	HRMS-10 DB5MS#US0423334H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene						8.69	5980	15		310
Acenaphthylene	11.23	40.2	14		31					
Acenaphthene	11.52	33.2	4.8	M	31					
Fluorene						12.34	4610	23	M	310
Phenanthrene						13.93	9120	8.5		310
Anthracene	14.01	132	0.96		31					
Fluoranthene	16.10	632	2.4		31					
Pyrene	16.56	348	2.3		31					
Benz(a)anthracene	19.11	16.9	0.16	M,J,B	31					
Chrysene	19.16	1330	0.17	M	31					
Benzo(b)fluoranthene	21.40	25.7	0.30	J	31					
Benzo(k)fluoranthene	NotFnd	<0.36	0.36	U	31					
Benzo(e)pyrene	21.94	18.3	0.44	J	31					
Benzo(a)pyrene	22.04	2.31	0.52	J,B	31					
Perylene	22.16	<0.54	0.54	U	31					
Indeno(1,2,3-cd)pyrene	24.19	5.80	1.2	J,B	31					
Dibenz(a,h)anthracene	24.23	2.67	1.0	J,B	31					
Benzo(g,h,i)perylene	24.72	7.41	0.80	J,B	31					

Extraction Standards	**NG**		**% Rec**	**Limits**		**% Rec**
Naphthalene d8	300			20-150	8.65	71
Acenaphthylene d8	300	11.21	69	20-150		
Phenanthrene d10	300			30-150	13.89	97
Anthracene-d10	300	13.97	71	30-150		
Fluoranthene d10	300	16.06	97	30-150		
Benz(a)anthracene-d12	300	19.06	46	30-150		
Chrysene d12	300	19.12	43	30-150		
Benzo(b)fluoranthene-d12	300	21.34	83	30-150		
Benzo(k)fluoranthene-d12	300	21.41	82	30-150		
Benzo(a)pyrene d12	300	21.99	80	30-150		
Perylene d12	300	22.15	76	30-150		
Indeno(1,2,3,cd)pyrene-d12	300	24.13	83	30-150		
Dibenz(a,h)anthracene-d14	300	24.18	80	30-150		
Benzo(g,h,i)perylene d12	300	24.65	87	30-150		
Field Spikes						
1-Methylnaphthalene-d10	300	9.88	74	50-150		
Fluorene-d10	300	12.29	84	50-150		
p-Terphenyl-d14	300	16.93	71	50-150		

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

ALS Life Sciences

Sample Analysis Report

Sample Name	R3	Sampling Date	27-May-21	
ALS Sample ID	L2599663-3	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
E. Sabijic
--e-signature--
27-Jul-2021

Run Information	**Run 1**	**Run 2**
Filename	10-210726A22	10-210726A18
Run Date	26-Jul-21 23:46	26-Jul-21 21:19
Final Volume	1020 uL	1020 uL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H	HRMS-10 DB5MS#US0423334H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene						8.68	27600	11		610
Acenaphthylene	11.23	132	12		31					
Acenaphthene	11.52	86.5	5.2	M	31					
Fluorene						12.34	3700	4.1		610
Phenanthrene						13.93	28900	5.1		610
Anthracene	14.01	178	1.3		31					
Fluoranthene	16.10	914	3.2	M	31					
Pyrene	16.54	1100	3.1		31					
Benz(a)anthracene						19.11	17.6	2.7	M,J,B	610
Chrysene	19.15	1510	0.22	M	31					
Benzo(b)fluoranthene	21.39	32.3	0.25		31					
Benzo(k)fluoranthene	NotFnd	<0.30	0.30	U	31					
Benzo(e)pyrene	21.94	32.7	0.35		31					
Benzo(a)pyrene	22.04	3.07	0.41	J,B	31					
Perylene	22.20	2.59	0.61	J,B	31					
Indeno(1,2,3-cd)pyrene	24.19	4.92	0.89	J,B	31					
Dibenz(a,h)anthracene	24.23	1.98	0.63	J,B	31					
Benzo(g,h,i)perylene	24.72	10.7	0.64	J,B	31					

Extraction Standards	**NG**		**% Rec**	**Limits**		**% Rec**
Naphthalene d8	300			20-150	8.65	78
Acenaphthylene d8	300	11.21	93	20-150		
Phenanthrene d10	300			30-150	13.88	102
Anthracene-d10	300	13.97	91	30-150		
Fluoranthene d10	300	16.06	117	30-150		
Benz(a)anthracene-d12	300			30-150	19.06	45
Chrysene d12	300	19.12	57	30-150		
Benzo(b)fluoranthene-d12	300	21.34	99	30-150		
Benzo(k)fluoranthene-d12	300	21.41	98	30-150		
Benzo(a)pyrene d12	300	21.99	99	30-150		
Perylene d12	300	22.15	66	30-150		
Indeno(1,2,3,cd)pyrene-d12	300	24.13	113	30-150		
Dibenz(a,h)anthracene-d14	300	24.16	114	30-150		
Benzo(g,h,i)perylene d12	300	24.65	116	30-150		
Field Spikes						
1-Methylnaphthalene-d10	300	9.88	85	50-150		
Fluorene-d10	300	12.29	89	50-150		
p-Terphenyl-d14	300	16.92	72	50-150		

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

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ALS Life Sciences

Sample Analysis Report

Sample Name	**BLANK**	Sampling Date	27-May-21		
ALS Sample ID	L2599663-4	Extraction Date	15-Jun-21		Approved:
Analysis Method	C429 Mod.	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	3		27-Jul-2021

Run Information	**Run 1**	**Run 2**
Filename	10-210726A20	10-210726A16
Run Date	26-Jul-21 22:33	26-Jul-21 20:06
Final Volume	1020 uL	1020 uL
Dilution Factor	1	5
Analysis Units	ng	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H	HRMS-10 DB5MS#US0423334H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene	8.67	1430	3.2		31					
Acenaphthylene	11.23	<18	18	U	31					
Acenaphthene	11.50	68.1	4.8		31					
Fluorene	12.33	177	19		31					
Phenanthrene	13.92	402	0.45		31					
Anthracene	14.00	21.5	0.63	J	31					
Fluoranthene	16.10	51.7	0.36	M	31					
Pyrene	16.54	68.0	0.35		31					
Benz(a)anthracene	19.10	2.53	0.16	J,B	31					
Chrysene	19.15	8.43	0.17	J,B	31					
Benzo(b)fluoranthene	21.39	2.95	0.25	J,B	31					
Benzo(k)fluoranthene	21.44	0.936	0.29	J,B	31					
Benzo(e)pyrene	21.93	3.86	0.37	J,B	31					
Benzo(a)pyrene	22.03	2.66	0.44	J,B	31					
Perylene	22.19	0.803	0.50	J,B	31					
Indeno(1,2,3-cd)pyrene	24.18	3.02	0.83	M,J,B	31					
Dibenz(a,h)anthracene	NotFnd	<0.58	0.58	U	31					
Benzo(g,h,i)perylene	24.71	7.80	0.54	J,B	31					

Extraction Standards	**NG**		**% Rec**	**Limits**	**% Rec**
Naphthalene d8	300	8.65	74	20-150	
Acenaphthylene d8	300	11.20	73	20-150	
Phenanthrene d10	300	13.88	90	30-150	
Anthracene-d10	300	13.97	69	30-150	
Fluoranthene d10	300	16.06	105	30-150	
Benz(a)anthracene-d12	300	19.05	49	30-150	
Chrysene d12	300	19.11	49	30-150	
Benzo(b)fluoranthene-d12	300	21.33	83	30-150	
Benzo(k)fluoranthene-d12	300	21.40	74	30-150	
Benzo(a)pyrene d12	300	21.98	75	30-150	
Perylene d12	300	22.14	64	30-150	
Indeno(1,2,3,cd)pyrene-d12	300	24.12	125	30-150	
Dibenz(a,h)anthracene-d14	300	24.16	126	30-150	
Benzo(g,h,i)perylene d12	300	24.64	141	30-150	
Field Spikes					
1-Methylnaphthalene-d10	300	9.87	78	50-150	
Fluorene-d10	300	12.28	90	50-150	
p-Terphenyl-d14	300	16.92	69	50-150	

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

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ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3554311-1	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	Blank
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Approved:
E. Sabljic
--e-signature--
27-Jul-2021

Run Information	**Run 1**
Filename	10-210726A14
Run Date	26-Jul-21 18:52
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene		8.68	17.0	0.32		10
Acenaphthylene		11.23	0.761	0.22	M,J	10
Acenaphthene		11.52	0.611	0.20	J	10
Fluorene		12.34	0.933	0.27	J	10
Phenanthrene		13.92	1.80	0.12	J	10
Anthracene		14.01	1.08	0.14	J	10
Fluoranthene		16.10	1.05	0.11	J	10
Pyrene		16.56	1.05	0.11	M,J	10
Benz(a)anthracene		19.11	1.88	0.17	J	10
Chrysene		19.19	1.98	0.18	J	10
Benzo(b)fluoranthene		21.39	1.84	0.34	M,J	10
Benzo(k)fluoranthene		21.45	1.74	0.41	J	10
Benzo(e)pyrene		21.94	1.09	0.46	J	10
Benzo(a)pyrene		22.04	1.19	0.54	J	10
Perylene		22.21	1.52	1.0	J	10
Indeno(1,2,3-cd)pyrene		24.19	2.40	1.3	M,J	10
Dibenz(a,h)anthracene		24.26	1.90	1.1	J	10
Benzo(g,h,i)perylene		24.73	1.31	0.81	M,J	10
Extraction Standards	**NG**		**% Rec**	**Limits**		
Naphthalene d8	300	8.65	86	20-150		
Acenaphthylene d8	300	11.21	101	20-150		
Phenanthrene d10	300	13.88	96	30-150		
Anthracene-d10	300	13.97	91	30-150		
Fluoranthene d10	300	16.06	107	30-150		
Benz(a)anthracene-d12	300	19.06	43	30-150		
Chrysene d12	300	19.12	39	30-150		
Benzo(b)fluoranthene-d12	300	21.35	102	30-150		
Benzo(k)fluoranthene-d12	300	21.41	91	30-150		
Benzo(a)pyrene d12	300	21.99	102	30-150		
Perylene d12	300	22.15	57	30-150		
Indeno(1,2,3,cd)pyrene-d12	300	24.13	133	30-150		
Dibenz(a,h)anthracene-d14	300	24.18	132	30-150		
Benzo(g,h,i)perylene d12	300	24.65	151	30-150		
Field Spikes						
1-Methylnaphthalene-d10	300	9.88		50-150		
Fluorene-d10	300	12.29		50-150		
p-Terphenyl-d14	300	16.93		50-150		

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.

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ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3554311-4	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	Blank
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Approved:
E. Sabljic
--e-signature--
27-Jul-2021

Run Information	**Run 1**
Filename	10-210726A15
Run Date	26-Jul-21 19:29
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 DB5MS#US0423334H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**LQL ng**
Naphthalene		8.69	7.90	0.40	J	10
Acenaphthylene		11.23	1.01	0.25	M,J	10
Acenaphthene		11.53	1.12	0.35	J	10
Fluorene		12.36	0.803	0.49	J	10
Phenanthrene		13.93	1.80	0.15	J	10
Anthracene		14.02	1.96	0.18	M,J	10
Fluoranthene		16.12	0.713	0.15	J	10
Pyrene		16.56	0.805	0.15	M,J	10
Benz(a)anthracene		19.11	2.50	0.23	J	10
Chrysene		19.19	2.17	0.23	J	10
Benzo(b)fluoranthene		21.41	2.46	0.61	J	10
Benzo(k)fluoranthene		21.46	2.36	0.76	J	10
Benzo(e)pyrene		NotFnd	<0.92	0.92	U	10
Benzo(a)pyrene		NotFnd	<1.1	1.1	U	10
Perylene		NotFnd	<1.3	1.3	U	10
Indeno(1,2,3-cd)pyrene		NotFnd	<2.4	2.4	M,U	10
Dibenz(a,h)anthracene		24.26	3.17	2.3	J	10
Benzo(g,h,i)perylene		NotFnd	<1.4	1.4	M,U	10
Extraction Standards	**NG**		**% Rec**	**Limits**		
Naphthalene d8	300	8.65	76	20-150		
Acenaphthylene d8	300	11.21	68	20-150		
Phenanthrene d10	300	13.89	69	30-150		
Anthracene-d10	300	13.98	61	30-150		
Fluoranthene d10	300	16.08	66	30-150		
Benz(a)anthracene-d12	300	19.07	24	30-150		
Chrysene d12	300	19.13	24	30-150		
Benzo(b)fluoranthene-d12	300	21.35	46	30-150		
Benzo(k)fluoranthene-d12	300	21.42	41	30-150		
Benzo(a)pyrene d12	300	22.00	45	30-150		
Perylene d12	300	22.16	36	30-150		
Indeno(1,2,3,cd)pyrene-d12	300	24.14	55	30-150		
Dibenz(a,h)anthracene-d14	300	24.19	54	30-150		
Benzo(g,h,i)perylene d12	300	24.66	66	30-150		
Field Spikes						
1-Methylnaphthalene-d10	300	9.89		50-150		
Fluorene-d10	300	12.29		50-150		
p-Terphenyl-d14	300	16.94		50-150		

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
J	Indicates that a target analyte was detected below the calibrated range.

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ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3554311-2	Extraction Date	15-Jun-21	
Analysis Method	C429 Mod.	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Approved:
E. Sabljic
--e-signature--
27-Jul-2021

Run Information	**Run 1**
Filename	10-210726A11
Run Date	26-Jul-21 17:02
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-10 DB5MS#US0423334H

		Ret.		**Limits**	
Target Analytes	**ng**	**Time**	**% Rec**		**Flags**
Naphthalene	300	8.68	104	50-150	
Acenaphthylene	300	11.23	95	50-150	
Acenaphthene	300	11.52	101	50-150	
Fluorene	300	12.34	96	50-150	
Phenanthrene	300	13.93	97	50-150	
Anthracene	300	14.01	91	50-150	
Fluoranthene	300	16.12	101	50-150	
Pyrene	300	16.56	98	50-150	
Benz(a)anthracene	300	19.11	92	50-150	
Chrysene	300	19.19	104	50-150	
Benzo(b)fluoranthene	300	21.40	89	50-150	
Benzo(k)fluoranthene	300	21.45	108	50-150	
Benzo(e)pyrene	300				
Benzo(a)pyrene	300	22.04	91	50-150	
Perylene	300				
Indeno(1,2,3-cd)pyrene	300	24.19	95	50-150	
Dibenz(a,h)anthracene	300	24.25	93	50-150	
Benzo(g,h,i)perylene	300	24.72	92	50-150	
Extraction Standards	**NG**		**% Rec**	**Limits**	
Naphthalene d8	300	8.65	71	20-150	
Acenaphthylene d8	300	11.21	79	20-150	
Phenanthrene d10	300	13.89	74	30-150	
Anthracene-d10	300	13.98	73	30-150	
Fluoranthene d10	300	16.08	78	30-150	
Benz(a)anthracene-d12	300	19.06	38	30-150	
Chrysene d12	300	19.13	35	30-150	
Benzo(b)fluoranthene-d12	300	21.35	82	30-150	
Benzo(k)fluoranthene-d12	300	21.41	73	30-150	
Benzo(a)pyrene d12	300	21.99	81	30-150	
Perylene d12	300	22.16	72	30-150	
Indeno(1,2,3,cd)pyrene-d12	300	24.13	94	30-150	
Dibenz(a,h)anthracene-d14	300	24.18	91	30-150	
Benzo(g,h,i)perylene d12	300	24.65	103	30-150	
Field Spikes					
1-Methylnaphthalene-d10	300				
Fluorene-d10	300				
p-Terphenyl-d14	300				

LQL	Indicates the Lower Quantification Limit, based on the lowest calibration level (corrected for sample size and dilutions)

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ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Breanne Dusureault	**Client Name:**	Best Environmental
ALS Project ID:	BEST100	**Client Address:**	339 Stealth Court Livermore, CA 94551 USA
ALS WO#:	L2599663		
Date of Report	8-Jul-21		
Date of Sample Receipt	9-Jun-21	**Client Contact:**	Basim Asfour
		Client Project ID:	BUBBLING WELLS

COMMENTS: **PCDD/F by EPA M23**

Certified by:

Steve Kennedy
Technical Supervisor

Results in this certificate relate only to the samples as submitted to the laboratory.

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Sample Analysis summary Report

Sample Name	**R1**	**R2**	**R3**	**BLANK**
ALS Sample ID	L2599663-1	L2599663-2	L2599663-3	L2599663-4
Sample Size	1	1	1	1
Sample size units	sample	sample	sample	sample
Percent Moisture	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack
Sampling Date	25-May-21	25-May-21	27-May-21	27-May-21
Extraction Date	15-Jun-21	15-Jun-21	15-Jun-21	15-Jun-21
Target Analytes	pg	pg	pg	pg
2,3,7,8-TCDD	16.9	9.79	<3.2	<4.9
1,2,3,7,8-PeCDD	77.7	41.4	25.2	<2.8
1,2,3,4,7,8-HxCDD	36.3	31.5	<9.4	<3.2
1,2,3,6,7,8-HxCDD	69.0	<41	<11	<3.1
1,2,3,7,8,9-HxCDD	62.7	63.6	<10	<3.2
1,2,3,4,6,7,8-HpCDD	210	300	<61	<3.7
OCDD	154	350	97.9	15.8
2,3,7,8-TCDF	124	43.0	82.9	<3.5
1,2,3,7,8-PeCDF	132	61.3	59.7	<1.6
2,3,4,7,8-PeCDF	162	94.2	173	<1.5
1,2,3,4,7,8-HxCDF	102	80.6	38.5	<1.0
1,2,3,6,7,8-HxCDF	125	87.5	<41	<0.96
2,3,4,6,7,8-HxCDF	112	92.4	67.4	<1.0
1,2,3,7,8,9-HxCDF	32.1	23.8	11.1	<2.8
1,2,3,4,6,7,8-HpCDF	177	237	77.9	<1.8
1,2,3,4,7,8,9-HpCDF	23.7	<18	5.26	<2.3
OCDF	35.2	75.1	17.5	<2.6
Field Spike Standards	% Rec	% Rec	% Rec	% Rec
37Cl4-2,3,7,8-TCDD	99	93	96	94
13C12-1,2,3,4,7,8-HxCDD	89	98	96	97
13C12-2,3,4,7,8-PeCDF	98	82	79	104
13C12-1,2,3,4,7,8-HxCDF	97	100	100	100
13C12-1,2,3,4,7,8,9-HpCDF	88	93	84	105
Extraction Standards				
13C12-2,3,7,8-TCDD	85	74	70	63
13C12-1,2,3,7,8-PeCDD	95	77	82	72
13C12-1,2,3,6,7,8-HxCDD	72	58	51	56
13C12-1,2,3,4,6,7,8-HpCDD	67	61	48	64
13C12-OCDD	71	69	46	77
13C12-2,3,7,8-TCDF	102	73	73	63
13C12-1,2,3,7,8-PeCDF	94	90	102	68
13C12-1,2,3,6,7,8-HxCDF	67	58	50	54
13C12-1,2,3,4,6,7,8-HpCDF	76	67	59	63
Cleanup Standard				
13C12-1,2,3,7,8,9-HxCDF	69	64	56	73
Homologue Group Totals	pg	pg	pg	pg
Total-TCDD	461	265	177	<4.9
Total-PeCDD	924	149	372	<2.8
Total-HxCDD	659	451	141	<3.2
Total-HpCDD	374	566	<2.3	<3.7
Total-TCDF	2390	1940	1780	<3.5
Total-PeCDF	2010	642	1350	<1.6
Total-HxCDF	898	634	576	<1.3
Total-HpCDF	227	319	112	<2.3
Toxic Equivalency - (WHO 2005)				
Lower Bound PCDD/F TEQ (WHO 2005)	218	129	99.7	0.00474
Mid Point PCDD/F TEQ (WHO 2005)	218	133	109	5.22
Upper Bound PCDD/F TEQ (WHO 2005)	218	133	111	10.2

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Quality Control Summary Report

Sample Name	**Method Blank**	**Method Blank**	**Laboratory Control Sample**
ALS Sample ID	WG3554311-1	WG3554311-4	WG3554311-2
Sample Size	1	1	1
Sample size units	n/a	n/a	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	MEDIA	REAGENT	MEDIA
Sampling Date	n/a	n/a	n/a
Extraction Date	15-Jun-21	15-Jun-21	15-Jun-21
Target Analytes	**pg**	**pg**	**% Rec**
2,3,7,8-TCDD	<4.0	<1.5	86
1,2,3,7,8-PeCDD	<3.0	<0.75	103
1,2,3,4,7,8-HxCDD	<4.0	<0.76	89
1,2,3,6,7,8-HxCDD	<3.9	<0.73	94
1,2,3,7,8,9-HxCDD	<4.0	<0.99	124
1,2,3,4,6,7,8-HpCDD	<3.5	<1.8	102
OCDD	35.5	<7.1	89
2,3,7,8-TCDF	<3.3	<1.1	99
1,2,3,7,8-PeCDF	<1.9	<0.93	109
2,3,4,7,8-PeCDF	<1.8	<1.3	100
1,2,3,4,7,8-HxCDF	<2.0	<0.72	103
1,2,3,6,7,8-HxCDF	<1.8	<0.67	104
2,3,4,6,7,8-HxCDF	<2.0	<0.73	107
1,2,3,7,8,9-HxCDF	4.85	<2.4	128
1,2,3,4,6,7,8-HpCDF	<3.1	<0.90	96
1,2,3,4,7,8,9-HpCDF	<4.0	<0.67	94
OCDF	<15	2.08	98
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	0	0	0
13C12-1,2,3,4,7,8-HxCDD	0	0	0
13C12-2,3,4,7,8-PeCDF	0	0	0
13C12-1,2,3,4,7,8-HxCDF	0	0	0
13C12-1,2,3,4,7,8,9-HpCDF	0	0	0
Extraction Standards			
13C12-2,3,7,8-TCDD	29	92	74
13C12-1,2,3,7,8-PeCDD	32	108	93
13C12-1,2,3,6,7,8-HxCDD	26	63	64
13C12-1,2,3,4,6,7,8-HpCDD	33	77	68
13C12-OCDD	41	86	69
13C12-2,3,7,8-TCDF	30	99	72
13C12-1,2,3,7,8-PeCDF	30	95	81
13C12-1,2,3,6,7,8-HxCDF	24	60	59
13C12-1,2,3,4,6,7,8-HpCDF	31	76	72
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	33	66	68
Homologue Group Totals	**pg**	**pg**	
Total-TCDD	<4.0	<1.5	
Total-PeCDD	<3.0	<0.75	
Total-HxCDD	<4.0	<0.77	
Total-HpCDD	<3.5	<1.8	
Total-TCDF	<3.3	<1.1	
Total-PeCDF	<1.9	<0.93	
Total-HxCDF	4.85	<0.88	
Total-HpCDF	<4.0	<0.67	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.496	0.000624	
Mid Point PCDD/F TEQ (WHO 2005)	5.40	2.13	
Upper Bound PCDD/F TEQ (WHO 2005)	10.3	3.51	

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Sample Analysis Report

Sample Name	R1	Sampling Date	25-May-21	
ALS Sample ID	L2599663-1	Extraction Date	15-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A26
Run Date	26-Jun-21 09:45
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.48	16.9	2.5	M,J		30
1,2,3,7,8-PeCDD	1	32.31	77.7	1.3	J		150
1,2,3,4,7,8-HxCDD	0.1	34.30	36.3	0.88	J		150
1,2,3,6,7,8-HxCDD	0.1	34.35	69.0	0.85	J		150
1,2,3,7,8,9-HxCDD	0.1	34.48	62.7	0.89	J		150
1,2,3,4,6,7,8-HpCDD	0.01	35.98	210	1.2			150
OCDD	0.0003	37.48	154	1.5	M,J,B		300
2,3,7,8-TCDF	0.1	27.58	124	1.7			30
1,2,3,7,8-PeCDF	0.03	31.40	132	0.90	J		150
2,3,4,7,8-PeCDF	0.3	32.10	162	0.86			150
1,2,3,4,7,8-HxCDF	0.1	33.82	102	0.71	J		150
1,2,3,6,7,8-HxCDF	0.1	33.90	125	0.65	J		150
2,3,4,6,7,8-HxCDF	0.1	34.22	112	0.71	J		150
1,2,3,7,8,9-HxCDF	0.1	34.65	32.1	0.86	J,B		150
1,2,3,4,6,7,8-HpCDF	0.01	35.41	177	1.2			150
1,2,3,4,7,8,9-HpCDF	0.01	36.23	23.7	1.5	J		150
OCDF	0.0003	37.58	35.2	0.88	M,J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	600	28.50	99	70-130
13C12-1,2,3,4,7,8-HxCDD	6000	34.30	89	70-130
13C12-2,3,4,7,8-PeCDF	6000	32.09	98	70-130
13C12-1,2,3,4,7,8-HxCDF	6000	33.81	97	70-130
13C12-1,2,3,4,7,8,9-HpCDF	6000	36.22	88	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.47	85	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.30	95	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.35	72	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.97	67	25-130
13C12-OCDD	12000	37.48	71	25-130
13C12-2,3,7,8-TCDF	6000	27.57	102	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.39	94	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	67	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.40	76	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.63	69	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	8	461	2.5	30
Total-PeCDD	8	924	1.3	150
Total-HxCDD	7	659	0.89	150
Total-HpCDD	2	374	1.2	150
Total-TCDF	18	2390	1.7	30
Total-PeCDF	15	2010	0.90	150
Total-HxCDF	11	898	0.86	150
Total-HpCDF	3	227	1.5	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	218
Mid Point PCDD/F TEQ (WHO 2005)	218
Upper Bound PCDD/F TEQ (WHO 2005)	218

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	R2	Sampling Date	25-May-21		
ALS Sample ID	L2599663-2	Extraction Date	15-Jun-21		
Analysis Method	EPA M23	Sample Size	1	sample	
Analysis Type	Sample	Percent Moisture	n/a		
Sample Matrix	Stack	Split Ratio	3		

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A27
Run Date	26-Jun-21 10:29
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.50	9.79	5.2	M,J		30
1,2,3,7,8-PeCDD	1	32.31	41.4	3.2	J		150
1,2,3,4,7,8-HxCDD	0.1	34.32	31.5	14	J		150
1,2,3,6,7,8-HxCDD	0.1	34.37	<41	14	J,R	41	150
1,2,3,7,8,9-HxCDD	0.1	34.49	63.6	14	J		150
1,2,3,4,6,7,8-HpCDD	0.01	35.98	300	4.1			150
OCDD	0.0003	37.49	350	3.7	B		300
2,3,7,8-TCDF	0.1	27.58	43.0	5.7	M		30
1,2,3,7,8-PeCDF	0.03	31.41	61.3	2.0	J		150
2,3,4,7,8-PeCDF	0.3	32.03	94.2	2.0	J		150
1,2,3,4,7,8-HxCDF	0.1	33.84	80.6	4.3	J		150
1,2,3,6,7,8-HxCDF	0.1	33.91	87.5	4.0	J		150
2,3,4,6,7,8-HxCDF	0.1	34.23	92.4	4.3	J		150
1,2,3,7,8,9-HxCDF	0.1	34.66	23.8	5.2	J,B		150
1,2,3,4,6,7,8-HpCDF	0.01	35.42	237	2.0			150
1,2,3,4,7,8,9-HpCDF	0.01	36.24	<18	2.5	M,J,R	18	150
OCDF	0.0003	37.59	75.1	2.6	J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	600	28.51	93	70-130
13C12-1,2,3,4,7,8-HxCDD	6000	34.31	98	70-130
13C12-2,3,4,7,8-PeCDF	6000	32.10	82	70-130
13C12-1,2,3,4,7,8-HxCDF	6000	33.82	100	70-130
13C12-1,2,3,4,7,8,9-HpCDF	6000	36.23	93	70-130

Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.48	74	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.31	77	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.35	58	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.98	61	25-130
13C12-OCDD	12000	37.49	69	25-130
13C12-2,3,7,8-TCDF	6000	27.57	73	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.40	90	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.90	58	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.41	67	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.64	64	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	10	265	5.2	30
Total-PeCDD	3	149	3.2	150
Total-HxCDD	5	451	14	150
Total-HpCDD	2	566	4.1	150
Total-TCDF	14	1940	5.7	30
Total-PeCDF	9	642	2.0	150
Total-HxCDF	8	634	5.2	150
Total-HpCDF	3	319	2.5	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	129
Mid Point PCDD/F TEQ (WHO 2005)	133
Upper Bound PCDD/F TEQ (WHO 2005)	133

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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ALS Life Sciences

Sample Analysis Report

Sample Name	R3	Sampling Date	27-May-21	
ALS Sample ID	L2599663-3	Extraction Date	15-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A28
Run Date	26-Jun-21 11:12
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.48	<3.2	3.2	M,U		30
1,2,3,7,8-PeCDD	1	32.31	25.2	1.6	J		150
1,2,3,4,7,8-HxCDD	0.1	34.30	<9.4	1.4	J,R	9.4	150
1,2,3,6,7,8-HxCDD	0.1	34.35	<11	1.4	J,R	11	150
1,2,3,7,8,9-HxCDD	0.1	34.46	<10	1.4	M,J,R	10	150
1,2,3,4,6,7,8-HpCDD	0.01	35.97	<61	2.3	M,J,R	61	150
OCDD	0.0003	37.48	97.9	1.8	J,B		300
2,3,7,8-TCDF	0.1	27.57	82.9	4.3			30
1,2,3,7,8-PeCDF	0.03	31.41	59.7	3.2	J		150
2,3,4,7,8-PeCDF	0.3	32.01	173	3.1			150
1,2,3,4,7,8-HxCDF	0.1	33.82	38.5	2.2	J		150
1,2,3,6,7,8-HxCDF	0.1	33.90	<41	2.0	M,J,R	41	150
2,3,4,6,7,8-HxCDF	0.1	34.22	67.4	2.2	J		150
1,2,3,7,8,9-HxCDF	0.1	34.65	11.1	2.6	J,B		150
1,2,3,4,6,7,8-HpCDF	0.01	35.41	77.9	2.1	M,J		150
1,2,3,4,7,8,9-HpCDF	0.01	36.23	5.26	2.6	J		150
OCDF	0.0003	37.58	17.5	1.9	J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	600	28.48	96	70-130
13C12-1,2,3,4,7,8-HxCDD	6000	34.30	96	70-130
13C12-2,3,4,7,8-PeCDF	6000	32.09	79	70-130
13C12-1,2,3,4,7,8-HxCDF	6000	33.81	100	70-130
13C12-1,2,3,4,7,8,9-HpCDF	6000	36.22	84	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.47	70	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.30	82	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.34	51	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.97	48	25-130
13C12-OCDD	12000	37.48	46	25-130
13C12-2,3,7,8-TCDF	6000	27.55	73	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.39	102	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	50	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.40	59	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.63	56	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	10	177	3.2		30
Total-PeCDD	8	372	1.6		150
Total-HxCDD	2	141	1.4		150
Total-HpCDD	0	<2.3	2.3	U	150
Total-TCDF	18	1780	4.3		30
Total-PeCDF	14	1350	3.2		150
Total-HxCDF	8	576	2.6		150
Total-HpCDF	4	112	2.6		150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	99.7
Mid Point PCDD/F TEQ (WHO 2005)	109
Upper Bound PCDD/F TEQ (WHO 2005)	111

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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ALS Life Sciences

Sample Analysis Report

Sample Name	BLANK	Sampling Date	27-May-21	
ALS Sample ID	L2599663-4	Extraction Date	15-Jun-21	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	3	

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A25
Run Date	26-Jun-21 09:01
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<4.9	4.9	U		30
1,2,3,7,8-PeCDD	1	NotFnd	<2.8	2.8	U		150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.2	3.2	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<3.1	3.1	U		150
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<3.2	3.2	U		150
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<3.7	3.7	U		150
OCDD	0.0003	37.48	15.8	3.2	M,J,B		300
2,3,7,8-TCDF	0.1	NotFnd	<3.5	3.5	U		30
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.6	1.6	U		150
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.5	1.5	U		150
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		150
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.96	0.96	U		150
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		150
1,2,3,7,8,9-HxCDF	0.1	34.63	<2.8	1.3	M,J,R	2.8	150
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.8	1.8	U		150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.3	2.3	U		150
OCDF	0.0003	NotFnd	<2.6	2.6	U		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	600	28.48	94	70-130
13C12-1,2,3,4,7,8-HxCDD	6000	34.29	97	70-130
13C12-2,3,4,7,8-PeCDF	6000	32.09	104	70-130
13C12-1,2,3,4,7,8-HxCDF	6000	33.81	100	70-130
13C12-1,2,3,4,7,8,9-HpCDF	6000	36.22	105	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.47	63	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.30	72	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.34	56	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.97	64	25-130
13C12-OCDD	12000	37.48	77	25-130
13C12-2,3,7,8-TCDF	6000	27.55	63	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.39	68	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	54	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.40	63	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.62	73	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<4.9	4.9	U	30
Total-PeCDD	0	<2.8	2.8	U	150
Total-HxCDD	0	<3.2	3.2	U	150
Total-HpCDD	0	<3.7	3.7	U	150
Total-TCDF	0	<3.5	3.5	U	30
Total-PeCDF	0	<1.6	1.6	U	150
Total-HxCDF	0	<1.3	1.3	U	150
Total-HpCDF	0	<2.3	2.3	U	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00474
Mid Point PCDD/F TEQ (WHO 2005)	5.22
Upper Bound PCDD/F TEQ (WHO 2005)	10.2

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3554311-1	Extraction Date	15-Jun-21	
Analysis Method	EPA M23	Sample Size	1	n/a
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	MEDIA	Split Ratio	3	

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A21
Run Date	26-Jun-21 06:06
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<4.0	4.0	U		30
1,2,3,7,8-PeCDD	1	NotFnd	<3.0	3.0	U		150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<4.0	4.0	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<3.9	3.9	U		150
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<4.0	4.0	U		150
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<3.5	3.5	U		150
OCDD	0.0003	37.48	35.5	3.4	J		300
2,3,7,8-TCDF	0.1	NotFnd	<3.3	3.3	U		30
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.9	1.9	U		150
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.8	1.8	U		150
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<2.0	2.0	U		150
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.8	1.8	U		150
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<2.0	2.0	U		150
1,2,3,7,8,9-HxCDF	0.1	34.64	4.85	2.4	J		150
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<3.1	3.1	U		150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<4.0	4.0	U		150
OCDF	0.0003	37.57	<15	2.1	M,J,R	15	300

Field Spike Standards	**pg**	**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0	NS	
13C12-1,2,3,4,7,8-HxCDD	0	NS	
13C12-2,3,4,7,8-PeCDF	0	NS	
13C12-1,2,3,4,7,8-HxCDF	0	NS	
13C12-1,2,3,4,7,8,9-HpCDF	0	NS	

Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.46	29	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.28	32	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.34	26	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.97	33	25-130
13C12-OCDD	12000	37.48	41	25-130
13C12-2,3,7,8-TCDF	6000	27.54	30	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.39	30	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	24	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.40	31	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.62	33	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<4.0	4.0	U	30
Total-PeCDD	0	<3.0	3.0	U	150
Total-HxCDD	0	<4.0	4.0	U	150
Total-HpCDD	0	<3.5	3.5	U	150
Total-TCDF	0	<3.3	3.3	U	30
Total-PeCDF	0	<1.9	1.9	U	150
Total-HxCDF	1	4.85	2.4		150
Total-HpCDF	0	<4.0	4.0	U	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.496
Mid Point PCDD/F TEQ (WHO 2005)	5.40
Upper Bound PCDD/F TEQ (WHO 2005)	10.3

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

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ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3554311-4	Extraction Date	15-Jun-21	Approved:
Analysis Method	EPA M23	Sample Size	1 n/a	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a	--e-signature--
Sample Matrix	REAGENT	Split Ratio	3	29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A22
Run Date	26-Jun-21 06:50
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.5	1.5	U		30
1,2,3,7,8-PeCDD	1	NotFnd	<0.75	0.75	U		150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.76	0.76	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.73	0.73	U		150
1,2,3,7,8,9-HxCDD	0.1	34.49	<0.99	0.77	M,J,R	0.99	150
1,2,3,4,6,7,8-HpCDD	0.01	35.98	<1.8	1.8	M,U	1.6	150
OCDD	0.0003	37.50	<7.1	0.91	M,J,R	7.1	300
2,3,7,8-TCDF	0.1	NotFnd	<1.1	1.1	U		30
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.93	0.93	U		150
2,3,4,7,8-PeCDF	0.3	32.25	<1.3	0.88	J,R	1.3	150
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.72	0.72	U		150
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.67	0.67	U		150
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.73	0.73	U		150
1,2,3,7,8,9-HxCDF	0.1	34.64	<2.4	0.88	J,R	2.4	150
1,2,3,4,6,7,8-HpCDF	0.01	35.42	<0.90	0.52	J,R	0.90	150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.67	0.67	U		150
OCDF	0.0003	37.59	2.08	0.66	J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0		NS	
13C12-1,2,3,4,7,8-HxCDD	0		NS	
13C12-2,3,4,7,8-PeCDF	0		NS	
13C12-1,2,3,4,7,8-HxCDF	0		NS	
13C12-1,2,3,4,7,8,9-HpCDF	0		NS	
Extraction Standards				
13C12-2,3,7,8-TCDD	6000	28.46	92	40-130
13C12-1,2,3,7,8-PeCDD	6000	32.30	108	40-130
13C12-1,2,3,6,7,8-HxCDD	6000	34.35	63	40-130
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.98	77	25-130
13C12-OCDD	12000	37.49	86	25-130
13C12-2,3,7,8-TCDF	6000	27.54	99	40-130
13C12-1,2,3,7,8-PeCDF	6000	31.39	95	40-130
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	60	40-130
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.41	76	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	6000	34.63	66	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<1.5	1.5	U	30
Total-PeCDD	0	<0.75	0.75	U	150
Total-HxCDD	0	<0.77	0.77	U	150
Total-HpCDD	0	<1.8	1.8	U	150
Total-TCDF	0	<1.1	1.1	U	30
Total-PeCDF	0	<0.93	0.93	U	150
Total-HxCDF	0	<0.88	0.88	U	150
Total-HpCDF	0	<0.67	0.67	U	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.000624
Mid Point PCDD/F TEQ (WHO 2005)	2.13
Upper Bound PCDD/F TEQ (WHO 2005)	3.51

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3554311-2	Extraction Date	15-Jun-21	
Analysis Method	EPA M23	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	MEDIA	Split Ratio	3	

Approved:
N Ashtari
--e-signature--
29-Jun-2021

Run Information	**Run 1**
Filename	7-210625A17
Run Date	26-Jun-21 03:14
Final Volume	20 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUS1221911H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	600	28.48	86	70-130	
1,2,3,7,8-PeCDD	3000	32.31	103	70-130	
1,2,3,4,7,8-HxCDD	3000	34.31	89	70-130	
1,2,3,6,7,8-HxCDD	3000	34.37	94	70-130	
1,2,3,7,8,9-HxCDD	3000	34.48	124	70-130	
1,2,3,4,6,7,8-HpCDD	3000	35.98	102	70-130	
OCDD	6000	37.49	89	70-130	
2,3,7,8-TCDF	600	27.58	99	70-130	
1,2,3,7,8-PeCDF	3000	31.40	109	70-130	
2,3,4,7,8-PeCDF	3000	32.10	100	70-130	
1,2,3,4,7,8-HxCDF	3000	33.82	103	70-130	
1,2,3,6,7,8-HxCDF	3000	33.90	104	70-130	
2,3,4,6,7,8-HxCDF	3000	34.22	107	70-130	
1,2,3,7,8,9-HxCDF	3000	34.64	128	70-130	
1,2,3,4,6,7,8-HpCDF	3000	35.41	96	70-130	
1,2,3,4,7,8,9-HpCDF	3000	36.23	94	70-130	
OCDF	6000	37.59	98	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	0		NS		
13C12-1,2,3,4,7,8-HxCDD	0		NS		
13C12-2,3,4,7,8-PeCDF	0		NS		
13C12-1,2,3,4,7,8-HxCDF	0		NS		
13C12-1,2,3,4,7,8,9-HpCDF	0		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	6000	28.47	74	40-130	
13C12-1,2,3,7,8-PeCDD	6000	32.30	93	40-130	
13C12-1,2,3,6,7,8-HxCDD	6000	34.35	64	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	6000	35.97	68	25-130	
13C12-OCDD	12000	37.48	69	25-130	
13C12-2,3,7,8-TCDF	6000	27.55	72	40-130	
13C12-1,2,3,7,8-PeCDF	6000	31.39	81	40-130	
13C12-1,2,3,6,7,8-HxCDF	6000	33.89	59	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	6000	35.41	72	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	6000	34.63	68	40-130	

R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this standard has not been added.

B-21

Best Environmental
ATTN: Basim Asfour
339 Stealth Court
Livermore CA 94551

Date Received: 09-JUN-21
Report Date: 13-JUL-21 13:50 (MT)
Version: FINAL

Client Phone: 925-455-9474

Certificate of Analysis

Lab Work Order #: L2600614

Project P.O. #: NOT SUBMITTED
Job Reference: BUBBLING WELLS
C of C Numbers:
Legal Site Desc:

Breanne Dusureault

Breanne Dusureault
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2600614-1 RUN 1 Sampled By: Client on 26-MAY-21 Matrix: Stack **Miscellaneous Parameters**							
Chromium, Hexavalent	0.29		0.21	ug	30-JUN-21	02-JUL-21	R5511941
L2600614-2 RUN 2 Sampled By: Client on 26-MAY-21 Matrix: Stack **Miscellaneous Parameters**							
Chromium, Hexavalent	0.78		0.15	ug	30-JUN-21	02-JUL-21	R5511941
L2600614-3 RUN 3 Sampled By: Client on 26-MAY-21 Matrix: Stack **Miscellaneous Parameters**							
Chromium, Hexavalent	1.21		0.16	ug	30-JUN-21	02-JUL-21	R5511941
L2600614-4 BLANK Sampled By: Client on 26-MAY-21 Matrix: Stack **Miscellaneous Parameters**							
Chromium, Hexavalent	<0.072		0.072	ug	30-JUN-21	02-JUL-21	R5511941

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CR-CR6-IC-BU-WT	Stack	Chromium, Hexavalent (Cr6+)	EPA 7199 / Method 306

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2600614 Report Date: 13-JUL-21

Client: Best Environmental
339 Stealth Court
Livermore CA 94551

Contact: Basim Asfour

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-BU-WT	**Stack**							
Batch R5511941								
WG3569046-3 DUP		**L2600614-1**						
Chromium, Hexavalent		0.29	0.27		ug	5.5	10	02-JUL-21
WG3569046-2 LCS								
Chromium, Hexavalent			100.2		%		90-110	02-JUL-21
WG3569046-1 MB								
Chromium, Hexavalent			<0.40		ug		0.4	02-JUL-21
WG3569046-4 MS		**L2600614-1**						
Chromium, Hexavalent			96.2		%		75-125	02-JUL-21

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Speciated Metals							
Chromium, Hexavalent (Cr6+)							
	1	26-MAY-21	02-JUL-21 00:00	14	37	days	EHTR
	2	26-MAY-21	02-JUL-21 00:00	14	37	days	EHTR
	3	26-MAY-21	02-JUL-21 00:00	14	37	days	EHTR
	4	26-MAY-21	02-JUL-21 00:00	14	37	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2600614 were received on 09-JUN-21 15:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Ph (925) 455-9474; Fx (925) 455-9479

Project ID: **Bubbling Wells**

SAMPLE CHAIN OF CUSTODY

BE PROJECT MANAGER: B Johnston

Analyical Lab:

DATE		SAMPLE ID Run#/Method/Fraction/Source	CONTAINER size / type	Volume	Storage Temp °F	Solution	ANALYSIS
5/26/21	1	Run 1 ✓✓	Poly Bottle		Refridge	0.1N NaOh	Total & Hex Chrome
5/26/21	2	Run 2 ✓✓	Poly Bottle		Refridge	0.1N NaOh	Total & Hex Chrome
5/26/21	3	Run 3 ✓✓	Poly Bottle		Refridge	0.1N NaOh	Total & Hex Chrome
5/26/21	4	Blank ✓	Poly Bottle		Refridge	0.1N NaOh	Total & Hex Chrome

BEST ENVIRONMENTAL 339 STEALTH COURT, LIVERMORE CA. 94551

Relinquished by:____ Received by:____ Date:____ Time:____

Relinquished by:____ Received by:____ Date:____ Time:____

Relinquished by: WRJ Received by: AARON BOLTON Date: 9-June-2024 Time: 15:00 15.6°C

SAMPLE CONDITION AS RECEIVED: OK or not OK

L2600614-COFC

ALS Environmental
1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Breanne Dusureault	**Client Name:**	Best Environmental
ALS Project ID:	BEST100	**Client Address:**	339 Stealth Court
ALS WO#:	L2599632		Livermore, CA 94551
Date of Report	29-Jun-21		United States
Date of Sample Receipt	9-Jun-21	**Client Contact:**	Basim Asfour
		Client Project ID:	BUBBLING WELLS

COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020B (SA 28-Jun-21)
Sample Preparation via USEPA Method 29 (SA/TPH 25-Jun-21)

LCB = Laboratory Control Blank
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
LOR = Limit of Reporting

Certified by: Breanne Dusureault

Breanne Dusureault
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		**R1**	**R2**	**R3**	**BLANK**	**MB**
ALS Sample ID		L2599632-1	L2599632-2	L2599632-3	L2599632-4	L2599632-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		26-May-21	26-May-21	26-May-21	26-May-21	n/a
Date of Receipt		9-Jun-21	9-Jun-21	9-Jun-21	9-Jun-21	n/a
Multi-Metals via ICP-MS	**LOR**					
	ug	**ug**	**ug**	**ug**	**ug**	**ug**
Combined Analysis Fraction 1A + 2A						
Arsenic	1	2.72	1.93	1.38	<	<
Beryllium	0.2	<	<	<	<	<
Cadmium	0.1	1.04	1.11	0.783	<	<
Copper	1	47.5	108	86.0	<	<
Lead	0.5	42.4	89.0	131	0.700	<
Nickel	0.2	7.42	26.6	15.6	2.68	0.461
Selenium	2	13.7	25.4	4.46	<	<

ALS Environmental

Sample QC Summary Report

Sample Name		**RB**	**LCS**	**LCS**	**LCSD**	**LCSD**
ALS Sample ID		RB	LCS	LCS	LCSD	LCSD
Matrix		STACK	STACK	STACK	STACK	STACK
Analysis Type		Blank	LCS	LCS	LCS	LCS
Sampling Date		n/a	n/a	n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a	n/a	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Combined Analysis Fraction 1A + 2A						
Arsenic	1	<	60.4	101	57.7	96
Beryllium	0.2	<	60.5	101	58.7	98
Cadmium	0.1	<	30.0	100	29.3	98
Copper	1	<	61.6	102	59.2	99
Lead	0.5	<	59.2	99	55.9	93
Nickel	0.2	0.206	61.5	102	59.3	98
Selenium	2	<	55.5	92	54.9	91

ALS Environmental

Sample QC Summary Report

Sample Name		R1	R1	R1	R1	R1	R1
ALS Sample ID		L2599632-1	L2599632-1	MS	MS	MSD	MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date		26-May-21	26-May-21	26-May-21	26-May-21	26-May-21	26-May-21
Date of Receipt		9-Jun-21	9-Jun-21	9-Jun-21	9-Jun-21	9-Jun-21	9-Jun-21
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Combined Analysis Fraction 1A + 2A							
Arsenic	1	2.72	2.52	118	96	118	96
Beryllium	0.2	<	<	116	97	119	99
Cadmium	0.1	1.04	0.942	60.5	99	59.4	97
Copper	1	47.5	46.2	164	97	166	99
Lead	0.5	42.4	42.2	147	87	149	89
Nickel	0.2	7.42	7.28	126	99	127	99
Selenium	2	13.7	13.2	125	93	127	94

Atmospheric Analysis & Consulting, Inc.

CLIENT : Best Environmental
PROJECT NAME : Bubbling Wells
AAC PROJECT NO. : 210958
REPORT DATE : 06/21/2021

On June 8, 2021, Atmospheric Analysis & Consulting, Inc. received three (3) Six-Liter Silonite Canisters for Fixed Gases analysis by EPA 3C. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

Client ID	Lab No.	Return Pressure (mmHg)
R1	210958-19905	564.5
R2	210958-19906	625.0
R3	210958-19907	587.5

This analysis is performed in accordance with AAC's Quality Manual. Test results apply to the sample(s) as received. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples.

The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha Parmar, Ph.D.
Technical Director

This report consists of 4 pages.

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : Best Environmental
PROJECT NO. : 210958
MATRIX : AIR

SAMPLING DATE : 05/27/2021
RECEIVING DATE : 06/08/2021
ANALYSIS DATE : 06/18/2021
REPORT DATE : 06/21/2021

EPA 3C

Client ID	R1	R2	R3
AAC ID	210958-19905	210958-19906	210958-19907
Can Dilution Factor	1.91	1.69	2.15
Analyte	Result	Result	Result
H_2	< 1.9 %	< 1.7 %	< 2.2 %
Ar/O_2	16.6 %	18.5 %	17.5 %
N_2	79.6 %	79.0 %	79.3 %
CO	< 0.2 %	< 0.2 %	< 0.2 %
CO_2	3.8 %	2.6 %	3.2 %
CH_4	< 0.2 %	< 0.2 %	< 0.2 %

All fixed gases have been normalized to 100% on a dry basis

Sample Reporting Limit (SRL) is equal to Reporting Limit x Analysis Dil. Fac x Canister Dil. Fac

Quality Control/Quality Assurance Report

Date Analyzed : 06/18/2021
Analyst : CH/DL
Units : %

Instrument ID : TCD #1
Calb Date : 10/05/20
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.8	10.1	19.8	9.9	9.7	9.6
	% Rec *	98.8	96.7	98.2	98.9	97.4	95.8

II - Method Blank - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	LCS Result	9.8	10.3	20.3	10.1	10.0	9.8
	LCSD Result	9.8	10.3	20.3	10.1	10.0	9.8
	LCS % Rec *	98.9	99.4	100.5	101.2	99.8	98.2
	LCSD % Rec *	99.0	99.1	100.6	101.3	99.8	98.3
	% RPD ***	0.1	0.3	0.1	0.1	0.1	0.1

IV -Sample & Sample Duplicate - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
210952-19866	Sample	0.0	1.8	46.3	0.0	0.0	11.4
	Sample Dup	0.0	1.8	46.9	0.0	0.0	11.5
	Mean	0.0	1.8	46.6	0.0	0.0	11.5
	% RPD ***	0.0	1.9	1.3	0.0	0.0	1.1

V - Matrix Spike & Duplicate- EPA 3C

AAC ID	Analyte	H_2	N_2	CH_4	CO	CO_2
210952-19866	Sample Conc	0.0	23.3	0.0	0.0	5.7
	Spike Conc	9.9	10.1	10.0	10.0	10.0
	MS Result	10.1	33.9	10.1	10.1	15.5
	MSD Result	10.2	34.2	10.3	10.2	15.8
	MS % Rec **	101.8	104.7	101.5	100.6	98.0
	MSD % Rec **	103.1	107.6	102.9	102.0	100.5
	% RPD ***	1.2	2.7	1.3	1.3	2.5

VI - Closing Continuing Calibration Verification - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.9	10.5	20.6	10.2	10.1	9.8
	% Rec *	99.5	100.7	102.0	101.8	100.9	98.2

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

210958

Ph (925) 455-9474; Fx (925) 455-9479

Project ID: Bubbling Wells

SAMPLE CHAIN OF CUSTODY

BE PROJECT MANAGER: B Johnston

Analyical Lab:

#	DATE	TIME	SAMPLE ID Run#/Method/Fraction/Source	CONTAINER size / type	Volume	Storage Temp °F	Method	ANALYSIS
1	5/27/21	920	19905 R1	Summa can	5L	Amb	TO 15	Benzene, Toluene
2	5/27/21	1025	19906 R2	Summa can	5L	Amb	TO 15	Benzene, Toluene
3	5/27/21	1130	19907 R3	Summa can	5L	Amb	TO 15	Benzene, Toluene
4								

SPECIAL INSTRUCTIONS:

Report only the two compounds

sults to: Attn: BEST ENVIRONMENTAL 339 STEALTH COURT, LIVERMORE CA. 94551

Relinquished by:____ Received by:____ Date:____ Time:____

Relinquished by:____ Received by:____ Date:____ Time:____

Relinquished by: WR Received by: HUNTER DALTON Date: 6/8/21 Time: 1243

SAMPLE CONDITION AS RECEIVED: OK or not OK

Fx - client returned 3x cans + 1x entech w/ probe

f:\forms\field\coc.xls - 6/4/99

Atmospheric Analysis & Consulting, Inc.

Client : Best Environmental
Client Project Name : Bubbling Wells
Client Project No. : NA
AAC Project No. : 210954
Reporting Date : 06/14/2021

On June 08, 2021, Atmospheric Analysis & Consulting, Inc. received eight (8) samples for Anions analysis by EPA Method 26. Upon receipt the samples were assigned unique Laboratory ID numbers as follows:

Client Sample ID	AAC Sample ID
Run 1, Imp 1&2	210954-19869
Run 2, Imp 1&2	210954-19870
Run 3, Imp 1&2	210954-19871
Run 1, Imp 3&4	210954-19872
Run 2, Imp 3&4	210954-19873
Run 3, Imp 3&4	210954-19874
Blank NaOH	210954-19875
Blank H2SO4	210954-19876

This analysis is performed in accordance with AAC's Quality Manual. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Dr. Sucha Parmar, PhD
Technical Director

This report consists of 5 pages.

Laboratory Analysis Report

Client : Best Environmental
Client Project Name : Bubbling Wells
AAC Project No. : 210954
Analyst : JD/RS

Sampling Date : 05/25/2021
Receiving Date : 06/08/2021
Analysis Date : 06/09-11/2020
Report Date : 06/14/2020

Anions Analysis by EPA Method 26

Client Sample ID	AAC Sample ID	Dilution Factor	Sample Volume (mL)	F2 (ug/Sample)	SRL (ug/Sample)	CL2 (ug/Sample)	SRL (ug/Sample)	HF (ug/Sample)	SRL (ug/Sample)	HCl (ug/Sample)	SRL (ug/Sample)
Run 1, Imp 1&2	210954-19869	5	298	NA	NA	NA	NA	<SRL	157	39900	153
Run 2, Imp 1&2	210954-19870	5	260	NA	NA	NA	NA	<SRL	137	50900	134
Run 3, Imp 1&2	210954-19871	5	274	NA	NA	NA	NA	253	144	43500	141
Run 1, Imp 3&4	210954-19872	5	193	<SRL	96.5	<SRL	96.5	NA	NA	NA	NA
Run 2, Imp 3&4	210954-19873	5	194	<SRL	97.0	<SRL	97.0	NA	NA	NA	NA
Run 3, Imp 3&4	210954-19874	5	196	<SRL	98.0	<SRL	98.0	NA	NA	NA	NA
Blank NaOH	210954-19875	5	234	<SRL	117	<SRL	117	NA	NA	NA	NA
Blank H2SO4	210954-19876	5	201	NA	NA	NA	NA	<SRL	106	<SRL	103

MRL - Method Reporting Limit = 0.100 ug/mL
SRL - Sample Reporting Limit
<SRL - Analyte was analyzed for but not detected at or above the SRL - Sample Reporting Limit = 0.100 ug/mL*Sample Volume(mL)

B-46

Quality Control/Quality Assurance Report

EPA Method 26

Analysis Date : 06/09-11/2021
Analyst : JD/RS
Instrument ID : DIONEX IC # 1

Calibration Verification of the 04/02/2021 Calibration

Sample ID	Analyte	Target Concentration (ug/mL)	Measured Concentration (ug/mL)	Percent Recovery (%)*
Opening CV	Fluoride	25.0	24.0	96.1
	Chloride	25.0	24.9	99.5
Continuing CV	Fluoride	25.0	24.6	98.3
	Chloride	25.0	25.8	103
Closing CV	Fluoride	25.0	24.0	96.1
	Chloride	25.0	25.4	102
Second Source	Fluoride	25.0	25.1	101
	Chloride	25.0	26.0	104

* Must be 85-115%

QUALITY CONTROL/ASSURANCE REPORT

EPA Method 26

Analysis Date : 06/09-11/2021
Analyst : JD/RS

Instrument ID : DIONEX IC # 1

Method Blank Analysis

Analyte	Concentration (ug/mL)	Reporting Limit (ug/mL)
Fluoride	<SRL	0.100
Chloride	<SRL	0.100

Laboratory Control Spike Analysis

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Lab Spike Concentration (ug/mL)	Duplicate Lab Spike Concentration (ug/mL)	Spike Recovery (%)**	Duplicate Spike Recovery (%)**	%RPD****
Fluoride	0.000	12.5	12.0	12.0	96.0	95.9	0.1
Chloride	0.000	12.5	12.2	12.2	97.5	97.3	0.2

Matrix Spike Analysis (201954-19869x5)

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Matrix Spike Concentration (ug/mL)	Duplicate Matrix Spike Concentration (ug/mL)	Spike Recovery (%)***	Duplicate Spike Recovery (%)***	%RPD****
Fluoride	0.000	12.5	11.4	11.4	90.9	91.3	0.5
Chloride	13.0	12.5	26.4	26.3	107	106	0.6

Duplicate Sample Analysis

Sample ID	Analyte	Result (ug/mL)	Duplicate Result (ug/mL)	%RPD*	DF
210954-19872	Fluoride	<SRL	<SRL	NA	5
	Chloride	<SRL	<SRL	NA	5
210954-19869	Fluoride	<SRL	<SRL	NA	5
	Chloride	130	128	1.3	5

* Must be <10%
** Must be 85-115%
*** Must be 75-125%
**** Must be < 25%

210954

SAMPLE CHAIN OF CUSTODY

Project ID: **Bubbling Wells**

BE PROJECT MANAGER: B Johnston

Analyical Lab:

DATE		SAMPLE ID Run#/Method/Fraction/Source	Method	Solution	ANALYSIS
5/25/21		19869 Run 1, Imp 1&2	EPA M26	0.1N H2SO4	HCl, HF
5/25/21		19870 Run 2, Imp 1&2	EPA M26	0.1N H2SO4	HCl, HF
5/25/21		19871 Run 3, Imp 1&2	EPA M26	0.1N H2SO4	HCl, HF
5/25/21		19872 Run 1, Imp 3&4	EPA M26	0.1N NaOH	HCl, HF
5/25/21		19873 Run 2, Imp 3&4	EPA M26	0.1N NaOH	HCl, HF
5/25/21		19874 Run 3, Imp3&4	EPA M26	0.1N NaOH	HCl, HF
5/25/21		19875 Blank	EPA M26	0.1N NaOH	
5/25/21		19876 Blank	EPA M26	0.1N H2SO4	

Relinquished by:________ Received by:________ Date:______

Relinquished by:________ Received by:________ Date:______

Relinquished by:________ Received by:________ Date: 6/8/21 1020

Client : Best Environmental
Client Project Name : Bubbling Wells
Client Project No. : NA
AAC Project No. : 210917
Reporting Date : 06/10/2021

On June 02, 2021, Atmospheric Analysis & Consulting, Inc. received nine (9) DNPH impinger contents for Formaldehyde and Acetaldehyde analysis by CARB Method 430. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

Client Sample ID	AAC Sample ID	Client Sample ID	AAC Sample ID
Run 1A	210917-19706	Run 2C	210917-19711
Run 1B	210917-19707	Run 3A	210917-19712
Run 1C	210917-19708	Run 3B	210917-19713
Run 2A	210917-19709	Run 3C	210917-19714
Run 2B	210917-19710		

This analysis is performed in accordance with AAC's Quality Manual. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

All samples were blank corrected for Formaldehyde and Acetaldehyde using the method blank value.

The DNPH solution was certified on 05/24/2021.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. Several small sized peaks that are the products of NOx and DNPH were observed in the samples indicating small NOx concentrations that may have reacted with the analytes resulting in lower than expected concentrations. No other problems were encountered during receiving, preparation, and/or analysis of these samples.

The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Dr. Sucha Parmar, PhD.
Technical Director

This report consists of 6 pages.

Laboratory Analysis Report

CARB Method 430

Client : Best Environmental
Client Project Name : Bubbling Wells
AAC Project No. : 210917
Analyst : RS/JD
Units : ug/sample

Sampling Date : 05/27/2021
Receiving Date : 06/02/2021
Analysis Date : 06/09-10/2021
Reporting Date : 06/10/2021

Client Sample ID	AAC Sample ID	Formaldehyde			Acetaldehyde		
		Concentration (ug/sample)	Analysis Dilution Factor	SRL (ug/sample)	Concentration (ug/sample)	Analysis Dilution Factor	SRL (ug/sample)
Run 1A	210917-19706	0.597	1.00	0.100	<SRL	1.00	0.100
Run 1B	210917-19707	<SRL	1.00	0.100	0.138	1.00	0.100
Run 1C	210917-19708	<SRL	1.00	0.100	<SRL	1.00	0.100
Run 2A	210917-19709	0.670	1.00	0.100	1.87	1.00	0.100
Run 2B	210917-19710	<SRL	1.00	0.100	0.211	1.00	0.100
Run 2C	210917-19711	0.990	1.00	0.100	<SRL	1.00	0.100
Run 3A	210917-19712	0.775	1.00	0.100	0.908	1.00	0.100
Run 3B	210917-19713	<SRL	1.00	0.100	0.174	1.00	0.100
Run 3C	210917-19714	0.190	1.00	0.100	<SRL	1.00	0.100
AAC Trip Blank		<SRL	1.00	0.100	<SRL	1.00	0.100
AAC Trip Spike		98.2 %Recovery	1.00	0.250	99.0 %Recovery	1.00	0.250

<SRL-compound was analyzed for but not detected at or above the SRL (Sample Reporting Limit)
SRL (ug/sample) = MRL (ug/mL) x Sample Volume (mL) x Analysis Dilution Factor x Method Dilution Factor
Method Reporting Limit - MRL = 0.025ug/mL
All samples were blank corrected for Formaldehyde and Acetaldehyde using the method blank value.

Quality Control/Quality Assurance Report

CARB Method 430

HPLC Calibration Verification of the 04/06/2021 Calibration

Analysis Date : 06/09-10/2021   Instrument ID : HPLC 01
Analyst : RS/JD

Sample ID	Analyte	Target Concentration (ug/mL)	Measured Concentration (ug/mL)	Percent Recovery (%)*
Opening CV	Formaldehyde	2.50	2.54	102
	Acetaldehyde	2.50	2.65	106
Continuing CV	Formaldehyde	2.50	2.51	100
	Acetaldehyde	2.50	2.63	105
Continuing CV	Formaldehyde	2.50	2.46	98.6
	Acetaldehyde	2.50	2.61	104
Closing CV	Formaldehyde	2.50	2.47	98.6
	Acetaldehyde	2.50	2.61	104
Closing CV	Formaldehyde	2.50	2.57	103
	Acetaldehyde	2.50	2.72	109
Second Source	Formaldehyde	2.50	2.47	98.8
	Acetaldehyde	2.50	2.60	104

* Must be 90 - 110 %
Second Source must be 85 - 115 %

Quality Control/Quality Assurance Report

CARB Method 430

Analysis Date	: 06/09-10/2021	Analyst	: RS/JD	Instrument ID	: HPLC 01

Laboratory Control Spike Analysis

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Measured Spike Concentration (ug/mL)	Measured Spike Dup Concentration (ug/mL)	Spike Recovery (%)*	Spike Dup Recovery (%)*	%RPD**
Formaldehyde	0.000	1.25	1.35	1.35	108	108	0.0
Acetaldehyde	0.000	1.25	1.43	1.42	114	114	0.4

* Must be 85-115%
** Must be ≤ 25%

Matrix Spike Analysis (210917-19712)

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Measured Spike Concentration (ug/mL)	Measured Spike Dup Concentration (ug/mL)	Spike Recovery (%)*	Spike Dup Recovery (%)*	%RPD**
Formaldehyde	0.104	1.25	1.33	1.33	98.1	98.1	0.1
Acetaldehyde	0.138	1.25	1.41	1.41	102	102	0.1

* Must be 75-125%
** Must be ≤ 25%

Quality Control/Quality Assurance Report

CARB Method 430

Analysis Date	: 06/09-10/2021		Instrument ID	: HPLC 01
Analyst	: RS/JD			

Duplicate Analysis

Sample ID	Analyte	Dilution Factor	Sample Concentration (ug/mL)	Duplicate Concentration (ug/mL)	*RPD*
210917-19708	Formaldehyde	1.0	0.029	0.029	0.0
	Acetaldehyde	1.0	0.058	0.057	1.2
210917-19710	Formaldehyde	1.0	<SRL	<SRL	NA
	Acetaldehyde	1.0	0.102	0.101	0.9

* Must be <20%

System and Method Blank Analysis

Sample ID	Analyte	Concentration (ug/mL)	RL / SRL (ug/mL)
Opening Acetonitrile Blank	Formaldehyde	<RL	0.025
	Acetaldehyde	<RL	0.025
Method Blank	Formaldehyde	<SRL	0.010
	Acetaldehyde	0.020	0.010
Closing Acetonitrile Blank	Formaldehyde	<RL	0.025
	Acetaldehyde	<RL	0.025

RL - Reporting Limit
SRL - Sample Reporting Limit

210917

Project ID: Bubbling Wells

SAMPLE CHAIN OF CUSTODY

BE PROJECT MANAGER: B Johnston

Analyical Lab: AAC

DATE		SAMPLE ID Run#/Method/Fraction/Source	CONTAINER size / type		Method		ANALYSIS
5/27/2021		19706 Run 1A	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19707 Run 1B	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19708 Run 1C	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19709 Run 2A	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19710 Run 2B	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19711 Run 2C	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
					ARB 430		
5/27/2021		19712 Run 3A	Vial			DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19713 Run 3B	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19714 Run 3C	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19715 Spike	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde
5/27/2021		19716 Spike	Vial		ARB 430	DNPH	Formadelhyde, Acetaldehyde

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Relinquished by:______ Received by:______ Date:______ Time:______

Relinquished by:______ Received by:______ Date:______ Time:______

Relinquished by: WR Received by:______ Date: 6/2/21 Time: 0945

SAMPLE CONDITION AS RECEIVED: OK or not OK

1.7°C T01

Fx

APPENDIX C
FIELD DATA SHEETS

Isokinetic Sampling Data Sheet (Method 23)

Facility: Bubbling Wells
Date: 5-25-21
Run #: 1
Personnel: BJ + SA

Facility Information	Equipment Information	Sampling Information
Location: 1EB 50	Meter #: LS11	Pbar: 30.07
Port Dia.: 4" Depth: 5"	Yd: 0.992 Pitot #: PR48	Pstatic: -0.03
Fitting: — Length: —	ΔH@: 2.28 Cp: 0.841	% O_2: 13
Port Height from deck:	Filter Box #: 6 Noz. #: Q14C	% CO_2: 5
Stack Dia: 25.5 Area:	Filter #: — D_n: 0.505	% H_2O: ~6
Upstream from disturbance: 71	Probe #: PR48 Mag. #: —	Run Mins 120
Downstream from disturbance: 76	Pyrometer #: LS11 Umb. # —	

Initial LC: 0.01
CFM @ 15 "Hg
Final LC: ~~15~~ 0.01
CFM @ 10 "Hg
Pitot LC: 0
Cyclonic Flow Check: 0

Point	Time 952	Gas Meter Vol, Ft^3	Meter Temp, °F		Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F			Vac., "Hg	Notes XAD
			In	Out						Probe	Filter	Imp.		
1	0	514.400	72	72	885	0.06	1.89	0.68	0.245	250	250	50	3	
2	6	18.4	73	73	913	0.06	1.86	0.68	0.245	250	250	50	3	
3	12	22.4	75	73	980	0.65	1.92	0.69	0.255	250	250	50	3	
4	18	26.6	77	74	960	0.06	1.80	0.67	0.245	250	250	50	3	
5	24	30.6	78	74	980	0.06	1.78	0.67	0.245	250	250	50	3	
6	30	34.7	79	75	975	0.05	1.49	0.61	0.224	245	253	55	3	
7	36	38.4	81	76	950	0.05	1.52	0.62	0.224	245	251	55	3	
8	42	42.1	81	76	1000	0.06	1.76	0.66	0.245	245	251	55	3	
9	48	46.3	82	77	984	0.06	1.79	0.67	0.245	240	248	58	3	
10	54	50.1	82	77	1015	0.06	1.75	0.66	0.245	240	248	58	3	
	60	54.0												
1	0	54.0	81	77	1000	0.06	1.77	0.67	0.245	245	250	55	3	
2	6	58.0	81	78	980	0.07	2.09	0.72	0.265	245	251	52	3	
3	12	62.3	81	78	1011	0.06	1.75	0.66	0.245	240	250	50	3	
4	18	66.3	81	78	1001	0.06	1.77	0.67	0.245	241	251	50	3	
5	24	70.3	81	78	990	0.06	1.78	0.67	0.245	244	252	48	3	
6	30	74.3	82	79	1050	0.06	1.71	0.66	0.245	242	250	50	4	
7	36	78.2	82	78	1094	0.06	1.66	0.65	0.245	240	250	50	4	
8	42	82.2	82	79	990	0.06	1.78	0.67	0.245	241	250	52	5	
9	48	86.2	82	79	1020	0.06	1.75	0.66	0.245	240	251	55	5	
10	54	90.2	81	78	1010	0.05	1.46	0.61	0.224	250	250	55	5	
	60	593.900												
	1156													
		79.500	78		989		1.75		0.240					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	0	210	210	
Impinger #2	100	90	-10	
Impinger(s) #				
Impinger(s) #				
Silica Gel:	848	872	24	
Total Net / Rinse:			224	
Total Sample Volume:				

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations	
Sample Vol., dscf:	
% H_2O:	
MWs:	
Stack Vel, ft/s:	
Flow rate, acfm:	C-2
Flow rate, dsfcm:	
% Isokinetics:	

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Isokinetic Sampling Data Sheet (Method 23)

Facility: Bubbling Wells
Date: 5-25-21
Run #: 2
Personnel: BJ+SA

Facility Information		Equipment Information		Sampling Information
Location: IEB 50		Meter #: LS11	Pitot #: PR48	Pbar: 30.07
Port Dia.: 4"	Depth: 5"	Yd: 0.992	Cp: 0.84	Pstatic: -0.09
Fitting:	Length:	ΔH@: 2.28	Noz. #: Q14C	% O_2:
Port Height from deck:		Filter Box #: 6	D_n: 0.505	% CO_2:
Stack Dia: 25.5	Area:	Filter #: —	Mag. #:	% H_2O: 8
Upstream from disturbance:		Probe #: PR48	Umb. #	Run Mins 120
Downstream from disturbance:		Pyrometer #:		

Initial LC: 0.015
CFM @ 15 "Hg
Final LC: ~~15~~ 0.01
CFM @ 10 "Hg
Pitot LC: 0
Cyclonic Flow Check: —

Point	Time	Gas Meter Vol, Ft³	Meter Temp, °F		Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F			Vac., "Hg	Notes
	1304		In	Out						Probe	Filter	Imp.		XAN
1	0	594.7	79	79	~~9.06~~ 992	0.06	1.71	0.65	0.245	241	250	50	2	
2	6	98.6	78	77	1000	0.06	1.70	0.65	0.245	245	252	50	2	
3	12	602.5	81	78	980	0.06	1.73	0.66	0.245	245	251	52	3	
4	18	6.5	81	78	990	0.06	1.72	0.66	0.245	246	251	52	3	
5	24	10.5	81	78	994	0.06	1.71	0.66	0.245	246	252	52	4	
6	30	14.5	82	79	1004	0.06	1.70	0.65	0.245	240	252	52	4	
7	36	18.5	83	79	990	0.06	1.72	0.66	0.245	250	250	54	5	
8	42	22.5	83	80	1000	0.06	1.71	0.66	0.245	250	250	54	5	
9	48	26.5	84	80	992	0.05	1.44	0.60	0.224	251	252	55	5	
10	54	~~24.8~~ 30.1	84	81	970	0.05	1.40	0.61	0.224	251	252	55	5	
	60	33.7												
1	0	33.7	85	83	972	0.05	1.46	0.61	0.224	250	250	51	5	
2	6	37.3	85	83	932	0.06	1.80	0.68	0.245	248	250	52	8	
3	12	41.4	86	84	931	0.06	1.81	0.68	0.245	245	250	50	8	
4	18	45.4	84	83	930	0.05	1.50	0.62	0.224	241	250	50	7	
5	24	49.1	84	84	930	0.05	1.51	0.62	0.224	245	250	52	7	
6	30	52.8	83	83	920	0.05	1.51	0.62	0.224	250	250	52	7	
7	36	56.5	84	84	915	0.06	1.83	0.68	0.245	250	250	54	8	
8	42	60.5	84	84	910	0.06	1.83	0.68	0.245	250	250	54	8	
9	48	64.5	85	85	905	0.05	1.54	0.62	0.224	250	250	56	7	
10	54	68.2	85	85	900	0.05	1.54	0.63	0.224	250	250	50	7	
stop	60	672.00												
	1508													
		77.3		82	958		1.65		0.236					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	0	100	100	
Impinger #2	100	80	-20	
Impinger(s) #				
Impinger(s) #				
Silica Gel:	872	887	15	
Total Net / Rinse:			95	
Total Sample Volume:				

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations

Sample Vol., dscf:
% H_2O:
MWs:
Stack Vel, ft/s:
Flow rate, acfm:
Flow rate, dsfcm:
% Isokinetics:

C-3

BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method M23)

Facility: Bubbling Wells **Date:** 5-27-21 **Run #:** 3 **Personnel:** BS 4 SA

Facility Information		Equipment Information		Sampling Information
Location: IEB 50		Meter #: LS11	Pitot #: PR248	Pbar: 29.90
Port Dia.: 4"	Depth: 5"	Yd: 0.992	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 2.28	Noz. #: Q14C	% O_2:
Port Height from deck:		Filter Box #: —	D_n: 0.505	% CO_2:
Stack Dia: 25.5	Area:	Filter #: —	Mag. #:	% H_2O:
Upstream from disturbance: 71		Probe #: PR48	Umb. #:	Run Mins 120
Downstream from disturbance: 76		Pyrometer #:		

Initial LC: 0.01 CFM @ 15 "Hg

Final LC: 0.01 CFM @ 8 "Hg

Pitot LC: 0

Cyclonic Flow Check: —

Point	Time 907	Gas Meter Vol, Ft³	Meter Temp, °F		Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F			Vac., "Hg	Notes
			In	Out						Probe	Filter	Imp.		
1	0	832.560	69	69	960	0.06	1.57	0.62	0.245	250	250	245	1	
2	6	36.3	69	69	980	0.06	1.55	0.62	0.245	250	250	246	1	
3	12	40.0	68	68	1005	0.06	1.52	0.61	0.245	251	250	245	1	
4	18	43.7	69	69	1031	0.06	1.49	0.61	0.245	252	250	46	1	
5	24	47.4	71	69	1070	0.06	1.46	0.60	0.245	250	251	47	3	
6	30	51.0	73	69	1062	0.06	1.47	0.60	0.245	250	251	47	3	
7	36	54.7	74	70	1073	0.06	1.46	0.60	0.245	251	250	48	3	
8	42	58.3	74	71	1087	0.06	1.45	0.60	0.245	255	250	48	3	
9	48	61.9	74	72	1070	0.06	1.44	0.60	0.245	252	251	46	4	
10	54	65.5	75	72	1095	0.06	1.44	0.60	0.245	257	251	49	4	
	60	69.1		72										
1	0	69.1	75	72	1084	0.07	1.7	0.65	0.265	250	250	50	4	
2	6	73.0	75	73	1081	0.06	1.46	0.60	0.245	251	251	52	4	
3	12	76.6	75	73	1083	0.06	1.46	0.60	0.245	252	251	51	4	
4	18	80	76	74	1066	0.06	1.48	0.61	0.245	249	252	52	4	
5	24	83.5	76	74	1084	0.06	1.46	0.60	0.245	248	252	52	5	
6	30	87.0	76	74	1078	0.06	1.47	0.60	0.245	247	252	53	5	
7	36	90.5	76	74	1083	0.06	1.46	0.60	0.245	249	252	53	5	
8	42	94	76	75	1094	0.06	1.45	0.60	0.245	250	250	53	5	
9	48	897.5	76	75	1088	0.06	1.46	0.60	0.245	250	250	54	5	
10	54	901	76	75	1090	0.06	1.46	0.60	0.245	250	250	55	5	
	60	904.500												
	1110													
		71.940	73		1064		1.419		0.246					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	0	199	199	
Impinger #2	100	105	5	
Impinger(s) #				
Impinger(s) #				
Silica Gel:	887	908	21	
Total Net / Rinse:				
Total Sample Volume:			225	

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations

Sample Vol., dscf:

% H_2O:

MWs:

Stack Vel, ft/s:

Flow rate, acfm:

Flow rate, dsfcm:

% Isokinetics:

C-4

Field Sampling Data Sheet
Method 430

Facility: Bubbling Well
Location: IEB 52
Date: 5.27.21
Personnel: SA, BJ, RB

Meter #: Low Flow #12
Yd: 1.006
Pyrometer #: BJ

Pbar: 29.90
% O_2:
% CO_2:
% H_2O:

Run 1 M 430

Initial Leak Check 0 CFM 18 "Hg
Final Leak Check 0 CFM 15 "Hg

Point	Time	Meter Vol, L ~~ft³~~	Temperature, °F			Vacuum, "Hg
			Meter In	Meter Out	Imp.	
1	09:20	270.6	59	60	<45	1
2	09:25	272.5	61	60	↓	1
3	09:30	275.0	62	61	↓	1
4	09:35	277.4	64	62		1
5	09:40	279.8	64	62		1
6	09:45	282.3	65	62		1
stop	09:50	284.6				
TOTAL/AVG		14.0	61.8			

		Initial	Final	Net
A	Impinger #1:	10		
B	Impinger #2:	10		
	Impinger #3:			
	Silica Gel:			
			Total Net:	
			% Moisture	

Run 2 M 430

Initial Leak Check 0 CFM 15 "Hg
Final Leak Check 0 CFM 15 "Hg

Point	Time	Meter Vol, L	Meter In	Meter Out	Imp.	Vacuum, "Hg
1	10:06	298.8	65	65	<45	1
2	10:11	301.2	68	67	↓	1
3	10:16	303.6	69	67	↓	1
4	10:21	306.1	70	68		1
5	10:26	308.4	72	68		1
6	10:31	310.8	73	68		1
stop	10:36	313.4				
TOTAL/AVG		14.6	68.3			

		Initial	Final	Net
A	Impinger #1:	10		
B	Impinger #2:	10		
	Impinger #3:			
	Silica Gel:			
			Total Net:	
			% Moisture	

Run 3 M 430

Initial Leak Check 0 CFM 15 "Hg
Final Leak Check 0 CFM 15 "Hg

Point	Time	Meter Vol, L	Meter In	Meter Out	Imp.	Vacuum, "Hg
1	10:44	314.0	67	68	<45	1
2	10:49	316.4	69	69	↓	1
3	10:54	318.8	70	69	↓	1
4	10:59	321.2	71	69		1
5	11:04	323.6	71	69		1
6	11:09	326.0	71	69		1
stop	11:14	328.4				
TOTAL/AVG		14.4	69.3			

		Initial	Final	Net
A	Impinger #1:	10		
B	Impinger #2:	10		
	Impinger #3:			
	Silica Gel:			
			Total Net:	
			% Moisture	

Comments:

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BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Field Sampling Data Sheet
Method 430

Facility: Bubbling Well
Location: SEB 5
Date: 5-27-21
Personnel: SA, BJ, RB

Meter #: Low Flow #12
Yd: 1.006
Pyrometer #:

Pbar: 29.90
% O_2:
% CO_2:
% H_2O:

Run 4 M 430

Point	Time	Meter Vol, L ~~ft³~~	Temperature, °F Meter In	Meter Out	Imp.	Vacuum, "Hg
1	11:20	329.1	70	70	<45	1
2	11:25	331.4	72	70	↓	1
3	11:30	334.0	72	71		1
4	11:35	336.4	73	71		1
5	11:40	338.9	73	71		1
6	11:45	341.4	73	71		1
stop	11:50	343.6				
TOTAL/AVG		14.5	71.4			

Initial Leak Check 0 CFM 15 "Hg
Final Leak Check 0 CFM 15 "Hg

	Initial	Final	Net
A Impinger #1:	10		
B Impinger #2:	10		
Impinger #3:			
Silica Gel:			
Total Net:			
% Moisture			

TOTAL/AVG						

Initial Leak Check ____ CFM ____ "Hg
Final Leak Check CFM "Hg

	Initial	Final	Net
Impinger #1:			
Impinger #2:			
Impinger #3:			
Silica Gel:			
Total Net:			
% Moisture			

TOTAL/AVG						

Initial Leak Check ____ CFM ____ "Hg
Final Leak Check CFM "Hg

	Initial	Final	Net
Impinger #1:			
Impinger #2:			
Impinger #3:			
Silica Gel:			
Total Net:			
% Moisture			

Comments:

BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method M 306)

Facility: Bubbling Wells **Date:** 5-~~29~~26-21 **Run #:** 1 **Personnel:** BJ & SA

Facility Information	Equipment Information	Sampling Information
Location: IEB 50	Meter #: LSI 1	Pbar: 29.85
Port Dia.: 4"	Pitot #: PR48	Pstatic: -0.03
Depth: 54	Yd: 0.992	% O_2:
Fitting:	Cp: 0.841	% CO_2:
Length:	ΔH@: 2.28	% H_2O:
Port Height from deck:	Noz. #: Q14C	Run Mins 80
Stack Dia: 25.5	Filter Box #: —	
Area: 3.547	D_n: 0.505	
Upstream from disturbance: 71	Filter #: —	
Downstream from disturbance: 76	Mag. #:	
	Probe #: PR48	
	Umb. #:	
	Pyrometer #:	

Initial LC: 0.01 CFM @ 15 "Hg

Final LC: 0.01 CFM @ 10 "Hg

Pitot LC: 0

Cyclonic Flow Check: —

Point	Time 918	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F ~~Probe~~	Temp, °F ~~Filter~~	Temp, °F Imp.	Vac., "Hg	Notes
1	0	675.564	74	74	920	0.05	1.49	0.61	0.224			245	1	
2	4	77.9	74	74	925	0.05	1.48	0.61	0.224			245	1	
3	8	80.4 ~~82.3~~	74	74	940	0.06	1.76	0.66	0.245			245	1	
4	12	83.0	75	75	930	0.06	1.78	0.66	0.245			245	1	
5	16	85.6	76	74	935	0.06	1.77	0.66	0.245			245	1	
6	20	88.2	78	75	941	0.06	1.77	0.66	0.245			245	1	
7	24	90.8	79	75	1000	0.06	1.70	0.65	0.245			245	1	
8	28	93.4	82	76	1010	0.06	1.69	0.65	0.245			245	1	
9	32	96.0	82	75	1030	0.06	1.67	0.65	0.245			245	1	
10	36	98.6	82	75	1040	0.05	1.38	0.59	0.224			245	1	
	40	701.0												
1	0	701.0	82	76	1070	0.05	1.36	0.58	0.224			245	1	
2	4	3.6	82	76	1067	0.06	1.63	0.64	0.245			245	1	
3	8	6.2	84	78	1080	0.06	1.62	0.64	0.245			245	1	
4	12	8.8	81	76	1070	0.06	1.62	0.64	0.245			245	1	
5	16	711.4	81	76	1065	0.06	1.62	0.64	0.245			245	1	
6	20	714	81	76	1078	0.06	1.62	0.64	0.245			245		
7	24	16.6	82	76	1080	0.06	1.62	0.64	0.245			245		
8	28	19.2	82	76	1090	0.06	1.61	0.63	0.245			245		
9	32	21.8	82	76	1094	0.06	1.60	0.63	0.245			245		
10	36	24.4	82	76	1095	0.05	1.33	0.58	0.~~245~~			245		
St	40	726.800							.224					
	1041													
		51.236	78		1023		1.61		0.240					

Moisture Data				
0.1N NaOH	Initial	Final	Net	Rinse
Impinger #1	100	196	96	
Impinger #2	100	150	50	
Impinger(s) #	0	0 ~~18.2~~	~~18.2~~	
Impinger(s) #				
Silica Gel:	738.7	756.9	18.2	
		Total Net / Rinse:	164.2	
		Total Sample Volume:		

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations

Sample Vol., dscf:

% H_2O:

MWs:

Stack Vel, ft/s:

Flow rate, acfm:

Flow rate, dsfcm:

% Isokinetics:

Isokinetic Sampling Data Sheet (Method M 306)

Facility: Bubbling Wells **Date:** 5-~~29~~ 26-21 **Run #:** 2 **Personnel:** BJ QSA

Facility Information		Equipment Information		Sampling Information
Location: IEB 50		Meter #: LS1 1	Pitot #: PR48	Pbar: 29.85
Port Dia.: 4"	Depth: 5"	Yd: 0.992	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 2.20	Noz. #: Q14G	% O_2:
Port Height from deck:		Filter Box #: —	D_n: 0.505	% CO_2:
Stack Dia: 25.5	Area:	Filter #: —	Mag. #: —	% H_2O:
Upstream from disturbance:		Probe #: PR48	Umb. #: —	Run Mins 80
Downstream from disturbance:		Pyrometer #: LS1 1		

Initial LC: 0.01 Final LC: 0.01 Pitot LC: 0
CFM @ 15 "Hg CFM @ 10 "Hg Cyclonic Flow Check: —

Point	Time 1155	Gas Meter Vol, Ft^3	Meter Temp, °F		Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F			Vac., "Hg	Notes
			In	Out						~~Probe~~	~~Filter~~	Imp.		
1	0	729.3	81	81	1090	0.06	1.53	0.62	0.245			245	1	
2	4	31.9	80	81	1106	0.06	1.51	0.62	0.245			245	1	
3	8	34.5	80	80	1100	0.06	1.51	0.62	0.245			245	1	
4	12	37.1	82	80	1101	0.06	1.52	0.62	0.245			245	1	
5	16	39.7	83	80	1100	0.06	1.52	0.62	0.245			245	1	
6	20	42.3	86	80	1096	0.06	1.53	0.62	0.248			245	1	
7	24	44.7	86	80	1095	0.06	1.53	0.62	0.245			245	1	
8	28	47.2	88	81	1095	0.06	1.53	0.62	0.245			245	1	
9	32	49.7	88	82	1097	0.06	1.53	0.62	0.245			245	1	
10	36	52.2	87	81	1092	0.05	1.28	0.57	0.224			245	1	
	40	54.6										245		
1	0	54.6	88	82	1080	0.05	1.29	0.57	0.224			245	1	
2	4	57.0	88	82	1076	0.06	1.55	0.63	0.245			245	1	
3	8	59.6	88	83	1067	0.06	1.56	0.63	0.245			245	1	
4	12	62.2	89	84	1076	0.06	1.56	0.63	0.245			245	1	
5	16	64.8	90	84	1068	0.06	1.57	0.63	0.245			245	1	
6	20	67.4	90	84	1077	0.06	1.56	0.63	0.245			245	1	
7	24	70	91	85	1077	0.06	1.56	0.63	0.245			245	1	
8	28	72.4	92	85	1077	0.06	1.56	0.63	0.245			245	1	
9	32	74.9	92	85	1081	0.06	1.56	0.63	0.245			245	1	
10	36	77.4	92	85	1075	0.06	1.56	0.63	0.245			245	1	
sfr	40	779.900				~~0.06~~								
	80													
	1318													
		50.600	85		1086		1.52		0.243					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	196	96	
Impinger #2	100	110	10	
Impinger(s) #	0	2	2	
Impinger(s) #	846.4			
Silica Gel:	~~855.0~~	855.0	8.6	
Total Net / Rinse:			116.6	
Total Sample Volume:				

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations

Sample Vol., dscf:
% H_2O:
MWs:
Stack Vel, ft/s:
Flow rate, acfm:
Flow rate, dsfcm:
% Isokinetics:

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BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method M 306)

Facility: Bubbling Wells Date: 5-~~29~~ 26-21 Run #: 3 Personnel: BJ+SA

Facility Information	Equipment Information	Sampling Information
Location: JEB 50	Meter #: LS11 Pitot #: PR42	Pbar: 29.85
Port Dia.: 4" Depth: 5"	Yd: 0.992 Cp: 0.841	Pstatic: -0.03
Fitting: Length:	ΔH@: 2.28 Noz. #:	% O_2:
Port Height from deck:	Filter Box #: — D_n: Q41C	% CO_2:
Stack Dia: 25.5 Area:	Filter #: — Mag. #: 0.505	% H_2O:
Upstream from disturbance:	Probe #: PR42 Umb. #	Run Mins 80
Downstream from disturbance:	Pyrometer #:	

Initial LC: 0.01 CFM @ 15 "Hg

Final LC: 0.01 CFM @ 5 "Hg

Pitot LC: 0

Cyclonic Flow Check: —

Point	Time 1359	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F ~~Probe~~	Temp, °F ~~Filter~~	Temp, °F Imp.	Vac., "Hg	Notes
1	0	780.300	86	86	1000	0.06	1.73	0.66	0.245			<45	1	
2	4	82.9	86	88	965	0.06	1.77	0.67	0.245			<45	1	
3	8	85.5	85	85	971	0.06	1.76	0.67	0.245			<45	1	
4	12	88.1	86	85	978	0.06	1.75	0.67	0.245			<45	1	
5	16	90.7	86	85	980	0.06	1.75	0.67	0.245		<	45	1	
6	20	93.3	87	85	980	0.06	1.75	0.67	0.245		<	45	1	
7	24	95.9	87	85	975	0.06	1.76	0.67	0.245		<	45	1	
8	28	98.5	87	85	976	0.06	1.76	0.67	0.245		<	45	1	
9	32	801.1	87	85	973	0.06	1.76	0.67	0.245		<	45	1	
10	36	3.7	87	85	970	0.05	1.47	0.61	~~0.245~~		<	45	1	
	40	6.1							0.224					
1	0	6.1	86	85	968	0.05	1.47	0.61	0.224		<	45	1	
2	4	8.5	85	84	966	0.06	1.76	0.67	0.245		<	45	1	
3	8	11.2	85	84	965	0.06	1.76	0.67	0.245		<	45	1	
4	12	13.8	85	84	963	0.06	1.77	0.67	0.245		<	45	1	
5	16	16.4	85	84	960	0.06	1.77	0.67	0.245		<	45	1	
6	20	19.1	84	83	960	0.06	1.77	0.67	0.245		<	45	1	
7	24	21.7	84	83	958	0.06	1.77	0.67	0.245		<	45	1	
8	28	24.3	85	84	955	0.06	1.78	0.67	0.245		<	45	1	
9	32	26.9	85	84	953	0.06	1.78	0.67	0.245		<	45	1	
10	36	29.5	85	84	950	0.05	1.49	0.61	0.224					
	40	831.9												
		51.6	85		962		1.719		0.242					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	150	50	
Impinger #2	100	108	8	
Impinger(s) #	0	26	26	
Impinger(s) #				
Silica Gel:	756.8	767.6	10.8	
Total Net / Rinse:			94.8	
Total Sample Volume:				

Stack Information

Electricity YES NO

Probe Stand YES NO

Port Threads YES NO

Platform Ht.

Field Calculations

Sample Vol., dscf:

% H_2O:

MWs:

Stack Vel, ft/s:

Flow rate, acfm:

Flow rate, dsfcm:

% Isokinetics:

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BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method 26A)

Facility: Bubbling Well **Date:** 5-25-21 **Run #:** 1 **Personnel:** SA, BJ, RB

Facility Information		Equipment Information		Sampling Information
Location: SEB 50		Meter #: APEX1	Pitot #: 52	Pbar: 30.07
Port Dia.: 4"	Depth: 5"	Yd: 1.02	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 1.85	Noz. #: Q14B	% O_2: 15
Port Height from deck:		Filter Box #: 4	D_n: 0.508	% CO_2: 5
Stack Dia: 25.5	Area: 3.547	Filter #: —	Mag. #:	% H_2O: 6
Upstream from disturbance: >1		Probe #: 52	Umb. #:	Run Mins 60
Downstream from disturbance: >6		Pyrometer #:		

Initial LC: 0.001 CFM @ 21 "Hg
Final LC: 0.001 CFM @ 20 "Hg
Pitot LC: ✓
Cyclonic Flow Check: ✓

	Point	Time 10:22	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F Probe	Temp, °F Filter	Temp, °F Imp.	Vac., "Hg	Notes
0	1	0	703.611		73	876	0.06	1.55	0.67	0.245	248	241	<45	3	
3	2	3	705.7		73	872	0.06	1.55	0.67	0.245	249	244	↓	3	
6	3	6	707.6		74	873	0.05	1.30	0.61	0.224	249	246		3	
9	4	9	709.5		74	818	0.06	1.51	0.66	0.245	250	246		3	
12	5	18	711.6		75	1002	0.06	1.42	0.64	0.245	250	245		3	
15	6	18	713.7		75	971	0.05	1.21	0.59	0.224	251	245		3	
18	7	18	715.4		75	1004	0.05	1.18	0.59	0.224	251	246		3	
21	8	24	717.2		75	1033	0.06	1.39	0.63	0.245	250	247		3	
24	9	27	719.1		75	955	0.06	1.47	0.65	0.245	250	247		3	
27	10	29	721.2		76	987	0.06	1.44	0.65	0.245	252	247		3	
stp		30													
	1	0	723.0		76	1006	0.06	1.42	0.64	0.245	251	248	<45	3	
	2	3	724.9		76	1023	0.06	1.40	0.64	0.245	251	248	↓	3	
	3	6	726.8		77	980	0.06	1.45	0.65	0.245	250	248		3	
	4	9	728.8		77	1017	0.05	1.18	0.59	0.224	250	248		3	
	5	12	730.6		77	1024	0.06	1.41	0.64	0.245	250	249		3	
	6	15	732.5		78	946	0.06	1.49	0.66	0.245	249	250		3	
	7	18	734.6		78	989	0.06	1.44	0.65	0.245	249	251		3	
	8	21	736.7		79	1005	0.06	1.43	0.65	0.245	248	251		3	
	9	24	738.5		80	1021	0.06	1.42	0.64	0.245	247	252		3	
	10	27	740.5		80	992	0.06	1.44	0.65	0.245	248	252		3	
stp		30	742.401												
								<1.405>							
		11:25	38.790		76.2	974.5		1.40		0.241					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	194	94	
Impinger #2	100	104	4	
Impinger(s) #	0	0		
Impinger(s) #				
Silica Gel:	827.5	838.6	9	
		Total Net / Rinse:	107	
		Total Sample Volume:		

Stack Information

Electricity [✓ YES] NO
Probe Stand [✓ YES] NO
Port Threads YES [✓ NO]
Platform Ht.

Field Calculations

Sample Vol., dscf: 39.443
% H_2O: 11.4
MWs: 28.10
Stack Vel, ft/s: 22.52
Flow rate, acfm: 4,[illegible]
Flow rate, dsfcm: 1,576
% Isokinetics: 106.3

Isokinetic Sampling Data Sheet (Method 26A)

Facility: Bubbling Well **Date:** 5-25-21 **Run #:** 2 **Personnel:** SA, BJ, RB

Facility Information		Equipment Information		Sampling Information
Location: IEB 5D		Meter #: APEX 1	Pitot #: 52	Pbar: 30.07
Port Dia.: 4"	Depth: 5"	Yd: 1.02	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 1.85	Noz. #: Φ14B	% O_2: 15
Port Height from deck:		Filter Box #: 4	D_n: 0.505	% CO_2: 5
Stack Dia: 25.5"	Area: 3.547	Filter #: 1	Mag. #:	% H_2O: 11.4
Upstream from disturbance:	>1	Probe #: 52	Umb. #:	Run Mins: 60
Downstream from disturbance:	>6	Pyrometer #:		

Initial LC: 0.001 CFM @ 18 "Hg
Final LC: 0.001 CFM @ 20 "Hg
Pitot LC: ✓
Cyclonic Flow Check:

Point	Time	Gas Meter Vol, Ft³	Meter Temp, °F		Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F			Vac., "Hg	Notes
	12:04		In	Out						Probe	Filter	Imp.		
1	0	744.601		80	1094	0.06	1.23	0.60	0.245	244	249	<45	3	
2	3.0	746.4		80	982	0.06	1.32	0.62	0.245	244	250	↓	3	
3	6.0	748.4		80	921	0.06	1.38	0.63	0.245	246	250		3	
4	9	750.3		80	916	0.05	1.15	0.58	0.224	247	251		3	
5	12	752.1		80	1028	0.05	1.07	0.56	0.224	247	250		3	
6	15	753.8		80	983	0.06	1.32	0.62	0.245	245	250		3	
7	18	755.7		81	1010	0.06	1.30	0.62	0.245	246	250		3	
8	21	757.6		81	994	0.06	1.32	0.62	0.245	245	251		3	
9	24	759.6		81	976	0.06	1.33	0.62	0.245	245	251		3	
10	27	761.5		81	952	0.06	1.35	0.63	0.245	244	251		3	
stp	30													
1	0	763.2		81	920	0.06	1.38	0.64	0.245	242	250	<45	3	
2	3	765.1		82	934	0.06	1.37	0.63	0.245	244	251	↓	3	
3	6	767.1		82	999	0.06	1.31	0.62	0.245	243	251		3	
4	9	769.0		83	980	0.06	1.33	0.63	0.245	244	250		3	
5	12	770.9		83	961	0.06	1.35	0.63	0.245	245	250		3	
6	15	772.8		83	992	0.06	1.32	0.62	0.245	245	251		3	
7	18	774.8		83	1004	0.06	1.31	0.62	0.245	246	250		3	
8	21	776.7		83	1017	0.06	1.30	0.62	0.245	247	251		3	
9	24	778.6		83	1009	0.06	1.30	0.62	0.245	247	251		3	
10	27	780.6		83	1000	0.06	1.31	0.62	0.245	248	250		3	
stp	30	782.348												
	1304													
		37.747		81.5	983.1		1.302		0.243					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	160	60	
Impinger #2	100	102	2	
Impinger(s) #	0			
Impinger(s) #				
Silica Gel:	768.1	778.9	10.8	
Total Net / Rinse:			72.8	
Total Sample Volume:				

Stack Information

Electricity YES NO
Probe Stand YES NO
Port Threads YES NO
Platform Ht.

Field Calculations

Sample Vol., dscf: 37.994
% H_2O: 8.3
MWs: 28.45
Stack Vel, ft/s: 22.65
Flow rate, acfm: 4,8[illegible]
Flow rate, dsfcm: 1,630.8
% Isokinetics: 99.0

Isokinetic Sampling Data Sheet (Method 26 A)

Facility: Bubbling Well **Date:** 5-25-21 **Run #:** 3 **Personnel:** SA, BJ, RR

Facility Information		Equipment Information		Sampling Information
Location: IEB 50		Meter #: APEX1	Pitot #: 52	Pbar: 30.07
Port Dia.: 4"	Depth: 5"	Yd: 1.02	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 1.85	Noz. #: 014B	% O_2: 15
Port Height from deck:		Filter Box #: 4	D_n: 0.505	% CO_2: 5
Stack Dia: 25.5	Area: 3.547	Filter #: —	Mag. #:	% H_2O: 8.3
Upstream from disturbance: >1		Probe #: 52	Umb. #:	Run Mins 60
Downstream from disturbance: >6		Pyrometer #:		

Initial LC: 0.001 CFM @ 22 "Hg Final LC: 0.001 CFM @ 20 "Hg Pitot LC: ✓
Cyclonic Flow Check:

Point	Time 13:34	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F Probe	Temp, °F Filter	Temp, °F Imp.	Vac., "Hg	Notes
1	0	783.294	78	78	996	0.06	1.38	0.63	0.245	249	252	<68	3	
2	3	785.1		78	990	0.06	1.38	0.63	0.245	250	252		3	
3	6	787.0		78	1001	0.06	1.37	0.63	0.245	249	252	↓	3	
4	9	788.9		78	985	0.05	1.16	0.58	0.224	248	253		3	
5	12	790.6		78	978	0.05	1.15	0.58	0.224	250	253		3	
6	15	792.4		78	989	0.06	1.29	0.64	0.245	250	255		3	
7	18	794.3		79	1002	0.06	1.38	0.63	0.245	251	255		3	
8	21	796.1		79	990	0.06	1.39	0.64	0.245	250	254		3	
9	24	798.1		79	998	0.06	1.38	0.63	0.245	249	255		3	
10	27	800.0		79	981	0.06	1.40	0.64	0.245	250	255		3	
stop	30													
1	0	801.9		79	997	0.06	1.38	0.63	0.245	250	256	<68	3	
2	3	803.8		79	1005	0.06	1.37	0.63	0.245	250	256		3	
3	6	805.7		79	986	0.06	1.29	0.64	0.245	249	255	↓	3	
4	9	807.7		79	994	0.06	1.38	0.64	0.245	249	255		3	
5	12	809.6		80	982	0.06	1.40	0.64	0.245	250	255		3	
6	15	811.5		80	1000	0.06	1.32	0.63	0.245	250	256		3	
7	18	813.4		80	992	0.06	1.39	0.64	0.245	249	256		3	
8	21	815.4		81	986	0.06	1.40	0.64	0.245	248	255		3	
9	24	817.3		81	998	0.06	1.38	0.64	0.245	249	255		3	
10	27	819.3		81	973	0.06	1.41	0.64	0.245	250	255		3	
stop	30	821.274												
				80	992		1.36							
14:38		37.980		~~83.2~~	~~1036.5~~		~~1.4~~		0.243					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	170	70	
Impinger #2	100	104	4	
Impinger(s) #	0	0	0	
Impinger(s) #				
Silica Gel:	827.5	835.6	9.8	
Total Net / Rinse:			83.8	
Total Sample Volume:				

Stack Information		
Electricity	YES	NO
Probe Stand	YES	NO
Port Threads	YES	NO
Platform Ht.		

Field Calculations	
Sample Vol., dscf:	
% H_2O:	
MWs:	
Stack Vel, ft/s:	
Flow rate, acfm:	
Flow rate, dscfm:	
% Isokinetics:	

C-12

BEST ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method 29)

Facility: Bubbling Well Date: 5-26-21 Run #: 1 Personnel: SA, BJ, RB

Facility Information		Equipment Information		Sampling Information
Location: IEB 50		Meter #: APEX1	Pitot #: 52	Pbar: 29.85
Port Dia.: 4''	Depth: 5''	Yd: 1.02	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 1.85	Noz. #: 9014B	% O_2: 15
Port Height from deck:		Filter Box #: 4	D_n: 0.505	% CO_2: 5
Stack Dia: 25.5''	Area: 3.547	Filter #: 1	Mag. #:	% H_2O: 8.0
Upstream from disturbance: >1		Probe #: 52	Umb. #	Run Mins 80
Downstream from disturbance: >6		Pyrometer #:		

Initial LC: 0.001 CFM @ 22 "Hg

Final LC: 0.001 CFM @ 22 "Hg

Pitot LC: ✓

Cyclonic Flow Check:

Point	Time 09:18	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F Probe	Temp, °F Filter	Temp, °F Imp.	Vac., "Hg	Notes
1	0	828.154		69	922	0.06	1.44	0.64	0.245	241	246	<45	5	
2	4	830.8		69	932	0.06	1.43	0.64	0.245	244	246		5	
3	8	833.4		70	930	0.06	1.43	0.64	0.245	245	247		5	
4	12	836.0		70	926	0.05	1.20	0.59	0.224	244	248		5	
5	16	838.4		70	921	0.05	1.20	0.59	0.224	246	248		5	
6	20	840.7		72	937	0.06	1.43	0.64	0.245	246	249		5	
7	24	843.3		72	931	0.06	1.43	0.64	0.245	245	249		5	
8	28	845.9		73	995	0.06	1.37	0.63	0.245	246	250		5	
9	32	848.2		74	1002	0.06	1.37	0.63	0.245	247	254		5	
10	36	850.7		74	1000	0.06	1.37	0.63	0.245	246	251		5	
stop	40													
1	0	853.2		74	1024	0.06	1.35	0.63	0.245	245	250	<45	5	
2	4	855.8		76	1065	0.06	1.32	0.62	0.245	246	251		5	
3	8	858.3		76	1074	0.06	1.31	0.62	0.245	246	250		5	
4	12	860.7		76	1068	0.06	1.32	0.62	0.245	246	251		5	
5	16	863.2		75	1076	0.06	1.31	0.62	0.245	245	251		5	
6	20	865.8		75	1061	0.06	1.32	0.62	0.245	246	251		5	
7	24	868.3		75	1077	0.05	1.09	0.56	0.224	246	250		5	
8	28	870.5		75	1056	0.05	1.10	0.57	0.224	248	250		5	
9	32	872.8		75	1088	0.06	1.30	0.61	0.245	249	249		5	
10	36	875.2		75	1094	0.06	1.29	0.61	0.245	249	250		5	
stop	40	877.636												
	10:41	49.482		73.3	1.008.0		1.318		0.241					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	~~770~~.100	268	168	
Impinger #2	100	180	80	
Impinger(s) #	0	30	30	
Impinger(s) #				
Silica Gel:	778.8	800.3	21.5	
Total Net / Rinse:				
Total Sample Volume:				

Stack Information

Electricity [✓ YES] NO

Probe Stand [✓ YES] NO

Port Threads YES [✓ NO]

Platform Ht.

Field Calculations

Sample Vol., dscf: 50.209

% H_2O:

MWs:

Stack Vel, ft/s:

Flow rate, acfm:

Flow rate, dsfcm:

% Isokinetics:

C-13

T ENVIRONMENTAL Livermore, CA 925-455-9474

Isokinetic Sampling Data Sheet (Method 29)

Facility: Bubbling Well **Date:** 5-26-21 **Run #:** 2 **Personnel:** SA, BJ, RB

Facility Information	Equipment Information	Sampling Information
Location: IEB 50	Meter #: APEX 1 Pitot #: 52	Pbar: 29.85
Port Dia.: 4" Depth: 5"	Yd: 1.02 Cp: 0.84	Pstatic: -0.03
Fitting: Length:	ΔH@: 1.85 Noz. #: Q014B	% O_2: 15
Port Height from deck:	Filter Box #: 4 D_n: 0.505	% CO_2: 5
Stack Dia: 25.5" Area: 3.547	Filter #: 2 Mag. #: /	% H_2O: 11.0
Upstream from disturbance: 31	Probe #: 52 Umb. #: /	Run Mins 80
Downstream from disturbance: 36	Pyrometer #:	

Initial LC: 0.001 CFM @ 20 "Hg

Final LC: 0.001 CFM @ 18 "Hg

Pitot LC: ✓

Cyclonic Flow Check:

Point	Time 11:55	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F Probe	Temp, °F Filter	Temp, °F Imp.	Vac., "Hg	Notes
1	0	882.309		77	1084	0.06	1.24	0.60	0.245	241	244	<45	5	
2	4	884.7		76	1100	0.06	1.22	0.60	0.245	242	246		5	
3	8	887.1		75	1096	0.05	1.02	0.55	0.224	243	246	↓	5	
4	12	889.3		76	1089	0.05	1.02	0.55	0.244	244	247		5	
5	16	891.5		76	1110	0.06	1.21	0.60	0.245	245	247		5	
6	20	894.0		76	1091	0.06	1.22	0.60	0.245	246	248		5	
7	24	896.4		76	1080	0.06	1.24	0.60	0.245	246	248		5	
8	28	898.8		76	1094	0.06	1.23	0.60	0.245	245	250		5	
9	32	901.2		77	1101	0.06	1.22	0.60	0.245	245	250		5	
10	36	903.5		78	1109	0.06	1.22	0.60	0.245	245	249		5	
stop	40													
1	0	905.9		77	1091	0.06	1.23	0.60	0.245	250	251	<45	5	
2	4	908.3		78	1082	0.06	1.24	0.60	0.245	249	251	↓	5	
3	8	910.7		79	1069	0.05	1.04	0.55	0.221	250	251		5	
4	12	912.9		79	1072	0.05	1.04	0.55	0.224	250	252		5	
5	16	915.1		79	1090	0.06	1.24	0.60	0.245	251	252		5	
6	20	917.5		79	1064	0.06	1.26	0.61	0.245	251	253		5	
7	24	920.0		80	1076	0.06	1.25	0.61	0.245	250	253		5	
8	28	922.4		80	1091	0.06	1.24	0.60	0.245	249	254		5	
9	32	924.9		80	1079	0.06	1.25	0.61	0.245	250	254		5	
10	36	927.3		80	1068	0.06	1.26	0.61	0.245	250	255		5	
stop	40	929.714												
	13:18	47.405		77.7	1,087.1		1.193		0.241					

Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	192	92	
Impinger #2	100	102	2	
Impinger(s) #	0	2	2	
Impinger(s) #				
Silica Gel:	867.2	880.0	12.8	
Total Net / Rinse:			108.8	
Total Sample Volume:				

Stack Information

Electricity [✓ YES] NO

Probe Stand [✓ YES] NO

Port Threads YES [✓ NO]

Platform Ht.

Field Calculations

Sample Vol., dscf: 47.689

% H_2O:

MWs:

Stack Vel, ft/s:

Flow rate, acfm:

Flow rate, dscfm:

% Isokinetics:

C-14

Isokinetic Sampling Data Sheet (Method 29)

Facility: Bubbling Well **Date:** 5-26-21 **Run #:** 3 **Personnel:** SA, BJ, RB

Facility Information		Equipment Information		Sampling Information
Location: EFB 52		Meter #: APEX 1	Pitot #: 52	Pbar: 29.85
Port Dia.: 4"	Depth: 5"	Yd: 1.02	Cp: 0.84	Pstatic: -0.03
Fitting:	Length:	ΔH@: 1.85	Noz. #: Q014B	% O_2: 15
Port Height from deck:		Filter Box #: 4	D_n: 0.505	% CO_2: 5
Stack Dia: 25.5"	Area: 3.547	Filter #: 3	Mag. #: /	% H_2O: 8.0
Upstream from disturbance: 31		Probe #: 52	Umb. # /	Run Mins 80
Downstream from disturbance: 36		Pyrometer #:		

Initial LC: 0.001 Final LC: 0.001 Pitot LC: ✓

CFM @ 22 "Hg CFM @ 17 "Hg Cyclonic Flow Check:

Point	Time 13:59	Gas Meter Vol, Ft³	Meter Temp, °F In	Meter Temp, °F Out	Stack Temp, °F	ΔP	ΔH	Meter ACFM	SQRT ΔP	Temp, °F Probe	Temp, °F Filter	Temp, °F Imp.	Vac., "Hg	Notes
1	0	932.251		82	1002	0.06	1.39	0.64	0.245	238	241	245	5	
2	4	934.8		82	979	0.06	1.41	0.65	0.245	240	242		5	
3	8	937.4		81	991	0.06	1.40	0.64	0.245	243	244		5	
4	12	940.0		81	962	0.05	1.19	0.59	0.224	245	243		5	
5	16	942.4		81	985	0.05	1.17	0.59	0.224	246	244		5	
6	20	944.7		82	996	0.06	1.40	0.64	0.245	246	243		5	
7	24	947.3		82	979	0.06	1.41	0.65	0.245	246	245		5	
8	28	949.9		82	988	0.06	1.40	0.64	0.245	245	246		5	
9	32	952.5		83	976	0.06	1.42	0.65	0.245	245	246		5	
10	36	955.1		83	992	0.06	1.40	0.64	0.245	244	247		5	
stop	40													
1	0	957.7		82	973	0.06	1.42	0.65	0.245	245	250	245	5	
2	4	960.3		82	981	0.06	1.41	0.65	0.245	246	251		5	
3	8	962.9		83	972	0.06	1.42	0.65	0.245	245	250		5	
4	12	965.5		82	968	0.06	1.42	0.65	0.245	245	250		5	
5	16	968.1		82	966	0.06	1.43	0.65	0.245	246	248		5	
6	20	970.7		81	964	0.05	1.19	0.59	0.224	245	249		5	
7	24	973.1		81	973	0.05	1.18	0.59	0.224	244	254		5	
8	28	975.5		81	968	0.06	1.42	0.65	0.245	245	254		5	
9	32	978.2		81	961	0.06	1.43	0.65	0.245	246	251		5	
10	36	980.8		80	958	0.06	1.43	0.65	0.245	245	254		5	
stop	40	983.408												
	15:22	51.157	81.7		976.7		1.367		0.241					

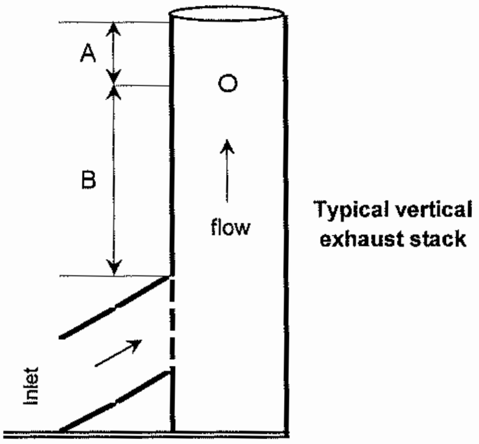
Moisture Data	Initial	Final	Net	Rinse
Impinger #1	100	152	52	
Impinger #2	100	108	8	
Impinger(s) #	0	4	4	
Impinger(s) #				
Silica Gel:	800.3	806.9	6.6	
Total Net / Rinse:			70.6	
Total Sample Volume:				

Stack Information		
Electricity	[✓ YES]	NO
Probe Stand	[✓ YES]	NO
Port Threads	YES	[✓ NO]
Platform Ht.		

Field Calculations	
Sample Vol., dscf:	51356
% H_2O:	E-15
MWs:	
Stack Vel, ft/s:	
Flow rate, acfm:	
Flow rate, dsfcm:	
% Isokinetics:	

Bubbling Well IEB 50
TRAVERSE POINT LAYOUT (PARTICULATE)
CIRCULAR STACKS OVER 24 INCHES

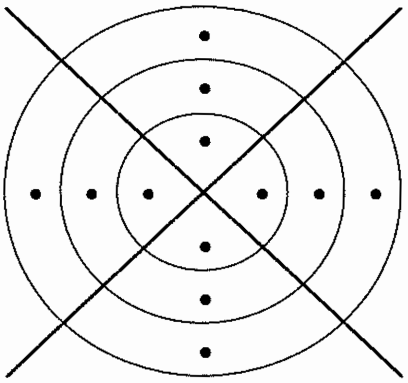
Stack diameter: 25.5 *inches*
Upstream diameter (A): 32.0 *inches*
Downstream diameter (B): 156.0 *inches*
Port length: 5.00 *inches*
Number of ports being used: 2 *see note*
Equivalent upstream diameter (A): 1.255 *Pass*
Equivalent downstream diameter (B): 6.118 *Pass*
All points at least 1.0" from stack wall: 0.663 *Fail - relocate*
Total points: 20
Points per port: 10



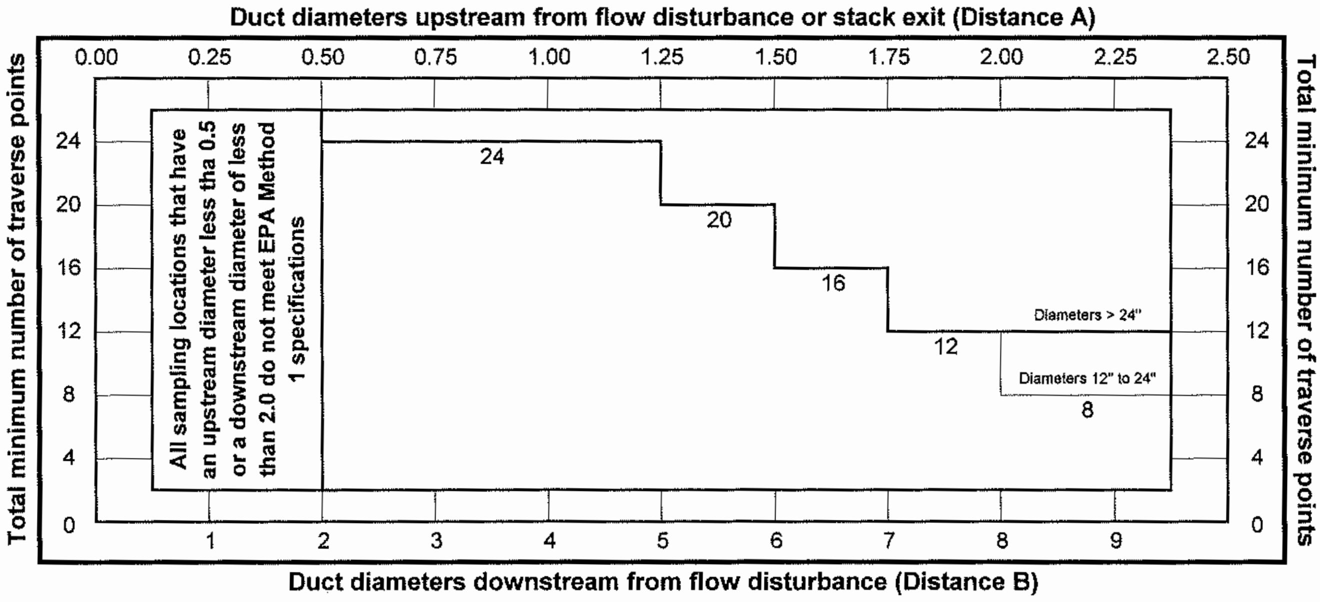
Point	% Diameter	Inside wall Distance (in)	Outside port Distance (in)
1	2.6	0.7	5.7
2	8.2	2.1	7.1
3	14.6	3.7	8.7
4	22.6	5.8	10.8
5	34.2	8.7	13.7
6	65.8	16.8	21.8
7	77.4	19.7	24.7
8	85.4	21.8	26.8
9	91.8	23.4	28.4
10	97.4	24.8	29.8
N/A	#N/A	#N/A	#N/A
N/A	#N/A	#N/A	#N/A

Note: No traverse point shall be within 1.0" of the stack walls (see Sections 11.3.1)

DUCT AREA = 3.547 ft^2



Example: Location of 12 points



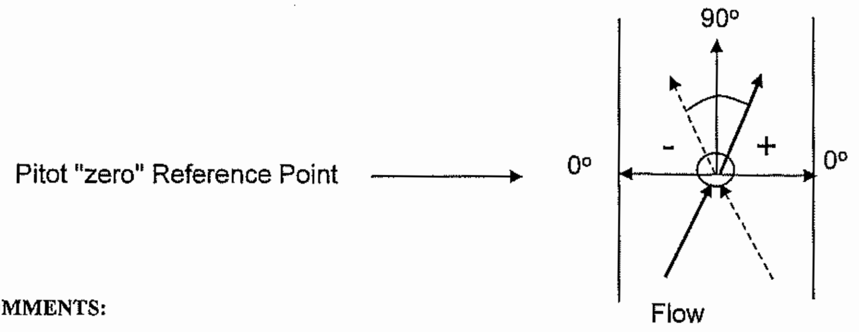
BEST ENVIRONMENTAL Livermore, CA 925 455-9474

Cyclonic Flow Check Data Sheet

Facility: Bubbling Well **Date:** 5-25-21 **Personnel:** BJ & SA

Facility Information		Equipment		Sampling Data
Location: LFB SD		Meter #	Pitot # PR 48	P Static:
Port Dia.	"Depth:		Pitot Cp: 0.84	
Fitting Type:	"Length:			
Stack Dia.	"Area:			Pitot LC:
Upstream Dist.		Probe # PR48	Mag.# LS1 1	
Downstream Dist.			Umb.# —	

Point	Clock Time	Delta P @ 0 Degrees		Port	+/-	Angle @ 0.0 Delta P									
1		0													
2		0													
3		0													
4		0													
5		0													
6		5													
7		5													
8		0													
9		0													
10		0													
1		0													
2		2													
3		0													
4		2													
5		2													
6		0													
7		0													
8		2													
9		0													
10		0													



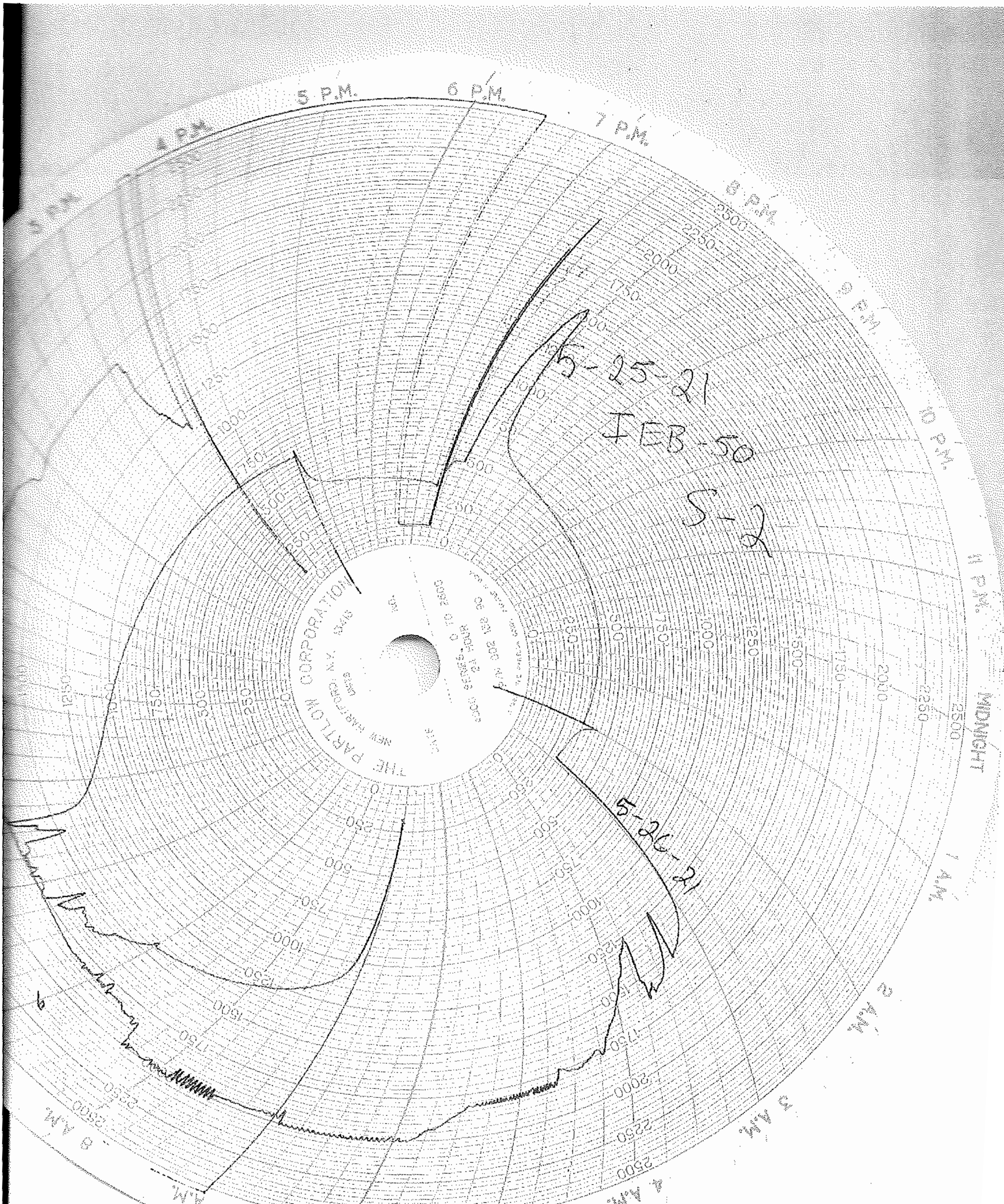
COMMENTS:

APPENDIX D
PROCESS INFORMATION

Bubbling Well Cremation Data for IEB 50

Source Testing per BAAQMD Requirements

Cremation Date:	Total Weight:		# Pets:	Run Time	
5/27/2021	2,374	lbs	91	6.75	hours
5/26/2021	2,037	lbs	84	6.25	hours
5/25/2021	1,528	lbs	53	5.50	hours
total:	**5,939**	lbs	**228**		



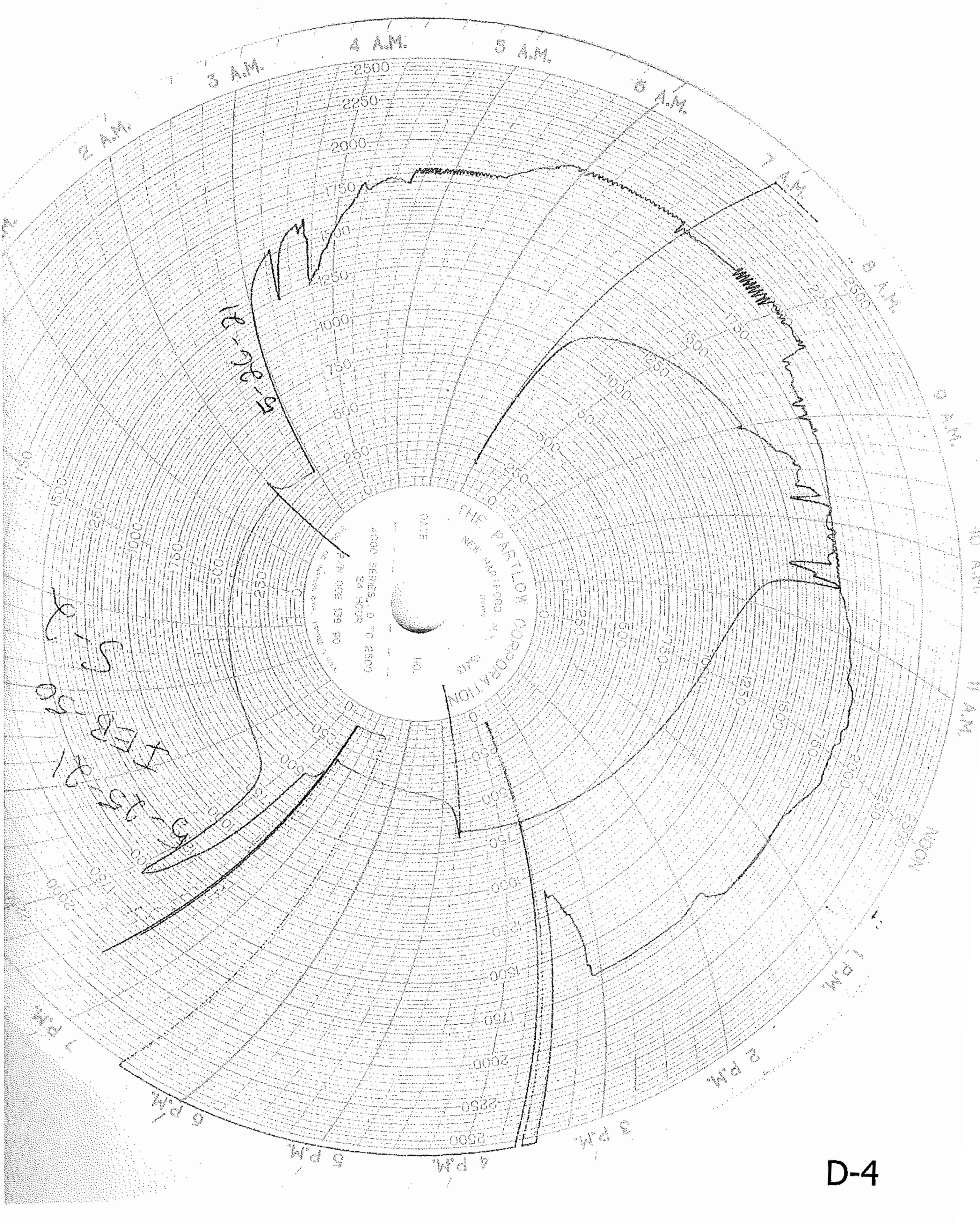
5-25-21

IEB-50

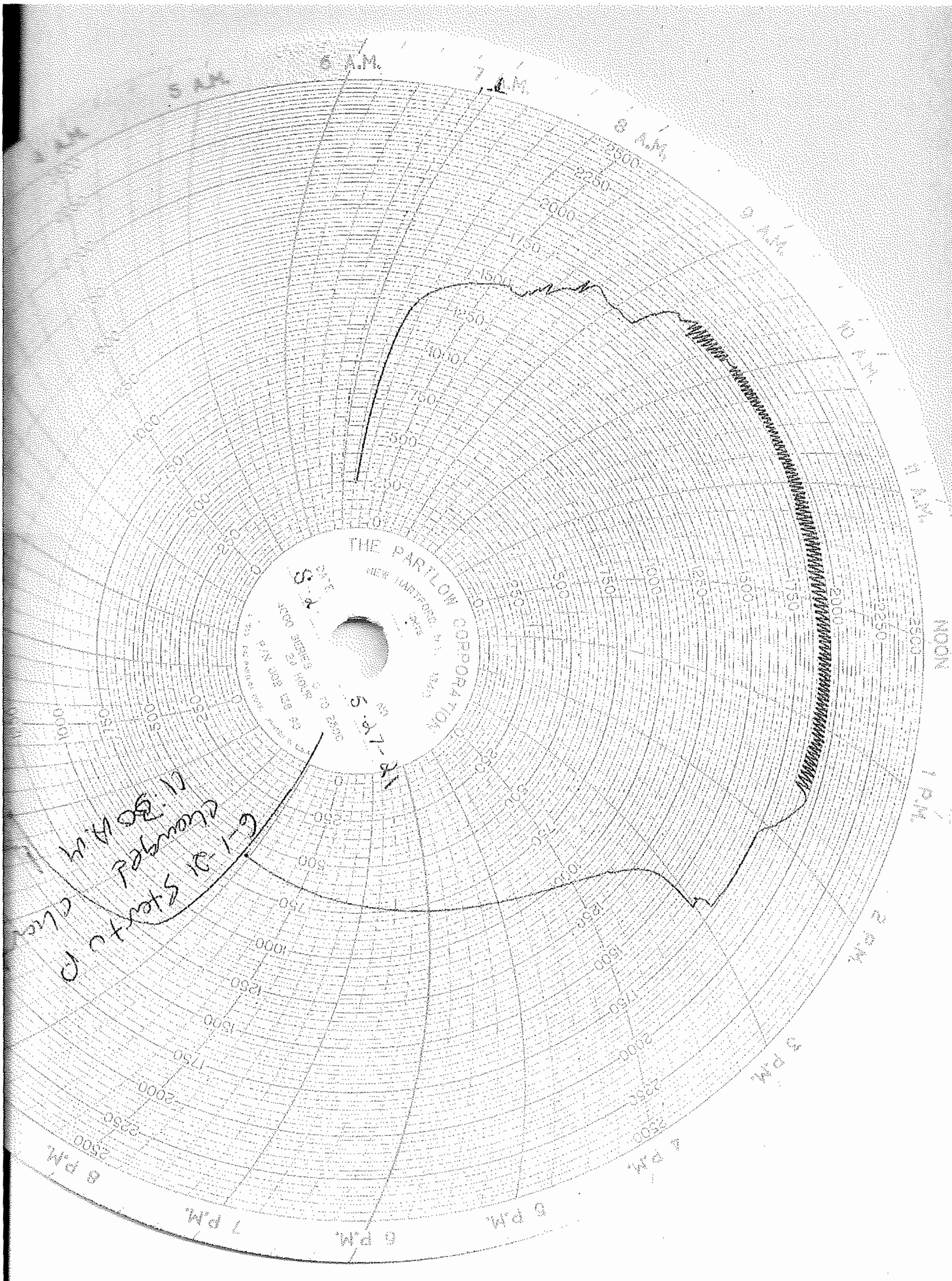
S-2

5-26-21

D-3


THE PARTLOW CORPORATION
NEW HARTFORD, N.Y.
DATE
NO.
4000 SERIES, 0 TO 2500
24 HOUR
P/N 00E 139 90
NOON
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
5-26-81
3-25-81
FEB 80

D-4


THE PARTLOW CORPORATION
NEW HARTFORD, N.Y.
DATE S-2
5-27-21
3000 SERIES 0 TO 2500
24 HOUR
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
0
250
500
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1250
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1750
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2500
6-1-21 Start up
changed cha
11:30 A.M.

D-5

APPENDIX E
EQUIPMENT CALIBRATION

BEST ENVIRONMENTAL METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	APEX1
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	Time	5-Jan-21	0:00
Barometric Pressure		30.1	in Hg
Theoretical Critical Vacuum[1]		14.2	in Hg
Calibration Technician		Burt Kusich	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1] For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2] The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
15.0	0.3	898.350	902.906	63	63	SF40	0.2323	71	73	16
20.0	0.6	902.906	911.700	63	65	SF48	0.3349	73	76	16
12.0	1.1	911.700	918.727	65	66	SF55	0.4442	76	64	15
7.0	1.9	918.727	923.400	66	67	SF63	0.5883	64	64	14
5.0	3.3	923.400	928.540	67	68	SF73	0.8043	64	64	10

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
$(V_{m(std)})$	$(Q_{m(std)})$	$(Vcr_{(std)})$	$(Q_{cr(std)})$	(Y)	(ΔY)	$(Q_{m(std)(corr)})$	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
4.631	0.309	4.547	0.303	0.982	-0.04	0.303	1.932	0.08
8.928	0.446	8.720	0.436	0.977	-0.04	0.436	1.927	0.08
7.122	0.593	6.969	0.581	0.979	-0.04	0.581	1.866	0.02
4.736	0.677	5.415	0.774	1.143	0.12	0.774	1.820	-0.03
5.218	1.044	5.288	1.058	1.013	-0.01	1.058	1.700	-0.15
				1.019	Y Average		1.849	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

Note: For Calibration Factor dHa, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.2.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 535476, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature: On File

Date: 1/5/2021

E-2

TYPE K THERMOCOUPLE READOUT CALIBRATION

Meter Box: Apex 1
Technician: BK
Date: 1/5/2021
Next Cal Due: 7/5/2021

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
59	60	1	1.7	Pass
99	100	1	1.0	Pass
200	200	0	0.0	Pass
299	300	1	0.3	Pass
397	400	3	0.8	Pass
497	500	3	0.6	Pass
599	600	1	0.2	Pass
698	700	2	0.3	Pass
898	900	2	0.2	Pass
1098	1100	2	0.2	Pass
1297	1300	3	0.2	Pass
1497	1500	3	0.2	Pass
1697	1700	3	0.2	Pass

Comments: Referance Omega tc simulator. CL300-2100f s/n 710

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass.

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Methods, Sect. 3.5.2.2

Pre Cal: ☑
Post Cal: ☐

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

NIST Pyrometer:	T223406
ASTM Thermometer:	3304RM
NIST Thermocouple:	OM121120934

Technicians Signature: Robert Gallagher

E-3

Differential Pressure Gauge Calibration

Meter Box: LSI 1
Technician: Burt Kusich
Date: 1/6/2021
ID No. **W37VYF**
Next Cal Due: 7/6/2021

Scale: 5
Electronic ☐
Magnahelic ☐
dH Mag

+/-	Guage ΔP	Ref. Manometer	Difference ΔP	% Difference	Results
+	0.94	0.94	0.0	0.0	**Pass**
+	1.75	1.8	0.1	1.0	**Pass**
+	3.5	3.5	0.0	0.0	**Pass**
-	0.84	0.86	0.0	0.4	**Pass**
-	1.62	1.64	0.0	0.4	**Pass**
-	4.6	4.6	0.0	0.0	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Acceptance limit: Agree within 5% of inclined manometer
Method Reference: Code of Regulations,40 PT60,App. A, Method 2
Calibration Frequency: 6 Months

Pre Cal: ☑
Post Cal: ☐

STD Used: 0-10" Manometer

The results submitted herein are true to the best of my knowledge.

Technicians Signature: Bust Kusich

\\ZENA-W2K\users\NEWEST CALIBRATIONS\NEWEST CALIBRATIONS\METER BOX CALS FOLDER\L.S.I.# 1\LSI 1 METER CAL 1-6-21.xlsm

E-4

Differential Pressure Gauge Calibration

Meter Box: LSI 1
Technician: Burt Kusich
Date: 1/6/2021
ID No. **R01081230N10**
Next Cal Due: 7/6/2021

Scale: 3
Electronic ☐
Magnahelic ☑
dP Mag

+/-	Guage ΔP	Ref. Manometer	Difference ΔP	% Difference	Results
+	0.52	0.51	0.0	-0.3	**Pass**
+	1.31	1.31	0.0	0.0	**Pass**
+	2.5	2.5	0.0	0.0	**Pass**
-	1	1	0.0	0.0	**Pass**
-	1.85	1.85	0.0	0.0	**Pass**
-	2.8	2.8	0.0	0.0	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Acceptance limit: Agree within 5% of inclined manometer
Method Reference: Code of Regulations,40 PT60,App. A, Method 2
Calibration Frequency: 6 Months

Pre Cal: ☑
Post Cal: ☐

STD Used: 0-10" Manometer

The results submitted herein are true to the best of my knowledge.

Technicians Signature: Burt Kusich

Differential Pressure Gauge Calibration

Meter Box: LSI 1
Technician: Burt Kusich
Date: 1/6/2021
ID No. **W38URH**
Next Cal Due: 7/6/2021

Scale: 1
Electronic ☐
Magnahelic ☑
dP Mag

+/-	Guage ΔP	Ref. Manometer	Difference ΔP	% Difference	Results
+	0.27	0.26	0.0	-1.0	**Pass**
+	0.44	0.43	0.0	-1.0	**Pass**
+	0.86	0.86	0.0	0.0	**Pass**
-	0.2	0.2	0.0	0.0	**Pass**
-	0.56	0.55	0.0	-1.0	**Pass**
-	1	1.00	0.0	0.0	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Acceptance limit: Agree within 5% of inclined manometer
Method Reference: Code of Regulations,40 PT60,App. A, Method 2
Calibration Frequency: 6 Months

Pre Cal: ☑
Post Cal: ☐

STD Used: 0-10" Manometer

The results submitted herein are true to the best of my knowledge.

Technicians Signature: Burt Kusich

E-6

TYPE K THERMOCOUPLE READOUT CALIBRATION

Meter Box:	LSI 1
Technician:	Burt Kusich
Date:	1/6/2021
Next Cal Due:	7/6/2021

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
61	61	0	0.0	**Pass**
99	100	1	1.0	**Pass**
201	200	-1	-0.5	**Pass**
299	300	1	0.3	**Pass**
399	400	1	0.3	**Pass**
499	500	1	0.2	**Pass**
596	600	4	0.7	**Pass**
696	700	4	0.6	**Pass**
901	900	-1	-0.1	**Pass**

Comments: Referance Omega tc simulator. CL300-2100f s/n 710

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass.

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Methods, Sect. 3.5.2.2

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

Pre Cal: ☑

Post Cal: ☐

NIST Pyrometer:	T223406
ASTM Thermometer:	3304RM
NIST Thermocouple:	OM121120934

Technicians Signature: Robert Gallagher

E-7

BEST ENVIRONMENTAL METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	LSI 1
Console Serial Number	
DGM Model Number	
DGM Serial Number	

Calibration Conditions			
Date	Time	January 6, 2021	900
Barometric Pressure		29.8	in Hg
Theoretical Critical Vacuum[1]		14.1	in Hg
Calibration Technician		Burt Kuscih	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 {}^{\circ}R^{1/2})/(in.Hg{}^*min)$.

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
16.0	0.4	36.800	41.570	60	60	SF40	0.2323	60	60	15
13.0	0.7	41.570	47.040	60	60	SF48	0.3349	60	60	15
15.0	1.3	47.040	55.793	60	61	SF55	0.4442	60	61	15
12.0	2.3	55.793	65.088	61	60	SF63	0.5883	61	60	14
7.0	4.5	65.088	72.510	60	60	SF73	0.8043	60	60	12

Results

Standardized Data				Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate	ΔH @	
				Value	Variation	Std & Corr	0.75 SCFM	Variation
$(V_{m(std)})$	$(Q_{m(std)})$	$(Vcr_{(std)})$	$(Q_{cr(std)})$	(Y)	(ΔY)	$(Q_{m(std)(corr)})$	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
4.829	0.302	4.857	0.304	1.006	0.01	0.304	2.476	0.20
5.541	0.426	5.689	0.438	1.027	0.03	0.438	2.088	-0.19
8.872	0.591	8.703	0.580	0.981	-0.01	0.580	2.210	-0.07
9.444	0.787	9.221	0.768	0.976	-0.02	0.768	2.241	-0.04
7.589	1.084	7.358	1.051	0.969	-0.02	1.051	2.371	0.09
				0.992	Y Average		2.277	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

Note: For Calibration Factor dHa, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.2.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 535476, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature: Burt Kusich

Date: 1/6/2021

E-8

BEST ENVIRONMENTAL **Livermore, CA 925-455-9474**

S-Type Pitot Tube Geometric Calibration Data Sheet

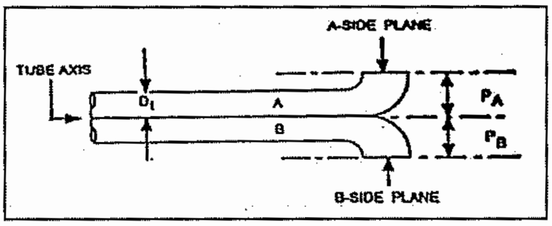
Technician:	Burt Kusich	Probe No.:	52
Date:	1/18/2021	Probe Length:	52"
Next Cal Due:	7/18/2021	Probe Type:	M5

Level Pitot Assembly

D_t= 0.225 in.

P_A= 0.307 in.

P_B= 0.310 in.



$P=(P_A+P_B)/2$ 0.3085

P/D_t= 1.371 in. ($1.05 \leq P/D_t \leq 1.50$)

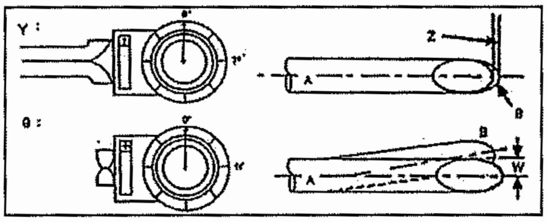
$A=P_A+P_B$= 0.617 in.

Y= 0 °

Z=A * sinY 0.000 in. (<0.125 in.)

Θ= 0 °

W=A * sin Θ= 0.000 in. (<0.031 in.)

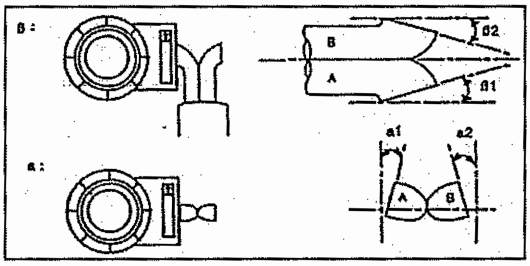


β1= 2 ° (<5°)

β2= 2 ° (<5°)

a1= 2 ° (<10°)

a2= 2 ° (<10°)



Comments:

Pitot Condition: ● Good ○ Fair ○ Poor ○ Repaired

Pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification factor of 0.84. As per 40 CFR Pt. 60 App. A, Reference Method 2

a1 & a2 (<10°), b1 & b2 (<5°). Z < 0.125 in. & W < 0.031 in.

Tolerance limits from:

1. Standards of Performance for New Stationary sources, Federal Register 36 (247) December 233,1971.
2. Valbra, R.F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Coeffici Emission Measurement Branch, Research Triangle Park, NC, October 1976.

The results submitted herein are true to the best of my knowledge.

Technicians Signature: On File

\\ZENA-W2K\users\NEWEST CALIBRATIONS\NEWEST CALIBRATIONS\PROBE CALS FOLDER\PR 52 M5\PR 52, 1-18-21.xlsx

PROBE HEATER THERMOCOUPLE CALIBRATION

Technician: Burt Kusich
Date: 1/18/2021

Next Cal Due: 7/18/2021

Pitot No.: 52
Pitot Length: 52"
Probe Type: Pitot

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
78	78	0.0	0.0	**Pass**
190	192	2.0	1.0	**Pass**
258	260	2.0	0.8	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. ☑

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Metho☐, Sect. 3.5.2.2

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

Technicians Signature: On File

E-10

TYPE K THERMOCOUPLE CALIBRATION

Technician:	Burt Kusich		
Date:	1/18/2021	Pitot No.:	52
		Pitot Length:	52"
Next Cal Due:	7/18/2021	Probe Type:	Pitot

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
54	54	0.0	0.0	**Pass**
211	211	0.0	0.0	**Pass**
348	350	2.0	0.6	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. Pre Cal: ☑

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Meth(Post Cal: ☐

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

NIST Pyrometer:	T223406
ASTM Thermometer:	3304RM
NIST Thermocouple:	OM121120934

Technicians Signature: On File

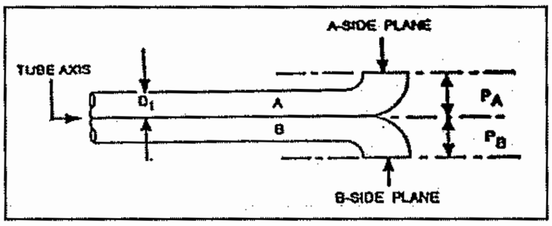
S-Type Pitot Tube Geometric Calibration Data Sheet

Technician: Burt Kusich
Date: 1/18/2021
Next Cal Due: 7/18/2021

Probe No.: 48
Probe Length: 48"
Probe Type: M5

Level Pitot Assembly

D_t= 0.250 in.
P_A= 0.320 in.
P_B= 0.322 in.

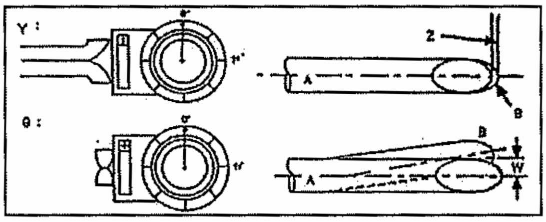


$P=(P_A+P_B)/2$ 0.3210

P/D_t= 1.284 in. ($1.05 \le P/D_t \le 1.50$)

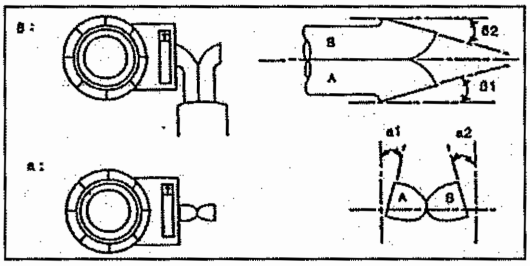
$A=P_A+P_B$= 0.642 in.
Y= 0 °
Z=A * sinY 0.000 in. (<0.125 in.)

Θ= 2 °
W=A * sin Θ= 0.022 in. (<0.031 in.)



β1= 2 ° (<5°)
β2= 2 ° (<5°)

a1= 2 ° (<10°)
a2= 1 ° (<10°)



Comments:

Pitot Condition: ● Good ○ Fair ○ Poor ○ Repaired

Pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification factor of 0.84. As per 40 CFR Pt. 60 App. A, Reference Method 2

a1 & a2 (<10°), b1 & b2 (<5°). Z < 0.125 in. & W < 0.031 in.

Tolerance limits from:

1. Standards of Performance for New Stationary sources, Federal Register 36 (247) December 233,1971.
2. Valbra, R.F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Coeffici Emission Measurement Branch, Research Triangle Park, NC, October 1976.

The results submitted herein are true to the best of my knowledge.

Technicians Signature: On File

\\ZENA-W2K\users\NEWEST CALIBRATIONS\NEWEST CALIBRATIONS\PROBE CALS FOLDER\PR 48 M5\PR 48, 1-18-21.xlsx

PROBE HEATER THERMOCOUPLE CALIBRATION

Technician: Burt Kusich
Date: 1/18/2021
Next Cal Due: 7/18/2021

Pitot No.: 48
Pitot Length: 48"
Probe Type: Pitot

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
77	78	1.0	1.3	**Pass**
189	190	1.0	0.5	**Pass**
260	262	2.0	0.8	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. ☑

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Metho☐, Sect. 3.5.2.2

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

Technicians Signature: On File

TYPE K THERMOCOUPLE CALIBRATION

Technician: Burt Kusich
Date: 1/18/2021

Next Cal Due: 7/18/2021

Pitot No.: 48
Pitot Length: 48"
Probe Type: Pitot

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
54	55	1.0	1.8	**Pass**
212	212	0.0	0.0	**Pass**
330	332	2.0	0.6	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. Pre Cal: ☑

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Meth Post Cal: ☐

Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

NIST Pyrometer: T223406
ASTM Thermometer: 3304RM
NIST Thermocouple: OM121120934

Technicians Signature: On File

METHOD 5 FILTER OVEN THERMOCOUPLE CALIBRATION

Technician:	Burt Kusich
Date:	1/13/2021
ID No.	4
Next Cal Due:	7/13/2021

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
82	82	0.0	0.0	**Pass**
181	180	-1.0	-0.6	**Pass**
283	282	-1.0	-0.4	**Pass**

Comments: Straight Style

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. Pre Cal: ☑

Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Metho Post Cal: ☐

Tolerance Limits: ±5.4 °F at ambient temperature and in hot water bath.

Calibration Frequency: 6 Months

The results submitted herein are true to the best of my knowledge.

NIST Pyrometer:	T223406
ASTM Thermometer:	3304RM
NIST Thermocouple:	OM121120934

Technicians Signature: On File

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METHOD 5 FILTER OVEN THERMOCOUPLE CALIBRATION

Technician: Burt Kusich
Date: 1/13/2021
ID No. **6**
Next Cal Due: 7/13/2021

Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
80	81	1.0	1.2	**Pass**
165	166	1.0	0.6	**Pass**
260	262	2.0	0.8	**Pass**

Comments: Straight Style

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. Pre Cal: ☑
Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Metho Post Cal: ☐
Tolerance Limits: ±5.4 °F at ambient temperature and in hot water bath.
Calibration Frequency: 6 Months
The results submitted herein are true to the best of my knowledge.

NIST Pyrometer:	T223406
ASTM Thermometer:	3304RM
NIST Thermocouple:	OM121120934

Technicians Signature: On File

TYPE K THERMOCOUPLE CALIBRATION

Technician: BK
Date: 1/11/2021
ID No. **Low Flow 12**
Next Cal Due: 7/11/2021

		Test T/C °F	Ref. T/C °F	Difference °F	% Difference	Results
Inlet tc		34	34	0.0	0.0	**Pass**
Inlet tc		70	71	1.0	1.4	**Pass**
Inlet tc		140	140	0.0	0.0	**Pass**
Outlet tc		35	35	0.0	0.0	**Pass**
Outlet tc		63	64	1.0	1.6	**Pass**
Outlet tc		150	151	1.0	0.7	**Pass**

Comments:

Equipment Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Thermometer. ASTM mercury in glass. Pre Cal: ☑
Method Reference: EPA QA Handbook Vol. III: Stationary Source Specific Meth(Post Cal: ☐
Tolerance Limits: ±4 °F at ≤400oF, ±1.5% at ≥400oF.
Calibration Frequency: 6 Months
The results submitted herein are true to the best of my knowledge.

NIST Pyrometer: T223406
ASTM Thermometer: 3304RM
NIST Thermocouple: OM121120934

Technicians Signature: On file

APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT METRIC UNITS

Meter Console Information	
Console Model Number	
Console Serial Number	
DGM Model Number	Low Flow 12
DGM Serial Number	

Calibration Conditions			
Date	Time	January 11, 2021	
Barometric Pressure		740	mm Hg
Theoretical Critical Vacuum[1]		349	mm Hg
Calibration Technician		BK	

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K_1	0.386	

[1]For valid test results, the Actual Vacuum should be 25 to 50 mm Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in Metric units, $m^3*K^{1/2}$)/(mmHg*min).

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	mm H_2O	m^3	m^3	°C	°C		see above2	°C	°C	mm Hg
6.0000	0.2800	3610.000	4116.000	12.0	13.0	SF40	1.9310	12.0	13.0	508
5.0000	0.6000	4116.000	4724.000	13.0	13.0	SF48	2.7830	13.0	13.0	457
5.0000	1.1000	4724.000	5526.000	13.0	13.0	SF55	3.6910	13.0	13.0	406
5.0000	1.9000	5526.000	6574.000	13.0	14.0	SF63	4.8890	13.0	13.0	330
5.0000	3.8000	6574.000	7938.000	14.0	14.0	SF73	6.6840	13.0	14.0	203

Results									
Standardized Data				Dry Gas Meter					
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate	ΔH @	
				Value	Variation	Std & Corr	.0212 m^3_{std}/min	Variation
$(V_{m(std)})$	$(Q_{m(std)})$	$(Vcr_{(std)})$	$(Q_{cr(std)})$	(Y)	(ΔY)	$(Q_{m(std)(corr)})$	(ΔH@)	(ΔΔH@)
m^3	m^3/min	m^3	m^3/min			m^3/min	mm H2O	
505.641	84.273	507.414	84.569	1.004	-0.002	84.569	0.000	0.000
606.526	121.305	608.880	121.776	1.004	-0.002	121.776	0.000	0.000
800.095	160.019	807.538	161.508	1.009	0.004	161.508	0.000	0.000
1043.769	208.754	1069.643	213.929	1.025	0.019	213.929	0.000	0.000
1356.382	271.276	1461.086	292.217	1.077	0.072	292.217	0.000	0.000
				1.006	Y Average		0.000	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature On File Date January 11, 2021

ctronic Thermometer Calibration Sheet

Manufacturer: Peak Meter
Instrument I.D.: Bill
Model #: PM6501
Calibration Date: 1/6/2021
Reference Inst. I.D. Omega CL-300
Cal. Due Date: 7/6/2021
Operator: B Kusich

Reference Temp., °F	Instrument Temp., °F	Temp Diff.	% Diff.	Comments
100	103	3		
200	203	3		
300	303	3		
400	403	3		
500	505	▨	0.99%	
600	606	▨	0.99%	
700	705	▨	0.71%	
800	805	▨	0.62%	
900	905	▨	0.55%	
1000	1007	▨	0.70%	
1100	1106	▨	0.54%	
1300	1306	▨	0.46%	
1500	1507	▨	0.46%	
1700	1704	▨	0.23%	
1900	1909	▨	0.47%	

STD - NIST Pyrometer # : 223406
Calibration frequency = 6 month
COMMENTS: Std. used , Omega thermocouple simulator, CL300-2100f, s/n 710

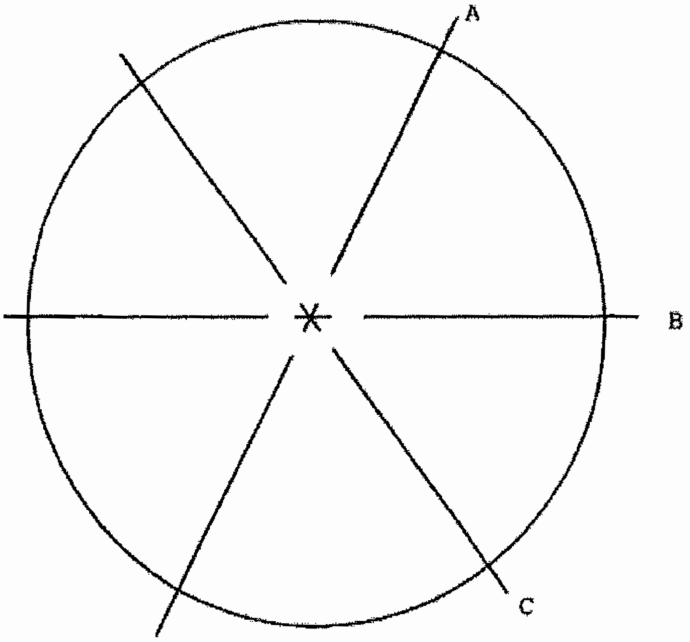
± 4°F for temperatures <400 °F
± 1.5% for temperatures >400 °F
Method Reference: 40CFR60

Nozzle Geometric Calibration Data Sheet

Nozzle Type: Method 5

Technician: Robert Gallagher
Date: 1/5/2020
Nozzle No. **Q14C**
Nozzle Diameter: **0.505**
Next Cal Due: 1/5/2021

Stainless Steel ☐
Glass ☐
Quartz ☑
Inconel ☐



A	0.503
B	0.505
C	0.506
Average:	0.505
Range:	0.003

Comments:

Nozzle Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Method: EPA 5 (section 5.1)

Acceptance Limits: <0.004" range of 3 measurements

Calibration Frequency: 12 Months

The results submitted herein are true to the best of my knowledge.

Technicians Signature: Robert Gallagher

\\ZENA-W2K\users\NEWEST CALIBRATIONS\NEWEST CALIBRATIONS\NOZZLE CALS FOLDER\QUARTZ\Old\Q14C I 10 2019.xlsx

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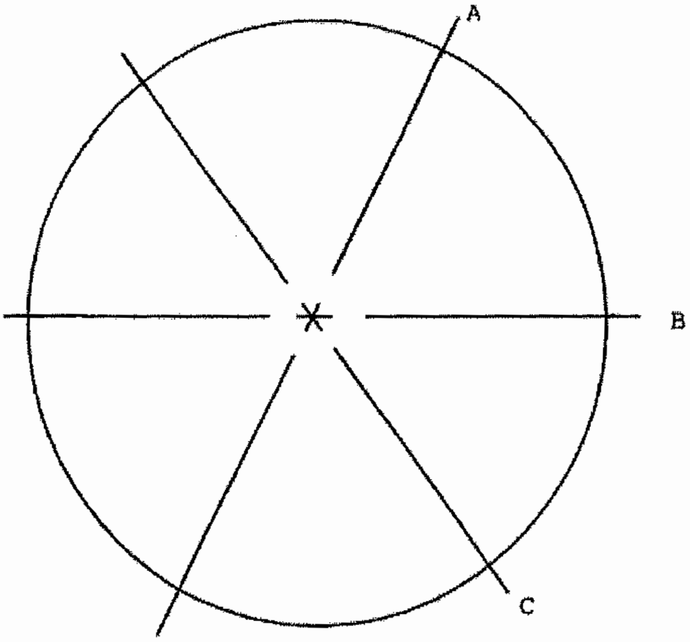
Nozzle Geometric Calibration Data Sheet

Nozzle Type: Method 5

Technician:	Robert Gallagher	Stainless Steel	☐
Date:	1/5/2020	Glass	☐
Nozzle No.	**Q14B**	Quartz	☑
Nozzle Diameter:	**0.505**	Inconel	☐
Next Cal Due:	1/5/2021		



A	0.503
B	0.505
C	0.506
Average:	0.505
Range:	0.003

Comments:

Nozzle Condition: ● Good ○ Fair ○ Poor ○ Repaired

Reference Method: EPA 5 (section 5.1)

Acceptance Limits: <0.004" range of 3 measurements

Calibration Frequency: 12 Months

The results submitted herein are true to the best of my knowledge.

Technicians Signature: Robert Gallagher

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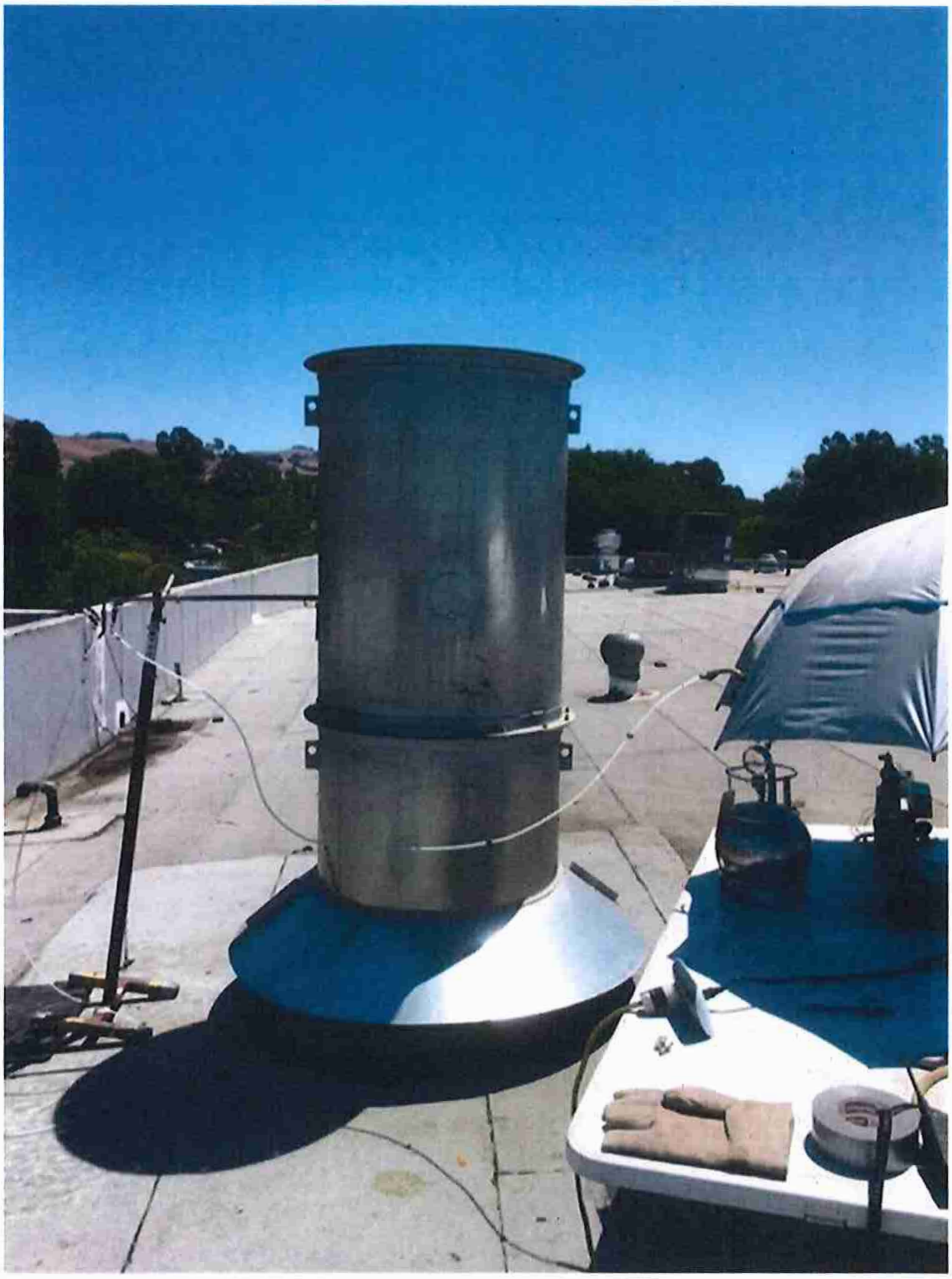
APPENDIX F
STACK DIAGRAMS

Bubbling Well

Cremation System IEB 50



F-2

APPENDIX G
SAMPLING SYSTEM DIAGRAMS

EPA METHOD 1

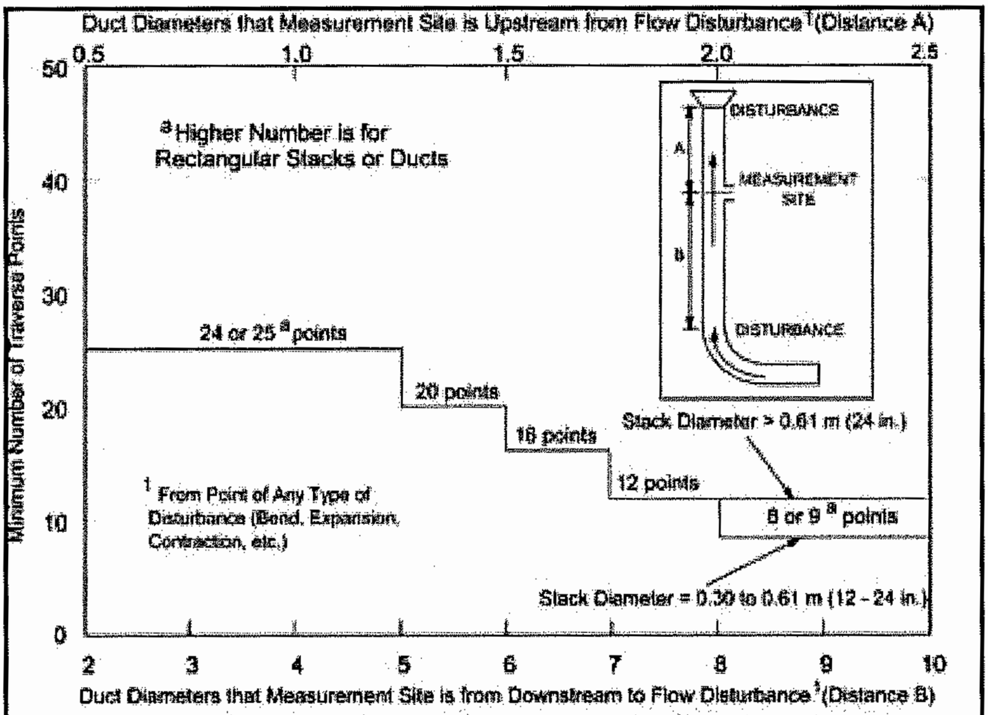


Figure 1-1. Minimum number of traverse points for particulate traverses

* * * * *

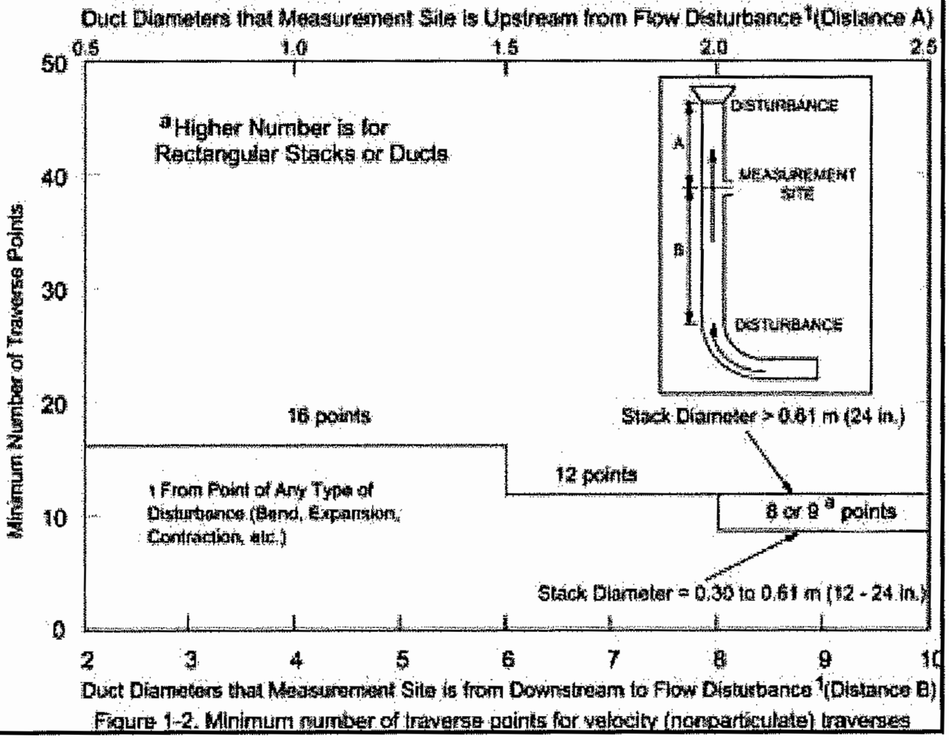


Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses

EPA METHOD 1

TABLE 1-1 CROSS-SECTION LAYOUT FOR RECTANGULAR STACKS

Number of tranverse points layout	Matrix
9	3×3
12	4×3
16	4×4
20	5×4
25	5×5
30	6×5
36	6×6
42	7×6
49	7×7

TABLE 1-2—LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

[Percent of stack diameter from inside wall to traverse point]

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

EPA METHOD 1

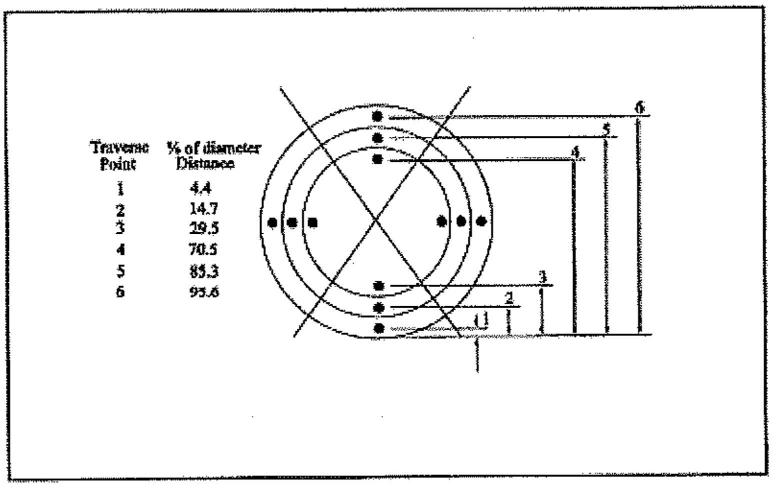


Figure 1-3. Example showing circular stack cross section divided into 12 equal areas, with location of traverse points.

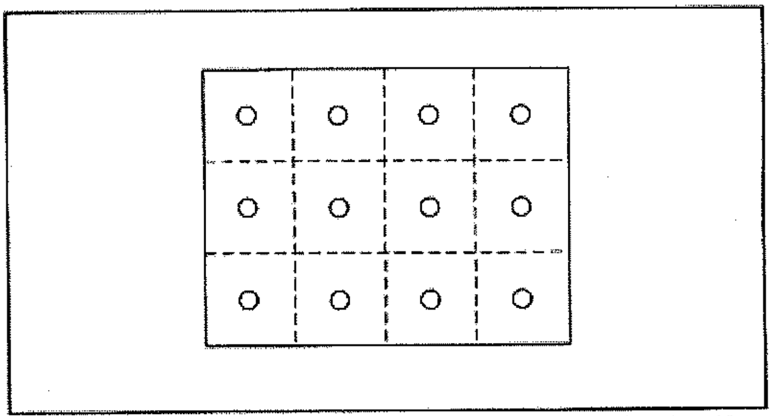
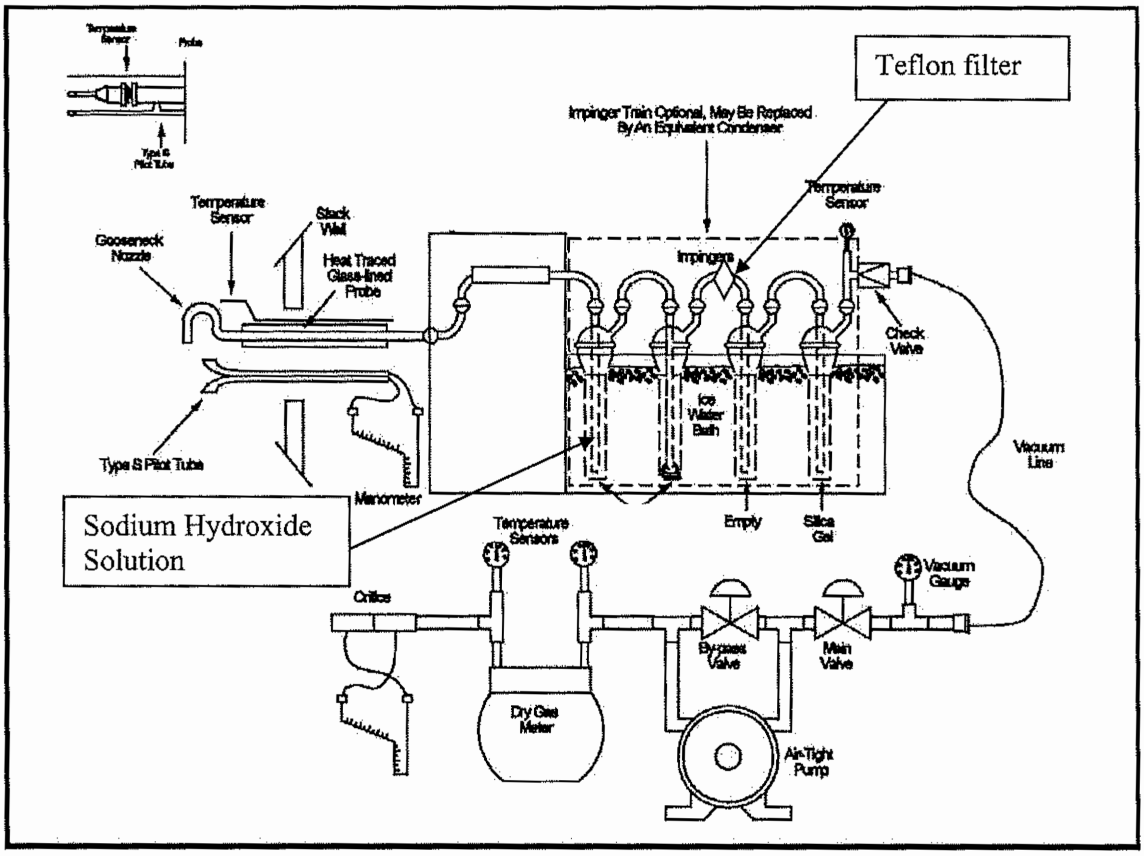


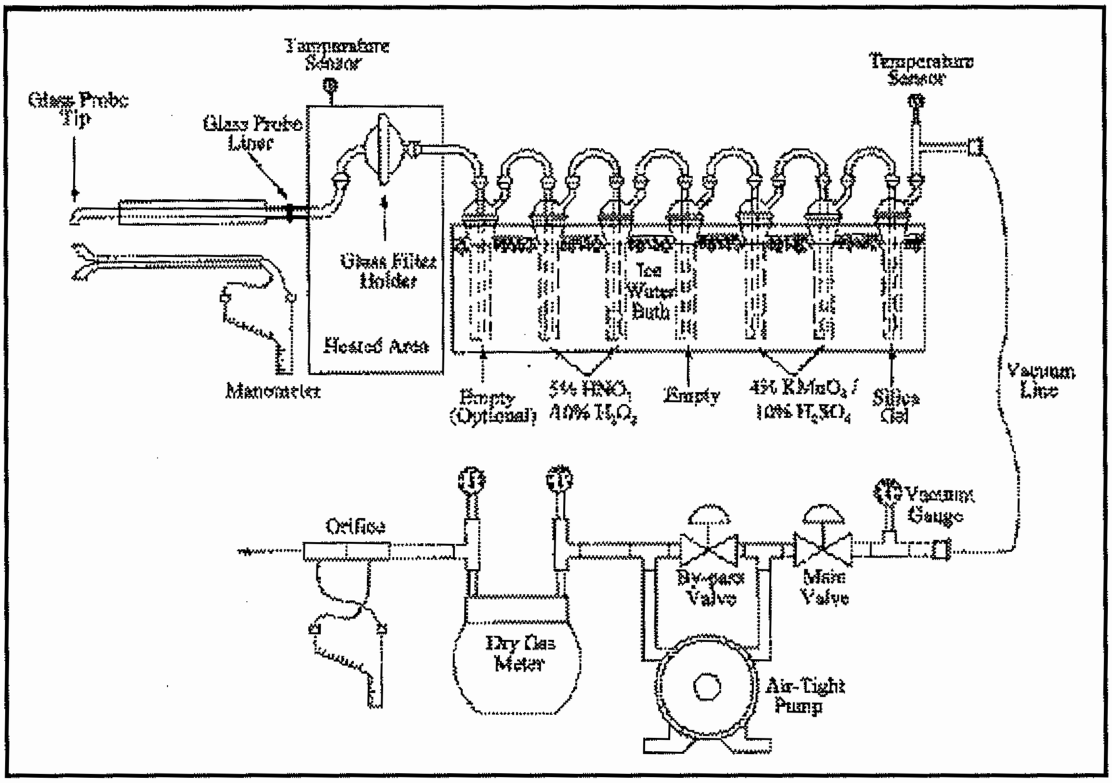
Figure 1-4. Example showing rectangular stack cross section divided into 12 equal areas, with traverse points at centroid of each area.

EPA Method 306



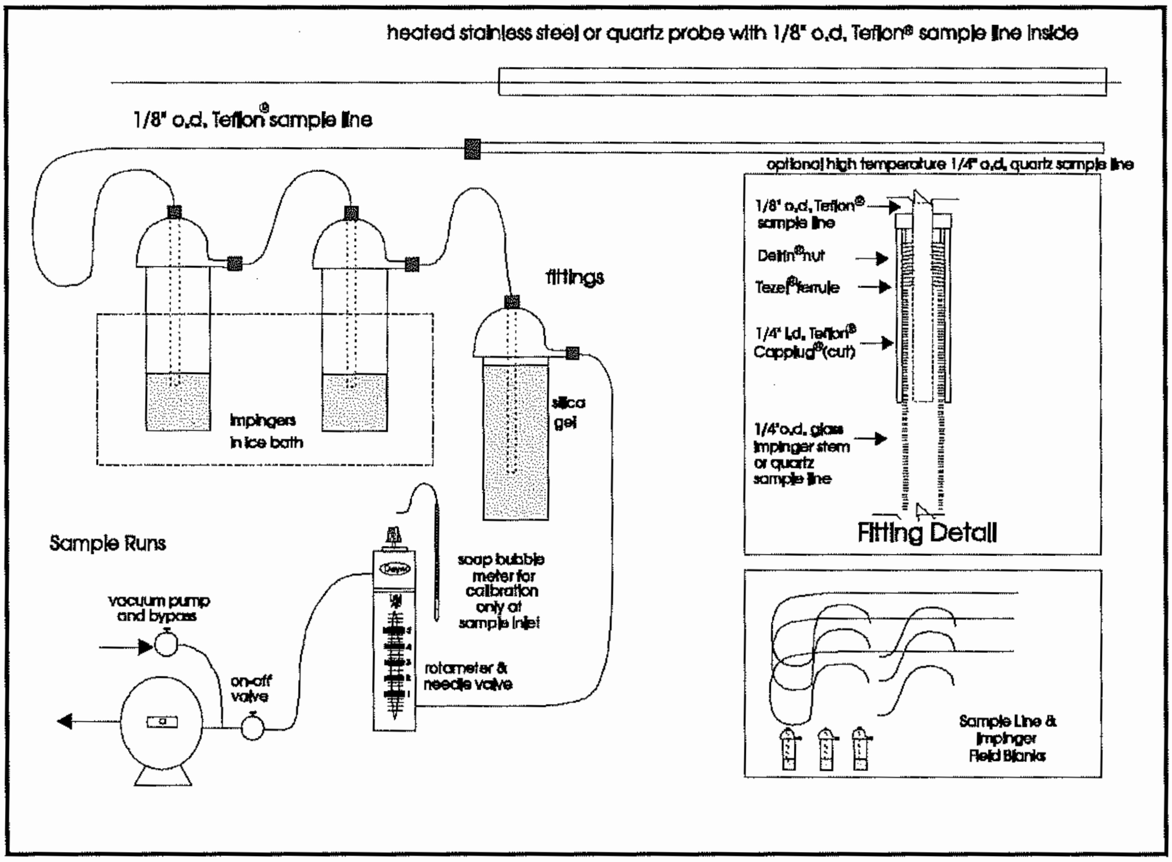
**Total & Hexavalent Chromium
Sampling Train**

EPA Method 29



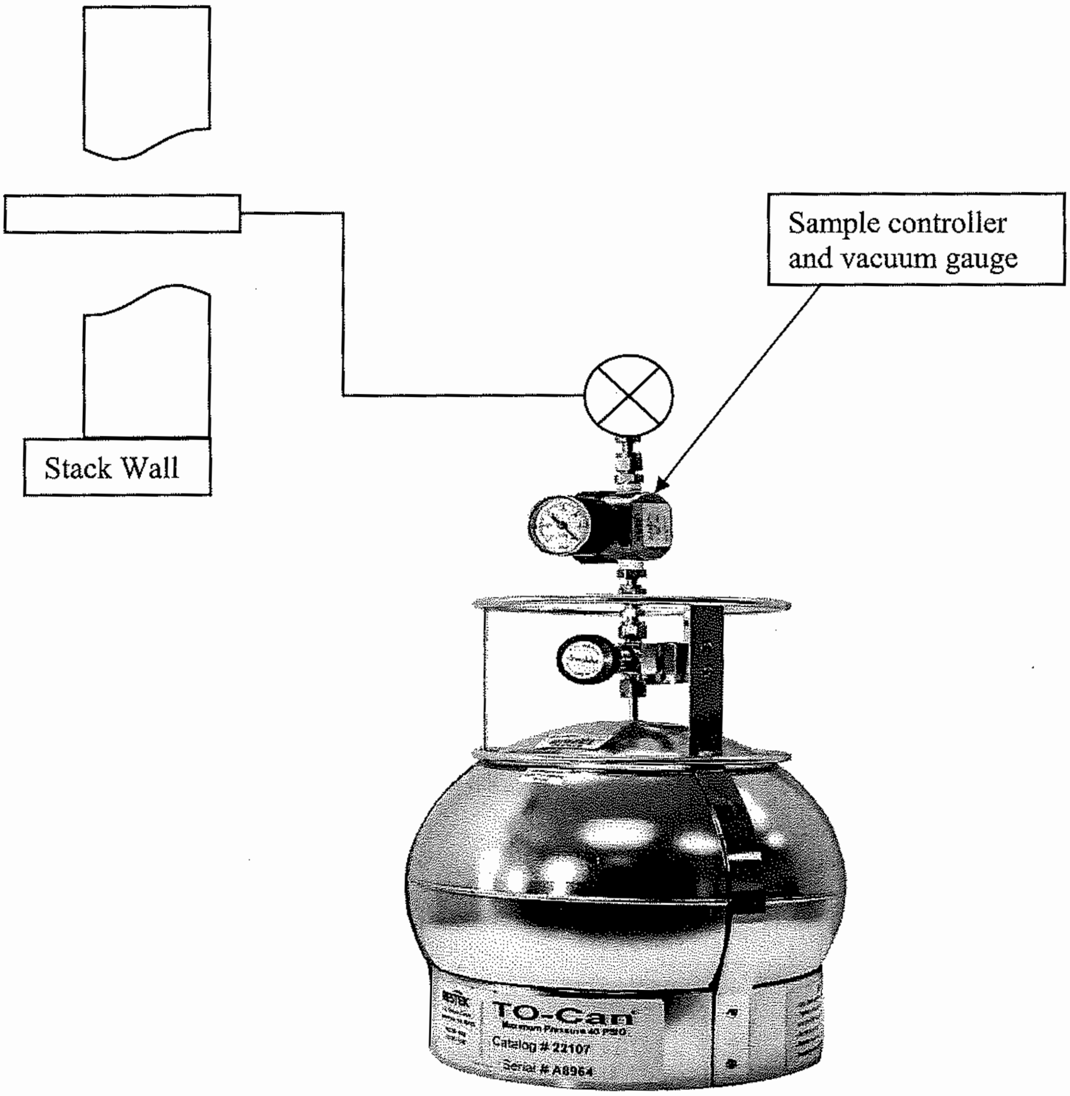
Particulate/Metals Sampling Train

CARB METHOD 430



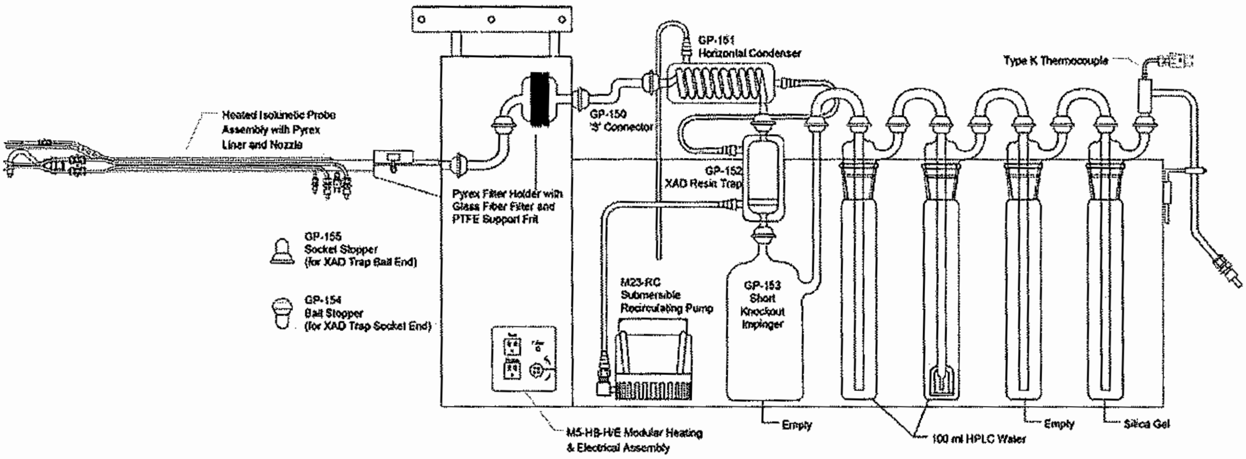
Formaldehyde Sampling System

EPA METHOD TO-15



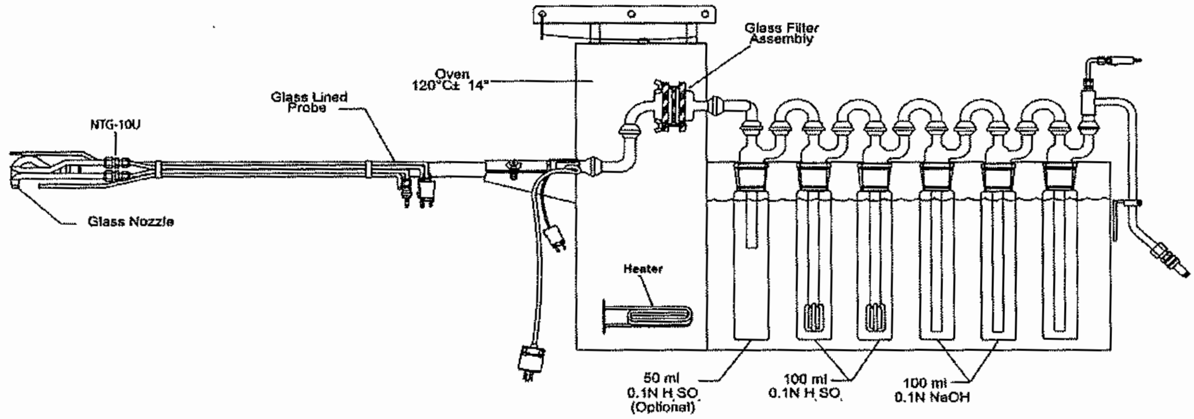
Summa Canister Sampling Train

EPA Method 23



Dioxin Sample Train

EPA Method 26A



HCl & HF Sample Train

APPENDIX H
NST

Bill Johnston

From: Bobby Asfour
Sent: Friday, June 04, 2021 1:40 PM
To: Bill Johnston
Subject: FW: NST-6521 : NST Request-Napa Bubbling Well
Attachments: Contractor ST Supplemental Form.docx

From: Gloria Espena <GEspena@baaqmd.gov>
Sent: Tuesday, May 25, 2021 9:10 AM
To: Bobby Asfour <bobby@best-enviro.com>; Marco Hernandez <MHernandez@baaqmd.gov>
Cc: Bob <box24_draw@qualibee.com>
Subject: NST-6521 : NST Request-Napa Bubbling Well

From: Bobby Asfour <bobby@best-enviro.com>
Sent: Friday, May 21, 2021 11:34 AM
To: Gloria Espena <GEspena@baaqmd.gov>; Marco Hernandez <MHernandez@baaqmd.gov>
Cc: Bob <box24_draw@qualibee.com>
Subject: RE: NST Request-Napa Bubbling Well

Does BAAQMD have any comments or an NST number for this?

Let me know if you have any questions.

Thanks,
Basim Asfour (Bobby)
Best Environmental
339 Stealth Court
Livermore, CA 94551
925/455-9474 x103 ph
510/719-0769 cell
bobby@best-enviro.com
www.best-enviro.com

Please note our new email address

H-2

not a named addressee please delete and otherwise erase it and any attachments from your computer system. Your assistance in correcting this error is appreciated.

NST-6521 has been assigned the pending 5/25-28/2021 work referenced below.

Also, we've introduced a new, supplemental form to be included when reports are submitted. It's just a sheet intended to help us with processing reports and prioritizing report review. The intention of the email is not to request additional testing. Please complete and submit the attached **"Contractor ST Supplemental Form"** with the final test report.

NST number(s) that are assigned for each source test notifications are for inner-office tracking purposes only, not an approval of the test plan. (For source testing methodologies please review permit conditions, BAAQMD Regulations and CFR, accordingly). Future notifications and report submittals should be made to **GEspena@baaqmd.gov** and **cc: MHernandez@baaqmd.gov.**

If you have other questions, please contact Marco Hernandez at mhernandez@baaqmd.gov.

Thank you,

Gloria M. Espena
Meteorology & Measurements
Source Test Section & Performance Evaluation Group
The Bay Area Air Quality Management District
375 Beale Street, Ste. 600 | San Francisco, CA 94105
Ofc (415) 749-4725 | Fax (510) 758-3087
gespena@baaqmd.gov | www.baaqmd.gov

From: Bobby Asfour
Sent: Friday, May 14, 2021 6:33 PM
To: Gloria Espena (GEspena@baaqmd.gov) <GEspena@baaqmd.gov>; Marco Hernandez <MHernandez@baaqmd.gov>
Cc: Bob <box24_draw@qualibee.com>
Subject: NST Request-Napa Bubbling Well

Hi Gloria,

Please accept this Notification/Protocol for performing a source test at the above referenced facility. Let me know if you have any questions.

Site Number:	24712
Plant Name:	Napa Bubbling Well
Plant Contact Name:	Bob McGuire
Plant Contact Phone:	707-226-2380
Testing Company:	Best Environmental
Testing Company Contact Name:	Bobby Asfour
Testing Company Phone:	510-719-0769
Source/Purpose:	Initial Compliance
Description:	Animal Cremation System
Parameters & Methods:	
Flow Rate	EPA Method 1-4 (Concurrent)
Hydrogen Chloride	EPA Method 26A (3 x 60-min Runs)

Hydrogen Fluoride	EPA Method26A (3 x 60-min Runs)
Chlorinated Dibenzodioxins and Furans	EPA Method 0023A (3 x 120-min Runs)
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA Method 0023A (3 x 120-min Runs)
Arsenic	EPA Method 29 (3 x 75-min Runs)
Beryllium	EPA Method 29 (3 x 75-min Runs)
Cadmium	EPA Method 29 (3 x 75-min Runs)
Copper	EPA Method 29 (3 x 75-min Runs)
Lead	EPA Method 29 (3 x 75-min Runs)
Nickel	EPA Method 29 (3 x 75-min Runs)
Selenium	EPA Method 29 (3 x 75-min Runs)
Chromium, hexavalent	EPA Method 306 (3 x 75-min Runs)
Benzene	EPA Method TO-15 (3 x 60-min Runs)
Toluene	EPA Method TO-15 (3 x 60-min Runs)
Acetaldehyde	CARB Method 430 (3 x ~30-min Runs)
Formaldehyde	CARB Method 430 (3 x ~30-min Runs)

1. Minimum Expected Run times are listed above.

Planned Deviations:	N/A
Test Dates:	May 25-28

Let me know if you have any questions.

Thanks,
Basim Asfour (Bobby)
Best Environmental
339 Stealth Court
Livermore, CA 94551
925/455-9474 x103 ph
510/719-0769 cell
bobby@best-enviro.com
www.best-enviro.com

Please note our new email address

Bobby Asfour

From: Bobby Asfour
Sent: Friday, May 14, 2021 6:33 PM
To: Gloria Espena (GEspena@baaqmd.gov); Marco Hernandez
Cc: Bob
Subject: NST Request-Napa Bubbling Well

Hi Gloria,

Please accept this Notification/Protocol for performing a source test at the above referenced facility. Let me know if you have any questions.

Site Number:	24712
Plant Name:	Napa Bubbling Well
Plant Contact Name:	Bob McGuire
Plant Contact Phone:	707-226-2380
Testing Company:	Best Environmental
Testing Company Contact Name:	Bobby Asfour
Testing Company Phone:	510-719-0769
Source/Purpose:	Initial Compliance
Description:	Animal Cremation System
Parameters & Methods:	
Flow Rate	EPA Method 1-4 (Concurrent)
Hydrogen Chloride	EPA Method 26A (3 x 60-min Runs)
Hydrogen Fluoride	EPA Method26A (3 x 60-min Runs)
Chlorinated Dibenzodioxins and Furans	EPA Method 0023A (3 x 120-min Runs)
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA Method 0023A (3 x 120-min Runs)
Arsenic	EPA Method 29 (3 x 75-min Runs)
Beryllium ~9.0	EPA Method 29 (3 x 75-min Runs)
Cadmium 112.41	EPA Method 29 (3 x 75-min Runs)
Copper 63.55	EPA Method 29 (3 x 75-min Runs)
Lead 207.2	EPA Method 29 (3 x 75-min Runs)
Nickel 5871	EPA Method 29 (3 x 75-min Runs)
Selenium 78.96	EPA Method 29 (3 x 75-min Runs)
Chromium, hexavalent	EPA Method 306 (3 x 75-min Runs)
Benzene	EPA Method TO-15 (3 x 60-min Runs)
Toluene	EPA Method TO-15 (3 x 60-min Runs)
Acetaldehyde	CARB Method 430 (3 x ~30-min Runs)
Formaldehyde	CARB Method 430 (3 x ~30-min Runs)

1. Minimum Expected Run times are listed above.

Planned Deviations: N/A
Test Dates: May 25-28

Let me know if you have any questions.

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APPENDIX I
PERMIT

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. **24712**
Application No. **30522**

Bubbling Well Pet Memorial Park, Inc
40 Executive Ct, Napa, CA 94558
is hereby granted an *Authority to Construct* for the following equipment:

S-1 **Animal Cremator, Matthews Model IEB Series 56-4S; total 3.9 MMBTU/hr, 340 lbs/hr, natural gas fired**

Equipment above is subject to attached condition no. 27310.

Issue date: December 1, 2020
Expiration date: December 1, 2022

APPROVED BY Pamela Leong Pamela Leong 2020.12.03 08:50:53 -08'00'

for PAMELA J. LEONG
DIRECTOR OF ENGINEERING

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Youjin Kim, Air Quality Engineer I
Tel: (415) 749-5136 **Fax:** (415) 749-5030
Email: ykim@baaqmd.gov

Plant No. 24712
Source No. S-1
Application No. 30522

The initial operation of this equipment is scheduled for ____________________ (month/day/year)

Print your first and last name ____

Telephone No. ____________________

Equipment Serial No.____

I-2

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. **24712**
Application No. **30522**

Bubbling Well Pet Memorial Park, Inc
40 Executive Ct, Napa, CA 94558
is hereby granted an *Authority to Construct* for the following equipment:

S-2 **Animal Cremator, Matthew, Model IEB Series 50; total 4.4 MMBTU/hr, 450 lbs/hr, natural gas fired**

Equipment above is subject to attached condition no. 27310.

Issue date: December 1, 2020
Expiration date: December 1, 2022

Approved by Pamela Leong
Pamela Leong
2020.12.03
08:51:29 -08'00'

for PAMELA J. LEONG
DIRECTOR OF ENGINEERING

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Youjin Kim, Air Quality Engineer I
Tel: (415) 749-5136 **Fax:** (415) 749-5030
Email: ykim@baaqmd.gov

Plant No. 24712
Source No. S-2
Application No. 30522

The initial operation of this equipment is scheduled for ______________________ (month/day/year)

Print your first and last name ____

Telephone No. ______________________________

Equipment Serial No. ____

I-3

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. **24712**
Application No. **30522**

Bubbling Well Pet Memorial Park, Inc
40 Executive Ct, Napa, CA 94558
is hereby granted an *Authority to Construct* for the following equipment:

S-3 **Animal Cremator, B&L Systems, Model BLP-1000; total 4.5 MMBTU/hr, 250 lbs/hr, natural gas fired**

Equipment above is subject to attached condition no. 27310.

Issue date: December 1, 2020
Expiration date: December 1, 2022

Approved by Pamela Leong Pamela Leong 2020.12.03 08:52:04 -08'00'

for PAMELA J. LEONG
DIRECTOR OF ENGINEERING

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Youjin Kim, Air Quality Engineer I
Tel: (415) 749-5136 **Fax:** (415) 749-5030
Email: ykim@baaqmd.gov

Plant No. 24712
Source No. S-3
Application No. 30522

The initial operation of this equipment is scheduled for ________________ (month/day/year)

Print your first and last name ____________________________

Telephone No. ________________

Equipment Serial No ________________________

I-4

1. The owner/operator shall operate S-1, S-2, and S-3 Cremators in such a way that the total maximum firing rate of each cremator shall not exceed the following limits:
   3.9 MMBtu per hr for S-1 Matthews IEB56-4S cremator
   4.4 MMBtu per hr for S-2 Matthews IEB50 cremator
   4.5 MMBtu per hr for S-3 B&L Systems BLP-1000 cremator
   (basis: Cumulative Increase; Regulation 2, Rule 5)
2. The owner/operator shall ensure that the minimum stack height will be 28 feet for each of the following equipment:

   S-1 Matthews IEB56-4S cremator
   S-2 Matthews IEB50 cremator
   S-3 B&L Systems BLP-1000 cremator
   (basis: Regulation 2, Rule 5)
3. The owner/operator shall not operate each of the following crematory equipment for more than 2,210 hours in any consecutive twelve-month period:

   S-1 Matthews IEB56-4S cremator
   S-2 Matthews IEB50 cremator
   S-3 B&L Systems BLP-1000 cremator
   (basis: Cumulative Increase; Regulation 2, Rule 5)

4. The owner/operator shall not cremate more than the following amount of animal remains in any consecutive twelve-month period:

   340 pounds per hour and 530,400 pounds per year for S-1 Matthews IEB56-4S cremator

   450 pounds per hour and 561,600 pounds per year for S-2 Matthews IEB50 cremator

   250 pounds per hour and 500,000 pounds per year for S-3 B&L Systems BLP-1000 cremator

   (basis: Cumulative Increase; Regulation 2, Rule 5)

5. The owner/operator shall maintain the operating temperature in the secondary chamber of the S-1, S-2 and S-3 Cremators at or above 1650 degrees Fahrenheit during the cremation mode. Any temperature excursion below 1600 degrees Fahrenheit during the cremation mode will be considered a violation of this permit condition. The owner/operator shall equip the cremator with a District approved continuous temperature monitoring and recording device to ensure compliance with this condition. The location of the thermocouple shall be approved by the Source Test Section of the District. Natural gas input

to the secondary chamber burner shall be increased, if necessary, to increase temperature sufficiently to control odor and visible plume. (Basis: Regulation 6-1-301, 6-1-310; TBACT)

6. After the shutdown, the owner/operator shall not cremate until the S-1, S-2, or S-3 Cremator has been preheated so that the temperature in the secondary chamber is at least 1650 degrees Fahrenheit. (Basis: Regulation 6-1-301, 6-1-310; TBACT)

7. The owner/operator shall fire the S-1, S-2, and S-3 Cremators with natural gas only. (basis: Cumulative Increase; TBACT)

8. The owner/operator shall use the S-1, S-2, or S-3 Cremators to cremate animal remains with or without enclosure in associated containers. No other material contaminated with toxic air contaminants as listed by Air Resources Board, including radioactive and biohazardous waste shall be incinerated in this cremator without prior approval of the District. (basis: Cumulative Increase; Regulation 2, Rule 5)

9. The District may require the owner/operator of the cremator to conduct a District approved source test to determine particulate matter, hydrocarbon, NOX, CO, O2, HCl, and toxic emissions under unusual conditions, such as: obese case, disaster bags. The Source Test Section of the District shall be contacted to obtain approval for the source test method. The Source Test Section shall be notified at least 7 days in advance of any expected source test. A copy of source test report for each test shall be provided to the District within 30 days of source test date. (basis: Cumulative Increase; Regulation 2, Rule 5)

10. Not later than 60 days from the startup of S-1, S-2, and S-3, the owner/operator shall conduct District approved source tests to determine initial compliance with the following emission limits.

	(lb/body*)	(lb/MMBtu)
Acetaldehyde	1.30E-04	
Arsenic	3.00E-05	
Beryllium	1.40E-06	
Cadmium	1.10E-05	
Chromium, hexavalent	1.40E-05	
Copper	2.70E-05	
Formaldehyde	3.40E-05	7.35E-05
Hydrogen Chloride	7.20E-02	
Hydrogen Fluoride	6.60E-04	
Lead	6.60E-05	

Nickel	3.80E-05	
Selenium	4.40E-05	
Chlorinated Dibenzodioxins and Furans	1.40E-09	
Polycyclic Aromatic Hydrocarbons (PAHs)	4.90E-08	
Benzene		2.06E-06
Toluene		3.33E-06

*body = 150 lbs

The owner/operator shall submit the source test results to the District staff no later than 60 days after the source test.
(basis: BACT, Cumulative Increase)

11. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols and projected test dates at least 7 days prior to testing. (basis: BACT, Cumulative Increase)

12. The owner/operator shall have the S-1, S-2, and S-3 Cremators equipped with sampling ports and platforms, the location of which shall have the approval of the Source Test Section of the District. (Basis: Regulation 6-1-310)

13. The owner/operator shall have an operator present at all times during cremations. (Basis: Regulation 6-1-301)

14. The owner/operator shall keep the S-1, S-2, and S-3 Cremators in good working condition. The date and detailed description of the type of maintenance done on cremator shall be recorded in a District approved logbook. (basis: Regulation 6-1-301, 6-1-310)

15. To determine compliance with the above conditions, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including but not limited to daily records of the following information:
    a. Operating hours
    b. Weight of animal remains
    c. Processing rate
    (basis: Regulation 1-441, Regulation 6-1-301, 6-1-310.1, Cumulative Increase, TBACT, Regulation 2, Rule 5)

16. The owner/operator shall keep all monitoring, source test, and maintenance records as required per parts 3, 4, 5, 9, 10, 11, 14, and 15 on site for at least two years from the date of data entry, and the records shall be made available to the District staff for inspection. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District regulations. (basis: Cumulative Increase, TBACT; Regulation 6-1-301, 6-1-310)

End of Conditions

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

December 3, 2020

Bubbling Well Pet Memorial Park, Inc
2462 Atlas Peak Rd
Napa, CA 94558

Attention: David Harberts

Authority to Construct for Permit Application No. 30522, Plant No. 24712

Required Action

Your Authority to Construct is enclosed. This Authority to Construct is not a Permit to Operate. **To receive your Permit to Operate you must:**

1. Complete the Start-up Notification portion of the Authority to Construct.
2. Send the Start-up Notification to the assigned Permit Engineer via e-mail, fax or mail **at least seven days** prior to operating your equipment.

Note: Operation of equipment without sending the Start-up Notification to the District may result in enforcement action.

Authorization of Limited Use

The Authority to Construct authorizes operation during the start-up period from the date of initial operation indicated in your Start-up Notification until the Permit to Operate is issued, up to a maximum of 90 days. All conditions (specific or implied) included in this Authority to Construct will be in effect during the start-up period.

Contact Information

If you have any questions, please contact your assigned Permit Engineer:

Youjin Kim, Air Quality Engineer I

Tel: (415) 749-5136 **Fax:** (415) 749-5030 **Email:** ykim@baaqmd.gov

I-9

TABLE 5
Bubbling Wells
PAH Emission Results
IEB 50

TEST#	1	2	3	AVERAGE	PEF	Avg PEF
Test Date	5-25-21	5-25-21	5/27/21			
Run Time	952-1156	1304-1508	0907-1110			
Total Weight, lbs	1,528		2,374			
Bodies per Batch	10.2	10.2	15.8			
Run Time, hrs	2.0	2.0	2.0			
Sample Volume (DSCF)	72.882	70.325	66.153	69.786		
Sample Volume (DSCM)	2.064	1.992	1.873	1.976		
Flow Rate (DSCFM)	1,563	1,616	1,510	1,563		
Isokinetic, %	99.1	92.5	93.1	94.9		
Naphthalene,						
total ng	19600	5980	27600	17727		
(ng/dscm)	9496	3003	14732	9077		
(lbs/hr)	5.56E-05	1.82E-05	8.33E-05	5.24E-05		
(lbs/body)	**1.09E-05**	**3.57E-06**	**1.05E-05**	**8.34E-06**		
ppt, MW = 128	1790	566	2777	1711		
Acenaphthylene,						
total ng	405	40.2	132	192.4		
(ng/dscm)	196	20	70	96		
(lbs/hr)	1.15E-06	1.22E-07	3.98E-07	5.57E-07		
(lbs/body)	**2.26E-07**	**2.40E-08**	**5.04E-08**	**1.00E-07**		
ppt, MW = 152	31.15	3.20	11.19	15.18		
Acenaphthene,						
total ng	122	33.2	86.5	80.57		
(ng/dscm)	59.1	16.7	46.2	40.6		
(lbs/hr)	3.46E-07	1.01E-07	2.61E-07	2.36E-07		
(lbs/body)	**6.80E-08**	**1.98E-08**	**3.30E-08**	**4.03E-08**		
ppt, MW = 154	9.26	2.61	7.23	6.37		
Fluorene,						
total ng	10300	4610	3700	6203		
(ng/dscm)	4990	2315	1975	3093		
(lbs/hr)	2.92E-05	1.40E-05	1.12E-05	1.81E-05		
(lbs/body)	**5.74E-06**	**2.75E-06**	**1.41E-06**	**3.30E-06**		
ppt, MW=166	725.40	336.47	287.09	449.65		
Phenanthrene,						
total ng	18800	9120	28900	18940		
(ng/dscm)	9108	4579	15426	9705		
(lbs/hr)	5.33E-05	2.77E-05	8.72E-05	5.61E-05		
(lbs/body)	**1.05E-05**	**5.44E-06**	**1.10E-05**	**8.98E-06**		
ppt, MW=178	1234.8	620.8	2091.2	1315.6		

TABLE 5 Continued...

(page 2 of 3)

PAH Emission Results

IEB 50

TEST#	1	2	3	AVERAGE	PEF	Avg PEF
Anthracene,						
total ng	1130	132	178	480		
(ng/dscm)	547	66	95	236		
(lbs/hr)	3.21E-06	4.01E-07	5.37E-07	1.38E-06		
(lbs/body)	**6.29E-07**	**7.88E-08**	**6.79E-08**	**2.59E-07**		
ppt, MW=178	74.22	8.98	12.88	32.03		
Fluoranthene,						
total ng	992	632	914	846		
(ng/dscm)	481	317	488	429		
(lbs/hr)	2.81E-06	1.92E-06	2.76E-06	2.50E-06		
(lbs/body)	**5.53E-07**	**3.77E-07**	**3.49E-07**	**4.26E-07**		
ppt, MW=202	57.41	37.907	58.279	51.200		
Pyrene,						
total ng	615	348	1100	688		
(ng/dscm)	298	175	587	353		
(lbs/hr)	1.74E-06	1.06E-06	3.32E-06	2.04E-06		
(lbs/body)	**3.43E-07**	**2.08E-07**	**4.20E-07**	**3.23E-07**		
ppt, MW=202	35.59	20.87	70.14	42.202		
Benzo(a)Anthracene,					0.1	
total ng	47.6	16.9	17.6	27.4		
(ng/dscm)	23.1	8.5	9.4	13.6		
(lbs/hr)	1.35E-07	5.14E-08	5.31E-08	7.99E-08		
(lbs/body)	**2.65E-08**	**1.01E-08**	**6.71E-09**	**1.44E-08**		**1.44E-09**
ppt, MW=228	2.441	0.9	0.994	1.444		
Chrysene					0.01	
total ng	3210	1330	1510	2017		
(ng/dscm)	1555	668	806	1010		
(lbs/hr)	9.11E-06	4.04E-06	4.56E-06	5.90E-06		
(lbs/body)	**1.79E-06**	**7.94E-07**	**5.76E-07**	**1.05E-06**		**1.05E-08**
ppt, MW=228	164.595	70.676	85.302	106.858		
Benzo(b)Fluoranthene,					0.1	
total ng	313.0	25.8	32.3	123.7		
(ng/dscm)	152	13	17	61		
(lbs/hr)	8.88E-07	7.84E-08	9.75E-08	3.55E-07		
(lbs/body)	**1.74E-07**	**1.54E-08**	**1.23E-08**	**6.74E-08**		**6.74E-09**
ppt, MW=252	14.5	1.2	1.7	5.8		
Benzo(k)Fluoranthene,					0.1	
total ng	17.2	<0.18	<0.15	<5.84		
(ng/dscm)	8.3	<0.09	<0.08	<2.83		
(lbs/hr)	4.88E-08	<5.47E-10	<4.53E-10	<1.66E-08		
(lbs/body)	**9.58E-09**	**<1.07E-10**	**<5.72E-11**	**<3.25E-09**		**3.25E-10**
ppt, MW=252	0.8	<0.009	<0.008	<0.271		

TABLE 5 Continued...

(page 3 of 3)

PAH Emission Results

IEB 50

TEST#	1	2	3	AVERAGE	PEF	Avg PEF
Benzo(e)Pyrene,						
total ng	267	18	33	106		
(ng/dscm)	129	9	17	52		
(lbs/hr)	7.58E-07	5.56E-08	9.87E-08	3.04E-07		
(lbs/body)	**1.49E-07**	**1.09E-08**	**1.25E-08**	**5.74E-08**		
ppt, MW=252	12.39	0.88	1.67	4.98		
Benzo(a)Pyrene,					1.0	
total ng	35.8	2.31	3.07	13.7		
(ng/dscm)	17.3	1.2	1.6	6.7		
(lbs/hr)	1.02E-07	7.02E-09	9.27E-09	3.93E-08		
(lbs/ton)	**1.99E-08**	**1.38E-09**	**1.17E-09**	**7.50E-09**		**7.50E-09**
ppt, MW=252	1.7	0.1	0.2	0.6		
Perylene,						
total ng	3.61	<0.27	2.59	2.2		
(ng/dscm)	1.7	<0.14	1.4	1.1		
(lbs/hr)	1.02E-08	<8.21E-10	7.82E-09	6.29E-09		
(lbs/body)	**2.01E-09**	**1.61E-10**	**9.88E-10**	**1.05E-09**		
ppt, MW=252	0.2	<0.013	0.1	0.1		
Indeno(1,2,3-cd)Pyrene,						
total ng	47.50	5.8	4.9	19.4		
(ng/dscm)	23.0	2.9	2.6	9.5		
(lbs/hr)	1.35E-07	1.76E-08	1.49E-08	5.58E-08		
(lbs/body)	**2.65E-08**	**3.46E-09**	**1.88E-09**	**1.06E-08**		
ppt, MW = 276	2.012	0.3	0.2	0.8		
Dibenz(a,h)Anthracene,					1.1	
total ng	57.8	2.7	2.0	20.8		
(ng/dscm)	28.0	1.3	1.1	10.1		
(lbs/hr)	1.64E-07	8.12E-09	5.98E-09	5.94E-08		
(lbs/body)	**3.22E-08**	**1.59E-09**	**7.55E-10**	**1.15E-08**		**1.21E-08**
ppt, MW=278	2.4	0.1	0.1	0.9		
Benzo(ghi)Perylene,						
total ng	57.8	7.4	10.7	25.303		
(ng/dscm)	28.0	3.7	5.7	12.479		
(lbs/hr)	1.64E-07	2.25E-08	3.23E-08	7.29E-08		
(lbs/body)	**3.22E-08**	**4.42E-09**	**4.08E-09**	**1.36E-08**		
ppt, MW = 276	2.448	<0.325	0.499	1.091		

Limit

Total PAHs, lbs/body **2.30E-05**

Total PAHs, lbs/body (PEF) **3.86E-08** **4.90E-08**

Note

Values reported as less than (<) are calculated at one-half the reporting limit

Where,

DSCFM = Dry Standard Cubic Feet per Minute
ng/dscm = nanograms per dry standard cubic meter
ng/sec = Emission rate, nanograms per second
ppt = part per trillion
lbs/hr = pounds per hour
lbs/body = pounds per body
body = 150m lbs

Calculations,

ng/dscm = ng / dscm
ng/sec = 0.02832 * DSCFM * ng/dscm / 60
ppt = ng/dscm * 22.4 * (Tstd. + 460) / 492 / M.W.
Emission Rate, lbs/hr = ppm * MW * DSCFM * 60 / 385E6 (Tstd 68^{o}F)
Emission Factor, lbs/body = (lbs/hr *hrs/batch / body per batch

MVA SCIENTIFIC
CONSULTANTS
Full Service Analytical Microscopy Laboratory

3300 Breckinridge Blvd
Suite 400
Duluth, GA 30096

770.662.8509
FAX 770.662.8532
www.mvainc.com

Report of Results: MVA14267

Particle Size Distribution of Filters

Prepared for:

Montrose Air Quality Services, LLC
2 New Pasture Road, Unit 5
Newburyport, MA 01950

Respectfully Submitted by: EXECUTED BY ELECTRONIC SIGNATURE

Jake Mosely, M.S.
Research Scientist

19 August 2021

Report of Results: MVA14267

Particle Size Distribution of Filters

Introduction

On 5 August 2021 we received three fiber filters with the request that we determine their particle size distributions down to 0.5 micrometer. Upon receipt the samples were assigned the unique MVA Scientific Consultants laboratory identification numbers shown in Table 1. The analyses and data reduction were performed at MVA Scientific Consultants during the period 10 August through 19 August 2021.

Methods

The samples were prepared for analysis in accordance with MVA SOP 310, “Sample Preparation Methods for Total Particle Sizing Using Microscopical Techniques.”

The particle size distribution measurements were performed using a JEOL JSM-6500F field emission scanning electron microscope operating in automated mode under the control of a Thermo Scientific Noran System 7 x-ray analysis system, utilizing MVA SOP 316, “Automated Particle Size Analysis Using the JEOL JSM-6500F FESEM and Thermo Scientific Noran System 7.” The particle size data are presented in terms of particle number and in terms of estimated mass. The assumption has been made that the particles are all of similar density and therefore the particle volume distribution is equivalent to the particle mass distribution.

Results

The size distributions of the filters down to 0.5 micrometer are shown in Tables 1 and 2.

Table 1. MVA14267. Percentages of Particles in Various Average Diameter Ranges by Number of Particles

MVA Sample Number	AG1248	AG1249	AG1250
Client ID	M5-R1	M5-R2	M5-R3
Average Diameter Range (µm)	Number %	Number %	Number %
0.5 - 1	66.5	59.5	60.7
>1 - 2.5	29.5	36.6	30.8
>2.5 - 5	3.6	3.6	7.0
>5 - 7.5	0.4	0.2	1.2
>7.5 - 10	0.1	0.04	0.2
>10	0.05	0.1	0.1
Total Particles	23371	22604	15252

Table 2. MVA14267. Percentages of Particles in Various Average Diameter Ranges by Mass of Particles

MVA Sample Number	AG1248	AG1249	AG1250
Client ID	M5-R1	M5-R2	M5-R3
Average Diameter Range (µm)	Mass %	Mass %	Mass %
0.5 - 1	7.4	6.2	3.7
>1 - 2.5	23.1	27.1	17.6
>2.5 - 5	20.0	16.6	35.8
>5 - 7.5	12.9	6.2	26.0
>7.5 - 10	6.4	3.3	10.4
>10	30.3	40.6	6.6

14267

MONTROSE
AIR QUALITY SERVICES

Sample Chain of Custody

Special Handling:
- Office Location: ____________
- Standard Delivery - 10 Days __X____
- Express Delivery - 3 Days ________
- RUSH Delivery - Next Day ________

* Delivery Based on Sample Receipt at Laboratory.

Client Name: Forget-Me-Not Pet Crematory	Project Number: PROJ-010182	PO No.: To be emailed	Samples Collected By: Mike Bruni
Project Manager: Anthony Stratton	Site ID: Unit EU4	Phone No.: 508-989-8996	
Report Results To: A. Stratton	Plant Location: Northborough, MA	Email: astratton@montrose-env.com	

Special Instructions:

Page__1__of__1_

Matrix Info: A = Air 1 = H2SO4 2 = NaOH 3 = Filter 4 = Acetone 5 = Water 6 = Hexanes X = XAD C = Charcoal * = Other

G = Grab C = Composite Q = Quality Control / Blanks

						Sample Container			Analysis			
Sample ID	**Date**	**Time**	**Volume**	**Type**	**Matrix**	**Glass**	**Plastic**	**Other**	**Method:**	**Method:**	**Method:**	**Notes:**
M5-R1 AG1248	7/21/2021			3			X		SEM			Please provide particle size distribution analysis via SEM
M5-R2 AG1249	7/21/2021			3			X		SEM			
M5-R3 AG1250	7/21/2021			3			X		SEM			

Relinquished By:	Date:	Time	Received By:	Date:	Time:	Sample Condition Upon Receipt:		
	8-3-21		Kathy Jennings	8/5/2021	2:00 pm	☐ Iced	☐ Ambient	☐ °C ______
						☐ Iced	☐ Ambient	☐ °C ______
						☐ Iced	☐ Ambient	☐ °C ______

Montrose Air Quality Services - 2 New Pasture Road, Unit 5 Newburyport, MA 01950 • 978.499.9300 • Fax 978.499.9303 • www.montrose-env.com

Rev. 4/21/2016 ARS

MONTROSE
AIR QUALITY SERVICES

April 5, 2023

Subject: Compliance Testing / MassDEP Test Report
Client/Test Site: Gateway Services, Inc. / Forget-Me-Not Crematorium Test Site
Montrose Document Number NE013AS-022280-RT-1414

Enclosed please find the compliance Test Report for one pet crematory unit/retort (EU5) operating at the Forget-Me-Not Crematorium facility in Northborough, MA. This test report documents the details of the testing that was performed by Montrose Air Quality Services, LLC (Montrose) on behalf of Gateway Services, Inc. (Gateway) for this source. All testing was conducted as planned on February 14, 2023.

The hard copy and/or electronic distribution for this test plan is as follows.

Name	Company/Agency	No. of Hard Copies	Electronic Copy
Michelle (Shelly) Walker	Gateway Services, Inc.	--	**Emailed PDF / 04-05-2023** walkerm@gatewayservicesinc.com
Thomas Hannah General Mailbox	MassDEP CERO 8 New Bond Street Worcester, MA 01606	--	**Emailed PDF / 04-05-2023** Thomas.hannah@mass.gov cero.air@mass.gov

If you have any questions, feel free to call me at (978) 499-9300 x11303 to discuss.

Sincerely,

David A. Caron, QSTI
District & Client Project Manager
Montrose Air Quality Services, LLC

SOURCE TEST REPORT
COMPLIANCE TESTING
FORGET-ME-NOT CREMATORIUM, INC. – EU5
NORTHBOROUGH, MASSACHUSETTS

Prepared For:

Client: Gateway Services, Inc.
Facility / Test Site Address:
Forget-Me-Not Pet Crematorium, Inc.
80 Lyman Street
Northborough, MA 01532

For Submittal To:

MassDEP, Central Regional Office
8 New Bond Street
Worcester, MA 01606

Prepared By:

Montrose Air Quality Services, LLC
2 New Pasture Rd., Unit 5
Newburyport, MA 01950

Document Number: **NE013AS-022280-RT-1414**
Test Date: **February 14, 2023**
Submittal Date: **April 5, 2023**

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature: ______________________ Date: 04/05/23

Name: David Caron Title: District & Client Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: ______________________ Date: 04/05/23

Name: Anthony Stratton Title: Client Project Manager

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1.0 INTRODUCTION

1.1 PROGRAM OVERVIEW AND OBJECTIVES

Montrose Air Quality Services, LLC's (Montrose) was retained by Gateway Services, Inc. to perform compliance emission testing services on their behalf at the Forget-Me-Not Pet Crematorium in Northborough, MA. Testing was conducted to demonstrate the compliance status of:

- Particulate Matter (PM), PM≤10 microns (PM_{10}), PM≤2.5 microns ($PM_{2.5}$), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO) and opacity from the facility's newly installed retort (EU5) while operating on natural gas to satisfy the testing requirements specified under Item 3 of Table 3 in the facility's permit, except as otherwise noted. See "Important Note" in Section 1.2 with respect to PM_{10} and $PM_{2.5}$ emission rate calculations.

Testing was conducted on February 14, 2023 in strict accordance with Montrose Test Protocol NE013AS-022280-PP-509, MassDEP and/or Environmental Protection Agency (EPA) requirements, including the EPA Quality Assurance Handbook and the individual EPA Methods as found in 40 CFR 60, Appendix A, except as noted otherwise, as applicable.

1.2 TECHNICAL APPROACH DISCUSSION

Compliance was demonstrated through the conduct of a three-run test set in accordance with EPA instrumental monitoring test methodologies. Specifically, Montrose conducted three 60-minute test runs while the retort was operated at ≥80% maximum rated production capacity (≥200 lb/hr). Each test run was comprised of the Continuous Emission Monitoring System (CEMS) instrumental monitoring for the determination of Oxygen (O_2), Carbon Dioxide (CO_2), Oxides of Nitrogen (NO_x) and Carbon Monoxide (CO) on a concentration or mass basis in accordance with EPA Methods 3A (O_2 and CO_2), 7E (NO_x) and 10 (CO) 40CFR60, Appendix A. Concurrent with each CEMS test run, Montrose conducted isokinetic front/back half Particulate Matter (PM)/Condensable Particulate Matter (CPM) sampling in accordance with test Methods 5 and 202, respectively, while additionally conducting concurrent opacity readings in accordance with EPA Method 9. A summary of the run configuration and test parameters are presented in Table 1-1, while a compliance summary in units of applicable standard is presented in Table 1-2.

TABLE 1-1
SUMMARY OF TEST PROGRAM – EU5

Test Date	Unit ID/ Test Location	Test Parameters	EPA Test Methods	No. of Runs	Duration (Minutes)
02/14/2023	EU5	PM/CPM	1-5/202[1]	3	60
		O_2 and CO_2	3A	3	60
		NO_x	7E	3	60
		CO	10	3	60
		Opacity	9	3	60

[1] – $PM_{2.5}$ and PM_{10} emission rates have been estimated based upon the particle sizing results documented in Appendix E and discussed under the “Important Note” in this section.

TABLE 1-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS – EU5
February 14, 2023

Pollutant	Test Method	Applicable Standard	MassDEP	
			Test Result	Limit
PM	5	g/dscf@7%O_2	0.028	0.05
CPM	202	NA	0.003	NA
PM_{10}[1]	by calculation	g/dscf@7%O_2	0.02	0.04
$PM_{2.5}$[2]	by calculation	g/dscf@7%O_2	0.01	0.02
CO	10	ppmvd@7%O_2	16.8	50
NO_x	7E	ppmvd@7%O_2	133.4	100
Opacity	9	%	0.0	See footnote [2]

[1] – See “Important Note” below.

[2] – Opacity Limit is <5%, except >5% to ≤20% for ≤2 consecutive minutes during any one hour.

Important Note: Per prior discussions with MassDEP, neither PM_{10} or $PM_{2.5}$ is directly determinable for this source due to the stack being less than minimum stack diameter of 26.5” as identified in Method 201A, in combination with the logistics of the test location (requires the use of an articulating lift) which will not allow for the simultaneous measurement of flow in accordance with Method 1A (combined with a modified sampling configuration). As such, per MassDEP request; the results for total PM, have been speciated to PM_{10} and $PM_{2.5}$ using the percentages included in the application that were obtained from preliminary testing performed on one of the existing units during the initial phases of this overall project. Per Table 2 of the report in Appendix E of this document, the $PM_{2.5}$ and PM_{10} represented 28.37 and 74.17 percent of total PM on a mass basis.

1.3 KEY PERSONNEL

A list of key project participants is presented below:

Facility/Client Information

Source Location: Forget-Me-Not Crematorium, Inc.
80 Lyman Street
Northborough, MA 01532
Client Contact: Mr. Michelle (Shelly) Walker
Client Telephone: (702) 241-1041
Client Email: walkerm@gatewayservicesinc.com

Agency Information

Regulatory Agency: MassDEP, CERO
Agency Contact: Mr. Thomas Hannah
Telephone: (508) 767-2845
Email: thomas.hannah@mass.gov

Testing Company Information

Testing Firm: Montrose Air Quality Services, LLC (Montrose)
Contact: Mr. David Caron, QSTI
Title: Client Project Manager
Telephone: (978) 302-6128 x11303
Email: dcaron@montrose-env.com

Test personnel and observers are summarized in Table 1-3.

TABLE 1-3
TEST PERSONNEL AND OBSERVERS[1]

Name	Affiliation	Role/Responsibility
David Caron	Montrose	Project Manager/Field Team Leader/ VE Reader / Qualified Individual (QI)/Reporting
Anthony Stratton	Montrose	CEMS Operation and Sample Train Recovery / Report QA
Hunter Stetz	Montrose	Job Preparation and Onsite Technician
Connor Melican	Montrose	Job Preparation and Onsite Technician
Thomas Hannah	MassDEP	Onsite Observer

1.4 REPORT ORGANIZATION

The remainder of this Final Report is divided into four additional sections. Section 2 presents source and sampling point descriptions. A description of the flue gas monitoring procedures is provided in Section 3, Section 4 presents individual run summaries, while Section 5 addresses the quality assurance/quality control aspects of the program. A copy of all emission PM/CPM calculations, CEMS emission calculations, visual emission data and facility data is presented in Indices 1-4 of Appendix A, respectively. Additionally, PM/CPM laboratory analyses are presented in Appendix B, while all quality assurance/quality control documentation are presented in Appendix C. Lastly, copies of the MassDEP Conditional Approval letter and the 2021 particle sizing report that is being used as a means of estimating particle size loading in the current program are presented in Appendices D and E, respectively.

2.0 SOURCE AND SAMPLING LOCATION DESCRIPTIONS

2.1 FACILITY AND SOURCE DESCRIPTION

For facility and source descriptions, please reference Sections 1 and 2, respectively of the facility's Final Air Quality Plan Approval presented in Appendix D of this test report.

2.2 FLUE GAS SAMPLING LOCATION – EU5

All compliance emission sampling was conducted in a round vertical section of the 20.4" diameter exhaust stack. The test location was equipped with two 4.0" diameter sampling ports installed at 90° to each other on the same horizontal plane. The test location was 10.0 (204") equivalent diameters downstream and 4.0 (81") equivalent diameters upstream from the closest bend or expected pollution concentration change.

In addition, acceptable cyclonic flow conditions were confirmed as part of the test in accordance with EPA Method 1, Section 11.4. Lastly, a CEMS stratification was performed as part of the test program in accordance with EPA Section 8.1 of EPA Method 7E. CEMS sampling points were chosen based on these results ensuring that all emission results were representative throughout the duration of the test program. Figure 2-1 below summarizes the Method 1 upstream and downstream distances, as well as providing a more detailed schematic of the test location

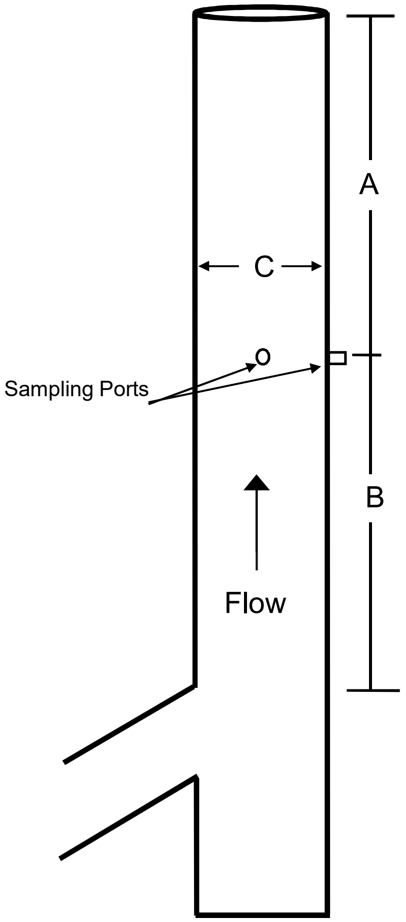
2.3 OPERATING CONDITIONS AND PROCESS DATA

During each test run, the facility recorded electronically and/or manually the required test parameters at regular intervals to accurately document operating conditions throughout the test program. Included were:

- Material processed (lbs)
- Primary and secondary chamber temperatures (F)

A full presentation of facility data is presented in Appendix A4 of this report.

FIGURE 2-1
SAMPLING LOCATION AND TRAVERSE POINTS – EU5



Stack Configuration		
Description	**Distance**	**Equivalent Diameters**
Upstream (A)	81”	4.0
Downstream (B)	204”	10.0
Diameter (C)	20.4”	NA
Number of Ports	2	NA
Flow Traverse Points (per diameter)		
Traverse Points	**% of diameter**	**Distance (inches)**
1	4.4	0.9
2	14.6	3.0
3	29.6	6.1
4	70.4	14.4
5	85.4	17.5
6	95.6	19.6
CEMS Stratification Points		
Traverse Points	**% of diameter**	**Distance (inches)**
1	16.7	3.4
2	50.0	10.2
3	83.3	17.0

[1] - Final CEMS traverse points were based upon the results of the stratification test.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 OVERVIEW

This stack testing program consisted of conducting a set of three 60-minute test runs while the unit was operating at ≥80% of normal operating capacity. Each test run was comprised of CEMS monitoring for O_2, CO_2, CO and NO_x in conjunction with concurrent PM, CPM and opacity determinations. This section provides greater detail to the CEMS, isokinetic sampling and opacity procedures/components that comprised this test program.

3.2 TOTAL PARTICULATE MATTER – METHODS 5 AND 202

Particulate matter and condensable particulate matter were measured using a single sampling train that met the specifications of EPA Methods 1 through 5 and EPA Method 202 (dry impinger method). This included the determination of the proper number of sampling points and their locations in the stack (RM1), stack velocity and volumetric flow rate (RM2), stack gas molecular weight (RM3A) and stack gas moisture content (RM4). The sampling train was an EPA Method 5 train (PM), modified to include the specific requirements of Method 202 (CPM). During each test run, sampling was conducted isokinetically at the traverse points identified in Figure 2-1. A total of 12 traverse points were sampled during each Method 5/202 run. Run lengths were selected in order to ensure sufficient sample collection to meet method objectives.

The Method 5 sampling train components included an air-cooled probe, quartz nozzle, inconel union with graphite ferrules, quartz probe liner, cyclone bypass, tared glass fiber filter, glass fiber filter holder with Teflon support, and a double 90° glass connector equipped with a thermocouple.

The Method 202 sampling train components included a water-jacketed coil condenser, a dry high-volume hybrid impinger, a dry modified Greenburg-Smith impinger, an untared Teflon filter in a glass filter holder with a Teflon support and a back-half thermocouple, a modified Greenburg-Smith impinger containing 100 ml of DI water, and a Greenburg-Smith impinger containing approximately 200 grams of silica gel.

Prior to mobilization, all glassware was cleaned with soapy water, rinsed with tap water, DI H_2O, acetone and finally hexane. Once onsite, but prior to the initiation of sampling, a field train proof blank was collected as described in Section 8.4.5.11 and 8.4.5.12 of Method 202. This consisted of rinsing all glassware components twice from the PM filter holder back half through the CPM dry filter holder front half with DI H_2O into one container, and then again with acetone (once) and hexane (twice) into another container.

Prior to the initiation of testing an initial traverse was conducted in order to choose a nozzle size from which an isokinetic correlation was established. The sampling train was carefully assembled and successfully leak checked to achieve a leak rate of less than 0.02 cfm. After the probe and filter box reached the desired operating temperature of 248°F (±25°F) and the process operation was verified to be ready, the probe was placed in the stack, and isokinetic sampling was initiated.

During sampling, the Method 5 filter outlet temperature, which was measured using the thermocouple located at the filter holder outlet, was maintained at approximately 248°F. The Method 202 dry filter temperature was maintained between 65°F and 85°F (ideally as closely as possible to 85°F as possible) by adjusting the amount and temperature of the water that was circulated through the coil condenser as well as the speed of the blower that was used to cool the probe. The silica gel outlet temperature was kept below 68°F.

Following each test run, the sampling train was leak checked at the highest vacuum observed during the test run. The sampling train components were disassembled, sealed with Teflon tape, and brought to our field lab. Once disassembled, the Method 5 filter was placed in a petri dish and labeled, and the nozzle, probe and front half filter holder (Method 5 filter) were thoroughly brushed and rinsed with acetone into a container and labeled for identification.

The volume of the condensate in the first two impingers was determined. The condensate from both impingers was then poured into impinger 2 and subsequently purged along with CPM filter for one hour at a rate of greater than 14 liters per minute. The remaining third and fourth impingers were measured for moisture gain and discarded.

Following the purge, the contents of impinger 2 was poured into a sample recovery bottle (Method 202 Container A). The Teflon dry filter was removed and placed in a labeled container (Method 202 Container C). The coil condenser, impingers 1 and 2 and the front half of the dry filter holder were rinsed twice with DI water into Container A. Lastly, these components were rinsed once with acetone and twice with hexane into a separate container (Method 202 Container B).

Following recovery of the first test run, this same sampling train was fully loaded, measured, re-loaded, purged, and recovered in the identical manner of a normal test run. This sample was then identified as a field train recovery blank for EPA Method 202. The resulting CPM value reported by the laboratory for this train was used for blank correcting the CPM values (Per Section 9.10 of the method the maximum correction of 2.0mg).

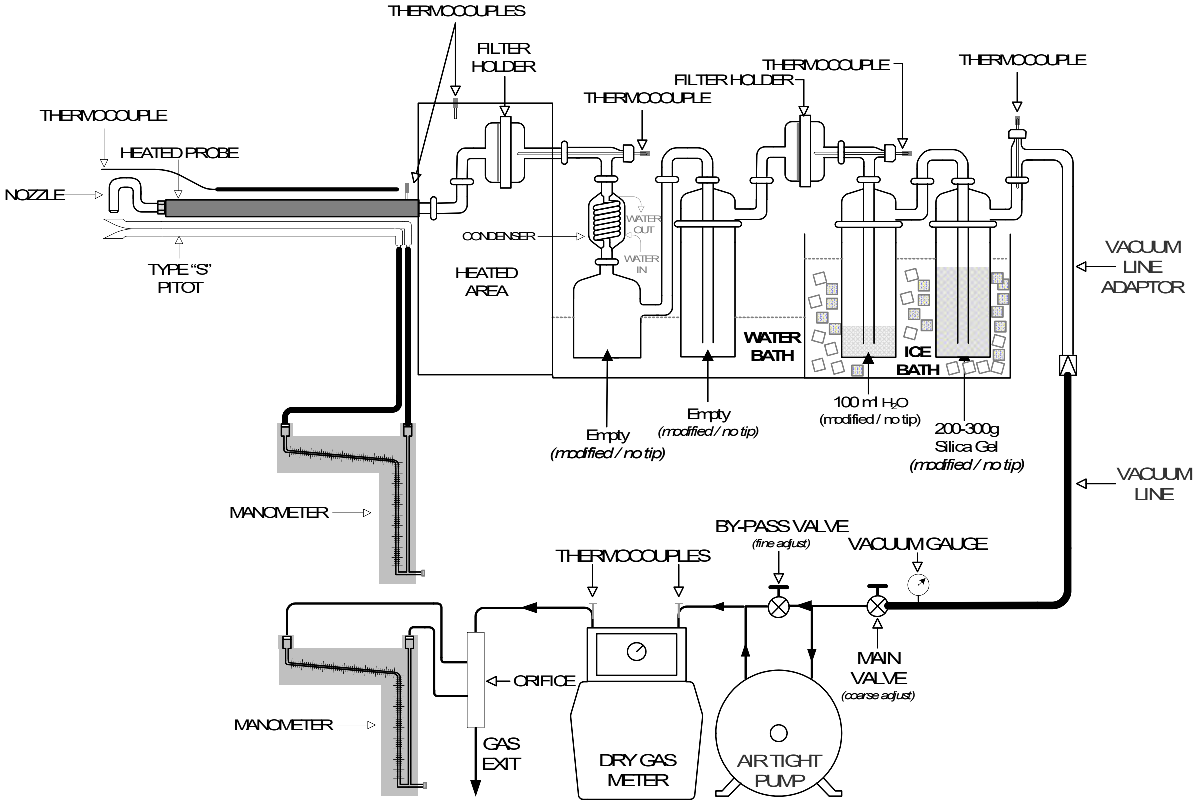
All PM and CPM samples were shipped under COC to Enthalpy Analytical in North Carolina for analysis.

PM and CPM Blank Correction Guidance:

- **Filterable/front half PM** - Per Method 5, the maximum blank correction for acetone was 0.001% by weight.
- **Condensable PM** - Per Method 202, a blank correction based upon the results of the field train blank recovery train may be made up to a maximum correction of 2.0mg.

Figure 3-1 below presents a schematic of the PM/CPM sampling train described above.

FIGURE 3-1
US EPA METHOD 5/202 SAMPLING TRAIN



3.2.1 Description of Isokinetic Sampling Equipment and Test Procedures

The following subsections describe the isokinetic sampling equipment, as well as a description of its use.

3.2.2 Sampling Equipment

The design specifications of the isokinetic sampling train met all the requirements of EPA's Reference Method 5 as found in the Federal Regulations under Section 40 CFR 60 Appendix A, as amended. The following is a description of the individual pieces of equipment that comprised the sampling train.

- **Nozzle** - The nozzle was constructed of quartz glass and was calibrated prior to testing.
- **Probe** – An air-cooled probe was equipped with a quartz glass liner of sufficient length to reach all of the required traverse points.
- **Heating System** - The probe and filter temperatures were maintained at 248° + 25°F throughout testing. These temperatures were monitored by use of a thermocouple (located on the back half of the filter and probe sheath) and temperature readout.

- **Front Half Filter (Method 5)** – Tared Glass Fiber filter.
- **Back Half Filter (Method 202)** – Untared 47mm Teflon.
- **Condenser (Method 5/202) –** A Method 23 type condenser followed by a water dropout impinger and three modified Greenburg-Smith impingers. Impingers 1 and 2 were initially empty, impinger 3 was initially loaded with 100ml of water and the fourth impinger contained 200-300g of silica gel.
- **Pitot Tube** - A S-type pitot tube was used to measure all gas velocities at the traverse points identified in Figure 2-1. The pitot tubes met all of the dimensional criteria set forth in Method 2, and therefore a coefficient of 0.84 was used.
- **Pitot Lines -** The pitot tube was connected to a manometer via leak free Tygon and/or teflon tubing.
- **Manometer -** An inclined manometer capable of measuring up to ten inches of water column pressure drop was used.
- **Thermocouple -** A "K" type thermocouple was used to monitor the stack temperature at each traverse point.
- **Umbilical** - An umbilical consisting of a gas sample line, tygon pitot lines, K-type thermocouple wire, and electrical cords were used to connect the sampling train to the metering console,
- **Metering Console** - A vacuum gauge, inclined manometer, leak-free pump, calibrated thermocouples, and a calibrated dry gas meter are the basic components used to meter the dry sample gas through the system.
- **Gas Molecular Weight Determination** – The O_2 and CO_2 content of the sample gas were measured in accordance with EPA Method 3A.

3.2.3 Sampling Procedures

All sampling procedures were conducted in strict accordance with the Methods prescribed in the Code of Federal Regulations as found in 40CFR60 as amended, where available. The following is the sequence of events that occurred prior to and during the actual tests.

1. **Traverse Points** - The traverse points were calculated and marked in accordance with Method 1 or Performance Specification, as applicable.
2. **Preliminary Traverse** - A preliminary traverse was conducted. Readings included the pressure drops and gas temperatures (used for selecting proper nozzle size).
3. **Cyclonic Flow** – For the test location, a cyclonic flow check was conducted in accordance with Section 11.4 of EPA Method 1. In summary, at each traverse (See Figure 2-1) point the probe was rotated perpendicular to the cross-sectional area of the stack (This is zero degrees). The probe was then rotated (if necessary) until a null pitot reading was obtained. The angle for each point was then recorded and then the absolute value of each angle was used to calculate an overall average cyclonic flow angle for the source. For the test location to be deemed acceptable, this average angle is required to be no more than 20 degrees.
4. **Static Pressure –** Static pressure was determined utilizing a S-type pitot tube. The probe was rotated until a null reading was observed and then the negative or positive side was

opened in order to ascertain the static pressure of the stack. If removing the negative pitot resulted in a positive deflection, then the static pressure was recorded as a positive. Conversely, if the positive pitot was removed in order to ascertain a positive deflection then the static pressure was recorded as a negative.

5. **Barometric Pressure -** The barometric pressure was determining using National Weather Service from Boston, MA (KBOS), adjusted for port elevation.
6. **Nomograph** - Once the above information was obtained, the nomograph (or computer program) for the actual test was setup to correlate the isokinetic relationships.
7. **Sampling Train Set-Up:**

    (a) The filter was placed in the filter holder and visually checked.
    (b) The impingers were loaded in accordance with the method. Volumes were recorded on the field data sheets.
    (c) Approximately 200 grams of silica gel was placed in the final impinger. Exact weights were logged on the field data sheets.
    (d) Crushed ice was placed around the impingers (on the dry side of the impinger bucket).
    (e) Once the entire train was assembled, the probe and hot box heaters were turned on.

8. **Pre-Test Leak Check – Metering System** - Once the heater box reached the desired temperature for testing, the system was leak checked at fifteen inches of vacuum (15"Hg). The meter was observed for movement over a 60-second period. A leak rate of less than 0.02 CFM was achieved prior to the start of sampling.
9. **Pre-Test Leak Check – Pitot System -** All pre and post-test pitot leak-checks were conducted as follows: (1) blow through the pitot impact opening until at least 7.6 cm (3.0 in.) H_20 velocity head registered on the manometer; then, close off the impact opening. The pressure was required to remain stable for at least 15 seconds to be considered valid; (2) the same was then done for the static pressure side, except using suction to obtain the minimum of 7.6 cm (3.0 in.) H_20.
10. **Final Check** – When sampling was ready to commence, plant operations were checked to confirm that the facility was operating at the desired capacity.
11. **Sampling** – Sampling occurred isokinetically at an approximate rate of 0.75 dcfm. At least once during each traverse point (but at no more than 5-minute intervals), the dry gas meter volume, system vacuum, dry gas meter temperatures (in and out), stack temperature, and filter outlet / probe temperatures were recorded for the duration of each test run.
12. **Post-Test Leak Check** – At the completion of each test run, the metering system was leak checked at the highest vacuum recorded during that run for a 60-second period. The actual leak rate was then recorded on the field data sheet. All leak checks less than 0.02 CFM were considered acceptable. The pitot tube was also leak checked as described above.
13. **Sample Recovery** - All samples were recovered according to the respective Reference Method procedures. Additional recovery procedures may be found in Section 5 of this report.
14. **Isokinetic Rate** - Once all sample recovery was completed (including moisture determination), calculations were conducted to determine the percent isokinetic sampling rate of the test run.

3.2.4 Moisture Determination

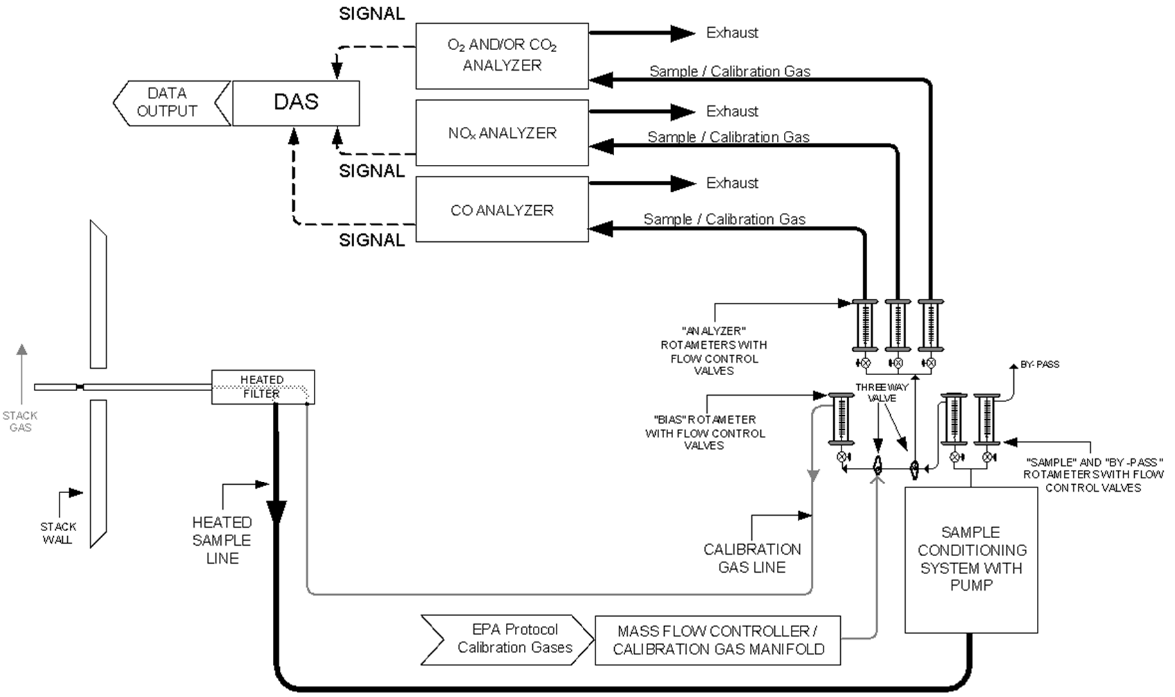
A moisture determination for each test run was made in accordance with Method 4 (modified for Method 5/202). A synopsis of the procedure is presented below.

1. **Sample Train Preparation** – Sample train preparation consisted of the following:
    - Place 100ml of DiH_20 in impinger 3.
    - Place approximately 200 grams of silica gel in the fourth impinger.
    - Record Initial weights on the field data for each impinger.
    - Assemble entire sampling train.
2. **Pre-Test Leak Check** - The system was leak checked at fifteen inches of vacuum (15"Hg). A leak rate of less than 0.02 CFM was achieved prior to the start of sampling.
3. **Sampling** – A sample was collected at a rate determined by the isokinetic relationship (approximately 0.75cfm) while recording sample gas volume, stack temperature, filter temperatures, system vacuum and dry gas meter temperatures (in and out) at each sample point.
4. **Post-Test Leak Check** - Upon completion of each test run, the system was leak checked at or above the highest vacuum recorded during that run. All leak checks were required to meet the criteria of less than or equal to 0.02 CFM to be considered valid.
5. **Sample Recovery** - The impingers were recovered gravimetrically for determination of net condensate gain.

3.3 CEMS TEST PROCEDURES

Figure 3-2 below presents a schematic of the Montrose's CEMS system configuration during this test program, while the remainder of this section outlines all procedures associated with the CEMS portion of the compliance test program.

FIGURE 3-2
US EPA METHOD 3A, 7E, AND 10 SAMPLING TRAIN



3.3.1 O_2, CO_2, NO_x and CO Sampling and Calibration Procedures

The reference method O_2, CO_2, NO_x and CO CEMS analyzers were calibrated through both a direct and system calibration procedure to ensure the validity of all data collected. First, each instrument was calibrated directly (not through the system) with zero and two upscale points, as follows:

1. Deliver zero gas to respective analyzers until stable response is obtained, then adjust each analyzer's zero potentiometer or equivalent to read as close to zero as possible.

2. Deliver span (highest value) gas to respective analyzers until stable response is obtained, then adjust each instrument's span potentiometer or equivalent to read as close to the cylinder value as possible.

3. Deliver mid-level gas to respective analyzers until stable response is obtained, then calculate if the observed value meets 2% linearity criteria specified by the method. If the calibration meets the linearity criteria, then proceed to system calibration procedures. Otherwise, take corrective action and repeat direct calibration procedures for analyzers not meeting the linearity criteria.

Following a successful direct calibration of the instruments a system calibration was conducted, as follows:

4. Deliver zero gas through the entire sampling system, record the respective analyzer responses and calculate the respective analyzer calibration biases.

5. Deliver a representative upscale calibration gas through the entire system, record the respective analyzer responses and calculate the respective analyzer calibration biases.

If initial bias criteria were satisfactorily met, a sampling run was initiated following a sufficient purge of the sampling line with stack gas (a minimum of twice the system response time). Following each sampling run a subsequent system calibration was conducted as follows:

6. Deliver zero gas through the entire sampling system, record the respective analyzer response and calculate the respective analyzer calibration drift and biases.

7. Deliver a representative upscale (same gas cylinder as step 5) calibration gas through the entire system, record the respective analyzer responses and calculate the respective analyzer calibration drift and biases.

If all linearity, calibration drift, and calibration bias criteria were met then the collected data was considered valid. Each test run was required to be bracketed by system calibrations. If calibration criteria were not met, the data collected would not be considered valid, corrective action would have been taken and all calibration steps would have been repeated.

3.3.2 CEMS Sampling System Description

The following is a description of the transportable continuous emissions monitoring system that was used to quantify each of the diluents/pollutants that comprised this test program.

3.3.2.1 Pollutant/Diluent Monitoring

In general, the sample was extracted, analyzed, and recorded in accordance with the applicable instrumental analyzer procedures. All calibrations were conducted utilizing EPA Protocol G1 gases. The results of calibrations were used to determine the acceptability of the test data. Each analyzer used during this test program are detailed below.

Oxygen - Oxygen was monitored in accordance with and EPA Method 3A, 40CFR60, Appendix A. Montrose complied with instrumental analyzer procedure 3A utilizing a California Analytical Instruments (CAI) Model 600 paramagnetic oxygen analyzer (or equivalent) operated on a 0-25% range.

Carbon Dioxide - Carbon dioxide was monitored in accordance with EPA Method 3A, 40 CFR 60, Appendix A. Montrose complied with instrumental analyzer procedure 3A utilizing a CAI Model 600 non-dispersive infrared (NDIR) carbon dioxide analyzer (or equivalent) operated on a 0-20% range.

Carbon Monoxide – Carbon Monoxide was monitored in accordance with EPA Method 10, 40CFR60, Appendix A. Montrose complied with instrumental analyzer procedure 10 utilizing a Model 48i CO monitor operated on a 0-200 range.

Oxides of Nitrogen – Oxides of Nitrogen was monitored in accordance with EPA Method 7E, 40CFR60, Appendix A. Montrose complied with instrumental analyzer procedure 7E utilizing a Model 42iHL chemiluminescent NO_x monitor operated a 0-200 ppm range.

3.3.2.2 Sample Delivery and Conditioning System

- **Sample Probe** - A stainless-steel probe of sufficient length to sample at the traverse points specified in Figure 2-1.
- **Filter** - A spun glass fiber filter contained in a heated sheath. The filter was located between the sample probe and sample line, it is designed to remove particulate from the gas stream.
- **Sample Line** - 3/8” Teflon tubing in a heated sample line designed to transport the sample gas from the probe to the sample conditioning system (in the CEMS trailer).
- **Condenser** – A thermo-electrically designed chiller was used to reduce the sample dew point to four degrees Celsius. The chiller is located just prior to the main sample pump.
- **Sample Pump** - A diaphragm type vacuum pump to draw gas from the probe through the conditioning system and to the analyzers. The pump head is stainless steel, the valve disks are Viton and the diaphragm are Teflon coated.
- **Sample Distribution System** - A series of flow meters, valves and backpressure regulators allows the operator to maintain constant flow and pressure conditions during sampling and calibration.

3.3.2.3 Calibration System

- **Calibration Gases** – EPA Protocol Gases certified in accordance with EPA Protocol G1 procedures.
- **Calibration System** - A series of manual valves designed to deliver a specified gas either directly to an analyzer or through the entire sampling system by activating the appropriate valve sequence.
- **Calibration Line** – Teflon line (1/4”) run in parallel to the sample line.
- **Calibration Tee** - Stainless steel tee (3/8”) located between the probe and the filter that allows the operator to inject calibration gas through the entire sampling system. Excess calibration gas exits the probe eliminating any potential over pressurization.

3.3.2.4 Data Acquisition System

- **Software** – Iotech data acquisition system (DAQ 56). This system is programmed to collect data once per every two seconds, while reporting 1-minute averages. This software operates in a Windows environment.

3.4 Visual Emissions – EPA Method 9

Visual Emission (VE)/opacity testing consisted of conducting three 60-minute test runs, for the determination of opacity emissions in accordance with EPA Method 9 test procedures. As such, each 60-minute test run was comprised of 240 consecutive readings collected at 15 second intervals. At the conclusion of each test run, ten 6-minute block averages were calculated by averaging each consecutive set of 24 readings (no overlapping data points). Each resulting value was subsequently compared to the facility’s operating permit to determine the compliance status of the unit with respect to opacity emissions.

The following subsections present the procedures that were adhered to in order to ensure the accuracy of the opacity readings

3.4.1 Position

The qualified observer shall stand at a distance sufficient to provide a clear view of the emissions with the sun oriented in the 140° sector to his back. Consistent with maintaining the above requirement, the observer shall, as much as possible, make their observations from a position such that the line of vision is approximately perpendicular to the plume's direction.

3.4.2 Field Records

The observer shall record the name of the plant, emission location, facility type, observer's name and affiliation, and the date on the field data sheet. The time, estimated wind speed, description of the sky conditions and plume background are recorded on the field data sheet at the time opacity readings are initiated and completed.

3.4.3 Observations

Opacity observations shall be made at the point of greatest opacity in that portion of the plume where condensed water vapor is not present. Observations were recorded to the nearest 5% at 15-second intervals throughout each test run.

3.4.4 Qualifications

All readings were conducted by an observer with a valid Visual Emission Evaluator (VEE) certification. A copy of their VEE certification is presented in Appendix C3 of this report.

4.0 TEST DISCUSSIONS AND RESULTS

4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

No field deviations or exceptions from the test plan or test methods occurred during this test program.

4.2 PRESENTATION OF RESULTS – COMPLIANCE / FULL LOAD

The average/compliance results were previously compared to the applicable permit limits in Table 1-2 are based upon the respective three run averages presented in Table 4-1. All emissions have been reported in units of applicable standard. All supporting emission calculations and field data sheets are presented in Appendix A, while the PM/CPM laboratory analyses and associated quality assurance documentation in Appendices B and C, respectively.

TABLE 4-1
INDIVIDUAL RUN EMISSIONS RESULTS – EU5

Parameter	Units	R1	R2	R3	Average
Test Date	MM/DD/YY	2/14/23	2/14/23	2/14/23	
Start Time	HH:MM	10:50	13:35	15:40	
End Time	HH:MM	12:07	14:56	16:50	
PM	gr/dscf@7%O_2	0.0334	0.0200	0.0292	**0.0275**
CPM	gr/dscf@7%O_2	0.0031	0.0025	0.0046	**0.0034**
CO	ppmvd@7%O_2	32.8	9.4	8.2	**16.8**
NO_x	ppmvd@7%O_2	165.5	127.1	107.5	**133.4**
Opacity	%	0.0	0.0	0.0	**0.0**
- Additional Sampling Parameters -					
Stack Flow	dscfh	50,344	48,815	47,667	48,942
Stack Temp	F	1190.2	1112.0	1106.2	1136.1
Stack Moist.	%	7.2	7.9	8.8	8.0
Stack Velocity	ft/sec	20.9	19.5	19.1	19.8
Stack O_2	%	13.53	14.30	14.63	14.15
Stack CO_2	%	5.24	4.18	3.91	4.44
Isokinetic Rate	%	90.75	98.39	91.95	93.70
- Facility Data -					
Parameter	**Units**	**R1**	**R2**	**R3**	**Average**
Loading	Actual, lbs	232.7	244.1	223.0	233.3
	Max. Rating, lbs	250	250	250	NA
	% of Max.	93.1	97.6	89.2	93.3

5.0 QUALITY ASSURANCE AND REPORTING

5.1 SAMPLING AND ANALYTICAL QA/QC

Montrose Air Quality Services (MAQS), its management, and employees are committed to consistently providing the highest quality services to our clients that is delivered with honesty and integrity. These services result in data that are accurate, precise, timely, and legally defensible in support of our clients' environmental compliance, engineering evaluation, and other needs. A corporate culture of quality and continuous improvement is maintained as a positive and desirable aspect of business operations.

All calculations were conducted in strict accordance with the equations found in the individual Methods. Strict QA/QC protocols were followed during all phases of this project. These protocols included:

- QA objectives for measurement data;
- Data reduction;
- Internal QC;
- Calibration of equipment;
- Corrective action, if necessary; and
- Use of standardized field data sheets.

These specific procedures in addition to Montrose's usual high standard of quality control aid to validate the results obtained during this test program. As the majority of our emissions testing work are done for compliance purposes, strict QC procedures are incorporated into our everyday work performance.

The remainder of this section summarizes the standard QA aspects of our test programs and may contain components that are not applicable to this test program.

5.2 EQUIPMENT MAINTENANCE AND CALIBRATION

Our Quality Assurance Program is in place to ensure consistent standards for our equipment maintenance, calibration schedule, quality control acceptance limits, and any necessary corrective action. Below are specific examples of our control system.

5.2.1 Equipment Inspection and Maintenance

- Each critical piece of field equipment is assigned a unique identification number to allow tracking of its calibration history.
- All field equipment is visually inspected prior to testing and includes pre-test calibration checks.
- Glassware is visually inspected prior to testing.
- Preliminary stack flow and temperature measurements were taken to assure correct isokinetic sampling.
- Reagents are made fresh daily, when required. A new reagent blank is retained for every new stock of reagent.

5.2.2 Equipment Calibrations

Montrose's meter boxes, pitot tubes, thermocouples and barometers are maintained in accordance with specifications set forth in EPA "Quality Assurance Handbook for Air Pollution Measurement Systems - Volume III Stationary Source Specific Methods" Section 3.3.5 dated January 15, 1980 and with manufactures suggested procedures. A summary is presented below:

- **Dry Gas Meter and Orifice Meter/EPA Method 5** - All dry gas meters are calibrated using calibrated critical orifices, according to 40 CFR 60, Appendix A, Method 5, Section 16.2. The orifice meters in the meter control boxes are calibrated against the calibrated critical orifices and checked against the dry gas meters to which they are attached.
- **Balance** - All analytical balances used for weighing impingers are calibrated in the field against ANSI Class 3 weights.
- **Thermocouples –** All type K thermocouples are calibrated against an NIST-traceable digital thermometer at either two or three points, depending on the application of the thermocouple.
- **S-type or Standard Pitot Tubes** - All standard and Type "S" stainless steel pitot tubes are designed to meet the dimensional criteria set forth in Method 2, therefore a coefficient of 0.99 (standard) or 0.84 (Type "S") was used.

5.3 AUDIT SAMPLES

When required by the test method, Montrose obtains EPA TNI SSAS audit samples from an accredited provider for analysis along with the samples. The audit samples are stored, shipped, and analyzed along with the emissions samples collected during the test program. The audit sample analysis results are reported along with the emissions results for the samples collected during the test program.

5.4 DATA ANALYSIS, VALIDATION, AND UNCERTAINTY

Montrose converts the raw field data and laboratory analysis data to reporting units consistent with the permit or subpart. Calculations are made using proprietary computer spreadsheets or data acquisition systems. Data entry are double-checked, and example calculations are performed to spot-check the calculations for accuracy.

Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting test program results. Whenever possible, Montrose personnel reduce the impact of these uncertainty factors through the use of approved and validated test methods. In addition, Montrose personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of our Quality Manual and ASTM D 7036-04. Limitations of the various methods, instruments, equipment, and materials to be utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty to the final data may not be quantifiable.

5.5 ISOKINETIC SAMPLING

Montrose's entire equipment inventory is on a schedule of routine maintenance and calibration. This includes meter boxes, thermocouples, barometers, pitot tubes and sampling nozzles. Meter boxes are calibrated over a full range of flow rates against a wet test meter or critical orifices every six months. Thermocouples are calibrated as specified in the EPA Handbook against NIST-traceable mercury in glass thermometer. Pitot tubes are visually inspected for conformance to the dimensional criteria specified in EPA Method 2. All pitot tubes used by Montrose meet these criteria and are assigned a pitot tube coefficient of 0.84. Pitot tubes which do not meet the criteria are either repaired or discarded. All nozzles are calibrated in the field immediately before use with calipers using a minimum of three diameters. If they do not meet the required maximum allowable range of .004 inches between points, then they are machined to fit these criteria, or are discarded if determined to be beyond repair.

Sample train recovery procedures were conducted in accordance with the specific methods. Chain of custody documentation was initiated in the field and maintained on all samples from their recovery through inter-laboratory transfer until their final analysis. Analysis was conducted in accordance with the specific methods using proper laboratory procedures. Subcontracted laboratory work was conducted by qualified analytical laboratories. Analytical results were used to calculate stack gas pollutant concentrations and emission rates. All calculations were conducted in strict accordance with the equations found in the individual methods. All calculations were conducted on a computer, and the input data was checked by a person other than the individual who originally input the data.

5.5.1 Particulate Matter

Particulate Matter testing was conducted in accordance with EPA Methods 5 and 202 in a combined sampling train. Specifically, Method 1 was used for the selection of traverse points, Method 2 was used for the determination of volumetric flow, Method 3A was used for the collection of fixed gases and Method 4 was followed in order to determine sample stream moisture content. A description of the QA/QC procedures to be adhered to for each PM/CPM test run is presented in Table 5-1.

TABLE 5-1
QA/QC Procedures for PM & CPM / EPA Methods 5 & 202

Task	Procedure
Glassware/ Teflon Preparation	1. Wash all glassware and Teflon components in warm, soapy water. Rinse clean with tap water. Rinse thoroughly with DI water. 2. Rinse all back half / impingers glassware with acetone and hexane. Allow to dry and seal with Teflon.
Sampling Train Set up	1. Load/assemble sampling train components in field lab (See Section 4). Re-seal components and send up to stack. 2. Finish assembling train on stack. Leak check train with Teflon tape on finger.
Sampling Train Operation	1. Operate sampling train between 0.5 and 1.0 cfm. 2. Leak check train. Seal train components with Teflon.
Sampling Train Recovery	1. Place Filter into EPA Method 5 container #1. 2. Rinse nozzle through front half of filter holder with acetone into EPA Method 5 container #2. 3. Purge sampling train (condenser coil through back half of CPM filter) with nitrogen for 60 minutes at a rate of ≥14 LPM. 4. Recover Impingers 1 and 2 sampling train contents into EPA Method 202 container #1. 5. Rinse sampling train from condenser coil through front half of condensable filter housing with DI H_2O into EPA Method 202 container #1. 6. Rinse sampling train from condenser coil through front half of condensable filter housing with acetone (once) and hexane (twice) into EPA Method 202 container #2 7. Place the Teflon filter into EPA Method 202 container #3. 8. Collect proof, reagent and/or field blanks as required.
Sample Identification And Shipping	1. Identify all samples by stack, method, runs no. fraction and contents. 2. Generate chain of custody form identifying all samples. 3. Transport or ship samples to analytical laboratory.
PM/CPM Sample Analysis	1. Receive samples, verify chain of custody/contents. 2. Evaporate front half acetone rinse in tared beaker. 3. Desiccate filters and beakers for 24 hours. Weigh at six-hour intervals until two consecutive weights agree by ±0.5 mg. 4. CPM samples analyzed in accordance with Method 202 as per selected laboratories SOPs.

5.6 CEMS QA

Specific procedures are followed to ensure the validity of the CEMS data collected for this task. The following subsections outline the specific procedures and performance criteria that were utilized to maintain quality assurance throughout the program.

5.6.1 Calibration Gases

All calibration gases utilized during the test program are prepared according to EPA Protocol quality standards. The gas specification sheets supplied by the vendor are presented in Appendix C1.

5.6.2 Determination of Stratification

All compliance CEMS sampling points were determined concurrently with run 1 program via a stratification check conducted in accordance with Section 8.1.2 of EPA Method 7E, 40CFR 60, Appendix A. As such, a heated single holed probe was traversed for at least 2 times the system response time (5-minutes/point) at 16.7, 50 and 83.3 percent of the stack diameter (prior to the initiation of compliance testing). An average pollutant (CO or NO_x) or diluent (O_2 or CO_2) concentration was determined for each point and subsequently compared to the average pollutant/diluent concentration of all three points. If each point differed by no more than 5% or 0.5ppm (CO/NO_x)/0.3% (O_2/CO_2) from the mean pollutant concentration (whichever is less restrictive) then the gas stream was considered unstratified and sampling was conducted from the point which most closely matches the average. If each point (for either diluent or pollutant) differed by no more than 10% or 1.0ppm (CO/NO_x)/0.5% (O_2/CO_2) then the gas stream was considered minimally stratified and testing was conducted at 3 points during each test run (16.7, 50 and 83.3% of stack diameter). If these criteria weren't met, then the gas stream was considered stratified and testing was conducted in accordance with Table 1-1 or 1-2 of Method 1. The results of the stratification tests are presented in Appendix C2.

Note: Per Section 8.1.2 of EPA Method 7: "If testing for multiple pollutants or diluents at the same site, a stratification test using only one pollutant or diluent satisfies this requirement." This unit met the most stringent criteria during this test program. Hence, a single point sampling strategy was employed throughout.

5.6.3 NO_x Converter Efficiency Tests

The chemiluminescent NO_x analyzer used by the reference method during the conduct of the test program was subjected to a NO_x converter efficiency test onsite in accordance with Section 8.2.4.1 (NO_2 bottle method) of EPA Method 7E, 40CFR 60, Appendix A. The analyzer met the converter efficiency requirement of ≥90%. A copy of the test results is presented in Appendix C2.

5.6.4 Instrumental Monitoring

The reference method CEMS system was leak-checked prior to the initiation of testing. This ensured that a representative sample from the stack was being delivered to the monitors. The calibration drift/bias checks provided a continuous check of data quality throughout the remainder of the test program.

CEMS data quality was assured throughout the test program by following procedures delineated in Instrumental Analyzer Procedures/Methods 3A (O_2 and CO_2), 7E (NO_x), 10 (CO). A summary of the QA portion of the test program is presented below.

5.6.5 Sampling Setup

The following procedures were conducted during the initial phase of the program

- **Sample Point Selection** – All sample points were selected in accordance with Method 7E based upon the results of the stratification test.
- **Leak Check** – Prior to the initiation of testing the reference method CEMS system was leak checked from the end of the sample probe. If a leak were detected, it was traced, fixed and the procedure was repeated until successful.
- **System Response Time** – Prior to the initiation of sampling a Reference Method (RM) CEMS response time (in seconds) was determined. Response time is the amount of time required for the RM CEMS to reach 95% of the final stable upscale and downscale values. The longer of the upscale and downscale response times was reported as the system response time. During the test program, the reference method CEMS was allowed to sample a minimum of 2 times the RM CEMS response time prior to the initiation of any sampling runs.

5.6.6 Calibration Criteria – O_2, CO_2, NO_x and CO

The following subsections present the CEMS criteria for O_2, CO_2, NO_x and CO that must be adhered to throughout the conduct of the test program.

- **Analyzer Calibration Error (ACE)** – At the beginning of each test day an analyzer calibration error (direct calibration) was conducted for each analyzer by introducing zero and an upscale calibration gas upstream from the respective analyzers and calibrating the respective analyzers to the corresponding calibration gas value. A mid-range gas was then injected to the respective analyzers in order to demonstrate linearity. The maximum allowable calibration error was 2% of instrument span. If this limit were not achieved, corrective action would have been taken and the procedure would have been repeated until successful. Analyzer calibration error was calculated as follows:

$$ACE = \frac{(C_{Dir} - C_v)}{CS} \times 100$$

Where:

C_{Dir} = Measured concentration of a calibration gas (low, mid, or high) when introduced in direct calibration mode, ppmvd.
C_v = Manufacturer certified concentration of a calibration gas (low, mid, or high), ppmvd.
CS = Calibration span, ppmvd.

- **Sampling System Bias (SB)** – Following the performance of the analyzer calibration error a system bias check was conducted by introducing sampling gas through the entire sampling system (system calibration) and comparing the response of the analyzer's calibration error with that of the system calibration. The maximum allowable calibration error is 5% of instrument span. If this limit were not achieved, the test run would have been voided and corrective action would have been taken. If analyzer adjustments were made the analyzer calibration error and system bias checks would have been repeated until the calibration met the EPA Method 7E criteria. System bias was calculated as follows:

$$SB = \frac{(C_s - C_{Dir})}{CS} \times 100$$

Where:

C_s = Measured concentration of a calibration gas (low, mid, or high) when introduced in system calibration mode, ppmvd.

- **Calibration Drift (D)** – Prior to and following each test run a system calibration was conducted in order to determine calibration drift during each test period. The maximum allowable calibration drift is 3% of instrument span. If the calibration drift were exceeded, corrective action would have been taken. If any analyzer adjustments were made, a new analyzer calibration error and system bias check would have been conducted. Calibration drift was calculated as follows:

$$D = \left| \; SB_{final} - SB_{iniital} \; \right| \times 100$$

5.7 EMISSION RATE CALCULATIONS

The following equations were followed when calculating compliance emission rates during this test program.

5.7.1 Grains/dscf

All PM emissions rates during this test program will be calculated on a grains per dry standard cubic foot basis in accordance with the following equation.

E=PM (0.0154) / DGM

Where:

E = PM pollutant emission rate (gr/dscf)
PM = Net gain in particulate matter for test run in milligrams
DGM = Dry Gas Meter Volume for test run (dscf)

5.7.2 ppmvd@7%O$_2$ Emission Rate Calculation

Emissions (ppmvd) corrected to 7%O$_2$ basis will be calculated in accordance with the following equation.

$$E = Cd[\frac{13.9}{20.9 - \%O2}]$$

Where:

E = pollutant emission rate, ppm_{vd}@15%O_2

C_d = pollutant concentration, ppm_{vd}

$\%O_{2d}$ = concentration of oxygen, $\%_{vd}$

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APPENDIX A

Emission Calculations and Field Data Sheets

Indices

1 - Emission Calculations and Field Data Sheets – M5/202
2 - Emission Calculations and Field Data Sheets – CEMS Parameters
3 - Visual Emission Data Sheets
4 - Facility Data

Index A.1 - Emission Calculations and Field Data Sheets – M5/202

Particulate Emission Calculations - Method 5

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

			BLANKS	
	FILTER	**BEAKER**	**FILTER**	**ACETONE***
Sample ID :	27420	39613	27423	39616
FINAL(g) :	0.43161	2.400574	0.39661	2.346751
TARE (g) :	0.40086	2.390485	0.39627	2.346640
NET (g) :	0.03075	0.010089	0.00034	0.000111

Volume of Blank Rinse (ml):	114
Weight of Acetone Blank (g):	89.4
PM attributable to acetone impurity (mg):	0.08
Max. allowable correction (mg):	0.09
Volume of Rinse (ml):	78

$M_n - A_r = M_n$		O_2	=	13.53	%vd
		CO_2	=	5.24	%vd
M_n (mg)** =	40.84	V_s	=	20.89	ft/sec
A_r (mg) =	0.08	A_S	=	2.27	ft^2
		V_m std	=	35.419	dscf
M_n (mg)** =	40.76				

C_s = (2.205 E-6) (M_n) / ($V_m$std) = 2.54E-06 lb/dscf

Cs' = 0.0154 (Mn) /(VmStd) = 0.0177 gr/dscf

Cs' @7%O_2 = 0.0154 (Mn) /(VmStd) = 0.0334 gr/dscf@7%O_2

*-max blank correction for acetone is 0.001% by weight.

Particulate Emission Calculations - Method 5

Facility/Site: Gateway Services / Forget-Me-Not
Source: EU5
Run No.: EU5-M5/202-R2

Date: 2/14/23
Start Time: 13:35
Stop Time: 14:56

			BLANKS	
	FILTER	**BEAKER**	**FILTER**	**ACETONE***
Sample ID :	27421	39614	27423	39616
FINAL(g) :	0.4214	2.4053	0.3966	2.34675
TARE (g) :	0.3993	2.4044	0.3963	2.34664
NET (g):	0.0222	0.0008	0.0003	0.00011

Volume of Blank Rinse (ml):	114
Weight of Acetone Blank (g):	89.4
PM attributable to acetone impurity (mg):	0.03
Max. allowable correction (mg):	0.09
Volume of Rinse (ml):	27

$M_n - A_r = M_n$

M_n (mg)** = 23.00

A_r (mg) = 0.03

M_n (mg)** = 22.97

O_2 = 14.30 %vd

CO_2 = 4.18 %vd

V_s = 19.45 ft/sec

A_S = 2.27 ft^2

V_m std = 37.234 dscf

C_s = (2.205 E-6) (M_n) / ($V_m$std) = 1.36E-06 lb/dscf

Cs' = 0.0154 (Mn) /(VmStd) = 0.0095 gr/dscf

Cs' @7%O_2 = 0.0154 (Mn) /(VmStd) = 0.0200 gr/dscf@7%O_2

*-max blank correction for acetone is 0.001% by weight.

0

Particulate Emission Calculations - Method 5

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

			BLANKS	
	FILTER	**BEAKER**	**FILTER**	**ACETONE***
Sample ID :	27422	39615	27423	39616
FINAL(g) :	0.4229	2.3946	0.3966	2.34675
TARE (g) :	0.3985	2.3898	0.3963	2.34664
NET (g) :	0.0243	0.0048	0.0003	0.00011

Volume of Blank Rinse (ml): 114

Weight of Acetone Blank (g): 89.4

PM attributable to acetone impurity (mg): 0.08

Max. allowable correction (mg): 0.09

Volume of Rinse (ml): 78

$M_n - A_r = M_n$

M_n (mg)** = 29.13

A_r (mg) = 0.08

M_n (mg)** = 29.05

O_2 = 14.63 %vd

CO_2 = 3.91 %vd

V_s = 19.11 ft/sec

A_S = 2.27 ft^2

V_m std = 33.979 dscf

C_s = (2.205 E-6) (M_n) / ($V_m$std) = 1.89E-06 lb/dscf

Cs' = 0.0154 (Mn) /(VmStd) = 0.0132 gr/dscf

Cs' @7%O_2 = 0.0154 (Mn) /(VmStd) = 0.0292 gr/dscf@7%O_2

*-max blank correction for acetone is 0.001% by weight.

Isokinetic Calculations

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

T_s (°F)	= 1190.2	O_2 (%vd)	= 13.53	V_m (dcf)	= 34.096
T_s (°R)	= 1650.2	CO_2 (%vd)	= 5.24	ΔH (Abs) ("Hg)	= 29.79
T_m (°F)	= 47.0	CO (%vd)	= 0	P_s ("Hg)	= 29.72
T_{std} (°R)	= 507.0	N_2 (%vd)	= 81.23	SQRT Δ P	= 0.2087
V_l (Total gain)	= 58.5	C_p	= 0.84	Y	= 1.0016
V_l (adj. for sat.)	= NA	Run Time (min.)	= 60	A_n (ft^2)	= 0.001760

V_m std = $\frac{(T_{std})(V_m)(Y)(\Delta \text{ H Abs})}{(P_{std})(T_m)}$ = 35.419 dscf

V_w std = 0.04706 (V_l Total gain) = 2.753 scf

B_{ws} = $V_{w\,(std)}$ / $Vm_{\,(std)} + Vw_{\,(std)}$ = 0.072

B_{ws} = by steam tables = NA

1 - B_{ws} = 1 - B_{ws} = 0.928

M_d = 0.440 (%CO_2)
0.320 (%O_2)
0.280 (%N_2 + %CO) = 29.379 lb/lb-mole

M_s = M_d (1-B_{ws}) + 18 (B_{ws}) = 28.559 lb/lb-mole

G = SQRT (Ts(abs)/Ps Ms) = 1.394

V_s = 85.49 (C_p) (G) (SQRTΔ P) = 20.895 fps

Q_s = 3600 (1-B_{ws})(V_s)(A)(T_{std} P_s/P_{std} T_s(abs)) = 50,344 dscfh

I = $\frac{(T_s)\ (V_m \text{ std})\ (P_{std})\ 100}{(T_{std})\ (\ V_s\ )\ (A_n)\ (P_s)\ 60\ (1\text{-}B_{ws})\ (\text{Run Time})}$ = 90.75 %Isokinetic

Isokinetic Calculations

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	13:35
Run No.:	EU5-M5/202-R2	**Stop Time:**	14:56

T_s (°F)	= 1112.0	O_2 (%vd)	= 14.30	V_m (dcf)	= 36.076
T_s (°R)	= 1572.0	CO_2 (%vd)	= 4.18	ΔH (Abs) ("Hg)	= 29.79
T_m (°F)	= 50.1	CO (%vd)	= 0	P_s ("Hg)	= 29.72
T_{std} (°R)	= 510.1	N_2 (%vd)	= 81.52	SQRT Δ P	= 0.1983
V_l (Total gain)	= 68.2	C_p	= 0.84	Y	= 1.0016
V_l (adj. for sat.)	= NA	Run Time (min.)	= 60	A_n (ft^2)	= 0.001760

V_m std = $\dfrac{(T_{std})(V_m)(Y)(\Delta\text{ H Abs})}{(P_{std})(T_m)}$ = 37.234 dscf

V_w std = 0.04706 (V_l Total gain) = 3.209 scf

B_{ws} = $V_{w\,(std)}$ / $Vm_{(std)} + Vw_{(std)}$ = 0.079

B_{ws} = by steam tables = NA

1 - B_{ws} = 1 - B_{ws} = 0.921

M_d = 0.440 (%CO_2)
0.320 (%O_2)
0.280 (%N_2 + %CO) = 29.242 lb/lb-mole

M_s = M_d (1-B_{ws}) + 18 (B_{ws}) = 28.349 lb/lb-mole

G = SQRT (Ts(abs)/Ps Ms) = 1.366

V_s = 85.49 (C_p) (G) (SQRTΔ P) = 19.452 fps

Q_s = 3600 (1-B_{ws})(V_s)(A)(T_{std} P_s/P_{std} T_s(abs)) = 48,815 dscfh

I = $\dfrac{(T_s)\ (V_m\text{ std})\ (P_{std})\ 100}{(T_{std})\ (\ V_s\ )\ (A_n)\ (P_s)\ 60\ (1\text{-}B_{ws})\ (\text{Run Time})}$ = 98.4 %Isokinetic

Isokinetic Calculations

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

T_s (°F)	= 1106.2	O_2 (%vd)	= 14.63	V_m (dcf)	= 33.123
T_s (°R)	= 1566.2	CO_2 (%vd)	= 3.91	ΔH (Abs) ("Hg)	= 29.79
T_m (°F)	= 53.3	CO (%vd)	= 0	P_s ("Hg)	= 29.72
T_{std} (°R)	= 513.3	N_2 (%vd)	= 81.46	SQRT Δ P	= 0.1947
V_l (Total gain)	= 70.0	C_p	= 0.84	Y	= 1.0016
V_l (adj. for sat.)	= NA	Run Time (min.)	= 60	A_n (ft^2)	= 0.001760

V_m std = $\frac{(T_{std})(V_m)(Y)(\Delta H\ Abs)}{(P_{std})(T_m)}$ = 33.979 dscf

V_w std = 0.04706 (V_l Total gain) = 3.294 scf

B_{ws} = $V_{w\,(std)}$ / $Vm_{(std)} + Vw_{(std)}$ = 0.088

B_{ws} = by steam tables = NA

1 - B_{ws} = 1 - B_{ws} = 0.912

M_d = 0.440 (%CO_2)
0.320 (%O_2)
0.280 (%N_2 + %CO) = 29.211 lb/lb-mole

M_s = M_d (1-B_{ws}) + 18 (B_{ws}) = 28.220 lb/lb-mole

G = SQRT (Ts(abs)/Ps Ms) = 1.367

V_s = 85.49 (C_p) (G) (SQRTΔ P) = 19.111 fps

Q_s = 3600 (1-B_{ws})(V_s)(A)(T_{std} P_s/P_{std} T_s(abs)) = 47,667 dscfh

I = $\frac{(T_s)\ (V_m\ std)\ (P_{std})\ 100}{(T_{std})\ (\ V_s\ )\ (A_n)\ (P_s)\ 60\ (1\text{-}B_{ws})\ (Run\ Time)}$ = 92.0 %Isokinetic

Input Data

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

Stack Diameter ("):	20.4
Stack Area (ft^2) :	2.27
Nozzle Diameter ("):	0.568
Pitot Coefficient:	0.84

Initial Impinger Volume/Weights:

Impinger 1 (ml)	377.0
Impinger 2 (ml)	595.5
Impinger 3 (ml)	711.7
Impinger 4 (ml)	814.5
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-

Final Impinger Volume/Weights:

Impinger 1 (ml)	413.1
Impinger 2 (ml)	599.6
Impinger 3 (ml)	718.9
Impinger 4 (ml)	825.6
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-

% O_2 (Outlet) :	13.53
% CO_2 (Outlet):	5.24
% CO (Outlet) :	0
Bar. Pressure ("Hg):	29.72
Static Pressure ("H_2O):	-0.06
No. of Traverse Points:	12
Run Duration (minutes):	60
Meter Vol. Final (dcf):	95.397
Leak Check Volume (dcf):	0.000
Meter Vol. Initial (dcf):	61.301

Traverse Point	Delta P ("H_2O)	Square Root Delta P	Delta H ("H_2O)	Dry Gas Meter Temps.		Stack Temp. (F)
				Inlet (F)	Outlet (F)	
A1	0.05	0.22	1.2	44	43	1209
2	0.05	0.22	1.2	44	43	1192
3	0.06	0.24	1.4	44	42	1190
4	0.06	0.24	1.4	45	43	1185
5	0.03	0.17	0.7	47	43	1183
6	0.04	0.20	0.9	48	44	1180
B1	0.04	0.20	0.9	49	46	1185
2	0.05	0.22	1.2	51	47	1191
3	0.05	0.22	1.2	52	48	1195
4	0.04	0.20	0.9	53	48	1199
5	0.03	0.17	0.7	53	48	1190
6	0.03	0.17	0.7	53	49	1183
AVERAGE:	**0.044**	**0.21**	**1.02**	**48.6**	**45.3**	**1190.2**

Input Data

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	13:35
Run No.:	EU5-M5/202-R2	**Stop Time:**	14:56

Stack Diameter ("):	20.4
Stack Area (ft^2) :	2.27
Nozzle Diameter ("):	0.568
Pitot Coefficient:	0.84
Initial Impinger Volume/Weights:	
Impinger 1 (ml)	383.2
Impinger 2 (ml)	516.1
Impinger 3 (ml)	701.4
Impinger 4 (ml)	812.5
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-
Final Impinger Volume/Weights:	
Impinger 1 (ml)	421.4
Impinger 2 (ml)	524.0
Impinger 3 (ml)	713.0
Impinger 4 (ml)	823.0
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-
% O_2 (Outlet) :	14.30
% CO_2 (Outlet):	4.18
% CO (Outlet) :	0
Bar. Pressure ("Hg):	29.72
Static Pressure ("H_2O):	-0.06
No. of Traverse Points:	12
Run Duration (minutes):	60
Meter Vol. Final (dcf):	131.959
Leak Check Volume (dcf):	0.000
Meter Vol. Initial (dcf):	95.883

Traverse Point	Delta P ("H_2O)	Square Root Delta P	Delta H ("H_2O)	Dry Gas Meter Temps. Inlet (F)	Dry Gas Meter Temps. Outlet (F)	Stack Temp. (F)
A1	0.06	0.24	1.4	46	45	1202
2	0.04	0.20	0.9	47	46	1186
3	0.03	0.17	0.7	48	46	1165
4	0.03	0.17	0.7	49	46	1085
5	0.04	0.20	0.9	51	47	1045
6	0.05	0.22	1.2	51	47	935
B1	0.04	0.20	0.9	49	50	1121
2	0.04	0.20	0.9	54	50	1139
3	0.03	0.17	0.7	55	51	1137
4	0.06	0.24	1.4	56	51	1155
5	0.03	0.17	0.7	57	52	1090
6	0.03	0.17	0.7	57	52	1084
AVERAGE:	**0.04**	**0.20**	**0.92**	**51.7**	**48.6**	**1112.0**

Input Data

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

Stack Diameter ("):	20.4
Stack Area (ft^2) :	2.27
Nozzle Diameter ("):	0.568
Pitot Coefficient:	0.84
Initial Impinger Volume/Weights:	
Impinger 1 (ml)	364.7
Impinger 2 (ml)	613.3
Impinger 3 (ml)	707.6
Impinger 4 (ml)	815.2
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-
Final Impinger Volume/Weights:	
Impinger 1 (ml)	408.7
Impinger 2 (ml)	620.8
Impinger 3 (ml)	715.2
Impinger 4 (ml)	826.1
Impinger 5 (ml)	-
Impinger 6 (ml)	-
Impinger 7 (g)	-
% O_2 (Outlet) :	14.63
% CO_2 (Outlet):	3.91
% CO (Outlet) :	0
Bar. Pressure ("Hg):	29.72
Static Pressure ("H_2O):	-0.06
No. of Traverse Points:	12
Run Duration (minutes):	60
Meter Vol. Final (dcf):	166.360
Leak Check Volume (dcf):	0.000
Meter Vol. Initial (dcf):	133.237

Traverse Point	Delta P ("H2O)	Square Root Delta P	Delta H ("H2O)	Dry Gas Meter Temps.		Stack Temp. (F)
				Inlet (F)	Outlet (F)	
A1	0.05	0.22	1.3	51	50	1126
2	0.04	0.20	1.0	52	50	1120
3	0.04	0.20	1.0	54	50	1132
4	0.04	0.20	1.0	55	51	1139
5	0.05	0.22	1.3	55	51	1092
6	0.03	0.17	0.8	56	52	950
B1	0.04	0.20	1.0	55	52	1130
2	0.03	0.17	0.8	56	52	1140
3	0.05	0.22	1.3	56	53	1137
4	0.03	0.17	0.8	57	52	1145
5	0.03	0.17	0.8	56	53	1113
6	0.03	0.17	0.8	57	53	1050
AVERAGE:	**0.04**	**0.19**	**0.96**	**55.0**	**51.6**	**1106.2**

MONTROSE AIR QUALITY SERVICES

EPA 5/202 Method Field Datasheet (Isokinetic)

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Project Information
Date 2-14-23 Project # PROJ-022280
Customer/Facility FORGET-ME-NOT (NORTHBOROUGH, MA)
Unit ID/Sample Location EVS - OUTLET
Run # 1 Operator CM/HS

Sampling Conditions
Static Pressure, in. H2O -0.06 Ambient Temp, °F 38
Barometric Pressure, in. Hg 29.726 Ref. Barometer ID MS
elevator
Wind Speed / Direction Precipitation, Y/N, type —
Probe / Filter Temp Range, °F 248 ± 25F

ALT 011	TC ID:	Ambient °F	Ref. °F
Stack	1605191		
Probe	1605191		
Filter Box	HB-5		
Filter Exit	HB-5		
Meter outlet	EE-2	See	R3
Impinger Exit	7906		
Other	3128 / 2024		

Ref. Thermometer ID
Continuity Check ☑ Continuity w/ Proper Polarity
Notes: * 65°F > T < 85°F

Sampling Equipment IDs
Meterbox ID EE-2
Umbilical ID UMB-100-1
Nozzle ID —
Pitot / Probe ID ~~NTP-1~~ 1605191
Manometer ID EE2
Sensitivity 0.01

Calibration
Meterbox Y 1.0016
Meterbox ΔH@, in. H2O 1.889
Nozzle diameter, Dn, in. 0.508
Pitot coefficient, Cp 0.84
Manometer zero and level ☒ yes
K-Factor 23

Equipment Checks	Pre	Mid	Post
Pitot (+), pass @ in. H2O	☑ @ > 3"	☐ @	☐ @ ≥ 3"
Pitot (-), pass @ in. H2O	☑ @ > 3"	☐ @	☐ @ > 3"
Pitot visual inspection	☑ pass	☐ pass	☑ pass
Nozzle visual inspection	☑ pass	☐ pass	☑ pass
Meter, cfm @ in. Hg	0.001 @ 15"	@	0.002 @ 10"
Intermediate leak check volume, ft³	— / —		/ —

Traverse Point #	Elapsed Time	Clock Time 24hr	DGM Reading, Vm, ft³	Velocity Head, ΔP in H2O	Orifice Pressure Differential, ΔH		Stack Temp, °F	Probe Temp, °F	Filter Temp, °F		Impinger Exit Temp, °F	Dry Gas Meter Temperature, °F		FILTER *(°F)	Pump Vacuum, in. Hg
					Target	Actual			Box	Exit		Inlet	Outlet		
A 1	0	1050	61.301	0.05	1.15	1.2	1209	253	245 →		45	44	43	65	4
2	5		64.9	0.05	1.15	1.2	1192	250	250 →		43	44	43	65	4
3	10		67.6	0.06	1.38	1.4	1190	250	250 →		48	44	42	66	4
4	15		71.2	0.06	1.38	1.4	1185	253	243 →		50	45	43	68	4
5	20		73.9	0.03	0.69	0.7	1183	249		265	43	47	43	69	4
6	25		76.6	0.04	0.92	1.0	1180	250		258	43	48	44	71	4
B 1	30		79.069	0.04	0.92	1.0	1185	254		240	42	49	46	70	4
2	35		81.7	0.05	1.15	1.2	1191	255		268	41	51	47	70	4
3	40		84.9	0.05	1.15	1.2	1195	252		249	42	52	48	70	4
4	45		87.6	0.04	0.92	1.0	1199	250		248	44	53	48	70	4
5	50		90.3	0.03	0.69	0.7	1190	248		245	44	53	48	68	4
6	55		92.9	0.03	0.69	0.7	1183	248		251	44	53	49	69	4
	60	1207	95.397	—	—	—	—	—	—	—	—	—	—	—	—
Averages															

QA/QC Check: Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Checked By Team Leader

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MONTROSE AIR QUALITY SERVICES

EPA Method 5/202 **Field Datasheet (Isokinetic)**

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Project Information
Date 2-14-23 Project # PROJ-022280
Customer/Facility FORGET-ME-NOT (NORTHBOROUGH, MA)
Unit ID/Sample Location EU-5
Run # 2 Operator CM/HS

Sampling Conditions
Static Pressure, in. H_2O -0.06
Barometric Pressure, in. Hg 29.72
Wind Speed / Direction —
Probe / Filter Temp Range, °F 247 ± 25
Ambient Temp, °F —
Ref. Barometer ID NWS Adj for elevation
Precipitation, Y [✓ N] type —

ALT 011 TC ID:	Ambient °F	Ref. °F
Stack 1605141		
Probe 1605141		
Filter Box HB-5		
Filter Exit 3132		
Meter outlet EE-2	See	R3
Impinger Exit 7906		
Other 3131		

Ref. Thermometer ID
Continuity Check ☑ Continuity w/ Proper Polarity
Notes: * 65 ≥ T ≤ 85

Sampling Equipment IDs
Meterbox ID EE-2
Umbilical ID UMB-1001
Nozzle ID —
Pitot / Probe ID 1605141
Manometer ID EE-2
Sensitivity 0.01

Calibration
Meterbox Y 1.0016
Meterbox ΔH@, in. H_2O 1.889
Nozzle diameter, Dn, in. 0.568
Pitot coefficient, Cp 0.84
Manometer zero and level ☒ yes
K-Factor 23

Equipment Checks	Pre	Mid	Post
Pitot (+), pass @ in. H_2O	☑ @ >3"	☒ @	☑ @ >3"
Pitot (-), pass @ in. H_2O	☑ @ >3"	☐ @	☑ @ >3"
Pitot visual inspection	☑ pass	☐ pass	☑ pass
Nozzle visual inspection	☑ pass	☒ pass	☑ pass
Meter, cfm @ in. Hg	0.002 @ 11"	@	0.005 @ 10"
Intermediate leak check volume, ft^3	—	—	—

Traverse Point #	Elapsed Time	Clock Time 24hr	DGM Reading, Vm, ft^3	Velocity Head, ΔP in H_2O	Orifice Pressure Differential, ΔH		Stack Temp, °F	Probe Temp, °F	Filter Temp, °F		Impinger Exit Temp, °F	Dry Gas Meter Temperature, °F		FILTER (°F) *	Pump Vacuum, in. Hg
					Target	Actual			Box	Exit		Inlet	Outlet		
A1	0	1335	95.883	0.06	1.38	1.4	1202	254		270	39	46	45	66	3
2	5		99.5	0.04	0.92	0.9	1186	255		270	41	47	46	66	3
3	10		102.8	0.03	0.69	0.7	1165	248		258	46	48	46	66	3
4	15		105.4	0.03	0.69	0.7	1085	250		250	48	49	46	68	3
5	20		108.9	0.04	0.92	0.9	1045	250		262	50	51	47	70	3
6	25		111.6	0.05	1.15	1.2	935	250		256	49	51	47	67	3
B1	30		114.920	0.04	0.92	0.9	1121	253		250	43	49	50	65	3
2	35		118.3	0.04	0.92	0.9	1139	252		270	44	54	50	65	3
3	40		120.5	0.03	0.69	0.7	1137	250		250	45	55	51	65	3
4	45		123.2	0.06	1.38	1.4	1155	249		238	47	56	51	66	3
5	50		125.8	0.03	0.69	0.7	1090	253		265	48	57	52	67	3
6	55		128.9	0.03	0.69	0.7	1084	252		268	49	57	52	73	3
	60	1456	131.959	—	—	—	—	—		—	—	—	—	—	—
Averages															

QA/QC Check: Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Checked By ______ Team Leader ______

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MONTROSE AIR QUALITY SERVICES

EPA 5/202 Method ________ **Field Datasheet (Isokinetic)**

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Project Information

Date 2-14 Project # PROJ-022280

Customer/Facility FOREST-NE-NUT (NORTHBOROUGH, MA)

Unit ID/Sample Location EU-5 OUTLET

Run # 3 Operator CM/KS

Sampling Conditions

Static Pressure, in. H_2O ~0.06 Ambient Temp, °F 46

Barometric Pressure, in. Hg 29.72 Ref. Barometer ID NWS

Wind Speed / Direction ________ Precipitation, Y / [✓ N], type —

Probe / Filter Temp Range, °F 247 ± 25 F

ALT 011	TC ID:	Ambient °F	Ref. °F
Stack	1605191	–	—
Probe	1605191	74	74
Filter Box	HB-5	—	—
Filter Exit	3132	74	74
Meter outlet	EE-2	75	74
Impinger Exit	7906	74	74
Other	3131	74	74

Ref. Thermometer ID 1815 29386

Continuity Check ☑ Continuity w/ Proper Polarity

Notes: * 65 ≤ T ≤ 85 °F

Sampling Equipment IDs

Meterbox ID EE-2

Umbilical ID UMB-100-1

Nozzle ID —

Pitot / Probe ID 1605191

Manometer ID EE-2

Sensitivity 0.01

Calibration

Meterbox Y 1.0016

Meterbox ΔH@, in. H_2O 1.889

Nozzle diameter, Dn, in. 0.568

Pitot coefficient, Cp 0.84

Manometer zero and level ☒ yes

K-Factor 23

Equipment Checks	Pre	Mid	Post
Pitot (+), pass @ in. H_2O	☑ @ >3"	☐ @	☑ @ >3"
Pitot (-), pass @ in. H_2O	☑ @ >3"	☐ @	☑ @ >3"
Pitot visual inspection	☑ pass	☐ pass	☑ pass
Nozzle visual inspection	☑ pass	☐ pass	☑ pass
Meter, cfm @ in. Hg	0.003 @ 12"	@	0.002 @ 11"
Intermediate leak check volume, ft³	— /	—	/ —

Traverse Point #	Elapsed Time	Clock Time 24hr	DGM Reading, Vm, ft³	Velocity Head, ΔP in H_2O	Orifice Pressure Differential, ΔH		Stack Temp, °F	Probe Temp, °F	Filter Temp, °F		Impinger Exit Temp, °F	Dry Gas Meter Temperature, °F		*FILTER (°F)	Pump Vacuum, in. Hg
					Target	Actual			Box	Exit		Inlet	Outlet		
A1	0	1540	133.237	0.05	1.25	1.3	1126	256		270	42	51	50	65	4
2	5		136.7	0.04	1.00	1.0	1120	248		270	41	52	50	65	4
3	10		139.5	0.04	1.00	1.0	1132	250		250	43	54	50	65	4
4	15		142.2	0.04	1.00	1.0	1139	252		253	45	55	51	66	4
5	20		145.3	0.05	1.25	1.3	1092	252		267	46	55	51	68	4
6	25		148.2	0.03	0.75	0.8	950	247		258	46	56	52	68	4
B1	30		151.0	0.04	1.00	1.0	1130	251		254	46	55	52	66	3
2	35		153.5	0.03	0.75	0.8	1140	251		264	45	56	52	66	3
3	40		156.0	0.05	1.25	1.3	1137	252		245	45	56	53	67	3
4	45		159.0	0.03	0.75	0.8	1145	251		261	46	57	52	68	4
5	50		161.7	0.03	0.75	0.8	1113	249		254	47	56	53	68	4
6	55		163.9	0.03	0.75	0.8	1050	251		247	48	57	53	69	4
	60	1650	166.360	—	—	—	—	—		—	—	—	—	—	—
Averages															

QA/QC Check: Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Checked By ________ Team Leader ________

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Montrose Air Quality Services

EPA METHOD 5/202 - SAMPLE RECOVERY DATA SHEET

Client: Gateway Services
City / State: Northborough, MA
Source: FUS
Project No.: 022280

Run No.: 1
Sample Date: 2-14-2023
Recovery Date: 2-14-2023

Impinger Type:	**Knockout**	**Modified GS**	**Modified GS**				
mL of Water	0	0	100				**Silica Gel**
Final Wt. (g)	413.1	599.6	7189				825.6
Initial Wt. (g)	377.0	595.5	711.7				814.5
Net Weight (g)	36.1	4.1	7.2				11.1

Moisture Impingers Total: ~~(g)~~
Moisture Silica Gel: (g)
Total: 58.5 (g)
Description of Impinger Contents: normal
Total DI H$_2$O added for purge.: 100 (ml)
Description of Particulate on Filter: light
Recovered & Sealed: [✓ Y] or N
Method 5 Filter I.D. No.: 027420
CPM Filter ID No.: NA
Probe Rinse Container No.: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 1: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 2: X
~~**Liquid Level Marked / Sealed:** Y or N~~

Run No.: 2
Sample Date: 2-14-2023
Recovery Date: 2-14-2023

Impinger Type:	**Knockout**	**Modified GS**	**Modified GS**				
mL of Water	0	0	100				**Silica Gel**
Final Wt. (g)	421.4	524.0	713.0				823.0
Initial Wt. (g)	383.2	516.1	701.4				812.5
Net Weight (g)	38.2	7.9	11.6				10.5

Moisture Impingers Total: (g)
Moisture Silica Gel: (g)
Total: 68.2 (g)
Description of Impinger Contents: normal
Total DI H$_2$O added for purge.: 100 (ml)
Description of Particulate on Filter: light
Recovered & Sealed: [✓ Y] or N
Method 5 Filter I.D. No.: 027421
CPM Filter ID No.: NA
Probe Rinse Container No.: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 1: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 2: X
Liquid ~~**Level Marked / Sealed:** Y or N~~

Run No.: 3
Sample Date: 2-14-2023
Recovery Date: 2-14-2023

Impinger Type:	**Knockout**	**Modified GS**	**Modified GS**				
mL of Water	0	0	100				**Silica Gel**
Final Wt. (g)	408.7	620.8	715.2				826.1
Initial Wt. (g)	364.7	613.3	707.6				815.2
Net Weight (g)	44.0	7.5	7.6				10.9

Moisture Impingers Total: (g)
Moisture Silica Gel: (g)
Total: 70.0 (g)
Description of Impinger Contents: normal
Total DI H$_2$O added for purge.: 100 (ml)
Description of Particulate on Filter: light
Recovered & Sealed: [✓ Y] or N
Method 5 Filter I.D. No.: 027422
CPM Filter ID No.: NA
Probe Rinse Container No.: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 1: ✓
Liquid Level Marked / Sealed: [✓ Y] or N
Impinger Contents Container No. 2: X
Liquid ~~**Level Marked / Sealed:** Y or N~~

LAB BLANKS COLLECTED: **Probe Rinse:** ✓ **Impinger:** ✓ **Filter:** ✓

FIELD BALANCE & CALIBRATION WEIGHT AUDIT REQUIREMENTS (EPA M. 4 Section 10.3)

Field Balance ID: YA004
Field Balance Tolerance: 0.5 grams
Certified Weight ID: ~~[illegible]~~ 1000119206
Field Weight Measured (g): (Pre) 999.6
Identified Certified Weight (g): 500g or [✓ 1000g]
Field Balance Acceptable: (Pre) [✓ Y] or N
Recovered By:
Analyst Signature:

Index A.2 - Emission Calculations and Field Data Sheets – CEMS Parameters

CEMS Pollutant Emission Calculations - Outlet

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

O_2,%vd = 13.53

CO_2,%vd = 5.24

CO,ppmvd = 17.4

NO_x,ppmvd = 87.8

Carbon Monoxide

ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 32.8 ppmvd@7%O_2

Oxides of Nitrogen

ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 165.5 ppmvd@7%O_2

CEMS Pollutant Emission Calculations - Outlet

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	13:35
Run No.:	EU5-M5/202-R2	**Stop Time:**	14:56

O_2,%vd = 14.30

CO_2,%vd = 4.18

CO,ppmvd = 4.5

NO_x,ppmvd = 60.3

Carbon Monoxide

ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 9.4 ppmvd@7%O_2

Oxides of Nitrogen

ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 127.1 ppmvd@7%O_2

CEMS Pollutant Emission Calculations - Outlet

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

O_2,%vd = 14.63

CO_2,%vd = 3.91

CO,ppmvd = 3.7

NO_x,ppmvd = 48.4

Carbon Monoxide
ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 8.2 ppmvd@7%O_2

Oxides of Nitrogen
ppmvd@7%O_2 =(ppmvd((13.9/(20.9-%O_2)) = 107.5 ppmvd@7%O_2

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site: Gateway Services / Forget-Me-Not
Source: EU5
Run No.: EU5-M5/202-R1

Date: 2/14/23
Start Time: 10:50
Stop Time: 12:07

Date/Time	O_2 (%vd)	CO_2 (%vd)	CO (ppmvd)	NO_x (ppmvd)		
2/14/2023 10:50:29 AM	14.62	4.23	5.35	47.11		
2/14/2023 10:51:29 AM	13.06	5.38	5.86	52.65		
2/14/2023 10:52:29 AM	10.42	7.68	6.98	121.84		
2/14/2023 10:53:29 AM	11.77	7.06	9.25	158.07		
2/14/2023 10:54:29 AM	12.57	6.48	10.87	149.12		
2/14/2023 10:55:29 AM	12.60	6.34	10.77	134.23		
2/14/2023 10:56:29 AM	12.73	6.15	10.30	115.87		
2/14/2023 10:57:29 AM	12.93	5.98	10.40	97.94		
2/14/2023 10:58:29 AM	13.26	5.70	10.28	90.00		
2/14/2023 10:59:29 AM	13.48	5.47	9.84	81.42		
2/14/2023 11:00:29 AM	13.62	5.33	9.84	77.51		
2/14/2023 11:01:29 AM	13.69	5.24	9.64	73.31		
2/14/2023 11:02:29 AM	13.68	5.22	47.87	69.78		
2/14/2023 11:03:29 AM	13.72	5.18	9.94	67.34		
2/14/2023 11:04:29 AM	13.70	5.16	10.05	65.95		
2/14/2023 11:05:29 AM	13.83	5.07	10.23	64.00		
2/14/2023 11:06:29 AM	13.88	5.01	10.02	59.56		
2/14/2023 11:07:29 AM	13.91	4.97	10.03	56.51		
2/14/2023 11:08:29 AM	14.09	4.82	10.64	55.59		
2/14/2023 11:09:29 AM	14.22	4.71	10.51	48.95		
2/14/2023 11:10:29 AM	14.51	4.47	10.42	44.16		
2/14/2023 11:11:29 AM	12.78	5.78	10.52	100.12		
2/14/2023 11:12:29 AM	11.71	6.87	11.44	104.02		
2/14/2023 11:13:29 AM	10.11	8.32	11.42	184.16		
2/14/2023 11:14:29 AM	9.89	8.51	12.00	183.66		
2/14/2023 11:15:29 AM	10.34	8.17	13.12	180.32		
2/14/2023 11:16:29 AM	10.72	7.86	15.79	169.79		
2/14/2023 11:17:29 AM	12.10	6.79	17.90	157.30		
2/14/2023 11:18:29 AM	13.41	5.82	17.25	139.71		
2/14/2023 11:19:29 AM	14.09	5.31	15.19	120.61		
2/14/2023 11:20:29 AM					port change	
2/14/2023 11:21:29 AM					port change	
2/14/2023 11:22:29 AM					port change	
2/14/2023 11:23:29 AM					port change	
2/14/2023 11:24:29 AM					port change	
2/14/2023 11:25:29 AM					port change	
2/14/2023 11:26:29 AM					port change	
2/14/2023 11:27:29 AM					port change	
2/14/2023 11:28:29 AM					port change	
2/14/2023 11:29:29 AM					port change	
2/14/2023 11:30:29 AM					port change	
2/14/2023 11:31:29 AM					port change	
2/14/2023 11:32:29 AM					port change	
2/14/2023 11:33:29 AM					port change	
2/14/2023 11:34:29 AM					port change	
2/14/2023 11:35:29 AM					port change	
2/14/2023 11:36:29 AM					port change	
2/14/2023 11:37:29 AM	13.28	5.74	19.23	71.61		
2/14/2023 11:38:29 AM	13.34	5.61	19.38	74.63		
2/14/2023 11:39:29 AM	13.62	5.36	20.47	69.81		
2/14/2023 11:40:29 AM	13.76	5.22	19.34	66.71		
2/14/2023 11:41:29 AM	13.97	5.03	17.74	63.65		
2/14/2023 11:42:29 AM	14.09	4.88	20.17	60.93		
2/14/2023 11:43:29 AM	14.16	4.79	21.71	59.65		

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

Date/Time	**O_2 (%vd)**	**CO_2 (%vd)**	**CO (ppmvd)**	**NO_x (ppmvd)**		
2/14/2023 11:44:29 AM	14.29	4.66	22.37	57.13		
2/14/2023 11:45:29 AM	14.50	4.49	21.45	53.42		
2/14/2023 11:46:29 AM	14.56	4.42	21.86	50.81		
2/14/2023 11:47:29 AM	14.68	4.31	22.12	47.81		
2/14/2023 11:48:29 AM	14.82	4.20	24.11	45.38		
2/14/2023 11:49:29 AM	14.84	4.16	24.12	42.88		
2/14/2023 11:50:29 AM	14.99	4.05	23.90	40.29		
2/14/2023 11:51:29 AM	14.85	4.16	24.63	37.86		
2/14/2023 11:52:29 AM	14.80	4.11	25.70	51.52		
2/14/2023 11:53:29 AM	14.40	4.52	25.14	44.47		
2/14/2023 11:54:29 AM	11.70	6.65	25.35	78.16		
2/14/2023 11:55:29 AM	13.09	5.87	29.72	108.82		
2/14/2023 11:56:29 AM	14.02	5.18	27.90	72.50		
2/14/2023 11:57:29 AM	13.79	5.09	23.94	50.62		
2/14/2023 11:58:29 AM	14.06	4.80	24.17	55.28		
2/14/2023 11:59:29 AM	14.52	4.45	24.49	71.58		
2/14/2023 12:00:29 PM	14.80	4.23	25.08	78.37		
2/14/2023 12:01:29 PM	15.32	3.88	24.91	79.43		
2/14/2023 12:02:29 PM	14.25	4.61	24.59	82.31		
2/14/2023 12:03:29 PM	12.52	6.04	24.16	114.36		
2/14/2023 12:04:29 PM	14.58	4.78	27.17	144.22		
2/14/2023 12:05:29 PM	14.84	4.48	24.73	123.43		
2/14/2023 12:06:29 PM	14.50	4.54	23.87	105.14		
Run Averages:	**13.51**	**5.39**	**17.79**	**86.22**		

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:** 2/14/23
Source:	EU5	**Start Time:** 13:35
Run No.:	EU5-M5/202-R2	**Stop Time:** 14:56

Date/Time	**O_2 (%vd)**	**CO_2 (%vd)**	**CO (ppmvd)**	**NO_x (ppmvd)**		
2/14/2023 1:35:29 PM	16.74	2.62	7.76	17.95		
2/14/2023 1:36:29 PM	15.65	3.33	8.01	32.86		
2/14/2023 1:37:29 PM	16.11	3.06	8.31	29.25		
2/14/2023 1:38:29 PM	16.04	3.14	7.85	27.81		
2/14/2023 1:39:29 PM	16.26	3.00	7.41	30.13		
2/14/2023 1:40:29 PM	16.30	2.96	7.13	28.59		
2/14/2023 1:41:29 PM	15.74	3.33	6.58	64.58		
2/14/2023 1:42:29 PM	17.11	2.54	5.78	112.15		
2/14/2023 1:43:29 PM	17.12	2.57	5.09	64.54		
2/14/2023 1:44:29 PM	15.91	3.37	4.62	49.51		
2/14/2023 1:45:29 PM	15.11	4.00	4.74	62.68		
2/14/2023 1:46:29 PM	15.64	3.71	5.01	64.13		
2/14/2023 1:47:29 PM	15.72	3.65	4.67	61.50		
2/14/2023 1:48:29 PM	14.35	4.59	5.22	69.36		
2/14/2023 1:49:29 PM	14.22	4.74	4.76	76.50		
2/14/2023 1:50:29 PM	13.04	5.80	4.58	76.70		
2/14/2023 1:51:29 PM	13.27	5.68	4.58	76.13		
2/14/2023 1:52:29 PM	13.38	5.61	4.64	73.26		
2/14/2023 1:53:29 PM	13.90	5.19	4.61	73.18		
2/14/2023 1:54:29 PM	14.25	4.87	4.51	75.41		
2/14/2023 1:55:29 PM	14.65	4.54	4.62	78.68		
2/14/2023 1:56:29 PM	14.84	4.38	4.70	79.10		
2/14/2023 1:57:29 PM	15.17	4.12	4.71	75.02		
2/14/2023 1:58:29 PM	15.38	3.92	4.74	68.56		
2/14/2023 1:59:29 PM	15.38	3.95	4.98	60.25		
2/14/2023 2:00:29 PM	15.03	4.08	5.07	59.17		
2/14/2023 2:01:29 PM	12.26	6.37	4.97	67.75		
2/14/2023 2:02:29 PM	12.49	6.34	5.09	90.22		
2/14/2023 2:03:29 PM	13.05	5.95	5.10	84.53		
2/14/2023 2:04:29 PM	13.34	5.67	4.84	78.97		
2/14/2023 2:05:29 PM					port change	
2/14/2023 2:06:29 PM					port change	
2/14/2023 2:07:29 PM					port change	
2/14/2023 2:08:29 PM					port change	
2/14/2023 2:09:29 PM					port change	
2/14/2023 2:10:29 PM					port change	
2/14/2023 2:11:29 PM					port change	
2/14/2023 2:12:29 PM					port change	
2/14/2023 2:13:29 PM					port change	
2/14/2023 2:14:29 PM					port change	
2/14/2023 2:15:29 PM					port change	
2/14/2023 2:16:29 PM					port change	
2/14/2023 2:17:29 PM					port change	
2/14/2023 2:18:29 PM					port change	
2/14/2023 2:19:29 PM					port change	
2/14/2023 2:20:29 PM					port change	
2/14/2023 2:21:29 PM					port change	
2/14/2023 2:22:29 PM					port change	
2/14/2023 2:23:29 PM					port change	
2/14/2023 2:24:29 PM					port change	
2/14/2023 2:25:29 PM	13.72	4.85	2.49	61.22		
2/14/2023 2:26:29 PM	11.32	6.22	3.15	65.29		
2/14/2023 2:27:29 PM	11.90	5.84	3.79	68.72		
2/14/2023 2:28:29 PM	12.06	5.73	4.09	69.01		

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site: Gateway Services / Forget-Me-Not
Source: EU5
Run No.: EU5-M5/202-R2

Date: 2/14/23
Start Time: 13:35
Stop Time: 14:56

Date/Time	O_2 (%vd)	CO_2 (%vd)	CO (ppmvd)	NO_x (ppmvd)		
2/14/2023 2:29:29 PM	11.89	5.81	4.03	72.52		
2/14/2023 2:30:29 PM	11.95	5.76	4.14	74.34		
2/14/2023 2:31:29 PM	12.20	5.60	4.37	72.32		
2/14/2023 2:32:29 PM	12.28	5.55	3.89	69.84		
2/14/2023 2:33:29 PM	12.41	5.46	4.11	69.47		
2/14/2023 2:34:29 PM	12.45	5.42	4.23	66.99		
2/14/2023 2:35:29 PM	12.70	5.26	4.08	64.82		
2/14/2023 2:36:29 PM	12.42	5.39	4.12	64.27		
2/14/2023 2:37:29 PM	12.48	5.36	4.31	62.98		
2/14/2023 2:38:29 PM	12.63	5.25	4.34	60.92		
2/14/2023 2:39:29 PM	12.89	5.08	4.26	57.80		
2/14/2023 2:40:29 PM	12.79	5.13	4.12	56.06		
2/14/2023 2:41:29 PM	15.91	3.32	5.64	52.38		
2/14/2023 2:42:29 PM	15.24	3.81	5.14	65.67		
2/14/2023 2:43:29 PM	16.35	3.14	4.90	60.03		
2/14/2023 2:44:29 PM	15.72	3.53	4.28	53.96		
2/14/2023 2:45:29 PM	13.80	4.50	3.86	43.91		
2/14/2023 2:46:29 PM	14.12	4.28	3.81	40.72		
2/14/2023 2:47:29 PM	14.26	4.19	3.78	37.32		
2/14/2023 2:48:29 PM	14.34	4.15	3.72	36.11		
2/14/2023 2:49:29 PM	14.36	4.09	3.71	36.40		
2/14/2023 2:50:29 PM	15.75	3.37	5.36	30.11		
2/14/2023 2:51:29 PM	14.23	4.14	4.14	35.83		
2/14/2023 2:52:29 PM	15.49	3.45	3.85	31.33		
2/14/2023 2:53:29 PM	15.52	3.41	3.66	29.69		
2/14/2023 2:54:29 PM	15.20	3.63	4.20	29.12		
2/14/2023 2:55:29 PM	14.70	3.82	4.12	34.44		
Run Averages:	**14.27**	**4.45**	**4.79**	**58.72**		

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

Date/Time	O_2 (%vd)	CO_2 (%vd)	CO (ppmvd)	NO_x (ppmvd)		
2/14/2023 3:40:29 PM	17.53	2.23	4.32	12.80		
2/14/2023 3:41:29 PM	14.89	3.95	4.74	47.89		
2/14/2023 3:42:29 PM	16.59	2.88	3.56	59.32		
2/14/2023 3:43:29 PM	16.09	3.35	3.49	43.78		
2/14/2023 3:44:29 PM	15.41	3.80	3.42	54.33		
2/14/2023 3:45:29 PM	15.53	3.74	3.33	56.77		
2/14/2023 3:46:29 PM	15.74	3.58	3.38	54.53		
2/14/2023 3:47:29 PM	15.89	3.46	3.39	50.39		
2/14/2023 3:48:29 PM	16.18	3.27	3.40	45.75		
2/14/2023 3:49:29 PM	16.01	3.42	3.68	45.61		
2/14/2023 3:50:29 PM	15.32	3.76	3.71	55.53		
2/14/2023 3:51:29 PM	15.62	3.74	3.30	60.59		
2/14/2023 3:52:29 PM	15.62	3.75	3.28	58.19		
2/14/2023 3:53:29 PM	15.41	3.86	3.32	58.45		
2/14/2023 3:54:29 PM	15.35	3.84	3.44	59.12		
2/14/2023 3:55:29 PM	14.94	4.19	3.67	60.21		
2/14/2023 3:56:29 PM	14.83	4.20	3.65	55.99		
2/14/2023 3:57:29 PM	15.48	3.83	3.64	57.38		
2/14/2023 3:58:29 PM	15.78	3.61	3.60	44.94		
2/14/2023 3:59:29 PM	15.75	3.61	3.53	38.89		
2/14/2023 4:00:29 PM	14.20	4.83	3.93	43.53		
2/14/2023 4:01:29 PM	14.64	4.34	3.96	54.53		
2/14/2023 4:02:29 PM	15.12	4.18	3.99	43.13		
2/14/2023 4:03:29 PM	12.27	6.33	3.77	48.58		
2/14/2023 4:04:29 PM	12.55	6.32	3.83	90.92		
2/14/2023 4:05:29 PM	12.79	6.21	3.85	84.50		
2/14/2023 4:06:29 PM	13.28	5.78	3.80	82.05		
2/14/2023 4:07:29 PM	13.47	5.54	3.69	71.42		
2/14/2023 4:08:29 PM	11.47	6.64	3.64	53.73		
2/14/2023 4:09:29 PM					port change	
2/14/2023 4:10:29 PM					port change	
2/14/2023 4:11:29 PM					port change	
2/14/2023 4:12:29 PM					port change	
2/14/2023 4:13:29 PM					port change	
2/14/2023 4:14:29 PM					port change	
2/14/2023 4:15:29 PM					port change	
2/14/2023 4:16:29 PM					port change	
2/14/2023 4:17:29 PM					port change	
2/14/2023 4:18:29 PM					port change	
2/14/2023 4:19:29 PM	14.53	4.31	4.30	56.40		
2/14/2023 4:20:29 PM	12.97	5.16	3.81	73.44		
2/14/2023 4:21:29 PM	13.22	5.03	3.68	50.00		
2/14/2023 4:22:29 PM	13.21	5.04	3.69	49.33		
2/14/2023 4:23:29 PM	13.09	5.08	3.70	48.46		
2/14/2023 4:24:29 PM	12.90	5.20	3.73	46.46		
2/14/2023 4:25:29 PM	11.81	5.80	3.84	52.51		
2/14/2023 4:26:29 PM	12.23	5.53	3.93	53.33		
2/14/2023 4:27:29 PM	15.23	3.79	4.59	50.77		
2/14/2023 4:28:29 PM	14.26	4.38	4.75	55.13		
2/14/2023 4:29:29 PM	14.47	4.22	4.30	45.25		
2/14/2023 4:30:29 PM	14.86	4.02	3.87	38.60		
2/14/2023 4:31:29 PM	14.79	4.06	4.53	39.07		
2/14/2023 4:32:29 PM	14.03	4.37	4.19	38.59		
2/14/2023 4:33:29 PM	14.65	4.09	6.02	34.72		

Instrumental Analyzer Monitoring Data (not corrected for calibrations)

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	15:40
Run No.:	EU5-M5/202-R3	**Stop Time:**	16:50

Date/Time	**O_2 (%vd)**	**CO_2 (%vd)**	**CO (ppmvd)**	**NO_x (ppmvd)**		
2/14/2023 4:34:29 PM	14.16	4.27	4.40	38.51		
2/14/2023 4:35:29 PM	14.63	4.10	5.98	31.33		
2/14/2023 4:36:29 PM	13.27	4.80	4.10	34.26		
2/14/2023 4:37:29 PM	13.82	4.49	3.97	33.38		
2/14/2023 4:38:29 PM	13.75	4.52	3.82	34.30		
2/14/2023 4:39:29 PM	13.57	4.61	3.76	34.12		
2/14/2023 4:40:29 PM	13.74	4.49	3.76	33.29		
2/14/2023 4:41:29 PM	15.46	3.53	5.55	28.04		
2/14/2023 4:42:29 PM	15.42	3.54	4.04	28.69		
2/14/2023 4:43:29 PM	15.37	3.64	4.90	38.40		
2/14/2023 4:44:29 PM	14.65	3.97	4.67	30.91		
2/14/2023 4:45:29 PM	15.26	3.63	3.96	23.69		
2/14/2023 4:46:29 PM	15.07	3.73	3.59	23.11		
2/14/2023 4:47:29 PM	14.85	3.82	3.52	24.11		
2/14/2023 4:48:29 PM	15.38	3.52	3.37	22.61		
2/14/2023 4:49:29 PM	15.82	3.26	3.38	22.03		
Run Averages:	**14.57**	**4.27**	**3.93**	**46.76**		

Analyzer Calibration Error Checks (ACE)

Facility / Site:	**Gateway Services / Forget-Me-**	**Date:**	**2/14/23**
Source:	**EU5**		

Diluent/Pollutant	O_2	CO_2	CO	NO_x	
Monitor Range (Programmed)	25	20	1000	200	
Monitor Range (Effective, per Method)	21.00	18.98	191.4	189.0	
--- Low Level Analyzer Calibration Error ---					
Cylinder Value	0.00	0.00	0.0	0.0	
Response	0.05	0.00	0.0	0.0	
ACE	0.24	0.00	0.00	0.00	
Calibration Status (Pass/Fail)	Pass	Pass	Pass	Pass	
--- Mid Level Analyzer Calibration Error ---					
Cylinder Value (Mid)	11.08	9.43	94.0	93.6	
Analyzer Response (Mid)	11.00	9.40	95.4	91.9	
ACE	-0.38	-0.16	0.73	-0.90	
Calibration Status (Pass/Fail)	Pass	Pass	Pass	Pass	
--- High Level Analyzer Calibration Error ---					
Cylinder Value (High/Span)	21.00	18.98	191.4	189.0	
Analyzer Response (High)	21.00	18.95	192.2	188.9	
ACE	0.00	-0.16	0.42	-0.05	
Calibration Status (Pass/Fail)	Pass	Pass	Pass	Pass	
--- Mid Level Gas Range Assessment ---					
Cylinder Value (Mid)	11.08	9.43	94.0	93.6	
Cylinder Value (High/Span)	21.00	18.98	191.4	189.0	
Mid Level Gas (Percentage of Span)	52.8%	49.7%	49.1%	49.5%	
Calibration Gas Status (Pass/Fail)	Pass	Pass	Pass	Pass	
--- System Calibration Gas Selection ---					
Use Mid or High Span (M or H)	M	M	M	M	

CEMS Pre/Post-Test Bias/Drift Calibration Checks and Calculations

Facility/Site:	Gateway Services / Forget-Me-Not	**Date:**	2/14/23
Source:	EU5	**Start Time:**	10:50
Run No.:	EU5-M5/202-R1	**Stop Time:**	12:07

Diluent/Pollutant:	O_2 (%)	CO_2 (%)	CO (ppmvd)	NO_x (ppmvd)
Instrument Span =	21.00	18.98	191.4	189.0
Analyzer Zero Response =	0.05	0.00	0.0	0.0
Analyzer Span Response =	11.00	9.40	95.4	91.9
Initial Sytem Zero Response =	0.05	0.15	0.1	0.0
Final System Zero Response =	0.02	0.39	0.3	0.4
Average Zero Response (C_o) =	0.04	0.27	0.2	0.2
Initial Sytem Span Response =	11.05	9.50	95.0	92.5
Final System Span Response =	11.09	9.47	95.2	91.3
Average Span Response (C_m) =	11.07	9.49	95.1	91.9
Calibration gas values (C_{ma}) =	11.08	9.43	94.0	93.6
System Bias (SB) and Drift Calculations:				
Initial Zero Bias (SB_i) =	0.00	0.79	0.05	0.00
Final Zero Bias (SB_{final}) =	-0.14	2.05	0.16	0.21
Zero Drift (D) =	0.14	1.26	0.10	0.21
Initial Span Bias (SB_i) =	0.24	0.53	-0.21	0.32
Final Span Bias (SB_{final}) =	0.43	0.37	-0.10	-0.32
Span Drift (D) =	0.19	0.16	0.10	0.63
Uncorrected Ave. (C_{Avg}) =	13.51	5.39	17.79	86.22
Corrected Ave.=$C_{gas} = (C_{Avg}-C_o)(C_{ma}/(C_m-C_o))$ =	13.53	5.24	17.42	87.81

CEMS Pre/Post-Test Bias/Drift Calibration Checks and Calculations

Facility/Site: Gateway Services / Forget-Me-Not
Source: EU5
Run No.: EU5-M5/202-R2

Date: 2/14/23
Start Time: 13:35
Stop Time: 14:56

Diluent/Pollutant:	O_2 (%)	CO_2 (%)	CO (ppmvd)	NO_x (ppmvd)
Instrument Span =	21.00	18.98	191.4	189.0
Analyzer Zero Response =	0.05	0.00	0.0	0.0
Analyzer Span Response =	11.00	9.40	95.4	91.9
Initial Sytem Zero Response =	0.02	0.39	0.3	0.4
Final System Zero Response =	0.05	0.40	0.3	0.5
Average Zero Response (C_o) =	0.04	0.40	0.3	0.5
Initial Sytem Span Response =	11.09	9.47	95.2	91.3
Final System Span Response =	11.04	9.61	95.0	90.4
Average Span Response (C_m) =	11.07	9.54	95.1	90.9
Calibration gas values (C_{ma}) =	11.08	9.43	94.0	93.6
System Bias (SB) and Drift Calculations:				
Initial Zero Bias (SB_i) =	-0.14	2.05	0.16	0.21
Final Zero Bias (SB_{final}) =	0.00	2.11	0.16	0.26
Zero Drift (D) =	0.14	0.05	0.00	0.05
Initial Span Bias (SB_i) =	0.43	0.37	-0.10	-0.32
Final Span Bias (SB_{final}) =	0.19	1.11	-0.21	-0.79
Span Drift (D) =	0.24	0.74	0.10	0.48
Uncorrected Ave. ($\bar{C}_{Avg}$) =	14.27	4.45	4.79	58.72
Corrected Ave.=C_{gas} = $(C_{Avg}-C_o)(C_{ma}/(C_m-C_o))$ =	14.30	4.18	4.46	60.34

CEMS Pre/Post-Test Bias/Drift Calibration Checks and Calculations

Facility/Site: Gateway Services / Forget-Me-Not
Source: EU5
Run No.: EU5-M5/202-R3

Date: 2/14/23
Start Time: 15:40
Stop Time: 16:50

Diluent/Pollutant:	O_2 (%)	CO_2 (%)	CO (ppmvd)	NOx (ppmvd)
Instrument Span =	21.00	18.98	191.4	189.0
Analyzer Zero Response =	0.05	0.00	0.0	0.0
Analyzer Span Response =	11.00	9.40	95.4	91.9
Initial Sytem Zero Response =	0.05	0.40	0.3	0.5
Final System Zero Response =	0.02	0.48	0.1	1.1
Average Zero Response (C_o) =	0.04	0.44	0.2	0.8
Initial Sytem Span Response =	11.04	9.61	95.0	90.4
Final System Span Response =	11.04	9.75	94.6	88.8
Average Span Response (C_m) =	11.04	9.68	94.8	89.6
Calibration gas values (C_{ma}) =	11.08	9.43	94.0	93.6
System Bias (SB) and Drift Calculations:				
Initial Zero Bias (SB_i) =	0.00	2.11	0.16	0.26
Final Zero Bias (SB_{final}) =	-0.14	2.53	0.05	0.58
Zero Drift (D) =	0.14	0.42	0.10	0.32
Initial Span Bias (SB_i) =	0.43	0.37	-0.21	-0.79
Final Span Bias (SB_{final}) =	0.19	1.11	-0.42	-1.64
Span Drift (D) =	0.24	0.74	0.21	0.85
Uncorrected Ave. ($\overline{C}_{Avg}$) =	14.57	4.27	3.93	46.76
Corrected Ave.=C_{gas} = ($\overline{C}_{Avg}$-C_o)(C_{ma}/(C_m-C_o)) =	14.63	3.91	3.71	48.45

MONTROSE
AIR QUALITY SERVICES

Client/Site: Gateway Services / Forget-Me-not

Source: EU5

Operator: D Cayon

Date: 2/14/23

Analyzer Calibration Error (ACE) – Reference Method

Pollutant/Diluent:	O_2 (%vd)		CO_2 (%vd)		CO (ppmvd)		NO_X (ppmvd)			
Analyzer ID:	CAI 600#2		CAI 600#2		TECO 48#2		TECO 42I#2			
Calibrations:	Cylinder Value (C_v)	Analyzer Response (C_{DIR})	Cylinder Value (C_v)	Analyzer Response (C_{DIR})	Cylinder Value (C_v)	Analyzer Response (C_{DIR})	Cylinder Value (C_v)	Analyzer Response (C_{DIR})		
Low/Zero	0.00	0.05	0.00	0.00	0.0	0.0	0.0	0.0		
Mid	11.08	11.00	9.43	9.40	94.0	95.4	93.6	91.9		
High	21.00	21.00	18.98	18.95	191.4	192.2	189.0	188.9		

RM Response Time: Upscale (seconds): 30 Downscale (seconds): 30

Note: System Response Time is the longer of the upscale and downscale response times. Performed during initial zero and bias checks:

Range selected for analyzer operation:

O_2	CO_2	CO	NO_X	
25	20	200	200	

Protocol Gases Used During Program:

Cylinder No.	Diluent/Pollutant Concentrations(s)
EB 0117102	11.08/9.43 O_2/CO_2
EB 0064990	21.00/18.98 O_2/CO_2
~~EB 0089224~~	~~191.4/189.0 CO/NOx~~
EB 0030050	191.4/189.0 CO/NOx
EB 0089224	94.0/93.6 CO/NOx

Analyzer Calibration Error (ACE) Acceptance Criteria: ≤ ± 2%

Where: ACE = $[(C_{Dir} - C_v)/CS] * 100\%$

REV 11/8/17 AMS

CEMS DATASHEETS AMS (rev 11-8-17)

Client/Site: Gateway Services / Forget-Me-not

Source: EU5

Test Series ID: 1-3

STRAT pt 1 900-905
905-910
910-915

Operator: J Carson

Date: 2/14/23

System Bias (SB)/Drift (D) Assessments – Reference Method

Run ID	Run Time		O_2 (%vd)		CO_2 (%vd)		CO (ppmvd)		NO_X (ppmvd)			
	Start	End	Zero (C_S)	Upscale (C_S)	Zero (C_S)	Upscale (C_S)	Zero (C_S)	Upscale (C_S)	Zero (C_S)	Upscale (C_S)		
Cal Gas Concentration			0.00	11.08	0.00	9.43	0.0	94.0	0.0	93.6		
Initial Response			0.05	11.05	0.15	9.50	0.1	95.0	0.0	92.5		
Run 1 Final	1050	1207	0.02	11.09	0.39	9.47	0.3	95.2	0.4	91.3		
Run 2 Final	1335	1456	0.05	11.04	0.40	9.61	0.3	95.0	0.5	90.4		
Run 3 Final	1540	1650	0.02	11.04	0.48	9.75	0.1	94.6	1.1	88.8		
Run 4 Final												
Run 5 Final												
Run 6 Final												

Sampling System Bias (SB) Criteria: ≤± 5% of span for zero and upscale gas, where:

Where: $SB = [(C_s - C_{Dir})/CS] * 100\%$

Zero and Calibration Drift (D) Criteria: ≤± 3% of span, where

$D = |SB_{final} - SB_i|$

REV 11/8/17 AMS

Index A.3 – Visual Emission Data Sheets

MONTROSE
AIR QUALITY SERVICES

Source Name: Gateway
Address: 80 Lyman
City: Northborough
State: MA
Zip: 01532
Phone: 702 241-1041
Source ID#: EU5
Describe Emission Point: / stack
Start vertical steel End same
Height Above Ground Level
Start ~30' Stop "
Height Relative to Observer
Start ~25' Stop "
Distance From Observer
Start ~75' Stop "
Describe Emissions
Start none visible Stop "
Emissions Color
Start none visible Stop "
Plume Type [✓ Continuous] "
Fugitive Intermittent
Water Droplets YES [✓ NO]
If Water Droplets Attached Detached
Point of Plume at which Opacity was Determined
Start @ exit Stop "
Descibe Background
Start Blue sky Stop "
Sky Conditions
Start partly cloudy Stop "
Wind Speed
Start 5-10 from West Stop "
Wind Direction 1120
Start from west Stop
Ambient Temperature
Start 48 Stop "
Wet Bulb Temperature
Start — Stop —
RH % —

Date: 2/14/23 Start Time 1050 End Time 1200

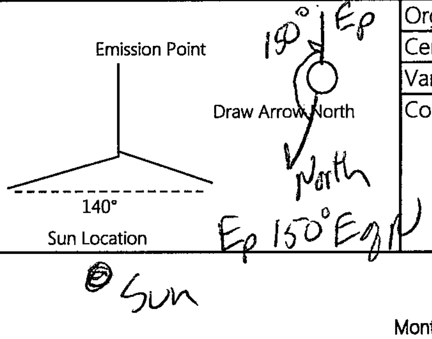
1050

	Seconds					Seconds			
Min	0	15	30	45	Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

1136

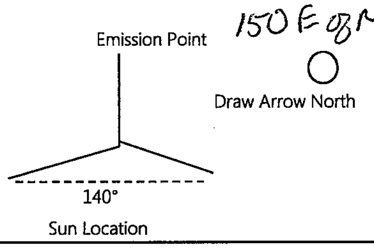
1200

Average Opacity For Highest Period 0
Number of Readings Above 5 % 0
Range Of Opacity Reading Minimum 0 Maximum 0
Observer's Name (print) David Caron
Observer's Signature David Caron
Date: ~~2/14~~ 2/14/23
Organization ~~Morrison~~ Montrose
Certified By Morrison Date 10/21/22
Varified By Date
Comments



MONTROSE
AIR QUALITY SERVICES

Source Name: Gateway Services
Address: 80 Lyman
City: Northboro
State: MA 1335
Zip: 01532
Phone: 702 241 -1041
Source ID#: EUS
Describe Emission Point: Start Vertical steel End Same
Height Above Ground Level: Start ~30' Stop Same
Height Relative to Observer: Start ~25' Stop Same
Distance From Observer: Start ~75 Stop Same
Describe Emissions: Start none visible Stop Same
Emissions Color: Start none visible Stop Same
Plume Type: [✓ Continuous] Fugitive Intermittent
Water Droplets: YES [✓ NO]
If Water Droplets: Attached Detached
Point of Plume at which Opacity was Determined: Start @ exit Stop same
Descibe Background: Start Blue sky Stop same
Sky Conditions: Start Clear Stop Same
Wind Speed: Start Calm Stop Same
Wind Direction 1405: Start none Stop Same
Ambient Temperature: Start 48 Stop 48
Wet Bulb Temperature: Start — Stop —
RH % —



Date: 2/14/23 Start Time 1335 End Time

	Seconds					Seconds			
Min	0	15	30	45	Min	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

1425

1455

Average Opacity For Highest Period 0
Number of Readings Above 5 % 0
Range Of Opacity Reading Minimum 0 Maximum 0
Observer's Name (print) David Caron
Observer's Signature David Caron
Date: 2/14/23
Organization Montrose
Certified By Morrison Date 10/21/22
Varified By Date
Comments

@ Sun

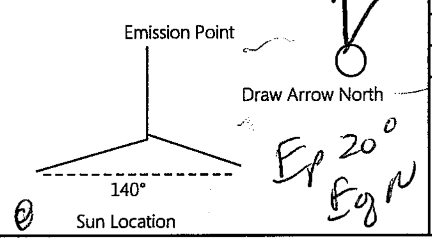
MONTROSE
AIR QUALITY SERVICES

Source Name: Gateway Services
Address: 80 Lyman
City: Northborough
State: MA
Zip: 01532
Phone: 702 241-1041
Source ID#: EU5
Describe Emission Point:
Start Vertical Steel End Same
Height Above Ground Level
Start ~30' Stop "
Height Relative to Observer
Start ~25' Stop "
Distance From Observer
Start ~100' Stop "
Describe Emissions
Start None Visible Stop "
Emissions Color
Start None Visible Stop "
Plume Type [✓ Continuous]
Fugitive Intermittent
Water Droplets YES [✓ NO]
If Water Droplets Attached Detached
Point of Plume at which Opacity was Determined
Start @ exit Stop "
Descibe Background
Start Clear blue Stop "
Sky Conditions
Start Clear Stop "
Wind Speed
Start None Stop "
Wind Direction
Start None Stop "
Ambient Temperature
Start 52 Stop 51
Wet Bulb Temperature —
Start Stop
RH % — N 20 Ep

Date: 2/14/23 Start Time 1550 End Time 1650

	Seconds					Seconds				
Min	0	15	30	45	Min	0	15	30	45	
1	0	0	0	0	31	0	0	0	0	1620
2	0	0	0	0	32	0	0	0	0	
3	0	0	0	0	33	0	0	0	0	
4	0	0	0	0	34	0	0	0	0	
5	0	0	0	0	35	0	0	0	0	
6	0	0	0	0	36	0	0	0	0	
7	0	0	0	0	37	0	0	0	0	
8	0	0	0	0	38	0	0	0	0	
9	0	0	0	0	39	0	0	0	0	
10	0	0	0	0	40	0	0	0	0	
11	0	0	0	0	41	0	0	0	0	
12	0	0	0	0	42	0	0	0	0	
13	0	0	0	0	43	0	0	0	0	
14	0	0	0	0	44	0	0	0	0	
15	0	0	0	0	45	0	0	0	0	
16	0	0	0	0	46	0	0	0	0	
17	0	0	0	0	47	0	0	0	0	
18	0	0	0	0	48	0	0	0	0	
19	0	0	0	0	49	0	0	0	0	
20	0	0	0	0	50	0	0	0	0	
21	0	0	0	0	51	0	0	0	0	
22	0	0	0	0	52	0	0	0	0	
23	0	0	0	0	53	0	0	0	0	
24	0	0	0	0	54	0	0	0	0	
25	0	0	0	0	55	0	0	0	0	
26	0	0	0	0	56	0	0	0	0	
27	0	0	0	0	57	0	0	0	0	
28	0	0	0	0	58	0	0	0	0	
29	0	0	0	0	59	0	0	0	0	
30	0	0	0	0	60	0	0	0	0	1650

Average Opacity For Highest Period 0
Number of Readings Above 5 % 0
Range Of Opacity Reading Minimum 0 Maximum 0
Observer's Name (print) David Curran
Observer's Signature David Curran
Date: 2/14/23
Organization Montrose
Certified By Morrison Date 10/21/22
Varified By Date
Comments



F Sun

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**1**
Start Time:	**10:50**
End Time:	**12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	10:50:00	1.0	1	0	
	10:50:15	1.0	2	0	
	10:50:30	1.0	3	0	
	10:50:45	1.0	4	0	
	10:51:00	2.0	1	0	
	10:51:15	2.0	2	0	
	10:51:30	2.0	3	0	
	10:51:45	2.0	4	0	
	10:52:00	3.0	1	0	
	10:52:15	3.0	2	0	
	10:52:30	3.0	3	0	
	10:52:45	3.0	4	0	
	10:53:00	4.0	1	0	
	10:53:15	4.0	2	0	
	10:53:30	4.0	3	0	
	10:53:45	4.0	4	0	
	10:54:00	5.0	1	0	
	10:54:15	5.0	2	0	
	10:54:30	5.0	3	0	
	10:54:45	5.0	4	0	
	10:55:00	6.0	1	0	
	10:55:15	6.0	2	0	
	10:55:30	6.0	3	0	
	10:55:45	6.0	4	0	**0.0**
	10:56:00	7.0	1	0	
	10:56:15	7.0	2	0	
	10:56:30	7.0	3	0	
	10:56:45	7.0	4	0	
	10:57:00	8.0	1	0	
	10:57:15	8.0	2	0	
	10:57:30	8.0	3	0	
	10:57:45	8.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **1**
Start Time: **10:50**
End Time: **12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	10:58:00	9.0	1	0	
	10:58:15	9.0	2	0	
	10:58:30	9.0	3	0	
	10:58:45	9.0	4	0	
	10:59:00	10.0	1	0	
	10:59:15	10.0	2	0	
	10:59:30	10.0	3	0	
	10:59:45	10.0	4	0	
	11:00:00	11.0	1	0	
	11:00:15	11.0	2	0	
	11:00:30	11.0	3	0	
	11:00:45	11.0	4	0	
	11:01:00	12.0	1	0	
	11:01:15	12.0	2	0	
	11:01:30	12.0	3	0	
	11:01:45	12.0	4	0	**0.0**
	11:02:00	13.0	1	0	
	11:02:15	13.0	2	0	
	11:02:30	13.0	3	0	
	11:02:45	13.0	4	0	
	11:03:00	14.0	1	0	
	11:03:15	14.0	2	0	
	11:03:30	14.0	3	0	
	11:03:45	14.0	4	0	
	11:04:00	15.0	1	0	
	11:04:15	15.0	2	0	
	11:04:30	15.0	3	0	
	11:04:45	15.0	4	0	
	11:05:00	16.0	1	0	
	11:05:15	16.0	2	0	
	11:05:30	16.0	3	0	
	11:05:45	16.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **1**
Start Time: **10:50**
End Time: **12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	11:06:00	17.0	1	0	
	11:06:15	17.0	2	0	
	11:06:30	17.0	3	0	
	11:06:45	17.0	4	0	
	11:07:00	18.0	1	0	
	11:07:15	18.0	2	0	
	11:07:30	18.0	3	0	
	11:07:45	18.0	4	0	**0.0**
	11:08:00	19.0	1	0	
	11:08:15	19.0	2	0	
	11:08:30	19.0	3	0	
	11:08:45	19.0	4	0	
	11:09:00	20.0	1	0	
	11:09:15	20.0	2	0	
	11:09:30	20.0	3	0	
	11:09:45	20.0	4	0	
	11:10:00	21.0	1	0	
	11:10:15	21.0	2	0	
	11:10:30	21.0	3	0	
	11:10:45	21.0	4	0	
	11:11:00	22.0	1	0	
	11:11:15	22.0	2	0	
	11:11:30	22.0	3	0	
	11:11:45	22.0	4	0	
	11:12:00	23.0	1	0	
	11:12:15	23.0	2	0	
	11:12:30	23.0	3	0	
	11:12:45	23.0	4	0	
	11:13:00	24.0	1	0	
	11:13:15	24.0	2	0	
	11:13:30	24.0	3	0	
	11:13:45	24.0	4	0	**0.0**

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **1**
Start Time: **10:50**
End Time: **12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	11:14:00	25.0	1	0	
	11:14:15	25.0	2	0	
	11:14:30	25.0	3	0	
	11:14:45	25.0	4	0	
	11:15:00	26.0	1	0	
	11:15:15	26.0	2	0	
	11:15:30	26.0	3	0	
	11:15:45	26.0	4	0	
	11:16:00	27.0	1	0	
	11:16:15	27.0	2	0	
	11:16:30	27.0	3	0	
	11:16:45	27.0	4	0	
	11:17:00	28.0	1	0	
	11:17:15	28.0	2	0	
	11:17:30	28.0	3	0	
	11:17:45	28.0	4	0	
	11:18:00	29.0	1	0	
	11:18:15	29.0	2	0	
	11:18:30	29.0	3	0	
	11:18:45	29.0	4	0	
	11:19:00	30.0	1	0	
	11:19:15	30.0	2	0	
	11:19:30	30.0	3	0	
	11:19:45	30.0	4	0	**0.0**
	Pause for port change				
	11:36:00	31.0	1	0	
	11:36:15	31.0	2	0	
	11:36:30	31.0	3	0	
	11:36:45	31.0	4	0	
	11:37:00	32.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**1**
Start Time:	**10:50**
End Time:	**12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	11:37:15	32.0	2	0	
	11:37:30	32.0	3	0	
	11:37:45	32.0	4	0	
	11:38:00	33.0	1	0	
	11:38:15	33.0	2	0	
	11:38:30	33.0	3	0	
	11:38:45	33.0	4	0	
	11:39:00	34.0	1	0	
	11:39:15	34.0	2	0	
	11:39:30	34.0	3	0	
	11:39:45	34.0	4	0	
	11:40:00	35.0	1	0	
	11:40:15	35.0	2	0	
	11:40:30	35.0	3	0	
	11:40:45	35.0	4	0	
	11:41:00	36.0	1	0	
	11:41:15	36.0	2	0	
	11:41:30	36.0	3	0	
	11:41:45	36.0	4	0	**0.0**
	11:42:00	37.0	1	0	
	11:42:15	37.0	2	0	
	11:42:30	37.0	3	0	
	11:42:45	37.0	4	0	
	11:43:00	38.0	1	0	
	11:43:15	38.0	2	0	
	11:43:30	38.0	3	0	
	11:43:45	38.0	4	0	
	11:44:00	39.0	1	0	
	11:44:15	39.0	2	0	
	11:44:30	39.0	3	0	
	11:44:45	39.0	4	0	
	11:45:00	40.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**1**
Start Time:	**10:50**
End Time:	**12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	11:45:15	40.0	2	0	
	11:45:30	40.0	3	0	
	11:45:45	40.0	4	0	
	11:46:00	41.0	1	0	
	11:46:15	41.0	2	0	
	11:46:30	41.0	3	0	
	11:46:45	41.0	4	0	
	11:47:00	42.0	1	0	
	11:47:15	42.0	2	0	
	11:47:30	42.0	3	0	
	11:47:45	42.0	4	0	**0.0**
	11:48:00	43.0	1	0	
	11:48:15	43.0	2	0	
	11:48:30	43.0	3	0	
	11:48:45	43.0	4	0	
	11:49:00	44.0	1	0	
	11:49:15	44.0	2	0	
	11:49:30	44.0	3	0	
	11:49:45	44.0	4	0	
	11:50:00	45.0	1	0	
	11:50:15	45.0	2	0	
	11:50:30	45.0	3	0	
	11:50:45	45.0	4	0	
	11:51:00	46.0	1	0	
	11:51:15	46.0	2	0	
	11:51:30	46.0	3	0	
	11:51:45	46.0	4	0	
	11:52:00	47.0	1	0	
	11:52:15	47.0	2	0	
	11:52:30	47.0	3	0	
	11:52:45	47.0	4	0	
	11:53:00	48.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**1**
Start Time:	**10:50**
End Time:	**12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	11:53:15	48.0	2	0	
	11:53:30	48.0	3	0	
	11:53:45	48.0	4	0	**0.0**
	11:54:00	49.0	1	0	
	11:54:15	49.0	2	0	
	11:54:30	49.0	3	0	
	11:54:45	49.0	4	0	
	11:55:00	50.0	1	0	
	11:55:15	50.0	2	0	
	11:55:30	50.0	3	0	
	11:55:45	50.0	4	0	
	11:56:00	51.0	1	0	
	11:56:15	51.0	2	0	
	11:56:30	51.0	3	0	
	11:56:45	51.0	4	0	
	11:57:00	52.0	1	0	
	11:57:15	52.0	2	0	
	11:57:30	52.0	3	0	
	11:57:45	52.0	4	0	
	11:58:00	53.0	1	0	
	11:58:15	53.0	2	0	
	11:58:30	53.0	3	0	
	11:58:45	53.0	4	0	
	11:59:00	54.0	1	0	
	11:59:15	54.0	2	0	
	11:59:30	54.0	3	0	
	11:59:45	54.0	4	0	**0.0**
	12:00:00	55.0	1	0	
	12:00:15	55.0	2	0	
	12:00:30	55.0	3	0	
	12:00:45	55.0	4	0	
	12:01:00	56.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**1**
Start Time:	**10:50**
End Time:	**12:06**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	12:01:15	56.0	2	0	
	12:01:30	56.0	3	0	
	12:01:45	56.0	4	0	
	12:02:00	57.0	1	0	
	12:02:15	57.0	2	0	
	12:02:30	57.0	3	0	
	12:02:45	57.0	4	0	
	12:03:00	58.0	1	0	
	12:03:15	58.0	2	0	
	12:03:30	58.0	3	0	
	12:03:45	58.0	4	0	
	12:04:00	59.0	1	0	
	12:04:15	59.0	2	0	
	12:04:30	59.0	3	0	
	12:04:45	59.0	4	0	
	12:05:00	60.0	1	0	
	12:05:15	60.0	2	0	
	12:05:30	60.0	3	0	
	12:05:45	60.0	4	0	**0.0**
Max. 6-Minute Average:					**0.0**

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Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**2**
Start Time:	**13:35**
End Time:	**14:55**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	13:35:00	1.0	1	0	
	13:35:15	1.0	2	0	
	13:35:30	1.0	3	0	
	13:35:45	1.0	4	0	
	13:36:00	2.0	1	0	
	13:36:15	2.0	2	0	
	13:36:30	2.0	3	0	
	13:36:45	2.0	4	0	
	13:37:00	3.0	1	0	
	13:37:15	3.0	2	0	
	13:37:30	3.0	3	0	
	13:37:45	3.0	4	0	
	13:38:00	4.0	1	0	
	13:38:15	4.0	2	0	
	13:38:30	4.0	3	0	
	13:38:45	4.0	4	0	
	13:39:00	5.0	1	0	
	13:39:15	5.0	2	0	
	13:39:30	5.0	3	0	
	13:39:45	5.0	4	0	
	13:40:00	6.0	1	0	
	13:40:15	6.0	2	0	
	13:40:30	6.0	3	0	
	13:40:45	6.0	4	0	**0.0**
	13:41:00	7.0	1	0	
	13:41:15	7.0	2	0	
	13:41:30	7.0	3	0	
	13:41:45	7.0	4	0	
	13:42:00	8.0	1	0	
	13:42:15	8.0	2	0	
	13:42:30	8.0	3	0	
	13:42:45	8.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility: Gateway Services / Forget-Me-Not
Site: Northborough, MA
Source: EU5
Reader: David Caron / Montrose Air Quality Services
Date: 2/14/23
Run No.: 2
Start Time: 13:35
End Time: 14:55

13:43:00	9.0	1	0	
13:43:15	9.0	2	0	
13:43:30	9.0	3	0	
13:43:45	9.0	4	0	
13:44:00	10.0	1	0	
13:44:15	10.0	2	0	
13:44:30	10.0	3	0	
13:44:45	10.0	4	0	
13:45:00	11.0	1	0	
13:45:15	11.0	2	0	
13:45:30	11.0	3	0	
13:45:45	11.0	4	0	
13:46:00	12.0	1	0	
13:46:15	12.0	2	0	
13:46:30	12.0	3	0	
13:46:45	12.0	4	0	**0.0**
13:47:00	13.0	1	0	
13:47:15	13.0	2	0	
13:47:30	13.0	3	0	
13:47:45	13.0	4	0	
13:48:00	14.0	1	0	
13:48:15	14.0	2	0	
13:48:30	14.0	3	0	
13:48:45	14.0	4	0	
13:49:00	15.0	1	0	
13:49:15	15.0	2	0	
13:49:30	15.0	3	0	
13:49:45	15.0	4	0	
13:50:00	16.0	1	0	
13:50:15	16.0	2	0	
13:50:30	16.0	3	0	
13:50:45	16.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility: Gateway Services / Forget-Me-Not
Site: Northborough, MA
Source: EU5
Reader: David Caron / Montrose Air Quality Services
Date: 2/14/23
Run No.: 2
Start Time: 13:35
End Time: 14:55

13:51:00	17.0	1	0	
13:51:15	17.0	2	0	
13:51:30	17.0	3	0	
13:51:45	17.0	4	0	
13:52:00	18.0	1	0	
13:52:15	18.0	2	0	
13:52:30	18.0	3	0	
13:52:45	18.0	4	0	**0.0**
13:53:00	19.0	1	0	
13:53:15	19.0	2	0	
13:53:30	19.0	3	0	
13:53:45	19.0	4	0	
13:54:00	20.0	1	0	
13:54:15	20.0	2	0	
13:54:30	20.0	3	0	
13:54:45	20.0	4	0	
13:55:00	21.0	1	0	
13:55:15	21.0	2	0	
13:55:30	21.0	3	0	
13:55:45	21.0	4	0	
13:56:00	22.0	1	0	
13:56:15	22.0	2	0	
13:56:30	22.0	3	0	
13:56:45	22.0	4	0	
13:57:00	23.0	1	0	
13:57:15	23.0	2	0	
13:57:30	23.0	3	0	
13:57:45	23.0	4	0	
13:58:00	24.0	1	0	
13:58:15	24.0	2	0	
13:58:30	24.0	3	0	
13:58:45	24.0	4	0	**0.0**
13:59:00	25.0	1	0	
13:59:15	25.0	2	0	

Opacity - Maximum Emissions (6-min average)

Facility: Gateway Services / Forget-Me-Not
Site: Northborough, MA
Source: EU5
Reader: David Caron / Montrose Air Quality Services
Date: 2/14/23
Run No.: 2
Start Time: 13:35
End Time: 14:55

13:59:30	25.0	3	0	
13:59:45	25.0	4	0	
14:00:00	26.0	1	0	
14:00:15	26.0	2	0	
14:00:30	26.0	3	0	
14:00:45	26.0	4	0	
14:01:00	27.0	1	0	
14:01:15	27.0	2	0	
14:01:30	27.0	3	0	
14:01:45	27.0	4	0	
14:02:00	28.0	1	0	
14:02:15	28.0	2	0	
14:02:30	28.0	3	0	
14:02:45	28.0	4	0	
14:03:00	29.0	1	0	
14:03:15	29.0	2	0	
14:03:30	29.0	3	0	
14:03:45	29.0	4	0	
14:04:00	30.0	1	0	
14:04:15	30.0	2	0	
14:04:30	30.0	3	0	
14:04:45	30.0	4	0	**0.0**

Pause for port change

14:25:00	31.0	1	0
14:25:15	31.0	2	0
14:25:30	31.0	3	0
14:25:45	31.0	4	0
14:26:00	32.0	1	0
14:26:15	32.0	2	0
14:26:30	32.0	3	0
14:26:45	32.0	4	0
14:27:00	33.0	1	0

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**2**
Start Time:	**13:35**
End Time:	**14:55**

14:27:15	33.0	2	0	
14:27:30	33.0	3	0	
14:27:45	33.0	4	0	
14:28:00	34.0	1	0	
14:28:15	34.0	2	0	
14:28:30	34.0	3	0	
14:28:45	34.0	4	0	
14:29:00	35.0	1	0	
14:29:15	35.0	2	0	
14:29:30	35.0	3	0	
14:29:45	35.0	4	0	
14:30:00	36.0	1	0	
14:30:15	36.0	2	0	
14:30:30	36.0	3	0	
14:30:45	36.0	4	0	**0.0**
14:31:00	37.0	1	0	
14:31:15	37.0	2	0	
14:31:30	37.0	3	0	
14:31:45	37.0	4	0	
14:32:00	38.0	1	0	
14:32:15	38.0	2	0	
14:32:30	38.0	3	0	
14:32:45	38.0	4	0	
14:33:00	39.0	1	0	
14:33:15	39.0	2	0	
14:33:30	39.0	3	0	
14:33:45	39.0	4	0	
14:34:00	40.0	1	0	
14:34:15	40.0	2	0	
14:34:30	40.0	3	0	
14:34:45	40.0	4	0	
14:35:00	41.0	1	0	
14:35:15	41.0	2	0	
14:35:30	41.0	3	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**2**
Start Time:	**13:35**
End Time:	**14:55**

14:35:45	41.0	4	0	
14:36:00	42.0	1	0	
14:36:15	42.0	2	0	
14:36:30	42.0	3	0	
14:36:45	42.0	4	0	**0.0**
14:37:00	43.0	1	0	
14:37:15	43.0	2	0	
14:37:30	43.0	3	0	
14:37:45	43.0	4	0	
14:38:00	44.0	1	0	
14:38:15	44.0	2	0	
14:38:30	44.0	3	0	
14:38:45	44.0	4	0	
14:39:00	45.0	1	0	
14:39:15	45.0	2	0	
14:39:30	45.0	3	0	
14:39:45	45.0	4	0	
14:40:00	46.0	1	0	
14:40:15	46.0	2	0	
14:40:30	46.0	3	0	
14:40:45	46.0	4	0	
14:41:00	47.0	1	0	
14:41:15	47.0	2	0	
14:41:30	47.0	3	0	
14:41:45	47.0	4	0	
14:42:00	48.0	1	0	
14:42:15	48.0	2	0	
14:42:30	48.0	3	0	
14:42:45	48.0	4	0	**0.0**
14:43:00	49.0	1	0	
14:43:15	49.0	2	0	
14:43:30	49.0	3	0	
14:43:45	49.0	4	0	
14:44:00	50.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility: Gateway Services / Forget-Me-Not
Site: Northborough, MA
Source: EU5
Reader: David Caron / Montrose Air Quality Services
Date: 2/14/23
Run No.: 2
Start Time: 13:35
End Time: 14:55

14:44:15	50.0	2	0	
14:44:30	50.0	3	0	
14:44:45	50.0	4	0	
14:45:00	51.0	1	0	
14:45:15	51.0	2	0	
14:45:30	51.0	3	0	
14:45:45	51.0	4	0	
14:46:00	52.0	1	0	
14:46:15	52.0	2	0	
14:46:30	52.0	3	0	
14:46:45	52.0	4	0	
14:47:00	53.0	1	0	
14:47:15	53.0	2	0	
14:47:30	53.0	3	0	
14:47:45	53.0	4	0	
14:48:00	54.0	1	0	
14:48:15	54.0	2	0	
14:48:30	54.0	3	0	
14:48:45	54.0	4	0	**0.0**
14:49:00	55.0	1	0	
14:49:15	55.0	2	0	
14:49:30	55.0	3	0	
14:49:45	55.0	4	0	
14:50:00	56.0	1	0	
14:50:15	56.0	2	0	
14:50:30	56.0	3	0	
14:50:45	56.0	4	0	
14:51:00	57.0	1	0	
14:51:15	57.0	2	0	
14:51:30	57.0	3	0	
14:51:45	57.0	4	0	
14:52:00	58.0	1	0	
14:52:15	58.0	2	0	
14:52:30	58.0	3	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**				
Site:	**Northborough, MA**				
Source:	**EU5**				
Reader:	**David Caron / Montrose Air Quality Services**				
Date:	**2/14/23**				
Run No.:	**2**				
Start Time:	**13:35**				
End Time:	**14:55**				
	14:52:45	58.0	4	0	
	14:53:00	59.0	1	0	
	14:53:15	59.0	2	0	
	14:53:30	59.0	3	0	
	14:53:45	59.0	4	0	
	14:54:00	60.0	1	0	
	14:54:15	60.0	2	0	
	14:54:30	60.0	3	0	
	14:54:45	60.0	4	0	**0.0**
Max. 6-Minute Average:					**0.0**

8 of 8

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**3**
Start Time:	**15:40**
End Time:	**16:50**

Operating Description	Time	Minute	Reading	VE (%)	6-min ave. (%)
	15:40:00	1.0	1	0	
	15:40:15	1.0	2	0	
	15:40:30	1.0	3	0	
	15:40:45	1.0	4	0	
	15:41:00	2.0	1	0	
	15:41:15	2.0	2	0	
	15:41:30	2.0	3	0	
	15:41:45	2.0	4	0	
	15:42:00	3.0	1	0	
	15:42:15	3.0	2	0	
	15:42:30	3.0	3	0	
	15:42:45	3.0	4	0	
	15:43:00	4.0	1	0	
	15:43:15	4.0	2	0	
	15:43:30	4.0	3	0	
	15:43:45	4.0	4	0	
	15:44:00	5.0	1	0	
	15:44:15	5.0	2	0	
	15:44:30	5.0	3	0	
	15:44:45	5.0	4	0	
	15:45:00	6.0	1	0	
	15:45:15	6.0	2	0	
	15:45:30	6.0	3	0	
	15:45:45	6.0	4	0	**0.0**
	15:46:00	7.0	1	0	
	15:46:15	7.0	2	0	
	15:46:30	7.0	3	0	
	15:46:45	7.0	4	0	
	15:47:00	8.0	1	0	
	15:47:15	8.0	2	0	
	15:47:30	8.0	3	0	
	15:47:45	8.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**3**
Start Time:	**15:40**
End Time:	**16:50**

15:48:00	9.0	1	0	
15:48:15	9.0	2	0	
15:48:30	9.0	3	0	
15:48:45	9.0	4	0	
15:49:00	10.0	1	0	
15:49:15	10.0	2	0	
15:49:30	10.0	3	0	
15:49:45	10.0	4	0	
15:50:00	11.0	1	0	
15:50:15	11.0	2	0	
15:50:30	11.0	3	0	
15:50:45	11.0	4	0	
15:51:00	12.0	1	0	
15:51:15	12.0	2	0	
15:51:30	12.0	3	0	
15:51:45	12.0	4	0	**0.0**
15:52:00	13.0	1	0	
15:52:15	13.0	2	0	
15:52:30	13.0	3	0	
15:52:45	13.0	4	0	
15:53:00	14.0	1	0	
15:53:15	14.0	2	0	
15:53:30	14.0	3	0	
15:53:45	14.0	4	0	
15:54:00	15.0	1	0	
15:54:15	15.0	2	0	
15:54:30	15.0	3	0	
15:54:45	15.0	4	0	
15:55:00	16.0	1	0	
15:55:15	16.0	2	0	
15:55:30	16.0	3	0	
15:55:45	16.0	4	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**3**
Start Time:	**15:40**
End Time:	**16:50**

15:56:00	17.0	1	0	
15:56:15	17.0	2	0	
15:56:30	17.0	3	0	
15:56:45	17.0	4	0	
15:57:00	18.0	1	0	
15:57:15	18.0	2	0	
15:57:30	18.0	3	0	
15:57:45	18.0	4	0	**0.0**
15:58:00	19.0	1	0	
15:58:15	19.0	2	0	
15:58:30	19.0	3	0	
15:58:45	19.0	4	0	
15:59:00	20.0	1	0	
15:59:15	20.0	2	0	
15:59:30	20.0	3	0	
15:59:45	20.0	4	0	
16:00:00	21.0	1	0	
16:00:15	21.0	2	0	
16:00:30	21.0	3	0	
16:00:45	21.0	4	0	
16:01:00	22.0	1	0	
16:01:15	22.0	2	0	
16:01:30	22.0	3	0	
16:01:45	22.0	4	0	
16:02:00	23.0	1	0	
16:02:15	23.0	2	0	
16:02:30	23.0	3	0	
16:02:45	23.0	4	0	
16:03:00	24.0	1	0	
16:03:15	24.0	2	0	
16:03:30	24.0	3	0	
16:03:45	24.0	4	0	**0.0**
16:04:00	25.0	1	0	
16:04:15	25.0	2	0	

Opacity - Maximum Emissions (6-min average)

Facility:	**Gateway Services / Forget-Me-Not**
Site:	**Northborough, MA**
Source:	**EU5**
Reader:	**David Caron / Montrose Air Quality Services**
Date:	**2/14/23**
Run No.:	**3**
Start Time:	**15:40**
End Time:	**16:50**

16:04:30	25.0	3	0	
16:04:45	25.0	4	0	
16:05:00	26.0	1	0	
16:05:15	26.0	2	0	
16:05:30	26.0	3	0	
16:05:45	26.0	4	0	
16:06:00	27.0	1	0	
16:06:15	27.0	2	0	
16:06:30	27.0	3	0	
16:06:45	27.0	4	0	
16:07:00	28.0	1	0	
16:07:15	28.0	2	0	
16:07:30	28.0	3	0	
16:07:45	28.0	4	0	
16:08:00	29.0	1	0	
16:08:15	29.0	2	0	
16:08:30	29.0	3	0	
16:08:45	29.0	4	0	
16:09:00	30.0	1	0	
16:09:15	30.0	2	0	
16:09:30	30.0	3	0	
16:09:45	30.0	4	0	**0.0**

Pause for port change

16:20:00	31.0	1	0
16:20:15	31.0	2	0
16:20:30	31.0	3	0
16:20:45	31.0	4	0
16:21:00	32.0	1	0
16:21:15	32.0	2	0
16:21:30	32.0	3	0
16:21:45	32.0	4	0
16:22:00	33.0	1	0

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **3**
Start Time: **15:40**
End Time: **16:50**

16:22:15	33.0	2	0	
16:22:30	33.0	3	0	
16:22:45	33.0	4	0	
16:23:00	34.0	1	0	
16:23:15	34.0	2	0	
16:23:30	34.0	3	0	
16:23:45	34.0	4	0	
16:24:00	35.0	1	0	
16:24:15	35.0	2	0	
16:24:30	35.0	3	0	
16:24:45	35.0	4	0	
16:25:00	36.0	1	0	
16:25:15	36.0	2	0	
16:25:30	36.0	3	0	
16:25:45	36.0	4	0	**0.0**
16:26:00	37.0	1	0	
16:26:15	37.0	2	0	
16:26:30	37.0	3	0	
16:26:45	37.0	4	0	
16:27:00	38.0	1	0	
16:27:15	38.0	2	0	
16:27:30	38.0	3	0	
16:27:45	38.0	4	0	
16:28:00	39.0	1	0	
16:28:15	39.0	2	0	
16:28:30	39.0	3	0	
16:28:45	39.0	4	0	
16:29:00	40.0	1	0	
16:29:15	40.0	2	0	
16:29:30	40.0	3	0	
16:29:45	40.0	4	0	
16:30:00	41.0	1	0	
16:30:15	41.0	2	0	
16:30:30	41.0	3	0	

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **3**
Start Time: **15:40**
End Time: **16:50**

16:30:45	41.0	4	0	
16:31:00	42.0	1	0	
16:31:15	42.0	2	0	
16:31:30	42.0	3	0	
16:31:45	42.0	4	0	**0.0**
16:32:00	43.0	1	0	
16:32:15	43.0	2	0	
16:32:30	43.0	3	0	
16:32:45	43.0	4	0	
16:33:00	44.0	1	0	
16:33:15	44.0	2	0	
16:33:30	44.0	3	0	
16:33:45	44.0	4	0	
16:34:00	45.0	1	0	
16:34:15	45.0	2	0	
16:34:30	45.0	3	0	
16:34:45	45.0	4	0	
16:35:00	46.0	1	0	
16:35:15	46.0	2	0	
16:35:30	46.0	3	0	
16:35:45	46.0	4	0	
16:36:00	47.0	1	0	
16:36:15	47.0	2	0	
16:36:30	47.0	3	0	
16:36:45	47.0	4	0	
16:37:00	48.0	1	0	
16:37:15	48.0	2	0	
16:37:30	48.0	3	0	
16:37:45	48.0	4	0	**0.0**
16:38:00	49.0	1	0	
16:38:15	49.0	2	0	
16:38:30	49.0	3	0	
16:38:45	49.0	4	0	
16:39:00	50.0	1	0	

Opacity - Maximum Emissions (6-min average)

Facility: **Gateway Services / Forget-Me-Not**
Site: **Northborough, MA**
Source: **EU5**
Reader: **David Caron / Montrose Air Quality Services**
Date: **2/14/23**
Run No.: **3**
Start Time: **15:40**
End Time: **16:50**

16:39:15	50.0	2	0	
16:39:30	50.0	3	0	
16:39:45	50.0	4	0	
16:40:00	51.0	1	0	
16:40:15	51.0	2	0	
16:40:30	51.0	3	0	
16:40:45	51.0	4	0	
16:41:00	52.0	1	0	
16:41:15	52.0	2	0	
16:41:30	52.0	3	0	
16:41:45	52.0	4	0	
16:42:00	53.0	1	0	
16:42:15	53.0	2	0	
16:42:30	53.0	3	0	
16:42:45	53.0	4	0	
16:43:00	54.0	1	0	
16:43:15	54.0	2	0	
16:43:30	54.0	3	0	
16:43:45	54.0	4	0	**0.0**
16:44:00	55.0	1	0	
16:44:15	55.0	2	0	
16:44:30	55.0	3	0	
16:44:45	55.0	4	0	
16:45:00	56.0	1	0	
16:45:15	56.0	2	0	
16:45:30	56.0	3	0	
16:45:45	56.0	4	0	
16:46:00	57.0	1	0	
16:46:15	57.0	2	0	
16:46:30	57.0	3	0	
16:46:45	57.0	4	0	
16:47:00	58.0	1	0	
16:47:15	58.0	2	0	
16:47:30	58.0	3	0	

Opacity - Maximum Emissions (6-min average)

Facility: Gateway Services / Forget-Me-Not
Site: Northborough, MA
Source: EU5
Reader: David Caron / Montrose Air Quality Services
Date: 2/14/23
Run No.: 3
Start Time: 15:40
End Time: 16:50

16:47:45	58.0	4	0	
16:48:00	59.0	1	0	
16:48:15	59.0	2	0	
16:48:30	59.0	3	0	
16:48:45	59.0	4	0	
16:49:00	60.0	1	0	
16:49:15	60.0	2	0	
16:49:30	60.0	3	0	
16:49:45	60.0	4	0	**0.0**

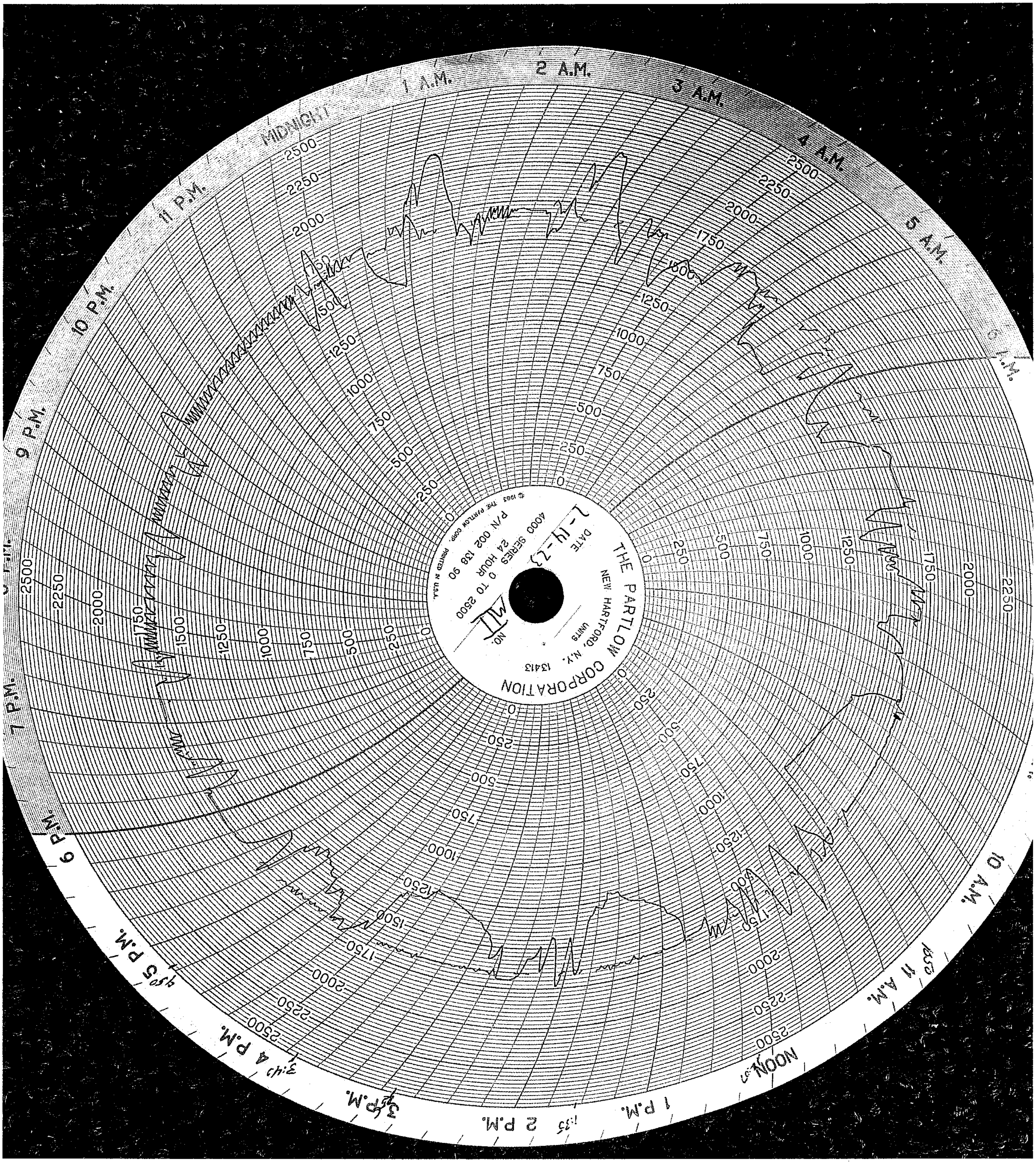
Max. 6-Minute Average: **0.0**

8 of 8

Index A.4 – Facility Data

EU5 Process Weights - 02/14/23

Chamber	**Chamber Weights (lbs)**		
	Run 1	**Run 2**	**Run 3**
1	92.0	90.0	90.0
2	50.3	71.0	50.0
3	50.0	41.4	33.0
4	21.2	26.0	30.0
5	19.2	15.7	20.0
Total Weight (lbs)	**232.7**	**244.1**	**223.0**



THE PARTLOW CORPORATION
NEW HARTFORD, N.Y. 13413
DATE 7-14-23
UNITS
NO. M
4000 SERIES
0 TO 2500
24 HOUR
P/N 002 138 90
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MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
10 A.M.
10:50 11 A.M.
NOON
1 P.M.
1:35 2 P.M.
3 P.M.
3:45 4 P.M.
4:50 5 P.M.
6 P.M.
7 P.M.
9 P.M.
10 P.M.
11 P.M.
0
250
500
750
1000
1250
1500
1750
2000
2250
2500

APPENDIX B

LABORATORY ANALYSES – PM/CPM

Montrose Air Quality Services, LLC – Newburyport

2 New Pasture Road Unit #5
Newburyport, MA 01950

Forget-Me-Not / EU5

Northborough, MA
Client Project # PROJ-022280

Analytical Report
(0223-150)

EPA Method 5

Particulate Matter

EPA Method 202

Condensable Particulate Matter

Enthalpy Analytical, LLC

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
800-1 Capitola Drive Durham, NC 27713-4385

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

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AMCross

Report Issued: 3/7/23

Summary of Results

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 5

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Summary Report

	M5-R1	**M5-R2**	**M5-R3**	**M5-Filter-Blank**
Net Filter Catch (mg)	30.75	22.16	24.33	0.34
Net Front Rinse (mg)	10.01	0.81	4.72	N/A
Total Particulate (mg)	40.8	23.0	29.1	0.3

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 202

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Summary Report

	M202-R1	M202-R2	M202-R3
Net Organic Catch (mg)	2.63	1.03	1.54
Net Inorganic (mg)	3.11	3.87	5.08
CPM (mg)	5.7	4.9	6.6
TB Corrected CPM (mg)	3.7	2.9	4.6

	FTRB	M202-Proof
Net Organic Catch (mg)	1.40	0.48
Net Inorganic (mg)	1.46	2.29
CPM (mg)	2.9	2.8

Results

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 5

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Results

	M5-R1		M5-R2		M5-R3		M5-Filter-Blank	
Filter ID	027420		027421		027422		027423	
Final Weight 1 (g)	0.43189	3/3/23 07:27	0.42136	3/3/23 07:28	0.42266	3/3/23 07:29	0.39682	3/3/23 07:30
Final Weight 2 (g)	0.43161	3/6/23 08:14	0.42143	3/6/23 08:14	0.42287	3/6/23 08:15	0.39661	3/6/23 08:16
Tare (g)	0.40086	8/22/22 12:50	0.39927	8/22/22 12:51	0.39854	8/22/22 12:51	0.39627	8/22/22 12:52
Net Filter Catch (mg)	30.75		22.16		24.33		0.34	
Beaker No.	39613		39614		39615			
Weight 1 (g)	2.400611	3/3/23 07:30	2.405262	3/3/23 07:31	2.394571	3/3/23 07:31		
Weight 2 (g)	2.400574	3/6/23 08:18	2.405260	3/6/23 08:18	2.394561	3/6/23 08:19		
Tare (g)	2.390485	2/22/23 14:46	2.404424	2/22/23 14:46	2.389764	2/22/23 14:47		
Acetone Volume (mL)	78		27		78			
Acetone Blank (g)	0.00008		0.00003		0.00008			
Net Front Rinse (mg)	10.01		0.81		4.72			
Total Particulate (mg)	40.76		22.97		29.05		0.34	

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 5

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Reagent Blanks - Acetone

	In House	
Beaker	39611	
Weight 1 (g)	2.404669	3/3/23 07:36
Weight 2 (g)	2.404696	3/6/23 08:26
Tare	2.404584	2/22/23 14:45
Residue (g)	0.00011	
Vol. (mL)	200	
Max. Residue	0.00158	

	Client's	
Beaker	39616	
Weight 1 (g)	2.346875	3/3/23 07:31
Weight 2 (g)	2.346751	3/6/23 08:20
Tare	2.346640	2/22/23 14:47
Residue (g)	0.00011	
Vol. (mL)	114	
Max. Residue	0.00090	

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 202

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Results

	M202-R1		**M202-R2**		**M202-R3**		**FTRB**		**M202-Proof**	
Organic Beaker Number	39606		39607		39608		39609		39610	
Initial Solvent Volume (mL)	110		100		74		66		110	
Org. Final Weight 1 (g)	2.376075	3/3/23 07:35	2.388560	3/3/23 07:35	2.399538	3/3/23 07:36	2.345809	3/3/23 07:36	2.360915	3/3/23 07:36
Org. Final Weight 2 (g)	2.376051	3/6/23 08:25	2.388604	3/6/23 08:25	2.399549	3/6/23 08:25	2.345788	3/6/23 08:26	2.360956	3/6/23 08:26
Tare (g)	2.373419	2/22/23 14:42	2.387575	2/22/23 14:43	2.398009	2/22/23 14:43	2.344389	2/22/23 14:44	2.360472	2/22/23 14:44
Organic Catch (mg)	2.63		1.03		1.54		1.40		0.48	
Inorganic Beaker Number	39600		39601		39602		39603		39604	
Weight 1 (g)	2.459179	3/3/23 07:32	2.455087	3/3/23 07:33	2.332042	3/3/23 07:33	2.404666	3/3/23 07:34	2.377820	3/3/23 07:34
Weight 2 (g)	2.459098	3/6/23 08:22	2.454877	3/6/23 08:23	2.331694	3/6/23 08:24	2.404618	3/6/23 08:24	2.377726	3/6/23 08:24
Tare (g)	2.455990	2/22/23 14:40	2.451009	2/22/23 14:40	2.326614	2/22/23 14:41	2.403156	2/22/23 14:41	2.375435	2/22/23 14:41
Initial Water Vol. (mL)	279		274		246		214		99	
Water Added by Lab (mL)	75		75		75		75		75	
Net Inorganic Catch (mg)	3.11		3.87		5.08		1.46		2.29	
Condensable Particulate (mg)	5.74		4.90		6.62		2.86		2.78	
TB Corrected CPM (mg)	3.74		2.90		4.62					

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Newburyport

Job No.: 0223-150 EPA Method 202

Client No.: PROJ-022280 Site: Forget-Me-Not/EU5-Northborough, MA

Reagent Blanks

In House

	Acetone		Water		Hexane	
Beaker	39611		39605		39612	
Weight 1 (g)	2.404669	3/3/23 07:36	2.371686	3/3/23 07:34	2.387180	3/3/23 07:37
Weight 2 (g)	2.404696	3/6/23 08:26	2.371649	3/6/23 08:25	2.387202	3/6/23 08:27
Tare (g)	2.404584	2/22/23 14:45	2.371405	2/22/23 14:42	2.387075	2/22/23 14:45
Residue (g)	0.00011		0.00024		0.00013	
Vol. (mL)	200		250		225	
Max. Residue (g)	0.00016		0.00025		0.00015	

Client's

	Acetone	
Beaker	39616	
Weight 1 (g)	2.346875	3/3/23 07:31
Weight 2 (g)	2.346751	3/6/23 08:20
Tare (g)	2.346640	2/22/23 14:47
Residue (g)	0.00011	
Vol. (mL)	114	
Max. Residue (g)	0.00009	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	MAQS – Newburyport
Analyst	CCB
Parameters	EPA Method 5

Client #	PROJ-022280
Job #	0223-150
# Samples	3 Runs + Blanks

Custody

Alyssa Miller received the samples on 2/17/23 and 2/21/23 after being relinquished by Montrose Air Quality Services, LLC – Newburyport. The samples were received at 19.6 and 21.2 °C respectively. The samples were in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC.

Analysis

The samples were analyzed for Particulate Matter using the analytical procedures in EPA Method 5, Determination of Particulate Matter Emissions from Stationary Sources.

The filter fractions were weighed on Balance 2 (Mettler Toledo, Model AB265-S, Serial# 1125163272) and the rinse fractions were weighed on Balance 8 (Sartorius Model ME5-OCE, Serial # 23104965). Both balances are certified by Mettler Toledo through July 31, 2023.

QC Notes

The samples catch weights were adjusted using the corresponding reagent blank correction value. A mathematically determined (theoretical) maximum value was calculated and compared with the actual value measured for the reagent blank. The lower of the two values was used as the blank correction value, which was then factored by the sample volume divided by the reagent blank volume, and subtracted from the sample catch weight. An acetone blank was received and used as described.

The laboratory also analyzed an acetone blank alongside the samples. It is not used to correct any results.

Reporting Notes

These gravimetric analyses are considered to be accurate to ±0.5 mg. Therefore, negative catch weights between 0 and –0.5 mg are set to zero and no investigation is undertaken. Negative catch weights less than -0.5 mg are investigated. There were no fractions with negative catch weights.

These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

The results presented in this report are representative of the samples as provided to the laboratory.

Enthalpy Analytical Narrative Summary

Company	MAQS – Newburyport
Analyst	CCB
Parameters	EPA Method 202

Client #	PROJ-0022280
Job #	0223-150
# Samples	5 Runs

Custody

Alyssa Miller received the samples on 2/17/23 and 2/21/23 after being relinquished by Montrose Air Quality Services, LLC – Newburyport. The samples were received at 19.6 and 21.2 °C respectively. The samples were in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC.

Analysis

The samples were analyzed for Condensable Particulate Matter using the analytical procedures in EPA Method 202, Determination of Condensable Particulate Emissions from Stationary Sources (40 CFR Part 51, Appendix M).

All samples were weighed on Balance 8 (Sartorius Model ME 5-F, Serial # 23104965), certified by Mettler Toledo through July 31, 2023.

QC Notes

A field (train) blank was received and analyzed with these samples. The method specifies that blank corrections are accomplished by subtracting the particulate mass determined for the 'Field Train Blank' or 2 mg (whichever is less) from the sample weight.

Acetone blank data was shared from the EPA Method 5 associated with this project. Laboratory reagent blanks were dried down with these samples. Results are reported for all these blanks, but none are used to blank correct the associated sample results.

A proof blank was also received from the client. The results are not adjusted or used to adjust any of the results.

Reporting Notes

Gravimetric analyses are considered to be accurate to ±0.5 mg. Therefore, negative catch weights between 0 and –0.5 mg are set to zero and no investigation is undertaken. Negative catch weights less than -0.5 mg are investigated. There were no fractions with negative catch weights for this set of Method 202 samples.

These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

The results presented in this report are representative of the samples as provided to the laboratory.

General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, LLC data reports, unless specifically noted otherwise.

- Any analysis which refers to the method as ***"Type"*** represents a planned deviation from the reference method. For instance a Hydrogen Sulfide assay from a Tedlar bag would be labeled as "EPA Method 16-Type" because Tedlar bags are not mentioned as one of the collection options in EPA Method 16.
- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** in the Qualifier or Flag column in the results indicates that the value is between the MDL and the LOQ. The laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** in the Qualifier or Flag column indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- Sample results are presented 'as measured' for single injection methodologies, or an average value if multiple injections are made. If all injections are below the MDL, the sample is considered non-detect and the ND value is presented. If one, but not all, are below the MDL, the MDL value is used for any injections that are below the MDL. For example, if the MDL is 0.500 and LOQ is 1.00, and the instrument measures 0.355, 0.620, and 0.442 - the result reported is the average of 0.500, 0.620, and 0.500 - - - i.e. 0.540 with a J flag.
- When a spike recovery (Bag Spike, Collocated Spike Train, or liquid matrix spike) is being calculated, the native (unspiked) sample result is used in the calculations, as long as the value is above the MDL. If a sample is ND, then 0 is used as the native amount (not the MDL value).
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. The MS analysis indicates what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).

General Reporting Notes

(continued)

- The addition of ***MSD*** to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as a MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.

- The addition of ***LD*** to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).

- The addition of ***AD*** to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.

- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two spikes are retained as LCSs. The LCSs are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection, and/or sample transport.

- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits. In the case of small numbers, generally 3 significant figures are presented, but still only 2 should be used with confidence. Many neat materials are only certified to 3 digits, and as the mathematically correct final result is always 1 digit less than all its pre-cursors - 2 significant figures are what are most defensible.

- **Manual Integration**: The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations on sample chromatograms, if provided in the report. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name on the chromatogram.

Sample Custody

MONTROSE
AIR QUALITY SERVICES

Sample Chain of Custody

Special Handling:
- Office Location: ______Newburyport, MA______________
- Standard Delivery - 10 Days ____x______
- Express Delivery - 3 Days __________
- RUSH Delivery - Next Day __________
- **Delivery Based on Sample Receipt at Laboratory.**

Client Name: Gateway Services	**Project Number:** PROJ-022280	**PO No.:** to be provided by Cathy Wray	**Samples Collected By:** Dave Caron / Anthony Stratton
Project Manager: David Caron	**Site ID:** Forget-Me-Not / EU5	**Phone No.:** (978) 499-9300 x11	
Report Results To: David Caron	**Plant Location:** Northborough, MA	**Email:** dcaron@montrose-env.com	

Special Instructions:

Matrix Info: A = Air 1 = H2SO4 2 = NaOH 3 = Filter 4 = Acetone
5 = Water 6 = Hexanes X = XAD C = Charcoal * = Other

Page__1__of__1__

G = Grab C = Composite Q = Quality Control / Blanks

	Sample ID	Date	Time	Volume	Type	Matrix	Sample Container Glass	Sample Container Plastic	Sample Container Other	Analysis Method:	Analysis Method:	Analysis Method:		Sample Receipt Acknowledgment (Initial / Date)
Ⓐ	M5-Filter-R1	2/14/23	10:50-12:07			filter		x		5				
Ⓑ	M5-FHA-R1	2/14/23	10:50-12:07	measure	C	acetone	x			5				
	M202-solvent rinses-R1	2/14/23	10:50-12:07	measure	C	acetone/hexane	x			202				
Ⓐ	M202-imp/Di rinse-R1	2/14/23	10:50-12:07	measure	C	DI		x		202				
Ⓐ	M202-CPM filter-R1	2/14/23	10:50-12:07		C	filter		x		202				
	M5-Filter-R2	2/14/23	13:35-14:56			filter		x		5				
Ⓑ	M5-FHA-R2	2/14/23	13:35-14:56	measure	C	acetone	x			5				
	M202-solvent rinses-R2	2/14/23	13:35-14:56	measure	C	acetone/hexane	x			202				
Ⓐ	M202-imp/Di rinse-R2	2/14/23	13:35-14:56	measure	C	DI		x		202				
	M202-CPM filter-R2	2/14/23	13:35-14:56		C	filter		x		202				
	M5-Filter-R3	2/14/23	15:40-16:50			filter		x		5				
Ⓑ	M5-FHA-R3	2/14/23	15:40-16:50	measure	C	acetone	x			5				
	M202-solvent rinses-R3	2/14/23	15:40-16:50	measure	C	aceton/hexane	x			202				
Ⓐ	M202-imp/Di rinse-R3	2/14/23	15:40-16:50	measure	C	DI		x		202				
	M202-CPM filter-R3	2/14/23	15:40-16:50		C	filter		x		202				
	M202-imps/Di-Proof	2/13/23	NA	measure		Di		x		202				
Ⓑ	M202-solvent rinse-Proof	2/13/23	NA	measure		acetone/hexane	x			202				
Ⓐ	FTRB-DiRinse	2/14/23	NA	measure		Di		x		202				
Ⓑ	FTRB-solvent rinses	2/14/23	NA	measure		acetone/hexane	x			202				
Ⓐ	FTRB-filter	2/14/23	NA			filter		x		202				
	M5-filter-Blank	2/14/23	NA			filter		x		5				
Ⓑ	Acetone-Blank	2/14/23	NA	measure		acetone	x			5				

Ⓐ 19.6°C Raytek 2
good condition
Amm3 02-17-23

Ⓑ 21.2°C Raytek 2
good condition
Amm3 02-21-23

Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
David Caron /	2/16/23	12:00	Ⓐ Amm3	2/17/23	0915	☐ Iced ☐ Ambient ☒ °C 19.6
			Ⓑ	02/21/23	1000	☐ Iced ☐ Ambient ☒ °C 21.2
						☐ Iced ☐ Ambient ☐ °C

This Is The Last Page Of This Report.

ENTHALPY
ANALYTICAL

APPENDIX C

Quality Assurance

Indices

Appendix C.1

Cylinder Gas and Equipment Certification Sheets

MAINE OXY

Your First Choice for Gases, Welding & Innovative Solutions Since 1929

PurityPlus Specialty Gases

EPA Protocol

Gas Mixture

SpecAir Specialty Gases

Customer:	Maine Oxy/ Spec Air	Reference #:	060722WZ-10
CGA:	590	Certification Date:	06/16/2022
Customer PO#:	432679	Expiration Date:	06/16/2030
Cylinder #:	EB0117102	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Components	Requested Concentration	Certified Concentration	Expanded Uncertainty (rel)	Assay Dates
Carbon Dioxide	9.5%	9.43%	0.7%	06/16/22
Oxygen	11%	11.08%	0.7%	06/16/22
Nitrogen	Balance	Balance	-	-

Reference Standard	Cylinder #	Concentration	Expanded Uncertainty	Expiration Date
Carbon Dioxide/ GMIS	CC105858	11.99%	0.5%	10/20/28
Carbon Dioxide/ SRM	CAL016053	15.63%	0.2%	02/07/25
Oxygen/ GMIS	EB0047724	12.53%	0.5%	11/08/27
Oxygen/ SRM	CAL015787	20.72%	0.2%	08/23/21

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
Micro GC/ Agilent	US020002031	6/16/2022	Thermal Conductivity
Teledyne/ 3000MA	345133	6/16/2022	Paramagnetic

This mixture was prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights, calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, there shall be no liability in excess of the established charge for this service.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST). The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. These materials comply with the requirements for emission testing per 40CFR1065.750. Do not use this standard when cylinder pressure is below 100 psig.

GLOBAL CALIBRATION GASES LLC
ISO/IEC 17025:2017

Produced and assayed by:
Global Calibration Gases LLC.
1090 Commerce Blvd N
Sarasota, Florida 34243
PGVP Vendor ID.: N22022

Analyst: Signature on file

Approved for release: 06/16/2022

MAINE OXY
Your First Choice for Gases, Welding & Innovative Solutions Since 1929
PurityPlus

EPA Protocol
Gas Mixture

SpecAir Specialty Gases

Customer:	Maine Oxy/ Spec Air
CGA:	590
Customer PO#:	432679
Cylinder #:	EB0064990

Reference#:	060722WZ-6
Certification Date:	06/16/2022
Expiration Date:	06/16/2030
Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Components	Requested Concentration	Certified Concentration	Expanded Uncertainty (rel)	Assay Dates
Carbon Dioxide	19%	18.98%	0.7%	06/16/22
Oxygen	21%	21.00%	0.5%	06/16/22
Nitrogen	Balance	Balance	-	-

Reference Standard	Cylinder #	Concentration	Expanded Uncertainty	Expiration Date
Carbon Dioxide/ GMIS	EB0053919	18.02%	0.4%	02/11/29
Carbon Dioxide/ RGM	GN0000008	20.00%	0.2%	03/09/22
Oxygen/ GMIS	GN0006236	20.99%	0.4%	11/26/23
Oxygen/ SRM	CAL015787	20.72%	0.2%	08/23/21

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
Micro GC/ Agilent	US020002031	6/16/2022	Thermal Conductivity
Teledyne/3000MA	345133	6/16/2022	Paramagnetic

This mixture was prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights, calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, there shall be no liability in excess of the established charge for this service.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST). The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. These materials comply with the requirements for emission testing per 40CFR1065.750. Do not use this standard when cylinder pressure is below 100 psig.

GLOBAL CALIBRATION GASES LLC
ISO/IEC 17025:2017

Produced and assayed by:
Global Calibration Gases LLC.
1090 Commerce Blvd N
Sarasota, Florida 34243
PGVP Vendor ID.: N22022

Analyst: Signature on file

Approved for release: 06/16/2022

MAINE OXY
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PurityPlus

EPA Protocol
Gas Mixture

SpecAir Specialty Gases

Customer: Maine Oxy/ Spec Air
CGA: 660
Customer PO #: 425275
Cylinder #: EB0089224

Reference #: 033022WZ-7
Certification Date: 04/18/2022
Expiration Date: 04/18/2030
Pressure, psig: 2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Components	Requested Concentration	Certified Concentration	Expanded Uncertainty	Assay Dates
Nitric Oxide	92.5ppm	93.6ppm	1.0%	04/11/22, 04/18/22
NOx	92.5ppm	93.6ppm	1.0%	04/11/22, 04/18/22
Sulfur Dioxide	92.5ppm	92.5ppm	1.2%	04/11/22, 04/18/22
Carbon Monoxide	92.5ppm	94.0ppm	0.9%	04/11/22
Nitrogen	Balance	Balance	-	-

Reference Standard	Cylinder #	Concentration	Expanded Uncertainty	Expiration Date
Nitric Oxide/ GMIS	GN0005017	99.4ppm	0.8%	10/30/23
Oxides of Nitrogen/ GMIS	GN0005017	99.8ppm	0.8%	10/30/23
Nitric Oxide/ SRM	CAL017400	244.5ppm	0.5%	11/02/15
Oxides of Nitrogen/ SRM	CAL017400	244.7ppm	0.5%	11/02/15
Sulfur Dioxide/ GMIS	EB0096611	101.2ppm	1.0%	01/10/25
Sulfur Dioxide/ SRM	FF28126	490.9ppm	0.8%	10/05/26
Carbon Monoxide/ GMIS	EB0126847	90.2ppm	0.7%	02/11/29
Carbon Monoxide/ SRM	CAL018039	98.85ppm	0.4%	09/25/22

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
CAI/ 600	Y09003	4/18/2022	Chemiluminescence
Horiba/ VIA-510	MAID39C8	4/18/2022	Non-Dispersive Infrared
Rosemount/ NGA 2000	3005333138	4/11/2022	Non-Dispersive Infrared

This mixture was prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights, calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, there shall be no liability in excess of the established charge for this service.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST). The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. These materials comply with the requirements for emission testing per 40CFR1065:750. Do not use this standard when cylinder pressure is below 100 psig.

GLOBAL CALIBRATION GASES LLC
ISO/IEC 17025:2017

Produced and assayed by:
Global Calibration Gases LLC.
1090 Commerce Blvd N.
Sarasota, Florida 34243 USA
PGVP Vendor ID.: N22022

Analyst: Signature on file

Approved for release: 04/19/22

Your First Choice for Gases, Welding & Innovative Solutions Since 1929

EPA Protocol
Gas Mixture

Customer:	Maine Oxy/ Spec Air	Reference#:	091319SY-I
CGA:	660	Certification Date:	10/07/2019
Customer PO#:	343975	Expiration Date:	10/07/2027
Cylinder #:	EB0030050	Pressure, psig:	2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Components	Requested Concentration	Certified Concentration	Expanded Uncertainty	Assay Dates
Nitric Oxide	190ppm	188.6ppm	0.9%	9/30/19, 10/7/19
Oxides of Nitrogen	190ppm	189.0ppm	0.9%	9/30/19, 10/7/19
Sulfur Dioxide	190ppm	193.1ppm	1.2%	9/30/19, 10/7/19
Carbon Monoxide	190ppm	191.4ppm	0.9%	9/30/19
Nitrogen	Balance	Balance	-	-

Reference Standard	Cylinder #	Concentration	Expanded Uncertainty	Expiration Date
Nitric Oxide/ GMIS	EB0021614	199.0ppm	0.7%	10/30/23
Oxides of Nitrogen/ GMIS	EB0021614	200.0ppm	0.7%	10/30/23
Nitric Oxide/ SRM	CAL017400	244.5ppm	0.5%	11/02/15
Oxides of Nitrogen/ SRM	CAL017400	244.7ppm	0.5%	11/02/15
Sulfur Dioxide/ GMIS	EB0096615	202.2ppm	1.0%	01/10/25
Sulfur Dioxide/ SRM	FF28126	490.9ppm	0.8%	01/15/17
Carbon Monoxide/ GMIS	EB0040769	244.9ppm	0.5%	12/22/25
Carbon Monoxide/ SRM	FF30742	247.1ppm	0.2%	03/26/18

Instrument/ Model	Serial Number	Last Date Calibrated	Analytical Method
CAI/ 600	Y09003	10/7/2019	Chemiluminescence
Horiba/ VIA-510	MAID39C8	10/7/2019	Non-Dispersive Infrared
Micro GC/ Inficon	70082698	9/30/2019	Thermal Conductivity

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Sarasota, Florida.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025:2017. Do not use this standard when cylinder pressure is below 100 psig.

GLOBAL CALIBRATION GASES LLC
ISO/IEC 17025:2017

Produced by:
Global Calibration Gases LLC.
1090 Commerce Blvd N.
Sarasota, Florida 34243 USA
PGVP Vendor ID.: N22019

Principal Analyst: Keith Walker
Date: 10/07/2019

Principal Reviewer:
Date: 10/07/2019

MAINE OXY

Your First Choice for Gases, Welding & Innovative Solutions Since 1929

PurityPlus

EPA Protocol Gas Mixture

SpecAir Specialty Gases

Customer: Maine Oxy/ Spec-Air
CGA: 660
Customer PO#: 397699
Cylinder #: EB0056140

Reference#: 041221TH-11
Certification Date: 04/23/2021
Expiration Date: 04/23/2024
Pressure, psig: 2000

Method: This standard was analyzed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, Procedure G1 (May 2012).

Components	**Requested Concentration**	**Certified Concentration**	**Expanded Uncertainty**	**Assay Dates**
Nitrogen Dioxide	50ppm	49.7ppm	1.8%	4/16/21, 4/23/21
Air	Balance	Balance	-	-

Reference Standard	**Cylinder #**	**Concentration**	**Expanded Uncertainty**	**Expiration Date**
Nitrogen Dioxide/ GMIS	EB0097397	47.8ppm	1.7%	09/21/21
Nitrogen Dioxide/ PRM	D562925	75.0ppm	1.5%	02/02/19

Instrument/ Model	**Serial Number**	**Last Date Calibrated**	**Analytical Method**
CAI/ 600	Y09003	4/23/2021	Chemiluminescence

These mixtures were prepared gravimetrically using a high load high sensitivity electronic scale. Prior to filling the scale is verified for accuracy throughout the target mass range against applicable NIST traceable weights. We certify that the weights are calibrated to ASTM E617-97 Echelon 1 tolerances.

This report states accurately the results of the investigation made upon the material submitted to the analytical laboratory. Every effort has been made to determine objectively the information requested. However, in connection with this report, Global Calibration Gases LLC shall have no liability in excess of the established charge for this service. Assayed at Global Calibration Gases LLC, Sarasota, Florida.

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. These materials comply with the requirements for emission testing per 40CFR1065.750. Do not use this standard when cylinder pressure is below 100 psig.

GLOBAL CALIBRATION GASES LLC
ISO/IEC 17025:2017

Produced by:
Global Calibration Gases LLC.
1090 Commerce Blvd N
Sarasota, Florida 34243
PGVP Vendor ID.: N22021

Principal Analyst:
Date: 04/23/2021

Principal Reviewer:
Date: 04/23/2021

MONTROSE
AIR QUALITY SERVICES

Method 5 Module Calibration
Using Critical Orifices

Module: EE-2

Cal. Date: 12/20/2022 **Exp. Date:** 6/20/2023 **Technician:** Hunter Stetz
(signature on file)

Orifice Number	**UJ-40**	**UJ-48**	**UJ-55**	**UJ-63**	**UJ-73**
Orifice Coefficient, *K'*	0.2321	0.3428	0.4401	0.5936	0.8109
Meter Volume (cf)					
Initial	195.639	198.563	202.914	227.254	216.090
Final	198.563	202.914	208.513	234.986	226.469
Total Volume, V_m (cf)	2.924	4.351	5.599	7.732	10.379
DGM Inlet Temp. (°F)					
Initial	50	55	59	71	68
Final	53	57	61	72	72
DGM Outlet Temp. (°F)					
Initial	49	53	56	69	63
Final	51	55	58	70	65
Avg. DGM Temp., T_m (°F)	50.6	54.8	58.1	70.4	66.5
Ambient Temp., T_{amb} (°F)	66	64	69	69	68
Bar. Pressure, P_{bar} (in. Hg)	30.29	30.29	30.29	30.29	30.29
ΔH	0.31	0.66	1.10	2.00	3.60
Vacuum (in. Hg)	24	23	21	19	15
Time, θ (min.)	10.0	10.0	10.0	10.0	10.0
Std. Meter Vol., $V_{m(std)}$ (dscf)	3.063	4.525	5.792	7.830	10.629
Std. Or. Vol., $V_{cr(std)}$ (dscf)	3.065	4.536	5.796	7.817	10.689
Y	1.0007	1.0023	1.0007	0.9983	1.0056
$\Delta H@$	1.95	1.88	1.91	1.87	1.83
Y Error (+/- .02)	0.001	-0.001	0.001	0.003	-0.004
$\Delta H@$ Error (+/- .20)	-0.058	0.008	-0.022	0.015	0.057

Average Y	1.0016	**Y Pass/Fail**	PASS
Average $\Delta H@$	1.889	**$\Delta H@$ Pass/Fail**	PASS

$V_{cr(std)} = K' \cdot P_{bar} \cdot \theta \,/\, \sqrt{(T_{amb} + 460)}$

$Y = V_{cr(std)} \,/\, V_{m(std)}$

$V_{m(std)} = 17.64 \cdot V_m \cdot (P_{bar} + \Delta H \,/\, 13.6) \,/\, (T_m + 460)$

$\Delta H@ = 0.0319 \cdot \Delta H \cdot (T_m + 460) \cdot \theta^2 \,/\, (P_{bar} Y^2 V_m^2)$

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Method 5 Module Post-Calibration
Using Critical Orifices

Module ID: EE-2
Date: 3/22/2023
Technician: H. Stetz
Project ID: 22280
Source ID: EU-5
Signature: on file
Orifice Cal Date: 2/1/23

	Run 1	Run 2	Run 3
Orifice Number	UJ-55	UJ-55	UJ-55
Orifice Coefficient, *K'*	0.4387	0.4387	0.4387
Meter Volume (cf)			
Initial	238.643	244.113	249.630
Final	244.113	249.630	255.745
Total Volume, V_m (cf)	5.470	5.517	6.115
DGM Inlet Temp. (°F)			
Initial	53	56	60
Final	55	58	62
DGM Outlet Temp. (°F)			
Initial	50	53	56
Final	52	55	58
Avg. DGM Temp., T_m (°F)	52.3	55.3	58.6
Ambient Temp., T_{amb} (°F)	68	68	68
Bar. Pressure, P_{bar} (in. Hg)	30.43	30.43	30.43
ΔH	1.10	1.10	1.10
Vacuum (in. Hg)	21.0	21.0	21.0
Time, θ (min.)	10.00	10.00	11.00
Std. Meter Vol., $V_{m(std)}$ (dscf)	5.750	5.765	6.348
Std. Or. Vol., $V_{cr(std)}$ (dscf)	5.810	5.810	6.391
Y	1.0105	1.0077	1.0066
$\Delta H@$	1.934	1.922	1.910
***Y* Error (+/- .02)**	0.002	0.001	0.002
$\Delta H@$ Error (+/- .05)	0.006	0.000	-0.006

Avg. *Y*: 1.0083
Avg. *ΔH@*: 1.922
Pre-Cal *Y*: 1.0016
Pre-Cal *ΔH@*: 1.8890
***Post Y* Diff.:** 0.67%
***Post ΔH@* Diff.:** 1.74%
***Y* Pass/Fail:** PASS

$V_{cr(std)} = K' \cdot P_{bar} \cdot \theta / \sqrt{(T_{amb} + 460)}$

$Y = V_{cr(std)} / V_{m(std)}$

$V_{m(std)} = 17.64 \cdot V_m \cdot (P_{bar} + \Delta H / 13.6) / (T_m + 460)$

$\Delta H@ = 0.039 \cdot \Delta H \cdot (T_m + 460) \cdot \theta^2 / (P_{bar} Y^2 V_m^2)$

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Meter Box Thermocouple Calibration

Meter Box: EE2 - Inlet
Cal Date: 1/10/2019
Reference Type: Digital Thermometer
Tech.: M. Bruni
Exp Date: N/A
Reference Cert. No.: 122381815 / 122537878

Ice Bath (~32°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	33	34	-0.20%
Run 2	33	34	-0.20%
Run 3	33	34	-0.20%

Pass/Fail: PASS

Ambient (~70°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	70	68	0.38%
Run 2	70	68	0.38%
Run 3	70	68	0.38%

Pass/Fail: PASS

Boiling Water (~212°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	212	210	0.30%
Run 2	212	210	0.30%
Run 3	212	210	0.30%

Pass/Fail: PASS

Test Pass/Fail: PASS

Calibration tolerance for each run is 1.5%.
% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$
Calibration conducted in accordance with EPA Method 2, Section 10.3.

MONTROSE
AIR QUALITY SERVICES

Meter Box Thermocouple Calibration

Meter Box: EE2 - Outlet
Cal Date: 1/10/2019
Reference Type: Digital Thermometer
Tech.: M. Bruni
Exp Date: N/A
Reference Cert. No.: 122381815 / 122537878

Ice Bath (~32°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	33	32	0.20%
Run 2	33	32	0.20%
Run 3	33	32	0.20%
		Pass/Fail	PASS

Ambient (~70°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	70	69	0.19%
Run 2	70	69	0.19%
Run 3	70	69	0.19%
		Pass/Fail	PASS

Boiling Water (~212°F)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	212	210	0.30%
Run 2	212	210	0.30%
Run 3	212	210	0.30%
		Pass/Fail	PASS

Test Pass/Fail: PASS

Calibration tolerance for each run is 1.5%.

$\% \text{ Error} = (((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$

Calibration conducted in accordance with EPA Method 2, Section 10.3.

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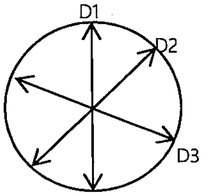
NOZZLE CALIBRATION SHEET

Project # : Pn5-022280
Test Date : 2-14-2023
Tech :
Caliper ID: CJ-P-1

	Nozzle #	Nozzle #	Nozzle #
Point #	4/9	4/9	
D1	0.506	0.568	
D2	0.505	0.568	
D3	0.505	0.567	
Average (D_N)	0.505	0.568	
	Metal Pyrex [✓ Quartz]	Metal Pyrex [✓ Quartz]	Metal Pyrex Quartz

---

	Nozzle #	Nozzle #	Nozzle #
Point #			
D1			
D2			
D3			
Average (D_N)			
	Metal Pyrex Quartz	Metal Pyrex Quartz	Metal Pyrex Quartz



$$Dn = \frac{D_1 + D_2 + D_3}{3}$$

The difference between the highest and lowest numbers shall not exceed 0.004 in.

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Back Half Thermocouple Calibration

TC ID:	3128	Cal Date:	1/7/2019	Technician:	T.Smith
Reference Type:	Digital Thermometer	Exp Date:	N/A		(signature on file)
Reference S/N :	181529396				

Ambient (~70 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	66	66	0.00%
Run 2	66	65	0.19%
Run 3	66	66	0.00%
		Pass/Fail	PASS

Boiling Water (~212 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	218	217	0.15%
Run 2	217	217	0.00%
Run 3	217	217	0.00%
		Pass/Fail	PASS

Hot Oil (~500 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	406	405	0.12%
Run 2	405	405	0.00%
Run 3	405	405	0.00%
		Pass/Fail	PASS

Test Pass/Fail PASS

Calibration tolerance for each run is 1.5%.
% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$
Calibration conducted in accordance with EPA Method 2, Section 10.3.

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Back Half Thermocouple Calibration

TC ID: 3131
Cal Date: 1/7/2019
Technician: T.Smith
Reference Type: Digital Thermometer
Exp Date: N/A
(signature on file)
Reference S/N : 181529396

Ambient (~70 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	66	65	0.19%
Run 2	65	65	0.00%
Run 3	66	65	0.19%
		Pass/Fail	PASS

Boiling Water (~212 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	218	218	0.00%
Run 2	218	217	0.15%
Run 3	217	217	0.00%
		Pass/Fail	PASS

Hot Oil (~500 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	409	408	0.12%
Run 2	408	407	0.12%
Run 3	407	407	0.00%
		Pass/Fail	PASS

Test Pass/Fail PASS

Calibration tolerance for each run is 1.5%.
% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$
Calibration conducted in accordance with EPA Method 2, Section 10.3.

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Back Half Thermocouple Calibration

TC ID:	3132	Cal Date:	1/7/2019	Technician:	T.Smith
Reference Type:	Digital Thermometer	Exp Date:	N/A		(signature on file)
Reference S/N :	181529396				

Ambient (~70 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	66	65	0.19%
Run 2	66	65	0.19%
Run 3	66	65	0.19%
		Pass/Fail	PASS

Boiling Water (~212 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	214	213	0.15%
Run 2	214	213	0.15%
Run 3	214	213	0.15%
		Pass/Fail	PASS

Hot Oil (~500 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	405	405	0.00%
Run 2	405	405	0.00%
Run 3	406	405	0.12%
		Pass/Fail	PASS

Test Pass/Fail PASS

Calibration tolerance for each run is 1.5%.
% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$
Calibration conducted in accordance with EPA Method 2, Section 10.3.

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4th Impinger Adapter Thermocouple Calibration

TC ID: 7906
Cal Date: 1/7/2019
Technician: T. Smith
(signature on file)
Reference Type: Digital Thermometer
Exp Date: N/A
Reference S/N : 181529396

Ice Bath (~32 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	35	35	0.00%
Run 2	34	35	-0.20%
Run 3	34	34	0.00%
		Pass/Fail	PASS

Ambient (~70 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	66	66	0.00%
Run 2	66	65	0.19%
Run 3	66	66	0.00%
		Pass/Fail	PASS

Test Pass/Fail Pass

Calibration tolerance for each run is 1.5%.
% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$
Calibration conducted in accordance with EPA Method 2, Section 10.3.

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Method 5 Probe Type S Pitot Calibration

Technician: Hunter Stetz (signature on file)

Pitot ID: 1605141

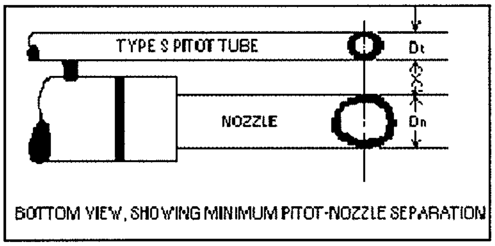
Date Calibrated: 12/29/22

Probe ID: 1605141

Next Due Cal Date: 12/29/23

Pitot Tube Assembly Level? Yes

Pitot Tube Openings Damaged? No

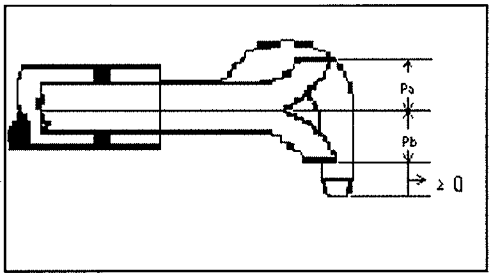


BOTTOM VIEW, SHOWING MINIMUM PITOT-NOZZLE SEPARATION

0.375 Dt (between 0.188 and 0.375 in.)

0.750 X (greater than or equal to 3/4 in.)

0.500 Dn (must use 1/2 in. nozzle)

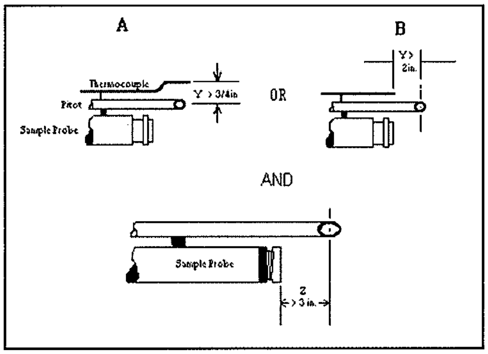


0.471 Pa Pa must = Pb

0.471 Pb

1.256 P(a) (Must be between 1.05 and 1.5 Dt)

1.256 P(b) (Must be between 1.05 and 1.5 Dt)



A

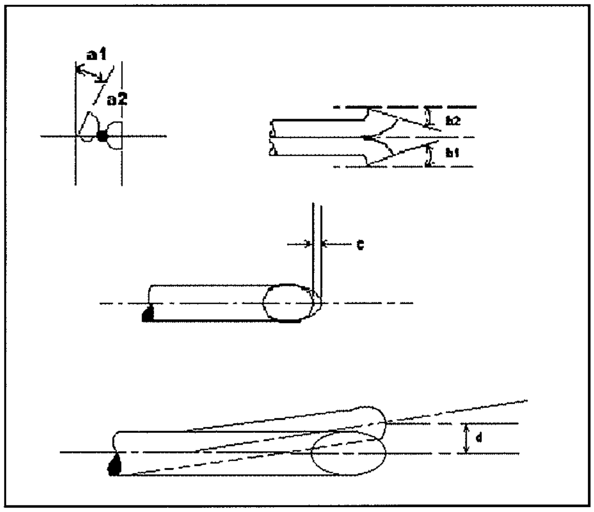
n/a Y (must be > 3/4in.)

or

B

2.434 Y (must be > 2in.)

3.503 Z (must be > 3in.)



Degrees		Inches	
1.2	a1		a1 and a2 must be
0.4	a2		< 10 degrees
0.4	b1		b1 and b2 must be
1.4	b2		< 5 degrees
1.2	α	c: 0.020	c must be < 0.125 in. (1/8in.) where: c = (Pa+Pb) x sin α
0	Θ	d: 0.00000	d must be < 0.03125 in (1/32in) where: d = (Pa + Pb) x sin Θ

* All calibrations are in accordance with CFR Pt.60, App.A, Meth.2, sect4.1.2 (Type S Pitot Calibration)

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Probe Thermocouple Calibration

TC ID:	1605141	Cal Date:	6/7/2019	Technician:	T.Smith
Reference Type:	Lollipop	Exp Date:	N/A		(signature on file)
Reference S/N :	160214423				

Ambient (~70 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	74	74	0.00%
Run 2	74	74	0.00%
Run 3	74	74	0.00%
		Pass/Fail	PASS

Boiling Water (~212 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	213	213	0.00%
Run 2	213	213	0.00%
Run 3	212	213	-0.15%
		Pass/Fail	PASS

Hot Oil (~300-500 °F)

	Ref Temp °F (T_R)	T/C Temp °F (T_T)	% Error
Run 1	320	320	0.00%
Run 2	320	320	0.00%
Run 3	319	320	-0.13%
		Pass/Fail	PASS

Test Pass/Fail PASS

Calibration tolerance for each run is 1.5%.

% Error = $(((T_R + 460) - (T_T + 460)) / (T_R + 460)) \cdot 100$

Calibration conducted in accordance with EPA Method 2, Section 10.3.

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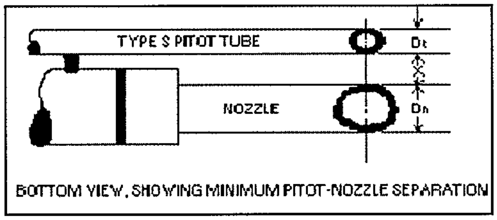
Type S Pitot Calibration

Technician: Hunter Stetz (signature on file)
Date Calibrated: 12/27/22
Next Due Cal Date: 12/27/23

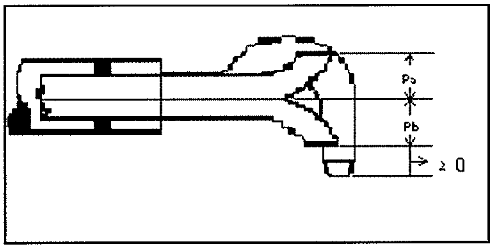
Pitot ID: S-4-2
Probe ID: n/a

Pitot Tube Assembly Level? Yes

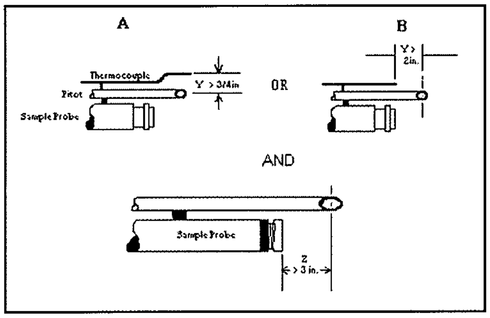
Pitot Tube Openings Damaged? No



0.375 Dt (between 0.188 and 0.375 in.)
n/a X (greater than or equal to 3/4 in.)
n/a Dn (must use 1/2 in. nozzle)



0.450 Pa Pa must = Pb
0.450 Pb
1.200 P(a) (Must be between 1.05 and 1.5 Dt)
1.200 P(b) (Must be between 1.05 and 1.5 Dt)

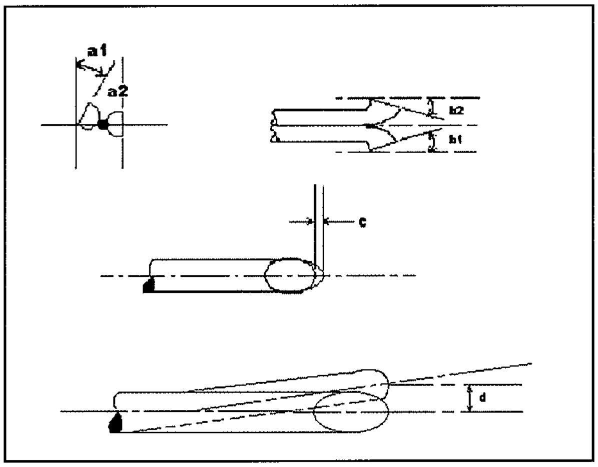


or

A
n/a Y (must be > 3/4in.)

B
2.312 Y (must be > 2in.)

n/a Z (must be > 3in.)



Degrees Inches

0.7 a1
0.4 a2
a1 and a2 must be < 10 degrees

0.9 b1
0 b2
b1 and b2 must be < 5 degrees

2.5 α c: 0.039
c must be < 0.125 in. (1/8in.)
where: c = (Pa+Pb) x sin α

0.2 Θ d: 0.00314
d must be < 0.03125 in (1/32in)
where: d = (Pa + Pb) x sin Θ

* All calibrations are in accordance with CFR Pt.60, App.A, Meth.2, sect4.1.2 (Type S Pitot Calibration)

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CP215228	CALIBRATED DEVICE
CP215228	CALIBRATED DEVICE SERIAL NUMBER
Pro 360	MODEL
RS	TECHNICIAN
02/14/22	CALIBRATION DATE
02/14/23	CALIBRATION DUE DATE
28.98	LABORATORY BAROMETRIC PRESSURE (IN HG)
71	LABORATORY TEMPERATURE (DEG F)
RF-DPR-001	PRIMARY STANDARD ID
04/14/21	PRIMARY STANDARD CALIBRATION DATE
04/14/22	PRIMARY STANDARD NEXT CALIBRATION DUE DATE
CALIBRATION STANDARD: RF-DPR-001, SN 12111032	

AS FOUND

Reference Angle	CP215228 Angle Read	% ERROR (IF >1 DEG, REPROGRAM DEVICE SETPOINTS)
0.0	0.0	0.0
10.0	10.1	0.1
20.0	20.1	0.1
30.0	30.1	0.1
40.0	40.0	0.0
50.0	50.1	0.1
60.0	60.1	0.1
70.0	70.0	0.0
80.0	80.0	0.0
90.0	90.0	0.0

Reference Angle	Angle Read	% ERROR (IF >1 DEG, REPROGRAM DEVICE SETPOINTS)
100.0	100.1	0.1
110.0	110.2	0.2
120.0	120.1	-0.1
130.0	130.1	0.1
140.0	140.0	0.0
150.0	150.2	0.2
160.0	160.1	0.1
170.0	170.2	0.2
180.0	180.2	0.2

Does the instrument require adjustment? ☐ YES ☑ NO

If YES then make adjustments and complete the AS LEFT section.

If NO then the AS LEFT values are the same as AS FOUND and no further calibration is necessary.

AS LEFT

Reference Angle	CP215228 Angle Read	% ERROR (IF >1 DEG, REPROGRAM DEVICE SETPOINTS)
0.0	0.0	0.0
10.0	10.1	0.1
20.0	20.1	0.1
30.0	30.1	0.1
40.0	40.0	0.0
50.0	50.1	0.1
60.0	60.1	0.1
70.0	70.0	0.0
80.0	80.0	0.0
90.0	90.0	0.0

Reference Angle	Angle Read	% ERROR (IF >1 DEG, REPROGRAM DEVICE SETPOINTS)
100.0	100.1	0.1
110.0	110.2	0.2
120.0	120.1	0.1
130.0	130.1	0.1
140.0	140.0	0.0
150.0	150.2	0.2
160.0	160.1	0.1
170.0	170.2	0.2
180.0	180.2	0.2

Approved By: ____________________

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TEMPERATUE GAUGE	CALIBRATED DEVICE
181529396	CALIBRATED DEVICE SERIAL NUMBER
TRACEABLE	MAKE
S04823	MODEL
RS	TECHNICIAN
02/17/22	CALIBRATION DATE
02/17/23	CALIBRATION DUE DATE
28.42	LABORATORY BAROMETRIC PRESSURE (IN HG)
67	LABORATORY TEMPERATURE (DEG F)
N/A	THERMOCOUPLE TYPE
-58	LOWER RANGE LIMIT (Deg. F)
572	UPPER RANGE LIMIT (Deg. F)
RF-THC-009	STANDARD ID
03/01/21	STANDARD CALIBRATION DATE
03/01/22	STANDARD NEXT CALIBRATION DUE DATE
CALIBRATION STANDARD: OMEGA CL3512A CALIBRATOR	
CALIBRATION STANDARD S/N: T-11000062	

OUTPUT AS FOUND

Actual Temperature Read on Device (Deg. F)	Temperature Read on Standard (Deg. F)	ERROR (IF >1% (ABSOLUTE), ADJUST DEVICE)
11.4	11.2	-0.04
68.0	68.1	0.02
107.4	107.6	0.04
174.5	173.5	-0.16
308.1	308.0	-0.01
377.2	377.0	-0.02

OUTPUT AS LEFT

Actual Temperature Read on Device (Deg. F)	Temperature Read on Standard (Deg. F)	ERROR (IF >1% (ABSOLUTE), ADJUST DEVICE)
11.4	11.2	-0.04
68.0	68.1	0.02
107.4	107.6	0.04
174.5	173.5	-0.16
308.1	308.0	-0.01
377.2	377.0	-0.02

Does the instrument require adjustment? ☐ YES ☑ NO

If YES then make adjustments and complete the AS LEFT section.

If NO then the AS LEFT values are the same as AS FOUND and no further calibration is

Approved By:

TROEMNER
Troemner, LLC

ISO/IEC 17025 Calibration Certificate

CALIBRATION
NVLAP LAB CODE 105013-0

ilac-MRA

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

Page 1 of 7 Pages
Weight

Certificate Number 220569385B-2
Date of Calibration 11-Apr-2022

SECTION 1: NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 2: APPROVED SIGNATORY

Lynn Dickerson, Metrologist

SECTION 3: PERSON PERFORMING WORK

Robotic Calibration

SECTION 4: CERTIFICATE INFORMATION

Description of Masses: ASTM Weight

Accuracy Class	: ASTM E617-18 Class 3	Date Received	: 18-Mar-2022
Order Number	: PO-025749	Date of Calibration	: 11-Apr-2022
Construction	: Two Piece	Date of Issue	: 18-Apr-2022
Material	: Stainless Steel	Weight Range	: 1kg

SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.68 °C Pressure: 764.84 mm Hg Relative Humidity: 44%

SECTION 6: PERTINENT INFORMATION

The Weights listed on this calibration report have been compared to reference mass standards that are traceable to the SI through the National Institute of Standards and Technology under Test No. 684/289871-17.

Reference standards and balances used to perform the calibration are listed in Section 10.

The weights calibrated for this report have been calibrated in accordance with Troemner's calibration process. The calibration performed meets the criteria as described in the current revisions of ASTM E617 and OIML R111.

This calibration also meets specifications as outlined in ISO/IEC 17025, ANSI/NCSL Z540-1-1994, and applicable documents.

ISO/IEC 17025 Calibration Certificate

Page 2 of 7 Pages
Weight

Certificate Number 220569385B-2
Date of Calibration 11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 7: TRUE MASS (MASS IN VACUUM) CALIBRATION DATA

Nominal Mass Value	Notes	Serial Number	--------- True Mass ---------- As Found	As Left	Density [1] of Weight	Uncertainty (+ or -)
1 kg		1000119206	999.99970 g	999.99970 g	8.0300 g/cm³	0.50 mg

---

[1] Density is assumed unless otherwise stated

1 As Found / 1 Total

ISO/IEC 17025 Calibration Certificate

Page 3 of 7 Pages
Weight

Certificate Number 220569385B-2
Date of Calibration 11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 8: CONVENTIONAL MASS CALIBRATION VALUE VS. REFERENCE DENSITY 8000 kg/m³

Nominal Mass Value	Notes	Serial Number	---- Conventional Mass Value ---- As Found	As Left	Uncertainty (+ or -)	Tolerance (+ or -)
1 kg		1000119206	1000.00026 g	1000.00026 g	0.50 mg	10.0000 mg

TROEMNER
Troemner, LLC

ISO/IEC 17025 Calibration Certificate

CALIBRATION
NVLAP LAB CODE 105013-0

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

Page 4 of 7 Pages
Weight

Certificate Number 220569385B-2
Date of Calibration 11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 9: CONVENTIONAL MASS CALIBRATION DATA VS. REFERENCE DENSITY 8000 kg/m³

Nominal Mass Value	Notes	Serial Number	-- Conventional Mass Correction -- As Found	As Left	Uncertainty (+ or -)	Tolerance (+ or -)
1 kg		1000119206	0.26 mg	0.26 mg	0.50 mg	10.0000 mg

Page 5 of 7 Pages
Weight

Certificate Number 220569385B-2
Date of Calibration 11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 10: CALIBRATION PROCEDURE DATA

Nominal Mass Value	Serial Number	Standard Set No.	Cal Due	Balance Used	Cal Due	Procedure Used
1 kg	1000119206	S124	01-Jul-2022	A1000XXL-135	01-Jan-2023	Multi A-B

Certificate Number	220569385B-2
Date of Calibration	11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 11: GENERAL INFORMATION

This calibration was performed in Troemner's High Precision Level I Mass Metrology Laboratory at 201 Wolf Drive, Thorofare, New Jersey 08086 unless otherwise noted on the Addendum. The internal procedures used are CAL-CLASSI and METR-MAP.

SECTION 12: DEFINITIONS AND TERMS

TRUE MASS - The mass of a weight as if it were measured in a vacuum. Also known as Mass in a Vacuum.

CONVENTIONAL MASS - The conventional value of the result of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of a density of 8000 kg/m³ which it balances in air of a density of 1.2 kg/m³.

AS FOUND TRUE MASS - The measured value of the mass(es) as they were received by Troemner.

AS LEFT TRUE MASS - The measured value of the mass(es) after adjustment, repair, or replacement when necessary. The As Found True Mass will equal the As Left True Mass if the mass(es) did not require adjustment, repair or replacement.

NOMINAL MASS - The mass value as marked on the weight.

CORRECTION - The difference between the conventional mass value of a weight and its nominal value. A positive correction indicates that the conventional mass value is greater than the nominal value by the amount of the correction.

AS FOUND CONVENTIONAL MASS CORRECTION - The conventional correction of the result, as it was received by Troemner, of weighing in air in accordance to International Recommendation D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³. which it balances in air density of 1.2 kg/m³. If the customer requires cleaning prior to calibration, the after cleaning correction would be reported.

AS LEFT CONVENTIONAL MASS CORRECTION - The conventional correction of the result, after adjust-, ment repair, or replacement of weighing in air in accordance to International Recommendation D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. The As Found will equal the As Left Conventional Mass Correction if the mass(es) did not require adjustment, repair or replacement.

(continued on next page)

Page 7 of 7 Pages
Weight

Certificate Number	220569385B-2
Date of Calibration	11-Apr-2022

NAME AND ADDRESS OF CUSTOMER

Montrose Air Quality Services
2 New Pasture Rd
Unit 5
Newburyport MA 01950

SECTION 12: DEFINITIONS AND TERMS (continued)

UNCERTAINTY - Non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used. The uncertainty is calculated in accordance with NIST TechNote 1297 using a coverage factor of $k = 2$ ($k = 2$ defines an interval having a level of confidence of approximately 95 percent). The uncertainty does not include possible effects of magnetism.

TOLERANCE - Defines the limits in which the correction value and the uncertainty must fall to meet the tolerance specification for the given Class.

AS FOUND CONVENTIONAL MASS VALUE - The measured value of the mass(es) as they were received by Troemner, of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. If the customer requires cleaning prior to calibration, the after cleaning value would be reported.

AS LEFT CONVENTIONAL MASS VALUE - The measured value of the mass(es) after they were adjusted, repaired or replaced when necessary, of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the Conventional Mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. The As Found will equal the As Left Conventional Mass Value if the mass(es) did not require adjustment, repair or replacement.

ASTM E617 - Weights meet the tolerance specification for ASTM E617. Weights 2kg - 1g screened for magnetism using a Gaussmeter.

SECTION 13: ADDENDUM

As Found data taken after cleaning with alcohol.
Supplementary to certificate # 220569385B-1
s/n amended

Appendix C.2

CEMS Stratification, NO_x Converter and Cyclonic Flow Checks

Facility/Site: Gateway Services / Forget-Me-Not **Date:** 2/14/23
Source: EU5 **Start Time:** 9:00
Run No.: Stratification Check **Stop Time:** 9:15

Date/time	**O_2 ($\%_{vd}$)**			
2/14/2023 9:00:29 AM	13.39			
2/14/2023 9:01:29 AM	13.23			
2/14/2023 9:02:29 AM	13.41			
2/14/2023 9:03:29 AM	13.47			
2/14/2023 9:04:29 AM	13.49			
3-min. avg	13.46			
2/14/2023 9:05:29 AM	13.42			
2/14/2023 9:06:29 AM	13.38			
2/14/2023 9:07:29 AM	13.37			
2/14/2023 9:08:29 AM	13.40			
2/14/2023 9:09:29 AM	13.49			
3-min. avg	13.42			
2/14/2023 9:10:29 AM	13.88			
2/14/2023 9:11:29 AM	14.12			
2/14/2023 9:12:29 AM	14.08			
2/14/2023 9:13:29 AM	14.22			
2/14/2023 9:14:29 AM	14.12			
3-min. avg	14.14			
Pt 1 Average	13.46			
Pt 2 Average	13.42			
Pt 3 Average	14.14			
Average	13.67			
lower 5% bound	12.99			
upper 5% bound	14.36			
Status	**Pass**			

MONTROSE
AIR QUALITY SERVICES

Method 7E - NO_2 to NO Conversion Efficiency / Post-Test Check

Client: Gateway-Forget Me Not
Analyzer ID: Teco 42i HL #2
Date: 2-14-2023
Location: ~~Northbridge~~, Northborough, MA
Operator: A Stoltz
Start Time: 1739
Source: EUS
Project #: 022280
End Time: 1744

NO_2 Cylinder No.	NO_2 Cylinder Value, ppm	Instrument Response, ppm	% Efficiency	Pass/Fail
EB0056146	49.7	47.7	96.0	Pass

$EffNO2 = CDir/CV \times 100$ [Eq. 7E-7]
EffNO2 must be ≥***90 Percent*** [per Section 13.5 of Method 7E)

where:
C_{Dir} = Measured concentration of a calibration gas when introduced in direct calibration mode, ppmv.
C_V = Manufacturer certified concentration of a calibration gas (low, mid, or high), ppmv.

NO_2 converter check was performed in accordance with 40 CFR Part 60, Appendix A, Method 7E, Section 8.2.4.1

MONTROSE
AIR QUALITY SERVICES

Cyclonic Flow Field Data Sheet

Client:	FORGET-ME-NOT
Site Location:	NORTHBOROUGH, MA
Source:	EU 5
Test Location:	OUTLET
Duct Diameter:	20.4"
Test Number:	PRE
Test Time:	1600 - 1615
Test Date:	2-13-23
Testers:	CM / HS
Angle Finder ID:	DP-1
Pitot Number:	S-4-2
Pitot Coefficient:	0.84
Ambient Temperature:	
Wet Bulb Temp:	
Barometric Pressure:	
Duct Static Pressure:	
	Pre / Post
Leak Checks:	✓✓ / ✓✓

Port Number	Traverse Point	Velocity Pressure	Stack Temp.	Cyclonic Angle
A 1				13
2				8
3				5
4				6
5				2
6				11
B 1				7
2				4
3				1
4				6
5				4
6				3

Appendix C.3

AETB Documentation

STACK TESTING ACCREDITATION COUNCIL

American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

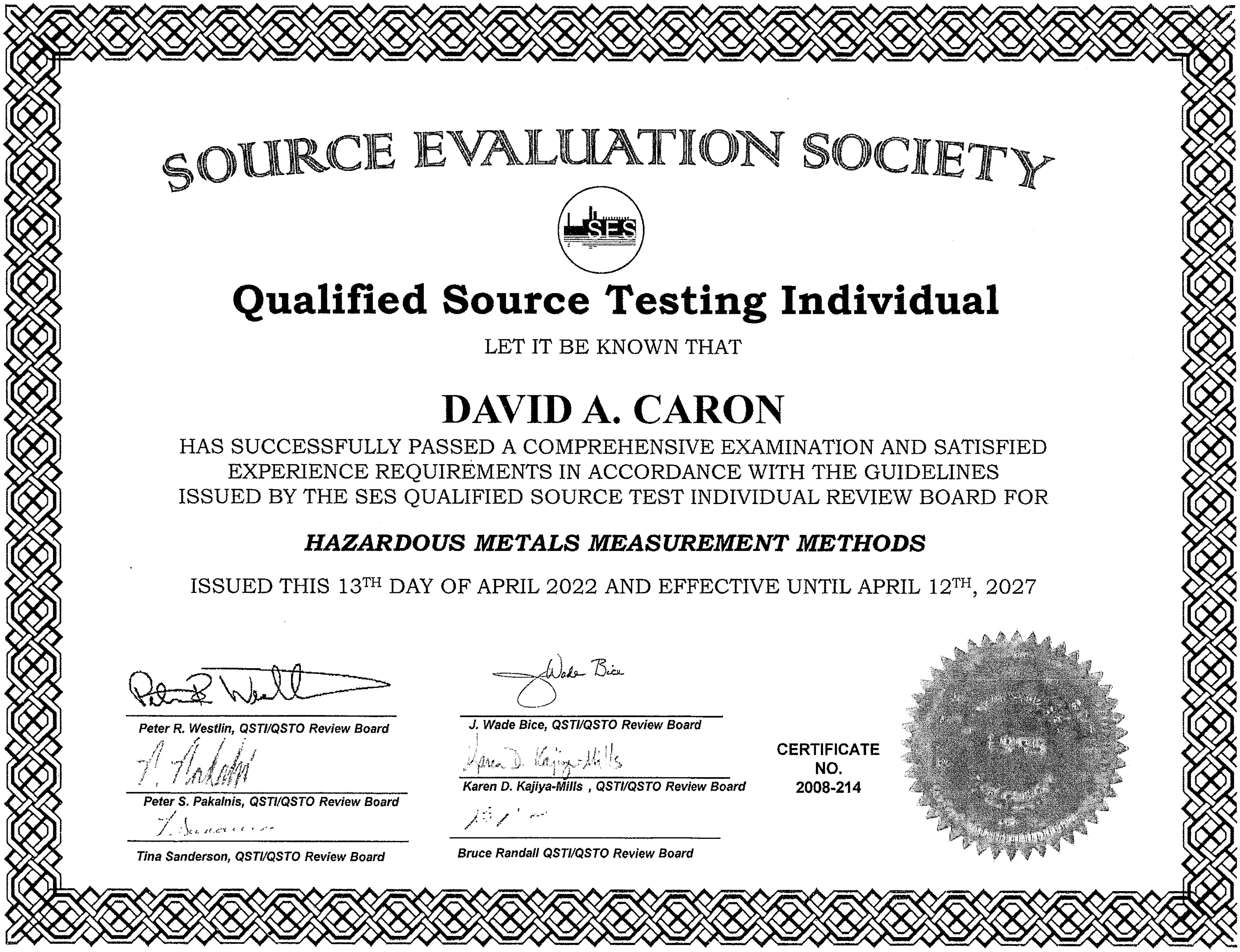
MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 4th day of February 2022.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3925.01
Valid to February 29, 2024

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.



SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

DAVID A. CARON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

HAZARDOUS METALS MEASUREMENT METHODS

ISSUED THIS 13TH DAY OF APRIL 2022 AND EFFECTIVE UNTIL APRIL 12TH, 2027

Peter R. Westlin, QSTI/QSTO Review Board

Wade Bice

J. Wade Bice, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Karen D. Kajiya-Mills

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Tina Sanderson, QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2008-214

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

DAVID A. CARON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE SAMPLING METHODS

ISSUED THIS 15TH DAY OF JANUARY 2019 AND EFFECTIVE UNTIL JANAURY 14TH, 2024

Peter R. Westlin, QSTI/QSTO Review Board

Wade Bice

J. Wade Bice, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Karen D. Kajiya-Mills

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Tina Sanderson, QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE
NO.
2008-214

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

DAVID A. CARON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS

ISSUED THIS 16TH DAY OF OCTOBER 2018 AND EFFECTIVE UNTIL OCTOBER 15TH, 2023

Peter R. Westlin, QSTI/QSTO Review Board

Wade Bice

J. Wade Bice, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Karen D. Kajiya-Mills

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Tina Sanderson, QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE
NO.
2008-214

Morrison
Environmental
Engineering

October 24, 2022

David Caron
Montrose Air Quality Services, LLC
2 New Pasture Rd. Ste 5
Newburyport, MA 01950

Re: Visible Emissions Observer Training and Certification

Dear David:

CONGRATULATIONS on passing the certification requirements for the Visible Emission Training held in Rye, New Hampshire on October 21, 2022. Morrison Environmental Engineering, Inc. is pleased to provide the enclosed certification, which is valid for six months.

MEE makes every effort to provide the highest quality training in the most efficient manner possible. In an effort to continually improve our Smoke School sessions, we always welcome any input you may have. Also, if you have any questions, feel free to call or email us.

We typically hold Spring Smoke School sessions during the month of April, and the registration notices go out by the end of February. We will be sending out notifications by email or you can check our website at morrisonenvironmental.com. We provide on-line registration or you can print a registration form and send or fax it to us.

We hope to see you in the Spring!

Sincerely,

Alan Morrison

Alan Morrison
Vice President

Continuing Education Credit: 1 Professional Development Hour

16 Pine Meadow Lane, North Yarmouth, Maine 04097
phone/fax (207) 846-9897 ◆ meeinc@maine.rr.com

MONTROSE
ENVIRONMENTAL

Qualified Individual Conformance Statement

I David Curran, as a QI (Qualified Individual) sign this Conformance Statement to verify that each of the test projects that I perform, and each of the test projects performed under my supervision will conform with the Montrose Air Quality Services Management System, the test methods applicable to the testing, and ASTM D 7036-04.

I realize that as a Qualified Individual I have the proper knowledge to perform these tests correctly, and that I am held to a high standard of integrity.

QI Signature

3/28/16
Date

APPENDIX D

FACILITY MASSDEP FINAL AIR QUALITY PLAN APPROVAL

MassDEP
Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Bethany A. Card
Secretary

Martin Suuberg
Commissioner

August 30, 2022

Ms. Sarah Streeter
Forget-Me-Not Pet Cremation, LLC
80 Lyman Street
Northborough, MA 01532

RE: **Northborough**
ePlace Authorization #: AQ02C-0000005
Application #: 20-AQ02C-0003-APP
Approval #.: CE-20-015
Class: NM25
FMF No.: 442938
FINAL AIR QUALITY PLAN APPROVAL

Dear Ms. Streeter:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Non-major Comprehensive Plan Application ("Application") listed above. This Application concerns the proposed construction and operation of one new animal crematory unit (retort) at your cremation facility located at 80 Lyman Street in Northborough, Massachusetts ("Facility"). The Application bears the seal and signature of Christopher Bannon, Massachusetts Registered Professional Engineer Number 55078.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-O, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Facility owner/operator ("Permittee") must comply in order for the Facility to be operated in compliance with this Plan Approval.

On July 21, 2022, public notice was published on the MassDEP website for public review and comment on the proposed Non-Major Plan Approval (ePlace Application number: 20-AQ02C-0003-APP) for your Facility located at 80 Lyman Street in Northborough, MA. The comment period ended August 20, 2022.

No comments were submitted.

1. DESCRIPTION OF FACILITY AND APPLICATION

A. FACILITY HISTORY AND DESCRIPTION

Forget-Me-Not Pet Cremation LLC is an existing pet crematory which has been in operation since 2007. The Facility currently operates one (1) Mathews Cremation Division Power Pak II cremation unit approved under Plan Approval Transmittal No. W133332 dated September 4, 2007, two (2) Crawford C1000P cremation units approved under Plan Approval Transmittal No. W229538 dated October 14, 2009, and one (1) American Crematory Equipment Co. A-400-P XL cremation unit approved under Plan Approval Transmittal No. X265131 dated August 17, 2015. Plan Approval Transmittal No. X265131 approved two (2) American Crematory Equipment Co. A-400-P XL cremation units, however, only one of the approved cremation units was installed. This Application proposes to revise operational restrictions, emission limits, and stack exhaust parameters on the four existing cremation units.

Additionally, this Application proposes to install and operate one (1) new animal crematory retort. The proposed unit is a Mathews Environmental Solutions IEB Series 32-5S and is designated as Emission Unit No.5 ("EU5"). The retort unit is designed with six individual cremation chambers for the cremation of animal remains only. Each chamber is equipped with its own combustion system which allows each chamber to operate independently of the others. The retort's primary chamber #1 is equipped with an Eclipse Model TJ-75 burner which uses natural gas as its only fuel of use at a maximum firing rate of 600,000 British thermal units ("Btu") per hour. The retorts primary chambers #2 through #5 are each equipped with an Eclipse Model TJ-50 burner which uses natural gas only at a maximum firing rate of 450,000 Btu per hour. The retort's secondary chamber is equipped with an Eclipse Model TJ-150 burner which uses natural gas only at a maximum firing rate of 1,200,000 Btu per hour. The unit is designed to provide a minimum exhaust gas residence time of 1 second at the minimum operating temperature of 1,600 degrees Fahrenheit.

This plan application and approval addresses the installation and operation of EU5, and revised operational limits and emission limits on existing retorts. The Facility has proposed and MassDEP approves Best Available Control Technology ("BACT") as defined in Table 2.

This Plan Approval, AQ02C-0000005, supersedes the following Plan Approvals: W133332 dated September 4, 2007, W229538 dated October 14, 2009, and X265131 dated August 17, 2015, in their entirety, with the exception that all plan application materials submitted as part of these Plan Approvals become part of this Plan Approval AQ02C-0000005.

B. REGULATORY REQUIREMENTS

1. State Requirements

Best Available Control Technology ("BACT")

MassDEP has determined that meeting the requirements as stated in this Application for the proposed installation and subsequent operation of EU5 represents BACT.

Air Dispersion Modeling

The Permittee has conducted an air dispersion modeling analysis to demonstrate that the simultaneous operation of the five cremation retorts, EU1 through EU5, will not cause an exceedance of any National Ambient Air Quality Standard (NAAQS).

The modeling assumes a worst-case condition of all five units operating simultaneously six (6) days per week (Monday through Saturday) between the hours of 7 AM to 7 PM (approx. 3,744 hours per year). Additionally, EUs 3, 4, & 5 were modeled simultaneously for all remaining hours in the year for a total of 8,760 hours per year.

Modeling was conducted for the following criteria pollutants: Nitrogen Dioxide (NO_2), Particulate Matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and Particulate Matter less than or equal to 10 microns in diameter (PM_{10}).

The modeling results, based on the emissions of each pollutant and stack heights proposed by the Permittee, indicated that the emissions associated with the proposed three new retorts, when added to monitored background values and compared to the NAAQS, will not cause or contribute to a condition of air pollution with respect to the criteria pollutant emissions.

2. EMISSION UNIT IDENTIFICATION

Each Emission Unit ("EU") identified in Table 1 is subject to and regulated by this Plan Approval:

Table 1

EU	Description	Design Capacity	Pollution Control Device
1[1]	Crematory Retort: Mathews Cremation Division Power Pak II Primary Combustion Chamber Burner: One (1) Eclipse Model TJ75 natural gas fired burner Secondary Combustion Chamber Burner: One (1) Eclipse Model TJ150 natural gas fired burner	Maximum total weight of animal remains per batch: 750 pounds per batch[3] Primary Combustion Chamber Burner: 1.4 MMBtu/hr Secondary Combustion Chamber Burner: 1.2 MMBtu/hr	None
2[1] and 3[1]	Crematory Retort: Crawford C1000P Primary Combustion Chamber Burner: One (1) Eclipse Model TJ50 natural gas fired burner Secondary Combustion Chamber Burner: One (1) Eclipse Model TJ150 natural gas fired burner	Maximum total weight of animal remains per cremation unit per batch: 600 pounds per batch[3] Primary Combustion Chamber Burner: 0.5 MMBtu/hr Secondary Combustion Chamber Burner: 1.5 MMBtu/hr	None

Table 1			
EU	**Description**	**Design Capacity**	**Pollution Control Device**
4[1]	<u>Crematory Retort:</u> American Crematory Equipment Co. Model A-400-P XL <u>Primary Combustion Chamber Burner:</u> Eight (8) Eclipse Model TJ0502 natural gas fired burner <u>Secondary Combustion Chamber Burner:</u> One (1) Eclipse Model TJ0200 natural gas fired burner	Maximum total weight of animal remains per cremation unit per hour: 470 pounds per hour[3] <u>Primary Combustion Chamber Burner:</u> 0.5 MMBtu/hr (each) 4.0 MMBtu/hr (combined) <u>Secondary Combustion Chamber Burner:</u> 2 MMBtu/hr	None
5[2]	<u>Crematory Retort:</u> Mathews Environmental Solutions IEB Series 32-5S <u>Primary Combustion Chamber Burner #1:</u> Eclipse Model TJ-75 natural gas fired burner <u>Primary Combustion Chamber Burners #2-#5:</u> Eclipse Model TJ-50 natural gas fired burner <u>Secondary Combustion Chamber Burner:</u> Eclipse Model TJ-150 natural gas fired burner	Maximum total weight of animal remains per cremation unit per hour: 250 pounds per hour[3] <u>Primary Combustion Chamber Burners:</u> 0.6 MMBtu/hr (Burner#1), 0.45 MMBtu/hr (Burner #2 through#5), 2.4 MMBtu/hr (combined) <u>Secondary Combustion Chamber Burner:</u> 1.2 MMBtu/hr	None

Table 1 Key:

EU = Emission Unit

MMBtu/hr = millions of British thermal units per hour

Table 1 Notes:

1. Existing Unit
2. Proposed unit, approved herein
3. For EU1-EU3, maximum batch weight is the equipment's stated design capacity. For EU4, batch weight was not available so the pounds cremated per hour value was used instead. For EU5, the batch weight is 1,000 lb/batch, however, since batch weight varies the 250 pound per hour value was used in Table 1.

3. APPLICABLE REQUIREMENTS

A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2:

Table 2

EU	Operational / Production Limit	Air Contaminant	Emission Limit[1]
1	1. ≤ 200 pounds Cremations per hour 2. ≤ 31.9 tons Cremations per month 3. ≤ 374.4 tons Cremations per any Consecutive 12-Month Period 4. 3744 hours per year 5. Operation restricted to Monday-Saturday from 7:00am – 7:00 pm	PM	0.05 gr/dscfm @ 7% O_2, 0.05 TPM, 0.57 TPY
		PM_{10}	0.04 gr/dscfm @ 7% O_2, 0.04 TPM, 0.44 TPY
		$PM_{2.5}$	0.02 gr/dscfm @ 7% O_2, 0.02 TPM, 0.20 TPY
		NO_x	63 ppmvd[2], 0.05 TPM, 0.59 TPY
		CO	0.16 TPM, 1.87 TPY
		SO_2	0.04 TPM, 0.47 TPY
		VOC	0.05 TPM, 0.56 TPY

Table 2			
EU	**Operational / Production Limit**	**Air Contaminant**	**Emission Limit[1]**
2	1. ≤175 pounds cremations per hour 2. 27.9 tons Cremations per month 3. 327.6 tons Cremations per any Consecutive 12-Month Period 4. 3744 hours per year 5. Operation restricted to Monday-Saturday from 7:00am – 7:00 pm	PM	0.05 gr/dscfm @ 7% O_2, 0.07 TPM, 0.79 TPY
		PM_{10}	0.04 gr/dscfm @ 7% O_2, 0.05 TPM, 0.62 TPY
		$PM_{2.5}$	0.02 gr/dscfm @ 7% O_2, 0.02 TPM, 0.29 TPY
		NO_x	38 ppmvd[2], 0.04 TPM, 0.49 TPY
		CO	0.14 TPM, 1.64 TPY
		SO_2	0.03 TPM, 0.41 TPY
		VOC	0.04 TPM, 0.49 TPY
3	1. ≤175 pounds cremations per hour 2. 65.1 tons Cremations per month 3. 766.5 tons Cremations per any Consecutive 12-Month Period	PM	0.05 gr/dscfm @ 7% O_2, 0.16 TPM, 1.86 TPY
		PM_{10}	0.04 gr/dscfm @ 7% O_2, 0.12 TPM, 1.45 TPY
		$PM_{2.5}$	0.02 gr/dscfm @ 7% O_2, 0.06 TPM, 0.67 TPY
		NO_x	38 ppmvd[2], 0.10 TPM, 1.16 TPY

Table 2

EU	Operational / Production Limit	Air Contaminant	Emission Limit[1]
3		CO	0.33 TPM, 3.83 TPY
		SO_2	0.08 TPM, 0.96 TPY
		VOC	0.10 TPM, 1.15 TPY
4	1. Maximum total weight of animal remains per hour: 470 pounds per hour 2. 174.8 tons Cremations per month 3. 2058.6 tons Cremations per any Consecutive 12-Month Period	PM	0.05 gr/dscfm @ 7% O_2, 0.17 TPM, 1.95 TPY
		PM_{10}	0.04 gr/dscfm @ 7% O_2, 0.13 TPM, 1.52 TPY
		$PM_{2.5}$	0.02 gr/dscfm @ 7% O_2, 0.06 TPM, 0.70 TPY
		NO_x	150 ppmvd @ 7% O_2 0.18 TPM, 2.07 TPY
		CO	0.08 TPM, 0.97 TPY
		SO_2	0.22 TPM, 2.57 TPY
		VOC	0.26 TPM, 3.09 TPY
5	1. ≤ 250 pounds Cremations per hour	PM	0.05 gr/dscf @ 7% O_2 0.23 TPM 2.65 TPY[4]

Table 2

EU	Operational / Production Limit	Air Contaminant	Emission Limit[1]
5	2. ≤ 93 tons Cremations per month 3. ≤ 1,095 tons Cremations per any Consecutive 12-Month Period	PM_{10}	0.04 gr/dscf @ 7% O_2, 0.18 TPM, 2.07 TPY
		$PM_{2.5}$	0.02 gr/dscf @ 7% O2, 0.08 TPM, 0.95 TPY
		NO_x	≤ 100 ppmvd @ 7% O_2[5] ≤ 0.16 TPM ≤ 1.88 TPY[4]
		CO	≤ 50.0 ppmvd @ 7% O_2 ≤ 0.11 TPM ≤ 1.32 TPY
		SO_2	0.12 TPM, 1.37 TPY
		VOC	0.14 TPM, 1.64 TPY
1,2,3	1. NA	Opacity[3]	≤10%
4,5	1. NA	Opacity[3]	≤ 5%, except > 5% to ≤ 20% for ≤ 2 consecutive minutes during any one hour
Facility-wide	1. Minimum Secondary Chamber Temperature ≥ 1,600 Degrees Fahrenheit per unit 2. ≤ 1,270 pounds Cremations per hour 3. ≤ 392.7 tons Cremations per Month	PM	0.66 TPM 7.81 TPY
		PM_{10}	0.52 TPM, 6.10 TPY
		$PM_{2.5}$	0.24 TPM, 2.81 TPY

Table 2			
EU	**Operational / Production Limit**	**Air Contaminant**	**Emission Limit[1]**
Facility-wide	4. ≤ 4,622.1 tons Cremations per any Consecutive 12 Month Time Period 5. ≤ 9.90 MMft3 Natural Gas usage Per Month[4] 6. ≤ 116.51 MMft3 Natural Gas usage per any Consecutive Twelve Month Time Period[4]	NO$_x$	0.53 TPM 6.19 TPY
		CO	0.82 TPM 9.63TPY
		SO$_2$	0.49 TPM, 5.78 TPY
		VOC	0.59 TPM, 6.93 TPY

Table 2 Key:

EU = Emission Unit

PM$_{2.5}$ = Particulate Matter less than or equal to 2.5 microns in diameter includes filterable and condensable fractions

ppmvd = parts per million by volume, dry basis,

CO = Carbon Monoxide

O$_2$ = Oxygen

MMft3 = million cubic feet

TPM = tons per calendar month

% = percent

≤ = less than or equal to

VOC = Volatile Organic Compounds

PM = Total Particulate Matter

PM$_{10}$= Particulate Matter less than or equal to 10 microns in diameter

gr/dscf = grains per dry standard cubic foot, corrected to 7 percent oxygen

NO$_x$ = Nitrogen Oxides

°F = Degrees Fahrenheit

> = greater than

TPY = tons per consecutive 12-month period

≥ = greater than or equal to

SO$_2$ = Sulfur Dioxide

Table 2 Notes:

1. Emission limits in TPM and TPY are based on the approved gr/dscf and ppmvd BACT emission limits, stack test data, or AP-42 emission factors and unrestricted operation of 8760 hours per year at maximum capacity for EU3-5 and 3744 hours per year at maximum capacity for EU1-2.
2. EU1-EU3 NO$_x$ short-term limits oxygen content is unknown. EU1-EU3 were permitted between 2007-2009 and the short-term NO$_x$ limit for these units were not included in the original Approvals. The pound per hour emission rates for these units were included in this current Plan Approval (ePLACE Authorization: AQ02C-0000005) as they were used in the air dispersion modeling for this Plan Approval. NO$_x$ short term emission

rates used in the modeling and Table 2 were derived from NO_x emission factors found in the USEPA publication *AP-42: Compilation of Air Emissions Factors*, 5th Edition, Table 2.1-12 for multiple chamber industrial/commercial combustor.

3. Opacity is exclusive of uncombined water vapor.
4. Natural gas usage is based on a proposed maximum natural gas heat input of 11.6 MMBtu/hr (EU3-EU5) 8760 hours per 12-month period and 4.3 MMBtu/hr (EU1-EU2) 3744 hours per 12-month period.
5. Based on the emissions test results, MassDEP may re-evaluate the NO_x BACT determination (NO_x ppm limit) for EU5.

B. COMPLIANCE DEMONSTRATION

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5:

Table 3

EU	Monitoring and Testing Requirements
1,2,3	1. The permittee shall equip each COMS and DAS with both audible and visual alarms to alert the operator whenever opacity exceeds ten (10) percent opacity.
4,5	2. The permittee shall equip each COMS and DAS with both an audible and a visual alarm set to alert the operator(s) whenever opacity exceeds either of the following two alarm points: a. The first alarm point shall be triggered when the opacity has exceeded five (5) percent opacity for more than any two consecutive one minute periods during any one clock hour time period, without exceeding twenty (20) percent; b. The second alarm point shall be triggered when the opacity exceeds twenty (20) percent for any period of time.
5	3. The Permittee shall conduct emissions compliance testing on the new cremation retort to demonstrate compliance with the PM, PM_{10}, $PM_{2.5}$, NO_x, CO, and opacity emission limitations as contained in Table 2 of this Plan Approval. All compliance testing for particulate shall include the condensable fraction. 4. The Permittee shall conduct emissions compliance testing within sixty (60) days after the installation of the retort is completed but no later than 180 days after the retort is installed and operational. Testing shall be conducted in accordance with the requirements and procedures set forth by appropriate EPA Reference Test Methods, 40 CFR Part 60 Subpart A, 40 CFR Part 51, Appendix M, Air Pollution Control Regulations 310 CMR 7.00, Section 7.13 and this Plan Approval. The opacity testing shall be conducted in accordance with the requirements and procedures as contained in 40 CFR 60 Subpart A, Method 9. The dates and times for conducting the emission tests shall be coordinated with MassDEP personnel of this Office for a mutually agreed upon schedule for testing.

Table 3

EU	Monitoring and Testing Requirements
1,2,3,4,5	5. The Permittee shall monitor temperatures in the primary and secondary chambers with Continuous Temperature Monitoring Systems (CTMS) during each complete cremation cycle. If the primary chamber thermocouple is located at a combined exit from the primary chambers, the Permittee shall monitor temperatures at the combined exit with a Continuous Temperature Monitoring System (CTMS) during each complete cremation cycle. A complete cremation cycle shall include burn-down and cool-down time as recommended by the manufacturer, or the time required to consume all combustible material, whichever is greater.
	6. The Permittee shall equip each secondary chamber temperature monitor, or thermocouple, with both audible and visual alarms set to alert the operator(s) whenever a temperature deviation occurs.
	7. The Permittee shall ensure the primary chamber burner is electronically interlocked with the secondary chamber thermocouple to prevent ignition of the primary chamber burner or to automatically shut off the primary chamber burner during the burn cycle should the secondary chamber thermocouple detect a temperature less than the minimum required temperature as stated in Table 2 of this Plan Approval.
	8. The Permittee shall monitor the opacity of the stack gas from each retort, during each complete cremation cycle, using its own dedicated full scale (0-100%) Continuous Opacity Monitoring Systems (COMS) with associated Data Acquisition System (DAS) or circular chart recorder which shall include the corresponding date and time. A complete cremation cycle shall include burn-down and cool-down time as recommended by the manufacturer, or the time required to consume all combustible material, whichever is greater.
	9. The Permittee shall install each COMS in an appropriate sampling location in the ductwork or stack to give a representative and accurate opacity measurement when the crematory retort is operating.
1,2,3,4,5	10. Each COMS shall have the following design specifications: a. The light source shall have a peak and mean spectral response between 500 and 600 nanometers (nm). The response at any wavelength below 400 nm or above 700 nm shall be less than 10 percent of the peak spectral response, b. The light source shall be modulated to filter out the effects of ambient light such as sunlight, c. The output signal from the COMS shall be in terms of electrical current such as in a 4 to 20 milliamp format, and d. Opacity data shall be collected using digital output technology or recorded using a circular chart recorder.
	11. The Permittee shall ensure that an electronic interlock automatically prevents ignition of the primary chamber or shut off the primary chamber burner during the burn cycle whenever opacity exceeds the limit in Table 2.
	12. The Permittee shall operate the crematory retorts in accordance with the manufacturer's Standard Operating and Maintenance Procedures (SOMP). The Permittee shall check all crematory equipment including the air pollution control and continuous opacity monitoring equipment daily for proper operation and function before proceeding with the cremation process. The photovoltaic eye on the opacity monitors shall be cleaned daily or as frequently as necessary to obtain accurate opacity readings.

Table 3

EU	Monitoring and Testing Requirements
1,2,3,4,5	13. The Permittee shall maintain the crematory retorts as necessary and ensure that they are kept in good working condition. The temperature monitoring equipment shall be calibrated at a frequency and maintained in accordance with manufacturer's recommendations to ensure continuous compliance with the temperature limits in Table 2 of this Approval. The COMS shall be calibrated in the field on a quarterly basis by performing clear path calibration that is conducted manually for the zero and for a span point that is between twenty (20) and thirty (30) percent transmission using a certified neutral density filter. Said quarterly calibrations shall be conducted between January 1st through March 31st, April 1st through June 30th, July 1st through September 30th, and October 1st through December 31st of every year.
	14. The Permittee shall monitor on a daily, monthly, and consecutive twelve-month period basis the pounds cremated in each crematory retort.
	15. The Permittee shall monitor on a daily, monthly, and consecutive twelve-month period basis the natural gas consumption for each crematory retort.
Facility-wide	16. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration and 310 CMR 7.71 Greenhouse Gas Reporting.
	17. If and when MassDEP requires it, the Permittee shall conduct emission testing in accordance with USEPA Reference Test Methods and Regulation 310 CMR 7.13.
	18. At least 30 days prior to emission testing, the Permittee shall submit to MassDEP for written approval a stack emission pretest protocol.
	19. Within 60 days after emission testing, the Permittee shall submit to MassDEP a final stack emission test results report.

Table 3 Key:

EU = Emission Unit
$PM_{2.5}$ = Particulate Matter less than or equal to 2.5 microns in diameter includes filterable and condensable fractions
CO = Carbon Monoxide
SOMP = Standard Operating and Maintenance Procedures
DAS = Data Acquisition System
nm = nanometer
USEPA = United States Environmental Protection Agency

CMR = Code of Massachusetts Regulations
PM_{10}= Particulate Matter less than or equal to 10 microns in diameter
NO_x = Nitrogen Oxides
CTMS – Continuous Temperature Monitoring System
COMS = Continuous Opacity Monitoring System
% = percent
PM = Total Particulate Matter

Table 4

EU	Record Keeping Requirements
1 and 2	1. The Permittee shall record the start time and end time for each retort on a daily basis to demonstrate compliance with Table 2 operational limits.
	2. The Permittee shall record the operating hours on a weekly and consecutive 12-month basis to demonstrate compliance with Table 2 operational limits.
1,2,3,4,5	3. The Permittee shall record temperatures continuously in the secondary chambers of each cremation retort during each complete cremation cycle. If the Permittee digitally records these temperatures, the Permittee shall use a computerized DAS and data logger and the DAS shall log at least one data point (for each temperature) every 15 seconds.
	4. The Permittee shall record continuously the opacity of the stack gas from each retort during each complete cremation cycle. a. If the Permittee digitally records opacity, the Permittee shall use a DAS and digital recorder that records opacity on a full scale of 0%-100%. The digital recorder shall record the opacity readings with corresponding dates and times on a continuous basis. All data shall be stored in electronic format using a hard drive or comparable storage device. b. If the Permittee records opacity using a circular chart recorder, the Permittee shall record opacity on a full scale of 0%-100%. The circular chart recorder shall record the opacity readings with corresponding dates and times on a continuous basis. The Permittee shall record all startups, shutdowns and malfunctions on the circular chart recorder, all charts shall be stored on-site.
	5. The Permittee shall identify in all records, the cremation retort and show the date, start and end time of each cremation cycle, and shall contain the name of the operator who performed the cremation.
	6. The Permittee shall maintain on site and accessible at, or near the subject equipment, at all times, a copy of this Approval letter and the SOMP for all air-emissions-related equipment at the Facility. The SOMP for each crematory retort shall include start-up or pre-heat, cremation loading, burn-down cycle procedures and photovoltaic eye cleaning frequency as well as descriptions of the temperature monitors, opacity monitors and all interlocks.
1,2,3,4,5	7. The Permittee shall keep on-site records of all preventive or corrective maintenance, calibration checks, adjustments, and evaluations performed on each retort and each retort's temperature and opacity monitors, including dates and detailed descriptions of what maintenance was performed.
	8. The Permittee shall record the date and pounds cremated each day in each crematory retort. The Permittee shall maintain detailed records of what was cremated, weight, time, and date of cremation.
	9. The Permittee shall record on a monthly and consecutive 12-month basis the natural gas consumption for each crematory retort.
	10. The Permittee shall maintain on-site documentation, including dated operator's certificates, showing that each operator at the Facility has received training in the proper operation and in the manufacturer's SOMP for said retorts. Said documentation shall be kept onsite throughout each operator's employment, as well as for at least five (5) years after termination of employment.

Table 4

EU	Record Keeping Requirements
Facility-wide	11. The Permittee shall maintain adequate records on-site to demonstrate compliance status with all operational, production, and emission limits contained in Table 2 above. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve-month period (current month plus prior eleven months). These records shall be compiled no later than the 15th day following each month. An electronic version of a MassDEP approved record keeping form, in Microsoft Excel format, may be downloaded at https://www.mass.gov/guides/massdep-facility-wide-emission-restrictions-caps-reporting#-application-&-notification-forms
	12. The Permittee shall maintain records of monitoring and testing as required by Table 3.
	13. The Permittee shall maintain a record of all malfunctions affecting air contaminant emission rates on the approved EU(s) and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; corrective actions taken; the date and time corrective actions were initiated and completed; and the date and time emission rates and monitoring equipment returned to compliant operation.
	14. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	15. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	16. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.

Table 4 Key:

EU = Emission Unit
SOMP = Standard Operating and Maintenance Procedure
DAS = Data Acquisition System
CMR = Code of Massachusetts Regulations
PCD = Pollution Control Device
USEPA = United States Environmental Protection Agency
% = percent

Table 5	
EU	**Reporting Requirements**
Facility-wide	1. The Permittee shall submit to MassDEP any changes to the SOMP within seven (7) days of commencement of the modification(s).
	2. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a "Responsible Official" as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).
	3. The Permittee shall notify the Central Regional Office of MassDEP, BAW Permit Chief by telephone: 508-767-2845, email, Thomas.Hannah@mass.gov and CERO.Air@mass.gov, as soon as possible, but no later than one (1) business days after discovery of an exceedance(s) of Table 2 requirements. A written report shall be submitted the BAW Permit Chief at MassDEP within three (3) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
	4. The Permittee shall report every three years to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The Permittee shall note therein any minor changes (under 310 CMR 7.02(2)(e), 7.03, 7.26, etc.), which did not require Plan Approval.
	5. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within 30-days from MassDEP's request.
	6. The Permittee shall submit to MassDEP for approval a stack emission pretest protocol, at least 30 days prior to emission testing, for emission testing as defined in Table 3 Monitoring and Testing Requirements.
	7. The Permittee shall submit to MassDEP a final stack emission test results report, within 45 days after emission testing, for emission testing as defined in Table 3 Monitoring and Testing Requirements.

Table 5 Key:

EU = Emission Unit

SOMP = Standard Operating and Maintenance Procedures

BAW = Bureau of Air and Waste

CMR = Code of Massachusetts Regulations

SPECIAL TERMS AND CONDITIONS

A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

Table 6

EU	Special Terms and Conditions
3	1. The Permittee shall replace the currently deteriorated stack at the present location no later than 30 days upon issuance of this Plan Approval, or after the retort is moved to a new location, whichever is sooner.
5	2. The Permittee shall ensure that, prior to operation of EU5, said retort is equipped with temperature and opacity monitoring and recording devices that comply with the requirements contained in Table 3 and Table 4 above.
1,2,3,4,5	3. The Permittee shall ensure that each primary chamber burner is electronically interlocked with the secondary chamber thermocouple to prevent ignition of the primary chamber burner or to automatically shut off the primary chamber burner during the burn cycle should the secondary chamber thermocouple detect a temperature less than the minimum required temperature as stated in Table 2 of this Plan Approval.
	4. The Permittee shall implement an Operator Training Program to train personnel who will be operating any of the crematory retorts in the proper operation and in the manufacturer's SOMP for said retorts. Said training shall be given by a representative from the manufacturer of the crematory retort or another qualified organization. The training shall include the following elements: a. principles of combustion; b. operating monitors and controls; c. operating sequence under normal conditions; d. safety and operating procedures under foreseeable upset conditions (e.g. power or fuel interruption, burner malfunction, visible emissions, high and low temperature incidents, etc.); e. regulatory requirements; f. calibration, adjustment and replacement of thermocouples; g. preventative maintenance practices and procedures and recommended frequency; and h. record keeping requirements and procedures; i. calibration, adjustment and replacement of opacity monitors; j. cleaning of the photovoltaic eye on the opacity monitor; and k. procedures to take when the alarm activates due to temperature or opacity deviations. Minimum training criteria shall include hands-on control of the retort for at least two (2) operating cycles in order to complete the program and receive an operator's certificate. All training shall be equipment specific. If an existing crematory retort is modified, the operator(s) must be re-trained to operate the modified retort.
	5. The Permittee shall have an operator who has completed the Operator Training Program present at all times during cremations. The cremation operator shall take any necessary action, including shutdown of the equipment, to ensure that the Facility operates in compliance with the temperature and opacity limits contained within this Approval.
	6. The Permittee shall utilize the crematory retorts only for animal-remains-related-material and their container. No other material shall be incinerated in the crematory retorts.

Table 6	
EU	**Special Terms and Conditions**
1,2,3,4,5	7. The Permittee shall locate the thermocouple in each retort's secondary chamber at a position that defines a chamber volume, as measured between the secondary chamber burner and the downstream thermocouple, sufficient to provide a minimum exhaust gas residence or retention time of 1.0 second at 1,600 degrees Fahrenheit.
	8. The Permittee shall locate the thermocouple in each retort's secondary chamber at the exit end of each combustion zone in order to measure each chamber's representative temperature and not be otherwise impacted by the flame's radiant heat effect.
	9. In the event of a malfunction or breakdown of a retort or the associated monitoring equipment, the Permittee shall not initiate any new cremations in said retort until repairs are completed and normal operation can be restored.
	10. The Permittee shall incinerate only containers, including cremation pouches that contain no chlorinated plastics.
	11. The Permittee shall burn Natural Gas in the retorts as the only fuel.
	12. The Permittee shall develop a Quality Assurance/Quality Control (QA/QC) plan to ensure that the thermocouple in each retort's primary and secondary chambers, as well as the COMS systems, are maintained and calibrated in accordance with the manufacturer's requirements.
	13. In accordance with 310 CMR 7.04(4)(a), the Permittee shall inspect and maintain the retorts in accordance with the manufacturer's recommendations and test for efficient operation at least once in each calendar year.
	14. This Plan Approval, AQ02C-0000005, supersedes the following Plan Approvals: W133332 dated September 4, 2007, W229538 dated October 14, 2009, and X265131 dated August 17, 2015, in their entirety, with the exception that all plan application materials submitted as part of these Plan Approvals become part of this Plan Approval AQ02C-0000005.

Table 6 Key:

EU = Emission Unit
SOMP = Standard Operating and Maintenance Procedures
COMS = Continuous Opacity Monitoring System
CMR = Code of Massachusetts Regulations

B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including, but not limited to, rain protection devices known as "shanty caps" and "egg beaters."

C. The Permittee shall install and utilize exhaust stacks with the following parameters, as

D. contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

Table 7

EU	Stack Height Above Ground (feet)	Stack Inside Exit Dimensions (inches)	Nominal Stack Gas Exit Velocity (feet per second)	Nominal Stack Gas Exit Temperature Range (°F)
1	28	30	6.9 – 8.3	900-1600
2	26	18	36.8-44.2	1400-1600
3	26	18	36.8-44.2	1400-1600
4	32	23	20.5-24.6	799-1199
5	32	20.4	32.1-38.5	755-1132

Table 7 Key:

EU = Emission Unit

°F = Degree Fahrenheit

4. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).

B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.

C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.

D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local laws or regulations now or in the future.

F. The Application is incorporated into this Plan Approval by reference. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.

G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.

H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.

I. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

5. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions," which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

6. APPEAL OF DECISION

This Decision is an action of MassDEP. If you are the applicant, an aggrieved person who has submitted written comments, where applicable, or a ten persons group that has submitted written comments, where applicable, you may request an adjudicatory hearing in accordance with 310 CMR 7.51(1). A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Decision.

Under 310 CMR 1.01(6)(b), the request for adjudicatory hearing must state clearly and concisely the facts which are the grounds for the request, and the relief sought. Additionally, the request must state why the Decision is not consistent with applicable laws and regulations. In the request, an aggrieved person must state with specificity the basis of his or her claim of aggrievement. A ten persons group that files a request for an adjudicatory hearing must include affidavits from each person of the group stating their intent to be a part of the group and to be represented by the group's authorized representative. The request must comply with all other requirements of 310 CMR 1.01.

The issues raised in the request for adjudicatory hearing are limited to the subject matter of this Decision and are limited further to the issues raised during the public comment period. If the issue was not raised during the public comment period, the issue may be raised upon showing that it was not reasonably possible with due diligence to have raised such matter during the public comment period or for good cause shown.

The hearing request along with a valid check payable to Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) and a completed Adjudicatory Hearing Fee Transmittal Form found at http://www.mass.gov/eea/docs/dep/service/adr/adjherfm.doc must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

An aggrieved person or a ten persons group shall send a copy of the request for an adjudicatory hearing by first class mail to the Applicant and MassDEP's contact person listed in the Decision.

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, the Massachusetts Bay Transportation Authority, federally recognized Indian tribe housing authority, effective January 14, 1994, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, a request for the waiver of the fee and an affidavit setting forth the facts believed to support the claim of undue financial hardship as specified in 310 CMR 4.06(2).

Should you have any questions concerning this Plan Approval, please contact Randa Kallin by telephone at 508-767-2760, or by email at Randa.Kallin@mass.gov and CERO.Air@mass.gov.

Randa Kallin

Randa Kallin
Permit Writer
Bureau of Air and Waste

Thomas A. Hannah
Permit Chief
Bureau of Air and Waste

ecc: Northborough Board of Health
Northborough Fire Department
MassDEP/Boston - Yi Tian
Amy Gilmartin – Regency Family
Christopher Bannon, PE, Capaccio Environmental Engineering, Inc.
Lynn Sheridan, Capaccio Environmental Engineering, Inc.

APPENDIX E

PARTICLE SIZE DISTRIBUTION REPORT FROM 7/21/21 TESTING ON A SIMILAR SOURCE / EU4

MVA SCIENTIFIC CONSULTANTS
Full Service Analytical Microscopy Laboratory

3300 Breckinridge Blvd
Suite 400
Duluth, GA 30096

770.662.8509
FAX 770.662.8532
www.mvainc.com

Stack Sample Analysis

PM10 & PM2.5 Custom Particle Sizing

Particle Shape Analysis

Particulate Matter Identification

Back-Half Catch Residue Identification (M202)

Filter Debris Analysis

Ambient Air Sample Characterization

Condensable Analysis

Litigation Support

Techniques

Light Microscopy

Scanning Electron Microscopy

Transmission Electron Microscopy

Fourier Transform Infrared Spectroscopy

Confocal Raman Microscopy

White Light Interference Microscopy

Energy Dispersive X-ray Spectrometry

Fluorescence Microscopy

Ion Milling & Ultramicrotomy

Accreditations

cGMP Compliant

ISO/IEC 17025

FDA Registered

DEA Licensed

Report of Results: MVA14267

Particle Size Distribution of Filters

Prepared for:

Montrose Air Quality Services, LLC
2 New Pasture Road, Unit 5
Newburyport, MA 01950

Respectfully Submitted by: **EXECUTED BY ELECTRONIC SIGNATURE**

Jake Mosely, M.S.
Research Scientist

19 August 2021

14267report081921.docx

Report of Results: MVA14267

Particle Size Distribution of Filters

Introduction

On 5 August 2021 we received three fiber filters with the request that we determine their particle size distributions down to 0.5 micrometer. Upon receipt the samples were assigned the unique MVA Scientific Consultants laboratory identification numbers shown in Table 1. The analyses and data reduction were performed at MVA Scientific Consultants during the period 10 August through 19 August 2021.

Methods

The samples were prepared for analysis in accordance with MVA SOP 310, "Sample Preparation Methods for Total Particle Sizing Using Microscopical Techniques."

The particle size distribution measurements were performed using a JEOL JSM-6500F field emission scanning electron microscope operating in automated mode under the control of a Thermo Scientific Noran System 7 x-ray analysis system, utilizing MVA SOP 316, "Automated Particle Size Analysis Using the JEOL JSM-6500F FESEM and Thermo Scientific Noran System 7." The particle size data are presented in terms of particle number and in terms of estimated mass. The assumption has been made that the particles are all of similar density and therefore the particle volume distribution is equivalent to the particle mass distribution.

Results

The size distributions of the filters down to 0.5 micrometer are shown in Tables 1 and 2.

Table 1. MVA14267. Percentages of Particles in Various Average Diameter Ranges by Number of Particles

MVA Sample Number	AG1248	AG1249	AG1250
Client ID	M5-R1	M5-R2	M5-R3
Average Diameter Range (µm)	Number %	Number %	Number %
0.5 - 1	66.5	59.5	60.7
>1 - 2.5	29.5	36.6	30.8
>2.5 - 5	3.6	3.6	7.0
>5 - 7.5	0.4	0.2	1.2
>7.5 - 10	0.1	0.04	0.2
>10	0.05	0.1	0.1
Total Particles	23371	22604	15252

Table 2. MVA14267. Percentages of Particles in Various Average Diameter Ranges by Mass of Particles

MVA Sample Number	AG1248	AG1249	AG1250
Client ID	M5-R1	M5-R2	M5-R3
Average Diameter Range (µm)	Mass %	Mass %	Mass %
0.5 - 1	7.4	6.2	3.7
>1 - 2.5	23.1	27.1	17.6
>2.5 - 5	20.0	16.6	35.8
>5 - 7.5	12.9	6.2	26.0
>7.5 - 10	6.4	3.3	10.4
>10	30.3	40.6	6.6

14267

MONTROSE
AIR QUALITY SERVICES

Sample Chain of Custody

Special Handling:
- Office Location: ________
- Standard Delivery - 10 Days __X__
- Express Delivery - 3 Days ________
- RUSH Delivery - Next Day ________
- * Delivery Based on Sample Receipt at Laboratory.

Client Name: Forget-Me-Not Pet Crematory
Project Manager: Anthony Stratton
Report Results To: A. Stratton
Project Number: PROJ-010182
Site ID: Unit EU4
Plant Location: Northborough, MA
PO No.: To be emailed
Phone No.: 508-989-8996
Email: astratton@montrose-env.com
Samples Collected By: Mike Bruni

Page__1__of__1_

Special Instructions:

Matrix Info: A = Air 1 = H2SO4 2 = NaOH 3 = Filter 4 = Acetone 5 = Water 6 = Hexanes X = XAD C = Charcoal * = Other

G = Grab C = Composite Q = Quality Control / Blanks

						Sample Container			Analysis			
Sample ID	Date	Time	Volume	Type	Matrix	Glass	Plastic	Other	Method:	Method:	Method:	Notes:
M5-R1 AG1248	7/21/2021			3			X		SEM			Please provide particle size distribution analysis via SEM
M5-R2 AG1249	7/21/2021			3			X		SEM			
M5-R3 AG1250	7/21/2021			3			X		SEM			

Relinquished By:	Date:	Time	Received By:	Date:	Time:	Sample Condition Upon Receipt:
	8-3-21		Kodey Jennings	9/5/2021	2:00 pm	☐ Iced ☐ Ambient ☐ °C ____
						☐ Iced ☐ Ambient ☐ °C ____
						☐ Iced ☐ Ambient ☐ °C ____

Montrose Air Quality Services - 2 New Pasture Road, Unit 5 Newburyport, MA 01950 • 978.499.9300 • Fax 978.499.9303 • www.montrose-env.com

Rev. 4/21/2016 ARS

THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact the following individual by email or phone.

Name: Mr. David A. Caron
Title: District & Client Project Manager
Region: Northeast
Email: dcaron@montrose-env.com
Phone: (978) 499-9300 x11303

Name: Mr. Anthony Stratton
Title: Client Project Manager
Region: Northeast
Email: mbruni@montrose-env.com
Phone: (978) 499-9300 x11304

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 1/8/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Marsh & McLennan Agency LLC
5605 Carnegie Blvd Suite 300
Charlotte NC 28209

CONTACT NAME:
PHONE (A/C, No, Ext): 704-365-6213
FAX (A/C, No):
E-MAIL ADDRESS: macerts@marshmma.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : The Cincinnati Insurance Company	10677
INSURER B : Federal Insurance Company	20281
INSURER C : Chubb Insurance Company of Canada	55555
INSURER D : Accident Fund General Ins. Co.	12304
INSURER E :	
INSURER F :	

INSURED GATESERV
Gateway Services USA, LLC; 222394536 Delaware LLC
4283929 Delaware, LLC; See Remarks
2 Daniels Way
Cranston RI 02921

COVERAGES **CERTIFICATE NUMBER:** 2116738197 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	☒ **COMMERCIAL GENERAL LIABILITY**	Y	Y	36074055	12/19/2023	12/19/2024	EACH OCCURRENCE	$ 2,000,000
	☐ CLAIMS-MADE ☒ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 2,000,000
	☐						MED EXP (Any one person)	$ 10,000
	☐						PERSONAL & ADV INJURY	$ 2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	☒ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:							$
A	**AUTOMOBILE LIABILITY**	Y	Y	EBA0615259	12/19/2023	12/19/2024	COMBINED SINGLE LIMIT (Ea accident)	$ 2,000,000
	☒ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
	☐ ☐							$
C	☒ **UMBRELLA LIAB** ☒ OCCUR			MPR2346764	12/19/2023	12/19/2024	EACH OCCURRENCE	$ 8,000,000
	☐ **EXCESS LIAB** ☐ CLAIMS-MADE						AGGREGATE	$ 8,000,000
	☐ DED ☒ RETENTION $ 0							$
D	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N		Y	10007017903	8/9/2023	8/9/2024	☒ PER STATUTE ☐ OTH-ER	
	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐	N / A					E.L. EACH ACCIDENT	$ 1,000,000
	(Mandatory in NH)						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Orchard Hill Memorial Park, LLC
A Memorial Service, LLC
Brandywine Green, LLC DBA Valley Pet Memorial Services, LLC
Cremanimo Inc.
FFPLS Lafayette, LLC
FFPLS Las Vegas, LLC
FFPLS Quakertown, LLC
Final Gift USA, LLC
See Attached...

CERTIFICATE HOLDER

Maryland Department of the Environment
Land Management Administration
Technical Services & Operations Program
1800 Washington Blvd. Ste 650
Baltimore MD 21230

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Courtney Steel

AGENCY CUSTOMER ID: GATESERV

LOC #:

ADDITIONAL REMARKS SCHEDULE

Page 1 **of** 1

AGENCY Marsh & McLennan Agency LLC	**NAMED INSURED** Gateway Services USA, LLC; 222394536 Delaware LLC 4283929 Delaware, LLC; See Remarks 2 Daniels Way Cranston RI 02921
POLICY NUMBER	
CARRIER / **NAIC CODE**	**EFFECTIVE DATE:**

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 **FORM TITLE:** CERTIFICATE OF LIABILITY INSURANCE

Forget-Me-Not Pet Cremation, LLC
Gateway Services Inc.
Greenbrier Pet Loss Services, LLC
Hartsdale Crematory, LLC
Hinsdale Animal Cemetery & Crematory, Inc.
Loving Hearts Pet Cremation Services, LLC
New York Pet Memorial Park, LLC
Orchard Hill Memorial Park, LLC
Paws & Cherish- Florida, LLC
Pet Crematory Agency, LLC
Pet Loss Services North America, LLC
Pet Memorial Park, Inc.
Regency- Akron, LLC
Regency- Albany, LLC
Regency- Chicago, LLC
Regency- Denver, LLC
Regency- Flagstaff, LLC
Regency- Florence, LLC
Regency- Green Oak, LLC
Regency- Houston, LLC
Regency- Lansing, LLC
Regency- Loveland, LLC
Regency-Ossian, LLC
Regency- Paso Robles, LLC
Regency- Pensacola, LLC
Regency- Portland, LLC
Regency Pet, LLC
Riverbend Pet Crematory, LLC
The S. Morris Co
Treasured Pets GP

**HIRED AUTO/Physical damage limit $100,000 included with a $1,000 deductible

Washington County
MARYLAND
est. 1776

DEPARTMENT OF PLANNING & ZONING
PLANNING | ZONING | LAND PRESERVATION | FOREST CONSERVATION | GIS

January 9, 2024

Misty Sirch
2 Daniels Way
Cranston, RI 02921

RE: Request for Zoning Confirmation for 19712 Shepherdstown Pike, Boonsboro, MD 21713

To Whom it may Concern,
In response to your request for information regarding the above referenced property, we have researched our files and present the following:

- The current zoning classification for the subject property is – Preservation District which is governed by Article 5C of the Washington County Zoning Ordinance.
- The subject property was granted approval by the Board of Zoning Appeals for the special exception use of a crematorium. No limits on the number of ovens were placed on the property.
- Additional permits would be required if additional equipment is installed on the property.

This information was researched on January 9, 2023 by the undersigned per request and as a public service. The undersigned certifies that the above information contained herein is believed to be accurate and is based upon or relates to the information supplied by the requestor. The Authority assumes no liability for errors or omissions. All information was obtained from public records which may be inspected during regular business hours.

Sincerely,

Katie Rathvon

Katie Rathvon
Zoning Coordinator

PETER ANDERSON
7652 Old National Pike
Boonsboro, MD 21716

Appellant

APPEAL NO. AP2006-038

OPINION

This action is a request for a special exception to establish a crematory business, "Agape Pet Services," for animals. The subject property is located at the north side of MD Rt. 34, 1,500 feet east of Wheeler Road, is owned by First Brethren Church of Hagerstown, and is zoned Environmental Preservation.

A public hearing was held before a full Board on April 12, 2006. The Appellant offered evidence and testimony in support of the appeal. Opponents offered evidence and testimony in opposition to the appeal.

FINDINGS OF FACT

The following findings of fact are made by the Board, based upon the testimony given and all data and other evidence presented, and upon a study of the specific property involved, as well as the neighborhood:

1. This action is essentially as set forth above.

2. Filed with the Board and incorporated with the record herein was the Notice of Appeal and supporting documentation.

3. This appeal was duly advertised in *The Herald-Mail*.

4. Appellant proposes operation of a small pet crematory on the property.

5. The crematory will be odorless and smokeless, and will not produce any dust.

6. The only waste produced by operation of the crematory is calcium.

7. Since the crematory started operations, they have had three Environmental Protection Agency inspections with no problems.

8. There are no measurable emissions created by the crematory.

9. The Appellant produced four exhibits:
   a. A letter discussing the technology;
   b. An aerial photograph of the property;
   c. A letter of support from Bast Funeral Home; and
   d. A letter of support from the Reese's.

10. The property is 50 acres in area and is wooded. Thus, existing trees provide natural screening.

11. The two neighboring property owners have no objections.

12. The Appellant is planning to live on the property.

13. The only traffic will be a driver making one trip each day. There are no plans for a pet cemetery.

14. There are no streams or wetlands on the property.

15. The proposed building will be 46'x60' with a small office.

16. The proposed use is compatible with the existing neighborhood and consistent with the Comprehensive Plan.

17. Opponents to the request argued that the crematory is located near Crystal Grottoes and is not compatible with the neighborhood. The property is a rocky area, and there will be a problem with runoff if waste is spread.

18. In rebuttal, the Appellant stated that there will be approximately two coffee can amounts of waste generated daily.

19. Received and filed with the Board was correspondence from Kathy A. Kroboth, Zoning Coordinator, advising that the proposed use was not inconsistent with the Comprehensive Plan.

RATIONALE

The Board has authority to grant a special exception pursuant to Section 25.2(b) of the Zoning Ordinance for Washington County, Maryland. A special exception is defined as "a grant of a specific use that would not be appropriate generally or without restriction; and shall be based upon a finding that the use conforms to the plan and is compatible with the existing neighborhood." Section 28.62. Section 25.6 of the Ordinance directs the Board to consider the following factors, as applicable, in rendering its decision: (a) The number of people residing or working in the immediate area concerned; (b) the orderly growth of a community; (c) traffic conditions and facilities; (d) the effect of such use upon the peaceful enjoyment of people in their homes; (e) the conservation of property values; (f) the effect of odors, dust, gas, smoke, fumes, vibrations, glare and noise upon the use of surrounding property values; (g) the most appropriate use of land and structure; (h) the decision of the courts; (I) the purpose of these regulations as set forth herein; (j) the type and kind of structures in the vicinity where public gatherings may be held, such as schools, churches and the like.

In the instant appeal, the Appellant has met his burden for the grant of a special exception. The crematory operation will be odorless, smokeless, and non-obtrusive, and it has operated without incident for approximately the past four years in another location. Furthermore, the property is of sufficient size to isolate the use, and existing trees will screen it from neighboring views. The neighboring property owners do not object to the proposal. The opposition's argument that a pet crematory is incompatible with an Environmental Preservation district is unpersuasive. No evidence was presented to show that the location of the crematory at this site would cause more adverse effects than would location of the same use at any other location in the district. Thus, under the holding of *Schultz v. Pritts*, the approval of this appeal is appropriate. Based upon all of the testimony and evidence presented, this Board finds that the subject request does not adversely affect the public health, safety, security, morals, or general welfare, nor does it result in dangerous traffic conditions, or jeopardize the life and property of neighborhood residents.

Accordingly, having considered all of the factors set forth in Section 25.6 of the Zoning Ordinance, this request for a special exception to establish a crematory business, "Agape Pet Services," for animals is hereby GRANTED WITH CONDITIONS AS SET FORTH BELOW this 11th day of May, 2006.

Conditions

1. The building shall be screened.
2. A 300' setback from the road is required.
3. The forest conservation requirements shall be met on site at the subject property and shall not be met via waiver.
4. Any signs identifying the business shall not be illuminated.

BOARD OF ZONING APPEALS
By: Spence Perry, Chair

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

AT RICHMOND, DECEMBER 28, 2019

The State Corporation Commission has found the accompanying articles of merger submitted on behalf of

Agape Pet Services of Virginia LLC

to comply with the requirements of law and confirms payment of all required fees. Therefore, it is ORDERED that this

CERTIFICATE OF MERGER

be issued and admitted to record with the articles of merger in the Office of the Clerk of the Commission, effective January 1, 2020. When the merger becomes effective, each of the following:

Agape Pet Services of Virginia LLC

is merged into Agape Pet Services LLC (a MD Limited Liability Company not registered in VA), which continues to exist under the laws of MARYLAND with the name Agape Pet Services LLC, and the separate existence of each merged entity ceases.

STATE CORPORATION COMMISSION

By Judith Williams Jagdmann

Commissioner

Commonwealth of Virginia
State Corporation Commission
Office of the Clerk
Entity ID: S4681989
Filing Number: 191228178465
Filing Date/Time: 12/28/2019 04:58 PM
Effective Date/Time: 01/01/2020 12:01 AM

ARTICLES OF MERGER

Agape Pet Services of Virginia LLC,
a Virginia limited liability company
with and into
Agape Pet Services LLC,
a Maryland limited liability company

Pursuant to Section 13.1-1072, these Articles of Merger are made effective as of January 1, 2020, by Agape Pet Services of Virginia LLC, a Virginia limited liability company ("Disappearing Company") and Agape Pet Services LLC, a Maryland limited liability company ("Surviving Company").

Article 1. The Plan of Merger is set forth as Exhibit A attached hereto.

Article 2. The merger shall affect no change in the Articles of Organization of the Surviving Company.

Article 3. The merger shall be effective as of January 1, 2020, and was adopted by the Disappearing Company and the Surviving Company, effective as of January 1, 2020.

Article 4. The Plan of Merger was adopted by the Disappearing Company in accordance with the provisions of Section 13.1-1071 of the Code of Virginia.

Article 5. The Plan of Merger is permitted by the State of Maryland.

Remainder of page intentionally left blank. Signatures follow on next page.

Commonwealth of Virginia
State Corporation Commission
Office of the Clerk
Entity ID: S4681989
Filing Number: 191228178466
Filing Date/Time: 12/28/2019 04:56 PM
Effective Date/Time: 01/01/2020 12:01 AM

AGAPE PET SERVICES LLC
By: Gateway US Holdings, Inc., Sole Member

By: ____________________
Name: Kelly Clinton
Title: Vice President

AGAPE PET SERVICES OF VIRGINIA LLC
By: Gateway US Holdings, Inc., Sole Member

By: ____________________
Name: Kelly Clinton
Title: Vice President

Commonwealth of Virginia
State Corporation Commission
Office of the Clerk
Entity ID: S4681989
Filing Number: 191228178465
Filing Date/Time: 12/28/2019 04:56 PM
Effective Date/Time: 01/01/2020 12:01 AM

PLAN OF MERGER

Pursuant to Section 13.1-1070 of the Virginia Limited Liability Company Act this Plan of Merger (the "Plan") is made effective as of January 1, 2020 between Agape Pet Services LLC, a Maryland limited liability company (the "Surviving Company") and Agape Pet Services of Virginia LLC, a Virginia limited liability company (the "Disappearing Company"), (the Surviving Company and Disappearing Company are sometimes hereinafter referred to as the "Constituent Entities"), who agree as follows:

1. Recitals.

a) The Surviving Company was organized in the State of Maryland on February 3, 2002. The Surviving Company has (a) Nine Hundred (900) Voting Units issued and outstanding and (b) One Hundred (100) Profit Interests Units issued and outstanding ((a) and (b) collectively, the "Surviving Company Units").

b) The Disappearing Company was organized in the Commonwealth of Virginia on August 21, 2013. The Disappearing Company has (a) Nine Hundred (900) Voting Units issued and outstanding and (b) One Hundred (100) Profit Interests Units issued and outstanding ((a) and (b) collectively, the "Disappearing Company Units").

d) The Constituent Entities deem it advisable and for the benefit of their respective entities that the Disappearing Company merge with and into the Surviving Company on the terms and conditions hereinafter set forth (the "Merger").

e) Gateway US Holdings, Inc., a Delaware corporation is the sole owner of all of the Disappearing Company Units and all of the Surviving Company Units.

2. Merger. At the effective time of the Merger, the Disappearing Company shall be merged with and into the Surviving Company and the Surviving Company shall continue its existence under the laws of the State of Maryland.

3. Certificate of Formation. The Merger shall effect no change in the Certificate of Formation of the Surviving Company.

4. Terms of Merger.

a) The Disappearing Company Units issued and outstanding at the effective time of the Merger shall be cancelled and retired. The Surviving Company Units shall be unaffected by the Merger.

b) The Surviving Company shall be liable for the payment of any required franchise taxes that are due and payment by Disappearing Company.

5. Right to Abandon Merger. This Plan may be terminated and the Merger abandoned at any time by mutual agreement of the Constituent Entities.

6. Right to Amend Plan of Merger. This Plan may be amended at any time prior to the filing of the Certificate of Merger by mutual agreement of the Constituent Entities.

7. Effective Time of Merger. The Merger shall be effective as of 12:01 a.m. on January 1, 2020.

Signed as of the date specified above.

AGAPE PET SERVICES OF VIRGINIA LLC

By: ____________________
Name: Kelly Clinton
Title: Vice President

AGAPE PET SERVICES LLC

By: ____________________
Name: Kelly Clinton
Title: Vice President

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

AT RICHMOND, DECEMBER 28, 2019

The State Corporation Commission has found the accompanying articles of merger submitted on behalf of

Agape Pet Services LLC

to comply with the requirements of law and confirms payment of all required fees. Therefore, it is ORDERED that this

CERTIFICATE OF MERGER

be issued and admitted to record with the articles of merger in the Office of the Clerk of the Commission, effective January 1, 2020. When the merger becomes effective, each of the following:

Agape Pet Services of Virginia LLC

is merged into Agape Pet Services LLC, which continues to exist under the laws of MARYLAND with the name Agape Pet Services LLC, and the separate existence of each merged entity ceases.

STATE CORPORATION COMMISSION

By Judith Williams Jagdmann

Commissioner

Commonwealth of Virginia

State Corporation Commission

I Certify the Following from the Records of the Commission:

The foregoing is a true copy of the articles of merger filed in the Clerk's Office of the Commission on December 28, 2019 by Agape Pet Services of Virginia LLC effective as of January 1, 2020.

Nothing more is hereby certified.

1903

Signed and Sealed at Richmond on this Date:
January 3, 2020

Joel H. Peck

Joel H. Peck, Clerk of the Commission

CIS0505

MARYLAND DEPARTMENT OF THE ENVIRONMENT

AIR AND RADIATION ADMINISTRATION
APPLICATION FOR A PERMIT TO CONSTRUCT

SUPPLEMENT TO
DOCKET #03-24

COMPANY: Brandywine Green, LLC dba Agape Pet Services

LOCATION: 19712 Shepherdstown Pike
Boonsboro, Maryland 21713

APPLICATION: Installation of five (5) animal crematories to replace three (3) existing crematories.

ITEM	DESCRIPTION
1	Notice of Tentative Determination, Opportunity to Request a Public Hearing, and Opportunity to Submit Written Comments
2	Fact Sheet and Tentative Determination
3	Draft Permit to Construct and Conditions
4	Supplemental Information References List
5	Privilege Log – Not Applicable

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

NOTICE OF TENTATIVE DETERMINATION, OPPORTUNITY TO REQUEST A PUBLIC HEARING, AND OPPORTUNITY TO SUBMIT WRITTEN COMMENTS

FIRST NOTICE

The Department of the Environment, Air and Radiation Administration (ARA) has completed its review of an application for a Permit to Construct submitted by Brandywine Green, LLC dba Agape Pet Services on February 26, 2024 for the installation of five animal crematories to replace three existing animal crematories. The proposed installation will be located at 19712 Shepherdstown Pike, Boonsboro, Maryland 21713.

Pursuant to Section 1-604, of the Environment Article, Annotated Code of Maryland, the Department has made a tentative determination that the Permit to Construct can be issued and is now ready to receive public comment on the application. Copies of the Department's tentative determination, the application, the draft permit to construct with conditions, and other supporting documents are available for public inspection on the Department's website. Look for Docket # 03-24 at the following link:

https://mde.maryland.gov/programs/Permits/AirManagementPermits/Pages/index.aspx

In accordance with HB 1200/Ch. 588 of 2022, the applicant provided an environmental justice (EJ) Score for the census tract in which the project is located using the Maryland EJ Screening Tool. The EJ Score, expressed as a statewide percentile, was shown to be 37.7 which the Department has verified. This score considers three demographic indicators, minority population above 50%, poverty rate above 25% and limited English proficiency above 15% to identify underserved communities. Multiple environmental health indicators are used to identify overburdened communities. The Department's review of the environmental and socioeconomic indicators contributing to that EJ score is included in the tentative determination that is available for public inspection.

Interested persons may request a public hearing and/or submit written comments on the tentative determination. Requests for a public hearing must be submitted in writing and must be received by the Department no later than 20 days from the date of this notice. A requested public hearing will be held virtually using teleconference or internet-based conferencing technology unless a specific request for an in-person public hearing is received. Written comments must be received by the Department no later than 30 days from the date of this notice.

Interested persons may request an extension to the public comment period. The extension request must be submitted in writing and must be received by the Department no later than 30 days from the date of this notice or within 5 days after the hearing (if a hearing is requested), whichever is later. The public comment period may only be extended one time for a 60-day period.

All requests for a public hearing, requests for an extension to the public comment period, and all written comments should be directed to the attention of Ms. Shannon Heafey, Air Quality Permits Program by email to shannon.heafey@maryland.gov or by mail to the Air and Radiation Administration, 1800 Washington Boulevard, Baltimore, Maryland 21230. Further information may be obtained by calling Ms. Shannon Heafey at 410-537-4433.

Christopher R. Hoagland, Director
Air and Radiation Administration

MARYLAND DEPARTMENT OF ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

FACT SHEET AND TENTATIVE DETERMINATION
BRANDYWINE GREEN, LLC DBA AGAPE PET SERVICES

PROPOSED INSTALLATION OF FIVE (5) ANIMAL CREMATORIES

I. INTRODUCTION

The Maryland Department of the Environment (the "Department") received an application from Brandywine Green, LLC dba Agape Pet Services on February 26, 2024, for a Permit to Construct for the installation of five animal crematories to replace three existing animal crematories. The proposed installation will be located at 19712 Shepherdstown Pike, Boonsboro, Maryland 21713.

A notice was placed in Hagerstown Herald on June 14, 2024 and again on June 21, 2024 announcing an opportunity to request an informational meeting to discuss the application for a Permit to Construct. An informational meeting was not requested.

As required by law, all public notices were also provided to elected officials in all State, county, and municipality legislative districts located within a one-mile radius of the facility's property boundary.

The Department has reviewed the application and has made a tentative determination that the proposed facility is expected to comply with all applicable air quality regulations. A notice will be published to provide the public with opportunities to request a public hearing and to comment on the application, the Department's tentative determination, the draft permit conditions, and other supporting documents. The Department will not schedule a public hearing unless a legitimate request is received.

If the Department does not receive any comments that are adverse to the tentative determination, the tentative determination will automatically become a final determination. If adverse comments are received, the Department will review the comments, and will then make a final determination with regard to issuance or denial of the permit. A notice of final determination will be published in a newspaper of general circulation in the affected area. The final determination may be subject to judicial review pursuant to Section 1-601 of the Environment Article, Annotated Code of Maryland.

II. CURRENT STATUS AND PROPOSED INSTALLATION

A. Current Status

Agape Pet Services currently operates an existing pet cremation facility that includes the following permitted equipment:

- One (1) Facultatieve Technologies ISI-1600 animal crematory rated at 240 pounds per hour
- One (1) Matthews Model IEB-40 animal crematory rated at 350 pounds per hour
- Three (3) B&L BLP 750 M5 animal crematories rated at 200 pounds per hour

B. Proposed Modification

Agape Pet Services is proposing to install five (5) new animal crematories, fired with liquified petroleum gas and remove the three (3) B&L BLP 750 M5 animal crematories for a total of seven (7) animal crematories at the site. The new units are as follows:

- One (1) Matthews Model IEB-56 animal crematory rated at 400 pounds per hour
- Two (2) Matthews Model PPjr animal crematories rated at 75 pounds per hour each
- Two (2) Therm Tec IS18P6 animal crematory rated at 300 pounds per hour each

Each of the new animal crematories will be equipped with a secondary combustion chamber capable of meeting at least a 1.0 second retention time and a minimum operating temperature of 1600 ºF. The animal crematories must be equipped with temperature sensors and monitors to continuously measure and record the temperature of the secondary combustion chamber. Exhaust gases must be vented out of a stack at a height of at least 35 feet from the ground to ensure proper dispersion of exhaust gases.

III. APPLICABLE REGULATIONS

The proposed installations are subject to all applicable Federal and State air quality control regulations, including, but not limited to the following:

(a) COMAR 26.11.01.07C, which requires that the Permittee report to the Department occurrences of excess emissions.

(b) COMAR 26.11.02.13A(1), which requires that the Permittee obtain from the Department, and maintain and renew as required, a valid State permit-to-operate.

(c) COMAR 26.11.02.19C & D, which require that the Permittee submit to the Department annual certifications of emissions, and that the Permittee maintain sufficient records to support the emissions information presented in the submittals.

(d) COMAR 26.11.06.08 and 26.11.06.09, which generally prohibit the discharge of emissions beyond the property line in such a manner that a nuisance or air pollution is created.

(e) COMAR 26.11.08.04A(1), which prohibits the Permittee to cause or permit the discharge of emissions from any incinerator, other than water in an uncombined form which is greater than 20 percent opacity.

Exceptions. The requirements do not apply to emissions during start-up, or adjustments or occasional cleaning of control equipment if:

(1) The visible emissions are not greater than 40 percent opacity; and

(2) The visible emissions do not occur for more than 6 consecutive minutes in any 60-minute period.

(f) COMAR 26.11.08.05A(1) & A(3), which limits the concentration of particulate matter in any exhaust gases to not more than 0.10 grains per standard cubic foot of dry exhaust gas.

(g) COMAR 26.11.15.05, which requires that the Permittee implement “Best Available Control Technology for Toxics” (T – BACT) to control emissions of toxic air pollutants.

(h) COMAR 26.11.15.06, which prohibits the discharge of toxic air pollutants to the extent that such emissions would unreasonably endanger human health.

IV. GENERAL AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has established primary and secondary National Ambient Air Quality Standards (NAAQS) for six (6) criteria pollutants, i.e., sulfur dioxide, particulate matter, carbon monoxide, nitrogen dioxide, ozone, and lead. The primary standards were established to protect public health, and the secondary standards were developed to protect against non-health effects such as damage to property and vegetation.

The Department utilizes a statewide air monitoring network, operated in accordance with EPA guidelines, to measure the concentrations of criteria pollutants in Maryland’s ambient air. The measurements are used to project statewide ambient air quality, and currently indicate that Washington County complies with the NAAQS for sulfur dioxide, particulate matter, carbon monoxide, nitrogen dioxide, ozone, and lead.

With regard to toxic air pollutants (TAPs), screening levels (i.e., acceptable ambient concentrations for toxic air pollutants) are generally established at 1/100 of allowed worker exposure levels (TLVs)[1]. The Department has also developed additional screening levels for carcinogenic compounds. The additional screening levels are established such that continuous exposure to the subject TAP at the screening level for a period of 70 years is expected to cause an increase in lifetime cancer risk of no more than 1 in 100,000.

V. ENVIRONMENTAL JUSTICE ANALYSIS

The concept behind the term environmental justice (EJ) is that regardless of race, color, national origin, or income, all Maryland residents and communities should have an equal opportunity to enjoy an enhanced quality of life. How to assess whether equal protection is being applied is the challenge.

Communities surrounded by a disproportionate number of polluting facilities puts residents at a higher risk for health problems from environmental exposures. It is important that residents who may be adversely affected by a proposed source be aware of the current environmental issues in their community in order to have meaningful involvement in the permitting process. Resources may be available from government and private entities to ensure that community health is not negatively impacted by a new source located in the community.

Extensive research has documented that health disparities exist between demographic groups in the United States, such as differences in mortality and morbidity associated with factors that include race/ethnicity, income, and educational attainment.

The Maryland General Assembly passed HB 1200, effective October 1, 2022, that adds to MDE’s work incorporating diversity, equity and inclusion into our mission to help overburdened and underserved communities with environmental issues. In accordance with HB 1200/Ch, 588 of 2022, the applicant provided an environmental justice (EJ) Score for the census tract in which the proposed source is located using the Maryland EJ Screening Tool. The EJ Score, expressed as a statewide percentile, was shown to be 37.7, which the Department has verified. This score considers three demographic indicators, minority population above 50%, poverty rate above 25% and limited English proficiency above 15%, to identify underserved communities. Multiple environmental health indicators are used to identify overburdened communities.

To account for other sources of pollution surrounding the proposed source, the Department conducted an additional EJ Score analysis to evaluate the impact of other sources located within 1 mile of the proposed source. The highest EJ Score in a census tract located within 1 mile of the proposed source, expressed as a statewide percentile, was shown to be 37.7.

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[1] TLVs are threshold limit values (exposure limits) established for toxic materials by the American Conference of Governmental Industrial Hygienists (ACGIH). Some TLVs are established for short-term exposure (TLV – STEL), and some are established for longer-term exposure (TLV – TWA), where TWA is an acronym for time-weight average.

An EJ Score of 37.7 indicates that the proposed installations are located in an area that is not disproportionately impacted by sources of pollution or at a higher risk of health problems from environmental exposures than other areas in Maryland. The Department has reviewed the air quality impacts from this proposed installation and has determined that the proposed installations will meet all applicable air quality standards.

VI. COMPLIANCE DEMONSTRATION AND ANALYSIS

The proposed installation must comply with all State imposed emissions limitations and screening levels, as well as the NAAQS. The Department has conducted an engineering and air quality review of the application. The emissions were projected based on U.S. EPA-approved emissions factors for crematory operations. The conservative U.S. EPA's SCREEN3 model was also used to project the maximum ground level concentrations from the proposed installation, which were then compared to the screening levels and the NAAQS.

A. **Estimated Emissions** - The maximum emissions of criterial pollutants from the proposed installation, including the proposed installation, are listed in Table I.

B. **Compliance with National Ambient Air Quality Standards -** The maximum ground level concentrations for particulate matter, sulfur dioxide, oxides of nitrogen, carbon monoxide, and volatile organic compounds based on the emissions from the proposed installation, are listed in column 2 of Table II. The combined impact of the proposed installation, and the ambient background concentration for each pollutant shown in column 3 of Table II, is less than the NAAQS for each pollutant shown in column 4.

C. **Compliance with Air Toxics Regulations** – The premises wide toxic air pollutants of concern that would be emitted from this facility are listed in column 1 of Table III. The predicted maximum off-site ambient concentrations of these toxic air pollutants are shown in column 4 of Table III, and in each case the maximum concentration is less than the corresponding screening level for the toxic air pollutant shown in column 3.

VII. TENTATIVE DETERMINATION

Based on the above information, the Department has concluded that the proposed installations will comply with all applicable Federal and State air quality control requirements. In accordance with the Administrative Procedure Act, the Department has made a tentative determination to issue the Permit to Construct.

Enclosed with the tentative determination is a copy of the draft Permit to Construct.

TABLE I
PROJECTED MAXIMUM EMISSIONS FROM THE PROPOSED INSTALLATION

POLLUTANT	PROJECTED MAXIMUM EMISSIONS	
	(lbs/day)	(tons/year)
Oxides of Nitrogen (NO_X) (includes Nitrogen Dioxide – NO_2)	355	64.8
Carbon Monoxide (CO)	298	54
Sulfur Dioxide (SO_2)	21.9	4.0
Total Particulate Matter (PM) (includes PM-10 and PM-2.5)	52.3	9.6
Volatile Organic Compounds (VOC)	45	8.2

TABLE II
PROJECTED IMPACT OF EMISSIONS OF CRITERIA POLLUTANTS FROM THE PROPOSED INSTALLATION ON AMBIENT AIR QUALITY

POLLUTANTS	**MAXIMUM OFF-SITE GROUND LEVEL CONCENTRATIONS CAUSED BY EMISSIONS FROM PROPOSED PROCESS ($\mu g/m^3$)**	**BACKGROUND AMBIENT AIR CONCENTRATIONS ($\mu g/m^3$)***	**NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) ($\mu g/m^3$)**
Nitrogen Dioxide (NO_2)	annual avg → 11.6	annual avg → 28	annual avg → 100
Carbon Monoxide (CO)	1-hour max → 121 8-hour max→ 85	1-hour max.→ 2977 8-hour max.→ 1260	1-hour max.→ 40,000 8-hour max.→ 10,000
Sulfur Dioxide (SO_2)	24-hour max → 3.6 annual avg → 0.7	24-hour max → 5 annual avg → 0.8	24-hour max → 366 annual avg → 78.5
Particulate Matter (PM_{10})	24-hour max → 4.5	24-hour max.→ 101	24-hour max.→ 150

*Background concentrations were obtained from Maryland air monitoring stations as follows:

NO_2 → Monitoring Station on Old Court Rd, Lochern
PM_{10} → Monitoring Station Hillen Rd, Baltimore City
CO and SO_2 → Monitoring Station in Essex, Baltimore County

TABLE III
PREDICTED MAXIMUM OFF-SITE AMBIENT CONCENTRATIONS FOR TOXIC AIR POLLUTANTS EMITTED FROM THE FACILITY

Toxic Air Pollutant	PROJECTED WORST-CASE FACILITY-WIDE EMISSIONS (lbs/hr)	SCREENING LEVELS (μg/m^3)	PREDICTED MAXIMUM OFF-SITE GROUND LEVEL CONCENTRATIONS (μg/m^3)
Acenaphthene (CAS No. 83329)	0.0000011	20.3 (8-hr)	0.0000076 (8-hr)
Acenaphthylene (CAS No. 208968)	0.0000067	24.6 (8-hr)	0.000046 (8-hr)
Acetaldehyde (CAS No. 75070)	0.0014	450 (1-hr) 2300 (8-hr) 5 (annual)	0.014 (1-hr) 0.0095 (8-hr) 0.00083 (annual)
Anthracene (CAS No. 120127)	0.0000032	20 (8-hr)	0.000022 (8-hr)
Antimony (CAS No. 7440360)	0.0003	5 (8-hr)	0.0021 (8-hr)
Arsenic (CAS No. 7440382)	0.00062	0.1 (8-hr) 0.002 (annual)	0.0042 (8-hr) 0.00037 (annual)
Barium (CAS No. 7440393)	0.00026	5 (8-hr)	0.0018 (8-hr)
Benzo (g,h,i) perylene (CAS No. 191242)	0.00000044	20 (8-hr)	0.000003 (8-hr)
Beryllium (CAS No. 7440417)	0.000026	0.0005 (8-hr) 0.004 (annual)	0.00018 (8-hr) 0.000016(annual)
Cadmium (CAS No. 7440439)	0.0022	0.02 (8-hr) 0.006 (annual)	0.016 (8-hr) 0.0013 (annual)
Chromium (CAS No. 7440473)	0.0003	5 (8-hr)	0.0021 (8-hr)
Chromium VI (CAS No. 18540299)	0.00014	0.01 (8-hr) 0.0008 (annual)	0.00096 (8-hr) 0.000083 (annual)
Cobalt (CAS No. 7440484)	0.00014	0.2 (8-hr)	0.00093 (8-hr)
Copper (CAS No. 7440508)	0.00029	2 (8-hr)	0.002 (8-hr)
Fluoranthene (CAS No. 206440)	0.0000021	82 (8-hr)	0.000014 (8-hr)
Fluorene (CAS No. 86737)	0.0000042	20 (8-hr)	0.000029 (8-hr)
Formaldehyde (CAS No. 50000)	0.00034	20.3 (8-hr) 0.8 (annual)	0.0023 (8-hr) 0.0002 (annual)
Hydrogen Chloride (CAS No. 7647010)	3.02	29.8 (1-hr) 165 (8-hr)	29.6(1-hr) 20.7 (8-hr)
Hydrogen Fluoride (CAS No. 7664393)	0.011	16.4 (1-hr) 4.1 (8-hr)	0.11 (1-hr) 0.078 (8-hr)
Lead (CAS No. 7439921)	0.015	0.5 (8-hr)	0.11 (8-hr)
Molybdenum (CAS No. 7439987)	0.00017	5 (8-hr)	0.0011 (8-hr)
Nickel (CAS No. 7440020)	0.00038	1 (8-hr)	0.0027 (8-hr)
Phenanthrene (CAS No. 85018)	0.000023	9.8 (8-hr)	0.00016 (8-hr)

Toxic Air Pollutant	**PROJECTED WORST-CASE FACILITY-WIDE EMISSIONS (lbs/hr)**	**SCREENING LEVELS (μg/m³)**	**PREDICTED MAXIMUM OFF-SITE GROUND LEVEL CONCENTRATIONS (μg/m³)**
Pyrene (CAS No. 129000)	0.0000016	20 (8-hr)	0.000011 (8-hr)
Selenium (CAS No. 7782492)	0.00045	2 (8-hr)	0.0031 (8-hr)
Silver (CAS No. 7440224)	0.000073	0.1 (8-hr)	0.0005 (8-hr)
Thallium (CAS No. 7440280)	0.00086	0.2 (8-hr)	0.0059 (8-hr)
Vanadium (CAS No. 7440622)	0.00058	0.5 (8-hr)	0.004 (8-hr)
Zinc (CAS No. 7440666)	0.0041	1000 (1-hr) 500 (8-hr)	0.04 (1-hr) 0.028 (8-hr)
Total Dioxins and Furans (CAS No. 174016)	0.000000014	0.0008 (8-hr)	0.000000096 (8-hr)

The values represent maximum facility-wide emissions of toxic air pollutants during any 1-hour period of facility operation.

The values are based on worst-case emissions from the proposed facility and were predicted by EPA's SCREEN3 model, which provides conservative estimations concerning the impact of pollutants on ambient air quality.

DRAFT PERMIT

Wes Moore Serena McIlwain

Air and Radiation Administration

1800 Washington Boulevard, Suite 720
Baltimore, MD 21230

☒ Construction Permit ☐ Operating Permit

PERMIT NO.
As Listed on Page 2

DATE ISSUED:

PERMIT FEE:
1500.00

EXPIRATION DATE:
In accordance with
COMAR 26.11.02.04B

LEGAL OWNER & ADDRESS
Brandywine Green, LLC dba Agape Pet Services
2 Daniels Way
Cranston, RI 02921
Attention: Ms. Emily Larkin
Environmental Permitting Manager

SITE
Agape Pet Services
19712 Shepherdstown Pike
Boonsboro, MD 21713
AI # 31943

SOURCE DESCRIPTION

Animal Crematory Facility. This Permit authorizes the installation of five (5) crematories to replace three (3) existing crematories.

This Permit supersedes all previous Permits to Construct issued to Premises Number 043-0046.

This Permit includes limitations on annual throughput in order that Brandywine Green, LLC may be recognized as a synthetic minor source with respect to emissions of oxides of nitrogen.

This source is subject to the conditions described on the attached pages.

Program Manager

Director, Air and Radiation Administration

BRANDYWINE GREEN, LLC
dba AGAPE PET SERVICES
PERMIT-TO-CONSTRUCT CONDITIONS
PREMISES NO. 043-0468

INDEX

This permit covers the following registered installations:

ARA Registration No.	Description	Installation Date
043-0468-2-0039	Facultatieve Technologies ISI-1600 animal crematory* rated at 240pounds per hour	2008
043-0468-2-0040	Matthews Model IEB-40 animal crematory'*rated at 350 pounds per hour	2013
043-0468-1-0042	Matthews Model PPJr animal crematory rated at 75 pounds per hour	2024
043-0468-1-0043	Matthews Model PPJr animal crematory rated at 75 pounds per hour	2024
043-0468-2-0047	Matthews Model IEB-56 animal crematory rated at 400 pounds per hour	2024
043-0468-2-0048	Therm Tec IS18P6 animal crematory rated at 300 pounds per hour	2024
043-0468-2-0049	Therm Tec IS18P6 animal crematory rated at 300 pounds per hour	2024

Part A – General Provisions

(1) The following Air and Radiation Administration (ARA) permit-to-construct application forms and supplemental information are incorporated into this permit by reference:

(a) All valid applications for Emission Point Data (Form 5 EP) received at the Department prior to issuance of this permit. This includes the Form 5EP applications received February 26, 2024, for the installation of five (5) animal crematories.

(b) All valid applications for Incinerators (Form 10) received at the Department prior to issuance of this permit. This includes the Form 10 applications received February 26, 2024, for the installation of five (5) animal crematories.

(c) All valid Supplemental Information proof of zoning, site plan, and process diagram received at the Department prior to issuance of this permit. This includes information the emission data, modeling and toxics reporting received February 26, 2024, for the installation of five (5) animal crematories.

If there are any conflicts between representations in this permit and representations in the applications, the representations in the permit shall govern. Estimates of dimensions, volumes, emissions rates, operating rates, feed rates and hours of operation included in the applications do not constitute enforceable numeric limits beyond the extent necessary for compliance with applicable requirements.

(2) Upon presentation of credentials, representatives of the Maryland Department of the Environment (the “Department”) and the Washington County Health Department shall at any reasonable time be granted, without delay and without prior notification, access to the Permittee’s property and permitted to:

(a) inspect any construction authorized by this permit;

(b) sample, as necessary to determine compliance with requirements of this permit, any materials stored or processed on-site, any waste materials, and any discharge into the environment;

(c) inspect any monitoring equipment required by this permit;

(d) review and copy any records, including all documents required to be maintained by this permit, relevant to a determination of compliance with requirements of this permit;

(e) obtain any photographic documentation or evidence necessary to determine compliance with the requirements of this permit; and

(f) exercise its right of entry through use of an unmanned aircraft system to conduct inspections, collect samples, or make visual observations through photographic or video recordings to determine compliance with the requirements of this permit.

(3) The Permittee shall notify the Department prior to increasing quantities and/or changing the types of any materials referenced in the application or limited by this permit. If the Department determines that such increases or changes constitute a modification, the Permittee shall obtain a permit-to-construct prior to implementing the modification.

(4) Nothing in this permit authorizes the violation of any rule or regulation or the creation of a nuisance or air pollution.

(5) If any provision of this permit is declared by proper authority to be invalid, the remaining provisions of the permit shall remain in effect.

(6) This permit supersedes all previous permits-to-construct issued to premises number 043-0468.

(7) Subsequent to issuance of this permit, the Department may impose additional and modified requirements that are incorporated into a State permit-to-operate issued pursuant to COMAR 26.11.02.13.

Part B – Applicable Regulations

(1) This source is subject to all applicable federal air pollution control requirements.

(2) This source is subject to all applicable federally enforceable State air pollution control requirements including, but not limited to, the following regulations:

(a) COMAR 26.11.01.04A(1) which provides that the Department may request sufficient testing to determine compliance with air quality regulations.

(b) COMAR 26.11.01.07C, which requires that the Permittee report to the Department occurrences of excess emissions.

(c) COMAR 26.11.02.04B, which states that a permit to construct or an approval expires if, as determined by the Department:

(i) Substantial construction or modification is not commenced within 18 months after the date of issuance of the permit or approval, unless the Department specifies a longer period in the permit or approval;

(ii) Construction or modification is substantially discontinued for a period of 18 months after the construction or modification has commenced; or

(iii) The source for which the permit or approval was issued is not completed within a reasonable period after the date of issuance of the permit or approval.

(d) COMAR 26.11.02.09A, which requires that the Permittee obtain a permit-to-construct if an installation is to be modified in a manner that would cause changes in the quantity, nature, or characteristics of emissions from the installation as referenced in this permit.

(e) COMAR 26.11.08.04A(1), which prohibits the Permittee to cause or permit the discharge of emissions from any incinerator, other than water in an uncombined form which is greater than 20 percent opacity.

Exceptions. The requirements do not apply to emissions during start-up, or adjustments or occasional cleaning of control equipment if:

(i) The visible emissions are not greater than 40 percent opacity; and

(ii) The visible emissions do not occur for more than 6 consecutive minutes in any 60-minute period.

(f) COMAR 26.11.08.05A(1) & A(3) which requires the Permittee to limit the discharge of particulate matter to 0.10 grains per dry standard cubic foot or less when adjusted to 12 percent carbon dioxide.

(3) This source is subject to all applicable State-only enforceable air pollution control requirements including, but not limited to, the following regulations:

(a) COMAR 26.11.02.13A(1), which requires that the Permittee obtain from the Department, and maintain and renew as required, a valid State permit-to-operate.

(b) COMAR 26.11.02.19C & D, which require that the Permittee submit to the Department annual certifications of emissions, and that the Permittee maintain sufficient records to support the emissions information presented in such submittals.

(c) COMAR 26.11.06.08 and 26.11.06.09, which generally prohibit the discharge of emissions beyond the property line in such a manner that a nuisance or air pollution is created.

(d) COMAR 26.11.15.05, which requires that the Permittee implement “Best Available Control Technology for Toxics” (T – BACT) to control emissions of toxic air pollutants.

(e) COMAR 26.11.15.06, which prohibits the discharge of toxic air pollutants to the extent that such emissions would unreasonably endanger human health.

Part C – Construction Conditions

(1) Except as otherwise provided in this part, the five (5) animal crematories that are replacing the three (3) existing animal crematories, shall be constructed in accordance with specifications included in the incorporated applications and in accordance with the specifications provided by the vendor and manufacturer.

(2) The crematories shall be designed to limit particulate matter emissions to no more than 0.10 grains per standard cubic foot dry, adjusted to 12 percent carbon dioxide.

(3) The crematories shall be equipped with a secondary combustion chamber capable of achieving a retention time of at least 1.0 second, and an operating temperature of at least 1600 ºF.

(4) The crematories shall be equipped with temperature sensors and recorders to continuously monitor and record the temperature of the secondary combustion chamber during operation.

(5) The crematory stacks shall be built to discharge exhaust at least 35 feet above the ground.

Part D – Operating Conditions

(1) Except as otherwise provided in this part, all registered equipment shall be operated in accordance with specifications included in the application and any operating procedures recommended by equipment vendors unless the Permittee obtains from the Department written authorization for alternative operating procedures.

(2) The Permittee shall keep the seven (7) animal crematories properly maintained and in good working condition so as to ensure full and continuous compliance with all applicable regulations.

(3) Premises wide emissions of oxides of nitrogen (NO_X) shall be less than 100 tons in any rolling 12-month period.

(4) The Permittee shall comply with the following premises-wide operational limitations unless the Permittee can demonstrate, to the satisfaction of the Department, that compliance with all applicable air quality regulations and standards can be achieved at other conditions:

(a) Only animal remains shall be cremated.

(b) The Permittee shall not cremate more than 1,500 lbs of animal remains per hour.

(c) The Permittee shall not cremate more than 12,000 lbs of animal remains in any 8-hour period.

(d) The Permittee shall not cremate more than 10,000,000 lbs of animal remains in any rolling 12-month period.

(e) The Permittee shall not combust any halogenated plastics, including polyvinyl chloride (PVC) body bags or PVC pipes.

(f) The Permittee shall not combust any hazardous waste, or hospital, medical, and infectious waste as defined in COMAR 26.11.08.01B(18).

(g) The Permittee shall determine the weight of the remains to be cremated prior to each cremation.

(h) The Permittee shall utilize the secondary chamber of the incinerator to comply with the T-BACT requirements of COMAR 26.11.15.05.

(i) Prior to the initiation of cremation in the primary chamber, the secondary chamber shall be preheated until the gases leaving the secondary chamber attain a temperature of at least 1600 ºF.

(j) While remains are being cremated, the Permittee shall maintain a secondary chamber temperature of at least 1600 ºF.

(k) The Permittee shall set the recycle time for the cremation so that animal remains will not be cremated at a rate exceeding the throughput in 3(b, c, or d) above.

(l) The exhaust gases from all crematory stacks shall discharge at least 35 feet above the ground.

Part E – Notifications and Monitoring

(1) The Permittee shall notify the Department of the initial start-up date of the five (5) animal crematories within fifteen (15) days after the date.

(2) While remains are cremated, the temperature of the flue gases at the outlet of the secondary combustion chambers shall be continuously monitored and recorded on a chart recorder or other continuous record keeping device. The records shall show the dates and times of all recorded temperature readings.

Part F – Record Keeping and Reporting

(1) The Permittee shall maintain for at least five (5) years, and shall make available to the Department upon request, records of the following information for the animal crematories:

(a) Charts or other continuous records of the flue gas temperature at the outlet of the secondary combustion chambers. The records must show the date and start time of each cremation.

(b) A daily log of the following information:

(i) the date and start time of each cremation;

(ii) the approximate weight of each charge;

(iii) the total weight cremated per hour;

(iv) the total weight cremated per 8 hours;

(v) the total weight cremated per rolling 12-month period; and

(vi) the duration of each cremation cycle.

(2) The Permittee shall maintain at the facility for at least five (5) years, and shall make available to the Department upon request, records necessary to support annual certifications of emissions and demonstrations of compliance for toxic air pollutants. Such records shall include, if applicable, the following:

- (a) mass emissions rates for each regulated pollutant, and the total mass emissions rate for all regulated pollutants for each registered source of emissions;
- (b) accounts of the methods and assumptions used to quantify emissions;
- (c) all operating data, including operating schedules and production data, that were used in determinations of emissions;
- (d) amounts, types, and analyses of all fuels used;
- (e) any records, the maintenance of which is required by this permit or by State or federal regulations, that pertain to the operation and maintenance of continuous emissions monitors, including:
  - (i) all emissions data generated by such monitors;
  - (ii) all monitor calibration data;
  - (iii) information regarding the percentage of time each monitor was available for service; and
  - (iv) information concerning any equipment malfunctions.
- (f) information concerning operation, maintenance, and performance of air pollution control equipment and compliance monitoring equipment, including:
  - (i) identifications and descriptions of all such equipment;
  - (ii) operating schedules for each item of such equipment;
  - (iii) accounts of any significant maintenance performed;
  - (iv) accounts of all malfunctions and outages; and
  - (v) accounts of any episodes of reduced efficiency.

(g) limitations on source operation or any work practice standards that significantly affect emissions; and

(h) other relevant information as required by the Department.

(3) The Permittee shall submit to the Department by April 1 of each year a certification of emissions for the previous calendar year. The certifications shall be prepared in accordance with requirements, as applicable, adopted under COMAR 26.11.01.05 – 1 and COMAR 26.11.02.19D.

(a) Certifications of emissions shall be submitted on forms obtained from the Department.

(b) A certification of emissions shall include mass emissions rates for each regulated pollutant, and the total mass emissions rate for all regulated pollutants for each of the facility's registered sources of emissions.

(c) The person responsible for a certification of emissions shall certify the submittal to the Department in the following manner:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

(4) The Permittee shall submit to the Department by April 1 of each year a written certification of the results of an analysis of emissions of toxic air pollutants from the Permittee's facility during the previous calendar year. Such analysis shall include either:

(a) a statement that previously submitted compliance demonstrations for emissions of toxic air pollutants remain valid; or

(b) a revised compliance demonstration, developed in accordance with requirements included under COMAR 26.11.15 & 16, that accounts for changes in operations, analytical methods, emissions determinations, or other factors that have invalidated previous demonstrations.

(5) The Permittee shall report, in accordance with requirements under COMAR 26.11.01.07, occurrences of excess emissions to the Compliance Program of the Air and Radiation Administration.

Part G – Temporary Permit-to-Operate Conditions

(1) This permit-to-construct shall also serve as a temporary permit-to-operate that confers upon the Permittee authorization to operate the five (5) animal crematories, for a period of up to 180 days after initiating operation of the first unit.

(2) During the effective period of the temporary permit-to-operate the Permittee shall operate the new installation as required by the applicable terms and conditions of this permit-to-construct, and in accordance with operating procedures and recommendations provided by equipment vendors.

(3) The Permittee shall submit to the Department an application for a State permit-to-operate no later than 60 days prior to expiration of the effective period of the temporary permit-to-operate.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

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AIR AND RADIATION ADMINISTRATION

SUPPLEMENTAL INFORMATION REFERENCES

The Code of Maryland Regulations (COMAR) is searchable by COMAR citation at the following Division of State Documents website:
https://dsd.maryland.gov/Pages/default.aspx

The Code of Federal Regulations (CFR), including New Source Performance Standards (NSPS) at 40 CFR, Part 60 and National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR, Parts 61 and 63, is searchable by CFR citation at the following U.S. Government Publishing Office website:
http://www.ecfr.gov

Information on National Ambient Air Quality Standards (NAAQS) is located at the following U.S. Environmental Protection Agency (EPA) website:
https://www.epa.gov/criteria-air-pollutants/naaqs-table

Information on Maryland's Ambient Air Monitoring Program is located at the following Maryland Department of the Environment website:
http://mde.maryland.gov/programs/Air/AirQualityMonitoring/Pages/index.aspx

Information on the U.S. EPA's Screen3 computer model and other EPA-approved air dispersion models is located at the following U.S. EPA website:
https://www.epa.gov/scram/air-quality-dispersion-modeling-screening-models

Information on the U.S. EPA TANKS Emission Estimation Software is located at the following U.S. EPA website:
https://www.epa.gov/air-emissions-factors-and-quantification/tanks-emissions-estimation-software-version-5

Information on the U.S. EPA Emission Factors and AP-42 is located at the following U.S. EPA website:
https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors