July 28, 2021

Subject: 2021 Compliance Test Plan, Vertical Paint Line & Paint Booth
Hydro Extrusion, Portland Coating Facility
Portland, OR
Permit No.: 26-3241-ST-01
Montrose Document Number W006AS-010226-PP-805

Enclosed please find the Enclosure Verification test plan for the above-referenced facility and source. The test plan documents the details of the testing that will be performed by Montrose Air Quality Services, LLC (Montrose) at Hydro Extrusion Portland Coatings on August 13, 2021.

The following distribution was provided for this project.

Name	Company/Agency	No. of Copies	Electronic Copy
Jeremy Basler	Hydro Extrusion North America 7933 NE 21st Avenue Portland, OR 97221	1	Emailed PDF, 7/16/2021 Emailed PDF, 7/28/2021 (Revision)
Thomas Rhodes	Oregon Department of Environmental Quality 700 NE Multnomah St., Suite 600 Portland, OR 97232-4100	1	Emailed PDF, 7/16/2021 Emailed PDF, 7/28/2021 (Revision)

Please do not hesitate to call our Portland office at 503-255-5050 if you have any questions.

Sincerely,

Peter Becker
Client Project Manager
Montrose Air Quality Services, LLC

SOURCE TEST PLAN
2021 ENCLOSURE VERIFICATION
HYDRO EXTRUSION
PORTLAND COATINGS FACILITY
PORTLAND, OREGON

Prepared For:

Hydro Extrusion Portland, Inc.
Coatings Division
7933 NE 21st Ave
Portland, OR 97221

For Submittal To:

Oregon Department of Environmental Quality
700 NE Multnomah St., Suite 600
Portland, OR 97232

Prepared By:

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13585 NE Whitaker Way
Portland, OR 97230

Document Number:	**W006AS-010226-PP-805R2**
Proposed Test Date:	**August 13, 2021**
Submittal Date:	**July 28, 2021**

ACCREDITED TO ASTM D7036 ONLY CERT #3925.01

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1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Hydro Extrusion Portland, Inc contracted Montrose Air Quality Services, LLC (Montrose) to perform an enclosure verification on the specific emission units ventilated to the regenerative thermal oxidizer at the Hydro Extrusion Coatings Division facility located in Portland, Oregon. The tests are conducted to verify 100% capture efficiency at the request of an Oregon Department of Environmental Quality (ODEQ) letter dated June 21, 2021 for compliance with the Cleaner Air Oregon Program.

The specific objectives are to determine the Capture efficiency by means of EPA 204 enclosure verification on the emission units listed in section 2.1 of the permit. In Agreement with ODEQ the Horizontal Paint Line and the Horizontal Paint Line Paint Room are currently anticipated to be decommissioned in 2021 and will not be addressed in the enclosure verification. Emission units are listed below as defined in the permit that are to be tested:

- Vertical Paint Line Coating Area
- Vertical Paint Line Flash Off Tunnel
- Vertical Paint Line Curing Oven
- Paint Room

Since the Vertical Paint Line (VPL) areas defined above are all interconnected without walled separation the individual vertical paint line areas are defined as the vertical paint line.

TABLE 1-1
SUMMARY OF TEST PROGRAM AND PROPOSED SCHEDULE

Proposed Test Date	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
8/13/2021	Vertical Paint Line VPL Paint Mixing Room	Enclosure Verification	EPA 204	3	60

To simplify this test plan, a list of Units and Abbreviations is included in Appendix A. Throughout this test plan, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

1.2 APPLICABLE REGULATIONS AND EMISSION LIMITS

The results from this test program are presented in units consistent with those listed in the applicable regulations or requirements. The reporting units and emission limits are presented in Table 1-2.

TABLE 1-2
REPORTING UNITS AND EMISSION LIMITS

Unit ID/ Source Name	Parameter	Reporting Units
System Capture Efficiency[1]	Capture Efficiency	% capture

[1]If all EPA 204 criteria are met the system will be shown to demonstrate 100% capture.

1.3 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location:	Hydro Extrusion Portland, Inc Hydro Coating Division 5325 NE Skyport Way Portland, OR 97221	
Project Contact:	Jeremy Basler	Jennifer Garcia
Role:	Regional HSE Manager	Regional Environmental Engineer
Company:	Hydro Extrusion Portland	Hydro Extrusion Portland
Telephone:	605-760-3548	503-680-4440
Email:	Jeremy.Basler@hydro.com	Jennifer.Garcia@hydro.com

Agency Information

Regulatory Agency:	Oregon Department of Environmental Quality
Agency Contact:	Thomas Rhodes
Telephone:	503-229-5534
Email:	Thomas.Rhodes@deq.state.or.us

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC (Montrose)	
Contact:	Peter Becker	Kristina Schafer
Title:	Client Project Manager	Hub District Manager
Telephone:	330-285-6884	253-480-3801
Email:	pbecker@montrose-env.com	kschafer@montrose-env.com

2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

The Hydro Extrusion facility is located at 5325 NE Skyport Way in Portland, Oregon.

2.2 FLUE GAS SAMPLING LOCATION

Measurement of facial velocity will be conducted on locations meeting the definition of Natural Draft Openings (NDO) as defined by EPA Method 204. Refer to Appendix A.1 for a Plant Drawing and potential NDO locations identified for evaluation.

2.3 OPERATING CONDITIONS AND PROCESS DATA

Enclosure tests are performed while the source/units and air pollution control devices are operating at the conditions required by the permit. The units are tested when operating normally.

Plant personnel are responsible for establishing the test conditions and collecting all applicable unit-operating data. Data collected includes the following parameters:

- Production Rate of the Vertical Paint Line

2.4 PLANT SAFETY

Montrose will comply with all safety requirements at the facility. The facility Client Sponsor, or designated point of contact, is responsible for ensuring routine compliance with plant entry, health, and safety requirements. The Client Sponsor has the authority to impose or waive facility restrictions. The Montrose test team leader has the authority to negotiate any deviations from the facility restrictions with the Client Sponsor. Any deviations must be documented.

2.4.1 Safety Responsibilities

Planning

- Montrose must complete a field review with the Client Sponsor prior to the project date. The purpose of the review is to develop a scope of work that identifies the conditions, equipment, methods, and physical locations that will be utilized along with any policies or procedures that will affect our work.
- We must reach an agreement on the proper use of client emergency services and ensure that proper response personnel are available, as needed.
- The potential for chemical exposure and actions to be taken in case of exposure must be communicated to Montrose. This information must include expected concentrations of the chemicals and the equipment used to identify the substances.
- Montrose will provide a list of equipment being brought to the site, if required by the client.

Project Day

- Montrose personnel will arrive with the appropriate training and credentials for the activities they will be performing and the equipment that they will operate.
- Our team will meet daily to review the Project Scope, Job Hazard Assessment, and Work Permits. The Client Sponsor and Operations Team are invited to participate.
- Montrose will provide equipment that can interface with the client utilities previously identified in the planning phase and only work with equipment that our client has made ready and prepared for connection.
- We will follow client direction regarding driving safety, safe work permitting, staging of equipment, and other crafts or work in the area.
- As per 40 CFR Part 60 Subpart A, Section 60.8, the facility must provide the following provisions at each sample location:
    - Sampling ports, which meet EPA minimum requirements for testing. The caps should be removed or be hand-tight.
    - Safe sampling platforms.
    - Safe access to the platforms and test ports, including any scaffolding or man lifts.
    - Sufficient utilities to perform all necessary testing.
- Montrose will use the client communication system, as directed, in case of plant or project emergency.
- Any adverse conditions, unplanned shutdowns or other deviations to the agreed scope and project plan must be reviewed with the Client Sponsor prior to continuing work. This will include any safe work permit and hazard assessment updates.

Completion

- Montrose personnel will report any process concerns, incidents or near misses to the Client Sponsor prior to leaving the site.
- Montrose will clean up our work area to the same condition as it was prior to our arrival.
- We will ensure that all utilities, connection points or equipment have been returned to the pre-project condition or as stated in the safe work permit. In addition, we will walk out the job completion with Operations and the Client Sponsor if required by the facility.

2.4.2 Safety Program and Requirements

Montrose has a comprehensive health and safety program that satisfies State and Federal OSHA requirements. The program includes an Illness and Injury Prevention Program, site-specific safety meetings, and training in safety awareness and procedures. The basic elements include:

- All regulatory required policies/procedures and training for OSHA, EPA and FMCSA

- Medical monitoring, as necessary
- Use of Personal Protective Equipment (PPE) and chemical detection equipment
- Hazard communication
- Pre-test and daily toolbox meetings
- Continued evaluation of work and potential hazards.
- Near-miss and incident reporting procedures as required by Montrose and the Client

Montrose will provide standard PPE to employees. The PPE will include but is not limited to; hard hats, safety shoes, glasses with side shields or goggles, hearing protection, hand protections, and fall protection.

The detailed Site Safety Plan for this project is attached to this test plan in Appendix “S”.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 TEST METHODS

The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 204, Criteria for and Verification of a Permanent or Temporary Total Enclosure

An enclosure is evaluated against a set of criteria defined in EPA Method 204.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Facial velocity (FV) will be determined using a Shortridge micromanometer
  - Facial velocity will be determined by the alternative criteria in section 8.3 of the method by measuring the pressure drop. A pressure drop of 0.007 inches of water corresponds to an FV of 200 feet per minute.
  - Measurements will be recorded in a series of 3 rounds; during each round, five measurements will be recorded at each NDO.
  - If FV is less than 500 feet per minute, the continuous inward flow shall be verified per Method 204. Video recordings or photographs with date and time stamp will document the checks made no more than 10 minutes apart as required under Method 204 when monitoring the direction of the air flow for at least one hour.
- Method Exceptions:
  - None

4.0 QUALITY ASSURANCE AND REPORTING

4.1 QA AUDITS

Montrose has instituted a rigorous QA/QC program for its air quality testing. Quality assurance audits are performed as part of the test program to ensure that the results are calculated using the highest quality data available. This program ensures that the emissions data we report are as accurate as possible. The procedures included in the cited reference methods are followed during preparation, sampling, calibration, and analysis. Montrose is responsible for preparation, calibration, and cleaning of the sampling apparatus. Montrose will also perform the sampling, sample recovery, storage, and shipping. Approved contract laboratories may perform some of the preparation and sample analyses, as needed.

4.2 QUALITY CONTROL PROCEDURES

Montrose calibrates and maintains equipment as required by the methods performed and applicable regulatory guidance. Montrose follows internal procedures to prevent the use of malfunctioning or inoperable equipment in test programs. All equipment is operated by trained personnel. Any incidence of nonconforming work encountered during testing is reported and addressed through the corrective action system.

4.2.1 Equipment Inspection and Maintenance

Each piece of field equipment that requires calibration 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 as required by the test method or regulatory agency. A calibration certificate for the digital manometer demonstrating accuracy to a differential pressure as low as 0.01 inches of water will be included in the report.

4.2.2 Audit Samples

When required by the test method and available, Montrose obtains EPA TNI SSAS audit samples from an accredited provider for analysis along with the samples. Currently, the SSAS program has been suspended pending the availability of a second accredited audit sample provider. If the program is reinstated, the audit samples will be ordered. If required as part of the test program, the audit samples are stored, shipped, and analyzed along with the emissions samples collected during the test program. The audit sample results are reported along with the emissions sample results.

4.3 DATA ANALYSIS AND VALIDATION

Montrose converts the raw field, laboratory, and process data to reporting units consistent with the permit or subpart. Calculations are made using proprietary computer spreadsheets or data acquisition systems. One run of each test method is also verified using a separate example calculation. The example calculations are checked against the spreadsheet results and are included in the final report. The “Standard Conditions” for this project are 29.92 inches of mercury and 68 °F.

4.4 SAMPLE IDENTIFICATION AND CUSTODY

No samples are required to be recovered for this test program.

4.5 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the appendices. The content of this test plan is modeled after the EPA Emission Measurement Center Guideline Document (GD-042).

4.6 REPORTING

Montrose will prepare a final report to present the test data, calculations/equations, descriptions, and results. Prior to release by Montrose, each report is reviewed and certified by the project manager and their supervisor, or a peer. Source test reports will be submitted to the facility or appropriate regulatory agency (upon customer approval) within 30 days of the completion of the field work. The report will include a series of appendices to present copies of the intermediate calculations and example calculations, raw field data, laboratory analysis data, process data, and equipment calibration data.

4.6.1 Example Report Format

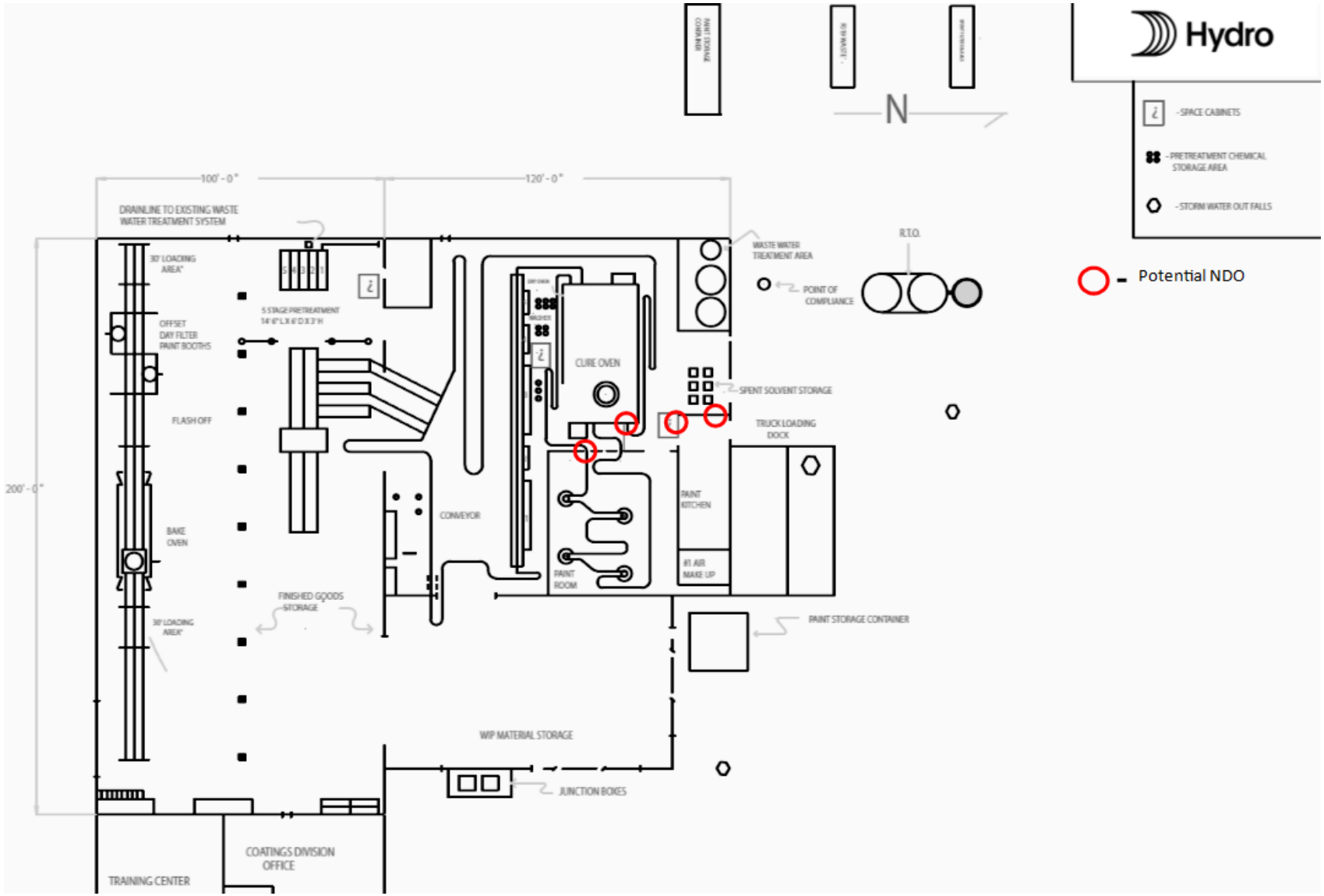
The report is divided into various sections describing the different aspects of the source testing program. Table 4-1 presents a typical Table of Contents for the final report.

TABLE 4-1
TYPICAL REPORT FORMAT

Cover Page	
Certification of Report	
Table of Contents	
Section	
1.0	INTRODUCTION
2.0	PLANT AND SAMPLING LOCATION DESCRIPTIONS
3.0	SAMPLING AND ANALYTICAL PROCEDURES
4.0	TEST DISCUSSION AND RESULTS
5.0	INTERNAL QA/QC ACTIVITIES
Appendices	
A	FIELD DATA AND CALCULATIONS
B	FACILITY PROCESS DATA
C	LABORATORY ANALYSIS DATA
D	QUALITY ASSURANCE/QUALITY CONTROL
E	REGULATORY INFORMATION

APPENDIX A
SUPPORTING INFORMATION

Appendix A.1
Facility Diagram


Hydro
N
- SPACE CABINETS
- PRETREATMENT CHEMICAL STORAGE AREA
- STORM WATER OUT FALLS
- Potential NDO
100' - 0"
120' - 0"
200' - 0"
DRAINLINE TO EXISTING WASTE WATER TREATMENT SYSTEM
30' LOADING AREA"
OFFSET DRY FILTER PAINT BOOTHS
5 STAGE PRETREATMENT 14'-6" L X 6'-0" D X 3'-3" H
FLASH OFF
BAKE OVEN
FINISHED GOODS STORAGE
30' LOADING AREA"
CURE OVEN
CONVEYOR
PAINT ROOM
PAINT KITCHEN
#1 AIR MAKE UP
WASTE WATER TREATMENT AREA
POINT OF COMPLIANCE
R.T.O.
SPENT SOLVENT STORAGE
TRUCK LOADING DOCK
PAINT STORAGE CONTAINER
WIP MATERIAL STORAGE
JUNCTION BOXES
COATINGS DIVISION OFFICE
TRAINING CENTER

Appendix A.2
Units and Abbreviations

UNITS AND ABBREVIATIONS

@ X% O_2	corrected to X% oxygen (corrected for dilution air)
|CC|	absolute value of the confidence coefficient
|d|	absolute value of the mean differences
ºC	degrees Celsius (centrigade)
ºF	degrees Fahrenheit
ºR	degrees Rankine
" H_2O	inches of water column
13.6	specific gravity of mercury
ΔH	pressure drop across orifice meter, inches H_2O
ΔP	velocity head of stack gas, inches H_2O
θ	total sampling time, minutes
µg	microgram
ρ_a	density of acetone, mg/ml
ρ_w	density of water, 0.9982 g/ml or 0.002201 lb/ml
acfm	actual cubic feet of gas per minute at stack conditions
A_n	cross-sectional area of nozzle, ft^2
A_s	cross-sectional area of stack, square feet (ft^2)
Btu	British thermal unit
B_{ws}	proportion by volume of water vapor in gas stream
C_a	particulate matter concentration in stack gas, gr/acf
C_{Avg}	average unadjusted gas concentration, ppmv
C_{Dir}	measured concentration of calibration gas, ppmv
cf or ft^3	cubic feet
cfm	cubic feet per minute
C_{Gas}	average gas concentration adjusted for bias, ppmv
C_M	average of initial and final system bias check responses from upscale calibration gas, ppmv
cm or m^3	cubic meters
C_{MA}	actual concentration of the upscale calibration gas, ppmv
C_O	average of initial and final system bias check responses from low-level calibration gas, ppmv
C_p	pitot tube coefficient
C_s	particulate matter concentration in stack gas, gr/dscf
CS	calibration span, % or ppmv
C_S	measured concentration of calibration gas, ppmv
C_V	manufactured certified concentration of calibration gas, ppmv
D	drift assessment, % of span
dcf	dry cubic feet

UNITS AND ABBREVIATIONS

dcm	dry cubic meters
D_n	diameter of nozzle, inches
D_s	diameter of stack, inches
dscf	dry standard cubic feet
dscfm	dry standard cubic feet per minute
dscm	dry standard cubic meters
F_d	F-factor, dscf/MMBtu of heat input
fpm	feet per minute
fps	feet per second
ft	feet
ft^2	square feet
g	gram
gal	gallons
gr	grains (7000 grains per pound)
gr/dscf	grains per dry standard cubic feet
hr	hour
I	percent of isokinetic sampling
in	inch
k	kilo or thousand (metric units, multiply by 10^3)
K	kelvin (temperature)
K_3	conversion factor 0.0154 gr/mg
K_4	conversion factor 0.002669 ((in. Hg)(ft^3))/((ml)(°R))
kg	kilogram
K_p	pitot tube constant (85.49 ft/sec)
kwscfh	thousand wet standard cubic feet per hour
l	liters
lb/hr	pounds per hour
lb/MMBtu	pounds per million Btu
lpm	liters per minute
m	meter or milli
M	thousand (English units) or mega (million, metric units)
m^3	cubic meters
m_a	mass of residue of acetone after evaporation, mg
M_d	molecular weight of stack gas; dry basis, lb/lb-mole
meq	milliequivalent
mg	milligram

UNITS AND ABBREVIATIONS

Mg	megagram (10^6 grams)
min	minute
ml or mL	milliliter
mm	millimeter
MM	million (English units)
MMBtu/hr	million Btu per hour
m_n	total amount of particulate matter collected, mg
mol	mole
mol. wt. or MW	molecular weight
M_s	molecular weight of stack gas; wet basis, lb/lb-mole
MW	molecular weight or megawatt
n	number of data points
ng	nanogram
nm	nanometer
P_{bar}	barometric pressure, inches Hg
pg	picogram
P_g	stack static pressure, inches H_2O
P_m	barometric pressure of dry gas meter, inches Hg
ppb	parts per billion
ppbv	parts per billion, by volume
ppbvd	parts per billion by volume, dry basis
ppm	parts per million
ppmv	parts per million, by volume
ppmvd	parts per million by volume, dry basis
P_s	absolute stack gas pressure, inches Hg
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
P_{std}	standard absolute pressure, 29.92 inches Hg
Q_a	volumetric flow rate, actual conditions, acfm
Q_s	volumetric flow rate, standard conditions, scfm
Q_{std}	volumetric flow rate, dry standard conditions, dscfm
R	ideal gas constant 21.85 ((in. Hg) ($ft^{3)}$)/((°R) (lbmole))
SB_{final}	post-run system bias check, % of span
SB_i	pre-run system bias check, % of span
scf	standard cubic feet

UNITS AND ABBREVIATIONS

scfh	standard cubic feet per hour
scfm	standard cubic feet per minute
scm	standard cubic meters
scmh	standard cubic meters per hour
sec	second
sf, sq. ft., or ft^2	square feet
std	standard
t	metric ton (1000 kg)
$T_{0.975}$	t-value
T_a	absolute average ambient temperature, ºR (+460 for English)
T_m	absolute average dry gas meter temperature, ºR (+460 for English)
ton or t	ton = 2000 pounds
tph or tons/hr	tons per hour
tpy or tons/yr	tons per year
T_s	absolute average stack gas meter temperature, ºR (+460 for English)
T_{std}	absolute temperature at standard conditions
V	volt
V_a	volume of acetone blank, ml
V_{aw}	volume of acetone used in wash, ml
V_{lc}	total volume H_2O collected in impingers and silica gel, grams
V_m	volume of gas sampled through dry gas meter, ft^3
$V_{m(std)}$	volume of gas measured by the dry gas meter, corrected to standard conditions, dscf
V_{ma}	stack gas volume sampled, acf
V_n	volume collected at stack conditions through nozzle, acf
V_s	average stack gas velocity, feet per second
$V_{wi(std)}$	volume of water vapor in gas sampled from impingers, scf
$V_{wsg(std)}$	volume of water vapor in gas sampled from silica gel, scf
W	watt
W_a	weight of residue in acetone wash, mg
W_{imp}	total weight of impingers, grams
W_{sg}	total weight of silica gel, grams
Y	dry gas meter calibration factor, dimensionless

ACRONYMS

AAS	atomic absorption spectroscopy
ACDP	air contaminant discharge permit
ACE	analyzer calibration error, percent of span
AD	absolute difference
ADL	above detection limit
AETB	Air Emissions Testing Body
AS	applicable standard (emission limit)
ASTM	American Society For Testing And Materials
BACT	best achievable control technology
BDL	below detection limit
BHP	brake horsepower
BIF	boiler and industrial furnace
BLS	black liquor solids
CC	confidence coefficient
CD	calibration drift
CE	calibration error
CEM	continuous emissions monitor
CEMS	continuous emissions monitoring system
CERMS	continuous emissions rate monitoring system
CET	calibration error test
CFR	Code of Federal Regulations
CGA	cylinder gas audit
CHNOS	elemental analysis for determination of carbon, hydrogen, nitrogen, oxygen, and sulfur content in fuels
CNCG	concentrated non-condensable gas
CO	catalytic oxidizer
COC	chain of custody
COMS	continuous opacity monitoring system
CPM	condensible particulate matter
CPMS	continuous parameter monitoring system
CT	combustion turbine
CTM	conditional test method
CTO	catalytic thermal oxidizer
CVAAS	cold vapor atomic absorption spectroscopy
D_e	equivalent diameter
DE	destruction efficiency
Dioxins	polychlorinated dibenzo-p-dioxins (pcdd's)

ACRONYMS

DLL	detection level limited
DNCG	dilute non-condensable gas
ECD	electron capture detector
EIT	Engineer In Training
ELCD	electoconductivity detector (hall detector)
EPA	US Environmental Protection Agency
EPRI	Electric Power Research Institute
ES	emission standard (applicable limit)
ESP	electrostatic precipitator
EU	emission unit
FCCU	fluid catalytic cracking unit
FGD	flue gas desulfurization
FIA	flame ionization analyzer
FID	flame ionization detector
FPD	flame photometric detector
FPM	filterable particulate matter
FTIR	Fourier-transform infrared spectroscopy
FTPB	field train proof blank
FTRB	field train recovery blank
Furans	polychlorinated dibenzofurans (pcdf's)
GC	gas chromatography
GC/MS	gas chromatography/mass spectroscopy
GFAAS	graphite furnace atomic absorption spectroscopy
GFC	gas filter correlation
GHG	greenhouse gas
HAP	hazardous air pollutant
HC	hydrocarbons
HHV	higher heating value
HPLC	high performance liquid chromatography
HRGC/HRMS	high-resolution gas chromatography/high-resolution mass spectroscopy
HRSG	heat recovery steam generator
IC	ion chromatography
ICAP	inductively-coupled argon plasmography
ICPCR	ion chromatography with a post-column reactor
IR	infrared radiation
ISO	International Standards Organization

ACRONYMS

kW	kilowatts
LFG	landfill gas
LHV	lower heating value
LPG	liquified petroleum gas
MACT	maximum achievable control technology
MDI	methylene diphyenyl diisocyanate
MDL	method detection limit
MNOC	maximum normal operating conditions
MRL	method reporting limit
MS	mass spectrometry
NA	not applicable or not available
NCASI	National Council For Air And Steam Improvement
NCG	non-condensable gases
NDIR	non-dispersive infrared
NESHAP	National Emissions Standards For Hazardous Air Pollutants
NG	natural gas
NIOSH	National Institute For Occupational Safety And Health
NIST	National Institute Of Standards And Technology
NMC	non-methane cutter
NMOC	non-methane organic compounds
NMVOC	non-methane volatile organic compounds
NPD	nitrogen phosphorus detector
NSPS	New Source Performance Standards
OSHA	Occupational Safety And Health Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl compounds
PCWP	plywood and composite wood products
PE	Professional Engineer
PFAS	per- and polyfluoroalkyl substances (PFAS)
PID	photoionization detector
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
POM	polycyclic organic matter
PS	performance specification
PSD	particle size distribution

ACRONYMS

PSEL	plant site emission limits
PST	performance specification test
PTE	permanent total enclosure
PTM	performance test method
QA/QC	quality assurance and quality control
QI	Qualified Individual
QSTI	Qualified Source Testing Individual
RA	relative accuracy
RAA	relative accuracy audit
RACT	reasonably available control technology
RATA	relative accuracy test audit
RCTO	rotary concentrator thermal oxidizer
RICE	stationary reciprocating internal combustion engine
RM	reference method
RTO	regenerative thermal oxidizer
SAM	sulfuric acid mist
SCD	sulfur chemiluminescent detector
SCR	selective catalytic reduction system
SD	standard deviation
Semi-VOST	semivolatile organic compounds sample train
SRM	standard reference material
TAP	toxic air pollutant
TBD	to be determined
TCA	thermal conductivity analyzer
TCD	thermal conductivity detector
TGNENMOC	total gaseous non-ethane non-methane organic compounds
TGNMOC	total gaseous non-methane organic compounds
TGOC	total gaseous organic compounds
THC	total hydrocarbons
TIC	tentatively identified compound
TO	thermal oxidizer
TO	toxic organic (as in EPA Method TO-15)
TPM	total particulate matter
TSP	total suspended particulate matter
TTE	temporary total enclosure
ULSD	ultra-low sulfur diesel

ACRONYMS

UV	ultraviolet radiation range
VE	visible emissions
VOC	volatile organic compounds
VOST	volatile organic sample train
WC	water column
WWTP	waste water treatment plant

CHEMICAL NOMENCLATURE

Ag	silver
As	arsenic
Ba	barium
Be	beryllium
C	carbon
Cd	cadmium
CdS	cadmium sulfide
CH_2O	formaldehyde
CH_3CHO	acetaldehyde
CH_3OH	methanol
CH_4	methane
C_2H_4O	ethylene oxide
C_2H_6	ethane
C_3H_4O	acrolein
C_3H_6O	propionaldehyde
C_3H_8	propane
C_6H_5OH	phenol
Cl_2	chlorine
ClO_2	chlorine dioxide
CO	carbon monoxide
Co	cobalt
CO_2	carbon dioxide
Cr	chromium
Cu	copper
EtOH	ethylene oxide
EtOH	ethyl alcohol (ethanol)
H_2	hydrogen
H_2O	water
H_2S	hydrogen sulfide
H_2SO_4	sulfuric acid
HCl	hydrogen chloride
Hg	mercury
IPA	isopropyl alcohol
MDI	methylene diphyenyl diisocyanate
MEK	methyl ethyl ketone
MeOH	methanol

CHEMICAL NOMENCLATURE

Mn	manganese
N_2	nitrogen
NH_3	ammonia
Ni	nickel
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
O_2	oxygen
P	phosphorus
Pb	lead
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
Sb	antimony
Se	selenium
SO_2	sulfur dioxide
SO_3	sulfur trioxide
SO_x	sulfur oxides
TCDD	tetrachlorodibenzodioxin
TCDF	tetrachlorodibenzofuran
TGOC	total gaseous organic concentration
THC	total hydrocarbons
Tl	thallium
TRS	total reduced sulfur compounds
Zn	zinc

Appendix A.3
Accreditation Information/Certifications

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 11th day of February 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3925.01
Valid to February 28, 2022

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

APPENDIX “S”
FIELD WORK SAFETY PLAN

MAQS Site Safety Plan

Client		Contact Name		Date	
Location		SSP Writer		PM	

Job Preparation

☐ Job Site Walk Through Completed ☐ Site Specific Training Complete ☐ Certified First Aid Person _____
☐ Site Walk Through Needed ☐ Site Specific Training Needed ☐ Other:

Facility Information/Emergency Preparedness

Plant Emergency # _____ Identify and Locate the following:
On-Site EMS ☐ Yes ☐ No Evacuation Routes _____
EMS Location _____ Severe Weather Shelter _____
Nearest Medical Facility & Address: Rally Point _____
_____ Location of Eye Wash/Safety Shower:

Source Information: (list type)

Flue Gas Temp. (^{o}F) _____ Flue Gas Press. ("H_2O) _____ Flue Gas Components _____
Flue Gas Inhalation Potential? ☐ Yes ☐ No
Describe Hazard Protection Plan:

Required PPE ☒ Hard Hats ☒ Safety Glasses ☒ Steel Toed Boots ☒ Hearing Protection

Additional PPE Requirements

☐ Hi-Vis Vests ☐ Harness/Lanyard* ☐ Goggles ☐ Personal Monitor Type: _____
☐ Metatarsal Guards ☐ SRL(s) ☐ Face Shield ☐ Respirator Type: _____
☐ Nomex/FRC ☐ Hot Gloves ☐ 4-Gas Monitor ☐ Other PPE:

Critical Procedures – check all that apply – "*" indicates additional form must be completed

☐ Hot Weather Work* ☐ Confined Space* ☐ Aerial Work Platform* ☐ Roof Work ☐ Scaffold
☐ Cold Weather Work ☐ Lock out/Tag Out ☐ Exposure Monitoring ☐ Other:

Working at Heights Management

Fall Protection Plan ☒ Fixed Guardrails/Toeboards ☐ Fall Protection PPE ☐ Warning Line
Describe Hazard Protection Plan:

Falling Objects Protection Plan

☐ Barricading ☐ Netting ☐ House Keeping ☐ Tethered Tools ☐ Catch Blanket or Tarp ☐ Safety Spotter
Describe Hazard Protection Plan:

MAQS Site Safety Plan

Fall Hazard Communication Plan

☐ Adjacent/Overhead Work ☐ Contractor Contact ☐ Client Contact

Describe Communication Plan:

Environmental Hazards - Weather Forecast

☐ Heat/Cold ☐ Lightning ☒ Rain ☒ Snow ☒ Ice ☐ Tornado ☐ Wind Speed _____

Describe Hazard Protection Plan:

Additional Work Place Hazards

Physical Hazards	**Hazard Controls**
☐ Nuisance Dust Hazards	☐ Dust Mask ☐ Goggles ☐ Other:
☐ Thermal Burn	☐ Hot Gloves ☒ Heat Shields ☐ Other Protective Clothing:
☐ Electrical Hazards	☐ Connections Protected from Elements ☐ External GFCI ☐ Other:
☐ Inadequate Lighting	☐ Install Temporary Lighting ☐ Headlamps
☐ Slip and Trip	☐ Housekeeping ☐ Barricade Area ☐ Other:

Describe Hazard Protection Plan:

List of Hazardous Chemicals

				Other Chemicals:
☐ Acetone	☐ Nitric Acid	☐ Hydrogen Peroxide	Compressed Gases	☐
☐ Hexane	☐ Sulfuric Acid	☐ Isopropyl Alcohol	☐ Flammable Gas	☐
☐ Toluene	☐ Hydrochloric Acid	☐ Liquid Nitrogen	☐ Non-Flammable Gas	☐

Describe Hazard Protection Plan:

Wildlife/Fauna

Describe Hazard Protection Plan:

Crew Names & Signatures

Print Name	Signature	Date	Print Name	Signature	Date

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Ergonomic: Strains/Sprains	The manual movement of equipment to testing location can cause strains	• Eliminate manual “lifts” and use elevators and/or cranes when possible. Stairs can also be used where feasible. • Use lifting straps and locking carabiners to eliminate the need to continuously tie and untie loads. • Use pulley system to eliminate improper ergonomics when lifting and facilitate sharing of loads • Winches should be evaluated and used as much as possible to assist • Equipment should be staged on table or other elevated platform to assist with rigging, lifting and prevent bending over when securing equipment to hoist. • Maintain radio contact between ground and platform to ensure the process is going smoothly or if a break is needed.	• Stretching prior to and after lifting and lowering tasks to keep muscles and joints loose • Break loads into smaller more manageable portions • 3 man lift teams during initial set up and tear down w/2 below and one above • Job rotation and/or breaks during initial set up and tear down. • Discuss potential hazard and controls during tailboard meetings • Observe others and comment on technique	• Gloves, appropriate to task
Falling objects	When working from heights there is a potential of falling objects from elevated work platform striking someone or something below	• Ensure job area is barricaded off with hazard cones, caution tape and/or appropriate warning signs. Specific measures should comply with local plant rules. • Ensure a spotter is present during a lift or lowering of equipment. • Catch blanket should be used on the platform to prevent objects from falling through any grating. • Magnetic trays should be used to hold flange bots and nuts. • Tools should be tethered to platform or personnel uniform.	• Review hazards with any adjacent workers & the client so they understand the scope and timing of the job • Follow proper housekeeping practices by keeping the test location neat and orderly, keeping trash in bags and non-essential equipment stored when not in use. • Perform periodic job site inspections to ensure housekeeping is being observed • Review “grab and twist” method of handling tools and equipment between employees	• Hardhat • Steel toed boots • Work clothes

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Fall	Fall hazard exists when working from above 4' with no guardrails	• Ensure all fall protection equipment has been inspected and is in good working order • Verify anchor point • Warning Line system	• Review Working from Heights procedure prior to job • Maintain 3 points of contact when climbing stairs or ladders	• Harness and Lanyard
Burn	Flue gas temperature can be elevated and that can lead to hot temperature testing equipment. Hot pipes or other duct work at plant.	• Use heat resistant refractory blanket insulation to seal port once probe is inserted. Use duct tape to further seal the outer flange area of the port. • Use heat resistant blankets to shield workers from hot sources	• Work in tandem with partner to immediately fill sample port with heat resistant refractory insulation • Stand up wind of port when opening. If stack pressure is greater than 2" H_2O, a face shield is required. • Allow appropriate time to handle probes • Notify all team members at the test location when a probe is removed from a hot source and communicate to all crew members to exercise caution handling or working near the probe	• High temp. gloves • Long gauntlets • Long sleeve shirts • FRC
Atmosphere	Air concentrations could be above PEL	• Probe are to be sealed to prevent stack gases from leaking out • Ventilation, open all doors and window to dilute concentrations in work area • Vent analyzer or meter outside	• Stand up wind of ports • Use a gas monitor to ensure levels of contaminants are below PEL	• Respirator • SAR
Hearing	Production areas of plants could be high	NA	• Set up equipment or trailer as far away as possible from noise producing plant equipment.	• Ear plugs • Ear muffs (check with plant contact on exposure levels)
Fire	High flue gas temps, chemicals, and electricity could cause fire	• Fire extinguisher at job location	• Observe proper housekeeping • If conducting hot work, review procedures and permitting with site contact	• N/A

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Weather	Conditions may pose significant hazards	• Weather App warning	• Lightning policy • JHA review of weather daily • Plant severe weather warning systems	• Appropriate clothing for conditions
Hot Weather	Extreme hot temperatures can cause physical symptoms	• Shade • Reduce radiant heat from hot sources • Ventilation fans	• Frequent breaks • Additional water or electrolyte replenishment • Heat Stress Prevention Form • Communication with workers • Share work load	• Appropriate clothing for conditions • Sunscreen
Cold Weather	Extreme cold temperatures can cause physical symptoms	• Hand warmers • Heaters • Wind blocks	• Calculate wind chill • Frequent warm up periods • Communication with workers	• Appropriate clothing for conditions
AWP	Overhead and ground hazards pose dangers	• Ensure all fall protection equipment has been inspected and is in good working order • Barricade off area where AWP is in use	• AWP pre-use inspection can identify problems with equipment • Site walk through can identify overhead and ground hazards	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard • Gloves
Scaffold	Fall hazard	• Yellow tagged scaffold may require harness & lanyard • Inspect harness & lanyard prior to use • Barricades • Netting	• Scaffold inspection prior to use can identify if scaffold meets OSHA regulations • Current scaffold training	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard
Chemicals	Chemical fumes or splashing can cause asphyxiation or burns	• Chemical containers stored properly • Ventilation • Properly labeled secondary containers	• Spill kit training • Lab SOP • Good housekeeping • Personal hygiene	• Safety glasses • Chemical gloves • Lab coat • Ventilation • Goggles/Face shield as needed

Toolbox Meeting Record

Project Name & No.: Project Manager: Job Start Date:

Changes in Scope of Work: check all that apply, fill in additional information where applicable.

☐ *Change in Hazards:*

☐ *Change in Sampling Location/Mobilization:*

☐ *Change in Flue Gas Characteristics*

Toolbox Topics: note daily weather conditions, prevailing wind direction, safety observations, near misses, or any additional notes, ect.

Day 1:

Day 2:

Day 3:

Day 4:

Day 5:

Day 6:

Day 7:

Field Crew

Initials	Signatures	Initials	Signatures	Initials	Signatures

Montrose Air Quality Services - Daily Aerial Lift Inspection Form

All checks must be completed before operation of the aerial lift. This checklist must be used at the beginning of each shift or after six to eight hours of use.

General Information (Check All That Apply)

Manually Propelled Lift:	_____	**Self Propelled Lift:**	_____
Aerial Lift Model Number:	_____	**Serial Number:**	_____
Make:	_____	**Rented Or Owned?**	_____

Initial Description – Indicate by checking "Yes" that an item is adequate, operational, and safe. Check "No" to indicate that a repair or other corrective action is required prior to use. Check "N/A" to indicate "Not Applicable."

Number	Item to be Inspected	Yes	No	N/A
A.	Perform a visual inspection of all aerial lift components, i.e. missing parts, torn or loose hoses, hydraulic fluid leaks, etc. Replace as necessary	□	□	□
B.	Check the hydraulic fluid level with the platform fully lowered	□	□	□
C.	Check the tires for damage. Check wheel lug nuts for tightness	□	□	□
D.	Check the hoses and the cables for worn areas or chafing. Replace if necessary	□	□	□
E.	Check for cracked welds	□	□	□
F.	Check the platform rails and safety gate for damage	□	□	□
G.	Check for bent or broken structural members	□	□	□

Initial Description – Continued

Number	Item to be Inspected	Yes	No	N/A
H.	Check the pivot pins for security	□	□	□
I.	Check that all warning and instructional labels are legible and secure	□	□	□
J.	Inspect the platform control. Ensure the load capacity is clearly marked	□	□	□
K.	Check for slippery conditions on the platform	□	□	□
L.	Verify that the Manufacturer's Instruction Manual is present inside the bucket	□	□	□
M.	Check the hydraulic system pressure (See manufacturer's specifications). If the pressure is low, determine the reason and repair in accordance with accepted procedures as outlined in the service manual	□	□	□
N.	Check the base controls for proper operation. Check switches and push buttons for proper operation	□	□	□
O.	Check the platform controls for proper operation. Check all switches and push buttons, as well as ensuring that the drive controller returns to neutral	□	□	□
P.	Verify that a fire extinguisher is present, mounted, and fully charged and operational inside the bucket	□	□	□
Q.	Verify that the aerial lift has headlights and a safety strobe-light installed and fully operational	□	□	□
R.	Verify that the aerial lift has a fully functional back-up alarm	□	□	□

_____ _____ _____

Print Name of Individual Inspecting Aerial Lift | Location | Date

Heat Stress Prevention Form

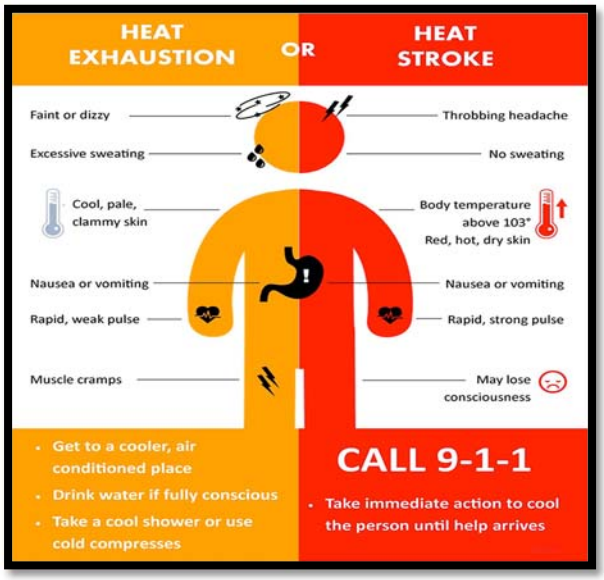
This form is to be used when the Expected Heat Index is above 91 degrees F. Keep the form with project documentation.

Project Location:_____

Date:_____Project Manager:_____

Expected High Temp:_____Expected High Heat Index:_____

1. Review the signs of Heat Exhaustion and Heat Stroke
2. If Heat Index is above 91 degrees F:
    a. Provide cold water and/or sports drinks to all field staff. Avoid caffeinated drinks and energy drinks which actually increase core temperature. Bring no less than one gallon of water per employee.
    b. If employee are dehydrated, on blood pressure medication or not acclimated, ensure they are aware of heightened risk for heat illness.
    c. Provide cool head bands, vests, etc.
    d. Have ice available to employees.
    e. Encourage work rotation and breaks, particularly for employees working in direct sunlight.
    f. Provide as much shade at the jobsite as possible, including tarps, tents or other acceptable temporary structures.
    g. PM should interview each field staff periodically to look for signs of heat illness.
3. If Heat Index is above 103 degrees F:
    a. Employees must stop for drinks and breaks every hour (about 4 cups/hour).
    b. Employees are not permitted to work alone for more than one hour at a time without a break with shade and drinks.
    c. Employees should wear cool bands and vests if working outside more than one hour at a time.
    d. PM should interview each field staff every 2 hours to look for signs of heat illness.



SAFE WORK PERMIT

A. WORK SCOPE (to be completed by MEG) – Check relevant box(es) to indicate type(s) of work.						
□ Hot Work	□ Line Break	□ Lock-out Tag-out	□ Other		**Permit Timing**	
Specific Location:					Date:	Time:
Equipment Worked On:					Valid Until	
Work to be Performed:					Date:	Time:

B. POTENTIAL HAZARDS (To be completed by MEG)			
□ Flammable	□ Harmful to breathe	□ Harmful by Skin Contact	
□ Verify process hazards have been reviewed			
C. PERSONAL PROTECTIVE EQUIPMENT (Check all additional equipment that is required)			
○ Tyvek Suit	○ Hearing Protection	○ H2S Monitor	○ Flash Hood
○ Rain Gear	○ Goggles	○ Safety Harness & Life Line	○ Life Vest
○ Chemical Resistant Gloves	○ Face shield	○ Tripod ER Escape Unit	○ Supplied Air Respirator
○ Rubber Boots	○ Organic Vapor Respirator	○ Fall Protection Equipment	○ Dust Respirator
○ Other:			
D. CHECK LIST (Check what has been completed)			
○ Joint Job Site Visit	○ Electrical Isolation Completed	○ Line Identified	○ Equipment Water Flushed
○ Equipment Depressurized	○ Isolated and locked out	○ Equipment Identified	○ Equipment Inert Gas Purged
○ Vents Opened & Cleared	○ Blinds in Place	○ Electrical Equipment Still Live	○ Written JSA Completed
○ Atmosphere Tested	○ Electrical Equipment Still Live	○ Equipment Still Live	○
Other:			
E. PRECAUTIONS (Check what must be completed PRIOR to commencing work)			
○ Cover Sewers	○ Scaffolding Inspection Done	○ Charged Hose/Area Wet	○ Communication Device(s)
○ Air Mover (Grounded)	○ Fire Extinguisher	○ Covered Cable Trays	○ Fire Watch
○ Barricade/Signs	○ Fire Resistant Blanket	○ Continuous Air Monitoring	
○ Other:			
○ Designated Fire Watch Individual and Start time (30 min after hot work):			
○ Fire Watch Complete (signature and time):			

F. HAZARD ANALYSIS (add additional information to form as necessary)

	Job Steps	Potential Hazards	Hazard Controls
1.			
2.			
3.			
4.			

I VERIFY THAT THE ABOVE CHECK LIST "D" HAS BEEN COMPLETED, ALL OTHER CONDITIONS ("B", "C", "E", "F") ARE UNDERSTOOD AND WHEN MET, THE AREA IS SAFE FOR WORK TO COMMENCE.			
Name:	Signature:	Date:	Time:

THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact one of the following individuals by email or phone.

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