CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT
AIR QUALITY PROGRAM

CONSTRUCTION PERMIT MODIFICATION APPLICATION #0051-M1-3TR

Western Refining Terminals, LLC
Albuquerque Asphalt Terminal

Prepared For:

Angela S. Brown – Vice President

Prepared By:

Margaret Garza – Advanced Environmental Specialist

Western Refining Terminals, LLC
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Disha Gadre – Managing Consultant

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April 2023

Project 203201.0114

Trinity Consultants
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April 24, 2023

Angela Lopez
Environmental Health Supervisor, Permitting Division
Air Quality Program, Environmental Health Department
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103
(505) 768-1962
angelalopez@cabq.gov

RE: Air Quality Construction Permit Application to Modify #0051-M1-3TR

Dear Ms. Lopez,

Trinity Consultants Inc., (Trinity) is submitting this permit modification application on behalf of Western Refining Terminals, LLC (Western). Western owns and operates the Albuquerque Asphalt Terminal (AAT) located at 2030 2nd Street SW in Albuquerque, NM 87102.

This application is being submitted as a permit modification pursuant to 20.11.41.29 NMAC. Per the regulation, the application shall be processed in accordance with all requirements established by 20.11.41 NMAC for permit applications. This application includes all of the components outlined in the Construction Permit Application Checklist including pre-application meeting requirements; required public notice documentation; and application contents including emission calculations with supporting documentation, an air dispersion modeling analysis, and zoning certification. Western is requesting to pay the required application fee online and as such, a check is not included in this submittal. Western has also outlined proposed conditions to be included in the updated permit, which are included in Section 1.1.

Please do not hesitate to reach out should you have any questions regarding the submittal. Western remains committed to ensuring continued compliance with all applicable regulations and appreciates the continued partnership with the department.

Sincerely,

Michael Celente
Managing Consultant

Cc:
Disha Gadre (Trinity)
Angela Brown (Western)
Margaret Garza (Western)

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LIST OF TABLES

1. GENERAL INFORMATION

1.0 Executive Summary

This application proposes a modification to ATC Permit #0051-M1-3TR for Western Refining Terminals, LLC Albuquerque Asphalt Terminal.

As part of this modification, Western proposes to remove thirteen (13) demolished asphalt tanks and three (3) existing tanks to be demolished (Tanks 6, 57, and 66), install two new asphalt tanks (Tanks 503 and 504), and request a facility-wide aggregate throughput and emission limit. Additionally, Western would like to update the calculations for its existing boilers, heater, tanks, loading racks, and unloading emissions with updated throughputs and stack emission test data. Since this is an application for a permit modification, an updated air dispersion modeling analysis has been completed and is included in this submittal. The included modeling report details AERMOD inputs and modeled concentrations associated with the proposed modifications.

The proposed modifications include the following updates to the existing permit:

- Removal of thirteen (13) demolished asphalt tanks;
- Removal of three (3) existing (but to-be-demolished) asphalt tanks (Tanks 6, 57, and 66);
- Transition the existing per-tank gal/yr throughput limit and emission limit (as detailed in Table 4 of the existing permit) into a facility-wide aggregate limit of 46,820,000 gallons/year (and associated lb/hr and tpy limits);
  - This will provide Western with additional flexibility required to meet future demands;
- Updated vapor expansion coefficient used in asphalt tank calculations to reflect a more conservative value;
- Addition of two (2) 6,000 bbl asphalt tanks (Tank-503 and Tank-504);
  - Western will provide notification to the agency prior to the start of construction of these tanks;
- Transition of the second loading rack (LR-2) from cutback asphalt to asphalt;
  - Cutback asphalt is no longer manufactured at the facility;
- Transition of Tank 7 from cutback asphalt to asphalt;
  - Cutback asphalt is no longer manufactured at the facility;
- Addition of pipeline fugitives (FUG) to the permit and modeling;
- Addition of railcar unloading emissions (UL-1 through UL-9) to the permit and modeling;
- Addition of truck offloading emissions (TL-1 and TL-2) to the permit and modeling;
- Update boiler and hot oil heater calculations to use stack test data (Units 1-3);
- Removal of rain caps from combustion unit stacks. The stacks from the boilers and hot oil heater currently have rain caps, which are proposed to be removed. Modeling details are provided in the report included in this application; and
- Modification of the stack parameters for the combustion units. The stack heights from the boilers (Units 1 and 2) are proposed to be increased from 20 ft to 35 ft. The stack height for the hot oil heater is proposed to be decreased from the previously proposed 30 ft to 26 ft, which is its existing height.

Table 1 details potential emissions associated with the proposed modifications.

1.1 Proposed Permit Conditions

As noted in the application cover letter, Western is proposing the following language for inclusion in the modified permit.

(1) Hydrogen Sulfide

- Limitation - Hydrogen Sulfide (H_2S): No source shall emit H_2S from any location in such a manner or amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 13.9 µg/m^3 for any averaging period of 1 hour or more.

- Compliance Demonstration
  - The Permittee shall perform a compliance demonstration by conducting a test to monitor H_2S levels within 90 days of any of the following events:
    - The receipt of three (3) odor complaints within any 12-month period; or
    - The receipt of a written request from the Environmental Health Department.
  - The compliance demonstration shall be performed at a location representing the nearest occupied place beyond the premises on which the source(s) of H_2S is located.
  - The Permittee shall submit a report within 30 days of completion of each demonstration to the Environmental Health Department, Attn: Compliance and Enforcement Division that details the results of each compliance demonstration.
- Compliance Plan:
  - In the event of an exceedance of the H_2S limitation, the Permittee shall submit a Compliance Plan to the Environmental Health Department for approval. The Compliance Plan shall include a description of additional monitoring to further assess H_2S concentrations and recommended action items.
  - The Permittee shall complete and submit a report on the actions identified in the Compliance Plan no longer than 120 days after approval of the plan.

(2) Tank 503 and 504

- Installation of New Equipment:
  - The permittee shall provide written notification to the department of the start of construction and installation of the new tanks (Tank 503 and 504) prior to commencing construction or installing.

(3) Draft Permit

- As part of this permit modification, Western is respectfully requesting that a draft permit be issued for review prior to issuance of the final permit.

Table 1. Potential Emissions (Uncontrolled and Controlled Emissions are Equal)

Unit	Description	Emission Summary															
		NO_x		CO		SO_2		VOC		H_2S		PM_{10}		$PM_{2.5}$		HAP	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	Superior Boiler	0.81	3.53	1.18	5.15	0.0084	0.037	0.077	0.34	-	-	0.11	0.47	0.11	0.47	0.026	0.12
2	Hurst Boiler	0.72	3.15	1.01	4.42	0.0072	0.032	0.066	0.29	-	-	0.091	0.40	0.091	0.40	0.023	0.099
3	Hot Oil Heater	0.30	1.33	1.23	5.41	0.0088	0.039	0.081	0.35	-	-	0.11	0.49	0.11	0.49	0.028	0.12
TANKS	Collection of Asphalt Tanks	-	-	-	-	-	-	12.06	3.67	0.0047	0.0015	-	-	-	-	-	-
LR-1	Loading Rack 1	-	-	-	-	-	-	2.17	4.04	0.00097	0.0018	-	-	-	-	-	-
LR-2	Loading Rack 2	-	-	-	-	-	-	2.17	4.04	0.00097	0.0018	-	-	-	-	-	-
UL	Railcar Unloading	-	-	-	-	-	-	3.81	0.70	0.0061	0.0011	-	-	-	-	-	-
TL	Truck Offloading	-	-	-	-	-	-	0.0014	0.0013	1.45E-06	1.35E-06	-	-	-	-	-	-
FUG	Fugitives	-	-	-	-	-	-	0.43	1.88	2.02E-05	8.86E-05	-	-	-	-	-	-
Total		**1.83**	**8.01**	**3.42**	**14.97**	**0.024**	**0.11**	**20.88**	**15.31**	**0.013**	**0.0063**	**0.31**	**1.35**	**0.31**	**1.35**	**0.077**	**0.34**

2. DESCRIPTION OF FACILITY AND EMISSIONS INFORMATION

The following section summarizes the emission factors and methodology used to estimate air pollutant emissions from the Albuquerque Asphalt Terminal.

2.1 Description of the Facility

The process description included below includes information for existing asphalt processing at the terminal with updates to all emissions sources as well as the removal of several units.

2.1.1 Albuquerque Asphalt Terminal Processing Description

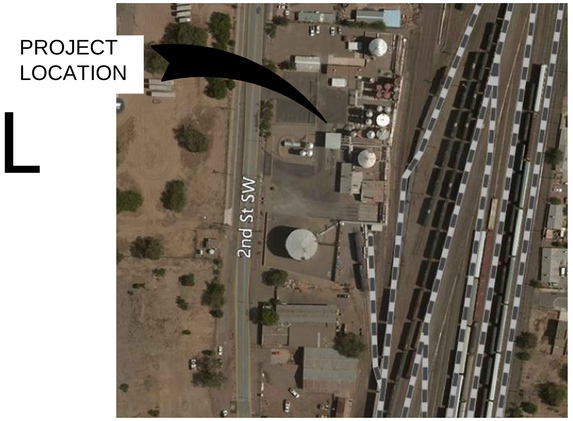
- Trucks and railcars deliver asphalt to facility;
- Asphalt is unloaded into facility tanks (detailed unloading operations are described in Sections 2.3.1.4 and 2.3.1.5);
- Asphalt is heated prior to transfer from railcars;
- Asphalt will be stored in Tanks 5, 7, 8, 9, 501, 502, and 503 & 504 (proposed new tanks) (detailed in Section 2.3.1.2);
- Asphalt is heated in tanks and pumped;
- All heating is provided by using the boilers and hot oil heater (detailed in Section 2.3.1.1); and
- Finished asphalt is loaded onto trucks at the loading rack (detailed in Section 2.3.1.3).

2.2 Process Flow Sheets

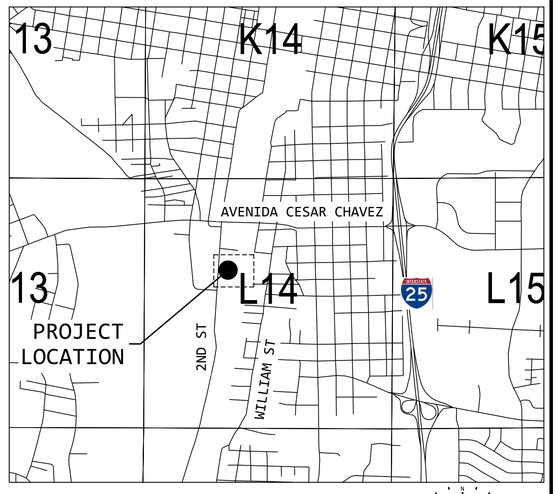
ALBUQUERQUE ASPHALT TERMINAL (AAT)

PROCESS FLOW DIAGRAMS

APRIL 05, 2019



LOCATION MAP
NOT TO SCALE



VICINITY MAP
SCALE: 1"=500'
(ZONE ATLAS MAP NO. L-14)

LIST OF DRAWINGS

NOTES:

COORDINATES:

LAT: #####
LONG: ######

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SCALE: AS NOTED

FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS
TITLE SHEET

ALBQ-PR-10248938

REVISION 0

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SAVE DATE: 4/5/2019 XXX - XXXXX
Printed On: Monday, April 08, 2019 3:16:51 PM Plot Login: Broeman, Darlene

PIPING & INSTRUMENT DIAGRAM SYMBOLS

- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- VENT/DRAIN, UTILITY OR PROCESS INSTRUMENT LINE
- HYDRAULIC SIGNAL
- CAPILLARY TUBING
- PNEUMATIC SIGNAL OR INSTRUMENT TUBING
- ELECTRICAL SIGNAL
- SOFTWARE SIGNAL
- SONIC SIGNAL
- SKID LIMITS OR PACKAGED UNIT
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- NEEDLE VALVE
- DOUBLE BLOCK & BLEED VALVE
- WEDGE BLOCK OPEN
- WEDGE BLOCK CLOSED
- 3 WAY GLOBE VALVE
- 3 WAY VALVE
- 4-WAY VALVE
- ANGLE VALVE
- PRESSURE SAFETY VALVE (RELIEF VALVE)
- VACUUM RELIEF VALVE
- IN-LINE PRESSURE SAFETY VALVE
- PRESSURE AND VACUUM RELIEF VALVE
- 3-WAY TEMPERATURE REGULATOR
- ORBIT VALVE
- SURGE RELIEF VALVE
- CONTROL VALVE
- SELF REGULATED CONTROL VALVE
- MOTOR OPERATED VALVE
- ELECTRO/HYDRAULIC VALVE
- SOLENOID OPERATED VALVE
- SPRING CHECK VALVE
- FLEX HOSE
- EXPANSION JOINT
- STATIC MIXER
- STRAIGHTENING VANES
- PRESSURE RUPTURE DISK
- VACUUM RUPTURE DISK
- CONE STRAINER
- VENT TO ATMOSPHERE
- OPEN DRAIN OR TRENCH
  - O = OILY
  - S = STORM
  - W = WATER

- SPACER PLATE (CLOSED)
- SPACER PLATE (OPEN)
- SPECTACLE BLIND (CLOSED)
- SPECTACLE BLIND (OPEN)
- INSULATING FLANGE OR GASKET
- ELECTRICALLY INSULATED JOINT
- BLIND OR FLANGE
- WELD CAP
- FLOW
- INSULATION
  - C = COLD SERVICE
  - H = HEAT CONSERVATION
  - PP = PERSONNEL PROTECTION
- INSULATION AND STEAM TRACED
- INSULATION AND ELECTRIC TRACED
- ORIFICE FITTING
- ORIFICE FLANGE WITH PLATE
- TURBINE METER
- ROTAMETER
- PD METER
- ULTRASONIC METER (NON-INTRUSIVE)
- GEAR METER
- VACUUM BREAKER
- FLAME ARRESTOR
- FOAM CHAMBER OR PROPORTIONER
- AIR CLEANER (COMPRESSOR SUCTION)
- HORN
- HYDRANT
  - F = FOAM
  - FW = FIREWATER
- MONITOR
  - F = FOAM
  - FW = FIREWATER
- SIGHT GLASS/FLOW INDICATOR
- STRAINER
- FILTER
- "Y" STRAINER
- REDUCER
- HOSE CONNECTION
- EYE WASH
- SAFETY SHOWER/ EYE WASH
- SPECIALTY ITEM
- SPEC BREAK
- SAMPLE CONNECTION

EQUIPMENT SYMBOLS

- RECIPROCATING PUMP
- CENTRIFUGAL PUMP
- ROTARY PUMP
- VACUUM PUMP
- PNEUMATIC PUMP
- SUMP PUMP
- IN-LINE CENTRIFUGAL PUMP
- WET PIT SUMP PUMP
- CHEMICAL FEED PUMP
- MIXER OR AGITATOR
- VESSEL/TANK INSULATION
- METER PROVER
- MARINE LOADING ARM
- TRUCK LOADING ARM
- SUMP TANK/PUMP
- STORAGE SPHERE
- STORAGE TANK (FLOATING ROOF)
- STORAGE TANK (CONICAL ROOF)
- STORAGE TANK (CONICAL ROOF W/ INTERNAL FLOATING ROOF)
- HORIZONTAL VESSEL
- VERTICAL VESSEL
- HEAT EXCHANGER
- HEATER ELEMENT
- LAUNCHER/RECEIVER

- WIRELESS ANTENNA
- GAUGE TUBE HATCH
- BLEED RING
- MECHANICAL LINKAGE CONTROL VALVE

EQUIPMENT TYPE

A/C	AIR CONDITIONER	M	MOTOR
AB	AIR PURGE/PRESSURIZER	MX	TANK MIXER
ACP	AIR COMPRESSOR		
AD	AIR DRYER	ODO	ODORIZER
AEL	AIR ELIMINATOR	OWS	OIL/WATER SEPARATOR
B	BOILER	P	PUMP
BDV	BLOWDOWN/DRAIN VALVE	PTR	TRANSFORMER
BF	BLIND FLANGE	PVB	PROVER BALL
BLD	BUILDING	PVR	PROVER
BL	BLOWER	RTU	REMOTE TERMINAL UNIT
C	COMPRESSOR		
CFG	CENTRIFUGE	SCA	SCADA CONTROL CENTER EQUIPMENT
CKV	CHECK VALVE	SM	STATIC MIXER
CP	CONTROL PANEL	SSY	STEAM SEPARATOR
CRN	CRANE	STP	STEAM DUMP TRAP
DH	DOCK HOSES	STR	STRAINER
DL	DOCK LINES	SUM	SUMP
ENG	INTERNAL COMBUSTION ENGINE	T	TANK
		TRP	POLY PIG/SCRAPER TRAP
F	FILTER	V	MANUAL BLOCK VALVE
FAC	FACILITY	VEH	VEHICLES
FAR	FLAME ARRESTOR	VLT	VAULT
FLG	FLANGE	VRU	VAPOR RECOVERY UNIT
GEN	GENERATOR	XFC	FIRE/FOAM SYSTEM COMPUTER
GH	GAUGE HATCH	XJ	EXPANSION JOINT
H	HEATER		
HE	HEAT EXCHANGER		
HST	HOISTS		
HYD	HYDRAULIC PRESSURE UNIT		
L	PIPELINE		
LA	LOADING ARMS		

NOTE: SEE APL ENGINEERING GUIDELINE, "APL 0300 EQUIPMENT AND DATA NAMING" FOR COMPLETE LIST.

LINE NUMBER IDENTIFICATION

LINE NUMBER

EXAMPLE: 8"-P-0127-A

- A - PIPING CLASS
- 0127 - SEQUENTIAL NUMBER
- P - LINE SERVICE (PRODUCT)
- 8" - LINE SIZE

TO/FROM ARROWS

HMCO-D-P-XXXX — TO T-100101 — CONNECTING SHEET — PROCESS NOTE

LINE SERVICE & PIPING CLASS IDENTIFICATION

LINE SERVICE

AVGAS	AVIATION GAS
BIO	BIODIESEL BLEND
BW	BALLAST WATER
CA	COLOR ADDITIVE
CR	CRUDE OIL
D	DRAIN
DA	DIESEL ADDITIVE
DCA	DETERGENT CONTROL ADDITIVE (GASOLINE)
ETOH	ETHANOL
FF	FOAM
FG	FUEL GAS
FW	FIRE WATER
HW	HOT WATER
IA	INSTRUMENT AIR
INFC	INTERFACE
JA	JET FUEL ADDITIVE
JETA	JET A
P	PRODUCT
PH	PROCESS HYDROCARBONS
R	RELIEF

LINE SERVICE CONT.

SLOP	SLOP (OIL/WATER)
UA	UTILITY AIR
ULP	UNLEADED PREMIUM GASOLINE
ULR	UNLEADED REGULAR GASOLINE
ULSD1	ULTRA LOW SULFUR DIESEL #1
ULSD2	ULTRA LOW SULFUR DIESEL #2
UW	UTILITY WATER
V	VENT
VR	VAPOR RECOVERY
WW	WASTE WATER

PIPING CLASS

A	ANSI CLASS 150#
B	ANSI CLASS 300#
C	ANSI CLASS 400#
D	ANSI CLASS 600#
E	ANSI CLASS 900#
L	ANSI CLASS 125#

REGULATORY DEMARCATIONS

- NON PSM | OSHA PSM — OSHA PSM/NON-PSM SYSTEM BREAK
- NON DOT | DOT — DOT/NON-DOT SYSTEM BREAK
- NON USCG | USCG — US COAST GUARD/NON-US COAST GUARD SYSTEM BREAK

MISCELLANEOUS ABBREVIATIONS

AG	ABOVE GROUND	GPM	GALLON PER MINUTE	NIS	NOT IN SERVICE	TS	TEMPORARY STRAINER
ATM	ATMOSPHERE	GR	GRADE	NNF	NORMALLY NO FLOW	TUV	TRUCK UNLOADING VALVE
BBL	BARREL	HC	HOSE CONNECTION	NO	NORMALLY OPEN	TYP	TYPICAL
BYP	BYPASS	H	HEIGHT	NOZ	NOZZLE	UG	UNDERGROUND
BT	BARRED TEE	HP	HIGH PRESSURE	O/O	ON/OFF	UI	UNIT INDICATOR
CL	CENTERLINE	HR	HOUR	OC	OPEN-CLOSE		
CO	CLEANOUT	IAS	INSTRUMENT AIR SUPPLY	OOS	OUT OF SERVICE		
CONN	CONNECTION	IGS	INSTRUMENT GAS SUPPLY	OSC	OPEN-STOP-CLOSE		
CSC	CAR SEAL CLOSED	LC	LOCK CLOSED	PRESS	PRESSURE		
CSO	CAR SEAL OPEN	LD	LOCKING DEVICE	SC	SAMPLE CONNECTION		
DIA	DIAMETER	LG	LONG	SCH	SCHEDULE		
DP	DESIGN PRESSURE	LO	LOCK OPEN	SP	SET POINT		
DRN	DRAIN	LOR	LOCAL-OFF-REMOTE	S/S	START/STOP		
DT	DESIGN TEMPERATURE	LP	LOW PRESSURE	STD	STANDARD		
DWG	DRAWING	MAX	MAXIMUM	SW	SOCKETWELD CONNECTION		
EHT	ELECTRIC HEAT TRACE	MIN	MINIMUM	TCC	TULSA CONTROL CENTER		
FC	FAIL CLOSED	MMI	MAN-MACHINE INTERFACE	TDR	THREAD-D-RING FITTING		
FL	FAIL LOCKED (LAST POSITION)	MPD	MOTOR MULTI-PROTECTIVE DEVICE	TEMP	TEMPERATURE		
FO	FAIL OPEN	MW	MANWAY	THD	THREADED CONNECTION		
FP	FULL PORT	NC	NORMALLY CLOSED	TOR	THREAD-O-RING FITTING		
GAL	GALLON	NE	NORMALLY ENERGIZED				

NOTES:

COORDINATES:

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SCALE: AS NOTED

FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS

LEGEND

ALBQ-PR-10248939

REVISION 0

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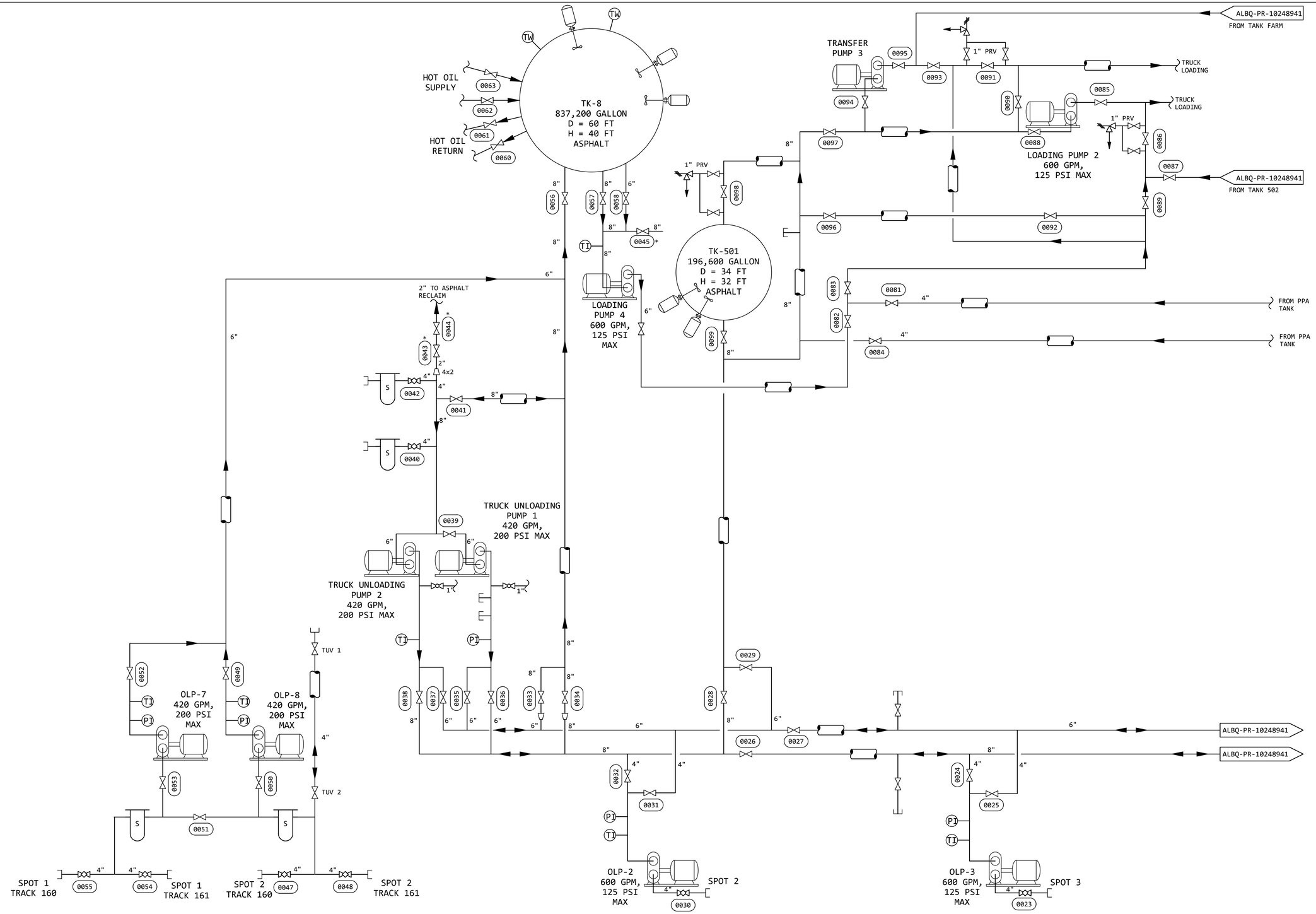

NOTES:

1. THE PIPE AND VALVE SIZES ARE COLLECTED FROM THE INFORMATION AVAILABLE ON VALVE'S MANUFACTURER TAGS.
2. HOT OIL SUPPLY & RETURN ARE NOT SHOWN FOR ALL TANKS.
3. * DENOTES NEW OR REVISED TAGS.

COORDINATES:

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LONG: ######

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SCALE: AS NOTED

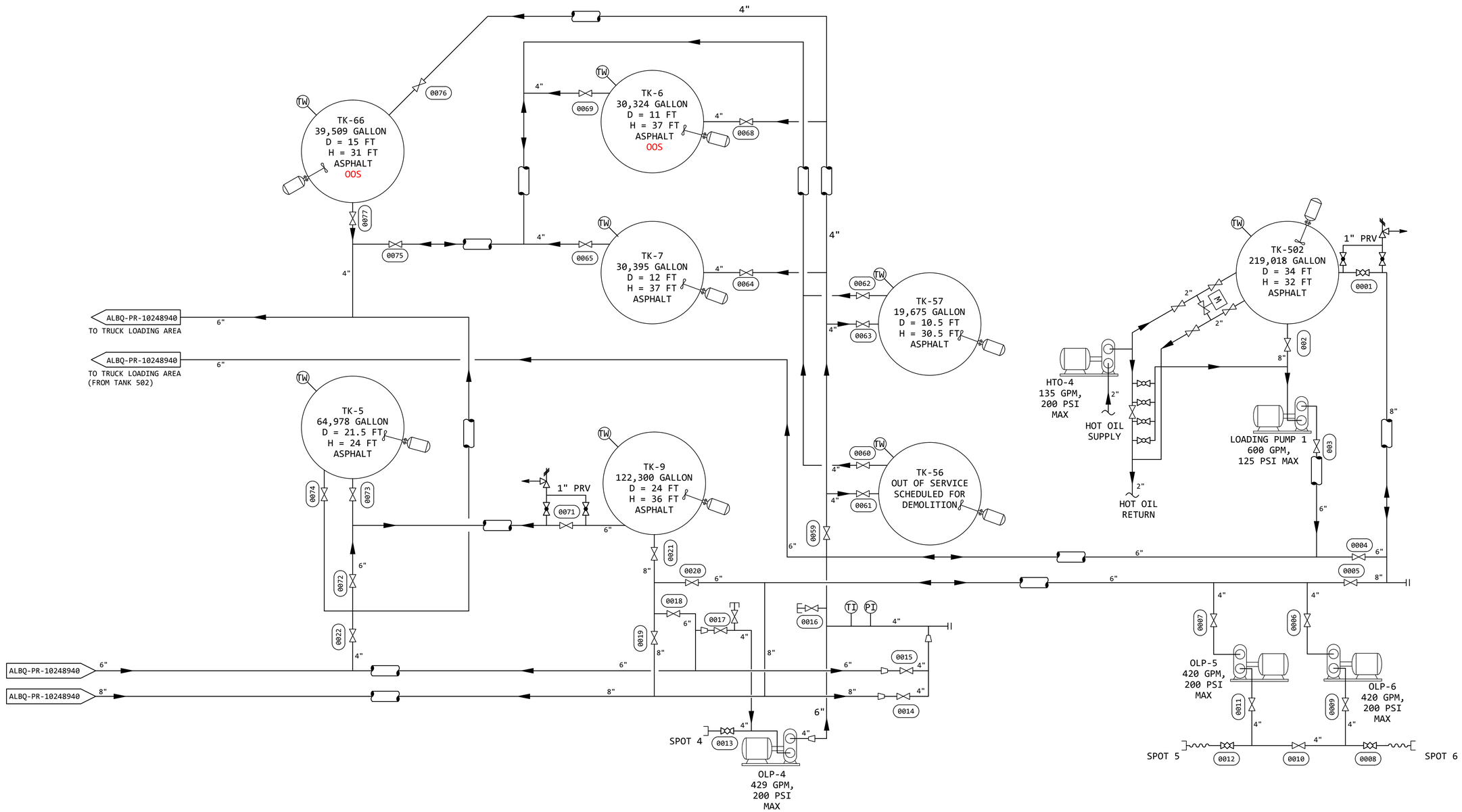
FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS

ASPHALT RECEIVING & STORAGE -1

ALBQ-PR-10248940

REVISION 0



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-	-	-	-	-	-	-	-	-	-	-	-

SCALE: AS NOTED

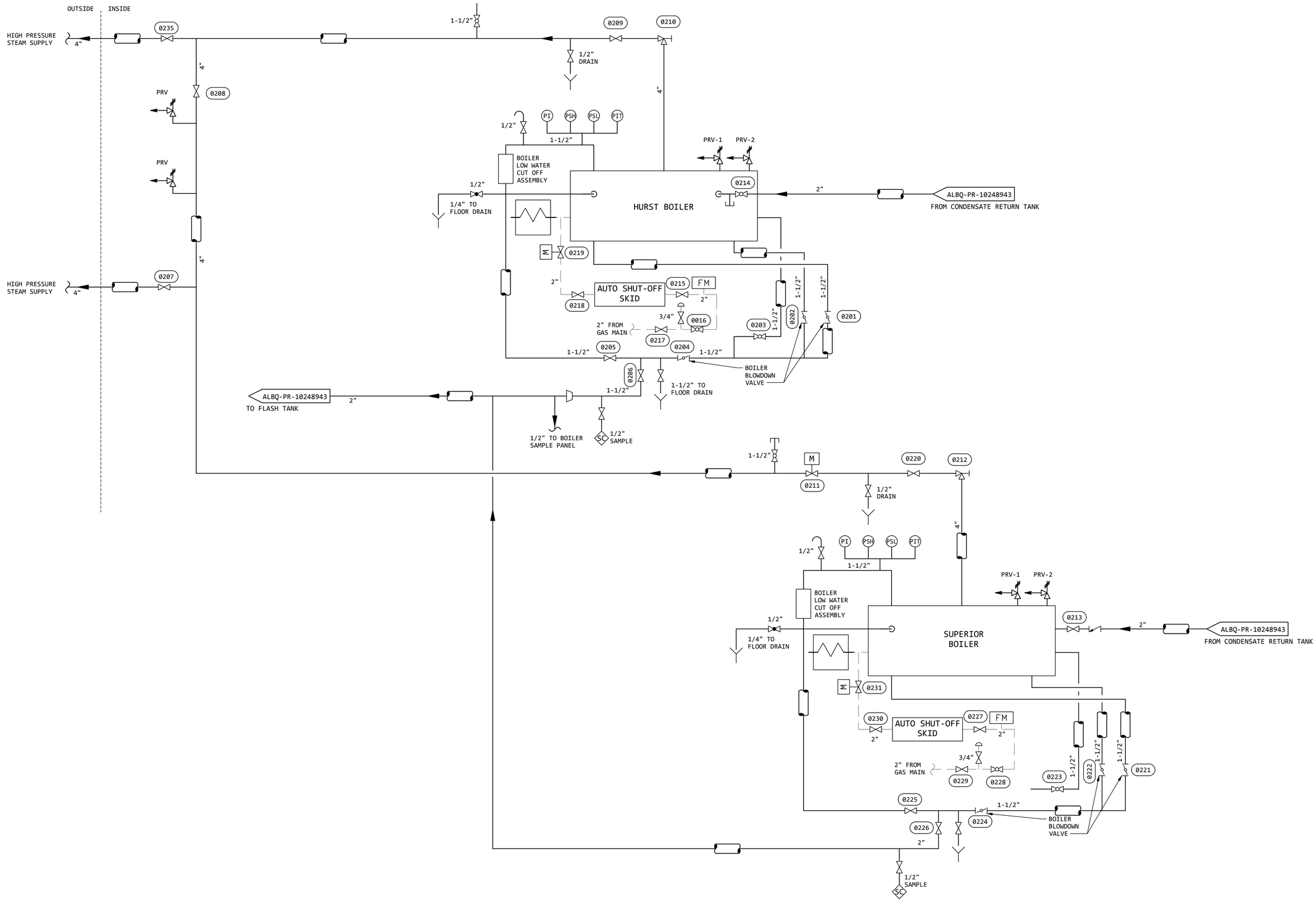
FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS

ASPHALT RECEIVING & STORAGE - 2

ALBQ-PR-10248941

REVISION 0



NOTES:

1. ALL TAGS ON THIS SHEET HAVE BEEN REVISED.

COORDINATES:

LAT: #####
LONG: ######

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-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

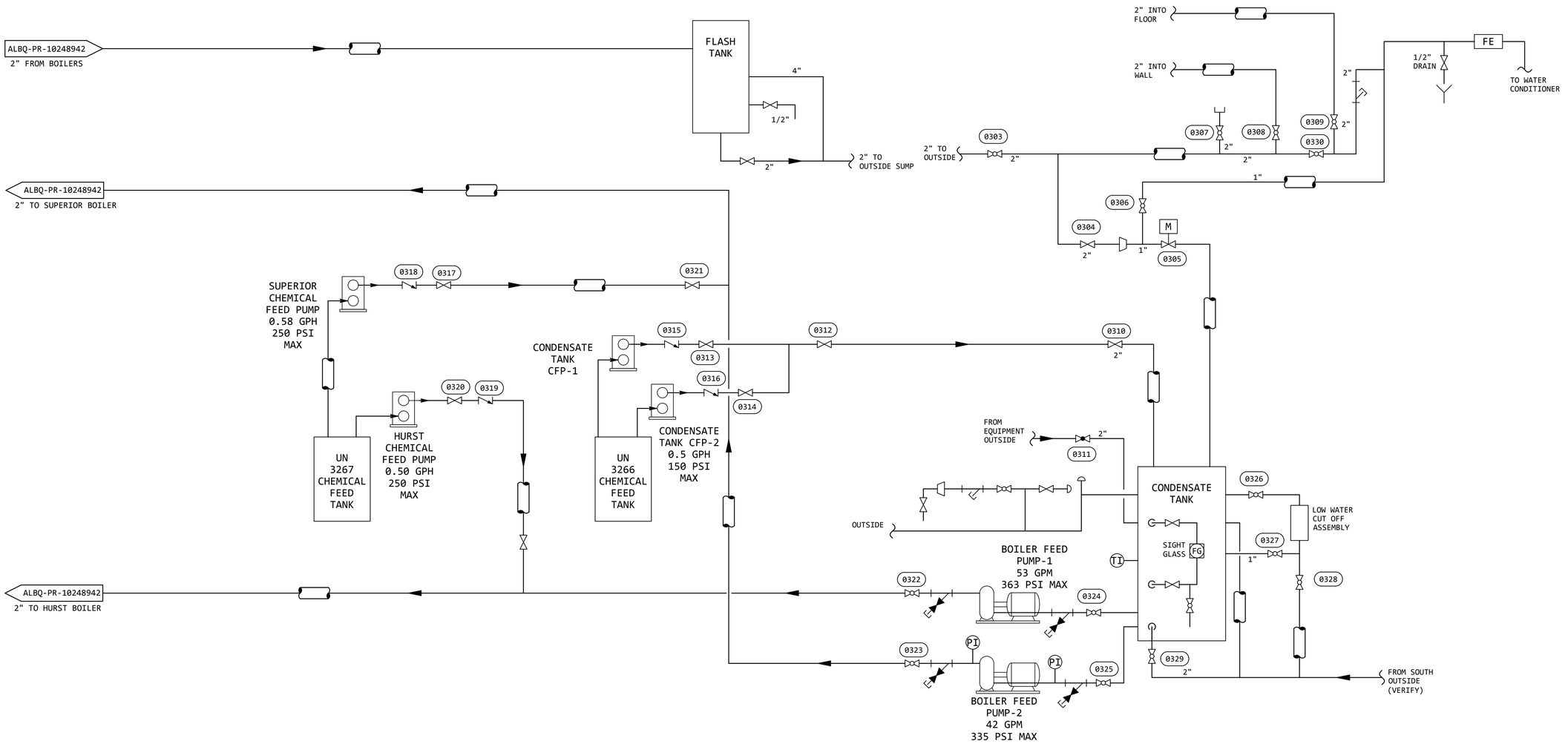
FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS

STEAM BOILERS

ALBQ-PR-10248942

REVISION 0



NOTES:

1. UN3267 - DIETHYLAMINOETHANOL, CYCLOHEXYLAMINE
2. UN3266 - POTASSIUM HYDROXIDE
3. ALL TAGS ON THIS SHEET HAVE BEEN ASSIGNED NEW TAG NUMBERS.

COORDINATES:

LAT: #####
LONG: ######

REFERENCE SHEET #	REFERENCE SHEET # CONTINUED	REV	STATUS	MOC	AFE	DESCRIPTION	DATE	BY	CHK	ENG	MGR
-	-	0	-	-	-	GENERATED PER FACILITY WALK DOWN - 2019	04/05/19	LDB	TJW	ARS	RKS
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

SCALE: AS NOTED

FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

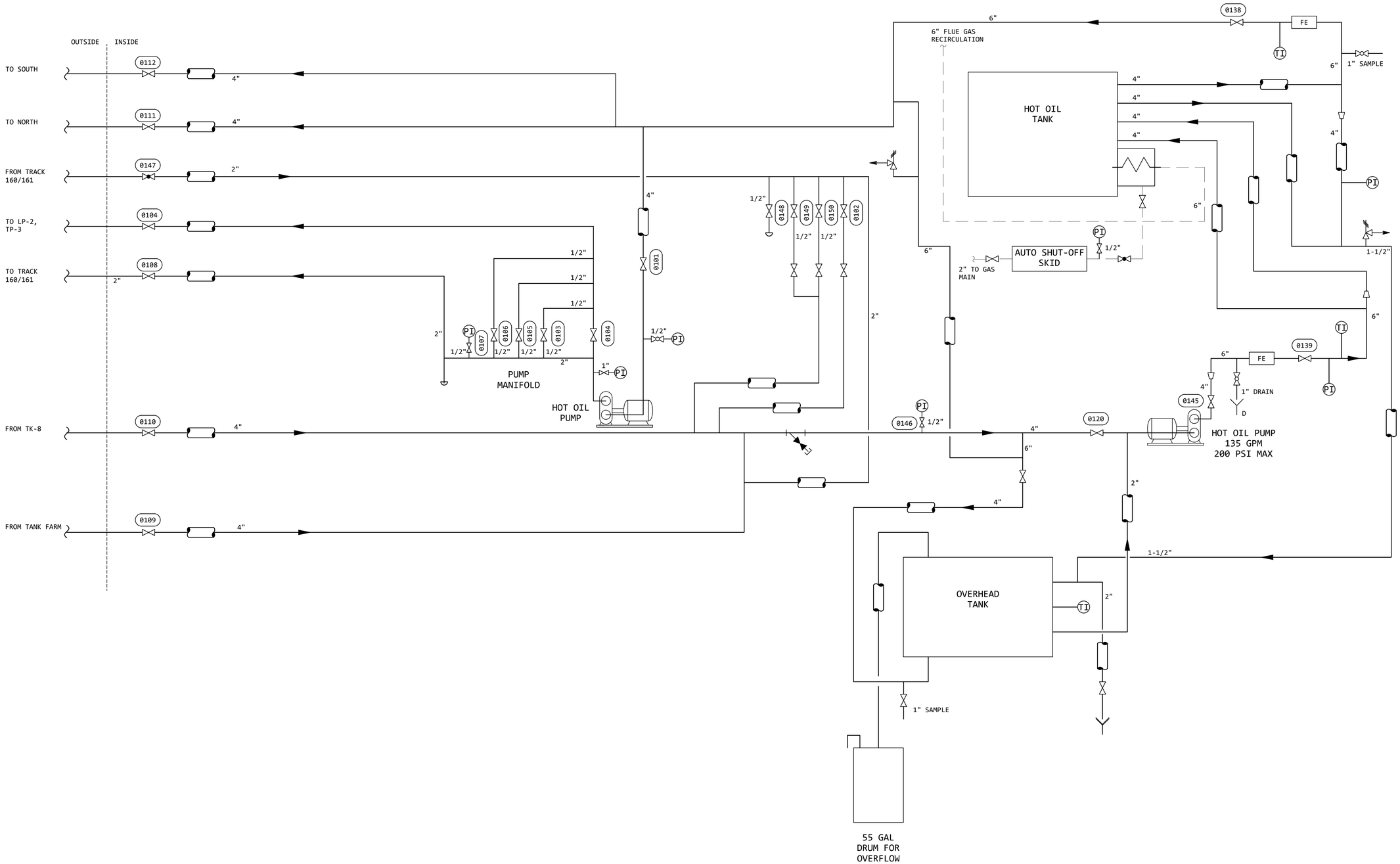
AAT PROCESS FLOW DIAGRAMS

STEAM CONDENSATE

ALBQ-PR-10248943

REVISION 0

Location:P:_TFDMOLOGY\Andeavor Asphalt Terminal - PFD\900-CAD-GIS\910-CAD\20-SHEETS\10248943.dwg
SAVE DATE: 4/5/2019 XXX - XXXXX
Printed On: Monday, April 08, 2019 3:37:42 PM Plot Login:Broxmeyn, Darlene



NOTES:

COORDINATES:

LAT: #####
LONG: ######

REFERENCE SHEET #	REFERENCE SHEET # CONTINUED	REV	STATUS	MOC	AFE	DESCRIPTION	DATE	BY	CHK	ENG	MGR
-	-	0	-	-	-	GENERATED PER FACILITY WALK DOWN - 2019	04/05/19	LDB	TJW	ARS	RKS
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

SCALE: AS NOTED

FACILITY: ALBUQUERQUE ASPHALT TERMINAL
LOCATION: ALBUQUERQUE, NM

AAT PROCESS FLOW DIAGRAMS

HOT OIL

ALBQ-PR-10248944

REVISION 0

2.3 Air Pollutant Emissions and Calculation Methodology

2.3.1 Current Process

2.3.1.1 Boilers and Hot Oil Heater (Units 1, 2, 3)

Emissions from the existing boilers and hot oil heater are a result of the combustion emissions (associated with the combustion of natural gas). SO_2, VOC, CO, PM, and HAPs combustion emissions are based on AP-42 Table 1.4-1 & 1.4-2 for external combustion sources. NO_X emission rates are based on worst-case stack test values with an applied 15% safety factor. These calculations have been updated in this permit modification.

Emission factors for CO, VOC, SO_2 and PM are in units of lb/MMscf, while the units for HAP emission factors are lb/MMBtu. The heat rate of the boiler (MMBtu/hr) is multiplied by the emission factor (lb/MMBtu) to calculate lb/hr values for HAPs. For CO, VOC, SO_2 and PM, the heat rate of the boiler (MMBtu/hr) is divided by the heating value of natural gas (Btu/scf) and multiplied by 1000 to calculate an hourly fuel usage (MScf/hr). This rate is then divided by 1000 to convert to MMscf/hr and multiplied by the emission factors (lb/MMscf) to calculate the lb/hr values. Although these units may not operate continuously in actuality, 8760 hours of operation are assumed to calculate maximum annual emissions. Hourly emissions (lb/hr) are multiplied by 8760 hours and divided by 2000 lb/ton to convert to annual emissions (tpy). Example calculations are included in Section 2.4.

2.3.1.2 Tanks (Units 5, 7, 8, 9, 501, 502, 503, and 504)

Emissions from the existing tanks (and proposed tanks 503 and 504) are combined into one source of VOC and H_2S emissions since all facility tanks contain asphalt. VOC working and standing emissions are based on AP-42 Section 7.1 for organic liquid storage tanks. An updated vapor expansion coefficient is used in the asphalt tank calculations to reflect a conservative value. These calculations have been updated in this permit modification.

For the tank calculations, the entire facility throughput of 77,000 gal/hr and 46,820,000 gal/yr were assumed to be handled through each of the tanks. Based on these maximum throughput values, working and standing losses were calculated for each tank based on several input values and calculated factors including tank size, liquid temperature, vapor expansion factor and turnovers. Total tank emissions were calculated for each of the tanks and the maximum working and standing emissions were assumed to be the worst-case scenario emissions from the facility. For this facility, the largest tank (Tank-8), had the highest calculated emissions from handling the entire facility-wide gal/hr and gal/yr throughputs. All other tanks had lower total emissions when handling the entire facility throughput. Since the entire facility will never exceed the requested value of 46,820,000 gal/yr, the requested maximum tank emission value is proposed to be the requested permit limit for all of the tanks (Unit TANKS). By maintaining operations at the facility at or below the requested facility-wide throughput value, the potential tank-wide limit will not be exceeded, regardless of which tank handles the volume.

There are two different scenarios in which H_2S emissions are released from the tanks. The first is associated with tank working and standing losses. In this scenario, an H_2S concentration of 8 ppm was assumed (corresponds to 0.0008% H_2S = 8 ppm/10^6 converted to percentage). This percentage was then multiplied by the respective tpy emissions to calculate the percentage of these emissions which are associated with H_2S. The lb/hr emissions are based on an annualized

gal/hr rate (i.e., 46,820,000 gal/yr / 8760 hr/yr = 5,345 gal/hr) as it is assumed that working and standing losses occur continuously throughout the year.

The second set of H_2S emissions associated with the tanks involves product offloading into the tanks. As product is offloaded from railcars or trucks into a tank, the vapor in the tank is displaced, resulting in emissions of VOC and H_2S. These emission calculations are based on a conservative (intentionally high) concentration of hydrogen sulfide assumed in the tank vapor space (8 ppm). The ideal gas law is used to convert this ppm concentration into a vapor density (lb/ft^3) based on the molecular weight of H_2S, the temperature of the asphalt, and pressure. Based on the tank vapor space associated with tank storage, a total airflow value is calculated utilizing the ideal gas law again. The H_2S density (lb/ft^3) is multiplied by either the hourly or annual total airflow (ft^3) to calculate lb/hr and ton/yr emissions.

The hourly gal/hr throughput is based on the maximum hourly throughput associated with railcar offloading (77,000 gal/hr). Truck offloading has a maximum hourly throughput of 25,200 gal/hr and since this is less than the railcar offloading value, the highest of the two throughputs was used for the calculations (railcar offloading and truck offloading do not occur simultaneously). Annual emissions are based on the requested 46,820,000 gal/yr which will not be exceeded and will be based on a combination of product offloading from both rail and truck.

Working and standing tank emissions were added to the maximum vapor displacement tank emissions (from product offloading) to calculate the requested H_2S total tank limit. Working and standing lb/hr H_2S emissions were calculated per tank and the maximum emissions are requested (same methodology as VOC emissions from the tanks). Additionally, the H_2S emissions from product offloading are also added to the requested H_2S total tank limit. Railcar and truck offloading will only occur in one tank at a time. As such, air dispersion modeling includes different scenarios where working and standing lb/hr H_2S emissions from each tank are modeled and the addition of H_2S emissions from product offloading are associated with each of the tanks separately (in other words, one scenario would be product offloading into Tank 8 plus working and standing emissions from all other tanks; another scenario would be product offloading into Tank 502 plus working and standing emissions form all other tanks, and so on for the remaining tanks). Additional details are provided in the modeling report and example calculations are included in Section 2.4.

2.3.1.3 Loading Racks (Units LR-1, LR-2)

Emissions associated with the Loading Racks for this facility are based on AP-42 Section 5.2 for transporting and marketing of petroleum liquids. VOC emissions are based on the Saturation Factor (S) from AP-42 Section 5.2 Table 5.2-1. These calculations have been updated in this permit modification.

The loading loss emission factor (lb/Mgal) is based on the vapor pressure, molecular weight, and temperature of the asphalt as well as an assumed saturation factor of 1.45 for splash loading. The annual throughput (gal/yr) is then multiplied by the loading loss emission factor (lb/Mgal) to calculate the tpy VOC emissions. The lb/hr value is based on a maximum hourly throughput of 12,600 gal/hr, which would correspond to two trucks per loading rack per hour assuming a truck capacity of 6,300 gallons.

The H_2S emissions from the loading rack are based on the same methodology described in Section 2.3.1.2 for the asphalt tanks. These calculations are based on a conservative

(intentionally high) concentration of hydrogen sulfide assumed at the loading rack (10 ppm). Once again, the ideal gas law is utilized to calculate the H_2S density (lb/ft^3) and airflow (ft^3), which are then multiplied to calculate hourly and annual emissions. In order to calculate conservative emissions and provide operational flexibility to the facility, the entire facility throughput is assumed to be handled through either loading rack (LR-1 or LR-2). The total facility throughput will never be exceeded, and calculating emissions for each loading rack and modeling them separately with a conservative throughput will allow the terminal to handle the maximum throughput through either rack. Example calculations are included in Section 2.4.

2.3.1.4 Railcar Unloading (Unit UL)

Emissions associated with the unloading of railcars for this facility are based on the ideal gas law for calculating the mass of vapor expelled during product heating. VOC and H_2S emissions are based on the heated expansion of the vapor within the railcars, therefore when these cars are unloaded they will expel this built-up vapor producing emissions. These calculations have been added to the permit in this modification.

Railcars arrive at the facility, the hatch is opened, and steam provided by the onsite boilers is used to heat the railcars. The volume change realized when the asphalt is heated at atmospheric pressure is used to calculate the mass forced out by vapor expansion. This mass is adjusted for the vapor pressure of material in the vapor phase. The atmospheric pressure, molecular weight and temperature change are all factored into the ideal gas law equation. A maximum of 9 vessels are heated per day, and it is assumed that these vessels could all be heated over the course of one hour. The capacity of the railcar and vapor space are used to calculate the change in volume, which is directly related to the molar mass of the expelled vapor and thus, the mass loss from the material in the vapor space. Vessel emissions are calculated separately (per railcar) and then multiplied by the number of railcars unloaded per hour to calculate lb/hr emissions. Annual emissions are based on the total number of vessels unloaded throughout the year. H_2S emissions are based on an assumption of 47 ppm per volume of H_2S in the expelled vapor. A lb/vessel H_2S value is calculated and then multiplied by the hourly and annual number of railcars to calculate total lb/hr and tpy emissions. Example calculations are included in Section 2.4.

2.3.1.5 Truck Offloading (Unit TL)

Upon arrival at the unloading point, the upper hatch of the tank of the truck is opened to maintain near ambient pressure in the tank. The drain pump is started to remove the asphalt. Upon opening the tank hatch, there are emissions of vapors from the head space in the truck tank. Once pumping starts, the tank is at a pressure slightly negative to ambient which results in no emissions from the tank. The ideal gas law is used to calculate the pressure change realized in the tanker head space when the hatch is opened and is used to estimate VOC and H_2S emissions. These calculations have been added to the permit in this modification.

The operating pressure, vapor pressure, molecular weight, partial pressure and temperature are all used to calculate the moles of gas in the vapor head space of the truck's tank to be unloaded. A safety factor was included in the calculation of the vapor head space to ensure that the VOC and H_2S emissions would not be exceeded should any of the inputs vary beyond typical operational limits. Raoult's law and the molecular weight are then utilized to calculate the mass of VOC losses per truck. This number is multiplied by the hourly and annual trucks to calculate lb/hr and tpy emissions. H_2S emissions are based on an assumption of 10 ppm per volume of H_2S in the expelled vapor. A lb/truck H_2S value is calculated and then multiplied by the hourly and

annual number of trucks to calculate total lb/hr and tpy emissions. Example calculations are included in Section 2.4.

2.3.1.6 Fugitive Emissions (Unit FUG)

Fugitive emissions at the facility are based on facility component counts as well as the EPA's Protocol for Equipment Leak Emission Estimates (Table 2-2, 2-3 and 2-4). Pump seals, valves, connectors, flanges, open-ended lines and other fugitive sources were counted and summed based on facility Piping and Instrumentation Diagrams. A 100% safety factor was then added to these components to ensure VOC and H_2S emissions will not be exceeded. It was assumed that the gas and the liquid phases were 100% VOC. Emission factors (lb/hr-source) were multiplied by the component counts to calculate lb/hr and tpy VOC emissions assuming 8760 hours of annual operation. In order to calculate H_2S emissions, it was assumed that both the liquid and vapor contain 47 ppm H_2S (0.0047 mol%). This was multiplied by the lb/hr and tpy VOC emissions to calculate lb/hr and tpy H_2S emissions. These calculations have been added to the permit in this modification.

There are four (4) separate fugitive area sources included in the modeling based on differing release heights at different parts of the facility (see modeling report). As a conservative (intentionally high) assumption, the entire facility-wide H_2S emissions (lb/hr) were modeled at each of the sources. This was due to the fact that the component counts were not separated based on release height, so there was no efficient way to differentiate emissions based on facility location. In other words, the modeled H_2S emissions were four times higher than the actual emissions as each of the fugitive area sources was modeled with the entire facility H_2S emissions.

2.4 Emission Calculations

Note: Some values shown in these example calculations may not match Excel values exactly due to intermediate rounding; please defer to Totals in the Excel calculations for exact values.

2.4.1 Tank Emission Rate Calculation

This calculation will outline the procedure for determining the emission rates of the hot asphalt tank Unit Tank#8 at the Albuquerque Asphalt Terminal. This methodology was applied to all tanks at the facility (Units Tank #5, Tank #7, Tank #8, Tank #9, Tank #501, Tank #502, Tank #503, and Tank #504).

Assumptions based on equipment data and tank contents provided by Western Refining Terminals, LLC for Tank #8:

Contents of Tank:	AC
Tank Type (Vertical or Horizontal):	Vertical
Heated (Yes or No):	Yes
Diameter (ft):	60
Effective Diameter (ft):	60
Shell Height or Length (ft):	40
Nominal Capacity (gal):	836,321
Annual Throughput (gal/yr):	46,820,000
Roof Type (Cone or Dome):	Cone
Tank Roof Cone Slope (ft/ft):	0.0625
Dome Tank Roof Radius (ft):	N/A

Dome Tank Roof Height (ft):	N/A
Daily Minimum Liquid Temperature (F):	300
Daily Maximum Liquid Temperature (F):	350
Dailey Average Liquid Temperature (F):	325
Daily Total Solar Insolation Factor (Btu/ft2/day):	1765
Tank Paint Solar Absorbance:	0.17
Type of Substance (Organic or Petroleum):	ORGANIC
Vapor Molecular Weight (lb/lbmol):	190
Antoine's Coefficient A:	4.2709
Antoine's Coefficient B:	1276.034
Antoine's Coefficient C (Organic Only):	160.458
Breather Vent Pressure Setting (psig):	0.03
Breather Vent Vacuum Setting (psig):	-0.03
Ambient Pressure (psia):	12.151
Vapor Space Expansion Factor*:	0.09294521509152
Working Loss Product Factor:	1

- * In lieu of using a variable vapor expansion factor for the potential emissions from the tanks, a maximum vapor expansion coefficient was calculated based on the worst-case scenario month. A 10% safety factor was then added to this value. This conservative (intentionally high) vapor expansion coefficient corresponds to higher potential emissions from all of the tanks and ensures that the proposed facility-wide tank emission limit will not be exceeded.

The following equations calculate the average liquid height, roof outage, vapor space volume, and daily temperature range for use in calculating the liquid vapor pressures and vapor losses:

$$Average\ liquid\ Height = \frac{Shell\ Height(ft)}{2} = \frac{40ft}{2} = \mathbf{20\ ft}$$

$$Roof\ Outage = Tank\ Roof\ Cone\ Slope\left({}^{ft}/_{ft}\right) * \frac{\left(\frac{Effective\ Diameter(ft)}{2}\right)}{3} = 0.0625\frac{ft}{ft} * \frac{\frac{60\ ft}{2}}{3}$$

$$Roof\ Outage = \frac{0.0625ft}{ft} * 10\ ft = \mathbf{0.625\ ft}$$

$$Vapor\ Space\ Outage(ft) = Shell\ Height(ft) - Average\ Liquid\ Height(ft) + Roof\ Outage(ft)$$
$$Vapor\ Space\ Outage = 40ft - 20ft + 0.625ft$$
$$Vapor\ Space\ Outage = \mathbf{20.63\ ft}$$

$$Vapor\ Space\ Volume(ft^3) = \frac{\pi}{4} * (Diameter(ft)^2) * Vapor\ Space\ Outage(ft)$$
$$Vapor\ Space\ Volume(ft^3) = \frac{\pi}{4} * ((60ft)^2) * 20.63\ ft$$
$$Vapor\ Space\ Volume(ft^3) = \mathbf{58,315.81\ ft^3}$$

$$Daily\ \Delta T(°R) = 0.72 * \left(Daily\ T_{Max}(°\text{F}) - Daily\ T_{Min}(°\text{F})\right)$$
$$+0.028 * Tank\ Paint\ Solar\ Absorabance * Daily\ Total\ Solar\ Insulation\ factor\left(\frac{\frac{Btu}{ft^2}}{day}\right)$$

$$Daily\ \Delta T(°R) = 0.72 * (350°\text{F} - 300°\text{F}) + 0.028 * 0.17 * 1{,}765\left(\frac{\frac{Btu}{ft^2}}{day}\right)$$

$$Daily\ Vapor\ Temp.Range(°R) = \mathbf{44.4°R}$$

The liquid contained within this tank is organic so therefore the following equation was used to determine the vapor pressure of the liquid within the tank:

$$P_{\ Vapor}(psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{A-B}{\left((Avg.Daily\ Liq\ Temp(°\text{F}) - 32°\text{F}) * \frac{5}{9} + C\right)}}$$

The following equation calculates the vapor pressure of the contained liquid at the average daily temperature of 325°F:

$$P_{Vapor\ @\ Avg\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{A-B}{\left((Avg.Daily\ Liq\ Temp(°\text{F}) - 32°\text{F}) * \frac{5}{9} + C\right)}}$$

$$P_{Vapor\ @\ Avg\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{4.2709 - 1276.03}{(325°\text{F} - 32°\text{F}) * \frac{5}{9} + 160.46}}$$

$$P_{Vapor\ @\ Avg\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 2.11\ mm\ Hg$$

$$P_{Vapor\ @\ Avg\ Liq\ Temp}\ (psia) = \mathbf{0.0407\ psia}$$

The following equation calculates the vapor pressure of the contained liquid at the minimum daily temperature of 300°F:

$$P_{Vapor\ @\ Min\ Liq\ Temp}(psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{A-B}{\left((Min.Daily\ Liq\ Temp(°\text{F}) - 32°\text{F}) * \frac{5}{9} + C\right)}}$$

$$P_{Vapor\ @\ Min\ Liq\ Temp}(psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{4.2709 - 1276.03}{(300°\text{F} - 32°\text{F}) * \frac{5}{9} + 160.46}}$$

$$P_{Vapor\ @\ Min\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 1.40\ mm\ Hg$$

$$P_{Vapor\ @\ Min\ Liq\ Temp}\ (psia)\ = \mathbf{0.0271\ psia}$$

The following equation calculates the vapor pressure of the contained liquid at the maximum daily temperature of 350°F:

$$P_{Vapor\ @\ Max\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{A-B}{\left((Max\ Daily\ Liq\ Temp(°F)-32°F)*\frac{5}{9}+C\right)}}$$

$$P_{Vapor\ @\ Max\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 10^{\frac{4.2709-1276.03}{(350°F-32°F)*\frac{5}{9}+160.46}}$$

$$P_{Vapor\ @\ Max\ Liq\ Temp}\ (psia) = \frac{14.696\ psia}{760\ mm\ Hg} * 3.061\ mm\ Hg$$

$$P_{Vapor\ @\ Max\ Liq\ Temp}\ (psia) = \mathbf{0.0592\ psia}$$

The following equation calculates the vapor density within the tank:

- Vapor Pressure will be represented at VP for this equation
- Molecular weight of vapor: MW_{vapor}

$$\rho_{Vapor}\left(\frac{lb}{ft^3}\right) = MW_{Vapor}\left(\frac{lb}{lbmol}\right) * \frac{\frac{VP_{Avg.Liq\ Surface\ Temp}(psia)}{R_{Universal\ gas\ constant}}}{Daily\ Avg.Temp(°F) + 459.67}$$

$$\rho_{Vapor}\left(\frac{lb}{ft^3}\right) = 190\left(\frac{lb}{lbmol}\right) * \frac{\frac{0.0407\ psia}{10.731\left(\frac{psia * ft^3}{lbmol * °R}\right)}}{325\ °F + 459.67}$$

$$\rho_{Vapor}\left(\frac{lb}{ft^3}\right) = 190\left(\frac{lb}{lbmol}\right) * \frac{0.00379\left(\frac{lbmol * °R}{ft^3}\right)}{784.67\ °R}$$

$$\rho_{Vapor}\left(\frac{lb}{ft^3}\right) = 190\left(\frac{lb}{lbmol}\right) * 4.834 * 10^{-6}\left(\frac{lbmol}{ft^3}\right)$$

$$\rho_{Vapor}\left(\frac{lb}{ft^3}\right) = \mathbf{0.000918\ \frac{lb}{ft^3}}$$

The following equation calculates the daily vapor pressure range:

$$Daily\ \Delta P(psi) = VP_{Max\ .Liq\ Surface\ Temp}(psia) - VP_{Min..Liq\ Surface\ Temp}(psia)$$
$$Daily\ \Delta P(psi) = 0.0592\ psia - 0.0271\ psia$$
$$Daily\ \Delta P(psi) = \mathbf{0.0321\ psi}$$

The following equation calculates the breather vent pressure setting range:

$$\Delta P_{Breather\ Vent}(psig) = Breather\ Vent\ Pressure\ (psig) - Breather\ Vent\ Vacuum(psig)$$
$$\Delta P_{Breather\ Vent}(psig) = 0.03\ psig - (-0.03\ psig)$$
$$Breather\ Vent\ Pressure\ Range(psi) = \mathbf{0.06\ psi}$$

The following equation calculates the vented vapor saturation factor:

$$Vented\ Vapor\ Saturation\ Factor = \frac{1}{1 + 0.053 * P_{Avg.Liq.Surface\ Temp} * Vapor\ Space\ Outage(ft)}$$

$$Vented\ Vapor\ Saturation\ Factor = \frac{1}{1 + 0.053 * 0.0407\ psia * 20.63\ ft}$$

$$Vented\ Vapor\ Saturation\ Factor = \frac{1}{1 + 0.0445} = \mathbf{0.957}$$

The following equation calculates the annual turnovers and the subsequent turnover factor:

$$Annual\ Turnovers = \frac{Annual\ Throughput\left(\frac{gal}{yr}\right)}{Nominal\ Capacity(gal) * 0.9}$$

$$Annual\ Turnovers = \frac{46{,}820{,}000\left(\frac{gal}{yr}\right)}{836{,}321\ gal * 0.9} = \mathbf{62.20}\ \boldsymbol{\frac{turnovers}{yr}}$$

To determine this factor the total number of turnovers must be greater than 36 turnovers per year, the following equation will represent that:

$$Turnover\ Factor = \frac{62.20\frac{turnovers}{yr} + 180}{6 * 62.20\frac{turnovers}{yr}} = \mathbf{0.649}$$

The following equation calculates the standing storage losses of the tank per year:

- Vapor Space Expansion Factor: K_S
- Vented Vapor Saturation Factor: S

$$Standing\ Storage\ loss\left(\frac{lb}{yr}\right) = 365\frac{d}{yr} * Vapor\ Space\ Vol.(ft^3) * \rho_{Vapor} * K_s * S$$

$$Standing\ Storage\ loss\left(\frac{lb}{yr}\right) = 365\frac{d}{yr} * 58315.81\ ft^3 * 0.000918\frac{lb}{ft^3} * 0.0929 * 0.957$$

$$Standing\ Storage\ loss\left(\frac{lb}{yr}\right) = \mathbf{1{,}739.5}\ \boldsymbol{\frac{lb}{yr}}$$

The following equation calculates the working losses of the tank per year:

- Turnover Factor: K_N
- Working loss product factor: W_L

$$Working\ loss\left(\frac{lb}{yr}\right) = 0.001 * MW_{vapor} * VP_{Avg.Liq\ Surf.Temp}(psia) * \frac{Annual\ throughput\left(\frac{gal}{yr}\right)}{42\frac{bbl}{gal}} * K_N * W_L$$

$$Working\ loss\left(\frac{lb}{yr}\right) = 0.001 * 190\frac{lb}{lbmol} * 0.0407\ psia * \frac{46{,}820{,}000\frac{gal}{yr}}{42\frac{bbl}{gal}} * 0.649 * 1.00$$

$$Working\ loss\left(\frac{lb}{yr}\right) = \mathbf{5{,}594.31\frac{lb}{yr}}$$

This lb/yr working and standing values were added together to calculate the total tank losses and this value was converted to ton/yr by dividing by 2000 lb/ton. Hourly emissions are based on the maximum hourly throughput of 77,000 gal/hr. A ratio of this maximum value and the hourly value assuming 8760 hrs was used:

Max lb/hr = lb/yr / (8760 hr/yr) * [(77,000 gal/hr) / (46,820,000 gal/yr / 8760 hr/yr)].

H_2S emissions are calculated by multiplying the ton/yr value by the H_2S percentage (8 ppm = 0.0008%). The lb/hr emissions are based on an annualized gal/hr rate (i.e., 46,820,000 gal/yr / 8760 hr/yr = 5,345 gal/hr) as it is assumed that working and standing losses occur continuously throughout the year and the product offloading H_2S calculations account for maximum gal/hr offloading into the tanks.

2.4.2 Loading Rack Emission Rate Calculation

This calculation will outline the procedure for determining the emission rates of the Loading Racks at the Albuquerque Asphalt Terminal. This methodology was applied to both of the loading racks at the facility (Units LR-1 and LR-2).

Assumptions based on equipment data and contents provided by Western Refining Terminals, LLC for LR-1:

Loading Method (Mode of Operation):	Splash
Saturation factor, S, from AP-42, Table 5.2-1:	1.45
Loading Control Efficiency, eff (%):	0
True vapor pressure of the product being loaded (psia):	0.0407
Molecular weight of the product vapors (lb / lbmol):	190
Temperature of the product being loaded (degrees F):	350
Total throughput (gal/yr)	46,820,000

The following equation calculates the loading loss emission factor:

- Saturation factor: S
- Loading Control efficiency: N

$$Loading\ Loss\ EF\left(\frac{lb}{kgal}\right) = \frac{12.46 * S * VP_{True}(psia) * MW_{Vapor}\left(\frac{lb}{lbmol}\right)}{460 + Temp_{Liq\ Loaded}(°F)} * \left(1 - \frac{eff}{100}\right)$$

$$Loading\ Loss\ EF\left(\frac{lb}{kgal}\right) = \frac{12.46 * 1.45 * 0.0407 psia * 190\frac{lb}{lbmol}}{460 + 350\ °F} * \left(1 - \frac{0\%}{100}\right)$$

$$Loading\ Loss\ EF\left(\frac{lb}{kgal}\right) = \mathbf{0.172}\frac{\boldsymbol{lb}}{\boldsymbol{kgal}}$$

The following equation calculates the loading losses for the loading racks:

$$VOC\ Emissions\ \left(\frac{lb}{yr}\right) = Loading\ Loss\ EF\left(\frac{lb}{kgal}\right) * \frac{Total\ Throughput\left(\frac{gal}{yr}\right)}{1000\ \left(\frac{gal}{kgal}\right)}$$

$$VOC\ Emissions\ \left(\frac{lb}{yr}\right) = 0.172\frac{lb}{kgal} * \frac{46{,}820{,}000\frac{gal}{yr}}{1000\ \left(\frac{gal}{kgal}\right)}$$

$$VOC\ Emissions\ \left(\frac{lb}{yr}\right) = \mathbf{8075.70}\frac{\boldsymbol{lb}}{\boldsymbol{yr}}$$

$$VOC\ Emissions\ \left(\frac{lb}{hr}\right) = 0.172\frac{lb}{kgal} * \frac{12{,}600\frac{gal}{hr}}{1000\ \left(\frac{gal}{kgal}\right)}$$

$$VOC\ Emissions\ \left(\frac{lb}{hr}\right) = \mathbf{2.17}\frac{\boldsymbol{lb}}{\boldsymbol{hr}}$$

2.4.3 Product Offloading into Tanks and Loading Rack H_2S Emission Rate Calculation

This calculation will outline the procedure for determining the emission rates of H_2S at the Tanks (associated with product offloading) and Loading Racks at the Albuquerque Asphalt Terminal. This methodology was applied to all of the tanks and loading racks at the facility (Units Tank #5, Tank #7, Tank #8, Tank #9, Tank #501, Tank #502, Tank #503, Tank #504, LR-1 and LR-2).

Assumptions based on equipment data and contents provided by Western Refining Terminals, LLC for the tanks and loading racks:

	Asphalt Tanks	Loading Racks
H_2S Concentration (ppm)	8	10
Pressure (atm)	1	1
MW H_2S (lb/lbmol)	34	34
Asphalt Temperature(°R)	809.67	809.67

The following equation calculates the H_2S density for the asphalt tanks based on the info above:

$$\rho_{H2S}\left(\frac{lb}{ft^3}\right) = \frac{H_2S\ Concentration\ (ppm)}{10^6} * \left(MW_{H2S}\left(\frac{lb}{lbmol}\right) * \frac{P_{Tank}(atm)}{0.73\ \frac{atm * ft^3}{lbmol * °R} * Asphalt\ Temp(°R)}\right)$$

$$\rho_{H2S}\left(\frac{lb}{ft^3}\right) = \frac{9\ ppm}{10^6} * \left(34\frac{lb}{lbmol} * \frac{1\ atm}{0.73\ \frac{atm * ft^3}{lbmol * °R} * 809.67\ °R}\right)$$

$$\rho_{H2S}\left(\frac{lb}{ft^3}\right) = \mathbf{4.60 * 10^{-7}\frac{lb}{ft^3}}$$

The following equation calculates the annual total airflow and the H_2S emissions:

$$Annual\ Total\ Airflow\left(\frac{ft^3}{yr}\right) = Total\ Asphalt\ Throughput(gal) * 0.133681\left(\frac{ft^3}{gal}\right)$$

$$Annual\ Total\ Airflow\left(\frac{ft^3}{yr}\right) = 46{,}820{,}000\frac{gal}{yr} * 0.133681\left(\frac{ft^3}{gal}\right) = \mathbf{6,258,944.42\frac{ft^3}{yr}}$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{yr}\right) = \rho_{H2S}\left(\frac{lb}{ft^3}\right) * Annual\ Total\ Airflow\left(\frac{ft^3}{yr}\right)$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{yr}\right) = 4.60 * 10^{-7}\frac{lb}{ft^3} * 6{,}258{,}944.42\frac{ft^3}{yr}$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{yr}\right) = \mathbf{2.88\frac{lb}{yr}}$$

$$Hourly\ Total\ Airflow\left(\frac{ft^3}{hr}\right) = Total\ Asphalt\ Throughput(gal/hr) * 0.133681\left(\frac{ft^3}{gal}\right)$$

$$Hourly\ Total\ Airflow\left(\frac{ft^3}{yr}\right) = 77{,}000\frac{gal}{hr} * 0.133681\left(\frac{ft^3}{gal}\right) = \mathbf{10,293.44\frac{ft^3}{hr}}$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{yr}\right) = \rho_{H2S}\left(\frac{lb}{ft^3}\right) * Hourly\ Total\ Airflow\left(\frac{ft^3}{hr}\right)$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{yr}\right) = 4.60 * 10^{-7}\frac{lb}{ft^3} * 10{,}293.44\frac{ft^3}{hr}$$

$$Tank\ H_2S\ Emission\ Rate\left(\frac{lb}{hr}\right) = \mathbf{0.0047\frac{lb}{hr}}$$

2.4.4 Railcar Unloading Emission Rate Calculation

This calculation will outline the procedure for determining the emission rates of the Railcar Unloading at the Albuquerque Asphalt Terminal. This methodology was applied to Unit UL.

Assumptions based on equipment data and contents provided by Western Refining Terminals, LLC for the Railcar Unloading:

atm, or operating pressure (psi)	12.15
Vapor pressure of pure chemical (psi)	0.0407
Vapor molecular weight (lb/lb-mole)	190.00
Gas constant (psi*ft3/lb-mole)	10.726
Temp of heated prod. (degrees F)	330

Temp of incoming prod. (degrees F)	70
Max Vessels heated/day	9
Railcar heating time (hrs)	24
Vessel Nominal Capacity(gal)	22,000
Vessel Shell Capacity(gal)	29,080
Volume of material heated(gal/yr)	46,820,000

The following equations calculate the number of vessels heated per year, vapor space per rail car prior to heating and post heating, and mass of vapor loss to determine the VOC and H_2S emission rates from the railcars:

$$Vessels\ heated\ per\ year = \frac{\#of\ Vessels\ heated}{day} * 365\frac{days}{yr} = \mathbf{3,285\ vessels}$$

$$Vapor\ Space\ Vol.(ft^3) = \frac{Shell\ Capacity(gal) - Nominal\ Capacity(gal)}{7.481\ \frac{gal}{ft^3}}$$

$$Vapor\ Space\ Vol.(ft^3) = \frac{29{,}080\ gal - 22{,}000\ gal}{7.481\ \frac{gal}{ft^3}} = \mathbf{946.4\ ft^3}$$

$$Vapor\ Space\ Vol._{Heated}\ (ft^3) = Vapor\ Space\ Vol._{Cold}\ (ft^3) * \frac{(T_{Prod\ Hot}(°\mathrm{F}) + 460)}{(T_{Prod\ Cold}(°\mathrm{F}) + 460)}$$

$$Vapor\ Space\ Vol._{Heated}\ (ft^3) = 946.4\ ft^3 * \frac{(330°\mathrm{F} + 460)}{(70°\mathrm{F} + 460)} = \mathbf{1{,}410.67\ ft^3}$$

$$\Delta Vapor\ Space(ft^3) = Vapor\ Space\ Vol._{Heated}\ (ft^3) - Vapor\ Space\ Vol._{Cold}\ (ft^3)$$
$$\Delta Vapor\ Space(ft^3) = 1{,}410.67\ ft^3 \quad - 946.4\ ft^3 = \mathbf{464.27 ft^3}$$

$$Mass\ of\ Vapor\ heated\left(\frac{lb}{vessel}\right) = \left(P_{atm} * \Delta Vapor\ Space(ft^3)\right) * \frac{MW_{Vapor}}{R_{Univ.Gas\ Const} * (T_{Prod\ Hot}(°\mathrm{F}) + 460)}$$

$$Mass\ of\ Vapor\ heated\left(\frac{lb}{vessel}\right) = (12.15\ psi * 464.27\ ft^3) * \frac{190\frac{lb}{lbmol}}{10.73\ \frac{psi * ft^3}{lbmol * R} * (330°\mathrm{F} + 460)}$$

$$Mass\ of\ Vapor\ heated\left(\frac{lb}{vessel}\right) = \mathbf{126.49\frac{lb}{vessel}}$$

$$Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) = Mass\ of\ Vapor\ Heated\left(\frac{lb}{vessel}\right) * \frac{P_{Chemical}}{P_{atm}}$$

$$Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) = 126.49\frac{lb}{vessel} * \frac{0.0407\ psi}{12.15\ psi}$$

$$Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) = \mathbf{0.424\frac{lb}{vessel\ heated}}$$

The following equations calculate the VOC and H_2S loss from the heated railroad cars:

$$VOC\ loss\left(\frac{lb}{yr}\right) = Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) * Vessels\ heated\ per\ year$$

$$VOC\ loss\left(\frac{lb}{yr}\right) = 0.424\frac{lb}{vessel\ heated} * 3{,}285\frac{vessels}{yr} = \mathbf{1391.85\frac{lb}{yr}}$$

$$VOC\ loss\left(\frac{lb}{hr}\right) = 0.424\frac{lb}{vessel\ heated} * 9\frac{vessels}{hr} = \mathbf{3.81}\frac{\boldsymbol{lb}}{\boldsymbol{hr}}$$

$$H_2S\ loss\left(\frac{lb}{vessel}\right) = Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) * [H_2S\ ] * MW_{H_2S}$$
$$H_2S\ loss\left(\frac{lb}{vessel}\right) = 0.424\frac{lb}{vessel\ heated} * \frac{47\ ppm}{10^6} * 34.08\frac{lb}{lbmol}$$

$$H_2S\ loss\left(\frac{lb}{vessel}\right) = \mathbf{0.00068}\frac{\boldsymbol{lb}}{\boldsymbol{vessel\ heated}}$$
$$H_2S\ loss\left(\frac{ton}{yr}\right) = H2S\ Mass\ loss_{Vapor\ Space}\left(\frac{lb}{vessel}\right) * Vessels\ heated\ per\ year * \frac{1\ ton}{2000\ lb}$$
$$H_2S\ loss\left(\frac{ton}{yr}\right) = 0.00068\frac{lb}{vessel\ heated} * 3{,}285\frac{vessels}{yr} * \frac{1\ ton}{2000\ lb} = \mathbf{0.0011}\frac{\boldsymbol{ton}}{\boldsymbol{yr}}$$
$$H_2S\ loss\left(\frac{lb}{hr}\right) = 0.00068\frac{lb}{vessel\ heated} * 9\frac{vessels}{hr} = \mathbf{0.0061}\frac{\boldsymbol{lb}}{\boldsymbol{hr}}$$

2.4.5 Truck Unloading Emission Rate Calculation

This calculation will outline the procedure for determining the emission rates of the Truck Unloading at the Albuquerque Asphalt Terminal. This methodology was applied to Unit TL.

Assumptions based on equipment data and contents provided by Western Refining Terminals, LLC for the Truck Unloading:

Operating pressure (psi)	12.15
Vapor pressure of pure chemicall (psi)	0.0407
Vapor molecular weight (lb/lb-mole)	190.00
Ambient pressure (psia)	12.15100
Over-pressure (psia)	0.03125
Initial tank pressure (psia)	12.18225
VOC vapor molecular weight (lb/lb-mole)	190.00
Gas constant (psi*ft3/lb-mole*R)	10.73
Temp of incoming product (degrees F)	330
H_2S concentration in head space vapor (ppmv)	10
Nominal Truck Capacity (gal)	7500
Normal Load (gal)	6300
Head Space (gal)	1200
Safety Factor, SF	180%

The following equations calculate the VOC partial pressure, vapor headspace, vapor mass in head space before and after hatch opening, and VOC/H_2S mass loss:

$$P_{VOC}(psi) = \frac{14.7\ psi}{760\ torr} * 10^{\frac{-0.05223*A}{((T_{Prod}(°F)-32°F)*\frac{5}{9})+273K+B}}$$
$$P_{VOC}(psi) = \frac{14.7\ psi}{760\ torr} * 10^{\frac{-0.05223*75350.06}{((330°F-32°F)*\frac{5}{9})+273K+9.00346}}$$

$$P_{VOC}(psia) = \mathbf{0.0207\ psia}$$

$$Vapor\ Head\ Space(ft^3) = Nominal\ Capacity(gal) - Normal\ Load(gal) = 7500\ gal - 6300\ gal$$

$$Vapor\ Head\ Space(ft^3) = \frac{1200\ gal}{7.481\frac{gal}{ft^3}} = \mathbf{160.42\ ft^3}$$

$$n_{Init.Vapor}\ (moles) = \frac{P_{init} * V_{Headspace}}{R * T_{Prod}} + SF$$

$$n_{Init.Vapor}\ (moles) = \frac{(12.18\ psi) * 160.42 ft^3}{10.73\ \frac{psi * ft^3}{lbmol * °R} * (330°\text{F} + 459.67)} + SF$$

$$n_{Init.Vapor} = \mathbf{0.414\ moles}$$

$$n_{Post.Vapor}\ (moles) = \frac{P_{post} * V_{Headspace}}{R * T_{Prod}} + SF$$

$$n_{Post.Vapor}\ (moles) = \frac{(12.15\ psi) * 160.42 ft^3}{10.73\ \frac{psi * ft^3}{lbmol * °R} * (330°\text{F} + 459.67)} + SF$$

$$n_{Post.Vapor} = \mathbf{0.413\ moles}$$

$$\Delta n_{Vapor} = n_{Init.Vapor} - n_{Post.Vapor}$$

$$\Delta n_{Vapor} = 0.414\ mol - 0.413\ mol = \mathbf{0.00106\ mol}$$

$$VOC_{Mass\ Loss}\left(\frac{lb}{truck}\right) = \Delta n_{Vapor} * MW_{Vapor} = 0.00106\ mol * 190\frac{lb}{lbmol}$$

$$VOC_{Mass\ Loss}\left(\frac{lb}{truck}\right) = \mathbf{3.44E-04\ \frac{lb}{truck}}$$

$$VOC_{Mass\ Loss}\left(\frac{lb}{hr}\right) = VOC_{Mass\ Loss}\left(\frac{lb}{truck}\right) * \frac{Trucks\ Unloaded}{hr}$$

$$VOC_{Mass\ Loss}\left(\frac{lb}{hr}\right) = 3.44E-04\ \frac{lb}{truck} * \frac{4\ trucks}{hr}$$

$$VOC_{Mass\ Loss}\left(\frac{lb}{hr}\right) = \mathbf{1.38E-03\ \ \frac{lb}{hr}}$$

$$H_2S_{Mass\ Loss}\left(\frac{lb}{truck}\right) = \Delta n_{Vapor} * \frac{C_{H_2S}}{10^6} * MW_{Vapor} = 0.00106\ mol * \frac{10\ ppm}{10^6} * 34.08\frac{lb}{lbmol}$$

$$H_2S_{Mass\ Loss}\left(\frac{lb}{truck}\right) = \mathbf{3.62E-07\ \frac{lb}{truck}}$$

$$H_2S_{Mass\ Loss}\left(\frac{lb}{hr}\right) = H_2S_{Mass\ Loss}\left(\frac{lb}{truck}\right) * \frac{Trucks\ Unloaded}{hr}$$

$$H_2S_{Mass\ Loss}\left(\frac{lb}{hr}\right) = 3.62E-07\ \frac{lb}{truck} * \frac{4\ trucks}{hr}$$

$$H_2S_{Mass\ Loss}\left(\frac{lb}{hr}\right) = \mathbf{1.45E-06}\ \ \boldsymbol{\frac{lb}{hr}}$$

$$H_2S_{Mass\ Loss}\left(\frac{ton}{yr}\right) = 3.62E-07\ \frac{lb}{truck} * \frac{7{,}432\ trucks}{yr} * \frac{1\ ton}{2000\ lb}$$

$$H_2S_{Mass\ Loss}\left(\frac{ton}{yr}\right) = \mathbf{1.35E-06}\ \ \boldsymbol{\frac{ton}{yr}}$$

Western Refining - Albuquerque Asphalt Terminal
Emission Summary

Limit	Requested Permit Limit
Total Annual Asphalt Throughput (gal/yr):	46,820,000

Unit	Description	Facility Emissions (Uncontrolled and Controlled Emissions are Equal)															
		NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		HAP		H_2S	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	Superior Boiler	0.81	3.53	1.18	5.15	0.077	0.34	0.0084	0.037	0.11	0.47	0.11	0.47	0.026	0.12	-	-
2	Hurst Boiler	0.72	3.15	1.01	4.42	0.066	0.29	0.0072	0.032	0.091	0.40	0.091	0.40	0.023	0.099	-	-
3	Hot Oil Heater	0.30	1.33	1.23	5.41	0.081	0.35	0.0088	0.039	0.11	0.49	0.11	0.49	0.028	0.12	-	-
TANKS	Collection of Asphalt Tanks	-	-	-	-	12.06	3.67	-	-	-	-	-	-	-	-	0.0047	0.0015
LR-1	Loading Rack 1	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	0.00097	0.0018
LR-2	Loading Rack 2	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	0.00097	0.0018
UL	Railcar Unloading	-	-	-	-	3.81	0.70	-	-	-	-	-	-	-	-	0.0061	0.0011
TL	Truck Offloading	-	-	-	-	0.0014	0.0013	-	-	-	-	-	-	-	-	1.45E-06	1.35E-06
FUG	Fugitives	-	-	-	-	0.43	1.88	-	-	-	-	-	-	-	-	2.02E-05	8.86E-05
Total		**1.83**	**8.01**	**3.42**	**14.97**	**20.88**	**15.31**	**0.024**	**0.11**	**0.31**	**1.35**	**0.31**	**1.35**	**0.077**	**0.34**	**0.013**	**0.0063**

Description	Permit Comparison - ANTICIPATED POLLUTANT INCREASES OR DECREASES															
	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		HAP		H_2S	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Proposed Emissions	1.83	8.01	3.42	14.97	20.88	15.31	0.024	0.11	0.31	1.35	0.31	1.35	0.077	0.34	0.013	0.0063
Table 4 - Combustion Emissions	2.84	12.43	2.46	10.74	0.23	0.98	0.030	0.11	0.31	1.35	0.31	1.35	-	-	-	-
Table 5 - VOC Emissions	-	-	-	-	-	10.87	-	-	-	-	-	-	-	-	-	0.020
Current Total Permitted Emissions	2.84	12.43	2.46	10.74	0.23	11.85	0.030	0.11	0.31	1.35	0.31	1.35	0.00	0.00	0.00	0.020
Change in Permitted Emissions	**-1.01**	**-4.42**	**0.96**	**4.23**	**N/A**	**3.46**	**-0.0056**	**-0.0030**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**	**N/A**	**N/A**	**-0.013**

Boiler PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

Unit: 1
Description: 14 MMBtu/hr Aztec, Superior Boiler

Boiler Fuel Usage

Fuel Consumption	14.00	MMBtu/hr	Input heat rate
Fuel heat value	1000	Btu/scf	
Hourly fuel usage	14.00	Mscf/hr	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel Heating Value (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	336.00	Mscf/d	Throughput
Annual fuel usage	122.64	MMscf/yr	Annual usage
Operating hours	8760	hr/yr	

NO_x [1]	CO	VOC	SO_2	PM		
0.81					lb/hr	Stack Test Data
	84	5.5	0.6	7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.81	**1.18**	**0.077**	**0.0084**	**0.11**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
3.53	**5.15**	**0.34**	**0.037**	**0.47**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

n-Hexane	Benzene	Toluene	e-Benzene	m-Xylene	HCHO	Total HAPs [2]		
1.80	0.0021	0.0034	-	-	0.075		lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.025	**2.94E-05**	**4.76E-05**	**-**	**-**	**1.05E-03**	**0.026**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
0.11	**1.29E-04**	**2.08E-04**	**-**	**-**	**4.60E-03**	**0.12**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] lb/hr values are based on stack test data plus 15% safety factor
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998.

Proposed HAP Emissions for the Boiler [1]

Constituent	Emission Factor [2,3,4] (lb/MMBtu)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Pb	5.00E-07	7.00E-06	3.07E-05
Benzene	2.10E-06	2.94E-05	1.29E-04
Formaldehyde	7.50E-05	1.05E-03	4.60E-03
Hexane	1.80E-03	2.52E-02	1.10E-01
Naphthalene	6.10E-07	8.54E-06	3.74E-05
Toluene	3.40E-06	4.76E-05	2.08E-04
Cobalt	8.40E-08	1.18E-06	5.15E-06
Chromium	1.40E-06	1.96E-05	8.58E-05
Manganese	3.80E-07	5.32E-06	2.33E-05
Nickel	2.10E-06	2.94E-05	1.29E-04
Selenium	2.40E-08	3.36E-07	1.47E-06
POM [4]	8.82E-08	1.23E-06	5.41E-06
Arsenic	2.00E-07	2.80E-06	1.23E-05
Beryllium	1.20E-08	1.68E-07	7.36E-07
Cadmium	1.10E-06	1.54E-05	6.75E-05
Mercury	2.60E-07	3.64E-06	1.59E-05
Total		**2.64E-02**	**1.16E-01**

[1] Emission factors were calculated using Reference 11 in footnote a of U.S. EPA, AP-42, Section 1.4, Table 1.4-1. The fuel gas higher heating value of 1000 Btu/scf is used to convert from emission factors from lb/MMscf to lb/MMBtu.
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998. Pb emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-2, July 1998.
[3] Heating duty for fuel gas (btu/scf) = 1000
[4] Per U.S. EPA, AP-42, Section 1.4, Table 1.4-3, constituents categorized as Polycyclic Organic Matter (POM) are HAPs. The emission factor used in this spreadsheet represents the combined emission factors for the constituents listed in Table 1.4-3 identified as POMs.

Boiler PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

Unit: 2
Description: 12 MMBtu/hr Hurst Boiler

Boiler Fuel Usage

Fuel Consumption	12.00	MMBtu/hr	Input heat rate
Fuel heat value	1000	Btu/scf	
Hourly fuel usage	12.00	Mscf/hr	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel Heating Value (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	288.00	Mscf/d	Throughput
Annual fuel usage	105.12	MMscf/yr	Annual usage
Operating hours	8760	hr/yr	

NO_x [1]	CO	VOC	SO_2	PM		
0.72					lb/hr	Stack Test Data
	84	5.5	0.6	7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.72	**1.01**	**0.066**	**0.0072**	**0.091**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
3.15	**4.42**	**0.29**	**0.032**	**0.40**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

n-Hexane	Benzene	Toluene	e-Benzene	m-Xylene	HCHO	Total HAPs [2]		
1.80	0.0021	0.0034	-	-	0.075		lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.022	**2.52E-05**	**4.08E-05**	**-**	**-**	**9.00E-04**	**0.023**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
0.09	**1.10E-04**	**1.79E-04**	**-**	**-**	**3.94E-03**	**0.099**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] lb/hr values are based on stack test data plus 15% safety factor
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998.

Proposed HAP Emissions for the Boiler [1]

Constituent	Emission Factor [2,3,4] (lb/MMBtu)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Pb	5.00E-07	6.00E-06	2.63E-05
Benzene	2.10E-06	2.52E-05	1.10E-04
Formaldehyde	7.50E-05	9.00E-04	3.94E-03
Hexane	1.80E-03	2.16E-02	9.46E-02
Naphthalene	6.10E-07	7.32E-06	3.21E-05
Toluene	3.40E-06	4.08E-05	1.79E-04
Cobalt	8.40E-08	1.01E-06	4.42E-06
Chromium	1.40E-06	1.68E-05	7.36E-05
Manganese	3.80E-07	4.56E-06	2.00E-05
Nickel	2.10E-06	2.52E-05	1.10E-04
Selenium	2.40E-08	2.88E-07	1.26E-06
POM [4]	8.82E-08	1.06E-06	4.64E-06
Arsenic	2.00E-07	2.40E-06	1.05E-05
Beryllium	1.20E-08	1.44E-07	6.31E-07
Cadmium	1.10E-06	1.32E-05	5.78E-05
Mercury	2.60E-07	3.12E-06	1.37E-05
Total		**2.26E-02**	**9.92E-02**

[1] Emission factors were calculated using Reference 11 in footnote a of U.S. EPA, AP-42, Section 1.4, Table 1.4-1. The fuel gas higher heating value of 1000 Btu/scf is used to convert from emission factors from lb/MMscf to lb/MMBtu.
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998. Pb emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-2, July 1998.
[3] Heating duty for fuel gas (btu/scf) 1000
[4] Per U.S. EPA, AP-42, Section 1.4, Table 1.4-3, constituents categorized as Polycyclic Organic Matter (POM) are HAPs. The emission factor used in this spreadsheet represents the combined emission factors for the constituents listed in Table 1.4-3 identified as POMs.

Hot Oil Heater PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

Unit: 3
Description: 14.7 MMBtu/hr Hot Oil Heater

Heater Fuel Usage

Fuel Consumption	14.70	MMBtu/hr	Input heat rate
Fuel heat value	1000	Btu/scf	
Hourly fuel usage	14.70	Mscf/hr	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel Heating Value (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	352.80	Mscf/d	Throughput
Annual fuel usage	128.77	MMscf/yr	Annual usage
Operating hours	8760	hr/yr	

NO_x [1]	CO	VOC	SO_2	PM		
0.30					lb/hr	Stack Test Data
	84	5.5	0.6	7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.30	**1.23**	**0.081**	**0.0088**	**0.11**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
1.33	**5.41**	**0.35**	**0.039**	**0.49**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

n-Hexane	Benzene	Toluene	e-Benzene	m-Xylene	HCHO	Total HAPs [2]		
1.80	0.0021	0.0034	-	-	0.075		lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,000 Btu/scf)
0.026	**3.09E-05**	**5.00E-05**	**-**	**-**	**1.10E-03**	**0.028**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
0.12	**1.35E-04**	**2.19E-04**	**-**	**-**	**4.83E-03**	**0.12**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton

[1] lb/hr values are based on stack test data plus 15% safety factor
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998.

Proposed HAP Emissions for the Heater [1]

Constituent	Emission Factor [2,3,4] (lb/MMBtu)	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
Pb	5.00E-07	7.35E-06	3.22E-05
Benzene	2.10E-06	3.09E-05	1.35E-04
Formaldehyde	7.50E-05	1.10E-03	4.83E-03
Hexane	1.80E-03	2.65E-02	1.16E-01
Naphthalene	6.10E-07	8.97E-06	3.93E-05
Toluene	3.40E-06	5.00E-05	2.19E-04
Cobalt	8.40E-08	1.23E-06	5.41E-06
Chromium	1.40E-06	2.06E-05	9.01E-05
Manganese	3.80E-07	5.59E-06	2.45E-05
Nickel	2.10E-06	3.09E-05	1.35E-04
Selenium	2.40E-08	3.53E-07	1.55E-06
POM [4]	8.82E-08	1.30E-06	5.68E-06
Arsenic	2.00E-07	2.94E-06	1.29E-05
Beryllium	1.20E-08	1.76E-07	7.73E-07
Cadmium	1.10E-06	1.62E-05	7.08E-05
Mercury	2.60E-07	3.82E-06	1.67E-05
	Total	**2.77E-02**	**1.22E-01**

[1] Emission factors were calculated using Reference 11 in footnote a of U.S. EPA, AP-42, Section 1.4, Table 1.4-1. The fuel gas higher heating value of 1000 Btu/scf is used to convert from emission factors from lb/MMscf to lb/MMBtu.
[2] HAP emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-3 and 1.4-4, July 1998. Pb emission factors are from U.S. EPA, AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-2, July 1998.
[3] Heating duty for fuel gas (btu/scf) 1000
[4] Per U.S. EPA, AP-42, Section 1.4, Table 1.4-3, constituents categorized as Polycyclic Organic Matter (POM) are HAPs. The emission factor used in this spreadsheet represents the combined emission factors for the constituents listed in Table 1.4-3 identified as POMs.

Unit 1

Parameters	Value	Unit	Note
Firing Rate	14.00	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	14.00	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	122.64	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Input heat rate	14.00	MMBtu/hr	
Exhaust temp	350.5	°F	Stack Test Data
Stack height	35	ft	Site Specific
Stack diameter	1.96	ft	Site Specific
Exhaust flow (Actual)	4352	acfm	Stack Test Data
Exhaust flow (Actual)	72.53	acfs	Stack Test Data
Exhaust velocity	24.10	ft/sec	Stack Test Data
O_2 %	3	%	Stack Test Data
NO_X	44.4	ppmv	Stack Test Data
NO_X	0.7	lb/hr	Stack Test Data
Safety Factor	15%	%	Assumed
Total NO_X	0.805	lb/hr	Stack Test Data

Unit 2

Parameters	Value	Unit	Note
Firing Rate	12.00	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	12.00	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	105.12	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Input heat rate	12.00	MMBtu/hr	
Exhaust temp	391.6	°F	Stack Test Data
Stack height	35	ft	Site Specific
Stack diameter	1.63	ft	Site Specific
Exhaust flow (Actual)	5065	acfm	Stack Test Data
Exhaust flow (Actual)	84.41	acfs	Stack Test Data
Exhaust velocity	40.70	ft/sec	Stack Test Data
O_2 %	3	%	Stack Test Data
NO_X	49.22	ppmv	Stack Test Data
NO_X	0.625	lb/hr	Stack Test Data
Safety Factor	15%	%	Assumed
Total NO_X	0.71875	lb/hr	Stack Test Data

Unit 3

Parameters	Value	Unit	Note
Firing Rate	14.70	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	14.70	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	128.77	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Input heat rate	14.70	MMBtu/hr	
Exhaust temp	368.4	°F	Stack Test Data
Stack height	26	ft	Site Specific
Stack diameter	1.63	ft	Site Specific
Exhaust flow (Actual)	2035	acfm	Stack Test Data
Exhaust flow (Actual)	33.91	acfs	Stack Test Data
Exhaust velocity	16.40	ft/sec	Stack Test Data
O_2 %	3	%	Stack Test Data
NO_X	32.47	ppmv	Stack Test Data
NO_X	0.265	lb/hr	Stack Test Data
Safety Factor	15%	%	Assumed
Total NO_X	0.30475	lb/hr	Stack Test Data

Unit 1 - 14 MMBtu/hr Aztec, Superior Boiler

Parameters	Value	Unit	Note
Input heat rate	14.00	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	14.00	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	122.64	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Exhaust temp	350.50	°F	Stack Test Data
Stack height	35.00	ft	Site Specific
Stack diameter	1.96	ft	Site Specific
Exhaust flow (Actual)	4352	acfm	Stack Test Data
Exhaust flow (Actual)	72.53	acfs	Stack Test Data
Exhaust velocity	24.10	ft/sec	Stack Test Data

Unit 2 - 12 MMBtu/hr Hurst Boiler

Parameters	Value	Unit	Note
Input heat rate	12.00	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	12.00	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	105.12	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Exhaust temp	391.60	°F	Stack Test Data
Stack height	35.00	ft	Site Specific
Stack diameter	1.63	ft	Site Specific
Exhaust flow (Actual)	5065	acfm	Stack Test Data
Exhaust flow (Actual)	84.41	acfs	Stack Test Data
Exhaust velocity	40.70	ft/sec	Stack Test Data

Unit 3 - 14.7 MMBtu/hr Hot Oil Heater

Parameters	Value	Unit	Note
Input heat rate	14.70	MMBtu/hr	MFG Data
Fuel heat value	1,000.00	Btu/scf	Estimated, nominal
Fuel rate	14.70	Mscf/hr	Input heat rate / fuel heat value
Annual fuel usage	128.77	MMscf/yr	8760 actual hrs/yr operation

Parameters	Value	Unit	Note
Exhaust temp	368.40	°F	Stack Test Data
Stack height	26.00	ft	Site Specific
Stack diameter	1.63	ft	Site Specific
Exhaust flow (Actual)	2,035	acfm	Stack Test Data
Exhaust flow (Actual)	33.91	acfs	Stack Test Data
Exhaust velocity	16.40	ft/sec	Stack Test Data

Asphalt Tank PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

Site Tank ID:	Tank #8	Tank #9	Tank #5	Tank #501	Tank #502	Tank #503	Tank #7	Tank #504	Maximum Values
Mixture Type:	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt
Contents of Tank:	AC	AC	AC	AC	AC	AC	AC	AC	-
Tank Type (Vertical or Horizontal):	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	-
Heated (Yes or No):	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
Diameter (ft):	60.00	24.00	21.50	34.00	34.00	35.00	12.00	35.00	-
Effective Diameter (ft):	60.00	24.00	21.50	34.00	34.00	35.00	12.00	35.00	-
Shell Height or Length (ft):	40.00	36.00	24.00	32.00	32.00	36.00	37.00	36.00	-
Nominal Capacity (gal): [1]	836,321	122,388	64,974	196,668	219,018	259,056	30,924	259,056	**1,988,405**
Annual Throughput (gal/yr): [2]	46,820,000.00	46,820,000.00	46,820,000.00	46,820,000.00	46,820,000.00	46,820,000.00	46,820,000.00	46,820,000.00	**46,820,000**
Average Liquid Height (ft):	20.00	18.00	12.00	16.00	16.00	18.00	18.50	18.00	-
Maximum Liquid Height (ft):	40.00	36.00	24.00	32.00	32.00	36.00	37.00	36.00	-
Roof Type (Cone or Dome):	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	-
Tank Roof Cone Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	-
Dome Tank Roof Radius (ft):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Dome Tank Roof Height (ft):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
Roof Outage (ft):	0.625	0.250	0.224	0.354	0.354	0.365	0.125	0.365	-
Vapor Space Outage (ft):	20.63	18.25	12.22	16.35	16.35	18.36	18.63	18.36	-
Vapor Space Volume (ft^3):	58,315.81	8,256.11	4,437.91	14,848.28	14,848.28	17,668.80	2,106.44	17,668.80	-
Daily Minimum Liquid Temperature (F):	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	-
Daily Maximum Liquid Temperature (F):	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	-
Dailey Average Liquid Temperature (F):	325.00	325.00	325.00	325.00	325.00	325.00	325.00	325.00	-
Daily Total Solar Insolation Factor (Btu/ft2/day):	1,765.00	1,765.00	1,765.00	1,765.00	1,765.00	1,765.00	1,765.00	1,765.00	-
Tank Paint Solar Absorbance:	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	-
Daily Vapor Temperature Range (R): [3]	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	-
Type of Substance (Organic or Petroleum):	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	-
Vapor Molecular Weight (lb/lbmol):	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	-
Antoine's Coefficient A:	4.2709	4.2709	4.2709	4.2709	4.2709	4.2709	4.2709	4.2709	-
Antoine's Coefficient B:	1,276.03	1,276.03	1,276.03	1,276.03	1,276.03	1,276.03	1,276.03	1,276.03	-
Antoine's Coefficient C (Organic Only):	160.46	160.46	160.46	160.46	160.46	160.46	160.46	160.46	-
Vapor Pressure at Avg. Liq. Surf. Temp. (psia):	0.0407	0.0407	0.0407	0.0407	0.0407	0.0407	0.0407	0.0407	-
Vapor Pressure at Min. Liquid Surf. Temp. (psia):	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	-
Vapor Pressure at Max. Liquid Surf. Temp. (psia):	0.0592	0.0592	0.0592	0.0592	0.0592	0.0592	0.0592	0.0592	-
Vapor Density (lb/ft^3): [4]	0.000918	0.000918	0.000918	0.000918	0.000918	0.000918	0.000918	0.000918	-
Daily Vapor Pressure range (psi):	0.032126	0.032126	0.032126	0.032126	0.032126	0.032126	0.032129	0.032126	-
Breather Vent Pressure Setting (psig):	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-
Breather Vent Vacuum Setting (psig):	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-
Breather Vent Pressure Setting Range (psi):	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-
Ambient Pressure (psia):	12.15	12.15	12.15	12.15	12.15	12.15	12.15	12.15	-
Vapor Space Expansion Factor:	0.0929	0.0929	0.0929	0.0929	0.0929	0.0929	0.0929	0.0929	-
Vented Vapor Saturation Factor: [5]	0.957	0.962	0.974	0.966	0.966	0.962	0.961	0.962	-
Annual Turnovers: [6]	62.2037	425.0598	800.6621	264.5180	237.5249	200.8146	1,682.2605	200.8146	-
Turnover Factor: [7]	0.6490	0.2372	0.2041	0.2801	0.2930	0.3161	0.1845	0.3161	-
Working Loss Product Factor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
Standing Storage Losses (lb/yr): [8]	**1,739.50**	**247.49**	**134.72**	**446.85**	**446.85**	**529.52**	**63.10**	**529.52**	**1,739.50**
Working Losses (lb/yr): [9]	**5,594.31**	**2,045.17**	**1,759.75**	**2,414.44**	**2,525.55**	**2,724.58**	**1,590.62**	**2,724.58**	**5,594.31**
Total Losses (lb/yr):	**7,333.82**	**2,292.66**	**1,894.47**	**2,861.29**	**2,972.40**	**3,254.10**	**1,653.72**	**3,254.10**	**7,333.82**
Total Losses (ton/yr):	**3.67**	**1.15**	**0.95**	**1.43**	**1.49**	**1.63**	**0.83**	**1.63**	**3.67**
Total Losses (lb/hr): [10]	**12.06**	**3.77**	**3.12**	**4.71**	**4.89**	**5.35**	**2.72**	**5.35**	**12.06**
H_2S W&S Losses (ton/yr): [11]	**2.93E-05**	**9.17E-06**	**7.58E-06**	**1.14E-05**	**1.19E-05**	**1.30E-05**	**6.61E-06**	**1.30E-05**	**2.93E-05**
H_2S W&S Losses (lb/hr): [11]	**6.70E-06**	**2.09E-06**	**1.73E-06**	**2.61E-06**	**2.71E-06**	**2.97E-06**	**1.51E-06**	**2.97E-06**	**6.70E-06**

References:

1.) Values obtained from the Spill Containment, Control, and Countermeasure (SPCC) Plan for the facility.

2.) Annual tank throughputs calculated by apportioning the total permitted throughput (46,820,000 gal/yr from permit# 0051-M1-3TR) by the capacity of each tank.

3.) Daily Vapor Temperature Range calculated using Equation 1-8 from EPA's AP-42, Section 7.1.

4.) Vapor Density calculated using Equation 1-21 from EPA's AP-42, Section 7.1.

5.) Vented Vapor Saturation Factor calculated using Equation 1-20 from EPA's AP-42, Section 7.1.

6.) Annual Turnovers calculated by dividing annual throughput by 90% of the nominal tank capacity.

7.) Turnover Factor calculated using equation from Section 7.1 of EPA's AP-42.

8.) Standing Losses calculated using Equation 1-2 from EPA's AP-42, Section 7.1.

9.) Working Losses calculated pursuant to Equation 1-29 of EPA's AP-42, Section 7.1.

10.) Hourly emissions are based on the maximum hourly throughput of 77,000 gal/hr. A ratio of this maximum value and the hourly value assuming 8760 hrs was used: Max lb/hr = lb/yr / (8760 hr/yr) * [(77,000 gal/hr) / (46,820,000 gal/yr / 8760 hr/yr)]

11.) H_2S emissions are calculated by multiplying the total tank losses by the H_2S percentage: (8 ppm/10^6) = 0.0008%. H_2S lb/hr = Total Losses (lb/hr) * 0.0008% H_2S and H_2S (tpy) = Total Losses (tpy) * 0.0008% H_2S

Loading Rack PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

Product Specific Emission Factors:

Loading Method (Mode of Operation):	Splash
Saturation factor, S, from AP-42, Table 5.2-1:	1.45
Loading Control Efficiency (%):	0
True vapor pressure of the product being loaded (psia):	0.0407
Molecular weight of the product vapors (lb / lbmol):	190
Temperature of the product being loaded (degrees F):	350
Loading Loss Emission Factor (lbs / kgal)[1]:	0.172

[1] Loading Loss Equation AP-42 Section 5.2 = 12.46 *SPM/T * (1-eff/100)

S Saturation Factor, S (from AP-42, Table 5.2-1)
P True vapor pressure of the product being loaded (psia):
M Molecular weight of the product vapors (lb / lbmol):
T Temperature of the product being loaded (converted to degrees R):
eff Loading Control Efficiency (%):

Saturation Factor, S (from AP-42, Table 5.2-1)
Splash Loading, 1.45
Submerged Loading, 0.6

Units	Asphalt Loaded	Asphalt Loaded	Total Loading	VOC Emissions		
	(gal/yr)[1]	(gal/hr)[2]	(kgal/yr)	(lbs/hr)	(lbs/yr)	(tons/yr)
LR-1 and LR-2	46,820,000	12,600	46820.00	2.17	8075.70	4.04

1.) Annual throughput based on maximum requested facility-wide annual value.

2.) Hourly throughput based on assumption that 2 trucks could be loaded per loading rack over the course of an hour with a capacity of 6,300 gal per truck.

Tank and Loading Rack H_2S Calculations

Western Refining - Albuquerque Asphalt Terminal

Basis: These calculations use an assumed H_2S concentration, MW, temperature, density and throughput to calculate emissions associated with product offloading (either railcar or truck) as well as truck loading**.**
The higher of the product loading throughputs (i.e., 77,000 gal/hr for railcar instead of 25,200 gal/hr for truck) was used to estimate hourly emissions as a conservative assumption.

Source	H_2S Concentration [1] (ppm)	Pressure (atm)	Molecular Weight H_2S (lb/lbmol)	Asphalt Temperature (R)	H_2S Density [2] (lb/ft^3)
Product Offloading Into Tanks	8	1	34	809.67	4.60E-07
Loading Racks 1 and 2	10	1	34	809.67	5.75E-07

Units	Annual Total Throughput (gallons)	Hourly Throughput (gallons)	Annual Total Airflow[3] (ft^3)	Hourly Total Airflow[3] (ft^3)	H_2S Emissions[4] (lb/yr)		H_2S Emissions (tpy)		H_2S Emissions (lb/hr)	
					Asphalt Tanks	Loading Racks	Asphalt Tanks	Loading Racks	Asphalt Tanks	Loading Racks
Product Offloading Into Tanks	46,820,000	77,000	6,258,944.42	10,293.44	2.88	-	0.0014	-	0.0047	-
Loading Racks 1 and 2	46,820,000	12,600	6,258,944.42	1,684.38	-	3.60	-	0.0018	-	0.00097

[1] Concentration of H_2S in tank and loading rack air (based on site specific maximum concentrations).

[2] H_2S Density calculated using ideal gas law, as follows:

(Equation 1) $C = V_{H2S} / V_{AIR}$ **Where:**

(Equation 2) $P \times V_{H2S} = n_{H2S} \times R \times T$ C = Concentration

V = Volume

P = pressure (atm)

n_{H2S} = number of moles of H_2S, or the mass of H_2S divided by the molecular weight (m_{H2S}/MW_{air})

R = universal gas constant = 0.73 atm-lbmol / R-ft^3

T = tank or loading rack air temperature, R

(Equation 3) $C = (n_{H2S} \times R \times T) / (P \times V_{air})$ (Solve Equation 2 for V_{H2S} and insert into Equation 1)

(Equation 4) $C = (m_{H2S} \times R \times T) / (MW_{H2S} \times P \times V_{air})$ (Replace n_{H2S} with mass divided by molecular weight)

(Equation 5) $m_{H2S} / V_{air} = C \times ((MW_{H2S} \times P) / (R \times T))$ (Solve Equation 4 for H_2S density)

[3] Airflow out of any tank or during loading only occurs when the tanks or trucks are being filled (the tanks/trucks are not pressurized).

The total airflow out of the tank or truck during filling is assumed to be equal to the total volume of asphalt placed into the tank and can be calculated as follows:

Total Asphalt Volume (ft^3) = Total Gallons of Asphalt [Gallons] x 0.133681 [ft^3/gallon]

[4] Total H_2S emissions are calculated as follows:

Total H_2S Emissions (lb) = H_2S Density (lb/ft^3) x Total Airflow (ft^3)

Railcar Unloading PTE Calculations

Western Refining - Albuquerque Asphalt Terminal

Basis: Using the Ideal Gas Law**,** PV=nRT, the volume change realized when the product is heated at atmospheric pressure can be used to calculate the mass forced out by the expansion. The calculated mass is adjusted for the vapor pressure of material in the vapor phase. These calculations take into account the vapor released once the railcar dome lid is opened. Per facility SOP, raiclar dome lids are kept closed during the railcar steaming process to reduce emissions to atmosphere.

$$P_L * V = n * R * T$$

Symbol	Description	Value	Units	Formula
P_M =	atm, or operating pressure	12.15	(psi)	given for site
P_L =	Vapor pressure of pure chemical	0.0407	(psi)	P_L = (10^((-0.05223*A/T)+B))*0.019337
MW =	Vapor molecular weight	190.00	(lb/lb-mole)	given
R =	Gas constant	10.726	(psi*ft^3/lb-mole)	constant
T_2 =	Temp of heated prod.	330	(degrees F)	given
T_1 =	Temp of incoming prod.	70	(degrees F)	given

2. Operating Data and Calculations

Vessels heated per year =	3,285	Volume of material heated (gallons/yr) =	**46,820,000**
Max Vessels heated/day =	9	(based on number of rail spots and switching frequency - assumes all 9 could be unloaded in an hour)	
Railcar heating time (hrs)=	24.0		
Vessels Nominal Capacity (gal) =	22,000	Change in Volume, V (cubic feet) =	464.27
Vessel Shell Capacity (gallons) =	29,080	Molar Mass of expelled vapor, n (lb-mol/RR car heated) = (lbs/Vessel heated) =	126.49
Orig. Vapor Space Vol. (cu.ft.) = (prior to heating)	946.40	Mass loss from mix in vapor space, m_L (lbs/Vessel heated) =	0.4237
Volume After Heating (cu.ft.) = (at max temp.)	1410.67		

Pound VOC/yr =	**1,391.85**
Tons VOC/yr =	**0.696**
Max. VOC lbs/hr =	**3.81**
H_2S mass expelled assuming 47 ppm, (lb/RR car heated) =	**0.00068**
Tons H_2S/yr =	**0.0011**
Maximum Emission assuming total release in one hour, H_2S lb/hr =	**0.0061**

Typical Railcar Dimensions

Calculated Volume:	29,080	gallons
Nominal Load:	22,000	gallons

Truck Offloading PTE Calculations

Western Refining - Albuquerque Asphalt Terminal

Tanker trucks deliver asphalt feedstock to the facility. Upon arrival at the unloading point, a drain line is attached to the bottom of the tank, the upper hatch is opened to maintain near ambient pressure in the tank, and the drain pump is started to remove the tank contents. Upon opening the tank hatch, there are emissions of vapors from the head space in the tank but once the pumping starts, the tank is at a pressure slightly negative to ambient which results in no emissions from the tank. This calculation estimates emissions during the period when the tank hatch is open and before pumping starts. It is assumed that the bulk of the emissions occur in the short interval of pressure equilibration when the hatch is opened. Pumping is initiated within several minutes of opening and the standing losses during this time are assumed to be neglible.

Basis: Using the Ideal Gas Law**,** PV=nRT, the pressure change realized in the vapor head space when the hatch is opened can be used to estimate the mass loss.

$$P_L * V = n * R * T$$

Symbol	Description	Value	Units	Formula
P_M =	atm, or operating pressure	12.15	psi	given for site
P_L =	vapor pressure of pure chemical	0.0407	psi	$P_L = (10^{((-0.05223*A/T)+B)})*0.019337$
MW =	vapor molecular weight	190.00	lb/lb-mole	given
P_A	Ambient pressure	12.15100	psia	given for site
P_O	Over-pressure	0.03125	psia	1/2 oz/in2 overpressure[1]
P_I =	Initial tank pressure	12.18225	psia	$P_I = P_A + Po$
MW =	VOC vapor molecular weight	190.00	lb/lb-mole	given
P_L=	Partial pressure, VOC	0.0207	psia	$PL = (10^{((-0.05223*A/T)+B)})*0.019337$
R =	gas constant	10.726	psi*ft^3/lb-mole	constant
T=	temp of incoming product	330	degrees F	design
V =	Vapor head space	160.42	cubic feet	Nominal head space
n_I=	vapor mass in head space	0.414	moles	$n_I = P_I*V/R*T$ + Safety Factor
n_2=	vapor mass in head space after hatch opened	0.413	moles	$n_2 = P_A*V/R*T$+ Safety Factor
n	total mass released on hatch opening	0.00106	moles	$n = n_I - n_2$
n_L =	VOC mass loss	1.81111E-06	moles	$n_L = n * P_L/P_A$; Raoult's Law
n_{LVOC} =	mass loss, VOC	3.44E-04	lbs.	$n_{LVOC} = n_L * MW$
C_{H2S}	H_2S concentration in head space vapor	10	ppmv	Conservative Assumption
VOC	VOC emissions per truck	3.44E-04	lbs/truck	m_{LVOC}
H_2S	H_2S emissions per truck	3.62E-07	lbs/truck	$H_2S = n*C_{H2S}/10^6*MW_{H2S}$

2. Operating Data and Calculations

Trucks unloaded per hour	4		
VOC Emissions	1.38E-03	lb/hr	events/hr* H_2S
H_2S emissions	1.45E-06	lb/hr	events/hr* H_2S
Tanker load	6,300	gallons	typical
Base annual unloading throughput	46,820,000	gal/yr	Permit limit
Trucks unloaded per year	7,432	trucks/yr	Permit limit/Tanker Capacity

Lbs VOC/hr =	**1.38E-03**
Tons VOC/yr =	**1.28E-03**
Lbs H_2S/hr =	**1.45E-06**
Tons H_2S/yr =	**1.35E-06**

[1] The over-pressure represents the pressure difference that potentially is generated between the time of loading and unloading.The over-pressure arises as a result

Typical Tanker Dimensions

Nominal Capacity	7,500	gallons	
Normal load	6,300	gallons	
Calculated head space	1,200	gallons	
	160.4166667	ft^3	Conversion gal > ft3
Safety Factor	180%		

Pipeline Fugitives PTE Calculations
Western Refining - Albuquerque Asphalt Terminal

	Fugitive VOC Emissions	Re: Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017, Table(s) 2-2, 2-3 & 2-4)							
	Source	**Pump Seals**	**Valves**	**Connectors**	**Flanges**	**Open-Ended Lines**	**Others[1]**	**VOC Emission Rate (lb/hr)**	**VOC Emission Rate (tpy)**
1	**Gas**								
	Quantity	0	393	0	264	24	30		
	Emissions Fa (kg/hr-source)	6.50E-05	1.30E-05	4.20E-05	4.20E-05	0.0023	1.20E-04		
	Emissions Fa (lb/hr-source)	1.43E-04	2.87E-05	9.26E-05	9.26E-05	5.07E-03	2.65E-04		
	Emissions (lbs/hr)	**0.00E+00**	**1.13E-02**	**0.00E+00**	**2.44E-02**	**1.22E-01**	**7.94E-03**	**0.17**	**0.72**
2	**Light Liquid[2]**								
	Quantity	0	0	0	0	0	0		
	Emissions Fa (kg/hr-source)	5.40E-04	4.30E-05	8.00E-06	8.00E-06	2.30E-03	1.30E-04		
	Emissions Fa (lb/hr-source)	1.19E-03	9.48E-05	1.76E-05	1.76E-05	5.07E-03	2.87E-04		
	Emissions (lbs/year)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
3	**Heavy Liquid (<20 API Gravity)**								
	Quantity	63	1275	36	1446	0	150		
	Emissions Fa (kg/hr-source)	5.40E-04	4.30E-05	8.00E-06	8.00E-06	2.30E-03	1.30E-04		
	Emissions Fa (lb/hr-source)	1.19E-03	9.48E-05	1.76E-05	1.76E-05	5.07E-03	2.87E-04		
	Emissions (lbs/year)	**7.50E-02**	**1.21E-01**	**6.35E-04**	**2.55E-02**	**0.00E+00**	**4.30E-02**	**0.26**	**1.16**
	FACILITY-WIDE ANNUAL FUGITIVE VOC EMISSIONS							***0.43***	***1.88***
	FACILITY-WIDE ANNUAL FUGITIVE H_2S EMISSIONS			***Assume***	***0.0047%***	***mol% H_2S[3]***		***2.02E-05***	***8.86E-05***

[1] The "other" equipment type was derived from instruments, loading arms, pressure relief valves, stuffing boxes, and vents. This "other" equipment type should be applied to any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

[2] All components in liquid service are represented under heavy liquid service.

[3] Based on conservative assumption of 47 ppm H_2S.

2.5 Supporting Information

AP-42 Tables 1.4-1 and 1.4-2: Emission Factors for Natural Gas Combustion

Boiler and Hot Oil Heater Stack Test Data

AP-42 Section 5.2: Transporting and Marketing of Petroleum Liquids

AP-42 Section 7.1: Organic Liquid Storage Tanks

EPA Protocol for Equipment Leak Emission Estimates

Scrubber Manufacturer Specifications

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_X emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_X emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 \text{ scf}] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, 4.2×10^4 $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylcholanthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D
74-98-6	Propane	1.6E+00	E

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

[b] Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

Stack Test Data
Units 1-3

Pursuant to the stack testing protocol submitted on July 16, 2021, stack tests were completed for Units 1-3 on Monday, August 2, and Tuesday, August 3, 2021. The units were tested at their current maximum operating conditions. The most conservative values from these stack tests (lowest exit velocity and exhaust temperature) were utilized in the air dispersion modeling and a 15% safety factor was applied to emissions.

COMPLIANCE TEST REPORT

FROM THREE:

NATURAL GAS FIRED BOILERS (UNIT #1, 2, & 3)

IN SERVICE AT:

MARATHON PETROLEUM'S
ALBUQUERQUE ASPHALT TERMINAL

PREPARED FOR:

MARATHON PETROLEUM

CITY OF ALBUQUERQUE ENVIRONMENTAL HEALTH DEPARTMENT -
AIR QUALITY PROGRAM
AIR QUALITY PERMIT NUMBER 0051-M1-3TR

TEST DATES:

AUGUST 2-3, 2021

PREPARED BY:

COMPLIANCE SERVICES AND TESTING

PROJECT NUMBER:

2039

COMPLIANCE SERVICES & TESTING

P.O. Box 94191-87199
7108 Washington St. NE
Suite A
Albuquerque, NM 87109
(505) 681-4909 Phone
www.comptesting.com

TABLE OF CONTENTS

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I. INTRODUCTION

A. Reasons for Conducting Test:

Exhaust emissions from a three natural gas fired boilers located at the Marathon Petroleum's Albuquerque Terminal were tested to quantify the criteria pollutants of NO_X and CO) released to the atmosphere and determine compliance with the permitted emission limits. The testing was conducted to demonstrate continual permit compliance.

B. Applicable Regulation and Permit:

The applicable regulation is Title 20, New Mexico Administrative Code, Chapter 11, Part 41 (20.11.41 NMAC) – Authority-To-Construct. The applicable permit is Air Quality Permit #0051-M1-3TR and was issued on March 9, 2018, by the City of Albuquerque Environmental Health Department Air Quality Program to Western Refining Terminals, LLC.

C. Date of Test:

The testing was conducted on August 2-3, 2021.

D. Startup Date & E. Date of Achievement of Maximum Production Rate:

The boiler startup dates are not available.

F. Description of Plant Process and Sampling Points:

The function of these sources is to provide heat in the form of steam and to heat oil for operations at the plant. Units 1 and 2 are boilers and 3 is a hot oil heater. The gaseous and moisture sampling took place from stainless-steel probes placed into the exhaust stack in Method 1 compliant exhaust ports. A stratification test was performed before the first test run began to ensure that a homogeneous portion of the exhaust was being sampled. No stratification above the threshold of 5% was observed so all sampling was from the stack centroid. The 16 velocity readings from the exhaust stack were taken from 2 ports in the general location of the gaseous sampling port.

G. Company Name, Contact Person, Mailing Address:
Marathon Petroleum is the owner of this facility. The contact person is:

Gill Valenzuela
Terminal Manager
2030 2nd Street SW
Albuquerque, NM 87102
Telephone: (505) 843-9414
Email: cbhall4@gvalenzuela@marathonpetroleum.com

H. Facility Name and Location:
The facility was named Albuquerque Asphalt Terminal by Western Refining Terminals, LLC. Marathon Petroleum is requesting the facility to be called Albuquerque Terminal. The facility is located 35.065353N, -106.652200W.

I. Name of Testing Organization, Contact Person:
The project manager for the testing firm of Compliance Services and Testing (CST) is:

Chris Spencer
Compliance Services and Testing
7108 Washington NE, Ste. A
Albuquerque, New Mexico 87109
Telephone: (505) 681-4909
Email: cspencer@comptesting.com

Field Test Participants Sign In Sheet

Job Name: MARATHON OIL COMPANY **DATE(S):** 08-02-2021

Job Number: 2276 **PERMIT #:**

Plant Name/Location: ABQ TERMINAL

Emission Source(s): 2 BOILER, 1 HOT OIL HEATER

PARTICIPANTS:

Compliance Services and Testing	Test Contractor
MARATHON OIL	Owner/Operator
CABQ - AQB	Regulatory Agency
	Regulation

Print Name:	Affiliation:	Position:	Phone Number:
CHRIS SPENCER	CST	D&R	505-681-4909
JAKE ANDERSON	"	TECH	"
EFREN ALVARADO	"	TECH	"
Gilbert Valenzuela	MPC	TM	424 386 8611
Margaret Garza	MPLX	Env. Prof.	480-532-1434

K. Unit Description and Design Capacity:
Unit #1 is an Aztec/Superior Boiler (designated as Superior) 5-X-1506 model which bears the serial number 12237. It is rated at 14 MMBtu/hr.

Unit #2 is a Hurst Boiler Series 400 model which bears the serial number 51545-200-1 and is rated at 12 MMBtu/hr.

Unit #3 is an AZ Boiler PX-120 model which bears the serial number 15134 and is rated at 14.7 MMBtu/hr. Unit #3 equipment heats oil in lieu of water and is recognized as a Hot Oil Heater, but the process is the same as Units 1 and 2.

L. Control Equipment Description:
There is no control equipment in use.

II. A-D. Summary of Results - Unit #1
Operational Data, Concentrations, Exhaust Flow Rates, Mass Emission Rates, and Comparison to Modeled and Measured Parameters

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Superior Aztec Boiler SN: 12237
Engine Site Rating: 14 MMBtu/hr
Technician: CS, EA, JA

Test Run Number	***1***	***2***	***3***	
Unit Number	**1**	**1**	**1**	
Date	8/3/21	8/3/21	8/3/21	
Start Time	12:10	13:20	14:30	
Stop Time	13:10	14:20	15:30	
Boiler Operational Parameters				***Average***
Load (%)	68.1	68.1	68.1	**68.1**
Firing Rate (MMBtu/hr)	9.5	9.5	9.5	**9.5**
Steam Pressure (psig)	123	123	123	**123.0**
Exhaust Temperature (°F)	373	373	373	**373.0**
Fuel Data				
Gas Fuel Supply Pressure (psig)	22	22	22	**22.0**
Measured Fuel Consumption (SCFD)	83608	83608	83608	**83608.0**
Calculated Fuel Consumption (SCFH)	3483.7	3483.7	3483.7	**3483.7**
O2 F-Factor (DSCF/MMBtu, HHV basis)	8643	8643	8643	**8643**
Fuel Heating Value (Btu/SCF, HHV)	1022	1022	1022	**1022**
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8500	8500	8500	**8500**
Ambient Conditions				
Pressure Altitude (MSL)	4780	4780	4780	**4780.0**
Atmospheric Pressure ("Hg)	25.13	25.13	25.13	**25.13**
Dry Bulb Temperature (°F)	89.2	94.7	95.2	**93.03**
Wet Bulb Temperature (°F)	66.9	68.4	70.0	**68.43**
Humidity (lb/lb air)	0.0113	0.0112	0.0125	**0.0117**
Measured Exhaust Emissions (Instrument Drift Corrected)				
NOx (ppmv)	37.01	37.99	39.09	**38.03**
NOx (ppmv @ 3% O2)	44.40	43.51	44.38	**44.10**
CO (ppmv)	4.67	3.89	4.32	**4.29**
CO (ppmv @ 3% O2)	5.60	4.45	4.90	**4.98**
O2 (vol %)	5.98	5.27	5.14	**5.46**
CO2 (vol %)	8.27	7.41	7.50	**7.73**
Fo (Natural Gas)	1.80	2.11	2.10	**2.01**
Exhaust Flow Rates				
Dry Standard Cubic Feet per Minute	2,623.68	2,200.07	2,023.82	**2,282.52**
Dry Standard Cubic Feet per Hour	157,421	132,004	121,429	**136,951**
Calculated Mass Emission Rates				
NOx (lbs/hr) **{Permit Limit = 1.4}**	0.70	0.60	0.57	**0.62**
CO (lbs/hr) **{Permit Limit = 1.18}**	0.05	0.04	0.04	**0.04**
NOx (tons/yr) **{Permit Limit = 6.13}**	3.05	2.62	2.48	**2.72**
CO (tons/yr) **{Permit Limit = 5.15}**	0.23	0.16	0.17	**0.19**

Exhaust Flow Parameters and Results Listed in Section IV.A.2 & 3

II. A-D. Summary of Results - Unit #2
Operational Data, Concentrations, Exhaust Flow Rates, Mass Emission Rates, and Comparison to Modeled and Measured Parameters

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Hurst 400 Boiler SN: 51545-200-1
Engine Site Rating: 12 MMBtu/hr
Technician: CS, EA, JA

Test Run Number	***1***	***2***	***3***	
Unit Number	**2**	**2**	**2**	
Date	8/3/21	8/3/21	8/3/21	
Start Time	8:04	10:48	11:54	
Stop Time	9:04	11:48	12:54	
Boiler Operational Parameters				***Average***
Load (%)	33.3	33.3	33.3	**33.3**
Firing Rate (MMBtu/hr)	4.0	4.0	4.0	**4.0**
Steam Pressure (psig)	121	121	121	**121.0**
Exhaust Temperature (°F)	390	390	390	**390.0**
Fuel Data				
Gas Fuel Supply Pressure (psig)	22	22	22	**22.0**
Measured Fuel Consumption (SCFD)	12601	12601	12601	**12601.0**
Calculated Fuel Consumption (SCFH)	525.04	525.04	525.04	**525.0**
O2 F-Factor (DSCF/MMBtu, HHV basis)	8643	8643	8643	**8643**
Fuel Heating Value (Btu/SCF, HHV)	1022	1022	1022	**1022**
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8500	8500	8500	**8500**
Ambient Conditions				
Pressure Altitude (MSL)	4780	4780	4780	**4780.0**
Atmospheric Pressure ("Hg)	25.13	25.13	25.13	**25.13**
Dry Bulb Temperature (°F)	76.6	80.0	83.9	**80.17**
Wet Bulb Temperature (°F)	66.0	67.3	68.2	**67.17**
Humidity (lb/lb air)	0.0135	0.0138	0.0136	**0.0136**
Measured Exhaust Emissions (Instrument Drift Corrected)				
NOx (ppmv)	37.54	37.42	38.38	**37.78**
NOx (ppmv @ 3% O2)	47.82	48.00	49.22	**48.34**
CO (ppmv)	2.32	2.15	1.47	**1.98**
CO (ppmv @ 3% O2)	2.96	2.75	1.88	**2.53**
O2 (vol %)	6.85	6.94	6.94	**6.91**
CO2 (vol %)	7.88	7.81	7.88	**7.86**
Fo (Natural Gas)	1.78	1.79	1.77	**1.78**
Exhaust Flow Rates				
Dry Standard Cubic Feet per Minute	2,309.81	2,321.02	2,272.70	**2,301.18**
Dry Standard Cubic Feet per Hour	138,589	139,261	136,362	**138,071**
Calculated Mass Emission Rates				
NOx (lbs/hr) **{Permit Limit = 1.25}**	0.62	0.62	0.62	**0.623**
CO (lbs/hr) **{Permit Limit = 1.01}**	0.02	0.02	0.01	**0.020**
NOx (tons/yr) **{Permit Limit = 5.26}**	2.72	2.73	2.74	**2.728**
CO (tons/yr) **{Permit Limit = 4.42}**	0.10	0.10	0.06	**0.087**

Exhaust Flow Parameters and Results Listed in Section IV.A.2 & 3

II. A-D. Summary of Results - Unit #3
Operational Data, Concentrations, Exhaust Flow Rates, Mass Emission Rates, and Comparison to Modeled and Measured Parameters

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Arizona Boiler Company SN: 15134
Engine Site Rating: 14.7 MMBtu/hr
Technician: CS, EA, JA

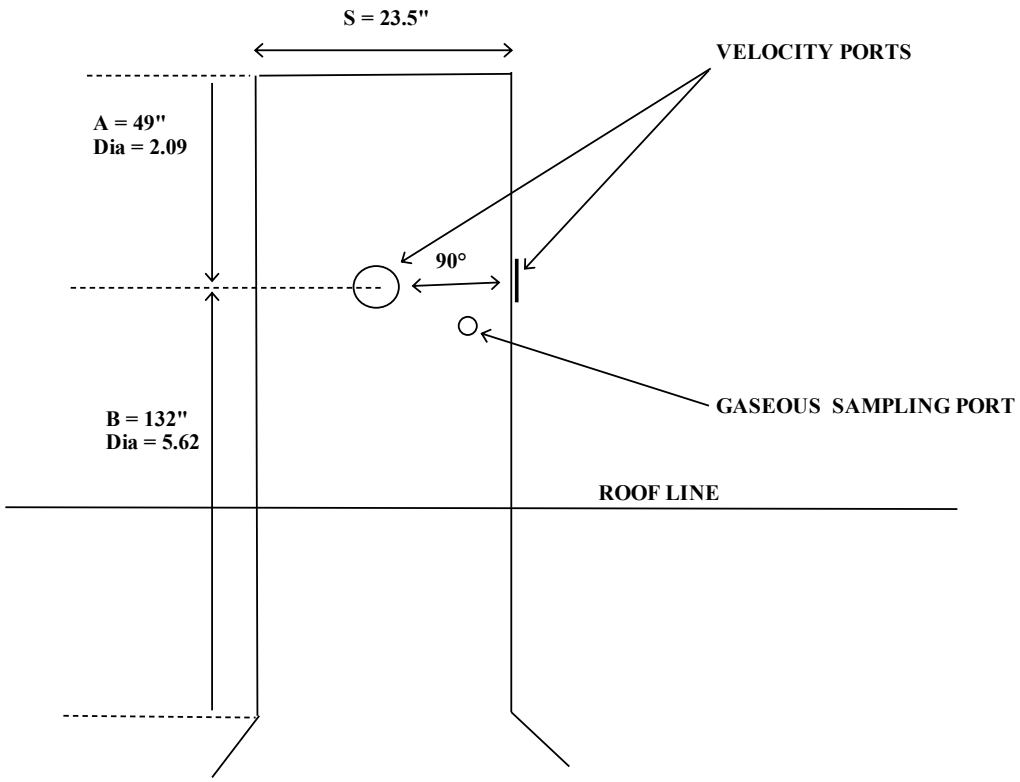
Test Run Number	***1***	***2***	***3***	
Unit Number	**3**	**3**	**3**	
Date	8/2/21	8/2/21	8/2/21	
Start Time	9:42	10:48	11:54	
Stop Time	10:42	11:48	12:54	
Hot Oil Heater Operational Parameters				***Average***
Load (%)	19.4	19.4	19.4	**19.4**
Firing Rate (MMBtu/hr)	2.86	2.86	2.86	**2.86**
Oil Inlet Temperature (°F)	332	332	332	**332.0**
Oil Oulet Temperature (°F)	399	399	399	**399.0**
Fuel Data				
Gas Fuel Supply Pressure (psig)	37	37	37	**37.0**
Measured Fuel Consumption (SCFD)	67058	67058	67058	**67058.0**
Calculated Fuel Consumption (SCFH)	2794.08	2794.08	2794.08	**2794.08**
O2 F-Factor (DSCF/MMBtu, HHV basis)	8643	8643	8643	**8643**
Fuel Heating Value (Btu/SCF, HHV)	1022	1022	1022	**1022**
BHp Specific Fuel Rate (Btu/Hp-hr, HHV basis)	8500	8500	8500	**8500**
Ambient Conditions				
Pressure Altitude (MSL)	4590	4590	4590	**4590.0**
Atmospheric Pressure ("Hg)	25.31	25.31	25.31	**25.31**
Dry Bulb Temperature (°F)	68.4	75.7	80.1	**74.73**
Wet Bulb Temperature (°F)	65.8	66.7	67.1	**66.53**
Humidity (lb/lb air)	0.0152	0.0142	0.0135	**0.0143**
Measured Exhaust Emissions (Instrument Drift Corrected)				
NOx (ppmv)	32.77	33.30	33.02	**33.03**
NOx (ppmv @ 3% O2)	32.03	32.47	32.34	**32.28**
CO (ppmv)	2.18	1.55	1.52	**1.75**
CO (ppmv @ 3% O2)	2.13	1.51	1.49	**1.71**
O2 (vol %)	2.59	2.54	2.62	**2.58**
CO2 (vol %)	9.88	9.83	9.78	**9.83**
Fo (Natural Gas)	1.85	1.87	1.87	**1.86**
Exhaust Flow Rates				
Dry Standard Cubic Feet per Minute	1,126.86	935.33	900.04	**987.41**
Dry Standard Cubic Feet per Hour	67,611	56,120	54,002	**59,244**
Calculated Mass Emission Rates				
NOx (lbs/hr) **{Permit Limit = 0.24}**	0.265	0.223	0.213	**0.234**
CO (lbs/hr) **{Permit Limit = 0.27}**	0.011	0.006	0.006	**0.008**
NOx (tons/yr) **{Permit Limit = 1.04}**	1.159	0.978	0.933	**1.023**
CO (tons/yr) **{Permit Limit = 1.17}**	0.047	0.028	0.026	**0.034**

Exhaust Flow Parameters and Results Listed in Section IV.A.2 & 3

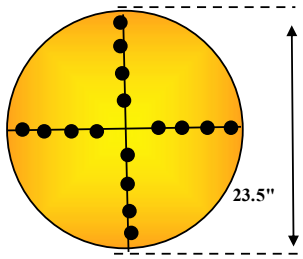
III. A. Test Procedures - Schematic of Exhaust Stack - Unit #2
EPA Method 1 / 7E Circular Stack Sampling Traverse Point Layout

Date:	8/2/21	Port + Stack ID (in):	23.5
Company:	Marathon Petroleum	Port Extension (in):	0.0
Location:	Albuquerque Terminal	Stack ID (in):	23.5
Technician(s):	CS, JA, EA	Stack Area (ft2):	3.01
		Duct Diameters **upstream** from flow disturbance (A):	2.09
NOTE:		Duct Diameters **downstream** from flow disturbance (B):	5.62
Unit #1 - Superior Boiler		Total Required Traverse Points:	16
		No. of Traverse Points per Diameter:	2
		Meets Method 1 Requirements:	YES

Stack Diagram

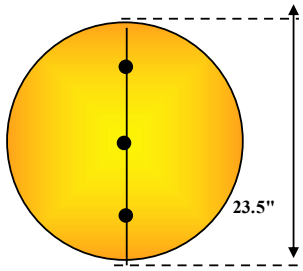


Stack Cross Section



Method 1 Sample Points

Stack Cross Section



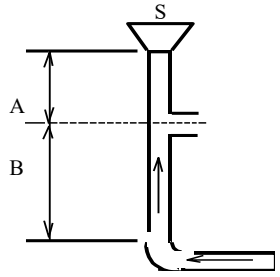
Method 7E Sample Points

Minimum Method 1 Port Location Formulas

A = 1/2 S
B = 2S

Unit Information

Traverse Point Number	*Number of Traverse Points on a Diameter* — *Percent distances (%)* 3	4	6	8	12	*Stratification Points* — Traverse Point (in.)	Port Offset (in.)	*Velocity Points* — Traverse Point (in.)	Port Offset (in.)
1	16.7	6.7	4.4	3.2	2.1	3.92	3.92	0.75	0.75
2	50.0	25.0	14.6	10.5	6.7	11.75	11.75	2.47	2.47
3	83.3	75.0	29.6	19.4	11.8	19.58	19.58	4.56	4.56
4		93.3	70.4	32.3	17.7			7.59	7.59
5			85.4	67.7	25.0			15.91	15.91
6			95.6	80.6	35.6			18.94	18.94
7				89.5	64.4			21.03	21.03
8				96.8	75.0			22.75	22.75
9					82.3				
10					88.2				
11					93.3				
12					97.9				



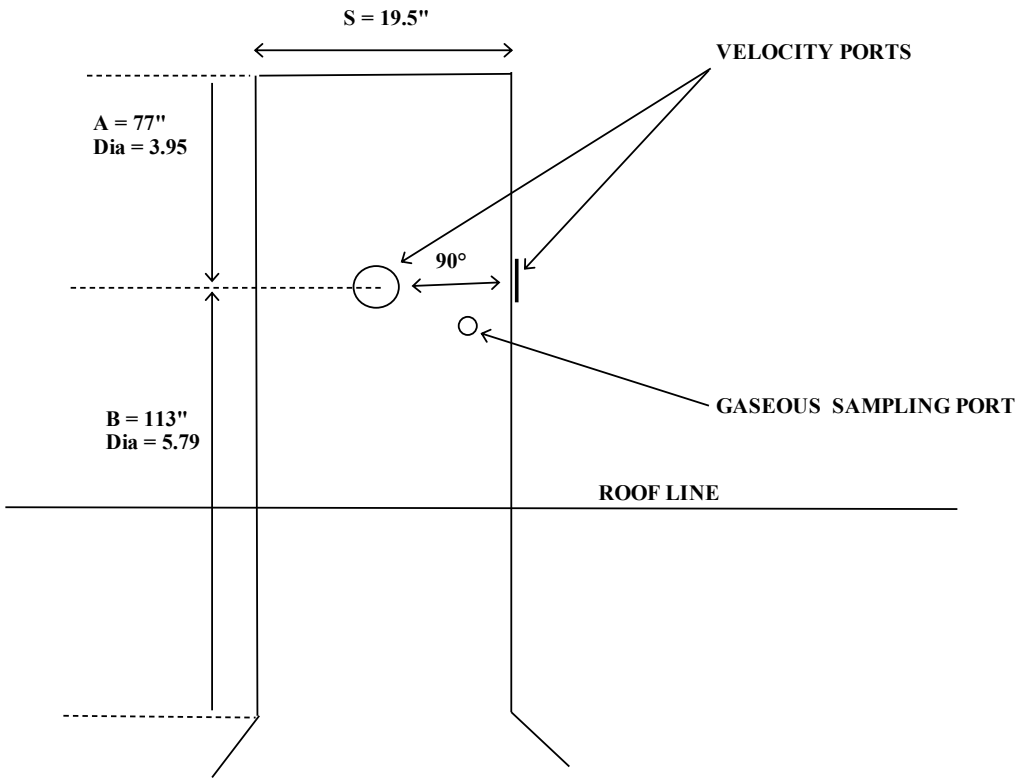
**Stack diameters > 24 in shall have no traverse points located w/in 1 in of the stack wall*

***Stack diameters ≤ 24 in shall have no traverse points located w/in 0.5 in of the stack wall*

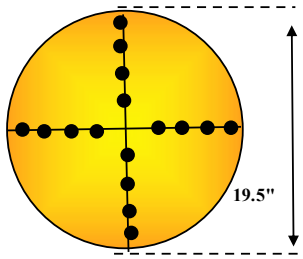
III. A. Test Procedures - Schematic of Exhaust Stack - Unit #2
EPA Method 1 / 7E Circular Stack Sampling Traverse Point Layout

Date:	8/2/21	Port + Stack ID (in):	19.5
Company:	Marathon Petroleum	Port Extension (in):	0.0
Location:	Albuquerque Terminal	Stack ID (in):	19.5
Technician(s):	CS, JA, EA	Stack Area (ft2):	2.07
		Duct Diameters **upstream** from flow disturbance (A):	3.95
NOTE:		Duct Diameters **downstream** from flow disturbance (B):	5.79
Unit #2 - Hurst Boiler		Total Required Traverse Points:	16
		No. of Traverse Points per Diameter:	2
		Meets Method 1 Requirements:	YES

Stack Diagram

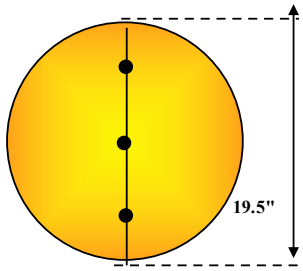


Stack Cross Section



Method 1 Sample Points

Stack Cross Section

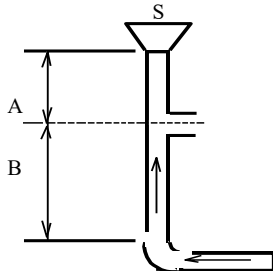


Method 7E Sample Points

Minimum Method 1 Port Location Formulas

A = 1/2 S
B = 2S

Unit Information



Traverse Point Number	*Number of Traverse Points on a Diameter* — *Percent distances (%)*					*Stratification Points*		*Velocity Points*	
	3	4	6	8	12	Traverse Point (in.)	Port Offset (in.)	Traverse Point (in.)	Port Offset (in.)
1	16.7	6.7	4.4	3.2	2.1	3.26	3.26	0.62	0.62
2	50.0	25.0	14.6	10.5	6.7	9.75	9.75	2.05	2.05
3	83.3	75.0	29.6	19.4	11.8	16.24	16.24	3.78	3.78
4		93.3	70.4	32.3	17.7			6.30	6.30
5			85.4	67.7	25.0			13.20	13.20
6			95.6	80.6	35.6			15.72	15.72
7				89.5	64.4			17.45	17.45
8				96.8	75.0			18.88	18.88
9					82.3				
10					88.2				
11					93.3				
12					97.9				

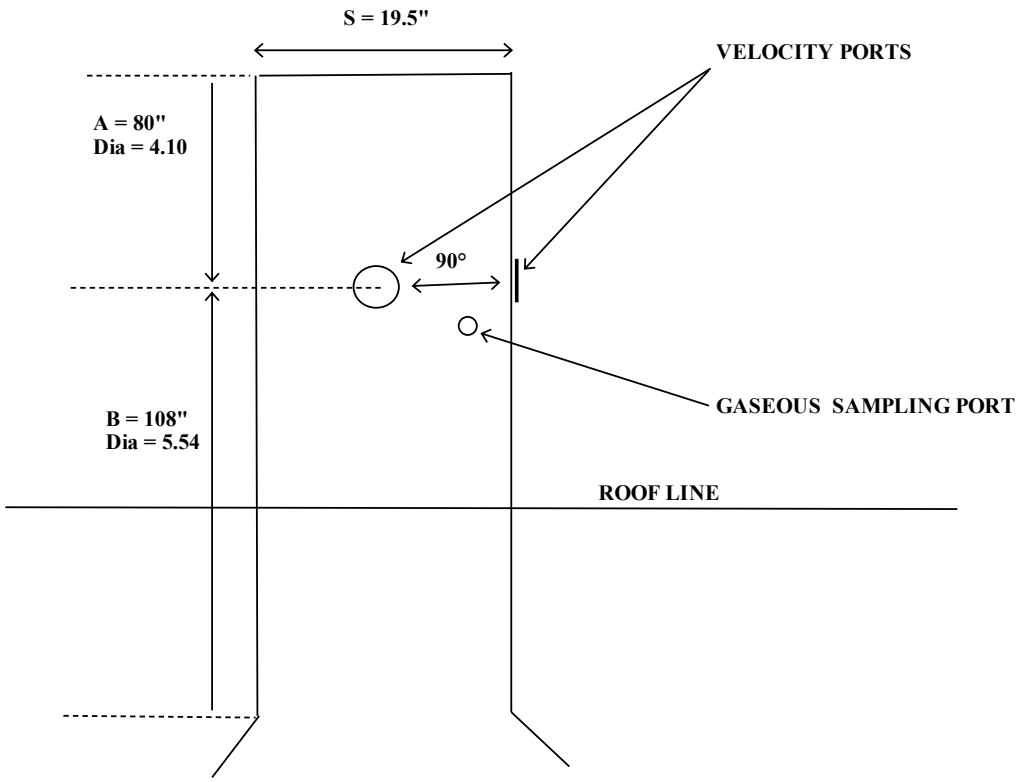
**Stack diameters > 24 in shall have no traverse points located w/in 1 in of the stack wall*

***Stack diameters ≤ 24 in shall have no traverse points located w/in 0.5 in of the stack wall*

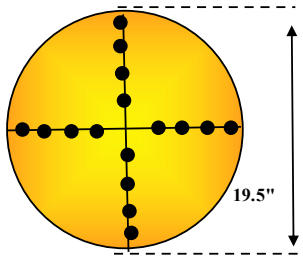
III. A. Test Procedures - Schematic of Exhaust Stack - Unit #3
EPA Method 1 / 7E Circular Stack Sampling Traverse Point Layout

Date:	8/2/21	Port + Stack ID (in):	19.5
Company:	Marathon Petroleum	Port Extension (in):	0.0
Location:	Albuquerque Terminal	Stack ID (in):	19.5
Technician(s):	CS, JA, EA	Stack Area (ft2):	2.07
		Duct Diameters **upstream** from flow disturbance (A):	4.10
NOTE:		Duct Diameters **downstream** from flow disturbance (B):	5.54
Unit #3 - Hot Oil Heater		Total Required Traverse Points:	16
		No. of Traverse Points per Diameter:	2
		Meets Method 1 Requirements:	YES

Stack Diagram

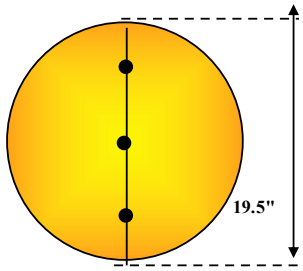


Stack Cross Section



Method 1 Sample Points

Stack Cross Section

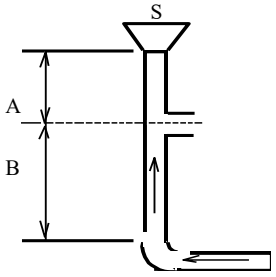


Method 7E Sample Points

Minimum Method 1 Port Location Formulas

A = 1/2 S
B = 2S

Unit Information

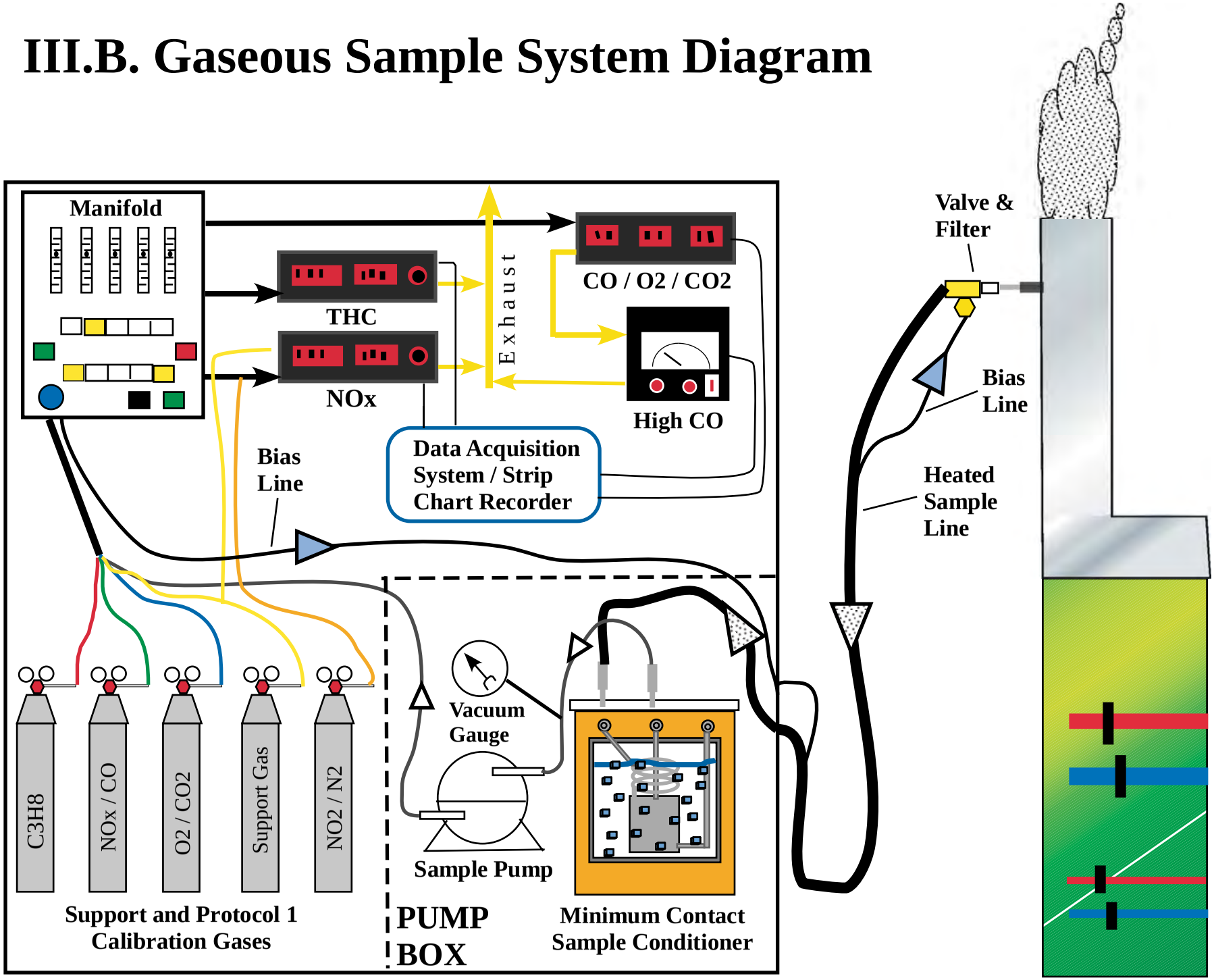


Traverse Point Number	*Number of Traverse Points on a Diameter* — *Percent distances (%)*					*Stratification Points*		*Velocity Points*	
	3	4	6	8	12	Traverse Point (in.)	Port Offset (in.)	Traverse Point (in.)	Port Offset (in.)
1	16.7	6.7	4.4	3.2	2.1	3.26	3.26	0.62	0.62
2	50.0	25.0	14.6	10.5	6.7	9.75	9.75	2.05	2.05
3	83.3	75.0	29.6	19.4	11.8	16.24	16.24	3.78	3.78
4		93.3	70.4	32.3	17.7			6.30	6.30
5			85.4	67.7	25.0			13.20	13.20
6			95.6	80.6	35.6			15.72	15.72
7				89.5	64.4			17.45	17.45
8				96.8	75.0			18.88	18.88
9					82.3				
10					88.2				
11					93.3				
12					97.9				

**Stack diameters > 24 in shall have no traverse points located w/in 1 in of the stack wall*

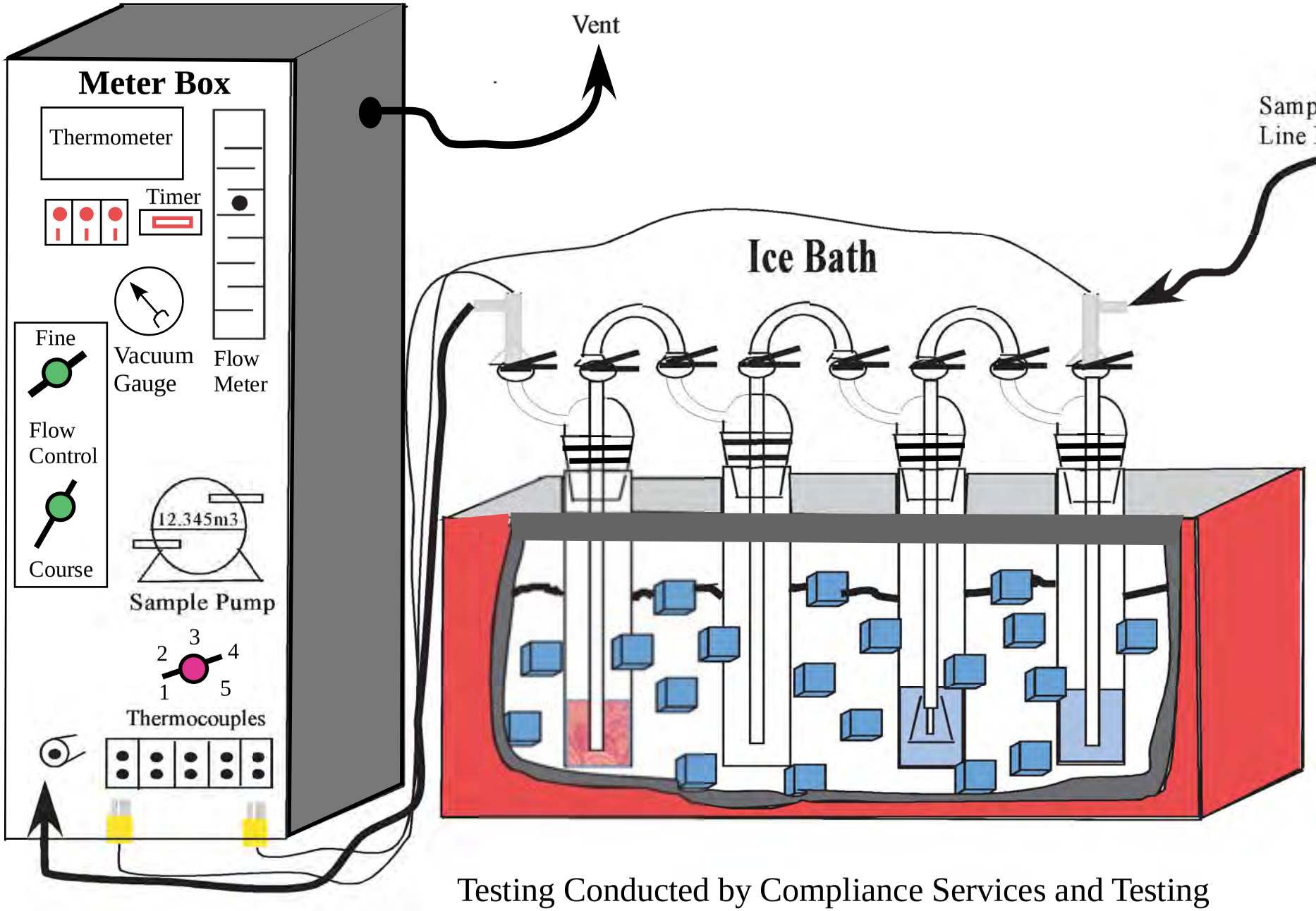
***Stack diameters ≤ 24 in shall have no traverse points located w/in 0.5 in of the stack wall*

III.B. Gaseous Sample System Diagram



Testing Conducted by Compliance Services and Testing

III.B. MOISTURE TRAIN SAMPLE SYSTEM DIAGRAM



Testing Conducted by Compliance Services and Testing

III. TEST PROCEDURES

C. Description of EPA Test Methods and Procedures:

Exhaust emissions from three boilers was tested to determine the quantity of the criteria combustion by-products being vented to the atmosphere. Three 60-minute tests runs at the normal operating load were completed and averaged on each source to quantify the gaseous emissions of nitrogen oxides (NO_X defined as NO_2 + NO), carbon monoxide (CO), oxygen (O_2) and carbon dioxide (CO_2) from the unit. This section of the report describes the analytical methods and procedures used during this test. The sampling and analyses procedures used during these tests conformed to those outlined in the Code of Federal Regulations, Title 40, Chapter 60, Appendix A, Methods 1-4, 7E, 9, and 10.

Stack gas entered the sampling system through a stainless-steel probe coupled with a 90-micron stainless-steel filter to trap any particulate matter that could damage or clog the system. The gas sample was transported through approximately 100 feet of 3/8-inch heat-traced Teflon® tubing via a stainless-steel/Teflon® diaphragm pump. The "wet" gas sample was delivered to a specially designed stainless-steel minimum-contact condenser, which dried the sample without removing NO_X or other compounds of interest. The "dry" sample was then diverted to the sample system manifold where it was partitioned to the NO_X, CO, and O_2/CO_2 analyzers through glass and stainless-steel rotameters for flow control of the sample. The sample flow remained continuous and did not vary by more than 10% throughout the testing and calibration.

The stack exhaust volumetric flow measurements were conducted in accordance with EPA Methods 1-4. Sixteen velocity head pressures (Method 2) measurements were taken from the exhaust stack (Method 1) during each test load. The sampling points were determined from using Method 1 criteria. An S-type Pitot tube was used for these measurements and the data was read with a digital manometer. The stack gas temperature was measured at the pressure sampling points using a K-type thermocouple and a digital thermometer. The moisture content measurements were made per EPA Method 4 (gravimetric) by pulling stack gas through an impinger train emerged in an ice bath. The impinger train acts as a moisture knockout, which allows for the collection of water in the gas stream produced by the combustion process of hydrocarbons with oxygen. The sample then went through a separate stainless-steel/Teflon® diaphragm pump and calibrated dry gas meter. The weights of the impingers (four total) were measured using a calibrated scale accurate to 0.1 grams. One moisture sample was collected from the stack during each 1-hour test run while pulling a minimum of 21 standard cubic feet at a rate no greater than 0.75

actual cubic feet per minute through the dry gas meter. This, along with the O_2/CO_2 measurements (Method 3A) and the head pressures, allowed for the molecular weight of the wet stack gas to be calculated (Methods 2 & 3) and for the volumetric flow rate of the stack on a dry basis to be determined. This value is a factor in determining the mass emissions rates.

Stack gas analyses for O_2/CO_2 concentrations were performed in accordance with procedures set forth in EPA Method 3A. The O_2 analyzer utilizes a paramagnetic detector and the CO_2 analyzer utilizes a continuous nondispersive infrared (NDIR) analyzer to quantify the diluent content of the exhaust gas.

EPA Method 7E was used to determine concentrations of NO_x (as defined as NO + NO_2). A chemiluminescence analyzer was used for this purpose. NO_x mass emission rates were calculated as if all of the NO_x were in the form of NO_2. This approach tends to overestimate the amount of NO_x emissions on a lb-mol basis but corresponds to the City of Albuquerque Environmental Health Department conventions.

Opacity readings were recorded per EPA Method 9 conventions. A six-minute reading was taken once per test run on each source.

CO emission concentrations were quantified during the tests in accordance with procedures set forth in EPA Method 10. A continuous nondispersive infrared analyzer was used for this purpose. This analyzer was equipped with a gas correlation filter, which also eliminates any interference from moisture, CO_2, and other combustion by-products. The response of the infrared absorption type CO analyzer is electronically linear.

All gaseous data was recorded with an electronic data acquisition system. All instruments were housed in an air-conditioned mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with the concentrations certified by the vendor. CST personnel collected ambient temperature from a digital psychrometer.

D. Deviations from EPA Reference Methods and Protocol:
There were no deviations from the reference methods or the approved test protocol.

III.E. - List of Instrumentation, Detection Principles and Data Recording Devices

Analytical Instrumentation

Sample System 1

Parameter	Models and Manufacturers	Common Operating Ranges	Minimum Sensitivity	Typical Response Time (sec)	Detection Principle
NOx	**California Analytical Instruments Model 600 CLD SN: D03022**	30 ppm 100 ppm 300 ppm 1000 ppm 3000 ppm	0.1 ppm	5	Thermal reduction of NO2 to NO. Chemiluminescent reaction of NO with excess of ozone. Detection by Photo-multiplier or Photodiode. Inherently linear for ranges listed.
CO	**Fuji Electric Instruments Model ZPA4 SN: N6F1105**	100 ppm 1000 ppm	0.1 ppm	5	Single beam non-dispersive infrared absorption. 2 channels.
O_2	**Fuji Electric Instruments Model ZPA4 SN: N6F1105**	10% 25%	0.01%	2	Paramagnetic by magneto-dynamic type measuring. All detection principals are inherently linear over a wide range.
CO_2	**Fuji Electric Instruments Model ZPA4 SN: N6F1105**	20% 50%	0.01%	5	Infrared absorption, analog linearization, solid state detector.
SO2	**Fuji Electric Instruments Model ZPA4 SN: N6F1105**	500 ppm 5000 ppm	0.1 ppm	5.0	Non-dispersive infrared analysis.
THC	**California Analytical Instruments 600M HFID SN: S09055**	10ppm 100ppm 1000ppm 10000ppm	0.1 ppm	5	Flame Ionization Detection to determine the total hydrocarbons.

Gas Dilution System

Parameter	Models and Manufacturers	Flow Ranges	Detection Principle
MFC 1 **MFC 2** **MFC 3**	**Environics Model 4040 SN: 8439**	500 SCCM -30000 SCCM 500 SCCM -30000 SCCM 50 SCCM -3000 SCCM	Provide know values of calibration gases through controlled dilution of high-level calibration gases.

Data Recorder

Parameter	Models and Manufacturers	Common Operating Speeds	Measuring Range	Detection Principle
20 channels	**Omega OMB-DAQ-56 SN: 351395**	625 ms to 6.25 secs	+/- 15 Volts	Voltage differential to a CPU.

CST reserves the right to substitute equivalent model analyzers that meet the specifications of the test methods.
Higher ranges available by sample dilution. Other ranges available via data logger/recorder signal attenuation.
Operating range is defined by the calibration gases used during the test (per EPA Methods 7e and 25b).

F. Methods for Obtaining Unit Operational Parameters:
Operational parameters were taken from available instrumentation control panels or gauges by CST personnel once per test run. Operational parameters obtained during the testing included steam production rates and pressures, and fuel consumption.

IV. DATA AND CALCULATIONS

A. RAW DATA USED IN EMISSION CALCULATIONS

1. **Exhaust Flow Rate Worksheets**
2. **Moisture/Velocity Worksheets**
3. **Fuel Gas Analysis**
4. **Natural Gas Fo Worksheet and Calculations**

IV.A.1. Exhaust Flow Rate Worksheet - Unit #1

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Superior Aztec Boiler SN: 12237
Engine Site Rating: 14 MMBtu/hr
Technician: CS, EA, JA

Test Run Number	***1***	***2***	***3***	
Engine Number	**1**	**1**	**1**	
Date	8/03/21	8/03/21	8/03/21	
Start Time	12:02	13:08	14:15	
Stop Time	13:02	14:08	15:15	
Stack Moisture & Molecular Weight				***Average***
Volume Fraction of dry O2	0.0598	0.0527	0.0514	**0.0546**
Volume Fraction of dry CO2	0.0827	0.0741	0.0750	**0.0773**
Volume Fraction of dry N2	0.8575	0.8732	0.8736	**0.8681**
Dry Gas Meter Volume (Vm - ft^3)	26.550	27.160	27.300	**27.003**
Dry Gas Meter Y-Factor (unitless)	0.9841	0.9841	0.9841	**0.9841**
Corrected Metered Volume ($Vm_{corrected}$ - ft^3)	26.128	26.728	26.866	**26.574**
Total Impinged Moisture (W_{tot} - g)	76.0	78.3	76.7	**77.0**
Constant K_{1A} (L / g)	1.336	1.336	1.336	**1.336**
Constant K_3 (°R-L / "Hg-cf)	499.7	499.7	499.7	**499.7**
Average Dry Gas Meter Temperature (°F)	110.5	116.0	120.0	**115.5**
Atmospheric Pressure (P_b - "Hg, absolute)	25.13	25.13	25.13	**25.13**
Volume of DGM Sample (Vm_{std} - ft^3)	20.309	20.578	20.541	**20.476**
Volume of DGM Sample (Vm_{std} - L)	575.098	582.694	581.658	**579.816**
Stack Moisture (B_{ws} - %)	15.00	15.22	14.98	**15.07**
Dry Gas Fraction (1-B_{ws})	0.8500	0.8478	0.8502	**0.8493**
Dry Stack Gas Molecular Wt. (M_D - lbs/lb-mole)	29.563	29.396	29.405	**29.455**
Wet Stack Gas Molecular Wt. (Mw - lbs/lb-mole)	27.828	27.662	27.697	**27.729**
Stack Flow Rate via Pitot Tube				
Pitot Tube Factor	0.84	0.84	0.84	**0.84**
Sum of Square Root of ΔP's	6.545	5.416	4.971	**5.644**
Number of Traverse Points	16	16	16	**16**
Average Square Root of ΔP's	0.409	0.338	0.311	**0.353**
Average Temperature (°F)	371.3	350.6	350.5	**357.4**
Average Temperature (T_s - °R)	831.3	810.6	810.5	**817.4**
Static Stack Pressure (P_g - "H2O)	-0.18	-0.05	-0.08	**-0.10**
Conversion Factor ("Hg / "H2O)	0.07355	0.07355	0.07355	**0.07355**
Absolute Stack Pressure (P_s - "Hg)	25.12	25.13	25.12	**25.12**
Pitot Tube Constant K_p (√(lb/lb.mol-"Hg/°R-"H20)	5129.4	5129.4	5129.4	**5129.4**
STP / Time Constant K_y (°R-min / "Hg-hr)	1058.8	1058.8	1058.8	**1058.8**
Stack Diameter (inches)	23.5	23.5	23.5	**23.5**
Stack Area (A - ft^2)	3.01	3.01	3.01	**3.01**
Stack Velocity (v_s - ft/min)	1922.0	1575.0	1444.7	**1647.2**
Stack Velocity (v_s - ft/sec)	32.0	26.2	24.1	**27.5**
Stack Flow, wet (Q_a - act. ft^3/sec)	96.5	79.1	72.5	**82.7**
Stack Flow, wet (Q_a - act. ft^3/min)	5789.2	4743.9	4351.5	**4961.5**
Stack Flow, dry (Q_s - std. ft^3/sec)	**43.73**	**36.67**	**33.73**	**38.04**
Stack Flow, dry (Q_s - std. ft^3/min)	**2,623.68**	**2,200.07**	**2,023.82**	**2,282.52**
Stack Flow, dry (Q_s - std. ft^3/hr)	**157,421**	**132,004**	**121,429**	**136,951**

IV.A.1. Exhaust Flow Rate Worksheet - Unit #2

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Hurst 400 Boiler SN: 51545-200-1
Engine Site Rating: 12 MMBtu/hr
Technician: CS, EA, JA

Test Run Number	*1*	*2*	*3*	
Engine Number	**2**	**2**	**2**	
Date	8/03/21	8/03/21	8/03/21	
Start Time	8:05	9:36	10:47	
Stop Time	9:05	10:36	11:47	
Stack Moisture & Molecular Weight				***Average***
Volume Fraction of dry O2	0.0685	0.0694	0.0694	**0.0691**
Volume Fraction of dry CO2	0.0788	0.0781	0.0788	**0.0786**
Volume Fraction of dry N2	0.8527	0.8524	0.8518	**0.8523**
Dry Gas Meter Volume (Vm - ft^3)	29.460	28.830	28.100	**28.797**
Dry Gas Meter Y-Factor (unitless)	0.9841	0.9841	0.9841	**0.9841**
Corrected Metered Volume ($Vm_{corrected}$ - ft^3)	28.992	28.372	27.653	**28.339**
Total Impinged Moisture (W_{tot} - g)	75.5	87.2	74.0	**78.9**
Constant K_{1A} (L / g)	1.336	1.336	1.336	**1.336**
Constant K_3 (°R-L / "Hg-cf)	499.7	499.7	499.7	**499.7**
Average Dry Gas Meter Temperature (°F)	85.5	95.0	102.5	**94.3**
Atmospheric Pressure (P_b - "Hg, absolute)	25.13	25.13	25.13	**25.13**
Volume of DGM Sample (Vm_{std} - ft^3)	23.568	22.669	21.801	**22.679**
Volume of DGM Sample (Vm_{std} - L)	667.377	641.925	617.329	**642.210**
Stack Moisture (B_{ws} - %)	13.13	15.36	13.80	**14.10**
Dry Gas Fraction (1-B_{ws})	0.8687	0.8464	0.8620	**0.8590**
Dry Stack Gas Molecular Wt. (M_D - lbs/lb-mole)	29.535	29.528	29.538	**29.534**
Wet Stack Gas Molecular Wt. (Mw - lbs/lb-mole)	28.020	27.758	27.946	**27.908**
Stack Flow Rate via Pitot Tube				
Pitot Tube Factor	0.84	0.84	0.84	**0.84**
Sum of Square Root of ΔP's	8.330	8.582	8.234	**8.382**
Number of Traverse Points	16	16	16	**16**
Average Square Root of ΔP's	0.521	0.536	0.515	**0.524**
Average Temperature (°F)	394.8	401.3	391.6	**395.9**
Average Temperature (T_s - °R)	854.8	861.3	851.6	**855.9**
Static Stack Pressure (P_g - "H2O)	-0.12	-0.05	-0.12	**-0.10**
Conversion Factor ("Hg / "H2O)	0.07355	0.07355	0.07355	**0.07355**
Absolute Stack Pressure (P_s - "Hg)	25.12	25.13	25.12	**25.12**
Pitot Tube Constant K_p (√(lb/lb.mol-"Hg/°R-"H20)	5129.4	5129.4	5129.4	**5129.4**
STP / Time Constant K_y (°R-min / "Hg-hr)	1058.8	1058.8	1058.8	**1058.8**
Stack Diameter (inches)	19.5	19.5	19.5	**19.5**
Stack Area (A - ft^2)	2.07	2.07	2.07	**2.07**
Stack Velocity (v_s - ft/min)	2472.0	2568.3	2442.1	**2494.1**
Stack Velocity (v_s - ft/sec)	41.2	42.8	40.7	**41.6**
Stack Flow, wet (Q_a - act. ft^3/sec)	85.4	88.8	84.4	**86.2**
Stack Flow, wet (Q_a - act. ft^3/min)	5126.7	5326.4	5064.8	**5172.6**
Stack Flow, dry (Q_s - std. ft^3/sec)	**38.50**	**38.68**	**37.88**	**38.35**
Stack Flow, dry (Q_s - std. ft^3/min)	**2,309.81**	**2,321.02**	**2,272.70**	**2,301.18**
Stack Flow, dry (Q_s - std. ft^3/hr)	**138,589**	**139,261**	**136,362**	**138,071**

IV.A.1. Exhaust Flow Rate Worksheet - Unit #3

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Arizona Boiler Company SN: 15134
Engine Site Rating: 14.7 MMBtu/hr
Technician: CS, EA, JA

Test Run Number	*1*	*2*	*3*	
Engine Number	**3**	**3**	**3**	
Date	8/02/21	8/02/21	8/02/21	
Start Time	9:28	10:43	11:47	
Stop Time	10:28	11:43	12:47	
Stack Moisture & Molecular Weight				***Average***
Volume Fraction of dry O2	0.0259	0.0254	0.0262	**0.0258**
Volume Fraction of dry CO2	0.0988	0.0983	0.0978	**0.0983**
Volume Fraction of dry N2	0.8753	0.8763	0.8760	**0.8759**
Dry Gas Meter Volume (Vm - ft^3)	28.963	28.710	29.160	**28.944**
Dry Gas Meter Y-Factor (unitless)	0.9968	0.9968	0.9968	**0.9968**
Corrected Metered Volume ($Vm_{corrected}$ - ft^3)	28.870	28.618	29.067	**28.852**
Total Impinged Moisture (W_{tot} - g)	104.5	103.2	106.5	**104.7**
Constant K_{1A} (L / g)	1.336	1.336	1.336	**1.336**
Constant K_3 (°R-L / "Hg-cf)	499.7	499.7	499.7	**499.7**
Average Dry Gas Meter Temperature (°F)	70.5	72.0	77.0	**73.2**
Atmospheric Pressure (P_b - "Hg, absolute)	25.31	25.31	25.31	**25.31**
Volume of DGM Sample (Vm_{std} - ft^3)	24.305	24.025	24.174	**24.168**
Volume of DGM Sample (Vm_{std} - L)	688.243	680.307	684.537	**684.362**
Stack Moisture (B_{ws} - %)	16.86	16.85	17.21	**16.97**
Dry Gas Fraction (1-B_{ws})	0.8314	0.8315	0.8279	**0.8303**
Dry Stack Gas Molecular Wt. (M_D - lbs/lb-mole)	29.684	29.675	29.669	**29.676**
Wet Stack Gas Molecular Wt. (M_W - lbs/lb-mole)	27.714	27.708	27.662	**27.694**
Stack Flow Rate via Pitot Tube				
Pitot Tube Factor	0.84	0.84	0.84	**0.84**
Sum of Square Root of ΔP's	4.142	3.438	3.334	**3.638**
Number of Traverse Points	16	16	16	**16**
Average Square Root of ΔP's	0.259	0.215	0.208	**0.227**
Average Temperature (°F)	368.4	368.8	375.9	**371.0**
Average Temperature (T_s - °R)	828.4	828.8	835.9	**831.0**
Static Stack Pressure (P_g - "H2O)	0	0.00	0	**0.00**
Conversion Factor ("Hg / "H2O)	0.07355	0.07355	0.07355	**0.07355**
Absolute Stack Pressure (P_s - "Hg)	25.31	25.31	25.31	**25.31**
Pitot Tube Constant K_p (√(lb/lb.mol-"Hg/°R-"H20)	5129.4	5129.4	5129.4	**5129.4**
STP / Time Constant K_y (°R-min / "Hg-hr)	1058.8	1058.8	1058.8	**1058.8**
Stack Diameter (inches)	19.5	19.5	19.5	**19.5**
Stack Area (A - ft^2)	2.07	2.07	2.07	**2.07**
Stack Velocity (v_s - ft/min)	1212.3	1006.5	981.0	**1066.6**
Stack Velocity (v_s - ft/sec)	20.2	16.8	16.4	**17.8**
Stack Flow, wet (Q_a - act. ft^3/sec)	41.9	34.8	33.9	**36.9**
Stack Flow, wet (Q_a - act. ft^3/min)	2514.2	2087.5	2034.6	**2212.1**
Stack Flow, dry (Q_s - std. ft^3/sec)	**18.78**	**15.59**	**15.00**	**16.46**
Stack Flow, dry (Q_s - std. ft^3/min)	**1,126.86**	**935.33**	**900.04**	**987.41**
Stack Flow, dry (Q_s - std. ft^3/hr)	**67,611**	**56,120**	**54,002**	**59,244**

IV.A.2. Moisture and Velocity Worksheet - Unit #1

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Superior Aztec Boiler SN: 12237
Engine Site Rating: 14 MMBtu/hr
Technician: CS, EA, JA

Stack Diameter (inches) = 23.5
Pitot Tube Factor = 0.84
Number of Traverse Points = 16
Meter ID: S3
Y Factor: 0.9841

Moisture Data

Run 1	*Impinger 1*	*Impinger 2*	*Impinger 3*	*Impinger 4*	*Total Wt*
Beginning	711.6	691.7	603.7	873.4	**2880.4**
Ending	781.9	692.8	604.0	877.7	**2956.4**
Total	70.3	1.1	0.3	4.3	**76.0**
Run 2					
Beginning	775.3	734.5	600.6	881.3	**2991.7**
Ending	848.1	736.9	600.7	884.3	**3070.0**
Total	72.8	2.4	0.1	3.0	**78.3**
Run 3					
Beginning	781.9	642.8	604.0	877.7	**2906.4**
Ending	851.0	645.6	604.4	882.1	**2983.1**
Total	69.1	2.8	0.4	4.4	**76.7**

Natural Gas F-Factors

Fwet =	10647	wscf/mmBtu	Theoretical Moisture Content @ 0% O2
Fdry =	8643	dscf/mmBtu	**18.82%**

Moisture @ O2 Stack Gas Concentration

	O2 Corr. Factor	H20 Content	% Difference from Theoretical	
Run 1	0.714	13.44%	-11.66%	**Average Difference**
Run 2	0.748	14.07%	-8.12%	**-8.43%**
Run 3	0.754	14.19%	-5.51%	

DGM Data

	Run 1	*Run 2*	*Run 3*	*Units*
Start Time	12:02	13:08	14:15	**24 Hr.**
Stop Time	13:02	14:08	15:15	**24 Hr.**
Sample Time	60	60	60	**Minutes**
Pre-Test Leak Check	0/18	0/18	0/18	**cf @ "Hg**
Post-Test Leak Check	0/18	0/18	0/18	**cf @ "Hg**
Starting Sampling Vacuum	11	11	11	**"Hg**
Ending Sampling Vacuum	11	11	11	**"Hg**
Starting Volume	190.520	217.520	244.880	**cf**
Ending Volume	217.070	244.680	272.180	**cf**
Volume Collected	**26.550**	**27.160**	**27.300**	**cf / min**
Sampling Rate	**0.44**	**0.45**	**0.46**	**cf / min**
Staring Temperature	109.0	112.0	120.0	**°F**
Ending Temperature	112.0	120.0	120.0	**°F**
Average Temperature	**110.5**	**116.0**	**120.0**	**°F**

ΔP Pitot Tube Pressure ("H20) / Temperature Data (°F)

Run Number	*1*			*2*		*3*	
Sample Point	**ΔP - "H20**	**°F**	**Yaw Ang.**	**ΔP - "H20**	**°F**	**ΔP - "H20**	**°F**
1	0.43	371	5	0.16	351	0.09	353
2	0.27	371	5	0.15	352	0.11	351
3	0.16	370	3	0.10	352	0.13	351
4	0.12	370	2	0.17	352	0.08	351
5	0.10	372	0	0.12	352	0.12	350
6	0.12	371	0	0.14	350	0.10	350
7	0.13	370	-2	0.12	350	0.07	349
8	0.12	369	-2	0.09	349	0.08	349
9	0.14	371	-2	0.11	350	0.10	351
10	0.19	371	-5	0.10	350	0.09	352
11	0.16	373	-5	0.14	351	0.14	352
12	0.17	374	-5	0.11	350	0.08	351
13	0.19	373	-3	0.07	351	0.07	350
14	0.18	371	-2	0.08	350	0.10	350
15	0.12	372	0	0.11	350	0.09	349
16	0.18	371	1	0.09	349	0.11	349
Average	**0.17**	**371.3**	**-0.6**	**0.12**	**350.6**	**0.10**	**350.5**
Sum of √ΔP's	**6.545**			**5.416**		**4.971**	
Static Pressure	**-0.18**			**-0.05**		**-0.08**	

IV.A.2. Moisture and Velocity Worksheet - Unit #2

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Hurst 400 Boiler SN: 51545-200-1
Engine Site Rating: 12 MMBtu/hr
Technician: CS, EA, JA

Stack Diameter (inches) = 19.5
Pitot Tube Factor = 0.84
Number of Traverse Points = 16
Meter ID: S3
Y Factor: 0.9841

Moisture Data

Run 1	*Impinger 1*	*Impinger 2*	*Impinger 3*	*Impinger 4*	*Total Wt*
Beginning	867.3	734.7	600.0	873.2	**3075.2**
Ending	936.8	736.1	600.2	877.6	**3150.7**
Total	69.5	1.4	0.2	4.4	**75.5**
Run 2					
Beginning	730.4	637.8	603.2	867.5	**2838.9**
Ending	807.0	642.0	603.7	873.4	**2926.1**
Total	76.6	4.2	0.5	5.9	**87.2**
Run 3					
Beginning	936.8	736.1	600.2	877.6	**3150.7**
Ending	1004.1	738.7	600.6	881.3	**3224.7**
Total	67.3	2.6	0.4	3.7	**74.0**

Natural Gas F-Factors

Fwet =	10647	wscf/mmBtu	Theoretical Moisture Content @ 0% O2
Fdry =	8643	dscf/mmBtu	**18.82%**

Moisture @ O2 Stack Gas Concentration

	O2 Corr. Factor	H20 Content	% Difference from Theoretical	
Run 1	0.672	12.65%	-3.75%	**Average Difference**
Run 2	0.668	12.57%	-22.21%	**-11.93%**
Run 3	0.668	12.57%	-9.82%	

DGM Data

	Run 1	*Run 2*	*Run 3*	*Units*
Start Time	8:05	9:36	10:47	**24 Hr.**
Stop Time	9:05	10:36	11:47	**24 Hr.**
Sample Time	60	60	60	**Minutes**
Pre-Test Leak Check	0/20	0/16	0/16	**cf @ "Hg**
Post-Test Leak Check	0/20	0/16	0/16	**cf @ "Hg**
Starting Sampling Vacuum	10	10	10	**"Hg**
Ending Sampling Vacuum	10	10	10	**"Hg**
Starting Volume	100.380	130.620	161.850	**cf**
Ending Volume	129.840	159.450	189.950	**cf**
Volume Collected	**29.460**	**28.830**	**28.100**	**cf / min**
Sampling Rate	**0.49**	**0.48**	**0.47**	**cf / min**
Staring Temperature	81.0	90.0	100.0	**°F**
Ending Temperature	90.0	100.0	105.0	**°F**
Average Temperature	**85.5**	**95.0**	**102.5**	**°F**

ΔP Pitot Tube Pressure ("H20) / Temperature Data (°F)

Run Number	*1*			*2*		*3*	
Sample Point	**ΔP - "H20**	**°F**	**Yaw Ang.**	**ΔP - "H20**	**°F**	**ΔP - "H20**	**°F**
1	0.39	396	2	0.43	390	0.23	390
2	0.10	398	2	0.20	390	0.22	391
3	0.50	405	2	0.33	398	0.41	391
4	0.43	410	3	0.32	407	0.27	391
5	0.26	413	3	0.38	413	0.28	392
6	0.35	413	4	0.37	413	0.18	394
7	0.18	394	4	0.21	410	0.41	393
8	0.27	394	5	0.23	409	0.37	393
9	0.17	399	8	0.41	390	0.32	392
10	0.21	398	8	0.34	391	0.21	391
11	0.27	392	7	0.30	393	0.22	390
12	0.19	393	6	0.21	396	0.20	391
13	0.25	394	6	0.16	399	0.25	391
14	0.24	393	4	0.19	409	0.16	392
15	0.31	373	3	0.35	407	0.34	391
16	0.37	351	3	0.27	405	0.25	392
Average	**0.28**	**394.8**	**4.4**	**0.29**	**401.3**	**0.27**	**391.6**
Sum of √ΔP's	**8.330**			**8.582**		**8.234**	
Static Pressure	**-0.12**			**-0.05**		**-0.12**	

IV.A.2. Moisture and Velocity Worksheet - Unit #3

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Arizona Boiler Company SN: 15134
Engine Site Rating: 14.7 MMBtu/hr
Technician: CS, EA, JA

Stack Diameter (inches) = 19.5
Pitot Tube Factor = 0.84
Number of Traverse Points = 16
Meter ID: S1
Y Factor: 0.9968

Moisture Data

Run 1	*Impinger 1*	*Impinger 2*	*Impinger 3*	*Impinger 4*	*Total Wt*
Beginning	750.8	736.4	602.2	860.7	**2950.1**
Ending	848.6	738.6	603.8	863.6	**3054.6**
Total	97.8	2.2	1.6	2.9	**104.5**
Run 2					
Beginning	737.1	738.6	603.8	863.6	**2943.1**
Ending	835.0	739.6	603.8	867.9	**3046.3**
Total	97.9	1.0	0.0	4.3	**103.2**
Run 3					
Beginning	769.5	730.5	599.9	868.5	**2968.4**
Ending	867.0	734.7	600.0	873.2	**3074.9**
Total	97.5	4.2	0.1	4.7	**106.5**

Natural Gas F-Factors

Fwet =	10647	wscf/mmBtu	Theoretical Moisture Content @ 0% O2
Fdry =	8643	dscf/mmBtu	**18.82%**

Moisture @ O2 Stack Gas Concentration

	O2 Corr. Factor	H20 Content	% Difference from Theoretical	
Run 1	0.876	16.49%	-2.27%	**Average Difference**
Run 2	0.878	16.53%	-1.92%	**-2.91%**
Run 3	0.875	16.46%	-4.55%	

DGM Data

	Run 1	*Run 2*	*Run 3*	*Units*
Start Time	9:28	10:43	11:47	**24 Hr.**
Stop Time	10:28	11:43	12:47	**24 Hr.**
Sample Time	60	60	60	**Minutes**
Pre-Test Leak Check	0/20	0/20	0/20	**cf @ "Hg**
Post-Test Leak Check	0/20	0/20	0/20	**cf @ "Hg**
Starting Sampling Vacuum	10	10	10	**"Hg**
Ending Sampling Vacuum	10	10	10	**"Hg**
Starting Volume	739.207	768.485	797.370	**cf**
Ending Volume	768.170	797.195	826.530	**cf**
Volume Collected	**28.963**	**28.710**	**29.160**	**cf / min**
Sampling Rate	**0.48**	**0.48**	**0.49**	**cf / min**
Staring Temperature	71.0	72.0	72.0	**°F**
Ending Temperature	70.0	72.0	82.0	**°F**
Average Temperature	**70.5**	**72.0**	**77.0**	**°F**

ΔP Pitot Tube Pressure ("H20) / Temperature Data (°F)

Run Number	*1*			*2*		*3*	
Sample Point	**ΔP - "H20**	**°F**	**Yaw Ang.**	**ΔP - "H20**	**°F**	**ΔP - "H20**	**°F**
1	0.08	365	0	0.04	379	0.02	374
2	0.08	366	0	0.05	379	0.05	376
3	0.09	366	0	0.04	378	0.06	377
4	0.10	366	0	0.07	378	0.05	378
5	0.09	365	0	0.08	378	0.09	378
6	0.05	365	0	0.03	363	0.05	376
7	0.04	365	0	0.04	367	0.02	374
8	0.06	365	0	0.03	365	0.08	373
9	0.07	366	0	0.07	365	0.07	374
10	0.08	369	0	0.06	366	0.04	374
11	0.09	370	0	0.07	366	0.03	375
12	0.08	371	0	0.04	367	0.04	375
13	0.07	373	0	0.03	368	0.04	376
14	0.05	374	0	0.03	360	0.04	378
15	0.04	374	0	0.04	361	0.02	378
16	0.03	375	0	0.04	361	0.03	378
Average	**0.07**	**368.4**	**0.0**	**0.05**	**368.8**	**0.05**	**375.9**
Sum of √ΔP's	**4.142**			**3.438**		**3.334**	
Static Pressure	**0.00**			**0.00**		**0.00**	

New Mexico Gas Company

8-Jan-18
2:19 PM

Albuquerque, New Mexico
Gas Analysis General Report (08 Jan 2018)
Analysis ID: 1714
Name: Atrisco SF Jnct Daily

Alternate ID: NA
Company Name: NMGCO

Analysis Type: NA **Analysis Origin:** NA
Sample Frequency: Daily **BTU Var Multiplier:**

Sample Date	Effective Date	Sample Pressure Base	Wet BTU	Dry BTU	Gravity	Methane	Ethane	Propane	I Butane	N Butane	I Pentane	N Pentane	Hexanes+	Nitrogen	CO2
	1/1/18 08:00	14.73	1015	1033	0.591	93.86	4.164	0.192	0.01	0.014	0.005	0.003	0.006	0.668	1.07
	1/2/18 08:00	14.73	1009.5	1027.4	0.5872	94.803	3.432	0.108	0.009	0.012	0.006	0.004	0.007	0.34	1.272
	1/3/18 08:00	14.73	1008.1	1026	0.5873	94.709	3.372	0.14	0.011	0.013	0.005	0.003	0.005	0.519	1.217
	1/4/18 08:00	14.73	1008.6	1026.4	0.5891	94.478	3.496	0.158	0.011	0.013	0.005	0.003	0.006	0.491	1.331
	1/5/18 08:00	14.73	1005.9	1023.7	0.587	94.969	3.127	0.11	0.011	0.013	0.005	0.004	0.006	0.343	1.404
	1/6/18 08:00	14.73	1006.8	1024.6	0.5879	94.854	3.214	0.126	0.011	0.013	0.006	0.004	0.007	0.316	1.44
	1/7/18 08:00	14.73	1008.1	1025.9	0.5877	94.847	3.297	0.123	0.01	0.012	0.006	0.004	0.008	0.292	1.393
		Averages:	1008.9	1026.7	0.5882	94.646	3.443	0.137	0.011	0.013	0.005	0.004	0.007	0.424	1.304

IV.A.4. Fuel Analysis
Gas Fuel F Factor and Heating Value Calculation

Company: New Mexico Gas Company
Sample ID: Atrisco SF Junction Daily
Time: 8:00
Date: 1/12/19

CALCULATION OF DENSITY AND HEATING VALUE @ 68°F and 29.92 in Hg

Component	% Volume	Molecular Wt.	Density (lb/ft3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross Htng. Val. (Btu/SCF)	Volume Fract. Btu
Hydrogen		2.016	0.0052	0.00000	0.0000	61100	0.00	325.0	0.000
Oxygen		32.000	0.0831	0.00000	0.0000	0	0.00	0.0	0.000
Nitrogen	0.346	28.016	0.0731	0.00025	0.5735	0	0.00	0.0	0.000
CO2	1.423	44.010	0.1149	0.00164	3.7090	0	0.00	0.0	0.000
CO		28.010	0.0727	0.00000	0.0000	4347	0.00	322.0	0.000
Methane	95.034	16.041	0.0417	0.03958	89.7738	23879	21437.08	1013.0	962.694
Ethane	3.023	30.067	0.0789	0.00238	5.4076	22320	1206.98	1792.0	54.172
Ethylene		28.051	0.0733	0.00000	0.0000	21644	0.00	1614.0	0.000
Propane	0.125	44.092	0.1175	0.00015	0.3330	21661	72.14	2590.0	3.238
propylene		42.077	0.1090	0.00000	0.0000	21041	0.00	2336.0	0.000
Isobutane	0.012	58.118	0.1554	0.00002	0.0423	21308	9.01	3363.0	0.404
n-butane	0.013	58.118	0.1554	0.00002	0.0458	21257	9.74	3370.0	0.438
Isobutene		56.102	0.1454	0.00000	0.0000	20840	0.00	3068.0	0.000
Isopentane	0.005	72.144	0.1870	0.00001	0.0212	21091	4.47	4008.0	0.200
n-pentane	0.003	72.144	0.1870	0.00001	0.0127	21052	2.68	4016.0	0.120
n-hexane +	0.016	86.169	0.2234	0.00004	0.0811	20940	16.97	4762.0	0.762
H2S		34.076	0.0895	0.00000	0.0000	7100	0.00	647.0	0.000
Totals	**100.00**	**731.25**	**1.91**	**0.04**	**100.00**	**Gross Heating Value**			
Average Density:		**0.0441**	**Specific Gravity:**		**0.576**	**Btu/lb:**	**22759**	**Btu/SCF:**	**1022**

CALCULATION OF F FACTORS

Component	Mol. Wt.	C Factor	H Factor	% volume	Fract. Wt.	Weight Percents				
						Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur
Hydrogen	2.016	0.0000	1.0000	0.0000	0.0000		0.0000			
Oxygen	32.000	0.0000	0.0000	0.0000	0.0000				0.0000	
Nitrogen	28.016	0.0000	0.0000	0.3460	9.6935			0.5714		
CO2	44.010	0.2723	0.0000	1.4230	62.6262	1.0051			2.6836	
CO	28.010	0.4259	0.0000	0.0000	0.0000	0.0000			0.0000	
Methane	16.041	0.7500	0.2500	95.0340	1524.4404	67.3906	22.4635			
Ethane	30.067	0.8000	0.2000	3.0230	90.8925	4.2859	1.0715			
Ethylene	28.051	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Propane	44.092	0.8182	0.1818	0.1250	5.5115	0.2658	0.0591			
Propene	42.077	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isobutane	58.118	0.8276	0.1725	0.0120	0.6974	0.0340	0.0071			
n-butane	58.118	0.8276	0.1725	0.0130	0.7555	0.0369	0.0077			
Isobutene	56.102	0.8571	0.1429	0.0000	0.0000	0.0000	0.0000			
Isopentane	72.144	0.8333	0.1667	0.0050	0.3607	0.0177	0.0035			
n-pentane	72.144	0.8333	0.1667	0.0030	0.2164	0.0106	0.0021			
n-hexane	86.169	0.8372	0.1628	0.0160	1.3787	0.0680	0.0132			
H2S	34.076	0.0000	0.0587	0.0000	0.0000	0.0000	0.0000			0.0000
Totals	**731.25**	**9.80**	**2.96**	**100.00**	**1696.573**	**73.115**	**23.628**	**0.571**	**2.684**	**0.000**

CALCULATED VALUES

O2 F Factor (dry)	**8643**	DSCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
O2 F Factor (wet)	**10647**	SCF of Exhaust/MMBtu of Fuel Burned @ 0% excess air
Moisture F Factor	**2004**	SCF of Water/MMBtu of Fuel Burned @ 0% excess air
Combust. Moisture	**18.82**	Volume % water in flue gas @ 0% excess air
CO2 F Factor	**1031**	DSCF of CO2/MMBtu of Fuel Burned @ 0% excess air
Carbon Dioxide	**11.93**	Volume % CO2 in flue gas @ 0% O2
Predicted Fo Factor	**1.75**	EPA Method 3b Fo value
Fuel VOC %	**6.15%**	Non-methane
Fuel VOC %	**0.56%**	Non-methane, non-ethane

B. LABORATORY DATA

Laboratory data is not applicable for this testing program. All sampling was performed on-site.

C. DATALOG RECORDS

NOx, CO, O_2 & CO_2

IV. C. Datalog Record
Unit #1

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
11:52	8/3/21	0.68	0.50	-0.11	0.08	Calibration
11:53	8/3/21	15.82	14.26	0.00	0.19	
11:54	8/3/21	24.91	24.19	-0.12	0.05	
11:55	8/3/21	6.85	9.66	7.30	7.34	
11:56	8/3/21	0.77	1.85	10.05	10.06	
11:57	8/3/21	12.49	3.46	2.94	4.28	
11:58	8/3/21	34.04	3.96	6.96	7.68	Stratification Test
11:59	8/3/21	35.74	4.30	6.29	8.10	Point 1
12:00	8/3/21	36.43	4.69	5.88	8.36	
12:01	8/3/21	36.58	4.59	5.82	8.42	
12:02	8/3/21	36.58	4.37	5.91	8.35	Point 2
12:03	8/3/21	36.46	4.59	5.99	8.31	
12:04	8/3/21	36.85	4.95	5.82	8.39	
12:05	8/3/21	37.27	4.82	5.70	8.47	
12:06	8/3/21	37.75	4.59	5.55	8.56	Point 3
12:07	8/3/21	37.66	4.85	5.58	8.54	
12:08	8/3/21	37.36	4.44	5.70	8.47	
12:09	8/3/21	37.00	4.69	5.88	8.36	

Stratification Results					*Average*
Average		Point 1 Avg	Point 2 Avg	Point 3 Avg	(%)
NOx	36.91	36.50	37.06	37.18	NOx
Percent Deviation (%):		1.12	-0.39	-0.72	0.00
CO	4.70	4.64	4.88	4.56	CO
Percent Deviation (%):		1.17	-3.91	2.86	0.04
O2	5.80	5.85	5.76	5.79	O2
Percent Deviation (%):		-0.83	0.70	0.14	0.00
CO2	8.41	8.39	8.43	8.42	CO2
Percent Deviation (%):		0.28	-0.22	-0.06	0.00

Gas Constituent Averages				
Time	NOx	CO	O2	CO2
12:00	36.43	4.69	5.88	8.36
12:01	36.58	4.59	5.82	8.42
12:04	36.85	4.95	5.82	8.39
12:05	37.27	4.82	5.70	8.47
12:08	37.36	4.44	5.70	8.47
12:09	37.00	4.69	5.88	8.36
Average	36.91	4.70	5.80	8.41

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
12:10	8/3/21	36.52	4.95	6.00	8.29	Start Run 1
12:11	8/3/21	35.70	4.85	6.11	8.23	
12:12	8/3/21	35.52	4.47	6.05	8.27	
12:13	8/3/21	35.31	5.31	6.02	8.28	
12:14	8/3/21	35.71	5.11	6.03	8.28	
12:15	8/3/21	35.77	5.14	6.07	8.25	
12:16	8/3/21	35.43	4.82	6.00	8.29	
12:17	8/3/21	36.40	5.31	5.94	8.32	
12:18	8/3/21	35.74	5.06	6.07	8.25	
12:19	8/3/21	35.53	4.95	6.11	8.23	
12:20	8/3/21	35.64	4.92	6.10	8.22	
12:21	8/3/21	36.73	5.50	5.97	8.30	
12:22	8/3/21	36.10	5.66	5.98	8.29	
12:23	8/3/21	36.61	5.75	5.94	8.32	
12:24	8/3/21	36.43	5.95	5.94	8.32	
12:25	8/3/21	36.61	5.50	5.94	8.32	
12:26	8/3/21	36.13	5.76	6.00	8.29	
12:27	8/3/21	36.79	5.53	5.97	8.31	
12:28	8/3/21	36.88	5.76	5.92	8.34	
12:29	8/3/21	36.76	5.76	5.92	8.34	
12:30	8/3/21	35.86	5.69	5.93	8.32	
12:31	8/3/21	36.97	5.40	5.92	8.33	
12:32	8/3/21	36.67	5.40	5.90	8.34	
12:33	8/3/21	36.40	5.92	5.96	8.31	
12:34	8/3/21	36.70	5.69	5.97	8.31	
12:35	8/3/21	36.37	5.31	5.97	8.31	
12:36	8/3/21	37.00	5.56	5.90	8.34	
12:37	8/3/21	36.79	5.24	5.94	8.32	
12:38	8/3/21	36.79	5.47	5.84	8.38	
12:39	8/3/21	36.97	5.31	5.94	8.32	
12:40	8/3/21	36.73	5.50	5.94	8.33	
12:41	8/3/21	36.76	5.21	5.94	8.34	
12:42	8/3/21	36.76	5.24	6.03	8.28	
12:43	8/3/21	37.33	5.01	5.97	8.31	
12:44	8/3/21	37.12	5.24	5.95	8.33	
12:45	8/3/21	37.03	5.24	5.86	8.38	
12:46	8/3/21	37.03	4.85	5.95	8.32	
12:47	8/3/21	36.85	4.69	5.92	8.33	
12:48	8/3/21	36.64	4.84	6.07	8.25	
12:49	8/3/21	37.21	4.59	5.93	8.33	
12:50	8/3/21	36.82	4.30	5.96	8.31	
12:51	8/3/21	37.39	4.08	5.84	8.38	
12:52	8/3/21	36.85	4.11	5.94	8.32	
12:53	8/3/21	37.15	4.24	5.94	8.31	
12:54	8/3/21	36.58	4.11	5.92	8.33	
12:55	8/3/21	36.55	3.66	5.99	8.29	
12:56	8/3/21	37.12	3.66	6.03	8.27	
12:57	8/3/21	36.67	3.69	5.86	8.35	
12:58	8/3/21	36.55	3.95	5.81	8.40	
12:59	8/3/21	36.69	3.69	5.94	8.32	
13:00	8/3/21	36.55	3.56	5.86	8.37	
13:01	8/3/21	37.18	3.56	5.83	8.39	
13:02	8/3/21	37.15	3.65	5.74	8.45	
13:03	8/3/21	36.73	3.30	5.70	8.46	
13:04	8/3/21	36.58	3.27	5.64	8.51	
13:05	8/3/21	36.97	5.40	5.92	8.33	
13:06	8/3/21	36.67	5.40	5.90	8.34	
13:07	8/3/21	35.74	5.06	6.07	8.25	
13:08	8/3/21	35.53	4.95	6.11	8.23	
13:09	8/3/21	36.13	5.76	6.00	8.29	
13:10	8/3/21	36.79	5.53	5.97	8.31	
Run 1 Average		**36.53**	**4.92**	**5.95**	**8.32**	
13:11	8/3/21	4.23	3.27	0.62	1.14	
13:12	8/3/21	0.64	0.58	-0.12	0.07	
13:13	8/3/21	15.82	14.26	0.00	0.19	
13:14	8/3/21	24.87	23.88	-0.12	0.05	
13:15	8/3/21	1.46	2.72	10.67	10.82	
13:16	8/3/21	0.83	2.17	10.01	10.02	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
13:17	8/3/21	21.62	4.37	3.92	5.81	
13:18	8/3/21	28.38	4.46	6.76	8.12	
13:19	8/3/21	35.01	4.29	5.59	7.38	
13:20	8/3/21	35.94	3.97	5.49	7.30	Start Run 2
13:21	8/3/21	36.13	4.07	5.44	7.29	
13:22	8/3/21	36.25	3.71	5.34	7.36	
13:23	8/3/21	36.40	3.87	5.46	7.29	
13:24	8/3/21	36.61	3.97	5.42	7.31	
13:25	8/3/21	36.58	4.07	5.28	7.39	
13:26	8/3/21	36.58	3.87	4.98	7.56	
13:27	8/3/21	37.42	3.75	5.21	7.43	
13:28	8/3/21	37.57	3.45	5.27	7.40	
13:29	8/3/21	36.88	4.07	5.24	7.41	
13:30	8/3/21	36.76	4.20	4.99	7.55	
13:31	8/3/21	36.55	3.97	5.13	7.47	
13:32	8/3/21	36.67	3.87	5.36	7.35	
13:33	8/3/21	36.94	3.71	5.31	7.38	
13:34	8/3/21	36.88	3.62	5.31	7.38	
13:35	8/3/21	36.97	3.87	5.24	7.41	
13:36	8/3/21	36.76	3.71	5.14	7.47	
13:37	8/3/21	36.70	3.62	5.32	7.37	
13:38	8/3/21	36.40	3.70	5.33	7.36	
13:39	8/3/21	36.58	3.74	5.36	7.36	
13:40	8/3/21	37.42	4.10	5.27	7.40	
13:41	8/3/21	36.52	4.07	5.33	7.37	
13:42	8/3/21	36.34	3.87	5.40	7.33	
13:43	8/3/21	36.55	3.97	5.34	7.36	
13:44	8/3/21	36.61	4.29	5.22	7.42	
13:45	8/3/21	37.00	4.29	5.33	7.37	
13:46	8/3/21	37.51	4.10	5.24	7.41	
13:47	8/3/21	36.82	4.36	5.15	7.46	
13:48	8/3/21	36.79	4.26	5.34	7.36	
13:49	8/3/21	36.73	4.46	5.40	7.33	
13:50	8/3/21	36.61	4.65	5.36	7.36	
13:51	8/3/21	36.76	4.36	5.24	7.42	
13:52	8/3/21	37.57	4.65	5.15	7.47	
13:53	8/3/21	37.09	4.26	5.18	7.46	
13:54	8/3/21	36.70	4.29	5.23	7.43	
13:55	8/3/21	37.12	4.65	5.20	7.45	
13:56	8/3/21	37.18	4.46	5.33	7.38	
13:57	8/3/21	25.97	4.20	5.31	7.38	
13:58	8/3/21	33.51	4.65	5.30	7.40	
13:59	8/3/21	37.36	4.46	5.27	7.38	
14:00	8/3/21	37.12	4.55	5.10	7.48	
14:01	8/3/21	36.85	4.00	5.10	7.48	
14:02	8/3/21	37.00	3.71	5.34	7.35	
14:03	8/3/21	37.39	3.97	5.21	7.41	
14:04	8/3/21	37.27	4.29	5.14	7.45	
14:05	8/3/21	37.21	4.40	5.04	7.51	
14:06	8/3/21	37.30	4.10	5.13	7.46	
14:07	8/3/21	37.48	4.07	5.17	7.43	
14:08	8/3/21	37.51	4.26	5.24	7.40	
14:09	8/3/21	38.08	4.46	5.15	7.43	
14:10	8/3/21	37.27	4.46	5.23	7.39	
14:11	8/3/21	37.09	4.29	5.31	7.36	
14:12	8/3/21	37.06	4.46	5.28	7.36	
14:13	8/3/21	36.97	4.55	5.10	7.46	
14:14	8/3/21	37.12	4.97	5.23	7.39	
14:15	8/3/21	37.93	4.85	5.13	7.44	
14:16	8/3/21	37.30	5.46	5.06	7.47	
14:17	8/3/21	37.06	5.00	4.87	7.59	
14:18	8/3/21	37.96	5.39	5.02	7.50	
14:19	8/3/21	38.11	5.26	5.07	7.47	
14:20	8/3/21	37.45	5.39	5.07	7.47	
Run 2 Average		**36.76**	**4.25**	**5.23**	**7.41**	
14:21	8/3/21	23.68	4.01	4.71	6.80	
14:22	8/3/21	1.34	0.75	0.01	0.23	
14:23	8/3/21	17.24	14.05	0.03	0.20	
14:24	8/3/21	24.18	23.52	-0.11	0.03	
14:25	8/3/21	14.06	20.82	6.21	6.20	
14:26	8/3/21	1.07	4.39	9.95	9.88	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
14:27	8/3/21	23.86	4.69	7.21	8.40	
14:28	8/3/21	27.78	35.74	3.02	2.13	
14:29	8/3/21	34.14	3.73	5.78	7.54	
14:30	8/3/21	36.22	5.01	5.27	7.46	Start Run 3
14:31	8/3/21	36.49	5.21	5.06	7.51	
14:32	8/3/21	37.27	5.11	5.23	7.40	
14:33	8/3/21	37.18	4.95	5.23	7.40	
14:34	8/3/21	36.93	4.75	4.99	7.52	
14:35	8/3/21	37.39	4.85	5.13	7.44	
14:36	8/3/21	37.30	4.66	5.27	7.37	
14:37	8/3/21	36.88	4.95	5.09	7.47	
14:38	8/3/21	36.28	4.75	5.06	7.49	
14:39	8/3/21	36.88	4.56	5.12	7.45	
14:40	8/3/21	37.39	4.69	5.17	7.42	
14:41	8/3/21	37.03	4.56	5.22	7.40	
14:42	8/3/21	36.85	4.66	4.94	7.54	
14:43	8/3/21	36.82	4.46	5.14	7.44	
14:44	8/3/21	37.24	4.56	5.19	7.41	
14:45	8/3/21	36.97	4.20	5.06	7.48	
14:46	8/3/21	36.91	4.01	5.00	7.52	
14:47	8/3/21	36.91	3.85	5.26	7.38	
14:48	8/3/21	37.21	5.11	5.28	7.36	
14:49	8/3/21	37.15	4.40	5.21	7.40	
14:50	8/3/21	37.03	3.97	5.16	7.42	
14:51	8/3/21	37.03	4.14	4.93	7.56	
14:52	8/3/21	37.54	4.27	5.11	7.44	
14:53	8/3/21	37.18	4.14	5.11	7.45	
14:54	8/3/21	36.73	4.50	4.99	7.51	
14:55	8/3/21	37.39	4.50	5.14	7.43	
14:56	8/3/21	37.06	4.27	5.22	7.39	
14:57	8/3/21	37.03	4.69	4.99	7.51	
14:58	8/3/21	37.84	4.66	5.07	7.47	
14:59	8/3/21	37.75	4.69	5.11	7.45	
15:00	8/3/21	37.27	4.85	5.03	7.49	
15:01	8/3/21	36.94	4.75	4.98	7.52	
15:02	8/3/21	37.27	4.69	5.16	7.41	
15:03	8/3/21	37.33	4.69	5.18	7.41	
15:04	8/3/21	37.27	4.95	5.04	7.49	
15:05	8/3/21	37.24	4.56	4.94	7.54	
15:06	8/3/21	37.27	4.69	5.12	7.43	
15:07	8/3/21	37.24	5.34	4.85	7.59	
15:08	8/3/21	37.27	4.95	5.07	7.47	
15:09	8/3/21	37.45	4.69	5.14	7.43	
15:10	8/3/21	37.21	5.30	4.94	7.54	
15:11	8/3/21	36.94	5.47	5.07	7.47	
15:12	8/3/21	36.76	4.95	5.23	7.38	
15:13	8/3/21	36.88	5.04	5.22	7.39	
15:14	8/3/21	37.63	4.21	5.10	7.45	
15:15	8/3/21	37.03	4.47	5.11	7.44	
15:16	8/3/21	36.61	4.30	4.89	7.57	
15:17	8/3/21	36.49	4.50	5.19	7.41	
15:18	8/3/21	36.49	4.50	5.23	7.38	
15:19	8/3/21	36.25	4.82	4.99	7.51	
15:20	8/3/21	36.28	4.56	5.11	7.45	
15:21	8/3/21	36.58	4.95	5.25	7.38	
15:22	8/3/21	36.52	4.69	5.15	7.43	
15:23	8/3/21	36.67	4.59	5.06	7.48	
15:24	8/3/21	36.70	4.60	5.19	7.41	
15:25	8/3/21	36.94	4.47	5.33	7.34	
15:26	8/3/21	36.85	4.37	5.13	7.44	
15:27	8/3/21	36.37	4.56	5.02	7.50	
15:28	8/3/21	37.06	4.37	5.12	7.45	
15:29	8/3/21	37.00	4.24	5.19	7.41	
15:30	8/3/21	36.76	4.21	5.06	7.47	
Run 3 Average		**36.99**	**4.63**	**5.11**	**7.45**	
15:31	8/3/21	4.95	4.11	0.68	1.25	
15:32	8/3/21	0.61	0.59	0.04	0.31	
15:33	8/3/21	16.60	15.39	0.17	0.42	
15:34	8/3/21	23.84	23.70	-0.10	0.06	
15:35	8/3/21	3.30	7.60	9.09	9.08	
15:36	8/3/21	1.34	5.56	9.91	9.81	

IV. C. Datalog Record
Unit #2

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
7:49	8/3/21	0.10	-0.25	-0.01	0.02	Calibration
7:50	8/3/21	24.34	24.00	-0.01	0.03	
7:51	8/3/21	0.79	1.86	9.92	10.03	
7:52	8/3/21	36.07	1.98	6.34	7.46	Stratification Test
7:53	8/3/21	34.35	2.24	6.85	7.93	Point 1
7:54	8/3/21	36.04	1.94	6.84	7.94	
7:55	8/3/21	35.98	2.25	6.70	8.02	
7:56	8/3/21	36.06	2.29	6.76	7.99	Point 2
7:57	8/3/21	36.21	2.22	6.99	7.82	
7:58	8/3/21	36.09	2.02	6.76	7.97	
7:59	8/3/21	35.55	1.96	6.98	7.84	
8:00	8/3/21	35.70	2.16	7.05	7.80	Point 3
8:01	8/3/21	36.16	2.29	6.96	7.86	
8:02	8/3/21	35.70	2.00	7.14	7.75	
8:03	8/3/21	35.86	2.37	7.17	7.73	

Stratification Results				*Average*
Average	Point 1 Avg	Point 2 Avg	Point 3 Avg	(%)
NOx 35.87	36.01	35.82	35.78	NOx
Percent Deviation (%):	-0.39	0.14	0.25	0.00
CO 2.09	2.10	1.99	2.19	CO
Percent Deviation (%):	-0.24	4.90	-4.44	0.07
O2 6.93	6.77	6.87	7.16	O2
Percent Deviation (%):	2.36	0.89	-3.17	0.03
CO2 7.88	7.98	7.91	7.74	CO2
Percent Deviation (%):	-1.32	-0.38	1.73	0.01

Gas Constituent Averages				
Time	NOx	CO	O2	CO2
7:54	36.04	1.94	6.84	7.94
7:55	35.98	2.25	6.70	8.02
7:58	36.09	2.02	6.76	7.97
7:59	35.55	1.96	6.98	7.84
8:02	35.70	2.00	7.14	7.75
8:03	35.86	2.37	7.17	7.73
Average	35.87	2.09	6.93	7.88

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
8:04	8/3/21	35.89	2.08	7.14	7.76	Start Run 1
8:05	8/3/21	35.94	2.05	6.92	7.89	
8:06	8/3/21	36.04	2.04	7.09	7.79	
8:07	8/3/21	36.04	2.11	7.09	7.80	
8:08	8/3/21	36.00	2.33	6.90	7.91	
8:09	8/3/21	36.04	2.31	7.03	7.84	
8:10	8/3/21	36.01	2.12	7.07	7.81	
8:11	8/3/21	36.25	1.97	6.92	7.90	
8:12	8/3/21	36.10	2.13	6.90	7.92	
8:13	8/3/21	36.31	2.33	6.99	7.87	
8:14	8/3/21	36.34	1.93	7.02	7.84	
8:15	8/3/21	36.12	2.25	6.84	7.95	
8:16	8/3/21	36.58	2.15	6.92	7.90	
8:17	8/3/21	36.67	2.23	6.91	7.91	
8:18	8/3/21	36.22	1.99	6.78	7.98	
8:19	8/3/21	36.55	1.94	6.85	7.93	
8:20	8/3/21	36.52	2.24	6.84	7.94	
8:21	8/3/21	36.25	1.98	6.70	8.02	
8:22	8/3/21	36.94	2.20	6.76	7.99	
8:23	8/3/21	37.36	2.00	6.90	7.89	
8:24	8/3/21	36.85	1.99	6.67	8.02	
8:25	8/3/21	36.31	2.24	6.69	8.01	
8:26	8/3/21	36.76	1.96	6.80	7.94	
8:27	8/3/21	37.03	2.03	6.77	7.95	
8:28	8/3/21	36.31	2.34	6.71	7.98	
8:29	8/3/21	36.64	2.13	6.71	7.98	
8:30	8/3/21	36.82	1.99	6.75	7.95	
8:31	8/3/21	36.46	2.04	6.57	8.06	
8:32	8/3/21	36.16	2.14	6.67	7.99	
8:33	8/3/21	36.85	2.35	6.71	7.97	
8:34	8/3/21	37.00	1.93	6.71	7.96	
8:35	8/3/21	36.16	2.04	6.67	7.98	
8:36	8/3/21	36.28	1.94	6.71	7.95	
8:37	8/3/21	36.79	2.37	6.75	7.93	
8:38	8/3/21	36.52	2.00	6.58	8.01	
8:39	8/3/21	35.95	2.07	6.72	7.93	
8:40	8/3/21	36.94	2.22	6.72	7.92	
8:41	8/3/21	37.00	2.33	6.74	7.91	
8:42	8/3/21	35.86	2.37	6.72	7.92	
8:43	8/3/21	35.92	2.38	6.75	7.89	
8:44	8/3/21	36.79	1.99	6.71	7.92	
8:45	8/3/21	37.30	2.12	6.67	7.95	
8:46	8/3/21	36.13	2.21	6.69	7.93	
8:47	8/3/21	36.16	2.19	6.71	7.92	
8:48	8/3/21	37.02	2.34	6.66	7.94	
8:49	8/3/21	36.77	2.19	6.56	7.99	
8:50	8/3/21	35.92	2.25	6.70	7.91	
8:51	8/3/21	36.61	2.01	6.62	7.95	
8:52	8/3/21	37.06	2.00	6.66	7.93	
8:53	8/3/21	36.67	2.02	6.54	7.99	
8:54	8/3/21	36.00	1.92	6.71	7.90	
8:55	8/3/21	37.48	2.13	6.66	7.91	
8:56	8/3/21	37.45	2.27	6.60	7.95	
8:57	8/3/21	36.28	2.27	6.58	7.96	
8:58	8/3/21	35.89	2.33	6.66	7.91	
8:59	8/3/21	37.00	2.37	6.63	7.92	
9:00	8/3/21	37.48	2.37	6.58	7.95	
9:01	8/3/21	36.25	2.03	6.58	7.95	
9:02	8/3/21	36.07	1.98	6.68	7.89	
9:03	8/3/21	37.16	1.97	6.62	7.92	
9:04	8/3/21	37.02	2.34	6.71	7.97	
	Run 1 Average	36.51	2.14	6.76	7.93	
9:05	8/3/21	0.44	2.27	-0.20	0.16	
9:06	8/3/21	0.25	2.14	-0.25	0.09	
9:07	8/3/21	0.23	-0.02	-0.26	0.09	
9:08	8/3/21	22.10	17.21	0.70	0.90	
9:09	8/3/21	24.52	24.40	0.03	0.13	
9:10	8/3/21	24.40	24.70	0.00	0.08	
9:11	8/3/21	12.56	17.74	5.63	5.56	
9:12	8/3/21	1.04	-0.99	9.69	9.80	
9:13	8/3/21	0.35	-0.80	9.94	10.07	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
9:14	8/3/21	32.48	1.90	7.46	8.32	
9:15	8/3/21	36.74	1.89	6.88	7.93	
9:16	8/3/21	33.62	2.02	6.92	7.85	Start Run 2
9:17	8/3/21	34.99	1.87	6.97	7.83	
9:18	8/3/21	37.24	2.00	6.86	7.89	
9:19	8/3/21	36.58	2.09	6.77	7.95	
9:20	8/3/21	35.98	2.22	6.92	7.86	
9:21	8/3/21	36.52	2.45	6.87	7.89	
9:22	8/3/21	36.88	2.21	6.85	7.89	
9:23	8/3/21	36.25	2.41	6.82	7.91	
9:24	8/3/21	35.86	2.04	6.93	7.84	
9:25	8/3/21	36.61	1.95	6.90	7.85	
9:26	8/3/21	36.88	2.16	6.83	7.89	
9:27	8/3/21	35.92	1.87	6.89	7.85	
9:28	8/3/21	35.95	2.04	6.91	7.84	
9:29	8/3/21	36.91	2.12	6.85	7.87	
9:30	8/3/21	36.91	2.37	6.73	7.94	
9:31	8/3/21	36.31	2.07	6.80	7.89	
9:32	8/3/21	36.55	2.04	6.79	7.89	
9:33	8/3/21	37.03	2.37	6.82	7.88	
9:34	8/3/21	36.43	2.01	6.75	7.92	
9:35	8/3/21	36.13	2.19	6.80	7.89	
9:36	8/3/21	36.64	2.33	6.79	7.89	
9:37	8/3/21	37.06	2.40	6.78	7.90	
9:38	8/3/21	36.55	2.39	6.77	7.91	
9:39	8/3/21	36.32	2.06	6.83	7.87	
9:40	8/3/21	37.00	2.28	6.75	7.91	
9:41	8/3/21	37.42	2.30	6.73	7.92	
9:42	8/3/21	36.40	2.21	6.75	7.91	
9:43	8/3/21	36.49	1.97	6.83	7.86	
9:44	8/3/21	37.24	2.34	6.79	7.89	
9:45	8/3/21	36.88	2.43	6.66	7.95	
9:46	8/3/21	36.37	2.11	6.79	7.87	
9:47	8/3/21	36.58	2.35	6.76	7.89	
9:48	8/3/21	37.27	2.04	6.74	7.91	
9:49	8/3/21	36.88	2.34	6.65	7.95	
9:50	8/3/21	36.13	2.22	6.80	7.87	
9:51	8/3/21	36.79	2.23	6.76	7.89	
9:52	8/3/21	37.21	2.41	6.78	7.88	
9:53	8/3/21	36.58	2.10	6.75	7.90	
9:54	8/3/21	36.19	2.04	6.82	7.86	
9:55	8/3/21	36.94	2.43	6.78	7.88	
9:56	8/3/21	37.42	1.95	6.78	7.87	
9:57	8/3/21	36.67	2.40	6.75	7.90	
9:58	8/3/21	36.58	2.44	6.78	7.89	
9:59	8/3/21	37.27	2.39	6.73	7.91	
10:00	8/3/21	37.60	2.11	6.62	7.96	
10:01	8/3/21	36.73	2.23	6.78	7.88	
10:02	8/3/21	36.76	2.45	6.82	7.85	
10:03	8/3/21	37.54	2.43	6.77	7.88	
10:04	8/3/21	37.00	1.89	6.69	7.93	
10:05	8/3/21	36.40	2.09	6.79	7.86	
10:06	8/3/21	37.42	2.30	6.86	7.82	
10:07	8/3/21	37.48	1.97	6.75	7.89	
10:08	8/3/21	36.43	2.17	6.79	7.87	
10:09	8/3/21	36.76	2.02	6.78	7.87	
10:10	8/3/21	37.33	2.30	6.78	7.87	
10:11	8/3/21	36.97	2.10	6.67	7.93	
10:12	8/3/21	36.67	1.90	6.76	7.87	
10:13	8/3/21	37.51	2.15	6.70	7.91	
10:14	8/3/21	37.84	2.27	6.78	7.86	
10:15	8/3/21	37.21	1.93	6.70	7.91	
10:16	8/3/21	36.46	2.38	6.77	7.87	
	Run 2 Average	36.70	2.19	6.79	7.89	
10:17	8/3/21	26.16	1.85	6.28	7.24	
10:18	8/3/21	4.27	1.98	0.90	1.26	
10:19	8/3/21	0.92	2.40	0.02	0.23	
10:20	8/3/21	0.43	0.17	-0.18	0.08	
10:21	8/3/21	21.43	17.43	0.52	0.78	
10:22	8/3/21	22.21	24.21	-0.03	0.18	
10:23	8/3/21	24.61	24.17	-0.08	0.08	
10:24	8/3/21	24.85	24.62	-0.05	0.11	
10:25	8/3/21	7.46	10.31	7.96	8.02	
10:26	8/3/21	1.76	2.56	9.48	9.69	
10:27	8/3/21	0.59	1.40	9.78	10.01	
10:28	8/3/21	1.97	1.46	9.81	10.07	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
10:29	8/3/21	33.17	2.01	7.34	8.30	
10:30	8/3/21	36.06	1.91	6.91	7.89	Start Run 3
10:31	8/3/21	36.67	1.75	6.87	7.82	
10:32	8/3/21	37.81	1.62	6.82	7.84	
10:33	8/3/21	37.54	2.62	6.71	7.90	
10:34	8/3/21	36.97	2.17	6.82	7.84	
10:35	8/3/21	37.96	2.30	6.75	7.87	
10:36	8/3/21	38.14	1.91	6.72	7.89	
10:37	8/3/21	37.42	2.01	6.70	7.91	
10:38	8/3/21	37.09	2.04	6.73	7.89	
10:39	8/3/21	37.60	2.30	6.70	7.91	
10:40	8/3/21	37.93	2.56	6.65	7.93	
10:41	8/3/21	37.00	2.17	6.66	7.93	
10:42	8/3/21	36.79	2.17	6.75	7.87	
10:43	8/3/21	37.60	2.01	6.73	7.89	
10:44	8/3/21	38.05	2.17	6.68	7.91	
10:45	8/3/21	37.12	2.17	6.66	7.93	
10:46	8/3/21	37.09	2.21	6.68	7.91	
10:47	8/3/21	37.81	2.30	6.71	7.89	
10:48	8/3/21	38.17	2.21	6.70	7.89	
10:49	8/3/21	36.94	1.85	6.82	7.83	
10:50	8/3/21	37.03	2.01	6.78	7.84	
10:51	8/3/21	37.96	1.75	6.70	7.89	
10:52	8/3/21	37.81	2.30	6.58	7.96	
10:53	8/3/21	36.94	1.91	6.82	7.83	
10:54	8/3/21	37.39	2.30	6.75	7.86	
10:55	8/3/21	38.02	1.66	6.72	7.88	
10:56	8/3/21	37.54	2.04	6.66	7.92	
10:57	8/3/21	37.21	2.01	6.74	7.88	
10:58	8/3/21	38.02	2.40	6.68	7.91	
10:59	8/3/21	38.66	2.04	6.69	7.91	
11:00	8/3/21	37.39	2.01	6.68	7.92	
11:01	8/3/21	37.21	2.21	6.76	7.87	
11:02	8/3/21	38.08	2.17	6.69	7.91	
11:03	8/3/21	38.35	2.21	6.67	7.92	
11:04	8/3/21	37.36	2.21	6.67	7.92	
11:05	8/3/21	37.00	1.85	6.79	7.85	
11:06	8/3/21	38.32	2.30	6.73	7.89	
11:07	8/3/21	37.93	1.72	6.58	7.97	
11:08	8/3/21	37.08	1.72	6.79	7.85	
11:09	8/3/21	37.54	1.75	6.78	7.84	
11:10	8/3/21	38.29	1.56	6.68	7.90	
11:11	8/3/21	37.54	1.66	6.75	7.87	
11:12	8/3/21	36.97	1.85	6.80	7.83	
11:13	8/3/21	38.11	2.01	6.73	7.88	
11:14	8/3/21	38.62	2.04	6.65	7.93	
11:15	8/3/21	37.39	2.17	6.77	7.87	
11:16	8/3/21	37.15	2.30	6.80	7.84	
11:17	8/3/21	38.14	2.01	6.70	7.91	
11:18	8/3/21	38.41	2.30	6.59	7.96	
11:19	8/3/21	37.27	2.40	6.79	7.85	
11:20	8/3/21	37.18	2.59	6.80	7.84	
11:21	8/3/21	38.23	2.40	6.72	7.89	
11:22	8/3/21	38.08	2.59	6.57	7.98	
11:23	8/3/21	36.82	2.66	6.73	7.89	
11:24	8/3/21	37.45	3.01	6.74	7.87	
11:25	8/3/21	38.83	3.01	6.65	7.93	
11:26	8/3/21	37.91	2.91	6.61	7.96	
11:27	8/3/21	37.39	3.01	6.75	7.87	
11:28	8/3/21	38.23	3.27	6.70	7.91	
11:29	8/3/21	38.71	3.27	6.69	7.91	
11:30	8/3/21	37.60	3.30	6.66	7.92	
	Run 3 Average	37.62	2.22	6.72	7.89	
11:31	8/3/21	25.70	3.56	6.45	7.48	
11:32	8/3/21	3.78	3.04	0.72	1.10	
11:33	8/3/21	1.01	1.49	-0.12	0.20	
11:34	8/3/21	19.08	13.36	0.56	0.83	
11:35	8/3/21	24.55	24.23	-0.03	0.18	
11:36	8/3/21	24.67	24.41	-0.12	0.09	
11:37	8/3/21	12.92	13.66	1.06	1.15	
11:38	8/3/21	4.88	9.11	8.66	8.80	
11:39	8/3/21	1.34	3.95	9.68	9.89	

IV. C. Datalog Record
Unit #3

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
8:26	8/2/21	1.67				MFC Check
8:27	8/2/21	252.88				MFC 3
8:28	8/2/21	250.16				
8:29	8/2/21	502.20				
8:30	8/2/21	252.85				
8:31	8/2/21	251.95				
8:32	8/2/21	503.93				
8:33	8/2/21	252.86				
8:34	8/2/21	250.98				
8:35	8/2/21	503.02				
8:36	8/2/21	254.66				MFC 2
8:37	8/2/21	1003.94				
8:38	8/2/21	2002.85				
8:39	8/2/21	253.96				
8:40	8/2/21	1005.02				
8:41	8/2/21	2004.44				
8:42	8/2/21	254.37				
8:43	8/2/21	1002.53				
8:44	8/2/21	2002.48				
9:16	8/2/21	0.60	-0.03	0.00	-0.01	Initial Linearity
9:17	8/2/21	25.02	25.20	0.05	-0.02	
9:18	8/2/21	49.89	48.61	0.05	-0.04	
9:19	8/2/21	50.01	50.17	0.05	-0.04	
9:20	8/2/21	46.82	-0.61	5.13	4.97	
9:21	8/2/21	48.91	-0.80	9.98	9.93	NOx Converter
9:22	8/2/21	0.27	12.53	15.45	15.04	Efficiency Test
9:23	8/2/21	0.21	-0.32	19.79	19.87	
9:24	8/2/21	2.99	0.91	0.53	1.16	
9:25	8/2/21	0.18	0.36	0.21	0.05	Response Time /
9:26	8/2/21	25.20	24.48	0.14	0.07	Interference Test
9:27	8/2/21	0.21	0.56	9.92	9.85	
9:28	8/2/21	0.18	0.49	0.30	0.19	
9:29	8/2/21	28.00	3.56	3.78	9.81	Unit #3
9:30	8/2/21	30.50	3.46	3.04	9.81	Stratification Test
9:31	8/2/21	31.35	3.56	2.77	9.81	Point 1
9:32	8/2/21	32.37	3.14	2.63	9.82	
9:33	8/2/21	32.37	3.85	2.60	9.80	
9:34	8/2/21	32.40	3.30	2.59	9.78	Point 2
9:35	8/2/21	32.43	3.49	2.57	9.79	
9:36	8/2/21	32.40	3.14	2.56	9.80	
9:37	8/2/21	32.43	3.27	2.56	9.80	
9:38	8/2/21	32.34	3.85	2.56	9.81	Point 3
9:39	8/2/21	32.40	3.10	2.52	9.83	
9:40	8/2/21	32.28	3.55	2.56	9.81	
9:41	8/2/21	32.25	3.36	2.56	9.82	

Stratification Results					*Average*
Average		Point 1 Avg	Point 2 Avg	Point 3 Avg	(%)
NOx	**32.35**	32.37	32.41	32.26	NOx
Percent Deviation (%):		**-0.06**	**-0.20**	**0.26**	**0.00**
CO	**3.38**	3.49	3.20	3.46	CO
Percent Deviation (%):		**-3.17**	**5.51**	**-2.12**	**0.07**
O2	**2.58**	2.61	2.56	2.56	O2
Percent Deviation (%):		**-1.30**	**0.73**	**0.58**	**0.00**
CO2	**9.81**	9.81	9.80	9.81	CO2
Percent Deviation (%):		**-0.02**	**0.08**	**-0.06**	**0.00**

Gas Constituent Averages				
Time	NOx	CO	O2	CO2
9:32	32.37	3.14	2.63	9.82
9:33	32.37	3.85	2.60	9.80
9:36	32.40	3.14	2.56	9.80
9:37	32.43	3.27	2.56	9.80
9:40	32.28	3.55	2.56	9.81
9:41	32.25	3.36	2.56	9.82
Average	**32.35**	**3.38**	**2.58**	**9.81**

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
9:42	8/2/21	32.34	3.49	2.60	9.80	Start Run 1
9:43	8/2/21	32.37	3.46	2.56	9.82	
9:44	8/2/21	32.46	3.59	2.54	9.83	
9:45	8/2/21	32.40	3.56	2.56	9.81	
9:46	8/2/21	32.46	3.11	2.56	9.83	
9:47	8/2/21	32.40	3.27	2.57	9.82	
9:48	8/2/21	32.55	2.85	2.56	9.82	
9:49	8/2/21	32.52	3.14	2.60	9.81	
9:50	8/2/21	32.49	3.01	2.62	9.79	
9:51	8/2/21	32.46	3.01	2.66	9.77	
9:52	8/2/21	32.46	2.49	2.70	9.74	
9:53	8/2/21	32.34	2.65	2.67	9.76	
9:54	8/2/21	32.58	2.94	2.64	9.78	
9:55	8/2/21	32.61	3.10	2.61	9.80	
9:56	8/2/21	32.61	2.94	2.62	9.79	
9:57	8/2/21	32.76	2.59	2.62	9.80	
9:58	8/2/21	32.58	2.94	2.58	9.82	
9:59	8/2/21	32.94	2.72	2.57	9.81	
10:00	8/2/21	32.64	3.01	2.64	9.78	
10:01	8/2/21	32.70	2.59	2.64	9.77	
10:02	8/2/21	32.73	2.75	2.64	9.76	
10:03	8/2/21	32.70	2.49	2.65	9.77	
10:04	8/2/21	32.85	2.10	2.68	9.76	
10:05	8/2/21	32.82	2.46	2.70	9.75	
10:06	8/2/21	32.91	2.46	2.72	9.74	
10:07	8/2/21	32.94	2.65	2.74	9.73	
10:08	8/2/21	32.88	2.49	2.77	9.71	
10:09	8/2/21	32.82	2.40	2.78	9.70	
10:10	8/2/21	33.06	2.40	2.79	9.70	
10:11	8/2/21	32.58	2.36	2.78	9.70	
10:12	8/2/21	32.85	2.41	2.77	9.70	
10:13	8/2/21	33.24	2.46	2.77	9.71	
10:14	8/2/21	32.94	2.36	2.80	9.69	
10:15	8/2/21	32.64	2.17	2.78	9.70	
10:16	8/2/21	31.19	1.65	2.78	9.69	
10:17	8/2/21	33.88	1.56	2.78	9.69	
10:18	8/2/21	34.26	1.99	2.77	9.70	
10:19	8/2/21	33.18	2.17	2.79	9.68	
10:20	8/2/21	33.20	1.56	2.78	9.68	
10:21	8/2/21	33.21	1.36	2.80	9.68	
10:22	8/2/21	33.12	2.39	2.81	9.68	
10:23	8/2/21	33.18	2.27	2.87	9.65	
10:24	8/2/21	33.18	2.27	2.92	9.62	
10:25	8/2/21	33.18	2.36	2.86	9.65	
10:26	8/2/21	32.43	2.49	2.85	9.66	
10:27	8/2/21	33.33	2.65	2.83	9.67	
10:28	8/2/21	33.21	2.20	2.81	9.67	
10:29	8/2/21	33.06	2.59	2.81	9.66	
10:30	8/2/21	33.00	2.59	2.82	9.66	
10:31	8/2/21	33.03	2.10	2.82	9.66	
10:32	8/2/21	33.12	2.43	2.81	9.67	
10:33	8/2/21	33.09	2.27	2.80	9.67	
10:34	8/2/21	33.09	2.31	2.79	9.67	
10:35	8/2/21	33.12	2.49	2.79	9.67	
10:36	8/2/21	33.12	2.56	2.79	9.67	
10:37	8/2/21	33.12	1.81	2.81	9.65	
10:38	8/2/21	33.06	2.10	2.83	9.64	
10:39	8/2/21	33.06	2.11	2.84	9.63	
10:40	8/2/21	33.12	2.30	2.84	9.63	
10:41	8/2/21	33.12	2.49	2.83	9.64	
10:42	8/2/21	33.12	1.81	2.81	9.65	
Run 1 Average		**32.86**	**2.51**	**2.73**	**9.72**	
10:43	8/2/21	0.12	0.47	0.23	0.11	
10:44	8/2/21	25.04	20.79	0.19	0.05	
10:45	8/2/21	25.01	24.47	0.21	0.07	
10:46	8/2/21	0.27	1.65	9.90	9.83	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
10:47	8/2/21	12.03	10.24	6.15	8.32	
10:48	8/2/21	33.12	2.30	2.84	9.63	Start Run 2
10:49	8/2/21	33.09	2.59	2.91	9.60	
10:50	8/2/21	33.18	2.65	2.94	9.58	
10:51	8/2/21	33.21	1.30	2.95	9.56	
10:52	8/2/21	33.27	1.91	2.93	9.57	
10:53	8/2/21	33.21	1.72	2.89	9.59	
10:54	8/2/21	33.18	2.27	2.85	9.61	
10:55	8/2/21	33.24	1.72	2.84	9.62	
10:56	8/2/21	33.21	2.10	2.87	9.60	
10:57	8/2/21	33.24	1.81	2.91	9.58	
10:58	8/2/21	33.33	1.94	2.90	9.58	
10:59	8/2/21	33.42	2.04	2.89	9.59	
11:00	8/2/21	33.42	1.91	2.89	9.59	
11:01	8/2/21	33.39	1.72	2.89	9.58	
11:02	8/2/21	33.42	1.46	2.88	9.58	
11:03	8/2/21	33.42	2.20	2.88	9.57	
11:04	8/2/21	33.54	1.91	2.88	9.58	
11:05	8/2/21	33.54	1.72	2.86	9.58	
11:06	8/2/21	33.54	1.91	2.88	9.58	
11:07	8/2/21	33.48	1.91	2.89	9.58	
11:08	8/2/21	33.45	1.91	2.88	9.58	
11:09	8/2/21	33.39	1.65	2.89	9.57	
11:10	8/2/21	33.42	1.46	2.92	9.56	
11:11	8/2/21	33.45	1.65	2.89	9.58	
11:12	8/2/21	33.42	1.81	2.85	9.59	
11:13	8/2/21	33.39	1.94	2.83	9.60	
11:14	8/2/21	33.42	1.81	2.83	9.60	
11:15	8/2/21	33.39	2.27	2.83	9.61	
11:16	8/2/21	33.36	2.72	2.83	9.60	
11:17	8/2/21	33.36	2.81	2.85	9.59	
11:18	8/2/21	33.30	2.60	2.84	9.59	
11:19	8/2/21	33.30	2.49	2.80	9.62	
11:20	8/2/21	33.33	1.46	2.69	9.68	
11:21	8/2/21	33.33	1.81	2.60	9.73	
11:22	8/2/21	33.30	1.65	2.55	9.76	
11:23	8/2/21	33.27	2.01	2.51	9.78	
11:24	8/2/21	33.27	2.01	2.48	9.81	
11:25	8/2/21	33.24	1.71	2.45	9.82	
11:26	8/2/21	33.24	2.10	2.44	9.83	
11:27	8/2/21	33.15	1.65	2.44	9.83	
11:28	8/2/21	33.18	2.01	2.46	9.82	
11:29	8/2/21	33.24	1.52	2.47	9.81	
11:30	8/2/21	33.24	1.46	2.47	9.81	
11:31	8/2/21	33.30	1.72	2.44	9.82	
11:32	8/2/21	33.33	1.46	2.44	9.82	
11:33	8/2/21	33.30	1.81	2.45	9.81	
11:34	8/2/21	33.33	1.46	2.45	9.81	
11:35	8/2/21	33.39	1.20	2.45	9.82	
11:36	8/2/21	33.39	1.55	2.44	9.82	
11:37	8/2/21	33.36	2.97	2.44	9.83	
11:38	8/2/21	33.30	3.84	2.45	9.82	
11:39	8/2/21	33.33	3.17	2.47	9.80	
11:40	8/2/21	33.36	3.17	2.51	9.78	
11:41	8/2/21	33.33	2.97	2.54	9.77	
11:42	8/2/21	33.27	2.84	2.59	9.74	
11:43	8/2/21	33.26	2.84	2.65	9.70	
11:44	8/2/21	33.36	2.94	2.67	9.69	
11:45	8/2/21	33.33	2.65	2.66	9.69	
11:46	8/2/21	33.33	2.68	2.67	9.70	
11:47	8/2/21	33.27	2.10	2.67	9.69	
11:48	8/2/21	33.21	2.39	2.68	9.68	
Run 2 Average		**33.32**	**2.09**	**2.71**	**9.68**	
11:49	8/2/21	0.60	0.77	0.28	0.08	
11:50	8/2/21	25.20	24.22	0.24	0.19	
11:51	8/2/21	3.23	5.20	8.93	9.42	
11:52	8/2/21	1.00	1.04	9.93	9.85	

Time	Date	NOx-1 PPMV	CO-1 PPMV	O2-1 %VOL	CO2-1 %VOL	Event
11:53	8/2/21	37.59	25.27	1.55	5.97	
11:54	8/2/21	33.24	3.00	2.74	9.65	Start Run 3
11:55	8/2/21	33.33	3.26	2.74	9.67	
11:56	8/2/21	33.36	2.97	2.73	9.67	
11:57	8/2/21	33.45	2.20	2.71	9.69	
11:58	8/2/21	33.51	2.23	2.70	9.71	
11:59	8/2/21	33.54	1.32	2.69	9.71	
12:00	8/2/21	33.54	1.16	2.66	9.71	
12:01	8/2/21	33.57	1.13	2.66	9.71	
12:02	8/2/21	33.54	1.55	2.68	9.68	
12:03	8/2/21	33.54	0.51	2.73	9.67	
12:04	8/2/21	33.39	0.45	2.76	9.64	
12:05	8/2/21	33.45	0.77	2.80	9.61	
12:06	8/2/21	33.39	0.96	2.82	9.60	
12:07	8/2/21	33.42	1.16	2.85	9.58	
12:08	8/2/21	33.39	1.16	2.85	9.58	
12:09	8/2/21	33.33	1.35	2.87	9.57	
12:10	8/2/21	33.36	1.32	2.87	9.57	
12:11	8/2/21	33.45	1.71	2.85	9.58	
12:12	8/2/21	33.45	1.06	2.84	9.58	
12:13	8/2/21	33.42	1.42	2.85	9.57	
12:14	8/2/21	33.48	1.16	2.85	9.57	
12:15	8/2/21	33.48	1.61	2.89	9.55	
12:16	8/2/21	33.48	2.16	2.90	9.54	
12:17	8/2/21	33.39	1.51	2.91	9.53	
12:18	8/2/21	33.42	2.55	2.93	9.52	
12:19	8/2/21	33.45	2.61	2.90	9.52	
12:20	8/2/21	33.45	2.16	2.88	9.54	
12:21	8/2/21	33.46	2.32	2.89	9.54	
12:22	8/2/21	33.51	2.16	2.90	9.53	
12:23	8/2/21	33.51	2.06	2.91	9.52	
12:24	8/2/21	33.54	1.87	2.94	9.50	
12:25	8/2/21	33.60	2.35	2.94	9.50	
12:26	8/2/21	33.66	2.61	2.91	9.52	
12:27	8/2/21	33.69	3.00	2.85	9.55	
12:28	8/2/21	33.66	2.81	2.85	9.56	
12:29	8/2/21	33.66	2.71	2.83	9.57	
12:30	8/2/21	33.69	2.64	2.81	9.58	
12:31	8/2/21	33.66	2.45	2.80	9.59	
12:32	8/2/21	33.72	2.45	2.80	9.60	
12:33	8/2/21	33.66	2.64	2.79	9.59	
12:34	8/2/21	33.66	3.11	2.78	9.60	
12:35	8/2/21	33.54	2.77	2.83	9.56	
12:36	8/2/21	33.36	2.71	2.93	9.52	
12:37	8/2/21	33.36	3.45	2.94	9.50	
12:38	8/2/21	33.42	2.77	2.94	9.50	
12:39	8/2/21	33.42	3.08	2.94	9.51	
12:40	8/2/21	33.42	3.06	2.91	9.52	
12:41	8/2/21	33.42	3.26	2.90	9.52	
12:42	8/2/21	33.39	2.71	2.91	9.52	
12:43	8/2/21	33.42	3.00	2.89	9.54	
12:44	8/2/21	33.42	3.19	2.83	9.56	
12:45	8/2/21	33.42	2.97	2.78	9.59	
12:46	8/2/21	33.42	2.90	2.71	9.63	
12:47	8/2/21	33.42	3.06	2.61	9.68	
12:48	8/2/21	33.36	2.81	2.48	9.76	
12:49	8/2/21	33.36	3.06	2.39	9.81	
12:50	8/2/21	33.42	1.87	2.34	9.85	
12:51	8/2/21	33.45	3.06	2.35	9.83	
12:52	8/2/21	31.87	2.77	2.34	9.83	
12:53	8/2/21	33.21	2.84	2.72	9.66	
12:54	8/2/21	33.12	2.85	2.82	9.65	
Run 3 Average		**33.44**	**2.26**	**2.79**	**9.60**	
12:55	8/2/21	0.15	0.90	0.26	0.03	
12:56	8/2/21	25.62	24.20	0.26	0.12	
12:57	8/2/21	1.08	1.75	9.76	8.32	
12:58	8/2/21	0.30	1.46	9.83	9.79	

IV. D. Example Calculations

Drift Corrected Emission Concentrations

Formula

$$C_{GAS} = (Ç - C_O) \times \frac{C_{MA}}{C_M - C_O} \quad \textit{(eq. 7E-5)}$$

All Calculations Refer to Test Run 1, Unit #2 - High Load

$Ç_{NOx}$ =	Raw Concentration of NOx	= 32.86 ppmv
C_O =	Avg. of Initial and Final Zero Checks	= 0.15 ppmv
C_M =	Avg. of Initial and Final Span Checks	= 25.11 ppmv
C_{MA} =	Certified Concentration of Span Gas	= 25.00 ppmv

C_{NOx} = (32.86 - 0.15) x 25.00 / (25.11 - 0.15) = 32.77 ppmv

$Ç_{CO}$ =	Raw Concentration of CO	= 2.51 ppmv
C_O =	Avg. of Initial and Final Zero Checks	= 0.42 ppmv
C_M =	Avg. of Initial and Final Span Checks	= 24.48 ppmv
C_{MA} =	Certified Concentration of Span Gas	= 25.00 ppmv

C_{CO} = (2.51 - 0.42) x 25.00 / (24.48 - 0.42) = 2.18 ppmv

$Ç_{O2}$ =	Raw Concentration of O2	= 2.73 %
C_O =	Avg. of initial and final zero bias checks	= 0.22%
C_M =	Avg. of initial and final span bias checks	= 9.91%
C_{MA} =	Actual concentration of span gas	= 10.00%

C_{O2} = (2.73 - 0.22) x 10.00 / (9.91 - 0.22) = 2.59%

$Ç_{CO2}$ =	Raw Concentration of CO2	= 9.72%
C_O =	Avg. of initial and final zero bias checks	= 0.08%
C_M =	Avg. of initial and final span bias checks	= 9.84%
C_{MA} =	Actual concentration of span gas	= 10.0%

C_{CO2} = (9.72 - 0.08) x 10.00 / (9.84 - 0.08) = 9.88%

Fo Calculation to Verify O2 / CO2 Measurements (Eq. 3b-1)

C_{O2} =	Corrected Concentration of O2	= 2.59%
C_{CO2} =	Corrected Concentration of CO2	= 9.88%
Th. F_O =	Theoretical Fo from FGA	= 1.75

$$F_O = \frac{(20.9 - O2\%)}{CO2\%}$$

F_O = (20.9 - 2.59) / 9.88 = 1.85

IV. D. Example Calculations

Moisture Content Determination

Moisture Content via EPA Method 4 - Unit #3, Run 1

V_1	=	Initial dry gas meter reading	=	739.207	ft3
V_2	=	Final dry gas meter reading	=	768.170	ft3
V_M	=	Total cubic meters of stack gas metered (V_2-V_1)	=	**28.963**	**m3**
Y	=	Dry gas meter correction factor	=	0.9968	unitless
$V_{M\ (corr)}$	=	Corrected DGM volume to cubic feet (V_M x Y)	=	**28.870**	**ft3**
W_I	=	Initial weight of impinger train	=	2950.1	grams
W_F	=	Final weight of impinger train	=	3054.6	grams
W_{TOT}	=	Total weight gain of impinger train (W_F-W_I)	=	**104.5**	**grams**
CF	=	Conversion factor	=	1.333	L_{H20}
1 m3/mL	=	Conversion factor	=	1 x e 6	
D_{H_20}	=	Density of water	=	998.2	L/g
K1A	=	Conv. factor x density of water @ EPA STP	=	1.336	L/g
K_3	=	528°R x 28.316 L / ft3 / 29.92 " Hg @ EPA STP	=	499.7	°R - L / "Hg-ft3
P_{ATM}	=	Atmospheric Pressure	=	**25.31**	**"Hg**
T °F	=	Average temperature of dry gas meter	=	70.5	°F
T °R	=	Avg. temperature of dry gas meter + 460°	=	**530.5**	**°R**

Formulas and Calculations (Equation 4-4)

$V_{M\ (std)}$ = Volume of gas metered @ EPA STP = $\left(\frac{V_{M\,corrected} x P_{atm} x K_3}{^{\circ}R}\right)$

$V_{M\ (std)}$ = $\frac{28.870 \text{ x } 25.31 \text{ x } 499.7}{530.50}$ @ EPA STP = **688.243** **L**

B_{WS} = Moisture content by volume = $\left(\frac{W_{tot} x\ K_2}{(W_{tot} x\ K_{2)} + V_{M\,(std)}}\right)$

B_{WS} = $\frac{(104.50 \text{ x } 1.336)}{(104.5 \text{ x } 1.336) + 688.243}$ = 0.1686

x 100 = **16.86%** **Moisture**

Stack Gas Molecular Weight

MW_{H20}	=	Molecular weight of water	=	18	lb/lb-mol
MW_{O2}	=	Molecular weight of oxygen	=	32	lb/lb-mol
MW_{CO2}	=	Molecular weight of carbon dioxide	=	44	lb/lb-mol
MW_{N2}	=	Molecular weight of nitrogen	=	28	lb/lb-mol
C_{O2}	=	Volume fraction of corrected oxygen	=	0.0259	O2
C_{CO2}	=	Volume fraction of corrected carbon dioxide	=	0.0988	CO2
C_{N2}	=	Volume fraction of nitrogen = 1-(C_{O2} + C_{CO2})	=	0.8753	N2
1-B_{WS}	=	Dry gas fraction = (1 - B_{WS})	=	0.8314	Dry Exhaust

Formulas and Calculations (Equations 3-1 and 2-6)

M_D	=	Dry molecular weight of stack gas		lb/lb-mol	
M_S	=	Wet molecular weight of stack gas		lb/lb-mol	
M_D	=	(MW_{O2} x C_{O2}) + (MW_{CO2} x C_{CO2}) + (MW_{N2} x C_{N2})			
	=	0.829 + 4.346 + 24.509	=	**29.684**	**lb/lb-mol**
M_S	=	(18 x B_{WS}) + [(1-B_{WS}) x M_D]			
	=	3.035 + 24.679	=	**27.714**	**lb/lb-mol**

IV. D. Example Calculations

Stack Gas Velocity Determination

Velocity and flow rate via Pitot tube (Equations 2-6, 2-8, 2-9, 2-10) - Unit #3, Run 1

C_P	=	S-Type Pitot Tube Coefficient (dimensionless)	=	**0.84**	
ΔP	=	Differential Pressure Measured by Pitot Tube	=	"H20	
$\sqrt{\Delta P}_{avg}$	=	Square Root of Average ΔP's	=	**0.259**	**"H20**
$T_{S-°F}$	=	Average Temperature (measured)	=	368.4	°F
$T_{S-°R}$	=	Absolute Temperature (°R) = (T_S + 460)	=	**828.4**	**°R**
1-B_{WS}	=	Dry Gas Fraction (unitless)	=	0.831	
M_S	=	Molecular Weight of Stack Gas, wet	=	27.71	lbs/lbs-mol
K_P	=	Pitot Tube Constant in Minutes $\sqrt{\left(\frac{lb/lb \bullet mole \times "Hg}{°R \times "H_2O}\right)}$	=	**5129.4**	**ft/min**
K_Y	=	Standard Pressure/Temperature Coefficient	=	°R-min/"Hg-hr	
	=	528° R ÷ 29.92 "Hg x 60 min ÷ 1 hr	=	1058.8	$\frac{°R\text{-min}}{"Hg\text{-hr}}$
P_B	=	Atmospheric Pressure ("Hg)	=	25.31	"Hg
P_G	=	Static Pressure ("H2O)	=	0.00	"H20
P_S	=	Absolute Pressure	=	"Hg	
P_S	=	$P_B + \frac{P_G}{13.6\ ("H2O/"Hg)}$	=	**25.31**	**"Hg**
D	=	Stack Diameter	=	1.63	feet
As	=	Area of Stack (ft2) = $\pi \times d_i^2 \div 4$	=	**2.07**	**ft2**
V_S	=	Stack Velocity	=	ft/min	
	=	$K_P \times C_P \times \sqrt{\Delta P}_{avg} \times \sqrt{\frac{T_S}{P_S x M_S}}$	=	ft/min	
V_S	=	$4308.7 \times 0.26 \times \sqrt{\frac{828}{701.39}}$	=	**1,212**	**ft/min**
Q_A	=	Volumetric Flow Rate = V_S x A_S	=	**2,514**	**ft3/min**
Q_{STD}	=	Volumetric Flow Rate on a Dry Basis			
	=	Q_A x (1-B_{WS}) x K_Y x P_S ÷ T_S			
Q_{STD}	=	$2{,}090 \times 1058.8 \times \frac{25.31}{828.4}$	=	**67,611**	**DSCF/H**

IV. D. Example Calculations

Mass Emission Rates via Methods 1-4

Measured Data and Constants - Unit #3, Run 1

C_{NOx} =	Corrected Concentration of NOx	=	32.77	ppmv
C_{CO} =	Corrected Concentration of CO	=	2.18	ppmv
$Q_{S\ M1-4}$ =	Measured Stack Flow Rate	=	67,611	SCF/H $_{Dry}$
lb / mole =	EPA STP for Ideal Gas	=	385.15	SCF
lbs / hr to tpy =	Mass Conversion Factor	=	4.38	hrs-tons / lbs-yr
C_F =	PPMV Normalization	=	1.00E-06	1 / ppmv
MW_{NOx} =	Molecular Weight of NOx	=	46	lb / lb-mol
MW_{CO} =	Molecular Weight of CO	=	28	lb / lb-mol

Formulas

Pounds per Hour (lbs/hr)

E_x (lb/hr) = C_x x C_F x Q_s x { MW_x / (lb / mole) }

Tons per Year (tpy)

E_x (tpy) = E_x (lb/hr) x { 8760 (hr / yr) / 2000 (lb / ton) }

Calculated Mass Emission Rates From Methods 1-4 Exhaust Flow Rates

E_{NOx}

lbs/hr = 32.77 x 1.00E-06 x 67,611 x $\frac{46}{385.15}$ = **0.265**

tpy = 0.26 lb/hr x 4.38 $\frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **1.159**

E_{CO}

lbs/hr = 2.18 x 1.00E-06 x 67,611 x $\frac{28}{385.15}$ = **0.011**

tpy = 0.01 lb/hr x 4.38 $\frac{\text{hrs-ton}}{\text{lbs-yr}}$ = **0.047**

E. ANALYSIS AND CERTIFICATION DOCUMENTS FOR CALIBRATION GASES AND DRY GAS METER

MATHESON
ask. . .The Gas Professionals™

1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: Matheson
8200 Washington St NE
CST
Albuquerque, NM 87113

Customer PO #: 19550313-00

Part # G2687907

Protocol: G1

Reference #: 745163-03

Lot#: 9009425785

Cylinder Number: EB0124096

Cylinder Pressure: 2000 psig

Last Analysis Date: 3/27/2019

Expiration Date: 3/27/2022

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Component: Nitrogen Dioxide

Certified Conc: 50.0 ppm +/- 0.9 ppm ABS

REPLICATE RESPONSES			
Date:	3/20/2019	Date:	3/27/2019
	49.9		49.8
	50.1		49.9
	50.1		50.2

BALANCE GAS: NITROGEN

REFERENCE STANDARDS:

Component: Nitrogen Dioxide
Reference Standard: PRM
Cylinder #: D562925
Concentration: 75.0 +/- 1.1 ppm ABS
Exp. Date: 2/2/2019
NIST Sample #: VSL PRIMARY

Reference Standard: GMIS
Cylinder #: EB0097397
Concentration: 47.8 +/- 0.8 ppm ABS
Exp. Date: 9/21/2021

CERTIFICATION INSTRUMENTS

Component: Nitrogen Dioxide
Make/Model: CAI / 600
Serial Number: Y09003
Measurement Principle: CHEMI
Last Calibration: 4/1/2019

Notes: **Basis of concentration: molar**

The certification was performed by Global Calibration Gases, LLC, Sarasota, FL and according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA PGVP Vendor ID Number: N22019.
The expanded uncertainty listed for each component was calculated at a coverage factor of k=2 and at a level of confidence of 95%.

Analyst: Signature on File Date: 3/27/2019

QA: Ashley Smallwood Date: 4/8/2019
Ashley Smallwood

MATHESON
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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer:	Matheson 8200 Washington St NE Compliance Service & Test Albuquerque, NM 87113	Customer PO#: 14285831-00		Part # G2684826
		Protocol: G1	Reference #: 700151-01	Lot#: 9306622507

Cylinder Number: SX34318

Cylinder Pressure: 1900 psig

Last Analysis Date: 11/28/2016

Expiration Date: 11/28/2024

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

			REPLICATE RESPONSES		
Component:	Carbon Monoxide		Date: 11/18/2016		
			252.0		
Certified Conc:	251.9 ppm	+/- 0.6 ppm ABS	251.9		
			251.8		
Component:	Nitric Oxide		Date: 11/18/2016	Date:	11/28/2016
			252.8		252.6
Certified Conc:	253.6 ppm	+/- 1.0 ppm ABS	254.1		253.4
			254.8		253.9
NOx:	253.8 ppm	Reference Only			

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Monoxide	Component:	Nitric Oxide
Reference Standard:	SRM	Reference Standard:	SRM
Cylinder #:	FF30844	Cylinder #:	FF20721
Concentration:	247.1 +/- 0.5 ppm ABS	Concentration:	251.5 +/- 0.8 ppm ABS
Exp. Date:	3/26/2018	Exp. Date:	6/29/2023
NIST Sample #:	57-F-29	NIST Sample #:	43-M-27

CERTIFICATION INSTRUMENTS

Component:	Carbon Monoxide	Component:	Nitric Oxide
Make/Model:	HORIBA VIA 510	Make/Model:	HORIBA CLA-510SS
Serial Number:	RL77YOOG	Serial Number:	FM1JMBMS
Measurement Principle:	NDIR	Measurement Principle:	CHEMI
Last Calibration:	11/7/2016	Last Calibration:	11/17/2016

Notes:

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62016, PGVP Participation Date: 01/01/16, PGVP Renewal Date: 01/01/17
The expanded uncertainty listed for each component was calculated at a coverage factor of k=2 and at a level of confidence of 95%.

Analyst: Ashley Smallwood

Ashley Smallwood

Date: 11/30/2016

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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer: CST

Protocol:	Reference #:	Lot#:
G1 G2- Nitric Oxide	T189569-1	9303607404

Cylinder Number: SX80353
Cylinder Pressure: 1900psig
Last Analysis Date: 11/19/2013
Expiration Date: 11/20/2021

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Component: Carbon Monoxide
Certified Conc: 2888 ppm +/- 6 ppm ABS

Component: Nitric Oxide
Certified Conc: 2951.8 ppm +/- 1.2 ppm ABS

NOx: 2952.0 ppm Reference Only

BALANCE GAS: Nitrogen

REPLICATE RESPONSES

Date: 11/12/2013	Date: 11/12/2013	Date: 11/19/2013
2888	2950.0	2954.2
2888	2949.0	2960.1
2888	2950.0	2947.2

REFERENCE STANDARDS:

Component: Carbon Monoxide	Component: Nitric Oxide
Reference Standard: SRM	Reference Standard: SRM
Cylinder #: FF30714	Cylinder #: CAL018027
Concentration: 4935 ppm	Concentration: 493.1 ppm
Exp. Date: 4/17/2018	Exp. Date: 10/8/2017
NIST Sample #: 55-F-42	NIST Sample #: 42-M-55

CERTIFICATION INSTRUMENTS

Component: Carbon Monoxide	Component: Nitric Oxide
Make/Model: HORIBA VIA-510	Make/Model: HORIBA CLA-510SS
Serial Number: RL77Y00G	Serial Number: M60VVSNN
Measurement Principle: NDIR	Measurement Principle: CHEMI
Last Calibration: 10/21/2013	Last Calibration: 10/29/2013

Notes:

This Certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2.

U.S. EPA Vendor ID No.: D62013 PGVP Participation Date: 01/01/13: PGVP Renewal Date: 01/01/14

Analyst: La'Shawn Grissom-Brown
La'Shawn Grissom-Brown

Date: 11/19/2013

MATHESON
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1700 Scepter Rd
Waverly, TN 37185
931-296-3357

Certificate of Analysis - EPA Protocol Mixtures

Customer:	MATHESON 8200 WASHINGTON ST NE ALBUQUERQUE, NM 87113	Customer PO# 19986363-00		Part # G2687073
		Protocol: G2=CO2	Reference #:	Lot#:
Cylinder Number:	CC177550	G2=O2	748803-001	9309637838

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Cylinder Pressure: 1000 psig

Last Analysis Date: 5/7/2019

Expiration Date: 5/7/2027

					REPLICATE RESPONSES
Component:	Carbon Dioxide			Date:	5/7/2019
					24.43
Certified Conc:	24.43%	+/- 0.06 %	ABS		24.43
					24.43
Component:	Oxygen			Date:	5/7/2019
					24.43
Certified Conc:	24.44 %	+/- 0.04 %	ABS		24.46
					24.43

BALANCE GAS: Nitrogen

REFERENCE STANDARDS:

Component:	Carbon Dioxide	Component:	Oxygen
Reference Standard:	NTRM	Reference Standard:	SRM
Cylinder #:	AM11350	Cylinder #:	CAL016956
Concentration:	19.405 +/- 0.58 % ABS	Concentration:	9.918 +/- 0.022 % ABS
Exp. Date:	12/9/2022	Exp. Date:	2/3/2024
SRM #:	NTRM	SRM #:	2658a
NIST Sample#	171101	NIST Sample#	72-D-41

CERTIFICATION INSTRUMENTS

Component:	Carbon Dioxide	Component:	Oxygen
Make/Model:	CAI 700	Make/Model:	HORIBA MPA 510
Serial Number:	1805006	Serial Number:	SGU27SC4
Measurement Principle:	NDIR	Measurement Principle:	PARAMAGNETIC
Last Calibration:	4/16/2019	Last Calibration:	4/16/2019

Notes: **Concentration based on Molar**

The certification was performed according to EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards May 2012, using procedure G1 and/or G2. U.S EPA Vendor ID Number: D62019, PGVP Participation Date: 01/01/19, PGVP Renewal Date: 01/01/20
The expanded uncertainty listed for each component was calculated at a coverage factor of k=2 and at a level of confidence of 95%.

Analyst: Cathy Swaw

Cathy Swaw

Date: 05/13/19

Mass Flow Controller Annual Calibration

Make: Environics
Model: 4040
Serial Number: 8439

Calibration Date: 3/29/21
Next Calibration Date: 3/29/22
Technician: CS

The mass flow controllers (MFC) in use with this gas dilution system was calibrated with a Bios Defender Model 530 High Flow. This calibration was performed with nitrogen and was corrected to standard reference temperature (68° F) and pressure (29.92" Hg). The data shown is performance data taken after the calibration of the gas dilution system. Acceptable criteria for pass/fail is a true flow value +/- 10% within the set flow.

MFC 1	*% Flow*	*Set Flow*	*True Flow*	*% Difference*
SN: 0604713001	5	1500	1526.0	-1.73
Size: 30,000 SCCM	10	3000	3006.2	-0.21
	20	6000	5946.4	0.89
	30	9000	8892.7	1.19
	40	12000	11794.2	1.72
	50	15000	14702.6	1.98
	60	18000	17605.2	2.19
	70	21000	20780.6	1.04
	80	24000	23737.2	1.10
	90	27000	27152.5	-0.56
	100	30000	29248.7	2.50

MFC 2	*% Flow*	*Set Flow*	*True Flow*	*% Difference*
SN: 0604713002	5	1500	1466.0	2.27
Size: 30,000 SCCM	10	3000	2992.1	0.26
	20	6000	6093.0	-1.55
	30	9000	9191.1	-2.12
	40	12000	12278.4	-2.32
	50	15000	15370.0	-2.47
	60	18000	18393.6	-2.19
	70	21000	21368.0	-1.75
	80	24000	24382.1	-1.59
	90	27000	27368.9	-1.37
	100	30000	29978.6	0.07

MFC 3	*% Flow*	*Set Flow*	*True Flow*	*% Difference*
SN: 0604715001	5	150	148.63	0.91
Size: 3,000 SCCM	10	300	300.20	-0.07
	20	600	570.31	4.95
	30	900	862.74	4.14
	40	1200	1156.47	3.63
	50	1500	1441.47	3.90
	60	1800	1739.19	3.38
	70	2100	2091.81	0.39
	80	2400	2356.67	1.81
	90	2700	2708.52	-0.32
	100	3000	3003.38	-0.11

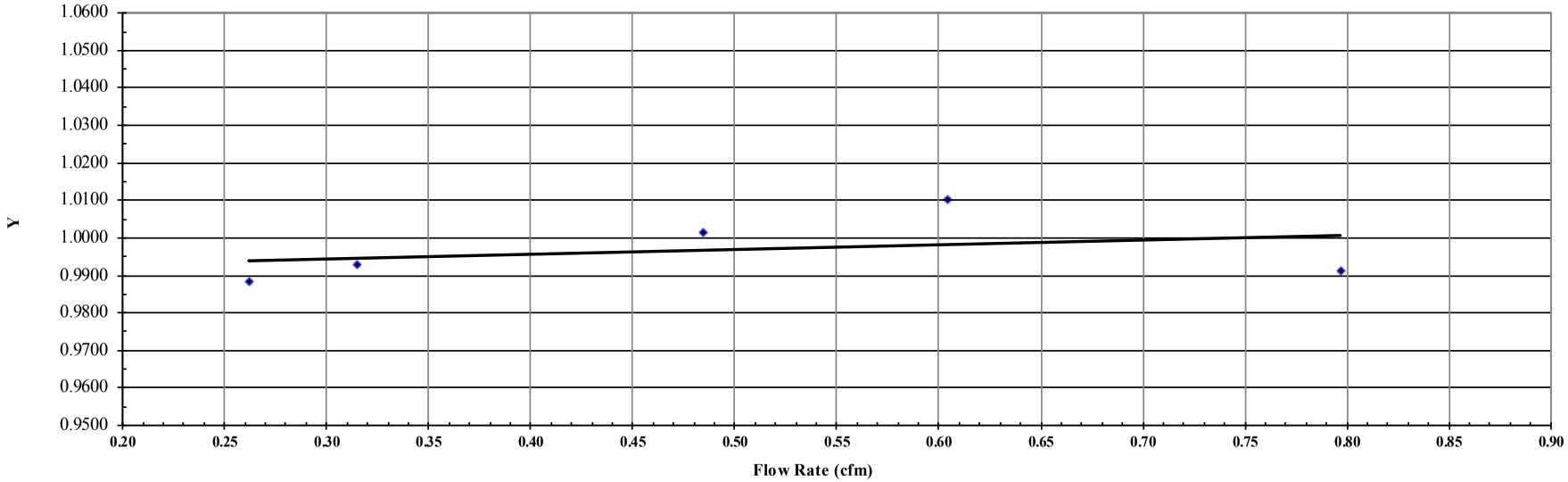
S1 Dry Gas Meter
5 Point Annual Calibration

Date: 6/2/21
Previous Calibration Date: 11/10/20
Technician: GC
DGM Identification: Sensus S1
DGM Serial Number: 15780484
Previous Calib Factor (Y): 0.9651

REFERENCE METER								Corr. Vol @	Corr. Vol @	*REFERENCE METER*
Calibration Run #	Time (min)	Start Temp (°F)	Stop Temp (°F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	EPA STP (cu ft)	EPA STP (L)	
1	60	71	79	532.299	547.960	15.558	0.259	15.1214	0.5340	**Calibration Date:** 12/3/08
2	60	79	83	547.960	566.909	18.824	0.314	18.0932	0.6390	**Location:** Apex Factory
3	60	83	83	566.909	596.301	29.198	0.487	27.9613	0.9874	**Technician:** EW
4	60	83	83	596.301	633.218	36.673	0.611	35.1200	1.2402	**DGM Identification:** CUFTRM1
5	60	72	81	633.218	680.872	47.339	0.789	45.8836	1.6204	**DGM Serial Number:** 321513
										Calib. Factor (Y): 0.9934

WORKING METER								Corr. Vol @	Calculated	*DRY GAS METER*
Calibration Run #	Time (min)	Start Temp (°F)	Stop Temp (°F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	EPA STP (cu ft)	DGM Factor (Y)	*CALIBRATION TEST RESULTS*
1	60	71	77	205.523	221.233	15.710	0.262	15.2981	0.9885	
2	60	77	81	221.233	240.122	18.889	0.315	18.2232	0.9929	**Average Y: 0.9968**
3	60	81	82	240.122	269.202	29.080	0.485	27.9254	1.0013	Ave. Y between 0.95 and 1.05: ***PASS***
4	60	82	83	269.202	305.474	36.272	0.605	34.7676	1.0101	Ind. Y values +/- 0.02 from Ave.: ***PASS***
5	60	72	82	305.474	353.275	47.801	0.797	46.2877	0.9913	

DGM Factor vs. Flow Rate



S1 Dry Gas Meter
3 Point Post Test Calibration

Date: 8/4/21

Reference Meter		*Working Meter*	
Manufacturer	Rockwell	**Manufacturer**	Sensus
Meter Number	RM 1	**Meter Number**	S1
Serial Number	321513	**Serial Number**	255403
Previous Calibration Date	12/3/08	**Previous Calibration Date**	5/11/15
Previous Calibration Factor	0.9934	**Previous Calibration Factor**	1.0377
Start Time	9:54	**Start Time**	9:54
Stop Time	10:13	**Stop Time**	10:13
Run Time (minutes)	19.0	**Run Time (minutes)**	19.0
Start Temperature °F	80.0	**Start Temperature °F**	80.0
Stop Temperature (°F)	80.0	**Stop Temperature (°F)**	81.0
Average Temperature (°F)	80.0	**Average Temperature (°F)**	80.5
Start Meter Reading (ft^3)	450.818	**Start Meter Reading (ft^3)**	210.226
Stop Meter Reading (ft^3)	460.182	**Stop Meter Reading (ft^3)**	219.400
Net Volume (ft^3)	9.717	**Net Volume (ft^3)**	9.520
Meter Rate (ft^3/min)	0.511	**Meter Rate (ft^3/min)**	0.501
Corrected Volume (ft^3 @ STP)	9.357	**Corrected Volume (ft^3 @ STP)**	9.159
		Calculated Meter Factor	***1.0217***
Run 2			
Start Time	10:13	**Start Time**	10:13
Stop Time	10:28	**Stop Time**	10:28
Run Time (minutes)	15.0	**Run Time (minutes)**	15.0
Start Temperature °F	80.0	**Start Temperature °F**	81.0
Stop Temperature (°F)	81.0	**Stop Temperature (°F)**	81.0
Average Temperature (°F)	80.5	**Average Temperature (°F)**	81.0
Start Meter Reading (ft^3)	460.182	**Start Meter Reading (ft^3)**	219.400
Stop Meter Reading (ft^3)	468.016	**Stop Meter Reading (ft^3)**	227.070
Net Volume (ft^3)	8.129	**Net Volume (ft^3)**	7.959
Meter Rate (ft^3/min)	0.542	**Meter Rate (ft^3/min)**	0.531
Corrected Volume (ft^3 @ STP)	7.821	**Corrected Volume (ft^3 @ STP)**	7.650
		Calculated Meter Factor	***1.0223***
Run 3			
Start Time	10:29	**Start Time**	10:29
Stop Time	10:44	**Stop Time**	10:44
Run Time (minutes)	15.0	**Run Time (minutes)**	15.0
Start Temperature °F	81.0	**Start Temperature °F**	81.0
Stop Temperature (°F)	81.0	**Stop Temperature (°F)**	82.0
Average Temperature (°F)	81.0	**Average Temperature (°F)**	81.5
Start Meter Reading (ft^3)	468.016	**Start Meter Reading (ft^3)**	227.070
Stop Meter Reading (ft^3)	476.142	**Stop Meter Reading (ft^3)**	235.04
Net Volume (ft^3)	8.433	**Net Volume (ft^3)**	8.270
Meter Rate (ft^3/min)	0.562	**Meter Rate (ft^3/min)**	0.551
Corrected Volume (ft^3 @ STP)	8.105	**Corrected Volume (ft^3 @ STP)**	7.942
		Calculated Meter Factor	***1.0206***

Average DGM Y-Factor: **1.0215**

Average Y-Factor Between 0.95 and 1.05: **PASS**

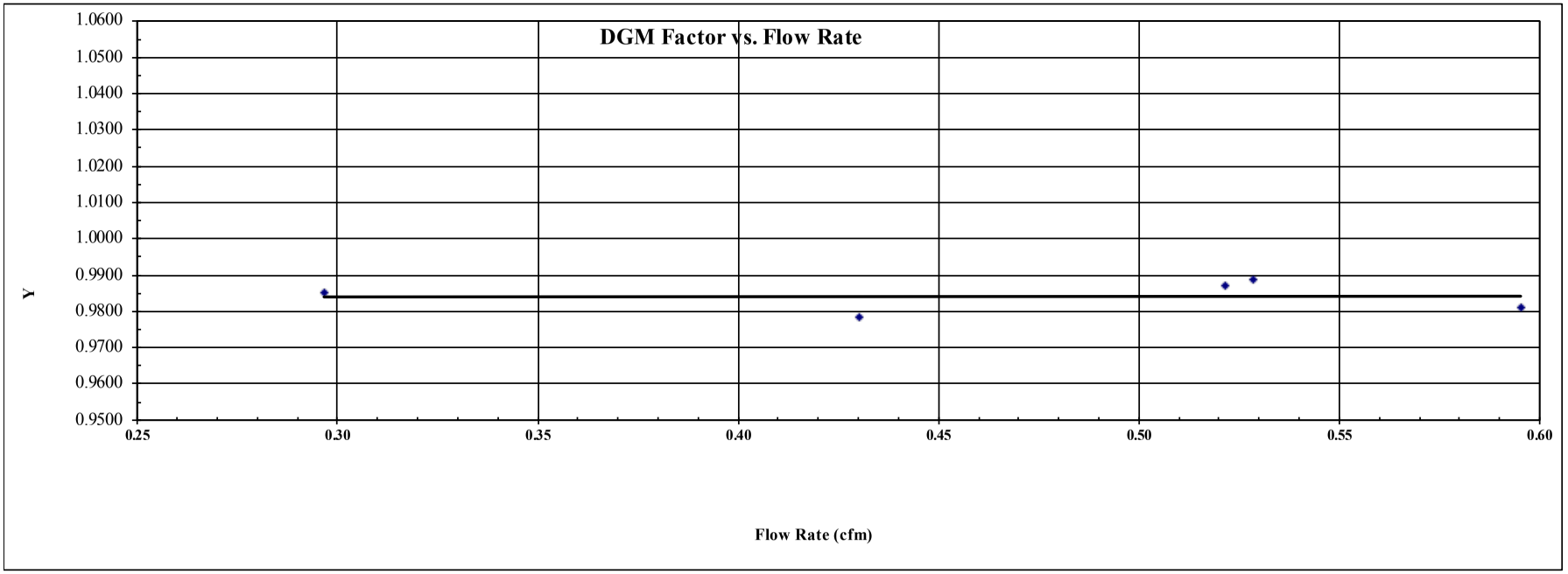
Individual Y-Factors ± 2% from Average: **PASS**

S3 Dry Gas Meter
5 Point Annual Calibration

Date: 6/8/21
Previous Calibration Date: 11/18/20
Technician: GC
DGM Identification: Sensus S3
DGM Serial Number: 1197460
Previous Calib Factor (Y): 1.0015

REFERENCE METER								Corr. Vol @	Corr. Vol @	*REFERENCE METER*
Calibration Run #	Time (min)	Start Temp (°F)	Stop Temp (°F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	EPA STP (cu ft)	EPA STP (L)	
1	60	85	86	814.633	832.431	17.681	0.295	16.8540	0.5952	**Calibration Date:** 12/3/08
2	60	85	84	832.431	858.021	25.421	0.424	24.2773	0.8573	**Location:** Apex Factory
3	60	75	84	858.021	889.612	31.382	0.523	30.2482	1.0682	**Technician:** EW
4	60	84	89	889.612	920.783	30.965	0.516	29.4638	1.0405	**DGM Identification:** CUFTRM1
5	60	89	87	920.783	955.949	34.934	0.582	33.1490	1.1706	**DGM Serial Number:** 321513
										Calib. Factor (Y): 0.9934

WORKING METER								Corr. Vol @	Calculated	*DRY GAS METER*
Calibration Run #	Time (min)	Start Temp (°F)	Stop Temp (°F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	EPA STP (cu ft)	DGM Factor (Y)	*CALIBRATION TEST RESULTS*
1	60	80	82	954.727	972.525	17.798	0.297	17.1071	0.9852	
2	60	80	82	972.525	998.334	25.809	0.430	24.8072	0.9786	**Average Y: 0.9841**
3	60	75	83	998.334	1030.049	31.715	0.529	30.5970	0.9886	Ave. Y between 0.95 and 1.05: ***PASS***
4	60	83	87	1030.049	1061.330	31.281	0.521	29.8461	0.9872	Ind. Y values +/- 0.02 from Ave.: ***PASS***
5	60	87	92	1061.330	1097.045	35.715	0.595	33.7976	0.9808	



S3 Dry Gas Meter
3 Point Post Test Calibration

Date: 7/4/21

Reference Meter		*Working Meter*	
Manufacturer	Rockwell	**Manufacturer**	Rockwell
Meter Number	RM 1	**Meter Number**	S3
Serial Number	321513	**Serial Number**	1197460
Previous Calibration Date	12/3/08	**Previous Calibration Date**	10/6/16
Previous Calibration Factor	0.9934	**Previous Calibration Factor**	1.0092
Run 1			
Start Time	8:38	**Start Time**	8:38
Stop Time	8:53	**Stop Time**	8:53
Run Time (minutes)	15.0	**Run Time (minutes)**	15.0
Start Temperature °F	80.0	**Start Temperature °F**	80.0
Stop Temperature (°F)	81.0	**Stop Temperature (°F)**	81.0
Average Temperature (°F)	80.5	**Average Temperature (°F)**	80.5
Start Meter Reading (ft^3)	423.817	**Start Meter Reading (ft^3)**	272.378
Stop Meter Reading (ft^3)	432.142	**Stop Meter Reading (ft^3)**	280.755
Net Volume (ft^3)	8.402	**Net Volume (ft^3)**	8.454
Meter Rate (ft^3/min)	0.560	**Meter Rate (ft^3/min)**	0.564
Corrected Volume (ft^3 @ STP)	8.083	**Corrected Volume (ft^3 @ STP)**	8.133
		Calculated Meter Factor	***0.9938***
Run 2			
Start Time	8:54	**Start Time**	8:54
Stop Time	9:09	**Stop Time**	9:09
Run Time (minutes)	15.0	**Run Time (minutes)**	15.0
Start Temperature °F	81.0	**Start Temperature °F**	81.0
Stop Temperature (°F)	81.0	**Stop Temperature (°F)**	81.0
Average Temperature (°F)	81.0	**Average Temperature (°F)**	81.0
Start Meter Reading (ft^3)	432.1420	**Start Meter Reading (ft^3)**	280.755
Stop Meter Reading (ft^3)	440.3000	**Stop Meter Reading (ft^3)**	288.976
Net Volume (ft^3)	8.104	**Net Volume (ft^3)**	8.297
Meter Rate (ft^3/min)	0.540	**Meter Rate (ft^3/min)**	0.553
Corrected Volume (ft^3 @ STP)	7.790	**Corrected Volume (ft^3 @ STP)**	7.975
		Calculated Meter Factor	***0.9768***
Run 3			
Start Time	9:10	**Start Time**	9:10
Stop Time	9:15	**Stop Time**	9:15
Run Time (minutes)	15.0	**Run Time (minutes)**	15.0
Start Temperature °F	80.0	**Start Temperature °F**	81.0
Stop Temperature (°F)	81.0	**Stop Temperature (°F)**	82.0
Average Temperature (°F)	80.5	**Average Temperature (°F)**	81.5
Start Meter Reading (ft^3)	440.300	**Start Meter Reading (ft^3)**	288.976
Stop Meter Reading (ft^3)	448.861	**Stop Meter Reading (ft^3)**	297.627
Net Volume (ft^3)	8.504	**Net Volume (ft^3)**	8.731
Meter Rate (ft^3/min)	0.567	**Meter Rate (ft^3/min)**	0.582
Corrected Volume (ft^3 @ STP)	8.182	**Corrected Volume (ft^3 @ STP)**	8.384
		Calculated Meter Factor	***0.9759***

Average DGM Y-Factor: **0.9822**

Average Y-Factor Between 0.95 and 1.05: **PASS**

Individual Y-Factors ± 2% from Average: **PASS**

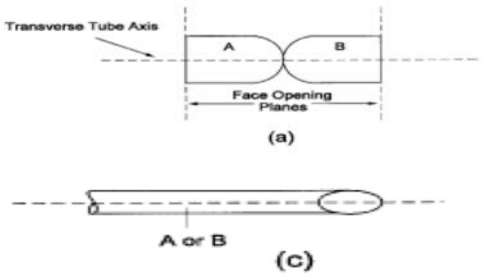
S-Type Pitot Tube Calibration

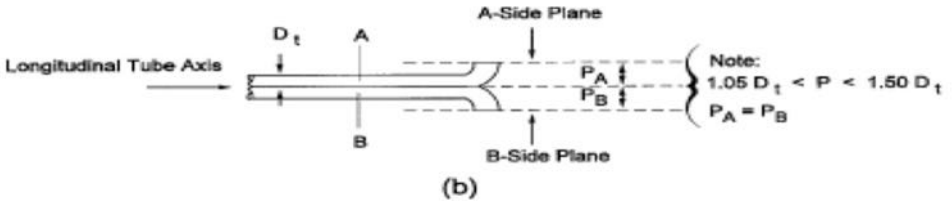
Date: 8/4/21
Technician: GC
Pitot Tube ID: PT-8-1 Assembly
Pitot Tube Type: S-Type

(a) end view; face opening planes perpendicular to transverse axis;

(b) top view; face opening planes parellel to longitudinal axis;

(c) side view; both legs of equal length and centerlines coincident, when viewed fromboth sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.

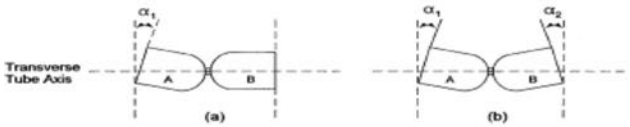




Dt-a = 0.374 "
Dt-b = 0.373 "
Pa = 0.933 "
Pb = 0.933 "
Pa/2Dt = 1.247 "

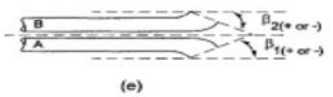
Method 2 - 10.1:
Coefficient = **0.84** *if:*
0.188'' ≤ Dt ≤ 0.375'' and if **Pa=Pb** and **1.05Dt < Pa/2Dt < 1.50Dt.**

The types of face-opening misalignment shown above will not affect the baseline value of $C_{p(s)}$ so long as α_1 and $\alpha_2 \leq 10°$, β_1 and $\beta_2 \leq 5°$, $z \leq 0.32$ cm (1/8 in.), and $w \leq 0.08$ cm (1/32 in.) (Reference 11.0 in Section 16.0)

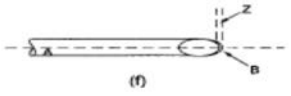


α-1= 0°
α-2= 0°

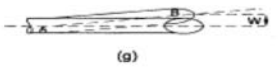
$\mathscr{B}$-1+= 0°
$\mathscr{B}$-2+= 0°



$\mathscr{B}$-1-= 0°
$\mathscr{B}$-2-= 0°



z= 0.0085" Z ≤



Wt= 0.0140" W ≤

Temperature Sensor Calibration Data Sheet

Thermocouple Calibration

Method: 2 Section 10.3.1
Frequency: After each field use
Criteria: < 1.5 % Absolute Temperature

Altitude (ft): 5087
Pressure ("Hg): 24.81
Boiling Point @ Alt.: 202.81

Calibration Date: 8/4/21
Technician: GC
Thermocouple ID: T-8

Water Temperature Range	*Freezing*	*Room*	*Boiling*
Reference Thermometer (°F)		78.3	
Probe Thermometer (°F)		77.5	
Reference Thermometer (°R)	460.0	538.3	460.0
Probe Thermometer (°R)	460.0	537.5	460.0
Absolute Temperature Difference	**0.0%**	**0.8%**	**0.0%**

Absolute Temp. (°R) = 460+°F)
Alt. Correction for Water Boiling Point = 49.161*Ln(I"Hg)+44.932
Pressure ("Hg) = 29.921*(1-6.8753e-6*alt)^5.2559

Thermometer Calibration

Tolerance ± 1.5%

Thermometer ID: F51-1
Potentiometer ID: Altech
Date: 8/4/21

Std (°R)	*Meas (°R)*	*Diff. (%)*
660	659.8	0.03
860	859.6	0.05
1060	1060.1	-0.01
1260	1260.2	-0.02
1460	1460.0	0.00
1660	1660.0	0.00
1860	1859.3	0.04
2060	2057.9	0.10
2260	2257.5	0.11
2460	2458.5	0.06
Avg. Error (%) =		**0.04**

Avg Error (%) =
[(Std - Meas) / Std] x 100

F. AUDIT SAMPLE RESULTS (NOT APPLICABLE)

Audit Samples are not applicable for this testing program. None are available for presentation.

G. OPACITY FIELD SHEETS AND READER CERTIFICATION

A six-minute opacity reading was collected for each load tested. An average of zero was observed for each test run.

IV. G. Visible Emissions Field Data Sheet - Unit #1

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

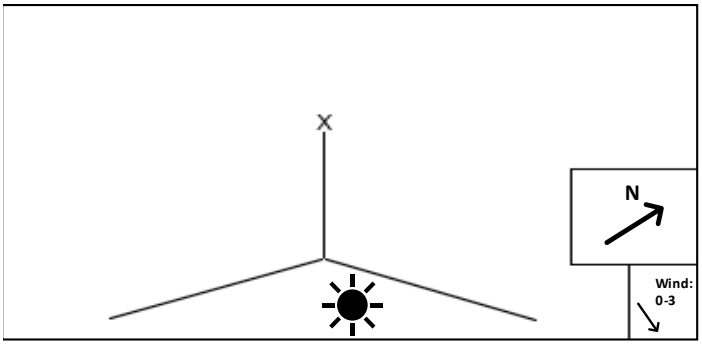
Process	Unit#	Operating Mode
Boiler	**1**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **57'** End:	Start **28°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **208°** End:
Distance and Direction to Observation Point from Emission Point	
Start **57' and 208°** End	

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **89.2**	End:	**66.9**	**30.5**



Form #				7	Page 1	Of 1			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**12:41**			**12:47**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/3/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #1 Run 1				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity= **0.00%**				

IV. G. Visible Emissions Field Data Sheet - Unit #1

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

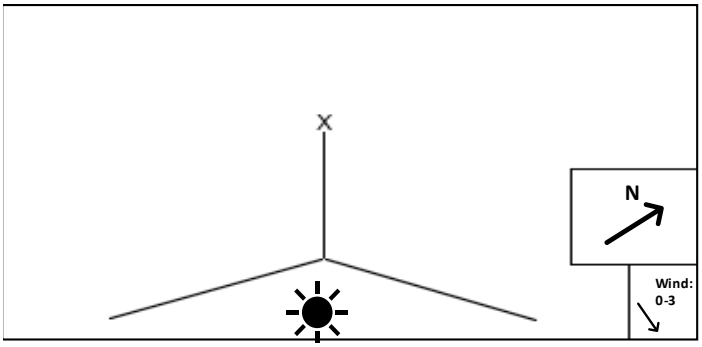
Process	Unit#	Operating Mode
Boiler	**1**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **57'** End:	Start **28°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **208°** End:
Distance and Direction to Observation Point from Emission Point	
Start **57' and 208°** End	

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **94.7**	End:	**68.4**	**27.8**



Form #				**8**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**13:51**			**13:57**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/3/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #1 Run 2				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

IV. G. Visible Emissions Field Data Sheet - Unit #1

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

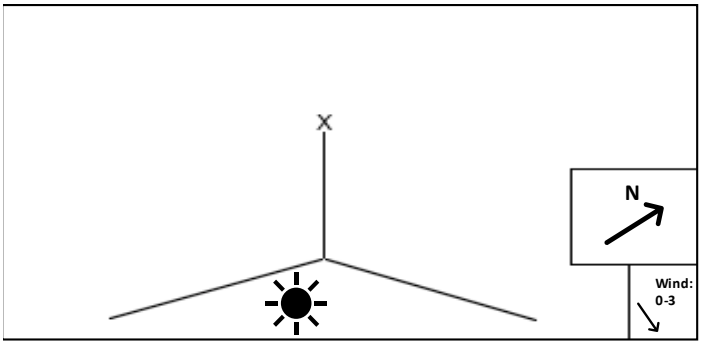
Process	Unit#	Operating Mode
Boiler	**1**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.			
Exhaust stack exiting roof of buidling			
Height of Emiss. Pt.		Hgt of Emiss. Pt. Rel. to Observer	
Start **25'**	End:	Start **19'**	End:
Distance to Emiss. Pt.		Direction to Emiss. Pt. (Degrees)	
Start **57'**	End:	Start **28°**	End:

Vertical Angle to Obs. Pt.		Direction to Obs. Pt. (Degrees)	
Start **18°**	End:	Start **208°**	End:
Distance and Direction to Observation Point from Emission Point			
Start **57' and 208°**	End		

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **95.2**	End:	**70**	**26.8**



Form #				**9**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**14:42**			**14:48**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/3/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #1 Run 3				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

IV. G. Visible Emissions Field Data Sheet - Unit #2

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

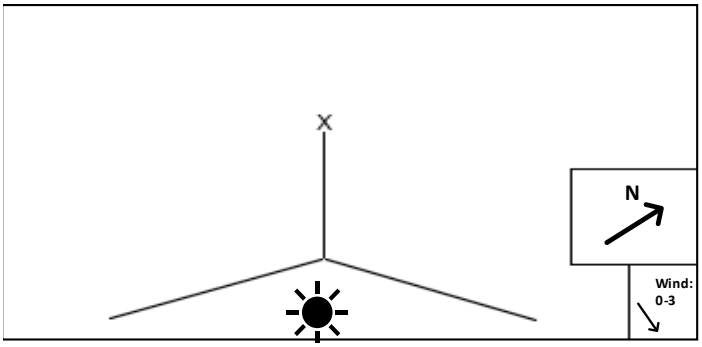
Process	Unit#	Operating Mode
Boiler	**2**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **57'** End:	Start **204°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **24°** End:
Distance and Direction to Observation Point from Emission Point	
Start **57' and 24°**	End

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **76.8**	End:	**66**	**54.3**



Form #				**4**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**8:15**			**8:21**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/3/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #2 Run 1				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

IV. G. Visible Emissions Field Data Sheet - Unit #2

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

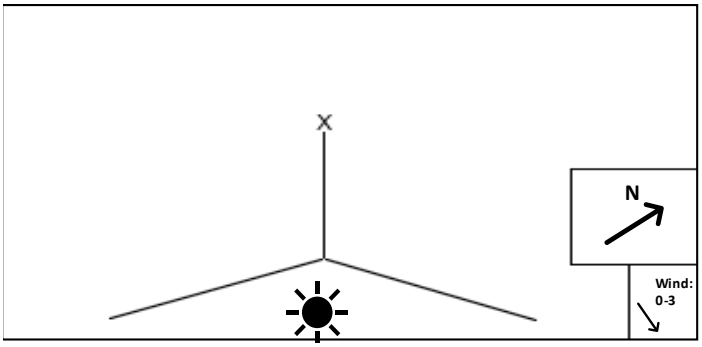
Process	Unit#	Operating Mode
Boiler	**2**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **57'** End:	Start **204°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **24°** End:
Distance and Direction to Observation Point from Emission Point	
Start **57' and 24°**	End

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **80**	End:	**67.3**	**48**



Form #				**5**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**10:02**			**10:08**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/3/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #2 Run 2				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

IV. G. Visible Emissions Field Data Sheet - Unit #2

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

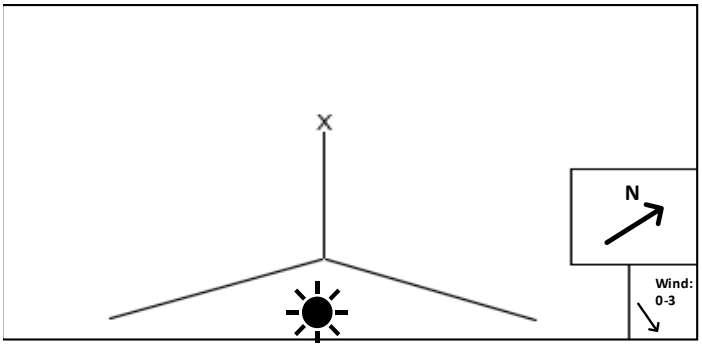
Process	Unit#	Operating Mode
Boiler	**2**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **57'** End:	Start **204°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **24°** End:
Distance and Direction to Observation Point from Emission Point	
Start **57' and 24°**	End

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Blue**	End:	Start: **Clear**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **83.9**	End:	**68.2**	**41.5**



Form #				**6**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/3/21			**MDT**		**11:22**			**11:28**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
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17					47				
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21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	**8/3/21**
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #2 Run 3				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

IV. G. Visible Emissions Field Data Sheet - Unit #3

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
	Marathon Oil Company
Facility Name	
	Albuquerque Termianl
Street Address	
	2030 2nd St. SW
City	State Zip
Albuquerque	**NM**

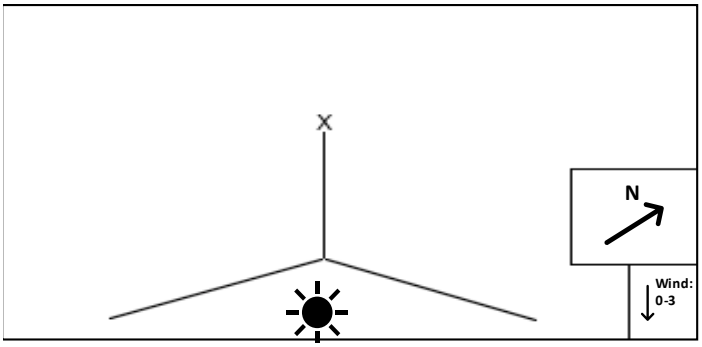
Process	Unit#	Operating Mode
Hot Oil Heater	**3**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.	
Exhaust stack exiting roof of buidling	
Height of Emiss. Pt.	Hgt of Emiss. Pt. Rel. to Observer
Start **25'** End:	Start **19'** End:
Distance to Emiss. Pt.	Direction to Emiss. Pt. (Degrees)
Start **60'** End:	Start **310°** End:

Vertical Angle to Obs. Pt.	Direction to Obs. Pt. (Degrees)
Start **18°** End:	Start **130°** End:
Distance and Direction to Observation Point from Emission Point	
Start **60' and 130°**	End **60' and 130°**

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Grey**	End:	Start: **Cloudy**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: 68.4	End:	**65.8**	**69**



Form #				1	Page 1	Of 1			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/2/21			**MDT**		**10:16**			**10:22**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
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21					51				
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23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/2/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #3 Run 1				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity= **0.00%**				

IV. G. Visible Emissions Field Data Sheet - Unit #3

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

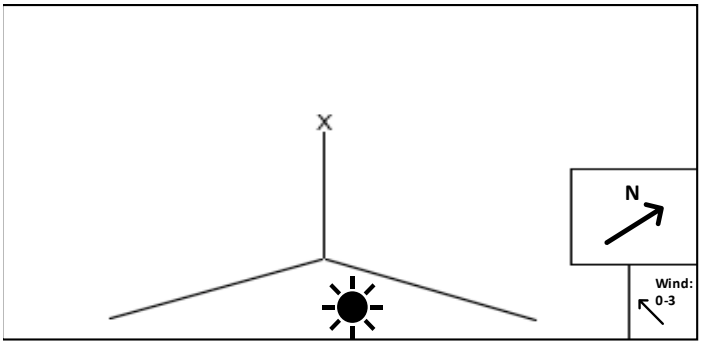
Process	Unit#	Operating Mode
Hot Oil Heater	**3**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.			
Exhaust stack exiting roof of buidling			
Height of Emiss. Pt.		Hgt of Emiss. Pt. Rel. to Observer	
Start **25'**	End:	Start **19'**	End:
Distance to Emiss. Pt.		Direction to Emiss. Pt. (Degrees)	
Start **60'**	End:	Start **310°**	End:

Vertical Angle to Obs. Pt.		Direction to Obs. Pt. (Degrees)	
Start **18°**	End:	Start **130°**	End:
Distance and Direction to Observation Point from Emission Point			
Start **60' and 130°**		End **60' and 130°**	

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Grey**	End:	Start: **Cloudy**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **75.7**	End:	**66.7**	**61.1**



Form #				**2**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/2/21			**MDT**		**11:16**			**11:22**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
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24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/2/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #3 Run 2				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity= **0.00%**				

IV. G. Visible Emissions Field Data Sheet - Unit #3

EPA Method Used: (Circle One)		
Method 9	Method 22	Other:

Company Name	
Marathon Oil Company	
Facility Name	
Albuquerque Termianl	
Street Address	
2030 2nd St. SW	
City	State Zip
Albuquerque	**NM**

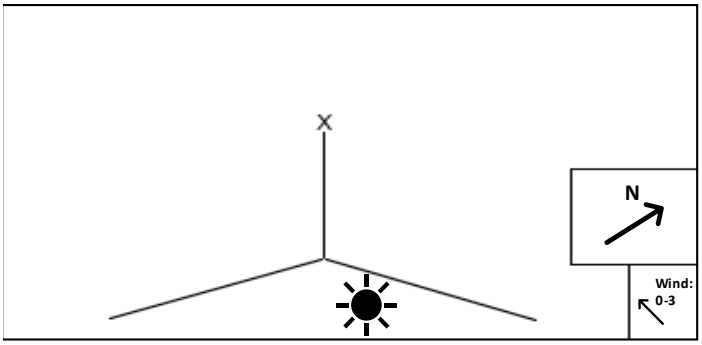
Process	Unit#	Operating Mode
Hot Oil Heater	**3**	**Full**
Control Equipment		Operating Mode
None		**None**

Describe Emiss. Pt.			
Exhaust stack exiting roof of buidling			
Height of Emiss. Pt.		Hgt of Emiss. Pt. Rel. to Observer	
Start **25'**	End:	Start **19'**	End:
Distance to Emiss. Pt.		Direction to Emiss. Pt. (Degrees)	
Start **60'**	End:	Start **310°**	End:

Vertical Angle to Obs. Pt.		Direction to Obs. Pt. (Degrees)	
Start **18°**	End:	Start **130°**	End:
Distance and Direction to Observation Point from Emission Point			
Start **60' and 130°**		End **60' and 130°**	

Describe Emissions			
Start **Streaming**		End **None**	
Emission Color		Water Droplet Plume	
Start: **None**	End: **None**	Attached˙ Detached˙	**None˙**

Describe Plume Background			
Start **Sky**		End **Sky**	
Background Color		Sky Conditions	
Start: **Grey**	End:	Start: **Cloudy**	End:
Wind Speed		Wind Direction	
Start: **0-3**	End:	Start: **W**	End: **W**
Ambient Temp.		Wet Bulb Temp.	R.H. %
Start: **80.1**	End:	**67.1**	**47.3**



Form #				**3**	Page **1**	Of **1**			
Continued on VEO Form Number									

Observation Date			Time Zone		Start Time			Stop Time	
8/2/21			**MDT**		**12:13**			**12:19**	
Min/Sec	0	15	30	45	Min/Sec	0	15	30	45
1	**0**	**0**	**0**	**0**	31				
2	**0**	**0**	**0**	**0**	32				
3	**0**	**0**	**0**	**0**	33				
4	**0**	**0**	**0**	**0**	34				
5	**0**	**0**	**0**	**0**	35				
6	**0**	**0**	**0**	**0**	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Observer's Name	
Jacob Anderson	
Observer's Signature	Date
	8/2/21
Organization	
Compliance Services and Testing	
Certified By	Date
AeroMet Engineering	**4/8/21**

Additional Information:				
Unit #3 Run 2				
Average	1-6= **0.00%**	7-12=	13-18=	19-24=
Opacities by	25-30=	31-36=	37-42=	43-48=
6 Min. Spans	49-54=	55-60=		
Total Average Opacity=	**0.00%**			

AeroMet Engineering, Inc.

Solutions for a Changing Environment

AEROMET ENGINEERING INC. CERTIFIES THAT

Jacob Anderson

has qualified as a CERTIFIED VISIBLE EMISSIONS READER per Title 40 Part 60 Appendix A USEPA Method 9

Issued: 04/08/2021 Expires: 10/08/2021

Questions? Call 573.636.6393

Certification of Visible Opacity Reading

Jacob Anderson

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: April 08, 2021

Expiration Date: October 08, 2021

AeroMet Instructor: Michael Wilson

H. SAMPLE CHAIN OF CUSTODY (NOT APPLICABLE)

No samples were transferred to a sub-contractor; therefore, a chain of custody is not applicable for this testing program.

I. QUALITY ASSURANCE ACTIVITIES

Each instrument's response was checked and adjusted in the field prior to the collection of data via multi-point calibration. The instrument's linearity was checked by first adjusting its zero and span responses to nitrogen (zero) gas and an upscale (mid-range) calibration gas within the range of the expected concentrations. The instrument response was then challenged with an upscale calibration gas of known concentration. NO_x, CO, and O_2/CO_2 employed a three-point calibration curve (zero, mid, and span gases). The instrument's response was accepted as being linear if the response of the other calibration gases agreed within ±2% of span of the predicted values for the NO_x, CO, and O_2/CO_2 analyzers.

As a minimum, before and after each test run, the analyzers were checked for zero and span drift. This provided means to use the drift correction calculation as required by Methods and also provided documentation of the precision of the data just collected. The criterion for test run data acceptability is that the instrument drift is no more than ±3% of the full-scale response from the previous calibration and the bias from the multi-point calibration is no more than ±5% of full-scale response. The Quality Assurance Worksheets summarize all multi-point calibration checks and zero to span checks performed during the tests. These worksheets, as prepared from the datalog records, show that none of the analyzer calibrations drifted in excess of method specifications during the tests. These worksheets are contained in Section IV.I.2 of the report.

Interference response tests were conducted on the instruments by the instrument vendors and/or CST on the NO_x, CO, and O_2/CO_2 analyzers before any field use. The sum of the interference responses for each measured gas is less than ±2% of the applicable full-scale span value. The instruments used for the tests meet the performance specifications for EPA Methods 3A, 7E, and 10. The interference response documentation is contained in Section IV.I.1 of the report.

The moisture train was leak checked before each test run began, as a caution, and after each test run. The criterion for acceptance is no more than 0.02 cfm per minute at a vacuum of 15" Hg from the inlet of the first impinger through the remainder of the train. The leak checks observed are typically observed at 18" Hg or more, which is greater than the typical sampling vacuum of 10" Hg. The data from these tests are located in Section IV.A.3.

The gaseous sampling system was leak checked by demonstrating that a vacuum greater than 10" Hg could be pulled and held for at least 1 minute with a decline of less than 1" Hg during that time period. The normal sampling vacuum is in the range of 1-3" Hg. A leak test was conducted on the sample line after it was assembled and before it was dismantled. These tests were conducted to ensure that ambient air had not diluted the sample. No leaks were detected throughout the duration of the test. Documentation of this procedure is recorded on the datalog record and included with the Quality Assurance Report in Section IV.I.1. The absence of leaks in the sampling system was also verified by the sample system bias checks, as required by testing methodology. Comparing the responses of an analyzer to a calibration gas introduced via two paths tested the sample system's integrity. The first path was into the analyzer via the zero/span calibration manifold. The second path was to introduce zero and calibration gases into the sample system at the sample probe via a 1/4" Teflon® tube inside the heated sample line that terminates at the two-way valve used for quality assurance procedures. Any difference in the instrument responses by these two methods was attributed to sampling system bias or leakage. These bias checks were conducted before the testing. Examination of the datalog record values transferred to the Quality Assurance Report show that the analyzer responses via both sample paths agreed within 5%, the allowed difference from the recorded span, in all cases. During the sample system bias check, the response time of each instrument was measured and recorded. No reported data was collected outside of this time. The same sample system was used throughout each test and the direct path through the manifold was used for all calibrations after passing the QA test.

The efficiency of the NO_2 to NO converter in the NO_x analyzer was checked by having the analyzer sample a mixture of NO_2 in N_2 standard gas. When this concentration of certified gas, in the range of 40-60 ppmv, is introduced to the analyzer, the NO_x instrument's converter should convert all NO_2 to NO in the presence of O_3. The criterion for acceptability is a difference of observed NO_2 less than 10% of the certified concentration over an unspecified time period. The Quality Assurance Report also summarizes the results of the converter efficiency test.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to ±1% accuracy for NO_x/CO and O_2/CO_2, and to ±2% accuracy for the remaining gases. EPA Protocol Number 1 was used, where applicable (i.e. NO_x gases), to assign the concentration values traceable to the National Institute of Standards and Technology, Standard Reference Materials (SRM's). The gas calibration sheets, as prepared by the vendor, are contained in Section IV.E. of this test report.

IV.I.1. Quality Assurance Report
Converter Efficiency Test, Interference Response, Bias and Leak Checks

NOx Converter Efficiency Check

Method: *7E Section 8.2.4.*
Frequency: *Before each field test.*
Criteria: *Equal to or greater than 90% conversion efficiency.*

Test Date: 8/2/21 Technician: CS

NO2	*Results*
Certified Value	50.00 ppmv
Observed Value	48.91 ppmv
Converter Efficiency	98%

Interference Response Checks

Method: *7E Section 8.2.7.*
Frequency: *Prior to initial use in the field or after major alteration or modification.*
Criteria: *Sum of responses < 2.5% of calibration span.*

Test Date: 8/2/21 Technician: CS

Interference Test Gases		**Analyzer Response (ppmv or % as applicable)**					
Type Gas	*Conc.*	*NOx (ppm)*	*CO (ppm)*	*SO2 (ppm)*	*THC (ppm)*	*O2 (%)*	*CO2 (%)*
NOx in N2	25.00 ppm	---	N/A	---	---	0.14	0.07
CO in N2	25.00 ppm	N/A	---	---	---	0.14	0.07
SO2 in N2	---	---	---	---	---	---	---
THC in Air	---	---	---	---	---	---	---
O2 in N2	10.00 %	0.21	0.56	---	---	---	N/A
CO2 in N2	10.00 %	0.21	0.56	---	---	N/A	---

Gas Dilution Calibration - 2 Mass Flow Controllers

Method: *205*
Frequency: *Before each field test.*
Criteria: *Produce Calibration gases whose measured values are within ± 2% of predicted values.*

Manufacturer: Environics Cal Gas: NOx
Model Number: Series 4040 Test Date: 8/2/21
Serial Number: 8439 Technician: CS

	MFC 3			*MFC 2*		
	Direct Inject	**Diluted Conc.**	**Diluted Conc.**	**Direct Inject**	**Diluted Conc.**	**Diluted Conc.**
Certified Value:	253.6	2952	2952	253.6	2952	2952
Ex. Dilution:	---	250	500	---	1000	2000
Injection 1	252.88	250.16	502.20	254.66	1003.94	2002.85
Injection 2	252.85	251.95	503.93	253.96	1005.02	2004.44
Injection 3	252.86	250.98	503.02	254.37	1002.53	2002.48
Average	**252.9**	**251.0**	**503.1**	**254.3**	**1003.8**	**2003.3**
% Variation	**0.01%**	**0.36%**	**0.17%**	**0.14%**	**0.12%**	**0.05%**
% Difference	**0.29%**	**-0.41%**	**-0.61%**	**-0.29%**	**-0.38%**	**-0.16%**

Sample System Bias & Response Time Check

Method: *7E Section 8.2.5-6.*
Frequency: *Before sampling begins.*
Criteria: *5% of calibration span.*
Criteria: *Note the longer of the two times as the response time.*

Test Date: 4/10/21 Technician: CS

Sample System Bias Check

Introduction Technique	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Direct Zero Input	0.60	-0.03	---	---	0.00	-0.01
Bias Input	0.18	0.36	---	---	0.21	0.05
Zero Bias	-0.84%	0.78%	---	---	2.10%	0.30%
Direct Span Input	25.02	25.20	---	---	9.98	9.93
Bias Input	25.20	24.48	---	---	9.92	9.85
Span Bias	0.36%	-1.44%	---	---	-0.60%	-0.40%

Sample System Response Time

Parameter	**NOx (ppmv)**	**CO (ppmv)**	**SO2 (ppmv)**	**THC (ppmv)**	**O2 (%)**	**CO2 (%)**
Upscale Response	35	45	---	---	45	35
Downscale Response	40	45	---	---	40	40
Purge Time	90 seconds					

IV.I. 2. Quality Assurance Worksheet - Unit #1
Instrument Calibration and Drift Correction

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Superior Aztec Boiler SN: 12237
Engine Site Rating: 14 MMBtu/hr
Test Date: Tuesday, August 3, 2021

UNIT #1					TEST RUN 1					TEST RUN 2					TEST RUN 3				
GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS		INITIAL CALIBRATION & LINEARITY CHECK		Start Run 12:10	ZERO and SPAN CALIBRATION CHECK				Start Run 13:20	ZERO and SPAN CALIBRATION CHECK				Start Run 14:30	ZERO and SPAN CALIBRATION CHECK			
	Certified Concentration	Target (% Span)	Analyzer Response	Calibration Error < 2%	Stop Run 13:10	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 14:20	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 15:30	Initial Response	Final Response	Drift < 3%	Bias < 5%
NOx					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	0.60 ppmv	1.2%	**36.53**	0.68 ppmv	0.64 ppmv	0.1%	1.3%	**36.76**	0.64 ppmv	1.34 ppmv	1.4%	2.7%	**36.99**	1.34 ppmv	0.61 ppmv	1.5%	1.2%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.02 ppmv	0.0%	**37.01**	24.91 ppmv	24.87 ppmv	0.2%	0.3%	**37.99**	24.87 ppmv	24.18 ppmv	2.8%	1.6%	**39.09**	24.18 ppmv	23.84 ppmv	1.4%	2.3%
High	50.0 ppmv	100.0	50.01 ppmv	0.0%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
CO					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	-0.03 ppmv	-0.1%	**4.92**	0.50 ppmv	0.58 ppmv	0.2%	1.2%	**4.25**	0.58 ppmv	0.75 ppmv	0.3%	1.5%	**4.63**	0.75 ppmv	0.59 ppmv	0.3%	1.2%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.20 ppmv	0.4%	**4.67**	24.19 ppmv	23.88 ppmv	1.2%	2.2%	**3.89**	23.88 ppmv	23.52 ppmv	1.4%	3.0%	**4.32**	23.52 ppmv	23.70 ppmv	0.7%	2.6%
High	50.0 ppmv	100.0	50.17 ppmv	0.3%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
O2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	0.00%	0.0%	**5.95**	-0.11%	-0.12%	0.1%	1.2%	**5.23**	-0.12%	0.01%	1.3%	0.1%	**5.11**	0.01%	0.04%	0.3%	0.4%
					Corr. %					Corr. %					Corr. %				
Mid	5.0%	50.0	4.97%	-0.3%	**5.98**					**5.27**					**5.14**				
High	10.0%	100.0	9.98%	-0.2%	Cal. Span	10.05%	10.01%	0.4%	0.1%	Cal. Span	10.01%	9.95%	0.6%	0.5%	Cal. Span	9.95%	9.91%	0.4%	0.9%
Analyzer Range = 25.0%			**Span = 10.0**		**10.0**					**10.0**					**10.0**				
CO2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	-0.01%	-0.1%	**8.32**	0.08%	0.07%	0.1%	0.4%	**7.41**	0.07%	0.23%	0.8%	1.2%	**7.45**	0.23%	0.31%	0.4%	1.6%
					Corr. %					Corr. %					Corr. %				
Mid	10.0%	50.0	9.93%	-0.4%	**8.27**	10.06%	10.02%	0.4%	0.1%	**7.41**	10.02%	9.88%	1.4%	0.6%	**7.50**	9.88%	9.81%	0.7%	0.9%
High	20.0%	100.0	19.79%	-1.1%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 20.0%			**Span = 20.0**		**20.0**					**20.0**					**20.0**				

IV.I. 2. Quality Assurance Worksheet - Unit #2
Instrument Calibration and Drift Correction

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Hurst 400 Boiler SN: 51545-200-1
Engine Site Rating: 12 MMBtu/hr
Test Date: Tuesday, August 3, 2021

UNIT #2					TEST RUN 1					TEST RUN 2					TEST RUN 3				
GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS		INITIAL CALIBRATION & LINEARITY CHECK		Start Run 8:04	ZERO and SPAN CALIBRATION CHECK				Start Run 10:48	ZERO and SPAN CALIBRATION CHECK				Start Run 11:54	ZERO and SPAN CALIBRATION CHECK			
	Certified Concentration	Target (% Span)	Analyzer Response	Calibration Error < 2%	Stop Run 9:04	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 11:48	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 12:54	Initial Response	Final Response	Drift < 3%	Bias < 5%
NOx					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	0.60 ppmv	1.2%	**36.51**	0.10 ppmv	0.23 ppmv	0.3%	0.5%	**36.70**	0.23 ppmv	0.43 ppmv	0.4%	0.9%	**37.62**	0.43 ppmv	1.01 ppmv	1.2%	2.0%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.02 ppmv	0.0%	**37.54**	24.34 ppmv	24.40 ppmv	0.2%	1.2%	**37.42**	24.40 ppmv	24.85 ppmv	1.8%	0.3%	**38.38**	24.85 ppmv	24.67 ppmv	0.7%	0.7%
High	50.0 ppmv	100.0	50.01 ppmv	0.0%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
CO					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	-0.03 ppmv	-0.1%	**2.14**	-0.25 ppmv	-0.02 ppmv	0.5%	0.0%	**2.19**	-0.02 ppmv	0.17 ppmv	0.4%	0.3%	**2.22**	0.17 ppmv	1.49 ppmv	2.6%	3.0%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.20 ppmv	0.4%	**2.32**	24.00 ppmv	24.70 ppmv	2.8%	0.6%	**2.15**	24.70 ppmv	24.62 ppmv	0.3%	0.8%	**1.47**	24.62 ppmv	24.41 ppmv	0.8%	1.2%
High	50.0 ppmv	100.0	50.17 ppmv	0.3%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
O2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	0.00%	0.0%	**6.76**	-0.01%	-0.26%	2.5%	2.6%	**6.79**	-0.26%	-0.18%	0.8%	1.8%	**6.72**	-0.18%	-0.12%	0.6%	1.2%
					Corr. %					Corr. %					Corr. %				
Mid	5.0%	50.0	4.97%	-0.3%	**6.85**					**6.94**					**6.94**				
High	10.0%	100.0	9.98%	-0.2%	Cal. Span	9.92%	9.94%	0.2%	0.6%	Cal. Span	9.94%	9.81%	1.3%	1.9%	Cal. Span	9.81%	9.68%	1.3%	3.2%
Analyzer Range = 25.0%			**Span = 10.0**		**10.0**					**10.0**					**10.0**				
CO2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	-0.01%	-0.1%	**7.93**	0.02%	0.09%	0.4%	0.5%	**7.89**	0.09%	0.08%	0.1%	0.4%	**7.89**	0.08%	0.20%	0.6%	1.0%
					Corr. %					Corr. %					Corr. %				
Mid	10.0%	50.0	9.93%	-0.4%	**7.88**	10.03%	10.07%	0.4%	0.4%	**7.81**	10.07%	10.07%	0.0%	0.4%	**7.88**	10.07%	9.89%	1.8%	0.5%
High	20.0%	100.0	19.79%	-1.1%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 20.0%			**Span = 20.0**		**20.0**					**20.0**					**20.0**				

IV.I. 2. Quality Assurance Worksheet - Unit #3
Instrument Calibration and Drift Correction

Company: Marathon Oil Company
Location: Albuquerque Terminal
Source: Arizona Boiler Company SN: 15134
Engine Site Rating: 14.7 MMBtu/hr
Test Date: Monday, August 2, 2021

UNIT #3					TEST RUN 1					TEST RUN 2					TEST RUN 3				
GAS LEVELS PER METHOD	CALIBRATION GAS CONCENTRATIONS		INITIAL CALIBRATION & LINEARITY CHECK		Start Run 9:42	ZERO and SPAN CALIBRATION CHECK				Start Run 10:48	ZERO and SPAN CALIBRATION CHECK				Start Run 11:54	ZERO and SPAN CALIBRATION CHECK			
	Certified Concentration	Target (% Span)	Analyzer Response	Calibration Error < 2%	Stop Run 10:42	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 11:48	Initial Response	Final Response	Drift < 3%	Bias < 5%	Stop Run 12:54	Initial Response	Final Response	Drift < 3%	Bias < 5%
NOx					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	0.60 ppmv	1.2%	**32.86**	0.18 ppmv	0.12 ppmv	0.1%	0.2%	**33.32**	0.12 ppmv	0.60 ppmv	1.0%	1.2%	**33.44**	0.60 ppmv	0.15 ppmv	0.9%	0.3%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.02 ppmv	0.0%	**32.77**	25.20 ppmv	25.01 ppmv	0.8%	0.0%	**33.30**	25.01 ppmv	25.20 ppmv	0.8%	0.4%	**33.02**	25.20 ppmv	25.62 ppmv	1.7%	1.2%
High	50.0 ppmv	100.0	50.01 ppmv	0.0%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
CO					Avg. ppmv					Avg. ppmv					Avg. ppmv				
Zero	0.0 ppmv	0.0	-0.03 ppmv	-0.1%	**2.51**	0.36 ppmv	0.47 ppmv	0.2%	0.9%	**2.09**	0.47 ppmv	0.77 ppmv	0.6%	1.5%	**2.26**	0.77 ppmv	0.90 ppmv	0.3%	1.8%
					Corr. ppmv					Corr. ppmv					Corr. ppmv				
Mid	25.0 ppmv	50.0	25.20 ppmv	0.4%	**2.18**	24.48 ppmv	24.47 ppmv	0.0%	1.1%	**1.55**	24.47 ppmv	24.22 ppmv	1.0%	1.6%	**1.52**	24.22 ppmv	24.20 ppmv	0.1%	1.6%
High	50.0 ppmv	100.0	50.17 ppmv	0.3%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 100 ppmv			**Span = 50.0**		**50.0**					**50.0**					**50.0**				
O2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	0.00%	0.0%	**2.73**	0.21%	0.23%	0.2%	2.3%	**2.71**	0.23%	0.28%	0.5%	2.8%	**2.79**	0.28%	0.26%	0.2%	2.6%
					Corr. %					Corr. %					Corr. %				
Mid	5.0%	50.0	5.13%	1.3%	**2.59**					**2.54**					**2.62**				
High	10.0%	100.0	9.98%	-0.2%	Cal. Span	9.92%	9.90%	0.2%	1.0%	Cal. Span	9.90%	9.93%	0.3%	0.7%	Cal. Span	9.93%	9.83%	1.0%	1.7%
Analyzer Range = 25.0%			**Span = 10.0**		**10.0**					**10.0**					**10.0**				
CO2					Avg.%					Avg.%					Avg.%				
Zero	0.0%	0.0	-0.01%	-0.1%	**9.72**	0.05%	0.11%	0.3%	0.6%	**9.68**	0.11%	0.08%	0.2%	0.4%	**9.60**	0.08%	0.03%	0.3%	0.2%
					Corr. %					Corr. %					Corr. %				
Mid	10.0%	50.0	9.93%	-0.4%	**9.88**	9.85%	9.83%	0.2%	0.9%	**9.83**	9.83%	9.85%	0.2%	0.8%	**9.78**	9.85%	9.79%	0.6%	1.1%
High	20.0%	100.0	19.87%	-0.6%	Cal. Span					Cal. Span					Cal. Span				
Analyzer Range = 20.0%			**Span = 20.0**		**20.0**					**20.0**					**20.0**				

V. APPENDIX

A. COMPLICATIONS DURING THE TESTS

There were no complications encountered during the test.

B. SPECIAL INFORMATION

CST collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. CST makes no warranty as to the suitability of the test methods and assumes no liability relating to the interpretation and use of the test data.

C. TEST CONTRACTOR'S RESUME

CHRIS SPENCER
COMPLIANCE SERVICES AND TESTING

EDUCATIONAL BACKGROUND

University of New Mexico, Albuquerque, New Mexico
Bachelor of Science - Biology, Degree Conferred 1995
Bachelor of Arts - Chemistry, Degree Conferred 2003

APPLICABLE EXPERIENCE

7/06 to Present: Compliance Services and Testing, Albuquerque, NM
Project Manager

9/99 to 7/06: TRC - CUBIX, Austin, Texas; Albuquerque, NM
Project Manager for a mobile laboratory. Travel to different plants and compressor stations in 2-3 person teams in a mobile laboratory to test emissions from exhaust stacks utilizing EPA Methods outlined in The Code of Federal Regulations, Title 40, Chapter 60. Familiar with methods 1-10, 15, 16, 19, 20, 22, 25, 101, 102, 320, 323, as well as Part 75 Acid Rain program and New Source Performance Specifications (Subpart GG) for turbine start-up projects. Performed emission analysis for Honeywell's Parallon 75 microturbine at their Albuquerque facility with several groups of engineers for research purposes. Tested with various fuel oils including natural gas and diesel. Performed guaranteed emissions on production units, including diesel and kerosene fueled microturbines. Maintained customer relations, prepare quotes for long-term and short-term testing, invoicing, and complete laboratory and office upkeep. Also performed quarterly monitoring, initial and compliance testing.

loading operation, resulting in high levels of vapor generation and loss. If the turbulence is great enough, liquid droplets will be entrained in the vented vapors.

A second method of loading is submerged loading. Two types are the submerged fill pipe method and the bottom loading method. In the submerged fill pipe method, the fill pipe extends almost to the bottom of the cargo tank. In the bottom loading method, a permanent fill pipe is attached to the cargo tank bottom. During most of submerged loading by both methods, the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly during submerged loading, resulting in much lower vapor generation than encountered during splash loading.

The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.

Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.

One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck results in greater loading losses than encountered during nonvapor balance, or "normal", service. Vapor balance service is usually not practiced with marine vessels, although some vessels practice emission control by means of vapor transfer within their own cargo tanks during ballasting operations, discussed below.

Emissions from loading petroleum liquid can be estimated (with a probable error of ±30 percent)[4] using the following expression:

$$L_L = 12.46 \frac{SPM}{T} \quad (1)$$

where:

L_L = loading loss, pounds per 1000 gallons ($lb/10^3$ gal) of liquid loaded

S = a saturation factor (see Table 5.2-1)
P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia) (see Section 7.1, "Organic Liquid Storage Tanks")
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole) (see Section 7.1, "Organic Liquid Storage Tanks")
T = temperature of bulk liquid loaded, °R (°F + 460)

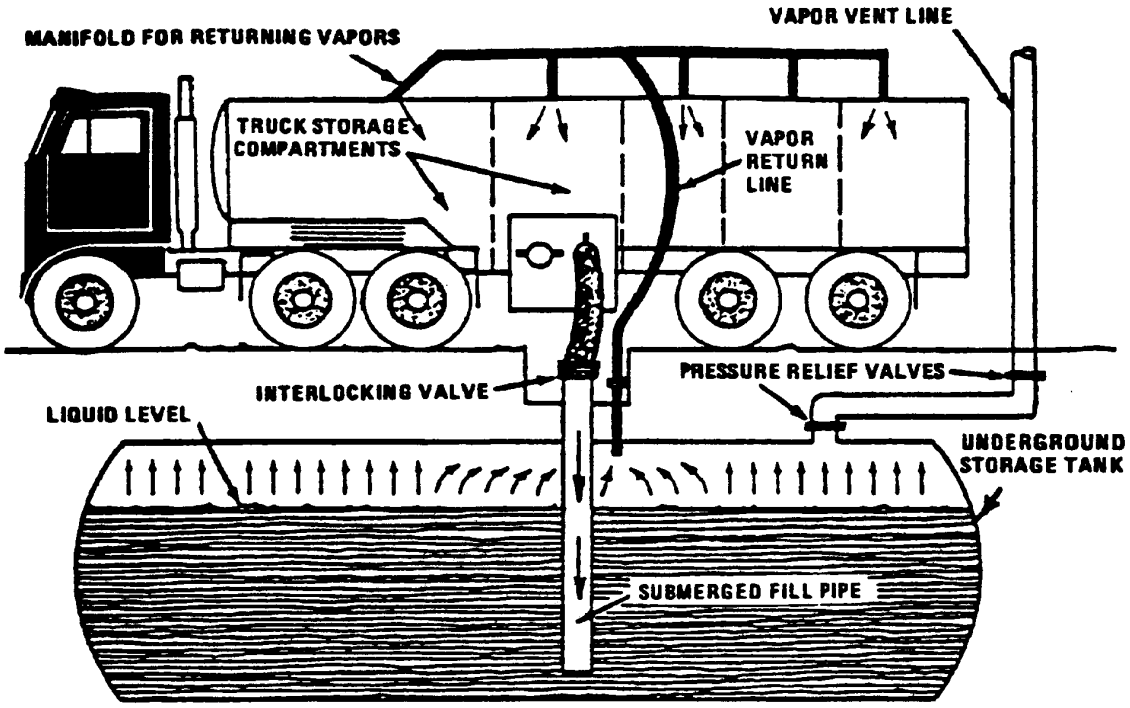


Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels[a]	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

[a] For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

7.1.3.1 Routine Losses From Fixed Roof Tanks[8-14,22]

The following equations, provided to estimate standing and working loss emissions, apply to tanks with vertical cylindrical shells and fixed roofs and to tanks with horizontal cylindrical shells. These tanks must be substantially liquid- and vapor-tight. The equations are not intended to be used in estimating losses from tanks which have air or other gases injected into the liquid, or which store unstable or boiling stocks or mixtures of hydrocarbons or petrochemicals for which the vapor pressure is not known or cannot be readily predicted. Tanks containing aqueous mixtures in which phase separation has occurred, resulting in a free layer of oil or other volatile materials floating on top of the water, should have emissions estimated on the basis of the properties of the free top layer.

Total routine losses from fixed roof tanks are equal to the sum of the standing loss and working loss:

$$L_T = L_S + L_W \quad (1\text{-}1)$$

where:

L_T = total routine losses, lb/yr
L_S = standing losses, lb/yr, see Equation 1-2
L_W = working losses, lb/yr, see Equation 1-35

7.1.3.1.1 Standing Loss

The standing loss, L_S, for a fixed roof tank refers to the loss of stock vapors as a result of tank vapor space breathing. Fixed roof tank standing losses can be estimated from Equation 1-2.

$$L_S = 365\ V_V\ W_V\ K_E\ K_S \quad (1\text{-}2)$$

where:

L_S = standing loss, lb/yr
V_V = vapor space volume, ft^3, see Equation 1-3
W_V = stock vapor density, lb/ft^3
K_E = vapor space expansion factor, per day
K_S = vented vapor saturation factor, dimensionless
365 = constant, the number of daily events in a year, (days/year)

Tank Vapor Space Volume, V_V - The tank vapor space volume is calculated using the following equation:

$$V_V = \left(\frac{\pi}{4} D^2\right) H_{VO} \quad \textbf{(1-3)}$$

where:

V_V = vapor space volume, ft^3
D = tank diameter, ft, see Equation 1-14 for horizontal tanks
H_{VO} = vapor space outage, ft, see Equation 1-16

not be construed as being applicable to an individual day. The average daily vapor temperature range is calculated for an uninsulated tank using Equation 1-6.

$$\Delta T_V = \left(1 - \frac{0.8}{2.2\,(H_S/D) + 1.9}\right)\Delta T_A + \frac{0.042\alpha_R I + 0.026(H_S/D)\alpha_S I}{2.2\,(H_S/D) + 1.9} \quad (1\text{-}6)$$

where:

ΔT_V = average daily vapor temperature range, °R
H_S = tank shell height, ft
D = tank diameter, ft,
ΔT_A = average daily ambient temperature range, °R; see Note 4
α_R = tank roof surface solar absorptance, dimensionless; see Table 7.1-6
α_S = tank shell surface solar absorptance, dimensionless; see Table 7.1-6
I = average daily total insolation factor, Btu/ft^2 d; see Table 7.1-7.

API assigns a default value of $H_s/D = 0.5$ and an assumption of $\alpha_R = \alpha_S$, resulting in the simplified equation shown below for an uninsulated tank:[22]

$$\Delta T_V = 0.7\,\Delta T_A + 0.02\,\alpha\,I \quad (1\text{-}7)$$

where:

α = average tank surface solar absorptance, dimensionless

For purposes of estimating emissions, a storage tank should be deemed insulated only if the roof and shell are both sufficiently insulated so as to minimize heat exchange with ambient air. If only the shell is insulated, and not the roof, the temperature equations are independent of H_s/D. Also, there likely will be sufficient heat exchange through the roof such that Equation 1-7 would be applicable.

A more accurate method of accounting for the average daily vapor temperature range, ΔT_V, in partially insulated scenarios is given below. When the tank shell is insulated but the tank roof is not, heat gain to the tank from insolation is almost entirely through the tank roof and thus the liquid surface temperature is not sensitive to H_S/D.

$$\Delta T_V = 0.6\,\Delta T_A + 0.02\,\alpha_R\,I \quad (1\text{-}8)$$

In the case of a fully insulated tank maintained at constant temperature, the average daily vapor temperature range, ΔT_V, should be taken as zero. This assumption that ΔT_V is equal to zero addresses only temperature differentials resulting from the diurnal ambient temperature cycle. In the case of cyclic heating of the bulk liquid, see Section 7.1.3.8.4.

2. The average daily vapor pressure range, ΔP_V, refers to the daily vapor pressure range at the liquid surface temperature averaged over all of the days in the given period of time, such as one year, and should not be construed as being applicable to an individual day. The average daily vapor pressure range can be calculated using the following equation:

$$\Delta P_V = P_{VX} - P_{VN} \quad (1\text{-}9)$$

$$H_{RO} = (1/3)\, H_R \qquad (1\text{-}17)$$

where:

H_{RO} = roof outage (or shell height equivalent to the volume contained under the roof), ft
H_R = tank roof height, ft

$$H_R = S_R\, R_S \qquad (1\text{-}18)$$

where: S_R = tank cone roof slope, ft/ft; if unknown, a standard value of 0.0625 is used
R_S = tank shell radius, ft

2. For a dome roof, the roof outage, H_{RO}, is calculated as follows:

$$H_{RO} = H_R \left[\frac{1}{2} + \frac{1}{6} \left[\frac{H_R}{R_S} \right]^2 \right] \qquad \textbf{(1-19)}$$

where:

H_{RO} = roof outage, ft
R_S = tank shell radius, ft
H_R = tank roof height, ft

$$H_R = R_R - \left(R_R^2 - R_S^2 \right)^{0.5} \qquad \textbf{(1-20)}$$

H_R = tank roof height, ft R_R = tank dome roof radius, ft R_S = tank shell radius,ft

The value of R_R usually ranges from 0.8D - 1.2D, where D = 2 R_S. If R_R is unknown, the tank diameter is used in its place. If the tank diameter is used as the value for R_R, Equations 1-19 and 1-20 reduce to H_{RO} = 0.137 R_S and H_R = 0.268 R_S.

Vented Vapor Saturation Factor, K_S

The vented vapor saturation factor, K_S, is calculated using the following equation:

$$K_S = \frac{1}{1 + 0.053 P_{VA} H_{VO}} \qquad \textbf{(1-21)}$$

where:

K_S = vented vapor saturation factor, dimensionless
P_{VA} = vapor pressure at average daily liquid surface temperature, psia; see Notes 1 and 2 to Equation 1-22
H_{VO} = vapor space outage, ft, see Equation 1-16

α_R = tank roof surface solar absorptance, dimensionless; see Table 7.1-6
α_S = tank shell surface solar absorptance, dimensionless; see Table 7.1-6
I = average daily total insolation factor, Btu/(ft^2 day); see Table 7.1-7

API assigns a default value of $H_s/D = 0.5$ and an assumption of $\alpha_R = \alpha_S$, resulting in the simplified equation shown below for an uninsulated fixed roof tank:[22]

$$T_{LA} = 0.4T_{AA} + 0.6T_B + 0.005\ \alpha\ I \quad (1\text{-}28)$$

where:

α = average tank surface solar absorptance, dimensionless

Equation 1-27 and Equation 1-28 should not be used to estimate liquid surface temperature for insulated tanks. In the case of fully insulated tanks, the average liquid surface temperature should be assumed to equal the average liquid bulk temperature (see Note 5). For purposes of estimating emissions, a storage tank should be deemed insulated only if the roof and shell are both fully insulated so as to minimize heat exchange with ambient air. If only the shell is insulated, and not the roof, there likely will be sufficient heat exchange through the roof such that Equation 1-28 would be applicable.

A more accurate method of estimating the average liquid surface temperature, T_{LA}, in partially insulated fixed roof tanks is given below. When the tank shell is insulated but the tank roof is not, heat gain to the tank from insolation is almost entirely through the tank roof and thus the liquid surface temperature is not sensitive to H_S/D.

$$T_{LA} = 0.3\ T_{AA} + 0.7\ T_B + 0.005\ \alpha_R\ I \quad (1\text{-}29)$$

If T_{LA} is used to calculate P_{VA} from Figures 7.1-13a, 7.1-13b, 7.1-14a, or 7.1-14b, T_{LA} must be converted from degrees Rankine to degrees Fahrenheit (°F = °R – 459.7). If T_{LA} is used to calculate P_{VA} from Equation 1-26, T_{LA} must be converted from degrees Rankine to degrees Celsius (°C = [°R – 491.7]/1.8).

4. The average daily ambient temperature, T_{AA}, is calculated using the following equation:

$$T_{AA} = \left(\frac{T_{AX} + T_{AN}}{2}\right) \quad \textbf{(1-30)}$$

where:

T_{AA} = average daily ambient temperature, °R
T_{AX} = average daily maximum ambient temperature, °R
T_{AN} = average daily minimum ambient temperature, °R

Table 7.1-7 gives historical values of T_{AX} and T_{AN} in degrees Fahrenheit for selected U.S. cities. These values are converted to degrees Rankine by adding 459.7.

5. The liquid bulk temperature, T_B, should preferably be based on measurements or estimated from process knowledge. For uninsulated fixed roof tanks known to be in approximate equilibrium with

TABLE 2-2. REFINERY AVERAGE EMISSION FACTORS[a]

Equipment type	Service	Emission factor (kg/hr/source)[b]
Valves	Gas	0.0268
	Light liquid	0.0109
	Heavy liquid	0.00023
Pump seals[c]	Light liquid	0.114
	Heavy liquid	0.021
Compressor seals	Gas	0.636
Pressure relief valves	Gas	0.16
Connectors	All	0.00025
Open-ended lines	All	0.0023
Sampling connections	All	0.0150

[a]Source: Reference 2.

[b]These factors are for non-methane organic compound emission rates.

[c]The light liquid pump seal factor can be used to estimate the leak rate from agitator seals.

TABLE 2-3. MARKETING TERMINAL AVERAGE EMISSION FACTORS

Equipment type	Service	Emission factor (kg/hr/source)[a]
Valves	Gas	1.3E-05
	Light Liquid	4.3E-05
Pump seals	Gas	6.5E-05
	Light Liquid	5.4E-04
Others (compressors and others)[b]	Gas	1.2E-04
	Light Liquid	1.3E-04
Fittings (connectors and flanges)[c]	Gas	4.2E-05
	Light Liquid	8.0E-06

[a]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane).

[b]The "other" equipment type should be applied for any equipment type other than fittings, pumps, or valves.

[c]"Fittings" were not identified as flanges or non-flanged connectors; therefore, the fitting emissions were estimated by averaging the estimates from the connector and the flange correlation equations.

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

H2S Scrubber MFG Data Sheet

ODOR CONTROL SYSTEM
EQUIPMENT DATA SHEET

Client	Andeavor	**Location**	Andeavor Asphalt Terminal Albuquerque, NM
		Tag	TK-502 Carbon Filtration System
Project	Odor Control	**Purchase Order No.**	12625763
Date	Sept. 14/2018	**ACC Project No**.	30721

EQUIPMENT INFORMATION

Model No.	ACC-350-DS-SS	**Configuration**	Draw Through
Serial No.	30721	**Construction**	304L Stainless Steel APIC
Air Volume	350 ACFM	**Weight**	3200 lb operating

INSTRUMENTATION

Inlet Duct Static Pressure	Dwyer Magnehelic Series 2000, 0-2" WG	**Customer Knock-Out Vessel Differential Pressure**	Dwyer Magnehelic Series 2000, 0-4" WG
Carbon Bed Differential Pressure	Dwyer Magnehelic Series 2000, 0-8" WG	**Carbon Bed Inlet Temperature**	Dwyer BTM34011D, 0-140 F
Carbon Bed Discharge Temperature	Dwyer BTM34011D, 0-140 F		

FAN INFORMATION

Type	IEFB 122	**Rotation**	CCW, UB
Construction	304 L SS APIC	**Volume**	350 ACFM
Pressure	-8" WG	**Arrangement**	4
BHP	0.80, 0.075 lb/ft^3	**Motor HP**	1.5
Electrical	460V/3/60	**Motor Enclosure**	TEFC IEEE 841
Motor Frame	TBA	**Motor Rpm**	3600 RPM
Motor Type	Single speed, inverter duty	**Manufacturer**	TBA
Bearings	N.A.	**Drive**	Arr 4 , direct
Shaft Seal	N.A.	**OSHA Guards**	None
Space Heater	None	**Motor Protection**	None

APPLIED CONTAMINANT CONTROL LTD.
10908-123 Street
Edmonton, Alberta, Canada T5M 0C9
T 780.413.6934 **F** 780.413.6935

GAS PHASE FILTRATION BED			
Stage 1 Media Type	Inert, ceramic saddles, 1”	**Stage 1 Media Volume / Weight**	N.A.
Stage 2 Media Type	Bituminous coal, extruded pellet, virgin	**Stage 2 Media Volume / Weight**	22 ft^3 / 550 lb
Overall Effective Bed Depth	3’	**Maximum Bed Volume Capacity**	28 ft^3
Bed Velocity	50 AFPM	**Empty Bed Residence Time**	3.8 secs
Inlet Temperature	100-120 F	**Inlet Moisture**	50-90% RH
Inlet Loading (assumed)	0-10 ppmv H_2S	**Removal Efficiency**	Minimum 90% on H_2S

NOZZLE SCHEDULE		
Vessel Inlet	6” ID / 11” OD	9.5” BCD, qty 8, 7/8” holes
Vessel Discharge	6” ID / 11” OD	9.5” BCD, qty 8, 7/8” holes
Drain #1	2” dia., 150# flanged	c/w qty 1, ¼ turn ball valve
Drain #2	N.A.	
Differential Pressure (2)	1/2” dia., fpt	c/w bushing to ¼” fpt
Fire Suppression Nozzles	Qty 1, 2” 150# flanged	c/w 2” ¼ turn ball valve, manually actuated
Inlet Static Pressure Sensor	1/2” dia., fpt	c/w bushing to ¼” fpt, duct mounted
Inlet Temperature Sensor	3/4” dia., fpt	c/w bushing to 1/2” fpt, duct mounted
Discharge Temperature Sensor	3/4” dia., fpt	c/w bushing to 1/2” fpt, duct mounted
Accessories	6” CI butterfly damper, 316L SS Disc and stem, Viton seals, QTY 2.	Inlet isolation / balancing damper, manual fresh air bleed damper.
Configuration	Skid mounted	Dry scrubber and fan mounted on common skid, fully ducted. CS skid, SSPC SP6 / Epoxy Coated.

APPLIED CONTAMINANT CONTROL LTD.
10908-123 Street
Edmonton, Alberta, Canada T5M 0C9
T 780.413.6934 **F** 780.413.6935

3. OPERATIONAL PLAN – AIR EMISSIONS DURING SSM

The Albuquerque Asphalt Terminal is owned and operated by Western Refining Terminals, LLC. As soon as a malfunction occurs, the facility will shut down applicable equipment as soon as possible to ensure no excess emissions or non-permitted emissions are released. The facility will only startup again once it is identified that the malfunction is addressed, and the facility will operate as normal and permitted.

Additional details are provided in this section regarding specific steps Western will take should any malfunction occur on site as well as details regarding safety procedures and processes to ensure protection of employees, the general public and the environment.

Albuquerque Asphalt - Operating Skill - Transport Loading

Overview

Purpose This document provides the operating skill for loading an asphalt transport.

Scope This document applies to Albuquerque Asphalt Terminal.

Contents This document contains the following sections:

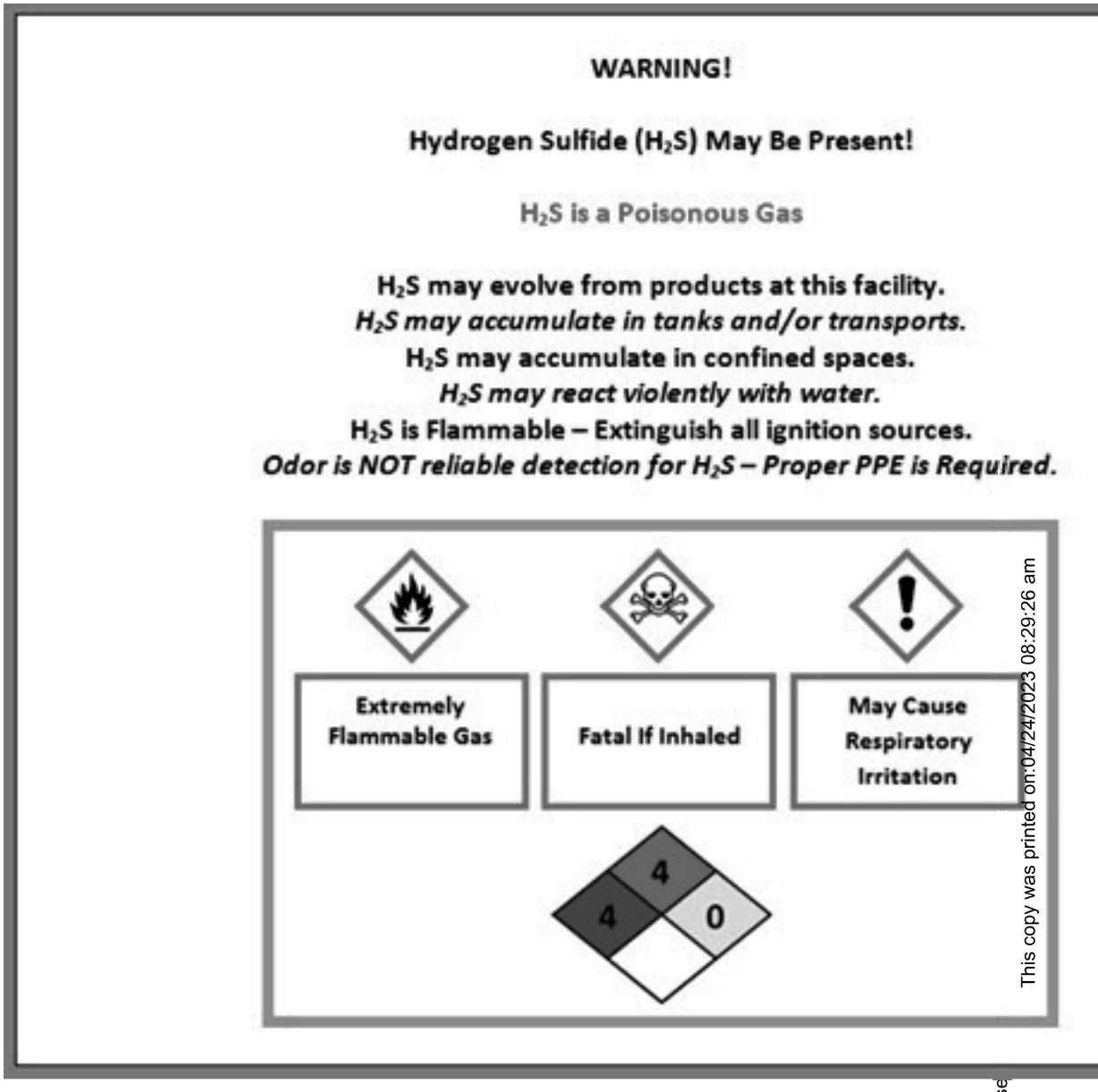
Health and Safety

Cautions and Warnings The following cautions and warnings apply to this task:

Item	Description
A	Drivers are prohibited from entering unauthorized areas including: • offices • buildings • the tank farm, and • terminal areas not specified in the loading skill.
B	Unauthorized riders with drivers are not permitted on the premises. **Note**: Unauthorized riders are required to wait outside the fenced area or in an area remotely located from the loading rack as specified by the Terminal Manager.
C	Loading privileges may be permanently suspended for any driver involved with • violating Company driver loading instructions or performing any unsafe act within the terminal • theft • purposely damaging equipment • failing to report damaged equipment

Item	Description
	• conducting themselves in an inappropriate manner • tailgating into the terminal without carding in • using another driver's card • smoking in non-designated areas, or • urinating or defecating anywhere other than the restrooms. See Policy - Driver Lockouts.
D	Do not leave the transport in the loading area unattended. **Exceptions**: In the event of an equipment failure, the driver may exit the loading area provided the driver ensures • all loading equipment is shut off • dome lids are closed, and • terminal personnel are notified immediately.
E	If a driver must access the top of a trailer (anytime drivers' feet need to leave the trailer access stairs and are on top of the tanker), • the Transport Trailer Fall Hazard Checklist must be completed prior to climbing on top of trailer, or • the terminal may allow the use of an approved portable ladder.
F	All drivers are required to comply with the Company's • Drug and Alcohol Policy, and • MPC Weapons Policy.
G	The only personnel authorized to be in the loading area are • the driver and/or • another driver being trained. **Notes**: • This restriction applies to drivers standing in the loading area talking to the driver who is loading. • Drivers loading more than one transport are required to handle all transport activities gate to gate.
H	Do not allow gloves to come in contact with • any equipment around the card reader or bill of lading (BOL) booths, or • any metering equipment. **Note**: Gloves may be used on the loading arms.
I	All transports loaded at Company terminals must comply with all applicable Federal, State, and Local regulations pertaining to maximum legal vehicle weight.

H2S Warning



Contact Phone Numbers

Contact	Guideline
911	Drivers should call emergency services at 911 if there is an emergency that could require the police, fire department, or ambulance service. After the Driver contacts emergency services, then they should call the MAPLINE.
CMD or MAPLINE	Drivers should call the MAPLINE if there is an emergency, problem, or questionable situation at a terminal.

- 911 for emergency services
- 1 (877) 627-5463 for MAPLINE.

Accident, Emergency or Equipment Malfunction

The following table describes what to do in the event of an accident, emergency or equipment malfunction.

Item	Description
A	Report any of the following to the Terminal Manager or designee immediately: • accidents • injuries • property damage • equipment malfunction • spills, or • near misses of any of the above.
B	Take the following action(s) in an alarm event.

Step	Action
1	Exit the loading rack immediately. **Important**: Do not move the transport.
2	Press the Emergency Shutdown (E-Stop) as you exit the loading rack (if applicable) or stop and secure the loading process.
3	Proceed to the Terminal's mustering point.

Disabled Transport

Item	Description
A	Drivers and terminal personnel are required to follow the Guideline - Disabled Transport Towing and Repairs. **Note**: A copy of this guideline is available upon request.

Item	Description
B	Drivers shall contact terminal personnel immediately upon discovering that their transport is disabled. Terminal personnel are required to notify the Terminal Manager of the disabled transport. **Important:** If the issue occurs after normal business hours, contact MAPLINE immediately.
C	After informing terminal personnel of the disabled transport, the driver is responsible for arranging a towing company to remove the vehicle. Notes: • No work shall be performed on a disabled transport under the loading rack. • Terminal personnel shall be on site when the tow service arrives.
D	Repairs are not allowed on terminal property unless discussed and approved by the Terminal Manager. **Cautions:** • If the situation warrants repairs on site, a safe area shall be designated and the transport moved to that area by a towing company. • The safe area shall be an area that does not impede normal business operations of the terminal. • A work permit is required. • If a hot work permit is required, call MAPLINE and include ○ Terminal Manager ○ Area Manager ○ Regional Transport Manager (if MPC transport), and ○ Field Safety Professional.
E	Special provisions shall be made if the transport is leaking fluids such as: • anti-freeze

Item	Description
	• hydraulic fluid • motor oil • fuel, or • product.
F	Loaded trailers dropped on site. • A loaded trailer may not be dropped on site by a 3rd party carrier unless it is part of normal operating procedures to do so. ○ Pre-loaded trailers are authorized at some terminals. • Disabled Company transports may be dropped on site if the Company Regional Transport Manager requests the drop and the Terminal Manager approves it. **Important**: A request made the by the Regional Transport Manager to drop a loaded Company trailer requires a MAPLINE call with the • Terminal Manager • Regional Transport Manager, and • Field Safety Professional.

Safety Features at Loading Rack

The following are safety features at the loading rack. Drivers are expected to know and understand the use of these features.

Item	Description
A	Emergency Shutdown (E-Stop) Buttons: (if applicable) Activation of the Emergency Shutdown (E-Stop) button will stop all loading activity on the entire loading rack. • Emergency Shutdown (E-Stop) buttons can be used in the event of an emergency.
B	Drench Hoses: (if applicable) Located at the top of each rack and the bottom of Lane 1.
C	Safety Showers: Located throughout the terminal
D	Safety Cage: (if applicable)

Item	Description
	The push-down walkway (safety cage) is used to gain access on to and off of the transport or distributor truck. Note: Ensure the cage is not resting on the trailer or truck.
E	Fire Extinguishers: Fire extinguishers are located on top of each loading rack
F	Video Surveillance: The terminal and loading rack are under video surveillance at all times.

CPV/NTE Refer to

PPE Refer to LS - Personal Protective Equipment (PPE) for specific requirements regarding PPE at LS Terminals.

- H2S monitor
- long-sleeved shirt, with sleeves rolled down to full length and shirt buttoned
- long pants
- sturdy closed toe work boots
- task specific gloves
- hard hat
- safety glasses with side shields, and
- face shield.

Safety Systems Refer to Albuquerque Asphalt - Knowledge - Safety Systems

SDS Refer to the Safety Data Sheet (SDS) site for information on all chemicals and products handled or stored at LS Terminals.

Important: SDS information is required to be accessible to all Drivers when terminal is open.

Pre-Work Activities

Activity Overview Prior to proceeding with loading an asphalt transport, the following activities shall be completed:

- Driver shall be trained by terminal personnel before he / she can perform unsupervised loading.

- Driver's carrier shall be an approved hauler.
- Driver shall be listed on the Asphalt Terminal Driver Signature Sheet.
- Truck shall have the appropriate placard in accordance with applicable DOT regulations.

Checking for Moisture

The driver must checks for moisture in the trailer before loading. Avoid, as much as possible, the practice of loading asphalt into a tank that has some moisture present.

Follow the steps in the table below when it cannot be avoided.

Important: The Terminal Manager MUST be notified and give approval BEFORE loading any trailer that has moisture in it.

Step	Responsible Person	Action
1	Driver OR Loader	Load a small volume of asphalt into the compartment(s).
2		Pull out from under the rack until the moisture dissipates. **Note**: • It may be necessary to have the driver drive slowly around the terminal lot for the moisture to dissipate. • If a boil is eminent, the truck and trailer must be spotted in an area where any boil over can be contained.
3		When the remaining moisture has dissipated, finish loading at the normal rate.

Transport Loading Instructions

Task 1:Transport Loading

Follow the steps in the table below to load an asphalt transport.

Step	Action
1	Operator verifies dispatch timing and carrier identity and admits truck. **Note:** Dispatch Sheet and Valve-Setting Worksheet are already set up for the day's requested products
2	Turn vehicle off, set brakes and inspect the transport and trailer for • hot tires • flat tires • hot brakes and • any other problems.

Step	Action
	• Verify all outlet, discharge, bleeder and sample valves are closed and capped. **Cautions**: • Proper PPE shall be worn at all times from this point on. • This inspection shall not be performed at the loading rack. • Transport and trailer must be in good working condition in order to proceed.
3	Driver parks in available loading spot, places chocks on both sides of a single wheel, goes into scale house and fills out Driver Loading Affidavit.
4	Driver shall enter information into G3 system.
5	Operator directs the tanker to the appropriate valve, based on the tank and valve lineup.
6	Assure that the truck is positioned properly under the safety cage. **Cautions**: • Driver must open the dome lid upwind if possible. • Minimize exposure time in the hazard zone of possible vapors coming from the open dome lid.
7	The driver shall open the dome lid and inspect the trailer for the following: • residual products • incompatible product, and • any water or moisture **Cautions**: • Position yourself upwind and at least 3 feet above the dome lid to perform the inspection. • Load only if the trailer compartment is clean and free of residual product before loading. • If there is any evidence of residual products, verify product compatibility. • Do not load if products are not compatible. • If there is any evidence of water or moisture, DO NOT LOAD! ○ A violent boil-over reaction may occur if product is loaded on top of water or moisture. ○ Exit the loading rack and contact terminal personnel. ○ If loading has already commenced, stop loading and contact the terminal manager immediately. ▪ Do not move the trailer without contacting terminal personnel first! **Note:** • Refer to the terminal-specific SPCC Plan for further guidance regarding transport and trailer inspections. • Terminal personnel shall refer to Asphalt - Guideline - Transport Loading (document) if loading a wet trailer is unavoidable.
8	Terminal personnel shall verify that the driver has properly positioned the load arm.

Step	Action
	Note: Loading arm must be secured to the truck to prevent movement of the arm out of the manway
9	Arm the appropriate pump and turn the valve on at the control board.
10	Operator monitors the loading operation until the system shuts off. Operator moves valve and pump switches to off position. **Note:** if partial load is required, operator will set the scale manually.
11	After driver unspouts the truck and removes the safety cage, verify weight on scale. • Enter information and signature into G3 system. • Receive bill-of-lading from terminal personnel. • Review the bill-of-lading to ensure that all information is correct.
12	Operator keeps BOL copy and puts it in the Daily Stock Report folder.
13	Give the Materials Spec Sheet and seal(s).
14	Driver attaches the seal(s), removes chocks, and departs the terminal
15	Terminal personnel shall note the load in the Shift Log.

Forms

Transport Trailer Fall Hazard Checklist	Form: Transport Trailer Fall Hazard Checklist

References

Asphalt Marketing and Technology's TeamView Site	Reference: Asphalt Quality Control Plans and Specifications site. A TeamView site used to house all current QC Plans and Specifications.

Documents

CPV/NTE Table	**Document**: Albuquerque Asphalt - Knowledge - CPV-NTE Tables
Safety Systems	**Document**: Albuquerque Asphalt - Knowledge - Safety Systems

LS - PPE	**Document**: LS - Personal Protective Equipment (PPE)
Company Drug and Alcohol Policy	Document: Drug and Alcohol Policy
Company Weapons Policy	Document: Weapons Policy
Policy - Driver Lockouts	Document: Policy - Driver Lockouts
Process - Disabled Transport Towing and Repairs	Document: Process - Disabled Transport Towing and Repairs

Definitions

Definitions

Reference: Definitions
Note: Company and industry terms in this document are searchable in the link above.

Revision History

Revision History Table

The table below provides the revision history for this document.

No	Date	Description
0	05/06/2020	New document

Albuquerque Asphalt - Operating Skill - Transport Asphalt Unloading

Overview

Purpose

The purpose of this document is to provide the operating skill for unloading an asphalt transport.

Scope

The scope of this document applies to the Albuquerque Asphalt Terminal.

Contents

This document contains the following sections:

Health and Safety

Contact Phone Numbers

- 911 for emergency services
- 1 (877) 627-5463 for MAPLINE.

Immediately report any of the following to the Terminal Personnel and MAPLINE:

- accidents
- injuries
- property damage
- equipment malfunction
- spills

Cautions and Warnings

The following cautions and warnings apply to this procedure:

Item	Requirement
A	Emergency response procedures, SDS Sheets, telephones / emergency numbers and first aid kits are located inside the office.
B	Individuals may be temporarily or permanently locked out of the terminal if they

Item	Requirement
	• violate the company's unloading procedure • perform any unsafe act within the terminal • become involved in any kind of theft • purposely damaging equipment • fail to report damaged equipment • conduct themselves in an inappropriate manner • tailgate into the terminal without carding in, and/or • smoke in non-designated areas.
C	Tailgating through the entrance gate is prohibited.
D	No visitors or riders are permitted. Visitors / riders must wait at the front of the terminal until the driver is finished unloading. **Exception**: A visitor / rider may accompany a driver unloading if he / she is in training. In this event, obtain prior approval from terminal personnel.
E	Set the parking brake before exiting the cab for any reason.
F	Transport drivers are prohibited from entering any unauthorized area, including • offices • buildings • the tank farm, and/or • terminal areas not specified in these procedures. **Notes**: • The office building and shop are authorized during MPC-manned hours only.
G	Do not use another driver’s card or information.
H	Do not leave a transport unattended. This includes while underneath the loading rack and any unloading area. Exceptions: • Emergency evacuation • In the event of an equipment failure, a driver may exit the area provided the driver ensures ○ unloading has ceased, and ○ terminal personnel are notified immediately.
I	Do not climb on top of the trailer without utilizing the terminal safety cages or obtaining prior approval from the Terminal Manager. Important: If accessing the top of a trailer is necessary and it is not possible to achieve the task utilizing a terminal safety cage, the Transport Trailer Fall Hazard Checklist shall be completed by the Terminal Manager or designee prior to accessing the top of the trailer.
J	The only persons authorized to be in the unloading area are • the driver • another driver being trained, and/or • terminal personnel.

Item	Requirement
K	Do not perform work of any kind on a transport while on terminal property.
L	Regeneration of the transport is prohibited while on Marathon property.
M	No smoking or open flames are permitted in the unloading area.
N	No food or beverages are permitted in the unloading area.
O	Do not allow gloves to come in contact with • Touch Panels • Control Switches • G3 system **Note**: Gloves may be used on • unloading hose • loading arms, and • the drip bucket.
P	Do not bypass or disable any alarm system! Doing so could result in severe personal injury and/or equipment damage.

Accident, Emergency or Equipment Malfunction

The following table describes what to do in the event of an accident, emergency or equipment malfunction.

Item	Description
A	Report any of the following to the Terminal Manager or designee immediately: • accidents • injuries • property damage • equipment malfunction • spills, or • near misses of any of the above.
B	Take the following action(s) in an alarm event.

Step	Action
1	Exit the unloading area immediately. **Important**: Do not move the transport!
2	If applicable, press the emergency stop as you exit the area.
3	Proceed to the area outside the Terminal's entry / exit gate.

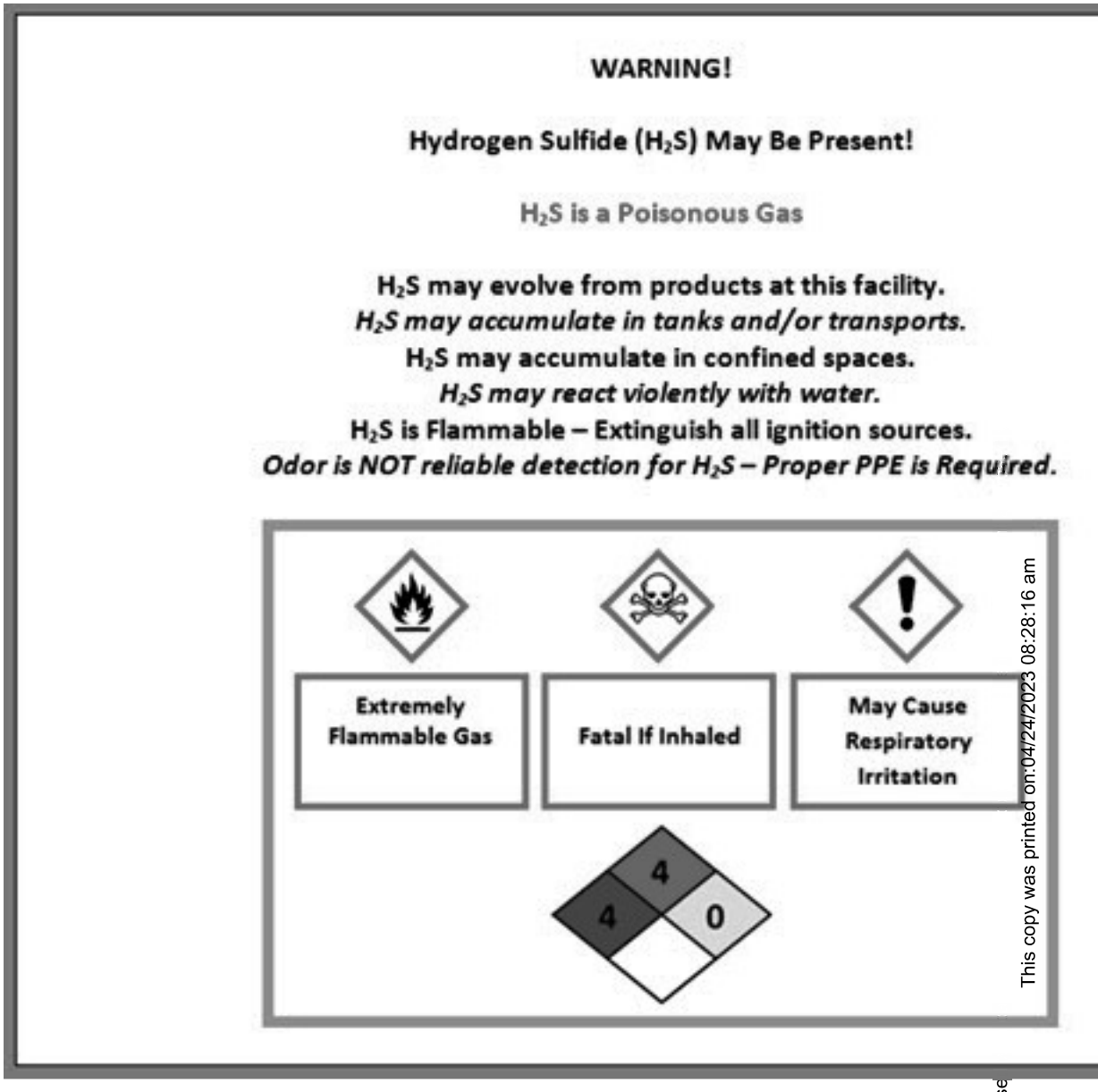
Disabled Transport

The following rules apply to disabled transports.

Item	Description
A	Drivers and terminal personnel are required to follow the Guideline - Disabled Transport Towing and Repairs. **Note**: A copy of this guideline is available upon request.

Item	Description
B	Drivers shall contact terminal personnel immediately upon discovering that their transport is disabled. Terminal personnel are required to notify the Terminal Manager of the disabled transport.
C	After informing terminal personnel of the disabled transport, the driver is responsible for arranging a towing company to remove the vehicle. **Note**: • No work shall be performed on a disabled transport on terminal property. • Terminal personnel shall be on site when the tow service arrives.
D	Repairs are not allowed on terminal property unless discussed and approved by the Terminal Manager. **Cautions**: • If the situation warrants repairs on site, a safe area shall be designated and the transport moved to that area by a towing company. • The safe area shall be an area that does not impede normal business operations of the terminal. • A work permit is required. • If a hot work permit is required, call MAPLINE and include ○ Terminal Manager ○ Area Manager ○ Regional Transport Manager (if MPC transport), and ○ Field Safety Professional.
E	Special provisions shall be made if the transport is leaking fluids such as: • anti-freeze • hydraulic fluid • motor oil • fuel, or • product.

H2S Warning



Muster Points

When there is an emergency or alarm event:

- exit the area without moving the transport
- press the E-stop as you exit, and
- go to a muster point.

Safety Features at Unloading Rack

The following are safety features at the unloading racks. Drivers are expected to know and understand the use of these features.

Item	Description
A	Emergency Stop Buttons: (If Applicable) Activation of the Emergency Shutdown (E-Stop) button will stop all loading activity on the entire loading rack.

Item	Description
	• Emergency Shutdown (E-Stop) buttons are located at the top and bottom of each stairwell of each loading rack. • Emergency Shutdown (E-Stop) buttons can be used in the event of an emergency.
B	Drench Hoses: (If Applicable) Located at the top of each rack and the bottom of Lane 1.
C	Safety Shower and Eyewash Stations: Located throughout terminal, see terminal personnel for nearest station to applicable unloading rack.
D	Safety Cage: (If Applicable) The push-down walkway (safety cage) is used to gain access on to and off of the transport or distributor truck. Note: Ensure the cage is not resting on the trailer or truck.
E	Fire Extinguishers: Located at unloading racks.
F	Video Surveillance: The terminal and unloading racks are under video surveillance at all times.

CPV/NTE

Refer to

PPE

While unloading at a Company terminal, all drivers shall wear personal protective equipment (PPE) as specified in LS - Personal Protective Equipment (PPE)

- long-sleeved shirt, with sleeves rolled down to full length and shirt buttoned
- long pants
- sturdy closed toe leather work boots
- hard hat
- safety glasses with side shields
- face shield
- H2S monitor
- task specific leather gloves

Safety Systems

Refer to Albuquerque Asphalt - Knowledge - Safety Systems

SDS

Refer to the Safety Data Sheet (SDS) site for information on all chemicals and products handled or stored at LS Terminals.

Important: SDS information is required to be accessible to all Drivers when terminal is open.

Pre-Work Activities

Activity Overview Prior to proceeding with unloading an asphalt transport, the following activities shall be completed:

- If applicable, the transport shall be weighed in prior to unloading.
- If applicable, terminal personnel shall complete the appropriate valve line-ups.
- Terminal personnel shall confirm the product being unloaded and the receiving tank or storage area.
- Terminal personnel shall assist in properly placing the transport to ensure safe operations for the unloading process.

Transport Unloading Instructions

Task 1:Transport Unloading Follow the steps in the table below to unload an asphalt transport.

Step	Action
1	If this is a return, terminal personnel will have received an email, otherwise, verify the return with a phone call to the Asphalt Dispatch Group. It is the responsibility of Terminal Personnel to view and sign the recieving BOL for correct product and quantity being delivered. Review the BOL and verify the • product or chemical name • chemical concentration (if applicable) • UN number • tank or equipment number (if on BOL), and • the volume to be delivered • where to unload the product, • what tank to unload the product in and • how the product shall be unloaded.
2	Direct the driver to park at the scale and weigh the tanker. • Enter information into G3 System, if applicable **Note**: Unless prior approval has been granted, split loads shall not be received due to risk of environmental release. Important: • Receipt of a split load requires the prior approval of the Area Manager. • Partial loads from supplier are acceptable.
3	Terminal personnel shall collect receiving tank gauge reading and compute the space available. • Subtract the current tank level from the safe fill height in the strapping chart. • Multiply the remainder by tons per foot to derive the available space in tons.

Step	Action
	• Take the empty weight of tanker in the BOL and add 500 pounds (rule of thumb for truck fuel). • Subtract this number from the loaded weight obtained at the scale. • Divide the difference by 2000 to determine tons of product. • Verify that this does not exceed the available space computed.
4	Terminal personnel shall walk the lineup to verify valve positions. • If valve(s) are not as expected, contact the other operator on shift to determine whether current processes conflict. • If no other operator is on duty, walk the lineups to verify/clarify correct valve positions.
5	Complete the Valve Lineup sheet by walking the line again, from the tank to the unloading area, setting valves as appropriate and noting the settings on the sheet.
6	Arm the pumps.
7	Driver moves truck to offload area. • Terminal personnel shall serve as a ground guide and directs the truck to the precise offload position using the landmark designated as the horizontal reference point. • Driver turns off the truck
8	After driver chocks front and rear of a single tire, and places buckets at rear valve and center overflow tubes, operator directs driver to open the manway. **Note**: Driver must keep a minimum distance of three feet from his breathing zone to the manway while opening.
9	After driver verifies rear unloading valve(s) is/are closed, then removes cap(s) from valve(s), operator opens suction valve and listens to verify line is clear, then closes suction valve.
10	Operator opens cam ears, removes the hose from the hose stand, pulls hose down • verify gasket is in place.
11	Operator connects the hose to the cam fitting on the trailer and secures the cam ears.
12	Operator opens the suction valve.
13	If no suction, apply heat from torch or steam wand until suction is restored. **Note**: Do not use torch on transport fittings, only use steam
14	Operator attaches the hose to the trailer offload spout
15	Operator places safety lock to the cam ear
16	Operator instructs driver to open trailer unloading valves
17	Operator verifies flow. • watch hose descend under weight of unloading product • listen for pump sound change

Step	Action
	Note: If no suction at this point, direct heat from the steam wand or torch, beginning at the suction hose attachment across the valves and line to the tank jacket. Do not use the torch on the trailer fittings, use only steam.
18	Record the time the unload was started on notepad.
19	Terminal personnel shall check for leaks from hose to transfer area. If leak is present, direct driver to close the unloading valves, then remove hose, check gasket, check cam ears, and replace gasket or cam ears if necessary.
20	If the leak continues, discontinue operations at that unloading area and move to the other unloading area
21	If leak continues at the alternate location, make provision to capture the leakage in successive 5-gallon buckets, and continue the unloading operation
22	Driver remains in view of the valves at all times
23	Operator goes to tank to verify flow by noting increase of gauge reading, and driver verifies decrease in product.
24	If there are no indications of flow, operator will walk the lineup and verify valve position and ease of valve movement. If a valve issue is suspected, determine an alternate route from the truck to the tank and continue operations at Step 5.2.31
25	If an alternate route is necessary, the pumps must be shut down and the trailer valves closed before changing the lineup.
26	If a gauge issue is suspected, hand-gauge the tank and report and repair the gauge as soon as operations permit • Operator takes 5 – minute gauge reading at the tank
27	Terminal personnel shall complete Movement Sheet while monitoring transfer from the scale house via the camera system. Enter the following, • product • receiving tank • quantity to receive • date • operator initials • start gauge and temperature
28	When supply hose begins shaking, indicating air in the line, instruct the driver to verify that the tank is empty.
29	Observe that driver secures trailer valves
30	Operator removes the safety lock from the cam ears, opens the ears and manipulates the hose to create suction
31	Allow the suction to continue for one to two minutes to allow residual product to drain from the hose, then close the suction valve
32	Remove the hose as the driver replaces the cap on the truck valve

Step	Action
33	Attach hose to the hose hanger, then cycle the suction valve 3 – 5 times to further remove residual product, then close the suction valve
34	Turn off pumps
35	Close valve from pump to tank
36	Direct driver to return the truck to scale
37	The driver shall proceed to the scale house and contact terminal personnel. • Turn vehicle off. • Verify weight on scale. • Enter information and signature into G3 system. • Receive bill-of-lading from terminal personnel. • Review bill-of-lading to ensure that all information is correct. **Note**: Stock transfers may not need to be scaled out, recieve copy of BOL from driver.
38	Terminal personnel shall record final gauge reading • complete the movement sheet by entering, 5 and 30 minute gauge readings • final gauge and temperature readings. • note the movement in the shift log.

Transport Received Load Diverted to a Customer Requirements

The table below provides requirements when a terminal is diverting an incoming transport load to a customer location.

Item	Requirement
A	If a transport load is received from another Company terminal and is being diverted to a customer location then • ensure the truck arrives with a weight reasonably close to the weight when it left the originating terminal using the Phase 6 Weight Verification Screen • record that verification, and • reissue a BOL for this delivery to the customer. Important: • The transport does not need to be offloaded and reloaded. • Verifying the weight is useful when a returned load may need to be re-dispatched. • If an unreasonable variance is found, ○ refuse to issue a new BOL, and ○ contact your Area Manager for direction.
B	If a transport load is received from a non-Company facility (terminal or refinery) and is requested by a customer, then the load must be offloaded before reloading the transport.

Forms

Transport Trailer Fall Hazard Checklist	Form: Transport Trailer Fall Hazard Checklist

Documents

CPV/NTE Table	**Document**: Albuquerque Asphalt - Knowledge - CPV/NTE Tables
Safety Systems	**Document**:Albuquerque Asphalt - Knowledge - Safety Systems
LS - PPE	**Document**: LS - Personal Protective Equipment (PPE)
Asphalt - Administrative - Terminal Tank Level Calculator	Document: Asphalt - Administrative - Terminal Tank Level Calculator
Asphalt - Guideline - Visitor Information	Document: Asphalt - Guideline - Visitor Information
Asphalt - Policy - Life Critical Activities	Document: Asphalt - Policy - Life Critical Activities
Company Drug and Alcohol Policy	Document: Drug and Alcohol Policy
Asphalt - Policy - Tank Gauging	Document: Asphalt - Policy - Tank Gauging
Company Weapons Policy	Document: Weapons Policy
Policy - Driver Lockouts	Document: Policy - Driver Lockouts
Process - Disabled Transport Towing and Repairs	Document: Process - Disabled Transport Towing and Repairs

Definitions

Definitions

Reference: Definitions
Note: Company and industry terms in this document are searchable in the link above.

Revision History

Revision History Table

The table below provides the revision history for this document.

No	Date	Description
0	05/08/2020	New document

ABQ-JA-1	Truck Loading and Unloading	
Job Aid	Approval: _____ Date: _____	Current and accurate as of: 4/3/2018

Purpose:

These instructions apply to terminal operators and transport drivers who load and unload trucks at the Albuquerque Asphalt Terminal. These instructions work in tandem with training the drivers have received, therefore these instructions should be followed closely in order for the loading and unloading processes to be conducted in a safe manner.

Safety Precautions:

- PPE required: Safety glasses, face shield, hard hat, long sleeve shirt, full length pants or coveralls, thermal protective gloves, appropriate safety footwear (NO TENNIS SHOES).
- Review SDS for asphalt
- Clean up spills and drips immediately to prevent slipping hazards. Keep area clean and free of debris
- Take immediate action to remedy any unsafe piece of equipment or condition before loading or unloading takes place
- Elevated workspace. Be aware of handrail locations
- Obey all posted warnings and use appropriate walkways

Environmental Precautions:

Follow procedures to avoid spills while loading and unloading. Clean up spills immediately and dispose of waste properly.

References:

MS-445 Bulk Receiving Record

CBT- DOT HAZMAT Employee Safety

CBT- DOT HAZMAT General Awareness

CBT- DOT HAZMAT Transportation Security Awareness

CBT- HAZMAT Security In Depth HM 232

CBT- HAZMAT Security Awareness HM 232

49 CFR DOT

Step	Action	Initial	Date	Time

Prerequisites:

- Visually check truck is spotted on scale correctly
- Verify Bill of Lading
- Complete MS-445 and verify closure of discharge PPA tank valves
- Establish cordon of unloading area and notify any person in the area of process
- Inspect and attach applicable hoses/fittings
- Don or stage appropriate PPE

Step	Action	Initial	Date	Time

Spill Control and Containment Procedures:

Uncontrolled spill or release would most likely occur while unloading PPA transports. Coupling gaskets, hose failure and handling issues. These will normally be small spills and easily contained by terminal personnel and the driver.

Mechanical issues such as PPA pump or piping leaks and tank overflow will occur within the PPA skid and will be contained by the skid's integral containment. The skid containment should be inspected daily to ensure there are no PPA leaks and no rainwater buildup inside the containment.

All waste generated from PPA operations should be segregated from other waste streams. All PPA waste including rags, spent coveralls and boots as well as spent sorbent will be placed in poly drums or poly buckets and disposed of through a local hazardous waste disposal company.

Response Equipment, Supplies and Vendors:

The response equipment listed below as well as listed PPE shall be maintained in inventory on site for prompt response. The vendor list and associated components shall be verified periodically. Any large spill greater than 1000 gallons or deemed too complex or risky for simple cleanup operations will be handled by a spill response contractor.

Response Supplies:

1. Four 250 gallon IBC with chemical rated valves and appurtenances
2. Four open top poly drums with lids
3. Five 5 gallon gamma lid buckets with lids
4. Two "2 drum" barrel containment pallets
5. One box of cotton rags
6. 2 Squeegees
7. One diaphragm pump and 30' of chemical rated hoses
8. 4 yards of sorbent
9. 5 bags of lime or soda ash
10. 2 tarps
11. 2 kiddie pools

Response Vendors:

1. Local vendor for chemical resistant IBC totes
2. Local vendor for vacuum truck
3. Large spill response and clean up- ACT

Response PPE:

1. 2 heavy chem suits
2. 5 chem suits/chemical resistant coveralls

Step	Action	Initial	Date	Time

3. 5 pair chem boots
4. 5 pair of chem gloves
5. 5 faceshields
6. 5 goggles

Any personnel directly working on a PPA spill will be required to have all PPE donned.

Small Spills:
< 10 gallons

1. Contain and direct the spill using sorbent berms
2. Use the diaphragm pump to transfer as much liquid as possible to a poly bucket or drum
3. Use sorbent to pick up as much remaining liquid as possible and place in open top poly drums
4. Use lime or soda ash to neutralize remaining PPA
5. If necessary, rinse the area with water. Rinse water should be picked up using the diaphragm pump and placed into poly containers for disposal

Medium Spills:
10-1000 gallons

1. Contain and direct the spill using sorbent berms
2. Use the diaphragm pump to transfer as much liquid as possible to a drum or IBC totes
3. Use sorbent to pick up as much remaining liquid as possible and place in open top poly drums
4. Use lime or soda ash to neutralize remaining PPA
5. If necessary, rinse the area with water. Rinse water should be picked up using the diaphragm pump and placed into poly containers for disposal

Large Spills:
> 1000 gallons

1. Contain and direct the spill using sorbent berms
2. Contact the spill response vendor
3. Contact vendor for IBC totes
4. Contact vendors for vacuum trucks- AAA
    a. Vacuum truck will pick up the material and transfer to onsite totes
    b. Vacuum truck will rinse/clean up on site into onsite totes, no material leaves the facility
5. Sorbent will be used to pick up residual liquid PPA. Sorbent to be placed in open top poly drums or yard boxes
6. Use lime or soda ash to neutralize remaining PPA and rinse the area with water. Rinse water should be picked up by the vacuum truck or diaphragm

Step	Action	Initial	Date	Time

pump and transferred into totes for disposal.

Tanker Unloading:

When a PPA tanker arrives at the facility, the tanker will be directed onto the east scale. Asphalt operations on the west rack can continue after the driver or other personnel on the rack have been briefed on the PPA unloading procedures.

When cleared to unload, the terminal operator will set up a barrier using safety yellow chains or “DO NOT ENTER” tape. Any personnel visiting or working in the terminal will not be allowed into this area. One designated terminal operator will witness the unloading process from outside the perimeter with PPE donned or within reach.

The ***driver*** is in charge of the offloading process. If an emergency occurs and the driver is unable to stop the unloading process, the terminal operator, with appropriate PPE donned, can enter the area and conduct an emergency shut down of the unloading process. The unloading process and emergency shutoff method should be discussed with the driver prior to unloading.

Tanker Unloading Procedures:

1. The driver will pull onto the east scale
2. The operator on duty will verify the Bill of Lading and check weight
3. The operator will complete the MS-445 and Valve Setting Worksheet
4. After verification of space in the tank and valve line up, the operator will instruct the driver to proceed
5. The driver will verify position for unloading
6. The operator will erect the barrier around the unloading area
7. The driver and operator will inspect unloading hose and fittings for serviceability

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At this time any personnel inside the barrier should
don required PPE. Notify other personnel in the
terminal. The operator will also go over the emergency
shutdown process with the driver.
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8. The driver will connect the unloading hose and place spill trays under hose connections
9. When unloading is complete, the driver will disconnect all hoses and clean up any drips or spill. Any waste generated will be placed into provided poly drums or buckets
10. The driver will then pull onto the east scale for tariff weight and complete paperwork
11. The operator will get the final gauge of the PPA tank and complete the MS-445.

Step	Action	Initial	Date	Time

12. Once all tasks are complete, the operator will perform a walkthrough inspection

Conclusion: Attention to detail during preparation of MS-445 will avoid tank overfill. Inspection of hoses and fittings will avoid equipment failure resulting in spills. Proper wear of PPE will protect driver and operator from exposure.

Attachments: PPA Tank Strapping Chart

Step	Action	Initial	Date	Time

Revisions and Addendums

6/26/2017 Original created from previous combined batching and unloading procedure.

ABQ-JA-2	Railcar Heating and Unloading	
Job Aid	Approval: _____ Date: _____	Current and accurate as of: 2/8/19

Purpose: These instructions apply to terminal operators who heat and unload railcars at the Albuquerque Asphalt Terminal. These instructions should be followed closely in order for the unloading process to be conducted in a safe manner.

Safety Precautions:

- PPE required: Personal H2S monitor, safety glasses, face shield, hard hat, long sleeve shirt, full length pants or coveralls, double palmed thermal protective gloves with gauntlet cuff, appropriate safety footwear (NO TENNIS SHOES). All clothing must be FR.
- Cut Level 4+ gloves will be used when removing the seals from valve handles and manway lids.
- Review SDS for asphalt
- Clean up spills and drips immediately to prevent slipping hazards. Keep area clean and free of debris
- When removing the product unloading and steam hoses from the railcar your face shield must be in the down position
- Take immediate action to remedy any unsafe piece of equipment or condition before loading or unloading takes place
- Elevated workspace. Be aware of handrail and ladder rung locations. ***3 points of contact must be maintained at all times.***
- To reduce the risk of H2S exposure, manways will be opened before heating and the railcar will heat while vented. To eliminate the risk of H2S ignition via metal to metal contact, place a wooden rod between the manway lid and rim to keep the railcar vented while heating. **Never use a manway bolt for venting**. Always visually verify that the manway is still vented before unloading the car.

Environmental Precautions: Follow procedures to avoid spills while unloading. Clean up spills immediately and dispose of waste properly.

Step	Action	Initial	Date	Time

References:

MS-445 Bulk Receiving Record

CBT- DOT HAZMAT Employee Safety

CBT- DOT HAZMAT General Awareness

CBT- DOT HAZMAT Transportation Security Awareness

CBT- HAZMAT Security In Depth HM 232

CBT- HAZMAT Security Awareness HM 232

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Prerequisites:

- Physically verify the railcar has been spotted correctly when spotted by BNSF
- Verify Bill of Lading to determine what product is in the railcar
- Complete MS-445/AAT Product Movement Sheet and verify tank gauges are correct
- Verify valve/manifold lineup is correct to corresponding tank
- Inspect and attach applicable hoses/fittings
- Don appropriate PPE

Step	Action	Initial	Date	Time

Spill Control and Containment Procedures:	Uncontrolled spill or release would most likely occur while attaching or disconnecting unloading hoses. Large scale spills are most likely if tank gauges are not verified and tank filling exceeds Safe Fill Height. Mechanical issues such as mechanical pump seal failure or piping leaks can occur and must be monitored during unloading process. All waste generated from railcar unloading should be disposed of in the reclaim if it is pure asphalt or in a yard box if it contains dirt or debris.
Response Equipment, Supplies and Vendors:	The response equipment listed below as well as listed PPE shall be maintained in inventory on site for prompt response. The vendor list and associated components shall be verified periodically. Any large spill greater than 1000 gallons or deemed too complex or risky for simple cleanup operations will be handled by a spill response contractor.
Response Supplies:	1. Four 55-gallon steel drums 2. 2 shovels 3. 2 yards of sand
Response Vendors:	Large spill response and clean up- Clean Harbors
Response PPE:	Normal facility operational PPE
Small Spills: **< 10 gallons**	1. Contain and direct the spill using sand berms 2. Wait for asphalt to cool, roll it up and place it into 5 gallon buckets
Medium Spills: **10-1000 gallons**	1. Contain and direct the spill using sand berms 2. Use metal 55 gallon steel drums or order in 20 yard roll off from ACT 3. Wait for product to cool, roll up and place into disposal container
Large Spills: **> 1000 gallons**	1. Contain and direct the spill using sand berms 2. Contact the spill response vendor 3. Contact vendor for roll off dumpsters 4. Spray light coating of water over the top of the forward edge on the ground to slow down flow every 5 mins
Railcar Operations can be Broken Down Into 3 Steps	1. Identification and hook up 2. Monitoring 3. Unloading
Identification	The first task the operator must perform when new railcars are spotted is to

Step	Action	Initial	Date	Time

and Hook Up

identify the railcars. Compare the railcar number to the Bill of Lading. If there is no BOL for the railcar, do not work on the railcar. Check your emails for the missing BOL, notify the Terminal Manager or an A Operator.

1. The first thing the operator must do when checking a new set of railcars is to make sure the derail is in place. This is required by the DOT and corporate rail policy.
2. Check the placement of the spotted railcars to ensure the steam hoses and product hoses will reach the proper connection points.
3. Write down the railcar number and compare them with the Bill of Lading.
4. After the railcars have been identified, fill out the railcar inspection sheet for each car. Place the “blue flag” on the track and chock each railcar. Both sides of whatever single wheel is chosen must be chocked. The “blue flag” is used to tell railroad personnel not to do any work on the track.
5. Once derails are in place, cars have been chocked and blue flags are in place, work on railcars can begin.
6. Manways can now be opened while the railcar is cold to reduce the possibility of H2S exposure.
    - If a vacuum exists, open the Top Fittings Cover and open the 2” Siphon ball valve to relieve that vacuum.

Hose Hook Ups…

1. ***Make sure product unloading valve is in the closed position.*** If there is any question about valve position consult an A Operator or the Terminal Manager.
2. **Product Hose**. Position your body under the railcar so that you are not directly underneath the product valve connection.
3. Heat the belly cap and remove slowly. Frequently shake the cap to determine if there is any product in the cap or valve cavity. If there is, consult an A Operator as this may indicate a faulty unloading valve.
4. Put the gooseneck on. Always point the opening away from you at all times.
5. Check the gasket in the hose connection if applicable.
6. Make sure the gooseneck is tight. Secure the hose connection ears.
7. **Steam Hoses**. Lay out the steam hoses for each car. Note inlet and outlet connections labeled on the railcar.
8. Connect the supply side hose to the inlet connection on the railcar.
9. Connect the condensate return hose to the outlet connection.
10. Close all valves on the steam manifold. Open the bleeder valve on the condensate return Wye Strainer. Ensure the return valve after the trap is

Step	Action	Initial	Date	Time

closed. This is done to blow out all contaminants that remain in the coils of the railcar.

11. At this point you will introduce live steam to the railcar and manifold. The steam is at 120-150PSI and up to 360 deg F. Open all steam valves slowly and allow steam to equalize a little at a time to prevent hammering.
12. After a few minutes you should see condensate coming from the condensate bleeder. Let this continue until live steam comes out and all foreign matter left behind in the railcar coils have been blown out.
13. Open the condensate return valve and close the condensate return bleeder valve.

Monitoring…

After the railcar is placed on steam the operator must monitor the railcars. Asphalt expands when heated. If the product is loaded at low temperatures there is a possibility that the contents of the railcar will overflow when heated. Monitoring of steam traps is also important. If a steam trap is not functioning properly large amounts of energy can be wasted and the railcars will not heat properly.

Within 24hrs of the railcar being placed on steam, the operator must observe the fluid level in the railcar. All railcars are required to have a minimum 20% outage when loaded.

1. To inspect the fluid level the operator must climb to the top of the railcar. You will need a thermometer. Keep both hands on the ladder as much as possible. Do not carry the tools in one hand when climbing the ladder. ***3 points of contact must be maintained at all times while climbing the ladder.***
2. Use the infrared thermometer to get the temperature of the asphalt. Use the scale in the railcar to get the fluid level.
3. Record your outage and temperature in the Shift Turnover Log when necessary.
4. When there are no personnel on site to monitor the heating process, i.e. the weekends or holidays, the manway bolts will be secured wrench tight and all fittings under the dome will be verified closed and plugged.

Steam Traps…

The method to determine if a steam trap is functioning correctly is to take the temperature of the steam trap on the railcar side and on the condensate return side of the trap.

1. Take the temperature of the railcar side of the steam trap by using the infrared thermometer. The laser dot should be on the body of the trap close to the inlet nipple of the trap. Normal readings range from 325 to 350. If the temperature is lower the car might be water logged from due to

Step	Action	Initial	Date	Time

a malfunctioning trap. Verify the return valve is open after the trap. If so, the trap may need to be replaced.

2. Take the temp on the condensate side of the trap. The laser dot should be on the body of the trap closest to the outlet. Normal readings range from 210 to 250 deg F. If the temp is above the normal reading, the steam trap is not working correctly and may need to be replaced.
3. If the steam trap needs to be repaired or replaced, the rail car will need to be depressurized and the applicable valves will need to be locked and tagged.

Unloading Process…

This task has the most risk and possibility of injury of any job performed in the facility. With proper training and adherence to protocols the risks associated with this task can be greatly reduced.

Once the product in the railcars reaches a temp of 250 deg F for 58-28/300 deg F for HP20, the railcar can be unloaded. The first and most important task is to once again identify the railcar and product. Then verify the tank that the product is going into. ***It is solely the operator's responsibility to make sure that the railcars are being pumped into the correct tank as well as tank gauge verification to prevent over filling. If you are on shift managing rail car unloading, this applies directly to you. Especially when gauges are turned over to you from another shift.***

Pre-Pump Activities…

1. De-pressurize the steam from all the railcars when it is not needed during unloading.
2. Write down all the railcar numbers on the MS-445, AAT Movement Sheet or note pad. Write down the tank gauge and temp on the MS-445, AAT Movement Sheet or note pad.
3. Verify the railcars and continue to update the MS-445/AAT Movement Sheet.
4. Open the valves to the tank you are pumping the railcars to. Use the Valve Setting Worksheet to document valves opened for the pump job. Close all tanks not currently in use to avoid cross contamination or tank overfills.
5. Double check the valve lineup, make sure all the manway lids are vented and arm the pumps.
6. Turn on the pump and open the product valve.
7. Slowly open the product valve on the railcar.
8. Listen to the pump. The tone of the pump will change as product starts

Step	Action	Initial	Date	Time

going through it.

9. **Check for leaks**. Most leaks will occur within the first ten minutes of unloading. As you get one car pumping go back and check previous cars for leaks.
10. Within 5 minutes of the start of unloading, a gauge reading must be taken to ensure the product is going into the correct tank. It is good practice to monitor other tanks to make sure they are not showing a gain or loss.

While pumping is in progress the operator(s) will maintain constant monitoring at all times. Gauges will be taken at a minimum every 30mins. When reaching within 2' of the Safe Fill Height of any tank it is required that an operator stand-by at the Varec gauge of the receiving tank to monitor intake. When within 2" of SFH, the process will be shut down.

Completing the Pumping Job…

1. When the railcar is empty the hose will start to jump. Always verify that the car is empty by opening up the manway lid and making visual confirmation. ***3 points of contact must be maintained at all times while climbing the ladder.***
2. After the railcar is empty, close the bottom unloading valve and secure the handle with the pin.
3. Loosen the gooseneck enough to allow air to enter the hose, remove the product hose from the gooseneck and then remove the gooseneck from the railcar. Thread the belly cap back on and ensure that it is wrench tight.
4. Once the hose is on the hose rack and gooseneck are put up, close and bolt down the manway lid ensuring that all bolts are wrench tight.
5. Open and close the product valve to drain the hose. This process can be different depending on which pump you use. If you are not familiar with the process, ask an A Operator.
6. Repeat this process for each of the railcars being unloaded.
7. After all the railcars are pumped on a track, double check the manway lids and caps. Then remove the chocks and blue flags in preparation for a switch.
8. Close the valves opened for the pump job using the Valve Setting Worksheet to document which valves are closed.
9. Get the final gauge reading and complete the paperwork.
10. Once the pump job is done, do a final walk around and pick up all tools, double check valves and clean up after yourself.

Step	Action	Initial	Date	Time

Conclusion: Attention to detail during preparation of MS-445/AAT Movement Sheet will avoid tank overfill. Inspection of hoses and fittings will avoid equipment failure resulting in spills. Proper wear of PPE will operator from exposure.

Attachments: Valve Setting Worksheet

AAT Movement Sheet

Railcar Inspection Sheet

Step	Action	Initial	Date	Time

Revisions and Addendums

6/26/2017 Original created from previous combined batching and unloading procedure.

5/8/2018 Updated to include ladder climbing safety

2/8/2019 Updated verbiage in Pre-Pump Activities to include use of note pad to annotate information.

Update “Pre-Pump Activities”, page 6, Step 1, to allow continuation of heating while unloading railcars.

Updated “Pre-Pump Activities”, page 6, Step 4, to instruct closure of tanks not in use while unloading.

Changed the term “dome” to manway throughout entire procedure.

Updated “Completing the Pumping Job”, page 7, Step 10, to instruct constant monitoring when approaching SFH.

Added face shield use requirements in the “Safety Precautions” on page 1.

Updated “Safety Precautions”, page 1, to include opening manways when RC’s are cold to mitigate H2S exposure.

Added instruction in “Identification and Hook Up”, page 4, Step 6, on opening a manway on a cold car.

Removed the Railcar Operations Test and MS-445 Bulk Receiving Log.

3/5/2019 Added requirement to “Monitoring”, page 5, Step 6, secure manway bolts when the facility is not manned.

Added requirement to use a wooden rod to vent manway while heating, page 1, Safety Precautions.

ABQ-JA-5	Tank to Tank Transfers	
Job Aid	Approval: Kerry Smith Date: 8/1/2013	Current and accurate as of: 8/16/2018 V. Marrujo

Purpose:

These instructions apply to terminal operators transferring from one tank to another within the terminal. Product is transferred from one tank to another at AAT to:

- prepare storage tanks for receipts or shipments
- prepare and make product blends and adjustments
- handle an emergency situation (i.e., mixer seal leaks and tank leaks)

These transfers are made with product loading/transfer pumps: Load Pump 1, Load Pump 2, Transfer Pump 3 and Load Pump 4.

> ***WARNING: Tanks involved in transfer cannot be used at rack for loading.***

Safety Precautions:

- PPE required: Personal H2S monitor, safety glasses, hard hat, long sleeve shirt, full length pants or coveralls, double palmed thermal protective gloves, appropriate safety footwear w/safety toe. All clothing must be FR.
- Cut Level 4 or 5 gloves will be used when not using thermal protective gloves.
- Review SDS for asphalt.
- Clean up spills and drips immediately to prevent slipping hazards. Keep area clean and free of debris.
- Take immediate action to remedy any unsafe piece of equipment or condition before loading or unloading takes place.
- Elevated workspace. Be aware of handrail and ladder rung locations. ***3 points of contact must be maintained at all times.***

Step	Action	Initial	Date	Time

Environmental Follow procedures to avoid spills while transferring. Clean up spills immediately and dispose of waste properly.

Precautions: **ALWAYS VISUALLY AND PHYSICALLY VERIFY YOUR VALVE LINEUP. IF YOUR NAME IS ON THE PAPERWORK YOU ARE RESPONSIBLE FOR LINEUP VERIFICATION.**

References:

MS-445 Bulk Receiving Record

CBT- DOT HAZMAT Employee Safety

CBT- DOT HAZMAT General Awareness

CBT- DOT HAZMAT Transportation Security Awareness

CBT- HAZMAT Security In Depth HM 232

CBT- HAZMAT Security Awareness HM 232

49 CFR DOT

Prerequisites:

1. Verify that the receiving tank has the space required for the amount to be transferred.
2. Complete MS-445 and verify tank gauges are correct.
3. Verify valve/manifold lineup is correct to receiving tank. Document on the Valve Setting Worksheet prior to starting any type of product movement.

Step	Action	Initial	Date	Time

Spill Control and Containment Procedures:

Large scale spills are most likely if tank gauges are not verified and tank filling exceeds Safe Fill Height.

Mechanical issues such as pump packing gland failure, mixer leaks and piping leaks can occur and must be monitored during unloading process.

Response Equipment, Supplies and Vendors:

The response equipment listed below as well as listed PPE shall be maintained in inventory on site for prompt response. The vendor list and associated components shall be verified periodically. Any large spill greater than 1000 gallons or deemed too complex or risky for simple cleanup operations will be handled by a spill response contractor.

Response Supplies:

1. Four 55-gallon drums
2. 2 shovels
3. 2 yards of sand

Response Vendors:

Large spill response and clean up- Clean Harbors

Response PPE:

Normal facility operational PPE

Small Spills:
< 10 gallons

1. Contain and direct the spill using sand berms
2. Wait for asphalt to cool, roll it up and place it into cubic yard boxes

Medium Spills:
10-1000 gallons

1. Contain and direct the spill using sand berms
2. Use cubic yard boxes or order in 20 yard roll off from ACT
3. Wait for product to cool, roll up and place into disposal container

Large Spills:
> 1000 gallons

1. Contain and direct the spill using sand berms
2. Contact the spill response vendor
3. Contact vendor for roll off dumpsters
4. Spray light coating of water over the top of the forward edge on the ground to slow down flow every 5 mins

Procedure:

1. Record opening tank gauges and temps on both tanks involved in transfer. Make the necessary calculations on MS-445 to verify amount to be transferred will fit into receiving tank. Note the start time on MS-445 and estimated time to complete the transfer.

2. Verify valve/manifold lineup is correct to receiving tank. Document on the Valve Setting Worksheet prior to starting any type of product movement.

Step	Action	Initial	Date	Time

3. Check receiving tank to verify initial tank rise and record on MS-445. Monitor tank rise in accordance with the MS-445 procedure. Record tank gauges every half hour and as product reaches the safe fill height, operator is to standby receiving tank and monitor tank gauge during the last 30 minutes to reach safe fill height and be prepared to shut down the transfer prior to reaching the SFH. Record end gauges on MS-445.

4. At the completion of the transfer shutdown the transfer pumps and PPA skid (if used).

5. Operators should walk the lines and verify that all necessary valves are closed and loading pumps are reset in their normal positions for operation.

Conclusion:

Attention to detail during preparation of MS-445 will avoid tank overfill. Always verify your gauges and reel gauge when there is any doubt or you are within 3 feet of Safe Fill Height if you are unsure the receiving product will fit.

Never start a transfer without physically walking the valve/product line up. If you are unsure, stop and wait for verification from a second operator.

Attachments:

Valve Setting Worksheet

MS-445 Bulk Receiving Log

AAT Movement Sheet

Step	Action	Initial	Date	Time

Revisions and Addendums

8/16/2018- Added specific verbiage **“**Document on the Valve Setting Worksheet prior to starting any type of product movement.”

Reference: Procedures & Prerequisites

ABQ-JA-9	Boiler Operations	
Job Aid	Approval: Vincent Marrujo Date: 1/7/2019	Current and accurate as of: _____

Purpose:

These instructions apply to facility personnel operating, monitoring and maintaining the boiler(s) and associated equipment.

WARNING: ***When opening gauge hatches be aware that the initial plume may contain high levels of H2S. Never stand directly above the gauge hatch and always keep a minimum 2ft distance between the hatch and breathing zone.***

Safety Precautions:

- PPE required: Personal H2S monitor, safety glasses, hard hat w/face shield, long sleeve shirt, full length pants or coveralls, double palmed thermal protective gloves/cut level 4+ gloves, appropriate safety footwear w/safety toe. All clothing must be FR.
- Thermal protective gloves may be needed when operating at or on the boiler.
- Review SDS for boiler water treatment chemicals.
- Clean up spills and drips immediately to prevent slipping hazards. Keep area clean and free of debris.
- Use 3-point contact when climbing ladders.
- Always use care in body position when climbing, bending or kneeling to prevent strains and injuries.
- Use hearing protection when necessary.

Step	Action	Initial	Date	Time

CAUTION:
Live steam is under pressure and can be as hot as 400°F. Steam can cause severe burns. Always wear PPE and stand clear of potential hazards.

Environmental:

Follow procedures to avoid spills. Clean up spills immediately and dispose of waste properly.

If water treatment chemicals are spilled, refer to SDS for clean-up guidance and PPE required.

References:

Instructor Led: Boiler Operator Journeyman Course

Instructor Led: HAZWOPER

LOG-ePILOT-A5022: Fall Prevention

LOG-Health-Fatigue-Attitude: Fatigue & Attitude

LOG-ePILOT-A5014: Personal Protective Equipment

LOG-ePilot-A1197: JHA & Stop Work Authority

LOG-SWP-LOTO: Lock Out Tag Out

LOG-ePilot-A5012: Lockout/Tagout

LOG-ePilot-A5003: Confined Space Entry

LOG-ePilot-A5004: Portable Fire Extinguishers

LOG-ePilot-A5014: Personal Protective Equipment

LOG-emrsp-hazcom: Hazard Communication

LOG-SWP-ConfEntryAware: Confined Space Entry: Awareness

Procedure Scope:

Boilers generate the steam that is used for heating and other purposes plant wide. The fact that boilers operate under pressure and burn large amounts of fuel to generate the heat to boil water means that they are inherently dangerous pieces of equipment. It is important that all boiler safety equipment is monitored, inspected

Step	Action	Initial	Date	Time

and tested on a regular basis (as outlined in these procedures) to avoid a potential explosion, sudden pressure release, or damage to the boiler and associated equipment. Further, minimizing steam leaks and maximizing condensate return will ensure efficient operation of the boiler(s).

Training for these procedures will consist of detailed classroom sessions on the principles of boiler operation, operation of associated equipment, safety devices, the hazards of steam, water treatment, and the detailed procedures associated with the actual equipment in the plant. An initial walk through during observation training will be conducted to identify the various pieces of equipment and features.

With increasing levels of knowledge, operators will progress in boiler operations as follows:

1. Observe start-up/shut down
2. Identify key pieces of equipment
3. Identify safety devices
4. Monitor chemical inventories
5. Monitor operating parameters and recognize excursions
6. Manually blow down
7. Add chemicals (i.e., salt) as needed
8. Conduct start-up/shut down under supervision
9. Start-up/ shut-down, monitor and operate the boiler and associated equipment unattended
10. Measure pH, TDS and conductivity daily

Prerequisites:

Supervised training for these procedures will take place over approximately a one-month time frame. Once the trainee has demonstrated the ability to satisfactorily operate the boiler and associated equipment and has satisfactorily completed the Boiler Operator Journeyman Course, the operator will then test for the State of New Mexico BO1 (Low Pressure Boilers) and BO2 (High Pressure Boilers) Operator Certification.

Step	Action	Initial	Date	Time

Spill Control and Containment Procedures:

Large scale spills are most likely if a line rupture occurs or the condensate tank over fills. The site glass level indicator should be a routine check performed once a shift.

The water in the boiler system is filtered and treated to a pH between 7-11. Open the boiler house doors in the event of a large leak at the boiler and allow excess water to flow into the Tank 8 basin.

Step	Action	Initial	Date	Time

Safety Features:

The following safety controls are built into the two boilers:

- In the event of loss of fire, a flame safeguard will shut down the burner.

- Steam drum pressure relief safety valves will pop open and relieve internal boiler pressure in the event the boiler should over pressure. The pressure relief valves should be inspected and tested (yearly) to verify that they function properly. (These safety devices are included in the plant critical equipment list.)

- Low water shut down safety switch. The low water safety switch should be tested on a daily basis.

High pressure cutoff switch. (This switch is a pressure control type switch, which when boiler reaches the set- point high pressure will shut down boiler and allow pressure to drop back. When pressure drops back to the pre-set range, the boiler will restart automatically and continue to cycle up to high and drip back maintaining operating pressure.

- Boiler control panel programmed for a continued period of blower operation to clear the boiler of all unburned fuel vapor, and a cycle to prove the pilot and main flame.

Equipment Facilities:

Condensate Tank - Condensate from various collection lines is piped to the condensate collection tank along with make-up treated water and chemicals. Both boilers share the common condensate/feed tank system.

Condensate Tank Level Control - Make-up of treated water maintains the condensate tank level by a controller and the sight glass indicates level.

Boiler Feed Water Pump - One boiler feed water pump for each boiler is located on the north side of the condensate tank and transfers the condensate tank water to the boiler to maintain the proper level in the boiler.

Step	Action	Initial	Date	Time

Boiler Level Control - A level controller on the boiler maintains the proper water level by controlling operation of the feed water pump.

Boiler Pressure Control - Boiler pressure is maintained by controllers on the top of the boiler.

Boiler Pressure Relief Valves - Two pressure relief valves are on each boiler.

Boiler Burner Gas System - The boiler operates on natural gas and the pressure control modulates the fuel gas supply to the burner.

Gas Regulation - The supply gas pressure is regulated from the main line pressure down to 4 inches of water column.

Pilot Light System - The natural gas is piped in a separate system through another regulator and solenoid valve to the flame pilot light.

Burner Gas Pressure Switches - There is first a pressure switch low and finally a pressure switch high that will not let the system operate outside of the feed gas pressure settmg.

Operating Controls - The panel contains the combustion safeguard programming control, motor starts and terminal blocks. Switches and lights mounted on a panel include an on/ off control switch, and a manual modulating control for manually setting the boiler firing rate.

Signal Lamps - Two amber lamps indicate power is on and the unit is firing.

Control Circuit Fuse, for over-current protection.

Firing Rate Controls - Burner input of gas and combustion air is fully modulated between low fire and high fire on boiler demand. Firing rate is regulated by the modulating motor. The combustion air control damper and gas volume valve are positioned by the

Step	Action	Initial	Date	Time

modulating motor via rod and lever linkages.

Flame Safeguard Controls - The flame safeguard programmer incorporates a flame sensing cell (scanner) to shut down the burner in the event of pilot flame or main flame failure. After shut down, a period of continued blower operation is automatically provided to purge the boiler of unburned fuel vapor. Safety controls shut down the burner under any of the following conditions.

1. Lower water level in boiler.
2. Low gas pressure.
3. High gas pressure.
4. Loss of combustion air.
5. Excessive steam pressure.

Burner - The burner consists of a set of baffles that mix and direct the flow of gas and combustion air into the blast tube section of the boiler where combustion occurs.

Chemical Treatment System - Each boiler has a chemical mix tank and injection pump to add water conditioning chemicals to the feed water. These chemicals provide protection to the boiler from corrosion and scale build up.

Manual Boiler Blow-down System - To manually blow- down boiler, operate the wheeled valve first and then crack open the levered valve for a maximum five-second interval. To close system, reverse the procedure by closing first the lever operated valve and finally the wheeled valve.

Procedure:

FIRING SUPERIOR BOILER

Conclusion:

1. Make sure the boiler feed water pump valves are open and set the boiler feedwater pump control switch to auto matic.

2. Check that the fresh water supply valve is open. The water level is controlled by a McDonnel mercury control float switch located on the side of the boiler with a sign glass for visual

Step	Action	Initial	Date	Time

monitoring of water level during boiler fill and normal operation. Nominal water level visible in the sight glass should be 2-3inches.

3. Check that the following circuit breakers are on. Superior Boiler Feed-Water Pump panel # 13 on wall by pump.

   Ensure the boiler chemical feed pump control switch is set to automatic, open the discharge valve, and check level of chemical in the drums. If either chemical is below 20gals alert the Lead Operator or send an email to our IWE Service Tech.

4. Set switch on the boiler control panel to on. The boiler will now go through its internal start-up sequence. Observe the operation of the modulating motor linkages and the main gas supply valve. Ensure the linkages as operating freely. If you smell or detect gas, shut down the boiler immediately and contact immediate supervisor.

5. If the boiler fails to start, turn off the switch and attempt to reset the pressure switches, the reset in the side electrical terminal panel, and the reset on the main Honeywell controller in the control panel. Attempt to start again. If unit fails to fire, contact immediate supervisor.

6. Firing can be confirmed by viewing through the sight tube.

7. Check that the steam header valves are open.

8. When the boiler has reached high fire and full pressure, check the stack temperature indicator and steam pressure gauge for the following operating ranges:
   - Stack Temperature - 325 - 375°F
   - Boiler Pressure - 110 - 130 psig

Safety Note:
As part of normal safe operation of the plant boilers, plant operators need to blow-down the sight glass and McDonnel low water-cutoff valve once per shift. Log this on the Boiler Blowdown Sheet. This blow-down will ensure that mud and scale do not build-up underneath the float valve and cause float to stick or not function properly.

Consult manual blowdown instructions.

Step	Action	Initial	Date	Time

Part of the plant operators normal shift duties will be to monitor and log boiler conditions during daily boiler operations. Operator should monitor and note any unusual readings during shift in the turnover log and be able to shut down the boiler if an unsafe condition develops. (WATCH FOR UNUSUAL NOISES, HIGH TEMPERATURE RANGES ON BOILER STACK, UNUSUAL FLAME COLOR OR FIRING RATES, HIGH PRESSURE CUTOFF NOT FUNCTIONING, ETC.) **If in doubt about the present condition, shut down the boiler immediately and contact Terminal Manager or Lead Operator.**

Plant boilers are running at all times in conjunction with each other. The auto-dialer will alert all operators via text or email if there is an issue. If over the weekend, the primary or alternate operator on duty will need to respond ASAP.

EMERGENCY SHUT DOWN:
Emergency shut down buttons are located at the north door behind the Hurst boiler and inside the scale house operator room.

Natural Gas shutoff valve is located south of Gate 3 inside the steel barriers. See image below:

Step	Action	Initial	Date	Time

Both gas and electrical should be shutdown in an emergency.

1. After electrical and gas mains are shut down call 911 in the event of a fire or if emergency medical assistance is required.

2. Shut down all loading operations and ask any drivers to leave the rack area and gather in the front parking lot (assembly area).

3. Contact other plant operator(s) and Terminal Manager, if on site, and meet at front assembly area for a head count. Allow the fire department to handle the fire or gas damage situations.

4. Keep a safe distance from the boiler area and keep all non-emergency people out of the plant until the damage can be assessed. A certified boiler repair technician must be called in to verify damage and make necessary repairs prior to restarting the boiler. Terminal Manager will make that decision.

MANUAL BLOWDOWN:

1. Proper boiler blowdown is an essential part of a firetube boiler operating procedure. It is necessary to control the amount conductivity of the boiler water. The conductivity limits will be determined by the water chemical contractor, IWE, and relayed to us.

2. The terminal operator in charge of boiler water testing will run the conductivity test and notify the shift operators if additional blowdowns will be required.

3. Normally, the boiler should be blown down once a day at a minimum unless directed otherwise by IWE.

Blowdown of the boiler should be conducted when the boiler has achieved normal operating temperature and pressure. Start by operating the ball valve below the McDonnell level controller for about 2 seconds. This will drain the controller body and sight glass, and serves two purposes:

Step	Action	Initial	Date	Time

- Removes scale, rust and other debris from the level controller.

- Tests the law water cutoff. When the level drops in the controller body, the alarm will sound and the boiler will shut down. If it does not shut down, manually shut down boiler and contact immediate supervisor.

Once the ball valve is closed, the controller and sight glass will refill, and the boiler will automatically restart using its internal testing and start-up sequence.

5. Now conduct manual blowdown from the bottom of the boiler. This serves two purposes.

- Removes scale, rust and other debris that has collected in the bottom of the boiler.

- Removes water from the system to control the buildup of dissolved solids in the water.

To blowdown the bottom, open the wheel-operated valve completely. Then, open the lever valves for about five seconds each at both ends of the boiler. After both lever valves have been operated, close the wheel valve. Log in the Boiler Blowdown Log.

Possible Hazards:

Live steam is under pressure and can be as hot as 400°F. Steam can cause severe burns. Always wear PPE and stand clear of potential hazards.

Boilers burn large amounts of gas to produce the heat to boil water. They are equipped with many safety devices to reduce the risk of explosion. It is imperative that these safety devices are inspected, tested and maintained on a regular basis to eliminate risk of explosion or fire.

Be aware of hot surfaces. Use thermal protective gloves when working on hot equipment.

Step	Action	Initial	Date	Time

Conclusion: Boilers are an integral part of plan operations as they provide heat needed to manufacture, transfer and ship products. Because they are under pressure with hot steam and burn large amounts of gas, they are dangerous pieces of equipment. Always keep this in mind when working on or around boilers. It is critical that boilers and their attendant safety devices are well maintained to prevent explosions, fire, damage to equipment, or personnel injuries. Paying attention to unusual operating conditions can indicate a serious condition is arising before a catastrophic failure occurs. Always report any unusual observations to your immediate supervisor. If unsure about an unusual condition, shut down the equipment immediately and seek assistance.

Attachments: Boiler Blow Down Log

Step	Action	Initial	Date	Time

Revisions and Addendums

8/16/2018- Added specific verbiage **"**Document on the Valve Setting Worksheet prior to starting any type of product movement."

Reference: Procedures & Prerequisites

4. AIR DISPERSION MODELING ANALYSIS

AIR DISPERSION MODELING REPORT

Permit Modification Application
0051-M1-3TR

Western Refining Terminals, LLC
Albuquerque Asphalt Terminal

Prepared By:

Michael Celente – Managing Consultant

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April 2023

Project 203201.0114

Trinity Consultants

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1. APPLICANT AND CONSULTANT INFORMATION

This modeling report is being submitted as part of a permit modification application submitted pursuant to 20.2.11.41.29 NMAC for the Albuquerque Asphalt Terminal (AAT), which is owned and operated by Western Refining Terminals, LLC (Western). This report and accompanying modeling files are being submitted to the City of Albuquerque (CABQ) Environmental Health Department (EHD), Air Quality Program (AQP) to satisfy the requirements of 20.11.41.13.E NMAC. This report includes all required components requested in the "Completeness Requirements" section of the CABQ's Air Dispersion Modeling Guidelines (published October 2019).

a) Name of Facility and Company

Facility Name: Albuquerque Asphalt Terminal (AAT)
Company: Western Refining Terminals, LLC (Western)

b) Permit Numbers

The facility operates under **ATC #0051-M1-3TR**

c) Contact Information for Modeling Questions

Contact Name: Michael Celente
Phone Number: (505) 266-6611
E-Mail Address: mcelente@trinityconsultants.com

2. FACILITY AND OPERATIONS DESCRIPTION

a) Narrative Summary of Modification

This modeling report details AERMOD inputs and modeled concentrations associated with the proposed updates. Details of the permit modification are included below.

The proposed modification includes the following updates to the existing permit:

- Removal of thirteen (13) demolished asphalt tanks;
- Removal of three (3) existing (but to-be-demolished) asphalt tanks (Tanks 6, 57, and 66);
- Transition the existing per-tank gal/yr throughput limit and emission limit (as detailed in Table 4 of the existing permit) into a facility-wide aggregate limit of 46,820,000 gallons/year (and associated lb/hr and tpy limits);
  - This will provide Western with additional flexibility required to meet future demands;
- Updated vapor expansion coefficient used in asphalt tank calculations to reflect a more conservative value;
- Addition of two (2) 6,000 bbl asphalt tanks (Tank-503 and Tank-504);
  - Western will provide notification to the agency prior to the start of construction of these tanks;
- Transition of the second loading rack (LR-2) from cutback asphalt to asphalt;
  - Cutback asphalt is no longer manufactured at the facility;
- Transition of Tank 7 from cutback asphalt to asphalt;
  - Cutback asphalt is no longer manufactured at the facility;
- Addition of pipeline fugitives (FUG) to the permit and modeling;
- Addition of railcar unloading emissions (UL-1 through UL-9) to the permit and modeling;
- Addition of truck offloading emissions (TL-1 and TL-2) to the permit and modeling;
- Update boiler and hot oil heater calculations to use stack test data (Units 1-3);
- The stacks from the boilers and hot oil heater currently have rain caps. As part of this permit modification, Western seeks to remove these rain caps while simultaneously modifying the stack heights for these existing combustion units. As such, these combustion sources were modeled as vertical point sources as opposed to vertical, capped point sources; and
- Additionally, in order to ensure that there were no exceedances of New Mexico or National Ambient Air Quality Standards, Western proposes modifying the stack parameters from the existing units. Comprehensive stack testing was completed as part of this permit modification application and the stack flow and temperature were based on actual data from the stack testing. Stack diameter is based on actual measured values, and stack height is proposed to be modified to ensure sufficient dispersion. As such, the stack heights from the boilers (Units 1 and 2) are proposed to be increased from 20 ft to 35 ft. It was determined that the hot oil heater (Unit 3) had lesser impacts than the boilers and the stack height is proposed to be decreased from the previously proposed 30 ft to 26 ft, which is its current height.

b) Physical Description

The Albuquerque Asphalt Terminal is currently located at 2030 2nd St SW, Albuquerque, NM 87102 (349,317 m E, 3,881,541 m N).

c) Duration of Time to be Located on Site

The facility will be at this location for greater than one (1) year.

d) Facility Maps

The following maps are included:

- Map showing location of facility;
- On-site buildings;
- Emission points;
- Fence line; and
- Property boundary.

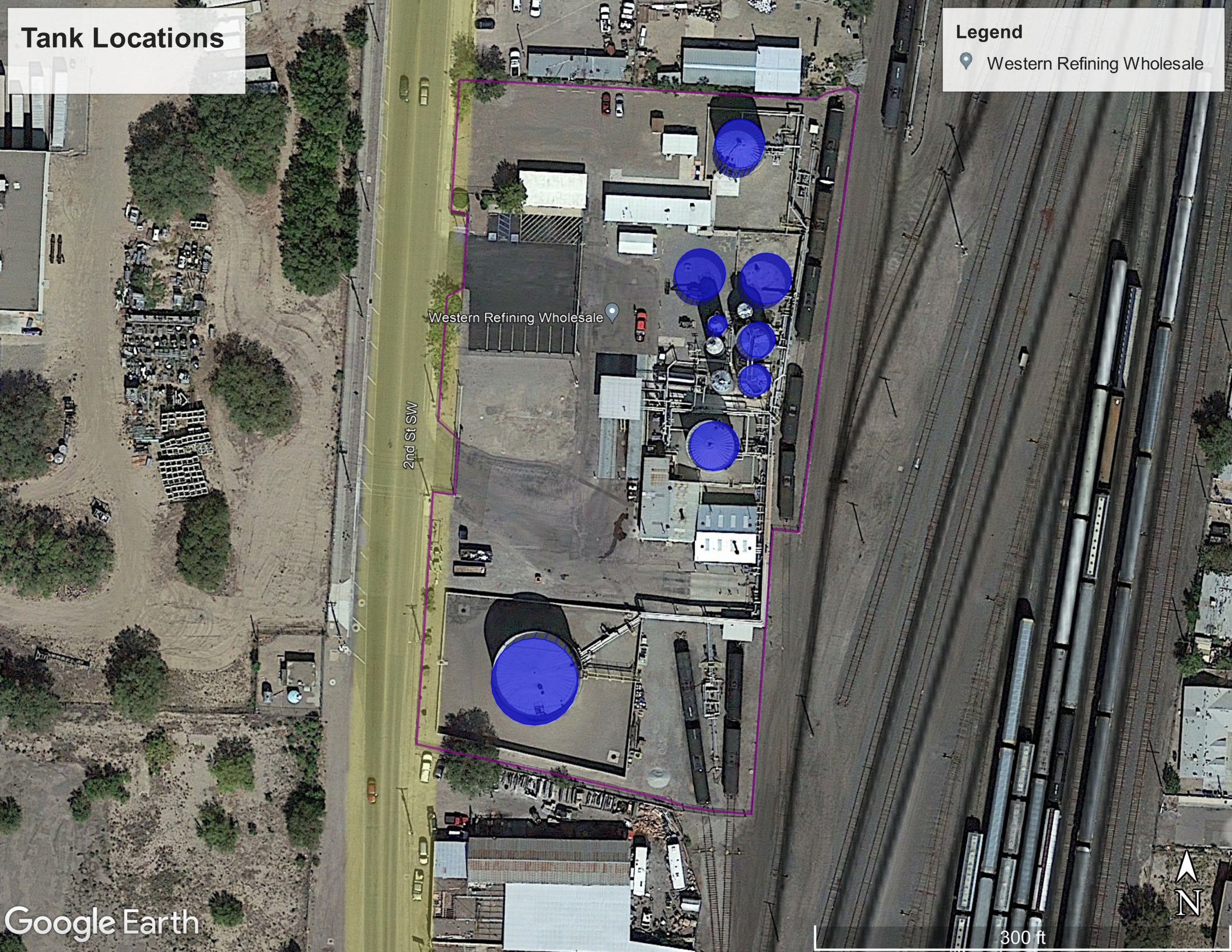
The attached figures display an aerial image of the facility with labels of all source emission points at the facility: point sources, area sources, and volume sources. Figures are also included which show the entire layout of buildings at the facility, an aerial image obtained from the City of Albuquerque's Advanced Map Viewer, and plot plans of the facility.


Buildings and Fence Line
Buildings included for downwash purposes.
Legend
AAT Fence Line
2nd St SW
BLDG_8
BLDG_9
BLDG_6
BLDG_5
BLDG_3
BLDG_2
BLDG_7
BLDG_4
BLDG_1
BLDG_10
303
Smith Ave SE
Abilene
N
400 ft
Google Earth
© 2021 Google


Point Sources
Combustion - Boilers and Heater
Legend
Superior Boiler (Unit 1)
Hurst Boiler (Unit 2)
Hot Oil Heater (Unit 3)
Google Earth
© 2021 Google
N
100 ft


Volume Sources
Railcar Unloading (UL)
Truck Offloading (TL)
Truck Loading (LR)
Legend
UL-1
UL-2
UL-3
UL-4
Loading Rack 2 (LR-2)
Loading Rack 1 (LR-1)
2nd St SW
UL-5
Truck Offloading 1 (TL-1)
Truck Offloading 2 (TL-2)
UL-8
UL-6
303
UL-9
UL-7
Google Earth
© 2021 Google
N
200 ft


Polygon Area Sources
Pipeline Fugitives (FUG-1 through FUG-4)
Based on Release Height
Legend
FUG-4
FUG-3
FUG-1
FUG-2
2nd St SW
303
Google Earth
© 2021 Google
200 ft
N


Tank Locations
Legend
Western Refining Wholesale
Western Refining Wholesale
2nd St SW
N
300 ft
Google Earth

3. MODELING REQUIREMENTS DESCRIPTION

a) List of Pollutants Requiring Modeling

This air dispersion modeling evaluation is for a permit modification that will authorize the addition of point sources with combustion emissions, and area and volume sources of hydrogen sulfide. As such, averaging periods will be evaluated for CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2 and H_2S. This facility is not a source of Pb; no modeling is required for this pollutant.

Table 1. Pollutants Standards That are Modeled to Demonstrate Compliance with the NAAQS/NMAAQS

Pollutant	Standard	Waiver Granted	Modeled
CO	8-hr		☑
	1-hr		☑
NO_2	Annual		☑
	24-hr*		☑
	1-hr		☑
PM_{10}	24-hr		☑
$PM_{2.5}$	Annual		☑
	24-hr		☑
SO_2	Annual		☑
	24-hr*		☑
	3-hr*		☑
	1-hr		☑
H_2S	1-hr		☑
Pb	Quarterly	N/A	

*Note: Demonstration of compliance with a certain standard can be a surrogate that demonstrates compliance with other standards/averaging periods (e.g. 1-hr NO_2 for 24-hr NO_2; 1-hr SO_2 for 3-hr and 24-hr SO_2). The high first high value is always compared to the significant impact level for each averaging period.

b) Additional Modeling Required

No additional New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP) or Prevention of Significant Deterioration (PSD) modeling is required as part of this modification application. The AAT is located in an area that is classified by the EPA as in attainment with the National Ambient Air Quality Standard (NAAQS) for all regulated pollutants.

4. MODELING INPUTS

a) General Modeling Approach

i. Models Used and Justification

The most recent executable of AERMOD (v22112) was used to perform all air dispersion modeling. All models were run in regulatory default mode and Building Profile Input Program (BPIP) Prime was run to address building downwash associated with the tanks and structures located at this facility as well as the surrounding area.

ii. Operational Flexibility

There are two sources of H_2S emissions associated with the asphalt tanks. The first is associated with storage tank working and standing loss emissions and the second is associated with product offloading into the storage tanks. Offloading (from either railcar or truck) will occur into only one of the storage tanks at one time. As such, a screening model was run which shows that the storage tank with the highest contributions and modeled impacts is Tank 502. See **Table 2** below. Each storage tank is modeled with an emission rate of 1 g/s and added to a source group with all other sources of emissions at the facility. In other words, the results below for Tank 502 include Tank 502 modeled at 1 g/s and all other sources (product offloading into tanks, railcar and truck unloading, fugitives, loading racks) are modeled at the rates included in Section 4.d.3.

Table 2. Results of Screening Model to Determine Highest Impact from Tanks

Tank	1-HR Modeled Impact (µg/m³)
Tank 5	16085.93
Tank 7	7468.11
Tank 8	8291.61
Tank 9	8800.89
Tank 501	7237.23
Tank 502	**17333.97**
Tank 503	8599.71
Tank 504	7880.33

It was assumed that product offloading at a rate of 77,000 gal/hr was occurring in Tank 502, while all other tanks were modeled during offloading with their working and breathing emissions. Railcar offloading occurs at a rate of 77,000 gal/hr while truck offloading occurs at a rate of 25,200 gal/hr. As such, the higher rate was used in the conservative lb/hr product offloading calculations.

In actuality, offloading could occur into any of the facility storage tanks at any given time, but only Tank 502 is included in the model as the screening model shows that impacts from offloading into Tank 502 are the highest. As such, it is assumed that modeled impacts will be lower for offloading into any other tank (still assuming simultaneous working and standing emissions from the remaining tanks).

It is also assumed that all railcar heating (railcar vent opening during heating), truck offloading (truck tanker vent opening prior to offloading) and loading rack emissions were modeled simultaneously as well as all

storage tanks, fugitives, and combustion sources. Although it is highly unlikely that all emission sources will be operating simultaneously, they are modeled as such to provide flexibility to the facility. For truck loading emissions, the maximum facility throughput is assumed to be loaded through each loading rack simultaneously as a conservative measure. Similarly, the total facility-wide fugitive emissions are modeled for each of the four (4) area sources representing fugitive emissions. The entire throughput and associated H_2S emissions are also modeled for each of the truck offloading sources. This is a very conservative representation.

iii. Source Groups

All units were modeled simultaneously. The FAC source group includes all Albuquerque Asphalt Terminal sources while the NAAQS source group in the CIA models includes the addition of the surrounding sources. The NAAQS source group also includes the addition of the 1-hr temporally varying background NO_2 concentration. Additional details are provided in Section vii.

iv. Hourly Emission Factors

No hourly emission factors were used as part of the air dispersion modeling evaluation. All lb/hr values were calculated as the maximum and conservative concentration for each of the sources. Units 1-3 were modeled with their stack test data, where the highest lb/hr rates, lowest temperature, and lowest stack velocities were used.

v. Gravitational Settling/Plume Depletion

Wet and dry depletion were not used to model ambient impacts of PM_{10} and $PM_{2.5}$

vi. Reduction of NO_X to NO_2

Initially, the Tier 2, Ambient Ratio Method 2 (ARM2) was proposed to model ambient impacts of NO_2. The national default minimum ambient ratio of 0.5 and maximum ambient ratio of 0.9 was proposed. However, after additional discussions with the EHD, Tier III methods were ultimately utilized in the air dispersion modeling. The South Valley Ozone data (as provided on the EHD's website) was utilized in conjunction with the Plume Volume Molar Ratio Method (PVMRM). PVMRM estimates the amount of ozone entrained in the dispersion plume of a source to determine the amount of O_3 that is available for oxidation from NO to NO_2. A limiting factor approach is then applied which restricts NO conversion as a function of the amount of O_3 entrained in modeled plumes. Using this method allows for individual sources to be assigned specialized in-stack ratios (ISR). The ratios applied to surrounding sources in the NO_2 modeling follow the table below as detailed in an email received from the EHD (dated 3/8/2021).

Table 3. Department-Approved In-Stack Ratios (ISR)

Sources	In-stack ratio value accepted by the AQP
Diesel-fired RICE engines	0.15
Natural-gas fired boilers	0.2
Other sources at facility seeking permit	0.5
Other sources 1-3 km from fence of facility seeking permit	0.2
Other sources < 1 km from fence of facility seeking permit	0.3

Stack testing was completed for the boilers and heaters at the facility, 0.2 ISR was used for the boilers and 0.5 ISR was used for the hot oil heater based on guidance provided by the EHD via email. EPA recommends source-specific data whenever possible for Tier III methods. Diesel generators at surrounding sources were modeled with an ISR of 0.15 and other combustion sources less than 1 km from the facility were modeled with an ISR of 0.3.

vii. Background Concentrations

Background concentrations shown in **Table 4** have been added to the calculated facility and neighboring source impacts for each pollutant and averaging period. These background concentrations were provided by the Air Quality Program (AQP) via email on November 18, 2022 and have been preserved as provided.

Table 4. Background Concentrations

Pollutant	Standard	Value (µg/m^3)	Location
NO_2	1-hr	VARIES*	Temporally Varying Data
NO_2	Annual	19	Del Norte
PM_{10}	24-hr	45	South Valley
$PM_{2.5}$	24-hr	23	South Valley
$PM_{2.5}$	Annual	9.1	South Valley

A temporally varying 1-hr NO_2 background concentration was provided by the EHD on 3/2/2021. The data was taken from the Del Norte monitor – which is the only EPA-approved monitor with checked data for a long enough period to calculate background values. This background file was added to AERMOD and used in lieu of the static background value of 84.6 µg/m^3 from the Del Norte Monitor. The table is included below – all values are in units of µg/m^3.

Table 5. Temporally Varying 1-hr NO_2 Background Data (µg/m³)

Hour	Winter	Spring	Summer	Fall
1	72.1	47.6	29.3	65.6
2	67.8	48.3	27.7	59.7
3	67.7	46	26.4	57.9
4	68.4	48.9	26.6	58.9
5	69.1	51.7	32.7	58
6	69.7	63.9	39.3	57.8
7	72.8	70.7	46.4	63.5
8	77.6	71.8	48.5	64.5
9	80	61.1	34.2	65.9
10	71.4	48	27.3	55
11	62	28.6	24.3	47.3
12	48.1	18.9	19.9	35.4
13	36.9	17.6	17	28.2
14	35.1	15.7	15.9	25.3
15	33.6	14.8	17.4	24.2
16	37.2	15.3	19.4	28
17	48.4	17.1	20.4	38
18	73	19.4	19.3	69.6
19	79.3	38.5	21.7	79.1
20	78.1	53.2	30.9	77.1
21	77.3	48	34.1	73.4
22	76.5	56.3	30.8	70.4
23	75	58.8	34.9	69.7
24	72.4	57.9	33.6	70.9

viii. Demonstration of Compliance in Nearby Facilities

Discrete receptors were included in all surrounding sources and facilities. Receptors were only deleted inside the Albuquerque Asphalt Terminal property line.

b) Meteorological and Ozone Data

i. Discussion of Meteorological and Ozone Data

The most recent meteorological data from the Albuquerque Airport from 2014 to 2018 provided by the CABQ was used for the air dispersion modeling. The airport is located nearby and this meteorological data is assumed to be adequately representative of conditions at the AAT.

Ozone data was required for the modeling as Tier III methods (PVMRM) were required for NO_2 modeling. There are two (2) sets of Ozone data provided by the EHD. One of the O_3 data sets uses primarily South Valley data while the other uses primarily Del Norte data. As this facility is located south of Central Avenue, the South Valley data was utilized. No modifications were made to this data.

ii. Actual Data

No further justification is required as the data was provided by the CABQ.

c) Receptor and Terrain Discussion

i. Spacing of Receptor Grids

- Fence line spacing: 25 meters
- Fine grid spacing: 100 meters out to approximately 1,500 meters from the facility fence line.
- Coarse grid spacing: 500 meters out to 3,000 meters from the facility, and finally 1,000 meters out to the edge of the modeling domain.

ii. Terrain Discussion

Based on the most recent guidance from the EHD, USGS National Elevation Dataset (NED) files were used in lieu of Digital Elevation Model (DEM) data. 1 arc-second NED files were downloaded from the USGS National Map website in GeoTIFF format. These files were then imported into AERMAP to determine elevations for sources, receptors, and buildings:

There is no complex terrain requiring modifications to air dispersion modeling inputs.

iii. Reduction in Receptor Grid Size

The full receptor grid was utilized for all SIL models. Receptors not exceeding significance thresholds per Table 6-A of the NMED Air Dispersion Modeling Guidelines were removed for all CIA modeling.

d) Emission Sources

i. Description of Sources at Facility

1. Choice of Source Type

Table 6. Point Source Stack Parameters

Unit	Description	Height* (ft)	Diameter (ft)	Flow (ft^3/min)	Velocity (ft/s)	Temperature (°F)	Stack Orientation
1	Superior Boiler	35.00	1.96	4,352	24.10	350.50	Vertical
2	Hurst Boiler	35.00	1.63	5,065	40.70	391.60	Vertical
3	Hot Oil Heater	26.00	1.63	2,035	16.40	368.40	Vertical
Tank_5	Fixed Roof Asphalt Tank	24.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_7	Fixed Roof Asphalt Tank	37.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_8	Fixed Roof Asphalt Tank	40.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_9	Fixed Roof Asphalt Tank	36.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_501	Fixed Roof Asphalt Tank	32.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_502	Fixed Roof Asphalt Tank	32.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_503	Fixed Roof Asphalt Tank	36.00	0.0033	Negligible	0.0033	Ambient	Vertical
Tank_504	Fixed Roof Asphalt Tank	36.00	0.0033	Negligible	0.0033	Ambient	Vertical

* The boilers and hot oil heater stacks currently have rain caps. As part of this permit modification application, the rain caps will be removed. Additionally, the stack heights for the boilers (Units 1 and 2) will be increased from 20 ft to 35 ft and the hot oil heater stack (Unit 3) will be decreased from the previously proposed 30 ft to its existing height of 26 ft.

2. Summary of Actual and Modeled Dimensions for Volume and Area Sources

Table 7. Volume Source Parameters

Volume Sources				
ID	**Description**	**Release Height**	**Initial Lateral**	**Initial Vertical**
LR-1	Loading Rack 1	11.42	0.39	0.39
LR-2	Loading Rack 2	11.42	0.39	0.39
TL-1	Truck Offloading 1	11.42	0.39	0.39
TL-2	Truck Offloading 2	11.42	0.39	0.39
UL-1	Railcar Unloading 1	15.50	0.39	0.39
UL-2	Railcar Unloading 2	15.50	0.39	0.39
UL-3	Railcar Unloading 3	15.50	0.39	0.39
UL-4	Railcar Unloading 4	15.50	0.39	0.39
UL-5	Railcar Unloading 5	15.50	0.39	0.39
UL-6	Railcar Unloading 6	15.50	0.39	0.39
UL-7	Railcar Unloading 7	15.50	0.39	0.39
UL-8	Railcar Unloading 8	15.50	0.39	0.39
UL-9	Railcar Unloading 9	15.50	0.39	0.39

ID	Description	Vertical Dimension	σ_{Zo}	Release Height	Apparent Length	σ_{Yo}
		(ft)	(ft)	(ft)	(ft)	(ft)
LR-1	Loading Rack 1	1.67	0.39	11.42	1.67	0.39
LR-2	Loading Rack 2	1.67	0.39	11.42	1.67	0.39
TL-1	Truck Offloading 1	1.67	0.39	11.42	1.67	0.39
TL-2	Truck Offloading 2	1.67	0.39	11.42	1.67	0.39
UL-1	Railcar Unloading 1	1.67	0.39	15.50	1.67	0.39
UL-2	Railcar Unloading 2	1.67	0.39	15.50	1.67	0.39
UL-3	Railcar Unloading 3	1.67	0.39	15.50	1.67	0.39
UL-4	Railcar Unloading 4	1.67	0.39	15.50	1.67	0.39
UL-5	Railcar Unloading 5	1.67	0.39	15.50	1.67	0.39
UL-6	Railcar Unloading 6	1.67	0.39	15.50	1.67	0.39
UL-7	Railcar Unloading 7	1.67	0.39	15.50	1.67	0.39
UL-8	Railcar Unloading 8	1.67	0.39	15.50	1.67	0.39
UL-9	Railcar Unloading 9	1.67	0.39	15.50	1.67	0.39

[1] The release height is defined as the distance from the center of the volume to the surface of the ground. This is assumed to be the height of the truck. The truck height was assumed to be 137″ or 11.42′ based on truck specifications. The truck hatch is 20″ or 1.67′ and is assumed to be the apparent length of the source. The vertical dimension is assumed to be equivalent to the apparent length.

[2] Per NMED guidelines, the apparent length was divided by 4.3 to determine the initial lateral dimension.

[3] Per NMED guidelines the vertical dimension was divided by 4.3 for isolated elevated sources.

Table 8. Polygon Area Source Parameters

Area Source				
ID	**Description**	**Release Height (ft)**	**Initial Vertical Dimension (ft)**	**Area (ft^2)**
FUG-1	Pipeline Fugitives	2.00	0.00	308.12
FUG-2	Pipeline Fugitives	3.00	0.00	479.67
FUG-3	Pipeline Fugitives	4.00	0.00	699.15
FUG-4	Pipeline Fugitives	15.00	0.00	6,790.64

For purposes of fugitives, the average height of the piping components varies across the facility. As such, the pipeline fugitives were broken into four (4) separate fugitive sources with distinct release heights. Per AERMOD v.19191 user guide, the initial vertical dimension is set to 0 as the fugitives are considered a passive area source. The area is calculated based on the polygon area taken from Google Earth.

3. Table of Proposed Changes

Table 9. Modeled Emission Rates for Modified or New Point Sources (lb/hr)

Unit	Description	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$	H_2S*
1	Superior Boiler	0.81	1.18	0.0084	0.11	0.11	-
2	Hurst Boiler	0.72	1.01	0.0072	0.091	0.091	-
3	Hot Oil Heater	0.30	1.23	0.0088	0.11	0.11	-
Tank_5	Fixed Roof Asphalt Tank	-	-	-	-	-	1.73E-06
Tank_7	Fixed Roof Asphalt Tank	-	-	-	-	-	1.51E-06
Tank_8	Fixed Roof Asphalt Tank	-	-	-	-	-	6.70E-06
Tank_9	Fixed Roof Asphalt Tank	-	-	-	-	-	2.09E-06
Tank_501	Fixed Roof Asphalt Tank	-	-	-	-	-	2.61E-06
Tank_502	Fixed Roof Asphalt Tank	-	-	-	-	-	0.0047
Tank_503	Fixed Roof Asphalt Tank	-	-	-	-	-	2.97E-06
Tank_504	Fixed Roof Asphalt Tank	-	-	-	-	-	2.97E-06

*An explanation of the tank emission calculation methodology is included in Section 2.3. The screening model shows that Tank 502 has the highest contribution. As such, product offloading (at a rate of 77,000 gal/hr) is modeled at Tank 502 while working and standing H_2S emissions are simultaneously modeled for all other tanks.

Table 10. Modeled Emission Rates for Modified or New Volume Sources (lb/hr)

Unit	Description	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$	H_2S*
UL_1	Railcar Unloading 1	-	-	-	-	-	6.79E-04
UL_2	Railcar Unloading 2	-	-	-	-	-	6.79E-04
UL_3	Railcar Unloading 3	-	-	-	-	-	6.79E-04
UL_4	Railcar Unloading 4	-	-	-	-	-	6.79E-04
UL_5	Railcar Unloading 5	-	-	-	-	-	6.79E-04
UL_6	Railcar Unloading 6	-	-	-	-	-	6.79E-04
UL_7	Railcar Unloading 7	-	-	-	-	-	6.79E-04
UL_8	Railcar Unloading 8	-	-	-	-	-	6.79E-04
UL_9	Railcar Unloading 9	-	-	-	-	-	6.79E-04
TL_1	Truck Offloading 1	-	-	-	-	-	1.45E-06
TL_2	Truck Offloading 2	-	-	-	-	-	1.45E-06
LR_1	Loading Rack 1	-	-	-	-	-	9.69E-04
LR_2	Loading Rack 2	-	-	-	-	-	9.69E-04

*An explanation of emissions from individual railcars, trucks and loading racks is included in Section 2.3 of the application. Total lb/hr and tpy emissions are based on a lb/railcar or lb/truck value as well as the number of railcars and trucks unloaded hourly and annually. As a conservative approach, the entire facility throughput is proposed to be handled through either of the loading racks.

Table 11. Modeled Emission Rates for Modified or New Area Sources (lb/hr-ft^2)

Unit	Description	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$	H_2S*
FUG_1	Pipeline Fugitives 1	-	-	-	-	-	6.56E-08
FUG_2	Pipeline Fugitives 2	-	-	-	-	-	4.22E-08
FUG_3	Pipeline Fugitives 3	-	-	-	-	-	2.89E-08
FUG_4	Pipeline Fugitives 4	-	-	-	-	-	2.98E-09

*The different fugitive sources are based on different release heights of the piping components throughout the facility (as shown in Table 8). As there is no way to efficiently differentiate component counts based on release height, the entire facility-wide H_2S lb/hr emissions were assumed for each of the area sources. This is an extremely conservative assumption and corresponds to modeled emissions 4 times higher than potential facility-wide emissions.

4. Treatment of Operating Hours

No reductions were claimed to represent non-continuous annual operation for any of the emission sources located on site. However, surrounding source hours of operation were limited as detailed in the data provided by the EHD. The data was preserved as provided and is included as an attachment to this report.

5. Particle Size Characteristics

No particle size distribution characteristics were included in the particulate matter modeling.

6. Discrepancies Between Modeled Parameters and those in the Applications

Modeled parameters and those represented in the application are identical.

7. Flare Calculations

There are no flares at this facility.

8. Cross-Reference of Model Input Numbers/Names

All unit names in the model are identical to unit names reported in this application.

e) Building Downwash

i. Dimensions of Buildings and Tanks

Table 12. Tank Dimensions and Locations (Circular Buildings)

Tank Name	Tank Height (ft)	Tank Diameter (ft)	X Coordinate (m)	Y Coordinate (m)
Tank_5	24.00	21.5	349389.4	3881498.2
Tank_7	37.00	12.0	349381.4	3881509.9
Tank_8	40.00	60.0	349341.2	3881435.1
Tank_9	36.00	24.0	349389.7	3881506.4
Tank_501	32.00	34.0	349380.3	3881484.2
Tank_502	32.00	34.0	349386.7	3881548.1
Tank_503	36.00	35.0	349391.7	3881519.4
Tank_504	36.00	35.0	349377.8	3881520.5

Table 13. Building Dimensions and Locations

Building #	Description	Height (ft)	X Coordinate (m)	Y Coordinate (m)
1	BLDG_1	16.0	349364.7	3881481.6
2	BLDG_2	13.0	349356.1	3881537.9
3	BLDG_3	13.0	349337.4	3881543.6
4	BLDG_4	16.0	349355.2	3881498.9
5	BLDG_5	13.0	349370.9	3881552.8
6	BLDG_6	13.0	349368.5	3881556.1
7	BLDG_7	13.0	349360.9	3881531.3
8	BLDG_8	15.0	349341.6	3881569.4
9	BLDG_9	20.0	349375.7	3881570.9
10	BLDG_10	20.0	349317.9	3881398.4

ii. Discussion of Included Buildings

All buildings were included in the air dispersion modeling as shown in Section 2(d). All AAT buildings were included as well as the required buildings from surrounding areas that were requested to be included by the EHD.

5. MODELING FILES DESCRIPTION

a) List of Files

Table 14. Modeling Files and Description

Name	Description
AAT_CO SIL	CO Significance Analysis
AAT_SO2_SIL	SO_2 Significance Analysis
AAT_H2S_SIL	H_2S Significance Analysis
AAT_H2S_SCREENING	H_2S Screening Model
AAT_NO2_SIL	NO_2 Significance Analysis
AAT_NO2_CIA_1HR	NO_2 Cumulative Impact Analysis for 1-hr Standard
AAT_NO2_CIA_ANNUAL	NO_2 Cumulative Impact Analysis for Annual Standard
AAT_PM2.5_SIL	$PM_{2.5}$ Significance Analysis
AAT_PM25_CIA_24HR	$PM_{2.5}$ Cumulative Impact Analysis for 24-hr Standard
AAT_PM25_CIA_ANNUAL	$PM_{2.5}$ Cumulative Impact Analysis for Annual Standard
AAT_PM10_SIL	PM_{10} Significance Analysis
AAT_PM10_CIA_24HR	PM_{10} Cumulative Impact Analysis for 24-hr Standard

b) Description of Scenarios

All files labeled "SIL" represent the Significance Impact Level analysis. Modeled concentrations were above the SIL for H_2S, NO_2, $PM_{2.5}$ and PM_{10} while modeled concentrations were below the SIL for CO and SO_2. As such, cumulative modeling was completed. Files labeled "CIA" represent the Cumulative Impact Analysis. Both background concentrations and surrounding sources were added into the cumulative modeling as required by the AQP.

c) Maximum Daily Contribution Analysis (MAXDCONT)

The maximum daily contribution (MAXDCONT) option in AERMOD allows users to create an output file which provides source contributions for the 24-hr $PM_{2.5}$, 1-hr NO_2 and 1-hr SO_2 standards in which the design value is based on averages of ranked values across multiple years. The user is able to define the ranks and an optimal minimum threshold concentration value. A MAXDCONT analysis was completed for the 1-hr NO_2 standard at this facility. A rank of 50 was chosen and the threshold set was 188.03 $\mu g/m^3$ (the 1-hr NAAQS for NO_2). The provided MAXDCONT file shows that the facility's contribution never exceeds the 1-hr NO_2 significance level of 7.52 $\mu g/m^3$ each time there is an exceedance of the NAAQS. In other words, the facility is not a significant contributor at any of the receptors which show exceedances of the 1-hr standard. This culpability analysis validates that the facility is not responsible for any exceedances of the 1-hr standard and demonstrates that the facility is in compliance with the applicable standard.

6. MODELING RESULTS

a) Summary of Modeling Results

Table 15. Model Results; Maximum Concentrations; SIL Comparison

Pollutant	Averaging Period	Significance Level	Modeled	Percent of Significance	Location of Maximum Concentration		Elevation (m)
		µg/m³	µg/m³		X	Y	
CO	8-hr	500	130.30	26.1%	349393.50	3881466.00	1507.33
CO	1-hr	2000	179.95	9.0%	349400.70	3881475.20	1507.44
H_2S	1-hr	5	11.17	Significant	349376.00	3881561.80	1507.44
NO_2	Annual	1	7.02	Significant	349393.50	3881466.00	1507.33
NO_2	24-hr	5	51.06	Significant	349393.50	3881466.00	1507.33
NO_2	1-hr	7.52	104.32	Significant	349400.70	3881475.20	1507.44
$PM_{2.5}$	Annual	0.2	1.34	Significant	349393.50	3881466.00	1507.33
$PM_{2.5}$	24-hr	1.2	7.28	Significant	349393.50	3881466.00	1507.33
PM_{10}	Annual	1	1.34	Significant	349393.50	3881466.00	1507.33
PM_{10}	24-hr	5	8.26	Significant	349393.50	3881466.00	1507.33
SO_2	Annual	1	0.11	10.6%	349393.50	3881466.00	1507.33
SO_2	24-hr	5	0.65	13.1%	349393.50	3881466.00	1507.33
SO_2	3-hr	25	1.15	4.6%	349392.60	3881456.80	1507.24
SO_2	1-hr	7.8	1.29	16.5%	349400.70	3881475.20	1507.44

b) Table of Cumulative Concentrations

Table 16. Cumulative vs. Ambient Air Quality Standards

Pollutant	Averaging Period	Standard, µg/m³		Modeled, µg/m3		Background	Calculated	Percent of the Standard	
		NAAQS	NMAAQS	Facility	Facility & Neighbors*	µg/m³	µg/m³	NAAQS	NMAAQS
H_2S	1-hr	-	13.9	11.17	11.17	0	11.17	-	80%
NO_2	Annual	99.66	94.0	7.02	12.73	19.00	31.73	32%	34%
	1-hr	188.03	-	97.18	MAXDCONT	VARIES	MAXDCONT	<100%	-
$PM_{2.5}$	Annual	12	-	1.34	2.34	9.10	11.44	95%	-
	24-hr	35	-	5.09	5.99	23.00	28.99	83%	-
PM_{10}	Annual	-	-	-	-	-	-	-	-
	24-hr	150	-	7.87	23.41	45.00	68.41	46%	-

7. SUMMARY AND CONCLUSIONS

a) Modeling Statement

The submitted air dispersion modeling and report demonstrate compliance with the National and New Mexico Ambient Air Quality Standards. All requirements have been satisfied. There are no exceedances which would prohibit approval of the permit modification.

Mike Celente

From: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Sent: Tuesday, March 21, 2023 8:45 AM
To: Mike Celente
Cc: Lopez, Angela; Albrecht, Christopher P.; Tumpane, Kyle; Adam Erenstein; Garza, Margaret A; Mathews, Shan; Westra, Jeffrey J; Gonzales, Gustavo; Disha Gadre
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

Mike,

Your responses have clarified the confusion and resolved our concerns regarding the modeling of operations at the Albuquerque Asphalt Terminal. The application with modeling may be submitted as soon as you ready to do so.

Regards,

JEFF STONESIFER
senior environmental health scientist | environmental health department
o 505.767.5624
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cabq.gov/environmentalhealth/

From: Mike Celente <MCelente@trinityconsultants.com>
Sent: Friday, March 10, 2023 4:59 PM
To: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Cc: Lopez, Angela <angelalopez@cabq.gov>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>; Tumpane, Kyle <ktumpane@cabq.gov>; Adam Erenstein <AErenstein@trinityconsultants.com>; Garza, Margaret A <MGarza4@marathonpetroleum.com>; Mathews, Shan <JSMathews@marathonpetroleum.com>; Westra, Jeffrey J <JJWestra@marathonpetroleum.com>; Gonzales, Gustavo <Gustavo.Gonzales@Marathonpetroleum.com>; Disha Gadre <dgadre@trinityconsultants.com>
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

Hi Jeff,

Thank you for the comments, we are in the process of updating the modeling accordingly. Please see our responses below and let us know if you see any concerns with the path forward or have any additional questions.

Have a great weekend!
Mike

Michael Celente, M.S.
Managing Consultant

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9400 Holly Ave NE, Building 3, Suite B | Albuquerque, NM 87122
Email: mcelente@trinityconsultants.com

From: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Sent: Tuesday, February 28, 2023 2:33 PM
To: Mike Celente <MCelente@trinityconsultants.com>
Cc: Lopez, Angela <angelalopez@cabq.gov>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>; Tumpane, Kyle <ktumpane@cabq.gov>; Adam Erenstein <AErenstein@trinityconsultants.com>; Garza, Margaret A <MGarza4@marathonpetroleum.com>; Mathews, Shan <JSMathews@marathonpetroleum.com>; Westra, Jeffrey J <JJWestra@marathonpetroleum.com>; Gonzales, Gustavo <Gustavo.Gonzales@Marathonpetroleum.com>; Disha Gadre <dgadre@trinityconsultants.com>
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

Mike,

Comments on the report for Western Refining's AAT (which we treated as a protocol) are below. The protocol is approved with comments. For all sources where emission rates were calculated (as opposed to being measured with stack testing), be sure to include those calculations with the application. The application may be submitted as soon as you are ready to do so.

1. The Air Quality Program will soon be updating local modeling guidelines to require fenceline receptor spacing of 25 meters or less. Given the concerns of the San Jose neighborhood about air pollution, please include this change in the modeling for Western Refining's Albuquerque Asphalt Terminal.

   Fence line spacing will be updated to 25 m.

2. The previous application stated that tank #5 had a nominal capacity of 64,974 gallons. How is vapor displacement calculated when the offloading to the tank in an hour is assumed to be greater than the nominal capacity of the tank? In other words, can the displacement of vapors be properly calculated for a 64,974 gallon tank when the product offloading is 77,000 gallons/hr? Did you assume an offloading rate of 64,974 gallons per hour, then use a ratio to increase the vapor displacement emission rate for 77,000 gallons/hr of offloading?

   The 77,000 gal/hr rate assumed in the calculations is the maximum offloading rate for any of the tanks. It is true that the rate would result in a greater volume than the capacity of Tank #5, but this would not occur at the

facility due to tank gauges. As such, the 77,000 gal/hr rate results in emission calculations that are deliberately conservative such that the VOC and H2S emissions from Tank #5 are higher than what would be expected for the tank during maximum operation.

3. The first paragraph of section 4.a.ii of the modeling report states "offloading (from either railcar or truck) will occur into only one of the storage tanks at a time." Does the "from either" part mean truck offloading does not occur when railcar offloading is occurring?

   You are correct. Offloading into the tanks (asphalt actively pumped into the tanks) does not occur from railcar and truck simultaneously.

   The second paragraph of section 4.a.ii states "the higher rate (of offloading, i.e. railcar) was used in the conservative lb/hr product offloading calculations" as if trucks and railcars cannot unload at the same time.
   On the other hand, the fourth paragraph of section 4.a.ii states "although it is highly unlikely that all emission sources will be operating simultaneously, they are modeled as such to provide flexibility to the facility. In other words, the modeling includes trucks and railcars unloading at the same time.

   There are two different sources of emissions associated with product offloading. The first involves either truck or railcar hatches being opened, and the vapor space of these tankers being evacuated resulting in emissions. During steaming of the railcars, the hatches remain closed and are opened when offloaded to a tank. They are initially opened when the hatch bolts are loosened. A SOP was developed to ensure this protocol is followed. The second involves the product from either railcar or truck being pumped into the tanks. During this pumping, the railcars and trucks themselves are operating under a vacuum such that emissions are no longer vented from the hatches. However, the asphalt that is pumped into the tanks displaces vapors in the tanks, resulting in additional emissions. So the conservative assumption is that venting is occurring from all railcars and trucks (TL and UL volume sources), while simultaneously being pumped into the tanks at the higher of the two offloading rates (77,000 gal/hr for railcars and 25,200 gal/hr for the trucks). These emissions are represented at the tanks.

   If trucks and railcars can offload at the same time, then wouldn't the maximum amount received by a tank(s) have to include both the 77,000 gallons/hour from the railcars and the 25,200 gallons/hour from the trucks. This need to be clarified because if modeling or calculations assume that the operating tank receives only 77,000 gallons per hour, then there will be a permit condition that limits the amount of facility-wide offloading per hour to that amount. Would such an assumption conflict with the total offloaded amounts assumed for the TL and UL sources?

   Railcar offloading and truck offloading into tanks does not occur simultaneously (active pumping into tanks), although the railcars and trucks could have their hatches open and therefore venting the vapor space at the same time as explained in the previous response.

   It seems like offloading refers to both the TL and UL sources as well as displacement of vapors from the tanks. This is confusing. When clarifying this, please use a different source name for the displacement of vapors from tanks receiving product than the offloading.

   The UL and TL sources refer to the emissions from the vapor space in the tanks being routed to the atmosphere (these are represented as volume sources). When the material is actively offloaded into the facility, the actual emission point is from the tanks themselves as the vapor is displaced when the asphalt enters the tanks. As such, working and breathing emissions are accounted for at the tanks as are the emissions associated with product offloading into these tanks.

Regards,

JEFF STONESIFER
senior environmental health scientist | environmental health department
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cabq.gov/environmentalhealth/

From: Mike Celente <MCelente@trinityconsultants.com>
Sent: Monday, February 13, 2023 3:18 PM
To: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Cc: Lopez, Angela <angelalopez@cabq.gov>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>; Tumpane, Kyle <ktumpane@cabq.gov>; Adam Erenstein <AErenstein@trinityconsultants.com>; Garza, Margaret A <MGarza4@marathonpetroleum.com>; Mathews, Shan <JSMathews@marathonpetroleum.com>; Westra, Jeffrey J <JJWestra@marathonpetroleum.com>; Gonzales, Gustavo <Gustavo.Gonzales@Marathonpetroleum.com>; Disha Gadre <dgadre@trinityconsultants.com>
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

Hi Jeff,

Thanks for the quick response! We will be sure to incorporate your comments below in the final modeling.

Please find our draft modeling report attached. Note that the model results are not included as they are subject to change based on your comments below. Please do not hesitate to reach out should you have any questions or wish to discuss anything in more detail.

For planning purposes, is there a specific timeline we can expect for the modeling report review? Thanks again for agreeing to review the report in lieu of the protocol!

Best,
Mike

Michael Celente, M.S.
Managing Consultant

P 505.266.6611
9400 Holly Ave NE, Building 3, Suite B | Albuquerque, NM 87122
Email: mcelente@trinityconsultants.com

From: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Sent: Saturday, February 11, 2023 7:08 PM
To: Mike Celente <MCelente@trinityconsultants.com>
Cc: Lopez, Angela <angelalopez@cabq.gov>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>; Tumpane, Kyle <ktumpane@cabq.gov>; Adam Erenstein <AErenstein@trinityconsultants.com>
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

Mike,

>The stack height is listed as 0 ft, the velocity is 0.00328 ft/s, and the diameter is listed as 55.8 ft for all boiler vents/stacks from Coreslab. This seems a bit strange to me – can you confirm these parameters are accurate?
Yes, those are the correct parameters for modeling Coreslab's vents. Coreslab creates custom concrete structures on site, then truck the structures to construction sites. The structures are cured by suspending them above steam vents.

>We assigned an ISR of 0.2 for all boilers and 0.3 for the remaining sources, please confirm this is acceptable. All the boilers listed in the surrounding source data are natural gas boilers and 0.2 is acceptable as an ISR value. For other sources, 0.3 is acceptable due to distance for WR-AAT.

>Per the attached email, we are not including any PM surrounding sources (from any of the 7 surrounding sources) as we are proposing the South Valley monitors. Please confirm
US Transport is about the same distance from WR-AAT as the South Valley monitor is Kinney Brick is from the South Valley monitor. US Transport should be included in the cumulative PM models. The email you referred was only discussing 3 additional nearby sources: Pres Hospital, Coreslab, and Quikrete. Sorry for the confusion.

Regards,

JEFF STONESIFER
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From: Mike Celente <MCelente@trinityconsultants.com>
Sent: Thursday, February 9, 2023 1:46 PM
To: Lopez, Angela <angelalopez@cabq.gov>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>
Cc: Stonesifer, Jeff W. <JStonesifer@cabq.gov>
Subject: RE: Albuquerque Asphalt Terminal Previous Protocol Submittal and Approval

[EXTERNAL] Forward to phishing@cabq.gov and delete if an email causes any concern.

Great, thanks Angela.

Jeff, the table below includes the most up to date surrounding sources that we received in the attached email (dated 10/25/2022). Prior to submitting the report, I wanted to confirm the following:

- The stack height is listed as 0 ft, the velocity is 0.00328 ft/s, and the diameter is listed as 55.8 ft for all boiler vents/stacks from Coreslab. This seems a bit strange to me – can you confirm these parameters are accurate?
- We assigned an ISR of 0.2 for all boilers and 0.3 for the remaining sources, please confirm this is acceptable.
- Per the attached email, we are not including any PM surrounding sources (from any of the 7 surrounding sources) as we are proposing the South Valley monitors. Please confirm.

ID	Description	X Coordinate	Y Coordinate	Stack Height	Stack Temp
-	-	(m)	(m)	(ft)	(F)
B3	PHS NG Boiler Unit 3	350833.10	3883177.00	37.00	400.00
B4	PHS NG Boiler Unit 4	350835.90	3883176.60	37.00	400.00
B5	PHS NG Boiler Unit 5	350837.90	3883176.20	37.00	400.00
B6	PHS NG Boiler Unit 6	350849.20	3883175.40	37.00	400.00
COGEN	PHS New CoGen	350838.30	3883182.20	51.00	375.00
BED1_1	Boilers 1&4 vent/stack 1 (Units 16&19)	349151.00	3880324.00	0.00	400.00
BED1_2	Boilers 1&4 vent/stack 2 (Units 16&19)	349168.00	3880323.50	0.00	400.00
BED1_3	Boilers 1&4 vent/stack 3 (Units 16&19)	349185.00	3880323.00	0.00	400.00
BED1_4	Boilers 1&4 vent/stack 4 (Units 16&19)	349202.00	3880322.50	0.00	400.00
BED1_5	Boilers 1&4 vent/stack 5 (Units 16&19)	349219.00	3880322.00	0.00	400.00
BED1_6	Boilers 1&4 vent/stack 6 (Units 16&19)	349236.00	3880321.50	0.00	400.00
BED2_1	Boilers 5&6 vent/stack 1 (Units 20&21)	349197.00	3880130.00	0.00	400.00
BED2_2	Boilers 5&6 vent/stack 2 (Units 20&21)	349200.00	3880146.00	0.00	400.00
BED2_3	Boilers 5&6 vent/stack 3 (Units 20&21)	349203.00	3880162.00	0.00	400.00
BED2_4	Boilers 5&6 vent/stack 4 (Units 20&21)	349206.00	3880178.00	0.00	400.00
BED2_5	Boilers 5&6 vent/stack 5 (Units 20&21)	349209.00	3880194.00	0.00	400.00
BED2_6	Boilers 5&6 vent/stack 6 (Units 20&21)	349212.00	3880210.00	0.00	400.00
BED2_7	Boilers 5&6 vent/stack 7 (Units 20&21)	349215.00	3880226.00	0.00	400.00
BED2_8	Boilers 5&6 vent/stack 8 (Units 20&21)	349218.00	3880242.00	0.00	400.00
BED2_9	Boilers 5&6 vent/stack 9 (Units 20&21)	349221.00	3880258.00	0.00	400.00
BED2_10	Boilers 5&6 vent/stack 10 (Units 20&21)	349224.00	3880274.00	0.00	400.00
Q13	Drum Dryer with Baghouse (Unit 13)	349207.40	3880386.90	23.00	400.00

Mike Celente
Managing Consultant

P 505.266.6611 M 973.508.5215
Email: mcelente@trinityconsultants.com

From: Lopez, Angela <angelalopez@cabq.gov>
Sent: Thursday, February 9, 2023 12:23 PM
To: Mike Celente <MCelente@trinityconsultants.com>; Albrecht, Christopher P. <CAlbrecht@cabq.gov>

APPENDIX A. APPLICATION FORMS

Application for Air Pollutant Sources in Bernalillo County Construction Permits (20.11.41 NMAC) - Updated February 2022

Permit Application Checklist

Permit Application Review Fee Checklist

City of Albuquerque – Environmental Health Department
Air Quality Program

Please mail this application to **P.O. Box 1293, Albuquerque, NM 87103**
or hand deliver between 8:00 am – 5:00 pm Monday – Friday to:
3rd Floor, Suite 3023 – One Civic Plaza NW, Albuquerque, NM 87102
(505) 768-1972 aqd@cabq.gov

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

Submittal Date: April 24, 2023

Owner/Corporate Information ☐ **Check here and leave this section blank if information is exactly the same as Facility Information below.**

Company Name: **Western Refining Terminals, LLC**			
Mailing Address: **2030 Second Street SW**	City: **Albuquerque**	State: **NM**	Zip: **87102**
Company Phone: **(419) 421-2629**	Company Contact: **Angela S. Brown**		
Company Contact Title: **Vice President**	Phone: **(419) 421-2629**	E-mail: **asbrown@marathonpetroleum.com**	

Stationary Source (Facility) Information: **Provide a plot plan (legal description/drawing of the facility property) with overlay sketch of facility processes, location of emission points, pollutant type, and distances to property boundaries.**

Facility Name: **Albuquerque Asphalt Terminal**			
Facility Physical Address: **2020 Second Street SW**	City: **Albuquerque**	State: **NM**	Zip: **87102**
Facility Mailing Address (if different): **Same as above**	City:	State:	Zip:
Facility Contact: **Margaret A. Garza**	Title: **Advanced Environmental Specialist**		
Phone: **(602) 286-1517**	E-mail: **Mgarza4@marathonpetroleum.com**		
Authorized Representative Name[1]: **N/A**	Authorized Representative Title: **N/A**		

Billing Information ☒ **Check here if same contact and mailing address as corporate** ☐ **Check here if same as facility**

Billing Company Name:			
Mailing Address:	City:	State:	Zip:
Billing Contact:	Title:		
Phone:	E-mail:		

Preparer/Consultant(s) Information ☐ **Check here and leave section blank if no Consultant used or Preparer is same as Facility Contact.**

Name: **Michael Celente**	Title: **Managing Consultant**		
Mailing Address: **9400 Holly Ave NE, Building 3, Suite B**	City: **Albuquerque**	State: **NM**	Zip: **87122**
Phone: **(505) 266-6611**	Email: **mcelente@trinityconsultants.com**		

1. See 20.11.41.13(E)(13) NMAC.

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

General Operation Information (if any question does not pertain to your facility, type N/A on the line or in the box)

Permitting action being requested (please refer to the definitions in 20.11.40 NMAC or 20.11.41 NMAC):			
☐ New Permit	☒ Permit Modification Current Permit #: **0051-M1-3TR**	☐ Technical Permit Revision Current Permit #:	☐ Administrative Permit Revision Current Permit #:
☐ New Registration Certificate	☐ Modification Current Reg. #:	☐ Technical Revision Current Reg. #:	☐ Administrative Revision Current Reg. #:
UTM coordinates of facility (Zone 13, NAD 83): **349,317 m E, 3,881,541 m N**			
Facility type (*i.e.*, a description of your facility operations): **Asphalt Storage and Distribution Terminal**			
Standard Industrial Classification (SIC Code #): **2951**		North American Industry Classification System (NAICS Code #): **324121**	
Is this facility currently operating in Bernalillo County? **Yes**		If **YES**, list date of original construction: **01/01/1970** If **NO**, list date of planned startup: **N/A**	
Is the facility permanent? **Yes**		If **NO**, list dates for requested temporary operation: From **N/A** Through **N/A**	
Is the facility a portable stationary source? **No**		If **YES**, is the facility address listed above the main permitted location for this source? **N/A**	
Is the application for a physical or operational change, expansion, or reconstruction (*e.g.*, altering process, or adding, or replacing process or control equipment, etc.) to an existing facility? **Yes**			
Provide a description of the requested changes: **Removal of sixteen (16) tanks from permit. Addition of two (2) replacement tanks to permit. Removal of cutback asphalt as a facility product from the permit (cutback asphalt has higher emissions than regular asphalt). Transition individual tank throughput and emission limit to aggregate limit. Modifications and updates to descriptions and information regarding emission sources to better reflect facility operations including updated vapor expansion coefficient for tank calculations and updated stack test data for combustion units. Removal of rain caps and updates to heights for combustion unit stacks.**			
What is the facility's operation? ☒ Continuous ☐ Intermittent ☐ Batch			

Estimated percent of production/operation:	Jan-Mar: **25**	Apr-Jun: **25**	Jul-Sep: **25**	Oct-Dec: **25**
Requested operating times of facility:	**24** hours/day	**7** days/week	**4** weeks/month	**12** months/year

Will there be special or seasonal operating times other than shown above? This includes monthly- or seasonally-varying hours. **No**
If **YES**, please explain: **N/A**
List raw materials processed: **Asphalt**
List saleable item(s) produced: **Asphalt**

USE INSTRUCTIONS: For the forms on the following pages, please do not alter or delete the existing footnotes or page breaks. If additional footnotes are needed then add them to the end of the existing footnote list for a given table. Only update the rows and cells within tables as necessary for your project. Unused rows can be deleted from tables. If multiple scenarios will be represented then the Uncontrolled and Controlled Emission Tables, and other tables as needed, can be duplicated and adjusted to indicate the different scenarios.

Regulated Emission Sources Table

(*E.g.*, Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator-Haul Road-Storage Pile, etc.) Match the Units listed on this Table to the same numbered line if also listed on Emissions Tables & Stack Table.

Unit Number and Description[1]		Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date[2]	Process Rate or Capacity (Hp, kW, Btu, ft^3, lbs, tons, yd^3, etc.)[3]	Fuel Type
1	**Boiler**	**Aztec, Superior**	**5-X-1506**	**12237**	**1994**	**N/A**	**N/A**	**14 MMBTU/hr**	**Natural Gas**
2	**Boiler**	**Hurst**	**Series 400**	**S1545-200-1**	**1997**	**N/A**	**N/A**	**12 MMBTU/hr**	**Natural Gas**
3	**Hot Oil Heater**	**AZ Boiler**	**PX-120**	**15134**	**2015**	**N/A**	**N/A**	**14.7 MMBTU/hr**	**Natural Gas**
LR-1	**Loading Rack 1**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**46,820,000 gal/yr**	**N/A**
LR-2	**Loading Rack 2**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**46,820,000 gal/yr**	**N/A**
UL	**Railcar Unloading**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**9 Railcars/day**	**N/A**
TL	**Truck Offloading**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**4 Trucks/hr**	**N/A**
Tank #5	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1964**	**N/A**	**64,974 gal**	**N/A**
Tank #7	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1964**	**N/A**	**30,924 gal**	**N/A**
Tank #8	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1992**	**N/A**	**836,321 gal**	**N/A**
Tank #9	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1997**	**N/A**	**122,388 gal**	**N/A**
Tank #501	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1998**	**N/A**	**196,668 gal**	**N/A**
Tank #502	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**1998**	**N/A**	**219,018 gal**	**N/A**
Tank #503	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**TBD**	**N/A**	**259,056 gal**	**N/A**
Tank #504	**Asphalt Storage Tank**	**N/A**	**N/A**	**N/A**	**N/A**	**TBD**	**N/A**	**259,056 gal**	**N/A**

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
2. To determine whether a unit has been modified, evaluate if changes have been made to the unit that impact emissions or that trigger modification as defined in 20.11.41.7(U) NMAC. If not, put N/A.
3. Basis for Equipment Process Rate or Capacity (*e.g.*, Manufacturer's Data, Field Observation/Test, etc.) **MFG Data/Specifications**
   Submit information for each unit as an attachment.

Emissions Control Equipment Table

Control Equipment Units listed on this Table should either match up to the same Unit number as listed on the Regulated Emission Sources, Controlled Emissions and Stack Parameters Tables (if the control equipment is integrated with the emission unit) or should have a distinct Control Equipment Unit Number and that number should then also be listed on the Stack Parameters Table.

Control Equipment Unit Number and Description		Controlling Emissions for Unit Number(s)	Manufacturer	Model # | Serial #	Date Installed	Controlled Pollutant(s)	% Control Efficiency[1]	Method Used to Estimate Efficiency	Rated Process Rate or Capacity or Flow
APCD-1	**H_2S Scrubber**	**Tank-502**	**ACC, Ltd**	**ACC-350-DS-SS | 30721**	**09/2018**	**H_2S**	**90%***	**Manufacturer Specification Sheet**	**350 acfm**

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Basis for Control Equipment % Efficiency (*e.g.*, Manufacturer's Data, Field Observation/Test, AP-42, etc.). **MFG Specifications**
   Submit information for each unit as an attachment.

***NOTE: Although the facility has a scrubber, no control efficiency is claimed in the calculations or the modeling as a conservative measure. Tank-502 emissions are reported and modeled as uncontrolled.**

Exempted Sources and Exempted Activities Table

See 20.11.41 NMAC for exemptions.

Unit Number and Description		Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date[1]	Process Rate or Capacity (Hp, kW, Btu, ft^3, lbs, tons, yd^3, etc.)[2]	Fuel Type
N/A – There are no exempt sources at this facility.									
								/	
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NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. To determine whether a unit has been modified, evaluate if changes have been made to the unit that impact emissions or that trigger modification as defined in 20.11.41.7(U) NMAC. Also, consider if any changes that were made alter the status from exempt to non-exempt. If not, put N/A.
2. Basis for Equipment Process Rate or Capacity (*e.g.*, Manufacturer's Data, Field Observation/Test, etc.) **N/A**
   Submit information for each unit as an attachment.

Uncontrolled Emissions Table

(Process potential under physical/operational limitations during a 24 hr/day and 365 day/year = 8760 hrs)

Regulated Emission Units listed on this Table should match up to the same numbered line and Unit as listed on the Regulated Emissions and Controlled Tables. List total HAP values per Emission Unit if overall HAP total for the facility is ≥ 1 ton/yr.

Unit Number*	Nitrogen Oxides (NO_X)		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO_2)		Particulate Matter ≤ 10 Microns (PM_{10})		Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)		Hazardous Air Pollutants (HAPs)		Method(s) used for Determination of Emissions (AP-42, Material Balance, Field Tests, etc.)
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	
1	0.81	3.53	1.18	5.15	0.077	0.34	0.0084	0.037	0.11	0.47	0.11	0.47	0.026	0.12	**Stack Test Data & AP-42**
2	0.72	3.15	1.01	4.42	0.066	0.29	0.0072	0.032	0.091	0.40	0.091	0.40	0.023	0.099	**Stack Test Data & AP-42**
3	0.30	1.33	1.23	5.41	0.081	0.35	0.0088	0.039	0.11	0.49	0.11	0.49	0.028	0.12	**Stack Test Data & AP-42**
TANKS	-	-	-	-	12.06	3.67	-	-	-	-	-	-	-	-	**AP-42**
LR-1	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	**AP-42**
LR-2	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	**AP-42**
UL	-	-	-	-	3.81	0.70	-	-	-	-	-	-	-	-	**Ideal Gas Equation**
TL	-	-	-	-	0.0014	0.0013	-	-	-	-	-	-	-	-	**Ideal Gas Equation**
FUG	-	-	-	-	0.43	1.88	-	-	-	-	-	-	-	-	**EPA Protocol for Equipment Leak Emission Estimates**
Totals of Uncontrolled Emissions	**1.83**	**8.01**	**3.42**	**14.97**	**20.88**	**15.31**	**0.024**	**0.11**	**0.31**	**1.35**	**0.31**	**1.35**	**0.077**	**0.34**	

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

*A permit is required and this application along with the additional checklist information requested on the Permit Application checklist must be provided if:

(1) any one of these process units or combination of units, has an uncontrolled emission rate greater than or equal to (≥) 10 lbs/hr or 25 tons/yr for any of the above pollutants, excluding HAPs, based on 8,760 hours of operation; or

(2) any one of these process units or combination of units, has an uncontrolled emission rate ≥ 2 tons/yr for any single HAP or ≥ 5 tons/yr for any combination of HAPs based on 8,760 hours of operation; or

(3) any one of these process units or combination of units, has an uncontrolled emission rate ≥ 5 tons/yr for lead (Pb) or any combination of lead and its compounds based on 8,760 hours of operation; or

(4) any one of the process units or combination of units is subject to an Air Board or federal emission limit or standard.

* If all of these process units, individually and in combination, have an uncontrolled emission rate less than (<) 10 lbs/hr or 25 tons/yr for all of the above pollutants (based on 8,760 hours of operation), but > 1 ton/yr for any of the above pollutants, then a source registration is required. A Registration is required, at minimum, for any amount of HAP emissions. Please complete the remainder of this form.

Controlled Emissions Table

(Based on current operations with emission controls OR requested operations with emission controls)

Regulated Emission Units listed on this Table should match up to the same numbered line and Unit as listed on the Regulated Emissions and Uncontrolled Tables. List total HAP values per Emission Unit if overall HAP total for the facility ≥ 1 ton/yr.

Unit Number	Nitrogen Oxides (NO_x)		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO_2)		Particulate Matter ≤ 10 Microns (PM_{10})		Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)		Hazardous Air Pollutants (HAPs)		Control Method	% Efficiency[1]
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr		
1	0.81	3.53	1.18	5.15	0.077	0.34	0.0084	0.037	0.11	0.47	0.11	0.47	0.026	0.12	**N/A**	**N/A**
2	0.72	3.15	1.01	4.42	0.066	0.29	0.0072	0.032	0.091	0.40	0.091	0.40	0.023	0.099	**N/A**	**N/A**
3	0.30	1.33	1.23	5.41	0.081	0.35	0.0088	0.039	0.11	0.49	0.11	0.49	0.028	0.12	**N/A**	**N/A**
TANKS	-	-	-	-	12.06	3.67	-	-	-	-	-	-	-	-	**N/A**	**N/A**
LR-1	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	**N/A**	**N/A**
LR-2	-	-	-	-	2.17	4.04	-	-	-	-	-	-	-	-	**N/A**	**N/A**
UL	-	-	-	-	3.81	0.70	-	-	-	-	-	-	-	-	**N/A**	**N/A**
TL	-	-	-	-	0.0014	0.0013	-	-	-	-	-	-	-	-	**N/A**	**N/A**
FUG	-	-	-	-	0.43	1.88	-	-	-	-	-	-	-	-	**N/A**	**N/A**
Totals of Controlled Emissions	**1.83**	**8.01**	**3.42**	**14.97**	**20.88**	**15.31**	**0.024**	**0.11**	**0.31**	**1.35**	**0.31**	**1.35**	**0.077**	**0.34**		

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Basis for Control Method % Efficiency (*e.g.*, Manufacturer's Data, Field Observation/Test, AP-42, etc.). **N/A**
   Submit information for each unit as an attachment.

Hazardous Air Pollutants (HAPs) Emissions Table

Report the Potential Emission Rate for each HAP from each source on the Regulated Emission Sources Table that emits a given HAP. Report individual HAPs with ≥ 1 ton/yr total emissions for the facility on this table. Otherwise, report total HAP emissions for each source that emits HAPs and report individual HAPs in the accompanying application package in association with emission calculations. If this application is for a Registration solely due to HAP emissions, report the largest HAP emissions on this table and the rest, if any, in the accompanying application package.

Unit Number	Total HAPs															
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	**0.026**	**0.12**														
2	**0.023**	**0.099**														
3	**0.028**	**0.12**														
Totals of HAPs for all units:	**0.077**	**0.34**														

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

Use Instructions: Copy and paste the HAPs table here if need to list more individual HAPs.

Purchased Hazardous Air Pollutant Table*

Product Categories (Coatings, Solvents, Thinners, etc.)	Hazardous Air Pollutant (HAP), or Volatile Hazardous Air Pollutant (VHAP) Primary To The Representative As Purchased Product	Chemical Abstract Service (CAS) Number of HAP or VHAP from Representative As Purchased Product	HAP or VHAP Concentration of Representative As Purchased Product (pounds/gallon, or %)	Concentration Determination (CPDS, SDS, etc.)[1]	Total Product Purchases For Category	(-)	Quantity of Product Recovered & Disposed For Category	(=)	Total Product Usage For Category
N/A – No Purchased HAPs to include in this table.									
2.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
3.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
4.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
5.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
6.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
7.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
8.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
9.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
.					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr
TOTALS					lb/yr gal/yr	(-)	lb/yr gal/yr	(=)	lb/yr gal/yr

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

NOTE: Product purchases, recovery/disposal and usage should be converted to the units listed in this table. If units cannot be converted please contact the Air Quality Program prior to making changes to this table.

1. Submit, as an attachment, information on one (1) product from each Category listed above which best represents the average of all the products purchased in that Category. CPDS = Certified Product Data Sheet; SDS = Safety Data Sheet

*** A Registration is required, at minimum, for any amount of HAP or VHAP emission.**
Emissions from purchased HAP usage should be accounted for on previous tables as appropriate.
A permit may be required for these emissions if the source meets the requirements of 20.11.41 NMAC.

Material and Fuel Storage Table

(*E.g.*, Tanks, barrels, silos, stockpiles, etc.)

Storage Equipment		Product Stored	Capacity (bbls, tons, gals, acres, etc.)	Above or Below Ground	Construction (Welded, riveted) & Color	Installation Date	Loading Rate[1]	Offloading Rate[1]	True Vapor Pressure	Control Method	Seal Type	% Eff.[2]
5	**Tank**	**Asphalt**	**64,974 gal**	**Above**	**Welded, Silver Metallic**	**1964**	**46,820,000 gal/yr Combined Rate**		**0.04**	**N/A**	**N/A**	**N/A**
7	**Tank**	**Asphalt**	**30,924 gal**	**Above**	**Welded, Silver Metallic**	**1964**			**0.04**	**N/A**	**N/A**	**N/A**
8	**Tank**	**Asphalt**	**836,321 gal**	**Above**	**Welded, Silver Metallic**	**1992**			**0.04**	**N/A**	**N/A**	**N/A**
9	**Tank**	**Asphalt**	**122,388 gal**	**Above**	**Welded, Silver Metallic**	**1997**			**0.04**	**N/A**	**N/A**	**N/A**
501	**Tank**	**Asphalt**	**196,668 gal**	**Above**	**Welded, Silver Metallic**	**1998**			**0.04**	**N/A**	**N/A**	**N/A**
502	**Tank**	**Asphalt**	**219,018 gal**	**Above**	**Welded, Silver Metallic**	**1998**			**0.04**	**N/A**	**N/A**	**N/A**
503	**Tank**	**Asphalt**	**259,056 gal**	**Above**	**Welded, Silver Metallic**	**TBD**			**0.04**	**N/A**	**N/A**	**N/A**
504	**Tank**	**Asphalt**	**259,056 gal**	**Above**	**Welded, Silver Metallic**	**TBD**			**0.04**	**N/A**	**N/A**	**N/A**

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Basis for Loading/Offloading Rate (*e.g.*, Manufacturer's Data, Field Observation/Test, etc.). **Field Observation**
   Submit information for each unit as an attachment.
2. Basis for Control Method % Efficiency (*e.g.*, Manufacturer's Data, Field Observation/Test, AP-42, etc.). **N/A**
   Submit information for each unit as an attachment.

Stack Parameters Table

If any equipment from the Regulated Emission Sources Table is also listed in this Stack Table, use the same numbered line for the emission unit on both tables to show the association between the Process Equipment and its stack.

Unit Number and Description		Pollutant (CO, NOx, PM_{10}, etc.)	UTM Easting (m)	UTM Northing (m)	Stack Height (ft)	Stack Exit Temp. (°F)	Stack Velocity (fps)	Stack Flow Rate (acfm)	Stack Inside Diameter (ft)	Stack Type
1	Boiler	CO, NO_X, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAP	349,374	3,881,468	35	350.5 °F	24.1 fps	4352 acfm	1.96	Vertical
2	Boiler	CO, NO_X, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAP	349,380	3,881,469	35	391.6 °F	40.7 fps	5065 acfm	1.63	Vertical
3	Hot Oil Heater	CO, NO_X, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAP	349,386	3,881,461	26	368.4 °F	16.4 fps	2035 acfm	1.63	Vertical

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

Certification

NOTICE REGARDING SCOPE OF A PERMIT: The Environmental Health Department's issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant's/permittee's responsibility to obtain all other necessary permits from the appropriate agencies, such as the City of Albuquerque Planning Department or Bernalillo County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City of Albuquerque Planning Department website at https://www.cabq.gov/planning and the Bernalillo County Department of Planning and Development Services website at https://www.bernco.gov/planning.

NOTICE REGARDING ACCURACY OF INFORMATION AND DATA SUBMITTED: Any misrepresentation of a material fact in this application and its attachments is cause for denial of a permit or revocation of part or all of the resulting registration or permit, and revocation of a permit for cause may limit the permitee's ability to obtain any subsequent air quality permit for ten (10) years. Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained under the Air Quality Control Act, NMSA 1978 §§ 74-2-1 to 74-2-17, is guilty of a misdemeanor and shall, upon conviction, be punished by a fine of not more than ten thousand dollars ($10,000) per day per violation or by imprisonment for not more than twelve months, or by both.

I, the undersigned, hereby certify that I have knowledge of the information and data represented and submitted in this application and that the same is true and accurate, including the information and date in any and all attachments, including without limitation associated forms, materials, drawings, specifications, and other data. I also certify that the information represented gives a true and complete portrayal of the existing, modified existing, or planned new stationary source with respect to air pollution sources and control equipment. I understand that there may be significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. I also understand that the person who has applied for or has been issued an air quality permit by the Department is an obligatory party to a permit appeal filed pursuant to 20.11.81 NMAC. Further, I certify that I am qualified and authorized to file this application, to certify the truth and accuracy of the information herein, and bind the source. Moreover, I covenant and agree to comply with any requests by the Department for additional information necessary for the Department to evaluate or make a final decision regarding the application.

Signed this 19 day of April, 20 23

Angela Brown
Print Name

Vice President
Print Title

X Angela Brown
Signature

Role: [X] Owner [ ] Operator

[ ] Other Authorized Representative

City of Albuquerque
Environmental Health Department
Air Quality Program

Construction Permit (20.11.41 NMAC)
Application Checklist

This checklist must be returned with the application

Any person seeking a new air quality permit, a permit modification, or an emergency permit under 20.11.41 NMAC (Construction Permits) shall do so by filing a written application with the Albuquerque-Bernalillo County Joint Air Quality Program, which administers and enforces local air quality laws for the City of Albuquerque ("City") and Bernalillo County ("County"), on behalf of the City Environmental Health Department ("Department").

The Department will rule an application administratively incomplete if it is missing or has incorrect information. The Department may require additional information that is necessary to make a thorough review of an application, including but not limited to technical clarifications, emission calculations, emission factor usage, additional application review fees if any are required by 20.11.2 NMAC, and new or additional air dispersion modeling.

If the Department has ruled an application administratively incomplete three (3) times, the Department will deny the permit application. Any fees submitted for processing an application that has been denied will not be refunded. If the Department denies an application, a person may submit a new application and the fee required for a new application. The applicant has the burden of demonstrating that a permit should be issued.

The following are the minimum elements that shall be included in the permit application before the Department can determine whether an application is administratively complete and ready for technical review. It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.

At all times before the Department has made a final decision regarding the application, an applicant has a duty to promptly supplement and correct information the applicant has submitted in an application to the Department. The applicant's duty to supplement and correct the application includes but is not limited to relevant information acquired after the applicant has submitted the application and additional information the applicant otherwise determines is relevant to the application and the Department's review and decision. While the Department is processing an application, regardless of whether the Department has determined the application is administratively complete, if the Department determines that additional information is necessary to evaluate or make a final decision regarding the application, the Department may request additional information and the applicant shall provide the requested additional information.

NOTICE REGARDING PERMIT APPEALS: A person who has applied for or has been issued an air quality permit by the Department shall be an obligatory party to a permit appeal filed pursuant to 20.11.81 NMAC.

NOTICE REGARDING SCOPE OF A PERMIT: The Department's issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant's/permittee's responsibility to obtain all other necessary permits from the appropriate agencies, such as the City Planning Department or County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City Planning Department website at https://www.cabq.gov/planning and the County Department of Planning and Development Services website at https://www.bernco.gov/planning.

The Applicant shall:

20.11.41.13(A) NMAC – Pre-Application Requirements:

Item	Completed	NA[1]	Waived[2]
(1) Request a pre-application meeting with the Department using the pre-application meeting request form.	☒	☐	☐
(2) Attend the pre-application meeting. Date of Pre-application meeting: 5/11/2022 and 2/7/2023	☒	☐	☐

1. *Not Applicable*
2. *It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.*

20.11.41.13(B) NMAC – Applicant's Public Notice Requirements:

Item	Included in Application	NA[1]	Waived[2]
(1) Provide public notice in accordance with the regulation, including by certified mail or electronic copy to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.	☒	☐	☐
• Contact list of representative(s) of neighborhood associations and recognized coalitions cannot be more than three months old from the application submittal date.	☒	☐	☐
• Provide notice using the Notice of Intent to Construct form.	☒	☐	☐
(2) In accordance with the regulation, post and maintain in a visible location a weather proof sign provided by the Department.	☒	☐	☐

1. *Not Applicable; For emergency permits, the public notice requirements in 20.11.41.24 NMAC shall apply instead.*
2. *It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.*

The Permit Application shall include:

20.11.41.13(E) NMAC – Application Contents

Item	Included In Application	NA[1]	Waived[2]
(1) A complete permit application on the most recent form provided by the Department.	☒	☐	☐
(2) The application form includes:			
a. The owner's name, street and post office address, and contact information;	☒	☐	☐
b. The facility/ operator's name, street address and mailing address, if different from the owner;	☒	☐	☐
c. The consultant's name, and contact information, if applicable;	☒	☐	☐
d. All information requested on the application form is included (*i.e.*, the form is complete).	☒	☐	☐
(3) Date application is submitted.	☒	☐	☐
(4) Sufficient attachments for the following:			
a. Ambient impact analysis using an atmospheric dispersion model approved by the U.S. Environmental Protection Agency, and the Department to demonstrate compliance with the applicable ambient air quality standards. *See* 20.11.01 NMAC. If you are modifying an existing source, the modeling must include the	☒	☐	☐

Item	Included In Application	NA[1]	Waived[2]
emissions of the entire source to demonstrate the impact the new or modified source(s) will have on existing plant emissions.			
b. The air dispersion model has been executed pursuant to a protocol that was approved in advance by the Department.	☒	☐	☐
c. Air dispersion modeling approved protocol date: Submitted: 8/12/2022	☒	☐	☐
d. Basis or source for each emission rate (including manufacturer's specification sheet, AP-42 section sheets, test data, or corresponding supporting documentation for any other source used).	☒	☐	☐
e. All calculations used to estimate potential emission rates and controlled/proposed emissions.	☒	☐	☐
f. Basis for the estimated control efficiencies and sufficient engineering data for verification of the control equipment operation, including if necessary, design, drawing, test report and factors which affect the normal operation.	☒	☐	☐
g. Fuel data for each existing and/or proposed piece of fuel burning equipment.	☒	☐	☐
h. Anticipated maximum production capacity of the entire facility and the requested production capacity after construction and/or modification.	☒	☐	☐
i. Stack and exhaust gas parameters for all existing and proposed emission stacks.	☒	☐	☐
(5) An operational and maintenance strategy detailing:	☒	☐	☐
a. steps the applicant will take if a malfunction occurs that may cause emission of a regulated air contaminant to exceed a limit that is included in the permit;	☒	☐	☐
b. the nature of emission during routine startup or shutdown of the source and the source's air pollution control equipment; and	☒	☐	☐
c. the steps the application will take to minimize emissions during routine startup or shutdown.	☒	☐	☐
(6) A map, such as a 7.5'-topographic quadrangle map published by the U.S. Geological Survey or a map of equivalent or greater scale, detail, and precision, including a City or County zone atlas map that shows the proposed location of each process equipment unit involved in the proposed construction, modification, or operation of the source, as applicable.	☒	☐	☐
(7) An aerial photograph showing the proposed location of each process equipment unit involved in the proposed construction, modification, relocation or technical revision of the source except for federal agencies or departments involved in national defense or national security as confirmed and agreed by the Department in writing.	☒	☐	☐
(8) A complete description of all sources of regulated air contaminants and a process flow diagram depicting the process equipment unit or units at the facility, both existing and proposed, that are proposed to be involved in routine operations and from which regulated air contaminant emissions are expected to be emitted.	☒	☐	☐
(9) A full description of air pollution control equipment, including all calculations and the basis for all control efficiencies presented, manufacturer's specifications sheets, and site layout and assembly drawings; UTM (universal transverse mercator) coordinates shall be used to identify the location of each emission unit.	☒	☐	☐
(10) A description of the equipment or methods proposed by the applicant to be used for emission measurement.	☒	☐	☐
(11) The maximum and normal operating time schedules of the source after completion of construction or modification, as applicable.	☒	☐	☐
(12) Any other relevant information as the Department may reasonably require, including without limitation:	☒	☐	☐
a. Applicants shall provide documentary proof that the proposed air quality permitted use of the facility's subject property is allowed by the zoning designation of the City or County zoning laws, as applicable. Sufficient documentation includes: (i) a zoning certification from the City Planning Department or County Department of Planning and Development Services, as applicable, if the property is subject to City or County zoning jurisdiction; or (ii) a zoning verification from both planning	☒	☐	☐

Item	Included In Application	NA[1]	Waived[2]
departments if the property is not subject to City or County zoning jurisdiction.[3] A zone atlas map shall not be sufficient.			
(13) The signature of the applicant, operator, owner or an authorized representative, certifying to the accuracy of all information as represented in the application and attachments, if any.	☒	☐	☐
(14) A check or money order for the appropriate application fee or fees required by 20.11.2 NMAC (Fees).	☒	☐	☐

1. *Not Applicable*
2. *It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.*
3. *For emergency permit applications, applicants are not required to submit documentation for the subject property's zoning designation.*

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Review Fee Instructions

All source registration, authority-to-construct, and operating permit applications for stationary or portable sources shall be charged an application review fee according to the fee schedule in 20.11.2 NMAC. These filing fees are required for both new construction, reconstruction, and permit modifications applications. Qualified small businesses as defined in 20.11.2 NMAC may be eligible to pay one-half of the application review fees and 100% of all applicable federal program review fees.

Please fill out the permit application review fee checklist and submit with a check or money order payable to the "City of Albuquerque Fund 242" and either:

1. be delivered in person to the Albuquerque Environmental Health Department, 3rd floor, Suite 3023 or Suite 3027, Albuquerque-Bernalillo County Government Center, south building, One Civic Plaza NW, Albuquerque, NM or,

2. mailed to Attn: Air Quality Program, Albuquerque Environmental Health Department, P.O. Box 1293, Albuquerque, NM 87103.

The department will provide a receipt of payment to the applicant. The person delivering or filing a submittal shall attach a copy of the receipt of payment to the submittal as proof of payment Application review fees shall not be refunded without the written approval of the manager. If a refund is requested, a reasonable professional service fee to cover the costs of staff time involved in processing such requests shall be assessed. Please refer to 20.11.2 NMAC (effective January 10, 2011) for more detail concerning the "Fees" regulation as this checklist does not relieve the applicant from any applicable requirement of the regulation.

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Review Fee Checklist Effective January 1, 2023 – December 31, 2023

Please completely fill out the information in each section. Incompleteness of this checklist may result in the Albuquerque Environmental Health Department not accepting the application review fees. If you should have any questions concerning this checklist, please call 768-1972.

I. COMPANY INFORMATION:

Company Name	Western Refining Terminals, LLC	
Company Address	2030 Second St SW, Albuquerque, NM 87102	
Facility Name	Albuquerque Asphalt Terminal	
Facility Address	2030 Second St SW, Albuquerque, NM 87102	
Contact Person	Margaret A. Garza	
Contact Person Phone Number	(602) 286-1517	
Are these application review fees for an existing permitted source located within the City of Albuquerque or Bernalillo County?	**Yes**	
If yes, what is the permit number associated with this modification?	**Permit # 0051-M1-3TR**	
Is this application review fee for a Qualified Small Business as defined in 20.11.2 NMAC? (See Definition of Qualified Small Business on Page 4)		**No**

II. STATIONARY SOURCE APPLICATION REVIEW FEES:

If the application is for a new stationary source facility, please check all that apply. If this application is for a modification to an existing permit please see Section III.

Check All That Apply	Stationary Sources	Review Fee	Program Element
Air Quality Notifications			
	AQN New Application	$641.00	2801
	AQN Technical Amendment	$352.00	2802
	AQN Transfer of a Prior Authorization	$352.00	2803
X	*Not Applicable*	*See Sections Below*	
Stationary Source Review Fees (Not Based on Proposed Allowable Emission Rate)			
	Source Registration required by 20.11.40 NMAC	$ 657.00	2401
	A Stationary Source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$1,314.00	2301
X	*Not Applicable*	*See Sections Below*	
Stationary Source Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)			
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$986.00	2302
	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$1,971.00	2303
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$3,942.00	2304
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$5,913.00	2305
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$7,884.00	2306
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$9,855.00	2307
X	*Not Applicable*	*See Section Above*	

Federal Program Review Fees (In addition to the Stationary Source Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$1,314.00	2308
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$1,314.00	2309
	40 CFR 63 - (NESHAPs) Promulgated Standards	$1,314.00	2310
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$13,140.00	2311
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$6,570.00	2312
	20.11.60 NMAC, Non-Attainment Area Permit	$6,570.00	2313
X	*Not Applicable*	*Not Applicable*	

III. MODIFICATION TO EXISTING PERMIT APPLICATION REVIEW FEES:

If the permit application is for a modification to an existing permit, please check all that apply. If this application is for a new stationary source facility, please see Section II.

Check All That Apply	Modifications	Review Fee	Program Element
Modification Application Review Fees (Not Based on Proposed Allowable Emission Rate)			
	Proposed modification to an existing stationary source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$1,314	2321
X	*Not Applicable*	*See Sections Below*	
Modification Application Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)			
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$986.00	2322
X	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$1,971.00	2323
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$3,942.00	2324
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$5,913.00	2325
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$7,884.00	2326
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$9,855.00	2327
X	*Not Applicable*	*See Section Above*	
Major Modifications Review Fees (In addition to the Modification Application Review Fees above)			
	20.11.60 NMAC, Permitting in Non-Attainment Areas	$6,570	2333
	20.11.61 NMAC, Prevention of Significant Deterioration	$6,570	2334
X	*Not Applicable*	*Not Applicable*	
Federal Program Review Fees (This section applies only if a Federal Program Review is triggered by the proposed modification) (These fees are in addition to the Modification and Major Modification Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$1,314.00	2328
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$1,314.00	2329
	40 CFR 63 - (NESHAPs) Promulgated Standards	$1,314.00	2330
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$13,140.00	2331
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$6,570.00	2332
	20.11.60 NMAC, Non-Attainment Area Permit	$6,570.00	2333
X	*Not Applicable*	*Not Applicable*	

IV. ADMINISTRATIVE AND TECHNICAL REVISION APPLICATION REVIEW FEES:

If the permit application is for an administrative or technical revision of an existing permit issued pursuant to 20.11.41 NMAC, please check one that applies.

Check One	Revision Type	Review Fee	Program Element
	Administrative Revisions	$ 250.00	2340
	Technical Revisions	$ 500.00	2341
X	*Not Applicable*	*See Sections II, III or V*	

V. PORTABLE STATIONARY SOURCE RELOCATION FEES:

If the permit application is for a portable stationary source relocation of an existing permit, please check one that applies.

Check One	Portable Stationary Source Relocation Type	Review Fee	Program Element
	No New Air Dispersion Modeling Required	$ 500.00	2501
	New Air Dispersion Modeling Required	$ 750.00	2502
X	*Not Applicable*	*See Sections II, III or V*	

VI. Please submit a check or money order in the amount shown for the total application review fee.

Section Totals	Review Fee Amount
Section II Total	$
Section III Total	$1,971.00
Section IV Total	$
Section V Total	$
Total Application Review Fee	**$ 1,971.00**

I, the undersigned, a responsible official of the applicant company, certify that to the best of my knowledge, the information stated on this checklist, give a true and complete representation of the permit application review fees which are being submitted. I also understand that an incorrect submittal of permit application reviews may cause an incompleteness determination of the submitted permit application and that the balance of the appropriate permit application review fees shall be paid in full prior to further processing of the application.

Signed this 19 **day of** April **20** 23

Angela Brown
Print Name

Vice President
Print Title

X Angela Brown
Signature

Definition of Qualified Small Business as defined in 20.11.2 NMAC:
"Qualified small business" means a business that meets all of the following requirements:

(1) a business that has 100 or fewer employees;
(2) a small business concern as defined by the federal Small Business Act;
(3) a source that emits less than 50 tons per year of any individual regulated air pollutant, or less than 75 tons per year of all regulated air pollutants combined; and
(4) a source that is not a major source or major stationary source.

Note: Beginning January 1, 2011, and every January 1 thereafter, an increase based on the consumer price index shall be added to the application review fees. The application review fees established in Subsection A through D of 20.11.2.18 NMAC shall be adjusted by an amount equal to the increase in the consumer price index for the immediately-preceding year. Application review fee adjustments equal to or greater than fifty cents ($0.50) shall be rounded up to the next highest whole dollar. Application review fee adjustments totaling less than fifty cents ($0.50) shall be rounded down to the next lowest whole dollar. The department shall post the application review fees on the city of Albuquerque environmental health department air quality program website.

APPENDIX B. PRE-PERMIT APPLICATION MEETING

Pre-Permit Application Meeting Request Form

Pre-Permit Application Meeting Checklist

Pre-Permit Application Meeting Request Form

Air Quality Program- Environmental Health Department

Please complete appropriate boxes and email to aqd@cabq.gov or mail to:

Environmental Health Department
Air Quality Program
P.O. Box 1293
Room 3047
Albuquerque, NM 87103

Name:	**Albuquerque Asphalt Terminal**
Company/Organization:	Western Refining Terminals, LLC (Western)
Point of Contact: **(phone number and email):** **Preferred form of contact (circle one):** Phone E-mail ☑	Margaret Garza, Environmental Professional Phone: (602) 286-1517 Email: MGarza4@marathonpetroleum.com Michael Celente, Senior Consultant Phone: (505) 266-6611 Email: mcelente@trinityconsultants.com
Preferred meeting date/times:	As soon as practicable for the Environmental Health Department (EHD) Air Quality Program.
Description of Project:	Western intends to submit a new permit modification application to address the questions and calculation methodology regarding H_2S modeling noted in EHD's March 21, 2022 letter entitled: "Permit Application Denial Construction Permit Application #0051-M2". The application will include updated H_2S calculations and modeling based on real-world operations to demonstrate compliance with the New Mexico Ambient Air Quality Standard (NMAAQS). Additionally, as part of this permit modification, Western plans to address the following: - Removal of 13 asphalt tanks; - Transition of per tank throughput to a facility-wide aggregate limit (gal/yr); - Updated calculation methodology for asphalt tanks; - Addition of one (1) 5,000 bbl asphalt tank;

	- Transition tanks and loading racks that handled cutback asphalt to asphalt; - Addition of fugitive, railcar unloading, and truck offloading emissions to the permit; - Update combustion unit emissions to be based on stack test data; - Modifications to stack parameters for combustion units (including removal of rain caps and increasing stack heights) Lastly, in April 2020, Western submitted an administrative revision to Construction Permit 0051-M1-3TR to incorporate minor revisions including: updating the responsible official; updating the facility name to include Western Refining Terminals, LLC; removal of former storage tanks from permit; and permit condition revisions as applicable. A redline permit was included as part of that submittal. These revisions are requested to be included in the updated facility permit.

City of Albuquerque

Environmental Health Department
Air Quality Program

Pre-Permit Application Meeting Checklist

Any person seeking a permit under 20.11.41 NMAC, Authority-to-Construct Permits, shall do so by filing a written application with the Department. Prior to submitting an application, the applicant shall contact the department in writing and request a pre-application meeting for information regarding the contents of the application and the application process. This checklist is provided to aid the applicant and **a copy must be submitted with the application.**

Applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

Name: Albuquerque Asphalt Terminal
Contact: Margaret Garza (Western), Michael Celente (Trinity)
Company/Business: Western Refining Terminals, LLC

☑ Fill out and submit a Pre-Permit Application Meeting Request form
⇒ Available online at http://www.cabq.gov/airquality

☑ Emission Factors and Control Efficiencies
Notes: AP-42, Stack Testing, MFG Specifications

☑ Air Dispersion modeling guidelines and protocol
Notes: Required for all pollutants and averaging periods.

☑ Department Policies
Notes:

☑ Air quality permit fees
Notes:

City of Albuquerque- Environmental Health Department
Air Quality Program- Permitting Section
Phone: (505) 768-1972 Email: aqd@cabq.gov

☑ Public notice requirements

- ☑ Replacement Part 41 Implementation
  - ☑ *20.11.41*.13 B. Applicant's public notice requirements
    - ☑ Providing public notice to neighborhood association/coalitions
      - Neighborhood association: Barelas Neighborhood Association, San Jose Neighborhood Association, and South Broadway Neighborhood Association
      - Coalition: South Valley Alliance of Neighborhood Associations, South Valley Coalition of Neighborhood Associations, South West Alliance of Neighborhoods (SWAN Coalition), Westside Coalition of Neighborhood Associations

        Notes: N/A

    - ☑ Posting and maintaining a weather-proof sign

      Notes:

☑ Regulatory timelines

- 30 days to rule application complete
- 90 days to issue completed permit
- Additional time allotted if there is significant public interest and/or a significant air quality issue
  - Public Information Hearing
  - Complex permitting action

Notes:

City of Albuquerque- Environmental Health Department
Air Quality Program- Permitting Section
Phone: (505) 768-1972 Email: aqd@cabq.gov

APPENDIX C. PUBLIC NOTICE REQUIREMENTS

Notice of Intent (NOI) to Construct

Notice of Intent Cover Letter

Email and Certified Mail Documentation of NOI Sent to Neighborhood Associations and Coalitions

Public Notice Sign Guidelines

Pictures of Posted Public Notice Sign

NOTICE FROM THE APPLICANT

Notice of Intent to Apply for Air Quality Construction Permit

You are receiving this notice because the New Mexico Air Quality Control Act (20.11.41.13B NMAC) requires any owner/operator proposing to construct or modify a facility subject to air quality regulations to provide public notice by certified mail or electronic mail to designated representatives of recognized neighborhood associations and coalitions within 0.5-mile of the property on which the source is or is proposed to be located.

This notice indicates that the owner/operator intends to apply for an Air Quality Construction Permit from the Albuquerque – Bernalillo County Joint Air Quality Program. Currently, no application for this proposed project has been submitted to the Air Quality Program. Applicants are required to include a copy of this form and documentation of mailed notices with their Air Quality Construction Permit Application.

Proposed Project Information

Applicant's name and address:
Nombre y domicilio del solicitante: Albuquerque Asphalt Terminal, 2030 2nd Street SW, Albuquerque, NM 87102

Owner / operator's name and address:
Nombre y domicilio del propietario u operador: Western Refining Terminals, LLC, 2030 2nd Street SW, Albuquerque, NM 87102

Contact for comments and inquires:
Datos actuales para comentarios y preguntas:

Name *(Nombre)*: Brad Shafer
Address *(Domicilio)*: 2030 2nd Street SW, Albuquerque, NM 87102
Phone Number *(Número Telefónico)*: (801) 244-9452
E-mail Address *(Correo Electrónico)*: bcshafer@marathonpetroleum.com

Actual or estimated date the application will be submitted to the department:
Fecha actual o estimada en que se entregará la solicitud al departamento: March 28, 2023

Description of the source:
Descripción de la fuente: Asphalt Terminal

Exact location of the source or proposed source:
Ubicación exacta de la fuente o fuente propuesta: 2030 2nd Street SW, Albuquerque, NM 87102

Nature of business:
Tipo de negocio: Asphalt Storage and Distribution

Process or change for which the permit is requested:
Proceso o cambio para el cuál de solicita el permiso: Removal of sixteen (16) tanks from permit. Addition of two (2) replacement tanks to permit. Removal of cutback asphalt as a facility product from the permit (cutback asphalt has higher emissions than regular asphalt).Transition individual tank throughput and emission limit to aggregate limit. Modifications and updates to descriptions and information regarding emission sources to better reflect facility operations including updated vapor expansion coefficient for tank calculations and updated stack test data for combustion units. Removal of rain caps and updates to heights for combustion unit stacks.

Maximum operating schedule:
Horario máximo de operaciones: 24/7/365

Normal operating schedule:
Horario normal de operaciones: 24/7/365

Preliminary estimate of the maximum quantities of each regulated air contaminant the source will emit:
Estimación preliminar de las cantidades máximas de cada contaminante de aire regulado que la fuente va a emitir:

Air Contaminant *Contaminante de aire*	**Proposed Construction Permit** *Permiso de Construcción Propuesto*		**Net Changes (for permit modification or technical revision)** *Cambio Neto de Emisiones (para modificación de permiso o revisión técnica)*	
	pounds per hour *libras por hora*	tons per year *toneladas por año*	pounds per hour *libras por hora*	tons per year *toneladas por año*
NO_x	1.83	8.01	-1.01	-4.42
CO	3.42	14.97	+0.96	+4.23
VOC	20.88	15.31	N/A	+3.46
SO_2	0.024	0.11	-0.0056	-0.0030
PM_{10}	0.31	1.35	0.00	0.00
$PM_{2.5}$	0.31	1.35	0.00	0.00
HAP	0.077	0.34	N/A	N/A
H2S	0.013	0.0063	N/A	-0.013

NOTE:"N/A" refers to pollutants that do not have current permitted values to compare to, whereas "0.00" is used when there is no change in emissions.

Questions or comments regarding this Notice of Intent should be directed to the Applicant. Contact information is provided with the Proposed Project Information on the first page of this notice. To check the status of an Air Quality Construction Permit application, call 311 and provide the Applicant's information, or visit www.cabq.gov/airquality/air-quality-permits.

The Air Quality Program will issue a Public Notice announcing a 30-day public comment period on the permit application for the proposed project when the application is deemed complete. The Air Quality Program does not process or issue notices on applications that are deemed incomplete. More information about the air quality permitting process is attached to this notice.

Air Quality Construction Permitting Overview

This is the typical process to obtain an Air Quality Construction Permit for Synthetic Minor and Minor sources of air pollution from the Albuquerque – Bernalillo County Joint Air Quality Program.

Step 1: Pre-application Meeting: The Applicant and their consultant must request a meeting with the Air Quality Program to discuss the proposed action. If air dispersion modeling is required, Air Quality Program staff discuss the modeling protocol with the Applicant to ensure that all proposed emissions are considered.

> **Notice of Intent from the Applicant:** Before submitting their application, the Applicant is required to notify all nearby neighborhood associations and interested parties that they intend to apply for an air quality permit or modify an existing permit. The Applicant is also required to post a notice sign at the facility location.

Step 2: Administrative Completeness Review and Preliminary Technical Review: The Air Quality Program has 30 days from the day the permit is received to review the permit application to be sure that it is administratively complete. This means that all application forms must be signed and filled out properly, and that all relevant technical information needed to evaluate any proposed impacts is included. If the application is not complete, the permit reviewer will return the application and request more information from the Applicant. Applicants have three opportunities to submit an administratively complete application with all relevant technical information.

> **Public Notice from the Department:** When the application is deemed complete, the Department will issue a Public Notice announcing a 30-day public comment period on the permit application. This notice is distributed to the same nearby neighborhood associations and interested parties that the Applicant sent notices to, and published on the Air Quality Program's website.
>
> During this 30-day comment period, individuals have the opportunity to submit written comments expressing their concerns or support for the proposed project, and/or to request a Public Information Hearing. If approved by the Environmental Health Department Director, Public Information Hearings are held after the technical analysis is complete and the permit has been drafted.

Step 3: Technical Analysis and Draft Permit: Air Quality Program staff review all elements of the proposed operation related to air quality, and review outputs from advanced air dispersion modeling software that considers existing emission levels in the area surrounding the proposed project, emission levels from the proposed project, and meteorological data. The total calculated level of emissions is compared to state and federal air quality standards and informs the decision on whether to approve or deny the Applicant's permit.

Draft Permit: The permit will establish emission limits, standards, monitoring, recordkeeping, and reporting requirements. The draft permit undergoes an internal peer review process to determine if the emissions were properly evaluated, permit limits are appropriate and enforceable, and the permit is clear, concise, and consistent.

> **Public Notice from the Department:** When the technical analysis is complete and the permit has been drafted, the Department will issue a second Public Notice announcing a 30-day public comment period on the technical analysis and draft permit. This second Public Notice, along with the technical analysis documentation and draft permit, will be published on the Air Quality Program's website, and the public notice for availability of the technical analysis and draft permit will only be directly sent to those who requested further information during the first comment period.

During this second 30-day comment period, residents have another opportunity to submit written comments expressing their concerns or support for the proposed project, and/or to request a Public Information Hearing.

Possible Public Information Hearing: The Environmental Health Department Director may decide to hold a Public Information Hearing for a permit application if there is significant public interest and a significant air quality issue. If a Public Information Hearing is held, it will occur after the technical analysis is complete and the permit has been drafted.

Step 4: Public Comment Evaluation and Response: The Air Quality Program evaluates all public comments received during the two 30-day public comment periods and Public Information Hearing, if held, and updates the technical analysis and draft permit as appropriate. The Air Quality Program prepares a response document to address the public comments received, and when a final decision is made on the permit application, the comment response document is published on the Air Quality Program's website and distributed to the individuals who participated in the permit process. If no comments are received, a response document is not prepared.

Step 5: Final Decision on the Application: After public comments are addressed and the final technical review is completed, the Environmental Health Department makes a final decision on the application. If the permit application meets all applicable requirements set forth by the New Mexico Air Quality Control Act and the federal Clean Air Act, the permit is approved. If the permit application does not meet all applicable requirements, it is denied.

Notifications of the final decision on the permit application and the availability of the comment response document is published on the Air Quality Program's website and distributed to the individuals who participated in the permit process.

The Department must approve a permit application if the proposed action will meet all applicable requirements and if it demonstrates that it will not result in an exceedance of ambient air quality standards. Permit writers are very careful to ensure that estimated emissions have been appropriately identified or quantified and that the emission data used are acceptable.

The Department must deny a permit application if it is deemed incomplete three times, if the proposed action will not meet applicable requirements, if estimated emissions have not been appropriately identified or quantified, or if the emission data are not acceptable for technical reasons.

For more information about air quality permitting, visit www.cabq.gov/airquality/air-quality-permits

Mike Celente

From: Mike Celente
Sent: Monday, April 24, 2023 10:58 AM
To: 'liberty.c.bell@icloud.com'; 'lisa@swop.net'; 'bacadeanna@gmail.com'; 'sjnase@gmail.com'; 'tiffany.hb10@gmail.com'; 'fparmijo@gmail.com'; 'snjart@yahoo.com'; 'zoecon@unm.edu'; 'rttrujil22@gmail.com'; 'dpatriciod@gmail.com'; 'eschman@unm.edu'; 'luis@wccdg.org'; 'jgallegoswccdg@gmail.com'; 'elizabethkayhaley@gmail.com'; 'aboard111@gmail.com'
Cc: 'Lopez, Angela'; 'Albrecht, Christopher P.'
Subject: Public Notice of Proposed Air Quality Construction Permit Application - Western Refining Terminals - Albuquerque Asphalt Terminal
Attachments: Notice_of_Intent_to_Construct_Western_Albuquerque_Asphalt_Terminal 2023 0424.pdf

SUBJECT: Public Notice of Proposed Air Quality Construction Permit Application

Dear Neighborhood Association/Coalition Representative(s),

Why did I receive this public notice?
You are receiving this notice in accordance with New Mexico Administrative Code (NMAC) 20.11.41.13.B(1) which requires any applicant seeking an Air Quality Construction Permit pursuant to 20.11.41 NMAC to provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.

What is the Air Quality Permit application review process?
The City of Albuquerque, Environmental Health Department, Air Quality Program (Program) is responsible for the review and issuance of Air Quality Permits for any stationary source of air contaminants within Bernalillo County. Once the application is received, the Program reviews each application and rules it either complete or incomplete. Complete applications will then go through a 30-day public comment period. Within 90 days after the Program has ruled the application complete, the Program shall issue the permit, issue the permit subject to conditions, or deny the requested permit or permit modification. The Program shall hold a Public Information Hearing pursuant to 20.11.41.15 NMAC if the Director determines there is significant public interest and a significant air quality issue is involved.

What do I need to know about this proposed application?

Applicant Name	WESTERN REFINING TERMINALS, LLC
Site or Facility Name	ALBUQUERQUE ASPHALT TERMINAL
Site or Facility Address	2030 2ND ST SW, ALBUQUERQUE, NM 87102
New or Existing Source	EXISTING
Anticipated Date of Application Submittal	APRIL 24, 2023
Summary of Proposed Source to Be Permitted	Removal of sixteen (16) tanks from permit. Addition of two (2) replacement tanks to permit. Removal of cutback asphalt as a facility product from the permit (cutback asphalt has higher emissions than regular asphalt).Transition individual tank throughput and emission limit to aggregate limit. Modifications and updates to descriptions and information regarding emission sources to better reflect facility operations including updated vapor expansion coefficient for tank calculations and updated stack test data for combustion units. Removal of rain caps and updates to heights for combustion unit stacks.

What emission limits and operating schedule are being requested?
See attached Notice of Intent to Construct form for this information.

How do I get additional information regarding this proposed application?
For inquiries regarding the proposed source, contact:

- BRAD SHAFER
- BCSHAFER@MARATHONPETROLEUM.COM

- (801) 244-9452

For inquiries regarding the air quality permitting process, contact:
- City of Albuquerque Environmental Health Department Air Quality Program
- aqd@cabq.gov
- (505) 768-1972

Michael Celente, M.S.
Managing Consultant

P 505.266.6611
9400 Holly Ave NE, Building 3, Suite B | Albuquerque, NM 87122
Email: mcelente@trinityconsultants.com

Timothy M. Keller,
Mayor

Public Participation

List of Neighborhood Associations
and Neighborhood Coalitions
MEMORANDUM

To: Mike Celente, Trinity Consultants
From: Angela Lopez, Environmental Health-Air Quality Permitting Manager
Subject: Determination of Neighborhood Associations and Coalitions within 0.5 mile of 2030 2nd Street SW in Bernalillo County, NM
Date: March 27, 2023

DETERMINATION:

On March 27, 2023, I used the City of Albuquerque Zoning Advanced Map Viewer (http://coagisweb.cabq.gov/) to verify which City of Albuquerque Neighborhood Associations (NA), Homeowner Associations (HOA) and Neighborhood Coalitions (NC) are located within 0.5 mile of 2030 2nd Street SW in Bernalillo County, NM.

I then used the City of Albuquerque Office (COA) of Neighborhood Coordination's Monthly Master NA List dated March 2023 and the Bernalillo County (BC) Monthly Neighborhood Association March 2023 Excel file to determine the contact information for each NA and NC located within 0.5 mile of 2030 2nd Street SW in Bernalillo County, NM.

The table below contains the contact information, which will be used in the City of Albuquerque Environmental Health Department's public notice. Duplicates have been deleted.

COA/BC Association or Coalition	Name	Email or Mailing Address*
Barelas Neighborhood Association	Courtney Bell Lisa Padilla	liberty.c.bell@icloud.com lisa@swop.net
San Jose Neighborhood Association	Deanna Barela Olivia Greathouse	bacadeanna@gmail.com sjnase@gmail.com
South Broadway Neighborhood Association	Tiffany Broadous Frances Armijo	tiffany.hb10@gmail.com fparmijo@gmail.com
South Valley Alliance	Sara Newton Juarez Zoe Economou	snjart@yahoo.com zoecon@unm.edu
South Valley Coalition of Neighborhood Association	Robert Trujillo Patricio Dominguez Peter Eschman	rttrujil22@gmail.com dpatriciod@gmail.com eschman@unm.edu
Southwest West Alliance of Neighborhood Association	Luis Hernandez Jerry Gallegos	luis@wccdg.org jgallegoswccdg@gmail.com
Westside Coalition of Neighborhood Association	Elizabeth Haley Rene Horvath	elizabethkayhaley@gmail.com aboard111@gmail.com

If email address is not listed, provide public notice via certified mail and include a copy of each mail receipt with the application submittal.

City of Albuquerque

Environmental Health Department
Air Quality Program

Public Notice Sign Guidelines

Any person seeking a permit under 20.11.41 NMAC, Authority-to-Construct Permits, shall do so by filing a written application with the Department. *Prior to submitting an application, the applicant shall post and maintain a weather-proof sign provided by the department. The applicant shall keep the sign posted until the department takes final action on the permit application; if an applicant can establish to the department's satisfaction that the applicant is prohibited by law from posting, at either location required, the department may waive the posting requirement and may impose different notification requirements.* **A copy of this form must be submitted with your application.**

Applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

Name: Albuquerque Asphalt Terminal
Contact: Margaret Garza (Western), Michael Celente (Trinity Consultants)
Company/Business: Western Refining Terminals, LLC

☑ The sign must be posted at the more visible of either the proposed or existing facility entrance (or, if approved in advance and in writing by the department, at another location on the property that is accessible to the public)

- ☑ The sign shall be installed and maintained in a condition such that members of the public can easily view, access, and read the sign at all times.
- ☑ The lower edge of the sign board should be mounted a minimum of 2' above the existing ground surface to facilitate ease of viewing

☑ Attach a picture of the completed, properly posted sign to this document

☐ ☐ **Check here if the department has waived the sign posting requirement.**
Alternative public notice details:

City of Albuquerque- Environmental Health Department
Air Quality Program- Permitting Section
Phone: (505) 768-1972 Email: aqd@cabq.gov

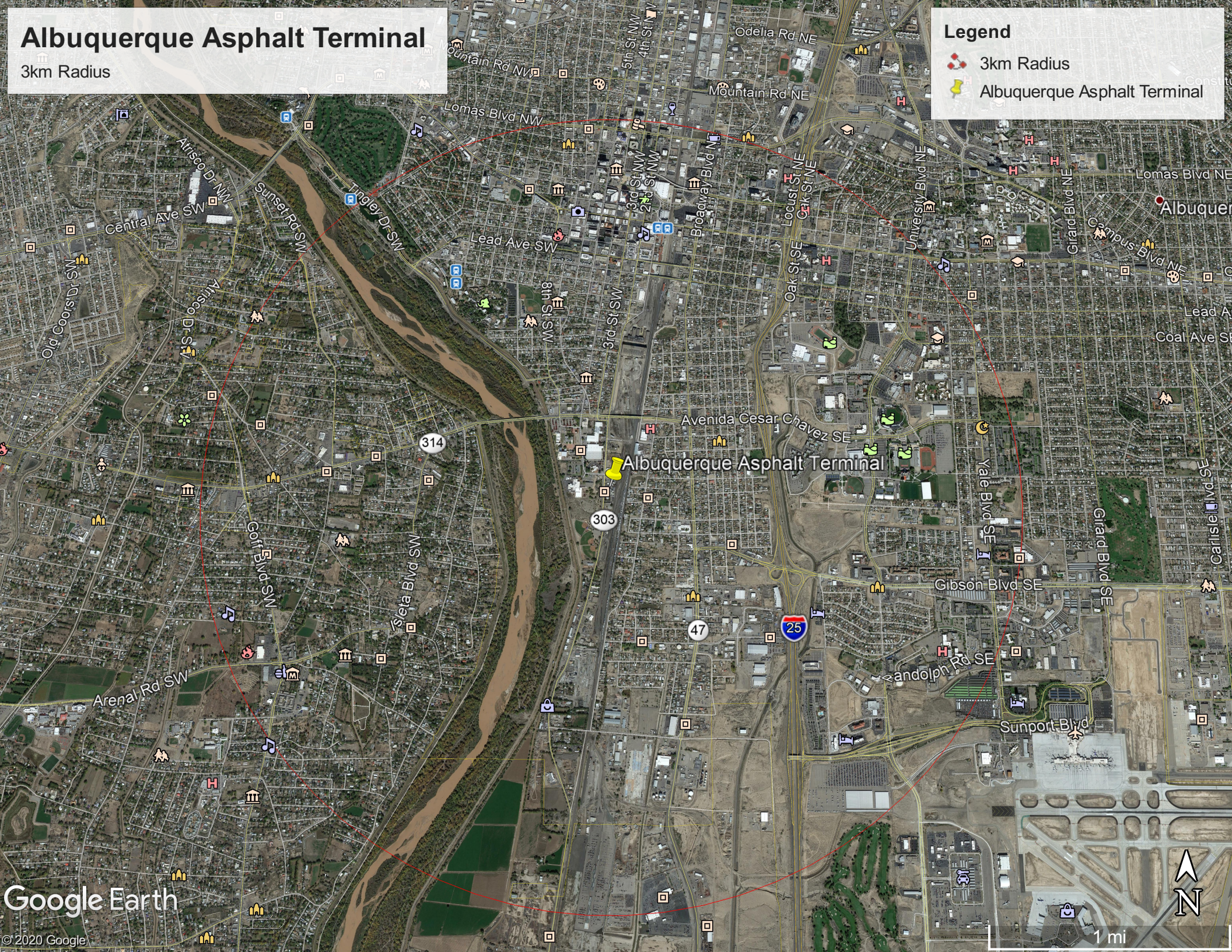

NOTICE
ACCESS TO THIS FACILITY IS LIMITED TO AUTHORIZED PERSONNEL ONLY.
ILLEGAL DRUGS, UNAUTHORIZED ALCOHOL, WEAPONS AND FIREARMS ARE PROHIBITED ON COMPANY PROPERTY INCLUDING PARKING LOTS.
THE COMPANY RESERVES THE RIGHT TO CONDUCT SEARCHES AND INSPECTIONS OF ALL PERSONS, PERSONAL PROPERTY, AND VEHICLES ENTERING, ON OR LEAVING COMPANY PREMISES OR OTHERWISE ENGAGED IN COMPANY BUSINESS WITHOUT FURTHER NOTICE.
SMOKING IS PROHIBITED EXCEPT IN DESIGNATED AREAS.
PHOTOGRAPHING OR OTHERWISE RECORDING THIS FACILITY OR ITS OPERATIONS IS PROHIBITED WITHOUT WRITTEN CONSENT FROM THE COMPANY.
ALL PERSONS AND VEHICLES ENGAGED IN COMPANY BUSINESS OR ENTERING, ON OR LEAVING COMPANY PROPERTY ARE SUBJECT TO THESE POLICIES.
ANY PERSON FOUND OR SUSPECTED TO BE IN VIOLATION OF ANY COMPANY POLICY OR ANY APPLICABLE LAW OF THIS JURISDICTION MAY BE REMOVED AND BARRED FROM COMPANY PROPERTY, SUBJECTED TO DISCIPLINARY ACTION, INCLUDING DISCHARGE AND REFERRED TO LAW ENFORCEMENT OFFICIALS.
THIS PROPERTY IS SUBJECT TO VIDEO MONITORING AND RECORDING AS PERMITTED BY LAW. EACH PERSON WHO ENTERS ONTO COMPANY PROPERTY OR ENGAGES IN COMPANY BUSINESS MAY BE SUBJECT TO SUCH VIDEO MONITORING AND RECORDING.
TO REPORT AN INCIDENT CALL
1-877-MAPLINE (1-877-627-5463)

APPENDIX D. FACILITY LOCATION AND AERIAL PHOTOGRAPH

Appendix Figure D-1: Facility Location

Appendix Figure D-2: Aerial Photograph of Process Locations

Appendix Figure D-1. Facility Location


Albuquerque Asphalt Terminal
3km Radius
Legend
3km Radius
Albuquerque Asphalt Terminal
Albuquerque Asphalt Terminal
Avenida Cesar Chavez SE
Lead Ave SW
Central Ave SW
Mountain Rd NW
Mountain Rd NE
Odelia Rd NE
Lomas Blvd NW
Lomas Blvd NE
Tingley Dr SW
Sunset Rd SW
Atrisco Dr NW
Old Coors Dr SW
Atrisco Dr SW
8th St SW
3rd St SW
5th St NW
4th St NW
3rd St NW
2nd St NW
Broadway Blvd NE
Locust St NE
Oak St NE
Oak St SE
University Blvd NE
Girard Blvd NE
Campus Blvd NE
Yale Blvd SE
Girard Blvd SE
Carlisle Blvd SE
Gibson Blvd SE
Randolph Rd SE
Sunport Blvd
Goff Blvd SW
Isleta Blvd SW
Arenal Rd SW
314
303
47
25
Google Earth
© 2020 Google
1 mi
N

Appendix Figure D-2. Aerial Photograph of Process Locations

LEGEND:

- POWER POLE
- LIGHT/POLE
- FIRE HYDRANT
- SPILL RESPONSE KIT
- TRANSFORMER

0 20' 40'

1"=20'-0"

REMOVE 2' CONTAINMENT WALL

32'-10"

503

502

504

57

9

5

10'

10'

18'-2½"

7

6

66

15'

501

PPA ADDITIVE TANK

HOT OIL HEATER

HURST BOILER

SUPERIOR BOILER

OFFLOAD AREA

CANOPY

TRUCK UNLOADING PUMPS

SCALE OFFICE

SCALE

LOADING RACK

SCALE

SHED

SHED

LABORATORY

SHED

28'-4½"

OFFICE

8

SECOND STREET SW

DRAWING PHASE

REV	DATE	MOC #	PROJECT ID#	REVISION DESCRIPTION	DESIGNER	APPROVER
-						

ALBUQUERQUE, NM - ASPHALT

ALBUQUERQUE, NM

CORE SITE DIAGRAM
NEW TANKS 503 & 504

SCALE	1 = 20'-0"
DATE	4/5/2022
DGNR.	A. MONTGOMERY
APRVR.	A. HOLMAN
PROJ. ID	-
	-
-	-

DISC. DRAWING NO.

P 5660-01080-01-FRP


ALBUQUERQUE ASPHALT TERMINAL
Legend
AAT Fence Line
2nd St SW
BLDG_8
BLDG_9
BLDG_6
BLDG_5
BLDG_3
BLDG_2
BLDG_7
BLDG_4
BLDG_1
303
BLDG_10
Smith Ave SE
Abilene
N
400 ft
Google Earth
© 2021 Google

APPENDIX E. ZONING REQUIREMENTS

City of Albuquerque
Environmental Health Department
Air Quality Program

Construction Permit (20.11.41 NMAC)
Zoning Requirement Cover Letter

This Cover Letter Must Be Returned With The Application Along With All Required Attachments

The Albuquerque-Bernalillo County Joint Air Quality Program, which administers and enforces local air quality laws for the City of Albuquerque ("City") and Bernalillo County ("County"), on behalf of the City Environmental Health Department ("Department").

Any person seeking a new air quality permit or a permit modification under 20.11.41 NMAC (Construction Permits) shall provide documentary proof that the proposed air quality permitted use of the facility's subject property is allowed by the zoning designation of the City or County zoning laws, as applicable. Sufficient documentation may include (i) a zoning certification from the City Planning Department or County Department of Planning and Development Services, as applicable, if the applicant is subject to City or County zoning jurisdiction; or (ii) a zoning verification from both planning departments if the applicant is not subject to City or County zoning jurisdiction. A zone atlas map shall not be sufficient. At this time, applicants are not required to submit documentation for the subject property's zoning designation when applying for an emergency permit, a new portable stationary source, a relocation of a portable stationary source, or a technical or administrative revision to an existing permit.

The Department will rule an application administratively incomplete if it is missing or has incorrect information. If the Department has ruled an application administratively incomplete three (3) times, the Department will deny the permit application. Any fees submitted for processing an application that has been denied will not be refunded. If the Department denies an application, a person may submit a new application and the fee required for a new application. The applicant has the burden of demonstrating that a permit should be issued.

The Department may require additional information that is necessary to make a thorough review of an application. At all times before the Department has made a final decision regarding the application, an applicant has a duty to promptly supplement and correct information the applicant has submitted in an application to the Department. The applicant's duty to supplement and correct the application includes, but is not limited to, relevant information acquired after the applicant has submitted the application and additional information the applicant otherwise determines is relevant to the application and the Department's review and decision. While the Department is processing an application, regardless of whether the Department has determined the application is administratively complete, if the Department determines that additional information is necessary to evaluate or make a final decision regarding the application, the Department may request additional information and the applicant shall provide the requested additional information.

NOTICE REGARDING SCOPE OF A PERMIT: The Department's issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant's/permittee's responsibility to obtain all other necessary permits from the appropriate agencies, such as the City Planning Department or County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City Planning Department website at https://www.cabq.gov/planning and the County Department of Planning and Development Services website at https://www.bernco.gov/planning.

Corporate and Facility Information: This information shall match the information in the permit application**.**

Air Quality Permit Applicant Company Name: **Western Refining Terminals, LLC**			
Facility Name: **Albuquerque Asphalt Terminal**			
Facility Physical Address: **2030 2nd Street SW**	City: **Albuquerque**	State: **NM**	Zip: **87102**
Facility Legal Description: **TR A-1 LANDS OF CHEVRON USA (EING A REPLAT OF TR A LANDS OFCHEVRON USA & TR 238-A) CONT 2.9334 AC M/L OR 127,778 SQ FTM/L**			

General Operation Information: This information shall match the information in the permit application.

Permitting action being requested (please refer to the definitions in 20.11.41 NMAC):
☐ New Permit ☒ Permit Modification, Current Permit #: **#0051-M1-3TR**

Attachment Information: The location information provided to the City Planning Department or County Department of Planning and Development Services, as applicable, and reflected in the zoning certification or verifications, as applicable, shall be the same as the Facility location information provided to the Department in the air quality construction permit application.

☒ Zoning Certification Provided by: **City Planning** *This is a use-specific certification.* **City Planning Form**: https://www.cabq.gov/planning/code-enforcement-zoning **County Planning Form**: https://www.bernco.gov/planning/planning-and-land-use/applications-forms/	☐ City Zoning Verification ☐ County Zoning Verification **City Planning Form**: https://www.cabq.gov/planning/code-enforcement-zoning **County Planning Form**: https://www.bernco.gov/planning/planning-and-land-use/applications-forms/

CITY OF ALBUQUERQUE

CODE ENFORCEMENT
Plaza Del Sol Building, Suite 500
600 2nd Street NW
Albuquerque, NM 87102
Tel: (505) 924-3850 Fax: (505) 924-3847

Date: November 17, 2022

VIA asbrown@marathonpetroleum.com
Western Refining Terminals LLC
Angela S. Brown
539 South main St,
Terminals HES&S
Findlay, OH 45840

RE: 2030 2ND ST SW, ALBUQUERQUE NM 87102,
UPC: 101405615322030905- the "property."

To Whom It May Concern:

This letter will certify that according to the map on file in this office on November 17, 2022, the referenced property, legally described as TR A-1 LANDS OF CHEVRON USA (EING A REPLAT OF TR A LANDS OFCHEVRON USA & TR 238-A) CONT 2.9334 AC M/L OR 127,778 SQ FTM/L, Albuquerque, Bernalillo County, New Mexico, is Zoned: NON-RESIDENTIAL – GENERAL MANUFACTURING ZONE DISTRICT (NR-GM.)

The current use of the property is for Light Manufacturing, a permissive use in this Zone.

This property has been inspected and it was found to be in compliance with the applicable provisions of the Integrated Development Ordinance. The property is within the Railroad and Spur Area and the Site Design and Sensitive Lands Area. The property is NOT governed by an on file Site Development Plan.

If you have any questions regarding this matter please contact me at (505) 924-3301 or by email at ametzgar@cabq.gov.

Sincerely:

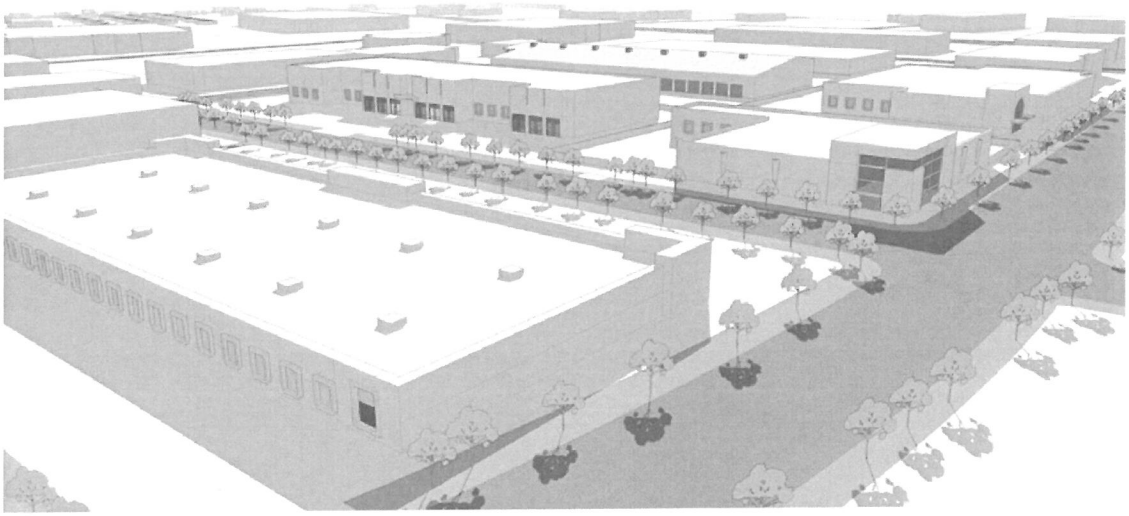
Angelo Metzgar,
Code Compliance Manager, Code Enforcement, Planning Department

PO Box 1293
Albuquerque
NM 87103
www.cabq.gov

2-5(D) NON-RESIDENTIAL – GENERAL MANUFACTURING ZONE DISTRICT (NR-GM)

2-5(D)(1) Purpose

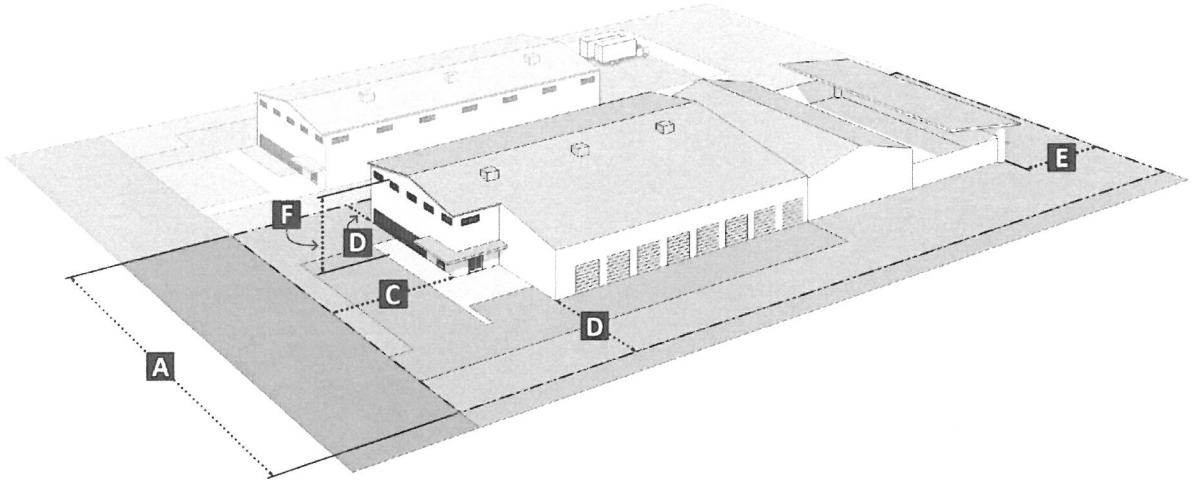
The purpose of the NR-GM zone district is to accommodate a wide variety of industrial, manufacturing, and heavy commercial uses, particularly those with noise, glare, or heavy traffic impacts, in areas separated from Residential and Mixed-use areas and less intense, lighter impact businesses. Allowable uses are shown in Table 4-2-1.



2-5(D)(2) Use and Development Standards

Table 2-5-7: NR-GM Zone District Dimensional Standards Summary *See Table 5-1-3 for complete Dimensional Standards*		
Site Standards		
A	Lot width, minimum	N/A
B	Building coverage, maximum	N/A
Setback Standards		
C	Front, minimum	5 ft.
D	Side, minimum	0 ft.
E	Rear, minimum	0 ft.
Building Height		
F	Building height, maximum	65 ft. >100 ft. from front lot line: N/A

Table 2-5-8: Other Applicable IDO Sections	
Overlay Zones	Part 14-16-3
Allowable Uses	14-16-4-2
Use-specific Standards	14-16-4-3
Dimensional Standards	14-16-5-1
Site Design and Sensitive Lands	14-16-5-2
Access and Connectivity	14-16-5-3
Subdivision of Land	14-16-5-4
Parking and Loading	14-16-5-5
Landscaping, Buffering, and Screening	14-16-5-6
Walls and Fences	14-16-5-7
Outdoor and Site Lighting	14-16-5-8
Neighborhood Edges	14-16-5-9
Solar Access	14-16-5-10
Building Design	14-16-5-11
Signs	14-16-5-12
Operation and Maintenance	14-16-5-13



2-5(D)(3) District Standards

None.

4-2 ALLOWABLE USES

Table 4-2-1: Allowable Uses
P = Permissive Primary C = Conditional Primary A = Permissive Accessory CA = Conditional Accessory
CV = Conditional if Structure Vacant for 5+ years T = Temporary CT = Conditional Temporary
Blank Cell = Not Allowed

Zone District >> / Land Uses	Residential						Mixed-use				Non-residential								Use-specific Standards
	R-A	R-1	R-MC	R-T	R-ML	R-MH	MX-T	MX-L	MX-M	MX-H	NR-C	NR-BP	NR-LM	NR-GM	NR-SU	NR-PO A	NR-PO B	NR-PO C	
PRIMARY USES THAT MAY BE ACCESSORY IN SOME ZONE DISTRICTS																			
RESIDENTIAL USES																			
Household Living																			
Dwelling, single-family detached	P	P	P	P	P		P												4-3(B)(1)
Dwelling, mobile home			P																4-3(B)(2)
Dwelling, cluster development	P	P		P	P		P												4-3(B)(3)
Dwelling, cottage development	P	P	P	P	P		P												4-3(B)(4)
Dwelling, two-family detached (duplex)		P		P	P		P												4-3(B)(5)
Dwelling, townhouse				P	P	P	P	P	P	P									4-3(B)(6)
Dwelling, live-work				C	C	P	P	P	P	P	CA	CA							4-3(B)(7)
Dwelling, multi-family					P	P	P	P	P	P									4-3(B)(8)
Group Living																			
Assisted living facility or nursing home				C	P	P	P	P	P	P									
Community residential facility, small	P	P		P	P	P	P	P	P	P									4-3(B)(9)
Community residential facility, large					P	P	P	P	P	P									4-3(B)(9)
Dormitory						P	C	P	P	P									
Group home, small					C	P	P	P	P										4-3(B)(10)
Group home, medium					C	C	C	P	P	P									4-3(B)(10)
Group home, large						C			C	C									4-3(B)(10)
CIVIC AND INSTITUTIONAL USES																			
Adult or child day care facility			C	C	C	P	P	P	P	P	P	P	A	A					
BioPark																P (in D)			4-3(C)(7)
Cemetery															P				
Community center or library	C	P		P	P	P	P	P	P	P	C	C	C	C		P		C	4-3(C)(1)
Correctional facility															P				
Elementary or middle school	C	C		C	P	P	P	P	P	P	P	P	CV			P		C	4-3(C)(2)
Fire or police station															P				
High school	C	C		C	C	P	P	P	P	P	P	P	C			P			4-3(C)(3)
Hospital									P	P	P	P							4-3(C)(4)
Museum				CV	CV	C	P	P	P	P	P	P	P	P		P	A		4-3(C)(5)
Overnight shelter									C	C	C	C	C	C					4-3(C)(6)
Parks and open space	P	P		P	P	P	P	P	P	P	P	P	C	C	A	P	P	P	4-3(C)(7)
Religious institution	P	P		P	P	P	P	P	P	P	P	P	CV	CV					4-3(C)(8)
Sports field							CV	C	P	P	P	P	P	C		P		C	

Table 4-2-1: Allowable Uses
P = Permissive Primary C = Conditional Primary A = Permissive Accessory CA = Conditional Accessory
CV = Conditional if Structure Vacant for 5+ years T = Temporary CT = Conditional Temporary
Blank Cell = Not Allowed

Zone District >> / Land Uses	Residential						Mixed-use				Non-residential								Use-specific Standards
	R-A	R-1	R-MC	R-T	R-ML	R-MH	MX-T	MX-L	MX-M	MX-H	NR-C	NR-BP	NR-LM	NR-GM	NR-SU	NR-PO A	NR-PO B	NR-PO C	
University or college						CV	CV	C	P	P	P	P	CV	CV					
Vocational school						CV	P	P	P	P	P	P	P	P					
COMMERCIAL USES																			
Agriculture and Animal-related																			
Community garden	P	P	P	P	P	P	P	P	P	P	P	P	C	C		A	A	A	4-3(D)(1)
Equestrian facility	P																P	C	4-3(D)(2)
General agriculture	P											C	P	P			P	A	4-3(D)(3)
Kennel	C							C	C		P	P	P	P					4-3(D)(4)
Nursery	P								A		P	P	P	P		A	A		
Veterinary hospital	C						C	P	P	P	P	P	P	P					4-3(D)(5)
Other pet services	C						C	P	P	P	P	P	P	P					
Food, Beverage, and Indoor Entertainment																			
Adult entertainment												P	P	P					4-3(D)(6)
Auditorium or theater						A	A	A	P	P	P	P	P	P					4-3(D)(7)
Bar							C	C	P	P	P	P	P	P					4-3(D)(8)
Catering service									P	P	P	P	P	P					
Health club or gym			A		A	A	P	P	P	P	P	P	P	A					4-3(D)(9)
Mobile food truck court							C	P	P	P	P	P	P	C					4-3(D)(10)
Nightclub									P	P	P	P	P						4-3(D)(8)
Residential community amenity, indoor	P	P	P	P	P	P	P	P	P	P								C	4-3(D)(11)
Restaurant							C	P	P	P	P	P	P	P					4-3(D)(8)
Tap room or tasting room							C	C	P	P	P	P	P	P					4-3(D)(8)
Other indoor entertainment							C	P	P	P	P	P	P	P		P		C	4-3(D)(12)
Lodging																			
Bed and breakfast	A	CA		A	A	P	P												4-3(D)(13)
Campground or recreational vehicle park									C		P	P					A	C	4-3(D)(14)
Hotel or motel							P	P	P	P	P	P	P	P					4-3(D)(15)
Motor Vehicle-related																			
Car wash								P	P	P	P	P	P	P					4-3(D)(16)
Heavy vehicle and equipment sales, rental, fueling, and repair											P	C	P	P					4-3(D)(17)
Light vehicle fueling station								C	P	P	P	P	P	P					4-3(D)(18)
Light vehicle repair								P	P	P	P	P	P	P					4-3(D)(19)
Light vehicle sales and rental								C	P	P	P	P	P	P					4-3(D)(20)
Outdoor vehicle storage											C	C	P	P			A		4-3(D)(21)
Paid parking lot			A		A	A	C	P	P	A	P	P	P	P	A	A	A		4-3(D)(22)
Parking structure			A		A	A	CA	P	P	P	P	P	P	P	A				4-3(D)(22)
Offices and Services																			
Bank							P	P	P	P	P	P	P	CV					4-3(D)(23)

Table 4-2-1: Allowable Uses

P = Permissive Primary C = Conditional Primary A = Permissive Accessory CA = Conditional Accessory
CV = Conditional if Structure Vacant for 5+ years T = Temporary CT = Conditional Temporary
Blank Cell = Not Allowed

Zone District >> / Land Uses	Residential						Mixed-use				Non-residential								Use-specific Standards
	R-A	R-1	R-MC	R-T	R-ML	R-MH	MX-T	MX-L	MX-M	MX-H	NR-C	NR-BP	NR-LM	NR-GM	NR-SU	NR-PO A	NR-PO B	NR-PO C	
Blood services facility									C	C	C	P	P	P					
Club or event facility							C	P	P	P	P	P	P	CV		P	P	C	4-3(D)(24)
Commercial services								P	P	P	P	P	P	P					
Construction contractor facility and yard										C	P	P	P	P					4-3(D)(25)
Crematorium															P				
Medical or dental clinic							P	P	P	P	P	P	P	P					4-3(D)(26)
Mortuary								C	P	P	P	P	C		A				
Office							P	P	P	P	P	P	P	P					
Personal and business services, small							P	P	P	P	P	P	P	P					4-3(D)(27)
Personal and business services, large									P	P	P	P	P	P					4-3(D)(27)
Research or testing facility							P	P	P	P	P	P	P	P					4-3(D)(28)
Self-storage								C	C	P	P	P	P	P			A		4-3(D)(29)
Outdoor Recreation and Entertainment																			
Amphitheater										C	C	C	C	C	A	P	A	C	
Balloon Fiesta Park events and activities																P			4-3(D)(30)
Drive-in theater									C	C	C	C	C						4-3(D)(31)
Fairgrounds															P				
Residential community amenity, outdoor	P	P	P	P	P	P	P	P	P	P								A	
Stadium or racetrack															P	P			
Other outdoor entertainment	CA	CA	CA	CA	CA	CA	A	A	A	A	P	P	P	A		P		P	4-3(D)(32)
Retail Sales																			
Adult retail										P		P	P	P					4-3(D)(6)
Art gallery	CV	CV	C	P	P	P	P	P	P	P	P		P	A					4-3(D)(33)
Bakery goods or confectionery shop							C	P	P	P	P	P	P	P					
Building and home improvement materials store									C	C	P	P	P	C					4-3(D)(34)
Cannabis retail							P	P	P	P	P	P	A	A					4-3(D)(35)
Farmers' market	T		T	T	T	T	T	P	P	P	P	P	CV	CV		P	A	CA	4-3(D)(36)
General retail, small			A			A	P	P	P	P	P	P	P	P					4-3(D)(37)
General retail, medium									P	P	P	C	C						4-3(D)(37)
General retail, large									C	C	P	P							4-3(D)(37)
Grocery store								P	P	P	P		P	P					4-3(D)(38)
Liquor retail							C	A	C	C	C	C	C	C					4-3(D)(39)
Nicotine retail							CA	A	C	C	C	C	C	C					4-3(D)(40)
Pawn shop								C	P	P	P	P	P	P					4-3(D)(41)

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Transportation																			
Airport															P				4-3(D)(42)
Freight terminal or dispatch center												C	P	P					4-3(D)(43)
Helipad									CA	CA	A	P	P	P	A				4-3(D)(44)
Park-and-ride lot						C	C	C	P	C	C	P	C	C	A	A			4-3(D)(45)
Railroad yard												C	P	P					4-3(D)(46)
Transit facility						C	C	C	P	P	P	P	P	P					4-3(D)(47)
INDUSTRIAL USES																			
Manufacturing, Fabrication, and Assembly																			
Artisan manufacturing							C	P	P	P	P	P	P	P					4-3(E)(1)
Cannabis cultivation							C	P	P	P	P	P	P	P					4-3(E)(2)
Cannabis-derived products manufacturing							C	P	P	P	P	P	P	P					4-3(E)(3)
Light manufacturing										A	P	P	P	P					4-3(E)(4)
Heavy manufacturing														P					4-3(E)(5)
Natural resource extraction															P				4-3(E)(6)
Special manufacturing														C					4-3(E)(7)
Telecommunications, Towers, and Utilities																			
Drainage facility	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	C	
Electric utility	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	4-3(E)(8)
Geothermal energy generation	A	A	A	A	A	A	A	A	A	A	A	P	P	P		A	A		4-3(E)(9)
Major utility, other	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	A	A	
Solar energy generation	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	4-3(E)(10)
Wind energy generation							A	A	A	A	A	A	A	C	A	A	A		4-3(E)(11)
Wireless Telecommunications Facility (WTF)																			
Architecturally integrated	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
Non-commercial or broadcasting antenna	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
Collocation	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			4-3(E)(12)
Freestanding							P	P	P	P	P	P	P	P	A				
Public utility collocation	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
Roof-mounted			A		A	A	A	A	A	A	A	A	A	A	A				
Small cell	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Waste and Recycling																			
Recycling drop-off bin facility						A	A	A	A	A	P	P	P	P					4-3(E)(13)
Solid waste convenience center															P				4-3(E)(14)
Salvage yard												C	C	P					4-3(E)(15)
Waste and/or recycling transfer station															P				4-3(E)(16)
Wholesaling and Storage																			

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Above-ground storage of fuels or feed													C	P					
Outdoor storage								CA	C	C	C	A	P	P					4-3(E)(17)
Warehousing									C	C	P	P	P	P					4-3(E)(18)
Wholesaling and distribution center									C	C	P	P	P	P					4-3(E)(19)
ACCESSORY AND TEMPORARY USES																			
ACCESSORY USES																			**4-3(F)(1)**
Agriculture sales stand	A	A	A	A	A	A	A	A	A	A	A	A	CA	CA			A		4-3(F)(2)
Animal keeping	A	A	A	A	A	A	A	A	A	A	A	A	A	A				CA	4-3(F)(3)
Automated Teller Machine (ATM)			A		A	A	A	A	A	A	A	A	A	A		T	T		
Drive-through or drive-up facility								A	A	CA	A	A	A						4-3(F)(4)
Dwelling unit, accessory with kitchen		A		A	A	A	A	A	A		A	A	A	A	A		A		4-3(F)(5)
Dwelling unit, accessory without kitchen	CA	A		A	A	A	A	A	A		A	A	A	A	A		A		4-3(F)(5)
Family care facility	A	A	A	A	A	A	A	A	A	A									4-3(F)(6)
Family home day care	CA	CA	CA	CA	A	A	A												4-3(F)(7)
Garden	A	A	A	A	A	A	A	A	A	A	A	A	A				A		
Hobby breeder	A	A	A	A															4-3(F)(8)
Home occupation	A	A	A	A	A	A	A	A	A	A									4-3(F)(9)
Independent living facility				A	A	A	A	A	A	A									4-3(F)(10)
Mobile food truck	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			4-3(F)(11)
Mobile vending cart							A	A	A	A	A	A	A	A		A		A	4-3(F)(12)
Outdoor animal run	A							CA	CA		CA		A	A					4-3(F)(13)
Outdoor dining area							CA	A	A	A	A	A	A	A	A				4-3(F)(14)
Second kitchen in a dwelling	A	A	A	A	A	A	A												4-3(F)(15)
Other use accessory to non-residential primary use							A	A	A	A	A	A	A	A	A			A	4-3(F)(16)
Other use accessory to residential primary use	A	A	A	A	A	A	A	A	A	A									4-3(F)(17)
TEMPORARY USES																			
Temporary Uses That Require A Permit																			
Circus									T		T	T	T						4-3(G)(1)
Construction staging area, trailer, or office	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		4-3(G)(2)
Dwelling, temporary	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		4-3(G)(3)
Fair, festival, or theatrical performance	T	T	T	T	T	T	T	T	T	T	T	T			T	T	T		4-3(G)(4)
Open air market							T	T	T	T	T						T		4-3(G)(5)

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Park-and-ride facility, temporary						T	T	T	T	T	T	T	T	T	T		T		4-3(G)(6)
Real estate office or model home	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T				4-3(G)(7)
Safe outdoor space							CT	CT	CT	CT	T	T	T	T					4-3(G)(8)
Seasonal outdoor sales							T	T	T	T	T	T	T	T					4-3(G)(9)
Temporary use not listed			T			T	T	T	T	T	T	T	T	T	T		T		4-3(G)(10)
Temporary Uses That Do Not Require A Permit																			
Garage or yard sale	T	T	T	T	T	T	T												4-3(G)(10)
Hot air balloon takeoff/landing	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	4-3(G)(11)