NEWFIELD

February 26, 2019

Claudia Smith
Environmental Scientist
Air Programs, Mail Code 8P-AR
US Environmental Protection Agency Region 8
1595 Wynkoop Street
Denver, Colorado 80202

RE: Mamie 4-25-3-3WH Site-Specific Permit Application
Revision 1

Dear Ms. Smith,

Newfield Production Company ("Newfield") is submitting the enclosed revision to the EPA Minor New Source Review permit application for a modification to the well pad Mamie 4-25-3-3WH. Newfield is proposing to add a well and associated tank battery equipment to the existing well pad which is located on Tribal land within the Uintah and Ouray Reservation in Duchesne County, Utah. Newfield submitted a Registration for New Sources (Form REG) for the existing well pad on October 30, 2013. The initial site-specific permit application for this project was submitted to EPA in January 2019. This revised permit application includes an Application for New Construction (Form NEW), a detailed project description, emission calculations and supporting documentation, an air quality review with dispersion modeling, and Endangered Species Act and National Historic Preservation Act compliance documentation. Changes from the initial permit application include revised oil production estimates and several updated/corrected emission calculations.

Please contact me (281-674-1588, jwoodall@newfield.com) with any questions or comments. We look forward to working with you to obtain a site-specific permit for this well pad.

Regards,

James Woodall
Sr. Air Quality Specialist
Newfield Production Company

Enclosure

Cc: Doug Jordan, Newfield
Eric Farstad, Redhorse Corporation
Bruce Pargeets, Uintah and Ouray Reservation
Mike Natchees, Uintah and Ouray Reservation

Newfield Production Company

EPA Minor NSR, Application for New Construction
MAMIE 4-25-3-3WH
Revision 1

Submitted to:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, CO 80202-1129

Submitted by:

Newfield Production Company
24 Waterway Avenue
Suite 900
The Woodlands, Texas 77380

February 2019

CONTENTS

SECTION

ATTACHMENTS

1.0 INTRODUCTION

This document presents technical and regulatory information in support of an Application for New Construction to obtain a Federal Minor New Source Review (MNSR) permit from the United States (U.S.) Environmental Protection Agency (EPA) for a Newfield Production Company oil well production site. This permit application documentation is a revision to a permit application submitted to EPA in January 2019. This revision updates projected production values and corrects source emission calculations.

This NOI is submitted for: **MAMIE 4-25-3-3WH**

Township:	**3S**
Range:	**3W**
Section:	**25**
County:	**DUCHESNE**
API #:	**4301351531**

This document provides all required documentation supporting an Application for New Construction for the well site listed above pursuant to Federal Minor New Source Review Program in Indian Country 40 CFR 49.151. The completed application form (Form NEW) is provided in Section 2 of this document. Attachments are provided which contain required EPA associated documentation, as defined in the Form NEW instructions.

2.0 APPLICATION FOR CONSTRUCTION FEDERAL MINOR NSR, APPLICATION FOR NEW CONSTRUCTION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY
40 CFR 49.151

Application for New Construction

(Form NEW)

Please check all that apply to show how you are using this form:

- ☐ **Proposed Construction of a New Source**
- ☐ **Proposed Construction of New Equipment at an Existing Source**
- ☑ **Proposed Modification of an Existing Source**
- ☐ **Other – Please Explain**

Use of this information request form is voluntary and not approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your proposed project. While submittal of this form is not required, it does offer details on the information we will use to complete your requested approval and providing the information requested may help expedite the process. An application form approved by the Office of Management and Budget can be found online at https://www.epa.gov/sites/production/files/2015-12/documents/new_source_general_application_rev2017.pdf.

Please submit information to following two entities:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, CO 80202-1129
R8airpermitting@epa.gov

For more information, visit:
http://www.epa.gov/caa-permitting/tribal-nsr-permitting-region-8

The Tribal Environmental Contact for the specific reservation:

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact:
R8airpermitting@epa.gov

A. GENERAL SOURCE INFORMATION

1. (a) **Company Name** (Who owns this facility?) Newfield Exploration (b) **Operator Name** (Is the company that operates this facility different than the company that owns this facility? What is the name of the company?)		2. **Facility Name** Mamie 4-25-3-3WH	
3. Type of Operation Oil Wellpad		4. Portable Source? ☐ Yes ☒ No 5. Temporary Source? ☐ Yes ☒ No	
6. NAICS Code 21111		7. SIC Code 1311	
8. Physical Address (Or, home base for portable sources) NW ¼ of the NW ¼ Section 25, T.3S, R.3W, Utah			
9. Reservation* Uintah and Ouray	10. County* Duchesne	11a. Latitude (decimal format)* 40.19965	11b. Longitude (decimal format)* -110.176876
12a. Quarter Quarter Section* NWNW	12b. Section* 25	12c. Township* 3S	12d. Range* 3W

*Provide all proposed locations of operation for portable sources

B. PREVIOUS PERMIT ACTIONS (Provide information in this format for each permit that has been issued to this source. Provide as an attachment if additional space is necessary)

Facility Name on the Permit The facility does not have a permit, but a FORM REG registration was submitted
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action FORM REG Submittal Date: October 30, 2013

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

C. CONTACT INFORMATION

Company Contact (Who is the primary contact for the company that owns this facility?**)** Noel Putscher	Title Production Manager
Mailing Address 24 Waterway Avenue, Suite 900 The Woodlands, Texas 77380	
Email Address nputscher@newfield.com	
Telephone Number (281) 210-5100	Facsimile Number (281) 210-5101

Operator Contact (Is the company that operates this facility different than the company that owns this facility? Who is the primary contact for the company that operates this facility?) N/A	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number

Permitting Contact (Who is the person primarily responsible for Clean Air Act permitting for the company? We are seeking one main contact for the company. Please do not list consultants.) James Woodall	Title Sr. Air Quality Specialist
Mailing Address 24 Waterway Avenue, Suite 900 The Woodlands, Texas 77380	
Email Address jwoodall@newfield.com	
Telephone Number (281) 674-1588	Facsimile Number (281) 210-5101

Compliance Contact (Is the person responsible for Clean Air Act compliance for this company different than the person responsible for Clean Air Act permitting? Who is the person primarily responsible for Clean Air Act compliance for the company? We are seeking one main contact for the company. Please do not list consultants.) James Woodall	Title Sr. Air Quality Specialist
Mailing Address 24 Waterway Avenue, Suite 900 The Woodlands, Texas 77380	
Email Address jwoodall@newfield.com	
Telephone Number (281) 674-1588	Facsimile Number (281) 210-5101

D. ATTACHMENTS

Include all of the following information (see the attached instructions)

*Please do not send Part 71 Operating Permit Application Forms in lieu of the check list below.

☐ **FORM SYNMIN -** New Source Review Synthetic Minor Limit Request Form, if synthetic minor limits are being requested.

☒ Narrative description of the proposed production processes. This description should follow the flow of the process flow diagram to be submitted with this application.

☒ Process flow chart identifying all proposed processing, combustion, handling, storage, and emission control equipment.

☒ A list and descriptions of all proposed emission units and air pollution-generating activities.

☒ Type and quantity of fuels, including sulfur content of fuels, proposed to be used on a daily, annual and maximum hourly basis.

☒ Type and quantity of raw materials used or final product produced proposed to be used on a daily, annual and maximum hourly basis.

☒ Proposed operating schedule, including number of hours per day, number of days per week and number of weeks per year.

☒ A list and description of all proposed emission controls, control efficiencies, emission limits, and monitoring for each emission unit and air pollution generating activity.

☒ **Criteria Pollutant Emissions -** Estimates of Current Actual Emissions, Current Allowable Emissions, Post-Change Uncontrolled Emissions, and Post-Change Allowable Emissions for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

These estimates are to be made for each emission unit, emission generating activity, and the project/source in total. Note, there are no insignificant emission units or activities in this permitting program, only exempted units and activities. Please see the regulation for a list of exempted units and activities.

☒ **Air Quality Review**

☒ **ESA (Endangered Species Act)**

☒ **NHPA (National Historic Preservation Act)**

E. TABLE OF ESTIMATED EMISSIONS

The following tables provide the total emissions in tons/year for all pollutants from the calculations required in Section D of this form, as appropriate for the use specified at the top of the form.

E(i) – Proposed New Source

Pollutant	Potential Emissions (tpy)	Proposed Allowable Emissions (tpy)	
PM	**0.32**	**0.32**	PM - Particulate Matter PM_{10} - Particulate Matter less than 10 microns in size $PM_{2.5}$ - Particulate Matter less than 2.5 microns in size SO_2 - Sulfur Dioxide NOx - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H_2SO_4 - Sulfuric Acid Mist H_2S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM_{10}	**0.32**	**0.32**	
$PM_{2.5}$	**0.32**	**0.32**	
SO_2	**0.02**	**0.02**	
NO_x	**6.35**	**6.35**	
CO	**12.31**	**12.31**	
VOC	**8.81**	**8.81**	
Pb	**0**	**0**	
Fluorides	**0**	**0**	
H_2SO_4	**0**	**0**	
H_2S	**negligible**	**negligible**	
TRS	**0**	**0**	
RSC	**0**	**0**	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

(a) Coal cleaning plants (with thermal dryers);
(b) Kraft pulp mills;
(c) Portland cement plants;
(d) Primary zinc smelters;
(e) Iron and steel mills;
(f) Primary aluminum ore reduction plants;
(g) Primary copper smelters;
(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
(i) Hydrofluoric, sulfuric, or nitric acid plants;
(j) Petroleum refineries;
(k) Lime plants;
(l) Phosphate rock processing plants;
(m) Coke oven batteries;
(n) Sulfur recovery plants;
(o) Carbon black plants (furnace process);
(p) Primary lead smelters;
(q) Fuel conversion plants;
(r) Sintering plants;
(s) Secondary metal production plants;
(t) Chemical process plants
(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(w) Taconite ore processing plants;
(x) Glass fiber processing plants;
(y) Charcoal production plants;
(z) Fossil fuel-fired steam electric plants of more that 250 million British thermal units per hour heat input, and
(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

E(ii) – Proposed New Construction at an Existing Source or Modification of an Existing Source

Pollutant	Current Actual Emissions (tpy)	Current Allowable Emissions (tpy)	Post-Change Potential Emissions (tpy)	Post-Change Allowable Emissions (tpy)
PM	0.11	N/A	0.19	0.19
PM_{10}	0.11	N/A	0.19	0.19
$PM_{2.5}$	0.11	N/A	0.19	0.19
SO_2	0.01	N/A	0.01	0.01
NO_x	3.03	N/A	6.35	6.35
CO	5.43	N/A	12.31	12.31
VOC	4.45	N/A	11.64	11.64
Pb	0	N/A	0	0
Fluorides	0	N/A	0	0
H_2SO_4	0	N/A	0	0
H_2S	negligible	N/A	negligible	negligible
TRS	0	N/A	0	0
RSC	0	N/A	0	0

PM - Particulate Matter
PM_{10} - Particulate Matter less than 10 microns in size
$PM_{2.5}$ - Particulate Matter less than 2.5 microns in size
SO_2 – Sulfur Dioxide
NOx - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

[Disclaimers] The public reporting and recordkeeping burden for this collection of information is estimated to average 20 hours per response, unless a modeling analysis is required. If a modeling analysis is required, the public reporting and recordkeeping burden for this collection of information is estimated to average 60 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Application for New Construction (Form NEW) REVISED FEBRUARY 2019

Newfield Exploration

Mamie 4-25-3-3WH

ATTACHMENTS

1. **Narrative Description of the proposed production processes, process flow chart, list and description of proposed emission units and air pollution-generating activities**
2. **Emission Inventory, including fuels, raw materials, final product produced, operating schedules, and emission controls**
3. **Air Quality Review**
4. **Endangered Species Act and National Historic Preservation Act Documentation**

Attachment 1

Source Description

The Mamie 4-25-3-3WH facility is an existing oil well production facility for the extraction, storage, and separation of produced oil, gas, and water. A registration form (Form REG) was submitted for the facility in November 2013 in accordance with the Federal Minor New Source Review Program in Indian Country (40 CFR 49.151). The facility consists of a natural gas-fired generator, electric pumping units, oil storage tanks, a produced water storage tank, tank heaters, a heater treater/separator, and pneumatic devices. The proposed modification would add a new well to the facility along with additional equipment, including an electric pumping unit, three oil storage tanks, a produced water storage tank, tank heaters, a heater treater/separator, and pneumatic devices. Tank emissions are controlled with flares. A list of equipment proposed for the registered site after modification is given below:

Emission units and air pollution generating activities:

Onsite Gas-Fired Engine:

- Two natural gas-fired generator engines

Heater Treaters and Tank Heaters:

- Two heater treaters
- Six tank heaters

Storage Tanks:

- Six oil storage tanks (heated)
- Two produced water storage tanks

Pneumatic Controllers:

- Pneumatic controllers

Storage Tank Unloading Operations:

- Oil storage tank unloading operations to tanker trucks will utilize submerged loading. The proposed unloading rack will install vapor capture lines

Fugitives:

- Fugitive emissions such as valves, connectors, open-ended lines, flanges, and other components

Air pollution control equipment:

- One existing flare and one proposed flare will be utilized to control storage tank VOC emissions in accordance with NSPS OOOOa standards. The existing flare is a Steffes SFI and the proposed flare will be a Steffes SAA-2. Specifications are provided in Attachment 2.
- Vapor capture during tank unloading operations will be utilized for the new unloading rack. Captured vapors will be routed back through the system or sent to the flare.

Newfield will comply with all applicable federal regulations such as New Source Performance Standards (NSPS) and any other regulations required under the Minor NSR Program in Indian Country. Detailed description of the facility processes, a process flowchart, and site figures are given below.

Company: Newfield Exploration
Facility: MAMIE 4-25-3-3WH
Location: Township: 3S, Range: 3W, Section: 25
API #: 4301351531

Facility Description
This is an example of common equipment at a well-head site. The equipment listed is not intended to be a specific representation of equipment at the site, but is an example of common equipment at a well pad for oil extraction. The well-head site is used for the extraction, storage, and separation of produced oil, gas, and water. For example, a well-head site could consist of pumping units, oil storage tanks, produced water storage tanks, tank heaters, heater treaters, dehydrators, and pneumatics. Details regarding the equipment listed in this document are presented below as this site description is representative of a typical well.

Onsite Engines
A well-site produces fluids from a well. The fluids are produced at the well-head by mechanically lifting the fluids out of the well using a pump. The mechanical action of the pump is generated by a co-located natural gas fired engine. The fluids produced at the well are piped to a heater treater, for separating oil, gas, and water. Information about the pumping unit at this site is presented below.

No. of engines: 2
List of engines: ENG-1, ENG-2

Additional details are contained in individual associated emission estimate forms for each engine at this site.

Heater Treaters
Fluids from a well consist of oil, water, and gas. The fluids produced at the well are typically piped to a separator unit, referred to here as a heater treater, where it is separated into the oil, water, and gas components using pressure and heat. Heat for the separator is provided by combusting natural gas in a burner. Information about the heater treaters at this site is presented below.

No. of heater treaters: 2
List of heater treaters: HTRTRTR-1, HTRTRTR-2

Additional details are contained in individual associated emission estimate forms for each heater treater at this site.

Tanks
Fluids produced by pumping units are typically stored on-site in vertical fixed-flat-roof tanks. The tanks at a site could be dedicated for production only from the well where it is located, a common tank battery fed by other well-sites, or a common tank battery fed by a well at that site in addition to other well-sites. Information about the tanks at this site is presented below.

No. of onsite oil tanks: 6
List of onsite oil tanks: OILTK-1, OILTK-2, OILTK-3, OILTK-4, OILTK-5, OILTK-6

No. of onsite water tanks: 2
List of onsite water tanks: PWTANK-1, PWTANK-2

Additional details are contained in individual associated emission estimate forms for each tank at this site.

Heaters
The temperature of the fluid in the tank can be controlled by using natural gas fired tank heaters. Tank heaters are typically small units used to keep the fluid viscous. Information about the heaters at this site is presented below.

No. of tank heaters: 6
List of tank heaters: TANKHTR1, TANKHTR2, TANKHTR3, TANKHTR4, TANKHTR5, TANKHTR6

Additional details are contained in individual associated emission estimate forms for each tank at this site.

Company: Newfield Exploration
Facility: MAMIE 4-25-3-3WH
Location: Township: 3S, Range: 3W, Section: 25
API #: 4301351531

Pneumatic controllers
Pneumatic controllers are sometimes used to actuate functions using instrument natural gas at the well. The gas used to operate the pneumatic controllers is released to the atmosphere on an intermittent basis. Information concerning the pneumatic controllers at this site are contained in individual associated emission estimate forms for the pneumatic controllers.

Tank Unloading
Trucks are often used to remove the oil and produced water collected in tanks at a well. The oil is loaded into trucks and transported to a refinery. Oil tanks are isolated so that only one truck loading outlet is used. Produced water is loaded into trucks and transported to water treatment facilities. The act of loading the trucks generates emissions at the well site. Information about truck loading at this site is presented below:

No. of tanks loaded to trucks at this site: 6

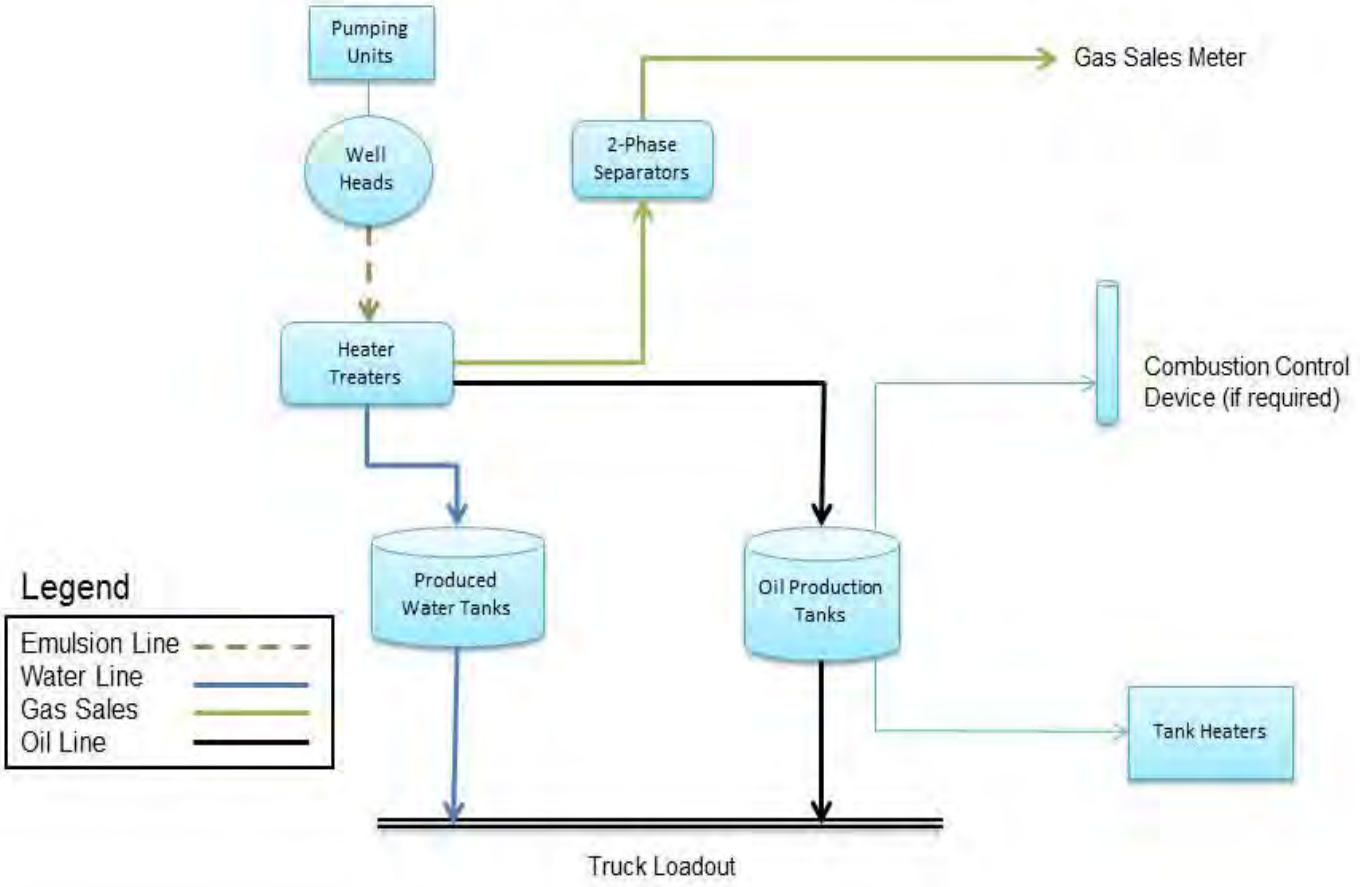
Additional details are contained in individual associated emission estimate forms for the truck loading at this site.

Fugitives
Each well site includes piping used to move oil and gas products. The well site system contains numerous components such as valves, connectors, open-ended lines, flanges, and other components that have potential fugitive emissions associated with their operation. The type and quantity of components at well sites are assumed to be the same as the default average component count from Subpart W of Part 98 of the Code of Federal Regulations. Additional details are contained in individual associated emission estimate forms for well fugitives at this site.

Flares
Flares are used to control emissions from oil and water tanks at the site. The flares control VOC at a rate of 98%.

Small Tanks
Well pads may also include other small tanks containing miscellaneous chemicals with maximum tank capacity less than or equal to 500 gallons each. Typically, these liquids will be contained in 55 gallon drums and are listed for informational purposes only.

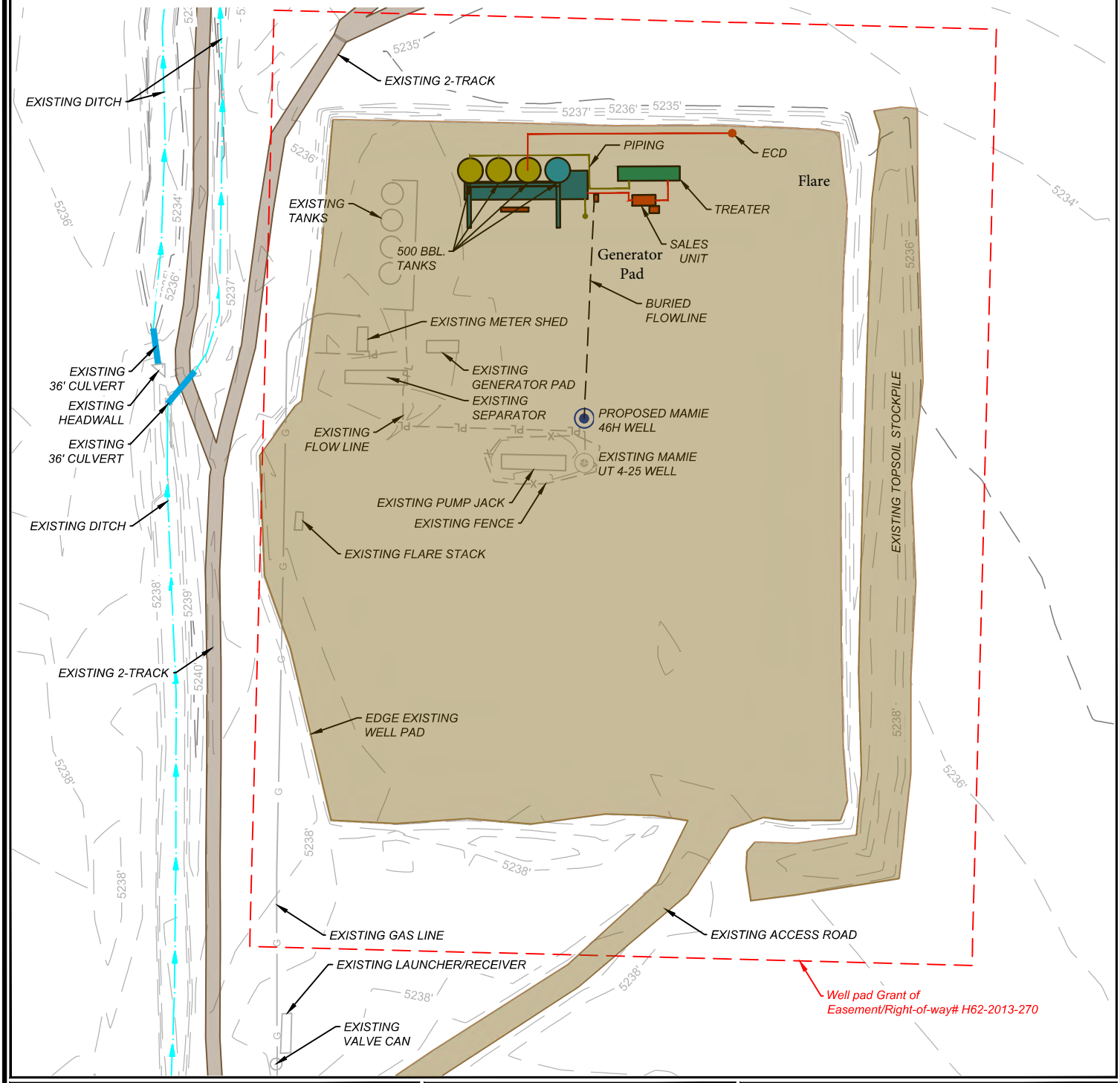
FIGURE A-1
NEWFIELD GENERAL OIL PRODUCTION
TYPICAL WELL FLOW DIAGRAM



NEWFIELD

PRODUCTION FACILITY LAYOUT

LC TRIBAL 4-25 3-3-25-36-46H



LEGEND

EXISTING CONTOURS

WELL LOCATION

EXISTING WELL LOCATION

SUMMARY

OUTLAW ENGINEERING INC.
P.O. BOX 1800
ROOSEVELT, UTAH 84066
(435) 232-4321

0 40 80

HORIZONTAL

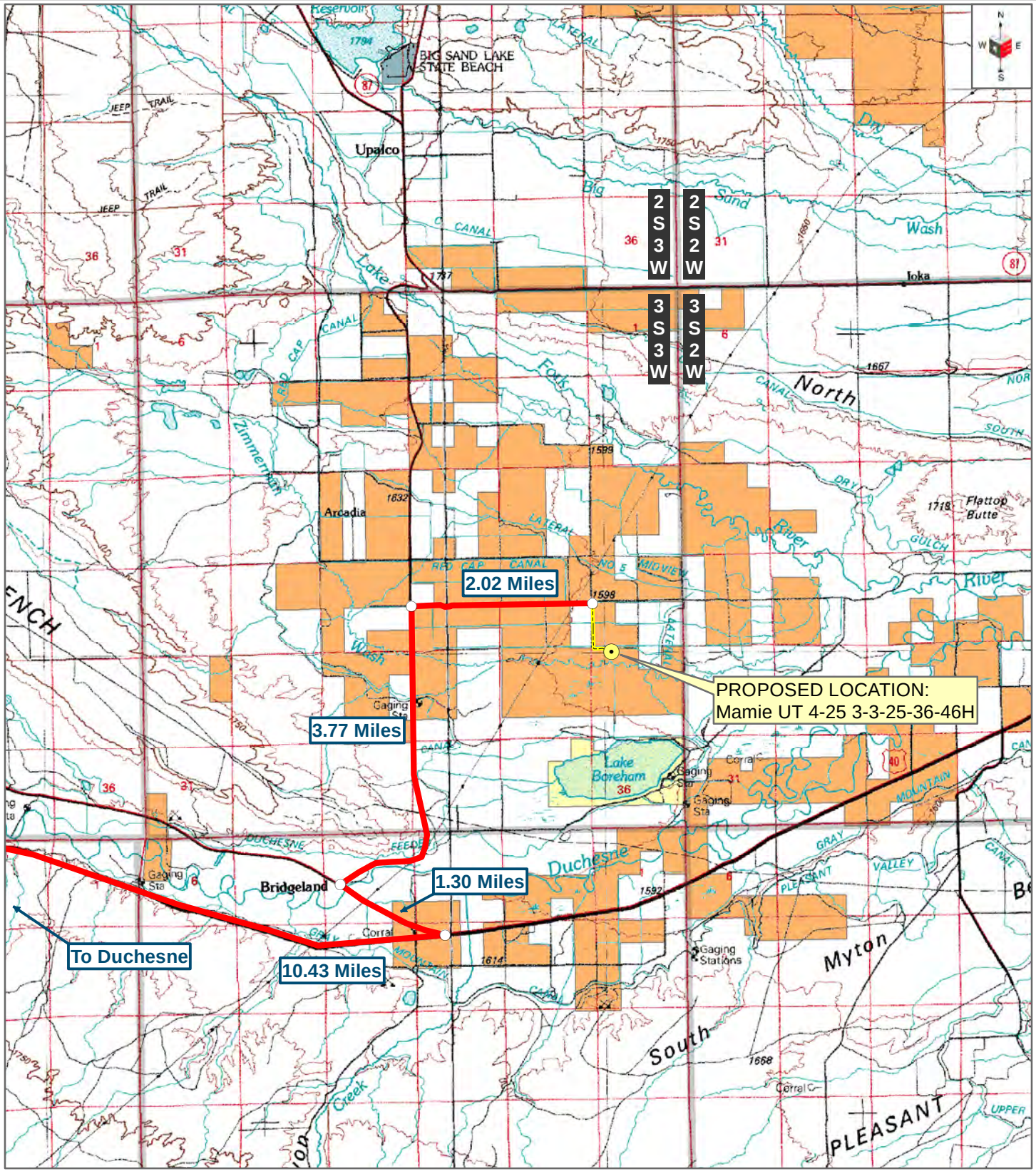
PRODUCTION FACILITY LAYOUT

MAMIE UT 4-25 3-3-25-36-46H

WELL LOCATION: NW 1/4 OF THE NW 1/4 SECTION 25, T3S, R3W, U.S.B.&M., DUCHESNE COUNTY, UTAH

NEWFIELD

PRODUCTION LAYOUT	OCTOBER 09, 2018	SHEET NO.
	SCALE: 1" = 60'	5
	DESIGN: MM,RF DRAWN: LCS	



OUTLAW ENGINEERING INC.
P.O. BOX 1800
ROOSEVELT, UTAH 84066
(435) 232-4321

PARCEL INFORMATION SHOWN HAS NOT BEEN SURVEYED BY OUTLAW ENGINEERING, INC. AND MAY NOT REFLECT ACTUAL LOCATION OF PROPERTY LINES.

Site Location

0 2,000 4,000 6,000 8,000 Feet

VERSION:	V1
SURVEYED:	9-17-18

LEGEND

- Site Location
- Existing Access Road
- Existing Road

Federal | Private | State | Tribal

Mamie UT 4-25 3-3-25-36-46H

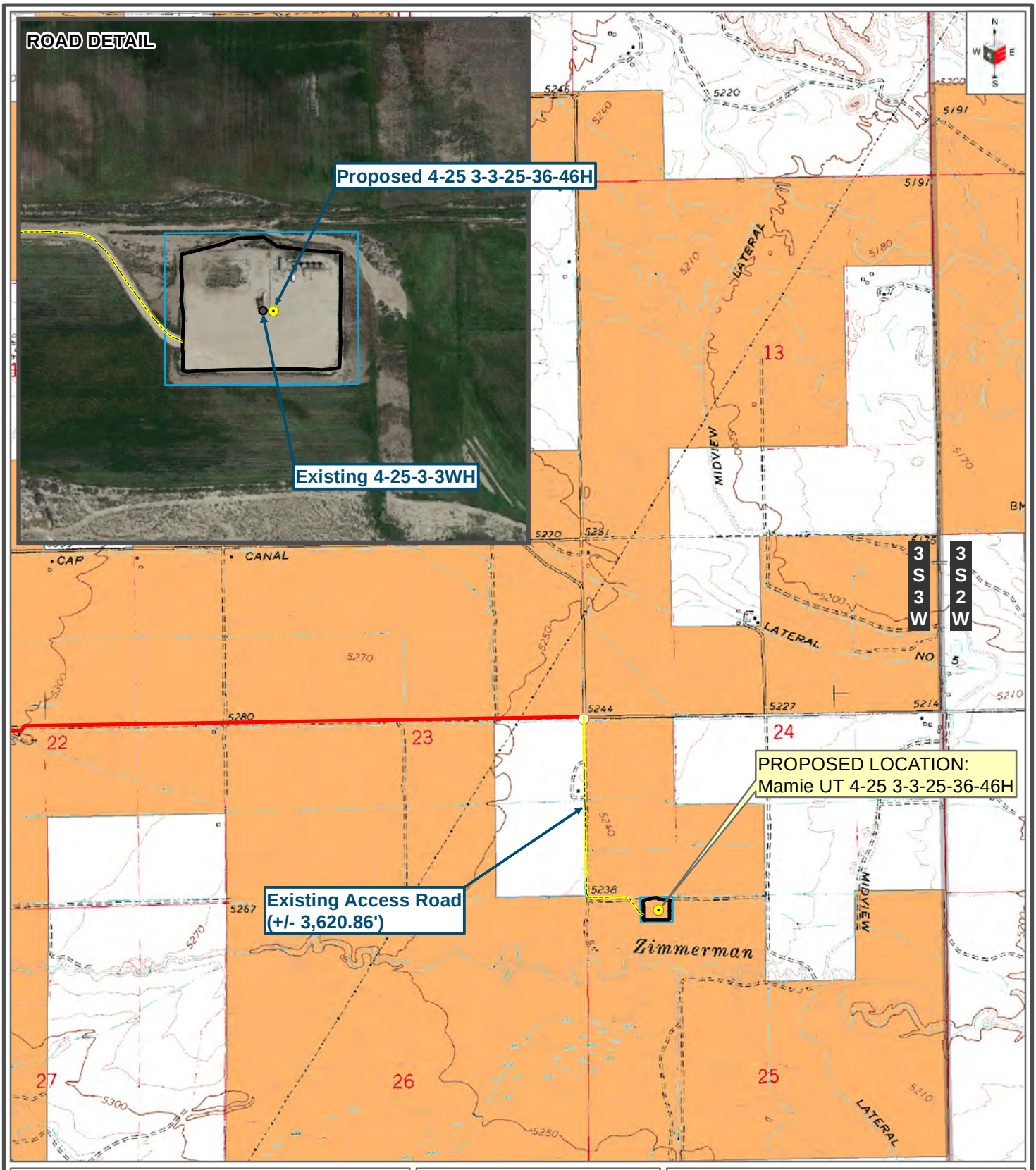
WELL LOCATION: NW 1/4 of the NW 1/4 SECTION 25, T.3S, R.3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

NEWFIELD

USGS 7.5' Bridgeland Quadrangle

SEPT 18, 2018
SCALE: 1" = 8,000'
AUTHOR: CMM

SHEET
A



OUTLAW ENGINEERING INC.
P.O. BOX 1800
ROOSEVELT, UTAH 84066
(435) 232-4321

PARCEL INFORMATION SHOWN HAS NOT BEEN SURVEYED BY OUTLAW ENGINEERING, INC. AND MAY NOT REFLECT ACTUAL LOCATION OF PROPERTY LINES.

Existing Access Road

0 500 1,000 1,500 2,000 Feet

VERSION:	V1
SURVEYED:	9-17-18

LEGEND

- Proposed Well Head
- Existing Access Road
- Existing Road
- Existing Well Pad
- Existing LOD

Federal | Private | State | Tribal

Mamie UT 4-25 3-3-25-36-46H

WELL LOCATION: NW 1/4 of the NW 1/4 SECTION 25, T.3S, R.3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

NEWFIELD

USGS 7.5' Bridgeland Quadrangle

SEPT 18, 2018
SCALE: 1" = 2,000'
AUTHOR: CMM

SHEET B

Attachment 2

Emission Inventory

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

			Controlled PTE (TPY)												
Type	ID No.	Name	VOC	HAP	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	CH_4	CO_2e	N_2O^{**}	CO_2e	Total CO_2e
Existing Sources															
Engine	1	ENG-1	1.54E+00	8.17E-02	2.20E+00	4.40E+00	4.91E-02	4.91E-02	1.49E-03	2.78E+02	5.82E-01	1.22E+01			2.90E+02
Treater Burner	2	HTRTRTR-1	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	3	FUG-1	5.42E-02	3.01E-03							6.02E-01	1.26E+01			1.26E+01
Oil Tank	4	OILTK-1	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank	5	OILTK-2	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank	6	OILTK-3	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank Unloading	7	OILTKLOAD-1	2.31E+00	4.17E-01							2.91E-01	6.11E+00			6.11E+00
Pneumatic Controllers	8	PCONT-1	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	9	PWTANK-1	5.48E-03	2.55E-04	2.65E-03	1.44E-02				4.58E+00	1.86E-02	3.91E-01	8.39E-05	2.60E-02	4.99E+00
Small Storage Tanks	10	SMTANKS-1	2.05E-02												
Heater	11	TANKHTR1	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	12	TANKHTR2	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	13	TANKHTR3	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Flare	14	FLARE-1	3.00E-02		3.93E-02	2.14E-01				6.80E+01	4.45E-02	1.38E+01	1.25E-03	3.87E-01	8.22E+01
Proposed Sources															
Engine	15	ENG-2	1.58E+00	2.66E-01	2.26E+00	4.52E+00	1.60E-01	1.60E-01	4.85E-03	9.07E+02	1.90E+00	3.98E+01			9.47E+02
Treater Burner	16	HTRTRTR-2	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	17	FUG-2	5.42E-02	3.01E-03							6.02E-01	1.26E+01			1.26E+01
Oil Tank	18	OILTK-4	5.40E-01	1.29E-01	4.77E-02	2.59E-01				8.25E+01	9.04E-02	1.90E+00	1.51E-03	4.69E-01	8.49E+01
Oil Tank	19	OILTK-5	5.40E-01	1.29E-01	4.77E-02	2.59E-01				8.25E+01	9.04E-02	1.90E+00	1.51E-03	4.69E-01	8.49E+01
Oil Tank	20	OILTK-6	5.40E-01	1.29E-01	4.77E-02	2.59E-01				8.25E+01	9.04E-02	1.90E+00	1.51E-03	4.69E-01	8.49E+01
Oil Tank Unloading	21	OILTKLOAD-2	7.97E-01	1.44E-01							1.00E-01	2.11E+00			2.11E+00
Pneumatic Controllers	22	PCONT-2	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	23	PWTANK-2	2.74E-02	1.28E-03	1.32E-02	7.20E-02				2.29E+01	9.31E-02	1.95E+00	4.20E-04	1.30E-01	2.50E+01
Small Storage Tanks	24	SMTANKS-2	2.05E-02												
Heater	25	TANKHTR4	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	26	TANKHTR5	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	27	TANKHTR6	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Flare	28	FLARE-2	1.23E-01		1.61E-01	8.78E-01				2.79E+02	1.83E-01	5.67E+01	5.12E-03	1.59E+00	3.37E+02
Totals (TPY)			**8.81**	**1.42**	**6.35**	**12.31**	**0.32**	**0.32**	**0.02**	**3663.95**	**6.70**	**206.48**	**0.05**	**14.09**	**3884.52**

**N_2O emissions have not been estimated for engines due to the absence of an AP-42 emission factor (AP-42, Section 3.2.3.4).

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

			Uncontrolled PTE (TPY)												
Type	**ID No.**	**Name**	**VOC**	**HAP**	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**CO_2**	**CH_4**	**CO_2e**	**N_2O****	**CO_2e**	**Total CO_2e**
Existing Sources															
Engine	1	ENG-1	1.54E+00	8.17E-02	2.20E+00	4.40E+00	4.91E-02	4.91E-02	1.49E-03	2.78E+02	5.82E-01	1.22E+01			2.90E+02
Treater Burner	2	HTRTRTR-1	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	3	FUG-1	5.42E-02	3.01E-03							6.02E-01	1.26E+01			1.26E+01
Oil Tank	4	OILTK-1	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank	5	OILTK-2	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank	6	OILTK-3	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank Unloading	7	OILTKLOAD-1	2.31E+00	4.17E-01							2.91E-01	6.11E+00			6.11E+00
Pneumatic Controllers	8	PCONT-1	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	9	PWTANK-1	2.74E-01	1.28E-02							9.31E-01	1.95E+01			1.95E+01
Small Storage Tanks	10	SMTANKS-1	2.05E-02												
Heater	11	TANKHTR1	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	12	TANKHTR2	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	13	TANKHTR3	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Flare	14	FLARE-1	3.00E-02		3.93E-02	2.14E-01				6.80E+01	4.45E-02	1.38E+01	1.25E-03	3.87E-01	
Proposed Sources															
Engine	15	ENG-2	1.58E+00	2.66E-01	2.26E+00	4.52E+00	1.60E-01	1.60E-01	4.85E-03	9.07E+02	1.90E+00	3.98E+01			9.47E+02
Treater Burner	16	HTRTRTR-2	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	17	FUG-2	5.42E-02	3.01E-03							6.02E-01	1.26E+01			1.26E+01
Oil Tank	18	OILTK-4	2.70E+01	6.47E+00							4.52E+00	9.49E+01			9.49E+01
Oil Tank	19	OILTK-5	2.70E+01	6.47E+00							4.52E+00	9.49E+01			9.49E+01
Oil Tank	20	OILTK-6	2.70E+01	6.47E+00							4.52E+00	9.49E+01			9.49E+01
Oil Tank Unloading	21	OILTKLOAD-2	1.16E+01	2.08E+00							1.46E+00	3.06E+01			3.06E+01
Pneumatic Controllers	22	PCONT-2	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	23	PWTANK-2	1.37E+00	6.38E-02							4.65E+00	9.77E+01			9.77E+01
Small Storage Tanks	24	SMTANKS-2	2.05E-02												
Heater	25	TANKHTR4	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	26	TANKHTR5	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	1.30E+02
Heater	27	TANKHTR6	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Flare	28	FLARE-2	1.23E-01		1.61E-01	8.78E-01				2.79E+02	1.83E-01	5.67E+01	5.12E-03	1.59E+00	
Totals (TPY)			**1.18E+02**	**2.66E+01**	**6.16E+00**	**1.13E+01**	**3.23E-01**	**3.23E-01**	**1.54E-02**	**3.34E+03**	**2.97E+01**	**6.89E+02**	**3.94E-02**	**1.22E+01**	**3.36E+03**

**N_2O emissions have not been estimated for engines due to the absence of an AP-42 emission factor (AP-42, Section 3.2.3.4).

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

			Controlled PTE (lb/hr)												
Type	**ID No.**	**Name**	**VOC**	**HAP**	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**CO_2**	**CH_4**	**CO_2e**	**N_2O****	**CO_2e**	**CO_2e**
Existing Sources															
Engine	1	ENG-1	3.52E-01	1.87E-02	5.03E-01	1.01E+00	1.12E-02	1.12E-02	3.40E-04	6.35E+01	1.33E-01	2.79E+00			6.63E+01
Treater Burner	2	HTRTRTR-1	5.39E-03	1.85E-03	9.80E-02	8.24E-02	7.45E-03	7.45E-03	5.88E-04	1.18E+02	2.25E-03	4.74E-02	2.16E-03	6.69E-01	1.18E+02
Oil Well Fugitives	3	FUG-1	1.24E-02	6.87E-04							1.37E-01	2.89E+00			2.89E+00
Oil Tank	4	OILTK-1	2.74E-02	6.40E-03	2.34E-03	1.27E-02				4.04E+00	4.47E-03	9.40E-02	7.41E-05	2.30E-02	4.16E+00
Oil Tank	5	OILTK-2	2.74E-02	6.40E-03	2.34E-03	1.27E-02				4.04E+00	4.47E-03	9.40E-02	7.41E-05	2.30E-02	4.16E+00
Oil Tank	6	OILTK-3	2.74E-02	6.40E-03	2.34E-03	1.27E-02				4.04E+00	4.47E-03	9.40E-02	7.41E-05	2.30E-02	4.16E+00
Oil Tank Unloading	7	OILTKLOAD-1	1.94E+01	3.50E+00							2.45E+00	6.11E+01			6.11E+01
Pneumatic Controllers	8	PCONT-1	2.02E-02								2.20E-01	4.62E+00			4.62E+00
Water Tank	9	PWTANK-1	1.25E-03	5.83E-05	6.04E-04	3.29E-03				1.05E+00	4.25E-03	8.93E-02	1.92E-05	5.94E-03	1.14E+00
Small Storage Tanks	10	SMTANKS-1	4.69E-03												
Heater	11	TANKHTR1	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	12	TANKHTR2	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	13	TANKHTR3	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Flare	14	FLARE-1	6.84E-03		8.98E-03	4.89E-02				1.55E+01	1.02E-02	3.15E+00	2.85E-04	8.83E-02	
Proposed Sources															
Engine	15	ENG-2	3.61E-01	6.08E-02	5.16E-01	1.03E+00	3.65E-02	3.65E-02	1.11E-03	2.07E+02	4.33E-01	9.09E+00			2.16E+02
Treater Burner	16	HTRTRTR-2	5.39E-03	1.85E-03	9.80E-02	8.24E-02	7.45E-03	7.45E-03	5.88E-04	1.18E+02	2.25E-03	4.74E-02	2.16E-03	6.69E-01	1.18E+02
Oil Well Fugitives	17	FUG-2	1.24E-02	6.87E-04							1.37E-01	2.89E+00			2.89E+00
Oil Tank	18	OILTK-4	1.23E-01	2.95E-02	1.09E-02	5.92E-02				1.88E+01	2.06E-02	4.33E-01	3.45E-04	1.07E-01	1.94E+01
Oil Tank	19	OILTK-5	1.23E-01	2.95E-02	1.09E-02	5.92E-02				1.88E+01	2.06E-02	4.33E-01	3.45E-04	1.07E-01	1.94E+01
Oil Tank	20	OILTK-6	1.23E-01	2.95E-02	1.09E-02	5.92E-02				1.88E+01	2.06E-02	4.33E-01	3.45E-04	1.07E-01	1.94E+01
Oil Tank Unloading	21	OILTKLOAD-2	1.34E+00	2.42E-01							1.69E-01	6.11E+01			6.11E+01
Pneumatic Controllers	22	PCONT-2	2.02E-02								2.20E-01	4.62E+00			4.62E+00
Water Tank	23	PWTANK-2	6.25E-03	2.91E-04	3.02E-03	1.64E-02				5.23E+00	2.13E-02	4.46E-01	9.58E-05	2.97E-02	5.70E+00
Small Storage Tanks	24	SMTANKS-2	4.69E-03												
Heater	25	TANKHTR4	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	26	TANKHTR5	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	27	TANKHTR6	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Flare	28	FLARE-2	2.81E-02		3.68E-02	2.00E-01				6.37E+01	4.17E-02	1.29E+01	1.17E-03	3.62E-01	
Totals (lb/hr)			**2.21E+01**	**3.94E+00**	**1.45E+00**	**2.81E+00**	**7.38E-02**	**7.38E-02**	**3.51E-03**	**8.37E+02**	**4.06E+00**	**1.68E+02**	**1.04E-02**	**3.22E+00**	**7.34E+02**

**N_2O emissions have not been estimated for engines due to the absence of an AP-42 emission factor (AP-42, Section 3.2.3.4).

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

			Uncontrolled PTE (lb/hr)												
Type	**ID No.**	**Name**	**VOC**	**HAP**	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**CO_2**	**CH_4**	**CO_2e**	**N_2O****	**CO_2e**	**Total CO_2e**
Existing Sources															
Engine	1	ENG-1	3.52E-01	1.87E-02	5.03E-01	1.01E+00	1.12E-02	1.12E-02	3.40E-04	6.35E+01	1.33E-01	2.79E+00			6.63E+01
Treater Burner	2	HTRTRTR-1	5.39E-03	1.85E-03	9.80E-02	8.24E-02	7.45E-03	7.45E-03	5.88E-04	1.18E+02	2.25E-03	4.74E-02	2.16E-03	6.69E-01	1.18E+02
Oil Well Fugitives	3	FUG-1	1.24E-02	6.87E-04							1.37E-01	2.89E+00			2.89E+00
Oil Tank	4	OILTK-1	1.37E+00	3.20E-01							2.24E-01	4.70E+00			4.70E+00
Oil Tank	5	OILTK-2	1.37E+00	3.20E-01							2.24E-01	4.70E+00			4.70E+00
Oil Tank	6	OILTK-3	1.37E+00	3.20E-01							2.24E-01	4.70E+00			4.70E+00
Oil Tank Unloading	7	OILTKLOAD-1	1.94E+01	3.50E+00							2.45E+00	6.11E+01			6.11E+01
Pneumatic Controllers	8	PCONT-1	2.02E-02								2.20E-01	4.62E+00			4.62E+00
Water Tank	9	PWTANK-1	6.25E-02	2.91E-03							2.13E-01	4.46E+00			4.46E+00
Small Storage Tanks	10	SMTANKS-1	4.69E-03												
Heater	11	TANKHTR1	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	12	TANKHTR2	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	13	TANKHTR3	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Flare	14	FLARE-1	6.84E-03		8.98E-03	4.89E-02				1.55E+01	1.02E-02	3.15E+00	2.85E-04	8.83E-02	
Proposed Sources															
Engine	15	ENG-2	3.61E-01	6.08E-02	5.16E-01	1.03E+00	3.65E-02	3.65E-02	1.11E-03	2.07E+02	4.33E-01	9.09E+00			2.16E+02
Treater Burner	16	HTRTRTR-2	5.39E-03	1.85E-03	9.80E-02	8.24E-02	7.45E-03	7.45E-03	5.88E-04	1.18E+02	2.25E-03	4.74E-02	2.16E-03	6.69E-01	1.18E+02
Oil Well Fugitives	17	FUG-2	1.24E-02	6.87E-04							1.37E-01	2.89E+00			2.89E+00
Oil Tank	18	OILTK-4	6.16E+00	1.48E+00							1.03E+00	2.17E+01			2.17E+01
Oil Tank	19	OILTK-5	6.16E+00	1.48E+00							1.03E+00	2.17E+01			2.17E+01
Oil Tank	20	OILTK-6	6.16E+00	1.48E+00							1.03E+00	2.17E+01			2.17E+01
Oil Tank Unloading	21	OILTKLOAD-2	1.94E+01	3.50E+00							2.45E+00	6.11E+01			6.11E+01
Pneumatic Controllers	22	PCONT-2	2.02E-02								2.20E-01	4.62E+00			4.62E+00
Water Tank	23	PWTANK-2	3.13E-01	1.46E-02							1.06E+00	2.23E+01			2.23E+01
Small Storage Tanks	24	SMTANKS-2	4.69E-03												
Heater	25	TANKHTR4	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	26	TANKHTR5	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Heater	27	TANKHTR6	1.35E-03	4.63E-04	2.45E-02	2.06E-02	1.86E-03	1.86E-03	1.47E-04	2.94E+01	5.64E-04	1.18E-02	5.39E-04	1.67E-01	
Flare	28	FLARE-2	2.81E-02		3.68E-02	2.00E-01				6.37E+01	4.17E-02	1.29E+01	1.17E-03	3.62E-01	
			6.26E+01	**1.25E+01**	**1.41E+00**	**2.57E+00**	**7.38E-02**	**7.38E-02**	**3.51E-03**	**7.62E+02**	**1.13E+01**	**2.71E+02**	**9.00E-03**	**2.79E+00**	**7.62E+02**

**N_2O emissions have not been estimated for engines due to the absence of an AP-42 emission factor (AP-42, Section 3.2.3.4).

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

Type	ID No.	Name	Controlled Actuals (TPY) VOC	HAP	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	CH_4	CO_2e	N_2O^{**}	CO_2e	Total CO_2e
Existing Sources															
Engine	1	ENG-1	1.54E+00	8.17E-02	2.20E+00	4.40E+00	4.91E-02	4.91E-02	1.49E-03	2.78E+02	5.82E-01	1.22E+01			2.90E+02
Treater Burner	2	HTRTRTR-1	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	3	FUG-1	5.42E-02	1.01E-02							6.02E-01	1.26E+01			1.26E+01
Oil Tank	4	OILTK-1	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank	5	OILTK-2	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank	6	OILTK-3	1.20E-01	2.80E-02	1.02E-02	5.57E-02				1.77E+01	1.96E-02	4.12E-01	3.24E-04	1.01E-01	1.82E+01
Oil Tank Unloading	7	OILTKLOAD-1	2.31E+00	4.17E-01							2.91E-01	7.28E+00			7.28E+00
Pneumatic Controllers	8	PCONT-1	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	9	PWTANK-1	5.48E-03	2.55E-04	2.65E-03	1.44E-02				4.58E+00	1.86E-02	3.91E-01	8.39E-05	2.60E-02	4.99E+00
Small Storage Tanks	10	SMTANKS-1	2.05E-02												
Heater	11	TANKHTR1	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Heater	12	TANKHTR2	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Heater	13	TANKHTR3	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Flare	14	FLARE-1	3.00E-02		3.93E-02	2.14E-01				6.80E+01	4.45E-02	1.38E+01	1.25E-03	3.87E-01	
Proposed Sources															
Engine	15	ENG-2													
Treater Burner	16	HTRTRTR-2													
Oil Well Fugitives	17	FUG-2													
Oil Tank	18	OILTK-4													
Oil Tank	19	OILTK-5													
Oil Tank	20	OILTK-6													
Oil Tank Unloading	21	OILTKLOAD-2													
Pneumatic Controllers	22	PCONT-2													
Water Tank	23	PWTANK-2													
Small Storage Tanks	24	SMTANKS-2													
Heater	25	TANKHTR4													
Heater	26	TANKHTR5													
Heater	27	TANKHTR6													
Flare	28	FLARE-2													
			4.45E+00	**6.07E-01**	**3.03E+00**	**5.43E+00**	**1.06E-01**	**1.06E-01**	**6.00E-03**	**1.31E+03**	**2.58E+00**	**6.82E+01**	**1.88E-02**	**5.84E+00**	**9.09E+02**

Facility:
MAMIE 4-25-3-3WH

Criteria Pollutant Emission Summary

			Uncontrolled Actuals (TPY)												
Type	ID No.	Name	VOC	HAP	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	CH_4	CO_2e	N_2O^{**}	CO_2e	Total CO_2e
Existing Sources															
Engine	1	ENG-1	1.54E+00	8.17E-02	2.20E+00	4.40E+00	4.91E-02	4.91E-02	1.49E-03	2.78E+02	5.82E-01	1.22E+01			2.90E+02
Treater Burner	2	HTRTRTR-1	2.36E-02	8.11E-03	4.29E-01	3.61E-01	3.26E-02	3.26E-02	2.58E-03	5.15E+02	9.88E-03	2.07E-01	9.45E-03	2.93E+00	5.18E+02
Oil Well Fugitives	3	FUG-1	5.42E-02	1.01E-02							6.02E-01	1.26E+01			1.26E+01
Oil Tank	4	OILTK-1	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank	5	OILTK-2	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank	6	OILTK-3	6.00E+00	1.40E+00							9.80E-01	2.06E+01			2.06E+01
Oil Tank Unloading	7	OILTKLOAD-1	2.31E+00	4.17E-01							2.91E-01	7.28E+00			7.28E+00
Pneumatic Controllers	8	PCONT-1	8.85E-02								9.64E-01	2.02E+01			2.02E+01
Water Tank	9	PWTANK-1	2.74E-01	1.28E-02							9.31E-01	1.95E+01			
Small Storage Tanks	10	SMTANKS-1	2.05E-02												
Heater	11	TANKHTR1	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Heater	12	TANKHTR2	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Heater	13	TANKHTR3	5.90E-03	2.03E-03	1.07E-01	9.02E-02	8.16E-03	8.16E-03	6.44E-04	1.29E+02	2.47E-03	5.19E-02	2.36E-03	7.32E-01	
Flare	14	FLARE-1	3.00E-02		3.93E-02	2.14E-01				6.80E+01	4.45E-02	1.38E+01	1.25E-03	3.87E-01	
Proposed Sources															
Engine	15	ENG-2													
Treater Burner	16	HTRTRTR-2													
Oil Well Fugitives	17	FUG-2													
Oil Tank	18	OILTK-4													
Oil Tank	19	OILTK-5													
Oil Tank	20	OILTK-6													
Oil Tank Unloading	21	OILTKLOAD-2													
Pneumatic Controllers	22	PCONT-2													
Water Tank	23	PWTANK-2													
Small Storage Tanks	24	SMTANKS-2													
Heater	25	TANKHTR4													
Heater	26	TANKHTR5													
Heater	27	TANKHTR6													
Flare	28	FLARE-2													
			2.24E+01	**4.74E+00**	**2.99E+00**	**5.25E+00**	**1.06E-01**	**1.06E-01**	**6.00E-03**	**1.25E+03**	**6.37E+00**	**1.48E+02**	**1.78E-02**	**5.51E+00**	**9.11E+02**

Facility:
MAMIE 4-25-3-3WH

HAP Emission Summary

			Controlled PTE (TPY)										
Type	**ID No.**	**Name**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylene**	**2,2,4-Tri-methylpentane**	**Acrolien**	**Acetal-dehyde**	**n-Hexane**	**Methanol**	**1,3-Butadiene**	**Formal-dehyde**
Existing Sources													
Engine	1	ENG-1	4.00E-03	1.41E-03	6.27E-05	4.93E-04		6.65E-03	7.06E-03		7.74E-03	1.68E-03	5.19E-02
Treater Burner	2	HTRTRTR-1	9.02E-06	1.46E-05						7.73E-03			3.22E-04
Oil Well Fugitives	3	FUG-1	1.30E-03	1.25E-03	6.22E-05	2.41E-04	1.56E-04						
Oil Tank	4	OILTK-1	6.23E-04	1.42E-03	1.63E-04	2.84E-04	3.28E-04			2.52E-02			
Oil Tank	5	OILTK-2	6.23E-04	1.42E-03	1.63E-04	2.84E-04	3.28E-04			2.52E-02			
Oil Tank	6	OILTK-3	6.23E-04	1.42E-03	1.63E-04	2.84E-04	3.28E-04			2.52E-02			
Oil Tank Unloading	7	OILTKLOAD-1	9.26E-03	2.11E-02	2.42E-03	4.21E-03	4.88E-03			3.75E-01			
Pneumatic Controllers	8	PCONT-1	2.12E-03	2.05E-03	1.02E-04	3.94E-04	2.54E-04						
Water Tank	9	PWTANK-1	5.48E-05	1.64E-04	3.29E-06	3.29E-05							
Small Storage Tanks	10	SMTANKS-1									2.05E-02		
Heater	11	TANKHTR1	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	12	TANKHTR2	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	13	TANKHTR3	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Flare	14	FLARE-1											
Proposed Sources													
Engine	15	ENG-2	1.30E-02	4.60E-03	2.04E-04	1.61E-03		2.17E-02	2.30E-02		2.52E-02	5.47E-03	1.69E-01
Treater Burner	16	HTRTRTR-2	9.02E-06	1.46E-05						7.73E-03			3.22E-04
Oil Well Fugitives	17	FUG-2	1.30E-03	1.25E-03	6.22E-05	2.41E-04	1.56E-04						
Oil Tank	18	OILTK-4	2.87E-03	6.56E-03	7.50E-04	1.31E-03	1.51E-03			1.16E-01			
Oil Tank	19	OILTK-5	2.87E-03	6.56E-03	7.50E-04	1.31E-03	1.51E-03			1.16E-01			
Oil Tank	20	OILTK-6	2.87E-03	6.56E-03	7.50E-04	1.31E-03	1.51E-03			1.16E-01			
Oil Tank Unloading	21	OILTKLOAD-2	3.19E-03	7.29E-03	8.34E-04	1.45E-03	1.68E-03			1.29E-01			
Pneumatic Controllers	22	PCONT-2	2.12E-03	2.05E-03	1.02E-04	3.94E-04	2.54E-04						
Water Tank	23	PWTANK-2	2.74E-04	8.21E-04	1.64E-05	1.64E-04							
Small Storage Tanks	24	SMTANKS-2									2.05E-02		
Heater	25	TANKHTR4	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	26	TANKHTR5	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	27	TANKHTR6	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Flare	28	FLARE-2											
Totals (TPY)			**4.72E-02**	**6.60E-02**	**6.60E-03**	**1.40E-02**	**1.29E-02**	**2.83E-02**	**3.01E-02**	**9.56E-01**	**7.40E-02**	**7.14E-03**	**2.22E-01**

Facility:
MAMIE 4-25-3-3WH

HAP Emission Summary

			Uncontrolled PTE (TPY)										
Type	**ID No.**	**Name**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylene**	**2,2,4-Tri-methylpentane**	**Acrolien**	**Acetal-dehyde**	**n-Hexane**	**Methanol**	**1,3-Butadiene**	**Formal-dehyde**
Existing Sources													
Engine	1	ENG-1	4.00E-03	1.41E-03	6.27E-05	4.93E-04		6.65E-03	7.06E-03		7.74E-03	1.68E-03	5.19E-02
Treater Burner	2	HTRTRTR-1	9.02E-06	1.46E-05						7.73E-03			3.22E-04
Oil Well Fugitives	3	FUG-1	1.30E-03	1.25E-03	6.22E-05	2.41E-04	1.56E-04						
Oil Tank	4	OILTK-1	3.12E-02	7.11E-02	8.13E-03	1.42E-02	1.64E-02			1.26E+00			
Oil Tank	5	OILTK-2	3.12E-02	7.11E-02	8.13E-03	1.42E-02	1.64E-02			1.26E+00			
Oil Tank	6	OILTK-3	3.12E-02	7.11E-02	8.13E-03	1.42E-02	1.64E-02			1.26E+00			
Oil Tank Unloading	7	OILTKLOAD-1	9.26E-03	2.11E-02	2.42E-03	4.21E-03	4.88E-03			3.75E-01			
Pneumatic Controllers	8	PCONT-1	2.12E-03	2.05E-03	1.02E-04	3.94E-04	2.54E-04						
Water Tank	9	PWTANK-1	2.74E-03	8.21E-03	1.64E-04	1.64E-03							
Small Storage Tanks	10	SMTANKS-1									2.05E-02		
Heater	11	TANKHTR1	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	12	TANKHTR2	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	13	TANKHTR3	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Flare	14	FLARE-1											
Proposed Sources													
Engine	15	ENG-2	1.30E-02	4.60E-03	2.04E-04	1.61E-03		2.17E-02	2.30E-02		2.52E-02	5.47E-03	1.69E-01
Treater Burner	16	HTRTRTR-2	9.02E-06	1.46E-05						7.73E-03			3.22E-04
Oil Well Fugitives	17	FUG-2	1.30E-03	1.25E-03	6.22E-05	2.41E-04	1.56E-04						
Oil Tank	18	OILTK-4	1.44E-01	3.28E-01	3.75E-02	6.54E-02	7.57E-02			5.82E+00			
Oil Tank	19	OILTK-5	1.44E-01	3.28E-01	3.75E-02	6.54E-02	7.57E-02			5.82E+00			
Oil Tank	20	OILTK-6	1.44E-01	3.28E-01	3.75E-02	6.54E-02	7.57E-02			5.82E+00			
Oil Tank Unloading	21	OILTKLOAD-2	4.63E-02	1.06E-01	1.21E-02	2.11E-02	2.44E-02			1.87E+00			
Pneumatic Controllers	22	PCONT-2	2.12E-03	2.05E-03	1.02E-04	3.94E-04	2.54E-04						
Water Tank	23	PWTANK-2	1.37E-02	4.11E-02	8.21E-04	8.21E-03							
Small Storage Tanks	24	SMTANKS-2									2.05E-02		
Heater	25	TANKHTR4	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	26	TANKHTR5	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Heater	27	TANKHTR6	2.25E-06	3.65E-06						1.93E-03			8.05E-05
Flare	28	FLARE-2											
Totals (TPY)			**6.21E-01**	**1.39E+00**	**1.53E-01**	**2.77E-01**	**3.07E-01**	**2.83E-02**	**3.01E-02**	**2.35E+01**	**7.40E-02**	**7.14E-03**	**2.22E-01**

Facility:
MAMIE 4-25-3-3WH

HAP Emission Summary

Type	ID No.	Name	Controlled PTE (lb/hr) Benzene	Toluene	Ethyl-benzene	Xylene	2,2,4-Tri-methylpentane	Acrolien	Acetal-dehyde	n-Hexane	Methanol	1,3-Butadiene	Formal-dehyde
Existing Sources													
Engine	1	ENG-1	9.12E-04	3.22E-04	1.43E-05	1.13E-04		1.52E-03	1.61E-03		1.77E-03	3.83E-04	1.18E-02
Treater Burner	2	HTRTRTR-1	2.06E-06	3.33E-06						1.76E-03			7.35E-05
Oil Well Fugitives	3	FUG-1	2.96E-04	2.86E-04	1.42E-05	5.50E-05	3.55E-05						
Oil Tank	4	OILTK-1	1.42E-04	3.25E-04	3.71E-05	6.48E-05	7.50E-05			5.76E-03			
Oil Tank	5	OILTK-2	1.42E-04	3.25E-04	3.71E-05	6.48E-05	7.50E-05			5.76E-03			
Oil Tank	6	OILTK-3	1.42E-04	3.25E-04	3.71E-05	6.48E-05	7.50E-05			5.76E-03			
Oil Tank Unloading	7	OILTKLOAD-1	7.78E-02	1.78E-01	2.03E-02	3.54E-02	4.10E-02			3.15E+00			
Pneumatic Controllers	8	PCONT-1	4.85E-04	4.67E-04	2.32E-05	8.99E-05	5.80E-05						
Water Tank	9	PWTANK-1	1.25E-05	3.75E-05	7.50E-07	7.50E-06							
Small Storage Tanks	10	SMTANKS-1									4.68E-03		
Heater	11	TANKHTR1	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	12	TANKHTR2	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	13	TANKHTR3	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Flare	14	FLARE-1											
Proposed Sources													
Engine	15	ENG-2	2.97E-03	1.05E-03	4.67E-05	3.67E-04		4.95E-03	5.25E-03		5.76E-03	1.25E-03	3.86E-02
Treater Burner	16	HTRTRTR-2	2.06E-06	3.33E-06						1.76E-03			7.35E-05
Oil Well Fugitives	17	FUG-2	2.96E-04	2.86E-04	1.42E-05	5.50E-05	3.55E-05						
Oil Tank	18	OILTK-4	6.56E-04	1.50E-03	1.71E-04	2.99E-04	3.46E-04			2.66E-02			
Oil Tank	19	OILTK-5	6.56E-04	1.50E-03	1.71E-04	2.99E-04	3.46E-04			2.66E-02			
Oil Tank	20	OILTK-6	6.56E-04	1.50E-03	1.71E-04	2.99E-04	3.46E-04			2.66E-02			
Oil Tank Unloading	21	OILTKLOAD-2	5.37E-03	1.22E-02	1.40E-03	2.44E-03	2.83E-03			2.17E-01			
Pneumatic Controllers	22	PCONT-2	4.85E-04	4.67E-04	2.32E-05	8.99E-05	5.80E-05						
Water Tank	23	PWTANK-2	6.25E-05	1.88E-04	3.75E-06	3.75E-05							
Small Storage Tanks	24	SMTANKS-2									4.68E-03		
Heater	25	TANKHTR4	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	26	TANKHTR5	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	27	TANKHTR6	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Flare	28	FLARE-2											
Totals (lb/hr)			**9.11E-02**	**1.98E-01**	**2.25E-02**	**3.98E-02**	**4.53E-02**	**6.47E-03**	**6.86E-03**	**3.47E+00**	**1.69E-02**	**1.63E-03**	**5.07E-02**

Facility:
MAMIE 4-25-3-3WH

HAP Emission Summary

Type	ID No.	Name	Uncontrolled PTE (lb/hr) Benzene	Toluene	Ethyl-benzene	Xylene	2,2,4-Tri-methylpentane	Acrolien	Acetal-dehyde	n-Hexane	Methanol	1,3-Butadiene	Formal-dehyde
Existing Sources													
Engine	1	ENG-1	9.12E-04	3.22E-04	1.43E-05	1.13E-04		1.52E-03	1.61E-03		1.77E-03	3.83E-04	1.18E-02
Treater Burner	2	HTRTRTR-1	2.06E-06	3.33E-06						1.76E-03			7.35E-05
Oil Well Fugitives	3	FUG-1	2.96E-04	2.86E-04	1.42E-05	5.50E-05	3.55E-05						
Oil Tank	4	OILTK-1	7.12E-03	1.62E-02	1.86E-03	3.24E-03	3.75E-03			2.88E-01			
Oil Tank	5	OILTK-2	7.12E-03	1.62E-02	1.86E-03	3.24E-03	3.75E-03			2.88E-01			
Oil Tank	6	OILTK-3	7.12E-03	1.62E-02	1.86E-03	3.24E-03	3.75E-03			2.88E-01			
Oil Tank Unloading	7	OILTKLOAD-1	7.78E-02	1.78E-01	2.03E-02	3.54E-02	4.10E-02			3.15E+00			
Pneumatic Controllers	8	PCONT-1	4.85E-04	4.67E-04	2.32E-05	8.99E-05	5.80E-05						
Water Tank	9	PWTANK-1	6.25E-04	1.88E-03	3.75E-05	3.75E-04							
Small Storage Tanks	10	SMTANKS-1									4.68E-03		
Heater	11	TANKHTR1	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	12	TANKHTR2	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	13	TANKHTR3	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Flare	14	FLARE-1											
Proposed Sources													
Engine	15	ENG-2	2.97E-03	1.05E-03	4.67E-05	3.67E-04		4.95E-03	5.25E-03		5.76E-03	1.25E-03	3.86E-02
Treater Burner	16	HTRTRTR-2	2.06E-06	3.33E-06						1.76E-03			7.35E-05
Oil Well Fugitives	17	FUG-2	2.96E-04	2.86E-04	1.42E-05	5.50E-05	3.55E-05						
Oil Tank	18	OILTK-4	3.28E-02	7.49E-02	8.56E-03	1.49E-02	1.73E-02			1.33E+00			
Oil Tank	19	OILTK-5	3.28E-02	7.49E-02	8.56E-03	1.49E-02	1.73E-02			1.33E+00			
Oil Tank	20	OILTK-6	3.28E-02	7.49E-02	8.56E-03	1.49E-02	1.73E-02			1.33E+00			
Oil Tank Unloading	21	OILTKLOAD-2	7.78E-02	1.78E-01	2.03E-02	3.54E-02	4.10E-02			3.15E+00			
Pneumatic Controllers	22	PCONT-2	4.85E-04	4.67E-04	2.32E-05	8.99E-05	5.80E-05						
Water Tank	23	PWTANK-2	3.13E-03	9.38E-03	1.88E-04	1.88E-03							
Small Storage Tanks	24	SMTANKS-2									4.68E-03		
Heater	25	TANKHTR4	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	26	TANKHTR5	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Heater	27	TANKHTR6	5.10E-07	8.30E-07						4.41E-04			1.84E-05
Flare	28	FLARE-2											
Totals (lb/hr)			**2.85E-01**	**6.43E-01**	**7.22E-02**	**1.28E-01**	**1.45E-01**	**6.47E-03**	**6.86E-03**	**1.12E+01**	**1.69E-02**	**1.63E-03**	**5.07E-02**

1. Company:	Newfield Exploration	**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Engine		
5. Emission Point:	ID Number: 1 Name: ENG-1	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Baldor 170 kW Gen, NG, 277/480 V		
8. Fuel Consumption:	22.18 MMscf/yr	9. Operating Schedule:	8,760 Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	4.91E-02	4.91E-02
PM_{10}	4.91E-02	4.91E-02
$PM_{2.5}$	4.91E-02	4.91E-02
SO_X	1.49E-03	1.49E-03
NO_X	2.20E+00	2.20E+00
CO	4.40E+00	4.40E+00
VOC	1.54E+00	1.54E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Engine		
5. Emission Point:	ID Number: 1 Name: ENG-1	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Baldor 170 kW Gen, NG, 277/480 V		
8. Fuel Consumption:	22.18 MMscf/yr	9. Operating Schedule:	8,760 Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	4.91E-02	4.91E-02
PM_{10}	4.91E-02	4.91E-02
$PM_{2.5}$	4.91E-02	4.91E-02
SO_X	1.49E-03	1.49E-03
NO_X	2.20E+00	2.20E+00
CO	4.40E+00	4.40E+00
VOC	1.54E+00	1.54E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

ENG-1

ENGINE Potential to Emit

228	MAX HP	2533	FUEL CONSUMPTION	0%	NOx DRE	0%	CO DRE	0%	VOC DRE	0%	HAP DRE

NO_x:	**1.00**	g/HP-HR	x	**228**	HP	x	1 lb / 453.6 g	=	**5.03E-01**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**2.20E+00** NO_x TPY
CO:	**2.00**	g/HP-HR	x	**228**	HP	x	1 lb / 453.6 g	=	**1.01E+00**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**4.40E+00** CO TPY
VOC:	**0.70**	g/HP-HR	x	**228**	HP	x	1 lb / 453.6 g	=	**3.52E-01**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**1.54E+00** VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.58**	MMBtu/hr			=	**3.40E-04**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**1.49E-03** SO_2 TPY
PM:	**0.0194**	lb/MMBtu	x	**0.58**	MMBtu/hr			=	**1.12E-02**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**4.91E-02** PM TPY
$PM_{2.5}$:	**0.0194**	lb/MMBtu	x	**0.58**	MMBtu/hr			=	**1.12E-02**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**4.91E-02** $PM_{2.5}$ TPY

NOx, CO & VOC Emission Factors are from manufacturer's data. SO_2, PM, & $PM_{2.5}$ & HAPs Emission Factors are from AP-42 Table 3.2-1, Table 3.2-2, or Table 3.2-3.

1. Company:	Newfield Exploration		**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Treater Burner			
5. Emission Point:	ID Number 2	Name HTRTRTR-1	7. Identification and Description of Control Equipment	
6. Description of Equipment:	Oil/Water Separation Unit		None	
8. Type of Fuel Used:	Natural Gas		9. Amount of Fuel Used:	8,760,000,000 Btu/year
10. Burner Rating:	1,000,000 BTU/hr		11. Operating Schedule:	8,760 Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	3.26E-02	3.26E-02
PM_{10}	3.26E-02	3.26E-02
$PM_{2.5}$	3.26E-02	3.26E-02
SO_X	2.58E-03	2.58E-03
NO_X	4.29E-01	4.29E-01
CO	3.61E-01	3.61E-01
VOC	2.36E-02	2.36E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration			**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Treater Burner				
5. Emission Point:	ID Number	Name	7. Identification and Description of Control Equipment		
	2	HTRTRTR-1	None		
6. Description of Equipment:	Oil/Water Separation Unit				
8. Type of Fuel Used:	Natural Gas		9. Amount of Fuel Used:	8,760,000,000	Btu/year
10. Burner Rating:	1,000,000	BTU/hr	11. Operating Schedule:	8,760	Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	3.26E-02	3.26E-02
PM_{10}	3.26E-02	3.26E-02
$PM_{2.5}$	3.26E-02	3.26E-02
SO_X	2.58E-03	2.58E-03
NO_X	4.29E-01	4.29E-01
CO	3.61E-01	3.61E-01
VOC	2.36E-02	2.36E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

HTRTRTR-1

Burner Rating **1,000,000** Btu/hr

NO_x:	0.10 lb/MMBtu	x	1.00 MMBtu/hr			=	**9.80E-02** lb/hr	
	9.80E-02 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**4.29E-01** TPY	
CO:	0.082 lb/MMBtu	x	1.00 MMBtu/hr			=	**8.24E-02** lb/hr	
	8.24E-02 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.61E-01** TPY	
VOC:	0.0054 lb/MMBtu	x	1.00 MMBtu/hr			=	**5.39E-03** lb/hr	
	5.39E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**2.36E-02** TPY	
SO_2:	0.0006 lb/MMBtu	x	1.00 MMBtu/hr			=	**5.88E-04** lb/hr	
	5.88E-04 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**2.58E-03** TPY	
PM:	0.0075 lb/MMBtu	x	1.00 MMBtu/hr			=	**7.45E-03** lb/hr	
	7.45E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.26E-02** TPY	

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

Newfield MAMIE 4-25-3-3WH

HTRTRTR-1

Burner Rating **1,000,000** Btu/hr

Benzene:	2.06E-06 lb/MMBtu	x	1.00 MMBtu/hr			=	**2.06E-06** lb/hr
	2.06E-06 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**9.02E-06** TPY
Toluene:	3.33E-06 lb/MMBtu	x	1.00 MMBtu/hr			=	**3.33E-06** lb/hr
	3.33E-06 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**1.46E-05** TPY
n-Hexane:	1.76E-03 lb/MMBtu	x	1.00 MMBtu/hr			=	**1.76E-03** lb/hr
	1.76E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**7.73E-03** TPY
Formaldehyde:	7.35E-05 lb/MMBtu	x	1.00 MMBtu/hr			=	**7.35E-05** lb/hr
	7.35E-05 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.22E-04** TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company: Newfield Exploration		**Potential Emissions**
2. Site/Source: MAMIE 4-25-3-3WH		3. Date: 2/7/2019
4. Type of Operation: Oil and Gas Production Well Fugitives		
5. Emission Point: ID Number: 3 Name: FUG-1		7. Identification and Description of Control Equipment: N/A
6. Description of Equipment: Oil Well Fugitive Emissions		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	5.42E-02	5.42E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company: Newfield Exploration		**Actual Emissions**
2. Site/Source: MAMIE 4-25-3-3WH		3. Date: 2/7/2019
4. Type of Operation: Oil and Gas Production Well Fugitives		
5. Emission Point: ID Number 3	Name FUG-1	7. Identification and Description of Control Equipment N/A
6. Description of Equipment: Oil Well Fugitive Emissions		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	5.42E-02	5.42E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

OIL PRODUCTION WELL FUGITIVES 1

Newfield MAMIE 4-25-3-3WH

EQUIPMENT TYPE AND SERVICE	NUMBER OF UNITS[1]	HOURS OF OPERATION (hours/yr)	VOC WEIGHT FRACTION[2]	CH_4 WEIGHT FRACTION[2]	EMISSION FACTOR[3] (kg/hr-unit)	EMISSION FACTOR (lb/hr-unit)	VOC EMISSIONS (tons/yr)	CH_4 EMISSIONS (tons/yr)
Wellhead								
Valves	5	8760	0.070	0.775	0.0025	0.005525	8.43E-03	9.37E-02
Connectors	4	8760	0.070	0.775	0.00021	0.0004641	5.66E-04	6.30E-03
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	10	8760	0.070	0.775	0.00011	0.0002431	7.42E-04	8.25E-03
Other	1	8760	0.070	0.775	0.0075	0.016575	5.06E-03	5.62E-02
Separator								
Valves	6	8760	0.070	0.775	0.0025	0.005525	1.01E-02	1.12E-01
Connectors	10	8760	0.070	0.775	0.00021	0.0004641	1.42E-03	1.57E-02
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	12	8760	0.070	0.775	0.00011	0.0002431	8.90E-04	9.90E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
Heater Treater								
Valves	8	8760	0.070	0.775	0.0025	0.005525	1.35E-02	1.50E-01
Connectors	20	8760	0.070	0.775	0.00021	0.0004641	2.83E-03	3.15E-02
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	12	8760	0.070	0.775	0.00011	0.0002431	8.90E-04	9.90E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
Header								
Valves	5	8760	0.070	0.775	0.0025	0.005525	8.43E-03	9.37E-02
Connectors	4	8760	0.070	0.775	0.00021	0.0004641	5.66E-04	6.30E-03
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	10	8760	0.070	0.775	0.00011	0.0002431	7.42E-04	8.25E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
TOTAL EMISSIONS (tons/yr)							**5.42E-02**	**6.02E-01**

Pollutant	Weight Fraction[2]	HAP Emissions (tons/yr)	HAP Emissions (lb/hr)
n-Hexane	0.00000	0.00E+00	0.00E+00
Benzene	0.00167	1.30E-03	2.96E-04
2,2,4 Trimethylpentane	0.00020	1.55E-04	3.55E-05
Toluene	0.00161	1.25E-03	2.86E-04
Ethylbenzene	0.00008	6.22E-05	1.42E-05
M&P XylenesO-Xylenes	0.00031	2.41E-04	5.50E-05
Total HAPs		**3.01E-03**	**6.87E-04**

[1]Average component count from Table W-1C to Subpart W of Part 98-Default Average Component Counts For Major Crude Oil Production Equipment.

[2]Based on gas composition and properties from samples collected at the KM Bar F fuel tap. HAPs values from samples collected at 12 different Newfield sites.

[3]"Protocol for Equipment Leak Emission Estimates," EPA-453/R-95-017, Table 2-4, Light Oil

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number: 4 Name: OILTK-1	7. Identification and Description of Control Equipment	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		Flare
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration	**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point: ID Number	Name	7. Identification and Description of Control Equipment	
4	OILTK-1	Flare	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

OILTK-1	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	18,250	**bbls/yr**
Throughput (bbls/day)	50.00	**bbls/day**
Gas Flash Rate (SCFD):	332.0	scfd
Gas Flash Rate (lbs./day):	37.49	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Hydrogen Sufide	0.000%	34.080	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Nitrogen	3.093%	28.013	0.8664	2.022%	0.0202	3.16E-02	**1.38E-01**
Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	1.21E-02	**5.28E-02**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	1.97E-01	**8.62E-01**
Ethane	15.073%	30.070	4.5325	10.577%	0.1058	1.65E-01	**7.24E-01**
Propane	13.269%	44.097	5.8513	13.654%	0.1365	2.13E-01	**9.34E-01**
Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	6.53E-02	**2.86E-01**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	1.65E-01	**7.24E-01**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	7.64E-02	**3.35E-01**
n-Pentane	4.186%	72.150	3.0205	7.048%	0.0705	1.10E-01	**4.82E-01**
2,2 Dimethylbutane	0.158%	86.178	0.1363	0.318%	0.0032	4.97E-03	**2.18E-02**
Cyclopentane	1.187%	70.100	0.8324	1.942%	0.0194	3.03E-02	**1.33E-01**
2,3 Dimethylbutane	0.237%	86.178	0.2046	0.477%	0.0048	7.46E-03	**3.27E-02**
2 Methylpentane	0.481%	86.178	0.4145	0.967%	0.0097	1.51E-02	**6.62E-02**
3 Methylpentane	0.283%	86.178	0.2441	0.570%	0.0057	8.90E-03	**3.90E-02**
n-Hexane	8.062%	86.178	6.9478	16.213%	0.1621	2.53E-01	**1.11E+00**
Methylcyclopentane	0.953%	84.160	0.8020	1.872%	0.0187	2.92E-02	**1.28E-01**
Benzene	0.220%	78.114	0.1717	0.401%	0.0040	6.26E-03	**2.74E-02**
Cyclohexane	0.225%	84.160	0.1890	0.441%	0.0044	6.89E-03	**3.02E-02**
2-Methylhexane	0.056%	100.200	0.0563	0.131%	0.0013	2.05E-03	**8.99E-03**
3-Methylhexane	0.080%	100.200	0.0806	0.188%	0.0019	2.94E-03	**1.29E-02**
2,2,4 Trimethylpentane	0.079%	114.230	0.0905	0.211%	0.0021	3.30E-03	**1.44E-02**

FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

OILTK-1	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	18,250	**bbls/yr**
Throughput (bbls/day)	50.00	**bbls/day**
Gas Flash Rate (SCFD):	332.0	scfd
Gas Flash Rate (lbs./day):	37.49	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Other C7's	1.588%	100.272	1.5925	3.716%	0.0372	5.81E-02	**2.54E-01**
n-Heptane	0.635%	100.272	0.6367	1.486%	0.0149	2.32E-02	**1.02E-01**
Mehtylcyclohexane	0.712%	98.190	0.6995	1.632%	0.0163	2.55E-02	**1.12E-01**
Toluene	0.425%	92.140	0.3918	0.914%	0.0091	1.43E-02	**6.26E-02**
Other C8's	0.367%	114.230	0.4192	0.978%	0.0098	1.53E-02	**6.69E-02**
n-Octane	0.198%	114.230	0.2257	0.527%	0.0053	8.23E-03	**3.60E-02**
Ethylbenzene	0.042%	106.170	0.0448	0.105%	0.0010	1.63E-03	**7.15E-03**
M&P Xylenes	0.061%	106.170	0.0652	0.152%	0.0015	2.38E-03	**1.04E-02**
O-Xylenes	0.012%	106.170	0.0130	0.030%	0.0003	4.72E-04	**2.07E-03**
Other C9's	0.063%	128.258	0.0811	0.189%	0.0019	2.95E-03	**1.29E-02**
n-Nonane	0.034%	128.258	0.0434	0.101%	0.0010	1.58E-03	**6.92E-03**
Other C10's	0.024%	142.280	0.0347	0.081%	0.0008	1.27E-03	**5.54E-03**
n-Decane	0.007%	142.280	0.0097	0.023%	0.0002	3.53E-04	**1.54E-03**
Undecanes+	0.004%	156.310	0.0056	0.013%	0.0001	2.05E-04	**8.98E-04**
Total	**100.000%**		42.853	100.000%			
					Total:	**1.5621E+00**	**6.8419E+00**

VOC INFO	
Mole % VOCs	47.44%
Total NM/NE Stream MW VOCs	31.726
lb Voc / mmscf	83602.308
MMSCF/YR	0.121

	Uncontrolled Emissions, (lb/hr)	**Uncontrolled Emissions, (tpy)**
Total VOC:	1.16E+00	**5.07E+00**
Total Me/Eth	3.62E-01	1.59E+00

AP-42 TANK WORKING and BREATHING EMISSIONS

OILTK-1 **Newfield MAMIE 4-25-3-3WH**

INPUT DATA				
	Symbol	**PTE**	**Units**	
Molecular Weight				
Molecular weight	Mv	50	Lb/lb-mole	
Tank design data				
Shell height	Hs	20.00	ft	
Diameter	D	12.00	ft	
Liquid height	Hl	20.00	ft	
Avg. Liquid height	Hl	10.00	ft	
vapor space outage	Hvo	10.00	ft	
Tank volume		16,921	gallons	
Turnovers	N	45		
Net throughput	Q	18250.00	bbl/yr	
Tunover factor	KN	0.829		
Working loss product factor	Kp	0.75		From AP-42, 11/06 Section 7 Equ. 1-31, page 7.1-19
Meteorological data				
Daily ave. ambient temp.	TAA	51.9625	°F	From TANKS
Daily max. ambient temp.	TAX	63.641667	°F	for Salt Lake
Daily min. ambient temp.	TAN	40.283333	°F	City, UT
Daily ambient temp. range	DTA	23.36	°F	
Tank paint solar absorptance (see adjacent table)	α	0.68	[2]	Tank color gray, condition good
Daily total insolation factor	I	1,452.11835	Btu/ft2-day	From TANKS for Salt Lake City, UT
Site elevation (feet)		4,162		
Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	
CALCULATIONS				
	Symbol		**Units**	
Breathing losses				
Tank vapor space volume	Vv	1,130.98	ft3	
Vapor density	Wv	2.834E-02	lb/ft3	
Vapor space expansion factor	KE	0.01427		
Vented vapor saturation factor	Ks	0.3713	ft2	
Breathing losses	LB	62.02	lb/yr	
Working losses	Lw	1,812.02	lb/yr	
TOTAL LOSSES	LT	**0.21**	lb/hr	
		1,874.04	lb/yr	
		0.9370	tpy	
		38.97	scfd	
HAP Emissions[2]	Wt%			
n-Hexane	16.21%	**0.15**	tpy	
Benzene	0.40%	**0.00**	tpy	
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy	
Toluene	0.91%	**0.01**	tpy	
Ethylbenzene	0.10%	**0.00**	tpy	
Xylenes	0.18%	**0.00**	tpy	

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.

[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-1

Potential to Emit Emission Calculations

Maximum Tank Vapor	**15.5**	scf/hr
Lower Heating Value	**2,222**	Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**1.37E+00**	lb/hr	x	100% - 98%	=	**2.74E-02**	lb/hr
	6.00E+00	TPY	x	100% - 98%	=	**1.20E-01**	TPY
Benzene:	**7.12E-03**	lb/hr	x	100% - 98%	=	**1.42E-04**	lb/hr
	3.12E-02	TPY	x	100% - 98%	=	**6.23E-04**	TPY
Toluene:	**1.62E-02**	lb/hr	x	100% - 98%	=	**3.25E-04**	lb/hr
	7.11E-02	TPY	x	100% - 98%	=	**1.42E-03**	TPY
Ethylbenzene:	**1.86E-03**	lb/hr	x	100% - 98%	=	**3.71E-05**	lb/hr
	8.13E-03	TPY	x	100% - 98%	=	**1.63E-04**	TPY
Xylenes:	**3.24E-03**	lb/hr	x	100% - 98%	=	**6.48E-05**	lb/hr
	1.42E-02	TPY	x	100% - 98%	=	**2.84E-04**	TPY
n-Hexane:	**2.88E-01**	lb/hr	x	100% - 98%	=	**5.76E-03**	lb/hr
	1.26E+00	TPY	x	100% - 98%	=	**2.52E-02**	TPY
2,2,4-Trimethyl-pentane:	**3.75E-03**	lb/hr	x	100% - 98%	=	**7.50E-05**	lb/hr
	1.64E-02	TPY	x	100% - 98%	=	**3.28E-04**	TPY

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number: 5 Name: OILTK-2	7. Identification and Description of Control Equipment	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		Flare
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration	**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point: ID Number	Name	7. Identification and Description of Control Equipment	
5	OILTK-2	Flare	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
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Pb - Lead and lead compounds
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H_2SO_4 - Sulfuric Acid Mist
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TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

OILTK-2	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	18,250	**bbls/yr**
Throughput (bbls/day)	50.00	**bbls/day**
Gas Flash Rate (SCFD):	332.0	scfd
Gas Flash Rate (lbs./day):	37.49	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

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Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	1.21E-02	**5.28E-02**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	1.97E-01	**8.62E-01**
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Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	6.53E-02	**2.86E-01**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	1.65E-01	**7.24E-01**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	7.64E-02	**3.35E-01**
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FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

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Total Me/Eth	3.62E-01	1.59E+00

AP-42 TANK WORKING and BREATHING EMISSIONS
OILTK-2 **Newfield MAMIE 4-25-3-3WH**

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Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	

CALCULATIONS			
	Symbol		**Units**
Breathing losses			
Tank vapor space volume	Vv	1,130.98	ft3
Vapor density	Wv	2.834E-02	lb/ft3
Vapor space expansion factor	KE	0.01427	
Vented vapor saturation factor	Ks	0.3713	ft2
Breathing losses	LB	62.02	lb/yr
Working losses	Lw	1,812.02	lb/yr
TOTAL LOSSES	LT	**0.21**	lb/hr
		1,874.04	lb/yr
		0.9370	tpy
		38.97	scfd
HAP Emissions[2]	Wt%		
n-Hexane	16.21%	**0.15**	tpy
Benzene	0.40%	**0.00**	tpy
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy
Toluene	0.91%	**0.01**	tpy
Ethylbenzene	0.10%	**0.00**	tpy
Xylenes	0.18%	**0.00**	tpy

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.
[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-2

Potential to Emit Emission Calculations

Maximum Tank Vapor	**15.5**	scf/hr
Lower Heating Value	**2,222**	Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**1.37E+00**	lb/hr	x	100% - 98%	=	**2.74E-02**	lb/hr
	6.00E+00	TPY	x	100% - 98%	=	**1.20E-01**	TPY
Benzene:	**7.12E-03**	lb/hr	x	100% - 98%	=	**1.42E-04**	lb/hr
	3.12E-02	TPY	x	100% - 98%	=	**6.23E-04**	TPY
Toluene:	**1.62E-02**	lb/hr	x	100% - 98%	=	**3.25E-04**	lb/hr
	7.11E-02	TPY	x	100% - 98%	=	**1.42E-03**	TPY
Ethylbenzene:	**1.86E-03**	lb/hr	x	100% - 98%	=	**3.71E-05**	lb/hr
	8.13E-03	TPY	x	100% - 98%	=	**1.63E-04**	TPY
Xylenes:	**3.24E-03**	lb/hr	x	100% - 98%	=	**6.48E-05**	lb/hr
	1.42E-02	TPY	x	100% - 98%	=	**2.84E-04**	TPY
n-Hexane:	**2.88E-01**	lb/hr	x	100% - 98%	=	**5.76E-03**	lb/hr
	1.26E+00	TPY	x	100% - 98%	=	**2.52E-02**	TPY
2,2,4-Trimethyl-pentane:	**3.75E-03**	lb/hr	x	100% - 98%	=	**7.50E-05**	lb/hr
	1.64E-02	TPY	x	100% - 98%	=	**3.28E-04**	TPY

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number: 6 Name: OILTK-3	7. Identification and Description of Control Equipment	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		Flare
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration	**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point: ID Number	Name	7. Identification and Description of Control Equipment	
6	OILTK-3	Flare	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		
8. Throughput:	18,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.02E-02
CO		5.57E-02
VOC	6.00E+00	1.20E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

OILTK-3	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	18,250	**bbls/yr**
Throughput (bbls/day)	50.00	**bbls/day**
Gas Flash Rate (SCFD):	332.0	scfd
Gas Flash Rate (lbs./day):	37.49	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Hydrogen Sufide	0.000%	34.080	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Nitrogen	3.093%	28.013	0.8664	2.022%	0.0202	3.16E-02	**1.38E-01**
Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	1.21E-02	**5.28E-02**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	1.97E-01	**8.62E-01**
Ethane	15.073%	30.070	4.5325	10.577%	0.1058	1.65E-01	**7.24E-01**
Propane	13.269%	44.097	5.8513	13.654%	0.1365	2.13E-01	**9.34E-01**
Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	6.53E-02	**2.86E-01**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	1.65E-01	**7.24E-01**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	7.64E-02	**3.35E-01**
n-Pentane	4.186%	72.150	3.0205	7.048%	0.0705	1.10E-01	**4.82E-01**
2,2 Dimethylbutane	0.158%	86.178	0.1363	0.318%	0.0032	4.97E-03	**2.18E-02**
Cyclopentane	1.187%	70.100	0.8324	1.942%	0.0194	3.03E-02	**1.33E-01**
2,3 Dimethylbutane	0.237%	86.178	0.2046	0.477%	0.0048	7.46E-03	**3.27E-02**
2 Methylpentane	0.481%	86.178	0.4145	0.967%	0.0097	1.51E-02	**6.62E-02**
3 Methylpentane	0.283%	86.178	0.2441	0.570%	0.0057	8.90E-03	**3.90E-02**
n-Hexane	8.062%	86.178	6.9478	16.213%	0.1621	2.53E-01	**1.11E+00**
Methylcyclopentane	0.953%	84.160	0.8020	1.872%	0.0187	2.92E-02	**1.28E-01**
Benzene	0.220%	78.114	0.1717	0.401%	0.0040	6.26E-03	**2.74E-02**
Cyclohexane	0.225%	84.160	0.1890	0.441%	0.0044	6.89E-03	**3.02E-02**
2-Methylhexane	0.056%	100.200	0.0563	0.131%	0.0013	2.05E-03	**8.99E-03**
3-Methylhexane	0.080%	100.200	0.0806	0.188%	0.0019	2.94E-03	**1.29E-02**
2,2,4 Trimethylpentane	0.079%	114.230	0.0905	0.211%	0.0021	3.30E-03	**1.44E-02**

FLASH LIBERATION OF HYDROCARBON LIQUID
FROM CENTRAL BASIN OIL STORAGE TANKS
MAMIE 4-25-3-3WH

CB UB SXL

OILTK-3	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	18,250	**bbls/yr**
Throughput (bbls/day)	50.00	**bbls/day**
Gas Flash Rate (SCFD):	332.0	scfd
Gas Flash Rate (lbs./day):	37.49	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Other C7's	1.588%	100.272	1.5925	3.716%	0.0372	5.81E-02	**2.54E-01**
n-Heptane	0.635%	100.272	0.6367	1.486%	0.0149	2.32E-02	**1.02E-01**
Mehtylcyclohexane	0.712%	98.190	0.6995	1.632%	0.0163	2.55E-02	**1.12E-01**
Toluene	0.425%	92.140	0.3918	0.914%	0.0091	1.43E-02	**6.26E-02**
Other C8's	0.367%	114.230	0.4192	0.978%	0.0098	1.53E-02	**6.69E-02**
n-Octane	0.198%	114.230	0.2257	0.527%	0.0053	8.23E-03	**3.60E-02**
Ethylbenzene	0.042%	106.170	0.0448	0.105%	0.0010	1.63E-03	**7.15E-03**
M&P Xylenes	0.061%	106.170	0.0652	0.152%	0.0015	2.38E-03	**1.04E-02**
O-Xylenes	0.012%	106.170	0.0130	0.030%	0.0003	4.72E-04	**2.07E-03**
Other C9's	0.063%	128.258	0.0811	0.189%	0.0019	2.95E-03	**1.29E-02**
n-Nonane	0.034%	128.258	0.0434	0.101%	0.0010	1.58E-03	**6.92E-03**
Other C10's	0.024%	142.280	0.0347	0.081%	0.0008	1.27E-03	**5.54E-03**
n-Decane	0.007%	142.280	0.0097	0.023%	0.0002	3.53E-04	**1.54E-03**
Undecanes+	0.004%	156.310	0.0056	0.013%	0.0001	2.05E-04	**8.98E-04**
Total	**100.000%**		42.853	100.000%			
					Total:	**1.5621E+00**	**6.8419E+00**

VOC INFO	
Mole % VOCs	47.44%
Total NM/NE Stream MW VOCs	31.726
lb Voc / mmscf	83602.308
MMSCF/YR	0.121

	Uncontrolled Emissions, (lb/hr)	**Uncontrolled Emissions, (tpy)**
Total VOC:	1.16E+00	**5.07E+00**
Total Me/Eth	3.62E-01	1.59E+00

AP-42 TANK WORKING and BREATHING EMISSIONS

OILTK-3 **Newfield MAMIE 4-25-3-3WH**

INPUT DATA				
	Symbol	**PTE**	**Units**	
Molecular Weight				
Molecular weight	Mv	50	Lb/lb-mole	
Tank design data				
Shell height	Hs	20.00	ft	
Diameter	D	12.00	ft	
Liquid height	Hl	20.00	ft	
Avg. Liquid height	Hl	10.00	ft	
vapor space outage	Hvo	10.00	ft	
Tank volume		16,921	gallons	
Turnovers	N	45		
Net throughput	Q	18250.00	bbl/yr	
Tunover factor	KN	0.829		
Working loss product factor	Kp	0.75		From AP-42, 11/06 Section 7 Equ. 1-31, page 7.1-19
Meteorological data				
Daily ave. ambient temp.	TAA	51.9625	°F	From TANKS
Daily max. ambient temp.	TAX	63.641667	°F	for Salt Lake
Daily min. ambient temp.	TAN	40.283333	°F	City, UT
Daily ambient temp. range	DTA	23.36	°F	
Tank paint solar absorptance (see adjacent table)	α	0.68	[2]	Tank color gray, condition good
Daily total insolation factor	I	1,452.11835	Btu/ft2-day	From TANKS for Salt Lake City, UT
Site elevation (feet)		4,162		
Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	
CALCULATIONS				
	Symbol		**Units**	
Breathing losses				
Tank vapor space volume	Vv	1,130.98	ft3	
Vapor density	Wv	2.834E-02	lb/ft3	
Vapor space expansion factor	KE	0.01427		
Vented vapor saturation factor	Ks	0.3713	ft2	
Breathing losses	LB	62.02	lb/yr	
Working losses	Lw	1,812.02	lb/yr	
TOTAL LOSSES	LT	**0.21**	lb/hr	
		1,874.04	lb/yr	
		0.9370	tpy	
		38.97	scfd	
HAP Emissions[2]	Wt%			
n-Hexane	16.21%	**0.15**	tpy	
Benzene	0.40%	**0.00**	tpy	
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy	
Toluene	0.91%	**0.01**	tpy	
Ethylbenzene	0.10%	**0.00**	tpy	
Xylenes	0.18%	**0.00**	tpy	

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.

[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-3

Potential to Emit Emission Calculations

Maximum Tank Vapor	**15.5**	scf/hr
Lower Heating Value	**2,222**	Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**1.37E+00**	lb/hr	x	100% - 98%	=	**2.74E-02**	lb/hr
	6.00E+00	TPY	x	100% - 98%	=	**1.20E-01**	TPY
Benzene:	**7.12E-03**	lb/hr	x	100% - 98%	=	**1.42E-04**	lb/hr
	3.12E-02	TPY	x	100% - 98%	=	**6.23E-04**	TPY
Toluene:	**1.62E-02**	lb/hr	x	100% - 98%	=	**3.25E-04**	lb/hr
	7.11E-02	TPY	x	100% - 98%	=	**1.42E-03**	TPY
Ethylbenzene:	**1.86E-03**	lb/hr	x	100% - 98%	=	**3.71E-05**	lb/hr
	8.13E-03	TPY	x	100% - 98%	=	**1.63E-04**	TPY
Xylenes:	**3.24E-03**	lb/hr	x	100% - 98%	=	**6.48E-05**	lb/hr
	1.42E-02	TPY	x	100% - 98%	=	**2.84E-04**	TPY
n-Hexane:	**2.88E-01**	lb/hr	x	100% - 98%	=	**5.76E-03**	lb/hr
	1.26E+00	TPY	x	100% - 98%	=	**2.52E-02**	TPY
2,2,4-Trimethyl-pentane:	**3.75E-03**	lb/hr	x	100% - 98%	=	**7.50E-05**	lb/hr
	1.64E-02	TPY	x	100% - 98%	=	**3.28E-04**	TPY

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tank Unloading		
5. Emission Point:	ID Number: 7	Name: OILTKLOAD-1	7. Identification and Description of Control Equipment: Not Applicable
6. Description of Equipment:	Emissions related to unloading of oil tank via truck		
8. Load Quantity:	54,750	barrels/yr	

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	2.31E+00	2.31E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tank Unloading		
5. Emission Point:	ID Number: 7	Name: OILTKLOAD-1	7. Identification and Description of Control Equipment: Not Applicable
6. Description of Equipment:	Emissions related to unloading of oil tank via truck		
8. Load Quantity:	54,750 barrels/yr		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	2.31E+00	2.31E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

OILTKLOAD-1

VOC wt%	**100.00%**	Benzene wt%	**0.40%**	Xylene wt%	**0.18%**
Total HAPs wt%	**18.03%**	Toluene wt%	**0.91%**	n-Hexane wt%	**16.21%**
CH_4 wt%	**12.60%**	Ethylbenzene wt%	**0.10%**	2,2,4-Trimethylpentane wt%	**0.21%**

		Saturation Factor (S)		Vapor Pressure (P) (psia)		Molecular Weight (MW) (lb/lb-mole)		Temperature (Rankine)		Load Loss (lb/1000 gal)
12.46	x	**0.60**	x	**2.80**	x	**50.00**	/	**520.00**	=	**2.01**

				Capture Effciency		Control Effciency			
			[100%	-	0%	x	0%]	x	
LL lb/1,000 gal		Truck Load Rate bbl/hr			gal/bbl		Emissions lb/hr HC		
2.01	x	**230.00**	x		**42.00**	=	**19.42**	x	100.00% = **1.94E+01** C3+ VOC lb/hr
								x	18.03% = **3.50E+00** Total HAPs lb/hr
								x	12.60% = **2.45E+00** CH_4 lb/hr
								x	0.40% = **7.78E-02** Benzene lb/hr
								x	0.91% = **1.78E-01** Toluene lb/hr
								x	0.10% = **2.03E-02** Ethylbenzene lb/hr
								x	0.18% = **3.54E-02** Xylene lb/hr
								x	16.21% = **3.15E+00** n-Hexane lb/hr
								x	0.21% = **4.10E-02** 2,2,4-Trimethylpentane lb/hr

Newfield MAMIE 4-25-3-3WH

OILTKLOAD-1

VOC wt%	**100.00%**	Benzene wt%	**0.40%**	Xylene wt%	**0.18%**
Total HAPs wt%	**18.03%**	Toluene wt%	**0.91%**	n-Hexane wt%	**16.21%**
CH_4 wt%	**12.60%**	Ethylbenzene wt%	**0.10%**	2,2,4-Trimethylpentane wt%	**0.21%**

		Saturation Factor (S)		Vapor Pressure (P) (psia)		Molecular Weight (MW) (lb/lb-mole)		Temperature (Rankine)		Load Loss (lb/1000 gal)
12.46	x	**0.60**	x	**2.80**	x	**50.00**	/	**520.00**	=	**2.01**

Potential to Emit

		Capture Effciency		Control Effciency						C3+ VOC TPY
[100%	-	0%	x	0%]	x			x	100.00%	= **2.31E+00**

LL lb/1,000 gal		Max Annual Throughput bbl/yr		gal/bbl		lb/ton		Emissions TPY HC				Total HAPs TPY
2.01	x	**54,750.00**	x	**42.00**	/	**2,000.00**	=	**2.31E+00**	x	18.03%	=	**4.17E-01**

				CH_4 TPY
x	12.60%	=	**2.91E-01**	

				CH_4 as CO_2e TPY
		=	**6.11E+00**	

				Benzene TPY
x	0.40%	=	**9.26E-03**	

				Toluene TPY
x	0.91%	=	**2.11E-02**	

				Ethylbenzene TPY
x	0.10%	=	**2.42E-03**	

				Xylene TPY
x	0.18%	=	**4.21E-03**	

				n-Hexane TPY
x	16.21%	=	**3.75E-01**	

				2,2,4-Trimethylpentane TPY
x	0.21%	=	**4.88E-03**	

Calculation basis: AP-42 Section 5.2. Defaults assume submerged loading: dedicated normal service.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Pneumatic Controllers		
5. Emission Point: ID Number:	8 Name: PCONT-1	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Low Pneumatic Controllers		
8. Controller Bleed Rate:	1 scf/hr	9. Operating Schedule:	8,760 Hours/year
10. Number of Pneumatic Controllers:	6		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	8.85E-02	8.85E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Pneumatic Controllers		
5. Emission Point: ID Number	Name	7. Identification and Description of Control Equipment	
8	PCONT-1	None	
6. Description of Equipment: Low Pneumatic Controllers			
8. Controller Bleed Rate: 1 scf/hr		9. Operating Schedule: 8,760 Hours/year	
10. Number of Pneumatic Controllers: 6			

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	8.85E-02	8.85E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

PCONT-1

UINTA CENTRAL BASIN

Emissions (lb/hr) = PSCR (scf/hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

Where:

PSCR = Pneumatic Source Consumption Rate (scf/min), as per manufacturers literature

Gas MW = Supply Gas Average Molecular Weight (lb/lb-mole)

		No. of Controllers			Supply Gas MW		VOC wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**6.97%**	=	**2.02E-02**	lb/hr VOC
				lbs/hr		Hours					
				2.02E-02	x	**8760**	x	2000 lbs/ton	=	**8.85E-02**	TPY VOC
		No. of Controllers			Supply Gas MW		Benzene wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.17%**	=	**4.85E-04**	lb/hr Benzene
				lbs/hr		Hours					
				4.85E-04	x	**8760**	x	2000 lbs/ton	=	**2.12E-03**	TPY Benzene
		No. of Controllers			Supply Gas MW		Toluene wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.16%**	=	**4.67E-04**	lb/hr Toluene
				lbs/hr		Hours					
				4.67E-04	x	**8760**	x	2000 lbs/ton	=	**2.05E-03**	TPY Toluene

Molecular weight and weight percent of gas constituents are from an extend gas analysis representative of this region.

Newfield MAMIE 4-25-3-3WH

PCONT-1

UINTA CENTRAL BASIN

Emissions (lb/hr) = PSCR (scf/hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

		No. of Controllers				Supply Gas MW		Ethylbenzene wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.01%**	=	**2.32E-05** lb/hr Ethylbenzene
				lbs/hr		Hours				
				2.32E-05	x	**8760**	x	2000 lbs/ton	=	**1.02E-04** TPY Ethylbenzene
		No. of Controllers				Supply Gas MW		Xylene wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.03%**	=	**8.99E-05** lb/hr Xylene
				lbs/hr		Hours				
				8.99E-05	x	**8760**	x	2000 lbs/ton	=	**3.94E-04** TPY Xylene
		No. of Controllers				Supply Gas MW		n-Hexane wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.00%**	=	**0.00E+00** lb/hr n-Hexane
				lbs/hr		Hours				
				0.00E+00	x	**8760**	x	2000 lbs/ton	=	**0.00E+00** TPY n-Hexane
		No. of Controllers				Supply Gas MW		2,2,4-Trimeth. wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.02%**	=	**5.80E-05** lb/hr 2,2,4-Trimethylpentane
				lbs/hr		Hours				
				5.80E-05	x	**8760**	x	2000 lbs/ton	=	**2.54E-04** TPY 2,2,4-Trimethylpentane

Molecular weight and weight percent of gas constituents are from an extended gas analysis representative of this region.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number 9 / Name PWTANK-1	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Produced Water Tank		
8. Throughput:	54,750 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		2.65E-03
CO		1.44E-02
VOC	2.74E-01	5.48E-03
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration	**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number: 9 Name: PWTANK-1	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Produced Water Tank		
8. Throughput:	54,750 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		2.65E-03
CO		1.44E-02
VOC	2.74E-01	5.48E-03
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

PWTANK-1

Potential to Emit Emission Calculations

Maximum Water Tank Throughput	**54,750**	bbl/yr
Flash Factor	**1.90**	scf/bbl
Maximum Tank Vapor	**11.9**	scf/hr
Lower Heating Value	**748**	Btu/scf
VOC	**0.01**	lb/bbl
Benzene	**0.0001**	lb/bbl
Toluene	**0.0003**	lb/bbl
Ethylbenzene	**0.000006**	lb/bbl
Xylenes	**0.00006**	lb/bbl

Environ Emission Factors for Produced Water Tanks
Environ Project No. 06-17477T, TCEQ Project 2010-29
Prepared for Texas Commission on Environmental Quality.
Given in pounds of emissions per barrel of produced water.
Methane Emission and Flash Factors were not provided in this report as such it was calculated from the data available within the report.

Maximum Tank Vapor (scf/hr) =
Flash Factor (scf/bbl) * Maximum Water Tank Throughput (bbl/yr) ÷ 8,760 (hr/yr)

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**262.5**	gal/hr	x	1/42 barrel/gallon	x	0.010 lb/bbl	x	100% - 98%	=	**1.25E-03**	lb/hr
	54,750	bbl/yr	x	0.01 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**5.48E-03**	TPY
Benzene:	**262.5**	gal/hr	x	1/42 barrel/gallon	x	0.0001 lb/bbl	x	100% - 98%	=	**1.25E-05**	lb/hr
	54,750	bbl/yr	x	0.0001 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**5.48E-05**	TPY
Toluene:	**262.5**	gal/hr	x	1/42 barrel/gallon	x	0.0003 lb/bbl	x	100% - 98%	=	**3.75E-05**	lb/hr
	54,750	bbl/yr	x	0.0003 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**1.64E-04**	TPY
Ethylbenzene:	**262.5**	gal/hr	x	1/42 barrel/gallon	x	0.000006 lb/bbl	x	100% - 98%	=	**7.50E-07**	lb/hr
	54,750	bbl/yr	x	0.000006 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**3.29E-06**	TPY

Newfield MAMIE 4-25-3-3WH

PWTANK-1

Xylenes:	**262.5** gal/hr	x	1/42 barrel/gallon	x	0.00006 lb/bbl	x	100% - 98%	=	**7.50E-06** lb/hr
	54,750 bbl/yr	x	0.00006 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**3.29E-05** TPY

NOx & CO emission factors are from AP-42 Table 13.5-1
(Emission Factors for Flare Operations).
CO_2 & N_2O emission factors are from AP-42 Table 1.4-2
(Emission Factors for Natural Gas Combustion).

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/07/2019
4. Type of Operation:	Miscellaneous Tanks		
5. Emission Point:	ID Number 10 / Name SMTANKS-1	7. Identification and Description of Control Equipment	
6. Description of Equipment:	Small Storage Tanks		
8. Throughput:	Not Applicable barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	2.05E-02	2.05E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date: 2/07/2019
4. Type of Operation:	Miscellaneous Tanks		
5. Emission Point:	ID Number 10	Name SMTANKS-1	7. Identification and Description of Control Equipment
6. Description of Equipment: Small Storage Tanks			
8. Throughput:	Not Applicable	barrels/year	9. Operating Schedule: Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	2.05E-02	2.05E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield Mamie 4-25-3-3WH

SMALL STORAGE TANKS -1			
	Emission Factor	**Units**	
Annual Storage Quantity			
Methanol	**8,600**	gallons/yr	
Ethylene glycol	**1,000**	gallons/yr	
Breathing losses Emission Factors			
Methanol	**3.70E+00**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Ethylene glycol	**5.20E-02**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Breathing Emissions			
Methanol	**3.63E-03**	VOC lb/hr	= 3.7 lb/1000 gal * 8600 gal/yr * 1 yr/365 days * 1 day/24 hrs
Ethylene glycol	**5.94E-06**	VOC lb/hr	= 0.052 lb/1000 gal * 1000 gal/yr * 1 yr/365 days * 1 day/24 hrs
Working losses Emission Factors			
Methanol	**1.07E+00**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Ethylene glycol	**2.00E-03**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Working Emissions			
Methanol	**1.05E-03**	VOC lb/hr	= 1.07 lb/1000 gal * 8600 gal/yr * 1 yr/365 days * 1 day/24 hrs
Ethylene glycol	**2.28E-07**	VOC lb/hr	= 0.002 lb/1000 gal * 1000 gal/yr * 1 yr/365 days * 1 day/24 hrs
Total Working & Breathing Emissions			
Methanol	**4.68E-03**	VOC lb/hr	
Methanol	**2.05E-02**	VOC ton/yr	
Ethylene glycol	**6.16E-06**	VOC lb/hr	
Ethylene glycol	**2.70E-05**	VOC ton/yr	
Totals	**4.69E-03**	VOC lb/hr	
Totals	**2.05E-02**	VOC ton/yr	

1. Company:	Newfield Exploration			**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 11	Name TANKHTR1	7. Identification and Description of Control Equipment		
6. Description of Equipment: Tank Heater			None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**		
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 11	Name TANKHTR1	7. Identification and Description of Control Equipment		
6. Description of Equipment:	Tank Heater		None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR1

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration			**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 12	Name TANKHTR2	7. Identification and Description of Control Equipment		
6. Description of Equipment: Tank Heater			None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration			**Actual Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number	Name	7. Identification and Description of Control Equipment		
	12	TANKHTR2	None		
6. Description of Equipment:	Tank Heater				
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR2

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration		**Potential Emissions**		
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 13	Name TANKHTR3	7. Identification and Description of Control Equipment		
6. Description of Equipment:	Tank Heater		None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**		
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number: 13	Name: TANKHTR3	7. Identification and Description of Control Equipment		
6. Description of Equipment:	Tank Heater		None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR3

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/01/2019
4. Type of Operation:	Flare		
5. Emission Point:	ID Number: 14 Name: FLARE-1	7. Identification and Description of Control Equipment	
6. Description of Equipment:	Flare		Flare
8. Throughput:	78 scf/hr	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		3.93E-02
CO		2.140E-01
VOC		3.00E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/07/2019
4. Type of Operation:	Flare		
5. Emission Point:	ID Number 14 / Name FLARE-1	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	Flare		
8. Throughput:	78 scf/hr	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		3.93E-02
CO		2.140E-01
VOC		3.00E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

FLARE 1

Flare Pilot Gas Volume	**0.33**	scfm
Tank Gas Volume	**0.97**	scfm
Lower Heating Value	**1,020**	Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

SO_2 **78** scf/hr x 1/379 scf/lb-mole x 64.064 lb/lb-mole x 0.00% x 98% = **0.00E+00** lb/hr

0.00E+00 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **0.00E+00** TPY

NOx: **78** scf/hr x **1,682** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.068 lb/MMBtu = **8.98E-03** lb/hr

8.98E-03 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **3.93E-02** TPY

CO: **78** scf/hr x **1,682** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.370 lb/MMBtu = **4.89E-02** lb/hr

4.89E-02 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **2.14E-01** TPY

VOC: **78** scf/hr x **1,682** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.052 lb/MMBtu = **6.84E-03** lb/hr

6.84E-03 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **3.00E-02** TPY

Newfield MAMIE 4-25-3-3WH

FLARE 1

CO_2:	**78**	scf/hr	x	**1,682**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	117.65 lb/MMBtu	=	**1.55E+01**	lb/hr	
	1.55E+01	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**6.80E+01**	TPY	

													CH_4 as CO_2e:	
CH_4:	**78**	scf/hr	x	**1,682**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	0.077 lb/MMBtu	=	**1.02E-02**	lb/hr	**3.15E+00**	lb/hr
	1.02E-02	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**4.45E-02**	TPY	**1.38E+01**	TPY

													N_2O as CO_2e:	
N_2O:	**78**	scf/hr	x	**1,682**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	0.002 lb/MMBtu	=	**2.85E-04**	lb/hr	**8.83E-02**	lb/hr
	2.85E-04	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**1.25E-03**	TPY	**3.87E-01**	TPY

NOx, CO, VOC, & CH_4 emission factors are from AP-42 Table 13.5-1 & 13.5-2
(Emission Factors for Flare Operations).
CO_2 & N_2O emission factors are from AP-42 Table 1.4-2
(Emission Factors for Natural Gas Combustion).

1. Company:	Newfield Exploration	**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/22/2019
4. Type of Operation:	Oil and Gas Production Engine		
5. Emission Point:	ID Number: 15 Name: ENG-2	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Blue Star 480 V, 175 kW		
8. Fuel Consumption:	16.22 MMscf/yr	9. Operating Schedule:	8,760 Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	1.60E-01	1.60E-01
PM_{10}	1.60E-01	1.60E-01
$PM_{2.5}$	1.60E-01	1.60E-01
SO_X	4.85E-03	4.85E-03
NO_X	2.26E+00	2.26E+00
CO	4.52E+00	4.52E+00
VOC	1.58E+00	1.58E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

1. Company:	Newfield Exploration		**Actual Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/22/2019
4. Type of Operation:	Oil and Gas Production Engine		
5. Emission Point:	ID Number: 15 Name: ENG-2	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Blue Star 480 V, 175 kW		
8. Fuel Consumption:	16.22 MMscf/yr	9. Operating Schedule:	8,760 Hours/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	1.60E-01	1.60E-01
PM_{10}	1.60E-01	1.60E-01
$PM_{2.5}$	1.60E-01	1.60E-01
SO_X	4.85E-03	4.85E-03
NO_X	2.26E+00	2.26E+00
CO	4.52E+00	4.52E+00
VOC	1.58E+00	1.58E+00
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

ENG-2

ENGINE Potential to Emit

234	MAX HP	8044	FUEL CONSUMPTION	0%	NOx DRE	0%	CO DRE	0%	VOC DRE	0%	HAP DRE

NO_x:	**1.00**	g/HP-HR	x	**234**	HP	x	1 lb / 453.6 g	=	**5.16E-01**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**2.26E+00** NO_x TPY
CO:	**2.00**	g/HP-HR	x	**234**	HP	x	1 lb / 453.6 g	=	**1.03E+00**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**4.52E+00** CO TPY
VOC:	**0.70**	g/HP-HR	x	**234**	HP	x	1 lb / 453.6 g	=	**3.61E-01**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb	x	100% - 0%	=	**1.58E+00** VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**1.88**	MMBtu/hr			=	**1.11E-03**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**4.85E-03** SO_2 TPY
PM:	**0.0194**	lb/MMBtu	x	**1.88**	MMBtu/hr			=	**3.65E-02**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**1.60E-01** PM TPY
$PM_{2.5}$:	**0.0194**	lb/MMBtu	x	**1.88**	MMBtu/hr			=	**3.65E-02**	lb/hr	x	**8760**	hr/yr	x	1 ton / 2000lb			=	**1.60E-01** $PM_{2.5}$ TPY

NOx, CO & VOC Emission Factors are from manufacturer's data. SO_2, PM, & $PM_{2.5}$ & HAPs Emission Factors are from AP-42 Table 3.2-1, Table 3.2-2, or Table 3.2-3.

Newfield MAMIE 4-25-3-3WH

HTRTRTR-2

Burner Rating **1,000,000** Btu/hr

NO_x:	0.10 lb/MMBtu	x	1.00 MMBtu/hr			=	**9.80E-02** lb/hr
	9.80E-02 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**4.29E-01** TPY
CO:	0.082 lb/MMBtu	x	1.00 MMBtu/hr			=	**8.24E-02** lb/hr
	8.24E-02 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.61E-01** TPY
VOC:	0.0054 lb/MMBtu	x	1.00 MMBtu/hr			=	**5.39E-03** lb/hr
	5.39E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**2.36E-02** TPY
SO_2:	0.0006 lb/MMBtu	x	1.00 MMBtu/hr			=	**5.88E-04** lb/hr
	5.88E-04 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**2.58E-03** TPY
PM:	0.0075 lb/MMBtu	x	1.00 MMBtu/hr			=	**7.45E-03** lb/hr
	7.45E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.26E-02** TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

Newfield MAMIE 4-25-3-3WH

HTRTRTR-2

Burner Rating **1,000,000** Btu/hr

Benzene:	2.06E-06 lb/MMBtu	x	1.00 MMBtu/hr			=	**2.06E-06** lb/hr
	2.06E-06 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**9.02E-06** TPY
Toluene:	3.33E-06 lb/MMBtu	x	1.00 MMBtu/hr			=	**3.33E-06** lb/hr
	3.33E-06 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**1.46E-05** TPY
n-Hexane:	1.76E-03 lb/MMBtu	x	1.00 MMBtu/hr			=	**1.76E-03** lb/hr
	1.76E-03 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**7.73E-03** TPY
Formaldehyde:	7.35E-05 lb/MMBtu	x	1.00 MMBtu/hr			=	**7.35E-05** lb/hr
	7.35E-05 lb/hr	x	8,760 hr/yr	x	1 ton / 2000 lb	=	**3.22E-04** TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company: Newfield Exploration		**Potential Emissions**
2. Site/Source: MAMIE 4-25-3-3WH		3. Date: 2/22/2019
4. Type of Operation: Oil and Gas Production Well Fugitives		
5. Emission Point: ID Number 17 Name FUG-2		7. Identification and Description of Control Equipment N/A
6. Description of Equipment: Oil Well Fugitive Emissions		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	5.42E-02	5.42E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

OIL PRODUCTION WELL FUGITIVES 2

Newfield MAMIE 4-25-3-3WH

EQUIPMENT TYPE AND SERVICE	NUMBER OF UNITS[1]	HOURS OF OPERATION (hours/yr)	VOC WEIGHT FRACTION[2]	CH_4 WEIGHT FRACTION[2]	EMISSION FACTOR[3] (kg/hr-unit)	EMISSION FACTOR (lb/hr-unit)	VOC EMISSIONS (tons/yr)	CH_4 EMISSIONS (tons/yr)
Wellhead								
Valves	5	8760	0.070	0.775	0.0025	0.005525	8.43E-03	9.37E-02
Connectors	4	8760	0.070	0.775	0.00021	0.0004641	5.66E-04	6.30E-03
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	10	8760	0.070	0.775	0.00011	0.0002431	7.42E-04	8.25E-03
Other	1	8760	0.070	0.775	0.0075	0.016575	5.06E-03	5.62E-02
Separator								
Valves	6	8760	0.070	0.775	0.0025	0.005525	1.01E-02	1.12E-01
Connectors	10	8760	0.070	0.775	0.00021	0.0004641	1.42E-03	1.57E-02
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	12	8760	0.070	0.775	0.00011	0.0002431	8.90E-04	9.90E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
Heater Treater								
Valves	8	8760	0.070	0.775	0.0025	0.005525	1.35E-02	1.50E-01
Connectors	20	8760	0.070	0.775	0.00021	0.0004641	2.83E-03	3.15E-02
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	12	8760	0.070	0.775	0.00011	0.0002431	8.90E-04	9.90E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
Header								
Valves	5	8760	0.070	0.775	0.0025	0.005525	8.43E-03	9.37E-02
Connectors	4	8760	0.070	0.775	0.00021	0.0004641	5.66E-04	6.30E-03
Open-Ended Lines	0	8760	0.070	0.775	0.0014	0.003094	0.00E+00	0.00E+00
Flanges	10	8760	0.070	0.775	0.00011	0.0002431	7.42E-04	8.25E-03
Other	0	8760	0.070	0.775	0.0075	0.016575	0.00E+00	0.00E+00
TOTAL EMISSIONS (tons/yr)							**5.42E-02**	**6.02E-01**

Pollutant	Weight Fraction[2]	HAP Emissions (tons/yr)	HAP Emissions (lb/hr)
n-Hexane	0.00000	0.00E+00	0.00E+00
Benzene	0.00167	1.30E-03	2.96E-04
2,2,4 Trimethylpentane	0.00020	1.55E-04	3.55E-05
Toluene	0.00161	1.25E-03	2.86E-04
Ethylbenzene	0.00008	6.22E-05	1.42E-05
M&P XylenesO-Xylenes	0.00031	2.41E-04	5.50E-05
Total HAPs		**3.01E-03**	**6.87E-04**

[1]Average component count from Table W-1C to Subpart W of Part 98-Default Average Component Counts For Major Crude Oil Production Equipment.

[2]Based on gas composition and properties from samples collected at the KM Bar F fuel tap. HAPs values from samples collected at 12 different Newfield sites.

[3]"Protocol for Equipment Leak Emission Estimates," EPA-453/R-95-017, Table 2-4, Light Oil

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number 18 Name OILTK-4	7. Identification and Description of Control Equipment	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		Flare
8. Throughput:	91,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		4.77E-02
CO		2.59E-01
VOC	2.70E+01	5.40E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-4

	PTE	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
Gas Flash Rate (SCFD):	1,660.0	scfd
Gas Flash Rate (lbs./day):	187.452	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Hydrogen Sufide	0.000%	34.080	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Nitrogen	3.093%	28.013	0.8664	2.022%	0.0202	1.58E-01	**6.92E-01**
Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	6.03E-02	**2.64E-01**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	9.84E-01	**4.31E+00**
Ethane	15.073%	30.070	4.5325	10.577%	0.1058	8.26E-01	**3.62E+00**
Propane	13.269%	44.097	5.8513	13.654%	0.1365	1.07E+00	**4.67E+00**
Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	3.26E-01	**1.43E+00**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	8.27E-01	**3.62E+00**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	3.82E-01	**1.67E+00**
n-Pentane	4.186%	72.150	3.0205	7.048%	0.0705	5.51E-01	**2.41E+00**
2,2 Dimethylbutane	0.158%	86.178	0.1363	0.318%	0.0032	2.48E-02	**1.09E-01**
Cyclopentane	1.187%	70.100	0.8324	1.942%	0.0194	1.52E-01	**6.64E-01**
2,3 Dimethylbutane	0.237%	86.178	0.2046	0.477%	0.0048	3.73E-02	**1.63E-01**
2 Methylpentane	0.481%	86.178	0.4145	0.967%	0.0097	7.56E-02	**3.31E-01**
3 Methylpentane	0.283%	86.178	0.2441	0.570%	0.0057	4.45E-02	**1.95E-01**
n-Hexane	8.062%	86.178	6.9478	16.213%	0.1621	1.27E+00	**5.55E+00**
Methylcyclopentane	0.953%	84.160	0.8020	1.872%	0.0187	1.46E-01	**6.40E-01**
Benzene	0.220%	78.114	0.1717	0.401%	0.0040	3.13E-02	**1.37E-01**
Cyclohexane	0.225%	84.160	0.1890	0.441%	0.0044	3.45E-02	**1.51E-01**
2-Methylhexane	0.056%	100.200	0.0563	0.131%	0.0013	1.03E-02	**4.50E-02**
3-Methylhexane	0.080%	100.200	0.0806	0.188%	0.0019	1.47E-02	**6.43E-02**
2,2,4 Trimethylpentane	0.079%	114.230	0.0905	0.211%	0.0021	1.65E-02	**7.22E-02**

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-4	**PTE**	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
Gas Flash Rate (SCFD):	1,660.0	scfd
Gas Flash Rate (lbs./day):	187.452	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Other C7's	1.588%	100.272	1.5925	3.716%	0.0372	2.90E-01	**1.27E+00**
n-Heptane	0.635%	100.272	0.6367	1.486%	0.0149	1.16E-01	**5.08E-01**
Mehtylcyclohexane	0.712%	98.190	0.6995	1.632%	0.0163	1.27E-01	**5.58E-01**
Toluene	0.425%	92.140	0.3918	0.914%	0.0091	7.14E-02	**3.13E-01**
Other C8's	0.367%	114.230	0.4192	0.978%	0.0098	7.64E-02	**3.35E-01**
n-Octane	0.198%	114.230	0.2257	0.527%	0.0053	4.11E-02	**1.80E-01**
Ethylbenzene	0.042%	106.170	0.0448	0.105%	0.0010	8.17E-03	**3.58E-02**
M&P Xylenes	0.061%	106.170	0.0652	0.152%	0.0015	1.19E-02	**5.20E-02**
O-Xylenes	0.012%	106.170	0.0130	0.030%	0.0003	2.36E-03	**1.03E-02**
Other C9's	0.063%	128.258	0.0811	0.189%	0.0019	1.48E-02	**6.47E-02**
n-Nonane	0.034%	128.258	0.0434	0.101%	0.0010	7.90E-03	**3.46E-02**
Other C10's	0.024%	142.280	0.0347	0.081%	0.0008	6.33E-03	**2.77E-02**
n-Decane	0.007%	142.280	0.0097	0.023%	0.0002	1.76E-03	**7.72E-03**
Undecanes+	0.004%	156.310	0.0056	0.013%	0.0001	1.03E-03	**4.49E-03**
Total	**100.000%**		42.853	100.000%			
					Total:	**7.8105E+00**	**3.4210E+01**

VOC INFO	
Mole % VOCs	47.44%
Total NM/NE Stream MW VOCs	31.726
lb Voc / mmscf	83602.308
MMSCF/YR	0.606

	Uncontrolled Emissions, (lb/hr)	**Uncontrolled Emissions, (tpy)**
Total VOC:	5.78E+00	**2.53E+01**
Total Me/Eth	1.81E+00	7.93E+00

AP-42 TANK WORKING and BREATHING EMISSIONS

OILTK-4 **Newfield MAMIE 4-25-3-3WH**

INPUT DATA				
	Symbol	**PTE**	**Units**	
Molecular Weight				
Molecular weight	Mv	50	Lb/lb-mole	
Tank design data				
Shell height	Hs	20.00	ft	
Diameter	D	12.00	ft	
Liquid height	Hl	20.00	ft	
Avg. Liquid height	Hl	10.00	ft	
vapor space outage	Hvo	10.00	ft	
Tank volume		16,921	gallons	
Turnovers	N	226		
Net throughput	Q	91250.00	bbl/yr	
Tunover factor	KN	0.299		
Working loss product factor	Kp	0.75		From AP-42, 11/06 Section 7 Equ. 1-31, page 7.1-19
Meteorological data				
Daily ave. ambient temp.	TAA	51.9625	°F	From TANKS
Daily max. ambient temp.	TAX	63.641667	°F	for Salt Lake
Daily min. ambient temp.	TAN	40.283333	°F	City, UT
Daily ambient temp. range	DTA	23.36	°F	
Tank paint solar absorptance (see adjacent table)	α	0.68	[2]	Tank color gray, condition good
Daily total insolation factor	I	1,452.11835	Btu/ft2-day	From TANKS for Salt Lake City, UT
Site elevation (feet)		4,162		
Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	
CALCULATIONS				
	Symbol		**Units**	
Breathing losses				
Tank vapor space volume	Vv	1,130.98	ft3	
Vapor density	Wv	2.834E-02	lb/ft3	
Vapor space expansion factor	KE	0.01427		
Vented vapor saturation factor	Ks	0.3713	ft2	
Breathing losses	LB	62.02	lb/yr	
Working losses	Lw	3,269.36	lb/yr	
TOTAL LOSSES	LT	**0.38**	lb/hr	
		3,331.38	lb/yr	
		1.6657	tpy	
		69.27	scfd	
HAP Emissions[2]	Wt%			
n-Hexane	16.21%	**0.27**	tpy	
Benzene	0.40%	**0.01**	tpy	
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy	
Toluene	0.91%	**0.02**	tpy	
Ethylbenzene	0.10%	**0.00**	tpy	
Xylenes	0.18%	**0.00**	tpy	

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.

[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-4

Potential to Emit Emission Calculations

Maximum Tank Vapor	72.1	scf/hr					
Lower Heating Value	2,222	Btu/scf					

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	6.16E+00	lb/hr	x	100% - 98%	=	1.23E-01	lb/hr
	2.70E+01	TPY	x	100% - 98%	=	5.40E-01	TPY
Benzene:	3.28E-02	lb/hr	x	100% - 98%	=	6.56E-04	lb/hr
	1.44E-01	TPY	x	100% - 98%	=	2.87E-03	TPY
Toluene:	7.49E-02	lb/hr	x	100% - 98%	=	1.50E-03	lb/hr
	3.28E-01	TPY	x	100% - 98%	=	6.56E-03	TPY
Ethylbenzene:	8.56E-03	lb/hr	x	100% - 98%	=	1.71E-04	lb/hr
	3.75E-02	TPY	x	100% - 98%	=	7.50E-04	TPY
Xylenes:	1.49E-02	lb/hr	x	100% - 98%	=	2.99E-04	lb/hr
	6.54E-02	TPY	x	100% - 98%	=	1.31E-03	TPY
n-Hexane:	1.33E+00	lb/hr	x	100% - 98%	=	2.66E-02	lb/hr
	5.82E+00	TPY	x	100% - 98%	=	1.16E-01	TPY
2,2,4-Trimethyl-pentane:	1.73E-02	lb/hr	x	100% - 98%	=	3.46E-04	lb/hr
	7.57E-02	TPY	x	100% - 98%	=	1.51E-03	TPY

Maximum Tank Vapor is a sum of the gas flash rate (scfd) plus the total losses rate (scfd) converted to scf/hr.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number 19 / Name OILTK-5	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		
8. Throughput:	91,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		4.77E-02
CO		2.59E-01
VOC	2.70E+01	5.40E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-5

	PTE	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
Gas Flash Rate (SCFD):	1,660.0	scfd
Gas Flash Rate (lbs./day):	187.452	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Hydrogen Sufide	0.000%	34.080	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Nitrogen	3.093%	28.013	0.8664	2.022%	0.0202	1.58E-01	**6.92E-01**
Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	6.03E-02	**2.64E-01**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	9.84E-01	**4.31E+00**
Ethane	15.073%	30.070	4.5325	10.577%	0.1058	8.26E-01	**3.62E+00**
Propane	13.269%	44.097	5.8513	13.654%	0.1365	1.07E+00	**4.67E+00**
Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	3.26E-01	**1.43E+00**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	8.27E-01	**3.62E+00**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	3.82E-01	**1.67E+00**
n-Pentane	4.186%	72.150	3.0205	7.048%	0.0705	5.51E-01	**2.41E+00**
2,2 Dimethylbutane	0.158%	86.178	0.1363	0.318%	0.0032	2.48E-02	**1.09E-01**
Cyclopentane	1.187%	70.100	0.8324	1.942%	0.0194	1.52E-01	**6.64E-01**
2,3 Dimethylbutane	0.237%	86.178	0.2046	0.477%	0.0048	3.73E-02	**1.63E-01**
2 Methylpentane	0.481%	86.178	0.4145	0.967%	0.0097	7.56E-02	**3.31E-01**
3 Methylpentane	0.283%	86.178	0.2441	0.570%	0.0057	4.45E-02	**1.95E-01**
n-Hexane	8.062%	86.178	6.9478	16.213%	0.1621	1.27E+00	**5.55E+00**
Methylcyclopentane	0.953%	84.160	0.8020	1.872%	0.0187	1.46E-01	**6.40E-01**
Benzene	0.220%	78.114	0.1717	0.401%	0.0040	3.13E-02	**1.37E-01**
Cyclohexane	0.225%	84.160	0.1890	0.441%	0.0044	3.45E-02	**1.51E-01**
2-Methylhexane	0.056%	100.200	0.0563	0.131%	0.0013	1.03E-02	**4.50E-02**
3-Methylhexane	0.080%	100.200	0.0806	0.188%	0.0019	1.47E-02	**6.43E-02**
2,2,4 Trimethylpentane	0.079%	114.230	0.0905	0.211%	0.0021	1.65E-02	**7.22E-02**

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-5

	PTE	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
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Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Other C7's	**1.588%**	100.272	**1.5925**	**3.716%**	**0.0372**	2.90E-01	**1.27E+00**
n-Heptane	**0.635%**	100.272	**0.6367**	**1.486%**	**0.0149**	1.16E-01	**5.08E-01**
Mehtylcyclohexane	**0.712%**	98.190	**0.6995**	**1.632%**	**0.0163**	1.27E-01	**5.58E-01**
Toluene	**0.425%**	92.140	**0.3918**	**0.914%**	**0.0091**	7.14E-02	**3.13E-01**
Other C8's	**0.367%**	114.230	**0.4192**	**0.978%**	**0.0098**	7.64E-02	**3.35E-01**
n-Octane	**0.198%**	114.230	**0.2257**	**0.527%**	**0.0053**	4.11E-02	**1.80E-01**
Ethylbenzene	**0.042%**	106.170	**0.0448**	**0.105%**	**0.0010**	8.17E-03	**3.58E-02**
M&P Xylenes	**0.061%**	106.170	**0.0652**	**0.152%**	**0.0015**	1.19E-02	**5.20E-02**
O-Xylenes	**0.012%**	106.170	**0.0130**	**0.030%**	**0.0003**	2.36E-03	**1.03E-02**
Other C9's	**0.063%**	128.258	**0.0811**	**0.189%**	**0.0019**	1.48E-02	**6.47E-02**
n-Nonane	**0.034%**	128.258	**0.0434**	**0.101%**	**0.0010**	7.90E-03	**3.46E-02**
Other C10's	**0.024%**	142.280	**0.0347**	**0.081%**	**0.0008**	6.33E-03	**2.77E-02**
n-Decane	**0.007%**	142.280	**0.0097**	**0.023%**	**0.0002**	1.76E-03	**7.72E-03**
Undecanes+	**0.004%**	156.310	**0.0056**	**0.013%**	**0.0001**	1.03E-03	**4.49E-03**
Total	**100.000%**		42.853	100.000%			
					Total:	**7.8105E+00**	**3.4210E+01**

VOC INFO	
Mole % VOCs	47.44%
Total NM/NE Stream MW VOCs	31.726
lb Voc / mmscf	83602.308
MMSCF/YR	0.606

	Uncontrolled Emissions, (lb/hr)	**Uncontrolled Emissions, (tpy)**
Total VOC:	5.78E+00	**2.53E+01**
Total Me/Eth	1.81E+00	7.93E+00

AP-42 TANK WORKING and BREATHING EMISSIONS
OILTK-5 **Newfield MAMIE 4-25-3-3WH**

INPUT DATA				
	Symbol	**PTE**	**Units**	
Molecular Weight				
Molecular weight	Mv	50	Lb/lb-mole	
Tank design data				
Shell height	Hs	20.00	ft	
Diameter	D	12.00	ft	
Liquid height	Hl	20.00	ft	
Avg. Liquid height	Hl	10.00	ft	
vapor space outage	Hvo	10.00	ft	
Tank volume		16,921	gallons	
Turnovers	N	226		
Net throughput	Q	91250.00	bbl/yr	
Tunover factor	KN	0.299		
Working loss product factor	Kp	0.75		From AP-42, 11/06 Section 7 Equ. 1-31, page 7.1-19
Meteorological data				
Daily ave. ambient temp.	TAA	51.9625	°F	From TANKS
Daily max. ambient temp.	TAX	63.641667	°F	for Salt Lake
Daily min. ambient temp.	TAN	40.283333	°F	City, UT
Daily ambient temp. range	DTA	23.36	°F	
Tank paint solar absorptance (see adjacent table)	α	0.68	[2]	Tank color gray, condition good
Daily total insolation factor	I	1,452.11835	Btu/ft2-day	From TANKS for Salt Lake City, UT
Site elevation (feet)		4,162		
Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	

CALCULATIONS			
	Symbol		**Units**
Breathing losses			
Tank vapor space volume	Vv	1,130.98	ft3
Vapor density	Wv	2.834E-02	lb/ft3
Vapor space expansion factor	KE	0.01427	
Vented vapor saturation factor	Ks	0.3713	ft2
Breathing losses	LB	62.02	lb/yr
Working losses	Lw	3,269.36	lb/yr
TOTAL LOSSES	LT	**0.38**	lb/hr
		3,331.38	lb/yr
		1.6657	tpy
		69.27	scfd
HAP Emissions[2]	Wt%		
n-Hexane	16.21%	**0.27**	tpy
Benzene	0.40%	**0.01**	tpy
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy
Toluene	0.91%	**0.02**	tpy
Ethylbenzene	0.10%	**0.00**	tpy
Xylenes	0.18%	**0.00**	tpy

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.
[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-5

Potential to Emit Emission Calculations

Maximum Tank Vapor: 72.1 scf/hr

Lower Heating Value: 2,222 Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**6.16E+00** lb/hr	x	100% - 98%	=	**1.23E-01** lb/hr
	2.70E+01 TPY	x	100% - 98%	=	**5.40E-01** TPY
Benzene:	**3.28E-02** lb/hr	x	100% - 98%	=	**6.56E-04** lb/hr
	1.44E-01 TPY	x	100% - 98%	=	**2.87E-03** TPY
Toluene:	**7.49E-02** lb/hr	x	100% - 98%	=	**1.50E-03** lb/hr
	3.28E-01 TPY	x	100% - 98%	=	**6.56E-03** TPY
Ethylbenzene:	**8.56E-03** lb/hr	x	100% - 98%	=	**1.71E-04** lb/hr
	3.75E-02 TPY	x	100% - 98%	=	**7.50E-04** TPY
Xylenes:	**1.49E-02** lb/hr	x	100% - 98%	=	**2.99E-04** lb/hr
	6.54E-02 TPY	x	100% - 98%	=	**1.31E-03** TPY
n-Hexane:	**1.33E+00** lb/hr	x	100% - 98%	=	**2.66E-02** lb/hr
	5.82E+00 TPY	x	100% - 98%	=	**1.16E-01** TPY
2,2,4-Trimethyl-pentane:	**1.73E-02** lb/hr	x	100% - 98%	=	**3.46E-04** lb/hr
	7.57E-02 TPY	x	100% - 98%	=	**1.51E-03** TPY

Maximum Tank Vapor is a sum of the gas flash rate (scfd) plus the total losses rate (scfd) converted to scf/hr.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number: 20 Name: OILTK-6	7. Identification and Description of Control Equipment	
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Oil Tank		Flare
8. Throughput:	91,250 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		4.77E-02
CO		2.59E-01
VOC	2.70E+01	5.40E-01
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-6

	PTE	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
Gas Flash Rate (SCFD):	1,660.0	scfd
Gas Flash Rate (lbs./day):	187.452	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Hydrogen Sufide	0.000%	34.080	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Nitrogen	3.093%	28.013	0.8664	2.022%	0.0202	1.58E-01	**6.92E-01**
Carbon Dioxide	0.751%	44.010	0.3307	0.772%	0.0077	6.03E-02	**2.64E-01**
Methane	33.643%	16.043	5.3974	12.595%	0.1260	9.84E-01	**4.31E+00**
Ethane	15.073%	30.070	4.5325	10.577%	0.1058	8.26E-01	**3.62E+00**
Propane	13.269%	44.097	5.8513	13.654%	0.1365	1.07E+00	**4.67E+00**
Iso-Butane	3.081%	58.123	1.7909	4.179%	0.0418	3.26E-01	**1.43E+00**
n-Butane	7.803%	58.123	4.5352	10.583%	0.1058	8.27E-01	**3.62E+00**
2,2 Dimethylpropane	0.000%	72.140	0.0000	0.000%	0.0000	0.00E+00	**0.00E+00**
Iso-Pentane	2.905%	72.150	2.0957	4.890%	0.0489	3.82E-01	**1.67E+00**
n-Pentane	4.186%	72.150	3.0205	7.048%	0.0705	5.51E-01	**2.41E+00**
2,2 Dimethylbutane	0.158%	86.178	0.1363	0.318%	0.0032	2.48E-02	**1.09E-01**
Cyclopentane	1.187%	70.100	0.8324	1.942%	0.0194	1.52E-01	**6.64E-01**
2,3 Dimethylbutane	0.237%	86.178	0.2046	0.477%	0.0048	3.73E-02	**1.63E-01**
2 Methylpentane	0.481%	86.178	0.4145	0.967%	0.0097	7.56E-02	**3.31E-01**
3 Methylpentane	0.283%	86.178	0.2441	0.570%	0.0057	4.45E-02	**1.95E-01**
n-Hexane	8.062%	86.178	6.9478	16.213%	0.1621	1.27E+00	**5.55E+00**
Methylcyclopentane	0.953%	84.160	0.8020	1.872%	0.0187	1.46E-01	**6.40E-01**
Benzene	0.220%	78.114	0.1717	0.401%	0.0040	3.13E-02	**1.37E-01**
Cyclohexane	0.225%	84.160	0.1890	0.441%	0.0044	3.45E-02	**1.51E-01**
2-Methylhexane	0.056%	100.200	0.0563	0.131%	0.0013	1.03E-02	**4.50E-02**
3-Methylhexane	0.080%	100.200	0.0806	0.188%	0.0019	1.47E-02	**6.43E-02**
2,2,4 Trimethylpentane	0.079%	114.230	0.0905	0.211%	0.0021	1.65E-02	**7.22E-02**

FLASH LIBERATION OF HYDROCARBON LIQUID

FROM CENTRAL BASIN OIL STORAGE TANKS

MAMIE 4-25-3-3WH

CB UB SXL

OILTK-6

	PTE	
GOR from analysis	6.64	**scf/bbl**
Throughput (bbls/yr)	91,250	**bbls/yr**
Throughput (bbls/day)	250.00	**bbls/day**
Gas Flash Rate (SCFD):	1,660.0	scfd
Gas Flash Rate (lbs./day):	187.452	lb/day
Lb./Day = gas (ft^3/day)x(Mwgas - lb/lb-mole) / (379.49 ft3/lb-mole)		

Gas oil ratio and mole percent of flash gas are representative of tanks in this region.

Component	Mole percent	Molecular Weight	Mole Frac x Mole **Stream MW**	Weight Percent	Weight Fraction	PTE Uncontrolled Emissions (lb/hr)	**PTE Uncontrolled Emissions (tpy)**
Other C7's	1.588%	100.272	1.5925	3.716%	0.0372	2.90E-01	**1.27E+00**
n-Heptane	0.635%	100.272	0.6367	1.486%	0.0149	1.16E-01	**5.08E-01**
Mehtylcyclohexane	0.712%	98.190	0.6995	1.632%	0.0163	1.27E-01	**5.58E-01**
Toluene	0.425%	92.140	0.3918	0.914%	0.0091	7.14E-02	**3.13E-01**
Other C8's	0.367%	114.230	0.4192	0.978%	0.0098	7.64E-02	**3.35E-01**
n-Octane	0.198%	114.230	0.2257	0.527%	0.0053	4.11E-02	**1.80E-01**
Ethylbenzene	0.042%	106.170	0.0448	0.105%	0.0010	8.17E-03	**3.58E-02**
M&P Xylenes	0.061%	106.170	0.0652	0.152%	0.0015	1.19E-02	**5.20E-02**
O-Xylenes	0.012%	106.170	0.0130	0.030%	0.0003	2.36E-03	**1.03E-02**
Other C9's	0.063%	128.258	0.0811	0.189%	0.0019	1.48E-02	**6.47E-02**
n-Nonane	0.034%	128.258	0.0434	0.101%	0.0010	7.90E-03	**3.46E-02**
Other C10's	0.024%	142.280	0.0347	0.081%	0.0008	6.33E-03	**2.77E-02**
n-Decane	0.007%	142.280	0.0097	0.023%	0.0002	1.76E-03	**7.72E-03**
Undecanes+	0.004%	156.310	0.0056	0.013%	0.0001	1.03E-03	**4.49E-03**
Total	**100.000%**		42.853	100.000%			
					Total:	**7.8105E+00**	**3.4210E+01**

VOC INFO	
Mole % VOCs	47.44%
Total NM/NE Stream MW VOCs	31.726
lb Voc / mmscf	83602.308
MMSCF/YR	0.606

	Uncontrolled Emissions, (lb/hr)	**Uncontrolled Emissions, (tpy)**
Total VOC:	5.78E+00	**2.53E+01**
Total Me/Eth	1.81E+00	7.93E+00

AP-42 TANK WORKING and BREATHING EMISSIONS

OILTK-6 **Newfield MAMIE 4-25-3-3WH**

INPUT DATA				
	Symbol	**PTE**	**Units**	
Molecular Weight				
Molecular weight	Mv	50	Lb/lb-mole	
Tank design data				
Shell height	Hs	20.00	ft	
Diameter	D	12.00	ft	
Liquid height	Hl	20.00	ft	
Avg. Liquid height	Hl	10.00	ft	
vapor space outage	Hvo	10.00	ft	
Tank volume		16,921	gallons	
Turnovers	N	226		
Net throughput	Q	91250.00	bbl/yr	
Tunover factor	KN	0.299		
Working loss product factor	Kp	0.75		From AP-42, 11/06 Section 7 Equ. 1-31, page 7.1-19
Meteorological data				
Daily ave. ambient temp.	TAA	51.9625	°F	From TANKS
Daily max. ambient temp.	TAX	63.641667	°F	for Salt Lake
Daily min. ambient temp.	TAN	40.283333	°F	City, UT
Daily ambient temp. range	DTA	23.36	°F	
Tank paint solar absorptance (see adjacent table)	α	0.68	[2]	Tank color gray, condition good
Daily total insolation factor	I	1,452.11835	Btu/ft2-day	From TANKS for Salt Lake City, UT
Site elevation (feet)		4,162		
Atmospheric pressure	PA	12.644		
Liquid bulk temperature	TB	61.49	°F	Tank is heated and temperature varies ± 2°F
Daily vapor temp. range	DTv	4.00	°F	Tank is heated and temperature varies ± 2°F
Daily ave. liquid surface temp.	TLA	65.10	°F	
Daily max. liquid surface temp.	TLX	66.10	°F	
Daily min. liquid surface temp.	TIN	64.10	°F	
VP @ daily ave. liquid surf. temp.	PvA	165.19	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily max. liquid surf. temp.	PvX	168.39	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
VP @ daily min. liquid surf. temp.	PvN	162.03	mm Hg	Equation from AP-42, 11/06 Section 7 Figure 7.1-13b
Daily vapor pressure range	DPv	6.36	mm Hg	
Breather vent pressure setting range	DPB	0.06	psia	Value from AP-42, 11/06 Section 7 page 7.1-13 Note 3
Breather vent pressure setting range	DPB	3.10	mm Hg	
CALCULATIONS				
	Symbol		**Units**	
Breathing losses				
Tank vapor space volume	Vv	1,130.98	ft3	
Vapor density	Wv	2.834E-02	lb/ft3	
Vapor space expansion factor	KE	0.01427		
Vented vapor saturation factor	Ks	0.3713	ft2	
Breathing losses	LB	62.02	lb/yr	
Working losses	Lw	3,269.36	lb/yr	
TOTAL LOSSES	LT	**0.38**	lb/hr	
		3,331.38	lb/yr	
		1.6657	tpy	
		69.27	scfd	
HAP Emissions[2]	Wt%			
n-Hexane	16.21%	**0.27**	tpy	
Benzene	0.40%	**0.01**	tpy	
2,2,4-Trimethylpentane	0.21%	**0.00**	tpy	
Toluene	0.91%	**0.02**	tpy	
Ethylbenzene	0.10%	**0.00**	tpy	
Xylenes	0.18%	**0.00**	tpy	

[1]Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - November 2006.

[2]HAP Emissions (tpy) = HAP Wt% * Total Losses (tpy)

Paint Color	Paint Shade or Type	Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.6	0.68
Aluminum	Mill finish, unpainted	0.1	0.15
Beige/Cream		0.35	0.49
Black		0.97	0.97
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.5
Tan		0.43	0.55
White	NA	0.17	0.34

From AP-42, 11/06 Section 7 Table 7.1-6, page 7.1-69

Newfield MAMIE 4-25-3-3WH

OILTK-6

Potential to Emit Emission Calculations

Maximum Tank Vapor: 72.1 scf/hr

Lower Heating Value: 2,222 Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	6.16E+00 lb/hr	x	100% - 98%	=	1.23E-01 lb/hr
	2.70E+01 TPY	x	100% - 98%	=	5.40E-01 TPY
Benzene:	3.28E-02 lb/hr	x	100% - 98%	=	6.56E-04 lb/hr
	1.44E-01 TPY	x	100% - 98%	=	2.87E-03 TPY
Toluene:	7.49E-02 lb/hr	x	100% - 98%	=	1.50E-03 lb/hr
	3.28E-01 TPY	x	100% - 98%	=	6.56E-03 TPY
Ethylbenzene:	8.56E-03 lb/hr	x	100% - 98%	=	1.71E-04 lb/hr
	3.75E-02 TPY	x	100% - 98%	=	7.50E-04 TPY
Xylenes:	1.49E-02 lb/hr	x	100% - 98%	=	2.99E-04 lb/hr
	6.54E-02 TPY	x	100% - 98%	=	1.31E-03 TPY
n-Hexane:	1.33E+00 lb/hr	x	100% - 98%	=	2.66E-02 lb/hr
	5.82E+00 TPY	x	100% - 98%	=	1.16E-01 TPY
2,2,4-Trimethyl-pentane:	1.73E-02 lb/hr	x	100% - 98%	=	3.46E-04 lb/hr
	7.57E-02 TPY	x	100% - 98%	=	1.51E-03 TPY

Maximum Tank Vapor is a sum of the gas flash rate (scfd) plus the total losses rate (scfd) converted to scf/hr.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/22/2019
4. Type of Operation:	Oil and Gas Production Tank Unloading		
5. Emission Point:	ID Number: 21	Name: OILTKLOAD-2	7. Identification and Description of Control Equipment: Not Applicable
6. Description of Equipment:	Emissions related to unloading of oil tank via truck		
8. Load Quantity:	273,750	barrels/yr	

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)	
PM			PM - Particulate Matter
PM_{10}			PM_{10} - PM less than 10 microns in size
$PM_{2.5}$			$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X			SO_X - Sulfur Oxides
NO_X			NO_X - Nitrogen Oxides
CO			CO - Carbon Monoxide
VOC	1.16E+01	7.97E-01	VOC - Volatile Organic Compound
Pb			Pb - Lead and lead compounds
Fluorides			Fluorides - Gaseous and particulates
H_2SO_4			H_2SO_4 - Sulfuric Acid Mist
H_2S			H_2S - Hydrogen Sulfide
TRS			TRS - Total Reduced Sulfur
RSC			RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

OILTKLOAD-2

VOC wt%	**100.00%**	Benzene wt%	**0.40%**	Xylene wt%	**0.18%**
Total HAPs wt%	**18.03%**	Toluene wt%	**0.91%**	n-Hexane wt%	**16.21%**
CH_4 wt%	**12.60%**	Ethylbenzene wt%	**0.10%**	2,2,4-Trimethylpentane wt%	**0.21%**

		Saturation Factor (S)		Vapor Pressure (P) (psia)		Molecular Weight (MW) (lb/lb-mole)		Temperature (Rankine)		Load Loss (lb/1000 gal)
12.46	x	**0.60**	x	**2.80**	x	**50.00**	/	**520.00**	=	**2.01**

			Capture Effciency		Control Effciency				
		[100%	-	95%	x	98%]	x		
LL lb/1,000 gal		Truck Load Rate bbl/hr			gal/bbl		Emissions lb/hr HC		
2.01	x	**230.00**	x		**42.00**	=	**1.34**	x	100.00% = **1.34E+00** C3+ VOC lb/hr
								x	18.03% = **2.42E-01** Total HAPs lb/hr
								x	12.60% = **1.69E-01** CH_4 lb/hr
								x	0.40% = **5.37E-03** Benzene lb/hr
								x	0.91% = **1.22E-02** Toluene lb/hr
								x	0.10% = **1.40E-03** Ethylbenzene lb/hr
								x	0.18% = **2.44E-03** Xylene lb/hr
								x	16.21% = **2.17E-01** n-Hexane lb/hr
								x	0.21% = **2.83E-03** 2,2,4-Trimethylpentane lb/hr

Newfield MAMIE 4-25-3-3WH

OILTKLOAD-2

VOC wt%	**100.00%**	Benzene wt%	**0.40%**	Xylene wt%	**0.18%**
Total HAPs wt%	**18.03%**	Toluene wt%	**0.91%**	n-Hexane wt%	**16.21%**
CH_4 wt%	**12.60%**	Ethylbenzene wt%	**0.10%**	2,2,4-Trimethylpentane wt%	**0.21%**

		Saturation Factor (S)		Vapor Pressure (P) (psia)		Molecular Weight (MW) (lb/lb-mole)		Temperature (Rankine)		Load Loss (lb/1000 gal)
12.46	x	**0.60**	x	**2.80**	x	**50.00**	/	**520.00**	=	**2.01**

Potential to Emit

		Capture Effciency		Control Effciency						C3+ VOC TPY
[100%	-	95%	x	98%	]	x		x	100.00%	= **7.97E-01**

LL lb/1,000 gal		Max Annual Throughput bbl/yr		gal/bbl		lb/ton		Emissions TPY HC				Total HAPs TPY
2.01	x	**273,750.00**	x	**42.00**	/	**2,000.00**	=	**7.97E-01**	x	18.03%	=	**1.44E-01**

				CH_4 TPY
x	12.60%	=	**1.00E-01**	

				CH_4 as CO_2e TPY
=	**2.11E+00**			

				Benzene TPY
x	0.40%	=	**3.19E-03**	

				Toluene TPY
x	0.91%	=	**7.29E-03**	

				Ethylbenzene TPY
x	0.10%	=	**8.34E-04**	

				Xylene TPY
x	0.18%	=	**1.45E-03**	

				n-Hexane TPY
x	16.21%	=	**1.29E-01**	

				2,2,4-Trimethylpentane TPY
x	0.21%	=	**1.68E-03**	

Calculation basis: AP-42 Section 5.2. Defaults assume submerged loading: dedicated normal service.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Pneumatic Controllers		
5. Emission Point: ID Number:	22 Name: PCONT-2	7. Identification and Description of Control Equipment	None
6. Description of Equipment:	Low Pneumatic Controllers		
8. Controller Bleed Rate:	1 scf/hr	9. Operating Schedule:	8,760 Hours/year
10. Number of Pneumatic Controllers:	6		

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	8.85E-02	8.85E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

PCONT-2

UINTA CENTRAL BASIN

Emissions (lb/hr) = PSCR (scf/hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

Where:

PSCR = Pneumatic Source Consumption Rate (scf/min), as per manufacturers literature

Gas MW = Supply Gas Average Molecular Weight (lb/lb-mole)

		No. of Controllers			Supply Gas MW		VOC wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**6.97%**	=	**2.02E-02**	lb/hr VOC
		lbs/hr			Hours						
		2.02E-02	x		**8760**	x	2000 lbs/ton	=		**8.85E-02**	TPY VOC
		No. of Controllers			Supply Gas MW		Benzene wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.17%**	=	**4.85E-04**	lb/hr Benzene
		lbs/hr			Hours						
		4.85E-04	x		**8760**	x	2000 lbs/ton	=		**2.12E-03**	TPY Benzene
		No. of Controllers			Supply Gas MW		Toluene wt%		Uncontrolled Emissions:	
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.16%**	=	**4.67E-04**	lb/hr Toluene
		lbs/hr			Hours						
		4.67E-04	x		**8760**	x	2000 lbs/ton	=		**2.05E-03**	TPY Toluene

Molecular weight and weight percent of gas constituents are from an extend gas analysis representative of this region.

Newfield MAMIE 4-25-3-3WH

PCONT-2

UINTA CENTRAL BASIN

Emissions (lb/hr) = PSCR (scf/hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

		No. of Controllers				Supply Gas MW		Ethylbenzene wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.01%**	=	**2.32E-05** lb/hr Ethylbenzene
				lbs/hr		Hours				
				2.32E-05	x	**8760**	x	2000 lbs/ton	=	**1.02E-04** TPY Ethylbenzene
		No. of Controllers				Supply Gas MW		Xylene wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.03%**	=	**8.99E-05** lb/hr Xylene
				lbs/hr		Hours				
				8.99E-05	x	**8760**	x	2000 lbs/ton	=	**3.94E-04** TPY Xylene
		No. of Controllers				Supply Gas MW		n-Hexane wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.00%**	=	**0.00E+00** lb/hr n-Hexane
				lbs/hr		Hours				
				0.00E+00	x	**8760**	x	2000 lbs/ton	=	**0.00E+00** TPY n-Hexane
		No. of Controllers				Supply Gas MW		2,2,4-Trimeth. wt%		Uncontrolled Emissions:
1.00	scf/hr x	6	x	1/379 scf/lb-mole	x	**18.33**	x	**0.02%**	=	**5.80E-05** lb/hr 2,2,4-Trimethylpentane
				lbs/hr		Hours				
				5.80E-05	x	**8760**	x	2000 lbs/ton	=	**2.54E-04** TPY 2,2,4-Trimethylpentane

Molecular weight and weight percent of gas constituents are from an extended gas analysis representative of this region.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/7/2019
4. Type of Operation:	Oil and Gas Production Tanks		
5. Emission Point:	ID Number 23 / Name PWTANK-2	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	400 Barrel Vertical Fixed Roof Steel Produced Water Tank		
8. Throughput:	273,750 barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.32E-02
CO		7.20E-02
VOC	1.37E+00	2.74E-02
Pb		
Fluorides		
H_2SO_4		
H_2S	Negligible	Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

PWTANK-2

Potential to Emit Emission Calculations

Maximum Water Tank Throughput	**273,750**	bbl/yr
Flash Factor	**1.90**	scf/bbl
Maximum Tank Vapor	**59.4**	scf/hr
Lower Heating Value	**748**	Btu/scf
VOC	**0.01**	lb/bbl
Benzene	**0.0001**	lb/bbl
Toluene	**0.0003**	lb/bbl
Ethylbenzene	**0.000006**	lb/bbl
Xylenes	**0.00006**	lb/bbl

Environ Emission Factors for Produced Water Tanks
Environ Project No. 06-17477T, TCEQ Project 2010-29
Prepared for Texas Commission on Environmental Quality.
Given in pounds of emissions per barrel of produced water.
Methane Emission and Flash Factors were not provided in this report as such it was calculated from the data available within the report.

Maximum Tank Vapor (scf/hr) =
Flash Factor (scf/bbl) * Maximum Water Tank Throughput (bbl/yr) ÷ 8,760 (hr/yr)

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

VOC:	**1,312.5**	gal/hr	x	1/42 barrel/gallon	x	0.010 lb/bbl	x	100% - 98%	=	**6.25E-03**	lb/hr
	273,750	bbl/yr	x	0.01 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**2.74E-02**	TPY
Benzene:	**1,312.5**	gal/hr	x	1/42 barrel/gallon	x	0.0001 lb/bbl	x	100% - 98%	=	**6.25E-05**	lb/hr
	273,750	bbl/yr	x	0.0001 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**2.74E-04**	TPY
Toluene:	**1,312.5**	gal/hr	x	1/42 barrel/gallon	x	0.0003 lb/bbl	x	100% - 98%	=	**1.88E-04**	lb/hr
	273,750	bbl/yr	x	0.0003 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**8.21E-04**	TPY
Ethylbenzene:	**1,312.5**	gal/hr	x	1/42 barrel/gallon	x	0.000006 lb/bbl	x	100% - 98%	=	**3.75E-06**	lb/hr
	273,750	bbl/yr	x	0.000006 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**1.64E-05**	TPY

Newfield MAMIE 4-25-3-3WH

PWTANK-2

Xylenes:	**1,312.5**	gal/hr	x	1/42 barrel/gallon	x	0.00006 lb/bbl	x	100% - 98%	=	**3.75E-05**	lb/hr
	273,750	bbl/yr	x	0.00006 lb/bbl	x	1/2,000 ton/lb	x	100% - 98%	=	**1.64E-04**	TPY

NOx & CO emission factors are from AP-42 Table 13.5-1
(Emission Factors for Flare Operations).
CO_2 & N_2O emission factors are from AP-42 Table 1.4-2
(Emission Factors for Natural Gas Combustion).

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/07/2019
4. Type of Operation:	Miscellaneous Tanks		
5. Emission Point:	ID Number 24 / Name SMTANKS-2	7. Identification and Description of Control Equipment	
6. Description of Equipment:	Small Storage Tanks		
8. Throughput:	Not Applicable barrels/year	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		
CO		
VOC	2.05E-02	2.05E-02
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield Mamie 4-25-3-3WH

SMALL STORAGE TANKS 2			
	Emission Factor	**Units**	
Annual Storage Quantity			
Methanol	**8,600**	gallons/yr	
Ethylene glycol	**1,000**	gallons/yr	
Breathing losses Emission Factors			
Methanol	**3.70E+00**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Ethylene glycol	**5.20E-02**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Breathing Emissions			
Methanol	**3.63E-03**	VOC lb/hr	= 3.7 lb/1000 gal * 8600 gal/yr * 1 yr/365 days * 1 day/24 hrs
Ethylene glycol	**5.94E-06**	VOC lb/hr	= 0.052 lb/1000 gal * 1000 gal/yr * 1 yr/365 days * 1 day/24 hrs
Working losses Emission Factors			
Methanol	**1.07E+00**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Ethylene glycol	**2.00E-03**	lb VOC/1000 gal	Value from "http://cfpub.epa.gov/webfire"
Working Emissions			
Methanol	**1.05E-03**	VOC lb/hr	= 1.07 lb/1000 gal * 8600 gal/yr * 1 yr/365 days * 1 day/24 hrs
Ethylene glycol	**2.28E-07**	VOC lb/hr	= 0.002 lb/1000 gal * 1000 gal/yr * 1 yr/365 days * 1 day/24 hrs
Total Working & Breathing Emissions			
Methanol	**4.68E-03**	VOC lb/hr	
Methanol	**2.05E-02**	VOC ton/yr	
Ethylene glycol	**6.16E-06**	VOC lb/hr	
Ethylene glycol	**2.70E-05**	VOC ton/yr	
Totals	**4.69E-03**	VOC lb/hr	
Totals	**2.05E-02**	VOC ton/yr	

1. Company:	Newfield Exploration			**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 25	Name TANKHTR4	7. Identification and Description of Control Equipment		
6. Description of Equipment: Tank Heater			None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR4

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration			**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 26	Name TANKHTR5	7. Identification and Description of Control Equipment		
6. Description of Equipment: Tank Heater			None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR5

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration			**Potential Emissions**	
2. Site/Source:	MAMIE 4-25-3-3WH		3. Date:	2/7/2019	
4. Type of Operation:	Oil and Gas Production Tank Heater				
5. Emission Point:	ID Number 27	Name TANKHTR6	7. Identification and Description of Control Equipment		
6. Description of Equipment: Tank Heater			None		
8. Hours of Operation:	8,760	Hours/Year	9. Burner Rating:	250,000	BTU/hr
10. Type of Fuel Used:	Natural Gas		11. Amount of Fuel Used:	2,190,000,000	BTU/yr

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM	8.16E-03	8.16E-03
PM_{10}	8.16E-03	8.16E-03
$PM_{2.5}$	8.16E-03	8.16E-03
SO_X	6.44E-04	6.44E-04
NO_X	1.07E-01	1.07E-01
CO	9.02E-02	9.02E-02
VOC	5.90E-03	5.90E-03
Pb		
Fluorides		
H_2SO_4		
H_2S		
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

TANKHTR6

HEATER Potential to Emit

Heater Rating **0.25** MMBtu/hr

NO_x:	**0.10**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.45E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**1.07E-01**	NO_x TPY
CO:	**0.08**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**2.06E-02**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**9.02E-02**	CO TPY
VOC:	**0.01**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.35E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**5.90E-03**	VOC TPY
SO_2:	**0.000588**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.47E-04**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**6.44E-04**	SO_2 TPY
PM_{10}:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	PM_{10} TPY
$PM_{2.5}$:	**0.0075**	lb/MMBtu	x	**0.3**	MMBtu/hr	=	**1.86E-03**	lb/hr	x	**8,760**	hr/yr	x	1 ton / 2000lb	=	**8.16E-03**	$PM_{2.5}$ TPY

Emission Factors are from AP-42 Table 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

1. Company:	Newfield Exploration		**Potential Emissions**
2. Site/Source:	MAMIE 4-25-3-3WH	3. Date:	2/07/2019
4. Type of Operation:	Flare		
5. Emission Point:	ID Number 28 / Name FLARE-2	7. Identification and Description of Control Equipment	Flare
6. Description of Equipment:	Flare		
8. Throughput:	296 scf/hr	9. Operating Schedule:	Not Applicable

Pollutant	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
PM		
PM_{10}		
$PM_{2.5}$		
SO_X		
NO_X		1.61E-01
CO		8.78E-01
VOC		1.23E-01
Pb		
Fluorides		
H_2SO_4		
H_2S		Negligible
TRS		
RSC		

PM - Particulate Matter
PM_{10} - PM less than 10 microns in size
$PM_{2.5}$ - PM less than 2.5 microns in size
SO_X - Sulfur Oxides
NO_X - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

Newfield MAMIE 4-25-3-3WH

FLARE-2

Flare Pilot Gas Volume	**0.33**	scfm
Tank Gas Volume	**4.60**	scfm
Lower Heating Value	**1,020**	Btu/scf

Controlled emissions are calculated based on a 98% destruction efficiency of the VOC gas.

SO_2: **296** scf/hr x 1/379 scf/lb-mole x 64.064 lb/lb-mole x 0.00% x 98% = **0.00E+00** lb/hr

0.00E+00 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **0.00E+00** TPY

NOx: **296** scf/hr x **1,832** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.068 lb/MMBtu = **3.68E-02** lb/hr

3.68E-02 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **1.61E-01** TPY

CO: **296** scf/hr x **1,832** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.370 lb/MMBtu = **2.00E-01** lb/hr

2.00E-01 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **8.78E-01** TPY

VOC: **296** scf/hr x **1,832** Btu/scf x 1 Mmbtu/1,000,000 Btu x 0.052 lb/MMBtu = **2.81E-02** lb/hr

2.81E-02 lb/hr x 8760 hr/yr x 1 ton/2000 lb = **1.23E-01** TPY

Newfield MAMIE 4-25-3-3WH

FLARE-2

CO_2:	**296**	scf/hr	x	**1,832**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	117.65 lb/MMBtu	=	**6.37E+01**	lb/hr	
	6.37E+01	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**2.79E+02**	TPY	

													CH_4 as CO_2e:	
CH_4:	**296**	scf/hr	x	**1,832**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	0.077 lb/MMBtu	=	**4.17E-02**	lb/hr	**1.29E+01**	lb/hr
	4.17E-02	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**1.83E-01**	TPY	**5.67E+01**	TPY

													N_2O as CO_2e:	
N_2O:	**296**	scf/hr	x	**1,832**	Btu/scf	x	1 Mmbtu/1,000,000 Btu	x	0.002 lb/MMBtu	=	**1.17E-03**	lb/hr	**3.62E-01**	lb/hr
	1.17E-03	lb/hr	x	8760 hr/yr		x	1 ton/2000 lb			=	**5.12E-03**	TPY	**1.59E+00**	TPY

NOx, CO, VOC, & CH_4 emission factors are from AP-42 Table 13.5-1 & 13.5-2
(Emission Factors for Flare Operations).
CO_2 & N_2O emission factors are from AP-42 Table 1.4-2
(Emission Factors for Natural Gas Combustion).

Detailed Information on Equipment Controls

STEFFES

CUSTOMER FOCUSED. SOLUTION DRIVEN. FIELD PROVEN.

VARIABLE ORIFICE FLARES

The Steffes Variable Orifice Flare offers optimum system performance with its ability to self-adjust to accommodate high, low or various gas flow rates. Its patented variable annular orifice design efficiently mixes air with gas prior to combustion for smokeless, efficient operation and a clean consistent burn.

Our experienced team of professionals can help you configure assemblies to meet a wide range of pressures, including designs for multiple pressures. The continuous running stable pilot ensures the flare remains lit and running, even in some of the harshest conditions. With its smokeless operation and ability to accommodate multiple pressures, the Steffes Variable Orifice Flare has become the industry standard.

FEATURES:

- Various flow rates for high and low pressures
- Single, combo, and dual flare tip combinations
- Stainless steel construction
- Patent pending technology
- Field proven 98% destruction efficiency
- Designed to meet EPA 40 CFR §60.18 requirement

BENEFITS:

- High, low, and combination pressure systems
- Continuous running stable pilot
- Smokeless operation
- Thermocouple for monitoring pilot with datalogger and temperature transmitter
- Reliable and complete solution

VARIABLE ORIFICE FLARES

High Pressure

Model: SHP-6 **Rated Flow Capacity:**[*] 1.1 MMSCFD **Max Flow Capacity:**[*2] 2.2 MMSCFD[*3] **Weight:** 200 lbs	**Model:** SHC-6 **Rated Flow Capacity:**[*] 3.0 MMSCFD **Max Flow Capacity:**[*2] 6.0 MMSCFD[*3] **Weight:** 230 lbs

Low Pressure

Model: SVG-3B4 **Rated Flow Capacity:**[*1] 106 MSCFD **Max Flow Capacity:**[*3] 750 MSCFD[*4] **Weight:** 70 lbs	**Model:** SVG-3D4 **Rated Flow Capacity:**[*1] 106 MSCFD **Max Flow Capacity:**[*3] 750 MSCFD[*4] **Weight:** 20 lbs	**Model:** SVG-3D8 **Rated Flow Capacity:**[*1] 120 MSCFD **Max Flow Capacity:**[*3] 750 MSCFD[*4] **Weight:** 22 lbs

Pilot

Model: SPL-1
Gas Flow Rate:
Pilot orifice is a #70 MTD
Propane at 8 PSI is 11 Cu. Ft./Hr.
Propane at 10 PSI is 13 Cu. Ft./Hr.
Weight: 15 lbs
Multiply flow by 1.6 for Natural Gas

All data is for reference only.
Call Factory for more specifics.

*[*]Rated flow, third party tested, to meet EPA 40 CFR §60.18 requirements. [*1]All Low Pressure models, third party testing, rated flow to meet EPA 40 CFR §60.18 was with 2479 BTU gas. [*2]Flares are able to handle flows up to max flow capacity, however they will not meet all the requirements of EPA 40 CFR §60.18. [*3]Flow rates higher than rated flow need to be evaluated for flame stability, re-light capability, radiation and smokeless operation per Method 22. [*4]All Low Pressure models max flow rate to meet exit velocity per EPA 40 CFR §60.18.*

Examples of Flare Configurations:

Dual SHP-6 Flare
High Pressure Flare Base

Combo SHP-6 & Dual SVG-3B4 Flare
Combo Flare Base

Dual SVG-3B4 Flare
Dual Low Pressure Flare Base

SVG-3D4 Flare
Low Pressure Flare Base

SHP-6 Flare
High Pressure Flare Base

Combo SHP-6 & SVG-3D8 Flare
Combo Flare Base

STEFFES
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STEFFES

CUSTOMER FOCUSED. SOLUTION DRIVEN. FIELD PROVEN.

FLARE SOLUTIONS
Specifications

Steffes is committed to working with our customers to provide the simplest, most efficient, and most reliable solutions for flaring requirements. Our flares are designed to help operators meet the EPA 40 CFR §60.18 requirements, including our patent pending variable orifice design.

Data is for reference only. Call Steffes Technical support for more specific information.

Flare Tip Model		Technology	Back Pressure*	Rated Flow*1 Meeting 40 CFR 60.18	Max Flow Capacity	Power Required	Pipe Connections	Typical Installations	
								Produced Gas	Tank Gas
High Pressure	SHP-6	Variable Orifice	5.5 - 10 PSI	1.1 MMSCFD	2.2 MMSCFD*2	No	4"	X	
	SHC-6		4 - 6 PSI	3.0 MMSCFD	6.0 MMSCFD*2	No	4"	X	
Low Pressure	SVG-3B4		3 - 5 OSI	106 MSCFD	750 MSCFD*3	No	3"		X
	SVG-3D4		4 - 6 OSI	106 MSCFD	750 MSCFD*3	No	3"		X
	SVG-3D8		7 - 10 OSI	120 MSCFD	750 MSCFD*3	No	3"		X
	SAA-2	Air Assist	0 - 3 OSI	200 MSCFD	See chart 4	120 v	3"		X
	SAA-4		0 - 1 OSI	600 MSCFD	See chart 5	480 V 3 Phase	4"		X
Pilot*4	SPL-1	Pilot	8 PSI	264 SCFD	N/A	Spark System Required	3/8" Compression	X or Propane	

*Measured at flare tip. *1 "Rated Flow" is the flow rate used by independent third parties to confirm Steffes' flare compliance with the perspective provisions of 40 CFR 60.18. Gas flow rates that do not exceed these values can be assumed to comply with all relevant EPA flare performance requirements. *2 "Max Flow Capacity" is the highest flow rate allowed by Steffes for use in each specified flare. Flow rates above the "Max Flow Rate" may void warranties. *3 All low pressure flares can meet requirements of 40 CFR 60.18 if smokeless operation is confirmed by Method 22. Also will need to be evaluated for flame stability, re-light capability, and radiation. *4 Pilot can run at 6 - 10 PSI, Flow Rate will vary by pressure and gas composition.

VARIABLE ORIFICE FLARES

SHP-6 **SHC-6** **SVG-3B4** **SVG-3D4** **SVG-3D8**

The Steffes Variable Orifice Flares give optimum system performance over a wide range of gas flows for both high pressure and low pressure gases. Configure your flare system with singular or multiple flare tips to maximize performance. Models SHP - 6, SHC - 6, SVG - 3B4, SVG - 3D4, and SVG - 3D8.

AIR ASSIST FLARES

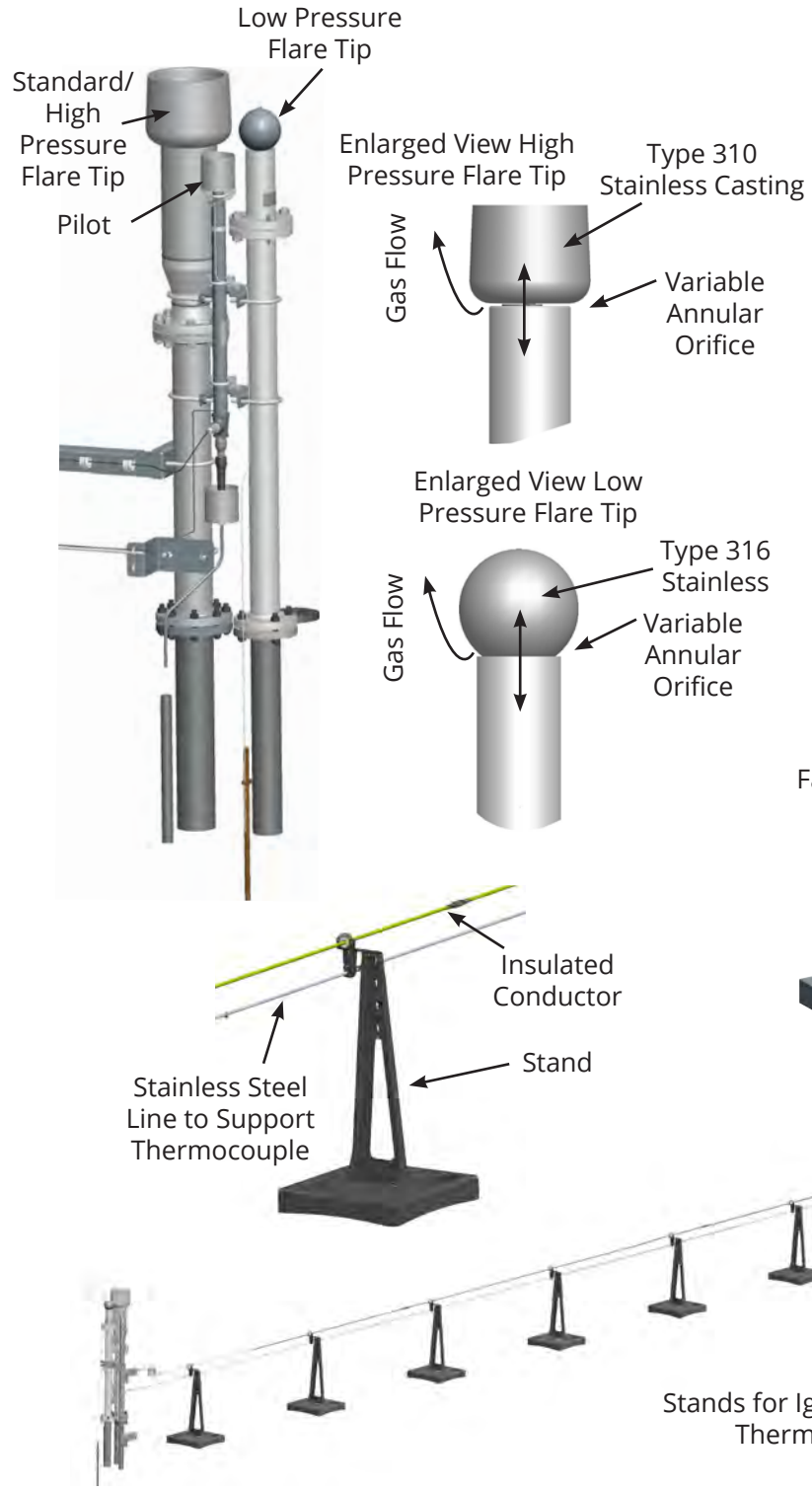
The Steffes Air Assist Flares burn low pressure gas over a wide range of flow rates. Low pressure gas is mixed with air from a variable speed fan to provide a clean burn. Model 2 (SAA - 2) and Model 4 (SAA - 4).

Model 2 SAA-2

Model 4 SAA-4

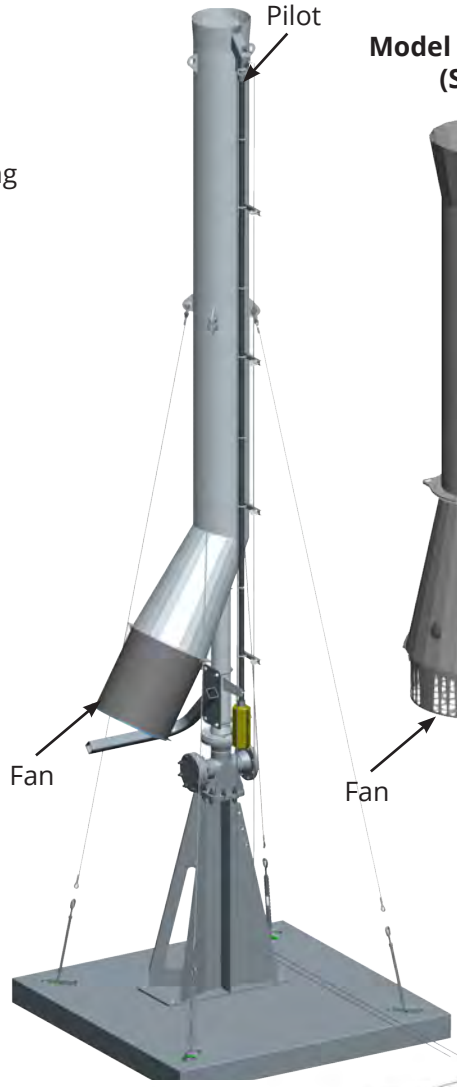
VARIABLE ORIFICE FLARES

Modular Design: Three (3) Pieces can be used together or separately



AIR ASSIST FLARES

Model 4 Air Assist (SAA-4)

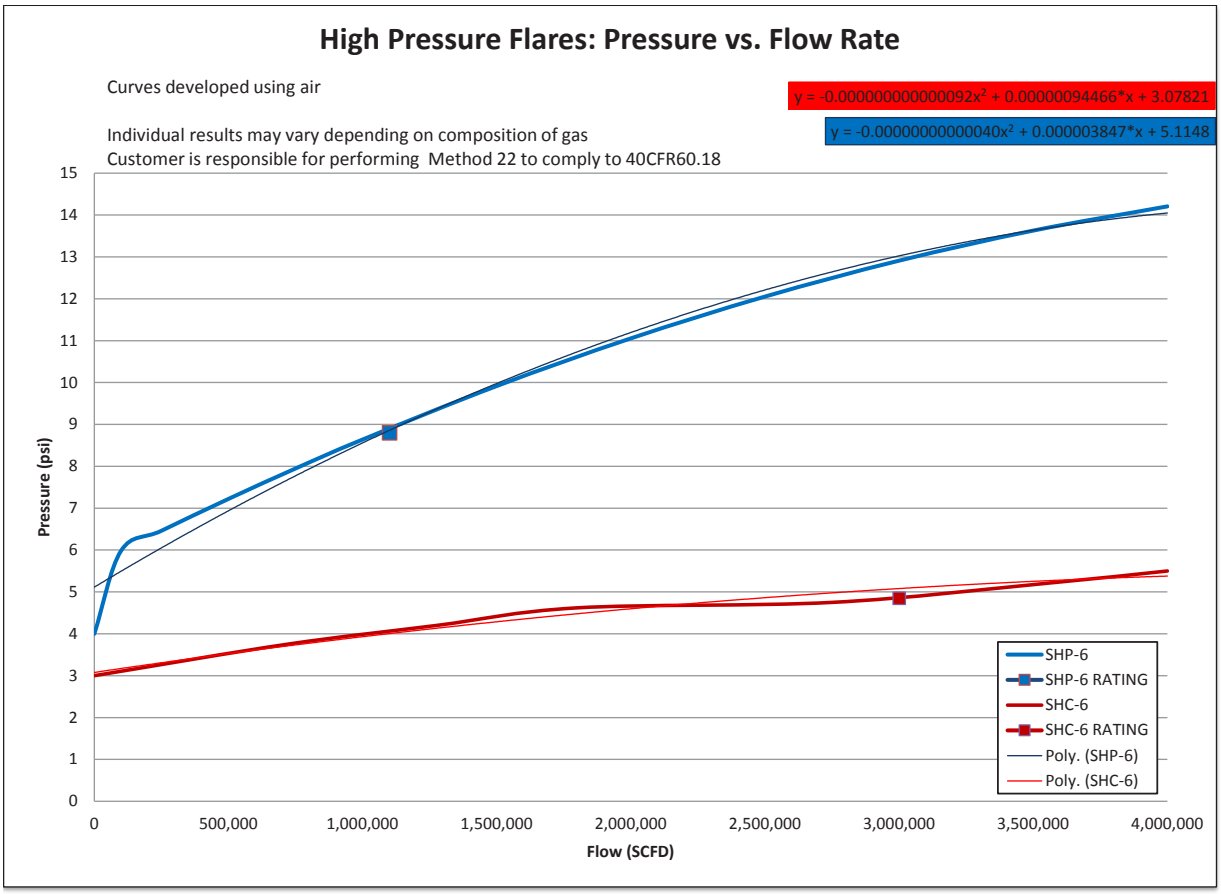


Model 2 Air Assist (SAA-2)

STEFFES
CUSTOMER FOCUSED. SOLUTION DRIVEN. FIELD PROVEN.

Phone: 888.783.3337
www.steffes.com
oilfieldproducts@steffes.com

CHART 1



SHP-6

Maximum Rate Tested by 3rd Party	1.1 MMSCFD
Minimum Rate Tested	0.05 MMSCFD

SHC-6

Maximum Rate Tested by 3rd Party	3.0 MMSCFD
Minimum Rate Tested	0.05 MMSCFD

GAS CHARACTERISTICS (SEPARATOR GAS) DURING 3RD PARTY TESTING

Specific Gravity at 40 psig and 100F	0.89*
Gross Heating Value	1550* BTU/SCF

*Pressure was measured at the test port on tip during third party testing.

*Data is from third party test report. Flare is designed to operate with 1100 to 2500 BTU/SCF gas. Performance can be affected by specific gas composition.

*Flares are able to handle more flow than the current ratings allow, however “Max Flow Capacity” is the highest flow rate allowed by Steffes for use in each specified flare. Flow rates above the “Max Flow Rate” may void warranties.

*Data is for reference only.

*Smokeless operation is achieved by building pressure in the flare, and the Minimum Rate is defined as typical flow required to begin building pressure in flare barrel. Minimum Rate can be affected by conditions restricting the proper seating of the translating tip and the barrel resulting in lower operating pressures. Flares operating at pressures less than those shown on chart can still meet the requirements of 40 CFR 60.18 if verification of smokeless operation is confirmed by Method 22.

CHART 2

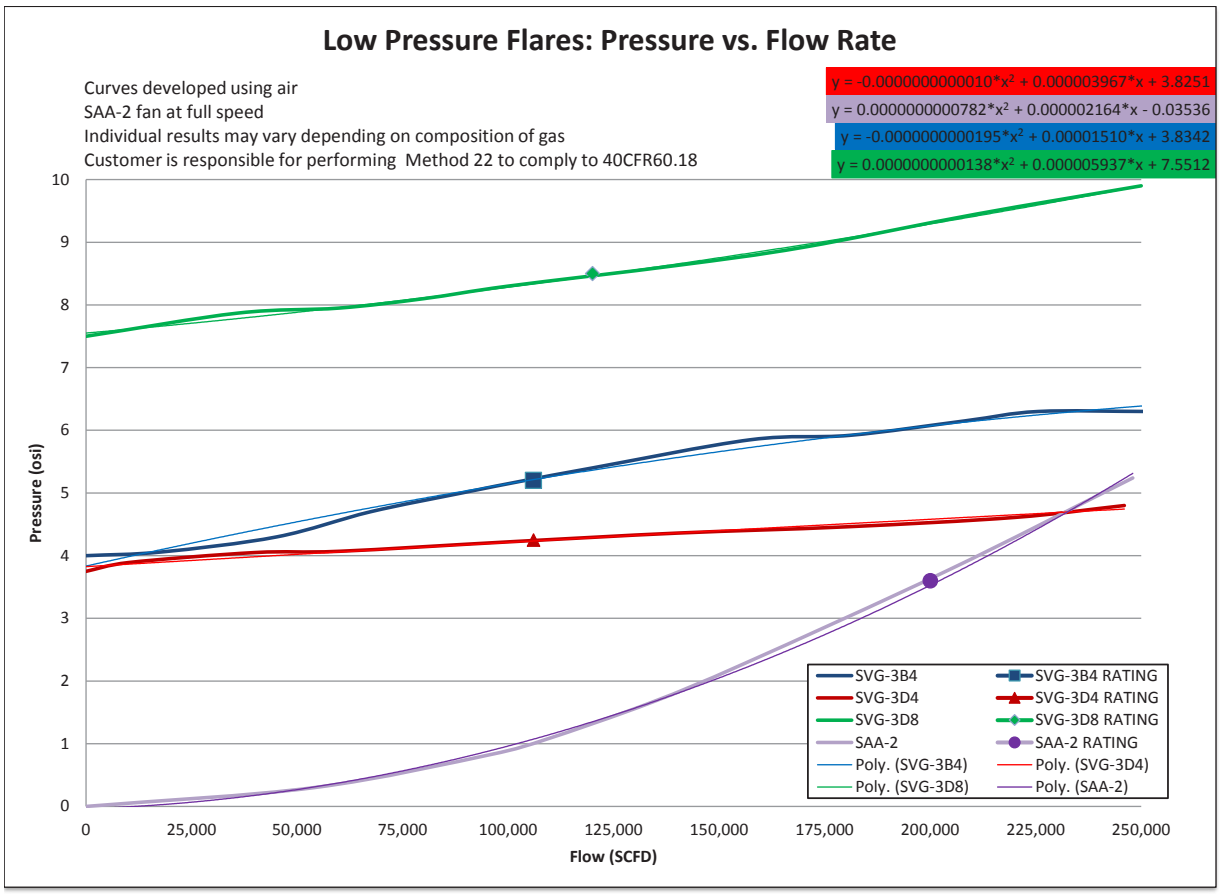


CHART 3

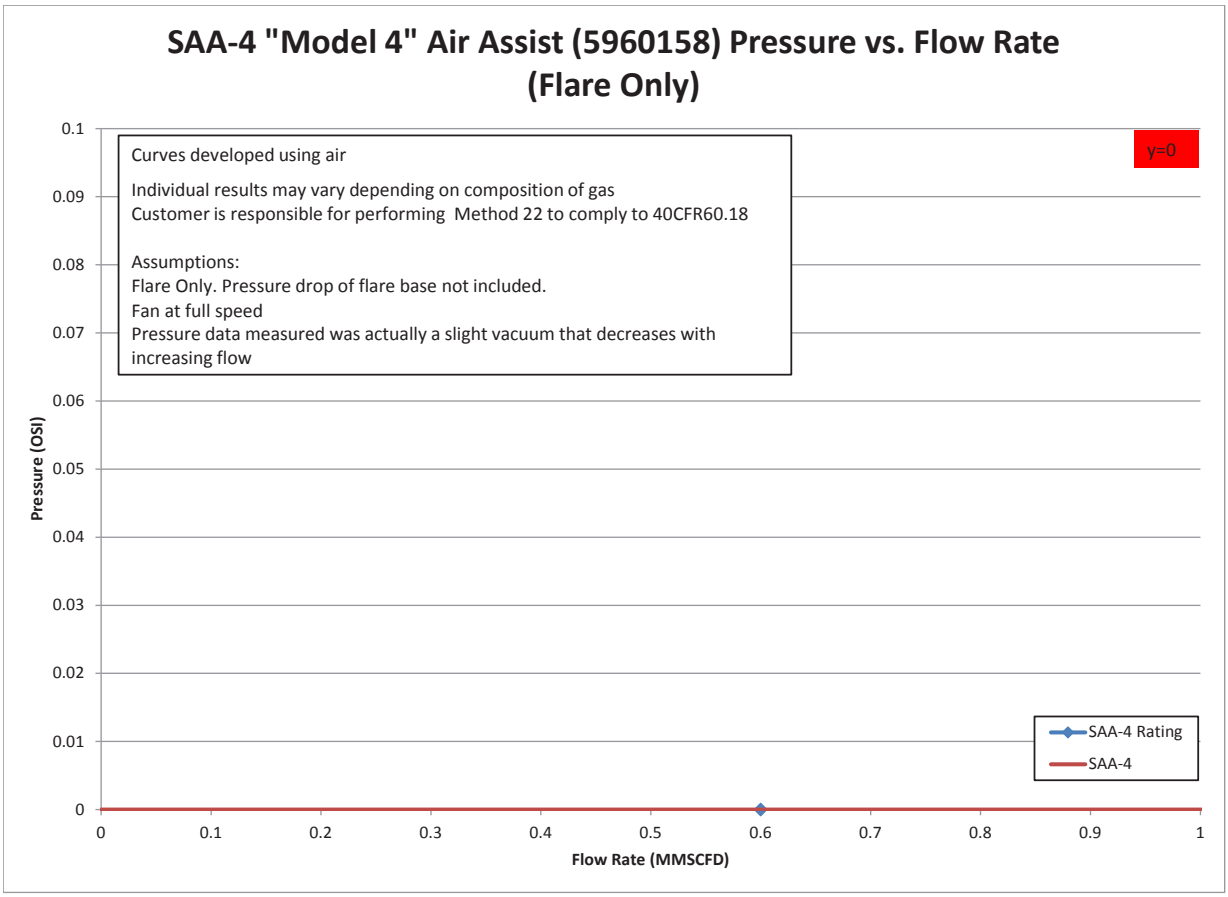


CHART 4

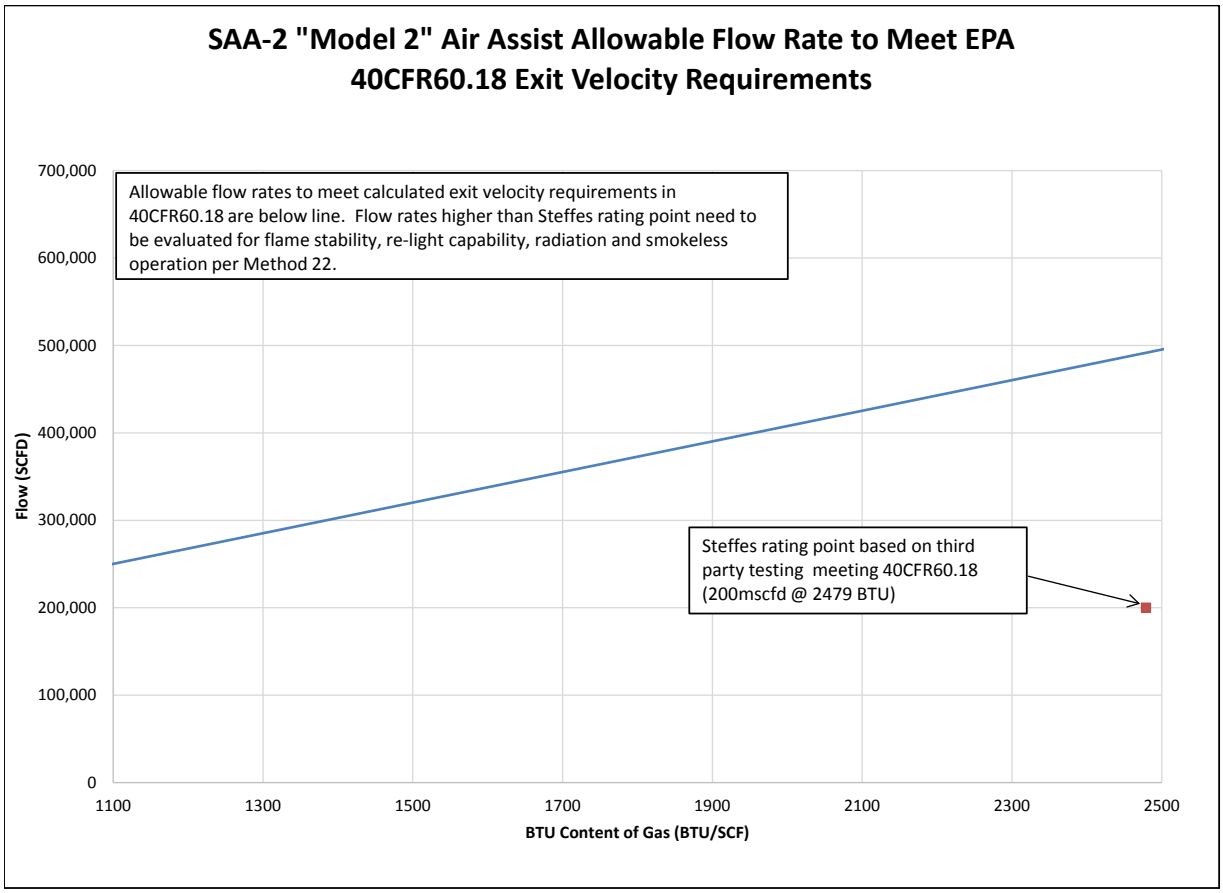
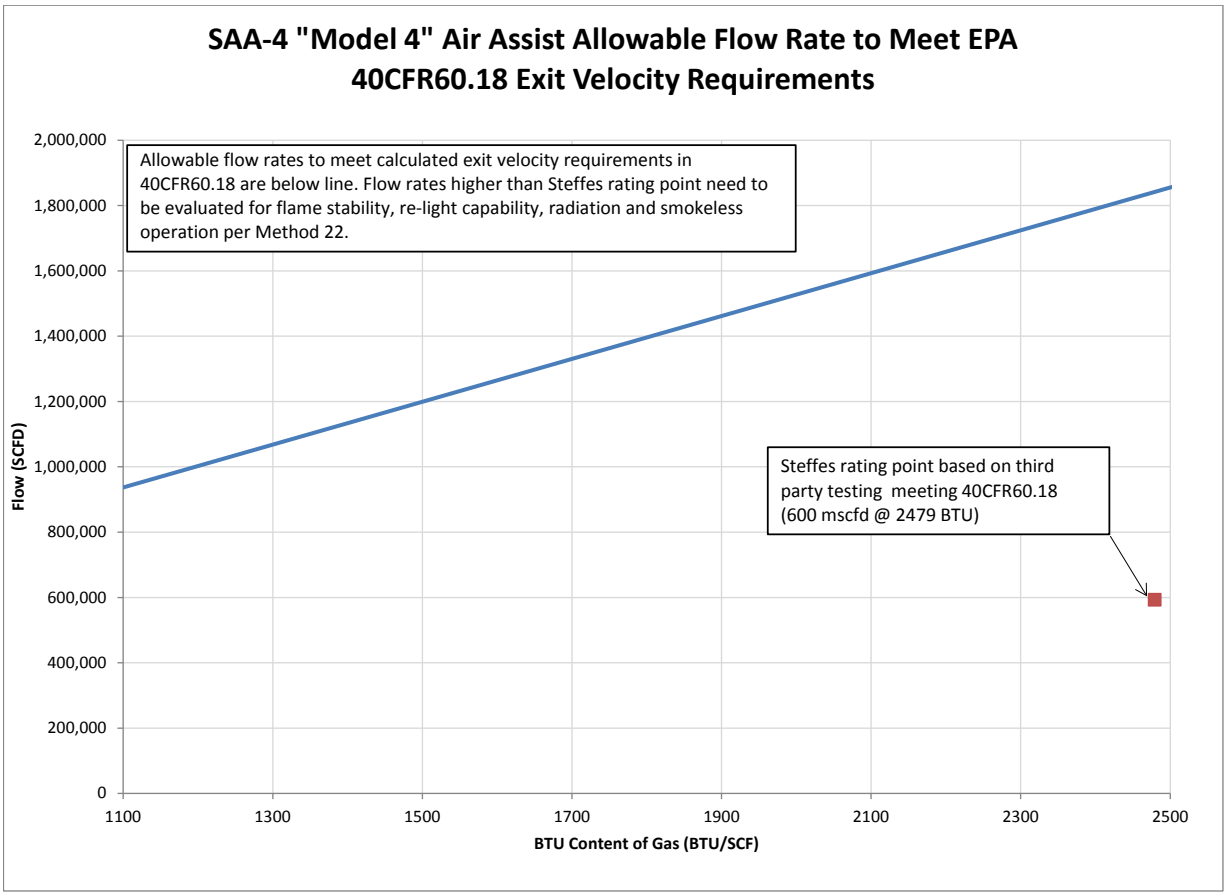


CHART 5



LOW PRESSURE FLARES	Rated Flow	Minimum Flow Rate	Gross Heating Value During Testing
Maximum Rate Tested by 3rd Party - SVG-3B4	106 MSCFD	18,000 SCFD	1750 BTU/SCF (on-site gas)
Maximum Rate Tested by 3rd Party - SVG-3D4	106 MSCFD	18,000 SCFD	2479 BTU/SCF (propane)
Maximum Rate Tested by 3rd Party - SVG-3D8	120 MSCFD	18,000 SCFD	2479 BTU/SCF (propane)
Maximum Rate Tested by 3rd Party - SAA-2	200 MSCFD	0	2479 BTU/SCF (propane)
Maximum Rate Tested by 3rd Party - SAA-4	600 MSCFD	0	2479 BTU/SCF (propane)

*Low Pressure curves represent testing data done with air as a medium, and pressure was measured at the test port on tip.

*Low Pressure Flares (SVG-3B4, SVG-3D4, and SVG-3D8) meet requirements of 40 CFR 60.18 up to flow rates of 750 mscfd if verification of smokeless operation is confirmed by method 22.

*Flares are designed to operate with 1100 to 2500 BTU/SCF gas. Performance can be affected by specific gas composition.

*Low Pressure curves represent the nominal to max pressure.

*Data is for reference only.

*Smokeless operation is achieved by building pressure in the flare, and the Minimum Rate is defined as typical flow required to begin building pressure in flare barrel. Minimum Rate can be effected by conditions restricting the proper seating of the translating tip and the barrel resulting in lower operating pressures. Flares operating at pressures less than those shown on chart can still meet the requirements of 40 CFR 60.18 if verification of smokeless operation is confirmed by Method 22.

Third Party has also confirmed the presence of a standing pilot flame monitored by a thermocouple on all Steffes flares in compliance with EPA 40 CFR 60.18.

CHART 6

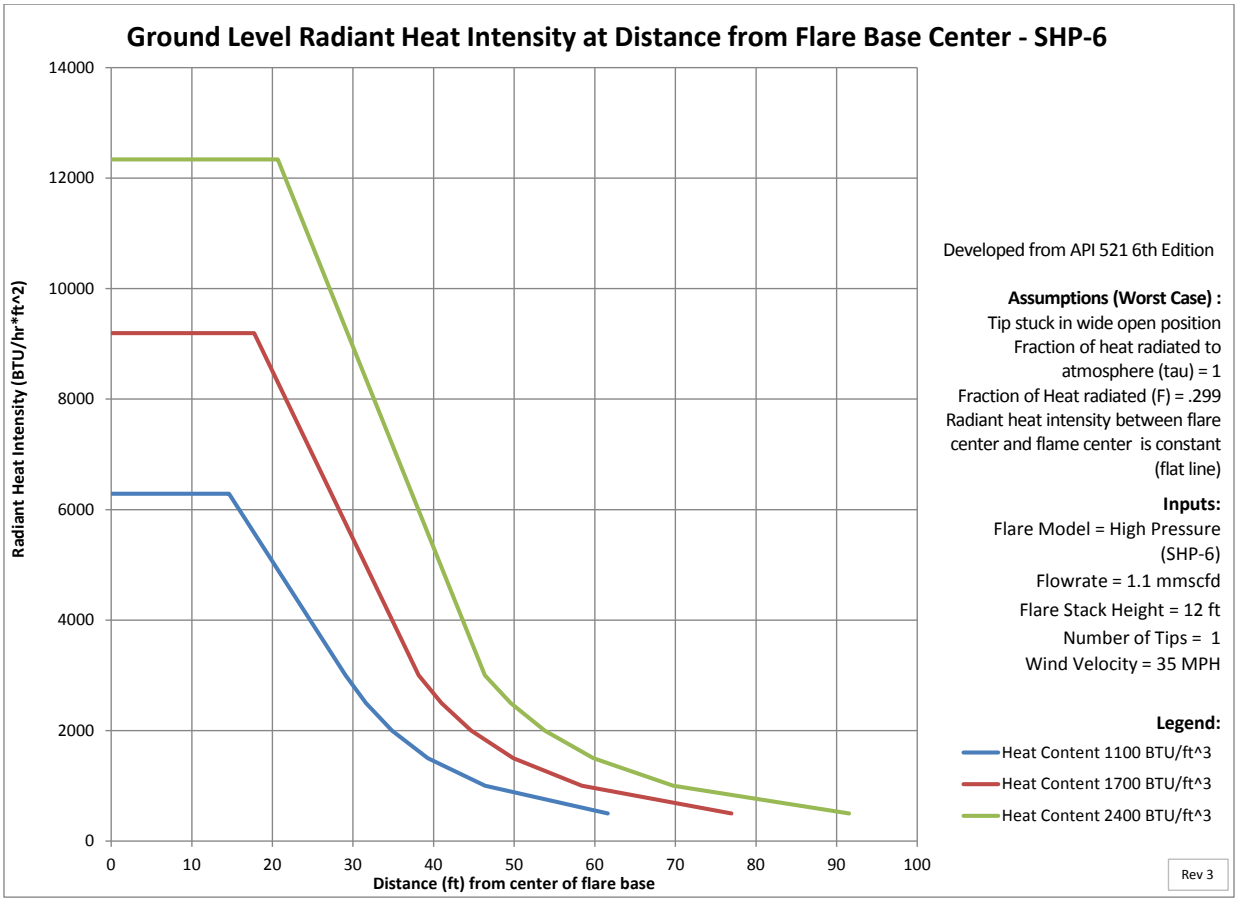


CHART 7

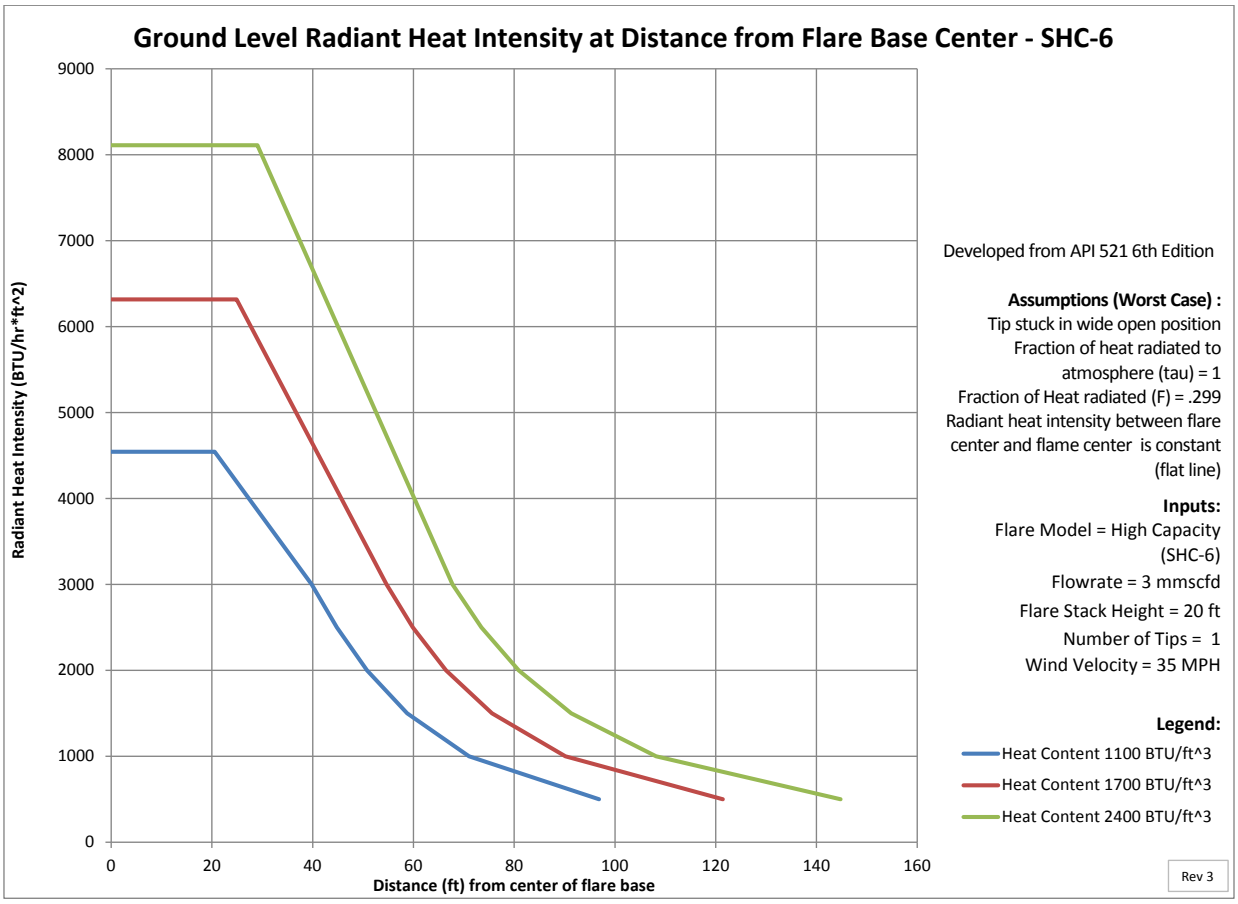


CHART 8

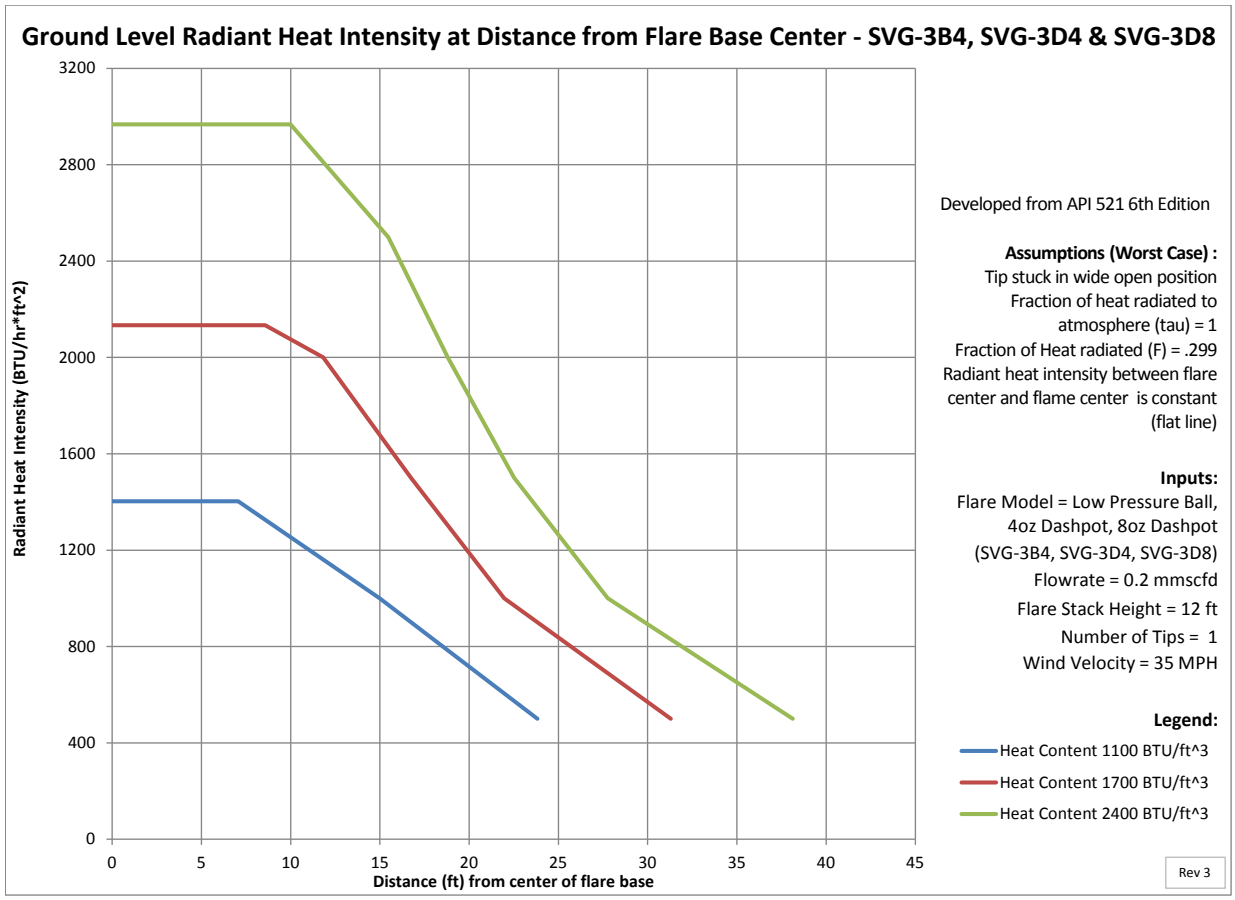


CHART 9

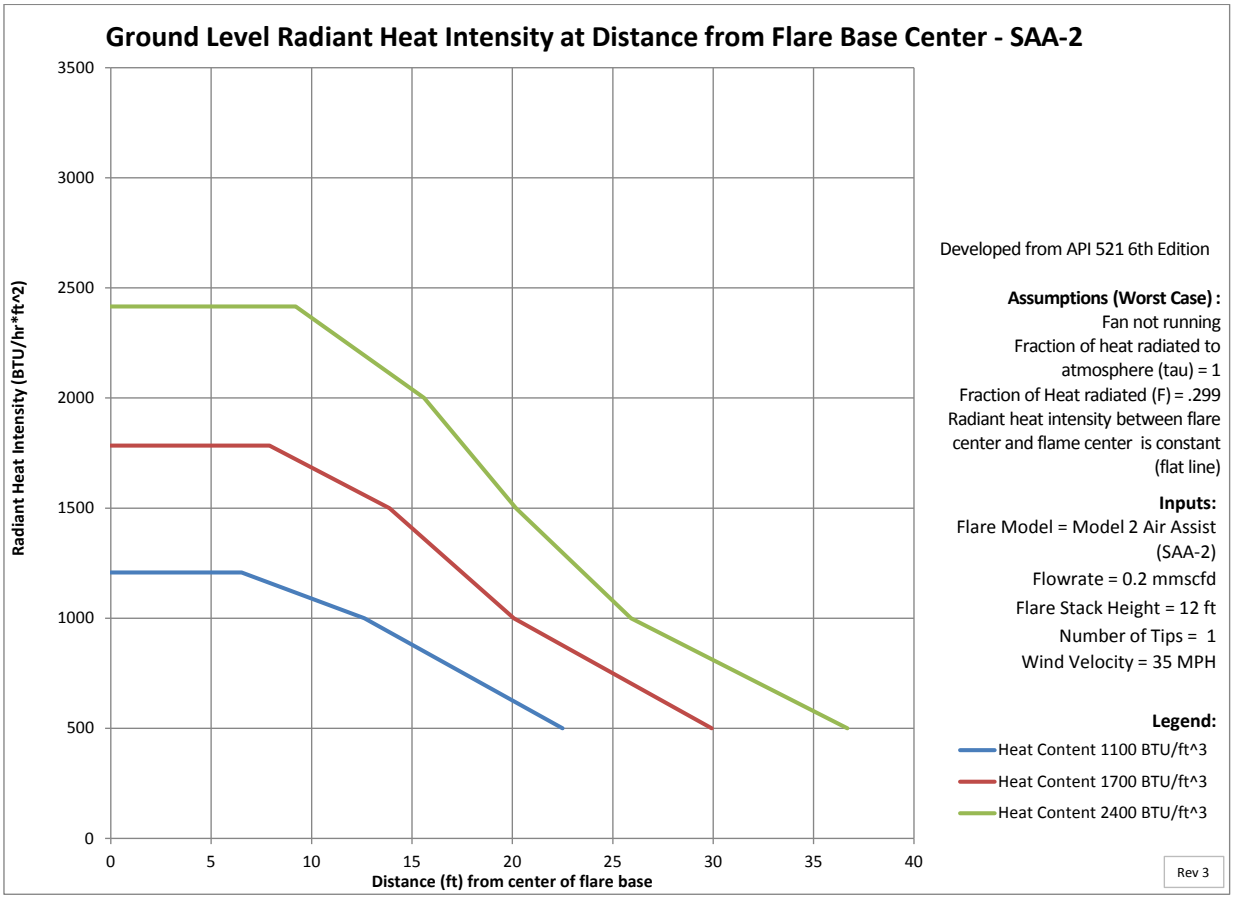


CHART 10

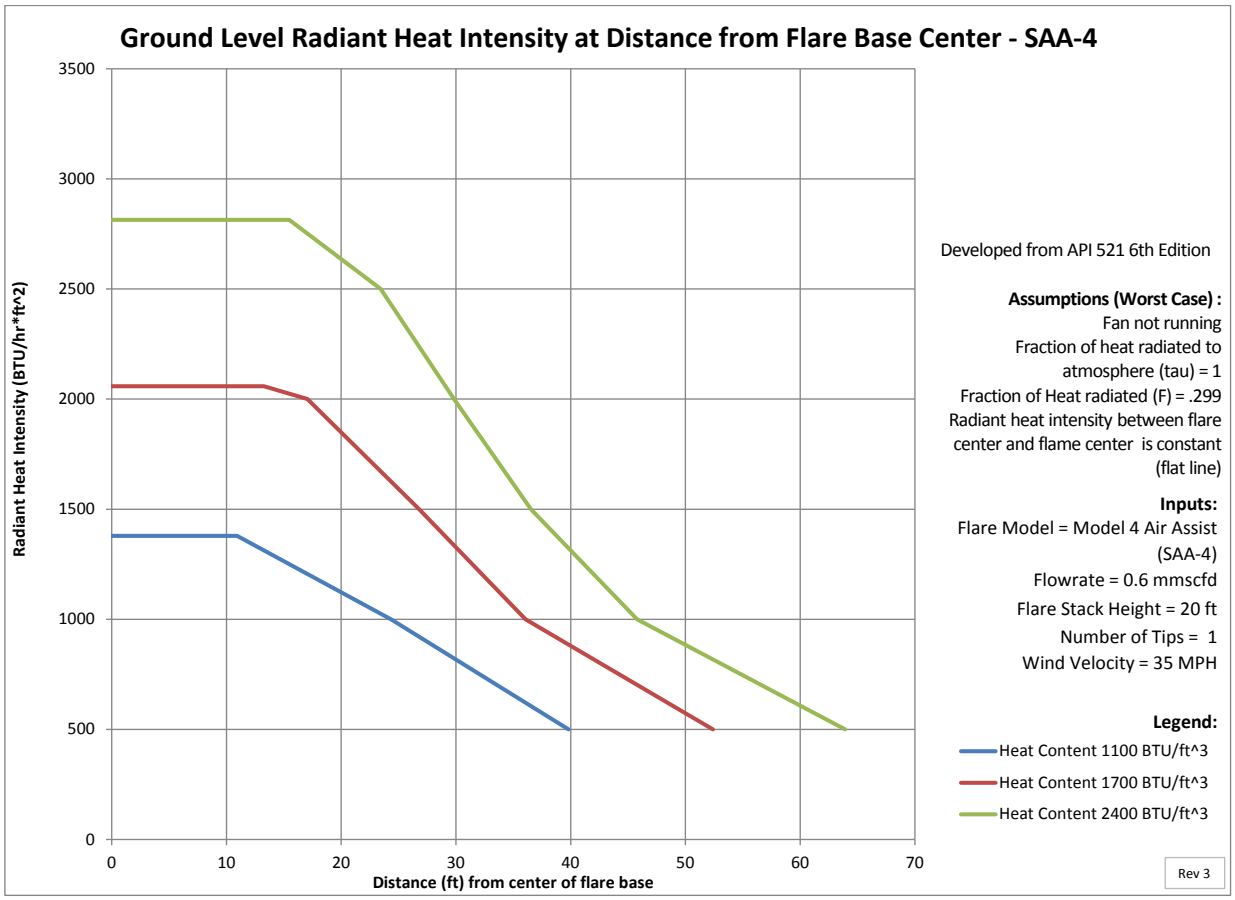
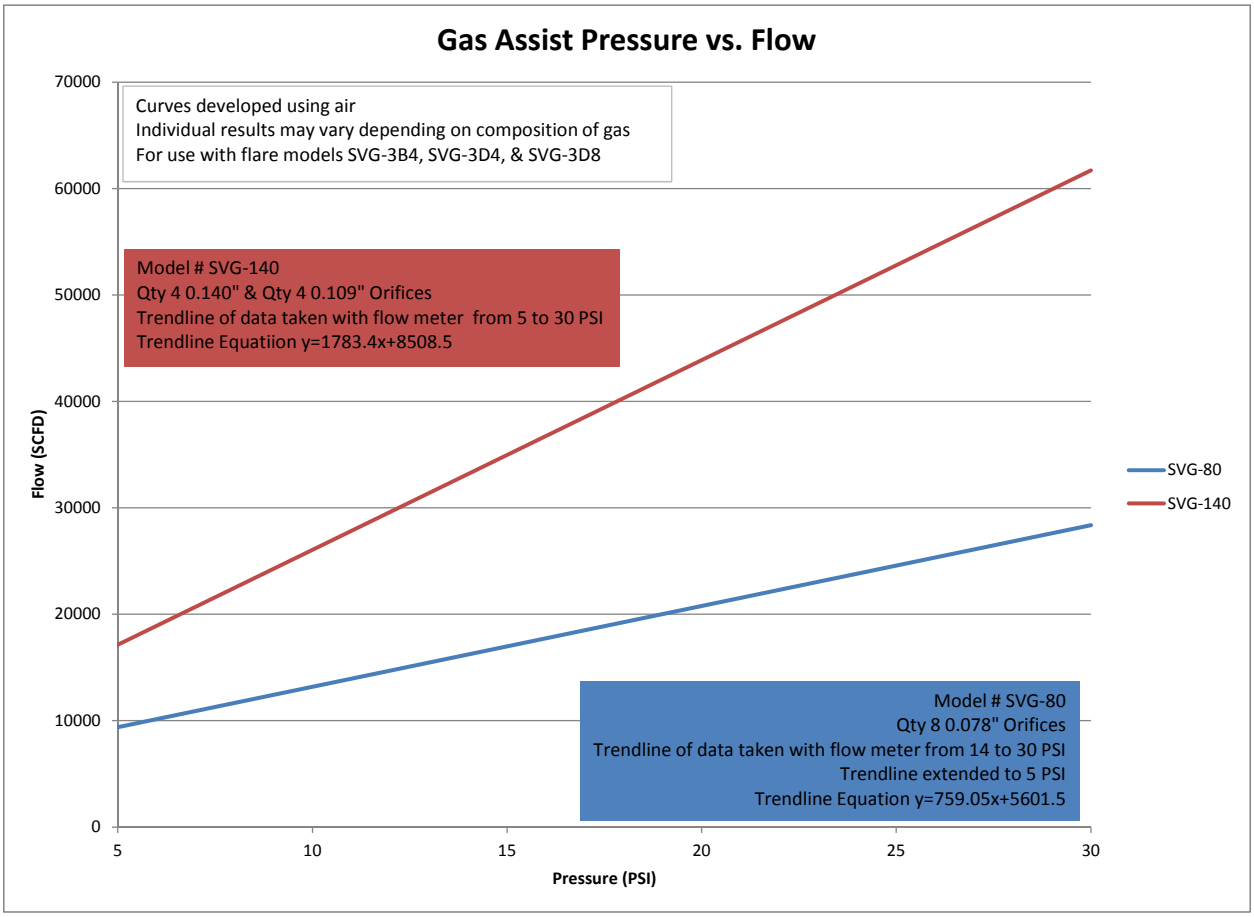


CHART 11



The Gas Assist is used to reduce smoke from low pressure flares, in cases when the BTU of gas is too high, the flow rate is too low or the flow rate is too high. Intended to fit low pressure models of the Variable Orifice Flares: SVG-3B4, SVG-3D4 and SVG-3D8.

Test data based on propane.

Data is reference only. Call factory for more specifics.

BALDOR GENERATORS

IGLC280-2N

Gaseous Fuel

Ratings Range – 60 Hertz Operation

Liquid Propane:	kW	123 - 175
	kVA	123 - 219
Natural Gas:	kW	123 - 264
	kVA	123 - 330

Baldor generators are available in a variety of power ratings and installation styles to meet the energy needs of the smallest businesses and the largest manufacturing facilities. All generator sets are designed to meet the specifications to ensure the fastest startup and dependable long-term operation. Rely on Baldor generators to provide the clean, quiet and environmentally friendly electrical power when you need it most. Emergency backup, standby, peak shaving or for any of your day or night electrical power needs, you can count on a dependable Baldor generator to provide the peace of mind and security you desire.

Standby Power Features

- ✓ Heavy-duty industrial gaseous fuel engine that meets the latest EPA emissions levels
- ✓ Brushless synchronous alternators with dynamic balancing and four pole construction
- ✓ Fully featured microprocessor based controller that's easy to use and field programmable for customized installations
- ✓ Generator sets are prototype tested and production tested to ensure easy startup
- ✓ Gen-set accepts rated load in one step
- ✓ Heavy duty construction that's designed for use in standby applications
- ✓ Manufactured in a dedicated and secure ISO-9001 certified facility
- ✓ Generator sets are backed by a world wide network of parts and service centers
- ✓ Optional agency approvals available including UL2200 and NFPA110
- ✓ Optional environmental enclosures available including weather resistant, sound attenuated, containerized, and walk-in models
- ✓ Full range of genset accessories and factory installed options available

Genset Ratings

Genset Model Number	Alternator	Voltage L-L / L-N	Phase	Hertz	150°C Rise Alternator Standby Rating – LP Fuel		150°C Rise Alternator Standby Rating – Natural Gas		125°C Rise Alternator Prime Rating – Natural Gas	
					kW / kVA	Amps	kW / kVA	Amps	kW / kVA	Amps
IGLC280-2N	UCI274G-311	208 / 120	3	60	170 / 213	591	170 / 213	591	164 / 205	570
		220 / 127	3	60	173 / 216	568	183 / 229	601	174 / 218	571
		240 / 120 (1)	3	60	170 / 213	512	170 / 213	512	164 / 205	494
		240 / 120 (1)	1	60	123 / 123	513	123 / 123	513	123 / 123	513
		240 / 139	3	60	173 / 216	521	200 / 250	602	185 / 231	557
		380 / 220	3	60	154 / 193	293	154 / 193	293	149 / 186	283
		416 / 240	3	60	170 / 213	295	170 / 213	295	164 / 205	285
		440 / 254	3	60	173 / 216	284	183 / 229	301	174 / 218	286
		480 / 277	3	60	173 / 216	260	200 / 250	301	185 / 231	278
	UCI274G-17	600 / 347	3	60	173 / 216	208	192 / 240	231	180 / 225	217
	UCI274H-311	208 / 120	3	60	174 / 218	604	200 / 250	695	190 / 238	660
		220 / 127	3	60	174 / 218	571	207 / 259	680	196 / 245	644
		240 / 120 (1)	3	60	174 / 218	524	200 / 250	602	190 / 238	572
		240 / 120 (1)	1	60	142 / 142	592	142 / 142	592	142 / 142	592
		240 / 139	3	60	175 / 219	527	207 / 259	623	204 / 255	614
		380 / 220	3	60	171 / 214	325	182 / 228	346	170 / 213	323
		416 / 240	3	60	174 / 218	302	200 / 250	347	190 / 238	330
		440 / 254	3	60	174 / 218	286	207 / 259	340	196 / 245	322
		480 / 277	3	60	175 / 219	100	220 / 275	331	204 / 255	307
	HCI444D-311	208 / 120	3	60	173 / 216	601	262 / 328	910	236 / 295	820
		220 / 127	3	60	173 / 216	568	263 / 329	864	236 / 295	775
		240 / 120 (1)	3	60	173 / 216	521	262 / 328	789	236 / 295	711
		240 / 120 (1)	1	60	170 / 170	708	170 / 170	708	170 / 170	708
		240 / 139	3	60	174 / 218	524	264 / 330	795	237 / 296	714
		380 / 220	3	60	171 / 214	325	260 / 325	494	235 / 294	447
		416 / 240	3	60	173 / 216	300	262 / 328	455	236 / 295	410
		440 / 254	3	60	173 / 216	284	263 / 329	432	236 / 295	388
		480 / 277	3	60	174 / 218	100	264 / 330	397	237 / 296	357
	HCI444C-17	600 / 347	3	60	174 / 218	210	263 / 329	317	237 / 296	285

NOTES: (1) Alternator connections have two circuits available for low voltage.
Available current in each low voltage circuit is equal to high voltage current listed in table.
For ratings and voltages not listed above refer to the Genset Selector.
Standby ratings do not have an overload capability but can be used for the duration of the utility failure per ISO-3046, DIN6271 and BS5514.
Baldor reserves the right to implement specifications or design changes without notice.

Engine Application Data

Engine Specifications

Manufacturer	NG Engine
Engine Model #	D146TIC
Engine Type	4 Cycle, 8 Cylinder
Induction System	Turbocharged/ Charge Air Cooled
Displacement, L (in^3)	14.62 (892)
EPA Emissions Certification	40 CFR Part 60 & 1048
HP at Rated Speed BHP (kW_m) NG	402 (300)
HP at Rated Speed BHP (kW_m) Propane	269 (201)
Rated RPM	1800
Bore and Stroke in (mm)	5.04x5.59 (128x142)
Compression Ratio	10.5:1
Air Filter Type	Dry
Governor Type / Model	Electronic
Governor Manufacturer	EControls
Freq Reg NL to FL	Isochronous
Freq Reg Steady State	+/-0.5%

Engine Lubrication System

Oil Pan Capacity gal (L)	8.2 (31.0)
Oil Capacity w/Filter gal (L)	10.1 (38.1)
Oil Filter Quantity	2
Oil Filter Type	Cartridge
Oil Cooler	Water Cooled
Recommended Oil	15W-40 Low Ash
Oil Press psi (kPa)	43.5 (299)

Engine Cooling System

Genset Max Ambient Temp °F (°C)	122 (50)
Engine Coolant Cap qt (L)	38 (43.2)
Engine + Radiator System Cap qt (L)	200 (227.0)
Water Pump Type	Centrifugal
Coolant Flow gpm (Lpm)	180 (680)
Charge Air Cooler Flow cfm (cmm)	809 (22.9)
Heat Rejected to Charge Air Cooler @ Rated kW; Btu/min (kW)	1430 (25.1)
Heat Rejected to Radiator @ Rated kW; Btu/min(kW)	16189 (284.7)
Max Restriction of Cooling Air in H_2O (kPa)	0.5 (0.124)

Engine Exhaust System

Exhaust Manifold Type	Wet
Exhaust Flow @ Rated kW cfm (cmm)	1895 (53.7)
Exhaust Temp (dry manifold) °F (°C)	1382 (750)
Min Back Pressure in H_2O (kPa)	0 (0)
Max Back Pressure in H_2O (kPa)	20.4 (5.1)
Exhaust Outlet Diameter in (mm)	3.5 (88.9)
Exhaust Outlet Type	Flange
Exhaust Catalyst	Included

Engine Electrical System

Charging Alternator Volts dc	24
Charging Alternator Amps	45
Grounding Polarity	Negative
Starter Motor Volts dc	24
Battery Recommendations	
Battery Volts dc	24
Min Cold Cranking Amps	900
Quantity Required	2

Ventilation Requirements

Cooling Airflow, scfm (cmm)	30000 (850)
Combustion Airflow, cfm (cmm)	532 (15.1)
Heat Rejected to Ambient	
From Engine, Btu/min (kW)	2389 (42)
From Alternator, Btu/min (kW)	1115 (19.6)
Recommended Free Area Intake	
Louver Size, ft^2 (m^2)	62.0 (5.76)

Engine Fuel System

Recommended Fuel	
Natural Gas min HHV (Btu/ft^3)	1015
Propane Vapor min HHV (Btu/ft^3)	2650
Fuel Supply Pressure in-H_2O (kPa)	7-11 (1.7-2.7)
Fuel Line At Engine	
Supply Line, npt	2

Propane Fuel Consumption – Standby Rating

100% Load cfph (m^3ph)	926 (26.2)
75% Load cfph (m^3ph)	789 (22.3)
50% Load cfph (m^3ph)	532 (15.1)
25% Load cfph (m^3ph)	335 (9.5)

NG Fuel Consumption – Standby Rating

100% Load cfph (m^3ph)	2782 (78.8)
75% Load cfph (m^3ph)	2168 (61.4)
50% Load cfph (m^3ph)	1522 (43.1)
25% Load cfph (m^3ph)	928 (26.3)

NG Fuel Consumption – Standby Rating

100% Load cfph (m^3ph)	2532 (71.7)
75% Load cfph (m^3ph)	1973 (55.9)
50% Load cfph (m^3ph)	1385 (39.2)
25% Load cfph (m^3ph)	844 (23.9)

Engine Output Deratings - Standby

Rated Temp	77ºF
Rated Altitude	325 ft
Max Altitude	10,000 ft
Temperature Derate	-1% / 8º F
Altitude Derate	-3% / 1000 ft

Alternator Specifications

Alternator Type	4-Pole, Rotating Field
Exciter Type	Brushless
Excitation System	
Shunt Connection	Standard
PMG	Optional
Insulation	per NEMA MG1
Material	Class H
Standby Temp Rise	150˚C
Lead Connection	12 Lead, Reconnectable
Stator Pitch	2/3
Amortisseur Winding	Full
Bearing	Single, Double Shielded
Drive Coupling	Flexible Disk
Unbalanced Load	20% of Standby Rating

Automatic Voltage Regulator		
Wound Field	SX460, SX440 for HCI444D	
PMG	MX341, MX321	
Voltage Regulation	No Load to Full Load	
Std Regulator	+/- 1.5%, +/- 1%	
PMG Regulator	+/- 1%, +/- 0.5%	
Load Acceptance	100% of Rating, One Step	
Subtransient Reactance		
480V, Per Unit	11%, 13%	
TIF (1960 Weighting)	<50	
Line Harmonics	5% Maximum	
Motor Starting kVA	30% Max Voltage Dip	
Alt @ 480V SkVA	UCI274H-311	730 kVA
Alt @ 480V SkVA	HCI444D-311	780 kVA

Genset Controller Specifications

Baldor InteliLite NT Features

Large back-lit graphical LCD Display
- 64x128 pixel resolution

6 LED Genset Status Indicators

Alarm	Red LED
Not In Auto	Red LED
Warning	Yellow LED
Running	Green LED
Ready / Auto	Green LED
Supplying Load	Green LED

Sealed Membrane Panel to IP65

Push Buttons for Simple Control
- Start, Stop, Fault Reset, Horn Reset, Mode, Page, and Enter Keys

Display Metering and Protection
- Oil Pressure Warning / Shutdown
- High / Low Coolant Temperature Warning
- High Coolant Temperature Shutdown
- Low Coolant Level Shutdown
- Over Speed Protection
- Battery Voltage Over / Under Warning
- Running Hour Meter
- Generator Under / Over Volts Warn / Shutdown
- Generator Under / Over Freq Warn / Shutdown
- Generator Over Current Shutdown
- Generator Output Metering for V1-V3, I1-I3, Hz, kW, kWh, kVAr, kVAh

Additional Standard Genset Features

- ✓ Structural Steel Sub-Base
- ✓ Sub-Base Lifting Eyes
- ✓ Unit Mounted Radiator
- ✓ Engine Mounted Fan
- ✓ Radiator Fan Guard
- ✓ Battery Charging Alternator
- ✓ Battery Rack and Cables
- ✓ Unit Mounted Control Panel
- ✓ Spin-On Oil Filter
- ✓ Enamel Finish
- ✓ One Set - Operation / Maintenance Manual
- ✓ Factory Tested Prior to Shipment
- ✓ Limited Warranty

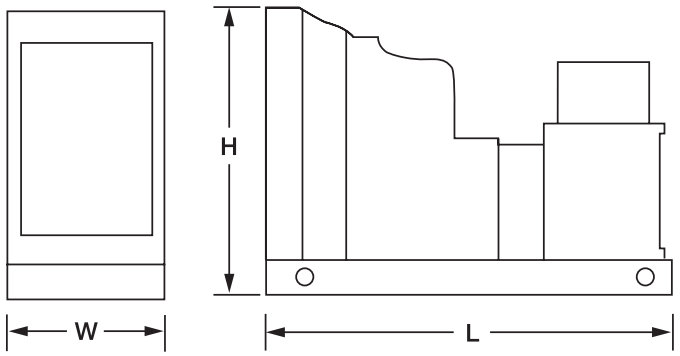
Optional Agency Approvals

- ❒ UL2200 (Review Option Availability)
- ❒ NFPA110 (Request Remote Annunciator)

Weight and Dimensions (Open Unit)

Weight – Wet lb (kg)	8030 (3642)
Overall Dimensions	Length x Width x Height
inches	137 x 72 x 79
mm	3479 x 1828 x 2006

Note: Drawing is provided for reference only.
Use engineering outline for installation planning.



Available Accessories and Options

Open Unit

- ❒ Industrial Silencer
- ❒ Residential Silencer
- ❒ Critical Silencer
- ❒ Hospital Grade Silencer
- ❒ Exhaust Flex Pipe
- ❒ Rain Cap
- ❒ Radiator Duct Flange

Enclosed Units

- ❒ Weather Resistant Enclosure
- ❒ Sound Attenuated w/Internal Critical Silencer
- ❒ ISO Container
- ❒ Walk-In Enclosure

Alternator Accessories

- ❒ PMG Exciter and AVR Upgrade
- ❒ Alternator Space Heater
- ❒ Exciter Field Circuit Breaker
- ❒ Alternator Drip Shield

Genset Accessories

- ❒ Voltage Adjust Potentiometer
- ❒ Starting Battery

Battery Charger ❒ Auto/Float

Auto/ Float Equalize Timer ❒ Manual ❒ Automatic

- ❒ Battery Heater
- ❒ Engine Coolant Heater
- ❒ Oil & Coolant Drain Valves (Engine/Radiator)
- ❒ Oil & Coolant Drain Extended to Base

Main Output Breaker

- ❒ Wall Mount
- ❒ Unit Mount

Transfer Switch

- ❒ Manual
- ❒ Automatic

Control Panel

- ❒ Remote Annunciator
- ❒ Remote Communications
- ❒ Remote E-Stop

Fuel System

- ❒ Fuel Strainer
- ❒ Dual Fuel Automatic Changeover

Vibration Isolators

- ❒ Elastomer Isolator
- ❒ Standard Spring
- ❒ Seismic Spring

BALDOR GENERATORS
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www.baldor.com

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BLUE STAR
Power Systems Inc.

Gaseous Product Line

208-600 Volt

NG200-01 / NG200-01P

60 Hz / 1800 RPM

190 - 200 kWe / 175 kWe

Standby UL 2200 / Non-UL 2200 / Prime UL 2200

Ratings

	240V	208V	240V	480V	600V
Phase	1	3	3	3	3
PF	1.0	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Generator Model	432CSL6210	431CSL6206	431CSL6206	431CSL6206	431PSL6243
Connection	12 LEAD ZIG-ZAG	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE
Standby UL 2200					
kWe Nat (LP)	190 (130)	190 (130)	190 (130)	190 (130)	190 (130)
AMPS Nat (LP)	792 (542)	660 (452)	572 (391)	286 (196)	229 (157)
Temp Rise	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C
Standby Non-UL 2200 [This rating not available with UL 2200 Listing or CSA Certification]					
kWe Nat (LP)	200 (130)	200 (130)	200 (130)	200 (130)	200 (130)
AMPS Nat (LP)	833 (542)	695 (452)	602 (391)	301 (196)	241 (157)
Temp Rise	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C	130˚C / 27˚C
Prime					
kWe Nat (LP)	175 (NA)	175 (NA)	175 (NA)	175 (NA)	175 (NA)
AMPS Nat (LP)	729 (NA)	608 (NA)	527 (NA)	263 (NA)	211 (NA)
Temp Rise	105˚C / 40˚C	105˚C / 40˚C	105˚C / 40˚C	105˚C / 40˚C	105˚C / 40˚C

Standard Equipment

Engine
- Radiator Cooled Unit Mounted (50˚C)
- Blower Fan & Fan Drive
- Starter & Alternator
- Oil Pump & Filter
- Oil Drain Extension w/Valve
- Governor - Electronic Isochronous
- 24V Battery System & Cables
- Air Cleaner (Dry Single Stage)
- Flexible Fuel Connector
- EPA Certified
- MasterTrak Remote Monitoring System

Listing Certifications
- UL 2200 Listed
- cUL Listed
- CSA Certified
- Seismic Certified to IBC 2012

Generator
- Brushless Single Bearing
- Automatic Voltage Regulator
- ± 1% Voltage Regulation
- 4 Pole, Rotating Field
- 130˚C Standby Temperature Rise
- 105˚C Prime Temperature Rise
- 100% of Rated Load - One Step
- 5% Maximum Harmonic Content
- NEMA MG 1, IEEE and ANSI Standards Compliance for Temperature Rise

Additional
- Microprocessor Based Digital Control
- Interface Connection Box
- Control Panel Mounted in NEMA 12 Enclosure
- Base - Formed Steel
- Main Line Circuit Breaker Mounted & Wired
- Catalyst / Silencer Mounted
- Battery Charger 24V 5 Amp
- Jacket Water Heater -20˚F 3000W 240V w/Isolation Valves
- Vibration Isolation Mounts
- Radiator Duct Flange (OPU Only)
- Single Source Supplier
- 2YR / 2000HR Standby Warranty
- 1YR / 1500HR Prime Warranty
- Standard Colors - White / Tan / Gray

Application Data

Engine			
Manufacturer:	Power Solutions International	Displacement - Cu. In. (lit):	673 (11.1)
Model:	D111TIC	Bore - in. (cm) x Stroke - in. (cm):	4.84 (12.3) x 6.1 (15.5)
Type:	4-Cycle	Compression Ratio:	10.5 : 1
Aspiration:	Turbo Charged, CAC	Rated RPM:	1800
Cylinder Arrangement:	6 Cylinder Inline	Max HP Stby (kWm):	302 (225)

Exhaust System	Standby	Prime
Gas Temp. (Stack): °F (°C)	1,350 (732)	1,350 (732)
Gas Volume at Stack Temp: CFM (m³/min)	1,247 (35.3)	1,247 (35.3)
Maximum Allowable Exhaust Restriction: in. H_2O (kPa)	40.8 (10.2)	40.8 (10.2)
Cooling System		
Ambient Capacity of Radiator: °F (°C)	122 (50.0)	122 (50.0)
Maximum Allowable Static Pressure on Rad. Exhaust: in. H_2O (kPa)	0.50 (0.12)	0.50 (0.12)
Water Pump Flow Rate: GPM (lit/min)	81.9 (310)	81.9 (310)
Heat Rejection to Coolant: BTUM (kW)	9,687 (170)	9,687 (170)
Heat Rejection to CAC: BTUM (kW)	1,278 (22.4)	1,278 (22.4)
Heat Radiated to Ambient: BTUM (kW)	1,893 (33.1)	1,893 (33.1)
Air Requirements		
Aspirating: CFM (m³/min)	392 (11.1)	392 (11.1)
Air Flow Required for Rad. Cooled Unit: CFM (m³/min)	18,000 (509)	18,000 (509)
Air Flow Required for Heat Exchanger/Rem. Rad. CFM (m³/min)	Consult Factory For Remote Cooled Applications	

	Standby		Prime	
Fuel Consumption	**Natural Gas**	**LP**	**Natural Gas**	**LP**
At 100% of Power Rating: ft3/hr (m3/hr)	2,115 (59.9)	704 (19.9)	1,851 (52.4)	N/A
At 75% of Power Rating: ft3/hr (m3/hr)	1,648 (46.7)	549 (15.5)	1,442 (40.8)	N/A
At 50% of Power Rating: ft3/hr (m3/hr)	1,157 (32.8)	463 (13.1)	1,012 (28.7)	N/A
Fuel Inlet Size: NPT	2.00”		2.00”	
Fuel Pressure Required: in. H_2O (kPa)	7.00 - 11.0 (1.75 - 2.75)		7.00 - 11.0 (1.75 - 2.75)	
Fluids Capacity				
Total Oil System: gal (lit)				6.60 (25.0)
Engine Jacket Water Capacity: gal (lit)				6.60 (25.0)
System Coolant Capacity: gal (lit)				27.7 (105)

All calculations based on natural gas fuel.
Deration Factors: Temperature: Derate 1.5% Per 10°F Over 77°F Air Inlet Temperature | Altitude: Derate 2.5% Per 1,000 ft Over 1,200 ft

Gaseous Product Line

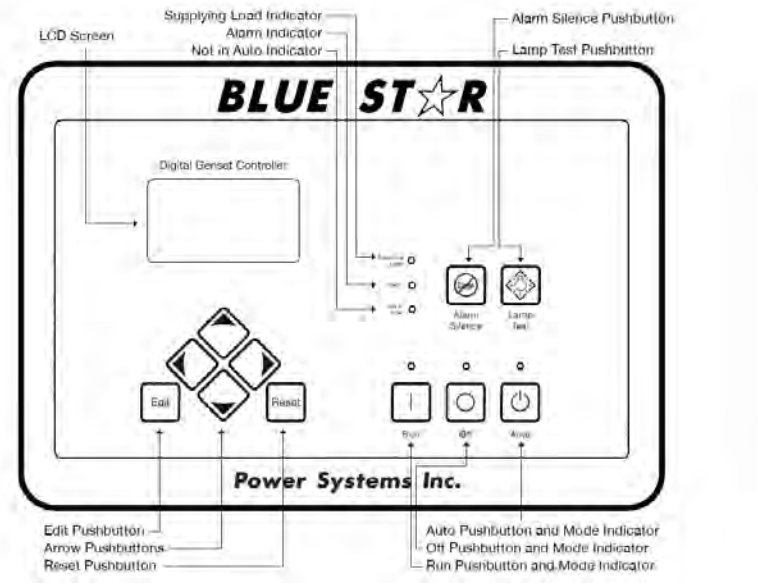
190 - 200 kWe / 175 kWe

BLUE STAR Power Systems Inc.

DGC-2020 Control Panel

Standard Features

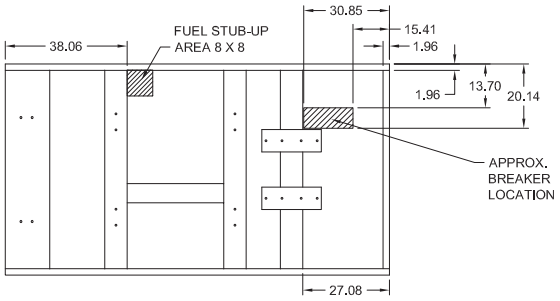
- Digital Metering
- Engine Parameters
- Generator Protection Functions
- Engine Protection
- CAN Bus ECU Communications
- Windows-Based Software
- Multilingual Capability
- Remote Communications to RDP-110 Remote Annunciator
- 16 Programmable Contact Inputs
- Up to 15 Contact Outputs (7 standard)
- UL Recognized, CSA Certified, CE Approved
- Event Recording
- IP 54 Front Panel Rating with Integrated Gasket
- NFPA 110 Level 1 Compatible

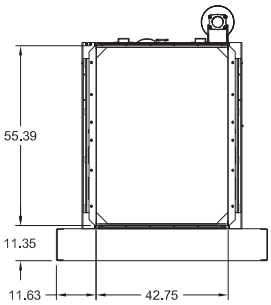


Weights / Dimensions / Sound Data

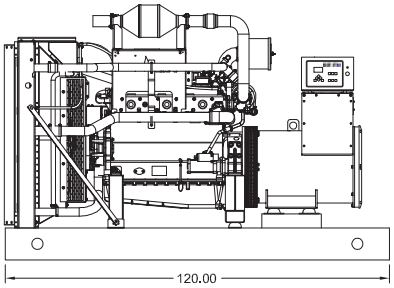
	L x W x H	Weight lbs
OPU	120 x 66 x 80 in	6,475
Level 1	156 x 66 x 94 in	7,725
Level 2	156 x 66 x 94 in	7,775
Level 3	196 x 66 x 94 in	8,100

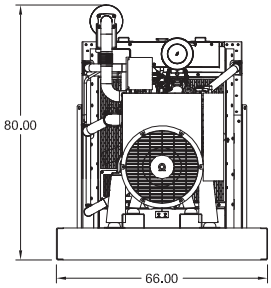
Please allow 6-12 inches of height of exhaust stack.





	No Load	Full Load
OPU	82 dBA	84 dBA
Level 1	80 dBA	82 dBA
Level 2	75 dBA	77 dBA
Level 3	69 dBA	71 dBA

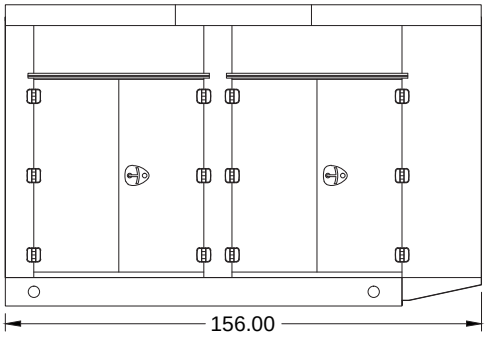




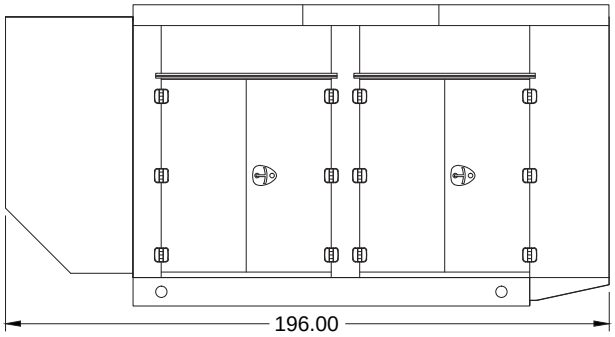
Drawings based on standard open power 480 volt standby generator. Lengths may vary with other voltages. Subject to change without notice.
Sound data as measured at 23 feet (7 meters) in accordance with ISO 8528-10 at standby rating.

Enclosures

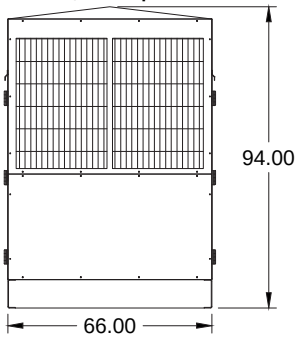
Level 1 & 2 | Side View (Weather Proof)



Level 3 | Side View (Sound Attenuated)



Level 1, 2 & 3 | Intake View



All enclosures are 150 MPH Wind Rated.
Level 2 & 3 enclosures include sound attenuation foam.
Level 3 enclosure includes frontal sound & exhaust hood.
*Enclosure height does not include exhaust stack.

All specification sheet dimensions are represented in inches.
Materials and specifications subject to change without notice.

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American Made

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Attachment 3

Air Quality Review

Introduction

The Mamie 4-25-3-3WH well pad is located in Duchesne County, Utah, approximately 5.5 miles west of Myton and 4 miles northeast of Bridgeland. The land use surrounding the well pad location consists of a mixture of open land, agriculture and oil and gas operations. The nearest residence (and associated farm) is located approximately 1 mile northeast of the well pad. Air quality in the region is generally good but does have elevated ozone concentrations. Table 3-1 shows measured criteria pollutant concentrations at the closest ambient monitors to the proposed well pad. All monitored values shown in Table 2 are below the respective National Ambient Air Quality Standard (NAAQS) except for ozone. Parts of the Uintah Basin are designated as marginal nonattainment for ozone, including the area surrounding the Mamie 4-25-3-3WH well pad. The 24-hour 2.5-micron particulate matter ($PM_{2.5}$) monitored value of 24 µg/m^3 is 69 percent of the 35 µg/m^3 NAAQS value.

The proposed well pad will increase pollutant emissions by less than 100 tons per year (tpy) for each pollutant, making it a minor source of criteria pollutant emissions. The largest criteria pollutant emissions from the site will be volatile organic compounds (VOC) [8.81 tpy], carbon monoxide (CO) [12.3 tpy], and nitrogen oxides (NO_X) [6.35 tpy]. VOC and NO_X emissions are precursors to ozone formation. The minor emissions of these precursor pollutants would not significantly change ozone concentrations in the region. Likewise, CO emissions would not be expected to significantly affect CO concentrations in the area.

Increased NO_X emissions from the well pad would result in an increase in Nitrogen dioxide (NO_2) concentrations, but the increases would be highly localized to the well pad and will not affect compliance with the NAAQS. NO_X emissions from the source will be 6.35 tpy, well below EPA's Significant Emission Rate (SER) of 40 tpy. The primary contributor of NO_X emissions at the site will be two natural gas-fired generator engines. One engine is an existing source at the site and the second engine is proposed. The engines have 9.3-foot stack heights which allow plumes to disperse and thereby reduce ground-level NO_2 concentrations.

Table 3-1
2015-2017 Ambient Monitor Values*

Pollutant	Monitor	City	County	Averaging Period	Form	3-Year Average Value	NAAQS	Units
NO_2	490130002	Roosevelt	Duchesne	1-hour	98th %	29.0	100	ppb
	490137011	near Myton	Duchesne			21.3		
	490130002	Roosevelt	Duchesne	Annual	Mean	4.7	53	ppb
	490137011	near Myton	Duchesne			4.2		
$PM_{2.5}$	490130002	Roosevelt	Duchesne	24-hour	98th %	24.0	35	µg/m^3
	490130002	Roosevelt	Duchesne	Annual	Mean	6.0	12	µg/m^3
Ozone	490130002	Roosevelt	Duchesne	8-hour	4th high	73.0	70	ppb
	490137011	near Myton	Duchesne			77.3		

* Data from https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

Dispersion Modeling

To verify that the NAAQS will be protected during operation of the modified well pad, a dispersion modeling analysis was completed for the site. A summary of the modeling methodology, model input data, and model results is provided in the following sections.

The technical approach to completing the dispersion modeling followed the guidance outlined in EPA's Guideline on Air Quality Models (Revised) (EPA 2017). The EPA guidance includes elements that only apply to major PSD sources, however the general modeling methodologies described in this document applies to all regulatory modeling. Based on the projected emissions from the project and modeling procedures set forth by EPA, the pollutants and averaging periods that were modeled include the following:

- 24-hour PM_{10}
- 24-hour and annual $PM_{2.5}$
- 1-hour and 3-hour SO_2
- 1-hour and Annual NO_2
- 1-hour and 8-hour CO

The air quality impact analysis involved characterizing the release parameters for the emission sources, selection of appropriate meteorological data, developing model receptors, identifying appropriate background concentrations, and processing these data in the dispersion model. Model inputs such as meteorological data, model receptors, and background pollutant concentrations were developed following guidance and recommendations from the EPA.

Modeling was completed by evaluating criteria pollutant emissions resulting from well pad emission sources, including tanks, tank heaters, heater-treaters, generator engines, and the flare. Modeled concentrations were added to background concentrations to estimate the cumulative impacts to air quality in the vicinity of the well pad. These cumulative concentrations were compared to the NAAQS to evaluate compliance with the standards.

Dispersion Model Selection

Dispersion modeling was completed using the American Meteorological Society/ EPA Regulatory Model Improvement Committee Dispersion Model named "AERMOD." AERMOD is EPA's preferred regulatory model for near-field dispersion modeling (EPA 2017). The most recent approved version of AERMOD (Version 18081) was used for this analysis. AERMOD is a Gaussian plume dispersion model based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions based on the probability density function and the superposition of several Gaussian plumes. The AERMOD modeling system has three components: (1) AERMAP, the terrain preprocessor program; (2) AERMET, the meteorological data preprocessor; and (3) AERMOD, which includes the dispersion modeling algorithms.

AERMOD was developed to handle simple and complex terrain issues using improved algorithms. As with the Complex Terrain Dispersion Model, AERMOD uses the dividing streamline concept to address interactions of the plume with elevated terrain. AERMOD was run using the regulatory default options, including use of elevated terrain algorithms, stack-tip downwash, calms processing routines, and use of missing data processing routines.

The latest versions of AERMOD incorporate new model options that were developed to address model performance issues during stable, low wind conditions. Recent studies have shown large model over-predictions during stable, low wind conditions, especially for low-level sources and ground-level fugitive sources such as those at the Mamie 4-25-3-3WH well pad (Paine and others 2012). The new model options are designed to reduce the amount of model over-prediction and produce more realistic model results. One new option has been accepted as a regulatory option by EPA and has been incorporated into this modeling analysis. This model option is referred to as the surface friction velocity adjustment and is briefly described below:

- AERMET Surface Friction Velocity Adjustment (STABLEBL ADJ_U*) – This model option is included in the AERMET pre-processor and addresses problems with modeled concentrations during stable, low wind conditions. During hours with a stable, low wind atmosphere, the surface friction velocity is adjusted to increase turbulence for that hour. Because most of the emission sources at the well pad will be low-level sources, this model option is appropriate for the use in the modeling analysis.

Nitrogen Dioxide Conversion Options

AERMOD includes several options for calculating the conversion of NO_X emissions to NO_2 in the atmosphere. EPA has identified a tiering approach for addressing NO_2 conversion, with each tier requiring a more technical approach and typically resulting in a less conservative result (EPA 2016). Three tiers are available for modeling. A summary of each tier is given below:

Tier 1: All of the NO_X emissions released from the source are assumed to convert to NO_2. This is the most conservative option and likely will result in an overestimate of NO_2 concentrations in the ambient air.

Tier 2: Modeled NO_X concentrations are converted to NO_2 by multiplying empirically-derived scaling factors. Two methods are available, the Ambient Ratio Method (ARM) and the Ambient Ratio Method 2 (ARM2).

Tier 3: NO_2 concentrations are calculated from NO_X within AERMOD using screening algorithms that estimate the amount of NO_2 conversion based on ambient ozone concentrations and other environmental factors. Two options are available in AERMOD, the Ozone Limiting Method (OLM) and the Plume Volume Molar Ratio Method (PVMRM2). Both Tier 3 methods are considered regulatory options by EPA and are generally considered acceptable for use in a regulatory context (EPA 2016).

The modeling option used for this analysis is the Tier 2 ARM2 method for calculating NO_2 chemical conversion. Use of the ARM2 method requires input of the upper and lower limits of the ambient ratio of NO_2/NO_X. The default values of 0.9 and 0.5, respectively, were used for the modeling.

Meteorological Data

UDEQ has processed several datasets through the AERMET meteorological data pre-processor and has made these datasets available on its website. Meteorological data from the closest available station is the Vernal, Utah dataset. Vernal is located approximately 38 miles northeast of the project site. The elevation of the Vernal station and the project site are similar, and both locations are located on the southern side of the Uinta Mountains. A review of wind data from nearby Roosevelt, UT shows that the

vicinity of the project site is dominated by westering wind directions, which is similar to Vernal, UT. As a result, the Vernal meteorological dataset has been deemed representative of conditions at the project site. The dataset consists of five years of data (2008-2012) from the Vernal National Weather Service (NWS) station, combined with upper air data from the Grand Junction, CO NWS station and processed by UDEQ into model-ready format using the AERMET pre-processor software. This meteorological dataset was used for the modeling analysis. Figure 3-1 shows the wind rose diagram meteorological data used in the modeling analysis.

Receptor Grid

A grid of model receptor points was defined for the modeling. The receptor points define where the model will calculate pollutant concentrations. Receptor points were developed using a dense grid of model receptors surrounding the well pad ambient boundary. Multiple receptor grid tiers were used to ensure that the maximum estimated impacts are identified. Following EPA guidelines, receptor locations were identified with sufficient density and spatial coverage to isolate the area with the highest impacts. To accomplish this goal, the following nested receptor grid was used for the modeling assessments:

- 25-meter spaced receptors located along the entire ambient boundary
- 1 km by 1 km receptor grid with 50 m spacing, centered on the well pad
- 4 km by 4 km receptor grid with 100 m spacing, centered on the well pad

A total of 2,020 receptors were processed in the modeling. All model receptors were preprocessed using the AERMAP software (Version 18081) that is associated with AERMOD. The AERMAP software establishes a base elevation and a height scale for each receptor location. The height scale is a measure of the receptor's location and base elevation and its relation to the terrain feature that has the greatest influence on dispersion for that receptor.

AERMAP was run using digital terrain from the U.S. Geological Survey (USGS) National Elevation Dataset (NED). Use of NED terrain data in AERMAP is recommended by EPA for characterizing the terrain throughout the model domain. Output from AERMAP was used as input to the AERMOD runstream file for each model run. Model receptors are presented in the UTM coordinate system, NAD83. Figure 3-2 shows the model receptors used for the analysis.

Emission Sources

The emissions incorporated into the modeling were all characterized as point sources. Effluent parameters were obtained from manufacturer specification, site drawings, and engineering judgement. Table 3-2 summarizes the stack parameters used in the modeling for each emission source. Emission rates are from the detailed emission inventory for the well pad. Figure 3-3 illustrates the locations of the emission sources at the well pad relative to the ambient boundary.

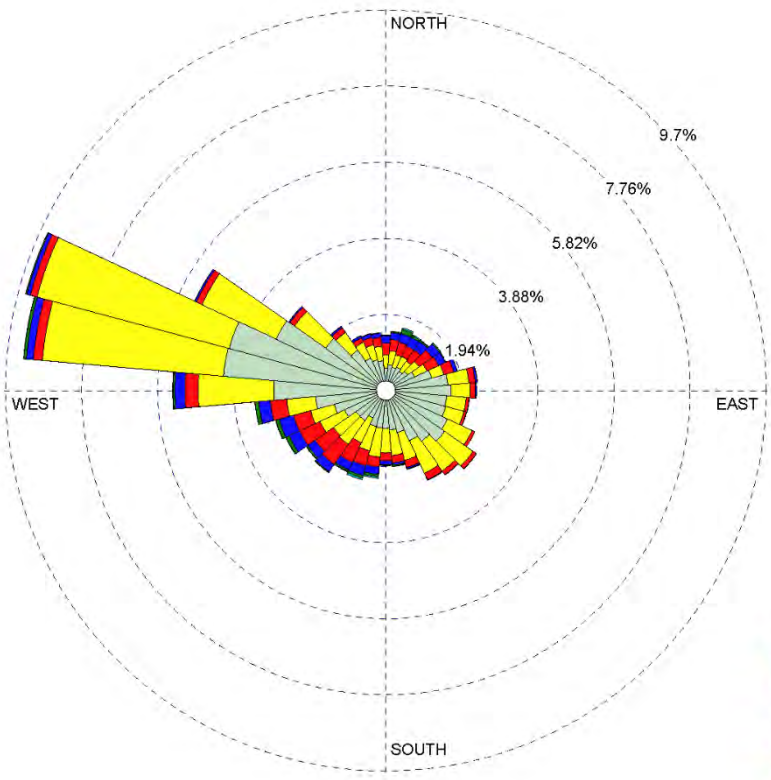
Building Wake Effects

The modeling analysis includes evaluation of building dimensions to assess potential downwash effects on stack emissions from nearby structures. Direction-specific downwash parameters were calculated for the facility's buildings using facility plot-plan maps and EPA's Building Profile Input Program PRIME (BPIPPRM) software. The primary structures at the well pad are associated with the tank batteries. Output from BPIPPRM produced building dimension data that was incorporated into AERMOD to calculate building downwash from emission sources.

WIND ROSE PLOT:

FIGURE 3-1
Vernal, Utah Windrose 2008-2012

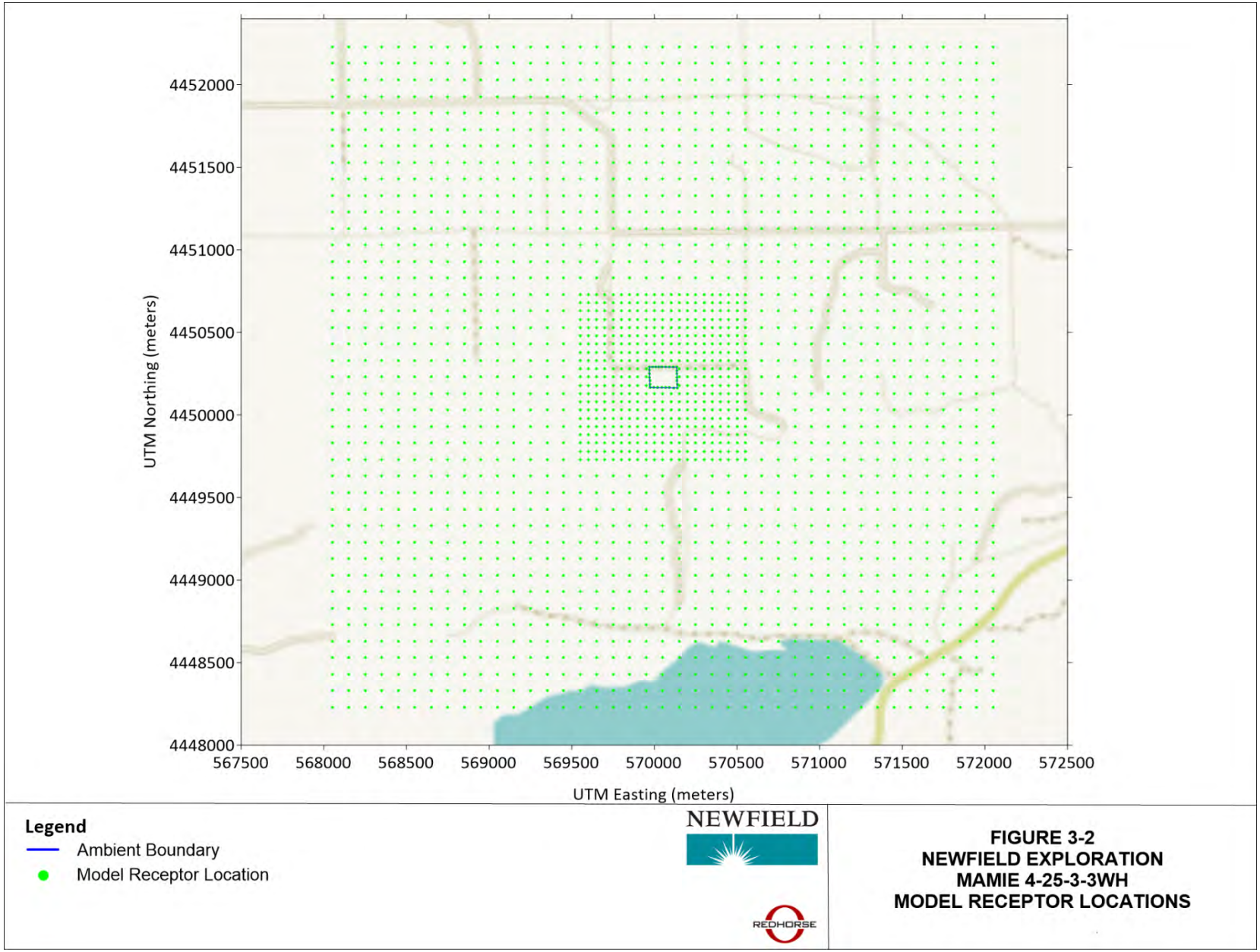
DISPLAY:
Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.21%

COMMENTS:	DATA PERIOD:		
	Start Date: 1/1/2008 - 00:00 **End Date: 12/31/2012 - 23:59**		
	CALM WINDS: **1.21%**	TOTAL COUNT: **43613 hrs.**	
	AVG. WIND SPEED: **2.50 m/s**	DATE: **12/12/2018**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software


4452000
4451500
4451000
4450500
4450000
4449500
4449000
4448500
4448000
UTM Northing (meters)
567500
568000
568500
569000
569500
570000
570500
571000
571500
572000
572500
UTM Easting (meters)
Legend
Ambient Boundary
Model Receptor Location
NEWFIELD
REDHORSE
FIGURE 3-2
NEWFIELD EXPLORATION
MAMIE 4-25-3-3WH
MODEL RECEPTOR LOCATIONS


4450400
4450300
4450200
4450100
UTM Northing (meters)
569800
569900
570000
570100
570200
570300
UTM Easting (meters)
Legend
Existing Emission Source Locations
Proposed Emission Source Locations
Ambient Boundary
NEWFIELD
REDHORSE
FIGURE 3-3
NEWFIELD EXPLORATION
MAMIE 4-25-3-3WH
SOURCE LOCATIONS

Table 3-2
Mamie 4-25-3-3WH Modeled Sources

Source ID	Source Description	UTM Location (m)	Stack Height (m)	Stack Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
ENG1	Gen Engine 1	570079.6/4450259.9	2.85	1023.15	58.21	0.102
ENG2	Gen Engine 2	570101.4/4450231.0	2.85	1023.15	58.21	0.102
HTRTRTR1	Heater-Treater 1	570070.4/4450274.9	5.49	675.00	15.88	0.102
HTRTRTR2	Heater-Treater 2	570109.3/4450230.0	5.49	675.00	15.88	0.102
HTR1	Heater 1	570092.6/4450269.1	1.52	588.71	11.55	0.102
HTR2	Heater 2	570097.2/4450269.1	1.52	588.71	11.55	0.102
HTR3	Heater 3	570101.6/4450269.1	1.52	588.71	11.55	0.102
HTR4	Heater 4	570106.7/4450256.0	1.52	588.71	11.55	0.102
HTR5	Heater 5	570106.8/4450251.0	1.52	588.71	11.55	0.102
HTR6	Heater 6	570106.8/4450246.0	1.52	588.71	11.55	0.102
Flare1	Flare	570106.8/4450283.9	3.66	962.59	41.20	0.300
Flare2	Flare	570112.0/4450217.0	3.66	962.59	41.20	0.300

Air Quality Background Data

Ambient background concentrations represent the contribution of pollutant sources not included in the modeling analysis, including naturally occurring sources. The background concentration for each criteria pollutant is added to the maximum modeled concentration to calculate the total estimated pollutant concentration. Monitored pollutant data has been collected in the region and is available on EPA's outdoor-air-quality-data website. Nearby monitored pollutant data summarized in Table 3-1 has been used as background concentrations for this modeling analysis.

Summary of Model Results

Results of the modeling indicate that operating the Mamie 4-25-3-3WH well pad after the proposed modification would comply with ambient air quality standards. Table 3-3 shows the modeled impacts, background concentrations, and total concentrations for the site. The highest modeled concentrations for all pollutants occurred on the northern and eastern edge of the ambient boundary, directly downwind of the operations. As expected with low-level emission sources, the modeled concentrations decrease quickly with distance from the well pad.

Modeled concentrations for PM_{10}, CO, and SO_2 were all less than the respective significant impact levels (SILs). Therefore, the impacts for these pollutants are considered insignificant and there is no need to evaluate total impacts with background concentrations added in.

The air quality impact evaluation involved development of the proposed emission inventory followed by detailed dispersion modeling analyses to assess compliance with the NAAQS. Based on the projected emissions, Mamie 4-25-3-3WH will be considered a minor air emission source for permitting purposes.

Table 3-3
Mamie 4-25-3-3WH Dispersion Modeling Results

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$) [(a)]	Significant Impact Level ($\mu g/m^3$) [(a)]	Measured Background Concentration ($\mu g/m^3$) [(a)]	Total Concentration ($\mu g/m^3$) [(a)]	NAAQS ($\mu g/m^3$) [(a)]
NO_2	Annual	15.47 [(b)]	1	7.9	23.4	100 [(b)]
	1-hour	83.05 [(c)]	7.5 [(d)]	40.0	123.1	188 [(c)]
PM_{10}	24-hour	2.67 [(e)]	5	N/A	N/A	150 [(f)]
$PM_{2.5}$	Annual	1.08 [(g)]	0.3	6.0	7.1	12 [(g)]
	24-hour	1.84 [(h)]	1.2	24.0	25.8	35 [(h)]
CO	8-hour	129.78 [(e)]	10,000	N/A	N/A	10,000 [(f)]
	1-hour	241.63 [(e)]	40,000	N/A	N/A	40,000 [(f)]
SO_2	3-hour	0.42 [(e)]	25	N/A	N/A	1,300 [(f)]
	1-hour	0.60 [(e)]	7.9 [(d)]	N/A	N/A	196.5 [(i)]

Notes:
(a) $\mu g/m^3$ = micrograms per cubic meter
(b) Annual mean
(c) 98th percentile value, averaged over 3 years
(d) Interim value
(e) Overall maximum modeled value
(f) Not to be exceeded more than once in a calendar year
(g) Annual mean, averaged over 3 years
(h) 98^{th} percentile value, averaged over 3 years
(i) 99^{th} percentile value, averaged over 3 years

REFERENCES

Paine, B., J. Connors, C. Szembek, and S. Hanna. 2012. AERMOD Low Wind Speed Evaluation Study. Presented at the 10th EPA Modeling Conference. March.

EPA. 2017. *Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter.* Fed. Reg./Vol. 82, No. 10/Tuesday, January 17, 2017, Rules and Regulations, pp. 5182-5235. 40 CFR Part 51, FRL-9956-23-OAR. RIN 2060-AS54.

EPA. 2016. User's Guide for the AMS/EPA Regulatory Model (AERMOD). EPA-454/B-16-011. Office of Air Quality Planning and Standards, Air Quality Assessment Division. Research Triangle Park, North Carolina. December.

Attachment 4

Endangered Species Act and

National Historic Preservation Act Documentation

The Mamie 4-25-4-4WH facility is located on a previously developed wellpad. The previously developed site will not require a change to the site's disturbed footprint. The well pad is part of the Rocky Point Exploration and Development plan. Enclosed is as copy of the Final Biological Opinion for the Rocky Point EDA. Newfield received an Administrative Modification approval for adding the new well with no additional disturbance from Bureau of Indian Affairs (BIA).

As a result, Newfield concludes that there is no potential to cause effects on federally-listed or endangered species or designated critical habitats.

In addition, no historic properties will be affected resulting from the proposed modification. BIA and the Uintah and Ouray Agency rendered a finding that the new construction would not impact archaeological or cultural resources. See the enclosed supporting documentation.

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Uintah and Ouray Agency
P. O. Box 130
Fort Duchesne, Utah 84026

In Reply, Refer to:
420 – Real Estate Services

OCT 30 2018

Jerry Kenczka
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, UT 84078

Re: Application for Permit to Drill Concurrence for **NEWFIELD PRODUCTION COMPANY**

Dear Mr. Kenczka:

This letter is to inform you that the Bureau of Indian Affairs, Uintah and Ouray Agency recommends the approval of the Applications for Permit to Drill for the below mentioned well sites along and associated access roads and pipelines, with required stipulations:

ROW No.	Well Name	Qtr/Qtr	Sec.	Twn.	Rng.	ROW Type
H62-2013-270	MAMIE UT 4-25-3-3WH	NWNW	25	3S	3W	WELLSITE

Based on available information received during the site specific inspection the proposed locations were cleared in the following areas of environmental impact:

YES		NO	X	Listed Threatened/Endangered Species
YES		NO	X	Critical Wildlife Habitat
YES		NO	X	Archaeological/Cultural Resources
YES		NO	X	Air Quality Aspects (to be used only if the project is in or adjacent to a Class I area)

Attached is a copy of the Grant of Easement for Right-of-way, as well as a copy of the Environmental Assessment.

If you have any questions, or if you require any additional information, please contact Karen Austin, Realty Specialist at 435-722-4326 or karen.austin@bia.gov

Sincerely,

Acting Superintendent

cc: Ute Indian Tribe Energy and Minerals
Agency/Branch Chrono

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
UINTAH AND OURAY AGENCY
P.O. Box 130
1400 South 7002 East
Fort Duchesne, Utah 84026
Phone (435) 722-4300 Fax (435) 722-2323

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Real Estate Services – MS 420

OCT 26 2018

Corie Miller, Regulatory Specialist
Newfield Production Company
10530 South County Road #33
Myton, Utah 84052

Re: Letter for an Administrative Modification

Dear Mr. Miller:

The following Administrative Modification has been completed for approved wellsite.

ROW No.	Well Name/No.	Modification Type
H62-2013-270	**Mamie UT 4-25-3-3WH**	**Additional well bore Mamie UT 4-25-3-3-25-36-46H. No additional disturbance**

Attached is an original copy of the Administrative Modification form that reflects the authorized modification to the original Grant of Easement. Please adhere to all original regulations and stipulations cited in the original site specific Environmental Assessment.

Retain this letter as your permit to begin construction on Tribal lands. **Please remind your field personnel of the firearm restrictions on the Uintah and Ouray Reservation.**

If you have any questions, or if you require any additional information, please contact Karen Austin, Realty Specialist, at (435) 722-4326 or karen.austin@bia.gov.

Sincerely,

Superintendent

cc: Ute Indian Tribe Energy and Minerals
Agency/Branch Chrono
420:KA/SG:10/24/2018:TR4616-P5

RECEIVED
OCT 11 2018
UINTAH AND OURAY
AGENCY
AP 420-18
Superintendent

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ADMINISTRATIVE MODIFICATION

TRACT NO.:_____

ROW NO.: H62 2013-270
TAAMS ID NO.: 6RW2013270
PAGE No.:_____

The United States of America, acting by and through the Bureau of Indian Affairs, Department of the Interior, Uintah & Ouray Agency for, and on behalf, of: Ute Indian Tribe (the GRANTOR), it is hereby agreed by and between, Newfield Production Company, that the Grant of Right-of-Way Easement No. H62 2013-270, approved on March 15, 2013, is hereby modified to correct the following clerical error:

Add Mamie UT 4-25 3-3-25-36-46H well bore to existing Mamie 4-25-3-3WH wellsite. No additional disturbance or change in acreage is proposed. Mamie wellsite is located in the NWNW Sec 25 T3S R3W USB&M.

This modification does not change any of the terms, conditions, or stipulations except as specifically set forth herein.

The within modification is hereby approved and declared to be made in accordance with the law and the rules and regulations prescribed by the Secretary of the Interior thereunder, and now in force.

DATE: 10/10/2018

(Grantee)
Newfield Regulatory Specialist

IN WITNESS WHEREOF, GRANTOR, pursuant to authority delegated to the Assistant Secretary – Indian Affairs by 209 DM 8, to the Director of BIA by 230 DM 1 and to the Western Regional Director by 3 IAM 4 and to the Superintendent by historic Phoenix Area Re-Delegation Documents in 10 BIAM is granting and executing this Modification of Grant of Easement on this 26 day of October, 2018.

BY: _____
Acting Superintendent
U.S. Department of the Interior
Bureau of Indian Affairs

A C K N O W L E D G E M E N T

STATE OF: Utah
: ss
COUNTY OF: Uintah

Subscribed and sworn to before me this 26th day of October, 20 18.

Signature of Notary Public

My commission expires on _____, 20_____.

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
UINTAH AND OURAY AGENCY
P.O. Box 130
988 South 7500 East
Fort Duchesne, Utah 84026
Phone (435) 722-4300 Fax (435) 722-2323

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Natural Resources – MS 460

Decision Record and Finding of No Significant Impact
Environmental Assessment and Biological Assessment
No. U&O-FY13-Q1-020

Newfield Exploration Company's
Ten (10)Well Central Basin Exploratory
Environmental Assessment and Biological Assessment

DECISION

I have reviewed the final Environmental Assessment and Biological Assessment (EA & BA) of Newfield Exploration Company's (Newfield) proposed *Ten (10) Well Central Basin Exploratory EA & BA*, BIA NEPA No. U&O-FY13-Q1-020.

Based upon my review of this information, and information contained in the EA's Administrative Record, I have decided to approve and implement the portions of the Proposed Action, together with general Bureau of Indian Affairs (BIA) generated mitigation measures (See Chapter 4 of the EA) and Applicant-committed Environmental Protection Measures (ACEPMs) (See Chapter 2.1.8 of the EA). Site specific mitigations and stipulations have been determined during the site-specific environmental assessment process, as well as ACEPMs and cited mitigation measures contained in the programmatic *Rocky Point Exploration and Development Agreement Leasing and Exploratory Drilling Environmental Assessment and Biological Assessment*, BIA NEPA No. U&O-FY12-Q1-040.

The Proposed Action analyzed the construction, drilling, completion and production of the following ten (10) well bores and pads, including their associated rights-of-way and support infrastructure, which would occur in the Central Basin area of the Rocky Point Exploration and Development Agreement (Rocky Point EDA) project area:

1. **Rhea 2-9-3-1W**, located in Section 9
2. **Chegar 1-10-3-1WH**, located in Section 10
3. **Oscar 1-19-3-1WH**, located in Section 19
4. **Tuck 1-20-3-1WH**, located in Section 20
5. **Jack Johnson 3-20-3-1WH**, located in Section 20
6. **Pekev 2-29-3-1WH**, located in Section 29
   Township 3 South, Range 1 West;

7. **Poker Jack 4-13-3-2WH**, located in Section 18

Township 3 South, Range 2 West;

8. **Ute Tribal 4-21-3-3WH**, located in Section 21
9. **Mamie 4-25-3-3WH**, located in Section 25
10. **Ute Tribal 7-26-3-3W**, located in Section 26
    Township 3 South, Range 3 West,
    Uintah Special Base and Meridian, Duchesne County, Utah.

Approval and implementation of the modified Proposed Action would include the following primary components, which would occur on lands owned privately and by the Ute Indian Tribe (Tribe/Tribal):

- Issuance of BIA Grants of Easement for right-of-way for ten (10) oil and gas well rights-of-way, also issue an Application for Permit to Drill concurrence for each well bore to the Bureau of Land Management, which would consist of approximately 47.331 acres, more or less, on both Tribal lands;
- Construction of ten (10) access roads, which would be approximately 40-foot width and 18,109-feet in length, being approximately 16.635 acres, more or less, on both Tribal and private lands;
- Construction of ten (10) pipeline corridors, which would be approximately 60-foot width and 26,035.78-feet in length, being approximately 40.292 acres, more or less, on both Tribal and private lands;

REASONS FOR THE DECISION

I have decided to implement the Proposed Action and concur with the *Ten (10) Well Central Basin Exploratory EA & BA* because of the following:

1. It meets the intent of the Indian Mineral Development Act (25 *United States Code* [U.S.C.] Section 2102).
2. BIA, Tribal, and other federal entity input were obtained and the environmental issues related to the Proposed Action were identified and analyzed.
3. The EA disclosed the environmental consequences of the Proposed Action and No Action alternatives.
4. Compliance will be met with all relevant federal, state, and local laws, as well as county and Tribal regulations and policies. Newfield will follow strict procedures during construction, operation and maintenance activities.
5. The EA provides for protection of affected resources before, during, and after the planned construction, operation, and reclamation activities associated with the Proposed Action.
6. The Proposed Action allows for the continued exploration and production of natural gas and oil activities in the Rocky Point EDA project area, which in turn keeps Newfield, the Tribe, and BIA in compliance with their approved EDA and associated Tribal leases.

7. The project will contribute to the economic development of Indian land and will assist in the self-determination objectives of the Tribe through job opportunities, lease revenue, and fees.
8. The project will contribute to the economy of the Uintah Basin through the purchase of goods and services.

SCOPING AND PUBLIC INVOLVEMENT

Due to the small scale of this project and exploratory nature of the proposed wells, no external public scoping was conducted for this project. Internal scoping meetings were conducted by the BIA, Tribe, BLM and Newfield and their contractors during onsite meetings conducted on May 1, 2012, and a determination of potential impacts to individual resources was conducted at that time.

List of Participants at the May 1, 2012 Onsite Meeting

Name	Representing	Responsibility
Audie Appawoo	Ute Tribe, Energy & Minerals Department	Compliance Officer
Bucky Secakuku	Bureau of Indian Affairs, Uintah & Ouray Agency	Environmental Protection Specialist
Sherri Wysong	Bureau of Land Management, Vernal Field Office	Natural Resource Specialist
Tim Eaton	Newfield Exploration Company	Regulatory Technician
Corie Miller	Newfield Exploration Company	Regulatory Technician
Zander McIntyre	Newfield Exploration Company	Production Foreman
Forest Bird	Newfield Exploration Company	Construction Foreman
Dennis Petty	Tri-State Surveying & Consulting, Inc. (TSLSC)	Surveyor
McCoy Anderson	Uinta Engineering & Land Surveying, Inc. (UELS)	Surveyor
Jodie Eisil	Outlaw Engineering, Inc.	Botanist
Randy Freston	Outlaw Engineering, Inc.	Biologist
Bridget Atkin	Outlaw Engineering, Inc.	Botanist
Todd Sherman	Outlaw Engineering, Inc.	Biologist
Amy Ackman	Montgomery Archaeological Consultants, Inc. (MOAC)	Archaeologist
Lindsey Kester	SWCA Environmental Consultants, Inc. (SWCA)	Archaeologist
Justin Strauss	SWCA	Paleontologist
Don Hamilton	Star Point Enterprises, Inc.	Regulatory Specialist
Jean Sinclear	Kleinfelder (KLF)	NEPA Specialist

PLAN CONFORMANCE AND CONSISTENCY

Rocky Point Exploration and Development Agreement Leasing and Exploratory Drilling Environmental Assessment and Biological Assessment, BIA NEPA No. U&O-FY12-Q1-040
The Proposed Action would be in compliance with the approved *Rocky Point Exploration and Development Agreement Leasing and Exploratory Drilling Environmental Assessment and Biological Assessment*, which allows for the Newfield Production Company and Ute Energy the right to conduct oil and gas operations on approximately 19,035 acres of Tribal and individual Allotted surfaces and minerals west of the project area. The proposed action would be used to transport product to either side of the Duchesne River, thereby reducing the need to construct

additional pipelines across the river. The continued oil and gas development of the Rocky Point field would continue operations, thereby developing Tribal and Allotted natural resources and generating revenue from those resources.

OTHER ALTERNATIVES CONSIDERED IN DETAIL

No Action Alternative

Under the No Action Alternative, the contract lands would not be leased to Newfield, and the ten (10) proposed well pads and ten (10) exploratory wells with their supporting infrastructure, including the installation and operation of production supporting gathering pipelines would not be authorized. Lacking federal approval, neither the BIA's purpose and need, nor the operator's purpose and need for the project would be realized. The No Action Alternative effectively constitutes denial of the Proposed Action as set out in this document. Other surface land uses in the project area would continue at their current trends. Newfield would continue to exercise and comply with their contractual rights and obligations to explore, and develop Tribal mineral resources as set forth in the Rocky Point EDA document. All such future exploration and/or development activities in the project area would be considered on a case-by-case basis and would be subject to separate NEPA analysis.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

I have considered both the beneficial and potential adverse effects of concurring with the approval of the modified Proposed Action. Based on experience and the results of the conceptual analyses contained in the *Ten (10) Well Central Basin Exploratory EA & BA*, I have determined that the effect of implementation will be limited in scope and intensity. Any effect that may occur will be within an acceptable range and, in and of themselves or by using the mitigation measures described in the Proposed Action of the *Ten (10) Well Central Basin Exploratory EA & BA*, and the ACEPMs and citied mitigation in Chapter 4 of the Proposed Action, if applicable, will result in no significant adverse environmental impact(s) either individually or cumulatively, to the physical or biological components of the environment, as defined in 40 *Code of Federal Regulations* (C.F.R.) 1508.27. My finding is based on the following determination:

1. Both beneficial and adverse effects were considered, and this action will not have a significant effect on the quality of the human environment.
2. The project will not adversely affect any unique characteristics of the geographic area (historic, heritage resources, prime farm lands, wetlands, etc.).
3. Based on the lack of information received from public participation, the scientific, social, and economic effects on the quality of the human environment are not likely to be highly controversial by implementing the Proposed Action.

4. There are no known effects on the human environment that are highly uncertain, involve unique or unknown risks.
5. The actions in this decision will not establish a precedent for future actions with significant effects, nor do they represent a decision in principle about a future consideration.
6. There are no known significant local cumulative effects from this project and other projects implemented or planned on areas separated from the affected area of this project.
7. The actions planned will not adversely affect any sites listed in, or eligible for listing on, the National Register of Historic Places, nor will they cause the loss or destruction of any other significant scientific, cultural, heritage, historic, or prehistoric resources. This finding is based upon the commitment to survey all areas and to satisfactorily complete the Section 106 Consultation process prior to surface disturbance in all areas to be disturbed.
8. The decided actions are not likely to adversely affect any listed or proposed endangered, threatened, or sensitive plant or animal species, critical habitats, or unique natural communities.
9. The actions do not constitute, nor will they lead to, a violation of any federal, state, or local law, ordinance, or requirement imposed for the protection of the environment.

Authority: This finding and decision is made in accordance with section 1503.1 of the Council on Environmental Quality Regulations (40 CFR Parts 1500 through 1508) implementing the procedural requirements of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), and the Department of the Interior Manual (516 DM 1-6), and is in the exercise of authority delegated to the Assistant Secretary-Indian Affairs (209 DM 8) to the Director of Indian Affairs (230 DM 1) to Regional Directors (3 IAM 4) to Agency Superintendents (10 BIAM).

Any questions regarding this Decision Record and Finding of No Significant Impact, please contact Bucky Secakuku, Environmental Protection Specialist, at (435) 722-4331 or bucky.secakuku@bia.gov.

Responsible Official:

ACTING Superintendent
Uintah and Ouray Agency

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

March 20, 2012

In Reply Refer To:
FWS/R6
ES/UT
12-F-0085
6-UT-12-F-019

Memorandum

To: Superintendent, Bureau of Indian Affairs, Uintah and Ouray Agency, Fort Duchesne, Utah

From: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: Final Biological Opinion for Newfield Exploration Company and Ute Energy, LLC's proposed Rocky Point Exploration and Development

In accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), and the Interagency Cooperation Regulations (50 CFR 402), this transmits our final biological opinion for impacts to the endangered Colorado pikeminnow *(Ptychocheilus lucius)*, razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*); including their designated critical habitat. We refer to your correspondence and final environmental assessment/biological assessment (EA/BA) that we received on March 9, 2012, in which you requested formal consultation for this project.

Spiranthes diluvialis, Sclerocactus brevispinus, and *S. wetlandicus* were also analyzed within the EA/BA. We concur with that this project may affect, but is not likely to adversely affect these species based on the applicant-committed conservation measures included in the final EA/BA. In particular, our concurrence is based on the fact that initiation of formal section 7 consultation will be sought on a site-specific basis for well locations that are unable to avoid occupied listed plant habitat by 300 feet (see applicant-committed conservation measures in the EA/BA beginning on page 26).

Consultation History

This section summarizes significant steps in the consultation process:

Colorado River Fish Recovery Program

On January 21-22, 1988, the Secretary of the Department of the Interior; the Governors of Wyoming, Colorado, and Utah; and the Administrator of the Western Area Power Administration were cosigners of a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (Recovery Program; Service 1987). The Recovery Program has been extended until September 30, 2013. An objective of the Recovery Program is to recover the listed species while providing for new water development in the Upper Colorado River Basin.

In order to further define and clarify processes outlined in sections 4.1.5, 4.1.6, and 5.3.4 of the Recovery Program, a section 7 Agreement (Agreement) and a Recovery Implementation Program Recovery Action Plan (RIPRAP) was developed. The Agreement establishes a framework for conducting all future section 7 consultations on depletion impacts related to new projects and all impacts associated with historic (defined as being initiated prior to January 1988) projects in the Upper Basin. Procedures outlined in the Agreement are used to determine if sufficient progress is being accomplished in the recovery of the endangered fishes to enable the Recovery Program to serve as a reasonable and prudent alternative to avoid jeopardy. The RIPRAP was finalized on October 15, 1993, and has been reviewed and updated annually.

In accordance with the 1993 Agreement, we assess the impacts of projects that require section 7 consultation and determine if progress toward recovery has been sufficient for the Recovery Program to serve as the reasonable and prudent alternative. As long as the Recovery Program achieves sufficient progress, biological opinions are written to identify activities and accomplishments of the Recovery Program that support it being used as the reasonable and prudent alternative. If sufficient progress in the recovery of the endangered fishes is not achieved by the Recovery Program, additional actions from the RIPRAP are identified for the project proponent to implement in order to avoid jeopardy to the endangered fishes. For historic projects, the Recovery Program serves as the reasonable and prudent alternative as long as recovery actions are completed according to the schedule identified in the RIPRAP. For new projects, the Recovery Program and/or addition actions identified from the RIPRAP serve as the reasonable and prudent alternative so long as they are completed prior to the project being implemented.

After many years of successful implementation of the Recovery Program and Agreement, Federal action agencies anticipate recovery activities that must be included in their project planning to avoid jeopardy to listed species. Thus, our reasonable and prudent alternative is essentially part of the proposed action. The Recovery Program now serves as a conservation measure within the proposed action and in many cases minimizes

adverse effects to listed species or critical habitat. The following excerpts summarize portions of the Recovery Program that address depletion impacts, section 7 consultation, and project proponent responsibilities:

"All future section 7 consultations completed after approval and implementation of this program (establishment of the Implementation Committee, provision of congressional funding, and initiation of the elements) will result in a one-time contribution to be paid to the Service by water project proponents in the amount of $10.00 per acre-foot based on the average annual depletion of the project . . . This figure will be adjusted annually for inflation [the current figure is $19.21 per acre-foot] . . . Concurrently with the completion of the Federal action which initiated the consultation, e.g., . . . issuance of a 404 permit, 10 percent of the total contribution will be provided. The balance . . . will be . . . due at the time the construction commences . . . ."

It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes. The Recovery Program further states:

". . . it is necessary to protect and manage sufficient habitat to support self-sustaining populations of these species. One way to accomplish this is to provide long term protection of the habitat by acquiring or appropriating water rights to ensure instream flows. Since this program sets in place a mechanism and a commitment to assure that the instream flows are protected under State law, the [U.S. Fish and Wildlife] Service (Service) will consider these elements under section 7 consultation as offsetting project depletion impacts."

On July 8, 1997, we issued an intra-Service biological opinion determining that the depletion fee for average annual depletions of 100 acre-feet or less are no longer required because the Recovery Program has made sufficient progress to be the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat by these small depletions. The intra-Service biological opinion has been reinitiated several times since 1997 to account for additional water depletions. The most recent update occurred on June 4, 2010 and increased the cap for small water depletions to 12,000 acre-feet. This increase will allow us to continue to exempt small depletions of 100 acre-feet or less.

Chronology of recent events and past consultations between the Bureau of Indian Affairs (BIA) and US Fish and Wildlife Service (Service) with regard to this section 7 consultation:

- 03/19/2012; we received clarification from Newfield and Ute Energy regarding pumping activities and water withdrawals from the Green River

- 03/09/2012; we received the final EA/BA and an addendum with updated applicant-committed conservation measures.

- 02/06/2012; we met with the BIA, Ute Tribe, Newfield, and biological consultants to discuss *Spiranthes diluvialis* mitigation measures.

- 02/02/2012; we sent comments to your office on the draft EA/BA.

- 01/26/2012; we received a scoping notice and a draft EA/BA from your office.

- 11/29/2011; we attended onsites with the BIA, Ute Tribe, Newfield, and Rana, Inc.

A complete administrative record for this project is on file in our office.

Biological Opinion

I. Description of Proposed Action

The project area is approximately 92,098 acres located mostly within Duchesne County (83,296 acres) and a small portion within Uintah County (8,802 acres). Surface ownership is 22,376 acres of Tribal surface administered by the BIA, 69,454 acres of Indian allottee or private land, and 268 acres of state lands. Under the proposed action (agency-preferred Alternative C of the EA/BA), Newfield and Ute Energy propose to construct, drill, complete, and produce 81 wells and build associated access roads and pipelines. Newfield intends to drill 55 exploratory oil and gas wells, and Ute Energy intends to drill 26 exploratory oil and gas wells over a two-year period. This alternative assumes that 4 wells from the original proposed action will not be developed because of overlap with occupied *Sclerocactus* habitat. The expected amount of new surface disturbance associated with this project is 1,539.3 acres. The life of the project is expected to be 20 to 30 years.

Action Area

The action area is defined in 50 CFR 402 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of this consultation, we define the action area to encompass all of the project area proposed for well development including a 300 foot buffer surrounding these areas, and waterways downstream of the project area including the Duchesne and Green Rivers within and outside of the project area.

Applicant Committed Conservation Measures

Conservation measures are actions that the action agency and applicant agree to implement to further the recovery of the species under review. The beneficial effects of conservation measures are taken into consideration for determining both jeopardy and incidental take analyses.

Colorado River Endangered Fish Species

The following applicant-committed conservation measures will help minimize the impacts of the Proposed Action to the four Colorado River endangered fish species:

- Newfield will not pump surface water from the Green River. Specifically, for Newfield's development, water collection wells will be connected to a centralized pumping station via underground waterlines. The water wells will be developed using conventional drilling methods. Each well will extend to a depth of approximately 100 feet below the surface.
- Ute Energy will not withdraw water directly from the Green River.

In addition, Newfield and Ute Energy agreed to have the Upper Colorado River Recovery Program (Recovery Program) serve as a conservation measure within the proposed action. A portion of the water needed for this project may be acquired from the Newfield Green River Collector Well (water right numbers 47-1802 and 47-1804). Approximately 2,081 acre-feet of water depletion per year was consulted on during formal section 7 consultation completed for the Castle Peak Eight Mile Flat Oil and Gas Expansion Project (6-UT-05-012). However, additional consultation is needed for depletion through the Newfield Green River Collector Well for this leasing and exploratory drilling project and to account for additional freshwater needs to support Newfield's waterflood program in the nearby Greater Monument Butte Unit. While not part of the Rocky Point Proposed Action, Newfield, the BIA, and the Service have agreed to use this EA/BA as the mechanism for the programmatic section 7 consultation on additional water depletion for the waterflood program for the life of the Greater Monument Butte Development (approximately 20 to 30 years).

It is expected that approximately 2,823 acre-feet will be used annually for Newfield's waterflood program. Approximately 742 acre-feet that have not yet been consulted on (2823 acre-feet – 2,081 acre-feet = 742 acre-feet) will be withdrawn from the Newfield Green River Collector well. An additional 175 acre-feet will be withdrawn from the Newfield Green River Collector Well for the Rocky Point project, for a total of 917 acre-feet per year.

The following paragraphs further clarify the Recovery Program's role:

In determining if sufficient progress has been achieved under the Recovery Program, we consider--a) actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction; b) status of fish populations; c) adequacy of flows; and, d) magnitude of the Project impact. In addition, we consider support activities (funding, research, information, and education, etc.) of the Recovery Program if they help achieve a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction. We evaluate progress separately for the Colorado River and Green River Subbasins; however, it gives due consideration to progress throughout the Upper Basin in evaluating progress toward recovery.

Water depletion impacts can be offset by: a) the water Project proponent's one-time contribution to the Recovery Program in the amount of $19.21 per acre-foot of the Project's average annual depletion; b) appropriate legal protection of instream flows pursuant to State law; and, c) accomplishment of activities necessary to recover the endangered fishes as specified under the RIPRAP. We believe it is essential that protection of instream flows proceed expeditiously, before significant additional water depletions occur. As the project's peak annual new depletion of 917 acre-feet is below the current sufficient progress threshold of 4,500 acre-feet, Recovery Program activities will serve as the conservation measures to minimize adverse effects to the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail and destruction or adverse modification of critical habitat caused by the project's new depletion.

With respect to (a) above (i.e., depletion charge), Newfield will make a one-time payment which has been calculated by multiplying the Project's peak annual depletion (917 acre-feet) by the depletion charge in effect at the time payment is made. For Fiscal Year 2012 (October 1, 2012, to September 30, 2012), the depletion charge is $19.21 per acre-foot for the average annual depletion which equals a total payment of **$17,615.57** for this Project. A minimum of 10% of the total payment will be provided to the Service's designated agent, the National Fish and Wildlife Foundation (Foundation), at the time of issuance of the Federal approvals from the BIA, with the rest to be paid when construction commences. Fifty percent of the funds will be used for acquisition of water rights to meet the instream flow needs of the endangered fishes (unless otherwise recommended by the Implementation Committee); the balance will be used to support other recovery activities for the Colorado River endangered fishes. All payments should be made to the National Fish and Wildlife Foundation.

National Fish and Wildlife Foundation
1133 15th Street, NW
Suite 1100
Washington, DC 20005

Each payment is to be accompanied by a cover letter that identifies the Project and biological opinion that requires the payment, the amount of payment enclosed, check number, and any special conditions identified in the biological opinion relative to disbursement or use of the funds (there are none in this instance). A copy of the cover letter and of the check is to be sent directly to our office. The cover letter shall identify the name and address of the payer, the name and address of the Federal Agency responsible for authorizing the Project, and the address of the Service office issuing the biological opinion. This information will be used by the Foundation to notify the payer, the lead Federal Agency, and the Service that payment has been received. The Foundation is to send notices of receipt to these entities within 5 working days of its receipt of payment.

II. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, BIA , Newfield, and Ute Energy must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions are assumed to include all previously listed applicant-committed environmental protection measures, but in some cases include more restrictive or more detailed measures. Conservation measures include implementing the Recovery Program (and relevant RIPRAP measures).

III. REPORTING REQUIREMENTS

In order to be exempt from the prohibitions of section 9 of the Act, the BIA must comply with all Recovery Program activities and the monitoring proposed below.

The implementing regulations for incidental take require that Federal agencies must report the progress of the action and its impact on the species (50 CFR 402.14(i)). To meet this mandate, the BIA will monitor and report the progress of their action as follows:

1. The BIA is required to submit to our office an annual report of water depletions associated with oil and gas development, including the following information:

    - Project name and/or applicant name
    - Permit number and/or special use authorization
    - General location and legal description
    - Depletion amount in acre-feet
    - Timing of depletion

- Identify if new or historic depletion[1]
- Sub-total water depletion (acre-feet) for each applicant
- Total depletion for the entire year in acre-feet
- Total number of APDs approved
- Total number of wells spudded

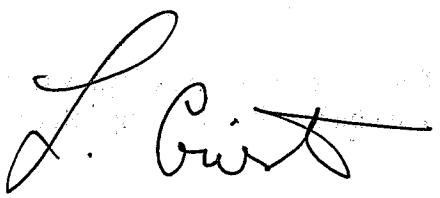
Reports shall be due to our office on a yearly basis by October 31. The address for the Utah Fish and Wildlife Service Field Office is:

2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

IV. Reinitiation - Closing Statement

This concludes formal consultation on the action outlined in your request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action was retained (or is authorized by law) and if: (1) the average annual water withdrawals out of the Upper Colorado River Drainage System exceed the estimated 917 acre-feet by more than 10 percent; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your commitment in the conservation of endangered species. If the project changes or it is later determined that the project affects listed species differently than identified above; it may become necessary to reinitiate section 7 consultation. If you require further assistance or have any questions, please contact Jessi Brunson, (435) 781-4448, or Drew Crane, (801) 975-3330, extension 124.



[1] It is important to include information on whether each depletion is new or historic (occurring prior to January 1988), because we addresses new and historic depletions differently under the new section 7 agreement of March 11, 1993. Historic depletions, regardless of size, do not pay a depletion fee.