Department of Environmental Quality

Air Resources Management Bureau • 49 N. Main St., Suite B • Butte, MT 59701 • (406) 782-2689

MONTANA AIR QUALITY REGISTRATION FORM FOR OIL AND GAS WELL FACILITIES

Montana Department of Environmental Quality
Supervisor Air Registration Section
Air Quality Registration Section
49 N. Main Street, Suite B
Butte, MT 59701
Phone: (406) 782-2689 FAX (406) 782-2701

For State of Montana Use Only		
Registration Number		
Registration Fee Paid?	☐ Yes	☐ No
Amount Paid		
AFS #		

Submit one (1) signed original paper copy and one (1) electronic copy of the registration form(s) (including calculations) or one (1) signed original paper copy and three (3) paper copies and the associated registration fee to the Air Quality Registration Section at the above address. Please contact the Montana Department of Environmental Quality (Department) if you have any questions or need assistance. A Department response will be provided to the facility within 30 days after receipt and review of the registration information.

☒ New Facility? ☐ Update to Registered Facility?

(Note: For facility deregistration, submit a letter of request to the Department along with all applicable calculations for review to determine the facility's potential to emit.)

COMPANY AND FACILITY NAME AND ADDRESS

Company Name: ABC Oil and Gas Corporation

Facility Name: Big Bubba 55-8H-BR

Mailing Address: 2600 North Main St., Suite 800

Butte, MT 59701

Contact Information

Owner's Name James W. North Telephone (000)-000-0000

Contact Person Nickolas A. South Telephone (000)-000-0000

PHYSICAL LOCATION AND FACILITY INFORMATION

Qtr/Qtr Section SE ¼ SE ¼ Section 11 Township 99 N Range 99 E

Latitude 43.867321 Longitude 101.542631 County Rosebud

General Nature of Business Oil and Gas Production

Standard Industrial Classification Codes(s) 1311

Standard Industrial Classification Description(s) Crude Petroleum and Natural Gas

Well Completion Date: 8/31/07 Date of Initial Production 10/01/07

Gas Production (MMscf/day) 0.2 Oil Production Rate (bbl/day) 60

Facility Process Description

Narrative Description of the Site and Facility: *(Provide a brief written description of the site and facility.)*

The Big Bubba 55-8H-BR oil and production facility is located in eastern Montana in Rosebud County on the Cedar Creek Anticline. At this facility there is one oil and gas production well that produces to the tank battery. The facility is situated on a two acre site in a rural area with the nearest town (Baker, Montana) located approximately eight miles away. The surrounding area is mainly used for agriculture and livestock grazing.

Site Maps: *(Provide as an attachment to this form a topographical and facility site map.)* –Refer to attached topographical and a facility production schematic maps (Figures 1 and 2).

Narrative Project Summary: *(Provide a written narrative summarizing the project and equipment or any changes to the facility if previously registered.)*

In October 2007, the ABC Oil and Gas Corporation began operation of an oil and gas production facility in Section 49, Township 72 North, Range 88 East in Rosebud County, Montana (See attached Figure 1.). The facility (or tank battery) is known as the Big Bubba 55-8H-BR and consists of the following primary production equipment and capabilities.

1 - Heater Treater
3 - 400-bbl production tanks
1 - 400-bbl produced water tank
1 - Oil and gas producing well
1 - Gas separator
1 - 0.5 MMBtu/hr line heater
1 - 25-ft enclosed smokeless combustor for tank flashing and treater emissions
1 - 110 BHP rich-burn internal combustion engine equipped with non-selective catalytic reduction
1 - Truck loading rack

As provided in the attached facility production schematic/figure (See attached Figure 2.), the product from the oil and gas well at this site is lifted by a small pumping engine to a flow line which transports the oil and gas emulsion in a closed system to a gas separator. Gas from the separator is sent to a natural gas pipeline for sale and the remaining emulsion is transported to the heater treater where additional gas and oil and water are separated. The separated gas is either utilized in the heater treater, engine, or sent to the smokeless combustor flare while the water is pumped to a holding tank and the separated oil is pumped to the production tanks. All the natural gas released to the flare from the heater treater and production tanks is burned automatically using an electric sparking ignition device. The crude oil is ultimately pumped from the production tanks to a truck loading station to be transported off-site for eventual sale. Produced wastewater is periodically trucked away to a processing facility for further treatment.

Emissions from this site consist primarily of the heater treater, production tanks (e.g., working, breathing, and flash emissions), produced water tank, prime mover (engine), flare, truck loading operations, and fugitive emissions (e.g., equipment leaks and road dust). To assist in determining the facilities potential to emit (PTE), the oil and gas production capacities of this facility were estimated from at 60 bbls/day and 0.2 MMscf/day, respectively, based on the October 2007 facility production rates. In addition, the produced gas stream and tank vapor samples were collected at the site and analyzed by O&G Laboratories in Billings, Montana. The laboratory results are provided in Appendix D of the application. Hydrogen sulfide (H_2S) gas was measured and not detected at this well. All applicable uncontrolled and controlled potential emissions from each source are provided below, and calculations, spreadsheets, emission factors, manufacturers' data, field gas composition data, maps, photographs, TANKS program inputs and outputs are provided Appendix A to E of the registration application.

As a registered facility, it would be subject to all the applicable requirements identified in the Administrative Rules of Montana (ARM) Title 17, Chapter 8, Subchapter 17, Registration of Air Contaminant Sources.

EMISSIONS UNIT EQUIPMENT INFORMATION

Where applicable, provide the following information for each facility emitting unit (including pollution control equipment) such as heater treatment units, dehydrators, tanks, internal combustion engines, wellhead assemblies, and smokeless combustion devices as well as fugitive equipment leaks. For additional emitting units, control equipment, or additional emissions information, provide as a separate attachment, as needed.

Facility Equipment Emitting Unit(s) Specifications

Emitting Unit 1: Three (3) 400 bbl crude Tanks

Manufacturer's Name: Smith Corporation — Model: Unknown
Unit Type: Welded Steel — Size: 400 bbl
Year of Manufacture: 2007
Year of Installation: 2007
Maximum Rated Design Capacity or Throughput: 250 bbls/day

Emitting Unit 2: Heater Treater

Manufacturer's Name: NWTC Technologies, Inc. — Model: XYZ-1
Unit Type: Vertical Treater — Size: 4' (O.D.) by 20' (H)
Year of Manufacture: 2006
Year of Installation: 2007
Maximum Rated Design Capacity or Throughput: 300 bbl/day oil and 0.30 MMscf/day gas

Emitting Unit 3: Engine (Prime Mover)

Manufacturer's Name: Waukesha — Model: F11
Unit Type: Natural gas fired rich-burn engine — Size: 110 HP
Year of Manufacture: 2002
Year of Installation: 2007
Maximum Rated Design Capacity or Throughput: Not Applicable

Emitting Unit 4: Produced gas flare

Manufacturer's Name: ABC, Inc. — Model: FKGT-H25-R20S-EPT
Unit Type: Smokeless Combustion Flare — Size: 25' with 20" stainless tip
Year of Manufacture: 2007
Year of Installation: October 1, 2007
Maximum Rated Design Capacity or Throughput: 10 MMscf/day

Emitting Unit 5: Produced Water Tank

Manufacturer's Name: XYZ Industries — Model: Unknown
Unit Type: 400 bbl Water Tank — Size: 400 bbl
Year of Manufacture: 2007
Year of Installation: 2007
Maximum Rated Design Capacity or Throughput: Not applicable

Emitting Unit 6: Fugitive Emissions (road dust (vehicle traffic)) and Equipment Leaks (valves, flanges etc.)

Manufacturer's Name: Not Applicable | Model: Not Applicable
Unit Type: Not Applicable | Size: Not Applicable
Year of Manufacture: Not Applicable
Year of Installation: Not Applicable
Maximum Rated Design Capacity or Throughput: Not Applicable

Emitting Unit 7: Truck Loading

Manufacturer's Name: Not Applicable | Model: Not Applicable
Unit Type: Not Applicable | Size: Not Applicable
Year of Manufacture: Not Applicable
Year of Installation: Not Applicable
Maximum Rated Design Capacity or Throughput: Not Applicable

Facility Air Pollution Control Unit(s) Identification

Air Pollution Control Unit 1: Smokeless Combustor Flare

Manufacturer's Name: ABC, Inc. | Model: FKGT-H25-R20S-EPT
Unit Type: Smokeless Combustion Flare | Size: 25' with 20" stainless tip
Year of Manufacture: 2007 | Estimated Control Efficiency: 98%
Date of Installation: October 1, 2007 | Emitting Unit Controlled: Tanks and Treater
Estimated Cost of Pollution Control Equipment: $11,000

Air Pollution Control Unit 2: Non-selective catalytic reduction with air-to-fuel ratio controllers

Manufacturer's Name: JM Technologies, Inc. | Model: A42-B
Unit Type: Non-selective catalytic reduction | Size: Not Applicable
Year of Manufacture: 2007 | Estimated Control Efficiency: 80-90%
Date of Installation: October 1, 2007 | Emitting Unit Controlled: Engine
Estimated Cost of Pollution Control Equipment: $8,000

Air Pollution Control Unit 3:

Manufacturer's Name: | Model:
Unit Type: | Size:
Year of Manufacture: | Estimated Control Efficiency:
Date of Installation: | Emitting Unit Controlled:
Estimated Cost of Pollution Control Equipment:

FACILITY EMISSIONS SUMMARY

The following tables must be completed for each emission source for total uncontrolled and controlled potential emissions from each source. Calculations must be provided as a separate attachment to this form. Potential emissions are to be calculated based on the production at a maximum capacity for 8760 hours per year (hrs/yr). (Note: To estimate produced gas flare emissions during periods of emergency, assume 500 to 2,000 hrs/yr of operation at maximum production capacity.)

Uncontrolled Potential Emissions (Tons Per Year)

EMISSION SOURCE (e.g., tanks, heater treater, natural gas-fired heater, produced gas flare, flash separator, pneumatic pump, separator gas vent, truck loading, fugitive equipment leaks etc.)	Uncontrolled Potential Emissions (Tons Per Year)						
	VOC	***HAPs***	***NO_x***	***CO***	***SO_2***	***PM_{10}***	***H_2S***
Three (3) 400 bbl crude Tanks (working, breathing, and flashing losses)	61.64	0.05	Na	na	na	na	0
One (1) Heater Treater burner	0.02	Neg.	0.07	0.25	0.002	0.02	0
One (1) Engine (Prime Mover)	0.27	0.10	11.68	11.68	0.002	0.04	0
One (1) Produced gas flare	1.03	0.05	0.0008	0.0017	Neg.	Neg.	0
One (1) Produced Water Tank	4.37	Neg.	Na	na	na	na	0
Fugitive Emissions (equip. and dust)	0.86	0.02	Na	na	na	0.25	0
Truck Loading	2.50	Neg.	Na	na	na	na	0
TOTAL	70.69	0.22	11.75	11.93	0.004	0.06	0

Controlled Potential Emissions (Tons Per Year)

For controlled potential emission calculations, include controlled emissions from each controlled source and uncontrolled emissions from each source which does not have control such as process equipment.

EMISSION SOURCE	Controlled Potential Emissions (Tons Per Year)						
	VOC	***HAPs***	***NO_x***	***CO***	***SO_2***	***PM_{10}***	***H_2S***
Three (3) 400 bbl crude Tanks (working, breathing, and flashing losses)	1.23	Neg.	Na	na	na	na	0
One (1) Heater Treater burner	0.02	Neg.	0.07	0.25	0.002	0.02	0
One (1) Engine (Prime Mover)	0.03	0.10	1.17	1.17	0.002	0.04	0
One (1) Produced gas flare	1.03	0.05	0.0008	0.0017	Neg.	Neg.	0
One (1) Produced Water Tank	0.09	Neg.	Neg.	na	na	na	0
Fugitive Emissions	0.86	0.02	Na	na	na	0.25	0
Truck Loading	2.50	Neg.	Na	na	na	na	0
TOTAL	5.76	0.17	1.24	1.42	0.004	0.31	0

Notes: 1.) Calculations for the uncontrolled and controlled potential emissions must be provided as a separate attachment to this form. Please make sure to include all applicable calculations, spreadsheets, emission factors, manufacturers' data, field gas composition data, TANKS program inputs and outputs, and any other appropriate model input and outputs.

2.) For air emissions that are determined to be minimal or negligible, please provide a brief written statement or explanation justifying this designation.

CERTIFICATION OF ACCURACY AND COMPLETENESS

I hereby certify that, to the best of my knowledge, information and belief, formed after reasonable inquiry, the information provided in this facility registration form is true, accurate, and complete.

(Name, title, and signature of company representative)

Name James W. North
(Print or Type)

Title President ABC Oil and Gas Corporation Telephone 000-000-0000

Signature James W. North **Date** 11/19/07
(Original Signature Required)

Oil and Gas Well Facilities
Checklist for a Complete Registration

INDUSTRY		MDEQ
☒	**Company Name/Contact Information**	☒
☒	**Well/Facility Name**	☒
☒	**Legal Locations/Facility Information** (e.g., Lat., Long., Sec., Twns., and Range)	☒
☒	**Current Facility Production Rates** (Oil and gas production rates)	☒
☒	**Facility Process Description**	☒
☒	**Facility Plot Plan/Maps**	☒
☒	**List of Equipment Onsite**	☒
☒	**Facility Equipment Emission Calculations** (e.g., heater treaters, tanks, and, engines, flares, fugitive leaks etc.)	☒
☒	**All Pertinent Dates** (e.g., well completion and control installation dates etc.)	☒
☒	**Gas Stream Composition Analyses** (including H_2S)	☒
☒	**Crude Oil Composition Analyses** (Note: sample must be taken from the upstream side of the storage tank)	☒
☒	**Emission Models (Inputs/Outputs)**	☒
☒	**Other Calculations**	☒
☒	**Signed Facility Registration Form**	☒

Note:
In order for the Air Quality Registration Section to adequately review the application, make sure to include all applicable calculations, spreadsheets, emission factors, manufacturers' data, field gas and/or crude oil composition data, raw laboratory data, E & P TANKS simulation program inputs and outputs, and/or any other appropriate model input and outputs. Contact the Air Quality Registration Section if you have any questions.

Determining Crude Oil Storage Tank Emissions
General Background Information and Recommendations

In order to assist the applicant in estimating emissions from the crude oil storage tanks at the oil and gas production facility, the Department has provided the following.

Tank Emissions

Emission losses from storage tanks that store crude oil (or other process condensate) include flashing losses, working losses, and breathing losses. Flashing losses occur when the vapors are released from the crude oil (or other hydrocarbon liquid) in the storage tanks as it is transferred from a higher pressure vessel (separator) to a lower pressure vessel (storage tank). Working losses are those losses caused as the tank is filled and emptied while breathing losses occur from the daily changes in temperature and barometric pressure. Flashing losses are normally greater than the working and breathing vapor losses.

Emission Models/Calculations

A variety of simulation software and other empirical methods to estimate tank flashing losses, working losses, and breathing losses are available including, E&P TANK Version 2.0, Vasquez-Beggs correlation, and Tanks 4.0. In general, simulation models accepted by the Department use Peng-Robinson or S-R-K methods based on widely acknowledged principals of behavior for hydrocarbon vapors and liquids. The empirical Vasquez-Beggs correlation method can provide a rough estimate of tank vapors for certain conditions and crude oil type; however, this method appears to be more appropriate for heavier crudes when the analysis of the extended hydrocarbons may be difficult. If the facility emissions are close to any regulatory or emission control requirements, a more precise method should be used to more accurately estimate tank emissions.

The E&P TANK Model has been the most common model utilized by applicants to register oil and gas production facilities in Montana. The E&P TANK Model has been previously identified as a preferred method for estimating emissions by the Environmental Protection Agency (EPA) and has been confirmed through comparisons with other models and actual field data. While a variety of approaches and modes of operation are available to the software user, the RVP Distillation Column Method with low-pressure oil data is the preferred option and provides the most accurate operation of the model according to the E&P TANK Model Users Manual.

Site Data

In order to obtain accurate emission estimates from the use of any simulation model, site-specific and process-specific information are recommended for inputs. The use of default values offered by the software should be reviewed and explained by the applicant. Default values or non site-specific data may not be acceptable when evaluating/reviewing facility emission control requirements, emission inventories, or deregistrations.

For the E&P TANK Model using the RVP Distillation Column Method with low-pressure oil data, a site-specific extended hydrocarbon analysis is required for the model inputs of the pressurized oil at the operating conditions of the separator. This oil sample should be collected at the outlet of the separator and upstream of the storage tanks. Other actual facility specific operating parameters needed for the model include the sales oil production rate; separator pressure and temperature; Reid Vapor Pressure (RVP) of the sales oil; and the API gravity of the sales oil.

Any other alternative methods for determining emissions will be reviewed by the Department on a case-by-case basis. Please contact the Air Quality Registration Section if you have any questions or need additional information.

(Note: When deregistering an oil and gas production facility, the facility's emissions (e.g., crude oil storage tanks) must be based on the well's maximum daily production rate. This daily production rate is the maximum capacity of the facility. The facility emissions must remain below 25 tons per year of any regulated air pollutant to stay deregistered.)