

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

**Permit Application Analysis
AP-16767**

July 10, 2015

NAME OF FIRM: Marathon Oil Company

NAME OF FACILITY: Gooseberry A Tank Battery

FACILITY LOCATION: SW¼ SW¼ Section 28, T47N, R100W
Latitude: 44.008569° Longitude: -108.871712°
Park County, Wyoming

TYPE OF OPERATION: Oil Production Battery

RESPONSIBLE OFFICIAL: Michelle Koch
HES Manager

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Cody, WY 82414

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REVIEWER: Christopher Sorensen, NSR Permit Engineer

1.0 PURPOSE OF APPLICATION

Marathon Oil Company submitted an application to modify the Gooseberry A Tank Battery with the addition of new equipment, update the existing equipment list to reflect the as-built configuration, increase the throughput of produced oil from 330 barrels of oil per day (BOPD) to 781 BOPD and produced water from 2,703 barrels of water per day (BWPD) to 19,871 BWPD, and reduce emissions by installing a smokeless flare with continuous pilot monitoring system for oil tank and produced water tank control.

2.0 PERMIT HISTORY

Air Quality Waiver wv-1P2 was issued December 16, 2004, for the operation of thirteen (13) associated wells and no controlled emission sources. Air Quality Waiver wv-8520 was issued November 1, 2008, to modify the Gooseberry A Tank Battery with the addition of four (4) new wells and the removal of two (2) wells. Under this waiver there are no controlled emission sources. Marathon Oil Company acquired the Gooseberry A Battery from Encore Operating, LP on May 1, 2014 and became the operator effective July 7, 2014.

This permit shall supersede wv-8520 for the Gooseberry A Tank Battery.

3.0 EQUIPMENT

Production equipment in operation:

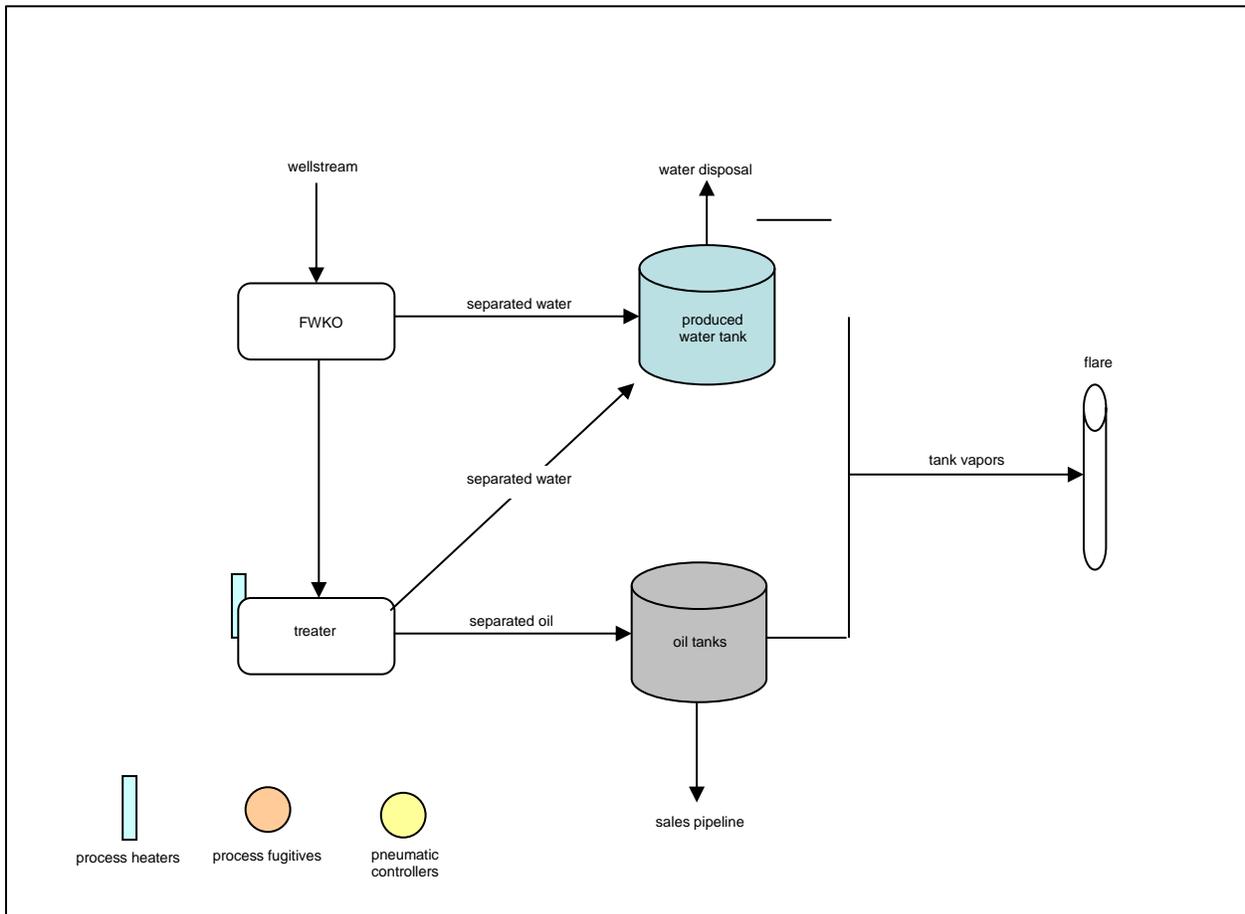
- One (1) 8-ft by 25-ft vertical tester w/ 1.25 million Btu per hour (MMBtu/hr) heater
- One (1) 10-ft by 50-ft vertical treater w/ 1.5 MMBtu/hr heater
- Five (5) 400-barrel (bbl) oil tanks
- One (1) 1,500-bbl skim tank
- Two (2) 500-bbl produced water tanks
- One (1) 400-bbl mobile workover tank

Proposed Equipment (AP-16767):

- One (1) 400-bbl mobile workover tank (in addition to the one (1) mobile workover tank on location)
- One (1) spare 400-bbl production tank (not connected)
- One (1) continuous flame pilot flare
- One (1) 10-ft by 30-ft Free Water Knock Out (FWKO)

4.0 PROCESS FLOW DIAGRAM

The following is a schematic representation of the production process at the facility. A complete process description is found in the permit application.



5.0 PROCESS DESCRIPTION

The Gooseberry A Tank Battery is engaged in the production/storage/sales of crude oil. Produced fluids are pumped to the surface from fifteen (15) wells in the Bighorn Basin in Park and Hot Springs Counties. Currently, an average of 330 BOPD and 2,703 BWPD are treated at the battery. Marathon based their application on an anticipated maximum production rate of 781 BOPD and 19,871 BWPD with at least 90% of the production emission controlled by flaring the oil tanks, and produced water tanks.

Produced fluids from the wells are piped to the battery and diverted between the heaters and FWKOs where gravity separates the free water from the incoming oil/water emulsion. The separated oil from the FWKOs is transferred to the treaters where heat is added to further break the oil/water emulsion. Oil from the treaters is sent to the oil storage tanks then later sold via pipeline. Water is sent to the water storage tanks for clarification prior to re-injection.

Gas vapors from the oil tanks and produced water tanks are to be routed to to a flare for at least 90% of the production throughputs for combustion at 98% destruction efficiency.

6.0 EMISSIONS

Regulated air emissions from the Gooseberry A Tank Battery include volatile organic compounds (VOC), hazardous air pollutants (HAP), hydrogen sulfide (H₂S), sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO).

NO_x and CO emissions are based on 0.14 lb NO_x/MMBtu and 0.035 lb CO/MMBtu and the calculated volume of vapors. SO₂ combustion emissions were calculated using metered volumes and measured H₂S concentrations of the various waste streams that are burned and the mass balance conversion of H₂S to SO₂.

NO_x and CO from the burners are calculated using the composition of the propane, reported heat values and the appropriate AP-42 emission factors for fuel boilers and heaters. Fugitive VOC, HAP and H₂S emissions from process equipment and components were calculated using a count of the various components and equipment leak factors listed in the Division's Chapter 6 Section 2 Oil and Gas Production Operations Permitting Guidance (C6 S2 Guidance).

7.0 CHAPTER 6, SECTION 4 – PREVENTION OF SIGNIFICANT DETERIORATION (PSD) APPLICABILITY

A major stationary source under Chapter 6, Section 4 of the Wyoming Air Quality Standards and Regulations is a named facility which emits, or has the potential to emit, 100 tons per year or more of any pollutant or any stationary source which emits or has the potential to emit 250 tons per year or more of any pollutant for which standards are established, except for GHGs. For greenhouse gases the facility must also emit as part of the proposed project, in addition to the mass emission rate, CO₂e of 75,000 tpy for a modified source or 75,000 tpy for new source subject to PSD for another pollutant. The Gooseberry A Tank Battery is not a named source under Chapter 6, Section 4; therefore, the 250 tpy threshold is applicable to this facility. Potential emissions for the facility are less than 250 tpy for non-GHG emissions. Therefore, the Gooseberry A Tank Battery is not subject to PSD review under Chapter 6, Section 4.

8.0 CHAPTER 6, SECTION 3 – MAJOR SOURCE APPLICABILITY (TITLE V)

The Gooseberry A Tank Battery is not a “major source” as defined by Chapter 6, Section 3 of the WAQSR. Emissions do not exceed the 100 tpy threshold of any non-GHG pollutant or 10 tpy of any individual HAP or 25 tpy of any combination of HAPs. Therefore, Marathon Oil Company shall obtain an operating permit in accordance with Chapter 6, Section 2 of the WAQSR.

9.0 CHAPTER 6, SECTION 2 – BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

For VOC and HAP emissions associated with the oil tanks, produced water tanks and heater treater flash gas, BACT requirements are met by flaring the vapors from the oil tanks and produced water tanks in smokeless flare with 98% destruction efficiency.

According to information presented in the application for this facility, no other emission sources warrant BACT review and the BACT requirements of Chapter 6, Section 2(k) (viii) of the Wyoming Air Quality Standards and Regulations are met.

10.0 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

The oil storage tanks at the Gooseberry A Tank Battery are not subject to 40 CFR part 60, subpart Kb as the tanks are operated prior to custody transfer.

40 CFR part 60, subpart OOOO - *Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution* applies to any new, modified or reconstructed emission source installed after August 23, 2011 at oil and gas production and gas processing facilities. The Gooseberry B Tank Battery is not subject to 40 CFR part 60, subpart OOOO as the facility was constructed prior to the effective date and has not been modified.

11.0 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)

The Gooseberry A Tank Battery is exempt from the requirements of 40 CFR 63, Subpart HH - National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities, because it is a facility that exclusively processes, stores, or transfers black oil and uses natural gas for fuel or generates gas from black oil. Black Oil is defined as hydrocarbon liquid with an initial producing gas-to-oil ratio (GOR) less than 0.31 cubic meters per liter and an API gravity less than 40°.

12.0 PROPOSED PERMIT CONDITIONS

The Division proposes to issue an air quality permit to Marathon Oil Company for the equipment modification of the Gooseberry A Tank Battery with the following permit conditions:

1. That authorized representatives of the Division of Air Quality shall be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution, and for determining compliance or non-compliance with any rules, regulations, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.
3. A permit to operate, in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR is required after a 120-day startup period, in order to operate this facility.
4. That all notifications, reports and correspondence required by this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 510 Meadowview Drive, Lander, WY 82520. Submissions may also be done electronically through <https://airimpact.wyo.gov> to satisfy requirements of this permit.
5. All records required under this permit shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.
6. Periodic training on the proper operation of equipment, systems and devices used to contain, control, eliminate or reduce pollution shall be provided to company personnel whose primary job is to regularly ensure that facility production equipment is functional. The training shall provide these personnel with the ability to recognize, correct and report all instances of malfunctioning equipment, systems and devices associated with air pollution control. These equipment, systems and devices include, but are not limited to combustion units, reboiler overheads condensers, hydrocarbons liquids storage tanks, drip tanks, vent lines, connectors, fittings, valves, relief valves, hatches and any other appurtenance employed to, or involved with, eliminating, reducing, containing or collecting vapors and transporting them to a pollution control system or device.
7. Trained personnel shall perform, at a minimum, a quarterly site evaluation of the operation of the air pollution control equipment, systems and devices under Condition 6. The first quarterly site evaluation shall be conducted within the second quarter after issuance of this permit.
8. An annual preventative maintenance program shall be instituted to inspect and replace equipment, systems and devices under Condition 6 as necessary to ensure their proper operation.
9. Results of all inspections, evaluations and periodic monitoring shall be documented and maintained for review by the Division upon request.
10. Vapors from all oil tanks and all active produced water tanks, including flashing and S/W/B losses, shall be routed to the smokeless flare to reduce the mass content of total HAP and VOC emissions in the tank vapors by at least ninety-eight percent (98%) by weight.
11. All produced gas from the battery, including gas evolved in the heater treaters, shall be routed to the smokeless flare to reduce the mass content of VOCs and HAPs in the produced gas vented to the device by at least ninety-eight percent (98%) by weight.
12. The presence of the flare pilot flame shall be monitored using a thermocouple and continuous recording device or any other equivalent device to detect and record the presence of the flame. Records shall be maintained noting periods during active well site operation when the pilot flame is not present. The records shall contain a description of the reason(s) for absence of the pilot flame and steps taken to return the pilot flame to proper operation.

13. The flare shall be designed, constructed, operated and maintained to be smokeless, per Chapter 3, Section 6(b)(i) of the WAQSR, with no visible emissions except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours as determined by 40 CFR, Part 60, Appendix A, Method 22.
14. Emission control devices and systems, including all vent lines, connections, fittings, valves, relief valves, hatches or any other appurtenance employed to contain and collect vapors and transport them to the emission control system or device, shall be maintained and operated during any time the facility is operational such that the emissions are controlled at all times. Records shall be maintained noting dates and durations of times during such operation when any emissions control system or device or the associated containment and collection equipment is not functioning to control emissions as required by this permit. The records shall contain a description of the reason(s) that the control system was not operating correctly and steps taken to return the control system to proper operation.
15. Effective upon permit issuance, this permit shall supersede Air Quality Waiver wv-8520 for the Gooseberry A Tank Battery.

WELLS PRODUCING TO GOOSEBERRY A TANK BATTERY

Facility	¼ ¼	Section	Township (N)	Range (W)	Latitude	Longitude	Startup
Gooseberry A 36-33G	NE SW	33	47N	100W	43.99541	-108.86866	1/11/1955
Gooseberry A 33-33G	NE NW	33	47N	100W	44.00198	-108.86837	2/14/1955
Gooseberry A T25X-33G	NW SW	33	47N	100W	43.99830	-108.87021	10/19/1991
Gooseberry A T45X-33G	SW SW	33	47N	100W	43.99705	-108.86440	9/5/1992
Gooseberry Fed A 27-33H	SW SW	33	47N	100W	43.99186	-108.86996	5/7/1997
Gooseberry A 8X-28P	SW SW	28	47N	100W	44.00762	-108.87321	4/4/1991
Gooseberry A T84-29P	SE NE	29	47N	100W	44.01459	-108.87668	6/9/1974
Gooseberry A T86-29P	NE SE	29	47N	100W	44.01125	-108.87690	4/3/1985
Gooseberry A 32-4 ¹	NW NW	4	46N	100W	43.98964	-108.86949	2/12/1997
Gooseberry A 22-33	NE NW	33	47N	100W	44.00099	-108.86904	3/1/1997
Gooseberry A 23-33	NW SW	33	47N	100W	43.99698	-108.87317	8/30/1997
Gooseberry A 84-29-2	SE NE	29	47N	100W	44.01448	-108.87565	5/1/2003
Gooseberry A 28-28	SW SW	28	47N	100W	44.00856	-108.87171	6/1/2003
Gooseberry A 4-28	NE NE	18	47N	100W	44.01743	-108.87767	11/4/2008
Gooseberry A 37-33	NW NW	33	47N	100W	44.00439	-108.87297	10/25/2008
Gooseberry A 17-28	SW SW	29	47N	100W	44.00764	-108.87498	10/17/1996

¹This well is in Hot Springs County. All others are in Park County

EQUIPMENT LIST

- One (1) 8-ft by 25-ft vertical treater w/ 1.25 million Btu per hour (MMBtu/hr) heater
- One (1) 10-ft by 50-ft vertical treater w/ 1.5 MMBtu/hr heater
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EMISSION SUMMARY

Gooseberry A Tank Battery						
781 BOPD 19,871 BWPD 65 MSCFD						
SOURCE	EMISSIONS ¹ (TPY)					
	VOC	HAP	NO _x	CO	H ₂ S	SO ₂
Current						
Oil and PW Storage Tanks	14.8	4.3			0.3	insig
Process Heaters			1.2	1.0		
Total Facility Emissions	14.8	4.3	1.2	1.0	0.3	insig
Modifications						
Flare (increased water tank throughput)	0.5	insig	--	--	1.4	2.7
Total Facility Emissions	15.3	4.3	1.2	1.0	1.7	2.7
Change in Emissions	+0.5	0	0	0	+1.4	+2.7

¹ Rounded to the nearest 0.1 ton