Division Information

Engineer:	Kirk Bear	
Control Engineer:	Chris Laplante	
Review Date:	10/23/2014	
Application Date:	11/19/2013	

Facility Identifiers

Permit No.		13WE1363	
AIRs	County #	123	Weld
	Facility #	9394	
Facility Type:		exploration and production facility	

☑ Located in the 8-hour non-attainment area?

○ True Minor

◉ Synthetic Minor for: ☑ VOC ☐ NOx ☐ CO

Administrative Information

Company Name:		Bonanza Creek Energy Operating Company LLC
Source Name:		North Platte Section 34
Source Location:		SESE, Section 27, T5N, R63W
SIC:		1311
Mailing Address	Address 1:	Bonanza Creek Energy Operating Company LLC
	Address 2:	410 17th Street, Suite 1500
	y, State Zip:	Denver, CO 80202
Person To Contact	Name:	Peg Young
	Phone:	720-440-6133
	Fax:	720-279-2331
	Email:	pyoung@bonanzacrk.com

Requested Action

Self Certification Required?	Yes
Issuance Number:	2

Source Description:

Oil and gas exploration and production facility known as the North Platte Section 34, located in the SESE, Section 27, T5N, R63W, Weld County, Colorado.

Point	Name	Type	Control	Action
008	PW Tanks	Water Tanks	Flare	Cancel GP05 Coverage
009	TL	Loadout	None	Change Permit Limit
010	FUG	Fugitives	None	Change Permit Limit
011	P-1	Pump	Flare	New Point
012	Sep-1 & Sep-2	Separator Venting	Flare	New Point
013	FL-1	Separator Venting	Flare	New Point

008 Two above ground 300 bbl tanks and two 600 bbl concrete vaults used for produced water storage. The 300 bbl tanks are controlled by an enclosed flare. The 60 bbl vaults are uncontrolled.

Emissions Calculations

Requsted Throughput	78840	bbl

Control	Flare
Efficiency	95.00%

Emissions Summary Table

Pollutant	Emission Factor		Uncontrolled Emissions		Controlled Emissions		Source
VOC	0.262	lb/bbl	10.3	tpy	0.5	tpy	CDPHE
Benzene	0.007	lb/bbl	552	lb/yr	28	lb/yr	CDPHE
n-Hexane	0.022	lb/bbl	1734	lb/yr	87	lb/yr	CDPHE

Regulatory Review

Section II.A.1 - Except as provided in paragraphs 2 through 6 below, no owner or operator of a source shall allow or cause the emission into the atmosphere of any air pollutant which is in excess of 20% opacity. This standard is based on 24 consecutive opacity readings taken at 15-second intervals for six minutes. The approved reference test method for visible emissions measurement is EPA Method 9 (40 CFR, Part 60, Appendix A (July, 1992)) in all subsections of Section II. A and B of this regulation.

Section II.A.5 - Smokeless Flare or Flares for the Combustion of Waste Gases No owner or operator of a smokeless flare or other flare for the combustion of waste gases shall allow or cause emissions into the atmosphere of any air pollutant which is in excess of 30% opacity for a period or periods aggregating more than six minutes in any sixty consecutive minutes.

Regulation 2 – Odor

Section I.A - No person, wherever located, shall cause or allow the emission of odorous air contaminants from any single source such as to result in detectable odors which are measured in excess of the following limits: For areas used predominantly for residential or commercial purposes it is a violation if odors are detected after the odorous air has been diluted with seven (7) or more volumes of odor free air.

009 **Truck Condensate Loadout**

Calculations

L = 12.46*S*P*M/T (AP-42: Chapter 5.2, Equation 1)

L = loading losses in lb per 1000 gallons loaded

Factor	Meaning	Value	Units	Source
S	Saturation Factor	0.6		AP-42
P	True Vapor Pressure	4.9	psia	Sales Oil Analysis
M	Molecular Weight of Vap	68	lb/lb-mole	AP-42
T	Liquid Temperature	524	deg. R	Field Data

L	4.75	lb/1000 gal
	0.20	lb/bbl

Annual requested Throughput	144540	bbl/yr
	6070680	gal/yr
Annual requested VOC emissions	28859	lb/yr
	14.43	tpy

Control: None

Efficiency: 0.00%

NCRPs

Component	Mass Fraction
Benzene	0.0125
n-hexane	0.0747
Toluene	0.0290
Xylenes	0.0243

Source: Condensate Analysis

Emissions Summary Table

Pollutant	Emission Factor		Uncontrolled Emissions	Controlled Emissions	Source
VOC	0.1997	lb/bbl	14.4 tpy	14.4 tpy	AP-42
Benzene	0.0025	lb/bbl	361 lb/yr	361 lb/yr	AP-42
n-Hexane	0.0149	lb/bbl	2156 lb/yr	2156 lb/yr	AP-42
Toluene	0.0058	lb/bbl	837 lb/yr	837 lb/yr	AP-42
Xylenes	0.0048	lb/bbl	701 lb/yr	701 lb/yr	AP-42

010 **Fugitive equipment leaks**

Regulation 7 Information

Operating Hours: 8760 hours/year

Emission Factor Source EPA-453/R-95-017 Table 2-4

Control Efficiency Source: None

Calculations

Service	Component Type	Count	Emission Factor (kg/hr-source) Table 2-4	Table 2-8	Control (%)	Pollutant	Mass Fraction	Emissions (tpy) Reg. 3
Gas	Connectors	1762	2.00E-04	1.00E-05	0.0%	VOC	0.2528	6.6161726
	Flanges	98	3.90E-04	5.70E-06	0.0%	Benzene	0.0003	0.0078515
	Open-Ended Lines	54	2.00E-03	1.50E-05	0.0%	Toluene	0.0002	0.0052343
	Pump Seals	8	2.40E-03	3.50E-04	0.0%	Ethylbenzene	0.0001	0.0026172
	Valves	246	4.50E-03	2.50E-05	0.0%	Xylenes	0.0001	0.0026172
	Other	124	8.80E-03	1.20E-04	0.0%	n-Hexane	0.0032	0.083749
Heavy Oil	Connectors	0	7.50E-06	7.50E-06	0.0%	VOC	0.3	0
	Flanges	0	3.90E-07	3.90E-07	0.0%	Benzene	0.001	0
	Open-Ended Lines	0	1.40E-04	7.20E-06	0.0%	Toluene	0.001	0
	Pump Seals	0	0.00E+00	0.00E+00	0.0%	Ethylbenzene	0.001	0
	Valves	0	8.40E-06	8.40E-06	0.0%	Xylenes	0.02	0
	Other	0	3.20E-05	3.20E-05	0.0%	n-Hexane	0.001	0
Light Oil	Connectors	676	2.10E-04	7.50E-06	0.0%	VOC	0.9964	4.6289838
	Flanges	16	1.10E-04	2.40E-06	0.0%	Benzene	0.0125	0.0580714
	Open-Ended Lines	6	1.40E-03	1.40E-05	0.0%	Toluene	0.029	0.1347255
	Pump Seals	0	1.30E-02	5.10E-04	0.0%	Ethylbenzene	0.004	0.0185828
	Valves	90	2.50E-03	1.90E-05	0.0%	Xylenes	0.0243	0.1128907
	Other	14	7.50E-03	1.10E-04	0.0%	n-Hexane	0.0747	0.3470344
Water/Oil	Connectors	534	1.10E-04	1.00E-05	0.0%	VOC	1	3.3247091
	Flanges	20	2.90E-06	2.90E-06	0.0%	Benzene	0.0012	0.0039897
	Open-Ended Lines	2	2.50E-04	3.50E-06	0.0%	Toluene	0.0003	0.0009974
	Pump Seals	2	2.40E-05	2.40E-05	0.0%	Ethylbenzene	0.0001	0.0003325
	Valves	58	9.80E-05	9.70E-06	0.0%	Xylenes	0.0001	0.0003325
	Other	20	1.40E-02	5.90E-05	0.0%	n-Hexane	0.0001	0.0003325

Emissions Summary Table

Pollutant	Uncontrolled Emissions		Controlled Emissions		Source
VOC	14.6	tpy	14.6	tpy	EPA-453/R-95-017 Table 2-4
Benzene	140	lb/yr	140	lb/yr	EPA-453/R-95-017 Table 2-4
Toluene	282	lb/yr	282	lb/yr	EPA-453/R-95-017 Table 2-4
Ethylbenzene	43	lb/yr	43	lb/yr	EPA-453/R-95-017 Table 2-4
Xylenes	232	lb/yr	232	lb/yr	EPA-453/R-95-017 Table 2-4
n-Hexane	862	lb/yr	862	lb/yr	EPA-453/R-95-017 Table 2-4

Regulatory Applicability

Reg. 3	Operator has agreed on the Division's standard conditions for RACT.

011 Two 600 scf/hr pneumatic pump used for water transfer & heat trace

Pump Information

Pump Information	Manufactur	Sandpiper	
	Model Number:	G1F	
	Serial Number:	1902031 & 1981471	
	Pump capacity	18.2	gallons per minute pumped
	natural gas consumptio	1200	scf/hour used
Control	Flare	95.00%	Efficiency

Calculations

EPA Emission Inventory Improvement Program Publication: Volume II, Chapter 10 - Displacement Equation (10.4-3)

Ex = Q * MW * Xx / C

Ex = emissions of pollutant x
Q = Volumetric flow rate/volume of gas processed
MW = Molecular weight of gas = SG of gas * MW of air
Xx = mass fraction of x in gas
C = molar volume of ideal gas (379 scf/lb-mol) at 60F and 1 atm

Q	1200	scf/hr
MW	22.6	lb/lb-mol
Hours of Op.	8760	hours/yr

Requested Throughput 10.512 MMscf/yr

Component	mole %	MW	mass fraction	Component	lb/hr	lb/yr	tpy
CO2	2.11	44	0.0411	CO2	2.940	25750.240	12.875
nitrogen	0.49	28	0.0061	nitrogen	0.434	3805.399	1.903
methane	70.35108	16.04	0.4993	methane	35.729	312983.379	156.492
ethane	14.366	30.07	0.1911	ethane	13.678	119816.170	59.908
propane	8.0658	44.09	0.1574	propane	11.260	98635.600	49.318
isobutane	0.8441	58.12	0.0217	isobutane	1.553	13607.102	6.804
n-butane	2.353	58.12	0.0605	n-butane	4.330	37930.946	18.965
isopentane	0.4248	72.15	0.0136	isopentane	0.970	8500.941	4.250
n-pentane	0.5301	72.15	0.0169	n-pentane	1.211	10608.165	5.304
cyclopentane	0.0325	70.15	0.0010	cyclopentane	0.072	632.349	0.316
n-hexane	0.104	86.18	0.0040	n-hexane	0.284	2485.913	1.243
cyclohexane	0.0232	84.18	0.0009	cyclohexane	0.062	541.680	0.271
Other hexanes	0.1694	86.18	0.0065	Other hexanes	0.462	4049.170	2.025
heptanes	0.0642	100.21	0.0028	heptanes	0.204	1784.400	0.892
methylcyclohexa	0.0147	98.19	0.0006	methylcyclohe	0.046	400.342	0.200
224-TMP	0.0001	114.22	0.0000	224-TMP	0.000	3.168	0.002
Benzene	0.0074	78.11	0.0003	Benzene	0.018	160.319	0.080
Toluene	0.0027	92.14	0.0001	Toluene	0.008	69.001	0.035
Ethylbenzene	0.0002	106.17	0.0000	Ethylbenzene	0.001	5.889	0.003
Xylenes	0.001	106.17	0.0000	Xylenes	0.003	29.447	0.015
C8+ Heavies	0.0231	-2335.3467	-0.0239	C8+ Heavies	-1.708	-14962.683	-7.481
		Mass Fraction VOC:	0.2624			Total VOC	82.241

Heating Value	1313	BTU/scf	
Combustion emission factor source:			AP-42: Chapter 13.5
0.07	lb NOX/MMBtu	0.37	lb CO/MMBtu

Notes

Emissions Summary Table

Pollutant	Uncontrolled Emission Fac		Controlled Emission Factor		Uncontrolled Emissions		Controlled Emissions		Source
VOC	15647.05	lb/MMscf	782.35	lb/MMscf	82.2	tpy	4.1	tpy	Gas Analysis
Nox	0.07	lb/MMBTU	0.07	lb/MMBTU	0.5	tpy	0.5	tpy	AP-42
CO	0.37	lb/MMBTU	0.37	lb/MMBTU	2.6	tpy	2.6	tpy	AP-42
Benzene	15.25	lb/MMscf	0.76	lb/MMscf	160	lb/yr	8	lb/yr	Gas Analysis
n-Hexane	236.48	lb/MMscf	11.82	lb/MMscf	2486	lb/yr	124	lb/yr	Gas Analysis
Toluene	6.56	lb/MMscf	0.33	lb/MMscf	69	lb/yr	3	lb/yr	Gas Analysis
Xylenes	2.80	lb/MMscf	0.14	lb/MMscf	29	lb/yr	1	lb/yr	Gas Analysis
Ethylbenzene	0.56	lb/MMscf	0.03	lb/MMscf	6	lb/yr	0	lb/yr	Gas Analysis

012	Two separators controlled by 4 enclosed flares. Flares have a minimum combustion efficiency of 95%. The flares are enclosed.

Equipment Description

This source vents natural gas from: a well head separator
Emissions from this source are: routed to a flare

Natural gas venting from a well head separator. Emissions from this source are routed to a flare.

Calculations

Emission Calculation Method

EPA Emission Inventory Improvement Program Publication: Volume II, Chapter 10 - Displacement Equation (10.4-3)

Ex = Q * MW * Xx / C

Ex = emissions of pollutant x
Q = Volumetric flow rate/volume of gas processed
MW = Molecular weight of gas = SG of gas * MW of air
Xx = mass fraction of x in gas
C = molar volume of ideal gas (379 scf/lb-mol) at 60F and 1 atm

Throughput (Q)	12.1	MMscf/yr	1381.278539	scf/hr
MW	32.8	lb/lb-mol	0.033150685	MMscf/d

	mole %	MW	lbx/lbmol	mass fraction	lb/hr	lb/yr	tpy
Helium	0.00	4.0026	0.000	0.000	0.00	0.00	0.00
CO2	2.69	44.01	1.184	0.036	4.31	37796.35	18.90
N2	0.19	28.013	0.053	0.002	0.19	1699.26	0.85
methane	38.05	16.041	6.103	0.186	22.24	194850.46	97.43
ethane	24.48	30.063	7.360	0.224	26.83	234991.41	117.50
propane	20.89	44.092	9.210	0.281	33.57	294053.05	147.03
isobutane	2.32	58.118	1.350	0.041	4.92	43097.29	21.55
n-butane	6.83	58.118	3.968	0.121	14.46	126673.78	63.34
isopentane	1.25	72.114	0.899	0.027	3.28	28716.84	14.36
n-pentane	1.60	72.114	1.152	0.035	4.20	36779.57	18.39
cyclopentane	0.11	70.13	0.077	0.002	0.28	2465.12	1.23
n-Hexane	0.33	86.18	0.288	0.009	1.05	9197.91	4.60
cyclohexane	0.09	84.16	0.075	0.002	0.27	2396.72	1.20
Other hexanes	0.54	86.18	0.469	0.014	1.71	14978.58	7.49
heptanes	0.26	100.21	0.265	0.008	0.96	8452.59	4.23
methylcyclohexane	0.07	98.19	0.069	0.002	0.25	2188.11	1.09
224-TMP	0.00	114.23	0.000	0.000	0.00	7.29	0.00
Benzene	0.06	78.12	0.048	0.001	0.17	1518.89	0.76
Toluene	0.04	92.15	0.038	0.001	0.14	1223.87	0.61
Ethylbenzene	0.00	106.17	0.004	0.000	0.01	128.80	0.06
Xylenes	0.01	106.17	0.014	0.000	0.05	437.26	0.22
C8+ Heavies	0.15	137.4837288	0.210	0.006	0.77	6720.05	3.36
			VOC mass fract	0.553	Total VOC (Uncontrolled)		289.52

Flaring Information

Equipment Description

Flare to combust produced gas until pipeline is available at this wellhead facility.

Manufacturer	Cimmaron and Leed	
Model	48" HVECD and L30-0010	
Serial Number	59011404, 20057, 20053, 21308	
Gas Heating Value	1871	Btu/scf
Throughput	22639.1	MMBtu/yr

VRU Information

Equipment Description

Engine to recompress gas to sales line.

Make	GasJack
Model	GJ230
Requested Control	100.00%
Annual Bypass Tim	50.00%
Backup	Flare

Overall Control	95.00%

Combustion emission factor source:		AP-42: Chapter 13.5	
0.07	lb NOX/MMBtu	0.37	lb CO/MMBtu

Emissions Summary Table

Pollutant	Uncontrolled Emission Factor		Controlled Emission Factor		Uncontrolled Emissions		Controlled Emissions		Source
VOC	47854.19	lb/MMscf	2392.71	lb/MMscf	289.5	tpy	14.5	tpy	Gas Analysis
Nox	0.07	lb/MMBTU	0.07	lb/MMBTU	0.8	tpy	0.8	tpy	AP-42
CO	0.37	lb/MMBTU	0.37	lb/MMBTU	4.2	tpy	4.2	tpy	AP-42
Benzene	125.53	lb/MMscf	6.28	lb/MMscf	1519	lb/yr	76	lb/yr	Gas Analysis
n-Hexane	760.16	lb/MMscf	38.01	lb/MMscf	9198	lb/yr	460	lb/yr	Gas Analysis
Toluene	101.15	lb/MMscf	5.06	lb/MMscf	1224	lb/yr	61	lb/yr	Gas Analysis
Xylenes	36.14	lb/MMscf	1.81	lb/MMscf	437	lb/yr	22	lb/yr	Gas Analysis
Ethylbenzene	10.65	lb/MMscf	0.53	lb/MMscf	129	lb/yr	6	lb/yr	Gas Analysis

Regulatory Applicability

AQCC Regulation 1

This source is subject to the opacity requirements for flares in Section II.A.5:'No owner or operator of a smokeless flare or other flare for the combustion of waste gases shall allow or cause emissions into the atmosphere of any air pollutant which is in excess of 30% opacity.'

AQCC Regulation 2

Section I.A applies to all emission sources. "No person, wherever located, shall cause or allow the emission of odorous air contaminants from any single source such as to result in detectable odors which are measured in excess of the following limits: For areas used predominantly for residential or commercial purposes it is a violation if odors are detected after the odorous air has been diluted with seven (7) or more volumes of odor free air."

013 Flare stack. Flare has a minimum combustion efficiency of 95%. The flare is not enclosed.

Equipment Description

This source vents natural gas from:

Emissions from this source are: routed to a flare

Calculations

Emission Calculation Method

EPA Emission Inventory Improvement Program Publication: Volume II, Chapter 10 - Displacement Equation (10.4-3)

Ex = Q * MW * Xx / C

Ex = emissions of pollutant x
Q = Volumetric flow rate/volume of gas processed
MW = Molecular weight of gas = SG of gas * MW of air
Xx = mass fraction of x in gas
C = molar volume of ideal gas (379 scf/lb-mol) at 60F and 1 atm

Throughput (Q)	5.8	MMscf/yr	662.1004566	scf/hr
MW	22.2	lb/lb-mol	0.015890411	MMscf/d

	mole %	MW	lbx/lbmol	mass fraction	lb/hr	lb/yr	tpy
Helium	0.01	4.0026	0.000	0.000	0.00	6.13	0.00
CO2	2.11	44.01	0.929	0.042	1.62	14210.93	7.11
N2	0.49	28.013	0.137	0.006	0.24	2100.61	1.05
methane	70.35	16.041	11.285	0.508	19.71	172699.46	86.35
ethane	14.37	30.063	4.319	0.195	7.54	66093.23	33.05
propane	8.07	44.092	3.556	0.160	6.21	54424.70	27.21
isobutane	0.84	58.118	0.491	0.022	0.86	7507.47	3.75
n-butane	2.35	58.118	1.368	0.062	2.39	20927.69	10.46
isopentane	0.42	72.114	0.306	0.014	0.54	4688.06	2.34
n-pentane	0.53	72.114	0.382	0.017	0.67	5850.14	2.93
cyclopentane	0.03	70.13	0.023	0.001	0.04	348.80	0.17
n-Hexane	0.10	86.18	0.090	0.004	0.16	1371.60	0.69
cyclohexane	0.02	84.16	0.020	0.001	0.03	298.80	0.15
Other hexanes	0.17	86.18	0.146	0.007	0.26	2234.13	1.12
heptanes	0.06	100.21	0.064	0.003	0.11	984.54	0.49
methylcyclohexane	0.01	98.19	0.014	0.001	0.03	220.89	0.11
224-TMP	0.00	114.23	0.000	0.000	0.00	1.75	0.00
Benzene	0.01	78.12	0.006	0.000	0.01	88.47	0.04
Toluene	0.00	92.15	0.002	0.000	0.00	38.08	0.02
Ethylbenzene	0.00	106.17	0.000	0.000	0.00	3.25	0.00
Xylenes	0.00	106.17	0.001	0.000	0.00	16.25	0.01
C8+ Heavies	0.02	137.4837288	0.032	0.001	0.06	486.02	0.24
			VOC mass fract	0.293	Total VOC (Uncontrolled)		49.75

Notes

Mole %, MW, and mass fractions from Critter Creek 2-03H gas analysis.
Emissions are based on 8760 hours of operation per year.
I calculated the average MW of C8+ based on the average MW on the analysis for the gas.

Flaring Information

Equipment Description

Flare to combust produced gas until pipeline is available at this wellhead facility.

Manufacturer		
Model		
Serial Number		
Gas Heating Value	1292	Btu/scf
Throughput	7493.6	MMBtu/yr

VRU Information

Equipment Description

Engine to recompress gas to sales line.

Make	
Model	
Requested Control	100.00%
Annual Bypass Tim	50.00%
Backup	Flare

Overall Control	95.00%

Combustion emission factor source:		AP-42: Chapter 13.5	
0.07	lb NOX/MMBtu	0.37	lb CO/MMBtu

Emissions Summary Table

Pollutant	Uncontrolled Emission Factor		Controlled Emission Factor		Uncontrolled Emissions		Controlled Emissions		Source
VOC	17153.56	lb/MMscf	857.68	lb/MMscf	49.7	tpy	2.5	tpy	Gas Analysis
Nox	0.07	lb/MMBTU	0.07	lb/MMBTU	0.3	tpy	0.3	tpy	AP-42
CO	0.37	lb/MMBTU	0.37	lb/MMBTU	1.4	tpy	1.4	tpy	AP-42
Benzene	15.25	lb/MMscf	0.76	lb/MMscf	88	lb/yr	4	lb/yr	Gas Analysis
n-Hexane	236.48	lb/MMscf	11.82	lb/MMscf	1372	lb/yr	69	lb/yr	Gas Analysis
Toluene	6.56	lb/MMscf	0.33	lb/MMscf	38	lb/yr	2	lb/yr	Gas Analysis
Xylenes	2.80	lb/MMscf	0.14	lb/MMscf	16	lb/yr	1	lb/yr	Gas Analysis
Ethylbenzene	0.56	lb/MMscf	0.03	lb/MMscf	3	lb/yr	0	lb/yr	Gas Analysis

Regulatory Applicability

AQCC Regulation 1

This source is subject to the opacity requirements for flares in Section II.A.5:'No owner or operator of a smokeless flare or other flare for the combustion of waste gases shall allow or cause emissions into the atmosphere of any air pollutant which is in excess of 30% opacity.'

AQCC Regulation 2

Section I.A applies to all emission sources. "No person, wherever located, shall cause or allow the emission of odorous air contaminants from any single source such as to result in detectable odors which are measured in excess of the following limits: For areas used predominantly for residential or commercial purposes it is a violation if odors are detected after the odorous air has been diluted with seven (7) or more volumes of odor free air."