TotalEnergies E&P Barnett USA
Barnett Sites
Impact Analysis

Air Quality Permit by Rule for Oil and Gas Handling and Production Facilities: TAC 106.352 (g)(3) Emission Limitations. Total maximum estimated registered or certified emissions shall meet the most stringent of the following. All emissions estimates must be based on representative worst-case operations and planned MSS activities.

Air Contaminant	Steady State (lb/hr)			<30 psig periodic releases lb/hr			≥ 30 psig periodic lb/hr up to 150 hr/yr[c]			Total tpy		
	Emission Limit	Facility Emissions	Exceed?	Emission Limit	Facility Emissions	Exceed?	Emission Limit	Facility Emissions	Exceed?	Emission Limit	Facility Emissions	Exceed?
Total VOC										15	10.30	No
Total crude oil or condensate VOC[a]	100	0.35	No	145	0.38	No	318		No			
Total natural gas VOC[b]	204	1.88	No	750	--	No	1500	44.24	No			
Benzene	1.95	0.03	No	7	0.06	No	15.4	0.02	No	2.8	0.11	No
Hydrogen Sulfide	4.7	1.33E-05	No	5.1	1.29E-03	No	9.8	5.11E-04	No	20.6	<0.01	No
Sulfur Dioxide	47	<0.01	No	93.2	<0.01	No				25	0.01	No
Nitrogen Oxides	43.2	0.95	No							100	4.15	No
Carbon Monoxide	45	3.79	No							100	16.61	No
PM_{10} and $PM_{2.5}$	10	0.27	No							5	1.20	No

[a] Steady State and <30 psig periodic crude oil/condensate VOC sources include TANKS-PW, TLH2O, MISC-1

[b] Steady State and <30 psig periodic crude natural gas VOC sources include FUG

[c] ≥ 30 psig periodic natural gas sources include MSS-BD, PAINT-1

(k)(3) Emission Limits Based on Impact Evaluation:

What is the distance to the closest receptor in miles?

0.057 Further ESL review is required

What is the distance to the closest property line in miles?

0.008 Further ambient air quality review is required

Air Contaminant	De Minimis Emission Limits	Project Total Emission Rates	Exceed?	
	lb/hr	lb/hr		
Benzene	0.039	0.09	Yes	Additional analysis or demonstration of this contaminant is required
Hydrogen Sulfide	0.025	<0.01	No	No further analysis or demonstration is required
Sulfur Dioxide	2	<0.01	No	No further analysis or demonstration is required
Nitrogen Oxides	4	0.95	No	No further analysis or demonstration is required

TotalEnergies E&P Barnett USA
Barnett Sites
Benzene Impact Analysis

Full Impacts Review

A full impacts review must be done for all of the following as applicable:

- **Benzene Hourly Steady State**
- **Benzene Hourly Low Pressure Periodic**
- **Benzene Hourly High Pressure Periodic**
- **Benzene Annual**

The maximum acceptable emission rate can be found on an hourly steady state basis, hourly periodic (low pressure) basis, hourly periodic (high pressure) basis, and annual basis, which can be expressed as $E_{max,hourly,steadystate}$, $E_{max,hourly,periodic(low\ pressure)}$, $E_{max,hourly,periodic(high\ pressure)}$, and $E_{max,annual,\ respectively}$.

The equations for Emax,hourly and Emax,annual are:

$$E_{max,hourly} = (WR_{EPN1}) * \left(\frac{P \text{ or } ESL}{G_{hourly,EPN1}}\right) + \cdots + (WR_{EPNx}) * \left(\frac{P \text{ or } ESL}{G_{hourly,EPNx}}\right)$$

$$E_{max,annual} = \left(\frac{8,760}{2,000}\right) * (WR_{EPN1}) * \left(\frac{P \text{ or } ESL}{0.08 * G_{hourly,EPN1}}\right) + \cdots + \left(\frac{8,760}{2,000}\right) * (WR_{EPNx}) * \left(\frac{P \text{ or } ESL}{0.08 * G_{hourly,EPNx}}\right)$$

The emissions must include all emissions in the impacts scope, which are contained in the Impacts Scope Emissions Totals box on the Impacts Scope Tab.

Impacts review is passed when the total estimated emission rate is less than the calculated maximum acceptable emission rate $E_{estimated,total} \leq E_{max,total}$.

The shortest distance from any emitting source to the nearest receptor can be used for each emitting source or the actual distance from the source to the nearest receptor.

The appropriate G factor can be found on the impact chart tabs based on the distance from the emission point to the nearest receptor, the height of the emission release point, and the type of emission point.

To change the number of rows in the charts below, click on the button to the right of the chart that says "Set Row Count" and it will ask how many rows you need. You can press the button more than once to add or delete more rows; the rows will be added or deleted starting at the bottom.

Benzene Short Term ESL ($\mu g/m^3$):	170
Benzene Long Term ESL ($\mu g/m^3$):	4.5

Benzene Hourly Steady State - Impact Review

EPN	Source Name	Which impacts table corresponds to this EPN?	Steady state hourly estimated emissions for each EPN (lbs/hr)	WR_{EPNx}	$ESL_{benzene,\ short\ term}$ ($\mu g/m^3$)	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPNx}	$E_{max,EPNx,\ hourly,steadystate}$ (lb/hr)
FUG	Fugitive Emissions	Fugitive	3.412E-05	0.0013646	170	50	3	4375	5.3025E-05
ENG-1	Caterpillar G3406NA	Eng. ≤ 250 hp	0.00	0.1117772	170	50	20	58	0.32762271
ENG-2	Caterpillar G3406NA	Eng. ≤ 250 hp	0.00	0.1117772	170	50	20	58	0.32762271
ENG-3	Caterpillar G3406NA	Eng. ≤ 250 hp	0.00	0.1117772	170	50	20	58	0.32762271
ENG-4	Caterpillar G3406NA	Eng. ≤ 250 hp	0.00	0.1117772	170	50	20	58	0.32762271
TANKS-PW	Water Storage Tank	Tank Hatch	0.0137912	0.5515268	170	50	20	305	0.30740836
			$E_{estimated,total,hourly,steadystate}$ (lb/hr)	Total		Passed			$E_{max,total,hourly,steadystate}$ (lb/hr)
			0.0250056	1					1.6179522

Benzene Hourly Low Pressure Periodic - Impact Review

EPN	Source Name	Which impacts table corresponds to this EPN?	Periodic (low P) hourly estimated emissions for each EPN (lbs/hr)	WR_{EPNx}	$ESL_{benzene,\ short\ term}$ ($\mu g/m^3$)	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPNx}	$E_{max,EPNx,\ hourly,periodic(low\ pressure)}$ (lb/hr)
TLH2O	Produced Water Loading	Loading	0.0460743	1	170	50	10	1232	0.13798701

$E_{estimated,total,hourly,periodic\ (low\ pressure)}$ (lb/hr)	Total		$E_{max,total,hourly,periodic(low\ pressure)}$ (lb/hr)
0.0460743	1	Passed	0.13798701

Benzene Hourly High Pressure Periodic - Impact Review

EPN	Source Name	Which impacts table corresponds to this EPN?	Periodic (high P) hourly estimated emissions for each EPN (lbs/hr)	WR_{EPNx}	$ESL_{benzene,\ short\ term}$ ($\mu g/m^3$)	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPNx}	$E_{max,EPNx,\ hourly,periodic(high\ pressure)}$ (lb/hr)
MSS-BD	MSS Blowdowns	High P. Blowd./Purg./Pig.	0.0178675	1	170	50	6	51	3.33333333

$E_{estimated,total,hourly,periodic\ (high\ pressure)}$ (lb/hr)	Total		$E_{max,total,hourly,periodic(high\ pressure)}$ (lb/hr)
0.0178675	1	Passed	3.33333333

Benzene Annual - Impact Review

EPN	Source Name	What amount of time is this source is emitting? (hrs/yr)	Which impacts table corresponds to this EPN?	Annual estimated emissions for each EPN (tons/yr)	WR_{EPNx}	$ESL_{benzene,\ long\ term}$ ($\mu g/m^3$)	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPNx}	$E_{max,EPNx,\ annual}$ (tons/yr)
FUG	Fugitive Emissions	8760	Fugitive	0.0001495	0.001368	4.5	50	3	4375	7.70405E-05
ENG-1	Caterpillar G3406NA	8760	Eng. ≤ 250 hp	0.0122423	0.112059	4.5	50	20	58	0.476009111
ENG-2	Caterpillar G3406NA	8760	Eng. ≤ 250 hp	0.0122423	0.112059	4.5	50	20	58	0.476009111
ENG-3	Caterpillar G3406NA	8760	Eng. ≤ 250 hp	0.0122423	0.112059	4.5	50	20	58	0.476009111
ENG-4	Caterpillar G3406NA	8760	Eng. ≤ 250 hp	0.0122423	0.112059	4.5	50	20	58	0.476009111
TANKS-PW	Water Storage Tank	8760	Tank Hatch	0.0435197	0.3983533	4.5	50	20	305	0.321784539
TLH2O	Produced Water Loading	1013.9	Loading	0.0163655	0.1497999	4.5	50	10	1232	0.003467238
MSS-BD	MSS Blowdowns	44	High P. Blowd./Purg./Pig.	0.000245	0.0022429	4.5	50	6	51	5.44244E-05

$E_{estimated,total,annual}$ (tons/yr)	Total			$E_{max,total,\ annual}$ (tons/yr)
0.109249	1	Passed		2.229419686