

University Lands 2014 O&G Methane Emissions, Potential Reductions, and Mitigation Costs for the Production and Gathering & Boosting Segments

O&G Emissions Source	Total - UL (MT CH4)	% UL Emissions	Mitigation	Reduction %	Applicability %	Total Reductions (MT CH4)	Cost/Mcf	Total Cost
O&G Leaks	3,674	6%	Quarterly LDAR	80%	100%	2,939	(\$3.99)	(\$608,890)
Liquids Unloading - No PL	254	0.4%	None	95%	30%	72	(\$0.05)	(\$188)
Liquids Unloading - PL ^[1]	7	0.0%	None	--	--	--	--	--
Flaring ^[2]	342	0.6%	None	--	--	--	--	--
Venting	879	2%	Flares	95%	70%	584	\$1.86	\$56,424
Uncontrolled Condensate Tanks	40	0.1%	VRU	95%	25%	9	(\$0.51)	(\$249)
Controlled Condensate Tanks ^[1]	0	0.0%	None	--	--	--	--	--
Uncontrolled Oil Tanks	7,540	13%	VRU	95%	50%	3,582	(\$0.51)	(\$94,838)
Controlled Oil Tanks ^[1]	26	0.0%	None	--	--	--	--	--
Pneumatic Pumps	1,588	3%	Electric Pumps	100%	80%	1,270	(\$0.22)	(\$14,507)
Op. High-Bleed Pneumatics	462	0.8%	Low-Bleed	97%	90%	403	(\$3.08)	(\$64,444)
Op. Low-Bleed Pneumatics ^[1]	1,141	2%	None	--	--	--	--	--
Op. Intermittent-Bleed Pneumatics	1,083	2%	Low-Bleed	91%	90%	887	\$0.58	\$26,703
Mal. Continuous Pneumatics	9,909	17%	Quarterly LDAR	68%	100%	6,729	(\$3.99)	(\$1,393,912)
Mal. Intermittent Pneumatics	1,215	2%	Quarterly LDAR	68%	100%	825	(\$3.99)	(\$170,944)
Dehydrators	266	0.5%	Flare/Combust	95%	80%	202	\$1.86	\$19,532
Gathering Stations ^[3]	14,676	25%	Quarterly LDAR	80%	100%	4,579	(\$4.36)	(\$1,036,580)
			Compressor Seals	35%	80%	1,397	\$1.82	\$132,029
Gathering Pipelines ^[4]	657	1.1%	None	--	--	--	--	--
HF Completions & Workovers ^[1]	83	0.1%	None	--	--	--	--	--
No-HF Completions & Workovers ^[1]	2	0.0%	None	--	--	--	--	--
Compressor Exhaust ^[2]	1,736	3%	None	--	--	--	--	--
Compressor Blowdown & Starts	84	0.1%	None	--	--	--	--	--
Heater Combustion ^[2]	376	0.6%	None	--	--	--	--	--
Produced Water ^[4]	5,461	9%	None	--	--	--	--	--
Abnormal Process Conditions	6,607	11%	Quarterly LDAR	80%	80%	4,229	(\$3.99)	(\$876,018)
TOTAL (MT CH4)	58,107	100%	Various	48%	Various	27,707	(\$2.80)	(\$4,025,882)

Notes:

[1] Assumes there are no additional reductions for unloading with PL, controlled tanks, low-bleed devices, completions/workovers.

[2] Assumes no reductions for combustion emissions (flares, compressor exhaust, heater combustion)

[3] Assumes 39% gathering station emissions are fugitives and 34% are from compressor seals (remaining emissions are from exhaust and process venting).

[4] Did not assess mitigation for gathering pipelines or for produced water emissions.