

Supplemental Material

Aerial and ground-based optical gas imaging survey of Uinta Basin oil and gas wells

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Table S-1. Information about controlled propane releases conducted to determine detectable emission rates. (Page 2)

Table S-2. Information about each well pad at which emissions were detected in the aerial survey. Size is a qualitative determination made by the camera operator. (Page 3)

Table S-1. Information about controlled propane releases conducted to determine detectable emission rates.

Date	Emission rate (g s⁻¹)	Temperature (°C)	Wind Speed (m s⁻¹)	Snow cover	Height (m)	Plume in aerial video
26 Feb	1.89	5.7	0.7	~80%	50	Faint, consistent
28 Feb	5.04	7.2	1.2	Patchy, ~70%	75	Faint, inconsistent
1 Mar	3.49	5.5	1.1	Patchy, ~50%	75	Clear, consistent
1 Mar	3.21	5.4	1.3	Patchy, ~50%		Helicopter not present
1 Mar	2.14	5.1	1.1	Patchy, ~50%		Helicopter not present
1 Mar	1.52	5.1	1.1	Patchy, ~50%		Helicopter not present
1 Mar	0.80	5.1	1.1	Patchy, ~50%		Helicopter not present
1 Mar	0.24	5.1	1.1	Patchy, ~50%		Helicopter not present
1 Mar	0.14	5.1	1.1	Patchy, ~50%		Helicopter not present

Height indicates the approximate height above ground of the helicopter.

Table S-2. Information about each well pad at which emissions were detected in the aerial survey. Size is a qualitative determination made by the camera operator.

Com-pany	Pad Type	Tank controls	Aerial survey			Repairs made	Spring ground survey		
			# plumes	Size	Emission source		# plumes	Size	Emission source
E	Oil	Yes	1	S	Tank vent line	Closed manual valve	1	S	Malfunctioning combustor
E	Oil	Yes	1	S	Tank vent	Closed manual valve	2	L, M	Tank vents
B	Oil	Yes	1	S	Thief hatch	None	1	L	Thief hatch
B	Oil	Yes	1	M	Tank vent—maintenance rig on location	None	None		
B	Oil	Yes	1	L	Tank vent	Adjusted flare regulator pressure	1	L	Tank vent (pressure relief valve)
B	Oil	Yes	2		Tank vent and thief hatch	None	4	L, L, L, L	Tank vents and surface piping
B	Oil	Yes	1	L	Tank vent	Relit combustor flame	1	L	Tank vent (pressure relief valve)
B	Oil	Yes	1	L	Tank venting after workover before connection to sales line	None	1	L	Thief hatch
L	Oil	No	2	S, M	Thief hatches	No operator response	2	S	Tank vents
L	Oil	Yes	1		Thief hatch	No operator response	2	L	Uncertain
H	Gas	Yes	1		Thief hatch during liquids unloading	None	Not surveyed		
H	Gas	No	1		Thief hatch during liquids unloading	None	None		
F	Oil	No	1	S	Burner exhaust on separator	None	2	M, S	Tank vent (pressure relief valve), uncertain
J	Oil	Yes	1		Thief hatch	Latched thief hatch	1	M	Uncertain
K	Gas	No	1		Tank vent	Closed manual valve	1	S	Tank vent
K	Gas	No	2		Tank vents during liquids unloading	None	2	S, S	Tank vents