

APPENDIX A: PHASE 1 SUMMARY

Table A.1: Summary of available methane quantification technologies

Technology	Survey Type	Detection Level	Concentration Dimension	Minimum Detection Limit (MDL)	Precision	Applicability	Limitations	Technology Readiness Level (TRL)
Ultraviolet Doppler Optical Absorption Spectroscopy	Fixed Location	Facility	Point Concentration (0D)	0.5-1 ppm-m	95%	LDAR programs (standalone or in combination with screening technologies)	Rain, snow, fog, and/or clouds reduce measurement abilities due to strong attenuation in the UV-Vis region.	9
OGI/QOGI Camera	Handheld	Component	Single Channel (1D)	0.44 m3/day	50-80%	LDAR programs (standalone or in combination with screening technologies)	Require a temperature difference between the emission plume and the local background (0.5 degrees to detect the gas; 3.0 degrees to quantify the mass flow rate). Must be between 1.5-4.6 m from the plume. Operating temperatures between -20 to +50 degrees Celsius.	7+
Dual Frequency Comb Spectroscopy	Fixed Location	Facility	Single Channel (1D)	2.10 m3/day	within 0.222 kg/hr with absolute deviation of 27%	LDAR programs (standalone or in combination with screening technologies)	Precipitation reduces signal path.	4-7

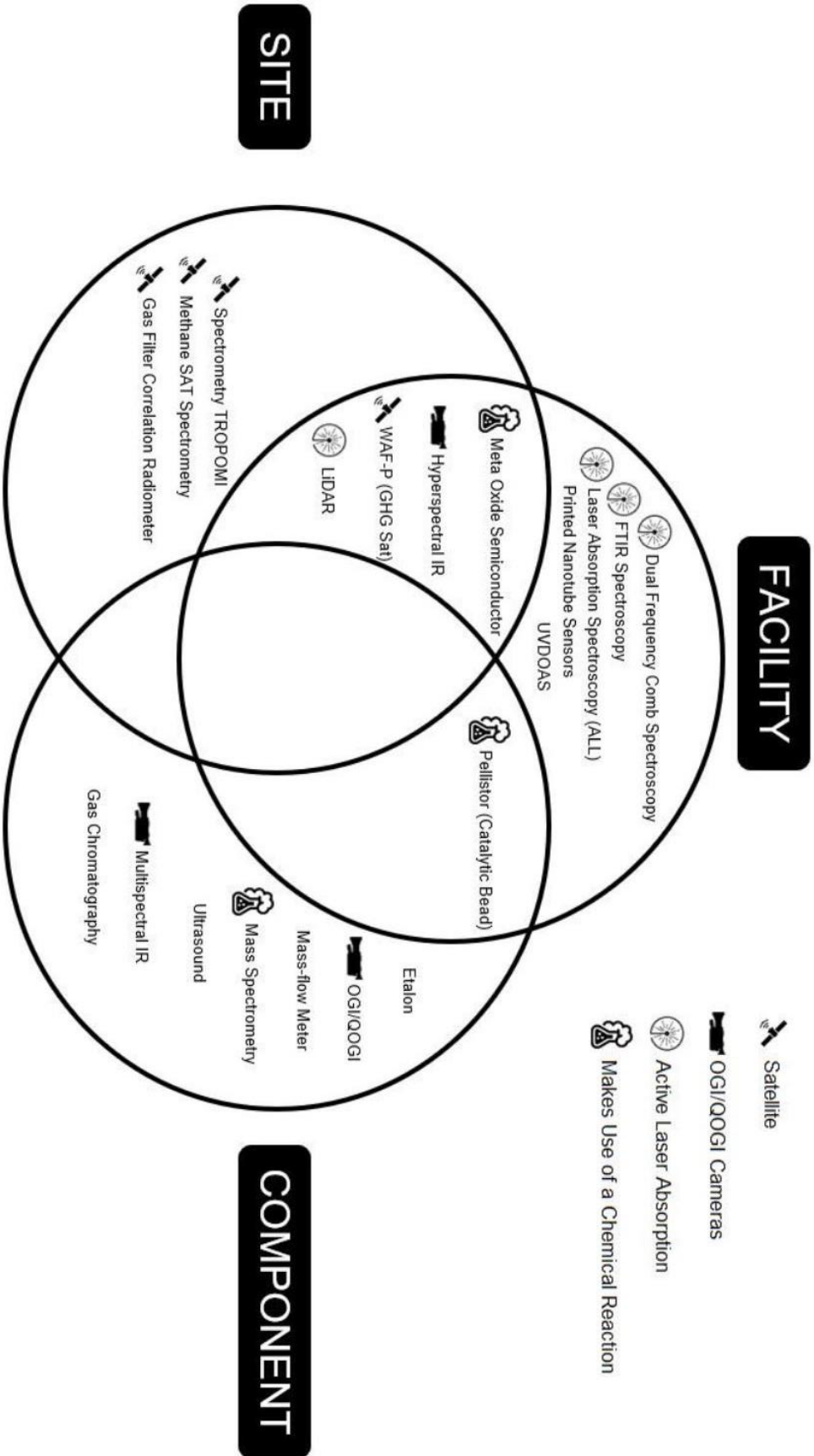
Airborne TDLAS (Bridger)	Aerial	Facility /Site	Imaging (2D)	29.22 m ³ /day at 1 m/s wind 73.06 m ³ /day at 3 m/s wind 21.92 m ³ /day under ideal conditions	68%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Standing water and snow absorb incident laser, leading to conservative emission estimates. Research is ongoing in developing a system that addresses this problem. Wind speed estimations limit accuracy of quantification (>3 m/s). A sufficient swath is required to meet the maximum efficiency of the technology. Drone applications are also less efficient than aircraft-mounted TDLAS.	9
Multispectral IR Camera	Handheld	Component	Imaging (2D)	13.211 m ³ /day	1 K from -15°C to 150°C	LDAR programs (standalone or in combination with screening technologies)	Most MS cameras have warm filters, which disallows measurements of gases at near ambient temperatures. (MS cameras with cold filters are being developed.)	9

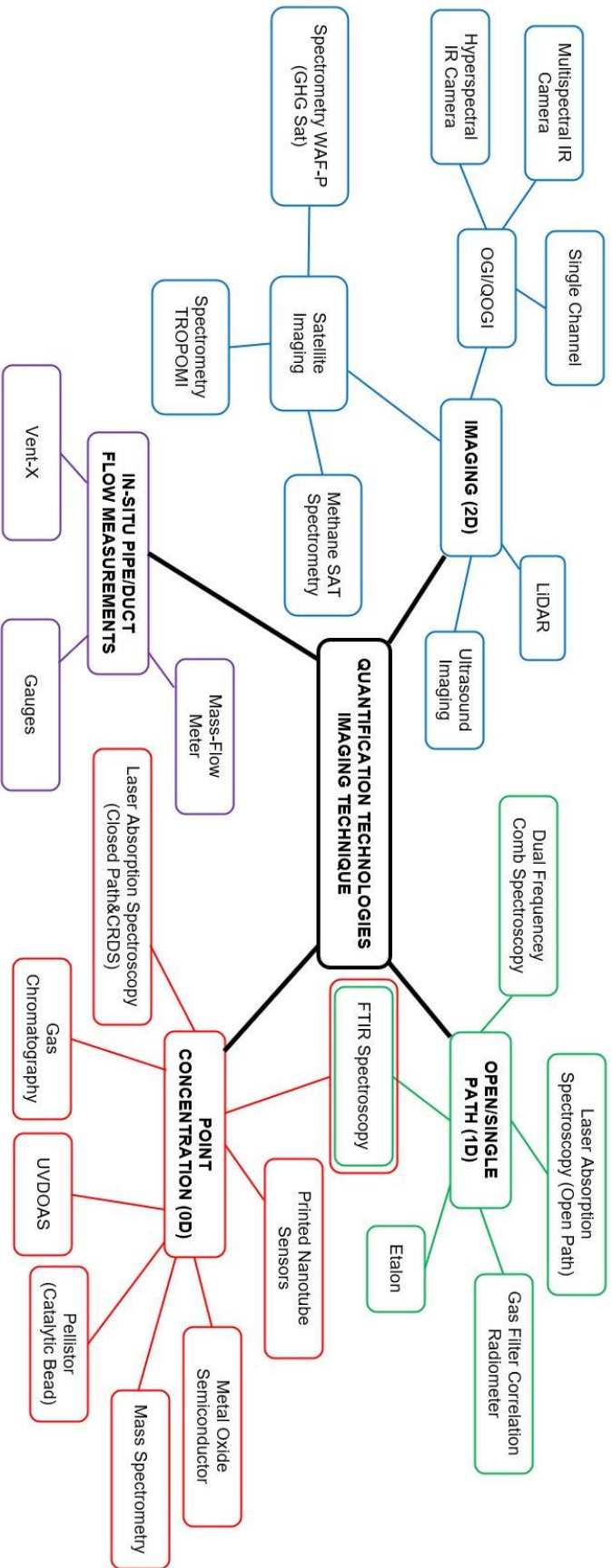
Spectrometry WAF-P (GHGSat)	Satellite	Facilities /Site	Imaging (2D)	36,529 m ³ /day in 3 m/s wind speeds	13-60%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Requires clear skies for observations; can revisit a site every 2 weeks.	7+
Hyperspectral IR Camera	Fixed Location	Component /Facility	Imaging (2D)	5.81 m ³ /day (3.4 m distance) 10.34 m ³ /day (5.9 m distance) at 4.5 m/s wind speed	up to 0.25 cm ⁻¹	LDAR programs (standalone or in combination with screening technologies)	Operating temperatures between -20 and +40 degrees celsius. Sensitive to high wind speeds. Measurement distance must be within 100 m of the sources.	7+
Spectrometry TROPOMI	Satellite	Site	Imaging (2D)	153,424 m ³ /day	0.60%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Limited by the visibility of the atmosphere (i.e., cloud coverage). Solar zenith can also limit the ability for detection.	7+
Gas Filter Correlation Radiometer	Aerial, Satellite	Site	Single Channel (1D)	Satellite: 547.95 m ³ /day	Developing; theoretically within 1 ppm	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Requires clear skies for observations. Measurements require a high solar zenith angle.	4/7

Pellistor (Catalytic Bead)	Handheld, Fixed Location,	Component /Facility	Point Concentration (0D)	500 ppm - 5%	100%	LDAR programs (standalone or in combination with screening technologies)	Sensitive to high humidity, large temperature differentials, and environmental contaminants.	9
FTIR Spectroscopy	Vehicle, Aerial, Fixed Location	Facility	Single Channel (1D)	11.4 ppb	63-73%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	The survey time required for measurements is inversely proportional to the spectral resolution (distance travelled by the mirror in the interferometer).	9
Ultrasound Imaging	Handheld, Fixed Location	Component	Single Channel (1D)	8.5 g/hr	90%	LDAR programs (standalone or in combination with screening technologies)	Requires pressure drop to detect emissions.	4/7
MethaneSAT Spectrometry	Satellite	Site	Imaging (2D)	2 ppb over 1.5 km ²	Satellite observations typically fall between <1-5% (not Methane SAT specific)	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Sensitive to low solar zenith and high wind speeds.	7+
Metal Oxide Semiconductor (MOS)	Handheld, Fixed Location	Facility /Site	Point Concentration (0D)	2-10 ppm	Within 0.36 ppm	Continuous monitoring of emissions on sites. LDAR Programs.	Sensitive to high humidity, large temperate differentials, and environmental contaminants. Exposure to large concentrations may de-sensitize the sensor irreversibly.	9

Mass-Flow Meter	Handheld, Fixed Location	Component	Point Concentration (0D)	1.4 standard liters per minute	Within 2%	LDAR programs (standalone or in combination with screening technologies)	No longer manufactured. Highly dependent on daily calibration procedures.	9
Laser Absorption Spectroscopy - Cavity Output	Fixed Location, Handheld UAVs, Vehicle	Facility	Point Concentration (0D)	30 ppb	87%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Moderate interference from moisture - dried samples preferred for optimal analysis.	7+
Laser Absorption Spectroscopy - Closed Path (Multi)	Fixed Location, UAVs, Vehicle	Facility	Point Concentration (0D)	100 ppb	within 79 ppb	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Require specific environmental requirements for measurement.	7+
Mass Spectrometry	Handheld, Fixed Location	Component	Single Channel (1D)	1 ppb	Within 3.4%	Continuous monitoring of emissions on sites. LDAR Programs.	Requires controlled environment (i.e., vacuum system).	9
Gas Chromatography	Handheld, Fixed Location	Component	Single Channel (1D)	1 ppb	Within 3% to 6% of true conc.	Continuous monitoring of emissions on sites. LDAR Programs.	Calibration and purge required prior to use. Calibration frequency varies based on instrument.	9

Printed Nanotube Sensors	Fixed Location	Facility	Point Concentration (0D)	5 ppm	Developing - Currently focused on detection rather than actual quantification	Continuous monitoring of emissions on sites. LDAR Programs.	Unknown	4/7
Laser Absorption Spectroscopy - Open Path	Fixed point, UAVs, Vehicle	Facility	Single Channel (1D)	2 ppm*m	90-97%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Measurement path length from 5 - 500 m. Wind limitations 2-10 m/s	7+
Etalon	Handheld, Vehicle, Fixed Location	Component	Single Channel (1D)	100 ppb	0.1 μm + 0.3 $\mu\text{m}/\text{m}$	Continuous monitoring of emissions on sites. LDAR Programs.	Highly dependent on surface reflectivity of the crystals; reflecting surfaces must be parallel and flat.	7+
Laser Absorption Spectroscopy - Closed Path (Single)	Fixed point, UAVs, Vehicle	Facility	Point Concentration (0D)	Relative to total pressure of the cell; 88 ppb	90-97%	Monitoring emissions from pipeline along ROW and remote/sparse arrangements of well sites. Screening technology for LDAR programs.	Require specific environmental requirements for measurement.	7+





APPENDIX B: SUMMARY OF FIRST FIELD TRIAL KEY FINDINGS

Summary table of key statistics and findings from first field trial.

Technology	Average Error	Average Bias	Key Findings
Aerial NIR Hyperspectral	41%	-34%	<ul style="list-style-type: none"> - Reliability issues with cloud cover and turbulence - Windspeed error may cause significant systematic errors
Truck-based TDLAS (BLS)	57%	+19%	<ul style="list-style-type: none"> - Might be less susceptible to wind direction variability with BLS model. - Performed worse with lower emission rates - Performed worse with tanks than stacks
Truck-based TDLAS (IGM)	47%	-35%	<ul style="list-style-type: none"> - Systematically underestimated true rate; potentially due to coarse meteorological data and wind direction variability
AGAT Labs MWIR QOGI	67%	-46%	<ul style="list-style-type: none"> - Struggled with high flowrates causing underestimation; potentially due to limitations of hardware/software for estimating plume velocity at high flowrates
FLIR GF320 QOGI	55%	-26%	<ul style="list-style-type: none"> - Increased wind and flowrates caused underestimation due to GF320 framerate - Tank measurements less accurate than stack measurements; perhaps due to increased measurement distance

APPENDIX C: FLOW CONTROLLER DATA LOGGING EXAMPLE

Excerpt of flow controller data log from September 27th, 2023, between 11:21AM and 11:23AM.

Time (Local)	Flowrate (m ³ /day)	Pressure (kPa)	Temperature (°C)	Setpoint (m ³ /day)	Volume Flow
2022-09-27T11:21:00.463	34.1	411.6	24.69	34	8.3
2022-09-27T11:21:01.501	34.1	411.7	24.7	34	8.3
2022-09-27T11:21:02.554	34.1	411.6	24.7	34	8.3
2022-09-27T11:21:03.592	34.2	411.6	24.71	34	8.3
2022-09-27T11:21:04.629	36.2	411.4	24.71	34	8.9
2022-09-27T11:21:05.667	35.4	411.3	24.72	34	8.8
2022-09-27T11:21:06.704	34.3	411.3	24.72	34	8.4
2022-09-27T11:21:07.742	34.1	411.4	24.73	34	8.4
2022-09-27T11:21:08.781	34	411.4	24.73	34	8.3
2022-09-27T11:21:09.833	34	411.5	24.73	34	8.3
2022-09-27T11:21:10.887	34	411.5	24.74	34	8.3
2022-09-27T11:21:11.940	34	411.6	24.75	34	8.3
2022-09-27T11:21:12.978	34	411.7	24.75	34	8.3
2022-09-27T11:21:14.031	34	411.7	24.75	34	8.3
2022-09-27T11:21:15.069	33.9	411.8	24.76	34	8.3
2022-09-27T11:21:16.138	33.9	411.9	24.76	34	8.3
2022-09-27T11:21:17.176	33.9	411.9	24.77	34	8.3
2022-09-27T11:21:18.245	33.9	412	24.77	34	8.3
2022-09-27T11:21:19.283	33.9	412.1	24.78	34	8.3
2022-09-27T11:21:20.352	33.9	412.1	24.78	34	8.3
2022-09-27T11:21:21.390	33.9	412.2	24.78	34	8.3
2022-09-27T11:21:22.460	33.9	412.3	24.79	34	8.3
2022-09-27T11:21:23.497	33.9	412.3	24.79	34	8.3
2022-09-27T11:21:24.551	33.9	412.4	24.8	34	8.3
2022-09-27T11:21:25.604	33.9	412.5	24.8	34	8.3
2022-09-27T11:21:26.690	33.9	412.5	24.8	34	8.3
2022-09-27T11:21:27.727	33.9	412.6	24.81	34	8.3
2022-09-27T11:21:28.765	44.9	411.9	24.81	51	11
2022-09-27T11:21:29.803	51.1	410.3	24.81	51	12.6
2022-09-27T11:21:30.913	51.7	409.9	24.81	51	12.8
2022-09-27T11:21:31.974	51.9	410.2	24.82	51	12.8
2022-09-27T11:21:33.011	51.9	410.5	24.82	51	12.8
2022-09-27T11:21:34.065	51.9	410.8	24.82	51	12.8
2022-09-27T11:21:35.118	51.9	411.1	24.83	51	12.8
2022-09-27T11:21:36.163	51.7	411.5	24.83	51	12.7
2022-09-27T11:21:37.241	51.9	411.8	24.83	51	12.7

2022-09-27T11:21:38.295	51.3	412.2	24.83	51	12.6
2022-09-27T11:21:39.332	51.1	412.6	24.83	51	12.5
2022-09-27T11:21:40.370	51	413	24.83	51	12.5
2022-09-27T11:21:41.455	51	413.5	24.83	51	12.5
2022-09-27T11:21:42.493	51	413.8	24.83	51	12.5
2022-09-27T11:21:43.578	50.8	414.2	24.82	51	12.5
2022-09-27T11:21:44.632	51	414.5	24.82	51	12.5
2022-09-27T11:21:45.718	51	414.8	24.82	51	12.5
2022-09-27T11:21:46.755	51	415.1	24.82	51	12.4
2022-09-27T11:21:47.840	50.8	415.4	24.82	51	12.4
2022-09-27T11:21:48.888	51	415.6	24.82	51	12.4
2022-09-27T11:21:49.963	51	415.8	24.82	51	12.4
2022-09-27T11:21:51.017	51	415.9	24.82	51	12.4
2022-09-27T11:21:52.087	51	416.1	24.82	51	12.4
2022-09-27T11:21:53.124	51	416.2	24.82	51	12.4
2022-09-27T11:21:54.177	51	416.4	24.82	51	12.4
2022-09-27T11:21:55.231	51	416.5	24.82	51	12.4
2022-09-27T11:21:56.269	51	416.6	24.82	51	12.4
2022-09-27T11:21:57.322	51	416.7	24.82	51	12.4
2022-09-27T11:21:58.360	51	416.7	24.82	51	12.4
2022-09-27T11:21:59.402	51	416.8	24.82	51	12.4
2022-09-27T11:22:00.458	50.8	416.9	24.82	51	12.4
2022-09-27T11:22:01.537	50.8	416.9	24.82	51	12.4
2022-09-27T11:22:02.590	51	417	24.82	51	12.4
2022-09-27T11:22:03.659	51	417	24.82	51	12.4
2022-09-27T11:22:04.697	51	417	24.82	51	12.4
2022-09-27T11:22:05.775	50.8	417	24.82	51	12.4
2022-09-27T11:22:06.804	50.8	417.1	24.82	51	12.4
2022-09-27T11:22:07.889	50.8	417.1	24.82	51	12.4
2022-09-27T11:22:08.927	51	417.1	24.82	51	12.4
2022-09-27T11:22:09.997	50.8	417.1	24.82	51	12.4
2022-09-27T11:22:11.034	50.8	417.1	24.82	51	12.4
2022-09-27T11:22:12.120	50.8	417.1	24.82	51	12.4
2022-09-27T11:22:13.173	50.8	417.1	24.83	51	12.4
2022-09-27T11:22:14.211	51	417.2	24.83	51	12.4
2022-09-27T11:22:15.248	51	417.2	24.83	51	12.4
2022-09-27T11:22:16.286	51	417.2	24.83	51	12.4
2022-09-27T11:22:17.324	51	417.2	24.83	51	12.4
2022-09-27T11:22:18.398	51	417.2	24.83	51	12.4
2022-09-27T11:22:19.431	51	417.2	24.83	51	12.4
2022-09-27T11:22:20.484	51	417.2	24.83	51	12.4

2022-09-27T11:22:21.549	50.8	417.2	24.83	51	12.4
2022-09-27T11:22:22.607	51	417.2	24.84	51	12.4
2022-09-27T11:22:23.645	51	417.1	24.84	51	12.4
2022-09-27T11:22:24.730	51	417.1	24.84	51	12.4
2022-09-27T11:22:25.768	51	417.1	24.84	51	12.4
2022-09-27T11:22:26.853	51	417.1	24.84	51	12.4
2022-09-27T11:22:27.907	50.8	417.1	24.85	51	12.4
2022-09-27T11:22:28.968	51	417.1	24.85	51	12.4
2022-09-27T11:22:30.014	50.8	417.1	24.85	51	12.4
2022-09-27T11:22:31.068	50.8	417.1	24.85	51	12.4
2022-09-27T11:22:32.129	51	417.1	24.85	51	12.4
2022-09-27T11:22:33.179	51	417.1	24.86	51	12.4
2022-09-27T11:22:34.229	51	417.1	24.86	51	12.4
2022-09-27T11:22:35.266	51	417.1	24.86	51	12.4
2022-09-27T11:22:36.335	51	417.1	24.86	51	12.4
2022-09-27T11:22:37.373	51	417	24.87	51	12.4
2022-09-27T11:22:38.411	51	417	24.87	51	12.4
2022-09-27T11:22:39.464	51	417	24.87	51	12.4
2022-09-27T11:22:40.502	51	417	24.87	51	12.4
2022-09-27T11:22:41.555	51	417	24.88	51	12.4
2022-09-27T11:22:42.609	51	417	24.88	51	12.4
2022-09-27T11:22:43.662	51	417	24.88	51	12.4
2022-09-27T11:22:44.700	51	416.9	24.89	51	12.4
2022-09-27T11:22:45.769	51	416.9	24.89	51	12.4
2022-09-27T11:22:46.814	51	416.9	24.89	51	12.4
2022-09-27T11:22:47.861	51	416.9	24.89	51	12.4
2022-09-27T11:22:48.898	51	416.9	24.9	51	12.4
2022-09-27T11:22:49.936	51	416.9	24.9	51	12.4
2022-09-27T11:22:50.974	51	416.8	24.9	51	12.4
2022-09-27T11:22:52.011	51	416.8	24.91	51	12.4
2022-09-27T11:22:53.048	51	416.8	24.91	51	12.4
2022-09-27T11:22:54.118	51	416.8	24.92	51	12.4
2022-09-27T11:22:55.155	51	416.7	24.92	51	12.4
2022-09-27T11:22:56.193	51	416.7	24.92	51	12.4
2022-09-27T11:22:57.231	51.1	416.7	24.92	51	12.4
2022-09-27T11:22:58.284	51.1	416.7	24.93	51	12.4
2022-09-27T11:22:59.338	51.1	416.7	24.93	51	12.4
2022-09-27T11:23:00.391	51	416.6	24.93	51	12.4

APPENDIX D: FIELD TRIAL NOTEBOOK

Release Type	Time Start	Release Rate (m ³ /day)	Wind Speed (m/s)	Wind Direction	Pressure (kPa)	Temp (°C) from mass-flow controller
SEPTEMBER 25TH						
Large stack	10:00	0	1	SW	N/A	N/A
Large stack	10:20	340	1.5	S	207.9	21.29
Large stack	10:36	1200	1	SW	380.6	22.71
Large stack	10:51	1690	1.5	WSW	380.9	17.28
Large stack	11:07	710	1.5	W	410.2	12.52
Large stack	11:20	1350	1.5	W	389.2	19.66
Large stack	11:29	2720	1.5	W	317.7	16.6
Short stack 1.7m	11:38	2720	2.5	W	315.9	4.88
Short stack 1.7m	11:51	0	1	W	0	0
Short stack 1.7m	11:54	710	2.5	W	406.8	14.01
Short stack 1.7m	12:03	1200	2.5	WNW	387.6	21.14
Short stack 1.7m	12:20	340	2.5	NW	421	23.58
Short stack 1.7m	12:38	0	1	WSW	0	0
Short stack 1.7m	12:44	1690	1.5	W	290.5	30.18
Short stack 1.7m	13:08	1350	2.5	SW	356.4	19.26
Large stack	13:12	0	1.5	SW	N/A	N/A
Large stack	13:22	1350	1.5	SSW	338.3	28.6
Large stack	13:31	170	2.5	SW	421.5	28.52
Large stack	13:39	1200	3	SW	337.5	30.66
SEPTEMBER 26TH						
1.7m Stack	09:31	170	0	NA	307	21.41
1.7m Stack	10:02	51	0	NA	285	26.62
1.7m Stack	10:23	710	1	SW	282.4	25.81
1.7m Stack	10:52	8.5	0	NA	228	28.77

1.7m Stack	11:05	0	1	SW	0	0
1.7m Stack	11:21	51	1.5	E	243.8	30.2
1.7m Stack	11:31	710	1.5	SSE	227.5	32.18
1.7m Stack	11:42	8.5	1.5	E	377.2	30.53
1.7m Stack	11:53	51	1.6	SE	320.7	31.8
1.7m Stack	12:04	710	1.5	SE	262.7	32.98
1.7m Stack	12:12	8.5	2	SE	347	31.57
1.7m Stack	12:24	0	1.4	S	0	0
1.7m Stack	12:33	710	2	S	334.9	33.03
1.7m Stack	12:52	710	2	S	334.9	33.03
1.7m Stack	12:59	51	1.5	SE	427.6	33.9
1.7m Stack	13:18	8.5	2.5	S	409.7	34.72
Flare stack	13:39	1690	3.5	S	397.7	33.35
Flare stack	14:09	710	2.5	SW	435.4	25.31
Flare stack	14:23	1200	3.5	SW	423.6	31.28
Flare stack	14:37	1350	3	SW	413.7	30.15
Flare stack	14:50	340	3	SW	420.7	30.57
Small stack (3 piece - 4.84m)	15:06	0	3	SW	0	0
Small stack (3 piece - 4.84m)	15:10	170	3	SW	397.2	32.65
Small stack (3 piece - 4.84m)	15:31	1690	2	SSW	234.5	34.83
Small stack (3 piece - 4.84m)	15:42	710	2	S	407.8	29.4
Small stack (3 piece - 4.84m)	15:51	1200	2.5	S	380.9	30.99
Small stack (3 piece - 4.84m)	16:02	1350	1.4	S	377.8	30.37
Small stack (3 piece - 4.84m)	16:13	340	2	S	420.7	29.34
Small stack (3 piece - 4.84m)	16:24	0	2.6	SSW	445.6	31.92

Small stack (3 piece - 4.84m)	16:32	8.5	1.7	S	432.031.8	31.8
Small stack (3 piece - 4.84m)	16:40	85	2.5	S	412.5	32.31
Small stack (3 piece - 4.84m)	16:50	51	2	S	420.5	32.19
SEPTEMBER 27TH						
Green tank	09:28	170	2.5	SSE	446.2	12.65
	09:58	85	2.8	SSE	414.5	12.68
	10:09	0	2	SSE	428.8	14.5
	10:19	340	2.6	SSE	411.1	15.03
	10:31	8.5	2.4	SSE	425	15.91
	10:35	51	2.4	SSE	417	16.53
	10:48	34	2.2	SSE	417.5	17.18
Green tank reversed hose orientation	11:08	34	1.8		412	21.14
	11:21	51	1.9	S	410.1	24.83
	11:29	8.5	2.8	S	423.6	26.46
	11:38	340	2.1	S	410.4	27.77
	11:50	0	2.2	S	429.4	28.49
	11:58	85	3	S	414.2	29.95
	12:08	170	1.5	S	416	31.65
Short stack, 1.7 height	14:23	1690	1.5	SW	384.4	39.64
	14:36	34	2.5	SW	428	35.5
	14:44	710	2.5	W	423.5	37.7
	14:51	8.5	3	W	430.4	38.2
	14:58	0	3	W	0	0
	15:08	1200	2.5	W	413.5	39.59
	15:14	51	3	W	430	39.04
	15:20	170	1.4	W	421.3	38.89
	15:26	85	3	WSW	424.5	39.63

	15:32	340	1.2	W	427.7	39.52
	15:40	1350	1.5	WSW	402.4	40.03
	15:50	51	1.4	W	453.2	37.29
	15:59	8.5	1.5	W	442.9	39.05
	16:06	0	3.1	W	437.8	39.17
	16:13	710	3.2		420.6	38.26
	16:21	51	2.5	WSW	430.8	37.55
	16:29	8.5	3.1	W	431	38.08
	16:36	710	1.5	SW	421.3	38.05
	16:44	51	0	NA	429.5	38.25
	16:50	8.5	1.2	N	428	38.78
	17:00	710	1.7	W	424.4	38.25
SEPTEMBER 28TH						
1.7m stack	09:23	1350	1.7	S	338.6	16.92
	09:32	1200	0	NA	383.3	18.56
	09:47	1690	1.7	SSW	358.9	19.12
	09:57	1200	0	NA	386.3	16.03
	10:07	1690	1.2	SE	306.7	17.01
	10:15	1350	1.6	S	384.1	16.86
	10:29	1690	1.2	SW	393.2	22.93
	10:39	1350	0.6	SW	361.8	23.2
	10:47	1200	1.1	SE	381.6	23.21
Tall 3-piece stack	11:06	1200	1.4	SW	421.1	29.2
	11:23	340	1.8	S	438.1	27.44
	11:28	0	0.8	SE	538.7	29.19
	11:36	85	1	S	460.7	30.77
	11:45	170	1.7	SSW	447.9	32.76
	11:51	1690	1.5	SW	385.5	34.97
Medium 2-piece stack	13:17	1200	0.9	S	409.1	38.51
	13:36	340	2.4	SE	431.3	34.68

	13:43	0	2.7	SE	466.2	35.71
	13:51	85	1.5	SW	430.9	35.43
	13:58	170	2	SW	437.1	36.17
	14:05	1690	2.2	SW	384.5	37.12
Vent from shack, tape on pipe	15:24	85	N/A	N/A	437.1	31.5
	15:30	51	N/A	N/A	436.5	31.77
	15:36	170	N/A	N/A	436	32.1
	15:44	0	N/A	N/A	440.3	32.92
	15:50	340	N/A	N/A	429.9	32.92
	15:57	8.5	N/A	N/A	437	32.77
Vent from shack, tape off	16:06	340	N/A	N/A	429.3	32.77
	16:14	170	N/A	N/A	432.5	33.59
	16:20	51	N/A	N/A	432	33.4
	16:25	85	N/A	N/A	433.5	33.53
SEPTEMBER 30TH						
Tall Flare Stack	12:55	340	2.3	NNW	431.2	27.38
	13:28	710	5.2	NW	436.4	31.92
	13:43	1200	6.5	NW	422.3	29.1
	13:48	1690	3.8	NW	396.7	26.47
	13:54	2720	3.3	NW	449.7	20.57
	14:00	1200	1	NNW	421.5	16.9
	14:02	1690	1.8	NW	406.9	18.32
	14:04	0	N/A	N/A	N/A	N/A
1.7m Stack	14:09	170	3.1	NNW	434.6	25.49
	14:17	1690	1.9	NNW	422.1	23.48
	14:23	340	3	N	452.9	27.6
	14:30	8.5	3.4	NNW	493.6	28.17
	14:35	0	N/A	N/A	N/A	N/A
	14:41	1200	3.3	N	441.2	28.72
	14:47	85	2	NW	461.1	28.83

	15:04	51	5	N	464.2	29.69
Flare stack	15:36	170	2.5	NNW	465.6	28.94
	15:44	0	4.3	NNW	92.9	27.31
	15:47	8.5	4.1	NNW	469	28.59
	15:54	85	3.7	NNW	458.4	29.48
	16:00	51	4	NNW	462.4	30.33
Short stack	16:10	51	3.6	NNW	465.6	28.96
	16:16	710	2.9	NW	445.3	26.14
	16:23	2720	3.4	NNW	360.7	22.14
	17:15	1350	3	NNW	419.7	21.12
	17:19	340	2	NW	436	20.58
	17:23	2720	3	NW	350.9	19.42
	17:27	51	2.5	NNW	457.1	17.17
	17:32	710	3.4	NNW	438.9	17.11
	17:37	170	2.5	NNW	450.6	17.47
OCTOBER 1ST						
Flare stack	10:25:00	170	2.5	NE	439.1	24.98
Flare stack	10:35:40	8.5	2.5	NE	422	23.93
Flare stack	10:44:00	1200	2.5	NE	325.6	24.27
Flare stack	10:49:30	340	1.6	NE	391.1	23.3
Flare stack	10:55:40	51	2.2	NE	417.3	23.7
Flare stack	11:02:10	85	2.5	NE	406.5	24.17
Flare stack	11:08:35	0	1.8	NE	-	-
Flare stack	11:15:40	710	2.1	ENE	410.7	26.39
Flare stack	11:23:00	2720	2	ENE	314.6	25.24
Flare stack	11:30:10	1690	2.1	ENE	384.7	17.11
1.4m stack	11:39:40	1690	1.2	E	405.6	19.8
1.4m stack	11:46:20	2720	0.5	E	335.2	18.59
1.4m stack	11:52:30	710	0.1	ESE	414.5	18.07
1.4m stack	11:58:00	0	1.4	ENE	-	-

1.4m stack	12:03:50	85	0	N/A	427.6	22.9
1.4m stack	12:09:20	51	1	NE	421.5	26.61
1.4m stack	12:16:15	340	1	NE	427	30.13
1.4m stack	12:21:50	1200	2.4	NNE	408.2	31.21
1.4m stack	12:28:10	8.5	0	N/A	465.7	30.87
1.4m stack	12:33:30	170	2.1	ENE		31.86
Tank (with wind)	14:20	170	1.5	NE	434.5	34.23
Tank (with wind)	14:31:15	85	2.2	E	424	34.93
Tank (with wind)	14:40:00	0	2	ESE	-	-
Tank (with wind)	14:47:30	340	2.6	E	425.6	34.86
Tank (with wind)	14:55:40	8.5	1.9	ENE	429.6	34.84
Tank (with wind)	15:02:05	51	0.8	NE	432	34.57
Tank (with wind)	15:08:35	34	2.3	E	427.1	34.93
flare stack	16:04	170	2.6	E	439.6	26.32
flare stack	16:15:55	8.5	3.3	ESE	431.7	25.38
flare stack	16:23:30	1200	2.6	SE	405.6	23.44
flare stack	16:28:15	340	2.6	SE	430.3	23.25
flare stack	16:34:00	51	2.4	SE	427.7	23.2
1.4 m stack	16:39:40	0				
1.4 m stack	16:41:35	340	2.0	SE	431.6	22.94
1.4 m stack	16:47:35	2720	2.1	SE	305.2	22.01
1.4 m stack	16:53:20	85	1.6	SE	431.4	19.77
1.4 m stack	16:59:10	1200	1.9	SE	412.1	20.23

APPENDIX E: SUPPLEMENTAL INFORMATION