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Heavy Oil

Controlled Document

Quest CCS Project

Quest Emissions to air, soil or water – Performance 2015

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Revision History

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2016-12-01	Originator	Celina Duong	Celina Duong

Summary

All emissions (non-CO₂) to air, soil and water caused by the introduction of a CO₂ capture process should be identified and reported by its concentration measured. Concentration measured in the streams to the environment from the capture facilities.

Keywords

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1. PURPOSE

The actual non-CO2 emissions to air, soil and water reported by its concentration measured in ppm during operational period

1.1. Air Monitoring as per EPEA Approval 49785-01-05

The primary source of air emissions from the Quest Project is the CO2 capture facility at Scotford, which increases NOx from the Hydrogen Manufacturing Units (HMUs). As a result, the amendment to the Upgrader's Environmental Protection and Enhancement Act Approval No. 49785-01-05 (incorporated Quest Capture Facility) required the following non-CO2 emissions monitoring:

- Increased NOx emissions limits for three HMU Steam Reformer stacks.
- Requirement to monitor NOx emissions continuously for each HMU stack and conduct two stack surveys per year.
- Shell is required to participate in the Fort Air Partnership ambient air monitoring program and was required to install a NOx analyzer for the Scotford 2 monitoring station. Lamont station monitors for PM2.5 as required by the Upgrader's operating approval.
- Note: as part of the Quest CCS Project Environmental Impact Assessment, air quality dispersion modeling showed that the Quest Project will not increase PM2.5 emissions.

1.2. Soil and Groundwater Monitoring as per EPEA Approval 49785-01-05

The Quest capture facility is integrated with the Scotford Upgrader and therefore all water use and treatment follows the terms and conditions. As well, groundwater and soil monitoring are conducted as an ongoing part of the operating approval.

2. 2015 EMISSIONS PERFORMANCE

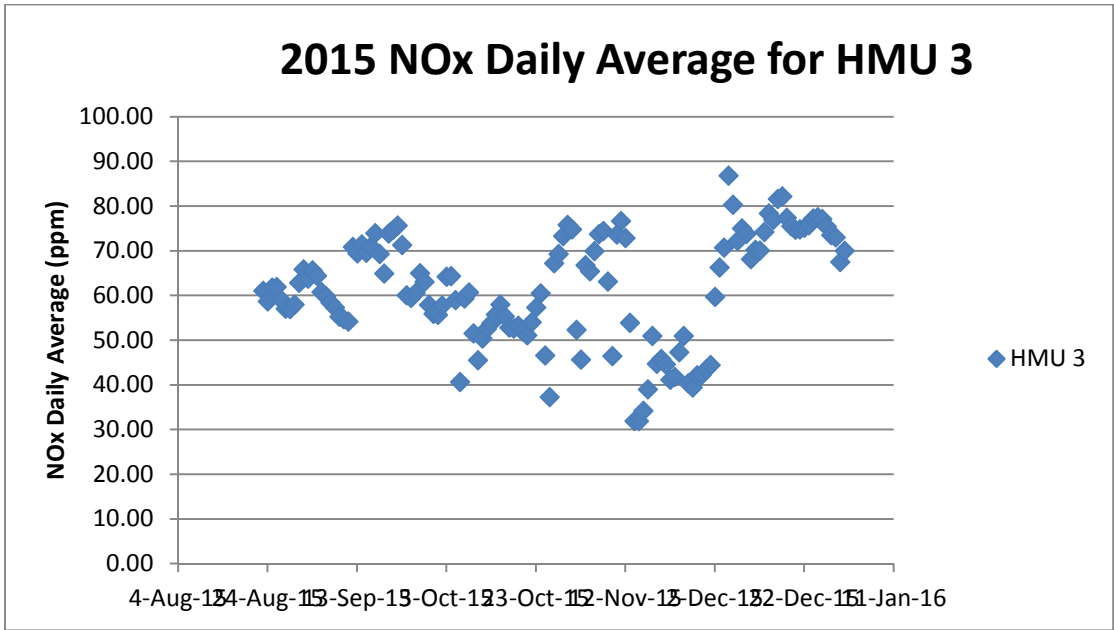
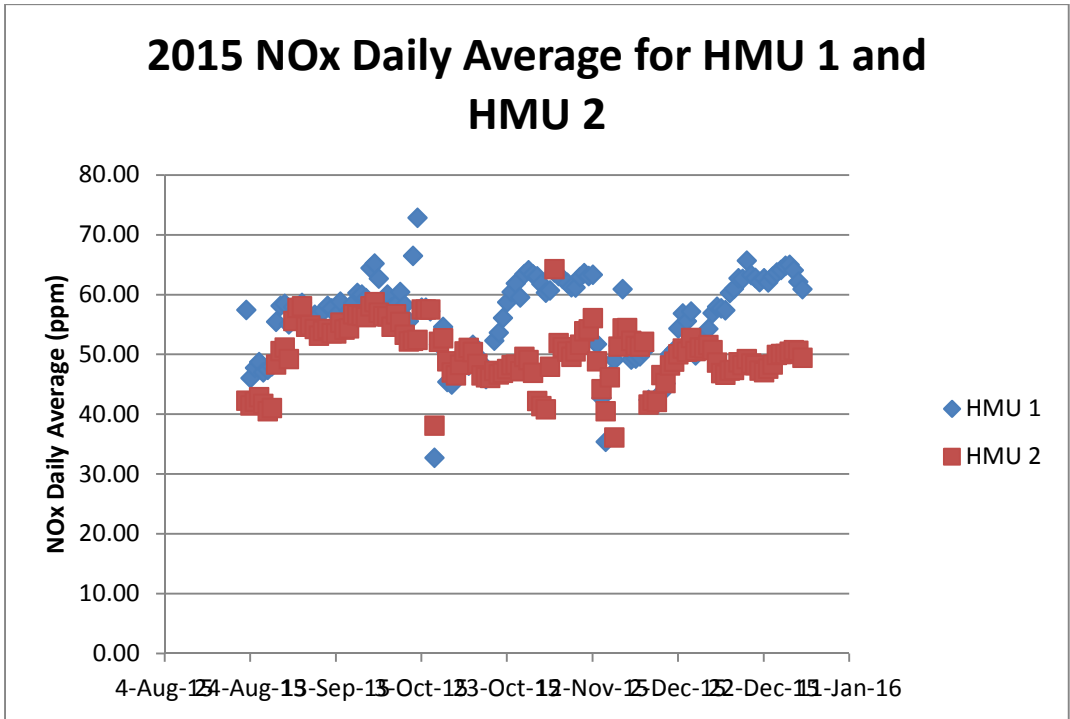
2.1. Glycol Losses and Amine Losses

The total glycol volume is lost to a combination of sources including the glycol regenerator/stripper vent, glycol circulation pump seals, and lastly to the pipeline. The glycol circulation pump seals are a major source of glycol loss.

	Amine Make-up	TEG losses
	t/month	kg/month
Design/Reference	10	3833
Aug-15	0	114
Sep-15	40	382
Oct-15	0	107
Nov-15	0	490
Dec-15	0	423
Total	40	1516

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2.2. 2015 NOx Daily Average (ppm) for the Hydrogen Manufacturing Units



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APPENDIX 1. NOX DATA

	Hydrogen Manufacturing Unit (S-24103) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-24203) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-44103) Steam Reformer Stack
	NOx Daily Average ppm	NOx Daily Average ppm	NOx Daily Average ppm
23-Aug-15	57.48	42.26	61.14
24-Aug-15	46.07	41.45	58.72
25-Aug-15	47.80	42.09	61.84
26-Aug-15	48.71	42.87	61.98
27-Aug-15	47.01	41.72	59.11
28-Aug-15	47.47	40.48	57.08
29-Aug-15	48.06	41.01	57.00
30-Aug-15	55.46	48.29	57.99
31-Aug-15	58.15	50.57	62.92
1-Sep-15	58.50	51.13	65.91
2-Sep-15	55.04	49.24	63.84
3-Sep-15	57.92	55.57	65.72
4-Sep-15	57.84	57.76	64.45
5-Sep-15	58.61	58.02	60.79
6-Sep-15	55.76	54.61	59.91
7-Sep-15	56.40	54.85	58.43
8-Sep-15	56.67	54.24	57.37
9-Sep-15	56.57	53.13	55.33
10-Sep-15	57.25	53.92	54.73
11-Sep-15	58.15	54.23	54.21
12-Sep-15	57.72	53.54	70.88
13-Sep-15	56.66	53.50	69.51
14-Sep-15	58.85	55.32	71.49
15-Sep-15	56.06	54.16	69.65
16-Sep-15	57.30	54.33	71.04
17-Sep-15	58.60	56.69	74.01
18-Sep-15	60.27	56.54	69.33
19-Sep-15	60.01	56.47	64.98
20-Sep-15	59.44	56.25	73.89
21-Sep-15	64.45	58.06	74.81
22-Sep-15	65.21	58.74	75.72
23-Sep-15	62.73	56.99	71.35
24-Sep-15	58.69	56.39	60.13
25-Sep-15	60.04	56.34	59.53
26-Sep-15	57.90	54.60	60.59
27-Sep-15	58.30	56.73	65.05
28-Sep-15	60.47	55.43	63.12
29-Sep-15	58.26	53.28	57.97
30-Sep-15	55.58	52.15	55.94
1-Oct-15	66.50	52.27	55.70
2-Oct-15	72.86	52.45	57.78
3-Oct-15	57.83	57.50	64.28
4-Oct-15	57.82	57.51	64.36
5-Oct-15	57.23	57.53	59.01
6-Oct-15	32.71	38.07	40.69
7-Oct-15	51.69	52.09	59.35
8-Oct-15	54.61	52.70	60.75
9-Oct-15	45.41	48.82	51.55
10-Oct-15	45.00	46.98	45.59
11-Oct-15	47.29	46.49	50.40
12-Oct-15	49.50	48.25	52.60
13-Oct-15	50.46	50.49	53.90
14-Oct-15	48.16	51.10	55.80
15-Oct-15	51.65	50.40	58.01

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	Hydrogen Manufacturing Unit (S-24103) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-24203) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-44103) Steam Reformer Stack
	NOx Daily Average ppm	NOx Daily Average ppm	NOx Daily Average ppm
16-Oct-15	49.76	48.39	55.41
17-Oct-15	48.52	46.47	52.87
18-Oct-15	45.89	46.15	52.67
19-Oct-15	46.88	46.05	53.33
20-Oct-15	52.32	47.22	51.98
21-Oct-15	53.66	46.65	51.14
22-Oct-15	56.11	46.92	54.11
23-Oct-15	58.72	47.58	57.41
24-Oct-15	60.46	48.19	60.53
25-Oct-15	61.92	48.29	46.64
26-Oct-15	59.52	47.17	37.34
27-Oct-15	63.44	49.57	67.28
28-Oct-15	64.12	49.04	69.35
29-Oct-15	63.38	46.94	73.37
30-Oct-15	63.10	42.19	75.87
31-Oct-15	61.78	41.38	74.84
1-Nov-15	60.37	40.82	52.36
2-Nov-15	60.70	47.95	45.67
3-Nov-15	63.72	64.25	66.83
4-Nov-15	63.12	51.89	65.49
5-Nov-15	62.64	51.20	69.96
6-Nov-15	62.02	50.45	73.79
7-Nov-15	61.25	49.61	74.53
8-Nov-15	61.20	50.53	63.14
9-Nov-15	62.96	51.63	46.52
10-Nov-15	63.60	53.89	73.69
11-Nov-15	63.12	54.18	76.70
12-Nov-15	63.32	56.07	72.89
13-Nov-15	51.73	48.86	53.97
14-Nov-15	42.72	44.20	31.94
15-Nov-15	35.43	40.49	31.97
16-Nov-15	46.42	46.15	34.27
17-Nov-15	49.09	36.11	39.03
18-Nov-15	51.46	51.29	51.04
19-Nov-15	60.96	54.38	44.74
20-Nov-15	52.40	54.39	45.85
21-Nov-15	49.16	52.25	44.65
22-Nov-15	49.30	51.42	41.17
23-Nov-15	49.68	51.32	41.82
24-Nov-15	50.64	52.12	47.35
25-Nov-15	42.43	41.63	51.01
26-Nov-15	41.89	42.25	40.38
27-Nov-15	41.68	42.07	39.47
28-Nov-15	43.61	46.55	42.18
29-Nov-15	45.15	45.19	42.24
30-Nov-15	50.00	48.14	43.48

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	Hydrogen Manufacturing Unit (S-24103) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-24203) Steam Reformer Stack	Hydrogen Manufacturing Unit (S-44103) Steam Reformer Stack
	NOx Daily Average ppm	NOx Daily Average ppm	NOx Daily Average ppm
1-Dec-15	50.73	48.81	44.47
2-Dec-15	54.38	50.04	59.77
3-Dec-15	56.88	50.99	66.33
4-Dec-15	55.58	50.45	70.73
5-Dec-15	57.20	52.74	86.88
6-Dec-15	49.85	50.56	80.39
7-Dec-15	52.43	51.13	72.25
8-Dec-15	52.67	51.03	75.07
9-Dec-15	54.33	51.56	73.83
10-Dec-15	56.92	50.71	68.18
11-Dec-15	58.00	48.62	70.28
12-Dec-15	57.75	46.84	70.12
13-Dec-15	57.42	46.60	74.26
14-Dec-15	60.28	47.31	78.45
15-Dec-15	60.98	47.41	77.01
16-Dec-15	62.76	48.66	81.68
17-Dec-15	62.67	48.20	82.26
18-Dec-15	65.69	49.23	77.41
19-Dec-15	63.29	48.47	75.57
20-Dec-15	62.80	48.22	74.81
21-Dec-15	62.11	47.30	74.86
22-Dec-15	62.74	47.00	75.22
23-Dec-15	62.08	47.59	75.76
24-Dec-15	63.00	48.29	77.25
25-Dec-15	63.71	49.94	77.59
26-Dec-15	64.12	50.09	77.13
27-Dec-15	64.85	50.07	75.51
28-Dec-15	64.98	50.46	73.54
29-Dec-15	64.08	50.70	73.05
30-Dec-15	62.15	50.60	67.57
31-Dec-15	60.93	49.43	70.04

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