

2014 Utah Air Agencies O&G Emissions Inventory



June 6th 2016



UTAH DEPARTMENT of
ENVIRONMENTAL QUALITY

**AIR
QUALITY**

Participation

- Approximately 60 companies contacted (some letters returned, other companies no longer operating)
- 31 Workbooks received
- Covers approximately **96%** of 2014 producing or shut-in APIs in Uintah and Duchesne counties

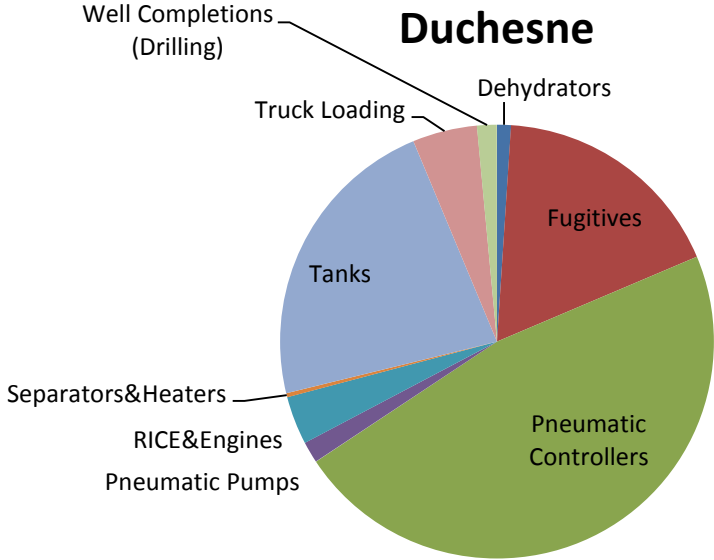


2014 UT O&G EI – All Pollutants

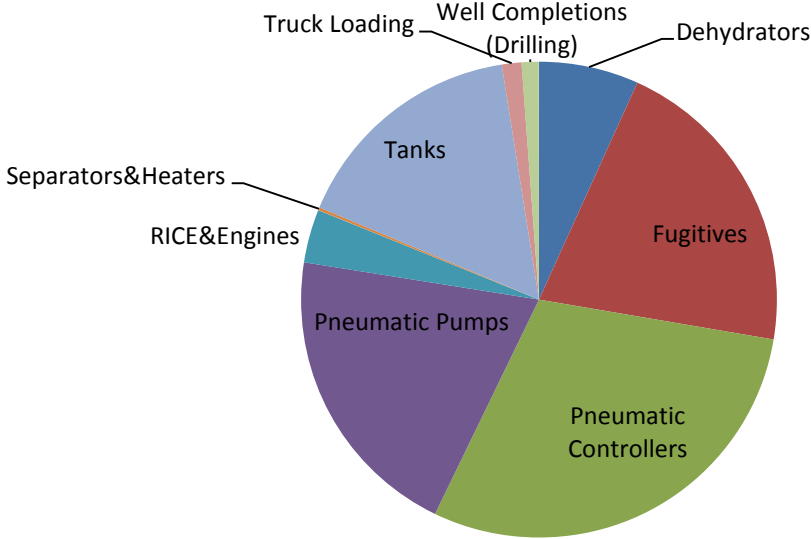
2014 Utah O&G EI Description	NOx (tons/year)		VOC (tons/year)		CO (tons/year)		SOx (tons/year)		PM10 (tons/year)		PM2.5 (tons/year)		CH2O (tons/year)	
	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
Dehydrators	1.96	4.49	198.93	3,686.32	8.68	12.47								
Fugitives			3,362.78	11,383.67										
Pneumatic Controllers			9,004.30	16,058.31										
Pneumatic Pumps			305.64	11,049.57										
RICE&Engines	4,127.68	31,502.35	685.50	1,977.45	4,912.12	7,042.47	5.00	22.72	153.69	450.83	153.69	450.83	258.61	719.72
Separators&Heaters	1,061.94	1,861.65	58.41	102.39	892.03	1,563.79	6.37	11.17	80.71	141.49	80.71	141.49		
Tanks	12.33	11.57	4,309.02	8,799.15	44.63	38.15								
Truck Loading			923.39	725.39										
Well Completions (Drilling)	405.87	918.96	282.35	639.28	152.94	346.28			8.82	19.98	8.82	19.98		
All Sources	5,609.79	34,299.03	19,130.31	54,421.53	6,010.39	9,003.16	11.37	33.89	243.23	612.30	243.23	612.30	258.61	719.72

VOC

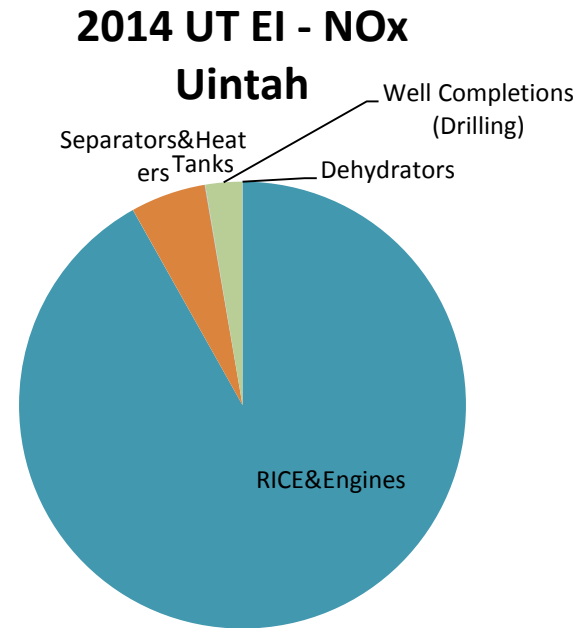
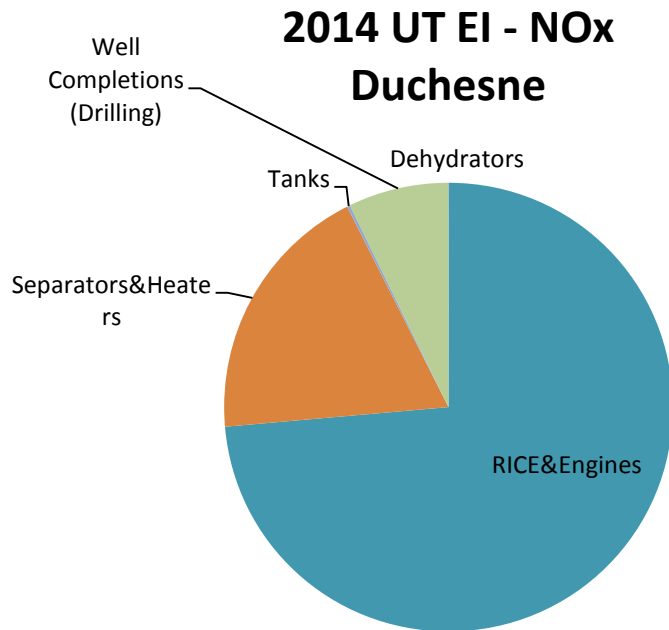
**2014 UT EI - VOC
Duchesne**



**2014 UT EI - VOC
Uintah**



NOx



2014 EI vs. 2014 NEI

		2014 UT EI		2014 NEI		2014 UT EI		2014 NEI	
		NOx		NOx		VOC		VOC	
2014 UT EI	2014 NEI	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
Dehydrators	Dehydrator	1.96	4.49	23.67	138.27	198.93	3,686.32	3,996.67	23,313.22
Fugitives	Unpermitted Fugitives			0.00	0.00	3,362.78	11,383.67	1,109.68	2,469.51
Pneumatic Controllers	Pneumatic devices			0.00	0.00	9,004.30	16,058.31	8,659.30	19,270.78
Pneumatic Pumps	Pneumatic pumps			0.00	0.00	305.64	11,049.57	4,900.74	10,921.80
RICE&Engines	Compressor engines + Miscellaneous engines + Artificial Lift	4,127.68	31,502.35	4,762.57	4,828.07	685.50	1,977.45	1,436.65	1,317.80
Separators&Heaters	Heaters	1,061.94	1,861.65	519.08	1,156.83	58.41	102.39	29.65	66.09
Tanks	Condensate tank + Oil Tank	12.33	11.57	0.00	0.00	4,309.02	8,799.15	28,717.91	23,714.15
Truck Loading	Truck Loading of Condensate + Truck Loading of Oil			0.00	0.00	923.39	725.39	1,914.75	1,277.29
Well Completions (Drilling)	Drill rigs + Workover rigs	405.87	918.96	1,702.57	1,285.25	282.35	639.28	147.97	113.12
TOTAL		5,609.79	34,299.03	7,007.89	7,408.42	19,130.31	54,421.53	50,913.32	82,463.76

- 2014 NEI data = projections from 2009 WRAP EI using 2014 activity data

2014 EI vs. 2014 NEI

		2014 UT EI		2014 NEI		2014 UT EI		2014 NEI	
		NOx		NOx		VOC		VOC	
2014 UT EI	2014 NEI	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
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2014 EI vs. 2014 NEI

		Percent Change		Percent Change	
		Duchesne		Uintah	
2014 UT EI	2014 NEI	NOx	VOC	NOx	VOC
Dehydrators	Dehydrator	-91.72%	-95.02%	-96.75%	-84.19%
Fugitives	Unpermitted Fugitives		203.04%		360.97%
Pneumatic Controllers	Pneumatic devices		3.98%		-16.67%
Pneumatic Pumps	Pneumatic pumps		-93.76%		1.17%
RICE&Engines	Compressor engines + Miscellaneous engines + Artificial Lift	-13.33%	-52.28%	552.48%	50.06%
Separators&Heaters	Heaters	104.58%	96.99%	60.93%	54.93%
Tanks	Condensate tank + Oil Tank	#DIV/0!	-85.00%	#DIV/0!	-62.89%
Truck Loading	Truck Loading of Condensate + Truck Loading of Oil		-51.77%		-43.21%
Well Completions (Drilling)	Drill rigs + Workover rigs	-76.16%	90.81%	-28.50%	465.13%
	Total	-19.95%	-62.43%	362.97%	-34.01%

2014 EI vs. 2011b 3SAQS

		2014 UT EI		2011b 3SAQS		2014 UT EI		2011b 3SAQS	
		NOx		NOx		VOC		VOC	
2014 UT EI	2011b 3SAQS	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
Dehydrators	Gas Well Dehydrators + Gas Well Dehydrators - Flaring	1.96	4.49	17.57	133.29	198.93	3,686.32		22,487.49
Fugitives	Fugitives + Fugitives: All Processes					3,362.78	11,383.67		1,933.51
Pneumatic Controllers	Pneumatic devices + Gas Well Pneumatic Devices					9,004.30	16,058.31	26.34	15,822.39
Pneumatic Pumps	Gas Well Pneumatic Pumps					305.64	11,049.57		23,565.46
RICE&Engines	Artificial Lift Engines + Compressor Engines + Miscellaneous Engines	4,127.68	31,502.35	3,264.11	3,220.41	685.50	1,977.45	701.68	717.54
Separators&Heaters	Gas Well Heaters	1,061.94	1,861.65	210.14	2,372.19	58.41	102.39		130.54
Tanks	Condensate Tank Flaring + Oil Well Tanks - flashing & s/w/b + Storage Tanks: Condensate + Specify Liquid: Working Loss (Tank Diameter Independent)	12.33	11.57	0.36	1.70	4,309.02	8,799.15	16,749.64	16,504.12
Truck Loading	Oil Well Truck Loading + Gas Plant Truck Loading					923.39	725.39	1,144.35	467.77
Well Completions (Drilling)	Drill Rigs + Workover Rigs	405.87	918.96	1,288.92	1,866.24	282.35	639.28	105.59	153.38
TOTAL		5,609.79	34,299.03	4,781.10	7,593.83	19,130.31	54,421.53	18,727.59	81,782.20
All Area Source Categories				5,063.38	7,980.56			18,728.36	84,159.86

2014 EI vs. 2011b 3SAQS

		2014 UT EI		2011b 3SAQS		2014 UT EI		2011b 3SAQS	
		NOx		NOx		VOC		VOC	
2014 UT EI	2011b 3SAQS	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
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	TOTAL	5,609.79	34,299.03	4,781.10	7,593.83	19,130.31	54,421.53	18,727.59	81,782.20
	All Area Source Categories			5,063.38	7,980.56			18,728.36	84,159.86

Initial Findings

- Counties (Uintah and Duchesne) are very different.
 - Points to the conclusion that it is likely not an EF issue but probably activity data related.
- NO_x is much higher in 2014 EI than in NEI or 2011b
 - Main culprit: engines
- VOC is much lower in 2014 EI than in NEI or 2011b
 - Main culprits: tanks, dehys, (truck loading), (pneu. pumps)

Phase II – O&G EI

- Continue to improve the inventory
- Potential Additions/Improvements:
 - Blowdowns
 - Venting – Completions
 - Venting – Recompletions
 - Workovers
 - Compressor Engine startup and shutdowns
 - Flaring
 - Improved Composition Analyses
 - Improved Fugitive Emissions EF
 - Efficacy of Control and capture systems
 - Improved Pneumatic Controller EF
 - Produced Water – ponds, improved method for tanks
 - Additional Midstream Sources
- Suggestions?

Questions?



2011b 3SAQS All Area Source Categories
Artificial Lift Engines
Compressor Engines
Condensate Tank Flaring
Drill rigs
Fugitives
Fugitives: All Processes
Gas Plant Truck Loading
Gas Well Completion: Flaring
Gas Well Dehydrators
Gas Well Dehydrators - Flaring
Gas Well Heaters
Gas Well Pneumatic Devices
Gas Well Pneumatic Pumps
Gas Well Venting-Blowdowns
Gas Well Venting-Compressor Shutdowns
Gas Well Venting-Compressor Startups
Gas Well Venting-Initial Completions
Gas Well Venting-Recompletions
Miscellaneous Engines
Oil Well Tanks - flashing & s/w/b
Oil Well Truck Loading
Pneumatic Devices
Storage Tanks: Condensate
Total: All Processes
Venting - Blowdowns
Venting - Compressor Shutdown
Venting - Compressor Startup
Venting - Recompletions
Venting-Initial Completions
Workover Rigs

Compressor Stations

	pm10	pm25	sox	nox	voc	co	ch2o
Total	26.16	26.16	24.47	2,441.69	3,829.29	1,498.20	1,473.98
Uintah	16.31578	16.31578	23.37747	2056.105	2291.839	842.1396	1430.615
Duchesne	9.802029	9.802029	1.094258	385.5679	1536.804	656.0303	43.27981
Carbon	0.040605	0.040605	0.002514	0.016226	0.648064	0.032043	0.087563