

UDAQ Updated Oil and Gas Inventory for the Uinta Basin

Kiera Harper, Utah Division of Air Quality

Background

In 2006, Environ (sponsored by the Independent Petroleum Association of Mountain States (IPAMS) and the Western Regional Air Partnership (WRAP)) conducted a study to compile baseline emissions estimates from the oil and gas industry for Utah's Uinta Basin, including Uintah and Duchesne County (Bar-Ilan, et al 2009). Emissions estimates for NO_x, VOCs, CO, SO_x, and PM₁₀ were inventoried through examining various processes of the oil and gas extraction and production. Spud counts (commencement of drilling by drill rigs for oil, gas, and water injection wells) were also included to estimate the total emissions from drilling processes. In 2009 Environ was tasked with projecting the 2006 baseline emissions to 2012. Production, well, and spud count values were analyzed and then extrapolated to the year 2012 (Friesen, et al 2009).

Current Status

The same method was used by the Utah Division of Air Quality to scale 2011 emission estimates off of the 2006 WRAP baseline emissions. Growth factors were created by using a ratio of 2011 production (or well or spud counts) to 2006 production (or well or spud counts) for each county (growth factors for 2011 ranged from 0.76 to 2.18). Oil and gas production, and well and spud counts were found on the Utah Division of Oil, Gas, and Mining (DOGGM) database and were last gathered in early December 2012.

Although the 2011 updated emissions are more valuable than the 2006 WRAP data, there is still much room for improvement. The 2011 inventory does not take into account possible green completions for drilling, better practices in the industry that have evolved during the five years since the original inventory, as well as pipeline emissions, evaporation ponds, etc. Presently, very little is known about evaporation pond emissions (not only in the Uinta Basin, but also elsewhere). Scientists at the Utah State University Commercialization and Regional Development office in Vernal, UT are currently exploring evaporation pond emissions. Only one pond during the springtime has been analyzed and is probably not a good representation of the entire basin. Studies are due to be underway for two additional ponds to be analyzed during the 2012-2013 winter and when combined with the already analyzed pond may be representative of the entire Uinta Basin. Emissions may also change per season since evaporation changes according to temperature.

Future Direction for More Accurate Oil and Gas Emissions

To vastly improve the emission estimates in the Uinta Basin, a new study needs to be conducted (done by a contractor like Environ), much like the WRAP 2006 study. A new study should account for changes in the industry in the Basin that cannot be accounted for in the Utah DOGM database, such as updated number of heaters, pneumatic devices, compressors, dehydrators, tanks, pipelines, etc., and their associated emissions. A new study would also account for other changes in the industry such as implementing green completions, better practices, updated machinery, etc. Ideally, it would be useful to work closely with the state of Wyoming and Colorado and use their oil and gas emissions inventory as a model for creating Utah's inventory. Also, working closely with the producers would be paramount to

understanding the elements and changes in the industry and also creating complete numbers for the oil and gas industry on Indian County and Indian Reservation land. Creating a system that would automatically update changes (like the number of heaters, etc.) by the producers to the UDAQ database and subsequently updating an emissions inventory would be the best for staying abreast of current emissions. Currently, the best practices for the emissions inventory is updating the WRAP emissions by using surrogates and scaling factors, but eventually those baseline WRAP emissions will no longer be valid due to an ever evolving industry.

The table below presents UDAQ's most up-to-date emission estimates for Uintah and Duchesne counties for the oil and gas industry for NO_x, VOCs, CO, SO_x, and PM10.

2011 Estimates	NO _x (tons/year)		VOCs (tons/year)		CO (tons/year)		SO _x (tons/year)		PM10 (tons/year)	
	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah	Duchesne	Uintah
Compressor engines	262	1989	60	460	275	2089	0	0	4	28
Condensate tank flaring	1	0	0	0	4	2	0	0	0	0
Drill rigs	1569	2342	136	203	592	884	119	177	116	173
Heaters	346	865	20	49	294	735	2	6	27	68
Pneumatic devices	0	0	5774	14409	0	0	0	0	0	0
Pneumatic pumps	0	0	3268	8154	0	0	0	0	0	0
Venting - blowdowns	0	0	45	8240	0	0	0	0	0	0
Venting - initial completions	0	0	39	159	0	0	0	0	0	0
Venting - recompletions	0	0	6	25	0	0	0	0	0	0
Workover rigs	9	196	1	18	3	79	1	16	1	16
Unpermitted Fugitives	0	0	740	1847	0	0	0	0	0	0
Miscellaneous engines	56	139	13	34	20	50	0	0	0	1
Artificial Lift	2593	1050	800	324	2993	1212	1	1	112	45
Truck Loading of Condensate	0	0	26	166	0	0	0	0	0	0
Gas Plant Truck Loading	0	0	1	4	0	0	0	0	0	0
Venting - Compressor Startup	0	0	126	956	0	0	0	0	0	0
Venting - Compressor Shutdown	0	0	119	906	0	0	0	0	0	0
Dehydrator	18	133	2964	22496	15	112	0	0	1	10
Dehydrator Flaring	0	0	0	0	0	1	0	0	0	0
Initial completion Flaring	0	0	0	0	1	1	0	0	0	0
Condensate tank	0	0	1248	8090	0	0	0	0	0	0
Oil Tank	0	0	17042	6903	0	0	0	0	0	0
Permitted Sources	1145	1899	454	1454	1369	0	1	6	9	27
Truck Loading of Oil	0	0	1144	463	0	0	0	0	0	0
Totals	5997	8615	34024	75360	5566	5166	124	206	270	369
Percent Change from 2006	62%	17%	76%	62%	72%	25%	28%	-18%	52%	2%

References

Bar-Ilan, A., Friesen, R., Parikh, R., Grant, J., Pollack, A. K., Henderer, D., Pring, D., Sgamma, K., Development of 2012 Oil and Gas Emissions Projections for the Uinta Basin, Environ, Novato, California, USA, available at http://wrapair.org/forums/ogwg/documents/2009-03_12_Projection_Emissions_Uinta_Basin_Technical_Memo_03-25.pdf, 2009.

Friesen, R., Parikh, R., Grant, J., Bar-Ilan, A., Pollack, A. K., Henderer, D., Pring, D., Sgamma, K., Schlagel, P.: Development of Baseline 2006 Emissions from Oil and Gas Activity in the Uinta Basin, Environ, Novato, California, USA, available at http://wrapair.org/forums/ogwg/documents/2009-03_06_Baseline_Emissions_Uinta_Basin_Technical_Memo_03-25.pdf, 2009.