MARAMA Mid-Atlantic Regional Air Management Association, Inc.

AN ANALYSIS OF THE USEPA OIL AND GAS ACCESS DATABASE TOOL

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What did it take to create the Oil and Gas Estimation Tool?

Winter 2011 – ERTAC identified Oil & Gas as a target category for inventory improvement. ERTAC group converted to national group to draw on strength of states nationwide with Oil & Gas sources.

Spring 2012 – "Key" source categories identified via surveys & states provide information on their approach to estimate emissions.

Summer 2012 – USEPA provides funds to develop the tool

Winter 2012 – First Draft of tool delivered.

Spring 2014 – Current version of tool delivered. It is used to estimate O&G emissions for NEI2011V2.

Fall 2014 – Oil and Gas Summit held to identify next steps.

How can we use the NEI 2011 created using this tool to identify next steps?

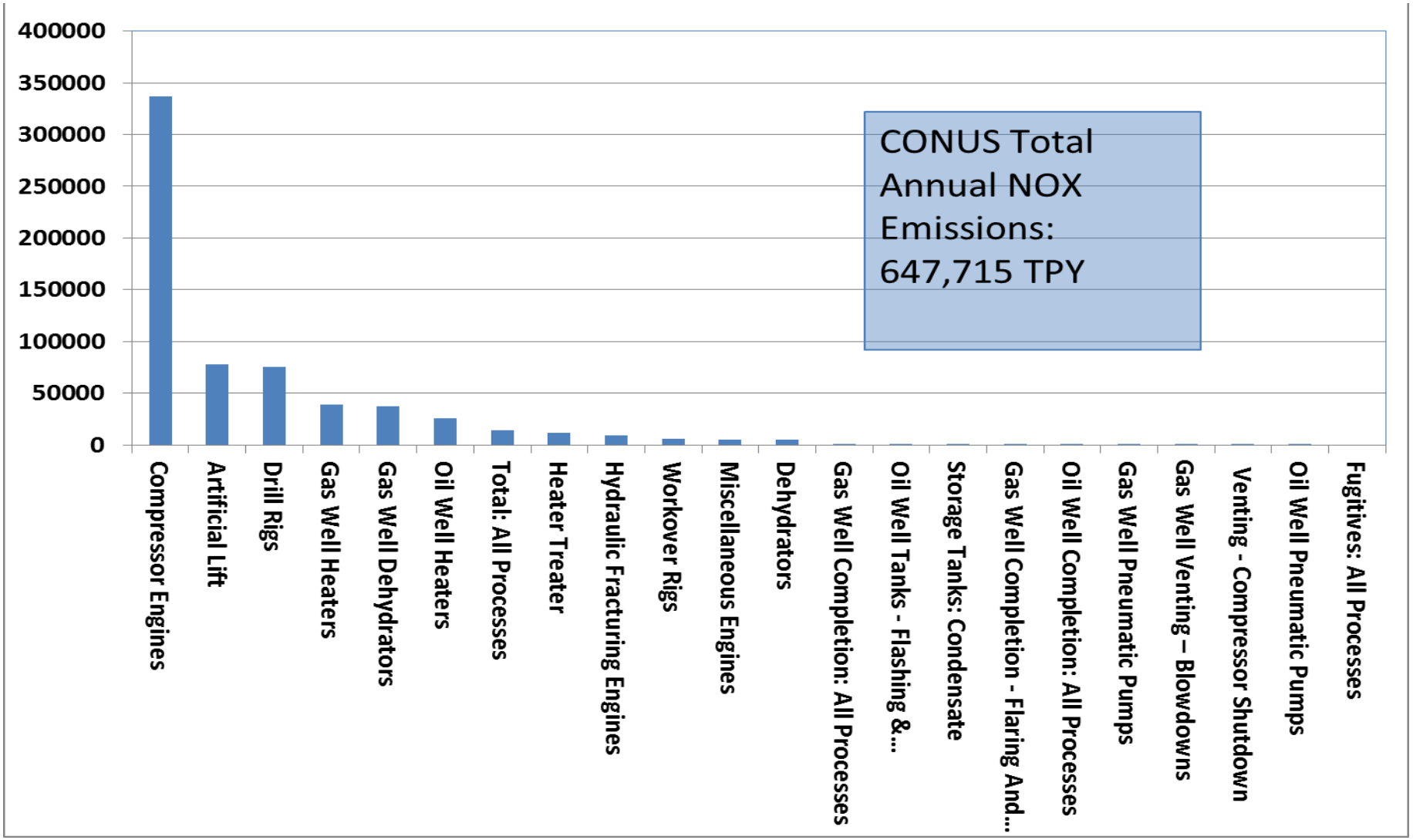
Methodology:

1. Summarize sector to identify important pollutants & categories.
2. Examine emission factors used for those pollutants & categories.
3. Compare between states – did states who developed estimates independent of the tool reach the same conclusions as the tool?

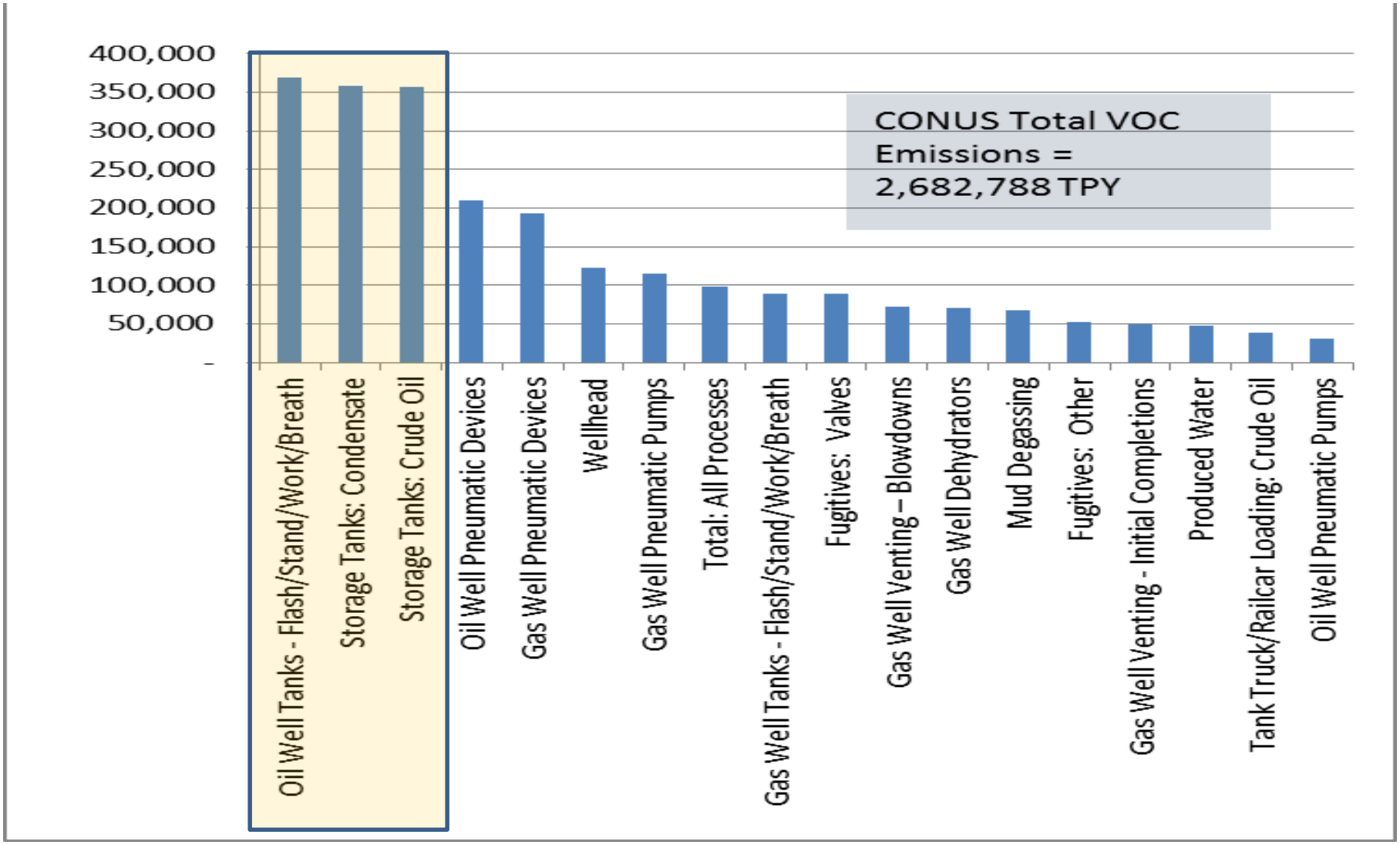
Importance of Oil & Gas Non-Point Srcs Summary of 2011 NEI V2

SECTOR	CO	NH3	NOX	PM2_5	SO2	VOC
Marine/Air Rail	0%	0%	10%	2%	2%	0%
Area	5%	90%	5%	43%	5%	25%
Electric Generation (EGU)	1%	1%	15%	6%	74%	0%
NonEGU Point	4%	2%	9%	10%	17%	6%
Nonpoint Oil and Gas	**1%**	**0%**	**5%**	**0%**	**0%**	**18%**
Nonroad	24%	0%	11%	5%	0%	14%
Onroad	46%	3%	40%	6%	0%	19%
Point Oil & Gas	0%	0%	4%	0%	1%	1%
Prescribed Fire	18%	4%	1%	27%	1%	16%

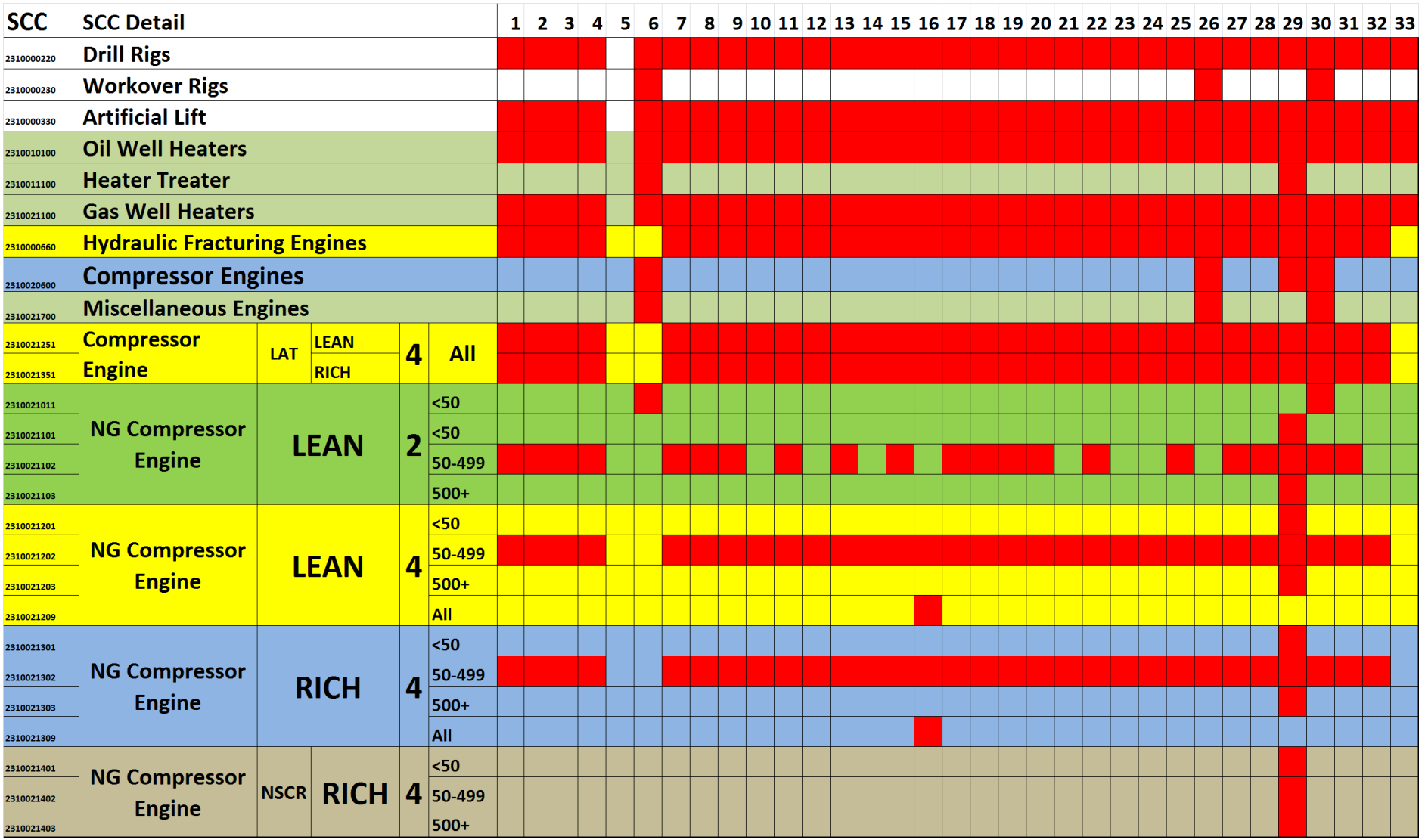
2011 NO_X Emissions by Source Type



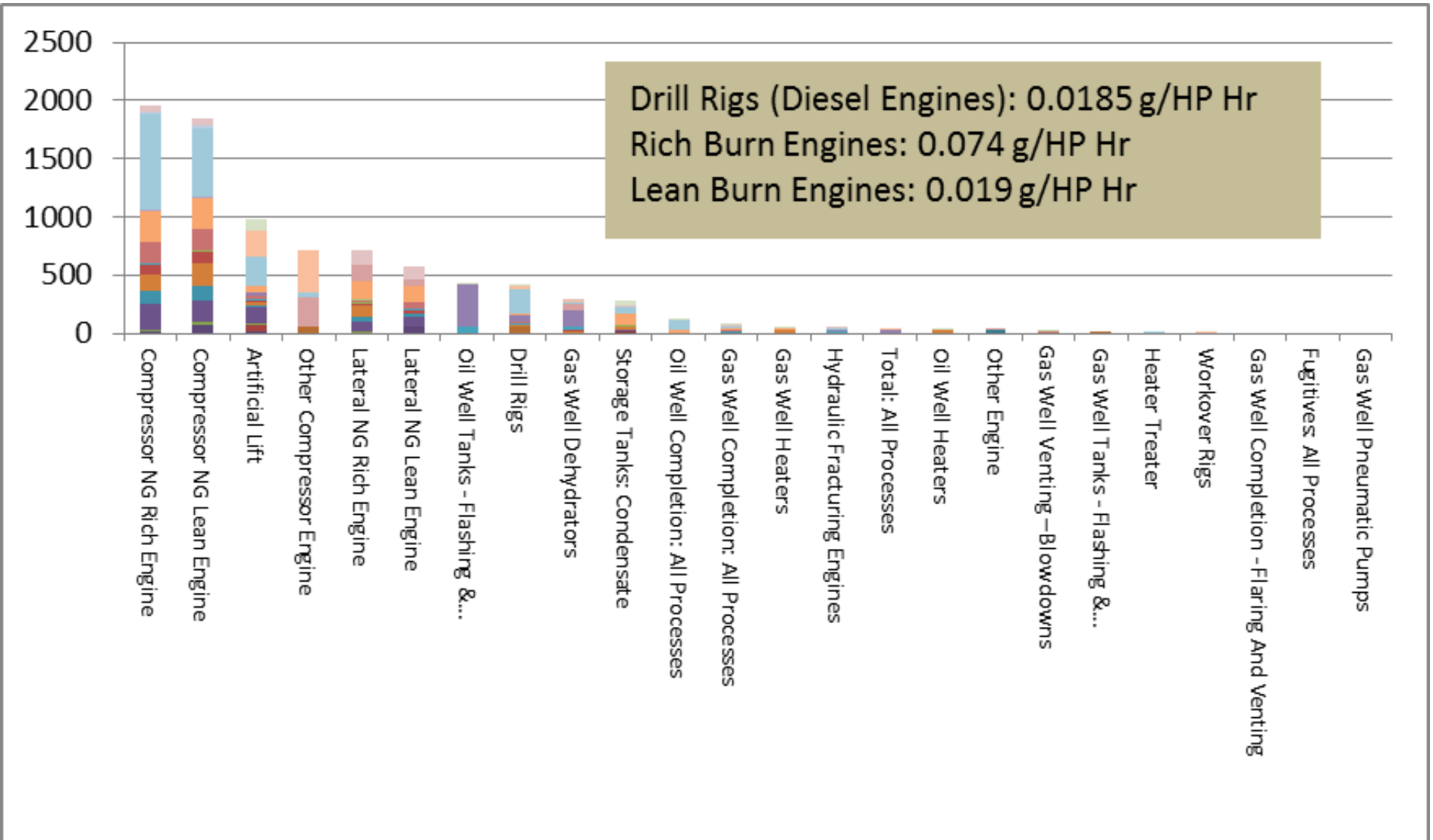
2011 VOC Emissions by Source Type



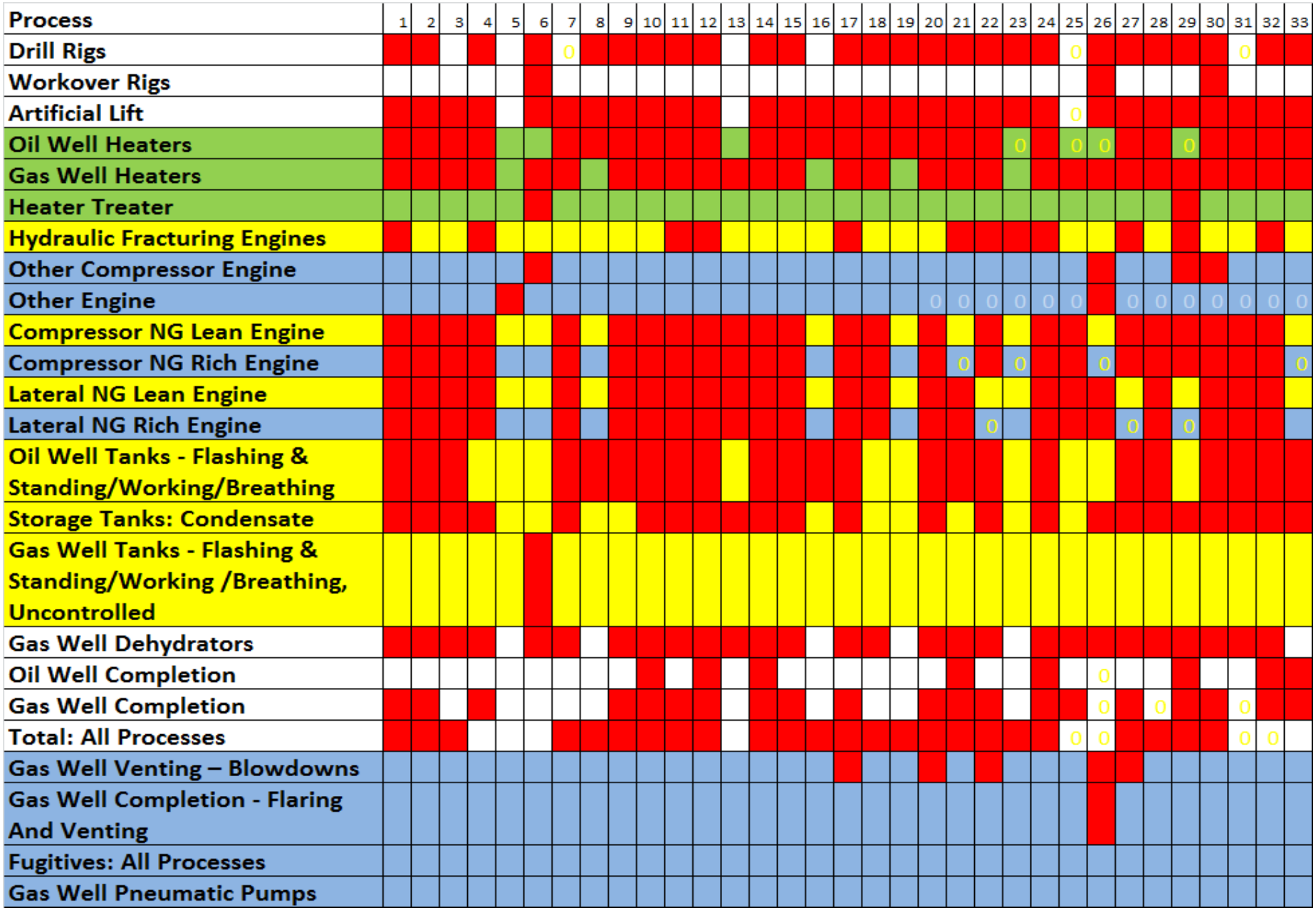
Analysis of NO_X State Coverage



Formaldehyde Analysis CONUS
Total = 8658 TPY



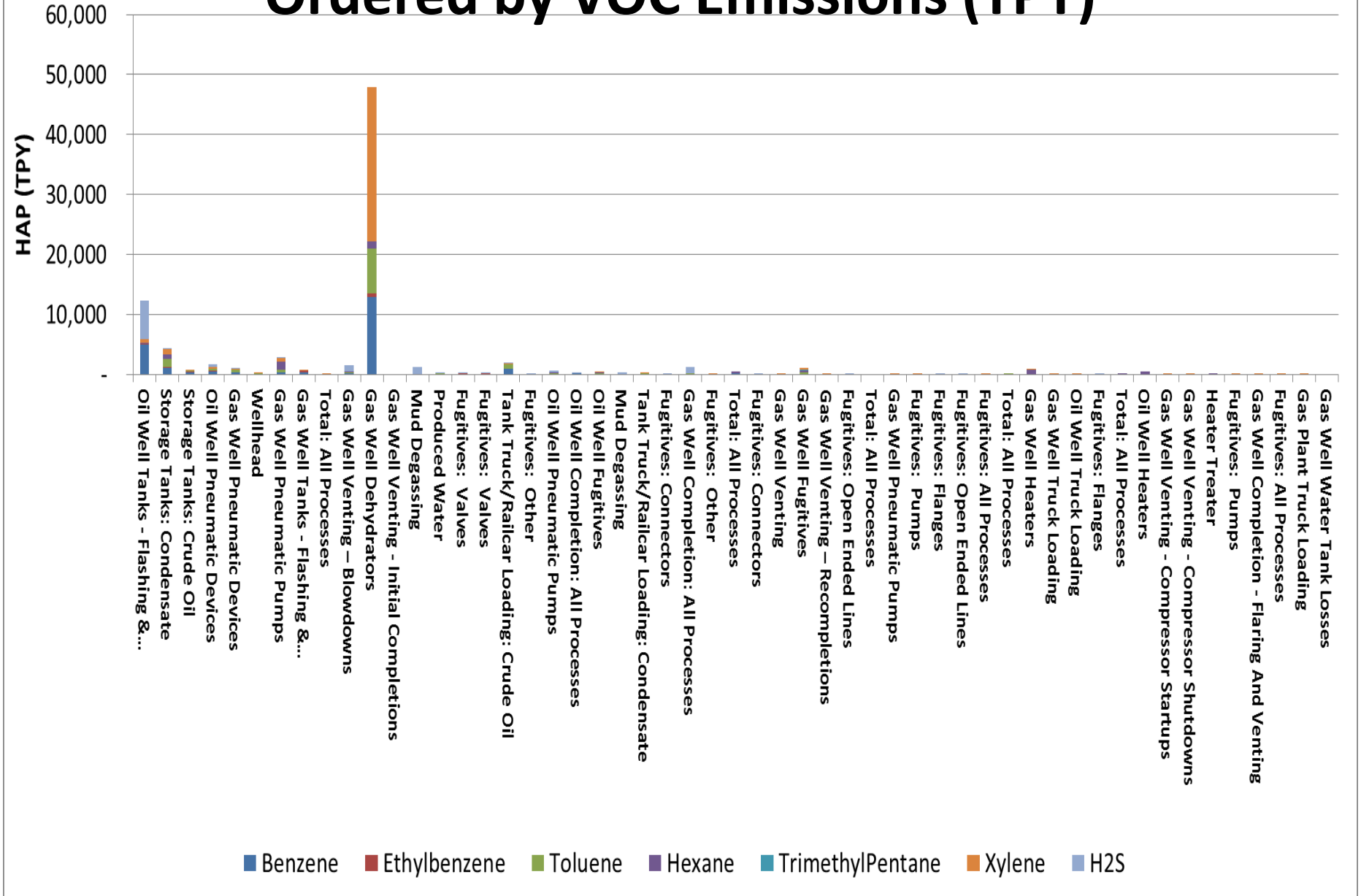
Formaldehyde Analysis – State Coverage



Use of Excel Pivot Table to Identify Missing HAP Emissions from Lean Burn Engines

Count of ANN_VAL	Co																				
Row Labels	250	50000	67561	71432	75070	91203	92524	100414	106990	107028	108883	110543	540841	1330207	CO	NOX	PM25-FIL	PM25-PRI	PM-CON	SO2	VOC
42	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**67**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**	**134**
Lateral Compressors 4 Cycle Lean Burn	67	67	67	67	67	67	67	67	67	67	67		67	67	67	67	67	67	67	67	67
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
46	**135**	**135**	**135**	**135**	**135**	**135**	**135**	**135**	**135**	**135**	**135**	**69**	**135**	**135**	**135**	**135**		**135**		**135**	**135**
Lateral Compressors 4 Cycle Lean Burn	66	66	66	66	66	66	66	66	66	66	66		66	66	66	66		66		66	66
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 50 To 499 HP	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		3		3	3
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66		66		66	66
47	**203**	**203**	**203**	**203**	**203**	**203**	**203**	**203**	**203**	**203**	**203**	**108**	**203**	**203**	**203**	**203**		**203**		**203**	**203**
Lateral Compressors 4 Cycle Lean Burn	95	95	95	95	95	95	95	95	95	95	95		95	95	95	95		95		95	95
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 50 To 499 HP	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13		13		13	13
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95		95		95	95
48	**725**	**725**	**725**	**725**	**725**	**725**	**725**	**725**	**725**	**725**	**725**	**155**	**725**	**725**	**1778**	**1778**	**1778**	**1778**	**1778**	**1778**	**1778**
Lateral Compressors 4 Cycle Lean Burn	190	190	190	190	190	190	190	190	190	190	190		190	190	254	254	254	254	254	254	254
Natural Gas Fired 2Cycle Lean Burn Compressor Engines < 50 HP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	254	254	254	254	254	254	254
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 50 To 499 HP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	254	254	254	254	254	254	254
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 500+ HP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	254	254	254	254	254	254	254
Natural Gas Fired 4Cycle Lean Burn Compressor Engines <50 HP	190	190	190	190	190	190	190	190	190	190	190		190	190	254	254	254	254	254	254	254
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	152	152	152	152	152	152	152	152	152	152	152	152	152	152	254	254	254	254	254	254	254
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 500+ HP	190	190	190	190	190	190	190	190	190	190	190		190	190	254	254	254	254	254	254	254
49	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**64**	**37**	**64**	**64**	**64**	**64**		**64**		**64**	**64**
Lateral Compressors 4 Cycle Lean Burn	27	27	27	27	27	27	27	27	27	27	27		27	27	27	27		27		27	27
Natural Gas Fired 2Cycle Lean Burn Compressor Engines < 50 HP																					
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 50 To 499 HP	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10		10		10	10
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27		27		27	27
51	**275**	**275**	**275**	**275**	**275**	**275**	**275**	**275**	**275**	**275**	**275**	**141**	**275**	**275**	**275**	**275**		**275**		**275**	**275**
Lateral Compressors 4 Cycle Lean Burn	134	134	134	134	134	134	134	134	134	134	134		134	134	134	134		134		134	134
Natural Gas Fired 2Cycle Lean Burn Compressor Engines 50 To 499 HP	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7		7		7	7
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134		134		134	134
54	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**55**	**110**	**110**	**110**	**110**	**71**	**110**	**71**	**110**	**110**
Lateral Compressors 4 Cycle Lean Burn	55	55	55	55	55	55	55	55	55	55	55		55	55	55	55	17	55	17	55	55
Natural Gas Fired 4Cycle Lean Burn Compressor Engines 50 To 499 HP	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	54	55	55

HAP Emissions – Evaporative Sources Ordered by VOC Emissions (TPY)



HAP Reporting Inconsistency
Some Examples

	Benzene	Ethylbenzene	Toluene	Hexane	Trimethyl Pentane	Xylene	H2S	VOC
Oil Well Tanks - Flashing & Standing/Working/Breathing	4,906	176		166	36	614	6,325	368,462
Storage Tanks: Condensate	1,041	245	1,351	661	35	862	25	358,419
Storage Tanks: Crude Oil	320	114	177			102		357,509
Oil Well Pneumatic Devices	518	183	297			159	540	210,228
Gas Well Pneumatic Devices	378	18	347			146	6	193,457
Wellhead	74	26	29			20		122,327
Gas Well Pneumatic Pumps	261	29	439	1,397	56	494	12	109,675
Gas Well Tanks - Flashing & Standing/Working/Breathing, Uncontrolled	273	333	49			130		89,066
Total: All Processes	41	6	5			36	-	78,933
Gas Well Venting – Blowdowns	126	24	162	96	5	85	1,039	72,503
Gas Well Dehydrators	12,899	648	7,355	1,271	8	25,774	-	71,427
Gas Well Venting - Initial Completions								49,435
Mud Degassing	50	21	15			17	1,076	49,261
Produced Water	74	25	24			20	217	47,768
Fugitives: Valves	99	29	49			27	187	43,331

Conclusions

- The Oil and Gas Tool can potentially provides a consistent methodology to calculate emissions from an important source category (4% NOX & 18% of VOC)
- Created by successful collaboration between USEPA and states over a period of years
- Important pollutants: NO_X, VOC & HAPS
- Largest source types:
  - NOX: Compressors
  - VOC: Tanks >> Pneumatic Devices
  - HAP: Formaldehyde from Engines
- State level pivot tables can be used to identify missing pollutants
- Improvements are still possible and recommended
  - More consistent coverage of Hazardous Air Pollutants
  - Improvement of SCC codes to simplify data analysis and minimize effort to project emissions.
  - Evaluation and improvement of key emission factors.
  - Continue to draw on knowledge from states with Oil and Gas experience