Western Regional Air Partnership Phase III Oil and Gas Inventory: New Mexico Case Study

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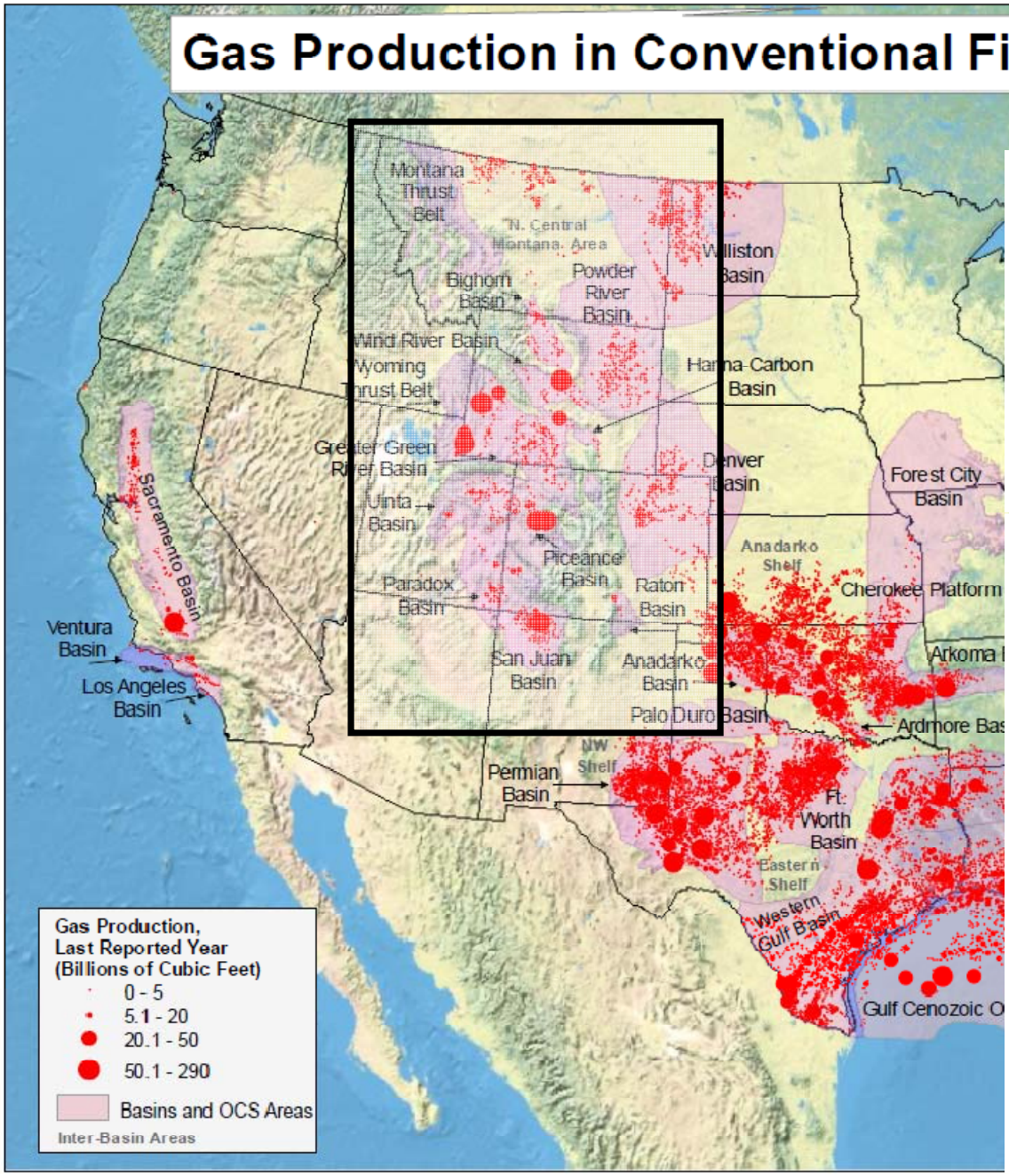
Presentation Overview

- Overview of Western Regional Air Partnership (WRAP) Phase III Inventory
- Northwest New Mexico, South San Juan Basin Oil and Gas Emissions
- Inventory as a tool in planning
- Inventory improvements/next steps



Source: Energy Information Administration based on data from HPDI, IN Geological Survey, USGS
Updated: April 8, 2009

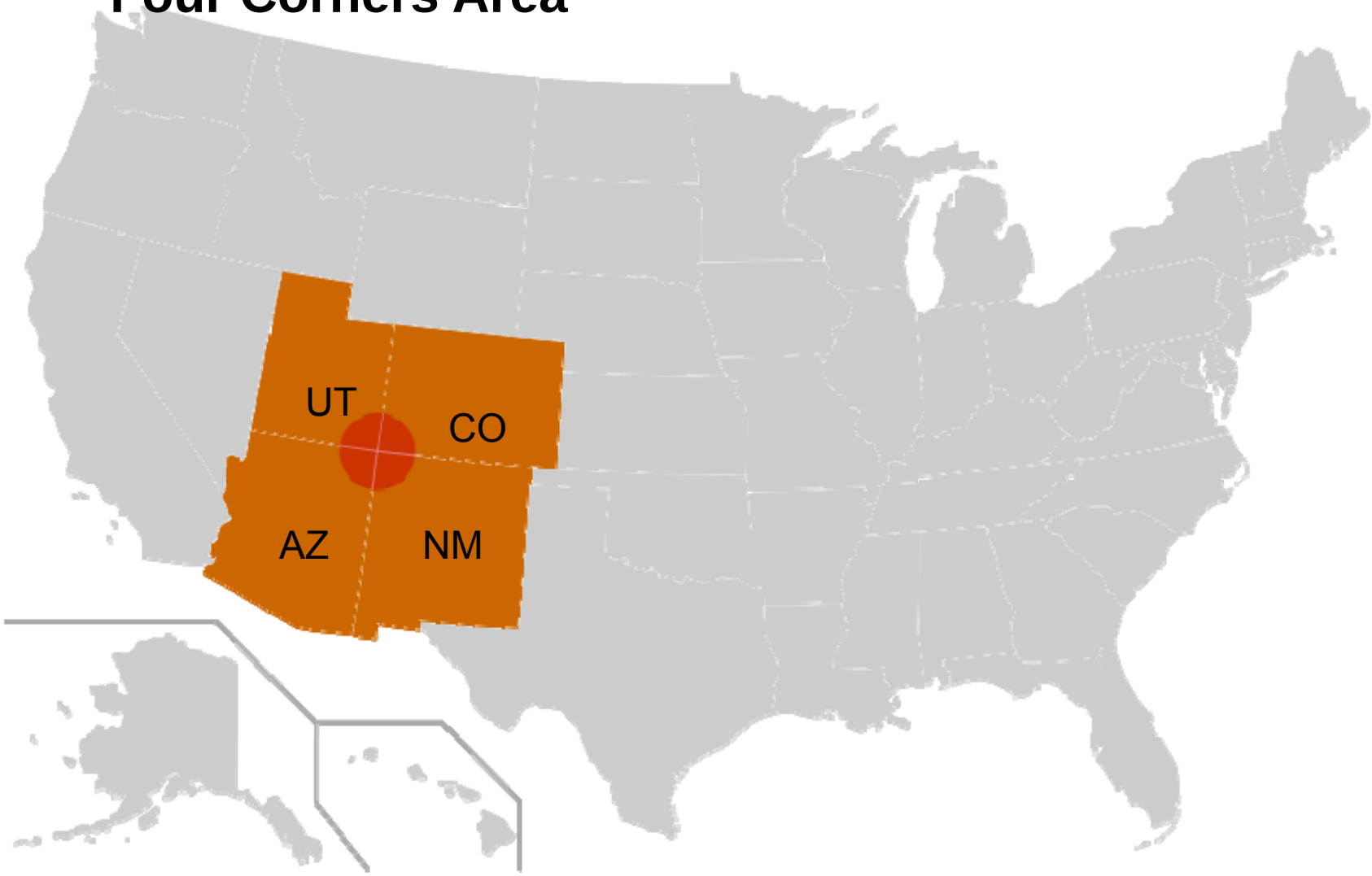
Scope:

- Oil and gas basins in Rocky Mountain States
- Focus pollutants NOx, SOx, PM, VOC and CO
- All oil and gas source categories (area and point)
- 2006 base year
- 2012 projection

Oil and Gas Emissions Sources

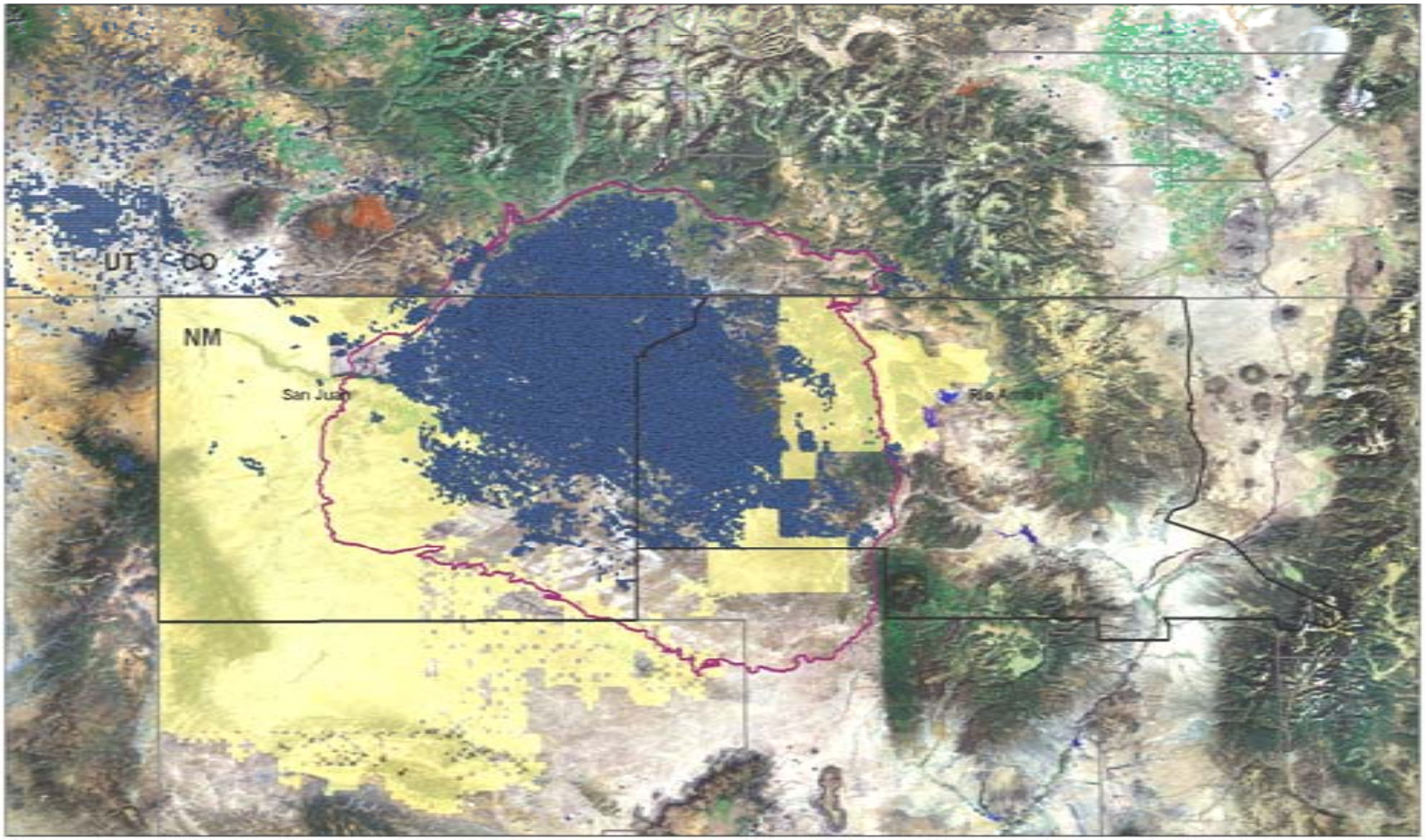
- Natural gas processing plants
- Large compressor stations
- Lateral/wellhead compressor engines
- Drilling rigs
- Workover rigs/frac rigs
- CBM pump engines
- Salt-water disposal engines
- Artificial lift engines (pumpjacks)
- Vapor recovery unit (VRU) compressor engines
- Miscellaneous gas-fired engines
- Oil well heaters
- Gas well heaters
- Miscellaneous gas-fired heaters or boilers
- Flaring
- Oil well tanks – breathing losses, gas venting, flashing emissions
- Gas well tanks – breathing losses, gas venting, flashing emissions
- Pneumatic devices
- Oil well fugitive emissions
- Gas well fugitive emissions
- Gas well completions
- Venting
- Blowdowns
- Dehydrators
- Amine units
- Gas well truck loading
- Oil well truck loading
- Pipeline/compressor station fugitive emissions
- Landfarms
- Water treatment/water injection facilities

Four Corners Area



Four Corners. (2010, September 16). In *Wikipedia, The Free Encyclopedia*. Retrieved 01:28, September 20, 2010, from http://en.wikipedia.org/w/index.php?title=Four_Corners&oldid=385251433

Four Corners Active Oil and Gas Locations



Legend

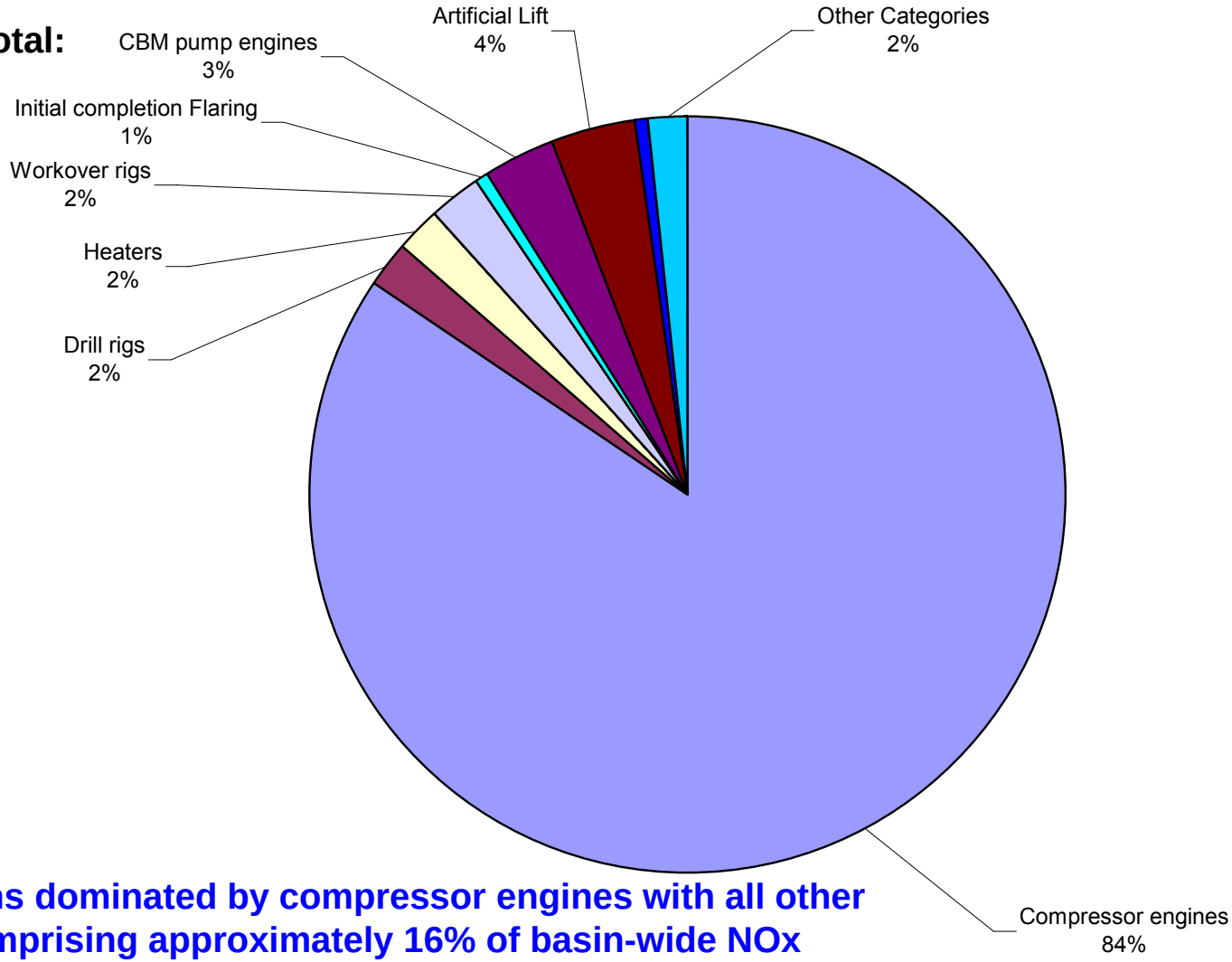
- County Boundaries
- Well Locations
- San Juan Basin
- Tribal Lands

Miles
0 5 10 20 30 40

N

South San Juan 2006 Baseline Results
NOx Emissions By Source Category

Basin-wide NOx total: 42,075 (tpy)

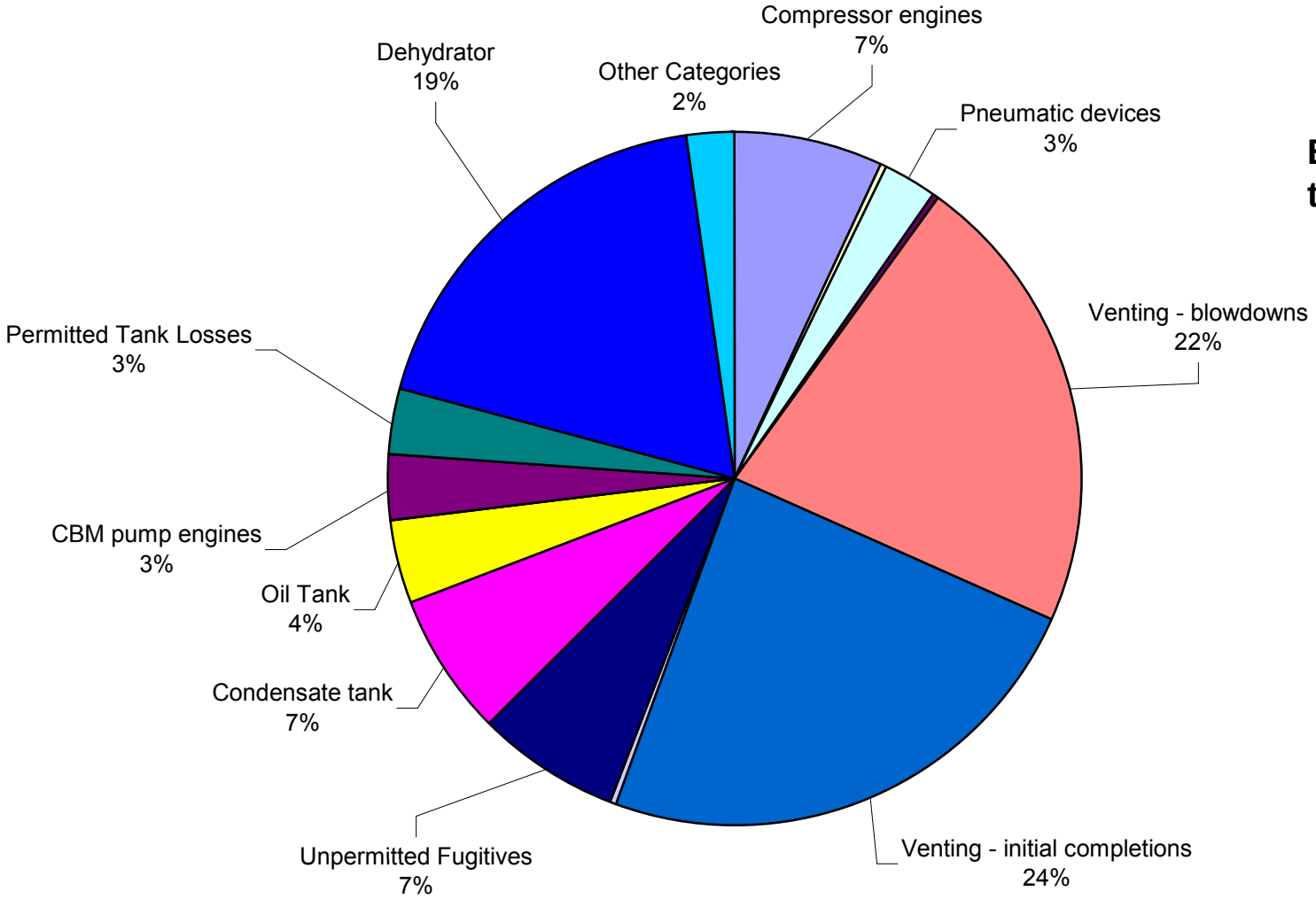


- **NOx emissions dominated by compressor engines with all other sources comprising approximately 16% of basin-wide NOx**

ENVIRON

Compressor Engines

South San Juan Basin 2006 Baseline Results
VOC Emissions By Source Category



Basin-wide VOC total: 60,697 (tpy)

- **Major VOC emissions source categories include well venting (completions and blowdowns) and dehydration collectively representing approximately 65% of basin-wide VOC emissions**

ENVIRON

Gas Dehydration

Examples of VOC Emissions Sources

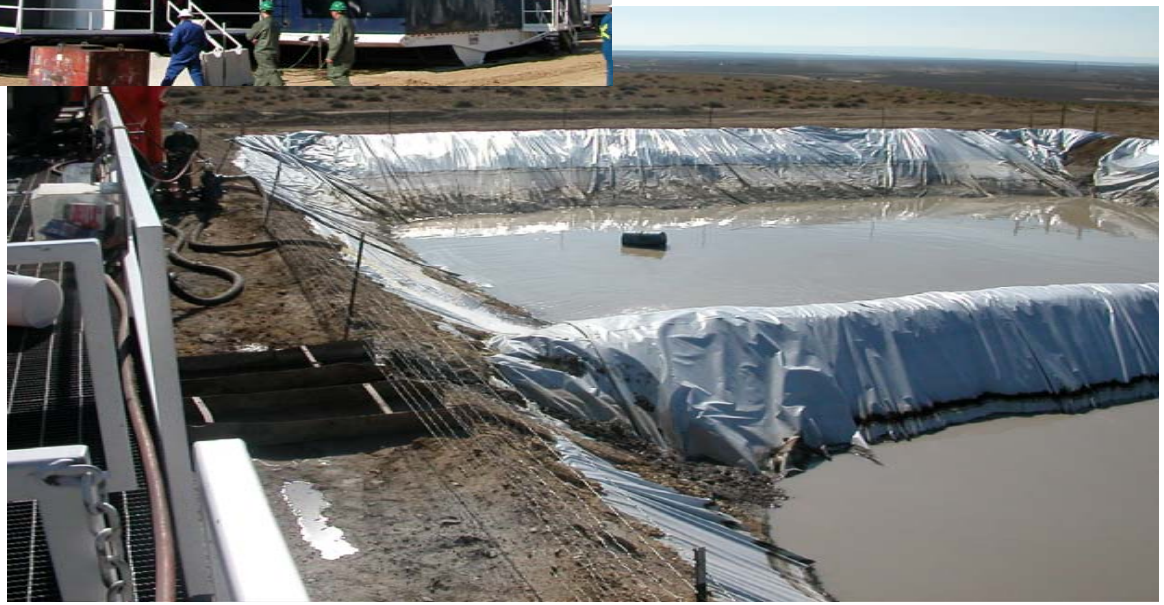


Figure 1. Two typical wellhead designs for wells using plunger lift.

Basin Comparisons

Basin	Well Count			Gas Production (MCF)		
	Total	CONV	CBM	Total	CONV	CBM
D-J Basin	19,841	19,841	0	234,630,779	234,630,779	0
Uinta Basin	6,881	6,018	863	331,844,336	254,219,432	77,624,904
Piceance Basin	6,315	6,225	60	421,358,666	420,165,237	1,193,429
North San Juan Basin	2,676	1,009	1,667	443,828,500	28,642,418	415,186,082
South San Juan Basin	20,649	16,486	4,163	1,020,014,851	520,060,869	499,953,982

Basin	Emissions (Tons/Yr)				
	NOx	VOC	CO	SOx	PM
D-J Basin	20,783	81,758	12,941	226	636
Uinta Basin	13,093	71,546	8,727	396	623
Piceance Basin	12,390	27,464	7,921	314	992
North San Juan Basin	835	69	321	1	10
South San Juan Basin	42,075	60,697	23,471	305	574

- South San Juan Basin has higher NOx emissions than other basins – likely due to the high usage of wellhead compression relative to other basins
- South San Juan Basin VOC emissions are comparable with other basins

Phase III Growth Estimates for South San Juan Basin 2006-2012

- Gas production projections were made from historical data
- Spud and well count projections were made using historical data and consultation with the major producers in the basin
- "On-the-books" regulations are considered which would impact 2012 emissions projections
  - Federal controls include Tier standards for non-road mobile sources (e.g. drilling rigs)
  - New Source Performance Standards (NSPS) for stationary spark-ignited engines
  - A locally implemented BLM condition of approval requiring 2 g/hp-hr NOx limit on RICE

Phase III Growth Estimates for South San Juan Basin

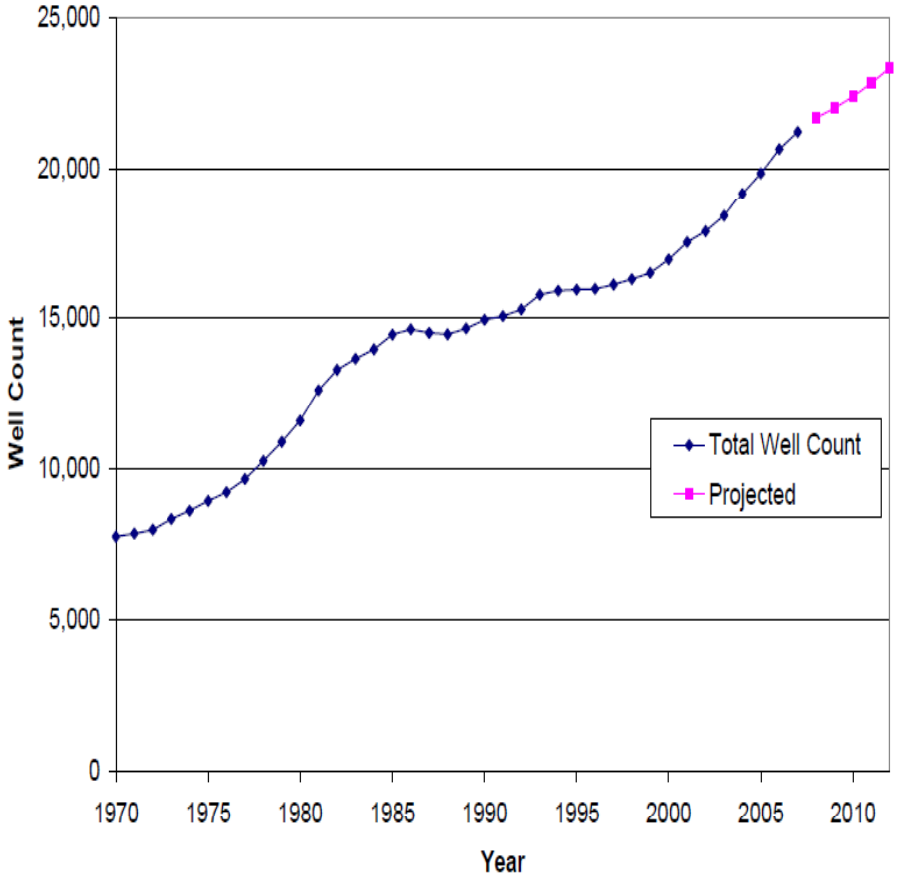


Figure 4. Total gas well count historical data (from the IHS database) for the South Basin and projections to 2012. [4]

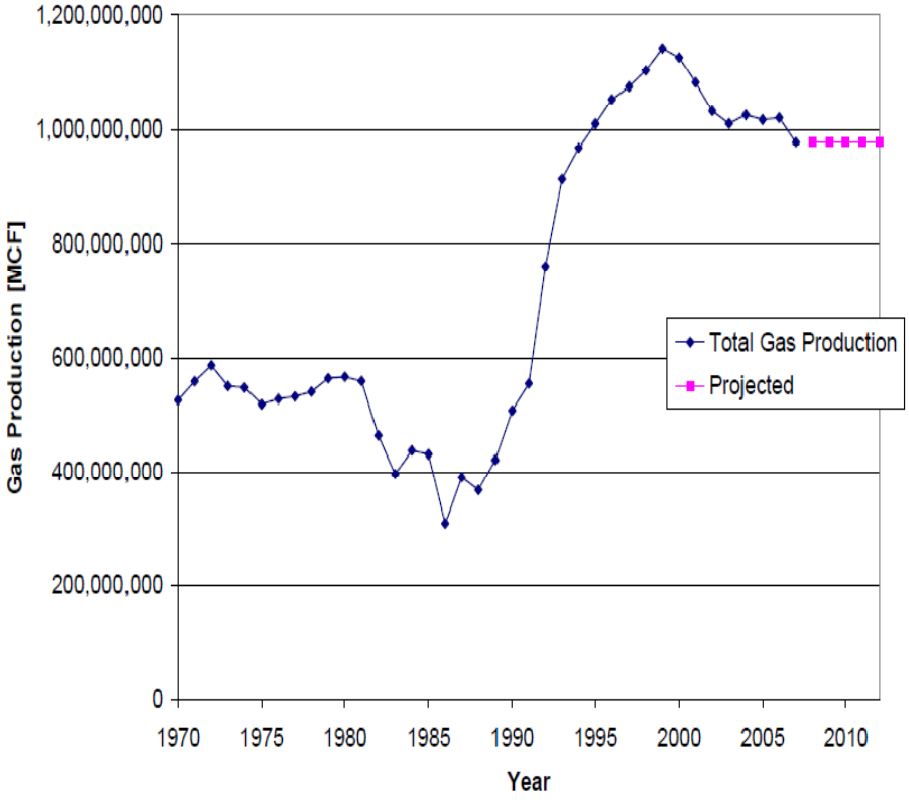
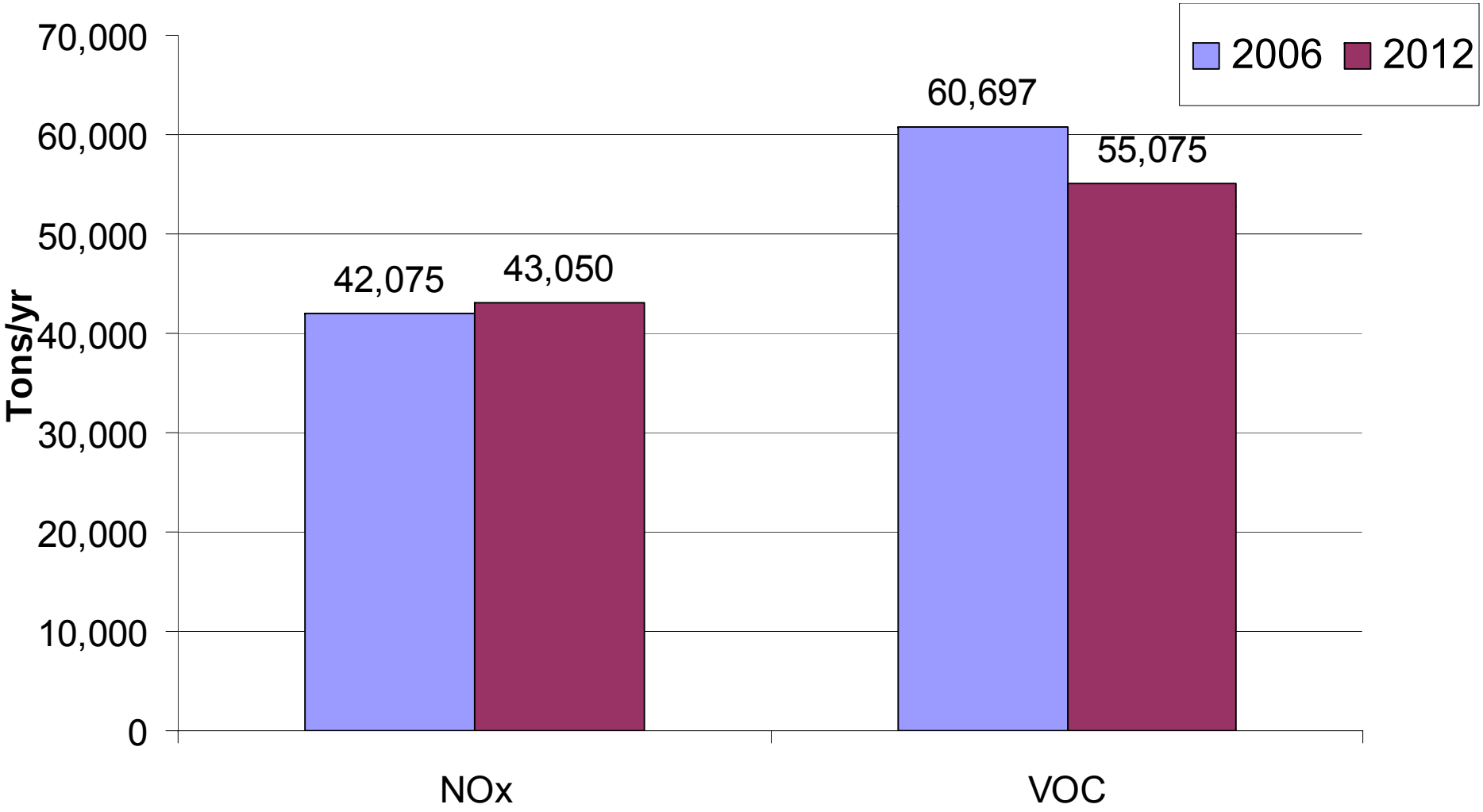


Figure 5. Total gas production historical data (from the IHS database) for the San Juan Ba and projections to 2012. [5]

Source: Bar-Ilan, A., et al., Development of baseline 2012 oil and gas emissions projections for the south San Juan Basin, pages 11,12.

South San Juan Basin 2006 Baseline Compared to 2012 Mid-term Emissions



Inventory as a Tool in NM Planning

- Ozone designation recommendation 2009
  - 2011
- Air Modeling Study for the Four Corners Region
  - 2005 basecase, 2018 future year
  - Control strategy assessments
- Control strategy selection
  - Use in rulemakings

Inventory Improvements / Next Steps

- WRAP is leading a pilot mobile source inventory in Piceance Basin.
  - To identify and quantify mobile source emissions for 2009 year
- NM plans to work with WRAP and other stakeholders
  - Integrate the WRAP Phase III Inventory into regional modeling and planning efforts that will be required as part of the new ozone standard (as funding is available)

Thank You

- Thanks to Tom Moore and the Western Regional Air Partnership for coordinating regional inventory and modeling work
- Thanks to Environ for their technical services
- Thanks to Western Energy Alliance for their collaboration and funding

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- WRAP Phase III website: http://www.wrapair.org/forums/ogwg/PhaseIII_Inventory.html
- New public WRAP website: http://www.wrapair2.org/