



# Oil and Gas Emissions Inventory (EI) Improvement Activities

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Presented to 19<sup>th</sup> International Emission Inventory Conference  
September 28, 2010



# Oil and Gas Emissions

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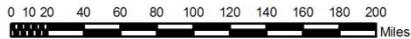
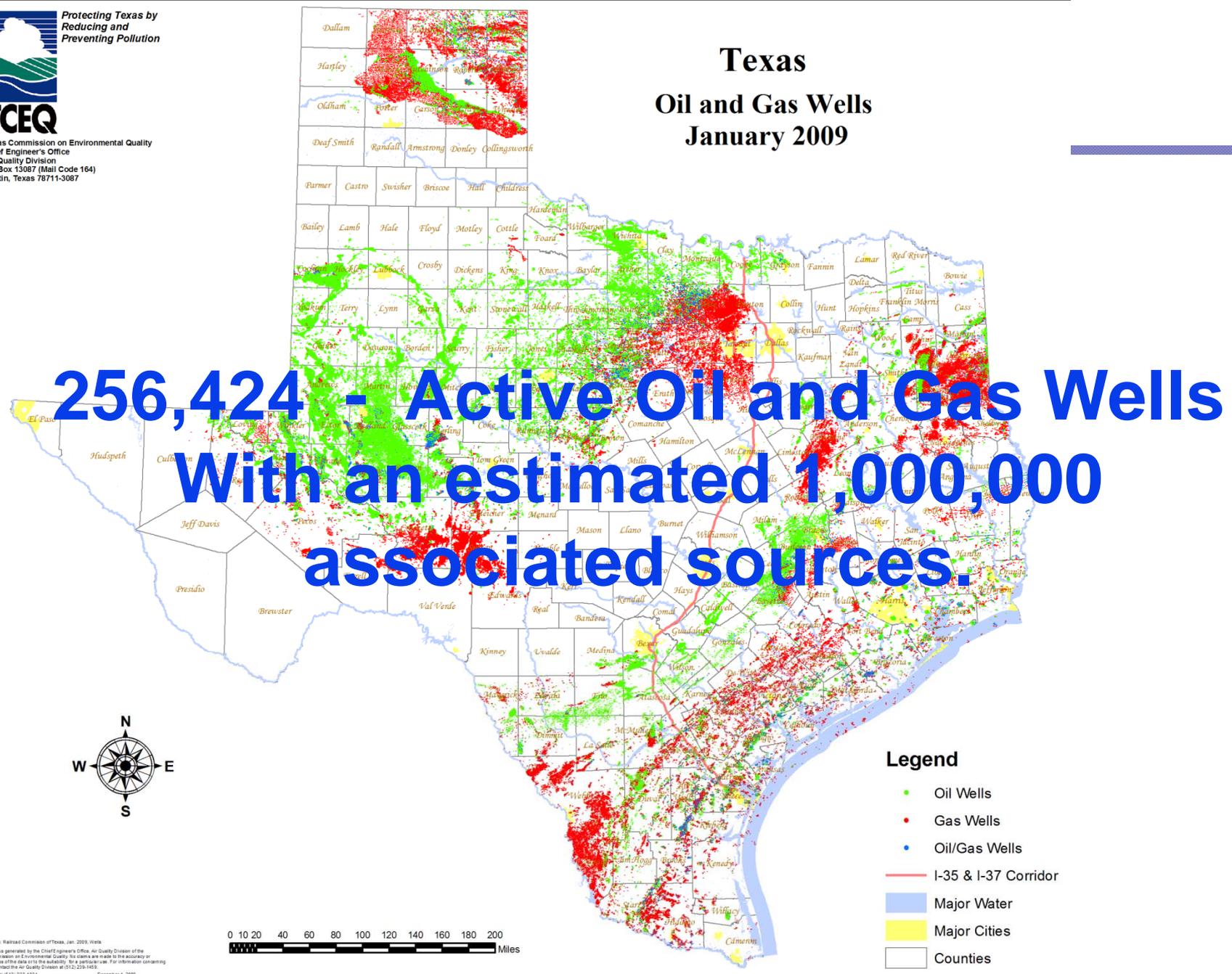
**“What’s coming out and how much?”**

It’s a real simple question,  
RIGHT?

# Texas

## Oil and Gas Wells

### January 2009



#### Legend

- Oil Wells
- Gas Wells
- Oil/Gas Wells
- I-35 & I-37 Corridor
- Major Water
- Major Cities
- Counties

Source Data: Railroad Commission of Texas, Jan. 2009; Wells  
This map was generated by the Chief Engineer's Office, Air Quality Division of the  
Texas Commission on Environmental Quality. No claims are made to the accuracy or  
completeness of the data or to the suitability, for a particular use. For information concerning  
this map, contact the Air Quality Division at (512) 239-1625.  
Dq: Heilbrunn (512) 239-1834 December 4, 2009



# Drilling Rigs





# Hydraulic Fracturing





# Compressor Stations





# Glycol Dehydration Unit





# Other Types of Operations or Equipment

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- Pump Jacks – Casing head gas
- Separators
- Turbines
- Flares
- Process vents
- Heaters/Boilers
- Blowdown vents
- Fugitives
- Salt water disposal
- Gas Plants
- Off-shore rigs, etc..., and



# Storage Tanks





# Oil and Gas EI Improvement Activities

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- Oil and Gas Model Evaluation
  - Evaluate methods, models, and related data
  - Texas-specific calculator for area inventory development
  - Expect to be posted October 2010
- Dallas-Fort Worth (DFW) Compressor Engine Project
  - Ambient measurements downwind of gas compressor engines
  - Develop typical compressor engine ambient signatures
  - Project schedule to be completed December 2010
- 2007 Engine Fleet DFW Nonattainment Area Survey
  - Information available upon request
- 2007 Southeast Texas Compressor and Dehydrator Survey
  - Information available upon request



# Oil and Gas EI Improvement Activities

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- 2005 Upstream Oil and Gas Tank Project
  - Measured emissions from oil and condensate tanks
  - Developed factor for area source emissions inventory
  - EPA approved Tank testing procedure needed
  - <http://projects.tercairquality.org/AQR/H051C>
- Flash Emissions Model Evaluation
  - Evaluated different methods for calculating oil and condensate tanks
  - Improved agency guidance
  - [www.tceq.state.tx.us/implementation/air/airmod/project/pj\\_report\\_ei.html](http://www.tceq.state.tx.us/implementation/air/airmod/project/pj_report_ei.html)



# Oil and Gas EI Improvement Activities

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- Produced Water Storage Tank Project
  - This area may need additional research
  - Limited available data
- EI Guidance Improvement
  - Comprehensive guidance documents
  - [www.tceq.state.tx.us/goto/ieas](http://www.tceq.state.tx.us/goto/ieas)



# Oil and Gas EI Improvement Activities

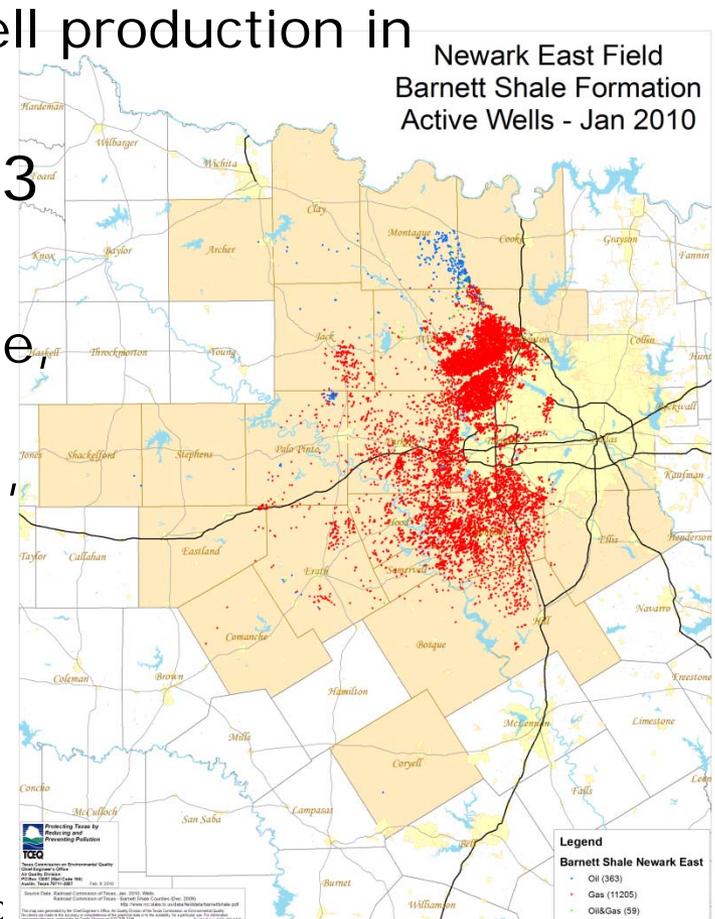
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- Drilling Rig Emissions Project
  - Activity data
  - Emissions characterization data
  - Used to develop the drilling rig emissions inventory for 2008
  - [www.tceq.state.tx.us/implementation/air/airmod/project/pj\\_report\\_ei.html](http://www.tceq.state.tx.us/implementation/air/airmod/project/pj_report_ei.html)
- Oil and Gas Platform Inventory Improvement Project
  - Oil and gas platforms in Texas water
  - Parallels federal platform inventories in Gulf of Mexico
  - [www.tceq.state.tx.us/implementation/air/airmod/project/pj\\_report\\_ei.html](http://www.tceq.state.tx.us/implementation/air/airmod/project/pj_report_ei.html)



# Barnett Shale Special Inventory

- Barnett Shale Formation Production\*
  - 13,902 total gas and 3,333 additional permitted wells (as of May 10, 2010)
  - Accounts for 25% of the gas well production in Texas for 2009
- The Barnett Shale includes 23 counties in DFW Area:
  - Archer, Bosque, Clay, Comanche, Cooke, Coryell, Dallas, Denton, Eastland, Ellis, Erath, Hill, Hood, Jack, Johnson, Montague, Palo Pinto, Parker, Shackelford, Somervell, Stephens, Tarrant, and Wise.



\* Railroad Commission of Texas data



# Barnett Shale Special Inventory

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- Barnett Shale, Phase One
  - Equipment count at county level
  - For more information:  
[www.tceq.state.tx.us/goto/ieas](http://www.tceq.state.tx.us/goto/ieas)



# Barnett Shale Special Inventory

10,393 leases responded to the Phase One inventory.

The equipment totals by source type:

Emission Source	Number of Sources
Separators Vented to Atmosphere	52
Total Oil Storage Tanks	841
Total Condensate Storage Tanks	4,185
Total Produced Water Storage Tanks	16,949
Total Slop Storage Tanks	138
Uncontrolled Glycol Dehydrators	30
Controlled Glycol Dehydrators	118
Total Stationary Engines	2,812
Turbines	15
Flares	40
Frac tanks	20
Piping Component Fugitive Areas	17,246
Process Vents	1,189
Blowdown Vents	9,022
Heaters/boilers	623
Other Stationary Equipment	1,286
<b>Total Emission Sources</b>	<b>54,566</b>



# Barnett Shale Special Inventory

Point source emissions inventory equipment counts for the 23 county Barnett Shale area.

Emission Source	Equipment Counts
Separators Vented to Atmosphere	*
Total Oil Storage Tanks	*
Total Condensate Storage Tanks	*
Total Produced Water Storage Tanks	*
Total Slop Storage Tanks	*
Total Storage Tanks	651
Uncontrolled Glycol Dehydrators	81
Controlled Glycol Dehydrators	64
Total Stationary Engines	900
Turbines	22
Flares	38
Frac tanks	*
Piping Component Fugitive Areas	307
Process Vents	*
Blowdown Vents	191
Heaters/boilers	277
Other Stationary Equipment	486
<b>Total Emission Sources</b>	<b>3,017</b>

\*Equipment counts could not be determined for the indicated sources from point source inventory data.



# Barnett Shale Special Inventory

Barnett Shale equipment Totals for all inventory types.

<b>Emission Source</b>	<b>Number of Sources</b>
Separators Vented to Atmosphere	52
Total Storage Tanks	22,764
Uncontrolled Glycol Dehydrators	111
Controlled Glycol Dehydrators	182
Total Stationary Engines	3,712
Turbines	37
Flares	78
Frac tanks	20
Piping Component Fugitive Areas	17,553
Blowdown Vents	9,213
Process Vents	1,189
Heaters/boilers	900
Other Stationary Equipment	1,772
<b>Total Emission Sources</b>	<b>57,583</b>



# Barnett Shale Special Inventory

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Phase Two will collect for emission sources:

- Equipment and production information
- Air emissions authorizations
- The proximity to the nearest off-site receptor
- Annual 2009 emissions for nitrogen oxides, volatile organic compounds, and hazardous air pollutants

Due December 31, 2010

For more information visit: [www.tceq.state.tx.us/goto/ieas](http://www.tceq.state.tx.us/goto/ieas)



# **Another Simple Question:**

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## **“What are you going to do with the data?”**

- Air Quality Planning:
  - Establishing baseline emission levels
  - Calculating emission reduction targets
  - Control strategy development
  - Tracking actual reductions against established emissions growth and control budgets
  - And cost and benefit analyses
- Air Quality Modeling and Assessment
  - Inputs in the photochemical modeling process
  - Trends analyses in SIPs

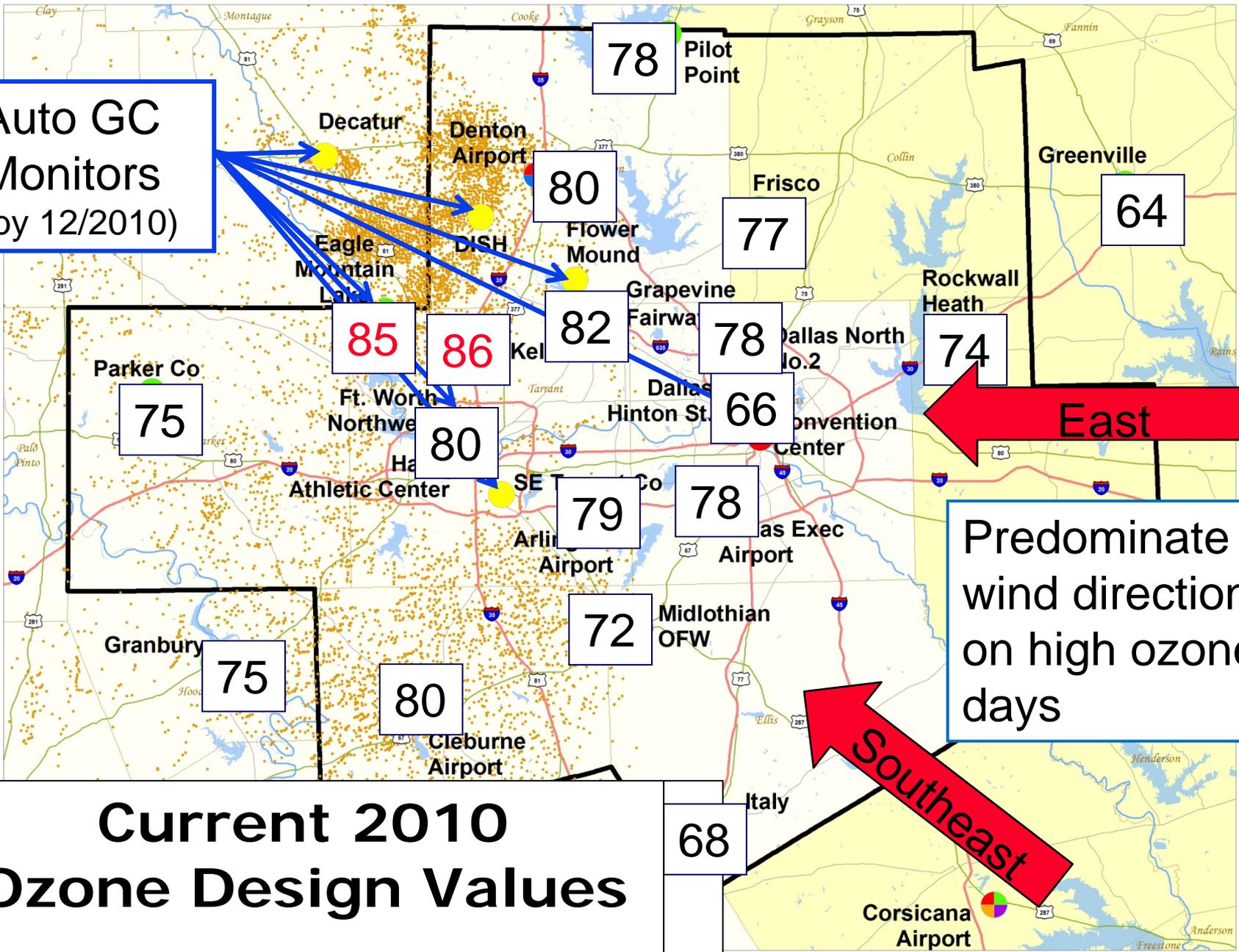


# “What are you going to do with the data?”

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- Regional Offices
  - High risk areas for future investigations
  - Source tracking of complaints
  - Possible locations for future monitoring efforts
- Permitting
  - Assist in permit reviews
  - Assessing major site modifications
  - Historical emission dispersion modeling
  - Helping with rule development
- Toxicology Reviews

**Auto GC  
Monitors  
(by 12/2010)**

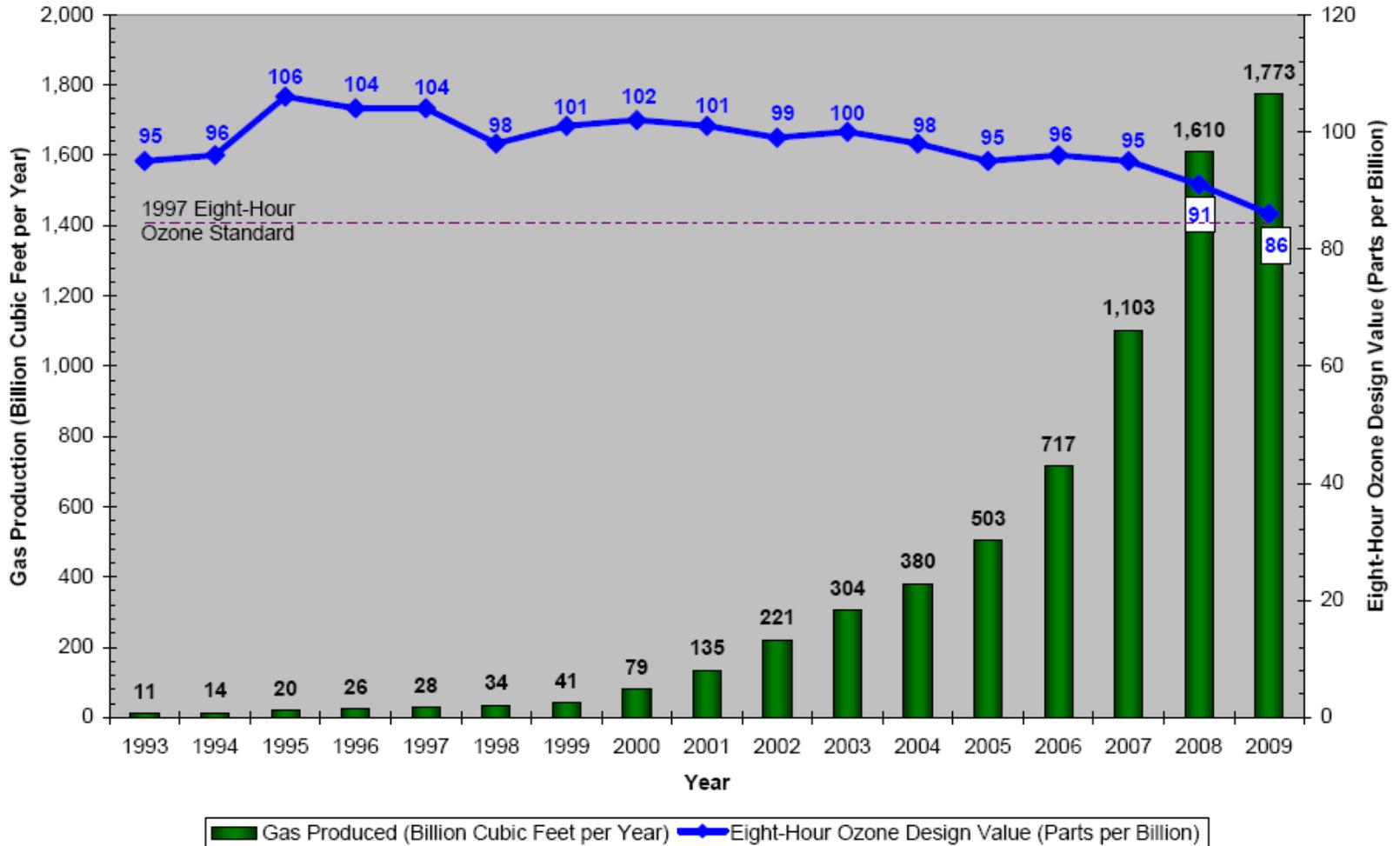


**Current 2010  
Ozone Design Values**



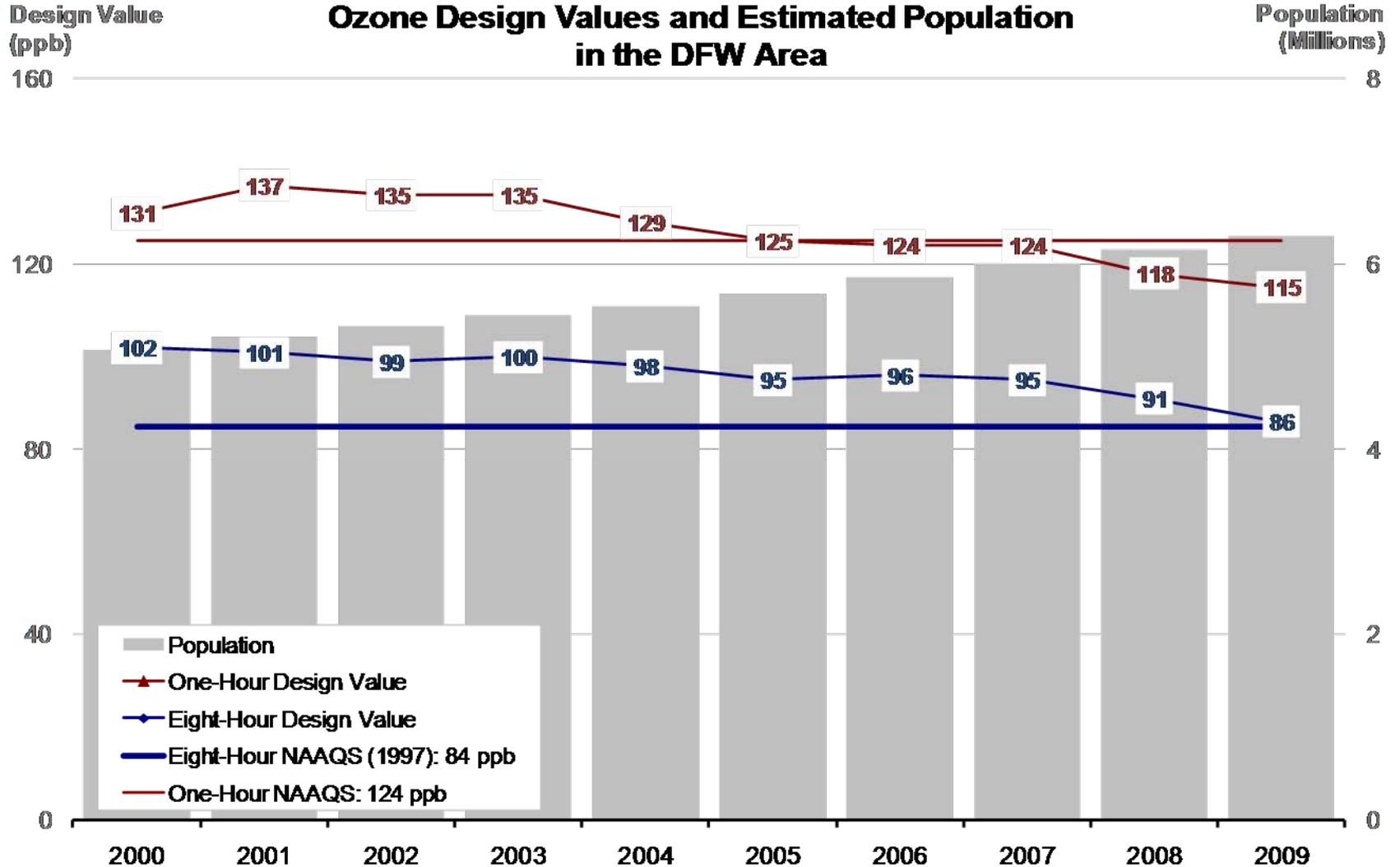
# DFW Ozone Design Values and Barnett Shale Production

Dallas-Fort Worth Ozone Design Values Compared to Barnett Shale Natural Gas Production





# DFW Ozone Design Values with Population

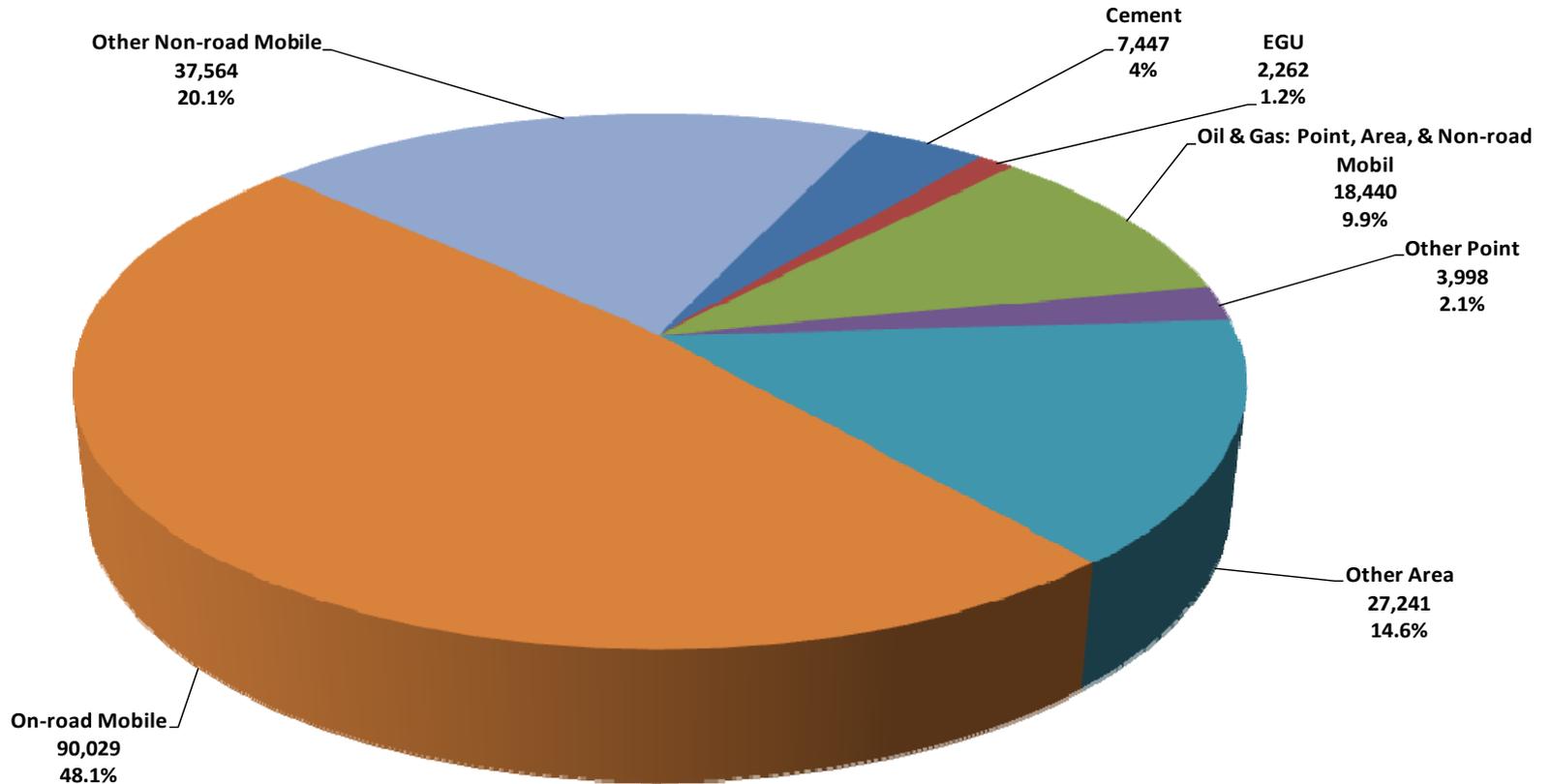


\*Source: Ozone – EPA's AQS database.

Population – U.S. Census Bureau, Population Division



# 2008 DFW Nonattainment Area NOx Emissions (tpy) by Category



TCEQ Contact: Adam  
Bullock  
Chart Updated: 07/19/10

Preliminary data - currently under review



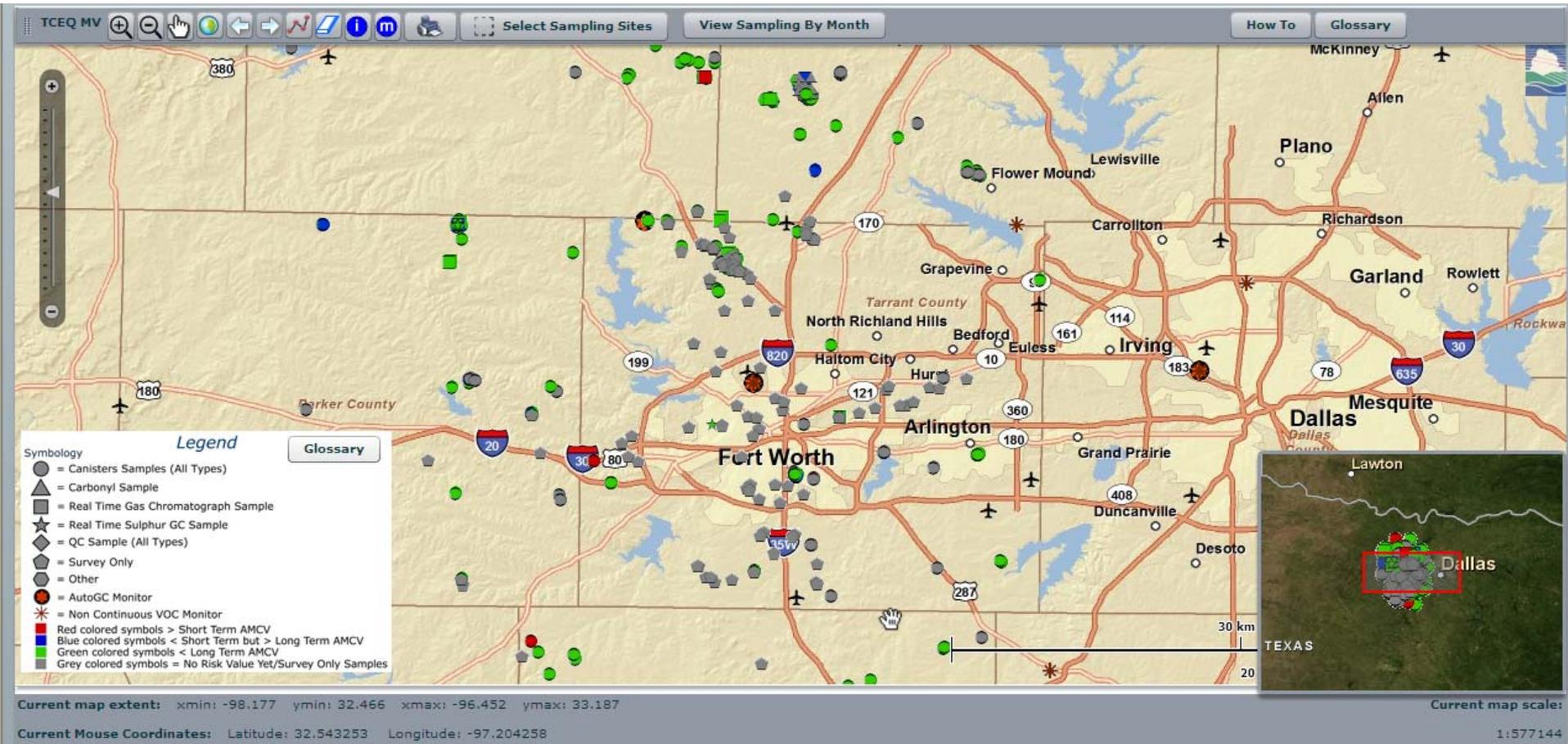
# Additional Barnett Shale Information

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- Barnett Shale website:
  - [www.tceq.state.tx.us/implementation/barnettshale/bshale-main](http://www.tceq.state.tx.us/implementation/barnettshale/bshale-main)
- Sign up for e-mail updates on Barnett Shale related news items:
- Barnett Shale interactive air sampling map viewer:
  - [www.tceq.state.tx.us/implementation/barnettshale/bshale-viewer](http://www.tceq.state.tx.us/implementation/barnettshale/bshale-viewer)



# Barnett Shale Interactive Map Viewer





# Questions?

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## Answers???

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