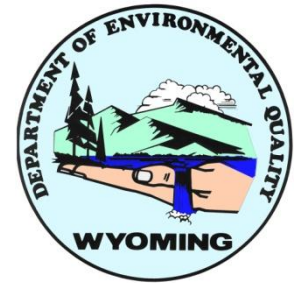

WDEQ

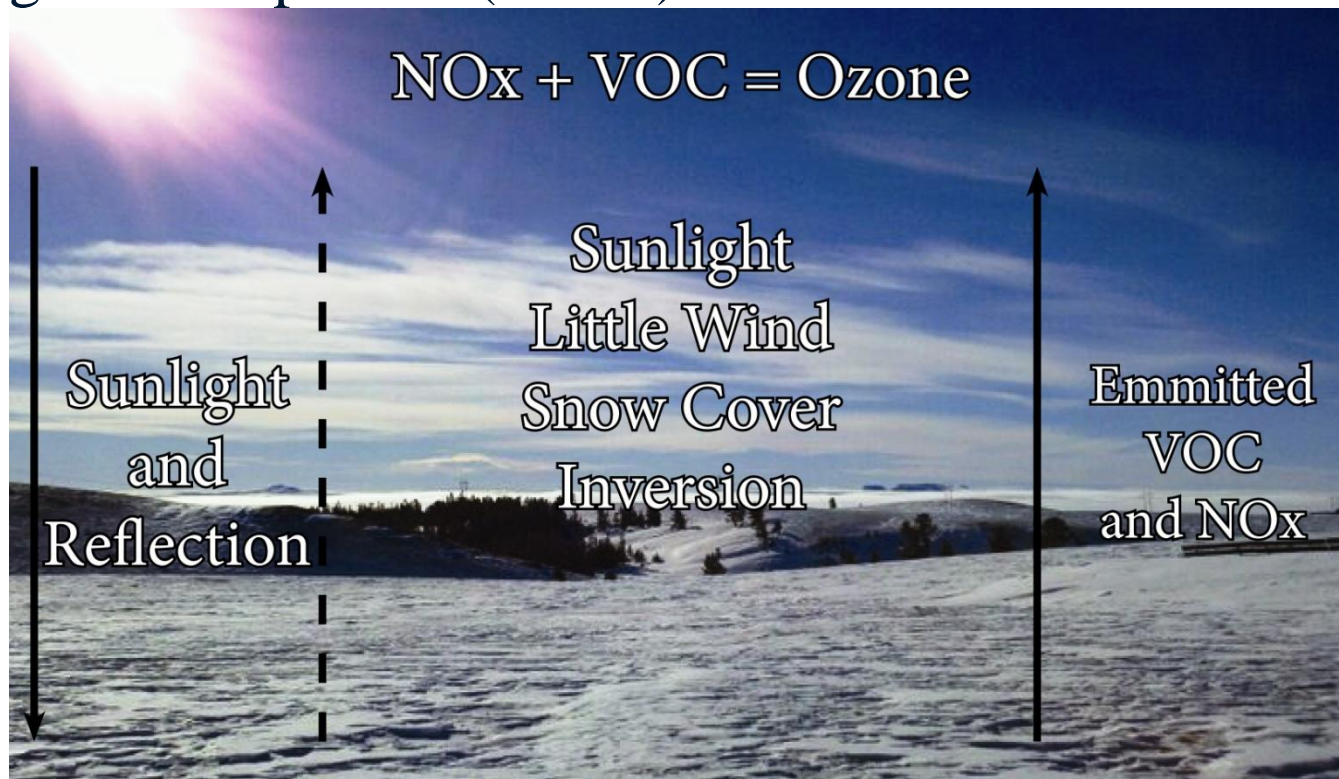
Winter Ozone Update

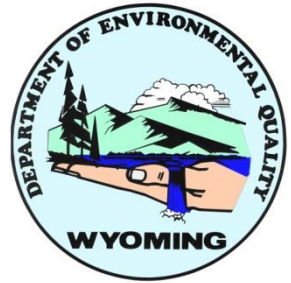
March 22, 2011
Public Meeting
Pinedale, WY



What is Ground Level Ozone

- ◆ A secondary pollutant formed by complex photochemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs).

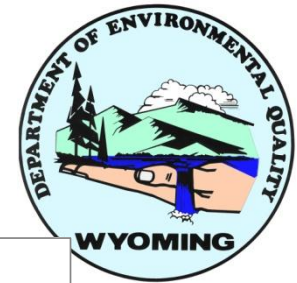




What is WDEQ Doing to Reduce Ozone in Sublette County?

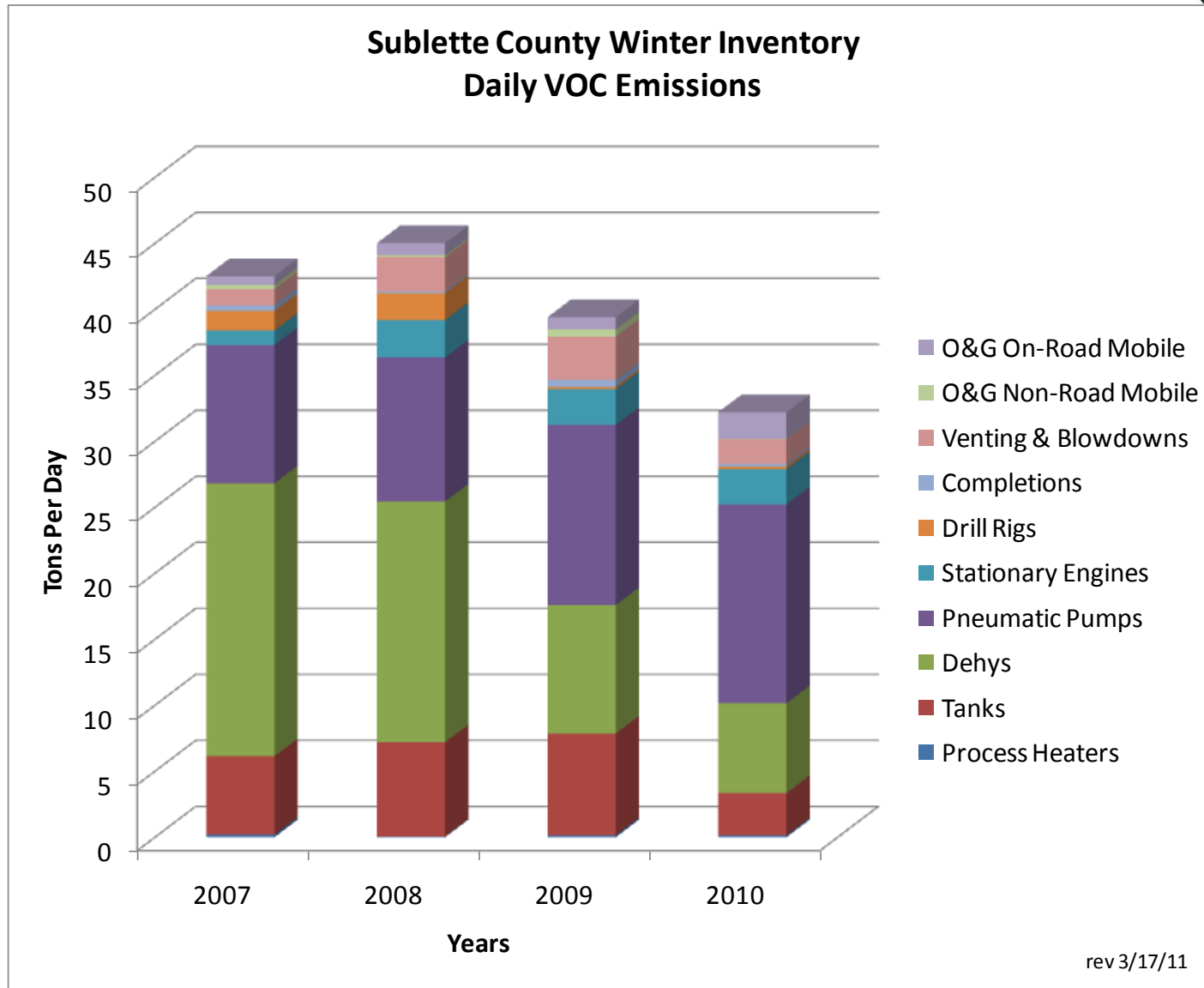
- ◆ Interim Policy (e.g., offsets) and Tighter BACT*
- ◆ Accelerated management of emissions from sources without controls
- ◆ Increased inspections
- ◆ Permitting drill rigs in Jonah – Pinedale Development Area (JPDA)
- ◆ Contingency Plans
- ◆ Studies

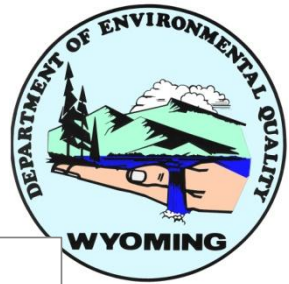
*Best Available Control Technology



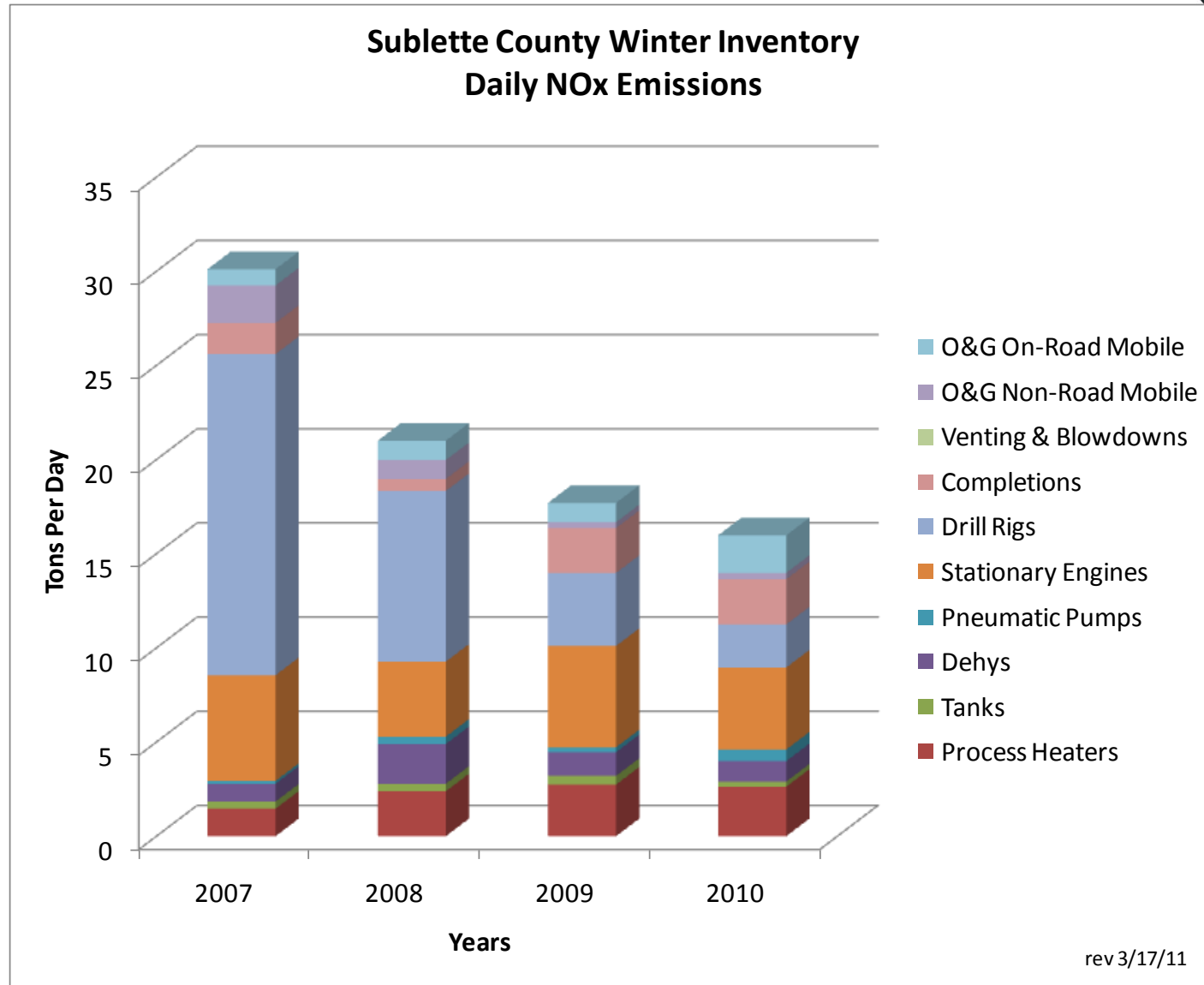
Emissions of Volatile Organics Declining

Note: Fugitives and emissions from truck loading excluded





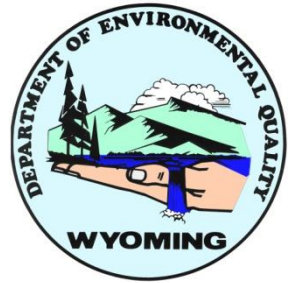
Emissions of Nitrogen Oxides Declining





Observations Made on Ozone Advisory Days (Ozone Contingency Plan Implementation Days)

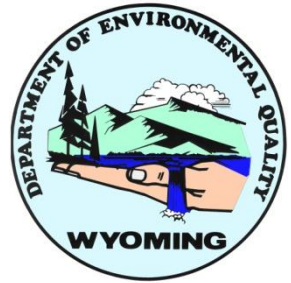
- ◆ Overall: Decreased Activity when compared to No-Advisory Days
- ◆ Non-Communication with Contractors
- ◆ Condensate and Water Trucks Hauling; but less than usual
- ◆ Active Construction
 - Decreased substantially (March 4 to March 18 observations)
- ◆ Potential Non-Compliance on Venting Tanks and Dehydration Units
- ◆ Construction Activities on Paradise Road
 - Ceased on Advisory Days (after March 10)
- ◆ Idling: Semi trucks (condensate, water, frac, drilling, etc.) and personal vehicles
 - In town and in the field



Winter Ozone Forecasting

- ◆ January 3 – March 31, 2011
 - 7 days a week by DEQ-AQD staff and contract meteorologists
- ◆ Based on weather forecasts
 - Wind, snow cover, pressure fronts, cloud cover
- ◆ DEQ webpage updated daily for the following day's forecast
 - <http://deq.state.wy.us/aqd/Ozone%20Main.asp>
- ◆ Ozone Advisory
 - Issued when weather conditions appear to be favorable for the formation of elevated 8-hour ozone.
 - Notification to Local media; Local government, schools, senior centers; Industry (to trigger ozone contingency plans)

DEQ Collaboration & Research



- ◆ DEQ Held Ozone Technical Forums (2009 & 2010)
- ◆ DEQ Formed Technical Advisory Group (2010, ongoing)
- ◆ Research
 - Meteorological Modeling (underway)
 - Reactivity Study (underway)
 - Photochemical Grid Modeling (pending)
 - Modeling Analysis of VOC and NO_x Concentration Fields (underway)
 - Climatology Study (underway)



2011 Preliminary Data

(as of 3/20/2011)

10 Advisory Days

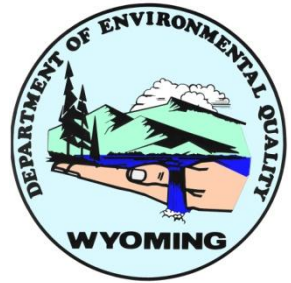
- ◆ February 28
- ◆ March 1, 2, 4, 5, 10, 13, 14, 15, 18

13 Elevated 8-Hour Ozone Days

- ◆ February 14, 15, 21
- ◆ March 1, 2, 3, 5, 6, 9, 10, 12, 14, 15

2011 Preliminary Raw Data (as of 3/20/2011)				
Monitored Ozone Top Four 8-Hour Daily Maximum (ppb)				
Wyoming Range	Pinedale	Daniel 2011 (2008)	Boulder 2011 (2008)	Juel Spring
84	90	85 (76)	124 (122)	95
81	84	80 (76)	121 (104)	86
80	81	77 (74)	116 (102)	85
73	77	76 (74)	104 (101)	77

NOTE: Three (3) year average of 4th high 8-Hour Daily Maximum is compared to NAAQS.



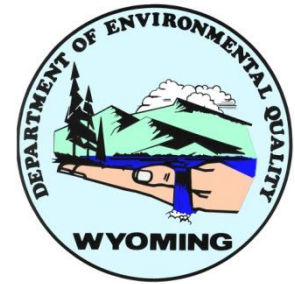
Much Effort But Not Enough

- ◆ Collect the appropriate scientific data
 - Amount of VOCs and NO_x produced and monitored
 - Where and when the VOCs and NO_x are produced
 - Weather data unique to the Upper Green River Basin
- ◆ Implement policies to reduce precursor emissions
- ◆ Industry coordination
 - Contingency planning
 - Voluntary reductions
- ◆ Forecasting and Ozone Advisories
- ◆ Use scientific data and develop models to reproduce actual ozone formation, in order to design more focused reduction strategies



What is WDEQ Considering to Further Reduce Ozone in Sublette County?

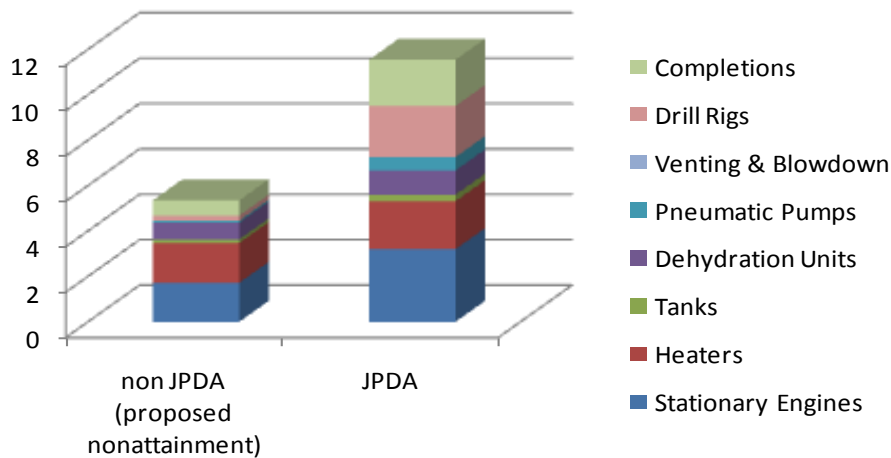
- ◆ Further reduce NO_x and VOC emissions
 - Existing equipment that does not meet current BACT
 - Drill rigs outside JPDA
 - Completion equipment
 - Review presumptive BACT requirements
 - Minimize emissions foot print
 - Electrification, LGS, Operation changes
- ◆ Contingency plans
 - Review existing
 - Increase participation in Sublette County
- ◆ Operational changes during winter ozone months
- ◆ Work with industry on additional voluntary reductions



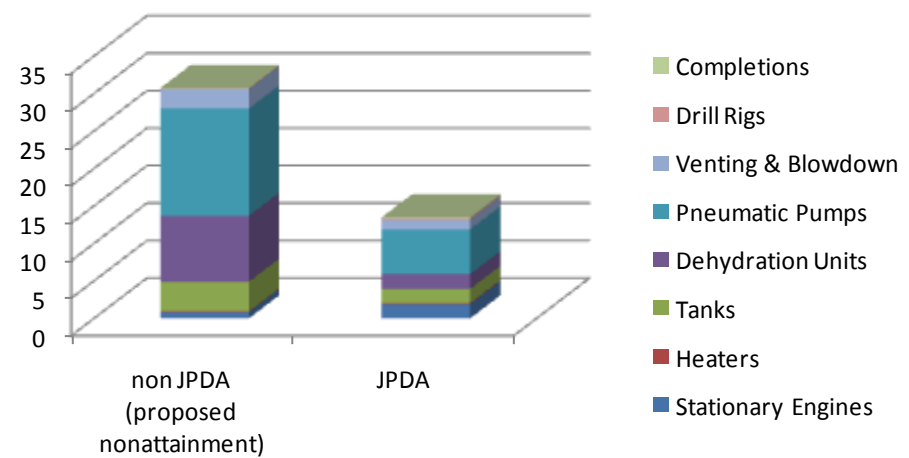
Emissions Comparison

Non JPDA vs JPDA within Proposed Nonattainment Area

**2010 Winter Inventory
Proposed Non-Attainment Area
NO_x (tpd)**

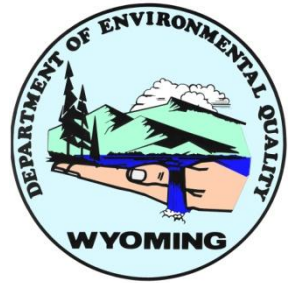


**2010 Winter Inventory
Proposed Non-Attainment Area
VOC (tpd)**



Notes:

1. Feasibility evaluation of control on Non JPDA sources is necessary before estimating amount of improvement for VOC and NO_x reduction.
2. Regulatory authority very limited.



Regulatory Authority / Challenges

- ◆ Non-road diesel engines (e.g., drill rigs, completion engines)
 - Regulated by EPA under the Non-Road Diesel Rule
 - WAQSR Permitting requirements only apply to stationary sources
- ◆ Existing uncontrolled minor sources
 - Chapter 6, Section 2 (minor sources)
 - Only applies to new or modified sources
- ◆ Shutdown operations
 - No authority in WAQSR
 - § 35-11-115 Environmental Quality Act