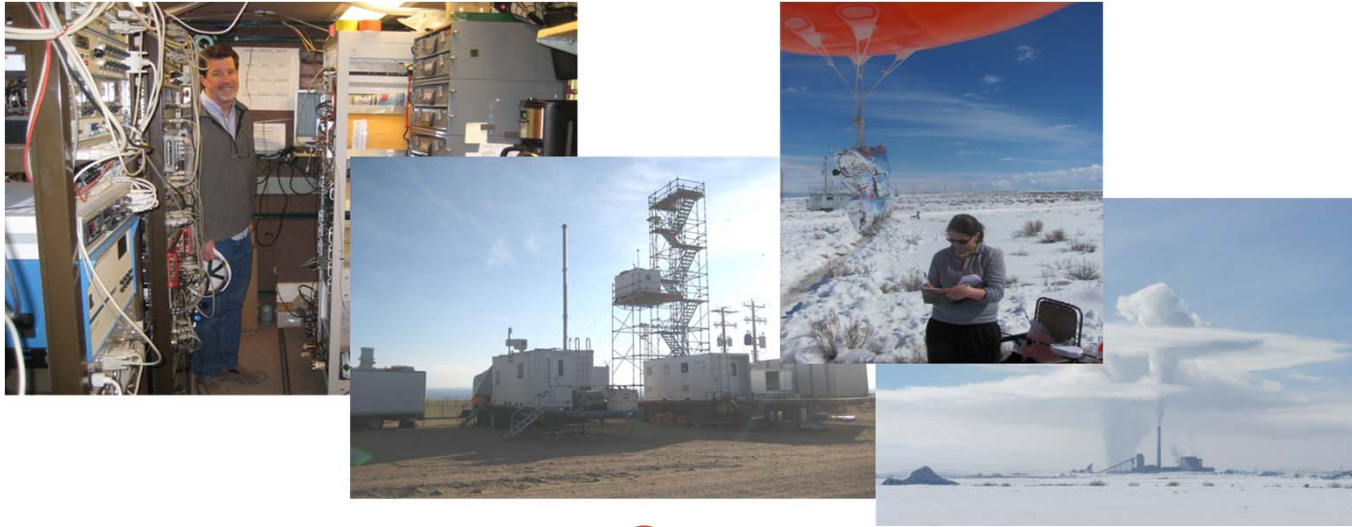


UINTAH BASIN OZONE
STAKEHOLDER MEETING
JULY 30, 2013, 3:00-5:00

DEQ Board Room
195 N 1950 W, Salt Lake City, UT

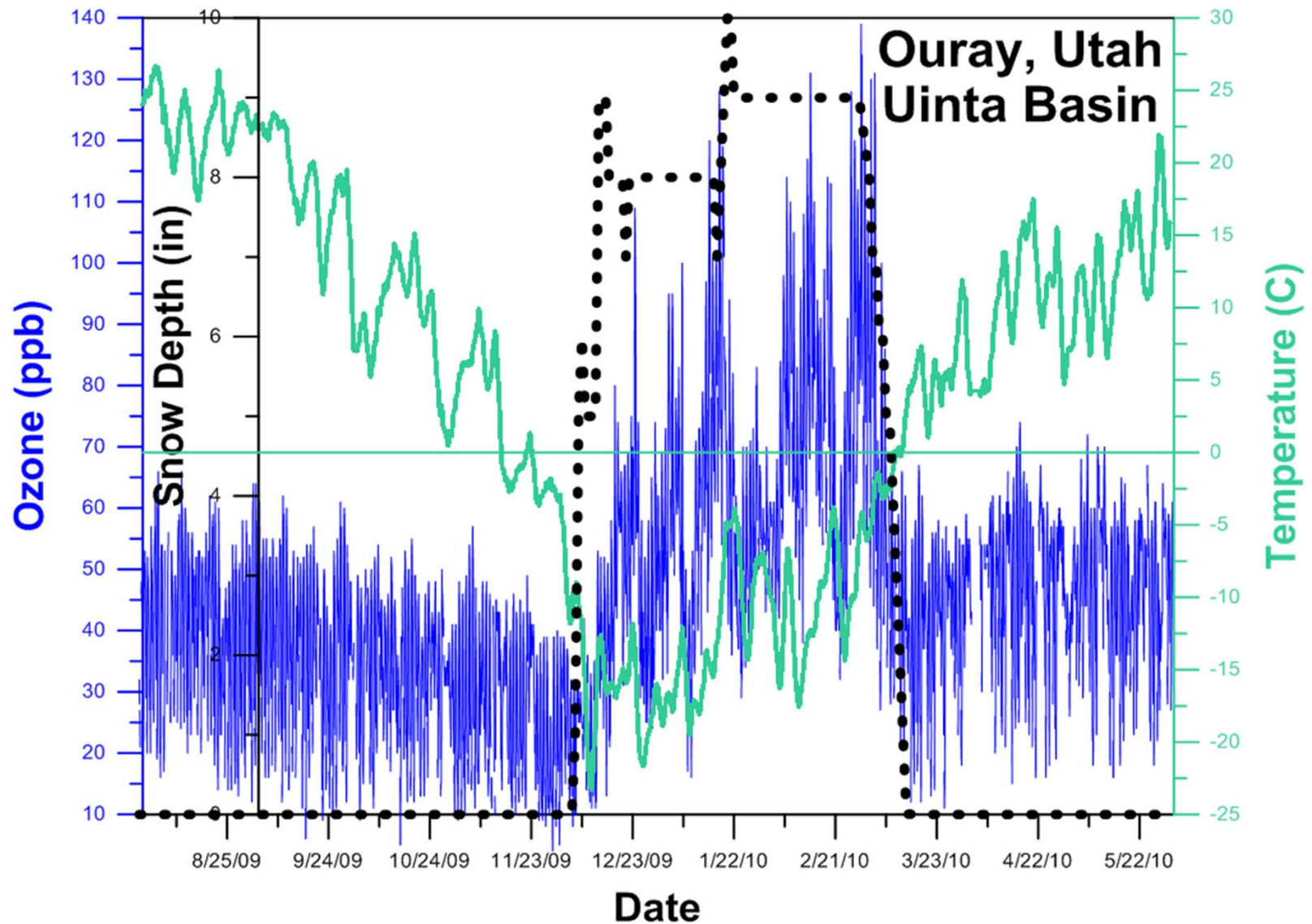


Uintah Basin Winter Ozone

- Monitoring in the Basin since 2009
- High ozone during winter – unique
- Episodic – with specific weather conditions
- High year-to-year variability
- Currently designated “unclassifiable”
- Special winter ozone studies – past 3 winters
- Apply findings to mitigation – Ozone Advance

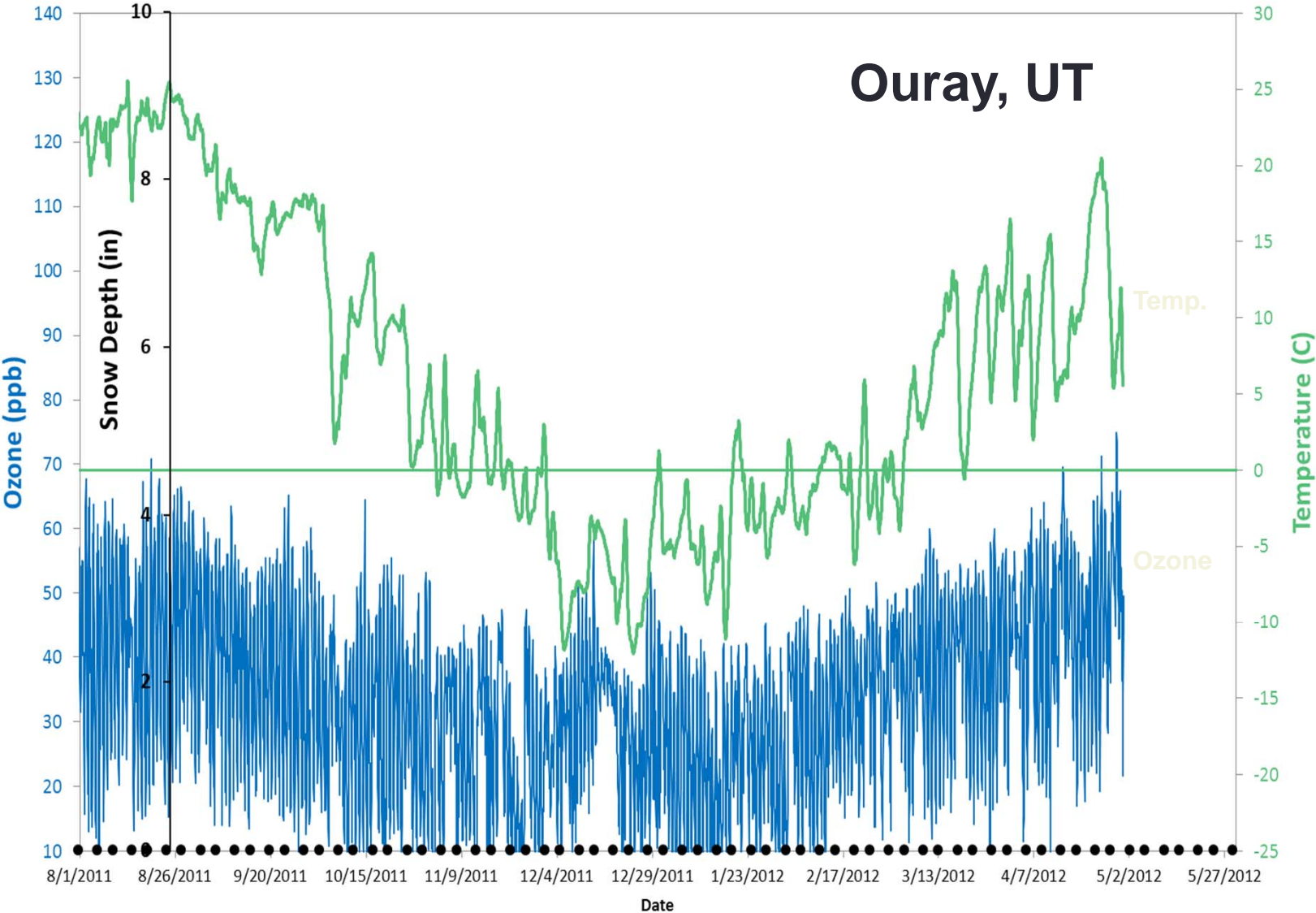


Ozone, Temperature and Snow Depth 2010/2011

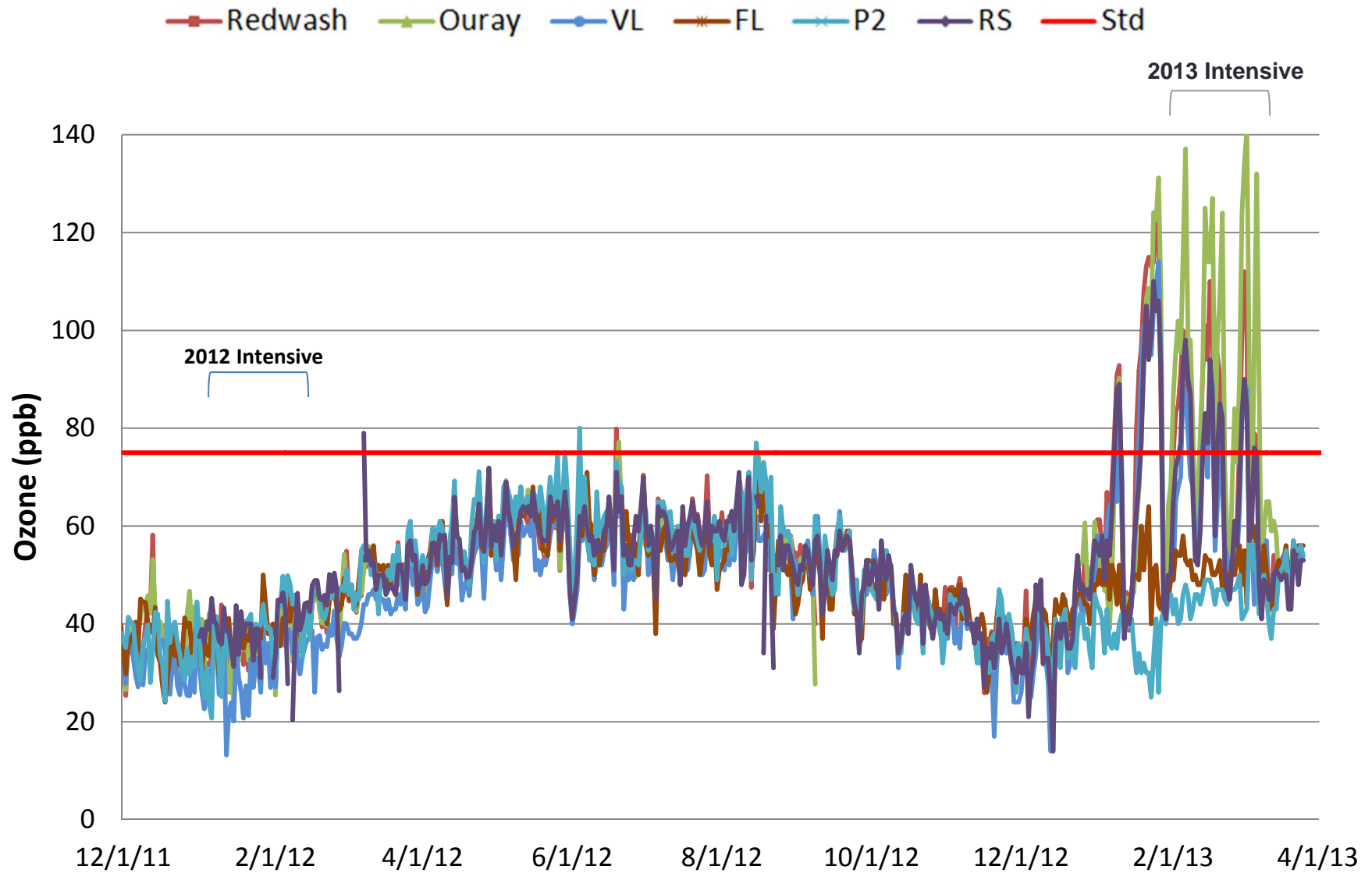


Source: Russ Schnell, Director, Observatory Operations, NOAA/CMDL

Ozone, Temperature and Snow Depth 2011/2012

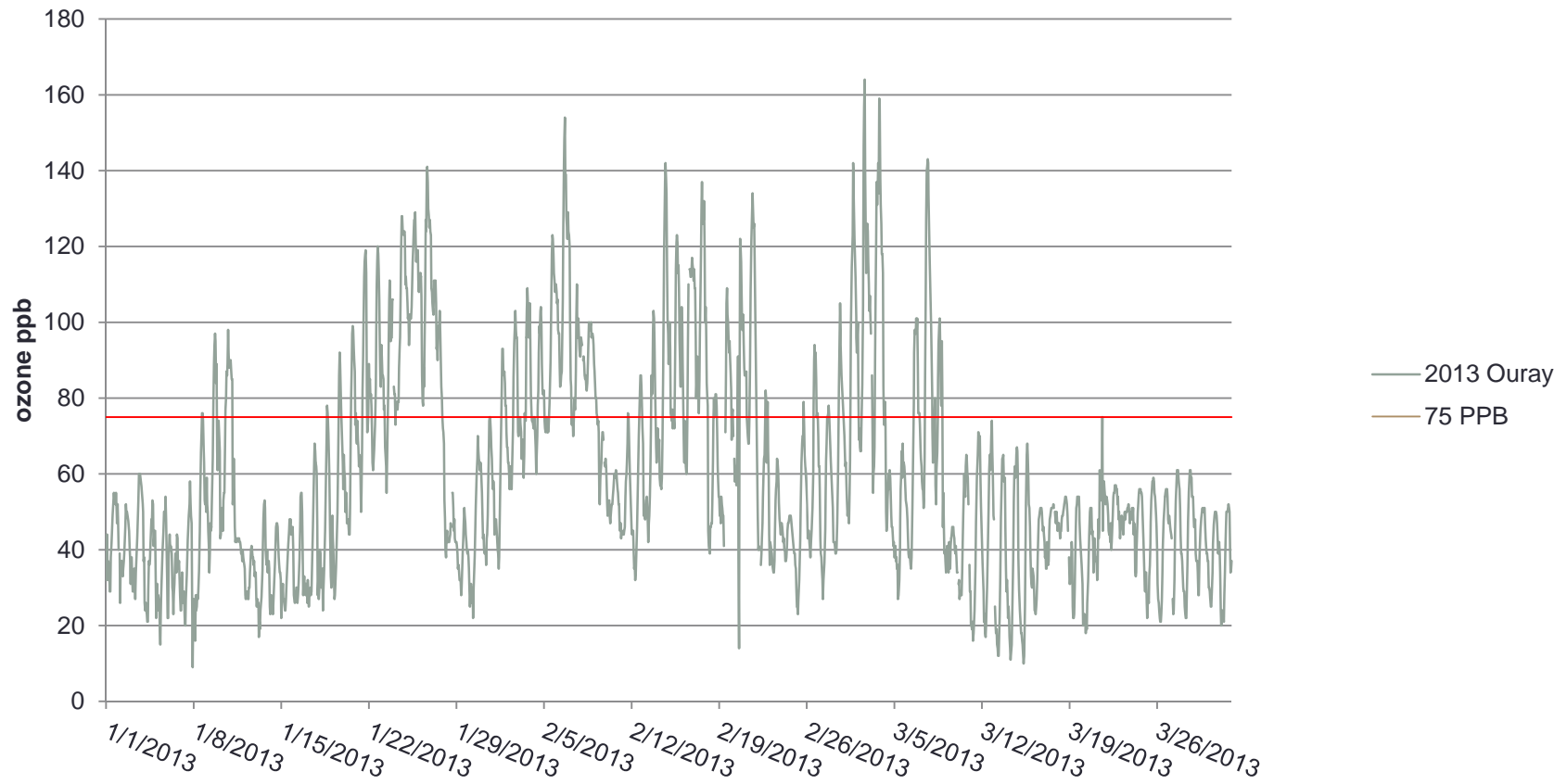


Ozone Concentration, 8-hr



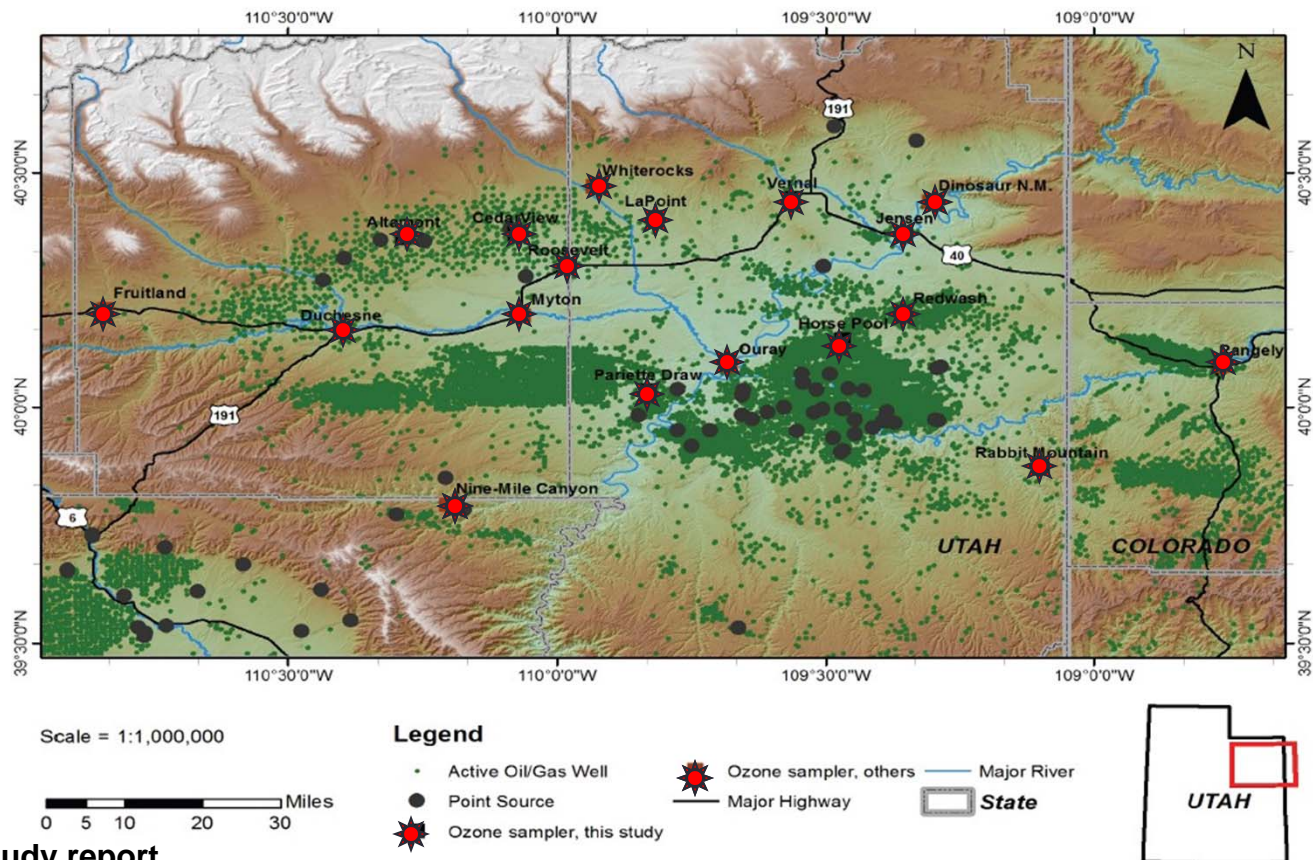
Distinct Winter Events, Episodic

Uintah Basin - 2013 Ouray Hourly (*not QA)



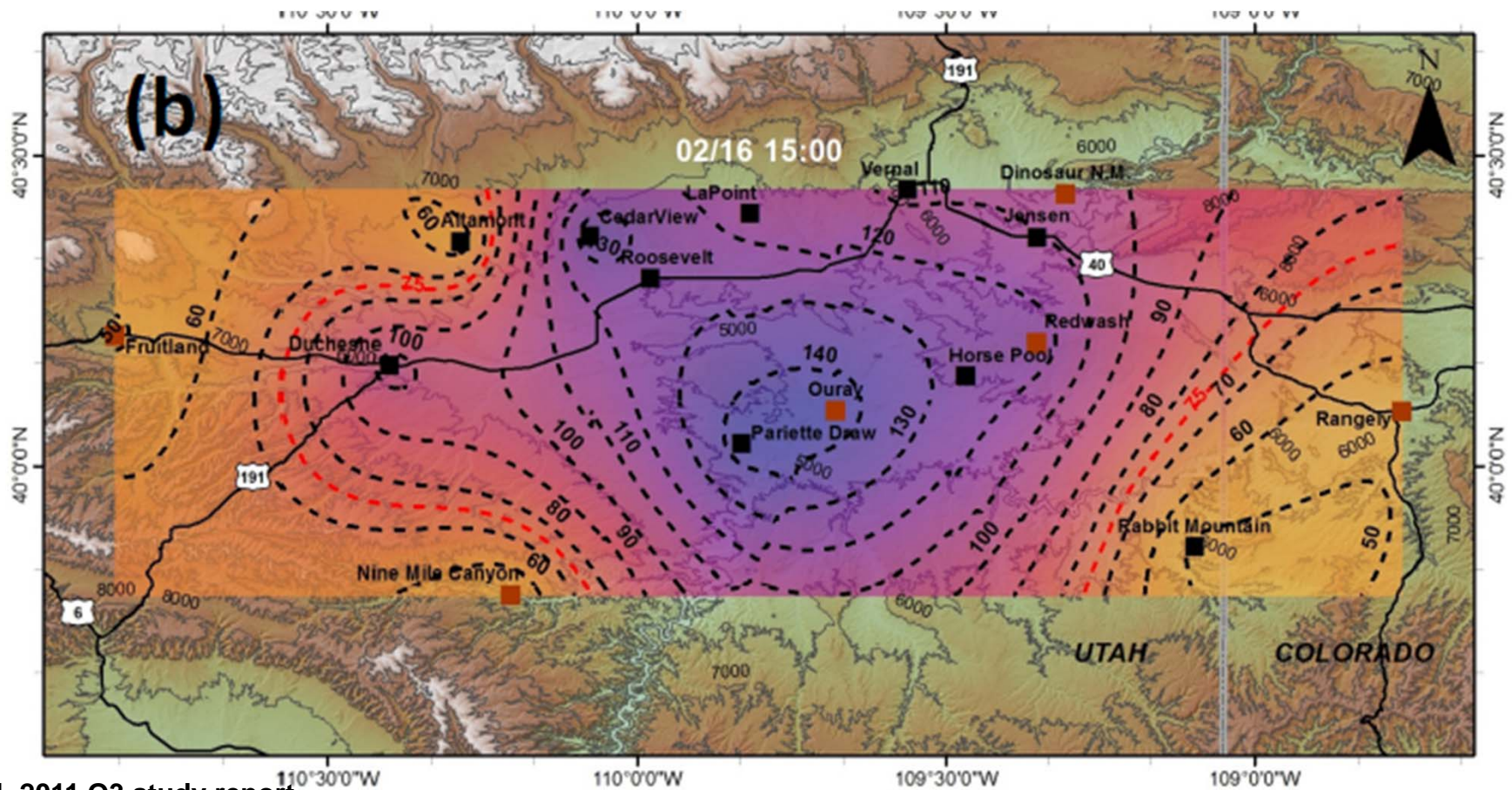
Special Winter Ozone Monitoring Studies 10/11, 11/12, 12/13

- 8 permanent and 10 portable sites
- O₃, PM_{2.5}, NO_x and Met, VOC sampling



USU/EDL Special Monitoring Study Winter 2010/2011

- Ozone 1-hour at 3 pm Feb 16, 2011
- Basin-wide O₃



Horse Pool Super Site

Installation of scaffold tower and monitoring pod



Horse Pool Super Site

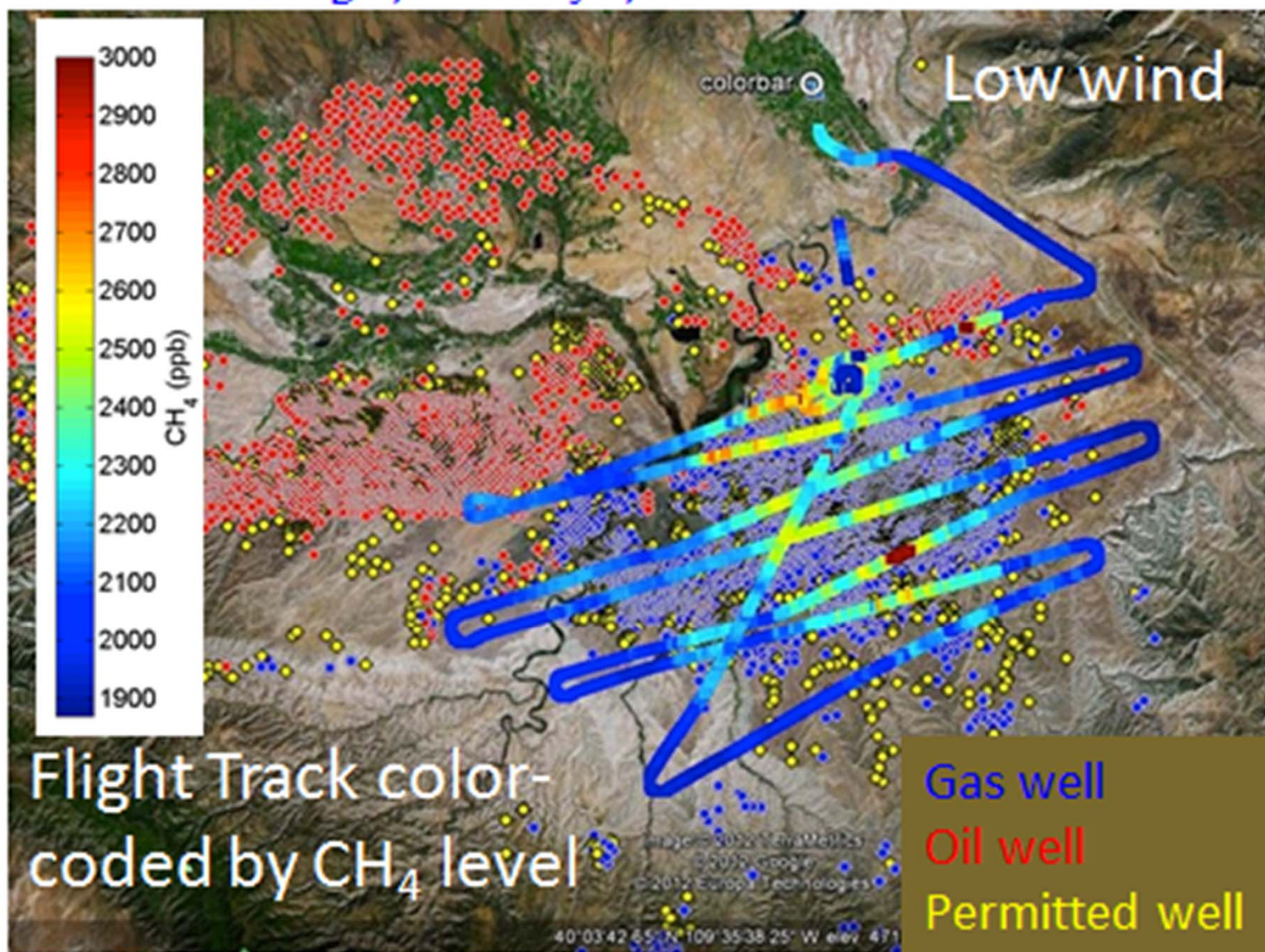
Monitoring equipment in monitoring pod



Winter O₃ Intensive Study Components

- Aircraft Basin-wide Measurements: O₃, NO_x and Speciated VOC
- Vertical Profiling of Meteorological Parameters, O₃, NO_x, and Total Hydrocarbons using Tethered Balloon
- Wintertime Ozone Formation Chemistry at Horse Pool
- Atmospheric Boundary Layer and Recirculation Characterization Basin-wide
- Long-Term Trends Wintertime Monitoring for Ozone, and Key Precursor Species – Roosevelt and Horse Pool “Super Sites”
- Photochemical Modeling of the Basin’s Airshed

Uintah Basin Flight, February 7, 2012



Summary

- Issue with winter ozone in the Basin
- Only occurs under specific conditions
- Cooperative effort to understand formation
- Let science lead the strategies
- Proactive effort through Ozone Advance
- Improve health / avoid nonattainment / lower design value

Early Reductions Will Benefit Uintah Basin

- Improve public health
- More time to solve the problem
- Reduce the design value for a potential future SIP
 - The CAA requires areas to be designated based on the severity of the problem
 - Areas closer to the standard have fewer mandatory requirements, but must attain the standard more quickly
 - If an area does not attain the standard it is bumped up to the next higher classification level
- Potential Cost Savings for Companies
 - Make reductions over time rather than all at once
 - Ability to include future costs in long-term business plan
 - Greater ability to control emission reduction strategy
- Ability to use voluntary measures and strategies that are more difficult to quantify
- Episodic reductions could be effective

Ozone Advance Program



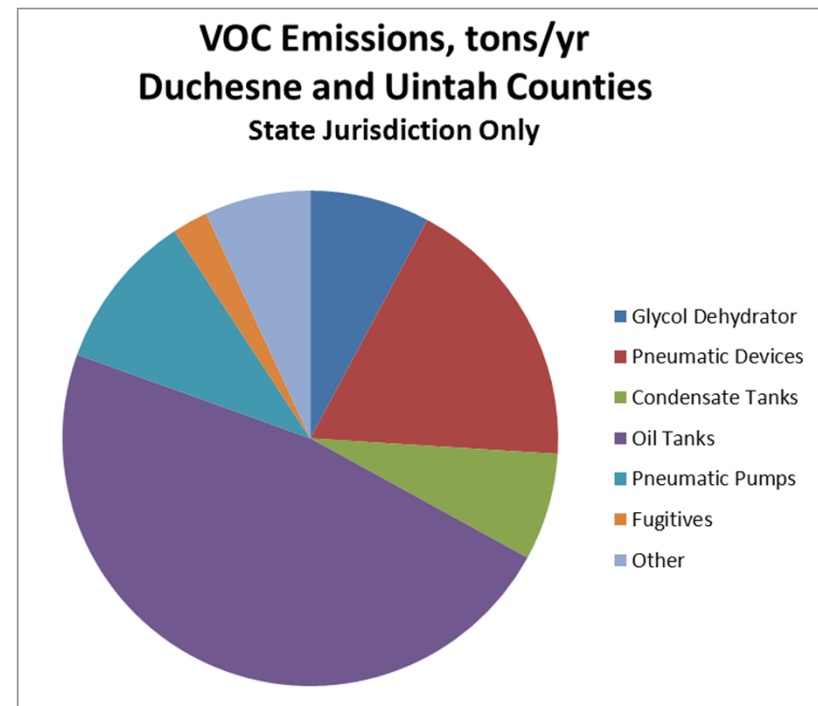
- Ozone Advance is a voluntary EPA program to facilitate early reductions of ozone before an area is designated nonattainment
 - Flexible, not a burdensome process
 - Stakeholder involvement
 - Opportunity for voluntary or non-regulatory measures
 - Opportunity to quantify and recognize early reductions
 - EPA support for the process
 - Opportunity to affect the design value and progress under this program may be a factor in timing of redesignations under current standard
 - No guarantees or regulatory relief
- On May 21, 2012 Governor Herbert submitted an application to EPA to enroll Duchesne and Uintah Counties in the program
- On June 4, 2012 EPA accepted Utah into the Ozone Advance Program

Activities Over Last Year

- On-going research studies to improve our understanding of wintertime ozone in the Uintah Basin
- Beginning technical work necessary to evaluate wintertime ozone
 - Emission inventories
 - Photochemical modeling
- Consider impact of permitted sources
 - Initially focused on individual approval orders
 - Developing a more comprehensive approach
 - New NSPS for oil and gas will provide significant benefits throughout the state
- Development of potential emission reduction strategies

Emission Reduction Strategies

- Follow the Science
 - Best estimate is that VOC emission reductions will reduce ozone pollution but the overall effectiveness of the strategy is unknown
- Begin with low hanging fruit
 - Low cost controls or controls that provide cost savings to producers
 - Strategies to ensure that existing equipment is working properly
 - Cost-effective strategies that can achieve large emission reductions
- Begin implementing strategies in stages instead of waiting for comprehensive plan
 - Initial implementation in Duchesne and Uintah Counties
 - Expand statewide for consistent approach



Source: WRAP Phase III Inventory for the Uintah Basin, projected to 2012, March 2009

General Provisions

- UDAQ's current rule R307-401-4(1) requires that any control apparatus installed on an installation shall be adequately and properly maintained
 - Applies to all new or modified sources, including de minimus sources
- New rule is needed to provide more specific requirements for oil and gas industry
 - Hydrocarbon liquid collection, storage, processing, and handling equipment shall be designed and operated to minimize emissions of VOC
 - Equipment shall be operated using good air pollution control practices
 - Close hatches and pressure release valves
 - Inspection and maintenance of equipment
 - Repair leaks when identified



Pneumatic Devices

- Pneumatic devices use energy from pressurized natural gas to operate valves and control pressure, flow, temperature, or liquid levels
 - Devices release or bleed natural gas as part of normal operations
 - High-bleed devices are a significant source of VOC emissions
- Up to 80% of high-bleed pneumatic devices can be replaced with low-bleed devices
 - Estimated emission reduction
 - 2,462 tons/yr VOC in Duchesne and Uintah Counties
 - 1,253 tons/yr VOC in Carbon, Emery and Grand Counties
 - Estimated cost of replacement is \$2,226/unit
 - Natural gas savings are estimated to pay for the retrofit in 18-22 months and then provide an on-going savings to the producer
- NSPS requires low-bleed devices for new or modified equipment
- Draft rule would require existing devices to meet NSPS standards
 - January 1, 2015 for Duchesne and Uintah Counties
 - January 1, 2017 for the rest of the state

Bottom or Submerged Filling - Tank Trucks

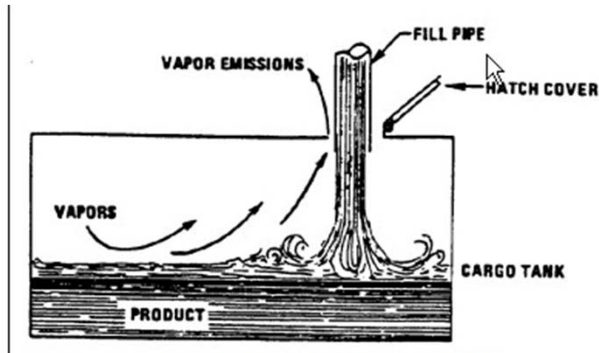


Figure 5.2-2. Splash loading method.

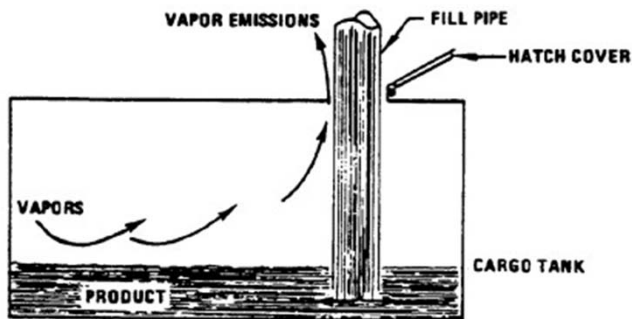


Figure 5.2-3. Submerged fill pipe.

Figures from AP-42, section 5.2, Transportation and Marketing of Petroleum Liquids

- Condensate, oil, and produced water are collected at many oil or gas well sites
- Splash loading of tanker trucks
- Bottom filling or submerged loading of tank trucks reduces loading loss by about 59% when compared to splash loading (AP-42, page 5.2-4)
 - Inexpensive retrofit
 - Currently required in UDAQ approval orders
- Draft rule would require bottom filling or submerged loading of condensate, oil, or produced water into tank trucks
 - Statewide
 - Effective January 2015

Self Igniters - Flares

- Flares are a common control device to reduce VOC emissions
 - UDAQ approval orders require continuous operation of flares
 - Many well sites are unmanned
 - If flare goes out it may be days before it is relit
 - Self-igniters would ensure continuous operation
 - Colorado estimates an initial cost of \$2,355 for each igniter, with an overall cost effectiveness of \$1,147/ton VOC reduced for tanks and \$540/ton VOC reduced for dehydrators
 - Data from presentation at April 25, 2013 Stakeholder Meeting for Colorado's 2013 Rulemaking effort



Episodic Controls



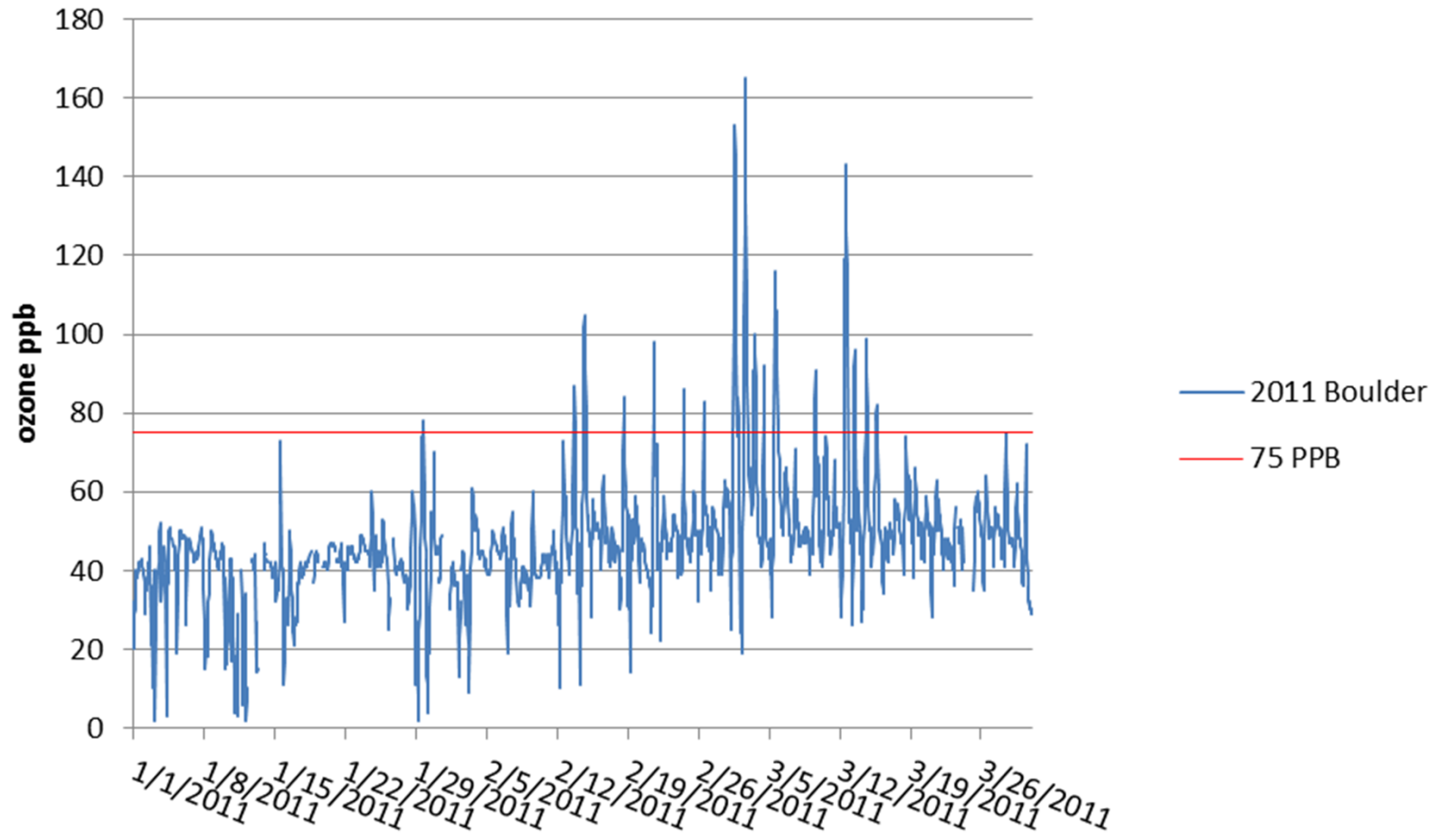
- High ozone values are linked to specific meteorological conditions
- Short-term reductions could have significant benefits
 - UDAQ is developing resource that producers could use to identify possible episodic controls
- Goal - voluntary episodic control plans for next winter
 - Identify effective strategies
 - Calculate the benefit
 - Expand use of successful strategies in future years

Episodic and Seasonal Controls

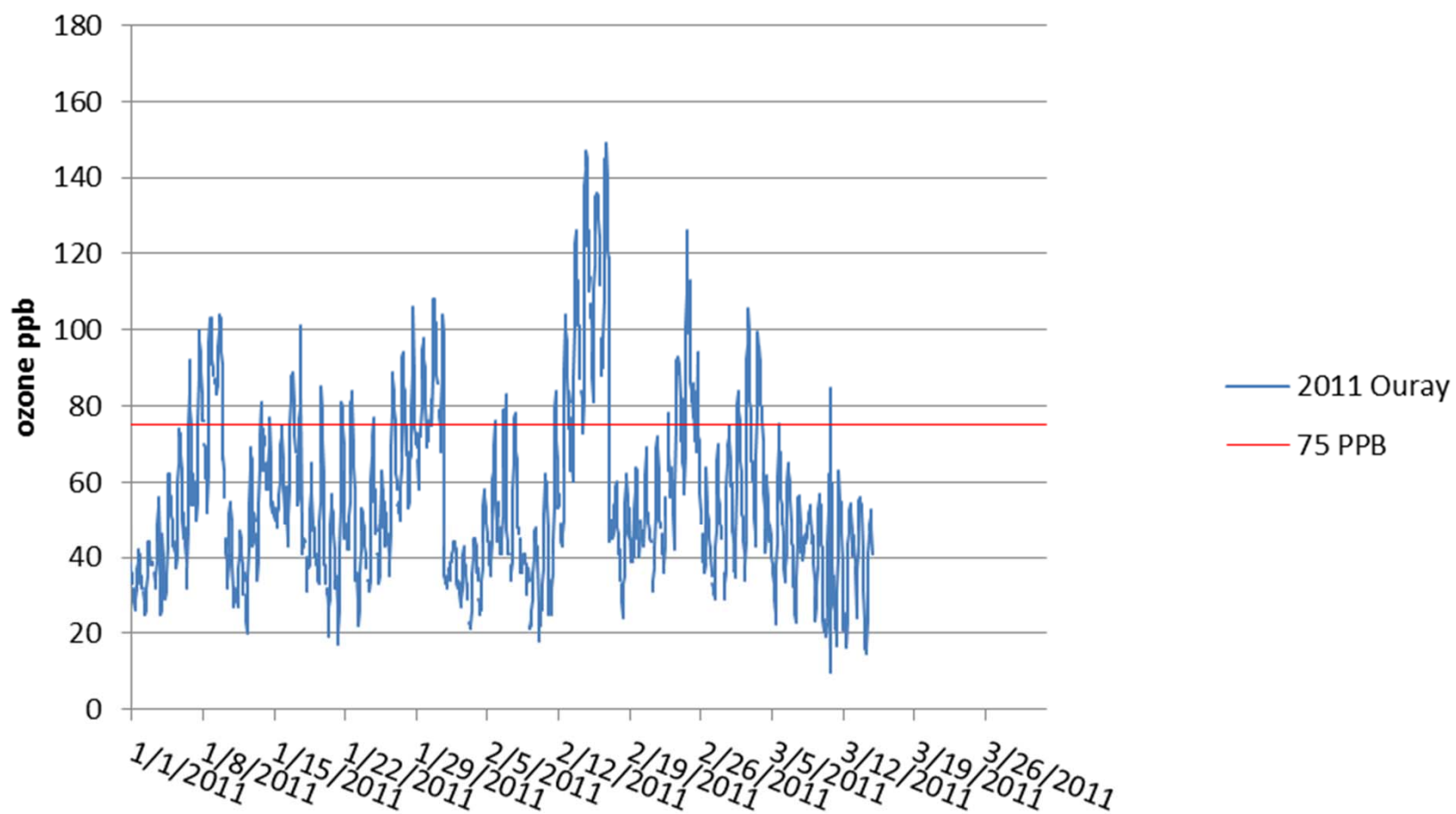
Whitney Oswald

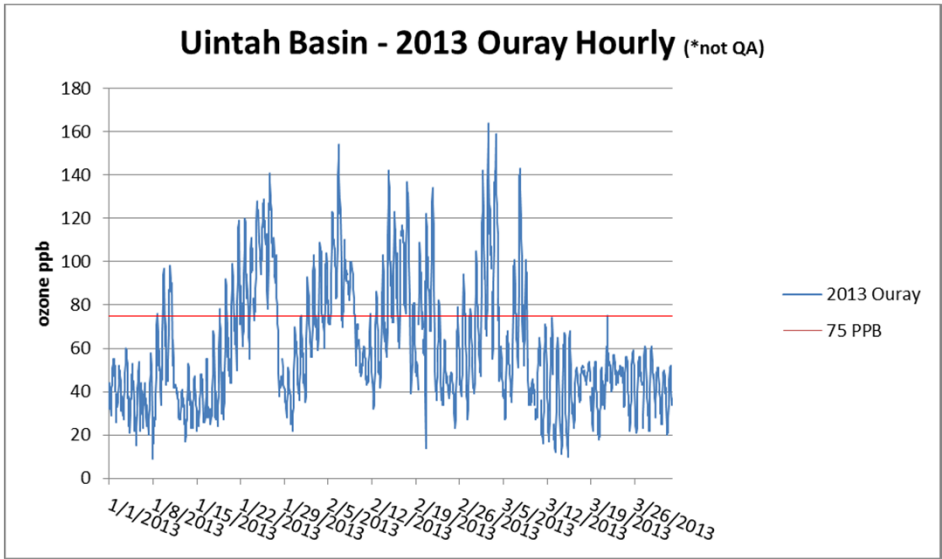
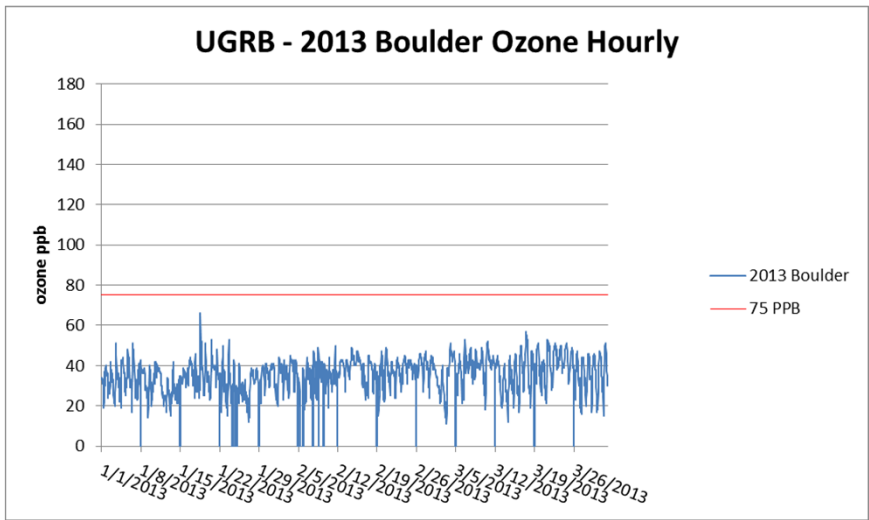


UGRB - 2011 Boulder Ozone 1-hr Avg.

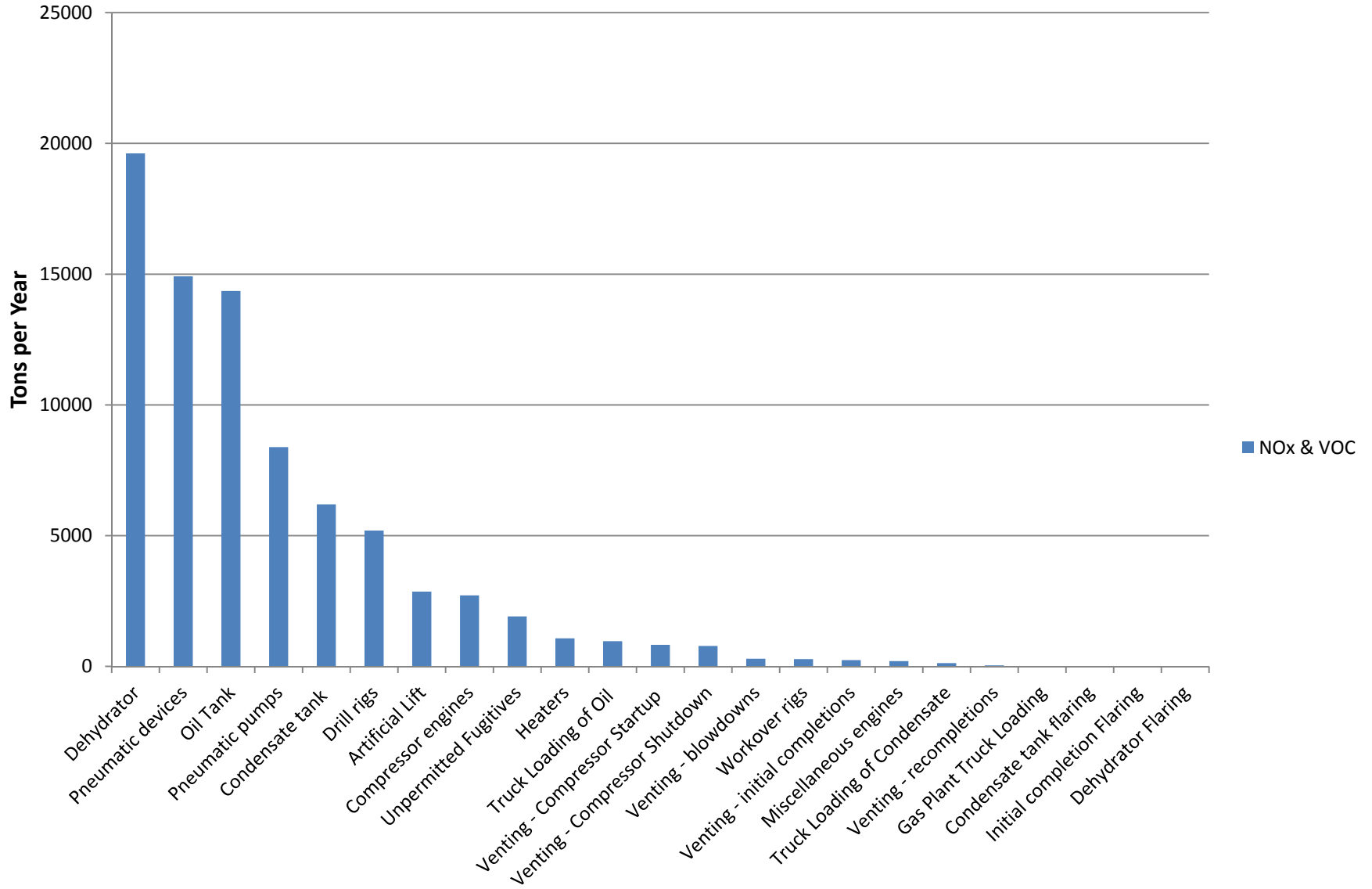


Uintah Basin - 2011 Ouray Ozone 1-hr Avg.





VOC & NOx Emissions All Counties Unpermitted



1. Dehydrators

- Short-term shutdown of glycol dehydration units on impending high ozone days.
- Reduction of glycol dehydration rates during:
 - impending high ozone days
 - the entire winter season
- Delay the charging of desiccant dehydration units on impending high ozone days.



2. Pneumatic devices

- Perform regular maintenance aimed at reducing emissions from pneumatic devices throughout the entire winter season.
 - e.g.
 - field survey of controllers
 - tune controllers to minimize bleed
 - re-evaluate the need for pneumatic positioners
 - repair/replace air set regulators
 - reduce regulated gas supply pressure minimum
 - routine maintenance to include repairing/replacing leaking components

3. Venting blow downs

- Postpone blow down actions associated with energy recovery and production during impending high ozone days.
- Minimize blow down actions associated with energy recovery and production during the entire winter season.



<http://www.freedigitalphotos.net>

4. Oil and Condensate tanks

- Utilize available emission controls on storage tanks to minimize emissions during:
 - impending high ozone days.
 - the entire winter season.



5. Pneumatic pumps

- Turn down uncontrolled pneumatic heat trace pumps during:
 - impending high ozone days.
 - the entire winter season.
- Perform regular maintenance to reduce emissions from pneumatic pumps throughout the entire winter season.



<http://www.epa.gov/gasstar>

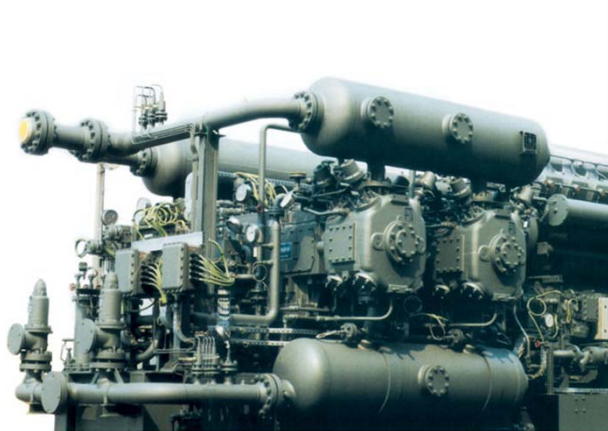
6. Drill rigs

- Suspend or minimize the use of drill rigs during:
 - impending high ozone days.
 - throughout the entire winter season.



7. Compressor engines

- Perform routine maintenance and tune-ups of all compressor engines throughout the entire winter season.
- Utilize compressed air or nitrogen in place of natural gas for compressor engine starters throughout the entire winter season.



<http://www.freedigitalphotos.net>

8. Unpermitted fugitives

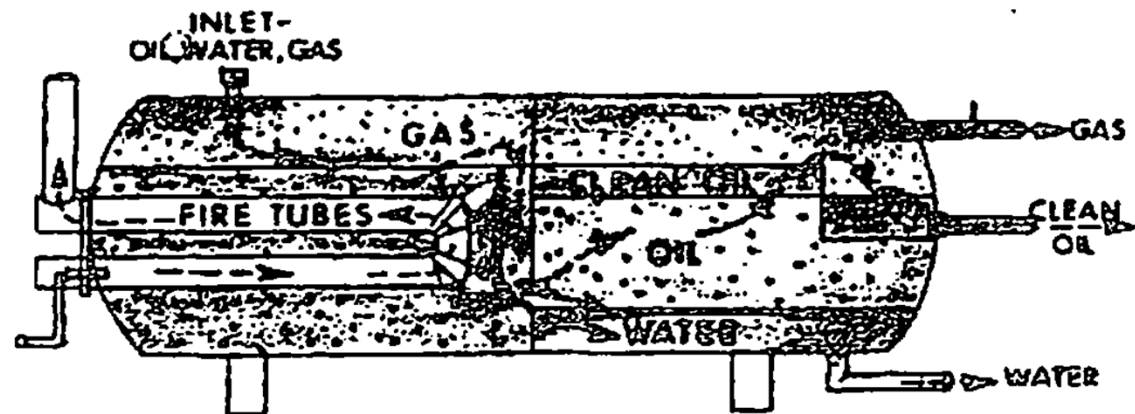
- Minimize and control leaks from equipment (e.g. hatches, seals, and valves) by performing regular leak detection and repair activities and performing routine maintenance of equipment throughout the entire winter season.
 - Utilize improved leak detection technology.



<http://www.epa.gov/gasstar/>

9. Heaters

- Decrease the temperature of the heater-treaters during:
 - impending high ozone days.
 - throughout the entire winter season.



heater treater

10. Venting – compressor startup and shutdown

- Reduce the number of failed startups by performing regular maintenance of compressors throughout the entire winter season.
- Reduce the number of compressor startups and shutdowns by having set operating and maintenance schedules, and performing regular maintenance of compressors only during planned compressor shutdowns as possible throughout the entire winter season.



BMPs for Oil and Gas Industry



By: Frances Bernards | DEQ's Business Assistance Program

Best Management Practices

- Proven methods
- Reduces environmental impacts
 - Conserves Water/Minimizes Wastes/Reduces Fugitive Air Emissions
- Usually results in cost savings



UDEQ Resources

- Top Ten BMPs pamphlet (Operators)
- Top Ten BMPs website (Managers)
- Courtesy Leak Detection Program using IR camera

www.deq.BizHelp.utah.gov



Additional BMP Resources

- EPA's Gas STAR website: www.epa.gov/gasstar/
- BLM's BMP website: www.blm.gov
- Intermtn Oil/Gas BMPs: <http://www.oilandgasbmps.org/>



Top Ten BMPs

- Reduce Emissions During Drilling/Well Completions:
 - Use “Green Completions” to recapture product that would have been vented or flared. Electricity is required.
 - EPA Gas STAR partners report an average of 270,000 Mcf of natural gas recovered per year.



Top Ten BMPs

- Reduce Emissions During Production:
 - Use and maintain hatches, seals, and valves properly.
 - Optimize glycol circulation and install Flash Tank Separator on Dehydration units.



Top Ten BMPs

- Conserve Water:
 - Utilize on-site water treatment facilities, such as a 3-phase (liquids, condensate, and gas) separator on the flowback fluid.
 - Capable of providing 2,000 bbls of recycled flowback water.



Top Ten BMPs

- Use Less Toxic Materials:
 - Substitute organic additives, polymers, or biodegradable additives for oil-based mud.



Top Ten BMPs

- Reuse Resources:
 - Recover and reuse weighting materials and drilling fluids.
 - Waste drilling mud can be reused at other locations for spudding or plugging and abandoning operations.



Top Ten BMPs

- Install High Efficiency Equipment:
 - Install or convert gas operated pneumatic devices to electric, solar, or compressed air driven devices/controllers.



Top Ten BMPs

- Monitoring & Maintenance:
 - Implement a Directed Inspection and Maintenance program to identify fugitive gas leaks.
 - Gas STAR partners estimate 45,000 to 128,000 Mcf/yr per plant savings.



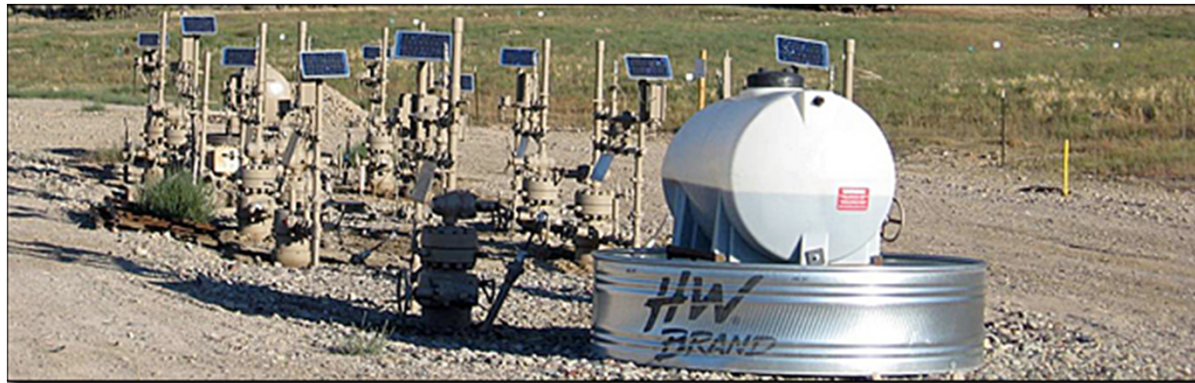
Top Ten BMPs

- Dust & Tailpipe Emissions:
 - Restrict vehicle speeds to 10 mph on site.
 - Apply water or chemical treatment, such as magnesium chloride, calcium chloride, lignin sulfonate, or asphalt emulsion.



Top Ten BMPs

- Improve System Design:
 - Use well monitoring telemetry powered by solar panels.



Top Ten BMPs

- Construction & Reclamation:
 - Use sediment traps, swales, and mulching during construction activities to reduce loss of sediment and contamination of runoff.
 - Reclaim disturbances.



Next Uintah Basin Ozone Stakeholder Meeting

- August 12, 2013 – General Approval Order for Oil and Gas Well Sites
 - Overview of rulemaking to provide authority
 - Schedule for development of GAO
 - Potential permit provisions
 - Applicability
 - Equipment covered
 - Control/emission requirements
 - Methodology for determining small source exemption under R307-401-9 (5 tons/yr VOC or NO_x, 500 pounds/yr HAPS)
 - New small source exemption level specific to oil and gas well sites
 - Potential retrofits for oil tanks and condensate tanks
- Future meetings will be scheduled to provide further opportunities for discussion and comment on GAO and emission reduction strategies

Comments Requested by August 30th

Emission reduction strategies:

Colleen Delaney, cdelaney@utah.gov

Best management practices:

Frances Bernards, fbernards@utah.gov

Episodic controls:

Whitney Oswald, woswald@utah.gov