

Analysis of States' and EPA Oil & Gas Air Emissions Control Requirements for Selected Basins in the Western United States

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November 28, 2011
(January 8, 2012 Errata Corrections)



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EXECUTIVE SUMMARY

The intent of this analysis is to examine the effect that two new federal air quality actions might have on the air pollution emissions from the oil and natural gas (O&G) industry exploration and production sector. The document also examines the current O&G emission control regulations in place in the western U.S. O&G producing states to determine where the new federal rules might overlap existing State rules and which source types could be affected. The seven O&G producing states in the WRAP region interviewed for this analysis include Alaska, Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming. California is also an O&G producing state, but because control of O&G exploration and production sector sources is handled by local Air Pollution Control Districts in that state rather than by the California Air Resources Board, it was not possible to contact each of these 35 Districts individually to assess their current regulations under the scope of this project. This analysis uses data from the WRAP-Western Energy Alliance Phase III O&G Emission Inventory project (<http://www.wrapair2.org/PhaseIII.aspx>), which accounts for state O&G rules in place at the time the Phase III inventories were compiled.

The first of the two federal actions is a Federal Implementation Plan (FIP) known as “Review of New Sources and Modifications in Indian Country”, promulgated in final form on June 10, 2011. The second action is a suite of four proposed air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS) for VOCs; 2) a New Source Performance Standard (NSPS) for sulfur dioxide; 3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for natural gas transmission and storage. The EPA proposed the rules on July 28, 2011, and was taking comment on the rules through November 30, 2011.

Observations & Conclusions

Tribal lands are dominant in two of the Rocky Mountain O&G basins examined in this analysis; those two being the Uinta and the North San Juan basins. Tribal lands hold a significant number of sources in two other basins; the South San Juan and the Wind River basins. Tribal lands are negligible in the Powder River basin, and nonexistent in Colorado’s Denver-Julesburg and Piceance basins.

On tribal lands, the new federal regulation for permitting of minor sources on Indian Lands will likely affect a significant portion of NO_x and VOC emissions from previously unpermitted small sources like field compressors, artificial lift engines and heaters. Although new sources will have lower emissions than previously projected due to the new federal permitting review, there will likely be a number of existing sources that were never reported in the past, which now will be caught up in the federal regulation reporting requirement. Thus we may see some increased emissions of these two pollutants show up on tribal lands in future emission inventories with the inclusion of these previously unreported sources.

Regarding SO₂, sources on tribal lands are likely larger facilities (i.e. gas processing plants) that already are addressed by federal permitting requirements, thus the minor source rule will have less effect on emissions of this pollutant.

The proposed federal regulations for NSPS and NESHAPs do not address NO_x. There is a new NSPS revision (Subpart LLL) for SO₂ from large throughput (> 5 LTPD sulfur) or high H₂S (> 50%) gas processing plants, but again these are likely larger facilities that already are addressed by federal and state permitting requirements. Thus this analysis does not look at the impact Subpart LLL may have on the minor or area sources assessed under the WRAP Phase III O&G exploration and production sector emission inventories. Consequently, this analysis looks primarily at the VOC emission changes that may be expected with implementation of the proposed federal NSPS and NESHAPs.

The source categories considered by the proposed federal NSPS and NESHAPs are: 1) well completions, 2) compressor leaks, 3) pneumatic controllers, 4) condensate and crude oil storage tanks, 5) natural gas processing plant fugitive emissions and 6) natural gas dehydrators.

Regarding the well completion category, of the interviewed states only Colorado and Wyoming have existing control regulations that are similar to the proposed federal control requirements, and for Wyoming their regulations only apply to limited portions of the state.

Regarding compressor leaks, none of the seven states interviewed reported any existing regulations that address fugitive VOC leaks.

For pneumatic controllers, of the interviewed states only Colorado and Wyoming have existing control regulations that are similar to the proposed federal control requirements.

Regarding condensate tanks, Colorado and Wyoming both have existing control regulations that are similar to the proposed federal control requirements. Montana has a regulation to require capture of VOC vapors if the tank is near a gas pipeline after the source is either registered or permitted, but that allows VOC emissions until those administrative steps are taken. Montana and North Dakota require minimizing VOC emissions with submerged filling requirements (ND for large > 1,000 gallon tanks) and Utah requires minimizing VOC on large (> 40,000 gallons), high pressure (>1.52 psia) new tanks through the use of floating roof technology.

Regarding gas processing plant fugitive emissions, all states already require Leak Detection and Repair (LDAR) programs under NSPS Subpart KKK, but do not currently have the monitoring options (optical gas imaging, ultrasound equipment) proposed under Subpart OOOO. Subpart KKK does allow alternate methods to be approved by the responsible agency, however.

Regarding dehydrator vents, of the interviewed states only Colorado and Wyoming have existing control regulations that are similar to the proposed federal 95% control standard.

As a final observation it is likely that although new sources will have lower emissions than previously projected due to the implementation of proposed federal NSPS and NESHAPs regulations in those basins located in states where there are no equivalent state control requirements. It was not possible to quantify these reductions within the scope of this analysis.

BACKGROUND

The intent of this analysis is to examine the effect that two new federal air quality actions might have on the criteria air pollutant emissions from the oil and natural gas (O&G) industry exploration and production sector. The document also examines the current O&G regulations in place in the WRAP O&G producing states to determine where the new federal rules might overlap existing State rules. The seven O&G producing states in the WRAP region interviewed for this analysis include Alaska, Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming. California also is a O&G producing state, but because control of O&G exploration and production sector sources is handled by local Air Pollution Control Districts in that state rather than by the California Air Resources Board, it was not possible to contact each of these 35 Districts individually to assess their current regulations under the scope of this project. The analysis uses data from the WRAP-Western Energy Alliance Phase III O&G Emission Inventory project (<http://www.wrapair2.org/PhaseIII.aspx>), which accounts for state O&G rules in place at the time the Phase III inventories were compiled.

The first of the two federal actions is a Federal Implementation Plan (FIP) known as “Review of New Sources and Modifications in Indian Country” which went final on June 10, 2011. The second action is a suite of four proposed air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS) for VOCs; 2) a New Source Performance Standard (NSPS) for sulfur dioxide; 3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for natural gas transmission and storage. The EPA proposed the rules on July 28, 2011, and was taking comment on the rules through November 30, 2011.

Significant air pollutant emissions come from production of oil and gas wells operating on both state-regulated and EPA-regulated tribal lands across the western United States, as well as from the interconnected product gathering networks associated with these wells. These emissions result from operation of an extensive fleet of field equipment and an array of processing plants, operating continuously across the West. These field operations, including exploration, production, and gathering activities, were historically not well quantified in traditional air pollution inventories due to the nature of smaller O&G field equipment (compressor engines, drill rigs, heaters, dehydrators, flares et cetera) which traditionally fell below state air pollution control agencies’ permitting thresholds. Although individually emissions from this field equipment could be considered minor, with increasing energy demand and continuing oil and gas field development the cumulative totals for O&G basins and producing states in the western U.S.

are a significant air pollution source.

The WRAP began looking at air quality issues resulting from these exploration & production operations in the western U.S. in 2005, and has compiled several iterations of emission inventories of the criteria air pollutants emitted from these field operations. In late 2005 the WRAP completed the Phase I O&G emission inventory project to estimate for the first time, regional emission totals from these field operations. As a “first cut” Phase I had a number of uncertainties identified, thus a second Phase II project was subsequently completed in the Fall of 2007. These WRAP inventories identified over 100,000 tons per year (tpy) of NO_x emissions in the WRAP region which had not previously been included in regional air quality assessment work, as well as significant totals of other air pollutant species (primarily VOCs) critical in the evaluation of Regional Haze and other air quality management issues.

WRAP stakeholders felt that still more improvement in the accuracy of these emission estimates was needed and available. In late 2007 the Western Energy Alliance (formerly known as IPAMS, the Independent Petroleum Association of the Mountain States) stepped in to underwrite the Phase III regional oil and gas emission inventory project. The project was planned and executed in partnership with the WRAP to assure that the products from Phase III were widely distributed among non-industry stakeholders (State/Local Agencies, Tribal Air Programs, Federal Land Managers, Environmental Groups and EPA), and that review and feedback was solicited from this diverse group of WRAP stakeholders such that the final inventory methodologies were transparent and more universally accepted by those parties interested in and affected by O&G development in the Intermountain West. Review of the Phase III work products has been done through the WRAP O&G Workgroup (see http://www.wrapair2.org/Oil_Gas.aspx for more explanation and history).

The scope of the Phase III O&G emission inventory effort was to compile a comprehensive criteria pollutant inventory (NO_x, VOC, CO, SO_x & PM) for a 2006 base year, with a mid-term projection forecast to 2012. The inventory was designed to cover all major source categories in the upstream sector (exploration, production and gathering phases of O&G field operations).

The O&G basins addressed by the Phase III inventories include:

- 1) Denver-Julesburg Basin (northeast Colorado)
- 2) Piceance Basin (northwestern Colorado)
- 3) Uinta Basin (northeastern Utah)
- 4) North San Juan Basin (southwest Colorado)
- 5) South San Juan Basin (northwest New Mexico)
- 6) Wind River Basin (central Wyoming)
- 7) Powder River Basin (northeast Wyoming)
- 8) Green River Basin (southwest Wyoming)
- 9) Williston Basin (western North Dakota and eastern Montana)

To date the WRAP has completed 2006 base year emission inventories for the first seven of

these basins, with the Green River and Williston Basin targeted for completion by the end of 2011.

In these seven completed inventories, the largest sources of NO_x and VOC emissions (primary pollutants of concern from O&G exploration and production operations) in these basins are assessed. This analysis identifies which of these source categories will be affected by the new federal regulations for these two pollutants.

This report is organized into four sections:

1. Recently Adopted Federal Rules - Review of New Sources and Modifications in Indian Country
 - a. Minor Source NSR Rule in Indian Country
 - b. Nonattainment Major NSR Rule in Indian Country
2. Proposed Federal Rules - EPA Proposed Oil and Natural Gas Air Regulations
 - a. Summary of Proposed New Source Performance Standards
 - b. Summary of Proposed National Emission Standards for Hazardous Air Pollutants
3. Review of State Oil and Natural Gas Rules
 - a. Summary of Existing State Rules
 - b. Potential Overlap with Federal O&G Rules
4. WRAP Phase III Oil and Natural Gas Emission Inventories – 2006 Baseline Data
 - a. Phase III O&G Basin Emissions

1. RECENTLY ADOPTED FEDERAL RULES: REVIEW OF NEW SOURCES AND MODIFICATIONS IN INDIAN COUNTRY

Background and Overview of Action

On June 10, 2011, EPA finalized a Federal Implementation Plan (FIP) to ensure that Clean Air Act permitting requirements are applied consistently to facilities in Indian country. This FIP is known as “Review of New Sources and Modifications in Indian Country”. The FIP puts in place the two remaining pieces of the New Source Review (NSR) preconstruction air permitting program (Nonattainment and Minor Sources) in Indian country. It lays out requirements for EPA to issue air permits to sources in Indian country, or allows tribes to take responsibility for issuing air permits according to EPA’s requirements. Together with existing Prevention of Significant Deterioration (PSD) rules for permitting major sources in areas of Indian country that currently meet clean air health standards, the provisions of this new FIP completes the federal program for issuing all preconstruction air permits in Indian country. This permit program is similar to the existing permit programs of the states and will provide industries the same

permitting opportunities and requirements as they have in states.

EPA already had the federal PSD plan in place for major sources in attainment areas in Indian country and had been issuing permits prior to this new action. The June 10, 2011 action puts a plan in place for a nonattainment major NSR program and a minor NSR program in Indian country. According to EPA only a few tribes have been administering an EPA approved minor NSR program and no tribes have been administering EPA approved nonattainment major NSR programs.

NSR is a federal Clean Air Act program commonly known as the “preconstruction air permitting program” that requires industrial facilities to install modern pollution control equipment when they are built or when making a change that increases emissions significantly. The program accomplishes this when owners or operators obtain permits limiting air emissions increases before they begin construction. The purpose of the NSR program is to protect public health and the environment, even as new industrial facilities are built and existing facilities expand. Specifically, its purpose is to ensure that air quality 1) does not worsen where the air is currently unhealthy (i.e. in nonattainment areas) and 2) is not significantly degraded where the air is currently below air quality standards (i.e. attainment areas).

There are three types of NSR permitting programs, each with a different set of requirements. A facility may have to meet one or more of these sets of permitting requirements.

- Prevention of Significant Deterioration (PSD) program applies to a new major source or a source making a major modification in an attainment area.
- Nonattainment NSR program applies to a new major source or a source making a major modification in a nonattainment area.
- Minor NSR program applies to a new minor source and/or a minor modification at both major and minor sources, in both attainment and nonattainment areas.

This FIP is made up of two rules to protect air quality:

- The minor NSR rule applies to new and modified small facilities or to minor modifications at large facilities in all of Indian country.
- The nonattainment major NSR rule applies to new major sources or major sources that make significant modifications in areas of Indian country that do not meet national clean air health standards.

Under the rules, a source owner or operator will need to apply for a permit before building a new facility or expanding an existing one if the facility increases emissions above any of the thresholds included in these rules. The permitting authority, either EPA or a tribe, will review the application and grant or deny the air permit.

Tribes that choose to implement the rules can accept delegation of the federal program or they

can develop and seek approval of a Tribal Implementation Plan (TIP) to administer these rules or portions of them, which would include some enforcement authority. EPA will maintain the sole authority to enforce these rules under federal law.

The rules will provide a 36-month phase-in for small sources. Large sources will need permits upon construction (the same is true everywhere else). Sources interested in synthetic minor permits will be able to get them right away.

a. Minor Source NSR Rule in Indian Country

The minor NSR rule applies to all of Indian country. New or modified industrial facilities with a potential to emit equal to or more than the minor NSR thresholds but less than the major NSR thresholds, generally 100 to 250 tons per year (tpy), are “minor sources” of emissions and subject to the rule requirements.

The minor NSR program provides three options for obtaining permits. These options are:

- Site-specific permits – A site-specific permit includes case-by-case determinations of the source emissions limits as well as any control technology requirements;
- General permits – A "general permit" is a permit that has been developed for a number of similar equipment types or facilities to simplify the permit issuance process for facilities
- Synthetic minor permits – A synthetic minor permit applies to a source that has the potential to emit pollutants in amounts that are at or above the thresholds for major sources, but has voluntarily accepted emissions limitations so that its potential to emit is less than these thresholds. Under this rule, synthetic minor permits can be issued for both regulated NSR pollutants and toxic air pollutants.

EPA will work on developing general permits, as a streamlined permitting option, for a number of source types in Indian country (e.g. dry cleaners, rock crushing facilities) and continue to explore other options for improving and streamlining the permit process for sources in Indian country such as permits-by-rule.

The rule requirements include:

- Case-by-case review of control technology for source-specific permits by the reviewing authority,
- Air quality impact analysis upon request by the reviewing authority,
- Monitoring, recordkeeping and reporting by the source owner or operator,
- Public participation through public notices and comment requirements and administrative and judicial review upon a permit appeal and
- Source registration with the reviewing authority

Under the rule, sources have different responsibilities depending on their status:

- Existing “true” minor sources, also called “natural” minor sources, will only need to register within the first 36 months of the program. After the first 36 months of the program or 6 months after a general permit for a source category is published, existing sources will need a permit only if the proposed modification emissions exceed the minor source thresholds.
- New “true” minor sources will not need a permit and will only need to register within the first 36 months of the program. After the first 36 months of the program or 6 months after a general permit for a source category is published, new sources will need a permit if the source’s emissions exceed the minor source thresholds.
- Existing “synthetic” minor sources may need permits depending on the mechanism they used to obtain their status as a “synthetic” minor.
- New “synthetic” minor sources will be able to apply for permits starting on the rule’s effective date.
- Minor modifications at major sources will need to apply for permits starting on the rule’s effective date.

b. Nonattainment Major NSR Rule in Indian Country

The nonattainment major NSR rule only applies to areas of Indian country that do not meet national air quality standards. New or modified industrial facilities with a potential to emit equal to or more than the major NSR thresholds, generally 100 tpy, are “major sources” of emissions and subject to the rule requirements.

The requirements include:

- Installing emissions controls that meet the requirements of Lowest Achievable Emission Rate (LAER) control technology,
- Obtaining emissions offsets – New or modified major sources contributing to increased emissions would have to obtain emissions reductions from other sources to offset that increase. These emissions offsets would provide a net air quality benefit in the affected area and
- Certifying compliance – Each permit applicant must certify that all other facilities owned or operated by the applicant in the same state as the new or modified source are in compliance with all applicable air quality regulations.

These requirements are the same as the requirements that apply in states for areas that do not have a State Implementation Plan (SIP) for implementing certain NSR provisions, the transitional NSR program commonly known as “Appendix S.”

Implementation

Initial implementation, training and technical assistance will be guided by EPA in close collaboration with tribes. EPA Regions will primarily be responsible for implementing this rule

until a tribe requests delegation of the federal program or until a tribe develops and gets approval of a Tribal Implementation Plan to run these programs.

The implementation of the minor NSR rule will be phased in over 36 months, giving sources and EPA Regional Offices time to prepare:

- New and modified synthetic minor sources and minor modifications at major sources will be subject to the rule requirements on the rule's effective date, which will be 60 days after publication in the Federal Register; and
- True minor sources will be subject to the rule requirements 36 months after the rule's effective date or 6 months after a general permit for a source category is published, whichever is earlier.

The phased implementation will allow EPA headquarters, regions and tribes to focus on capacity building, outreach and education about the permitting requirements. EPA headquarters and regions will work closely together to identify adequate resources to meet any increase in permitting needs.

2. RECENTLY PROPOSED FEDERAL RULES: EPA PROPOSED OIL AND NATURAL GAS AIR REGULATIONS

Background and Overview of Action

The Clean Air Act requires EPA to periodically review their rules. In the case of New Source Performance Standards (NSPS) they must review the rules every eight years, and for a National Emissions Standard for Hazardous Air Pollutants (NESHAPS) rule a residual risk assessment must be conducted one time, eight years after a standard is issued, to determine what risks remain, and whether more protective standards are necessary to protect public health. Then a technology review must be conducted every eight years after the air toxics standard is issued to determine if new and better emission control practices, processes or technologies have become generally available or cost effective such that it would warrant revising the standard.

In January 2009, WildEarth Guardians and the San Juan Citizens Alliance sued EPA, alleging that the Agency had failed to review the NSPS and NESHAPS for the oil and natural gas industry on this mandated schedule. In February 2010, the U.S. Court of Appeals for the D.C. Circuit entered a consent decree that requires EPA to sign proposals related to the review of these standards. Under the ruling EPA must have signed the proposal by July 28, 2011. They were to issue final standards by the end of February 2012, but EPA has now pushed that deadline back until April 3, 2012.

Accordingly, on July 28, 2011, the U.S. Environmental Protection Agency (EPA) proposed a suite of four air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS) for VOC's; 2) a New Source Performance Standard (NSPS) for sulfur dioxide;

3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) standard for natural gas transmission and storage. EPA asserts that the estimated revenues from selling the gas that currently goes to waste are significant – so much so that today’s proposed rule is anticipated to quickly result in a net savings of nearly \$30,000,000 annually, while significantly reducing pollution from the O&G industry.

The proposed rules would apply to the more than 25,000 wells that are fractured and refractured each year, as well as to storage tanks and other pieces of equipment. EPA is seeking comment on several steps to reduce the compliance burdens of the rule to industry and to state, local and tribal air agencies. EPA proposed to accept public comment on the proposed amendments through November 30, 2011.

a. Summary of Proposed New Source Performance Standards

New Source Performance Standards for Volatile Organic Compounds (VOCs)

The oil and gas industry is a significant source of VOCs, which contribute to the formation of ground level ozone. EPA’s existing NSPS for VOCs (Subpart KKK) was issued in 1985. The existing standards address only VOC leak detection and repair (LDAR) at new and modified natural gas process processing plants, meaning significant sources of VOC emissions in the oil and gas industry currently are not subject to nationwide regulation. EPA is proposing new standards under Subpart OOOO for several processes or pieces of equipment used in oil and gas production that have not previously been subject to federal regulation. These include well completions at new hydraulically fractured natural gas wells and at existing wells that are fractured or refractured.

The proposal would require VOC reductions from five categories of sources including:

- 1) Completions of new hydraulically fractured natural gas wells and re-completions of existing natural gas wells that undergo fracturing or refracturing.
 - VOC emissions would be minimized through the use of “green completions,” also called “reduced emissions completions.” In a green completion, special equipment separates gas and liquid hydrocarbons from the flowback that comes from the well as it is being prepared for production. The gas and hydrocarbons can then be treated and sold.
 - Wyoming and Colorado already require green completions in certain situations, and a number of companies are voluntarily using this process through EPA’s Natural Gas STAR program. In addition, green completions have been identified as an option for thousands of new gas wells in the Uinta Basin in Utah to address concerns about air quality impacts associated with natural gas development in the region.

- EPA estimates that use of this equipment for the three to 10 day flowback period reduces VOC emissions from completions and recompletions of hydraulically fractured wells by 95 percent.
 - When natural gas cannot be collected, VOCs would be reduced through pit flaring, unless it is a safety hazard.
 - Methane emissions would also be significantly reduced as a co-benefit of reducing VOCs.
 - The green completion requirements would not apply to exploratory wells or delineation wells (used to define the borders of a natural gas reservoir), because they are not near a sales line. Those wells must use pit flaring to burn off their emissions, unless it is a safety hazard.
- 2) Compressors
- Compression is necessary to move natural gas along a pipeline. The proposed rule would reduce VOC emissions from two types of compressors:
 - Centrifugal compressors would have to be equipped with dry seal systems.
 - Owners/operators of reciprocating compressors would have to replace rod packing systems every 26,000 hours of operation.
- 3) Pneumatic controllers
- Pneumatic controllers are automated instruments used for maintaining a condition such as liquid level, pressure, and temperature at wells, gas processing plants, compressor stations, among other locations. These controllers often are powered by high-pressure natural gas. These gas-driven pneumatic controllers may release natural gas (including VOCs and methane) with every valve movement, or continuously in some cases.
 - EPA is proposing VOC emission limits for pneumatic controllers.
 - For new or replaced pneumatic controllers at gas processing plants, the proposed limits would eliminate VOC emissions. These limits could be met through using controllers that are not natural gas driven.
 - For controllers used at other sites, such as compressor stations, the emission limits could be met by using controllers that emit no more than six cubic feet of gas per hour (referred to as low bleed pneumatic controllers).
 - The proposed amendments include exceptions for controllers in applications requiring high bleed controllers for certain purposes, including operational requirements and safety.
- 4) Condensate and crude oil storage tanks
- Tanks with a throughput of at least 1 barrel per day of condensate or 20 barrels per day of crude oil (these throughput volumes are estimated to be cause approximately 6 tpy of VOC emissions from uncontrolled tanks according to EPA's analysis) must reduce VOC emissions by 95 percent.
- 5) Natural gas processing plants

- EPA is proposing to amend the existing NSPS for natural gas processing plants to strengthen the leak detection and repair requirements that apply to these plants to reduce VOC emissions.

New Source Performance Standards for Sulfur Dioxide

The new source performance standards for sulfur dioxide (SO₂) were issued in 1985 under Subpart LLL and apply to natural gas processing plants. The EPA is proposing to strengthen the performance standards for plants processing gas with the highest hydrogen sulfide content (at least 50 percent) or sulfur feed of at least 5 long tons per day, in order to further reduce sulfur dioxide emissions from these facilities.

b. Summary of Proposed National Emissions Standards for Hazardous Air Pollutants

Air toxics are pollutants known to, or suspected of causing cancer and other serious health effects. EPA reviewed both the air toxics standards for oil and natural gas production, and the standards for natural gas transmission and storage. Both of the existing standards were issued in 1999.

NESHAP Standards for Oil & Natural Gas Production (Subpart HH)

EPA's residual risk review found that the current maximum individual cancer risk from oil and natural gas production – is 40 in 1 million, which falls within a range EPA considers acceptable. However, the review also found that the level of emissions *allowed* under the existing air toxics standard could drive that risk significantly higher than this – as high as 400 in 1 million, which EPA does not consider acceptable. To prevent this from occurring, EPA is proposing changes to the standards for major sources to ensure that cancer risk does not increase beyond current levels.

To address this potential risk, EPA is proposing to remove the 1 ton per year benzene compliance option for large glycol dehydrators (used to remove excess water vapor from natural gas). Under the revised requirements, all large dehydrators would have to reduce air toxics their emissions by 95 percent.

In addition, EPA is proposing to:

- 1) Establish emission limits for small glycol dehydrators at major sources. Under Subpart HH a dehydrator would be considered small if it has an annual average natural gas throughput of less than 85,000 standard cubic meters per day (approximately 3 million cubic feet per day)

or if it has actual annual average benzene emissions of less than 0.90 megagrams per year (approximately 1 tpy).

- 2) Require all crude oil and condensate tanks at major sources to control their air toxics by at least 95 percent. In addition, emissions from these tanks will be counted toward determining whether a facility is a major source. By way of explanation, currently there are only requirements for control/counting tanks with the Potential for Flash Emissions (PFE) and this action would extend that requirement to those tanks without PFE (non-flashing tanks with only working & breathing losses).
- 3) Tighten the definition of a leak for valves at natural gas processing plants. This change is a result of the technology review.

The proposed changes to this rule do not apply to sources that are considered “area sources,” meaning they have fewer than 10 tons a year of emissions of a single air toxic and less than 25 tons a year of a combination of toxics. Standards for these sources were issued in 2007.

NESHAP Standards for Natural Gas Transmission and Storage (Subpart HHH)

EPA’s technology review of these standards did not identify controls that warranted changes to the current standards. However, the agency’s residual risk review of these standards estimates the current maximum individual cancer risk from air toxics emissions from natural gas transmission and storage is 90 in 1 million, a risk level that EPA considers acceptable.

To protect public health with an ample margin of safety, EPA is proposing changes to this standard that would reduce the maximum risk level to 20 in 1 million.

The proposed changes would remove the 1 ton per year benzene compliance alternative for large glycol dehydrators (the threshold between large and small glycol dehydrators in EPA’s analysis is defined as an actual annual average natural gas flow rate of 283,000 cubic meters per day (approximately 10 million cubic feet per day) or annual average benzene emissions of greater than 0.90 megagrams per year (approximately 1 tpy). Instead of the 1 tpy benzene compliance option, all large dehydrators would be required to reduce their VOC emissions by 95%. In addition, EPA is proposing to establish emission limits for small glycol dehydrators in the Natural Gas and Storage sector.

Reducing Compliance Burdens

To reduce the compliance burden to industry, state and local governments and tribes, EPA also is proposing to exempt certain sources from Title V permitting requirements that would be triggered by the proposed rule. The proposed exemption would apply only to sources covered by the NSPS that are not major sources and that do not have to obtain Title V permits for another reason. EPA believes the recordkeeping and reporting requirements included in the proposed standards are sufficient to assure compliance.

VOC sources generally are considered “non-major” if they emit less than 100 tons per year. That emissions threshold is lower in certain nonattainment areas, however. EPA also is seeking comment on additional approaches to provide the industry and regulatory agencies with more efficient and effective tools for maximizing transparency compliance with the proposed regulations. These include submitting performance test results to an EPA electronic database, and third-party compliance verification.

Costs and Benefits

EPA asserts that the proposed rules would be extremely cost-effective, yielding significant reductions in air pollution at a net savings to the industry. EPA estimates the combined annual costs of meeting the proposed requirements would be \$754,000,000 in 2015. The estimated value of the natural gas and condensate that would be made available for sale is \$783,000,000 – a net savings of \$29,000,000 when the rules are combined. (For NSPS, the annual costs are estimated at \$738,000,000, with the value the natural gas and condensate collected yielding an annual net savings of \$45,000,000 as a result of those rules — for the air toxics standards EPA estimates the annual costs of compliance at \$16,000,000) The industry is expected to recover its costs quickly – in about 60 days for green completions, and within about one year for other equipment.

The VOCs and air toxics reductions in the proposed rule are expected to improve outdoor air quality, reduce cancer risk from air toxics emissions and reduce health effects associated with exposure to ground-level ozone (smog) and fine particles (particle pollution). Exposure to both pollutants is linked to increased asthma attacks, hospital admissions and emergency room visits, and premature death. These rules also are anticipated to yield significant climate co-benefits by significantly reducing emissions of methane, a potent greenhouse gas. EPA was unable to model health benefit estimates for the rule due to uncertainties about future locations of oil and gas emissions. Air quality changes associated with air toxics and VOC reductions can be highly

localized.

EPA asserts that the proposed rules also would yield significant reductions in methane, a potent greenhouse gas. EPA's Regulatory Impact Analysis for the rule estimates the value of the climate benefits that would result from this reduction at \$1,600,000,000 annually by 2015. This includes the value of climate-related benefits such as avoided health impacts, crop damage and damage to coastal properties.

How to Comment (The Public Comment Period for this action closed on November 30, 2011)

Comments, identified by Docket ID Number EPA-HQ-OAR-2010-0505, may be submitted by one of the following methods:

- www.regulations.gov: follow the on-line instructions for submitting comments
- Email: Comments may be sent by electronic mail to a-and-r-Docket@epa.gov
- Fax: Fax comments to (202) 566-9744
- Mail: Send comments to Air and Radiation Docket and Information Center, Environmental Protection Agency, Mail Code 2822T, 1200 Pennsylvania Avenue NW, Washington, DC 20460
- Hand Delivery of Courier: Deliver comments to EPA Docket Center, 1301 Constitution Avenue NW, Room 3334, Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

3. REVIEW OF STATE OIL AND NATURAL GAS RULES

Table 1 gives a summary of the existing State O&G rules, as compared to the adopted and proposed federal regulations.

a. Summary of Existing State Rules

Table 1 provides a tabular summary of existing state control requirements for the source categories affected by federal regulations. Following the table are state by state discussions of these requirements.

Table 1 State Control Requirements		State Regulations						
Source Category	Federal Regulations	Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Well Completions	Subpart OOOO: Green Completions (in combination with pit flaring for gas not suitable for entering a pipeline) required for all hydraulically fractured or re-fractured, non-exploratory or non-delineation wells	NONE	COGCC HB-07-1341, Section 805.b(3) Green completions shall be used when technically and economically feasible. If not feasible, Best Management Practices shall be used.	MT DNRC BOGC 36.22.1221 All gas vented to the atmosphere at a rate exceeding 20 MCF per day for a period in excess of 72 hours shall be burned.	NONE	NONE	NONE	C6 S2 O&G Permitting Guidance Wyoming has 3 area categories; 1) Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide Green completions are required in the JPAD area and CDA's in Wyoming as of August 1, 2011.
Compression	Subpart OOOO FUGITIVE STANDARDS: Requires centrifugal units be equipped with a dry seal system, and reciprocating engines have a maintenance schedule to replace rod packing every 26,000 hours	NONE	NONE	Montana has permitting and registration rules for controlling fugitive VOC vapors (See Footnote #1)	NONE	NONE	NONE	NONE
Pneumatic Controllers	Subpart OOOO: Zero emission limit @ gas processing plants (equivalent to non gas-driven pneumatic controllers). Six SCFH @ other locations (equivalent to low bleed gas-driven pneumatic controllers)	NONE	Reg. 7, XVIII.C.1 No or low-bleed pneumatic devices required for all new & existing applications. (exceptions allowed) (only applies in ozone non-attainment areas) COGCC HB-07-1341, Section 805.b(2)E No or low-bleed required for new, repaired or replaced devices where technically feasible	Montana has permitting and registration rules for controlling fugitive VOC vapors (See Footnote #1)	NONE	NONE	NONE	C6 S2 O&G Permitting Guidance Install low or no-bleed at all new facilities. Upon modification of facilities, new pneumatic controllers must be low/no-bleed and existing controllers must be replaced with no/low-bleed. (well site facilities only - not gas plants)

Table 1 State Control Requirements		State Regulations							
Source Category	Federal Regulations	Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	
Condensate & Crude Oil Tanks	<p>Subpart OOOO: 95% VOC reduction for new or modified storage vessels with one bbl condensate or 20 bbls crude oil throughput per day.</p> <p>Subpart HH: 95% control of HAP's @ production facilities</p>	NONE	<p>(Reg. 7, XII.G.2) 95% VOC reduction @ gas processing plants if uncontrolled emissions from condensate tanks are ≥ 2 tpy (only applies in ozone non-attainment areas)</p> <p>(Reg. 7, XVII.C.1) 95% VOC reduction for condensate storage tanks if uncontrolled emissions ≥ 20 tpy</p> <p>(Reg. 7, XVII.C.2) For condensate storage tanks with past uncontrolled actual emissions < 20 tpy VOC may become subject to Section XVII.C.1 with addition of a newly drilled well (or recompletion/stimulation of an existing well), Such tanks have 90 days after 1st production to install/operate control equipment. If emissions of VOC still < 20 tpy CDPHE notification required w/ explanation of the determination methodology.</p> <p>(Reg.. 7, XIID) Condensate tanks in ozone non-attainment areas shall be controlled under a system wide approach</p> <p>(COGCC HB-07-1341, Section 805.b(2)A) 95% VOC reduction for liquids condensate & crude oil tanks if uncontrolled emissions ≥ 5 tpy within 1/4 mile of an affected building (applies only to Garfield, Mesa & Rio Blanco Counties)</p>	<p>17.8.1603(1)(b) VOC vapors from O&G oil or condensate storage tanks with a PTE > 15 tpy must be routed to a gas pipeline or emissions minimizing technology.</p> <p>Registration - 17.8.1711 (1)(a)- VOC vapors from each piece of O&G well facility equipment with PTE >15 tpy, must be captured and routed to a gas pipeline, or routed to air pollution control equipment with a 95% or greater control efficiency</p> <p>17.8.1711(1)(b) requires submerged filling technology on all hydrocarbon liquid loading or unloading</p>	NONE		<p>NDAC Section 33-15-07 submerged filling requirements for tanks $>1,000$ gallons and control of organic compounds</p>	<p>R307-327 Ozone Nonattainment Area Volatile Petroleum Liquid Tanks ($> 40,000$ gallons, true vapor pressure [TVP] > 1.52 psia at storage temperature) shall be controlled to minimize vapor loss. New tanks shall be fitted with an internal floating roof resting on the liquid surface with the space (roof edge to tank wall) sealed. Owner/operator shall maintain records of the liquid type/maximum TVP. Records required of average monthly storage temperature, the liquid type, throughput and maximum TVP for tanks not subject to above (petroleum liquid TVP > 1.0 psia)</p>	<p>C6 S2 O&G Permitting Guidance Wyoming has 3 area categories; 1) Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide</p> <p>JPAD - 98% control of all new/modified tank emissions upon startup/modification</p> <p>CDA - 98% control of all new/modified tank emissions ≥ 8 tpy VOC within 60 days of startup/modification</p> <p>Statewide 98% control of all new/modified tank emissions ≥ 10 tpy VOC within 60 days of startup/modification</p>

Table 1 State Control Requirements		State Regulations						
Source Category	Federal Regulations	Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Gas Processing Plants	<p>Subpart OOOO: Allows advanced leak detection tools (ie/ optical gas imaging or ultrasound equipment) as an alternative to the LDAR protocol based on Method 21 organic vapor analyzer leak measurements.</p> <p>Subpart HH: 500 ppm threshold for valve leaks</p>	Alaska has adopted NSPS Subpart KKK on LDAR	Colorado has adopted NSPS Subpart KKK on LDAR under Reg. 7, XII.G.1 (KKK applies at gas processing plants located in ozone non-attainment areas regardless of the date of construction of the affected facility)	Montana has adopted NSPS Subpart KKK on LDAR	New Mexico has adopted NSPS Subpart KKK on LDAR	North Dakota has adopted NSPS Subpart KKK on LDAR	Utah has adopted NSPS Subpart KKK on LDAR	Wyoming has adopted NSPS Subpart KKK on LDAR
Dehydrators	<p>Subpart HH: 95% reduction of HAP's in all large glycol dehydrators (> 3 MMCFD or > 1 tpy benzene emissions). Small dehydrator emission limits of 4.66 E-6 grams BTEX/scm-ppmv (new units) or 1.1 E-4 grams BTEX/scm-ppmv (existing units)</p>	NONE	<p>Reg. 7, XII.H and XVII.D 90% reduction of VOCs where uncontrolled VOC emissions \geq 15 tpy</p> <p>COGCC HB-07-1341, Section 805.b(2)C) 90% reduction of VOCs required where uncontrolled VOC emissions \geq 5 tpy within 1/4 mile of an affected building (applies only to Garfield, Mesa & Rio Blanco Counties)</p>	Montana has permitting and registration rules for controlling fugitive VOC vapors (See Footnote #1)	NONE	TEG units with a condenser require temperature monitoring	NONE	<p>C6 S2 O&G Permitting Guidance Wyoming has 3 area categories; 1) Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide</p> <p>JPAD 98% control of all new/modified dehydrator VOC/HAP emissions at start up</p> <p>CDA & Statewide PAD Facilities - 98% control upon startup</p> <p>SINGLE Well Facilities - 98% control within 60 days of startup for VOC emissions \geq6 OR 98% control within 30 days of startup for VOC emissions \geq8 tpy</p>

Table 1 State Control Requirements		State Regulations						
Source Category	Federal Regulations	Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Minor Source Permitting	NSR permitting required for minor sources (< NSR thresholds of 100- 250 tpy) in Indian Country	NONE (for VOC)	Reg. 3 Part B, II.D Minor Source permitting required for sources with thresholds that vary by pollutant and area (generally required in non-attainment areas for criteria emissions > 1-5 tpy – required statewide for criteria emissions > 5-10 tpy – thresholds depend on the pollutant)	17.8.743 Montana Air Quality Permits (MAQP) NSR permitting required for sources with > 25 tpy PTE 17.8.1702: A registration eligible facility may register in lieu of obtaining a MAQP	20.2.72 NMAC requires permits for all sources >25 tpy of a criteria pollutant. 20.2.73 NMAC requires Notices of Intent for all sources >10 tpy of a criteria pollutant	NONE (registration of O&G facilities required per Chapter 33-15-20 rules in lieu of a permit)	UAC Rule 307- 401-9 NSR permitting exempted for sources with controlled emissions below de minimis levels: PTE < 5 tpy each PM10, NOx, SOx, CO, VOCs, or single HAP < 500 lbs per year, combined HAP < 1 tpy	Emissions from minor sources must be approved through permitting applied through the WAQSR Chapter 6 Section 2(a)(i) O&G Permitting Guidance. For VOC emissions ≥8 tpy from sources other than tanks, dehydrators, pneumatic controllers and pumps, water tanks, BACT is considered on case-by- case basis.

Footnote #1: Montana VOC Rules

17.8.1603(1)(a) VOC vapors (> 500 BTU/scf) from O&G wellhead equipment must be captured and routed to a gas pipeline if within ½ mile, or to emissions minimizing technology or smokeless combustion device equipped with an electronic ignition device or continuous burning pilot system.

Montana Air Quality Permits (MAQP) – 17.8.752 - requires a case by case BACT determination

Montana Registration – 17.8.1711(1)(a) - VOC vapors (>200 Btu/scf) from each piece of O&G well facility equipment, with a PTE > 15 tpy, must be captured and routed to a gas pipeline, or routed to air pollution control equipment with a 95% or greater control efficiency.

Alaska The Alaska Department Environmental Conservation (DEC) has adopted no regulations comparable to the proposed federal NSPS Subpart OOOO for VOC emissions from O&G operations, with the exception that Alaska, like all WRAP region O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO. Alaska does not consider or include VOC/HAP emissions/controls in their minor source permit program, nor do they require reiteration of the applicable NSPS/NESHAP obligations in their minor source permits.

Colorado The Colorado Department of Public Health and Environment (CDPHE) has adopted several rules which regulate VOC emissions from O&G operations in the state. Additionally the Colorado Oil and Gas Conservation Commission (COGCC) has adopted requirements under HB 07-1341 which further regulates VOC emissions. Regarding “Green Completions” COGCC HB-07-1341 requires that green completions be used when technically and economically feasible. If not feasible, Best Management Practices shall be used. For the purpose of gross emission inventory evaluation this COGCC rule is essentially equivalent to the proposed Subpart OOOO regulation.

Regarding compression Colorado has no equivalent to the proposed Subpart OOOO regulations for dry seal systems or maintenance schedules to prevent fugitive VOC leaks from the compressor units themselves.

Regarding pneumatic controllers, CDPHE’s Regulation 7 requires no or low-bleed equipment for all new and existing applications, but some exceptions are allowed. Regulation 7 applies only in ozone nonattainment areas. In addition COGCC HB 07-1341 contains statewide pneumatic device requirements. Once again for the purpose of gross emission inventory evaluation this level of mandated control is essentially equivalent to the Subpart OOOO proposal for the purpose of gross emission inventory evaluation.

On condensate tanks the federal proposal calls for 95% control on tanks with 1 bbl/day condensate or 20 bbl/day crude oil throughput (equivalent to approximate 6 tpy VOC emissions). For the purpose of gross emission inventory evaluation the federal proposal is essentially matched by Colorado’s Regulation 7 (applicable only in ozone nonattainment areas). The COGCC HB 07-1341 regulation lowers the threshold to 5 tpy for requiring control if the site is within 1/4 mile of an “affected building” (applicable only in Garfield, Mesa & Rio Blanco Counties).

Colorado, like all western O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection

monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO. Regarding glycol dehydrators the federal proposal requires 95% control on large units and emission limits on smaller dehydrators. For the purpose of gross emission inventory evaluation, this is essentially matched by Colorado's Regulation 7 requiring 90% reduction on an emission threshold of 15 tpy (applicable in ozone non-attainment areas). Under the COGCC HB-07-1341 regulation the threshold is lowered to 5 tpy if the site is within 1/4 mile of an "affected building" (applies only to Garfield, Mesa & Rio Blanco Counties).

Although Colorado has minor source permitting requirements, those regulations do not apply to Indian Country.

Montana Except as noted below the Montana Department of Environmental Quality (DEQ) has adopted no regulations as specific as the proposed federal NSPS Subpart OOOO for VOC emissions from O&G operations. The Montana Board of Oil and Gas Conservation (MBOGC) has regulations that limit VOC emissions during the drilling and completion of oil and gas wells.

The Montana DEQ has regulation that requires oil or gas well facilities to control emissions from the time the well is completed until the source is registered or permitted (Administrative Rules of Montana (ARM) 17.8.16). The Montana DEQ's regulation ARM 17.8.17 (Registration of Air Contaminant Sources) is essentially a permit by rule, which allows owner or operator of a registration eligible facility to register with the Montana DEQ in lieu of submitting an application for and obtaining a Montana Air Quality Permit (MAQP). If a source cannot meet the requirements outlined in ARM 17.8.17, it must apply for an MAQP. A registered facility, like an MAQP facility, is subject to all applicable state and federal rules, including SIP-approved, federally enforceable requirements.

The only sources eligible to register in Montana are crude oil well (tank battery) facilities. Storage vessels are the only NSPS Subpart OOOO affected facility associated with these registered sources. All other oil and gas sector facilities which exceed the minor source threshold of 25 tpy are required to obtain an MAQP.

Regarding compression devices, pneumatic controllers, condensate/crude oil storage tanks and glycol dehydrators, Montana has permitting and registration rules regarding control of fugitive VOC vapors. Regulation ARM 17.8.17 requires that each piece of oil or gas well facility equipment, with a PTE greater than 15 tpy be controlled at 95% or greater control efficiency. If a source has compression devices, pneumatic controllers, and/or glycol dehydrators that exceed 15 tpy emissions, they must control the emissions by 95% or greater if registered, or obtain an MAQP which requires a case-by-case BACT analysis.

A case-by-case BACT analysis may include design, equipment, work practice, or operational standards in place of or in combination with an emission limitation.

Regarding condensate tanks, the federal proposal for 95% control on 6 tpy VOC emitters is similar to Montana's Regulation ARM 17.7.17, except that Montana has thresholds of 15 tpy, and uses site/formation specific sampling to determine PTE rather than using a single throughput threshold for all sources. Additionally, Montana requires submerged filling of liquid hydrocarbons to minimize VOC emissions for all loading and unloading of transport vehicles.

Montana, like all western O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO.

Montana does have minor source control requirements in rule. In addition, Montana incorporates applicable federal requirements found in the CFR on an annual basis. This includes NSPS Subparts KKK and LLL, and NESHAPS HH and HHH. Regarding minor source permitting, Montana Regulation ARM 17.8.743 requires minor NSR air quality permits for sources with > 25 tpy PTE. Emissions from minor sources must be approved through permitting, BACT is considered on a case-by-case basis. These rules do not apply to Indian Country.

New Mexico The New Mexico Environmental Department (NMED) Air Quality Bureau has adopted no regulations comparable to the proposed federal NSPS Subpart OOOO for VOC emissions from O&G operations, although New Mexico, like all western O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO.

Regarding New Mexico minor source permitting requirements NMAC 20.2.72 requires permits for all sources >25 tpy of a criteria pollutant, while NMAC 20.2.73 requires Notices of Intent for all sources >10 tpy of a criteria pollutant. These rules do not apply to Indian Country.

North Dakota Except as noted below the North Dakota Department of Health Air Quality Division has adopted no regulations comparable to the proposed federal NSPS Subpart OOOO for VOC emissions from O&G operations, although North Dakota, like all western O&G states surveyed, has adopted NSPS Subpart

KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO. North Dakota does have NDAC Section 33-15-07 which requires submerged filling of liquid hydrocarbons to minimize VOC emissions from large (>1000 gallons), and glycol dehydrators with a condenser require temperature monitoring to remain cool enough to be effective.

North Dakota has no minor source permitting requirements, but the State does require O&G production facilities to register according to Chapter 33-15-20 in lieu of a permit. To insure compliance the “Bakken Pool Oil and Gas Production Facilities Air Pollution Control Permitting & Compliance Guidance” (http://www.ndhealth.gov/AQ/OilAndGasWells_files/New%20Guidance%20O&G%20Files/20110502Oil%20%20Gas%20Permitting%20Guidance.pdf) is followed when calculating emissions and selecting control equipment for tank vapor controls.

Utah Except as noted below the Utah Department of Environmental Quality (DEQ) has adopted no regulations comparable to the proposed federal NSPS Subpart OOOO for VOC emissions from O&G operations, although Utah, like all western O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO. Utah does have an existing regulations for hydrocarbon storage tanks in ozone nonattainment areas (R307-327) which requires large tanks (> 40,000 gallons) with high vapor pressure (TVP > 1.52 psia at storage temperature) to be controlled to minimize vapor loss (new tanks shall be fitted with an internal floating roof resting on the liquid surface), but the only areas that regulation applies to are Salt Lake and Davis Counties. Since the Uinta Basin is located in northeast Utah and does not include these two nonattainment counties, the regulation does not apply to the Utah O&G operations.

Regarding minor source permits UAC Rule 307-401-9 exempts sources from NSR permitting with controlled emissions below de minimus levels (PTE < 5 tpy each PM₁₀, NO_x, SO_x, CO, VOCs, or single HAP < 500 lbs per year, combined HAP < 1 tpy). These rules do not apply to Indian Country.

Wyoming The Wyoming Department of Environmental Quality (DEQ) has adopted several rules which regulate VOC and HAP Emissions from O&G production facilities in the state. For permitting purposes Wyoming has defined three specific areas: 1) the Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Areas (CDAs) & 3) Statewide. CDAs include Sublette, Lincoln, Uinta and Sweetwater Counties which make up the Southwest Wyoming Green River Basin, and Fremont County which makes up the Wind River Basin of the state. Natrona and Carbon Counties are also defined as CDAs,

but these two counties reside outside the O&G Basins that are included in the WRAP Phase III project basin definitions for Wyoming.

Chapter 6 Section 2 O&G Permitting Guidance requires green completions in CDAs for all wells as of August 1, 2011. Green Completions have been required in the JAPD area since 2004. The proposed Subpart OOOO regulation for the Green River and Wind River Basins, only applies to hydraulically fractured wells. The Wyoming regulation does not currently apply to the Powder River Basin.

For compression Wyoming has no equivalent to the proposed Subpart OOOO regulations for dry seal systems or maintenance schedules to prevent fugitive VOC leaks from the compressor units themselves.

Regarding pneumatic controllers, Chapter 6 Section 2 O&G Permitting Guidance requires operators to install low or no-bleed controllers at all new facilities. Upon modification of facilities, new pneumatic controllers must be low/no-bleed and existing controllers must be replaced with no/low-bleed. (well site facilities only - not gas plants) Once again this is essentially equivalent to the Subpart OOOO proposal.

On condensate and oil tanks the federal proposal for 95% control on 6 tpy VOC emitters. The Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control on startup/modification for all tanks in the JAPD area. In CDAs all tanks at multiple well facilities must be controlled by 98% upon startup/modification. Also, in CDAs all tanks at single well facilities with ≥ 8 tpy VOC must be controlled by 98% within 60 days of startup/modification. At other facilities statewide, all tanks with ≥ 10 tpy VOC must be controlled by 98% within 60 days of startup/modification.

Wyoming, like all western O&G states surveyed, has adopted NSPS Subpart KKK regulations for Leak Detection and Repair (LDAR) at gas plants. However none of the states allow the new leak detection monitoring options (optical gas imaging, ultrasound equipment) contemplated under Subpart OOOO.

For glycol dehydrators the federal proposal for 95% control on large units and emission limits on smaller dehydrators varies somewhat from Wyoming requirements. For the JPAD all dehydration unit emissions must be controlled by 98% upon startup/modification. For CDAs and Statewide PAD facilities all dehydrators must be controlled by 98% upon startup/modification. Other than PAD facilities, single dehydration units with ≥ 6 tpy VOC emissions must be controlled by 98% within 60 days of startup/modification or dehydration units with ≥ 8 tpy VOC emissions must be controlled by 98% within 30 days of startup/modification. Removal of controls is allowed after various elapsed time periods and upon

WAQD approval when VOC emissions are less than 6 or 8 tpy depending on whether the dehydrators are equipped with condensers and/or glycol flash tanks, and depending on where the units are located. For gross emission inventory purposes, the federal proposal and Wyoming regulations result in essentially the same control levels.

Regarding Wyoming minor source permitting requirements emissions from minor sources must be approved through permitting applied through the WAQSR Chapter 6 Section 2(a)(i) O&G Permitting Guidance. For VOC emissions ≥ 8 tpy from sources not considered under the Permitting Guidance, BACT is considered on case-by-case basis. These rules do not apply to Indian Country.

b. Potential Overlap with Federal O&G Rules

Wyoming and Colorado have several rules with potential overlap as compared with the proposed federal O&G rules. These areas of potential overlap are explained in more detail in the basin by basin analyses which follow in the next section of this analysis.

4. WRAP PHASE III OIL AND NATURAL GAS EMISSION INVENTORIES

In late 2005 the WRAP completed the Phase I emission inventory project to estimate for the first time, emissions from oil and natural gas production field operations. Emphasis was placed on generating the first complete and consistent area source estimates for pollutant emissions from this source category with the potential to impair visibility near Class I areas in the West, in particular for NO_x. Discussion of the results from Phase I, uncertainties identified and the availability of additional data then led to the Phase II project, completed in Fall 2007. Phase II also focused on NO_x and SO_x emissions affecting regional haze planning.

Because of remaining uncertainties and completeness issues for O&G inventories, in Fall 2007 the Western Energy Alliance (formerly the Independent Petroleum Association of Mountain States - IPAMS) proposed a plan for funding a Phase III regional oil and gas emission inventory project for the Intermountain West, to build on the WRAP Phase I and Phase II projects. The Phase III project was coordinated with the WRAP to assure that the products from Phase III were widely distributed among non-industry stakeholders (State/Local Agencies, Tribal Air Programs, Federal Land Managers, Environmental Groups and EPA) for review and to enhance the transparency of the effort.

The resulting comprehensive inventories from Phase III cover all criteria pollutant emissions for all

identified point and area sources associated with the exploration, production and gathering operations of oil and gas in the major basins throughout the six-state (CO, MT, NM, ND, UT, and WY) study region for the base year 2006. In addition the project is completing mid-term future projection years. Western Energy Alliance and WRAP coordinate the data collection and analysis, review and discussion, and inventory data file preparation for each major basin

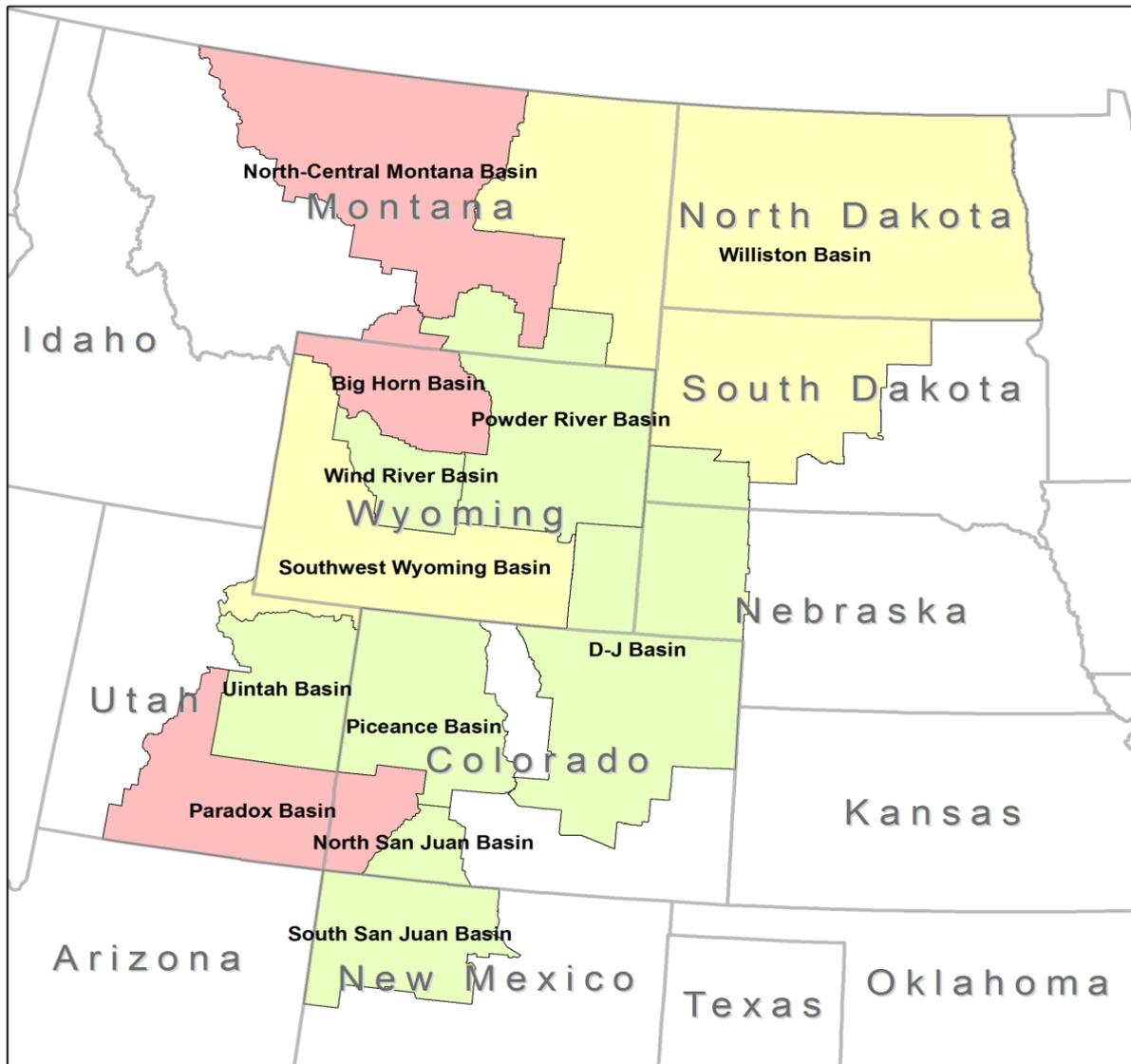
The O&G basins addressed by the Phase III inventories include the following list:

- 1) Denver-Julesburg Basin (northeast Colorado)
- 2) Piceance Basin (northwestern Colorado)
- 3) Uinta Basin (northeastern Utah)
- 4) North San Juan Basin (southwest Colorado)
- 5) South San Juan Basin (northwest New Mexico)
- 6) Wind River Basin (central Wyoming)
- 7) Powder River Basin (northeast Wyoming)
- 8) Green River Basin (southwest Wyoming)
- 9) Williston Basin (western North Dakota and eastern Montana)

Additionally Phase III originally considered three other O&G basins: 1) the Paradox Basin in southeastern Utah, 2) the Big Horn Basin in northwestern Wyoming and 3) the Montana Plains in central Montana. These three basins were dropped from the project when preliminary investigation showed lower O&G activity in these areas and project budgets forced a prioritization of the emission inventories that could be completed with available funding.

Figure 1 shows the locations of the O&G Basins in the Rocky Mountain west that were included in the original Scope of the Phase III project.

Figure 1: Basin Boundaries in the Phase III Oil and Gas Project



Reports and more details of the Phase I and II inventories are found at the archived WRAP website at: http://www.wrapair.org/forums/ogwg/Phases_I_and_II_Inventories.html. Work has been completed on all planned Phase III basins to date, with the exception of the Green River and Williston basins. Reports, including maps of the basins and the emission source list covered under the project can be accessed from the “Oil & Gas Phase III” link on the “Emissions” tab of the current WRAP webpage at: <http://www.wrapair2.org/PhaseIII.aspx>

The federal regulations summarized earlier in this analysis (Review of New Sources and Modifications in Indian Country and EPA Proposed Oil and Natural Gas Air Regulations) will have the effect of changing some of the emissions calculated by the WRAP Phase III inventories, and the following analysis reviews where such changes will occur, as well as which sources are affected.

a. WRAP Phase III O&G Basin Emissions - 2006 Baseline Data

To date the 2006 baseline emissions totals for the completed WRAP Phase III O&G gas basins are shown in Table 2.

Table 2: Phase III Basin 2006 Overall Emissions Totals

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	5,700	2,147	6,450	15	52
South San Juan Basin	42,075	60,697	23,471	305	574
Wind River Basin	1,814	11,981	2,840	1,792	37
Powder River Basin	21,086	21,557	12,873	609	681

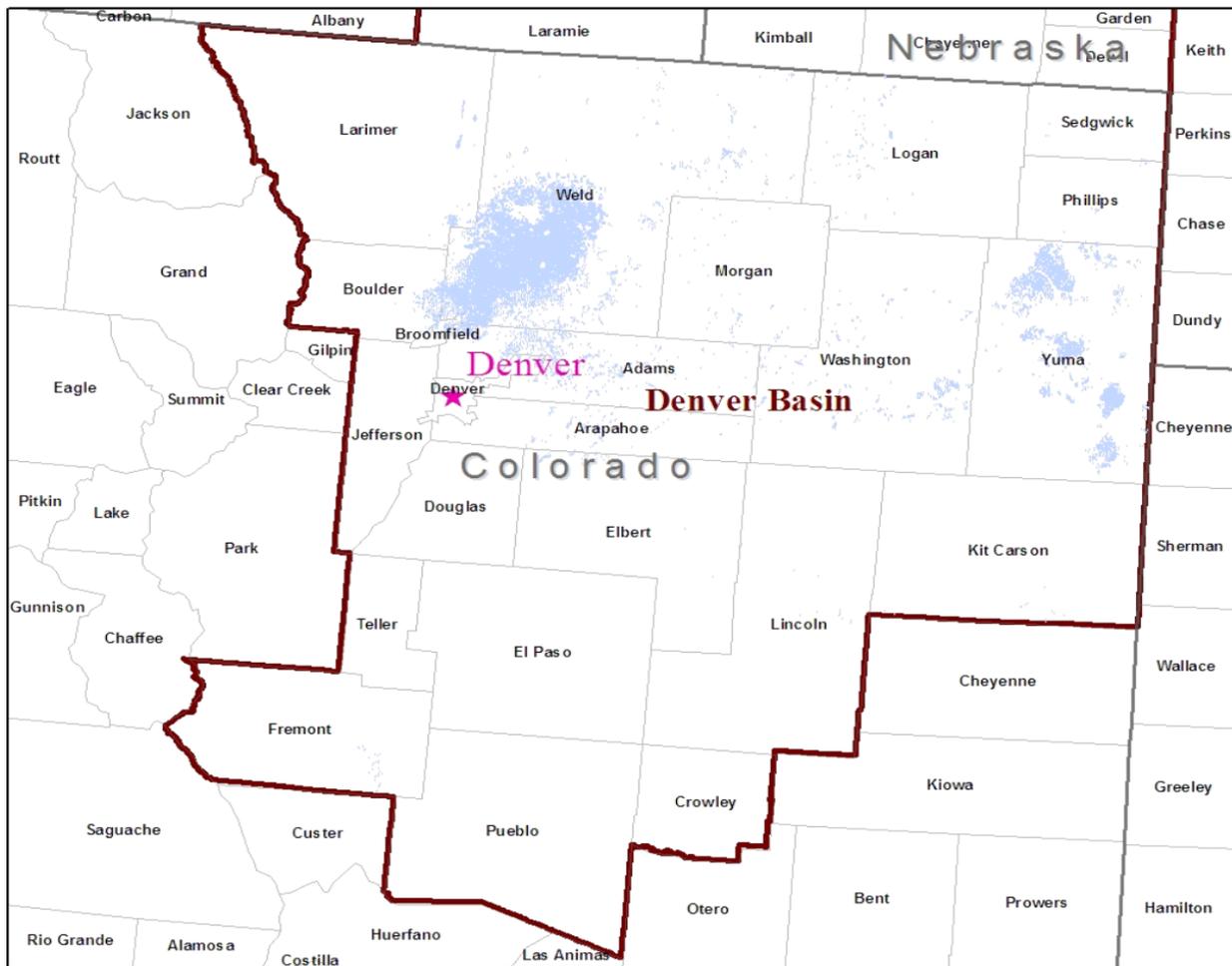
Basin specific reports break the emission totals for the two primary pollutants of concern (NOx and VOCs) down into source categories from which they came. These basin specific reports are available for public download and review from the previously cited WRAP Phase III webpage. By identifying the highest contributing source categories in each basin, one can qualitatively assess which of these source categories will most likely be affected by the federal regulations identified in this analysis.

It should be noted that since all Phase III emission inventories compiled to date are based on a 2006 baseline. Since there may have been additional State rules adopted since 2006 and the writing of this analysis, the basin by basin emission totals utilized in this analysis would be affected by any new rules that have been implemented after the Phase III inventories were calculated.

Denver-Julesburg Basin 2006 Emissions

Figure 2: D-J Basin Boundaries Overlaid With 2006 Oil and Gas Well Locations

D-J Basin



Legend

 2006 Well Locations



75 37.5 0 75 Kilometers

Table 3 contains a listing of the Denver-Julesburg Basin NOx emissions from ENVIRON’s April 30, 2008 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE DENVER-JULESBURG BASIN” located at:

[http://www.wrapair.org/forums/ogwg/documents/2008-04_'06_Baseline_Emissions_DJ_Basin_Technical_Memo_\(04-30\).pdf](http://www.wrapair.org/forums/ogwg/documents/2008-04_'06_Baseline_Emissions_DJ_Basin_Technical_Memo_(04-30).pdf)

Table 3: Denver-Julesburg Basin 2006 NOx Emission Sources (tpy)

	Drill rigs	Exempt engines	Heaters	Workover Rigs	Compressor Engines	Glycol Dehydrator	Other Categories	Totals
Totals	5,152	2,854	565	553	11,506	13	141	20,783
Percent of Total	25%	14%	3%	3%	55%	0%	1%	100%

As can be seen, compressors and exempt engines made up 69% of the NOx emissions in the Denver-Julesburg Basin, followed by 25% from drill rigs. NOx is not covered by the proposed NSPS, therefore these emission rates should not be affected. Since there are no Indian Lands in the Denver-Julesburg basin, the new Permitting of Minor sources on Indian Lands regulation, will have no affect on the emissions in this area either. Thus the overall effect of the regulations is likely to be negligible in terms of NOx totals from the Denver-Julesburg Basin.

Table 4 contains a listing of the Denver-Julesburg Basin VOC emissions from ENVIRON’s above cited April 30, 2008 Technical Memo.

Table 4: Denver-Julesburg Basin 2006 VOC Emission Sources (tpy)

	Drill Rigs	Unpermitted Fugitives	Permitted Fugitives	Large condensate Tanks	Pneumatic devices	Pneumatic pumps	Small condensate Tanks	Truck loading of condensate	Venting – blowdowns	Venting - initial completions	Venting - recompletions	Compressor Engines	Glycol Dehydrator	Other Categories	Totals
Totals	357	7564	460	40,636	11,545	836	12,874	800	1,744	500	674	2,393	506	869	81,758
Percent of Total	0%	9%	1%	50%	14%	1%	16%	1%	2%	1%	1%	3%	1%	1%	100%

In this case, large (50%) and small (16%) condensate tanks comprise 66% of the D-J VOC emissions, followed by 14% from pneumatic devices and 9% from unpermitted fugitives.

The new regulations of NSPS Subpart OOOO will address VOC from the largest D-J contributor, condensate tanks, requiring tanks with 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. However the State of Colorado already requires 95% VOC reduction for tanks containing

unstabilized condensate at gas processing plants if uncontrolled emissions are greater than or equal to 2 tpy (Reg. 7, XII.G.2 – applies only in ozone nonattainment areas). The 95% control applies for all condensate tanks if uncontrolled emissions are greater than or equal to 20 tpy (Reg. 7, XVII.C.1). In addition condensate tanks in ozone non-attainment areas shall be controlled under a system-wide approach (Reg. 7, XII.D). Furthermore if the tanks are within 1/4 mile of an affected building (COGCC HB-07-1341, Section 805.b(2)A), the threshold for condensate and crude oil tanks is lowered to a level of uncontrolled emissions greater than or equal to 5 tpy. There are other requirements for auto-ignitors and surveillance at controlled locations based on emission level. Thus the effect of Subpart OOOO on the gross emission inventory will be minimized in the D-J Basin by existing Colorado regulations.

Regarding the second largest source, pneumatic devices, under Subpart OOOO no VOC emissions would be allowed from devices located at gas processing plants, and devices at other sites would be limited to emissions of 6 ft³/day (this is equivalent to low bleed devices). Regulation 7, XVIII.C.1 of the CDPHE already requires no or low-bleed pneumatic controllers for all new & existing applications in ozone non-attainment areas (exceptions allowed). The COGCC HB-07-1341, Section 805.b(2)E requires no or low-bleed required for new, repaired or replaced devices where technically feasible. So the impact of Subpart OOOO on the gross emission inventory of the D-J Basin would also be minimized by this existing Colorado regulation.

The new regulations do not address unpermitted fugitive emissions.

Regarding the federal rules for Permitting of Minor sources on Indian Lands, as noted for NO_x above, there are no Indian Lands in the D-J, therefore the new requirements will have no effect on VOC emission totals in this area in the future.

Uinta Basin 2006 Emissions

Figure 3: Uinta Basin Boundaries Overlaid With 2006 Oil and Gas Well Locations

Uinta Basin - 2006 Well Location

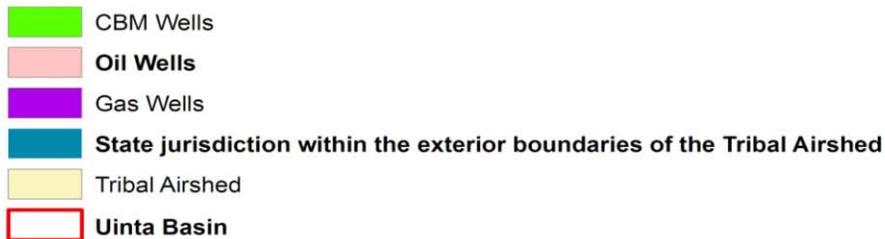
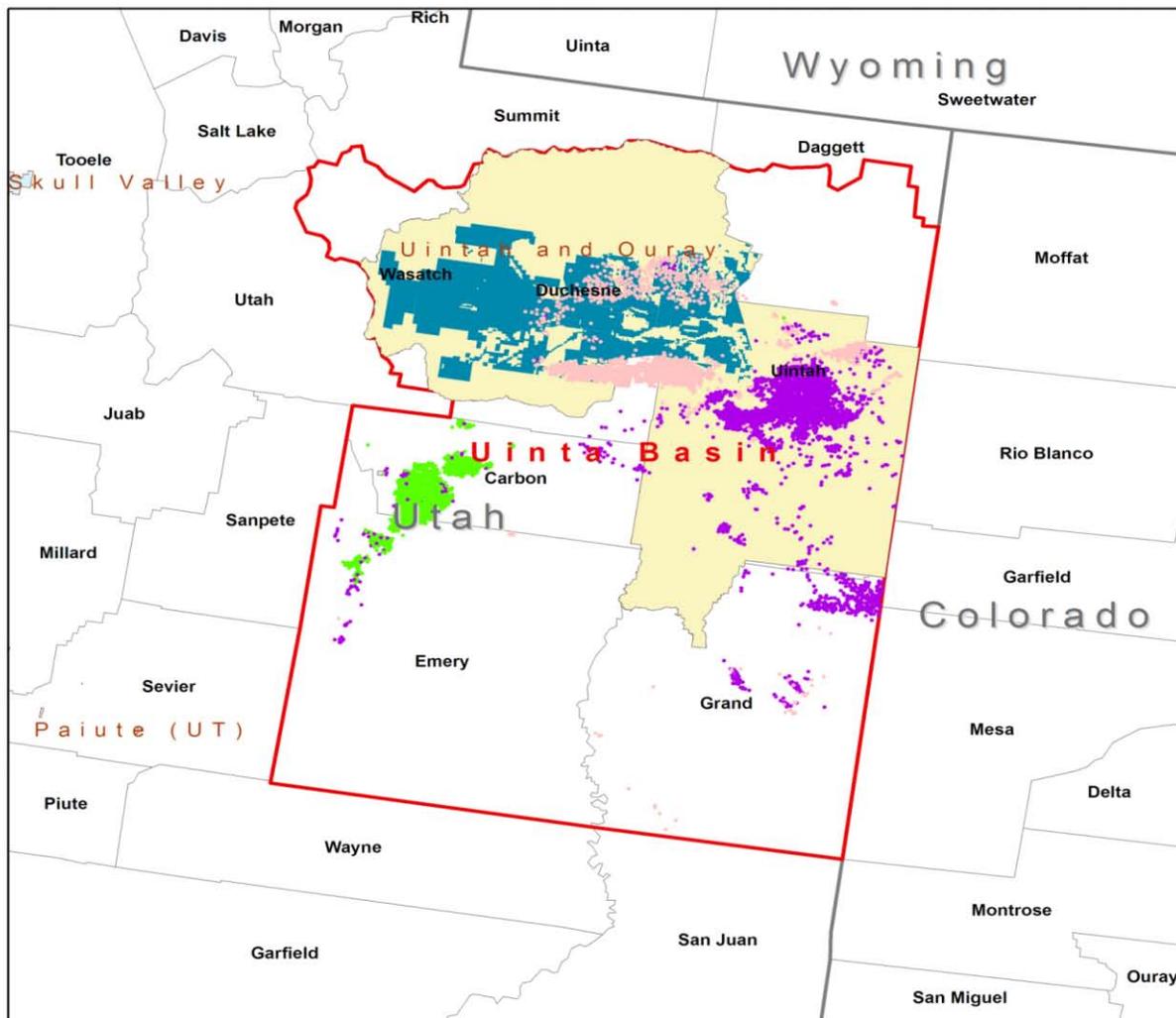


Table 5 contains a listing of the Uinta Basin NOx emissions from ENVIRON’s March 25, 2009 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE UINTA BASIN” located at:

http://www.wrapair.org/forums/ogwg/documents/2009-03_06_Baseline_Emissions_Uinta_Basin_Technical_Memo_03-25.pdf

Table 5: Uinta Basin 2006 NOx Emission Sources (tpy)

	Compressor engines	Condensate tank flaring	Drill rigs	Heaters	Workover rigs	Miscellaneous engines	Artificial Lift	Dehydrator	Dehydrator Flaring	Initial completion flaring	Permitted Sources	Total
Totals	2207.2	0.6	4778.8	1015.6	255.0	163.3	2184.5	148.1	0.1	0.6	2339.3	13093
Percent of Total	17%	0%	36%	8%	2%	1%	17%	1%	0%	0%	18%	100%
Total Tribal	1464.0	0.4	3755.1	695.9	184.4	111.9	1312.0	98.2	0.1	0.4	2339.3	9962
Total Nontribal	743.2	0.2	1023.7	319.7	70.6	51.4	872.5	49.9	0.0	0.1	0.0	3131

As can be seen from this table in the Uinta Basin main NOx sources are drill rigs with 36% of the emissions, followed by 34% from compressors and artificial lift engines and 18% from permitted sources. NOx is not covered by the proposed NSPS, therefore these emission rates should not be affected.

Also seen from the table, the majority of NOx emissions in the Uinta Basin are located on Tribal lands. Thus in the future, the new federal regulation for permitting of minor sources on Indian Lands will likely affect a significant portion of NOx emissions from previously unpermitted small sources like field compressors, artificial lift engines and heaters from the Uinta Basin. Although new sources will have lower emissions than previously projected due to the new federal permitting review, there will likely be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirement. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Table 6 contains a listing of the Uinta Basin VOC emissions, as taken from ENVIRON’s above cited March 25, 2009 Technical Memo.

Table 6: Uinta Basin 2006 VOC Emission Sources (tpy)

	Oil Well Truck Loading	Gas Well Truck Loading	Pneumatic devices	Pneumatic pumps	Unpermitted Fugitives	Glycol Dehydrator	Condensate Tank	Oil Tank	Permitted Sources	Venting - Compressor Startup	Venting - Compressor Shutdown	Other Categories	Total
Totals	963.9	127.0	14915.7	8385.7	1909.6	19470.5	6194.6	14356.7	1320.4	825.4	782.4	2294.3	71546.0
Percent of Total	1%	0%	21%	12%	3%	27%	9%	20%	2%	1%	1%	3%	100%
Total Tribal	578.9	112.6	11594.8	6561.7	1485.9	16563.6	5494.2	8622.4	1320.4	703.7	667.0	1664.6	55369.8
Total Nontribal	385.0	14.4	3320.8	1824.0	423.7	2906.9	700.4	5734.2	0.0	121.7	115.3	629.5	16176.0

In the Uinta Basin pneumatic devices (21%) and pneumatic pumps (12%) comprise the largest sources of VOC emissions with 33% of the total, followed by oil (20%) and condensate (9%) tanks with a combined 29% of the total, and glycol dehydrators with another 27% of the basin VOC

As noted before, the new regulations of NSPS Subpart OOOO will address VOC emissions from pneumatic devices such that no VOC emissions will be allowed from devices located at gas processing plants, while devices at other sites would be limited to emissions of 6 ft³/day. The State of Utah has no regulations on pneumatic devices, so Subpart OOOO would likely reduce VOC emissions in future inventories from this source category.

The Subpart OOOO regulation also will require oil and condensate tanks with at least 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. The State of Utah has an existing regulations for hydrocarbon storage tanks in ozone nonattainment areas (R307-327) which requires large tanks (> 40,000 gallons) with high vapor pressure (TVP > 1.52 psia at storage temperature) to be controlled to minimize vapor loss (new tanks shall be fitted with an internal floating roof resting on the liquid surface), but the only areas that regulation applies to are Salt Lake and Davis Counties. Since the Uinta Basin is located in northeast Utah and does not include these two nonattainment counties, the regulation does not apply to the Uinta O&G operations. The new federal regulation would likely reduce VOC emissions in future inventories from tanks in this basin.

Regarding glycol dehydrators, revisions to NESHAPS Subpart HH would remove the 1 ton per year benzene compliance alternative for large dehydrators (actual annual average natural gas flow rate greater than 3 million cubic feet per day or annual average benzene emissions of greater than 1 tpy). Instead, all large dehydrators would be required to reduce their VOC emissions by 95%. As with other VOC sources, the

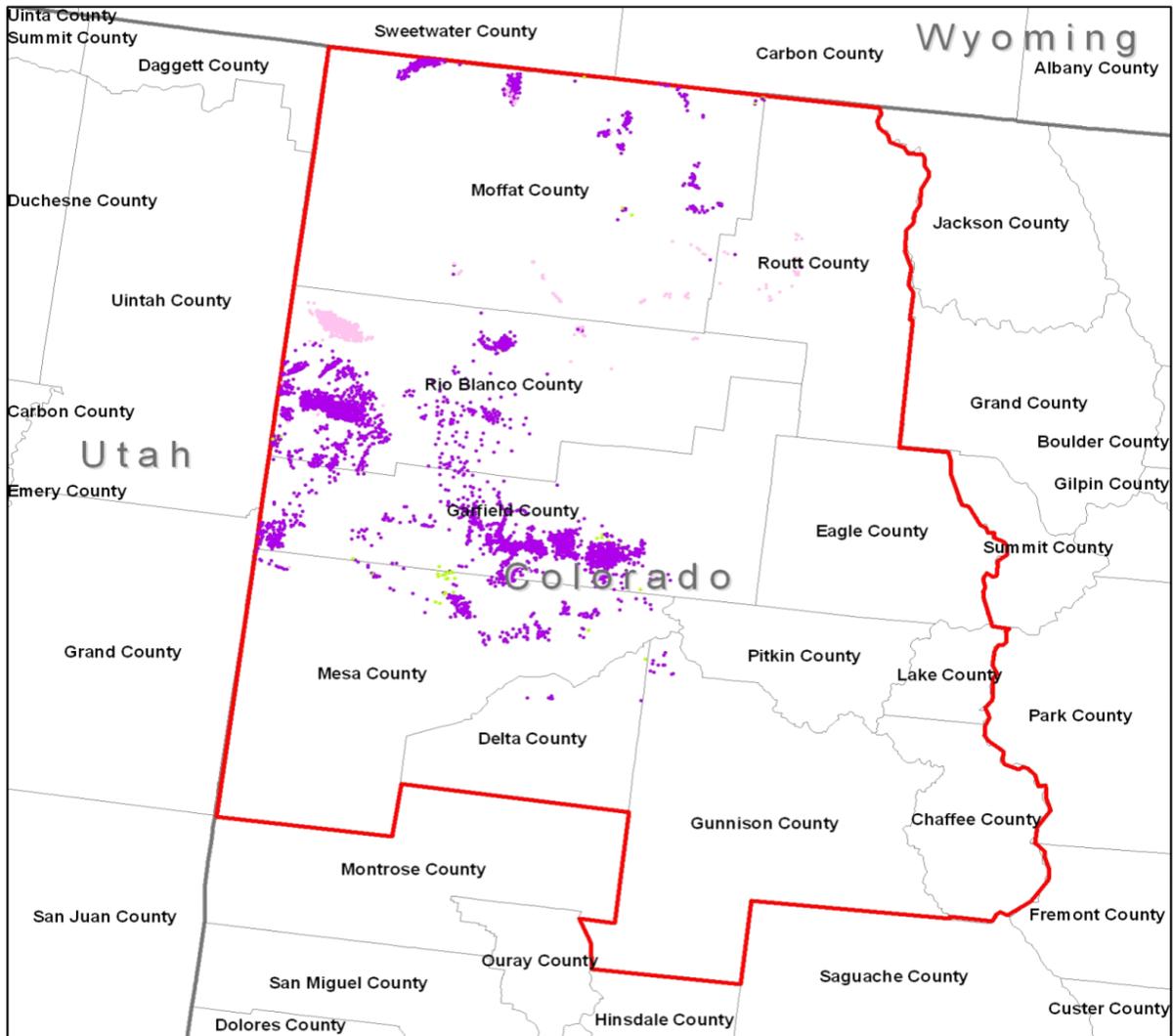
State of Utah doesn't have regulations on dehydrators, so the new federal rule would likely reduce VOC emissions in future inventories from tanks in the Uinta basin

Again, a large portion of VOC emissions in the Uinta Basin come from Indian Lands, therefore the new requirements for Permitting of Minor sources on Indian Lands, will likely have some effect of lowering VOC emission totals in this area on new sources in the future. Although new sources will have lower emissions than previously projected due to the new federal permitting review, there will be a number of existing sources that were never reported in the past and will be included in emission inventories under the federal reporting requirement. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Piceance Basin 2006 Emissions

Figure 4: Piceance Basin Boundaries Overlaid With 2006 Oil and Gas Well Locations

Piceance Basin - 2006 Well Locations



Legend

-  Oil Wells
-  Gas Wells
-  CBM Wells



0 15 30 60 90 120 Kilometers

Table 7 contains a listing of the Piceance Basin NOx emissions from the ENVIRON’s January 20, 2009 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE PICEANCE BASIN” located at:

http://www.wrapair.org/forums/ogwg/documents/2009-01_06_Baseline_Emissions_Piceance_Basin_Technical_Memo_01-20.pdf

Table 7: Piceance Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Exempt engines	Flaring	Glycol Dehydrator	Heaters	Workover Rigs	Other Categories	Totals
Totals	5,705	5,382	128	136	53	589	75	323	12,390
Percent of Total	46%	43%	1%	1%	0%	5%	1%	3%	100%

In the Piceance Basin compressors (46%) and exempt engines (1%) made up 47% of the NOx emissions in 2006, followed by 43% from drill rigs. NOx is not covered by the proposed NSPS, therefore these emission rates should not be affected. As in the Denver-Julesburg basin, there are no Indian Lands in the Piceance Basin, thus the new Permitting of Minor sources on Indian Lands will have no affect on the emissions in this area. The overall effect of the new regulations is therefore likely to be negligible in terms of NOx totals from the Piceance Basin.

Table 8 contains a listing of the Piceance Basin VOC emissions from ENVIRON’s above cited January 20, 2009 Technical Memo.

Table 8: Piceance Basin 2006 VOC Emission Sources (tpy)

	Drill Rigs	Unpermitted Fugitives	Permitted Fugitives	Condensate Tanks	Pneumatic Devices	Pneumatic Pumps	Venting – Blowdown	Venting - Initial Completion	Venting - Recompletion	Compressor Engines	Glycol Dehydrator	Other Categories	Totals
Totals	244	967	364	3,405	1,883	648	2,172	10,845	1,434	1,501	2,929	1,072	27,464
Percent of Total	1%	4%	1%	12%	7%	2%	8%	39%	5%	5%	11%	4%	100%

In this case, venting from initial completions (39%), venting blowdowns (8%) and recompletions (5%) comprise more than half - 52% of the VOC emissions in the Piceance Basin. This is followed by condensate tanks with 12%, glycol dehydrators with 11% and pneumatic devices with 7% of the Piceance VOC emissions.

The new regulations of NSPS Subpart OOOO will address VOC emissions from any new or existing non-exploratory or non-delineation wells (wells that are in close proximity to a gathering line) that have undergone high pressure hydraulic fracturing (fracing). The regulation will require “Green Completions” for these wells, in combination with pit flaring for gas unsuitable to enter a sales pipeline. However the Colorado Oil & Gas Conservation Commission HB-07-1341, Section 805.b(3) requires green completions when technically and economically feasible. If not feasible, Best Management Practices shall be used. Thus the effect of Subpart OOOO will be minimized in the Piceance Basin by existing Colorado regulations.

Also applicable to this basin, the Subpart OOOO regulation also will require condensate tanks with 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. As noted before the State of Colorado already requires 95% VOC reduction for tanks containing unstabilized condensate at gas processing plants if uncontrolled emissions are greater than or equal to 2 tpy (Reg. 7, XII.G.2). The 95% control applies for all hydrocarbon liquids (not just unstabilized condensate) if uncontrolled emissions are greater than or equal to 20 tpy (Reg. 7, XVII.C.1). Furthermore if the tanks are within 1/4 mile of an affected building (COGCC HB-07-1341, Section 805.b(2)A), the threshold for all hydrocarbon liquids is lowered to a level of uncontrolled emissions greater than or equal to 5 tpy. There are other requirements for auto ignitors and surveillance at controlled locations based on emission level. Thus the effect of Subpart OOOO will be minimized in the Piceance Basin by existing Colorado regulations.

Regarding glycol dehydrators, revisions to NESHAPS Subpart HH would remove the 1 ton per year benzene compliance alternative for large dehydrators (actual annual average natural gas flow rate greater than 3 million cubic feet per day or annual average benzene emissions of greater than 1 tpy). Instead, all large dehydrators would be required to reduce their VOC emissions by 95%. The State of Colorado Regulation 7, XII.H and XVII.D requires 90% reduction of VOCs where uncontrolled VOC emissions \geq 15 tpy. The threshold is reduced to \geq 5 tpy within 1/4 mile of an affected building under COGCC HB-07-1341, Section 805.b(2)C). So once again the effect of Subpart OOOO will be minimized in the Piceance Basin.

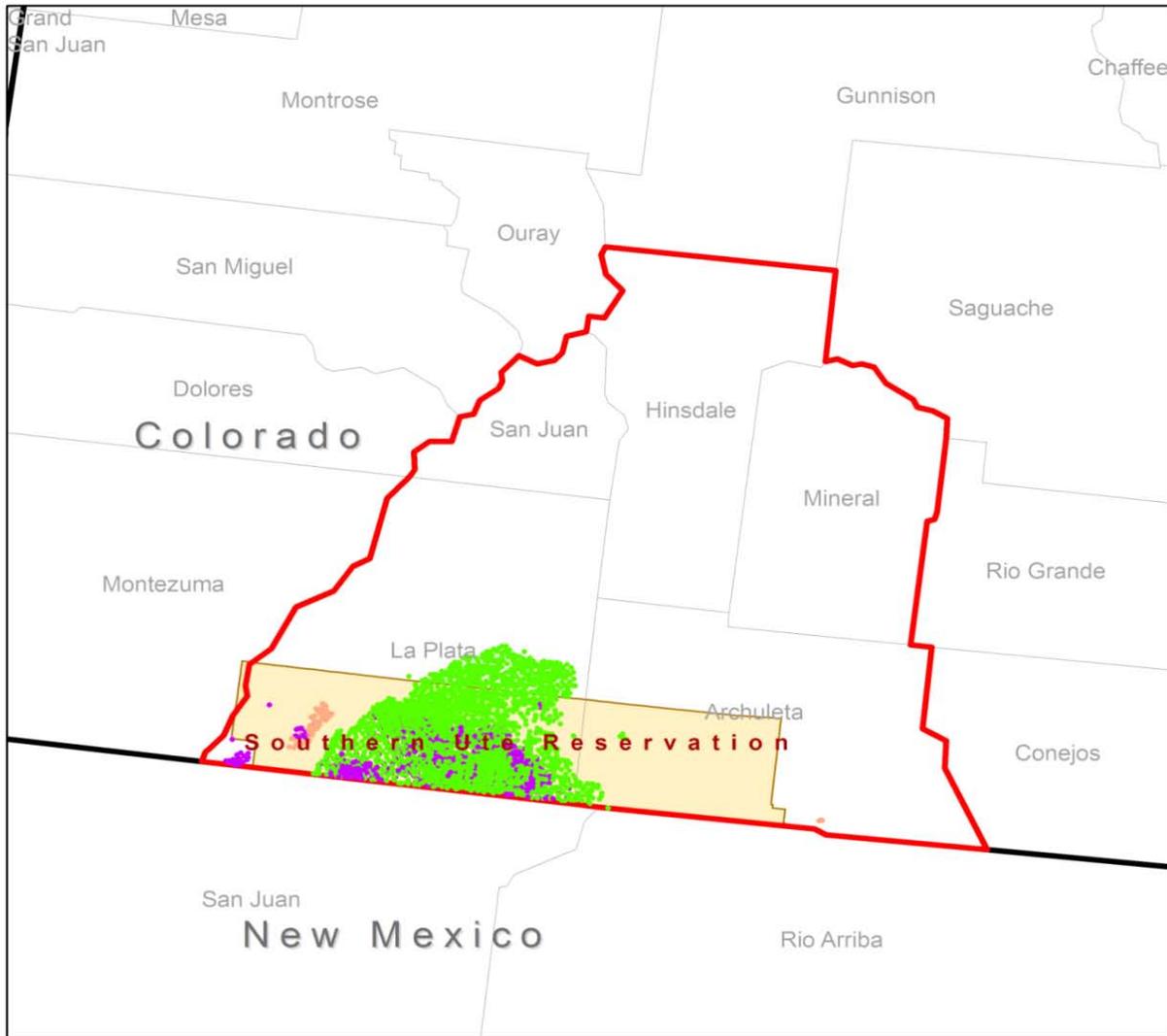
For pneumatic devices, under Subpart OOOO no VOC emissions would be allowed from devices located at gas processing plants, while devices at other sites would be limited to emissions of 6 ft³/day (this is equivalent to bleed devices). Reg. 7, XVIII.C.1 of the CDPHE already requires no or low-bleed pneumatic controllers for all new & existing applications (exceptions allowed), so the impact of Subpart OOOO would be minimized.

Regarding the federal rules for Permitting of Minor sources on Indian Lands, like for NO_x noted above, there are no Indian Lands in the Piceance, and therefore the new requirements will have no effect on VOC emission totals in this area in the future.

North San Juan Basin 2006 Emissions

Figure 5: North San Juan Basin Boundaries Overlaid With 2006 O&G Well Locations

Northern San Juan Basin - 2006 Well Location



- CBM Wells
- Gas Wells
- Oil Wells

Table 9 contains a listing of the North San Juan Basin NOx emissions from the ENVIRON’s September 1, 2009 Technical Memo, “DEVELOPMENT OF BASELINE 2006 AND MIDTERM 2012 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE NORTH SAN JUAN BASIN” located at:

http://www.wrapair.org/forums/ogwg/documents/NSanJuanBasin/2009-09_06_Baseline_and_12_Midterm_Emissions_N_San_Juan_Basin_Technical_Memo_09-01.pdf

Table 9: North San Juan Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Miscellaneous Engines	Heaters/ Boilers	Dehydrators	Flaring	Other Categories	Totals
Totals	4,947	225	48	462	4	3	12	5,700
Percent of Total	87%	4%	1%	8%	0%	0%	0%	100%
Total Tribal	4,184	213	43	406	3	2	11	4,862
Total Non-Tribal	763	12	6	56	1	0	1	839

In the North San Juan compressors (87%) and miscellaneous engines (1%) make up an overwhelming 88% majority of the NOx emissions, distantly followed by 8% from heaters/boilers and 4% from drill rigs.

NOx is not covered by the proposed NSPS, therefore these emission rates should not be affected by Subpart OOOO. Most of the NOx emissions in the North San Juan Basin are on Indian Lands. Although new sources will have lower emissions from previously unpermitted small sources like field compressors, artificial lift engines and heaters than previously projected due to the new federal regulation for permitting of minor sources on Indian Lands, there will be a number of existing sources that were never reported in the past and with the federal reporting requirements they will now be included in emission inventories. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Table 10 contains a listing of the North San Juan Basin VOC emissions from ENVIRON’s above cited September 1, 2009 Technical Memo.

Table 10: North San Juan Basin 2006 VOC Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Miscellaneous Engines	Heaters/ Boilers	Dehydrators	Oil Tanks	Flaring	Other Categories	Totals
Totals	1,886	18	6	17	14	165	5	36	2,147
Percent of Total	88%	1%	0%	1%	1%	8%	0%	2%	100%
Total Tribal	1,830	18	5	15	12	151	5	29	2,064
Total Non-Tribal	56	1	1	2	2	14	0	7	83

As with NO_x, compressors and miscellaneous engines make up an overwhelming 88% majority of the VOC emissions the North San Juan, distantly followed by 8% from oil tanks.

NSPS Subpart OOOO does address compressor VOC emissions, mandating that centrifugal units be equipped with a dry seal system, and reciprocating engines have a maintenance schedule to replace rod packing every 26,000 hours. The State of Colorado has no equivalent measures for minimizing compressor fugitive emissions, so Subpart OOOO will lower VOC emissions for non-tribal sources in the North San Juan Basin.

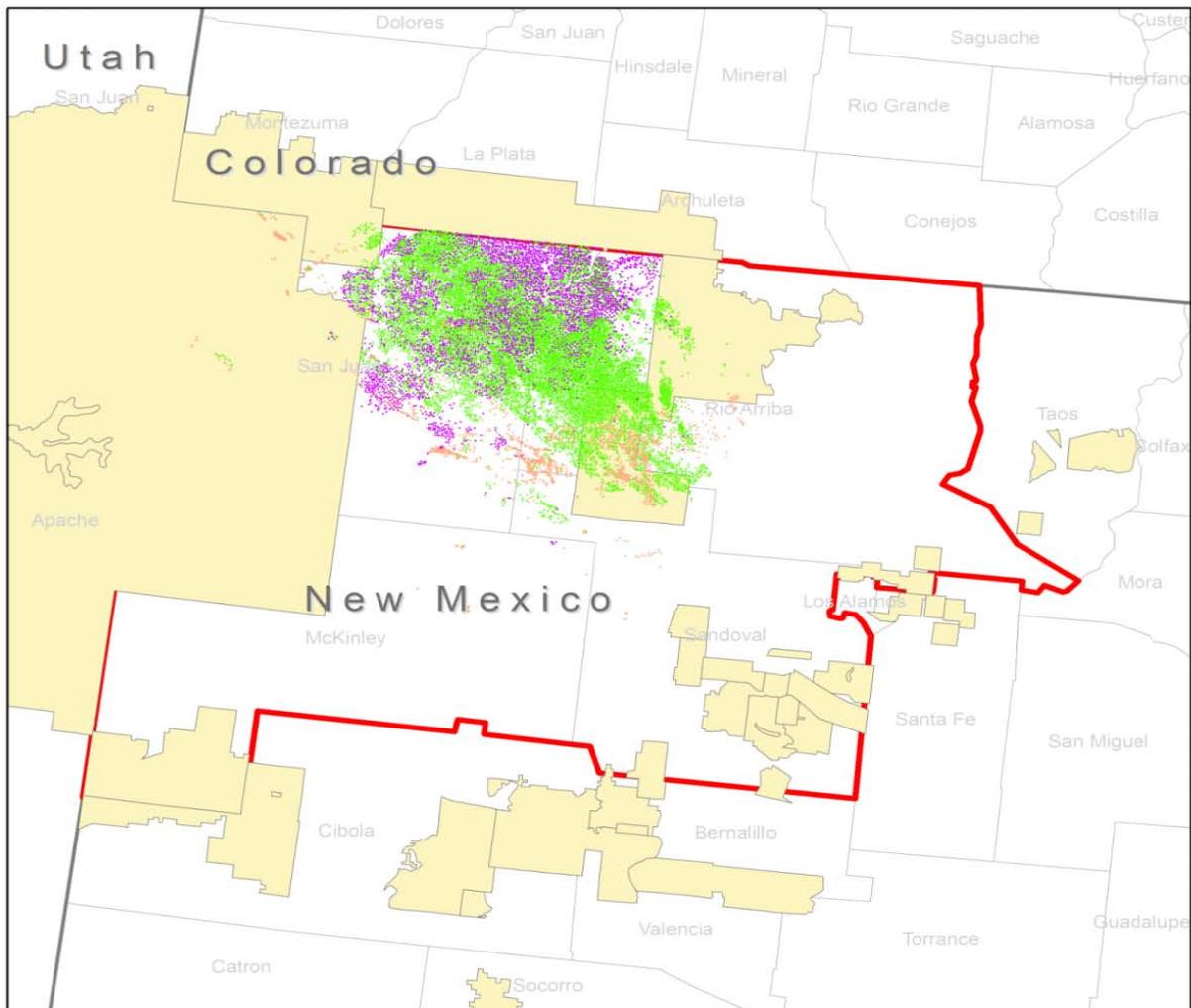
Also applicable to this basin, the Subpart OOOO regulation also will require oil tanks with 20 bbl/day crude oil throughput to reduce VOC by 95%. But as noted before the State of Colorado already requires 95% VOC reduction for tanks containing unstabilized condensate at gas processing plants if uncontrolled emissions are greater than or equal to 2 tpy (Reg. 7, XII.G.2). The 95% control applies for all hydrocarbon liquids (not just unstabilized condensate) if uncontrolled emissions are greater than or equal to 20 tpy (Reg. 7, XVII.C.1). Furthermore if the tanks are within 1/4 mile of an affected building (COGCC HB-07-1341, Section 805.b(2)A), the threshold for all hydrocarbon liquids is lowered to a level of uncontrolled emissions greater than or equal to 5 tpy. There are other requirements for auto ignitors and surveillance at controlled locations based on emission level. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the North San Juan Basin by existing Colorado regulations.

A vast majority of VOC emissions in the North San Juan come from Indian Lands, therefore the new requirements for Permitting of Minor sources on Indian Lands, will likely have some effect of lowering VOC emission totals in this area on new sources in the future. But as pointed out, it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

South San Juan Basin 2006 Emissions

Figure 6: South San Juan Basin Boundaries Overlaid With 2006 O&G Well Locations

South San Juan Basin - 2006 Wells



Legend

-  Oil Wells
-  CBM Wells
-  Gas Wells
-  Tribal Land defined by ITEP



0 15 30 60 90 120 Kilometers

Table 11 contains a listing of the South San Juan Basin NOx emissions from the ENVIRON’s November 25, 2009 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE SOUTH SAN JUAN BASIN” located at:

http://www.wrapair.org/forums/ogwg/documents/SSanJuanBasin/2009-11y_06_Baseline_S_San_JuanBasin_Technical_Memo_11-25R.pdf

Table 11: South San Juan Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Workover Rigs	Completion Flaring	CBM Pump Engines	Artificial Lift	Dehydrator	Other Categories	Total
Totals	35,545	848	805	876	214	1,374	1,498	209	705	42,075
Percent of Total	84%	2%	2%	2%	1%	3%	4%	0%	2%	100%
Total Tribal	2,426	52	94	102	25	67	477	2	43	3,287
Total Nontribal	33,119	796	711	775	189	1,307	1,022	208	661	38,788

Once again in the South San Juan gas fired engines (compressors [84%], CBM pump [3%] and artificial lift engines [4%]) make up the majority of the NOx emissions with 91% of the total, distantly followed by drill and workover engines at 4% from these two categories.

NOx is not covered by the proposed NSPS, therefore these emission rates will not be affected by Subpart OOOO. The new federal rules for permitting of minor sources on Indian Lands will likely affect the emissions of previously unpermitted small sources like field compressors, miscellaneous engines and heaters in the future, therefore the new requirements for Permitting of Minor sources on Indian Lands will likely have some effect of lowering VOC emission totals in this area on new sources in the future. However, it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Table 12 contains a listing of the South San Juan Basin VOC emissions from ENVIRON’s above cited November 25, 2009 Technical Memo.

Table 12: South San Juan Basin 2006 VOC Emission Sources (tpy)

	Compressor Engines	Pneumatic Devices	Pneumatic Pumps	Venting – Blowdown	Venting - Initial Completion	Unpermitted Fugitives	Condensate Tanks	Oil Tanks	CBM Pump Engines	Permitted Tank Losses	Dehydrator	Other Categories	Totals
Totals	4,180	1,584	142	13,145	14,492	4,137	3,964	2,430	1,837	1,832	11,372	1,582	60,697
Percent of Total	7%	3%	0%	22%	24%	7%	7%	4%	3%	3%	19%	3%	100%
Total Tribal	212	225	20	1,150	2,074	592	401	773	90	222	1,031	132	6,923
Total Nontribal	3,968	1,359	121	11,995	12,418	3,545	3,563	1,657	1,747	1,610	10,341	1,450	53,774

In the South San Juan case, venting from initial completions (24%) and venting from blowdowns (22%) comprise almost half - 46% of the VOC emissions in the basin. This is followed by glycol dehydrators emissions with 19% and emissions from condensate (7%), oil tanks (4%) and permitted tank losses (3%) totaling to 14% of the VOC emission totals. Compressors (7%) and CBM pump engines (3%) are the next biggest source category with 10% from these two types of gas fired sources.

As noted before new regulations of NSPS Subpart OOOO will address VOC emissions from any new or existing non-exploratory or non-delineation wells (wells that are in close proximity to a gathering line) that have undergone high pressure hydraulic fracturing (fracing). The regulation will require “Green Completions” for these wells, in combination with pit flaring for gas unsuitable to enter a sales pipeline. The State of New Mexico has no regulations on Green Completions, so Subpart OOOO would likely reduce VOC emissions in future inventories from this source category in the South San Juan Basin.

Regarding glycol dehydrators, revisions to NESHAPS Subpart HH would remove the 1 ton per year benzene compliance alternative for large dehydrators (actual annual average natural gas flow rate greater than 3 million cubic feet per day or annual average benzene emissions of greater than 1 tpy). Instead, all large dehydrators would be required to reduce their VOC emissions by 95%. Once again the State of New Mexico has no existing regulations on dehydrator control requirements for this source category, so Subpart OOOO would likely reduce VOC emissions in future inventories from dehydrators in the South San Juan Basin.

Also applicable to this basin, the Subpart OOOO regulation will require condensate tanks with 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. As for other categories the State of New Mexico has no existing regulations on tank control requirements, so Subpart OOOO would

likely reduce VOC emissions in future inventories from storage tanks in the South San Juan Basin.

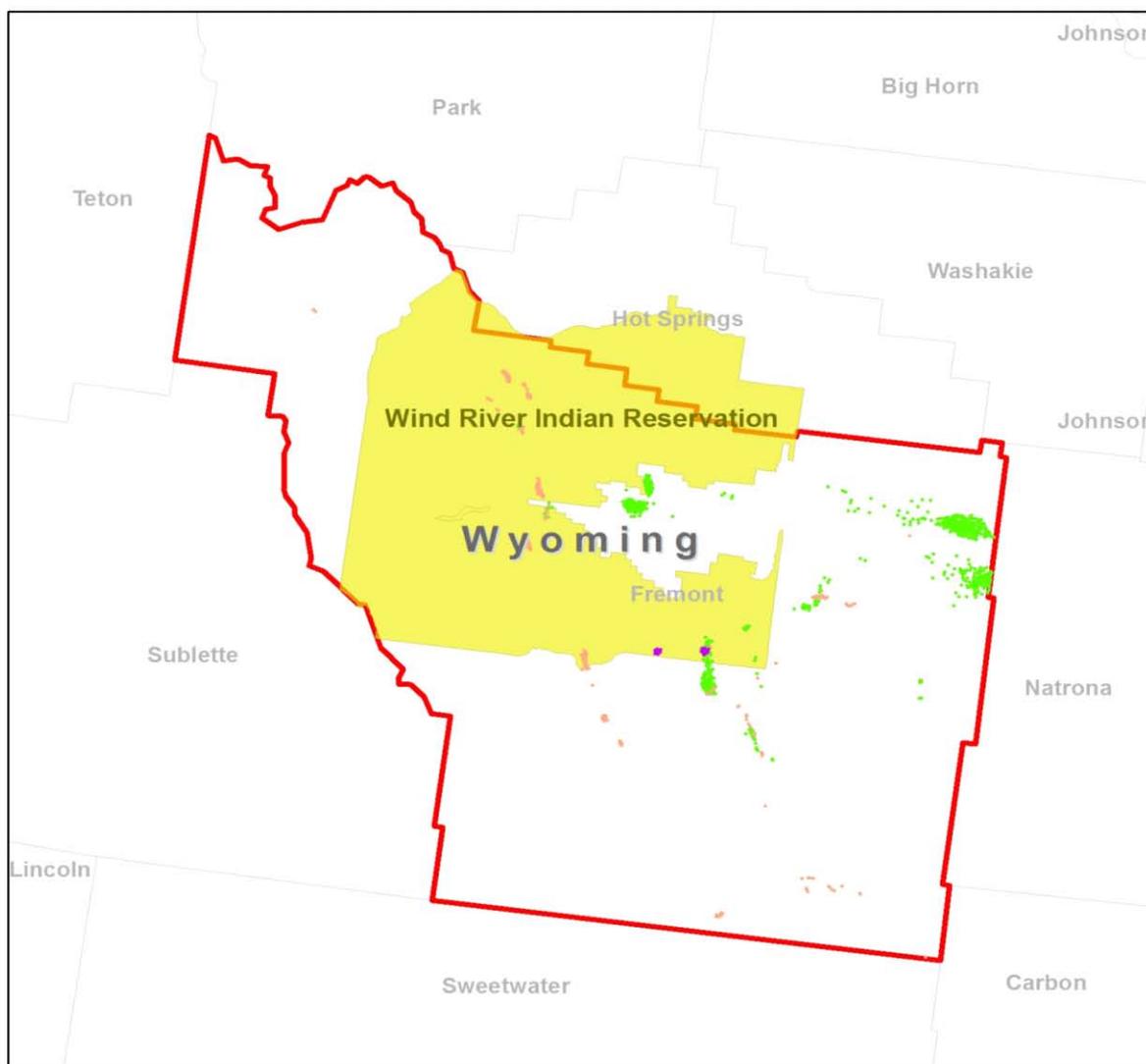
Regarding fired engines NSPS Subpart OOOO does address VOC emissions, mandating that centrifugal units be equipped with a dry seal system, and reciprocating engines have a maintenance schedule to replace rod packing every 26,000 hours. The State of New Mexico has no existing regulations on compressor fugitive emissions, so Subpart OOOO would likely reduce VOC emissions in future inventories from this source category in the South San Juan Basin.

Regarding the federal rules for permitting of minor sources on Indian Lands, in the South San Juan Basin Indian Lands comprise a small portion of the VOC sources, therefore the new requirements for Permitting of Minor sources on Indian Lands, will likely have some effect of lowering VOC emission totals in this area on future new sources. However it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Wind River Basin 2006 Emissions

Figure 7: Wind River Basin Boundaries Overlaid With 2006 Oil and Gas Well Locations

Wind River Basin



-  CBM Wells
-  Gas Wells
-  Oil Wells
-  Tribal Reservation
-  Wind River Basin



 Kilometers
0 10 20 30 40

Table 13 contains a listing of the Wind River Basin NOx emissions from the ENVIRON’s July 14, 2010 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE WIND RIVER BASIN” located at:

http://www.wrapair.org/forums/ogwg/documents/2010-07_%2706%20Baseline;%20Wind%20RiverBasin%20Technical%20Memo%20%2807-14%29.pdf

Table 13: Wind River Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Workover Rigs	Dehydrators	Other Categories	Total
Total Tons	1,290	218	145	62	17	82	1,814
Percent of Total	71%	12%	8%	3%	1%	5%	100%
Total Tribal	213	16	43	18	10	37	337
Total Nontribal	1,077	203	102	44	7	45	1,478

In the Wind River Basin compressors are the largest source category in 2006, with almost ¾ of the NOx emissions (71%). This is followed by 12% from drill rigs and 8% from gas fired heaters.

As cited throughout this analysis NOx is not covered by the proposed NSPS, therefore these emission rates should not be affected Subpart OOOO. There are some Indian Lands in the Wind River Basin, thus the new Permitting of Minor sources on Indian Lands will affect the emissions of previously unpermitted small sources like field compressors, miscellaneous engines and heaters in the future and that will likely lower VOC emission totals on new sources in the future. However, it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Table 14 contains a listing of the Wind River Basin VOC emissions from ENVIRON’s above cited July 14, 2010 Technical Memo.

Table 14: Wind River Basin 2006 VOC Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Pneumatic Devices	Venting - Blowdowns	Workover Rigs	Dehydrators	Condensate Tanks	Oil Tanks	Unpermitted Fugitives	Other Categories	Total
Total Tons	220	24	8	6,351	2,018	9	1,324	710	449	296	574	11,982
Percent of Total	2%	0%	0%	53%	17%	0%	11%	6%	4%	2%	5%	100%
Total Tribal	48	2	2	1,886	599	3	36	26	314	88	191	3,196
Total Nontribal	171	23	6	4,464	1,418	7	1,288	684	135	208	382	8,786

In the Wind River Basin pneumatic devices comprise more than half (53%) of the VOC emissions, followed by 17% from venting blowdowns, 11% from glycol dehydrators and 10 % from condensate (6%) and oil tanks (4%).

The new regulations of NSPS Subpart OOOO will address VOC emissions from pneumatic devices, allowing no VOC emissions from devices located at gas processing plants, while devices at other sites would be limited to emissions of 6 ft³/day (this is equivalent to low bleed devices). The Wind River Basin is part of the Concentrated Development Area for the State of Wyoming and Chapter 6 Section 2 O&G Permitting Guidance, already requires installation of low or no-bleed at all new facilities. Upon modification of facilities, new pneumatic controllers must be low/no-bleed and existing controllers must be replaced with no/low-bleed. (well site facilities only - not gas plants). Thus the impact of Subpart OOOO on pneumatic emissions would be minimized in the Wind River Basin.

Regarding well completions (venting blowdowns in the Phase III inventory) under Subpart OOOO any new or existing non-exploratory or non-delineation wells (wells that are in close proximity to a gathering line) that have undergone high pressure hydraulic fracturing (fracing), the regulation will require “Green Completions” for these wells, in combination with pit flaring for gas unsuitable to enter a sales pipeline. Wyoming Chapter 6 Section 2 O&G Permitting Guidance defines 3 area categories; 1) the Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide

Green completions have been required in the JPAD area since 2004, and are required CDAs as of 2011-12 (depending upon individual permit issuance -- August 1, 2011 rule). Fremont County containing the Wind River Basin is classified as a CDA, therefore the requirement for Green Completions applies. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Regarding glycol dehydrators, as noted before, revisions to NESHAPS Subpart HH would remove the 1 ton per year benzene compliance alternative for large dehydrators (actual annual average natural gas flow rate greater than 3 million cubic feet per day or annual average benzene emissions of greater than 1 tpy). Instead, all large dehydrators would be required to reduce their VOC emissions by 95%. In CDAs (Fremont County) Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control from multiple well (PAD) facilities upon startup/modification. Emissions from single well dehydration units must be controlled by 98% within 60 days of startup/modification for ≥ 6 tpy VOC (30 days for ≥ 8 tpy VOC) with removal allowed upon approval after various elapsed time scenarios. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Also applicable to this basin, the Subpart OOOO regulation will require hydrocarbon tanks with 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control of all new/modified tank emissions ≥ 8 tpy VOC at start up in CDAs. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Regarding the federal rules for permitting of minor sources on Indian Lands, the Wind River Basin Indian Lands comprise a minority of VOC sources, therefore the new requirements will likely have a small effect on VOC emission totals in this area in the future. However, it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Powder River Basin 2006 Emissions

Figure 8: Powder River Basin Boundaries Overlaid With 2006 Oil and Gas Well Locations

Powder River Basin

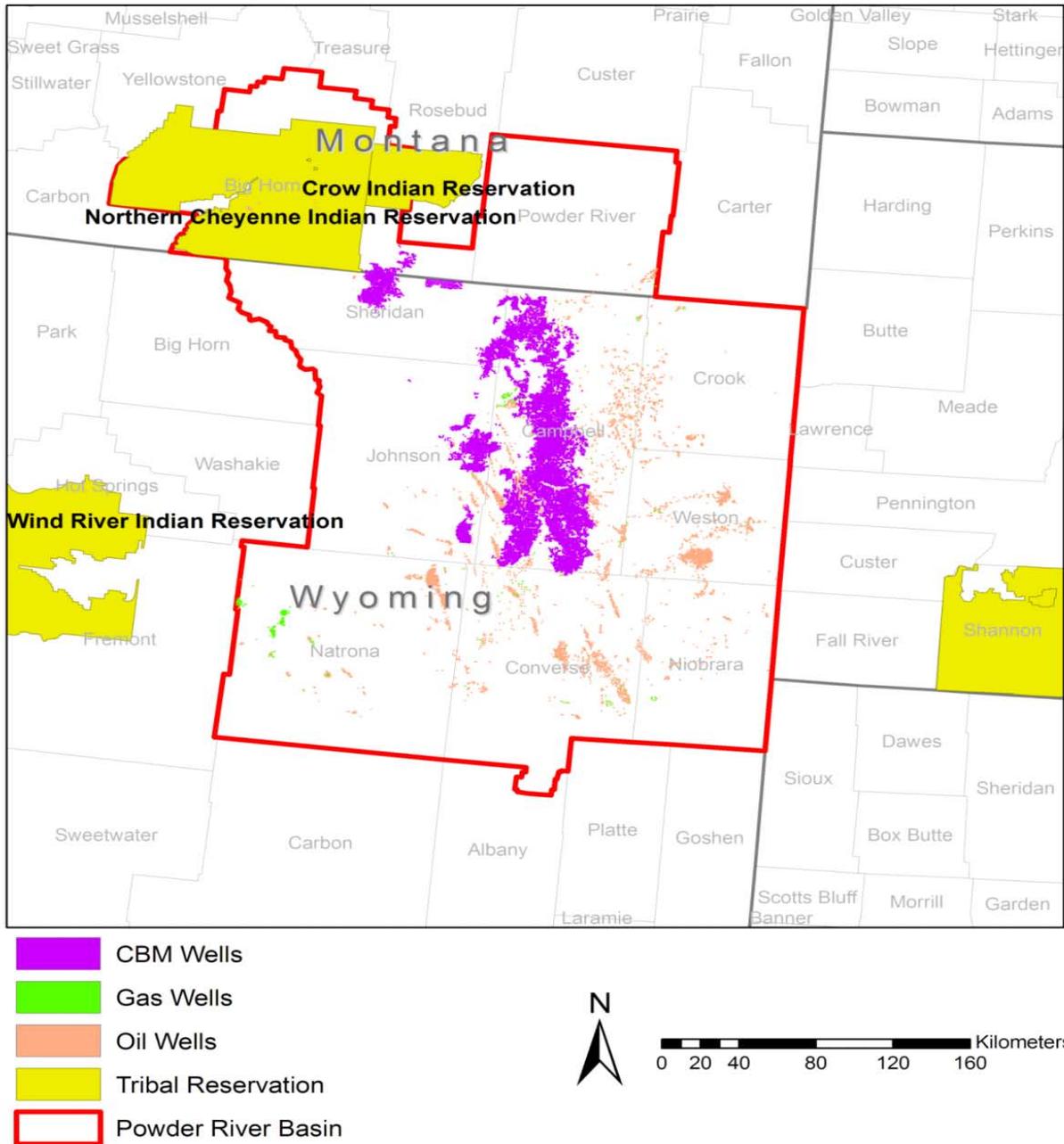


Table 15 contains a listing of the Powder River Basin NOx emissions from the ENVIRON’s June 10, 2011 Technical Memo, “DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE POWDER RIVER BASIN” located at:

http://www.wrapair2.org/pdf/2011-06_%2706%20Baseline%20Emissions;%20Powder%20River%20Basin%20%2806-10%29.pdf

Table 15: Powder River Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Miscellaneous Engines	Artificial Lift	Dehydrators	Other Categories	Total
Total Tons	9,320	5,796	351	4,136	469	20	995	21,086
Percent of Total	44%	27%	2%	20%	2%	0%	5%	100%
Total Tribal	0	2	1	7	2	0	158	169
Total Nontribal	9,320	5,794	350	4,129	467	20	837	20,917

Gas fired engines (compressors [44%] and other miscellaneous engines [20%]) are the largest category of NOx emissions in the Powder River Basin, making up 64% of the total. The next largest source is 27% from drill rigs. NOx is not covered by the proposed federal NSPS or NESHAPs regulations, therefore these emission rates should not be affected by these new federal rules.

Although there is a very small portion of Powder River Basin NOx located on Indian lands, the federal permitting program for minor sources will likely have a fairly negligible effect on the emissions of previously unpermitted small sources in this basin. However it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal Regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.

Table 16 contains a listing of the Powder River Basin VOC emissions from ENVIRON’s above cited June 10, 2011 Technical Memo.

Table 16: Powder River Basin 2006 VOC Emission Sources (tpy)

	Compressor Engines	Drilling Rigs	Venting - Initial Completion	Venting - Recompletion	Unpermitted Fugitives	Misc. Engines	Dehydrator	Oil Well Truck Loading	Pneumatic Devices	Oil Tanks	Condensate Tanks	Other Categories	Totals
Total Tons	3,847	241	686	6,510	3,530	502	994	863	2,859	412	310	802	21,557
Percent of Total	18%	1%	3%	30%	16%	2%	5%	4%	13%	2%	1%	4%	100%
Total Tribal	0	0	0	0	19	1	0	3	15	2	0	6	46
Total Nontribal	3,847	241	686	6,510	3,511	501	994	860	2,844	410	310	796	21,511

In the Powder River case well completion venting from initial (3%) and recompletions (30%) are the largest VOC sources, showing 33% of the basin total emissions. This is followed by compressor (18%) and miscellaneous engines (2%) combined for 20%, unpermitted fugitives with 16% and pneumatic devices with 13% of the basin's VOC. Glycol dehydrators with 5% and oil/condensate tanks with 3% make up the bulk of the rest of the sources.

As noted new regulations of NSPS Subpart OOOO will address VOC emissions from completions at any new or existing non-exploratory or non-delineation wells (wells that are in close proximity to a gathering line) that have undergone high pressure hydraulic fracturing (fracing). The regulation will require Green Completions for these wells, in combination with pit flaring for gas unsuitable to enter a sales pipeline. As noted above Wyoming Chapter 6 Section 2 O&G Permitting Guidance defines 3 area categories; 1) Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide. Green completions are required in the JPAD and in CDAs in Wyoming as of August 1, 2011. The Powder River Basin is not classified as a CDA, therefore the requirement for Green Completions does not apply to this section. Thus the effect of Subpart OOOO will be to minimize completion/recompletion emissions in the non tribal portion of the Powder River Basin.

Regarding gas fired engines NSPS Subpart OOOO addresses VOC emissions, mandating that centrifugal units be equipped with a dry seal system, and reciprocating engines have a maintenance schedule to replace rod packing every 26,000 hours. The State of Wyoming has no existing regulations on compressor fugitive emissions, so Subpart OOOO would likely reduce VOC emissions in future inventories from this source category in the Powder River Basin.

As noted earlier, the new regulations do not address unpermitted fugitive emissions.

The new regulations of NSPS Subpart OOOO will address VOC emissions from pneumatic devices, allowing no VOC emissions from devices located at gas processing plants, while devices at other sites would be limited to emissions of 6 ft³/day. In Wyoming all pneumatic devices (excluding pumps) must be low or no bleed which limits emissions to this threshold of 6 ft³/day. Thus Wyoming regulations on pneumatic devices do apply in the Powder River Basin and already control pneumatic devices as well as Subpart OOOO. Therefore VOC emissions in future inventories from this source category will not likely be affected in the Powder River Basin.

Regarding glycol dehydrators, revisions to NESHAPs Subpart HH would remove the 1 ton per year benzene compliance alternative for large dehydrators (actual annual average natural gas flow rate greater than 3 million cubic feet per day or annual average benzene emissions of greater than 1 tpy). Instead, all large dehydrators would be required to reduce their VOC emissions by 95%. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control of all new/modified dehydrator VOC/HAP emissions statewide at startup, with removal allowed for emissions ≥ 6 or 8 tpy after various elapsed time scenarios. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the Powder River Basin by existing Wyoming regulations.

Also applicable to this basin, the Subpart OOOO regulation will require condensate tanks with 1 bbl/day condensate throughput (or 20 bbl/day crude oil throughput) to reduce VOC by 95%. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires emissions ≥ 10 tpy VOC within 60 days statewide. Thus the effect of Subpart OOOO will be minimized in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Regarding the federal rules for permitting of minor sources on Indian Lands, in the Powder River Basin Indian Lands comprise a small portion of VOC sources, therefore the new requirements will likely have a small effect on VOC emission totals in this area in the future. However it is likely there will be a number of existing sources that were never reported in the past, and now will be caught up in the federal regulation reporting requirements. Thus we may see some increased emissions show up on tribal lands in future emission inventories.