Analysis of States' and EPA Oil & Gas Air Emissions Control Requirements for Selected Basins in the Western United States (2013 Update)

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EXECUTIVE SUMMARY

The primary intent of this analysis is to examine the effect that two recent federal air quality actions might have on the air pollution emissions from the oil and natural gas (O&G) industry exploration and production sector in the WRAP region of the western United States.

The first of the two recent federal actions considered here is a Federal Implementation Plan (FIP) known as "Review of New Sources and Modifications in Indian Country. The second federal action considered here is the issuance of a suite of four air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS Subpart OOOO) for VOCs; 2) a New Source Performance Standard (NSPS Subpart OOOO) for sulfur dioxide; 3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HH) for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HHH) for natural gas transmission and storage.

The NSPS/NESHAP regulations focus on VOCs, but EPA has had other NSPS in place for a number of years which focus on control of combustion emissions. These NSPS include Subpart Db and Dc for boilers, Subpart IIII for stationary compression ignition (diesel) engines, Subpart JJJJ for stationary spark ignition engines and Subpart KKKK for stationary combustion turbines. NOx is a major pollutant from these four source categories.

NOx is also emitted in large quantities from temporary engines in the fields that power such equipment as drill and workover rigs. Since these engines generally operate for some period of time less than a year at any one site before being relocated, EPA regulates these temporary engines as "Nonroad Mobile" sources. So in addition to looking at the VOC impact of the recent federal O&G actions, this analysis also examines the impact of previously existing federal rules on the NOx component of the inventories.

This document also examines the O&G emission control regulations currently in place in the western U.S. O&G producing states to determine where the federal rules might overlap existing State rules and which O&G source types could be affected by the federal rules.

The seven O&G producing states in the WRAP region interviewed for this analysis consisted of 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 California Districts individually to assess their current regulations under the scope of this project.

Finally this document describes the most current WRAP effort at evaluating O&G operations, which is a BLM Sponsored emission inventory compilation for the Montana Great Plains and Williston Basins. This effort will produce a 2011 year baseline emission inventory, along with projections 5-7 years into the future.

This analysis uses data from the WRAP-Western Energy Alliance Phase III O&G Emission Inventory project (details posted at http://www.wrapair2.org/PhaseIII.aspx). These Phase III O&G emission totals reflected O&G control rules in place in the states at the time those inventories were compiled. Some of the state regulations may have been updated since that time.

The WRAP produced an initial copy of this analysis on November 28, 2011 (w/ January 8, 2012 Errata Corrections). Since that time EPA has finalized the O&G NSPS and new information has been gleaned from the states on some of their O&G control programs. Thus this current 2013 document provides an update to that initial 2011 report addressing the changes that have occurred since 2011.

Observations & Conclusions

This section of the Executive Summary attempts to describe in a general manner what emission changes are likely to occur with implementation of the two Federal O&G actions.

The Rocky Mountain O&G basins examined for this analysis are:

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)

"Review of New Sources and Modifications in Indian Country" FIP

Regarding the "Review of New Sources and Modifications in Indian Country" FIP, Tribal Lands are dominant in two of these nine Rocky Mountain O&G basins; those being the Uinta and the North San Juan basins. Tribal Lands hold a significant number of O&G sources in two other basins; the South San Juan and the Wind River basins. In the Wyoming Powder River Basin and in the Williston Basin some production comes from Tribal Lands, but the numbers of O&G sources on these Tribal Lands represent a small portion of the total. Finally, there are no Tribal Lands located in Colorado's Denver-Julesburg or Piceance basins, nor are there any in Wyoming's Green River basin.

On Tribal Lands, the new federal regulation for permitting of minor sources will likely affect a significant portion of **NOx and VOC** emission inventories. These changes should show up by inclusion in the post regulation inventories of previously unpermitted small source categories

like field compressors, artificial lift engines and heaters.

It is thought that any "true" new sources established on Tribal Lands will have lower NOx and VOC emissions than these sources would have had without scrutiny from the new federal permitting review. This factor would tend to reduce totals of these pollutants as compared to projections made prior to implementing the FIP. However it is also likely that there will be a number of sources that are already existing in place, but were never previously included in these projection inventories in the past. With the reporting requirements found in the new federal regulation these existing sources will now be captured in future inventory emissions totals. Thus in spite of more restrictions and lower emissions resulting from federal permitting of "true" new sources, we may actually see some increases of pollutant totals in future emission inventory projections as these previously unreported sources now show up and are added to inventory totals calculated for Tribal Lands.

Regarding **SO_2**, sources of this pollutant located on Tribal Lands are likely to be larger major source facilities (i.e. gas processing plants) that already are addressed by federal permitting requirements. Thus the minor source rule should have relatively little effect on emission totals for this pollutant.

New Federal O&G NSPS and NESHAPs Regulations

Regarding the new suite of four Federal NSPS and NESHAP standards, these regulations **do not address NOx** in any fashion so emission totals for this pollutant will not be affected by the new O&G NSPS/NESHAPs rules.

There is a new NSPS revision to previous Subpart LLL rules for SO_2 emissions from large throughput (> 5 LTPD sulfur) or high H_2S (> 50%) gas processing plants (the revision has been incorporated into Subpart OOOO). But these gas processing plants are likely to be larger major source facilities that already are addressed by federal and state permitting requirements. Thus this analysis does not look at the impact the revisions to 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 with NOx and SO_2 pollutants not applicable, for the purpose of analyzing the impact of the four recent Federal rules this analysis focuses solely on the VOC emission changes that may be expected with implementation of the new federal O&G NSPS and NESHAPs.

The source categories considered by the federal O&G 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 Subpart OOOO "Green Completion"

control requirements, and for Wyoming their regulations do not apply to the entire state.

Regarding compressor leaks, none of the seven states interviewed reported any existing regulations that address fugitive VOC leaks from gas fired engines like Subpart OOO does.

For pneumatic controllers, of the interviewed states Colorado, North Dakota and Wyoming have existing control regulations that are similar to the no or low bleed equipment specified under Subpart OOOO control requirements.

Regarding hydrocarbon liquids (crude oil/condensate) or produced water storage tanks, Colorado, Montana, North Dakota and Wyoming have existing regulations that require control levels similar to the 95% control requirements of Subpart OOOO. Montana also has a regulation that requires VOC vapors either to be captured and routed to a gas pipeline, or controlled through use of other emissions minimizing technology, from the date of initial well completion until the source is registered/permitted. Montana and North Dakota require minimizing VOC emissions with submerged filling requirements (ND only for large > 1,000 gallon tanks). 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 have adopted NSPS Subpart KKK, thus they already require Leak Detection and Repair (LDAR) programs mandated by this standard for control of VOC leaks. Under Subpart OOOO the EPA revised the existing NSPS requirements for LDAR to reflect the procedures and leak thresholds established by 40 CFR 60, Subpart VVa (Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry). Subpart VVa lowers the leak definition for valves from 10,000 ppm to 500 ppm VOC, and requires the monitoring of connectors, pumps, pressure relief devices and open-ended valves or lines. Thus a Subpart KKK LDAR program will allow somewhat more VOC to escape than a Subpart OOOO LDAR program.

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

As a final observation we note that it is likely that new sources will have lower emissions than previously projected due to the implementation of the federal NSPS and NESHAPs regulations in those basins located in states where there are no equivalent state control requirements. It was not possible however, to quantify these reductions within the scope of this analysis. So this analysis only discusses potential changes to the emission inventories in a qualitative manner.

Existing Federal NSPS Combustion Regulations

As mentioned earlier EPA has had other NSPS in place for several years which focus on control of combustion emissions, including Subpart Db and Dc for boilers, Subpart IIII for stationary compression ignition (diesel) engines, Subpart JJJJ for stationary spark ignition engines and

Subpart KKKK for stationary combustion turbines. NOx is a major pollutant from these four source categories. It was found that the O&G producing states considered in this analysis have either adopted all four of these federal combustion NSPS, or in one case where Subpart JJJJ was not adopted (Colorado), the state has their own regulations which mirror the federal emission standards contained in that spark ignition engine rule. Thus state rules add nothing to the NOx control mandated by the federal NSPS regulations as applicable to O&G combustion sources.

NOx is also emitted in large quantities from temporary engines in the fields that power such equipment as drill and workover rigs. Since these engines generally operate for some period of time less than a year at any one site before being relocated, EPA regulates these temporary engines as "Nonroad Mobile" sources. EPA rules for both new and in-use Nonroad Mobile compression ignition (diesel) internal combustion engines (CI-ICE) are found under 40 CFR 1039. Rules for new Nonroad Mobile spark ignition internal combustion engines (SI-ICE) are found under 40 CFR 1048. These rules are in the form of "Tier" standards which set grams per kilowatt-hour (convertible to grams per horsepower-hour) NOx emission limits based on engine size and model year. The States do not typically adopt federal Nonroad Mobile regulations, but rather rely on EPA for enforcement.

Correspondence with state Air Quality Agencies however, revealed three instances where the states do have separate rules affecting Nonroad Mobile sources. Alaska requires a permit for temporary portable O&G operations and Colorado requires a permit for certain larger (greater than 1200 HP) Nonroad Mobile engines with the potential to emit over 100 TPY NOx (40 TPY if collocated at an existing major source). In both cases the applicant must demonstrate that the emissions will allow compliance with the respective states' Ambient Air Quality Standards.

In addition Wyoming has an "Interim Policy" for their Upper Green River Basin ozone non-attainment area, which allows operators to voluntarily permit temporary drill/workover rig engines with BACT control, in return for receiving future emission credits. In all three of these cases it is possible that emissions of temporary engines could be restricted to something under Federal Nonroad Mobile either to assure ambient air quality compliance or to meet BACT in a non-attainment area.

BACKGROUND

Significant air pollutant emissions come from production of oil and gas wells operating on both state-regulated and Tribal Lands (typically EPA-regulated) 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 O&G field operations (including exploration, production, and product gathering activities) were historically not well quantified in air pollution inventories. This was due to the smaller

nature of individual pieces of field O&G equipment as compared with traditional permitted larger point sources such as factories, refineries and power plants. If individual pieces of O&G equipment (i.e. compressor engines, drill rigs, heaters, dehydrators, flares and et cetera) are considered separately for each particular unit, the emission totals from that individual piece are often found to be minor. Thus individual emissions from separate pieces of equipment traditionally fell below state air pollution control agencies' permitting thresholds. But with increasing energy demand and continuing oil and gas field development, the cumulative totals of emissions for this category of O&G field equipment proves to be a significant air pollution source, both at the state level for these O&G producing states in the western U.S., and even from the individual basins themselves.

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 O&G 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 initial WRAP inventories identified over 100,000 tons per year (tpy) of NOx 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. 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

After Phase II results were evaluated, WRAP stakeholders felt that still more improvement in the accuracy of these emission estimates was needed and could be compiled. In late 2007 the Western Energy Alliance (formerly known as IPAMS, the Independent Petroleum Association of the Mountain States) stepped forward 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 not solely industry centric, but were widely distributed among non-industry stakeholders (State/Local Agencies, Tribal Air Programs, Federal Land Managers, Environmental Groups and EPA). WRAP strove to see 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 all 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, a large and diverse group of interested O&G stakeholders (see details at 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 (NOx, VOC, CO, SOx & PM) for a 2006 base year, with a mid-term projection forecast out to 2012. Due to the lengthy time necessary to complete all basins, the last Phase III basin completed [Williston] covered a more current 2009 base year with a mid-term projection forecast out to 2015. The Phase III inventories were designed to cover all major source categories in the upstream O&G sector (exploration, production and gathering phases of O&G field operations).

As noted earlier in the "Executive Summary" 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)

The WRAP completed 2006 base year emission inventories for the first eight of these basins. With the extended time interval that elapsed before the last basin [Williston] was compiled, a more current base year of 2009 was used for the Williston case. 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 primary intent of this analysis is to examine the effect that two recent federal air quality actions might have on the air pollution emissions from the oil and natural gas (O&G) industry exploration and production sector in the WRAP region of the western United States.

The first of the two federal actions considered here is a Federal Implementation Plan (FIP) known as "Review of New Sources and Modifications in Indian Country". That FIP was finalized by EPA on June 10, 2011. The Final Rule was published in the Federal Register on July 1, 2011, and provided an "Effective Date" for implementing the FIP of August 30, 2011 (60 days after FR publication).

The second federal action considered here is the issuance of a suite of four air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS Subpart OOOO) for VOCs; 2) a New Source Performance Standard (NSPS Subpart OOOO) for sulfur dioxide; 3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HH) for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HHH) for natural gas transmission and storage. The EPA proposed these rules on July 28, 2011, and was still taking comment on the rules when the WRAP's initial 2011 dated analysis was released. The EPA eventually finalized these O&G regulations on April 17, 2012. The Final Rule was published in the Federal Register on August 16, 2012, and provided an "Effective Date" for implementing the rules of October 15, 2012 (60 days after FR publication).

After issuance of the Final O&G Rule in 2012, the EPA received several administrative petitions for reconsideration and responded to the petitions by revising portions of the NSPS. This amendment dealt solely with storage tanks used to store crude oil, condensate, unrefined petroleum liquids (known as "intermediate hydrocarbon liquids") or produced water. On August.2, 2013 EPA updated its 2012 performance standards for VOC emissions from these storage tanks used in the O&G production industry. The EPA published the amendments in the Federal Register on September 23, 2013.

The recent NSPS/NESHAP regulations focus on VOCs, but EPA has had other NSPS in place for a number of years which focus on control of combustion emissions. These NSPS include Subpart Db and Dc for boilers, Subpart IIII for stationary compression ignition (diesel) engines, Subpart JJJJ for stationary spark ignition engines and Subpart KKKK for stationary combustion turbines. NOx is a major pollutant from these four source categories.

NOx is also emitted in large quantities from temporary engines in the fields that power such equipment as drill and workover rigs. Since these engines generally operate for some period of time less than a year at any one site before being relocated, EPA regulates these temporary engines as "Nonroad Mobile" sources. So in addition to looking at the VOC impact of the new federal O&G actions, this analysis also examines the impact of previously existing federal rules on the NOx component of the inventories.

This document also examines the O&G emission control regulations currently in place in the western U.S. O&G producing states to determine where the federal rules might overlap existing State rules and which O&G source types could be affected by the federal rules.

The seven O&G producing states in the WRAP region interviewed for this analysis consisted of 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 California Districts individually to assess their current regulations under the scope of this project.

Finally this document describes the most current WRAP effort at evaluating O&G operations, which is a BLM Sponsored emission inventory compilation for the Montana Great Plains and Williston Basins. This effort will produce a 2011 year baseline emission inventory, along with projections 5-7 years into the future.

This analysis uses data from the WRAP-Western Energy Alliance Phase III O&G Emission Inventory project (http://www.wrapair2.org/PhaseIII.aspx). These Phase III O&G emission totals reflect O&G control rules in place in the states at the time those inventories were compiled. Some of the state regulations may have been updated since that time.

Although all criteria pollutants are totaled in the reports for these Phase III inventories, the sources of NOx and VOC emissions found in these basins are analyzed in more detail (NOx and VOC being the primary pollutants of concern from O&G exploration and production operations). This document goes a step further and identifies which of these source categories are likely to be affected by the new federal O&G regulations for these two pollutants.

This report is organized into six sections:

1. 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. Review of EPA Oil and Natural Gas Air Regulations
   a. Summary of Adopted New Source Performance Standards
   b. Summary of Adopted National Emission Standards for Hazardous Air Pollutants
3. Review of EPA Combustion Air Regulations
   a. NSPS Subpart Db and Dc
   b. NSPS Subpart IIII
   c. NSPS Subpart JJJJ
   d. NSPS Subpart KKKK
   e. Nonroad Mobile Internal Combustion Engine Standards
4. Review of State Oil and Natural Gas Rules
   a. Summary of Existing State Rules
   b. Potential Overlap with Federal O&G Rules
5. WRAP Phase III Oil and Natural Gas Emission Inventories – Baseline Data
   a. Phase III O&G Basin Emissions
6. BLM Sponsored Montana Great Plains & Williston Basin Emission Inventory

1. REVIEW OF NEW SOURCES & 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 in Indian country, those pieces addressing 1) Nonattainment and 2) Minor Sources. The FIP 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 on tribal lands as exist on state administrated lands.

The 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 the plan in place for 1) a nonattainment major NSR program and 2) 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.

New Source Review 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 first built or when owners/operators make a changes that significantly increase emissions. The program accomplishes this when owners or operators obtain permits limiting air emissions increases before they begin construction/modification. 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 air is currently clean - pollutant levels below ambient 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 particular FIP addresses the latter two issues and 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 must 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 can accept delegation of the federal program to the EPA or they can develop and seek approval of a Tribal Implementation Plan (TIP) to administer these rules or portions therein themselves. The TIP option would include some enforcement authority. EPA maintains the sole authority to enforce these rules under federal law.

The rules 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 (See Table I below), 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 held to less than these thresholds. Under this rule, synthetic minor permits can be issued

for both regulated NSR pollutants and toxic air pollutants.

EPA is working 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 continues to explore other options for improving and streamlining the permit process for sources in Indian country such as permits-by-rule.

The minor source 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 as required of 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, 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, but rather 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 (August 30, 2011).
- **Minor modifications at major sources** will need to apply for permits starting on the rule's effective date (August 30, 2011).

Table 1: MINOR NSR THRESHOLDS [a]		
Regulated NSR pollutant	Minor NSR thresholds for nonattainment areas (tpy)	Minor NSR thresholds for attainment areas (tpy)
Carbon Monoxide (CO)	5	10
Nitrogen oxides (NOX)	5 [b]	10
Sulfur dioxide (SO2)	5	10
Volatile Organic Compounds (VOC)	2 [b]	5
PM	5	10
PM10	1	5
PM2.5	0.6	3
Lead	0.1	0.1
Fluorides	Not Applicable	1
Sulfuric acid mist	Not Applicable	2
Hydrogen sulfide (H2S)	Not Applicable	2
Total reduced sulfur (including H2S)	Not Applicable	2
Reduced sulfur compounds (including H2S)	Not Applicable	2
Municipal waste combustor emissions	Not Applicable	2
Municipal solid waste landfill emissions (measured as nonmethane organic compounds)	Not Applicable	10

Minor NSR Threshold Footnotes

[a] If part of a Tribe's area of Indian country is designated as attainment and another part as nonattainment, the applicable threshold for a proposed source or modification is determined based on the designation where the source would be located. If the source straddles the two areas, the more stringent thresholds apply.

[b] In extreme ozone nonattainment areas, section 182(e)(2) of the Act requires any change at a major source that results in any increase in emissions to be subject to major NSR permitting. In other words, any changes to existing major sources in extreme ozone nonattainment areas are subject to a ''0'' tpy threshold, but that threshold does not apply to minor sources.

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 is guided by EPA in close collaboration with tribes. EPA Regions are primarily 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 is 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 are subject to the rule requirements on the rule's effective date (August 30, 2011); and
- True minor source are subject to the rule requirements 36 months after the rule's effective date (August 30, 2011) or 6 months after a general permit for a source category is published, whichever is earlier.

The Final Rule for "REVIEW OF NEW SOURCES AND MODIFICATIONS IN INDIAN COUNTRY" was published in the Federal Register on July 1, 2011, and gives the "Effective Date"

for the Final Rule as 60 days after FR publication (August 30, 2011).

The phased implementation allowed 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. REVIEW OF EPA 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. 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 required EPA to sign proposals related to the review of these standards. Under the ruling EPA was required to have signed the proposal by July 28, 2011. They were to issue final standards by the end of February 2012, but EPA eventually pushed that deadline back until April of 2012.

Accordingly, on July 28, 2011 the U.S. Environmental Protection Agency proposed a suite of four air regulations for the oil and natural gas industry: 1) a New Source Performance Standard (NSPS Subpart OOOO) for VOC's; 2) a New Source Performance Standard (NSPS Subpart OOOO) for sulfur dioxide; 3) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HH) standard for oil and natural gas production; and 4) a National Emissions Standard for Hazardous Air Pollutants (NESHAP Subpart HHH) standard for natural gas transmission and storage.

The EPA proposed the rules on July 28, 2011, and was still taking comment on the rules when the initial 2011 version of this WRAP analysis was released. The EPA eventually finalized these O&G regulations on April 17, 2012. The Final Rule was published in the Federal Register on August 16, 2012, and provided an "Effective Date" for implementing the rules of October 15, 2012 (60 days after FR publication).

After issuance of the 2012 Final O&G Rule the EPA received several administrative petitions for reconsideration and responded to the petitions by revising portions of the NSPS. The amendments dealt solely with storage tanks used to store crude oil, condensate, unrefined petroleum liquids (known as "intermediate hydrocarbon liquids") or produced water. On August. 2, 2013 EPA updated its 2012 performance standards for VOC emissions from these storage tanks used in the O&G production industry. The EPA published the amendments in the Federal Register on September 23, 2013.

The rules 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 O&G equipment. EPA asserts that the estimated revenues from selling the gas that currently goes to waste are significant – so much so that the 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

a. Summary of Adopted New Source Performance Standards

New Source Performance Standards Subpart OOOO 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 old NSPS for VOCs (Subpart KKK) was issued in 1985. The old standards addressed only VOC leak detection and repair (LDAR) at new and modified natural gas process processing plants. This meant that significant sources of VOC emissions in the oil and gas industry were not subject to nationwide regulation. EPA issued new standards under Subpart OOOO for several processes or pieces of equipment used in oil and gas production that had 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 regulations require VOC reductions from **five categories** of sources including:

- Completions/Re-Completions of Fractured Natural Gas Wells
- Compressor Fugitive Leaks
- Pneumatic Controllers
- Hydrocarbon Liquid Storage Tanks Flashing or Standing/Working Breathing Losses
- Natural Gas Processing Plants

1) Completions of new hydraulically fractured natural gas wells and re-completions of existing natural gas wells that undergo fracturing or refracturing.

- VOC emissions are minimized through the use of "green completions," also called "reduced emissions completions" or RECs. 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 are reduced through pit flaring, unless it is a safety hazard.
- Greenhouse Gas methane emissions are also significantly reduced as a co-benefit of reducing VOCs.
- The green completion requirements do 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 VOC emissions, unless it is a safety hazard.
- The green completion requirements do not apply to low pressure wells. Low pressure wells are defined as those with reservoir pressure and vertical well depth such that 0.445 times static reservoir pressure (in pounds per square inch absolute - psia), minus 0.038 times the vertical well depth (in feet), minus 67.578 psia is less than the flow line pressure at the sales meter. Thus wells above this pressure differential must implement REC, while wells below this pressure differential are required to route emissions to a completion combustion device.
- To insure that REC equipment is broadly available, EPA has identified a transition period (until January 1, 2015). Owners/Operators ***may use*** RECs ***or*** a completion combustion devices (including flaring) until January 1, 2015, but the ***must use*** RECs ***and*** a completion combustion device on or after that date.

2) Compressors

- Compression is necessary to move natural gas along a pipeline. This rule reduces VOC emissions from two types of compressors:
- This rule requires 95% reduction of VOC emissions from wet seal centrifugal compressors located between the wellhead and the point at which the gas enters the transmission and storage segment.
- Owners/operators of reciprocating compressors must replace rod packing systems every 26,000 hours of operation, or after 36 months.

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 has established VOC emission limits for pneumatic controllers.
- For new or modified pneumatic controllers at gas processing plants (constructed or modified after August 23, 2011) the rule requires owners/operators to completely eliminate VOC emissions. This limit could be met through using no bleed controllers or controllers that are not natural gas driven.
- For controllers used at sites other than gas processing plants, such as compressor stations, the emission limit requires use of low bleed controllers that emit no more than six cubic feet of gas per hour.
- This rule includes exceptions in applications requiring high bleed controllers for certain purposes, such as operational requirements and safety.
- The rules for compressors and pneumatic controllers apply only to the ***production and processing segment*** of the industry, because the rule did not finalize requirements ***transmission segment*** of this industry. EPA concluded it needed additional information in order to set cost-effective standards for compressors in this transmission segment, where VOC content of the gas generally is low.

4) Condensate and crude oil storage tanks

- A revision to the 2012 NSPS for storage tanks was issued on August. 2, 2013
- The EPA published the amendments in the Federal Register on September 23, 2013.
- Tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions, must reduce VOC emissions by 95 percent.
- The August 2, 2013 revision phases in the date by which storage tanks must install VOC controls.
- **April 15, 2015** is the compliance deadline for tanks constructed between Aug. 23, 2011, and April 12, 2013 (known as Group 1 tanks). Owners/operators of Group 1 tanks have until October 15, 2013 to estimate their tanks' potential emissions and determine whether their tanks are subject to the rule. If a tank's potential emissions are 6 or more tons of VOCs per year, the owner/operator has to control VOC emissions by April 15, 2015.
- **April 15, 2014** is the compliance deadline for tanks constructed after April 12, 2013 (known as Group 2 tanks), or within 60 days after startup, whichever is later. Owners/operators of Group 2 tanks have 30 days to estimate their tanks' potential emissions and determine whether their tanks are subject to the rule. For tanks constructed after February 14, 2014, if a tank's potential emissions are 6 or more tons of VOCs per year, the owner/operator has an additional 30 days to control VOC emissions.
- EPA also established an alternative emissions limit for storage tanks that allows owners/operators to either 1) reduce VOC emissions at a tank by 95 percent, as required in the 2012 rule; or 2) demonstrate that emissions from a tank have dropped to less than

4 tons per year of VOCs without emission controls for 12 consecutive months.

5) Natural gas processing plants

- EPA revised the existing Leak Detection and Repair (LDAR) provisions of NSPS Subpart KKK for natural gas processing plants to reduce VOC emissions. The action revises KKK to reflect the procedures and leak thresholds established in NSPS Subpart VVa (Equipment Leaks of VOCs in the Synthetic Organic Chemicals Manufacturing Industry). Thus it lowers the leak definition threshold from 10,000 ppm to 500 ppm VOC, and in addition to valves, requires the monitoring of other components including connectors, pumps, pressure relief devices and open-ended valves or lines. The EPA incorporated all changes into Subpart OOOO.

New Source Performance Standards (Subpart OOOO) for Sulfur Dioxide

The original New Source Performance Standards for sulfur dioxide (SO_2) were issued in 1985 under Subpart LLL and apply to natural gas processing plants. Revisions were incorporated into the new Subpart OOOO as follows. The EPA strengthened the performance standards for plants processing gas with sulfur feed of at least 5 long tons per day in order to further reduce sulfur dioxide emissions from these facilities. The control level was raised from the old level of 99.8%, now up to 99.9%. The EPA incorporated all changes into Subpart OOOO.

b. Summary of Adopted 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 the ***oil and natural gas production segment*** (NESHAPS Subpart HH) and for the ***natural gas transmission and storage segment*** NESHAPS Subpart HHH). Both of the original existing standards were issued in 1999.

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

EPA's revised risk analysis for the Oil and Natural Gas Production source category MACT standard found that approximately 120,000 people are estimated to have cancer risks at or above 1-in-1 million, which falls within a range EPA considers acceptable. EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators (glycol dehydrators are equipment used to remove excess water vapor from natural gas) but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, then **large** dehydrators would have to reduce air toxics their emissions by 95 percent.

In addition, EPA:

1) Established Benzene/Toluene/Ethylbenzene/Xylene (BTEX) emission limits for **small** glycol dehydrators. Under Subpart HH a dehydrator in the ***oil and natural gas production segment*** is 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 0.9 megagrams per year (approximately 1 tpy). The BTEX emission limits are 4.66 E-6 grams BTEX/scm-ppmv (for new units) or 3.28 E-4 grams BTEX/scm-ppmv (for existing units).

2) Requires 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, previous to this action there were only requirements for control/counting tanks with the Potential for Flash Emissions (PFE). This action extends that requirement to those tanks without PFE (non-flashing tanks that only have VOC emissions from working & breathing losses).

3) Tightened the definition of a leak for valves at natural gas processing plants to 500 parts per million (ppm).

The 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 area sources were issued in 2007.

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

In its revision to Subpart HHH, EPA established Benzene/Toluene/Ethylbenzene/Xylene (BTEX) emission limits for **small** glycol dehydrators. Under Subpart HHH a dehydrator in the ***natural gas transmission and storage segment*** a glycol dehydrator is considered small if it has an annual average natural gas throughput of less than 283,000 standard cubic meters per day (approximately 10 million cubic feet per day) or if it has actual annual average benzene emissions of less than 0.9 megagrams per year (approximately 1 tpy). The BTEX emission limits are 5.44x10 E-5 grams /scm-ppmv (for new units) or 3.10 E-4 grams BTEX/scm-ppmv (for existing units).

3. REVIEW OF EPA COMBUSTION AIR REGULATIONS

a. NSPS Subpart Db and Dc

Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) regulates emissions from steam generating units constructed/modified after June 19, 1984, and with heat input capacity >100 MMBtu/hr, while Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) regulates emissions from steam generating units constructed/modified after June 9, 1989, and with heat input capacity between 10 - 100 MMBtu/hr. Subpart Db emission standards for NOx from natural gas or distillate oil fired boilers are 0.1 lb/MMBtu (low heat release rate) and 0.2 lb/MMBtu (high heat release rate). Subpart Dc has no emission standards for NOx. There are other standards for different fuels (residual oil, coal) and different burner styles (combined cycle), but these other fuels and configurations are not typically found in O&G field equipment.

But as stated in the August 16, 2012 Federal Register publication of the Final O&G Rule, although these smaller heaters and boilers are generally within the scope of this category, most, if not all of the process heaters and boilers used in O&G field operations fall below applicability thresholds for EPA's Db and Dc boiler rules.

Details of these Subpart Db and Dc NSPS are found on the U.S. Government Printing Office website for the Title 40 Code of Federal Regulations at: **http://www.ecfr.gov/cgi-bin/text-idx?SID=d262c561c7c8fe0534dff0978ef9eb71&tpl=/ecfrbrowse/Title40/40tab_02.tpl**

b. NSPS Subpart IIII

Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; abbreviated as CI-ICE) is aimed at emissions from diesel fired engines. Diesel engines in the O&G field are typically found powering well drill rigs, electric generators or hydraulic fracturing pumps. Because such engines are relocated fairly regularly, they are then classified as "Nonroad Mobile Sources". As such they are covered under EPA's Mobile Source Rules. But if a diesel engine is permanently located (stationary such that it stays in one place for a year or more), then it is covered by Subpart IIII.

Subpart IIII sets grams/hp-hr emission standards for NOx from CI-ICE based on Model Year of the engine, broken down into 10 bins of engine capacity sized from under 11 HP up to greater than 750 HP.

Details of Subpart IIII NSPS are found on the U.S. Government Printing Office website for the Title 40 Code of Federal Regulations at: **http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=3e1e822c2995c7186d6ae658d35705da&rgn=div6&view=text&node=40:7.0.1.1.1.97&idno=40**

c. NSPS Subpart JJJJ

Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines; abbreviated as SI-ICE) is aimed at emissions from engines firing natural gas, LPG or gasoline. In the O&G fields SI-ICE are most often natural gas fired and typically found powering gas compressors, pumps or electric generators.

SI-ICE in the O&G field are also sometimes found powering temporary well drill rigs, electric generators or hydraulic fracturing pumps. Such engines are relocated fairly regularly, thus they are then classified as "Nonroad Mobile Sources". As such they are covered under EPA's Mobile Source Rules. But if a SI-ICE is permanently located (stationary such that it stays in one place for a year or more), then it is covered by Subpart JJJJ.

Subpart JJJJ sets NOx emission standards in terms of grams/hp-hr and ppm concentration in the exhaust stream from SI-ICE based on manufacture date of the engine, broken down into engine capacity sized from under 11 HP up to greater than 750 HP.

Details of Subpart JJJJ NSPS are found on the U.S. Government Printing Office website for the Title 40 Code of Federal Regulations at: **http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=76a8c177e56077333836b4d3204f32e4&rgn=div6&view=text&node=40:7.0.1.1.1.98&idno=40**

d. NSPS Subpart KKKK

Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) is aimed at emissions from turbines firing natural gas or other fuel that were constructed/modified after February 18, 2005. In the O&G fields these turbines are typically found powering gas compressors, pumps or electric generators.

Subpart KKKK sets NOx emission standards in terms of ppm concentration in the exhaust stream and in terms of lb/MW-hr useful energy output. The standards differ from small turbines

(≤ 50 MMBtu/hr) based on whether they are electric generating or mechanical drive units. For larger turbines above 50 HP there are standards for units up to 850 MMBtu/hr, and separate standards for units greater than 850 MMBtu/hr. These four emission limits vary depending on whether the unit fires natural gas or another fuel, and also vary depending on whether the unit is new or modified/reconstructed. Turbines located north of the Arctic Circle and those where heat recovery units operate independent of the combustion turbine have standards written specifically for these conditions.

Details of Subpart KKKK NSPS are found on the U.S. Government Printing Office website for the Title 40 Code of Federal Regulations at: **http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=76a8c177e56077333836b4d3204f32e4&rgn=div6&view=text&node=40:7.0.1.1.1.99&idno=40**

e. EPA Mobile Source Nonroad Engines

As noted in the Subpart IIII and JJJJ discussions, some engines in the O&G field are typically found powering equipment such as well drill rigs, electric generators or hydraulic fracturing pumps, sources that are relocated fairly regularly. If such engines are not "stationary" (in one place for a year or more), they are classified as "Nonroad Mobile Sources". CI-ICE are regulated under 40 CFR 1039, while SI-ICE are regulated under 40 CFR 1048. Those regulations set "Tiers" of emission standards which vary based on Model Year of the engine and engine capacity (sized in 9 bins from under 11 HP up to greater than 750 HP). Subpart B of Part 1039 and of Part 1048 contains tables of grams per kilowatt-hour (convertible to grams per horsepower-hour) based emission limits.

The Final Rule for the latest "Tier 4" standards for CI-ICE was signed into law by EPA on May 11, 2004, with emission limits which are phased-in beginning in 2008 and take full effect after 2014. Tiers 1, 2 and 3 standards apply to engines prior to Tier 4 applicability.

Details of the Nonroad CI-ICE Emission Standards are found under on the U.S. Government Printing Office website for the Title 40 Code of Federal Regulations at: **http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=87fc616f76940ac52050146859bf7538&tpl=/ecfrbrowse/Title40/40cfr1039_main_02.tpl**

Details of the Nonroad SI-ICE Emission Standards are found under on the U.S. Government

Printing Office website for the Title 40 Code of Federal Regulations at:

http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=766a6aaa5d5b0e86ae09c1c9f56af5f8&tpl=/ecfrbrowse/Title40/40cfr1048_main_02.tpl

4. REVIEW OF STATE OIL AND NATURAL GAS RULES

a. Summary of Existing State Rules

Table 2 gives a summary of the existing State O&G rules, as compared to the adopted federal regulations for VOC emissions and for minor source permitting. Table 3 gives a summary of the existing State O&G rules, as compared to the adopted federal regulations for NOx emissions. Following the tables are state by state discussions of these requirements.

Table 2: State Control Regulations as Compared to Federal Rules (VOC & Minor Source Permits)								
Source Category	**Federal Regulations**	**State 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 wet seal centrifugal units to achieve 95% VOC control, and requires reciprocating engines to replace rod packing every 26,000 hours or every 36 months	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 2: State Control Regulations as Compared to Federal Rules (VOC & Minor Source Permits)

Source Category	Federal Regulations	State Regulations						
		Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Condensate & Crude Oil Tanks	**Subpart OOOO**: 95% VOC reduction for new or modified storage vessels that have PTE of 6 TPY VOC emissions. (phased in date for implementation through 2015). **Subpart HH**: 95% control of HAP's @ production facilities	NONE	(**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) (**Reg. 7, XVII.C.1**) 95% VOC reduction for condensate storage tanks if uncontrolled emissions ≥ 20 tpy **(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. **(Reg.. 7, XIID)** Condensate tanks in ozone non-attainment areas shall be controlled under a system wide approach (**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)	**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. **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 **17.8.1711(1)(b)** requires submerged filling technology on all hydrocarbon liquid loading or unloading	NONE	**NDAC Section 33-15-07** submerged filling requirements for tanks >1,000 gallons and control of organic compounds **Bakken Pool O&G Production Facilities Air Pollution Control Permitting & Compliance Guidance** tanks constructed after 6/1/2011 must control VOC by 98% (90% if PTE < 20 TPY)	**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)	**C6 S2 O&G Permitting Guidance** Wyoming has 3 area categories; 1) Jonah-Pinedale Anticline Development (JPAD), 2) Concentrated Development Area (CDA) & 3) Statewide **JPAD** - 98% control of all new/modified tank emissions upon startup/modification **CDA** – 98% control of all new/modified tank emissions ≥ 8 tpy VOC within 60 days of startup/modification **Statewide** 98% control of all new/modified tank emissions ≥10 tpy VOC within 60 days of startup/modification

Table 2: State Control Regulations as Compared to Federal Rules (VOC & Minor Source Permits)								
Source Category	**Federal Regulations**	**State Regulations**						
		Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Gas Processing Plants	**Subpart OOOO**: Revises LDAR by lowering the leak definition for valves from 10,000 ppm to 500 ppm VOC, & requires monitoring of connectors, pumps, pressure relief devices and open-ended valves or lines **Subpart HH**: 500 ppm threshold for valve leaks	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
Glycol Dehydrators	**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 3.28 E-4 grams BTEX/scm-ppmv (existing units)	NONE	**Reg. 7, XII.H and XVII.D** 90% reduction of VOCs where uncontrolled VOC emissions ≥ 15 tpy **COGCC HB-07-1341, Section 805.b(2)C**) 90% reduction of VOCs required where uncontrolled VOC emissions ≥ 5 tpy within 1/4 mile of an affected building (applies only to Garfield, Mesa & Rio Blanco Counties)	Montana has permitting and registration rules for controlling fugitive VOC vapors (See Footnote #1)	NONE	TEG units with a condenser require temperature monitoring **Bakken Pool O&G Production Facilities Air Pollution Control Permitting & Compliance Guidance** dehydrators constructed after 6/1/2011 must control VOC by at least 90%	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 **JPAD** 98% control of all new/modified dehydrator VOC/HAP emissions at start up **CDA & Statewide** ***PAD Facilities*** - 98% control upon startup ***SINGLE Well Facilities*** - 98% control within 60 days of startup for VOC emissions ≥6 **OR** 98% control within 30 days of startup for VOC emissions ≥8 tpy

Table 2: State Control Regulations as Compared to Federal Rules (VOC & Minor Source Permits)								
Source Category	**Federal Regulations**	**State 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.

Table 3: State Control Regulations as Compared to Federal Rules (NOx Control Requirements)								
Source Category	**Federal Regulations**	**State Regulations**						
		Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Gas Fired Process Heaters and Boilers	**Subpart Db & Dc** O&G sources generally covered, but sources are typically too small for applicability under these regulations	No additional state requirements, but Alaska has adopted NSPS Subpart Db & Dc	No additional state requirements, but Colorado has adopted NSPS Subpart Db & Dc	No additional state requirements, but Montana has adopted NSPS Subpart Db & Dc	No additional state requirements, but New Mexico has adopted NSPS Subpart Db & Dc	No additional state requirements, but North Dakota has adopted NSPS Subpart Db & Dc	No additional state requirements, but Utah has adopted NSPS Subpart Db & Dc	No additional state requirements, but, Wyoming has adopted NSPS Subpart Db & Dc
Compression Ignition (CI) Internal Combustion Engines (ICE) (typically diesel drill rig engines in O&G)	**Subpart IIII** grams/hp-hr standards for NOx from CI-ICE	No additional state requirements, but Alaska has adopted NSPS Subpart IIII	No additional state requirements, but Colorado has adopted NSPS Subpart IIII	No additional state requirements, but Montana has adopted NSPS Subpart IIII	No additional state requirements, but New Mexico has adopted NSPS Subpart IIII	No additional state requirements, but North Dakota has adopted NSPS Subpart IIII	No additional state requirements, but Utah has adopted NSPS Subpart IIII	No additional state requirements, but Wyoming has adopted NSPS Subpart IIII
Spark Ignition (SI) Internal Combustion Engines (ICE) (typically gas fired compressor engines in O&G)	**Subpart JJJJ** grams/hp-hr standards for NOx from SI-ICE	No additional state requirements, but Alaska has adopted NSPS Subpart JJJJ	Colorado has not adopted NSPS Subpart JJJJ, but **Reg. 7, XVII.E** sets the ceiling for emissions of SI-ICE	Montana has adopted NSPS Subpart JJJJ **ARM 17.8.1711** requires catalytic controls or equivalent on all stationary internal combustion engines > 85 HP	No additional state requirements, but New Mexico has adopted NSPS Subpart JJJJ	No additional state requirements, but North Dakota has adopted NSPS Subpart JJJJ	No additional state requirements, but Utah has adopted NSPS Subpart JJJJ	No additional state requirements, but Wyoming has adopted NSPS Subpart JJJJ
Gas Turbine Engines (typically gas fired compressor or generator engines in O&G)	**Subpart KKKK** parts per million standards for NOx from Gas Turbines	No additional state requirements, but Alaska has adopted NSPS Subpart KKKK	No additional state requirements, but Colorado has adopted NSPS Subpart KKKK	No additional state requirements, but Montana has adopted NSPS Subpart KKKK	No additional state requirements, but New Mexico has adopted NSPS Subpart KKKK	No additional state requirements, but North Dakota has adopted NSPS Subpart KKKK	No additional state requirements, but Utah has adopted NSPS Subpart KKKK	No additional state requirements, but Wyoming has adopted NSPS Subpart KKKK

Table 3: State Control Regulations as Compared to Federal Rules (NOx Control Requirements)								
Source Category	**Federal Regulations**	**State Regulations**						
		Alaska	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Temporary Compression Ignition (CI) & Spark Ignition (SI) Internal Combustion Engines (ICE) (typically drill & workover rig engines in O&G)	**Nonroad Mobile Tier Standards** grams/kw-hr standards for NOx for CI and SI-ICE	**18AAC50.502(c)(2)** Requires a minor source permit for temporary portable O&G operations to comply w/ AAAQS (no BACT) Nonroad Mobile Tier Standards take precedence	**Reg. 3 Part A, I.B.31** Requires Nonroad Engines >1200 HP operating >4380 Hr/Yr w/ 100 TPY NOx (40 TPY @ existing major source) to obtain a state permit w/ conditions to comply w/ CAAQS Nonroad Mobile Tier Standards take precedence	Montana has no separate state restrictions for temporary CI or SI-ICE Nonroad Mobile Tier Standards take precedence	New Mexico has no separate state restrictions for temporary CI or SI-ICE Nonroad Mobile Tier Standards take precedence	North Dakota has no separate state restrictions for temporary CI or SI-ICE Nonroad Mobile Tier Standards take precedence	Utah has no separate state restrictions for temporary CI or SI-ICE Nonroad Mobile Tier Standards take precedence	Wyoming has no separate state restrictions for temporary CI or SI-ICE Nonroad Mobile Tier Standards take precedence Wyoming has an Interim Policy for the **GRB Ozone Non-Attainment area** allowing operators to voluntarily permit temporary drill rig engines w/ BACT control in return for future emission credits.
Point Source Permitting Threshold	100 TPY	Sources > 100 TPY permitting threshold undergo BACT analysis The Minor Permit program in AK does not require NOX emission controls. If the source has a PSD permit, BACT controls are required	Colorado has a 10 TPY permitting threshold (5 TPY in non-attainment areas) but sources don't undergo BACT analysis unless the source reaches PSD emission levels.	Montana has a permit/registration threshold of >25 TPY. Registration rules incorporate BACT during O&G facility development & permitted sources undergo case by case BACT analysis.	Sources > 25 TPY permitting threshold undergo BACT analysis	Sources > 100 TPY permitting threshold undergo BACT analysis	Sources > 5 TPY permitting threshold undergo BACT analysis	Wyoming has no de minimus permitting threshold outside of their **C6 S2(k)** exemptions, thus all sources not waived by the Administrator are permitted and undergo BACT analysis

Alaska

The Alaska Department Environmental Conservation (DEC) has adopted no regulations comparable to the 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 have the 500 ppm VOC leak threshold required 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. Their minor source permitting program does not apply in Indian Country.

Regarding NOx, Alaska has adopted the combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state's major source permitting threshold for that pollutant is 100 TPY, so minor sources under that threshold do not undergo a BACT review. And as with other pollutants, Alaska does not consider or include NOx emissions/controls for their minor sources, nor do they require reiteration of the applicable NSPS/ NESHAP obligations in their minor source permits. Regarding major sources although the NSPS represent the ceiling for NOx limits in major source permits, BACT may drive emissions lower if review shows controls to be technically feasible and economically reasonable.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. Alaska does have a regulation [**18AAC50.502(c)(2**)] which requires a minor source permit for temporary portable O&G operations. Such sources have to demonstrate through modeling that the proposed potential emissions will not interfere with the attainment or maintenance of the Alaska Ambient Air Quality Standards. No BACT review is conducted for these minor sources, however. Thus it is possible that emissions of temporary engines could be restricted to something under Federal Nonroad Mobile emission limits in order to meet ambient standards.

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 Subpart OOOO regulation.

Regarding compression Colorado has no equivalent to the Subpart OOOO regulations for wet 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 regulation calls for 95% control on tanks constructed or modified after August 23, 2011 with PTE of 6 tpy VOC emissions. For the purpose of gross emission inventory evaluation the federal regulation 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 have the 500 ppm VOC leak threshold required under Subpart OOOO.

Regarding glycol dehydrators the federal regulation 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.

Regarding NOx, Colorado has adopted most of combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII and KKKK). Unlike the other states discussed here however, Colorado did not adopt NSPS Subpart JJJJ for SI-ICE. But in its place, Colorado has **Regulation 7.XVII.E** which sets emission limits for SI-ICE which mirror Subpart JJJJ. The state's permitting threshold for NOx is 10 TPY (5 TPY for non-attainment areas), but minor sources between 25-100 TPY do not undergo a BACT review. So for this state the NSPS and regulation 7.XVII.E represent the ceiling for NOx limits in minor source permits.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. Colorado does have a regulation [**Regulation 3 Part A, I.B.31**] which requires that nonroad engines >1200 HP in size, which operate more than 4380 hours per year are subject to state only requirements (for nonroad engines co-located at an existing major source of NOx or SO2, engines only must be >1200 HP and there is no operating hour threshold). Such engines must pay a Colorado emission fee mandated by an Air Pollutant Emission Notice (APENs), and if they emit 100 TPY

or more of NOx (other thresholds for other pollutants), they must submit an application for a site-specific, temporary permit. This permit will contain such terms and conditions determined by CDPHE to be necessary to protect Colorado Ambient Air Quality Standards. Thus it is possible that emissions of temporary engines could be restricted to something under Federal Nonroad Mobile emission limits in order to meet ambient standards.

Montana

Except as noted below the Montana Department of Environmental Quality (DEQ) has adopted no regulations as specific as the 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 currently 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 currently 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 17.8.16 requires that each applicable piece of oil or gas well facility equipment, with VOC heating value >500 BTU/scf and with a PTE greater than 15 tpy be controlled. These VOC vapors must either be routed to a gas pipeline or controlled using emission minimizing technology from the time the well is initially completed until the facility is registered or permitted. If a source has compression devices, pneumatic controllers, condensate/crude oil storage tanks and/or glycol dehydrators, with VOC heating value >200 BTU/scf and with a PTE greater than 15 tpy emissions, these emissions must be captured or controlled 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 hydrocarbon liquids (crude oil/condensate) or produced water storage tanks, the federal regulation 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. 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 have the 500 ppm VOC leak threshold required 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.

Regarding NOx, Montana has adopted the combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state's permitting threshold for that pollutant is 25 TPY. Regulations ARM 17.8.16 and ARM 17.8.17 require that stationary internal combustion engines of rich burn design greater than 85 brake horsepower (BHP) be equipped with nonselective catalytic reduction or its equivalent to control air emissions. Stationary internal combustion engines of lean burn design greater than 85 BHP must be equipped with oxidation catalytic reduction or its equivalent to control air emissions. Sources required to obtain a MAQP undergo 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 Nonroad Mobile Sources, the federal Tier Standards take precedence. Montana has no separate state restrictions for temporary CI or SI-ICE.

New Mexico

The New Mexico Environmental Department (NMED) Air Quality Bureau has adopted no regulations comparable to the 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 have the 500 ppm VOC leak threshold required 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.

Regarding NOx, New Mexico has adopted the combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state's permitting

threshold for that pollutant is 25 TPY, and minor sources do undergo a BACT review. Therefore in New Mexico the NSPS represent the ceiling for NOx limits in minor source permits.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. New Mexico has no separate state restrictions for temporary CI or SI-ICE.

North Dakota

Except as noted below the North Dakota Department of Health Air Quality Division has adopted no regulations comparable to the 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 have the 500 ppm VOC leak threshold required 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.

Instead of minor source permitting requirements for oil and gas wells, North Dakota requires 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**" is followed when calculating and selecting control equipment for tank vapor controls. This Bakken Pool O&G Guidance is available at: http://www.ndhealth.gov/AQ/OilAndGasWells_files/New%20Guidance%20O&G%20Files/20110502Oil%20%20Gas%20Permitting%20Guidance.pdf

This Bakken Pool O&G Guidance requires that tanks constructed after June 1, 2011 must control total VOC emissions from Flashing and from Standing/Working/Breathing losses by at least 90% (the control efficiency requirement is raised to 98% if the VOC Potential to Emit (PTE) is equal to or greater than 20 TPY from a tank).

Regarding NOx, North Dakota has adopted the combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state's permitting threshold for that pollutant is 100 TPY. Other than O&G sources (see O&G registration requirements above), minor NOx emitters under that 100 TPY threshold are subject to minor source permitting, but do not undergo a BACT review. Regarding major sources although the NSPS represent the ceiling for NOx limits in major source permits, BACT may drive emissions lower if review shows controls to be technically feasible and economically reasonable.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. North Dakota has no separate state restrictions for temporary CI or SI-ICE.

Utah

Except as noted below the Utah Department of Environmental Quality (DEQ) has adopted no

regulations comparable to the 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 have the 500 ppm VOC leak threshold required 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 deminimus levels (PTE< 5 tpy each PM10, NOx, SOx, CO, VOCs, or single HAP < 500 lbs per year, combined HAP < 1 tpy). These rules do not apply to Indian Country.

Regarding NOx, Utah has adopted the combustion control NSPS standards (boiler Subparts Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state's permitting threshold for that pollutant is 5 TPY, and minor sources between 5-100 TPY do undergo a BACT review. So for this state although the NSPS represent the ceiling for NOx limits in minor source permits, BACT may drive emissions lower if review shows controls to be technically feasible and economically reasonable.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. Utah has no separate state restrictions for temporary CI or SI-ICE.

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, Sweetwater and Carbon Counties which make up the majority of the Southwest Wyoming Green River Basin, Fremont County which makes up the Wind River Basin of the state and Natrona County which is part of the Powder River Basin of the state.

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 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 Subpart OOOO regulations for wet 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 regulation.

On condensate tanks the federal regulation calls for 95% control on tanks constructed or modified after August 23, 2011 with PTE of 6 tpy VOC emissions. 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 (PAD) 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 have the 500 ppm VOC leak threshold required under Subpart OOOO.

For glycol dehydrators the federal rule 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 (multiple well) 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 regulation 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.

Regarding NOx, Wyoming has adopted the combustion control NSPS standards (boiler Subparts

Db and Dc, engine/turbine Subparts IIII, JJJJ and KKKK). The state has no de minimus permitting threshold for that pollutant, and minor sources between do undergo a BACT review. So for this state although the NSPS represent the ceiling for NOx limits in minor source permits, BACT may drive emissions lower if review shows controls to be technically feasible and economically reasonable.

Regarding Nonroad Mobile Sources, the federal Tier Standards take precedence. Wyoming has no separate state restrictions for temporary CI or SI-ICE.

Wyoming does have an "Interim Policy" for their Upper Green River Basin ozone non-attainment area however, which allows operators to voluntarily permit temporary drill/workover rig engines in return for receiving future emission credits. Wyoming AQD does conduct a BACT review of emissions on such permits, thus it is possible that emissions of temporary engines could be restricted to something under Federal Nonroad Mobile emission standards.

b. Potential Overlap with Federal O&G Rules

Wyoming and Colorado have several rules with potential overlap as compared with the federal O&G rules, as do Alaska, Montana and North Dakota to a lesser extent. 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.

5. 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 in the Rocky Mountain Region. The project was focused on generating the first complete and consistent area source estimates for pollutant emissions from this O&G source category with the potential to impair visibility near Class I areas in the West. Primary emphasis in Phase I was placed on NOx. Discussion of the results from Phase I, uncertainties identified and the availability of additional data then led to the Phase II project, which was completed in the Fall of 2007. Phase II also focused on NOx, and added more information on SO2 emissions, two pollutants significantly 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. Phase III was to build on the information gathered in Phase I and Phase II projects. The Phase III project was planned and executed in partnership with the WRAP to assure that the products from Phase III were not solely industry centric, but were widely distributed among non-industry stakeholders (State/Local Agencies, Tribal Air Programs,

Federal Land Managers, Environmental Groups and EPA). WRAP strove to see 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 all 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, a large and diverse group of interested O&G stakeholders (see details at http://www.wrapair2.org/Oil_Gas.aspx for more explanation and history).

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 located in the six-state (CO, MT, NM, ND, UT, and WY) central Rockies study region. The target base year for Phase III was 2006. In addition the scope of the project included completing mid-term projections for six years into the future. Western Energy Alliance and the WRAP coordinated 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 Great 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.

Completed

Dropped from Phase III Study

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. Reports, including maps of the individual 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", "EPA Oil and Natural Gas Air Regulations" and "EPA Mobile Source Nonroad Engines" will have the effect of changing some of the emissions calculated for future Projections of the WRAP Phase III inventories. The following analysis reviews where such changes will occur, as well as which source categories are likely affected. It should be emphasized that this is a qualitative analysis as it was not possible to quantify these changes within the scope of this project.

WRAP Phase III O&G Basin Emissions – 2006 Baseline Data

The 2006 baseline emissions totals calculated for the completed WRAP Phase III O&G gas basins are shown in Table 4 (Williston has a 2009 baseline).

Table 4: 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	14,367	12,873	609	681
Southwest Wyoming Basin	21,569	94,013	13,150	5,259	541
Williston Basin (2009 baseline)	14,387	357,798	18,765	2,081	1,045

Basin specific reports break out 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 all Phase III emission inventories compiled are based on historical baselines now several years old (2006, or 2009 in the case of Williston). In some cases there may have been additional State rules adopted between the baseline year(s) and the writing of this analysis. Thus 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.

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

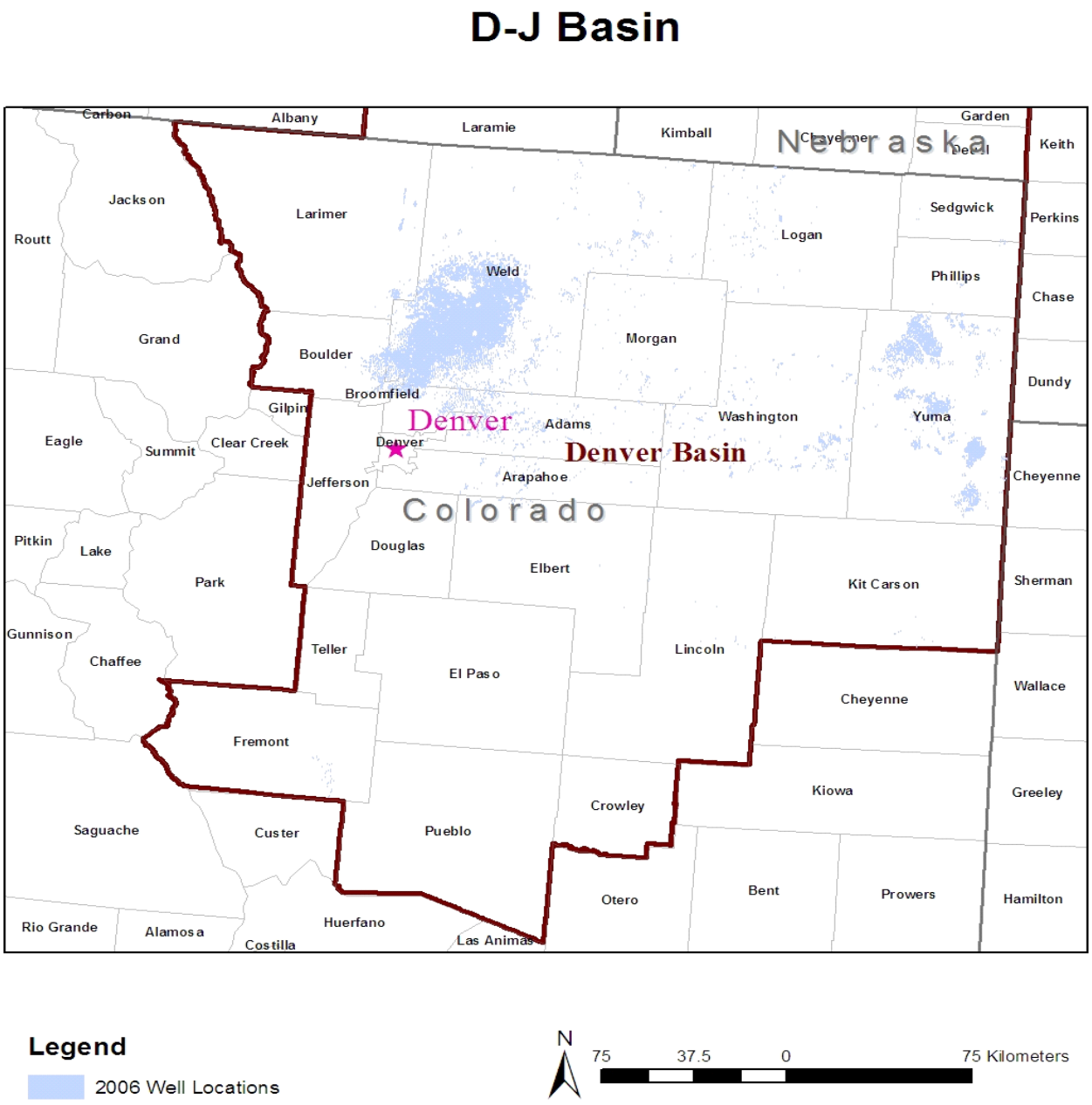

Table 5 contains a listing of the Denver-Julesburg Basin NOx emissions from ENVIRON's April 30, 2008 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE DENVER-JULESBURG BASIN" located at:

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

Table 5: Denver-Julesburg Basin 2006 NOx Emission Sources (tpy)

	Drill rigs	Exempt engines	Heaters	Workover Rigs	Compressor Engines	Glycol Dehydrator	Other Categories	Grand Total
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 (55%) and exempt engines (14%) are responsible for 69% of the NOx emissions in the Denver-Julesburg Basin, followed by 28% from drill (25%) and workover (3%) rigs. NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. Since there are no Indian Lands in the Denver-Julesburg basin, the new "Permitting of Minor Sources on Indian Lands" regulation will have no effect on the emissions in this area either. Thus the overall effect of the new federal regulations is likely to be a non-factor in terms of NOx totals from the Denver-Julesburg Basin.

Regarding the 28% of NOx from Nonroad Mobile drill/workover rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory. But Colorado Regulation 3 Part A, I.B.31 may affect some temporary engines >1200 HP in size with restricted emissions in order to meet ambient air quality standards.

Table 6 contains a listing of the Denver-Julesburg Basin VOC emissions from ENVIRON's above cited April 30, 2008 Technical Memo.

Table 6: 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	Grand Total
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 the most significant sources are comprised of large (50%) and small (16%) condensate tanks making up 66% of the D-J VOC emissions. The next most significant sources are 14% from pneumatic devices and 9% from unpermitted fugitives.

The Subpart OOOO regulation requires condensate tanks constructed or modified after August

23, 2011, with 6 tpy of VOC of uncontrolled emissions 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 the Subpart OOOO tank regulation on the gross emission inventory will be minimized in the D-J Basin by existing Colorado regulations.

Regarding the second largest source, pneumatic devices, the new regulations of NSPS Subpart OOOO will address VOC emissions by allowing no emissions from devices located at gas processing plants, while devices at other sites would be required to use low bleed devices limited to 6 ft^3/day of VOC emissions. 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 the Subpart OOOO pneumatics regulation 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 NOx 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.

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

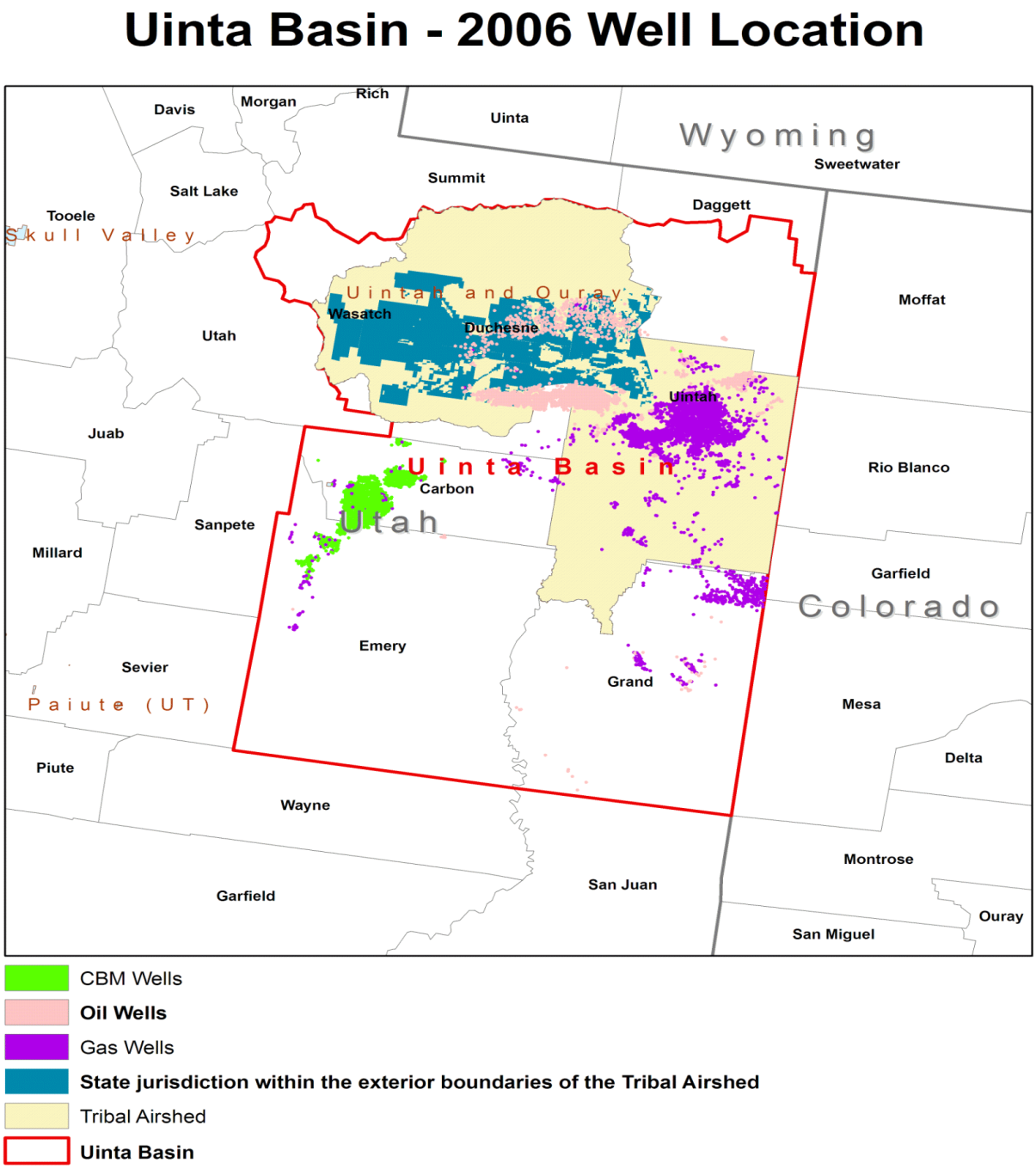

Table 7 contains a listing of the Uinta Basin NOx emissions from ENVIRON's March 25, 2009 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE UINTA BASIN" located at:

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

Table 7: 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	Grand 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 (36%) and workover (2%) rigs with 38% of the emissions, followed by 34% from compressors (17%) and artificial lift engines (17%). The next largest category is 18% from permitted sources. NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action.

Also seen from the table, the majority of NOx emissions in the Uinta Basin are located on Tribal Lands. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to the new federal regulation for "Permitting of Minor Sources on Indian Lands", there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to reporting requirements in the federal rule. Thus we may actually see some increased NOx emissions show up on Tribal Lands in the Uinta Basin in future emission inventories due to this permitting regulation.

Regarding the 38% of NOx from Nonroad Mobile drill/workover rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory.

Table 8 contains a listing of the Uinta Basin VOC emissions, as taken from ENVIRON's above cited March 25, 2009 Technical Memo.

Table 8: 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	Grand 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 tanks with a combined 29% of the total (oil-20% & condensate-9%), 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 by allowing no emissions from devices located at gas processing plants, while devices at other sites would be required to use low bleed devices limited to 6 ft^3/day of VOC emissions. The State of Utah has no regulations on pneumatic devices, so Subpart OOOO would likely reduce VOC emissions in future Uinta Basin inventories from this source category.

The Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions 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. Thus the new federal regulation would likely reduce VOC emissions from tanks in future Uinta Basin inventories.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics emissions by 95 percent. As is the case with other VOC sources, the State of Utah doesn't have regulations on dehydrators, so the new federal NSPS would likely reduce VOC emissions from dehydrators in future Uinta Basin inventories.

As with NOx, 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 an effect on emission totals in this area in the future. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to the federal permitting review, there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased VOC emissions show up on Tribal Lands in the Uinta basin in future emission inventories due to this permitting regulation.

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

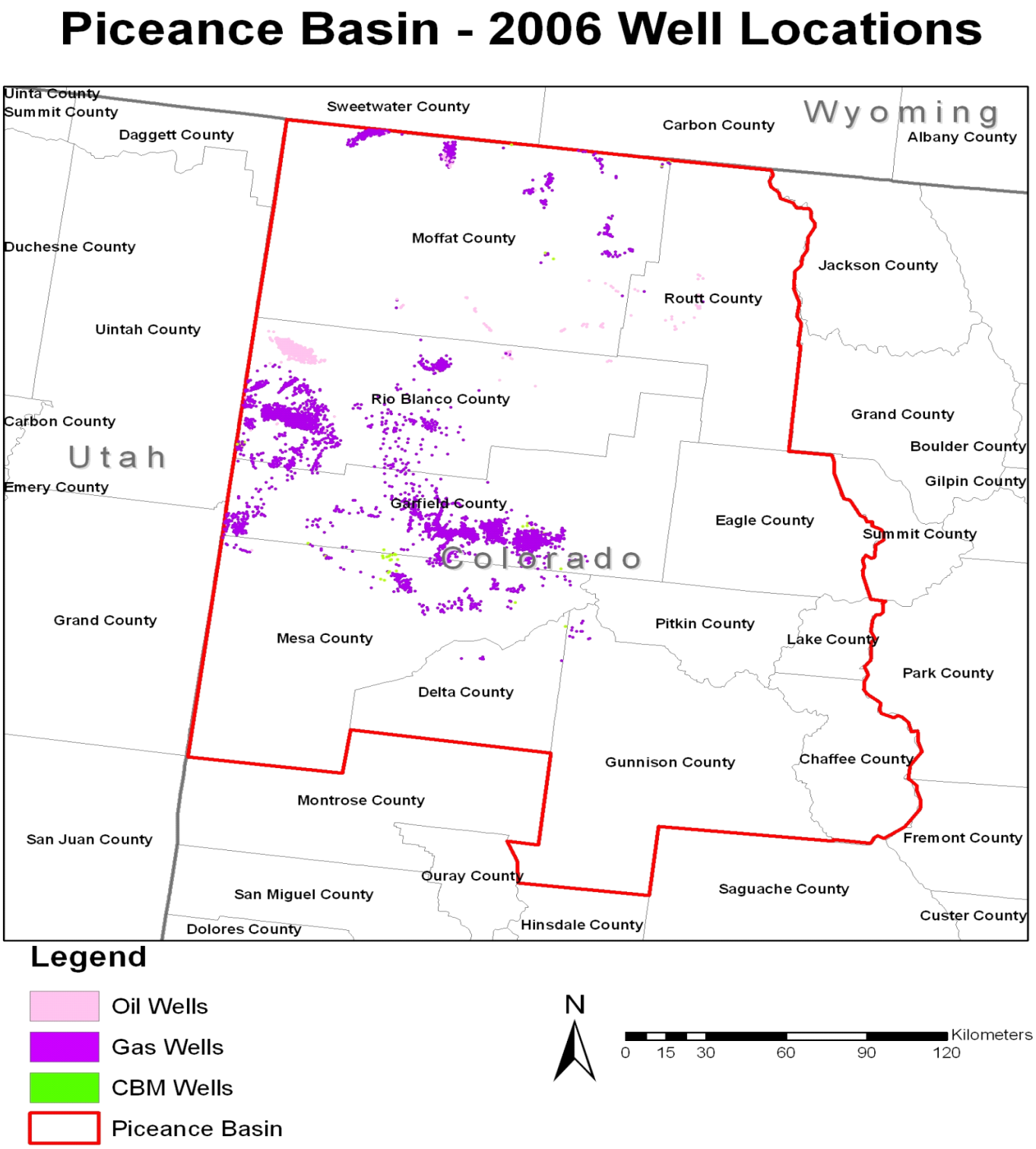

Table 9 contains a listing of the Piceance Basin NOx emissions from the ENVIRON's January 20, 2009 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE PICEANCE BASIN" located at:

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

Table 9: Piceance Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Exempt engines	Flaring	Glycol Dehydrator	Heaters	Workover Rigs	Other Categories	Grand Total
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 44% from drill (43%) and workover (1%) rigs. NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. Also, 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 effect on future emissions in this area. The overall effect of the new federal regulations is therefore likely to be negligible in terms of NOx totals from the Piceance Basin.

Regarding the 44% of NOx from Nonroad Mobile drill/workover rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory. But Colorado Regulation 3 Part A, I.B.31 may affect some temporary engines >1200 HP in size with restricted emissions in order to meet ambient air quality standards.

Table 10 contains a listing of the Piceance Basin VOC emissions from ENVIRON's above cited January 20, 2009 Technical Memo.

Table 10: 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	Grand Total
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.

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 requires "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) already 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 requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions 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 on completions/re-completions in the Piceance Basin will be minimized by existing Colorado regulations.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics emissions by 95 percent. 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 glycol dehydrator regulations will be minimized in the Piceance Basin by existing Colorado regulations

For pneumatic devices, under Subpart OOOO no VOC emissions are allowed from devices located at gas processing plants, while devices at other sites would be limited to emissions of 6 ft^3/day (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 pneumatic regulations would be minimized in the Piceance Basin.

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

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

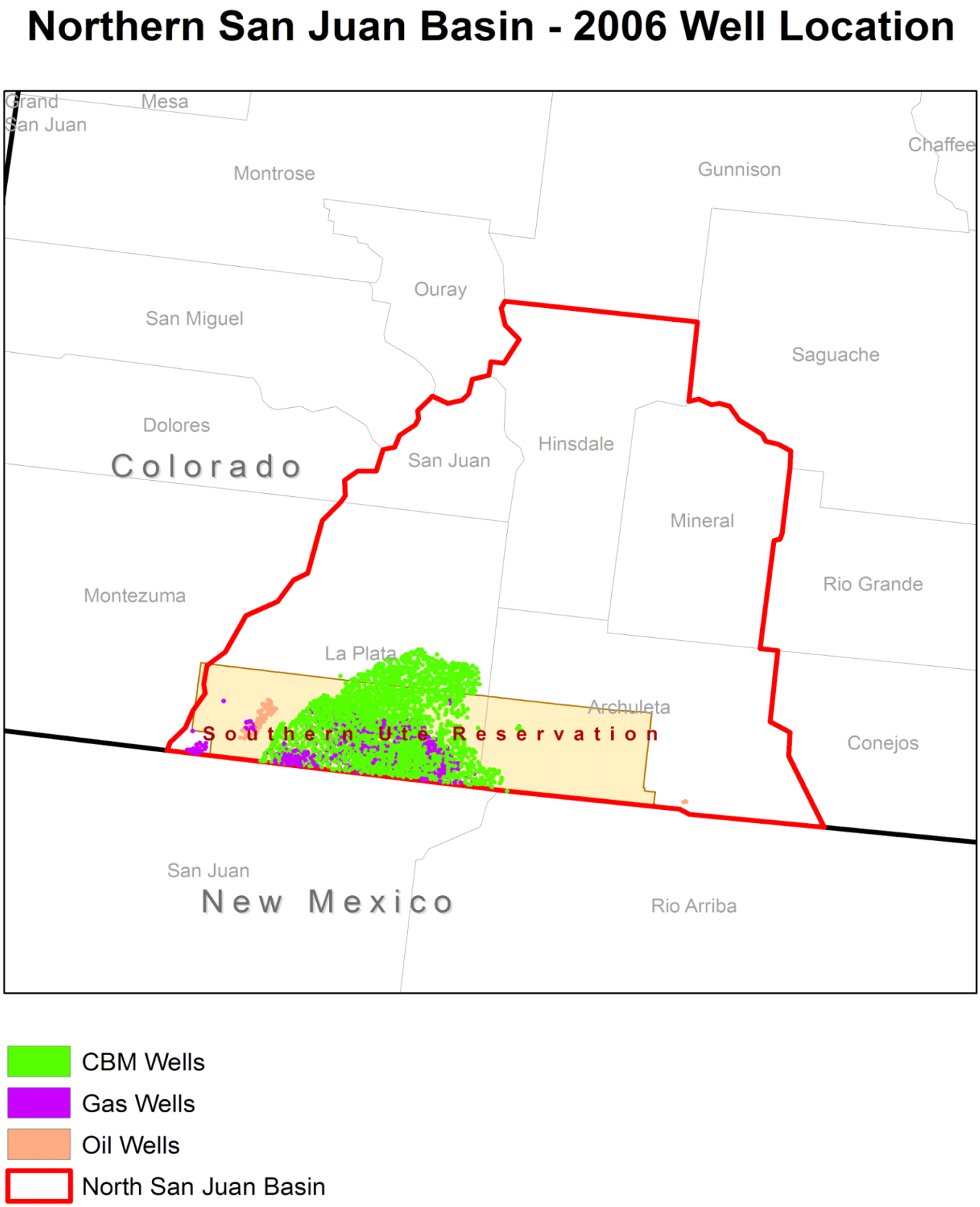

Table 11 contains a listing of the North San Juan Basin NOx emissions from the ENVIRON's September 1, 2009 Technical Memo, "DEVELOPMENT OF BASELINE 2006 AND MIDTERM 2012 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE NORTH SAN JUAN BASIN" located at:

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

	Compressor Engines	Drill Rigs	Miscellaneous Engines	Heaters/ Boilers	Dehydrators	Flaring	Other Categories	**Grand Total**
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 new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. Most of the NOx emissions in the North San Juan Basin are on Indian Lands, however. Regarding the "Permitting of Minor Sources on Indian Lands" regulation, 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 federal permitting review, there will also be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased NOx emissions show up on Tribal Lands in the North San Juan Basin in future emission inventories due to this permitting regulation.

Regarding the 4% of NOx from Nonroad Mobile drill rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory. But Colorado Regulation 3 Part A, I.B.31 may affect some temporary engines >1200 HP in size with restricted emissions in order to meet ambient air quality standards.

Table 12 contains a listing of the North San Juan Basin VOC emissions from ENVIRON's above cited September 1, 2009 Technical Memo.

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

	Compressor Engines	Drill Rigs	Miscellaneous Engines	Heaters/ Boilers	Dehydrators	Oil Tanks	Flaring	Other Categories	**Grand Total**
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 NOx, compressors are responsible an overwhelming 88% majority of the VOC emissions the North San Juan, distantly followed by 8% from oil tanks.

Regarding compressors NSPS Subpart OOOO addresses VOC emissions, mandating 95% control of centrifugal units that have a wet seal system, and a maintenance schedule to replace rod packing every 26,000 hours (or 3 months) for reciprocating engines. The State of Colorado has no equivalent measures for minimizing compressor fugitive emissions, so Subpart OOOO compressor rules will lower VOC emissions in future inventories for non-tribal sources in the North San Juan Basin.

Also applicable to this basin, the Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions 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 tank rules 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 an effect on VOC emission totals in this area on new sources in the future. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to the federal permitting review, there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to reporting requirements in the federal permitting rule. Thus we may actually see some increased VOC emissions show up on Tribal Lands in the North San Juan basin in future emission inventories due to this permitting regulation.

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

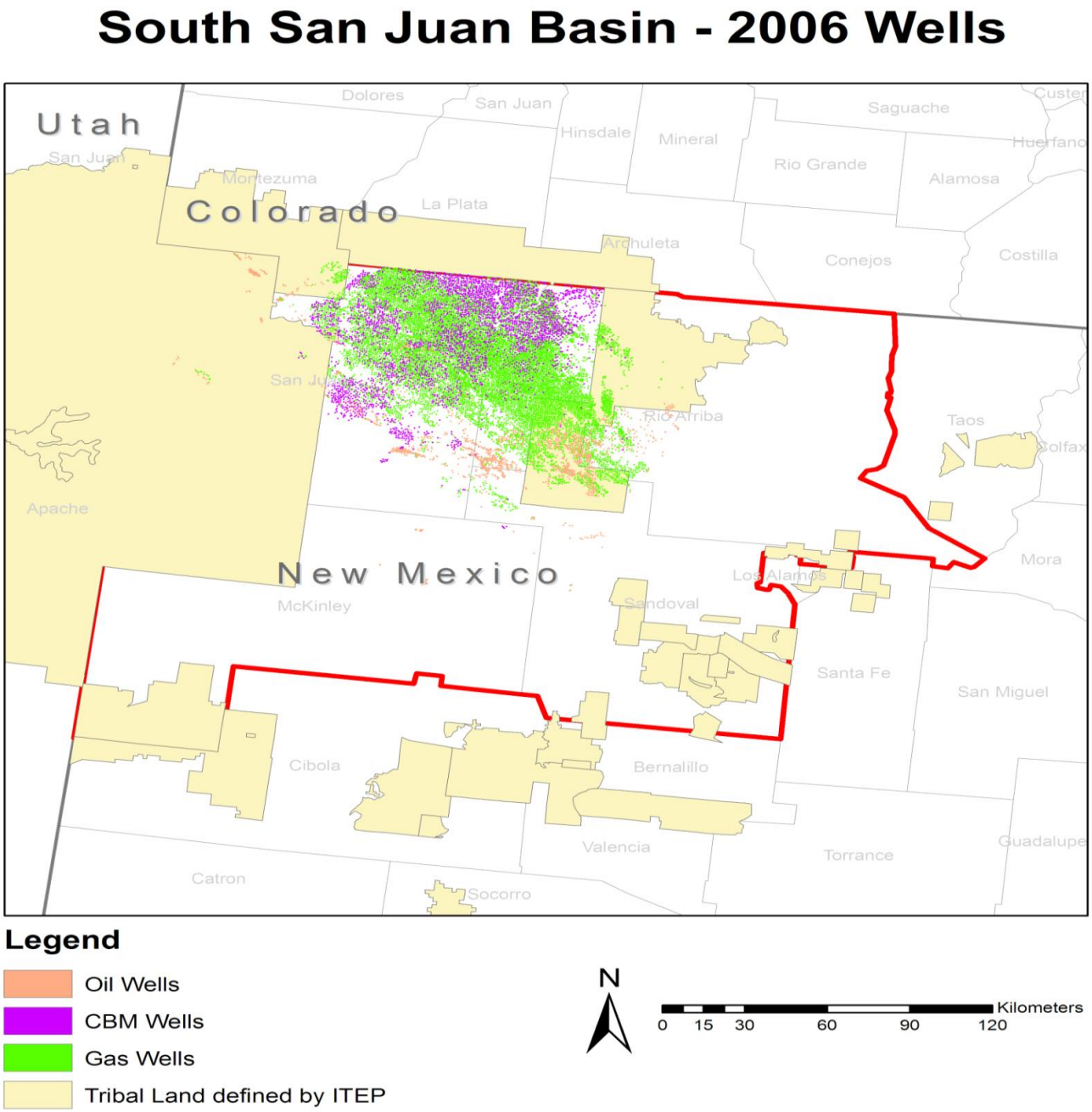

Table 13 contains a listing of the South San Juan Basin NOx emissions from the ENVIRON's November 25, 2009 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE SOUTH SAN JUAN BASIN" located at:

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

Table 13: 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	Grand 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

In the South San Juan Basin gas fired engines (compressors [84%], CBM pump [3%] and artificial lift engines [4%]) are responsible for the majority of the NOx emissions with 91% of the total, distantly followed by drill and workover engines at 4% summed from these two categories.

NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. Also seen from the table, a portion of NOx emissions in the South San Juan Basin are located on Tribal Lands. 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. The new requirements for minor source permitting review will likely have the effect of lowering NOx emission totals in this area on new sources in the future. However, it is also 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 actually see some increased NOx emissions show up in future emission inventories on Tribal Lands in the South San Juan Basin due to this permitting regulation.

Regarding the 4% of NOx from Nonroad Mobile drill/workover rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory.

Table 14 contains a listing of the South San Juan Basin VOC emissions from ENVIRON's above cited November 25, 2009 Technical Memo.

Table 14: 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	**Grand Total**
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%) combine to make up the next biggest source category with 10% of the total basin VOC from these two types of gas fired engines.

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. 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, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics their emissions by 95 percent. 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 from dehydrators in future inventories for the South San Juan Basin.

The Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions to reduce VOC by 95%. As is the case for other categories the State of New Mexico has no existing regulations on tank control requirements, so Subpart OOOO would likely reduce VOC emissions from storage tanks in future inventories for the South San Juan Basin.

Regarding gas fired engines NSPS Subpart OOOO addresses VOC emissions, mandating 95%

control of centrifugal units that have a wet seal system, and a maintenance schedule to replace rod packing every 26,000 hours (or 3 months) for reciprocating engines. 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. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to federal permitting review, there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased VOC emissions show up in future emission inventories for Tribal Lands in the South San Juan basin due to this federal permitting regulation.

Figure 7: Wind River Basin Boundaries Overlaid With 2006 O&G Well Locations

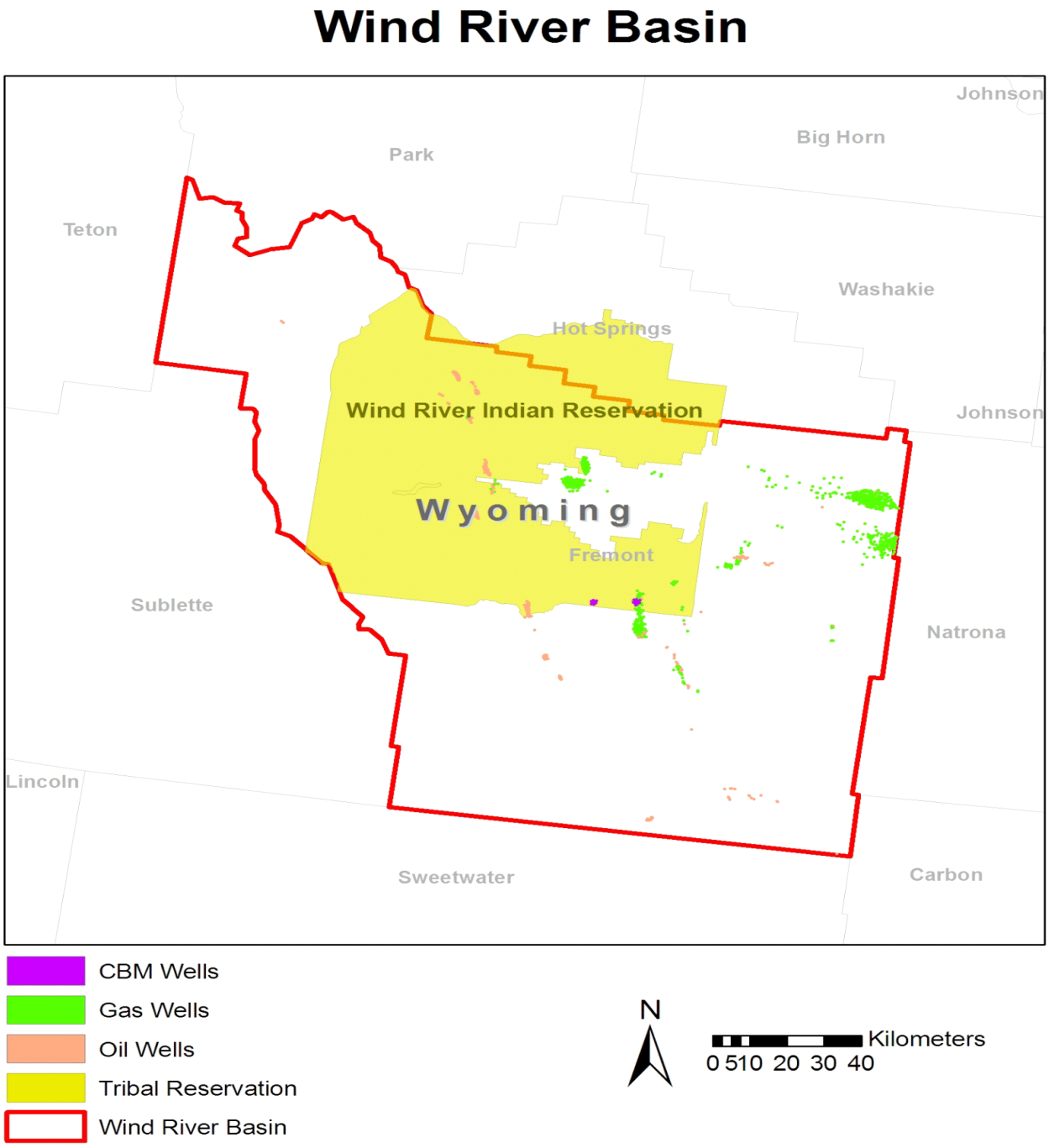

Table 15 contains a listing of the Wind River Basin NOx emissions from the ENVIRON's July 14, 2010 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE WIND RIVER BASIN" located at:

http://www.wrapair.org/forums/ogwg/documents/2010-07_'06%20Baseline;%20Wind%20RiverBasin%20Technical%20Memo%20(07-14).pdf

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

	Compressor Engines	Drill Rigs	Heaters	Workover Rigs	Dehydrators	Other Categories	Grand 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, responsible for almost ¾ of the NOx emissions (71%). This is followed by 15% from drill (12%) and workover (3%) rigs and then 8% from gas fired heaters.

As cited throughout this analysis NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. There are some Indian Lands in the Wind River Basin, thus the new "Permitting of Minor Sources on Indian Lands" regulation will affect the emissions of previously unpermitted small sources like field compressors, miscellaneous engines and heaters. Federal permitting review will likely lower NOx emission totals on new sources in the future. However, it is also 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 actually see some increased NOx emissions show up in future emission inventories for Tribal Lands in the Wind River Basin due to this permitting regulation.

Regarding the 15% of NOx from Nonroad Mobile drill rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory.

Table 16 contains a listing of the Wind River Basin VOC emissions from ENVIRON's above cited July 14, 2010 Technical Memo.

Table 16: 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	Grand 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%).

Regarding pneumatic devices, the new regulations of NSPS Subpart OOOO address VOC emissions by allowing no emissions from devices located at gas processing plants, while devices at other sites would be required to use low bleed devices limited to VOC emissions of 6 ft^3/day. 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 pneumatic devices at all new facilities. Upon modification of facilities, new pneumatic controllers must also be low/no-bleed, while 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 future Wind River Basin emission inventories.

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 requires "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 2011-2012 (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 on venting VOC emissions will be minimized in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics their emissions by 95 percent. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires

98% control for statewide PAD (multiple well) facilities 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 (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. Thus the effect of Subpart OOOO glycol dehydrator rules will be minimized for VOC emissions in the non tribal portion of the Wind River Basin by existing Wyoming regulations.

Also applicable to this basin, the Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of uncontrolled VOC emissions to reduce those emissions 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 on tank VOC emissions 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", VOC emissions from the Wind River Basin Indian Lands represent a minority of sources. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to federal permitting review, there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased VOC emissions show up in future emission inventories for Tribal Lands in the Wind River Basin due to this permitting regulation.

Figure 8: Powder River Basin Boundaries Overlaid With 2006 OG Well Locations

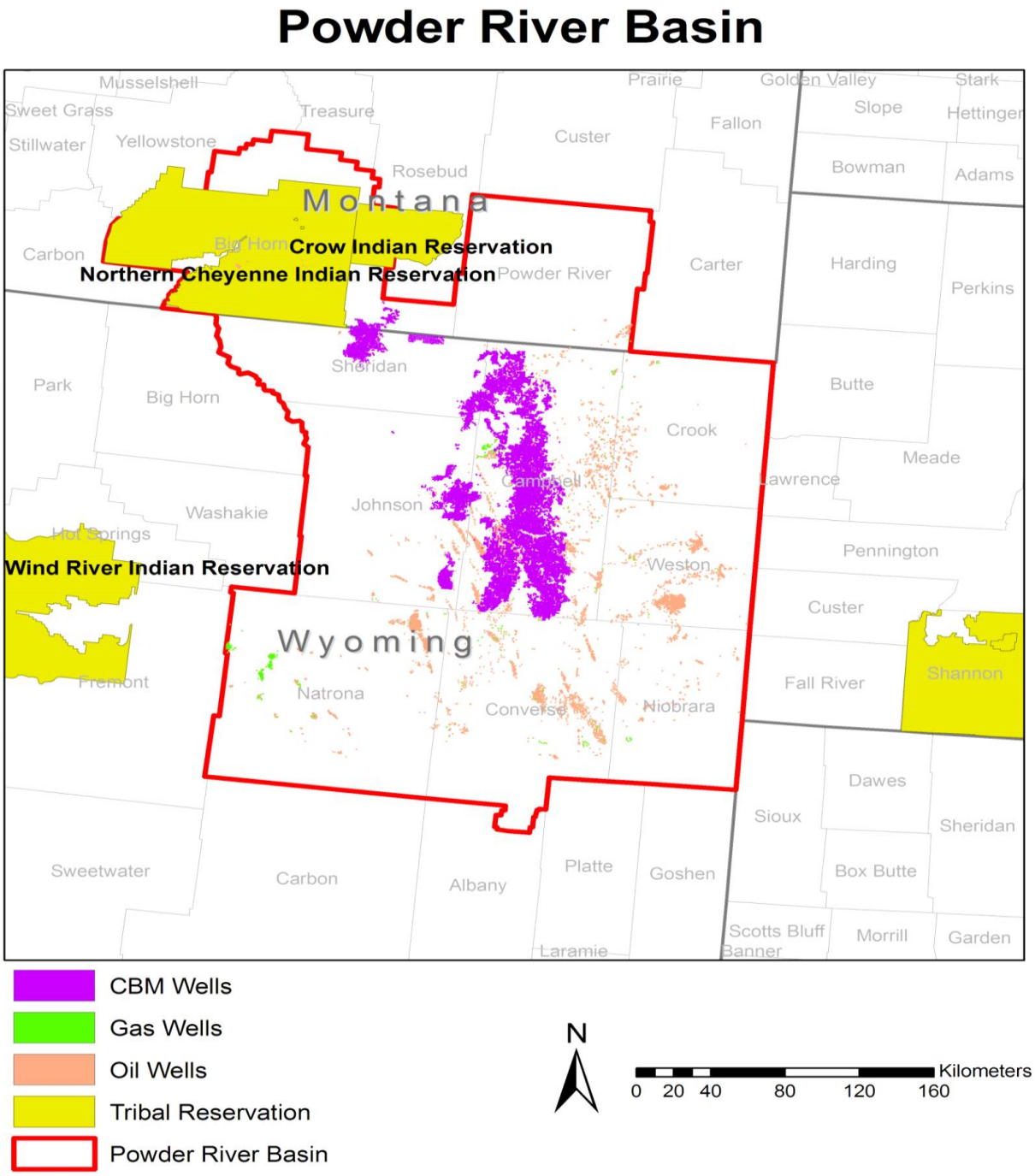

Table 17 contains a listing of the Powder River Basin NOx emissions from the ENVIRON's June 10, 2011 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE POWDER RIVER BASIN" located at:

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

Table 17: Powder River Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Miscellaneous Engines	Artificial Lift	Dehydrators	Other Categories	Grand 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 new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action.

There is a very small portion of Powder River Basin NOx sources located on Indian lands. Regarding the "Permitting of Minor Sources on Indian Lands" regulation, 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 federal permitting review, there will also be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased NOx emissions show up in future emission inventories for Tribal Lands in the Powder River Basin due to this permitting regulation.

Regarding the 27% of NOx from Nonroad Mobile drill rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory.

Table 18 contains a listing of the Powder River Basin VOC emissions from ENVIRON's above cited June 10, 2011 Technical Memo.

Table 18: 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	Grand 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 fugitive leaks from compressors with 18% of the basin total, 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 VOC emissions in future emission inventories for the non tribal portion of the Powder River Basin.

Regarding compressors 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 compressor VOC emissions in future inventories for 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 emissions from devices located at gas processing plants, while devices at other sites would be limited to VOC emissions of 6 ft^3/day. In Wyoming all pneumatic devices (excluding pumps) must be low or no bleed design which limits emissions to a threshold of 6 ft^3/day. Thus Wyoming regulations on pneumatic devices do apply in the Powder River Basin and already control pneumatic devices as well as Subpart OOOO would. Therefore VOC

emissions from this source category will not likely be affected in future inventories for the Powder River Basin.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics their emissions by 95 percent. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control for statewide PAD (multiple well) facilities 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 (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. Thus the effect of Subpart OOOO glycol dehydrator rules will be minimized for VOC emissions in the non tribal portion of the Powder River Basin by existing Wyoming regulations.

Also applicable to this basin, the Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions to reduce VOC by 95%. Wyoming Chapter 6 Section 2 O&G Permitting Guidance requires 98% control of all new/modified tank emissions ≥10 tpy VOC within 60 days statewide. Thus the effect of Subpart OOOO on tank VOC emissions will be minimized in the non tribal portion of the Powder 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 the VOC sources. Therefore federal permitting review will likely have some effect on VOC emission totals in this area. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to the federal permitting, there will likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to reporting requirements in the federal rule. Thus we may actually see some increased VOC emissions show up in future emission inventories on Tribal Lands in the Powder River Basin due to this permitting regulation.

Figure 9: SW Wyoming Basin Boundaries Overlaid With 2006 O&G Well Locations

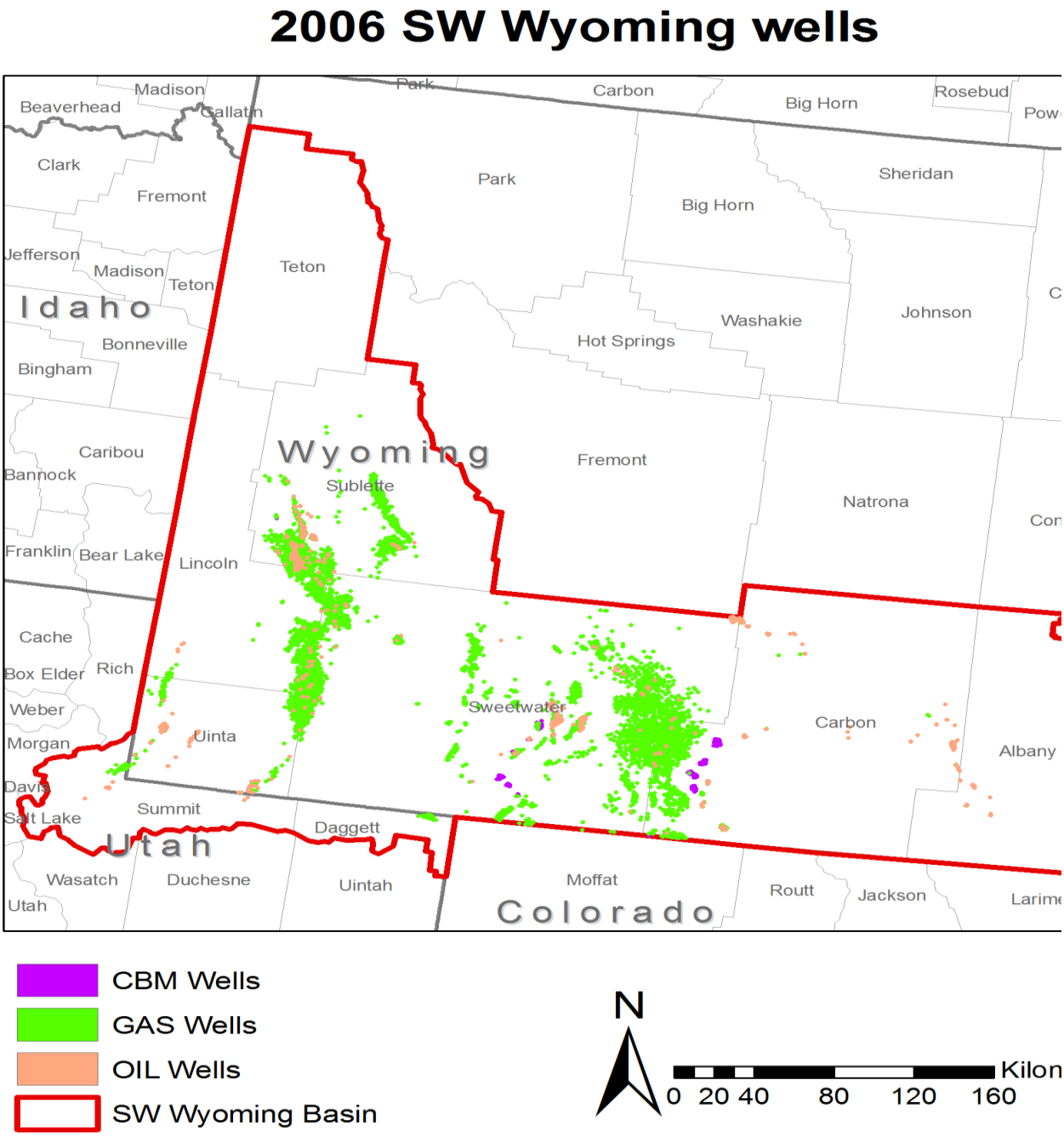

Table 19 contains a listing of the Green River Basin NOx emissions from the ENVIRON's November 27, 2012 Technical Memo, "DEVELOPMENT OF BASELINE 2006 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE SOUTHWEST WYOMING (GREATER GREEN RIVER) BASIN" located at:

http://www.wrapair2.org/pdf/2006_Baseline_Emiss_SWWY_Basin_120712.pdf

Table 19: SW Wyoming Basin 2006 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Dehydrators	Other Categories	Grand Total
Total Tons	**11,674**	**5,115**	**2,722**	**362**	**1,696**	**21,569**
Percent of Total	**54%**	**24%**	**13%**	**2%**	**8%**	**100%**
Total JPAD	**296**	**3,289**	**378**	**88**	**479**	**4,531**
Total Non-JPAD	**11,378**	**1,826**	**2,344**	**274**	**1,217**	**17,038**

In the SW Wyoming Green River Basin compressors are the largest NOx source category in 2006, with more than half (54%) of the emissions. This is followed by 24% from drill rigs and 13% from gas fired heaters.

NOx is not covered by the new federal NSPS Subpart OOOO, therefore these emission rates should not be affected by that action. And since there are no Indian Lands in the SW Wyoming (Greater Green River) Basin, the new Federal regulation for "Permitting of Minor sources on Indian Lands" will have no effect on the future emissions in this area either. Thus the overall effect of the new federal regulations on future emission inventories is likely to be negligible in terms of NOx totals from the SW Wyoming (Greater Green River) Basin.

Regarding the 24% of NOx from Nonroad Mobile drill/workover rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory. But Wyoming does have an "Interim Policy" for their Upper Green River Basin ozone non-attainment area however, which allows operators to voluntarily permit temporary drill/workover rig engines in return for receiving future emission credits. Wyoming AQD does conduct a BACT review of emissions on such permits, thus it is possible that emissions of temporary engines could be restricted to something under Federal Nonroad Mobile emission standards in such voluntary permitting actions.

Table 20 contains a listing of the Green River Basin VOC emissions from ENVIRON's above cited November 27, 2012 Technical Memo.

Table 20: SW Wyoming Basin 2006 VOC Emission Sources (tpy)

	Condensate Tanks	Oil Tanks	Fugitives	Pneumatic Devices	Pneumatic Pumps	Dehydrators	Compressor Engines	Drill Rigs	Venting – Initial Completions	Venting – Recompletions	Other Categories	Grand Total
Total Tons	31,259	1,659	23,024	16,309	5,993	9,610	1,553	596	746	508	2,756	94,013
Percent Of Total	33%	2%	24%	17%	6%	10%	2%	1%	1%	1%	3%	100%
Total JPAD	2,662	0	827	1,171	1,731	2,935	231	391	217	0	602	10,766
Total Non-JPAD	28,597	1,659	22,197	15,138	4,262	6,675	1,322	205	529	508	2,154	83,247

In the SW Wyoming (Greater Green River) Basin tanks comprise more than a third (35%) of the VOC emissions [condensate-33% & oil-2%], followed by 24% from fugitive emissions, 23% from pneumatic

devices [17%-controllers & 6%-pneumatic pumps] and 10% from dehydrators. Negligible emissions come from compressor engines (2%), drill rigs (1%) and venting (initial- 1% and recompletions 1%) in the basin.

The Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of uncontrolled emissions to reduce VOC by 95%. 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 as well. 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. Thus the effect of Subpart OOOO on tank VOC emissions will be minimized in future emission inventories for the SW Wyoming (Greater Green River) Basin by existing Wyoming regulations.

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

Regarding pneumatic devices, the new regulations of NSPS Subpart OOOO address VOC emissions by allowing no VOC emissions from devices located at gas processing plants, while devices at other sites would be required to use low bleed devices limited to emissions of 6 ft^3/day. 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). This is essentially equivalent to the Subpart OOOO requirement. Thus the impact of Subpart OOOO on pneumatic emissions would be minimized in future emission inventories for the SW Wyoming (Greater Green River) Basin by existing Wyoming regulations.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics their emissions by 95 percent. In Wyoming for JPAD areas, CDAs and Statewide PAD (multiple well) facilities Chapter 6 Section 2 O&G Permitting Guidance requires that all dehydration unit emissions must be controlled by 98% upon startup/modification. Emissions from single well dehydration units must be controlled by 98% within 60 days of startup/modification for those with ≥6 tpy VOC (30 days for ≥8 tpy VOC) with removal allowed upon approval after various elapsed time scenarios. The Wyoming requirements for dehydrators are equivalent to or better than the Subpart OOOO requirement. Thus the effect of Subpart OOOO on glycol dehydrator VOC emissions will be minimized in future emission inventories for the SW Wyoming (Greater Green River)

Basin by existing Wyoming regulations.

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). The entire SW Wyoming (Greater Green River) Basin is covered by the Wyoming requirement for Green Completions, Thus the effect of Subpart OOOO on venting VOC emissions will be minimized in future emission inventories for the SW Wyoming (Greater Green River) Basin by existing Wyoming regulations.

Regarding gas fired engines NSPS Subpart OOOO addresses VOC emissions, mandating 95% control of centrifugal units that have a wet seal system, and a maintenance schedule to replace rod packing every 26,000 hours (or 3 months) for reciprocating engines. The State of Wyoming has no existing regulations on compressor fugitive VOC emissions, so Subpart OOOO would likely reduce VOC emissions from this engine source category in future inventories for the SW Wyoming (Greater Green River) Basin.

Regarding the federal rules for "Permitting of Minor Sources on Indian Lands", once again there are no Indian Lands in the SW Wyoming (Greater Green River) Basin, and therefore the new requirements will have no effect on VOC emission totals in this area in the future.

Williston Basin 2009 Emissions

Figure 10: Williston Basin Boundaries Overlaid With 2009 O&G Well Locations

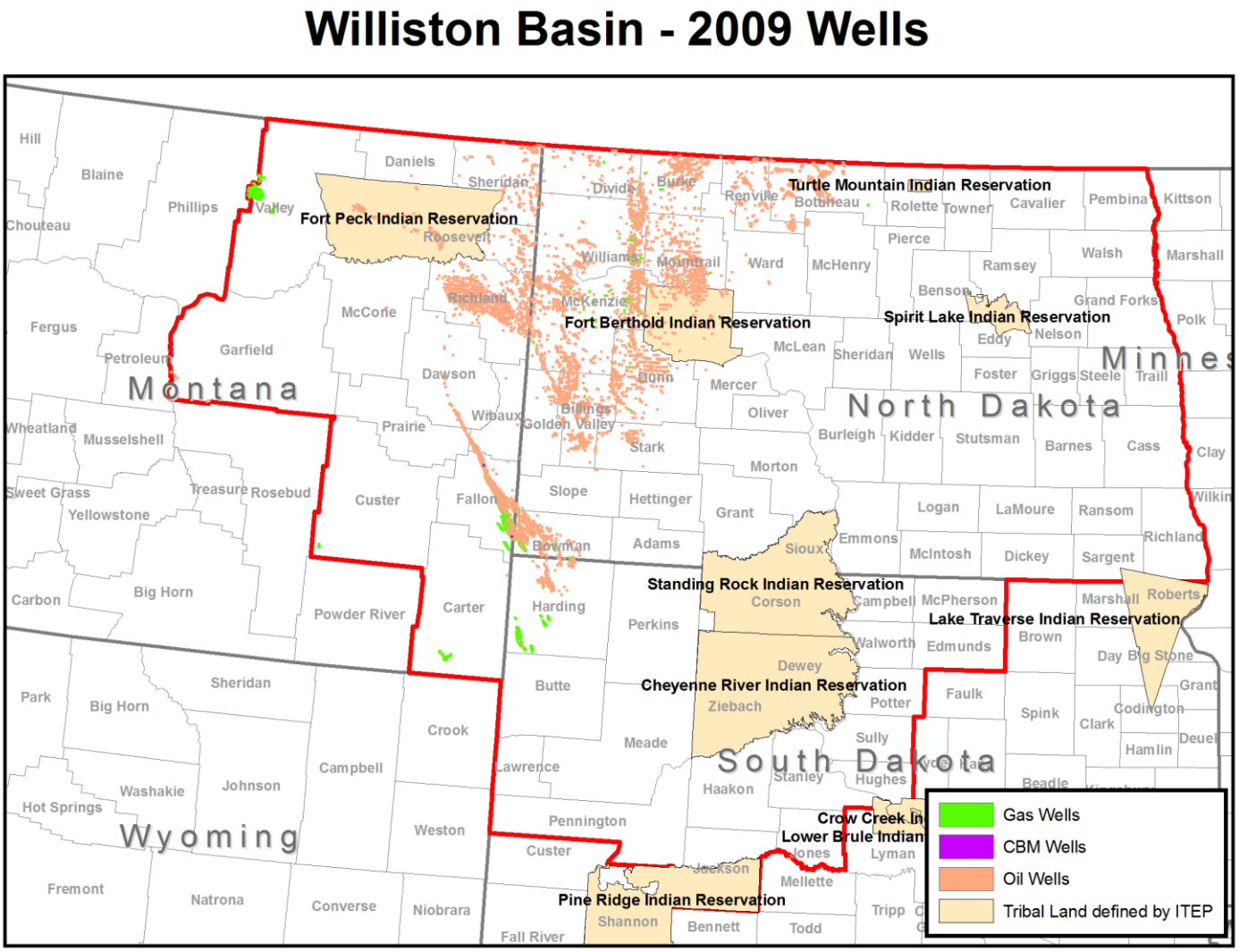

Table 21 contains a listing of the Williston Basin NOx emissions from the ENVIRON's June 25, 2013 Technical Memo, "DEVELOPMENT OF BASELINE 2009 EMISSIONS FROM OIL AND GAS ACTIVITY IN THE WILLISTON BASIN" located at:

http://www.wrapair2.org/pdf/2009_Baseline_Emiss_Williston_Basin_062513.pdf

Table 21: Williston Basin 2009 NOx Emission Sources (tpy)

	Compressor Engines	Drill Rigs	Heaters	Miscellaneous Engines	Artificial Lift Engines	Oil Tank Flaring	Casing Head Gas Flaring	Other Categories	Grand Total
Total Tons	4,953	4,974	654	554	1,620	258	918	456	14,387
Percent of Total	34%	35%	5%	4%	11%	2%	6%	3%	100%
Total (Tribal)	90	785	23	19	108	7	77	5	1,114
Total (Non-Tribal)	4,863	4,189	631	535	1,512	251	841	451	13,273

In the Williston Basin compressor (34%), artificial lift (11%) and miscellaneous engines (4%) form the largest source category in 2009, with almost half of the basin NOx emissions attributable to these engines. This is followed by 35% from drill rigs engines, 8% from flaring activities (casing head - 6% and oil tank flaring – 2%) and 5% from gas fired heaters.

As cited throughout this analysis NOx is not covered by the federal NSPS, therefore future emission rates should not be affected by Subpart OOOO in this basin. There are some Indian Lands in the Williston Basin, thus the new "Permitting of Minor Sources on Indian Lands" regulation will affect the emissions of previously unpermitted small sources like field compressors, miscellaneous engines and heaters. Federal permitting review will likely lower NOx emission totals on new sources in the future. However, it is also 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 actually see some increased NOx emissions show up in future emission inventories for Tribal Lands in the Williston Basin due to this permitting regulation.

Regarding the 35% of NOx from Nonroad Mobile drill rig engines, the federal Tier Standards take precedence and should be already accounted for in this inventory

Table 22 contains a listing of the Williston Basin VOC emissions from ENVIRON's above cited June 25, 2013 Technical Memo.

Table 22: Williston Basin 2009 VOC Emission Sources (tpy)

	Pneumatic Devices	Pneumatic Pumps	Recompletion Venting	Fugitives	Condensate Tanks	Oil Tanks	Oil Well Truck Loading	Casing Head Gas Venting	Other Categories	Grand Totals
Total Tons	**25,237**	**26,861**	**1,700**	**7,836**	**26,692**	**227,035**	**7,392**	**27,184**	**7,861**	**357,798**
Percent of Total	7%	8%	1%	2%	7%	63%	2%	8%	2%	100%
Total (Tribal)	**886**	**944**	**60**	**275**	**0**	**19,219**	**493**	**2,285**	**640**	**24,802**
Total (Non-Tribal	24,351	25,917	1,640	7,561	26,692	207,816	6,899	24,899	7,221	332,996

In the Williston 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 storage tanks [condensate-6% & oil-4%].

Regarding pneumatic devices, the new regulations of NSPS Subpart OOOO address VOC emissions by allowing no VOC emissions from devices located at gas processing plants, while devices at other sites would be required to use low bleed devices limited to emissions of 6 ft^3/day. The State of North Dakota has no regulations on pneumatic devices, so Subpart OOOO would likely reduce VOC emissions in future Williston Basin inventories from this source category.

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. The State of North Dakota has no regulations on Green Completions, so Subpart OOOO would likely reduce VOC emissions in future inventories from this source category in the Williston Basin.

Regarding glycol dehydrators, EPA previously proposed to remove the 1 ton per year benzene compliance option for large glycol dehydrators, but with the revised risk analysis, the final rule retained this 1 TPY option for large dehydrators. If annual benzene emissions don't meet the 1 TPY threshold, under Subpart OOOO the large dehydrators would have to reduce air toxics their emissions by 95 percent. The **Bakken Pool O&G Production Facilities Air Pollution Control Permitting & Compliance Guidance** requires that dehydrators constructed after June 1, 2011 must control total VOC by at least 90%. Thus the effect of Subpart OOOO on glycol dehydrator VOC emissions in future emission inventories will be minimized in the non tribal portion of the Williston Basin by existing North Dakota regulations.

Also applicable to this basin, the Subpart OOOO regulation requires condensate tanks constructed or modified after August 23, 2011, with 6 tpy of VOC of uncontrolled emissions to reduce VOC by 95%. The

requires that tanks constructed after June 1, 2011 must control total VOC by at least 90% (the control efficiency requirement is raised to 98% if the VOC Potential to Emit (PTE) is equal to or greater than 20 TPY from a tank). Thus the effect of Subpart OOOO on glycol dehydrator VOC emissions in future emission inventories will be minimized in the non tribal portion of the Williston Basin by existing North Dakota regulations.

Regarding the federal rules for "Permitting of Minor Sources on Indian Lands", the Williston Basin Indian Lands comprise a minority of VOC sources. Although newly constructed sources like field compressors, artificial lift engines and heaters will have lower emissions than previously projected due to federal permitting review, there will also likely be a number of existing sources that were never reported in the past. These newly captured sources will now be included in emission inventories due to federal reporting requirements. Thus we may actually see some increased VOC emissions show up in future emission inventories for Tribal Lands on the Williston Basin due to this permitting regulation.

6. BLM SPONSORED MONTANA GREAT PLAINS & WILLISTON BASIN EI

The Bureau of Land Management (BLM) Montana-Dakotas Office is sponsoring development of an oil and gas (O&G) emissions inventory for the Williston Basin in North Dakota, South Dakota, and Montana, and the Montana North Central (Great Plains) Basin. The WRAP, with expert contractor assistance, will build and report the inventory using the Phase III methodology employed in large active basins in the intermountain West. The result will be an accurate, comprehensive criteria pollutant inventory of actual emissions for most major point and area sources associated with exploration and production of O&G in the MT North Central (Great Plains) and ND-SD-MT Williston Basins for year 2011, as well as a mid-term projection year. One benefit of the project is development of a more accurate regional O&G emission inventory data based on input from knowledgeable sources. The project will also contribute to regional air quality modeling efforts and streamline future National Environmental Policy Act (NEPA) reviews by reducing the need for project-specific modeling.

More details of the project, including documents describing the Project Overview and the Technical Approach, can be found on the Emissions Tab of the main WRAP website under the link "Williston and Great Plains Basins' O&G 2011 and projection year Emission Inventory Project". The schedules in these documents show the project being completed in August 2013, but delays have pushed that completion date back to the end of year 2013 instead. When the reports for the two basins are completed, the WRAP will hold a stakeholder call to show the results to interested parties. The page is found at

http://www.wrapair2.org/ND-SD-MT.aspx.