



State of Utah

GARY R. HERBERT  
*Governor*

SPENCER J. COX  
*Lieutenant Governor*

Department of  
Environmental Quality

Alan Matheson  
*Executive Director*

DIVISION OF AIR QUALITY  
Bryce C. Bird  
*Director*

DAQP-065-18

July 31, 2018

Laura Bunte  
Advanced Program  
US Environmental Protection Agency  
OAQPS, C304-01  
4930 Old Page Road  
Durham, North Carolina 27703

Dear Ms. Bunte:

The State of Utah and Duchesne and Uintah counties joined the Environmental Protection Agency's (EPA) Ozone Advance Program in June of 2012. The Ute Tribe was also accepted into the Ozone Advance Program at about the same time. The Ozone Advance Program provided an opportunity for these agencies to work collaboratively to develop proactive strategies to address the ozone levels in the Uinta Basin. A Path Forward Letter was provided to EPA in June of 2014 that described activities that were undertaken to improve ozone levels in the Uinta Basin and areas for future focus. In accordance with Ozone Advance guidance, it is expected that participants in the program will provide periodic updates to EPA on the progress of programs and efforts being made to address high ozone levels in the area.

Due to staffing changes and other priorities, updates on the Path Forward provided in 2014 have not been provided to EPA in a written format. However, the State of Utah has been in continuous communication with EPA on ozone reduction efforts and scientific studies as the majority of all air quality improvement efforts are planned and executed in collaboration with the Ute Tribe and EPA. To meet the Ozone Advance guidance requirements the State of Utah is providing a written document summarizing all actions and activities taken since the Path Forward Letter was provided in June of 2014. Areas within the Uinta Basin have been identified for a nonattainment designation with a marginal classification to be effective as of August 3, 2018. We are providing this information to meet the guidance requirements, and as this will be a marginal nonattainment area for ozone, the State of Utah can still be eligible for participation in the Ozone Advance Program. We look forward to continued collaboration with the Ute Tribe and EPA to proactively address high levels of ozone in the Basin.

DAQP-065-18

Page 2

If you have any questions about Utah's Ozone Advance Program please contact me at (801) 536-4064 or Sheila Vance at (801) 536-4001.

Sincerely,

A handwritten signature in cursive script that reads "Bryce C. Bird".

Bryce C. Bird  
Director

cc: Chris Dresser, EPA  
Minnie Grant, Ute Tribe  
Uintah County Commissioners  
Duchesne County Commissioners

## Utah Ozone Advance Update

**I. Introduction**

On May 21, 2012, Governor Gary Herbert requested that the Environmental Protection Agency (EPA) enroll Duchesne and Uintah counties in the Ozone Advance Program. On June 4, 2012, EPA formally accepted Utah into the program. On July 2, 2013, the Ute Indian Tribe of the Uintah and Ouray Reservations also requested to enroll in the Ozone Advance Program and was also accepted by EPA. On June 30, 2014, the State of Utah provided a Path Forward Letter to EPA. The State of Utah is coordinating emission reduction activities with the Ute Tribe and appreciates the opportunity to work in partnership with the Tribe to improve air quality in the common airshed of the Uinta Basin (the Basin).

EPA's guidelines for Ozone Advance state that participants should stay in communication periodically throughout their tenure in the program. In addition, each year from the time the Path Forward was sent to EPA, a summary of the status of the area's measure and programs undertaken under Ozone Advance, current air quality, stakeholder meetings/events and other information should be provided to EPA via letter or e-mail. The State of Utah has been in continuous communication as suggested however a written summary or e-mail has not been provided annually. The State of Utah is now providing a summary of actions taken since the Path Forward Letter to meet the requirement prior to the effective date of ozone nonattainment designation. The State of Utah, and in conjunction with the Ute Tribe, have continuously taken a proactive approach to understand and potentially reduce ozone levels in the Basin. As the nonattainment designation for the Basin has been classified as marginal, the Basin still qualifies for participation in the Ozone Advance Program. A marginal classification does not require the formal development of a State Implementation Plan (SIP) and as such the Ozone Advance Program will provide a framework to continue the development of potential emission reduction strategies in the Basin and assist in efforts to achieve attainment of the ozone standard.

**II. Background**

Unexpectedly high ozone levels were measured in the Basin during the winter of 2010 when ozone levels are typically low. This has led to a new area of scientific study in the Basin and similar areas like the Upper Green River Basin in Wyoming. The Basin has continued to experience periods of high ozone levels during wintertime inversions since 2010, and as such, will be formally designated as an ozone nonattainment area with a marginal classification. The Basin is a rural area and the primary source of emissions is the oil and gas extraction industry. The jurisdictional issues can be complicated in the Basin with the sources spread out over federal, state, and tribal lands. Each entity has their own air agency with jurisdictional control and regulations that can apply in different situations. It is therefore important that these agencies, the Ute Tribe, EPA, and the State of Utah work together and collaborate to proactively reduce ozone levels in the Basin.

### III. Technical Studies

Ozone is typically a summertime pollutant because the chemical reactions that create ozone are fueled by sunlight. Wintertime ozone is less common, and the mechanisms that form ozone during winter months in the Basin are not well understood. When wintertime ozone was first measured in the Uinta Basin, the State of Utah began working with researchers and other government agencies to determine the extent of the ozone problem, the chemistry that leads to wintertime ozone, and the ozone precursors that are contributing to the problem. This ongoing technical work has been the primary focus of Utah's Ozone Advance Program because a good understanding of how ozone is being formed in the winter is necessary to identify the best strategies to solve the problem.

- Significant research has occurred over the last four winters that has laid the technical groundwork for Utah's ozone strategy. The research has improved the understanding of meteorological conditions in the Basin, the effect of local emissions versus transported emissions, and cold-pool chemistry. The research has indicated that volatile organic compounds (VOC) are the most significant precursor in the Basin; therefore, the emission reduction strategies are currently focused on VOCs.
- In February of 2015, the results of the 2014 wintertime ozone study were released. This study looked at quantifying the contribution of nitrous acid (HONO) and formaldehyde (HCHO) to the chemical reactions responsible for ozone formation. Prior studies in the Basin showed that the radical chemistry that drives ozone production is dominated by HONO and HCHO. Key findings were that HONO does not appear to be a major source of radicals during the winter episodes. Ozone formation at the Horse Pool study site is sensitive to VOC reductions, and these results also suggest that NO<sub>x</sub> reductions, either by themselves or in conjunction with VOC reductions, would lead to ozone reductions at Horse Pool. These findings are not sufficiently robust to apply as Basin-wide control strategies, but they provide additional data on possible control options. Formaldehyde and other aldehydes are the dominant radical sources in the Basin. Aromatic VOCs, including toluene and xylene, while less abundant than other VOC species in the Basin, are also particularly important sources of radicals. The recommendations for further study were to compare radical sources in areas where oil production dominates with locations where natural gas production dominates. The 2014 study measurements were focused in an area of natural gas dominance. The emissions inventory needs to be improved as there appears to be some biases that need correcting, which have led to the development of a comprehensive 2014 emissions inventory discussed in section IV.
- The Utah Division of Air Quality (UDAQ) seeks to maintain the regulatory ozone limits within the Basin without impeding continued development. As such, the UDAQ developed a model projecting future-year emissions inventories in the oil and gas sector accounting for both growth within the sector, as well as production decline due to the natural lifecycle of production wells. Additionally, the model accounted for the impact of regulatory policy development on a year-to-year basis. Researchers at the University of Utah (U of U) improved upon the model initially developed by the UDAQ by better accounting for variability in decline among wells, as well as producing more accurate

month-by-month production estimates. The project utilized a model developed at the U of U using the software R that has proven accurate for the Basin, as a tool for the UDAQ.

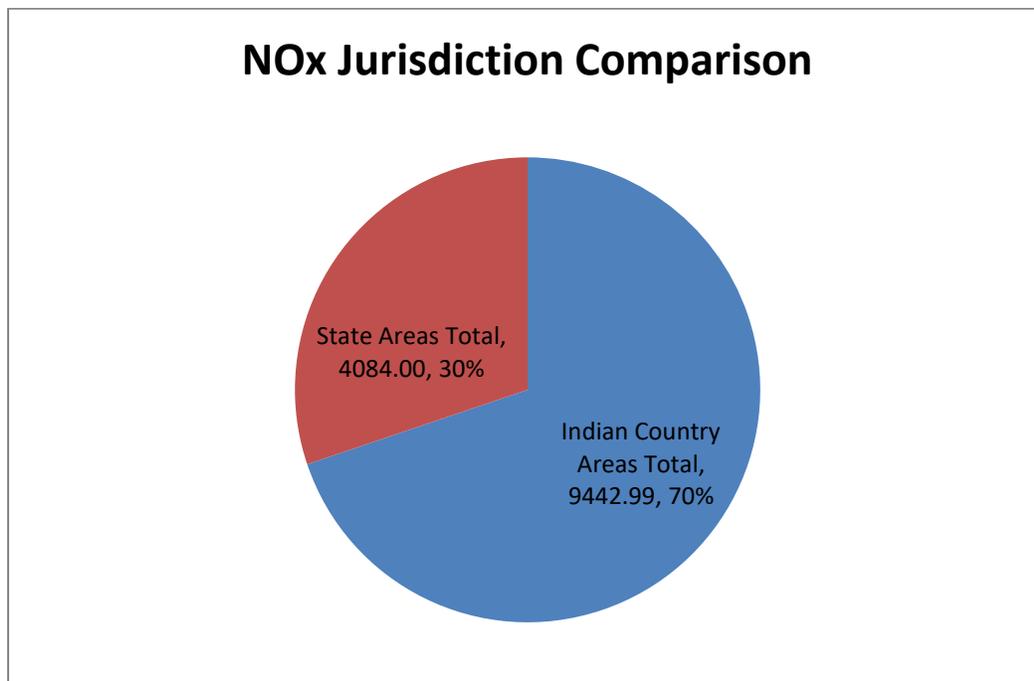
- Using funds provided by the Utah State Legislature in 2016, UDAQ, TriCounty Health Department, and the Bingham Research Center at Utah State University Uintah Basin (USU) collaborated on the Storage Tank Emissions Pilot Project (STEPP), using infrared imaging of fugitive organic compound emissions from storage tanks at well pads. Between August and October 2016, approximately 400 natural gas and oil well pads in Duchesne and Uintah Counties were visited, and an infrared imaging camera was used to detect emissions of hydrocarbon gases to the atmosphere from liquid storage tanks on the well pads. Even though these tanks were equipped with emissions controls, the camera was able to detect one or more infrared-visible emission plumes at 39% of the well pads. The emissions control devices are designed to capture hydrocarbon gases before they can be emitted to the atmosphere and either convert them by combustion to carbon dioxide or recover them. Most of the plumes observed were emitted before they reached the control device. Therefore, the problem observed appears to be not so much a failure of the control devices themselves, but a failure to adequately deliver escaping gases to the control devices.
- Based upon the results of the above STEPP work, the 2017 Utah Legislature provided funding for the establishment of an *ULend* program in the Basin. This program loans a state-of-the-art infrared (IR) camera to oil and gas operators and will allow them to inspect their equipment for possible fugitive VOC emissions. An IR camera is a very expensive piece of equipment that many smaller operators may not be able to afford and is now available to them at no cost to assist in the discovery of early VOC leaks. This identification and then corrective action to fix leaks reduces emissions that can contribute to the formation of ozone in the Basin. *ULend* will provide training on the camera's use to program participants. Operators utilizing the borrowed cameras will be asked to share some simple data; basic facility information, date of site visit, specific leak location, how the leak was addressed, and associated costs with DAQ. This data will be used solely for research purposes, not compliance actions. This program benefits both operators and UDAQ as early detection of leaks reduces loss of saleable product, eases the burden of costs associated with compliance, and the data collected will help target regulations that are effective at reducing VOC emissions without applying undo or unnecessary burden on the industry.
- In the winter of 2018, a joint venture with the Ute Tribe, EPA, BLM, and UDAQ utilized the USU Bingham Research Center to manage an aerial survey project. The project was to carry out an aerial infrared camera-based survey of leaks from a large percentage of the oil and gas facilities in the Basin. Oil and gas operators were engaged in the project and supplied information on any potential leaks identified via the aerial survey. The USU conducted a ground survey with an infrared camera on sites where the aerial survey was conducted to provide a comparison in results to the aerial survey. Analysis of the results and preparation of a final report is currently ongoing and should be available by the third quarter of 2018.

#### **IV. Emissions Inventory**

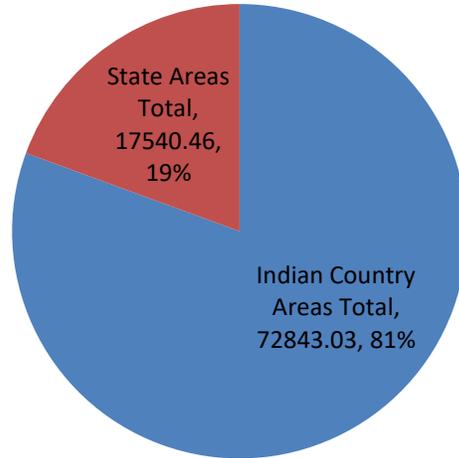
As the winter time ozone studies were developed and executed, it was determined that there was a need to develop a comprehensive and detailed oil and gas emissions inventory. For almost a decade, the 2006 Western Regional Air Partnership (WRAP) Phase III oil and gas emissions inventories were relied on for the Basin, the main oil and gas producing region in Utah. Although these inventories were projected forward using up-to-date annual production and drilling activity data from the region, the inventories still lacked the ability to capture the technological advancements that occurred over the period.

In 2013, UDAQ started working to develop an up-to-date and improved oil and gas emissions inventory for the Basin. This process involved the cooperation of various stakeholders, including operators from the Basin, Western Energy Alliance (WEA), Environmental Protection Agency (EPA), Bureau of Land Management (BLM), and the Ute Tribe. In 2015, an emissions inventory workbook and request for completion was sent to each operator in the Uinta Basin that was active in 2014. In 2016, the data was compiled into a 2014 Uinta Basin oil and gas emissions inventory database. In addition to the collected inventory, UDAQ has worked to determine and begin collecting supplemental data needed in addition to the collected inventory to create a truly comprehensive 2014 inventory, including additional equipment categories not addressed through the workbook request.

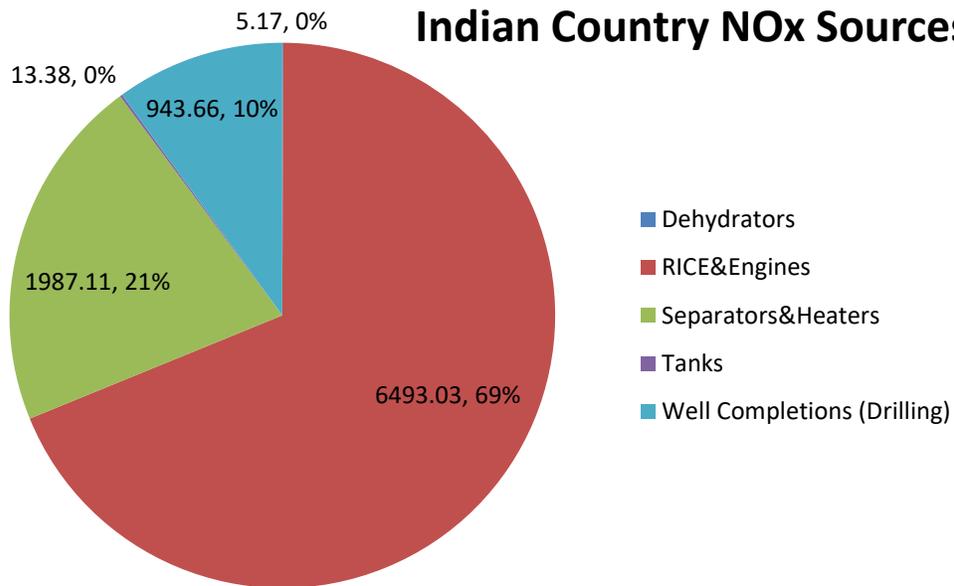
The results from the 2014 oil and gas emissions inventory for the combined jurisdictional areas of the Tribe and State lands for the ozone precursors of NO<sub>x</sub> and VOCs are as follows:

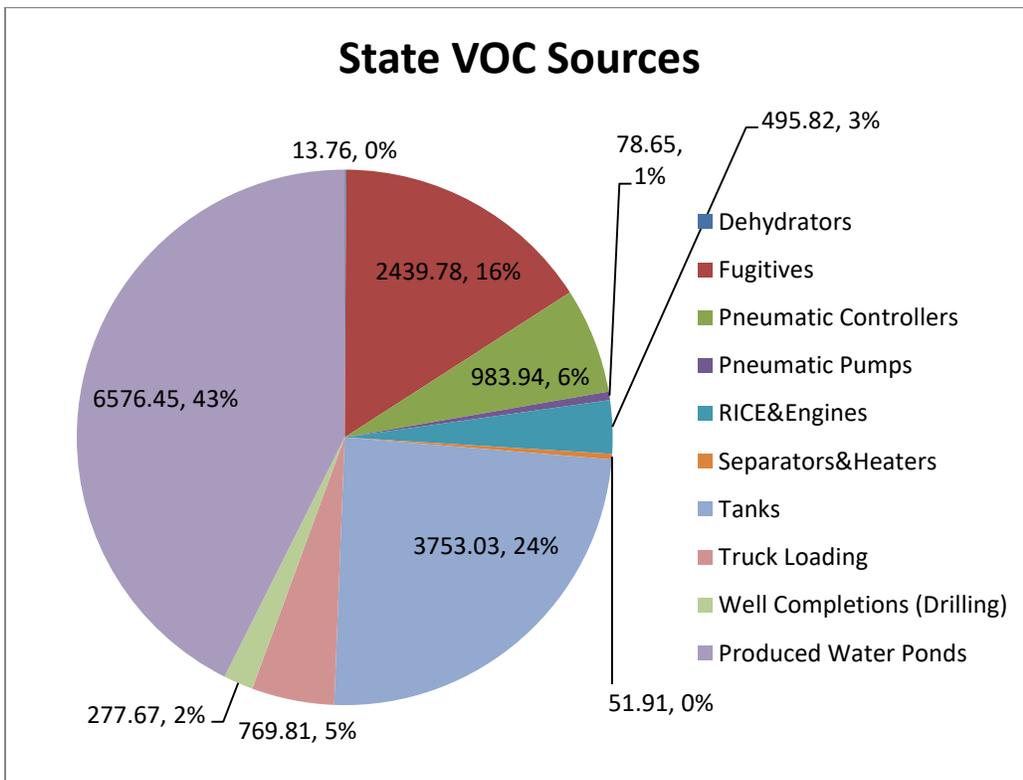
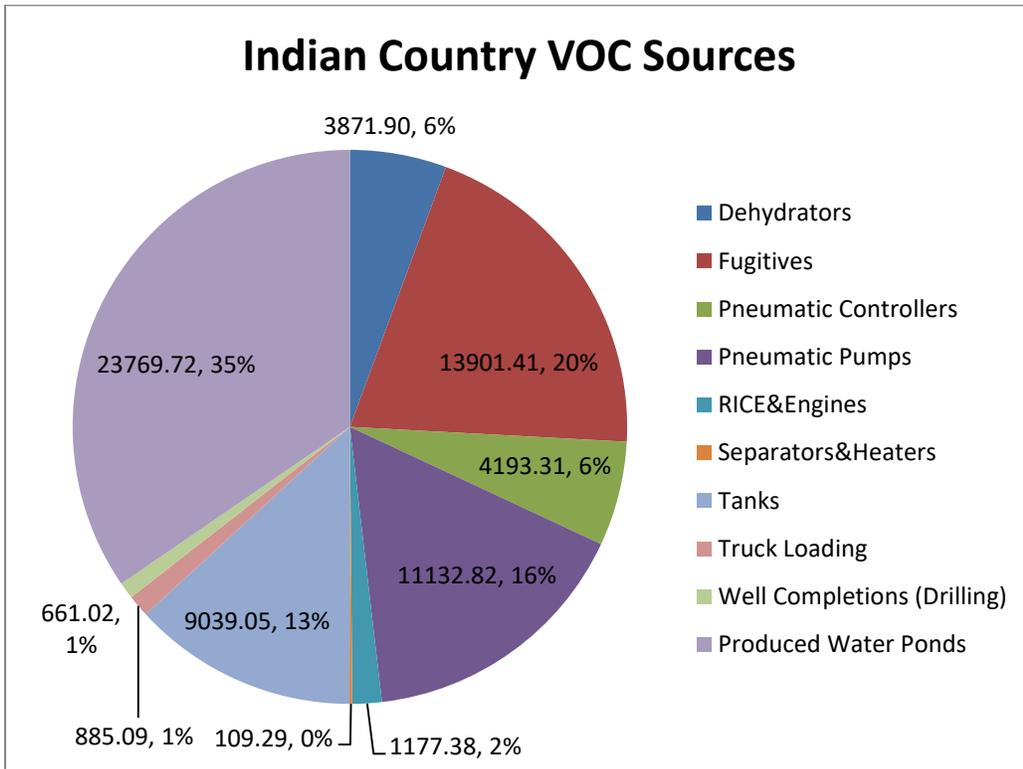


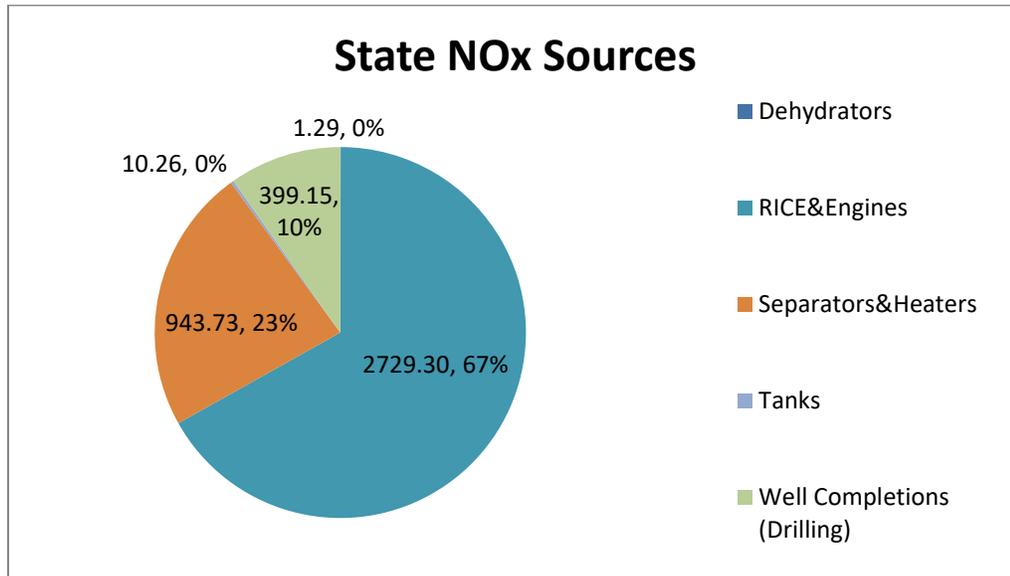
### VOC Jurisdiction Comparison



### Indian Country NOx Sources







Currently, the UDAQ is analyzing inventory data collected for 2017. For 2017, UDAQ was able to collect the data within Utah’s jurisdiction in accordance with a new state inventory rule, R307-150-9, that addresses oil and gas sources. This inventory should be able to be utilized to meet the Clean Air Act requirements for a marginal nonattainment area.

**V. New Federal and State Control Measures**

The Utah Air Quality Board adopted amendments to three existing rules and six new rules to support facilitated permitting and increased information requirements for oil and gas sources located on State lands. The rules were proposed in September of 2017, and were adopted in January of 2018. The rules were developed to improve the permitting, compliance, and emissions inventory processes for oil and gas sources. The rules were intended to increase efficiency while ensuring that air requirements are being met statewide. Included in the rule changes was a shift to a 'permit-by-rule' (PBR) approach for oil and gas well sites in lieu of issuing individual permits. These new rules incorporated the current Best Available Control Technology (BACT) requirements that are being applied to New Source Review (NSR) permits. BACT is required in both attainment and nonattainment areas. To be consistent with current permitting requirements, the PBR will apply statewide.

This approach benefits both staff and industry. The PBR eliminates several administrative steps in the permitting process. This saves sources the cost of obtaining a permit and reduces the time permit engineers spend on such permits. Compliance officers for UDAQ benefit from these rule changes as they will go from inspecting individualized permitted sites to a more general oversight of all sites that are subject to the same PBR requirements.

UDAQ worked with stakeholders from the regulated industries and environmental advocates for over a year to develop these rules. Stakeholders were provided versions of draft rules and were able to participate in stakeholder meetings to discuss rule revisions. Staff took time to understand

stakeholder concerns and issues and revised language in response to comments provided through the stakeholder process.

As part of the PBR approach, the new rules included a requirement that all oil and gas sources, existing and new, to register with the UDAQ. The registration rule is applicable statewide to ensure that the UDAQ has the information necessary to ensure that we are aware of the sources that are present and what equipment and controls they have. The UDAQ developed an online registration process for ease of entering, tracking, organizing and availability of this data for use. This addresses concerns regarding existence of de minimis sources and the appropriate application of the small source exemption. Additionally, all oil and gas sources with emissions greater than one ton per year are required to participate in the triennial emissions inventory. The emissions inventory will provide information that is necessary to continue to model air quality impacts and potential exceedances of the NAAQS.

In summary, these rule changes provided a streamlined permitting process for minor oil and gas sources. This process will be more efficient and productive for both operators and regulatory staff. As the rules represent current permitting BACT, there is no reduction to the protection of air quality in the State.

## **VI. Air Monitoring and Public Notification**

UDAQ operates several monitors in the Basin, and real-time data is available to the public. UDAQ has developed a smartphone app to provide real-time monitoring information to the public. Additionally, UDAQ has worked with the Ute Tribe and now includes tribal monitors in the Basin on the UDAQ website and the smart phone app. Therefore, forecasting and trending of monitoring data are available for the public to plan their activities to minimize the potential impacts to and from air pollution.

In 2017, the USU Bingham Research Center partnered with UDAQ to provide email alerts when ozone exceeding EPA standards is forecast for the Uintah Basin. The purpose of these alerts is to provide the oil and gas industry with real-time information about air quality in the Basin so they can take action to reduce emissions of ozone-forming pollutants. Any interested party can sign up on the USU Bingham Research Center webpage and they will receive the following alerts:

- Two days in advance of when moderate air quality is forecast (unless there is no snow on the ground, or unless you opt to only receive email if exceedance days are forecast),
- Two days in advance of when ozone exceedance days are forecast (unless there is no snow on the ground), and
- When an inversion episode ends (or if one was forecast but did not materialize).

## **VII. Future Emission Reduction Strategies**

As the Basin will be designated as a marginal nonattainment area effective August 3, 2018, there are certain regulatory actions that are required to be taken. The Basin will now be required to permit major sources under the nonattainment new source review requirements. Therefore, offsets for VOCs and NO<sub>x</sub> will be required for new or modified major sources at a ratio of 1.1 to 1.

Rules will be developed and proposed in late 2018 or early 2019 to implement this requirement. A periodic emissions inventory is also required, and the inventory work that is detailed in section IV of this report should meet this requirement.

As the Basin will have three years from the effective date of designation to reach attainment, the focus will be to ensure current applicable requirements are being met through the implementation of the registration of oil and gas sources, and verification that the current rules discussed in section V are being complied with. The registration requirement obligates oil and gas sources to re-evaluate course to determine if pollution controls are needed and allows UDAQ compliance inspectors to more broadly oversee oil and gas operations in the Basin. The majority of inspections performed prior to the new rules were at facilities that had obtained an operating permit. With the PBR approach where requirements have been standardized and all sources are required to register with UDAQ, inspectors have additional information that was not available previously to prioritize compliance inspections. Additionally, a compliance inspector is now physically located in the Basin, allowing increased time in the field for compliance support and oversight for oil and gas sources.

A composition study is currently being developed by UDAQ to be implemented in the Basin. The purpose of this study is to gather a statistically significant amount of oil and gas samples from the various geological formations in the Basin where the majority of oil and gas development and production occur. The robust sampling and analysis plan will provide data on the composition of the oil and gas produced in the Basin. This will provide improved speciation data to use in photochemical modeling and emissions inventory work associated with efforts to understand the formation of ozone in the Basin. The data collected could also potentially allow the development of site specific emission factors to be utilized to increase the accuracy of future emissions inventories. This work should be completed by the end of 2018.

### **VIII. Stakeholder Involvement**

EPA's Ozone Advance Guidance highlights the importance of stakeholder involvement in the development of emission reduction strategies. This is consistent with Utah's long-standing process to encourage stakeholder input when developing rules and state implementation plans. The majority of stakeholder outreach performed was to support the development of the amendments to current rules and new rules described in section V. This was a fairly intensive outreach program where all interested parties were met with and involved in the development of these rules. Approximately 18 months was spent in the development of these rules.

As the Basin has a fairly complex jurisdictional make up that can complicate air pollution regulation, it is vitally important that the tribe, EPA and state air agencies are in communication and work together on solutions for the current ozone exceedances that are occurring in the Basin. The UDAQ regularly meets with the Ute Indian Tribe's Air Quality Division and Region VIII EPA to ensure information gathered through scientific studies, permitting of sources and compliance inspections are shared. The ability to move the Uinta Basin back into attainment of the ozone standard will require the shared resources of these agencies and similar regulatory approaches for the reduction of emissions.

Additionally, the UDAQ regularly attends the Division of Oil, Gas and Mining's quarterly Collaborative Meetings which are held in Duchesne, Utah. These meetings allow the UDAQ to either formally present information on current air quality issues and concerns but also to have informal interactions with members of the oil and gas industry, local citizens, local government officials, and local elected officials.