



---

## **Final Report for 2016 Southern Ute Indian Tribe Emissions Inventory for Criteria Pollutants, Hazardous Air Pollutants, and Greenhouse Gases**

---

**Prepared by:**

Southern Ute Indian Tribe  
Environmental Programs Division  
Air Quality Program  
P.O. Box 737, MS# 84  
Ignacio, Colorado 81137  
(970) 563-4705

**Emission Inventory Report prepared by Matt Wampler, Air Quality Scientist**

**January, 2018**

# TABLE OF CONTENTS

Table of Contents .....	2
Table of Figures .....	3
List of Acronyms .....	5
I. Executive Summary .....	1
II. Overview .....	2
II.1 Purpose of Inventory .....	2
II.2 Geographic Location of southern Ute Indian Reservation .....	2
II.3 Climate .....	3
II.4 Geology .....	3
II.5 Sources .....	4
III. Data Quality Objectives .....	4
III.1 Accuracy .....	4
III.2 Uncertainty .....	4
III.3 Completeness .....	5
III.4 Comparability .....	5
IV. Point sources .....	5
IV.1 Title V Permitted Sources .....	5
IV.2 Permitted Tribal Minor New Source Review Point Sources .....	10
V. Quality Assurance Summary .....	17
V.1 Quality Assurance Checks .....	17
V.2 Criteria and HAP Pollutants .....	17
V.3 GHG .....	19
V.4 CY2016 Emission Summary .....	19
VI. Bibliography .....	22

## TABLE OF FIGURES

<i>Figure 1: Title V and permitted TMNSR sources located within the exterior boundaries of the Southern Ute Indian Reservation</i> .....	1
<i>Figure 2: 2016 Total Criteria Pollutant and Total HAP Emissions on the Southern Ute Indian Reservation [tpy]</i> .....	2
<i>Figure 3: 2016 Title V Source Criteria Pollutant and Total HAP on the Southern Ute Indian Reservation [tpy]</i> .....	6
<i>Figure 4: 2016 NO<sub>x</sub> Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	7
<i>Figure 5: 2016 VOC Emissions at Title V Sources on the southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	7
<i>Figure 6: CO Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	8
<i>Figure 7: 2016 Title V Source HAP Emissions on the Southen Ute Indian Reservation [tpy]</i> .....	9
<i>Figure 8: 2016 HAP Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	9
<i>Figure 9: 2016 Equipment Counts for Title V Sources on the Southern Ute Indian Reservation</i> .....	10
<i>Figure 10: 2016 Criteria Pollutant and HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]</i> .....	12
<i>Figure 11: 2016 NO<sub>x</sub> Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	13
<i>Figure 12: 2016 VOC Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	13
<i>Figure 13: 2016 CO Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	14
<i>Figure 14: 2016 Speciated HAP Emissions at permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]</i> .....	15
<i>Figure 15: 2016 Total HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]</i> .....	15
<i>Figure 16: 2016 Equipment Counts for permitted TMNSR Sources on the Southern Ute Indian Reservation</i> .....	16
<i>Figure 17: Comparison of Criteria Pollutants and Total HAP from CY2015 EI (grey) and CY 2016 EI (color) on the Southern Ute Indian Reservation</i> .....	18
<i>Figure 18: CY2015 (grey) and CY 2016 (color) Equipment Count Comparison of Title V and permitted TMNSR Sources</i> .....	18
<i>Figure 19: CY2015 (grey) and CY2016 (color) GHG Emissions Comparison of Title V and permitted TMNSR Sources [tpy]</i> .....	19
<i>Figure 20: 2016 Total Criteria Pollutant Emissions on the Southern Ute Indian Reservation [tpy]</i> .	20
<i>Figure 21: 2016 HAP Emissions from Title V and TMNSR Sources on the Southern Ute Indian Reservation [tpy]</i> .....	20
<i>Figure 22: Total Criteria Pollutant and HAP Emissions for Title V and permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]</i> .....	21

## LIST OF TABLES

<i>Table 1: 2016 Title V Source Criteria Pollutant, Total HAP and GHG Emissions for the Southern Ute Indian Reservation [tpy] .....</i>	<i>6</i>
<i>Table 2: 2016 Title V Sources HAP Emissions on the Southern Ute Indian Reservation [tpy].....</i>	<i>8</i>
<i>Table 3: 2016 Criteria Pollutant, HAP and GHG Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy] .....</i>	<i>12</i>
<i>Table 4: Speciated HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy].....</i>	<i>14</i>
<i>Table 5: 2016 Criteria Pollutants, HAP and GHG Emissions on the Southern Ute Indian Reservation [tpy].....</i>	<i>21</i>

## List of Acronyms

AP-42	EPA Compilation of Air Pollutant Emission Factors
AQP	Air Quality Program
CAA	Clean Air Act
CO	Carbon Monoxide
CO <sub>2e</sub>	Carbon Dioxide Equivalent
COGCC	Colorado Oil and Gas Conservation Commission
CY	Calendar Year
CFR	Code of Federal Regulations
EI	Emissions Inventory
EPA	United States Environmental Protection Agency
GHG	Greenhouse gas
HAP	Hazardous Air Pollutants
ICR	Information Collection Request
Kdf	Cretaceous Fruitland Formation
Kpcl	Cretaceous Picture Cliffs Sandstone
MSW	Municipal Solid Waste
NEI	National Emissions Inventory
NO <sub>x</sub>	Oxides of Nitrogen
PM <sub>10</sub>	Particulate Matter 10 microns and smaller
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
QA	Quality Assurance
SO <sub>2</sub>	Sulfur Dioxide
SUIT	Southern Ute Indian Tribe
TEISS	Tribal Emissions Inventory Software Solutions
TMNSR	Tribal Minor New Source Review Program
Tribe	Southern Ute Indian Tribe
tpy	Tons per Year
VOC	Volatile Organic Compounds

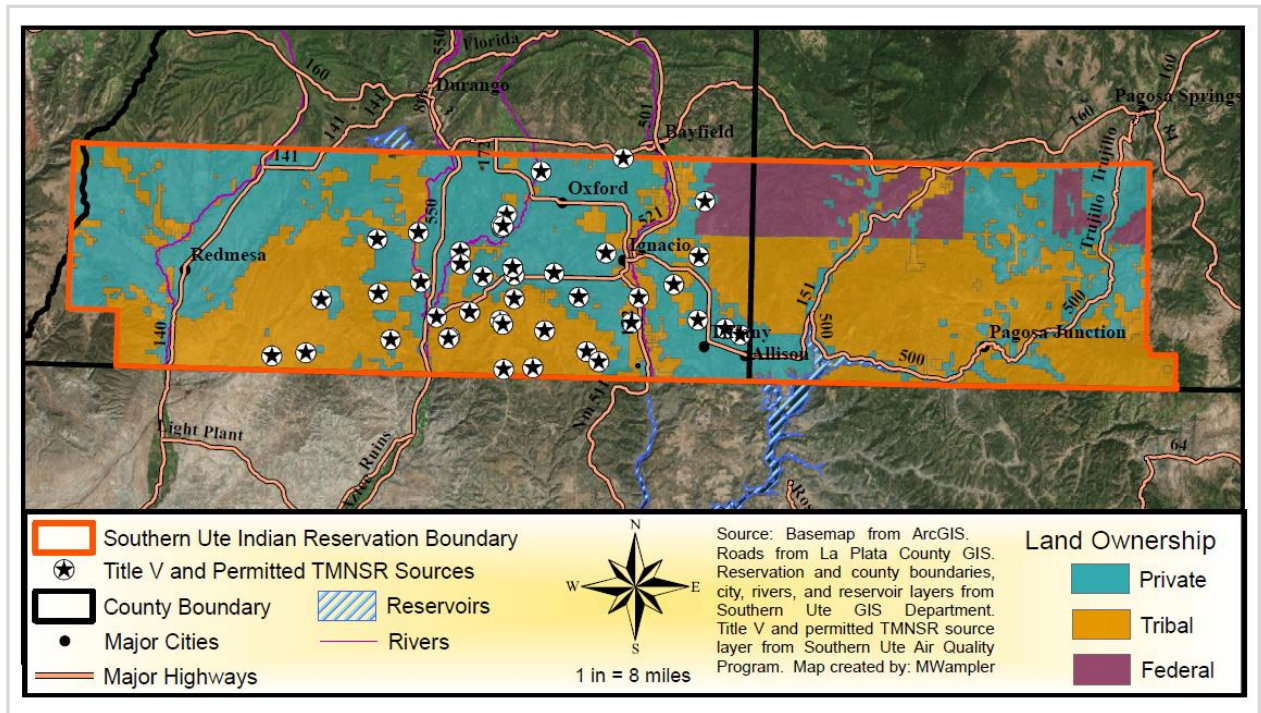
## I. EXECUTIVE SUMMARY

The Southern Ute Indian Tribe (Tribe) Air Quality Program (AQP) has prepared an emissions inventory (EI) of all Title V Operating Permit Program (Title V) and Synthetic Minor quantifiable point sources on the Southern Ute Indian Reservation (Reservation) for calendar year 2016 (CY2016). The EI was prepared with data from federal and tribal annual emission fee forms.

Oil and natural gas production is the predominant industry on the Reservation and emissions data for these sources were collected directly from source operators through annual emission inventories. Data for other sources were collected from various reputable local and federal data sources.

As of January 2017, there were a total of 37 sources operating under Title V operating permits and five sources operating as Synthetic Minor Sources under Tribal Minor New Source Review (TMNSR) permits. Figure 1 shows a map of the Southern Ute Indian Reservation with the Title V and permitted TMNSR Sources.

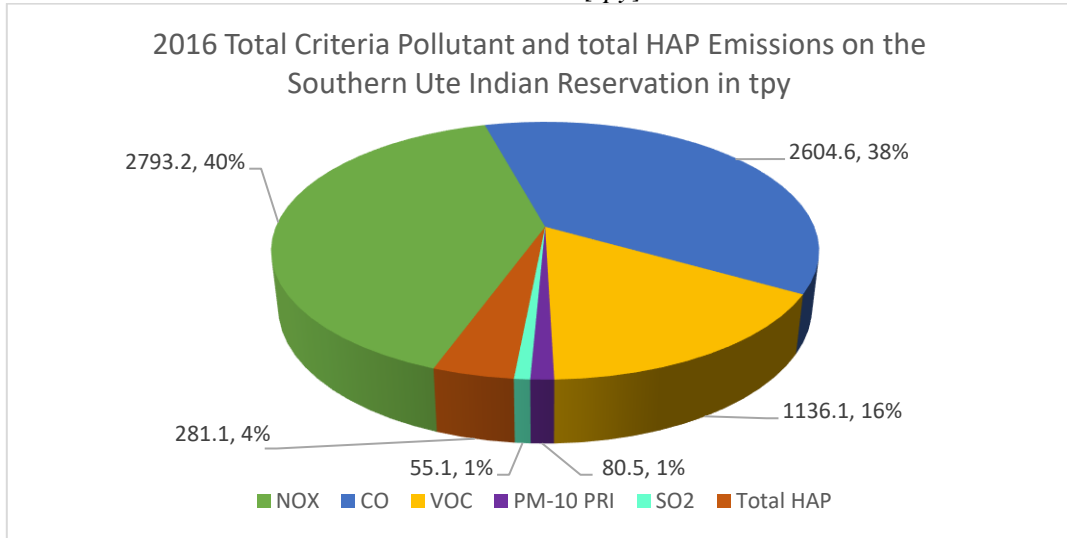
*Figure 1: Title V and permitted TMNSR sources located within the exterior boundaries of the Southern Ute Indian Reservation*



Reservation emission totals for CY2016 were 2,793.2 tpy of oxides of Nitrogen (NO<sub>x</sub>), 1,136.1 tpy of Volatile Organic Compounds (VOC), 55.1 tpy of Sulfur Dioxide (SO<sub>2</sub>), 80.5 tpy of Particulate Matter 10 micrometers or less in diameter (PM<sub>10</sub>), 2,604.6 tpy of Carbon

Monoxide (CO), 281.1 tpy of total Hazardous Air Pollutants (HAP), and 1,771,044 tpy of Greenhouse Gas (GHG) emissions measured in Carbon Dioxide Equivalents (CO<sub>2e</sub>). Total criteria pollutant and HAP emissions on the Reservation for 2016 are presented below in Figure 2.

Figure 2: 2016 Total Criteria Pollutant and Total HAP Emissions on the Southern Ute Indian Reservation [tpy]



## II. OVERVIEW

### II.1 Purpose of Inventory

The purpose of this EI was to update emissions from the Title V and TMNSR permitted sources for the 2016 calendar year. As required by the Clean Air Act (CAA) 103 work plan components 3.2 and 3.4, the AQP compiles and submits yearly EIs to EPA’s National Emission Inventory (NEI). The emissions data for the Reservation presented in this EI has been organized by pollutant and equipment type. The EI will be used for future air quality planning purposes, such as development of air quality regulations targeted at ozone precursors for maintaining attainment with the National Ambient Air Quality Standards, emissions modeling, and Title V permitting fee analysis.

The primary air pollutants included in this EI are NO<sub>x</sub>, CO, PM<sub>10</sub>, SO<sub>2</sub>, VOC, HAP and GHG.

### II.2 Geographic Location of southern Ute Indian Reservation

The Reservation is located in southwestern Colorado. The Reservation land area covers 1,064 square miles in three counties (La Plata, Archuleta, and Montezuma) and borders New Mexico

to the south.<sup>1</sup> The total area covered by this inventory is approximately 681,000 acres, which encompasses all land within the external boundaries of the Reservation. The Tribe and/or its members own approximately 320,000 acres, while the remaining land mass is comprised of non-Indian (private) and government land in a checkerboard fashion. The primary land use is agricultural and the predominant industry is oil and natural gas production.

### **II.3 Climate**

The Reservation remains generally semi-arid throughout the year. Located north of northern New Mexico desert land and south of the Colorado alpenes, the average temperature range during the winter months is between 20 and 40 degrees Fahrenheit. Freezing temperatures are common throughout the winter and during the 2016 calendar year the coldest month was December with a monthly average of 29.9 degrees Fahrenheit. January had the lowest temperature with -0.9 degrees Fahrenheit. During the summer months, the temperature typically remains in the high eighties to low nineties. The warmest month of 2016 was July with a monthly average of 72.8 degrees Fahrenheit. June had the highest temperature with 97.1 degrees Fahrenheit. Snow is the dominant form of precipitation on the Reservation and total precipitation for calendar year 2016 was 10.7 inches. The driest month was June with 0.01 inches of precipitation and the wettest month was February with 2.1 inches of precipitation.<sup>2</sup>

### **II.4 Geology**

The Reservation is situated in the northern portion of the San Juan Basin, a geologic structural basin underlying southwestern Colorado and northwestern New Mexico. The basin is composed of Cambrian to Holocene aged sedimentary rocks and contains one of the largest coal-bed methane natural gas fields in the world within the Cretaceous aged Fruitland Formation.<sup>3</sup> The majority of the natural gas production on the Reservation is coalbed methane from the Fruitland Formation, but conventional natural gas is also produced from Cretaceous aged sandstone reservoirs of the Pictured Cliffs Formation, Mesa Verde Group, and the

---

<sup>1</sup> Southern Ute Indian Tribe (2018). *History of the Southern Ute*. Retrieved from: <https://www.southernute-nsn.gov/history/>

<sup>2</sup> Southern Ute Indian Tribe: Ambient Monitoring. (2016). *2016 AQS Ute 3 Humidity and Temperature Hourly Data*. Retrieved from: <http://www.southernute-nsn.gov/environmental-programs/air-quality/ambient-monitoring/>

<sup>3</sup> Fasset, J. E., & Hinds, J. S. (1971). *Geology and Fuel Resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado*. Geological Survey Professional Paper 676. United States Government Printing Office. Retrieved from <https://pubs.usgs.gov/pp/0676/report.pdf>



Dakota Sandstone. Tight gas reservoirs of the Cretaceous aged Mancos Shale have also been drilled, however, no significant exploration and production has occurred within the Reservation as of 2016.

## **II.5 Sources**

The only sources included in this emissions inventory are larger point sources, either permitted under the Tribe's Title V Program or permitted through EPA's TMNSR Program.

## **III. DATA QUALITY OBJECTIVES**

Data objectives for this inventory are as follows:

### **III.1 Accuracy**

- Data for this EI were collected using measured data from reputable sources such as EPA and industry.
- Permitted facilities are required to submit an Annual Fee Calculation Worksheet to AQP. Emissions are calculated by the operator using calculation models and emission factors of their choice.
- Utilize emission calculation models when available (GRI-GLYCalc 4.0; Tanks 4.09d; AP-42, Fifth Edition; Caterpillar Engine Rating Pro 4.01.02; Waukesha Bulletin 7005 0710; Solar Turbines February 12, 2013 Predicted Emission Performance Emission Factors; etc.)
- Actual running times were used when available. If actual running times were not available, maximum running times (8,760 hours) were used.
- Quality Assurance tests are run through the Tribal Emission Inventory Software Solution (TEISS), version 3.6.26 and EPA's NEI.

### **III.2 Uncertainty**

- Reported emissions may be inaccurate.
- Some emissions may be reported as Potential to Emit (PTE) and may not represent actual emissions.
- If actual facility criteria and HAP emissions or PTE were not reported, previous calendar year emissions may be used.
- Not all facilities are required to submit GHG emissions. If GHG emissions were not reported for CY2016, GHG emissions were used from CY2015.

### **III.3 Completeness**

- Capture 100% of Title V point source emissions reported in the annual emission fees for CY2016.
- TMNSR permitted facilities are required to report CO and formaldehyde. Other criteria pollutants, HAPs, and GHG may be under reported.

### **III.4 Comparability**

- EI results will be compared with results from previous emission inventories.
- Emission factors and assumptions will be compared with methodologies used in similar emission calculation applications.

## **IV. POINT SOURCES**

### **IV.1 Title V Permitted Sources**

#### **Description of Sources**

37 Title V sources operated on the Reservation during CY2016. Sources include natural gas compressor stations, central delivery points, treating plants, processing plants, a salt water disposal facility, and a municipal solid waste disposal site.

Title V sources are defined as sources with the PTE 100 tpy of a single criteria pollutant, 25 tpy of HAP in aggregate, or ten tpy of an individual HAP. The Tribe has full delegation of a Title V Operating Permit Program under 40 CFR Part 70 and during calendar year 2016, 36 oil and gas sources operated under Tribally-issued Part 70 Title V permits. One source, a natural gas processing plant, operated under a Federally-issued Part 71 Title V permit issued by EPA Region 8.

#### **Data Collection**

Title V sources are required to report emissions annually and pay a per-ton emission fee for pollutants emitted. Emissions data for Title V sources were collected directly from the CY2016 fee calculation worksheets submitted by each source to the Tribe or EPA. Actual emissions data were available for all 37 Title V oil and gas sources. Two facilities did not report GHG emissions. The missing GHG emissions data for these sources were obtained from the 2015 Southern Ute Indian Tribe Comprehensive Emissions Inventory for Criteria Pollutants, Hazardous Air Pollutant, and Greenhouse Gases.<sup>4</sup>

---

<sup>4</sup> (2017). 170131 Comprehensive Emission Inventory Data Summary (2015) w charts - Excel

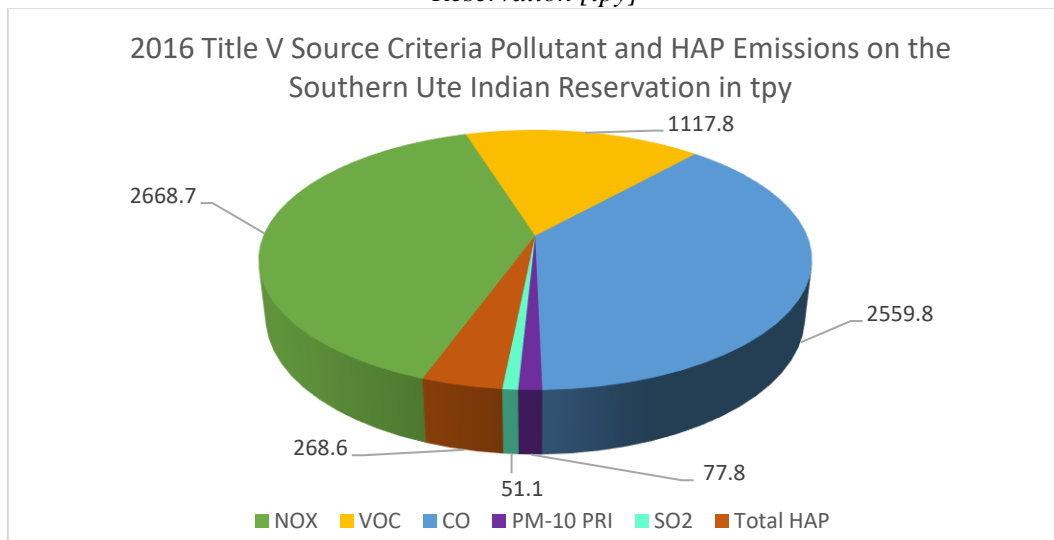
## Emissions

Total Criteria pollutant, Total HAP and GHG emissions from Title V sources for CY2016 are displayed below in Table 1 and Figure 3.

*Table 1: 2016 Title V Source Criteria Pollutant, Total HAP and GHG Emissions for the Southern Ute Indian Reservation [tpy]*

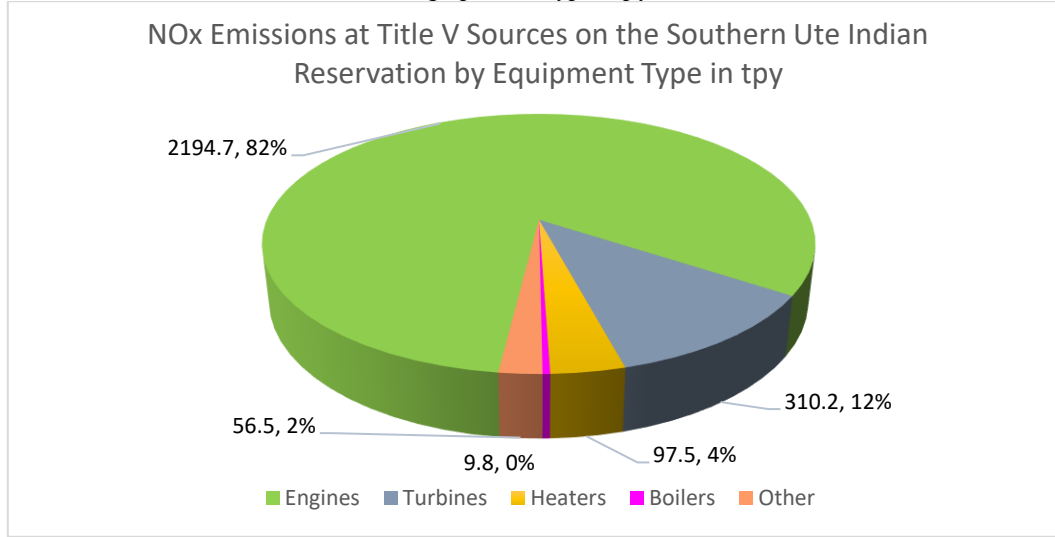
<b>Pollutant</b>	<b>NOx</b>	<b>CO</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>SO<sub>2</sub></b>	<b>Total HAP</b>	<b>CO<sub>2e</sub></b>
<b>Emissions</b>	2,668.7	2,559.8	1,117.8	77.8	51.1	268.7	1,658,675

*Figure 3: 2016 Title V Source Criteria Pollutant and Total HAP on the Southern Ute Indian Reservation [tpy]*



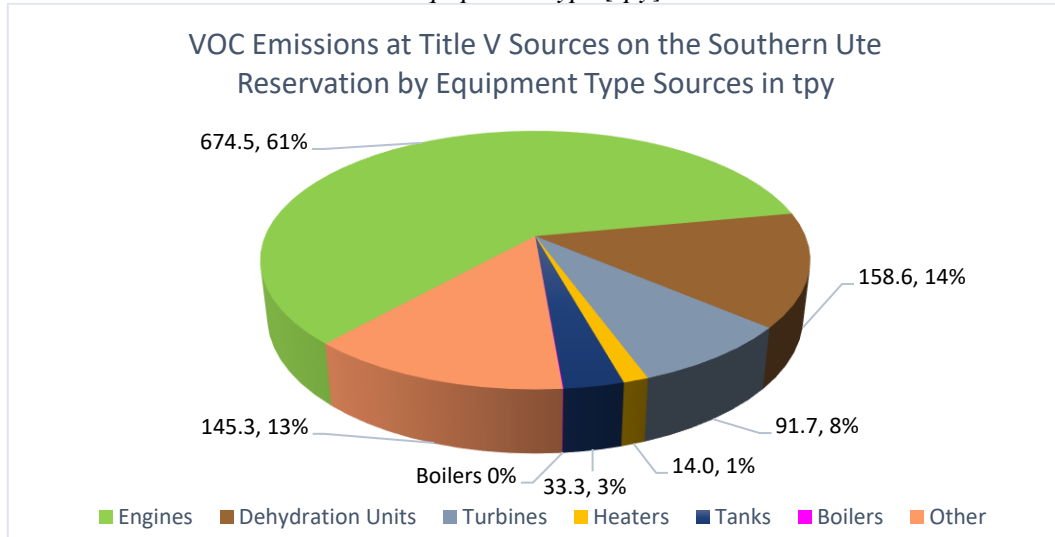
NOx emissions by equipment type at Title V sources for the 2016 calendar year are displayed below in Figure 4.

Figure 4: 2016 NOx Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]



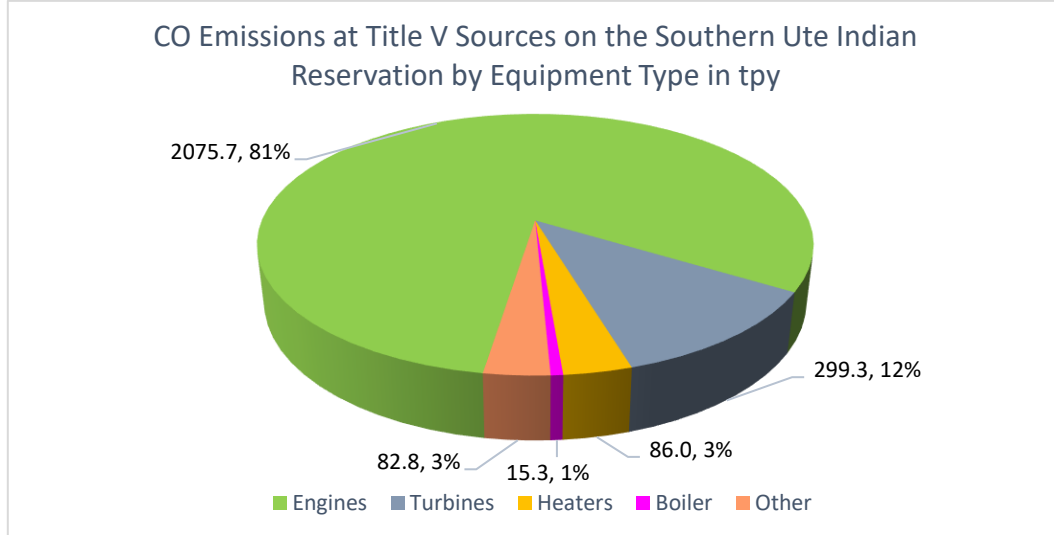
VOC emissions by equipment type at Title V sources for the 2016 calendar year are displayed below in Figure 5.

Figure 5: 2016 VOC Emissions at Title V Sources on the southern Ute Indian Reservation by Equipment Type [tpy]



CO emissions by equipment type at Title V sources for the 2016 calendar year are displayed below in Figure 6.

Figure 6: CO Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]

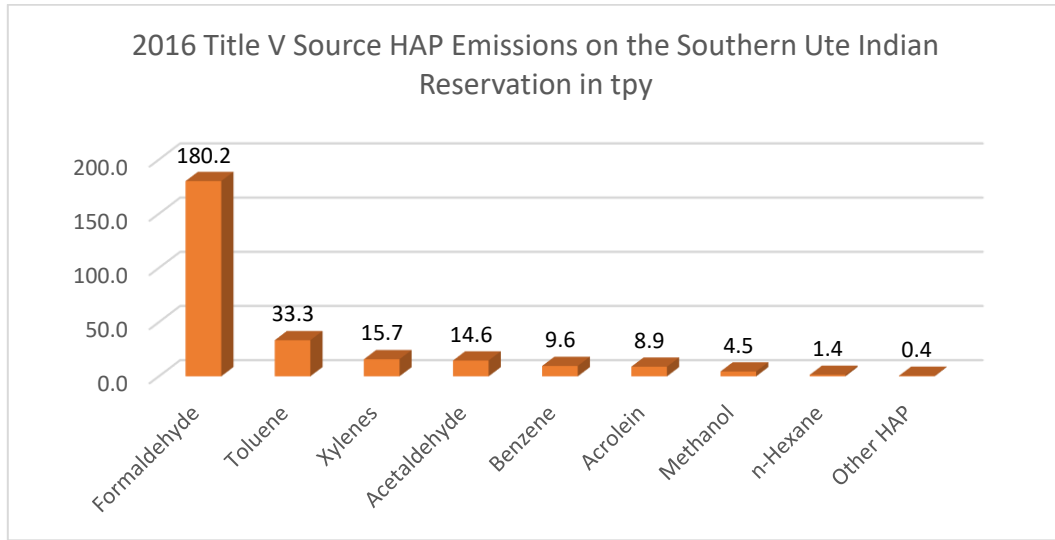


Total and speciated 2016 HAP emissions from Title V sources are displayed below in Table 2 and Figure 7.

Table 2: 2016 Title V Sources HAP Emissions on the Southern Ute Indian Reservation [tpy]

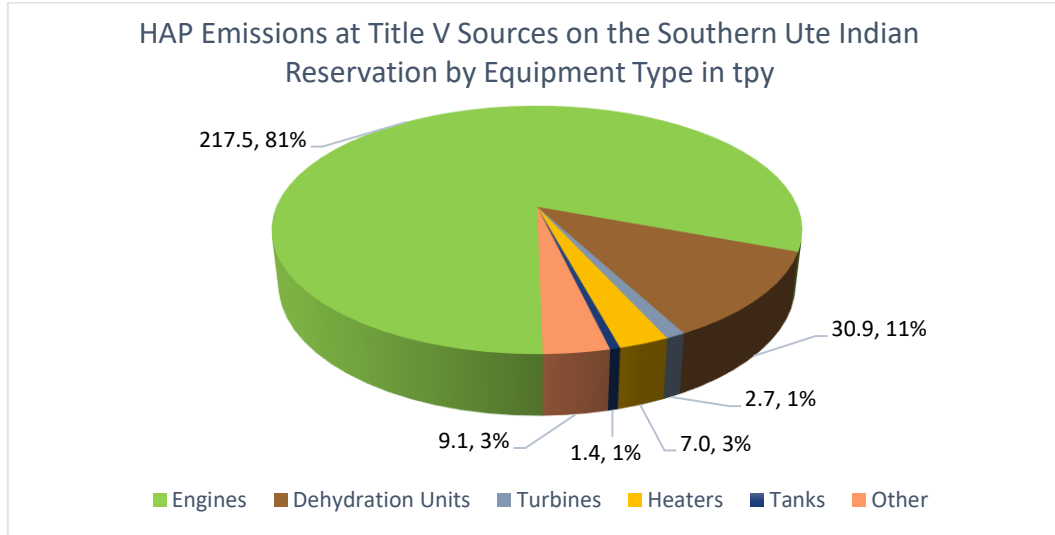
<b>Pollutant</b>	<b>Emissions [tpy]</b>
Formaldehyde	180.2
Toluene	33.3
Xylenes	15.7
Acetaldehyde	14.6
Benzene	9.6
Acrolein	8.9
Methanol	4.5
n-Hexane	1.4
Other HAP	0.4
<b>Total</b>	<b>286.6</b>

Figure 7: 2016 Title V Source HAP Emissions on the Southern Ute Indian Reservation [tpy]



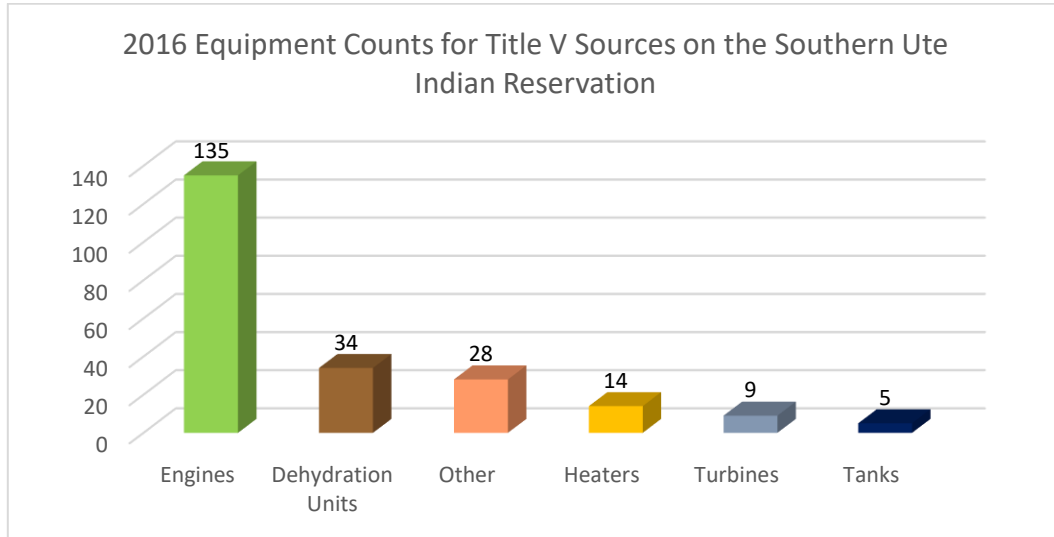
HAP emissions by equipment type at Title V sources for CY2016 are displayed below in Figure 8.

Figure 8: 2016 HAP Emissions at Title V Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]



Title V equipment counts for the CY2016 EI are displayed below in Figure 9.

Figure 9: 2016 Equipment Counts for Title V Sources on the Southern Ute Indian Reservation



### Summary

NO<sub>x</sub> emissions represent the largest portion of criteria pollutant emissions from Title V sources on the Reservation, with 41% of the total criteria pollutant emissions. CO emissions represent the second largest pollutant emission with 40% of the total criteria pollutant emissions. Title V sources reported emissions from 225 pieces of equipment, with engines representing the majority of the equipment type with 60%. Proportionally high engine counts correlate with NO<sub>x</sub> and CO emissions representing the majority of criteria pollutant emissions.

Formaldehyde emissions represent the largest portion of HAP emission from Title V sources on the Reservation with 67% of the total HAP emissions on the Reservation. As previously stated, engines are the primary equipment type at Title V sources. Engines emit 98% of the formaldehyde emissions.

### IV.2 Permitted Tribal Minor New Source Review Point Sources

The TMNSR Permitting Program is found at 40 CFR Part §49.151 through §49.164.<sup>5</sup> The TMNSR Permitting Program includes new or modified source permitting, permits by rule,

<sup>5</sup> 40 CFR Part 49 - Indian Country: Air Quality Planning and Management. (2016). U.S. Government Publishing Office. Retrieved from [http://www.ecfr.gov/cgi-bin/text-idx?SID=bc4187dbf0b08beb092efe4251fe4493&mc=true&tpl=/ecfrbrowse/Title40/40cfr49\\_main\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?SID=bc4187dbf0b08beb092efe4251fe4493&mc=true&tpl=/ecfrbrowse/Title40/40cfr49_main_02.tpl)

and a registration program. For the purposes of this inventory, only permitted TMNSR oil and natural gas sources have been included.

This category reflects larger emission sources that would be subject to either the Prevention of Significant Deterioration (PSD), Title V Program, or both programs absent enforceable emission limitations to reduce the source's PTE. These types of permits are often referred to as "Synthetic Minor Permits". To avoid the double counting of emissions for sources that have both a Title V and Synthetic Minor Permits, this inventory only includes emissions from sources that obtained Synthetic Minor Source permits to reduce emission levels below the Title V Program emission thresholds. Sources that have obtained Synthetic Minor Permits to reduce emission levels below PSD thresholds, but not below Title V operating Permit Program thresholds, have been included in the emission estimates for Title V permitted sources.

During calendar year 2016, twelve sources on the Reservation operated under TMNSR permits. Of the twelve sources in this category, eleven sources were natural gas compressor stations and one source was a natural gas processing plant. Five sources had permits to reduce emissions below Title V permitting thresholds and seven sources had permits to reduce emissions below the PSD permitting thresholds.

## **Data Collection**

Only the five sources with TMNSR permitted emissions below the Title V permitting thresholds were included in this category in order to avoid double counting emissions. Emissions from the remaining seven sources, which hold Title V operating permits issued by the Tribe, were already accounted for under the Title V Oil and Gas Sources category of this inventory.

TMNSR sources are required to submit annual emissions inventories to EPA Region 8 for the pollutants regulated under each permit. Emission data was collected directly from these annual emissions inventories submitted to EPA for calendar year 2016.<sup>6</sup> Two TMNSR permitted facilities reported only CO and formaldehyde emissions. One TMNSR permitted facility did not report NO<sub>x</sub> emissions for one engine, formaldehyde emissions for the other engine, and did not report VOC, PM<sub>10</sub> or SO<sub>2</sub> emissions for the facility. GHG emissions were not reported by the TMNSR permitted facilities. CY2015 GHG emissions were used. Therefore, the emission estimates for TMNSR permitted facilities in this inventory do not represent all criteria pollutant and HAP emissions from these sources.

## **Emissions**

Total 2016 criteria pollutant, HAP, and GHG emissions from permitted TMNSR sources on the Southern Ute Indian Reservation are presented below in Table 3.

---

<sup>6</sup> (2017). CY 2016 EPA TMNSR Fee Forms.

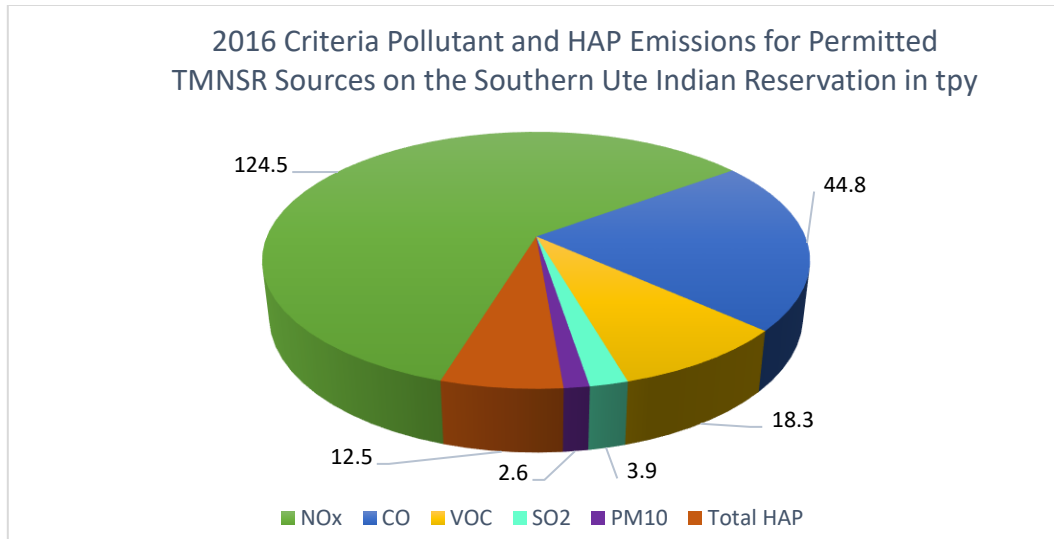


Table 3: 2016 Criteria Pollutant, HAP and GHG Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]

Pollutant	NOx	CO	VOC	PM <sub>10</sub>	SO <sub>2</sub>	Total HAP	CO <sub>2e</sub>
Emissions	124.5	44.8	18.3	2.6	3.9	12.5	112,369

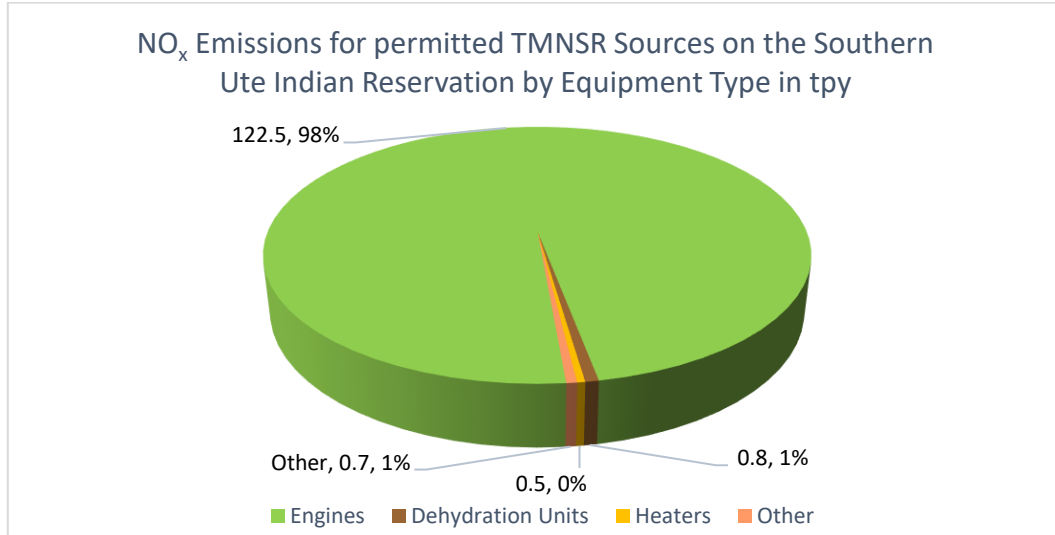
Total criteria pollutant and HAP emissions from permitted TMSNR sources on the Southern Ute Indian Reservation are presented below in Figure 10.

Figure 10: 2016 Criteria Pollutant and HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]



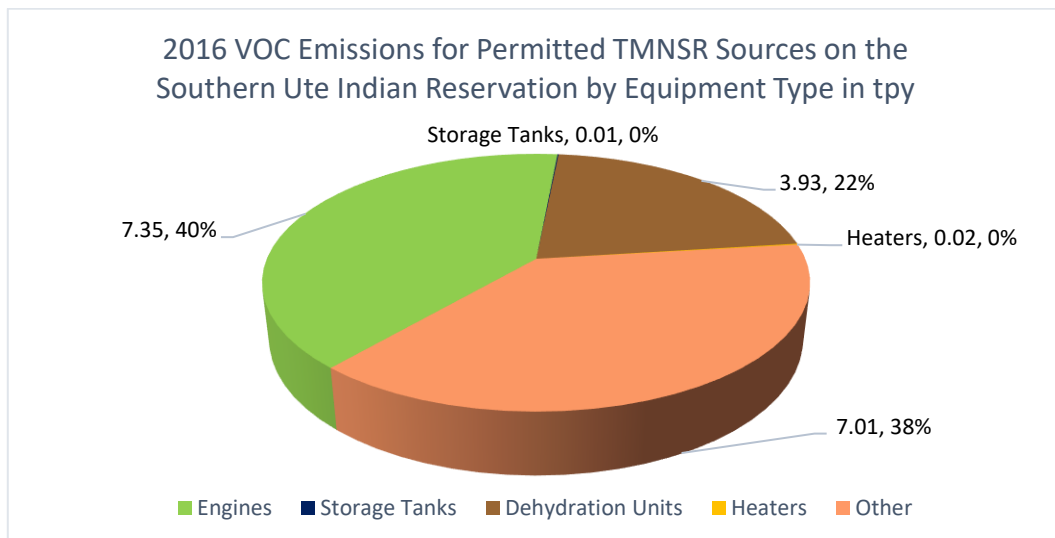
Total 2016 NO<sub>x</sub> emissions from permitted TMNSR sources on the Reservation are displayed below in Figure 11.

Figure 11: 2016 NO<sub>x</sub> Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]



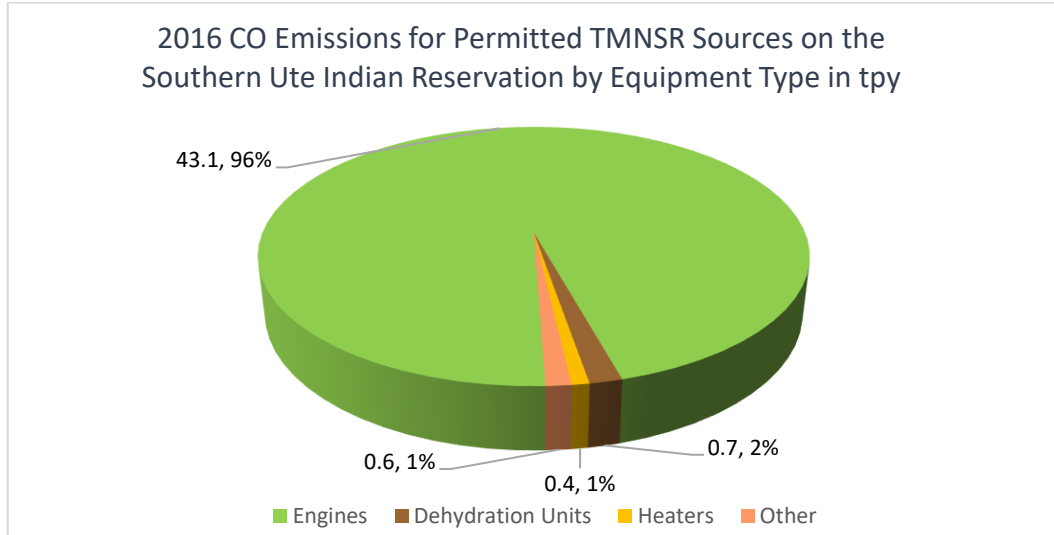
Total 2016 VOC emissions from permitted TMNSR sources on the Reservation are displayed below in Figure 12.

Figure 12: 2016 VOC Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]



Total 2016 CO emissions from permitted TMNSR sources on the Reservation are displayed below in Figure 13.

Figure 13: 2016 CO Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]

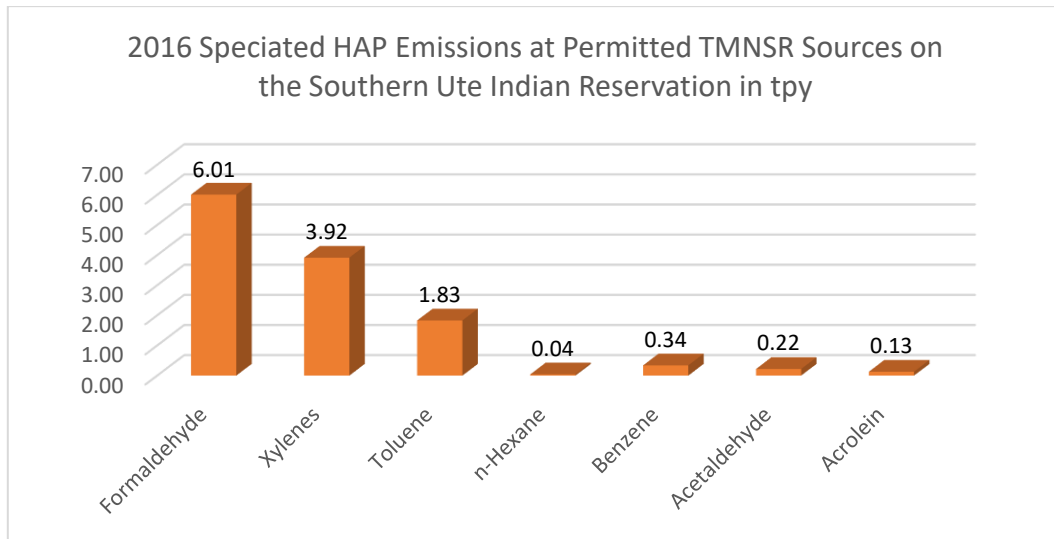


Total 2016 speciated HAP emissions from permitted TMNSR sources on the Reservation are displayed below in Table 4 and Figure 14.

Table 4: Speciated HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]

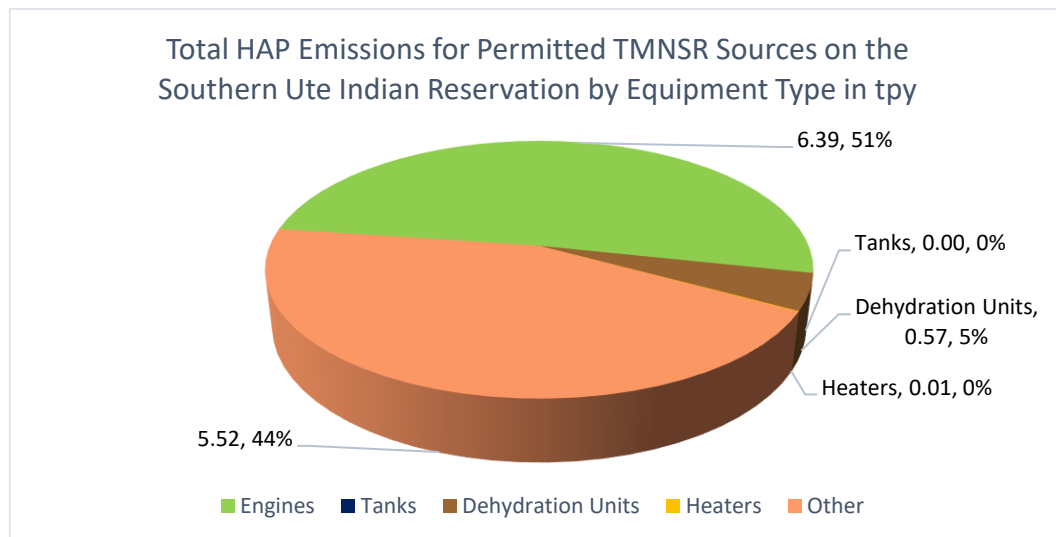
Pollutant	Emissions [tpy]
Formaldehyde	6.01
Xylenes	3.92
Toluenes	1.83
Benzene	0.34
Acetaldehyde	0.22
Acrolein	0.13
n-Hexane	0.04
<b>Total</b>	<b>12.49</b>

Figure 14: 2016 Speciated HAP Emissions at permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]



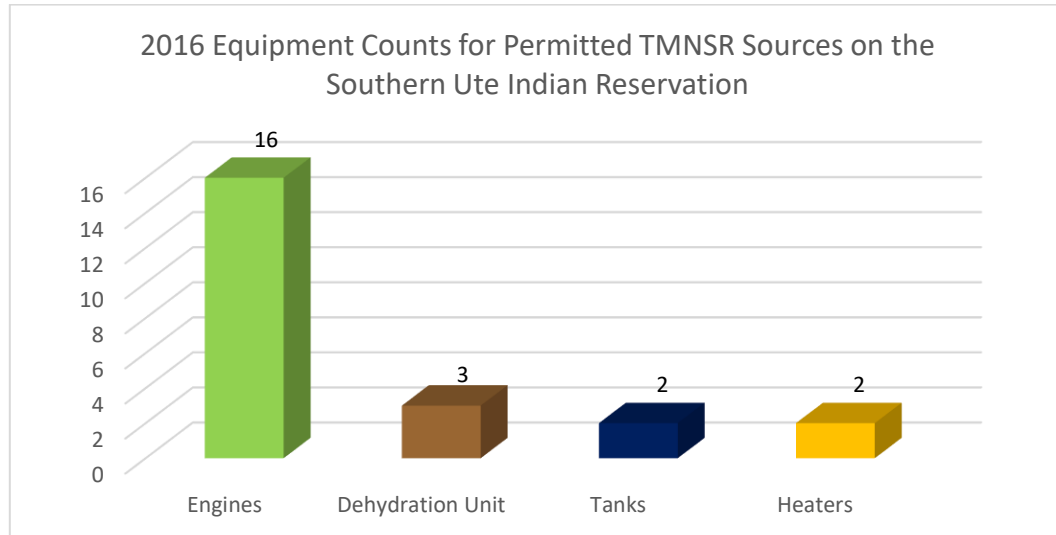
Total 2016 HAP emissions from permitted TMNSR sources on the Reservation are displayed below in Figure 15.

Figure 15: 2016 Total HAP Emissions for permitted TMNSR Sources on the Southern Ute Indian Reservation by Equipment Type [tpy]



Permitted TMNSR equipment counts for the CY2016 inventory are displayed below in Figure 16.

*Figure 16: 2016 Equipment Counts for permitted TMNSR Sources on the Southern Ute Indian Reservation*



### Summary

NO<sub>x</sub> emissions represent the largest portion of criteria pollutant emissions from permitted TMNSR sources on the Reservation with 60% of the total criteria pollutant emissions. CO emissions represent the second largest pollutant emission with 22% of the total criteria pollutant emissions. Permitted TMNSR sources reported emissions from 23 pieces of equipment from four different categories with engines being the most commonly reported equipment type. Engines represented 70% of the total equipment reported. Proportionally high engine counts correlate with NO<sub>x</sub> and CO emissions representing the majority of criteria pollutant emissions.

Formaldehyde emissions represent the largest portion of HAP emission from permitted TMNSR sources on the Reservation with 48% of the total HAP emissions on the Reservation. As previously stated, engines are the primary equipment type at permitted TMNSR sources. Engines account for 100% of the formaldehyde emissions in this source category

## **V. QUALITY ASSURANCE SUMMARY**

### **V.1 Quality Assurance Checks**

Quality assurance (QA) checks were run through TEISS and through NEI. TEISS QA checks ensures the EI data contains all required components to submit to NEI. This includes facility, release point, emission unit, emission process, release point apportionment, reporting periods, and emissions. The CY2016 EI passed TEISS QA checks.

NEI completes QA checks prior to submitting data for production. NEI QA categorizes the data into “Total System Errors,” Total Critical Errors,” Total Protected Errors,” “Total Warnings,” and “Total Duplicates.” The facility inventory passed all QA except for “Total Protected Errors.” The protected errors pertain to facility coordinates and cannot be changed without EPA authorization. These errors do not affect emission data.

Point inventory QA checks contained six identical “warnings” for three facilities and six different pollutants. The warning is “Total emissions should be less than the outlier maximum.” Emissions from the three facilities were rechecked and emission calculations verified; emissions were left as reported.

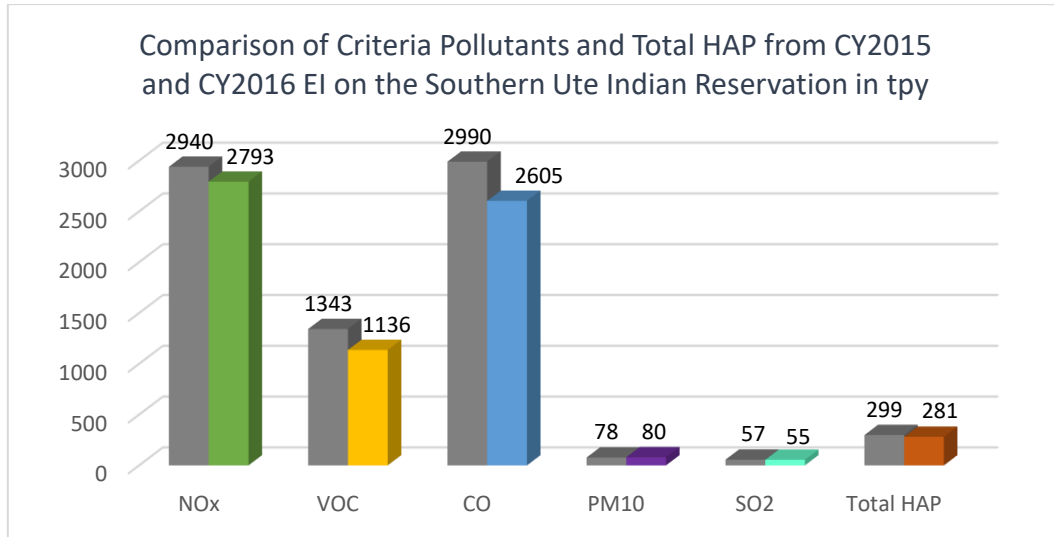
EPA performed QA comparisons on the CY2016 emission inventory. Emissions were compared to the finalized 2014 NEI v2 and flagged if reported tpy were less than or greater than 25% of the 2014 NEI v2 amount. No emissions from the CY2016 emission inventory were flagged.

### **V.2 Criteria and HAP Pollutants**

Emissions from the CY2015 EI were compared to the CY2016 EI to ensure accuracy and identify possible inaccuracies. There was consistency between the years with no greater than 15% difference between each criteria pollutant and Total HAP. NO<sub>x</sub> and CO were the greatest emitted pollutants.

Comparison of criteria pollutants and total HAP from CY2015 and CY2016 are displayed below in Figure 17.

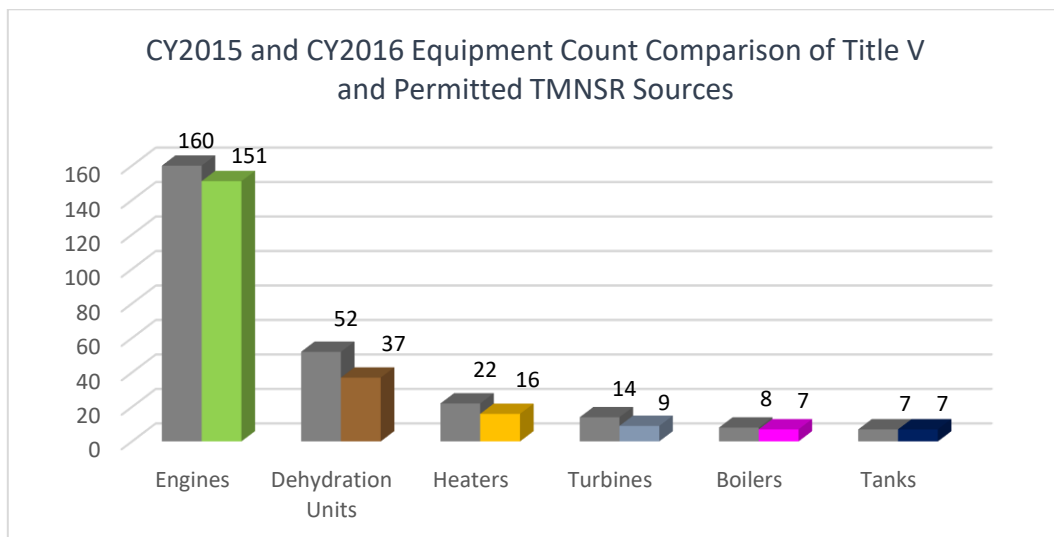
Figure 17: Comparison of Criteria Pollutants and Total HAP from CY2015 EI (grey) and CY 2016 EI (color) on the Southern Ute Indian Reservation



AQP compared equipment counts from the CY2015 EI and the CY2016 EI for Title V and permitted TMNSR sources. Equipment counts were consistently lower in CY2016 than in CY2015. The CY2015 inventory was comprehensive and included insignificant emission sources equipment operators are not normally required to report emissions from.

Comparison of Title V and permitted TMNSR source equipment counts from the CY2015 and CY2016 is displayed below in Figure 18.

Figure 18: CY2015 (grey) and CY 2016 (color) Equipment Count Comparison of Title V and permitted TMNSR Sources



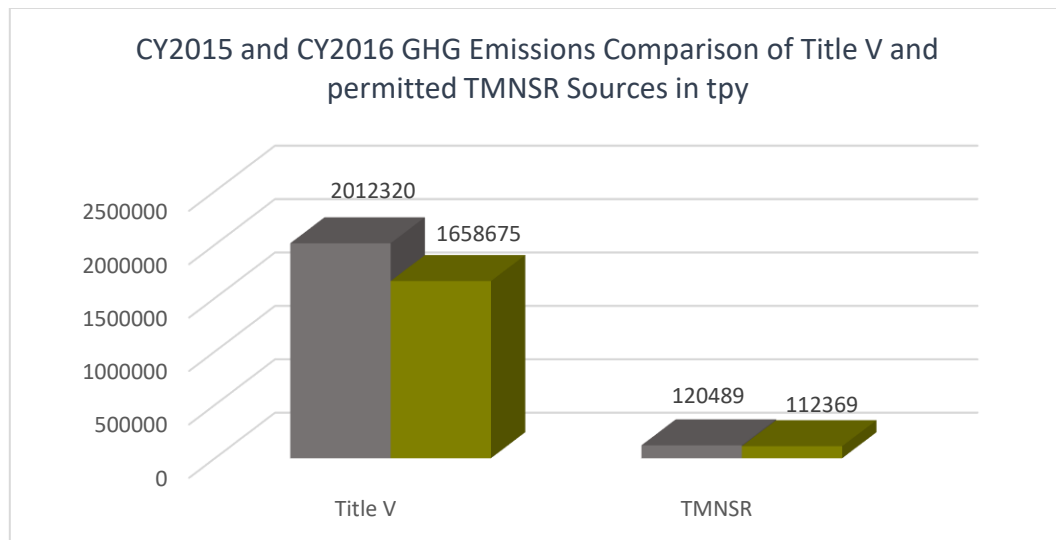
### V.3 GHG

Total GHG Emissions from Title V Sources from CY2015 were compared to CY2016 to ensure accuracy and identify possible inaccuracies. The reduction of 353,645 tpy or 18% of GHG emissions can be accounted for with a difference in activity in the oil and natural gas sector.

Permitted TMNSR Sources do not report GHG emissions for emission fee calculation to the EPA. Therefore CY2016 GHG data for permitted TMNSR sources is not available. CY2015 GHG emissions data for permitted TMNSR sources is used in this report.

One permitted TMNSR facility reduced activity to attain synthetic minor status. AQP used reduced activity emissions for GHG emissions calculations in 2016 EI. This factor accounts for a 7% reduction of GHG emissions for permitted TMNSR. Figure 19 illustrates GHG emissions of Title V and permitted TMNSR Sources for calendar years 2015 and 2016.

Figure 19: CY2015 (grey) and CY2016 (color) GHG Emissions Comparison of Title V and permitted TMNSR Sources [tpy]

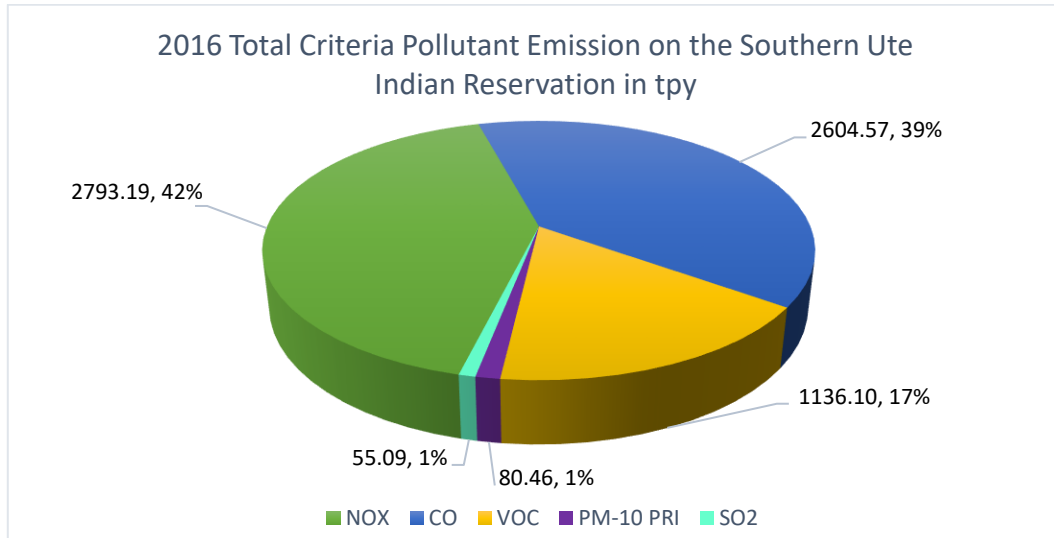


### V.4 CY2016 Emission Summary

NO<sub>x</sub> accounts for 2,793 tpy, or 42%, of the 6,669 tpy of criteria pollutants emitted from Title V and permitted TMNSR sources within the exterior boundaries of the Reservation during 2016. CO emissions at 2,605 tpy represents 39% of emissions and VOC represents 17% as represented in Figure 20.

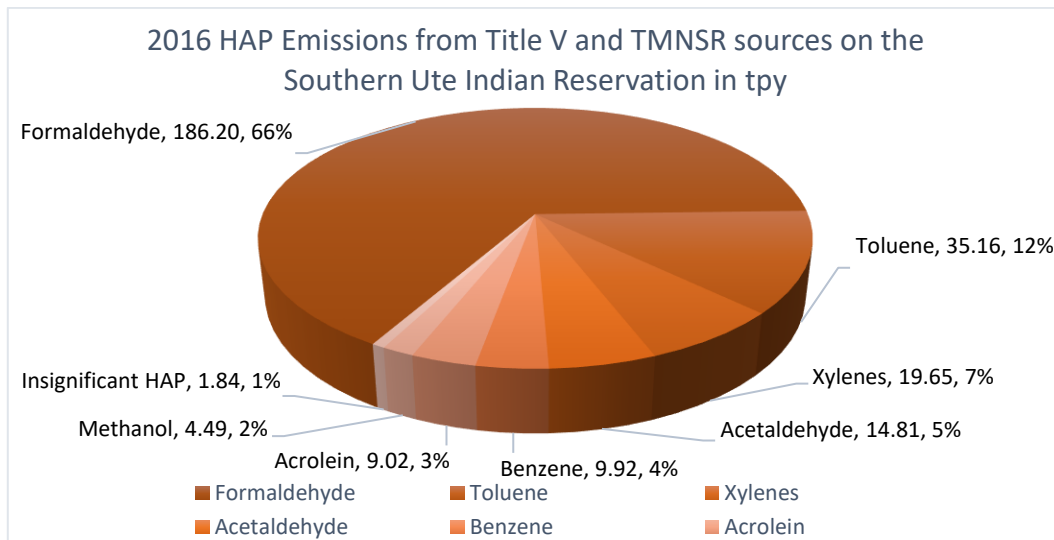


Figure 20: 2016 Total Criteria Pollutant Emissions on the Southern Ute Indian Reservation [tpy]



Formaldehyde represents 186.2 tpy, or 66%, of the 281.1 tpy of HAPs emitted from the Title V and permitted TMNSR sources within the exterior boundaries of the Reservation in 2016. Toluene emissions at 35 tpy represents 13%; Xylenes emissions at 19.7 tons represents 7%; Acetaldehyde emissions at 14.8 tpy represents 5%; Benzene emissions at 9.9 tpy represents 4%, Acrolein emissions at 9.0 tpy represents 3%; and Methanol emissions at 4.5 tons represents 2% as seen in Figure 24. The remaining 1.8 tpy, or 1% of HAP represent insignificant emissions from 22 HAPs as illustrated in Figure 21.

Figure 21: 2016 HAP Emissions from Title V and TMNSR Sources on the Southern Ute Indian Reservation [tpy]



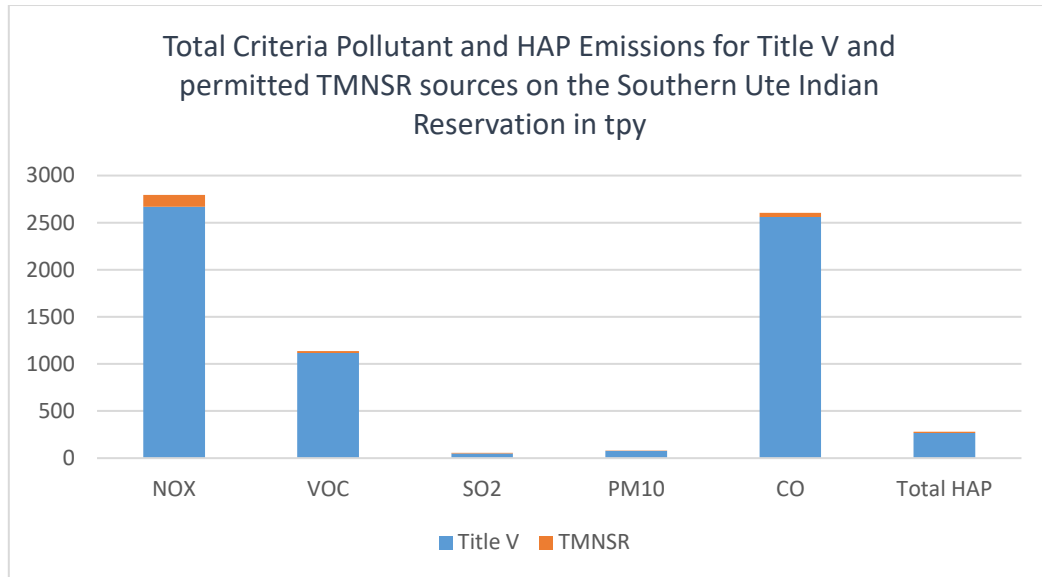
Registered TMNSR account for 7.1% of the 55 tpy SO<sub>2</sub>, 4.5% of the 2793.7 tpy NO<sub>x</sub>, 4.4% of the 281.2 tpy Total HAP, 3.2 % of the 80.4 tpy PM<sub>10</sub>, 1.7% of the 2604.6 tpy CO and 1.6% of the 1117.8 tpy VOC of the emissions from Title V and permitted TMNSR sources on the Reservation.

Permitted TMNSR sources account for 3% of the total criteria pollutant and HAP emissions and 6.3% of the GHG emissions from Title V and permitted TMNSR sources on the Reservation. Table 5 and Figure 21 illustrate emissions from and Title V and permitted TMNSR sources on the Reservation.

Table 5: 2016 Criteria Pollutants, HAP and GHG Emissions on the Southern Ute Indian Reservation [tpy]

Source Category	NO <sub>x</sub>	VOC	SO <sub>2</sub>	PM <sub>10</sub>	CO	Total HAP	GHG (CO <sub>2</sub> e)
Title V	2,668.7	1,117.8	51.1	77.8	2,559.8	268.7	1,658,675
TMNSR	124.5	18.3	3.9	2.6	44.8	12.5	112,369
Total	2793.2	1136.1	55	80.4	2604.6	281.2	1,771,044

Figure 22: Total Criteria Pollutant and HAP Emissions for Title V and permitted TMNSR Sources on the Southern Ute Indian Reservation [tpy]



## VI. BIBLIOGRAPHY

- 40 CFR Part 49 - Indian Country: Air Quality Planning and Management. (2016). U.S. Government Publishing Office. Retrieved from [http://www.ecfr.gov/cgi-bin/text-idx?SID=bc4187dbf0b08beb092efe4251fe4493&mc=true&tpl=/ecfrbrowse/Title40/40cfr49\\_main\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?SID=bc4187dbf0b08beb092efe4251fe4493&mc=true&tpl=/ecfrbrowse/Title40/40cfr49_main_02.tpl).
- (2017). *CY 2016 EPA Part 71 Fee Forms*.
- (2017). *CY 2016 EPA TMNSR Fee Forms*.
- Fasset, J. E., & Hinds, J. S. (1971). Geology and Fuel Resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado. *Geological Survey Professional Paper 676*. United States Government Printing Office. Retrieved from <https://pubs.usgs.gov/pp/0676/report.pdf>
- Gas Research Institute. (2000). GLYCalc Version 4.0. Retrieved from <http://sales.gastechnology.org/000102.html>
- Institute for Tribal Environmental Professionals. (2016). Tribal Emissions Inventory Software Solution Version 3.6.26. Retrieved from [http://www7.nau.edu/itep/main/air/air\\_aqt\\_teiss](http://www7.nau.edu/itep/main/air/air_aqt_teiss).
- Southern Ute Indian Tribe. (2016). *Information Collection Request*.
- (2016). *Southern Ute Indian Tribe Calendar Year 2015 Part 70 FEE Forms*.
- Southern Ute Indian Tribe: Ambient Monitoring. (2016). *2015 AQS Ute 3 Temp Hourly Data*. Retrieved from <http://www.southernute-nsn.gov/environmental-programs/air-quality/ambient-monitoring/>
- Southern Ute Indian Tribe: Ambient Monitoring. (2017). *2016 AQS Ute 3 Humidity Hourly Data*. Retrieved from <http://www.southernute-nsn.gov/environmental-programs/air-quality/ambient-monitoring/>
- U.S. Environmental Protection Agency. (2016). *AP-42: Compilation of Air Emission Factors*. Retrieved from <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors>
- U.S. EPA - Landfill Gas Emissions Model. (2016). Retrieved from <https://www.epa.gov/catc/clean-air-technology-center-products#software>.
- U.S. EPA. (1995). Glycol Dehydrator Emissions Test Report and Emissions Estimation Methodology. Retrieved from <https://www3.epa.gov/ttn/chief/old/efddocs/glycoldehydratortestreport.pdf>

U.S. EPA. (2006). TANKS 4.09d Emissions Estimation Software. Retrieved from <https://www3.epa.gov/ttnchie1/software/tanks>