SOUTHERN UTE INDIAN TRIBE
AIR QUALITY PROGRAM
ANNUAL NETWORK REVIEW
2019

Prepared For:
United States Environmental Protection Agency
Region VIII
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2019 Network Review
Air Monitoring Program
Southern Ute Indian Tribe
February 20, 2020

1.0 Introduction

The purpose of this document is to provide information concerning the operation of the ambient air monitoring network by the Southern Ute Indian Tribe's (SUIT) Air Quality Program (AQP) in Fiscal Year 2019 which covers the period from October 1, 2018 through September 30, 2019.

In October 2006, US EPA issued final regulations concerning state and local agency ambient air monitoring networks. These regulations require states to submit an annual monitoring network review to USEPA. This network plan is required to provide the framework for establishment and maintenance of an air quality surveillance system and to list any changes that are proposed to take place to the current network during the 2019 Fiscal Year. Under 40 CFR, Part 58, Subpart B, states and applicable tribes are required to submit an annual monitoring network review to the Environmental Protection Agency (EPA) regional office. This network review is required to provide the framework for establishment and maintenance of an air quality surveillance system. The annual monitoring network review must be made available for public inspection for at least 30 days prior to submission to EPA.

1.1 Overview

Located in southwestern Colorado, the SUIT AQP regulates air quality to protect public health and the environment in the Southern Ute Indian Reservation. Air monitoring data are required by regulation and are used to determine compliance with U.S. EPA's National Ambient Air Quality Standards (NAAQS). Other important uses of the air monitoring data include the production of a daily Air Quality Index (AQI), daily air quality forecast report, support of short and long-term health risk assessments, identification of localized health concerns and tracking long-term trends in air quality.

1.2 Personnel

In 2019, all air quality monitoring activities were conducted by the Tribe's Environmental Programs Division – Air Quality Program staff. Mr. Danny Powers, the Air Quality Program Manager, directs and provides managerial direction to the program. Mr. Christopher Franco, the Air Quality Analyst, provides technical direction and verifies data quality; and Ms. Naomi Begay implements the day-to-day activities of the program as the Air Quality Technician.

1.3 Overview of Monitored Parameters – Criteria Pollutants

Nitrogen Dioxide (NO_2)

NO_2 is a highly toxic, reddish brown gas that is created primarily from fuel combustion in industrial sources and vehicles. It creates an odorous haze that causes eye and sinus irritation, blocks natural sunlight, and reduces visibility. Along with NO it forms the oxides of nitrogen family (NOx), which is one of the primary pollutants responsible for the formation of surface level ozone.

Carbon Monoxide (CO)
CO is a colorless, odorless, and tasteless gas that is created primarily from incomplete fuel combustion and plays a small role in the formation of ground-level ozone. It is toxic to humans and animals as it attaches to hemoglobin in red blood cells that normally carries oxygen. Exposure to low concentrations of CO can result in headaches, nausea, confusion, disorientation, syncope (fainting), and seizures.

Ozone (O_3)
Ground-level O_3, also known as photochemical smog is not emitted into the atmosphere as ozone, but rather is formed by the reactions of other pollutants. The primary pollutants entering this reaction, VOC's and oxides of nitrogen, create ozone in the presence of sunlight. Ozone is a strong irritant of the upper respiratory system and causes damage to crops.

Sulfur Dioxide (SO_2)
SO_2 is a gaseous pollutant that is emitted primarily by industrial furnaces or power plants burning coal or oil containing sulfur. At high concentrations, breathing can be impaired and damage to vegetation can also result.

Fine Particulate Matter ($PM_{2.5}$)
Fine particulate matter with a diameter of 2.5 microns or less is created primarily from industrial processes and fuel combustion. These particles are breathed deep into the lungs. Exposure to particle pollution is linked to a variety of significant health problems ranging from aggravated asthma to premature death in people with heart and lung disease.

Particulate Matter (PM_{10})
Particulate matter with a mean diameter of 10 microns or less is emitted from transportation and industrial sources. Diesel fuel exhaust, dust storms, and fires generate a significant number of particulates. Exposure to particle pollution is linked to a variety of significant health problems ranging from aggravated asthma to premature death in people with heart and lung disease.

Methane (CH_4) and Non-Methane Hydrocarbons
Although it is not considered a criteria pollutant by the EPA's NAAQS, methane is of significant concern to the SUIT's air quality program. Due to the nature of the oil and gas industry within the region, higher-than-average concentrations of methane within the tribal boundaries is a possibility and is therefore monitored to establish trends with the industry's production. Methane and other non-methane hydrocarbons are some of the primary pollutants leading to the generation of ozone.

Figure . Air Monitoring Stations within SUIT boundaries.

2.0 Monitoring Objectives

The monitoring program has been designed to respond to the needs of the Reservation, while adhering to strict EPA specifications and regulations. Monitoring is conducted to:

- Determine if criteria pollutants of interest are compliant with the National Ambient Air Quality Standards.
- Maintain extremely reliable continuous ambient air monitoring network, and/or conduct special studies that meet the requirements of the Code of Federal Regulations, particularly, but not limited, to appendix A in 40 CFR Part 58.
- Protect the health and welfare of all residents within the exterior boundaries of the Southern Ute Indian Reservation.
- Identification of localized health concerns and tracking long-term trends in air quality.

Although the reservation does not meet the requirement of a Metropolitan Statistical Area with a population greater than 350,000 in 40 CFR Part 58.50 AQI requirements, the AQP participates in AirNow. Data obtained from all 3 monitoring stations is uploaded and is viewable online for public access of the Air Quality Index on the reservation.

3.0 Air Monitoring Network

SUIT has established three monitoring stations. Ute 1 is located in the town of Ignacio, CO, Ute 3 is located on the central-western portion of the Reservation, while MMS is located at the northeastern corner. SUIT monitors five of the six NAAQS criteria pollutants: NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), CO, and SO_2. **(Table 1.)** The tribe does not monitor Lead as the reservation currently does not meet the criteria for monitoring this pollutant. Meteorological parameters are obtained at all three of the monitoring stations.

All three monitoring stations are fully equipped with an Agilaire 8872 data acquisition system connected to the gaseous analyzers, automated calibrators, MET tower sensors, and other diagnostic sensors. The continuous data is recorded locally at the individual station and remotely on a main server located in Ignacio, CO in which all historical data is stored and can be retrieved at will. This type of set up has enabled the AQP to collect data with increased precision and allowed errors or system faults to be identified and corrected with minimal downtime.

The air monitoring results are used as a basis to improve environmental related decisions, further the understanding of the local air resources, and broaden the awareness of air quality concerns within the region.

The NetAssess2020 app, which was developed by the EPA's Office of Air Quality Planning and Standards (https://sti-r-shiny.shinyapps.io/EPA_Network_Assessment/), is used to determine the demographics and area served for each of the three SLAMS. This data is in each station's respective section and Appendix A.

Table 1. SLAM Site Identification

SUIT Site Designation	EPA-AQS Number	Street Address	Geographic Coordinates	NAAQS Criteria Pollutants
Ute 1	08-067-7001	1 MI. NE of Ignacio, County RD. 517. Ignacio, CO 81137	37.13678, -107.62863	NO_x, O_3 CO
Ute 3	08-067-7003	7571 Hwy. 550. Ignacio, CO 81137	37.10258, -107.870219	NO_x, O_3, $PM_{2.5}$, PM_{10}, CH_4/NMHC, Visibility
MMS	08-007-7004	398 CO-151, Pagosa Springs, CO 81147	37.205717, -107.254234	NO_x, O_3, SO_2, CH_4/NMHC

3.1. Ute 1 Air Monitoring Station

Ute 1 is located approximately one mile north of Ignacio, Colorado. The station is situated in the Pine River Valley, the most densely populated area of the Reservation **(Figure 1)**.

The Ute 1 station meets all siting criteria for an urban SLAMS. The Ute 1 station **(Figure 2)** is likely to be most affected by local activities such as vehicle traffic, on-going building and road construction, and winter residential wood and coal burning. Residential burning and traffic are the most influential sources that directly impact the air quality around the Ignacio community. Therefore, Ute 1 is the only station designated to monitor carbon monoxide.

Ute 1 serves a population of 5,575 and an area of 204 mi^2 (528km^2). Demographics of this area are in Appendix A.

Figure . *Northeastern view of the Ute 1 station.*

This station is in a secured area within the Southern Ute Indian Tribe Forestry complex and is thought to be representative of the air quality around the Ignacio community. All criteria air pollutants currently measured at the monitoring station are consistent with the parameters reported in the Tribe's AQP 2019 Network Review and have remained below the current NAAQS (**Table 2.**).

Table 2. Ute 1 instrument description and 2019 measured ambient concentrations in comparison to the NAAQS.

Instrument Type	Reference Method	Parameter	NAAQS	2019 Concentrations
Thermo 42i	EQOA-0880-047	NO, NO_2, NO_X	53 ppb (annual)	20.7 ppb
			100 ppb (1-hour)	31.1 ppb
Thermo 42i	RFCA-0981-054	CO	9 ppm (8-hour)	0.4 ppm
			35 ppm (1-hour)	0.4 ppm
Thermo 49i	EQOA-0880-047	O_3	0.070 ppm (8-hour)	0.061 ppm

The Ute 1 monitoring station continues to collect meteorological data for the following parameters: solar radiation, wind speed, wind direction, ambient temperature, humidity, and precipitation. All the meteorological instruments, except for the precipitation gauge, are located on the 30-foot tilt-over aluminum met tower. The peripherals of the meteorological instruments are housed in a weather-resistant, surge protected enclosure box affixed to the base of the tower (**Figure 3**).

Figure . ***Meteorological tower and weather resistant, surge protected enclosure box (left). The thirty-foot meteorological tower (right).***

3.1.1 Recommendations for Ute 1

The monitoring station is adequately sited and has a long history of collecting monitoring data. With the Tribe's casino development and cultural museum that were completed in 2008 and 2011, respectively, the Ute 1 monitoring station has collected useful data representing traffic congestion and construction activities. The casino and cultural museum are located less than 1/2 mile west of the Ute 1 monitoring station. The AQP continues to use the contrasting monitoring stations to analyze the air quality impacts and differences that occur within the Reservation's airshed.

3.2. Ute 3 (Bondad) Monitoring Station

Figure 4. ***Northern view of Ute 3 monitoring station.***

Figure 1 Northern view of Ute 3 monitoring station.

The Ute 3 station is located approximately twenty miles west of Ignacio, near Bondad, Colorado. The station is situated along the eastern rim of the Animas River Valley near Highway 550, a major roadway that connects southwestern Colorado with northwestern New Mexico **(Figure 1.).** The area surrounding this monitoring site is comprised of dispersed homes, agricultural activities, and oil and gas production sites, so the site is influenced by both stationary and mobile sources of air pollution.

Ute 3 serves a population of 46,774 and an area of 3,743 mi^2 (9,694km^2). Although Ute 3 does not serve Ignacio, CO, due to the scarcity of SLAMS in western Colorado, the EPA's NetAssess2020 app includes Durango and the area north of it as the area served (Appendix A).

The Ute 3 monitoring station is located on Tribal land within a locked perimeter fence and the area is regularly patrolled by tribal rangers. The station meets all siting criteria for an urban SLAMS. A $PM_{2.5}/PM_{10}$ FRM sampler is located at Ute 3 and will continue to operate in conjunction with the PM FEM monitor for precision measurements and comparison to the NAAQS during FY19.

All meteorological parameters and criteria air pollutants currently measured at this monitoring station are consistent with the parameters reported in the AQP's 2019 Network Review and have remained below the current NAAQS **(Table 3)**.

Table 3. Ute 3 Instrument description and 2019 measured ambient concentrations in comparison to the NAAQS.

Instrument Type	Reference Method	Parameter	NAAQS	2019 Concentrations
Thermo 42i	EQOA-0880-047	NO, NO_2, NO_X	53 ppb (annual)	26.4 ppb
			100 ppb (1-hour)	32.8 ppb
Thermo 49i	EQOA-0880-047	O_3	0.070 ppm (8-hour)	0.063 ppm
Thermo 55i	---	NMHC, CH_4	----	1 ppm
Teledyne T640x	EQPM-0516-236	$PM_{2.5}$	15µg/m^3 (Annual)	4.22 µg/m^3
			35µg/m^3 (24-Hour)	11.8 µg/m^3
Ecotech Aurora Nephelometer	---	Visibility in Miles	----	100 miles

3.2.1 Modifications Completed

The Ute 3 station has been monitoring air quality and meteorological conditions for almost 22 years. An EPA grant allowed the Air Monitoring team to invest in a new shelter to house the instruments at the Ute 3 station **(Figure 5.).** The new shelter was installed on January 15, 2019 and has demonstrated a marked improvement in energy efficiency and temperature stability of the instruments at the Ute 3 station, as well as improved employee safety during routine operations and maintenance activities.

3.2.2 Recommendations for Ute 3

The AQP has previously operated a Thermo Scientific 2000i Federal Reference Method (FRM) $PM_{2.5}$ filter sampler on a 1 and 12 sampling schedule at the Ute 3 site, in conjunction with a Teledyne API T640x continuous PM mass monitor in order to support the regulatory measurement of $PM_{2.5}$, consistent with 40 CFR 58, Appendix A, Sections 3.2.5 and 3.3.5. The AQP has been advised, by our EPA technical advisor, to transition our $PM_{2.5}$ measurements to non-regulatory moving forward and to discontinue our FRM filter sampling beginning in FY2020.

Because it is necessary for the AQP to continue providing information to the Southern Ute Drum regarding the air quality index and visibility data to assure the Reservation community that the air quality is maintained, the AQP will continue to operate the T640x for continuous measurement of both PM_{10} and $PM_{2.5}$.

The equipment issues on the Thermo Scientific 55i that affect the capture of CH4/NMHC data will be corrected to improve capture rate percentage to meet 75% requirement.

For safety reasons a winch system is proposed to be installed on the MET tower at both Ute 1 and Ute 3. This system will allow the MET tower to be lowered in a controlled fashion for maintenance and repairs.

3.3. Lake Capote (MMS) Monitoring Station

Figure 5. ***Mobile Monitoring Station.***

The Mobile Monitoring Station (MMS) is located on the northeastern portion of the Reservation near Lake Capote **(Figure 1.).** It is further removed from the oil and gas development on the western portion of the Reservation and is well suited to assess ambient background concentrations prior to proposed development of shale gas resources on the eastern portion of the Reservation.

The MMS site is located within a locked perimeter fence and the area is regularly patrolled by tribal rangers as well as and visited weekly by ambient air quality monitoring program staff. The current location of the MMS meets all siting criteria for an urban SLAMS.

MMS is located on the least populated area of the reservation yet serves a population of 78,080 and an area of 15,023 mi^2 (38,910km^2). Due to the scarcity of SLAMS in western Colorado, the EPA's NetAssess2020 app includes Pagosa Springs, Alamosa, and some parts of Northern New Mexico and the Jicarilla Apache Nation Reservation as the area served. A map containing the boundaries and demographics of this area is shown in Appendix A.

The purpose of the Mobile Monitoring Station (MMS) has been to assess pre-oil and gas development and ambient air quality conditions in the eastern portion of the Reservation. After completing a two-year background monitoring campaign, the MMS has remained "stationed" at its current location at Lake Capote but may be periodically moved for special purpose monitoring projects or source surveillance. MMS also includes a sulfur dioxide (SO_2) monitor to satisfy minimum monitoring requirements as described in 40CFR60 Appendix D.

Mobile Monitoring Station continues to collect meteorological data for the following parameters: wind speed, wind direction, ambient temperature, and humidity. All the meteorological instruments are located on an aluminum tower affixed to the station roof. All criteria air pollutants currently measured at the monitoring station are consistent with the parameters reported in the Tribe's AQP 2019 Network Review and have remained below the current NAAQS **(Table 4)**.

Table 4. MMS Instrument description and 2019 measured ambient concentrations in comparison to the NAAQS.

Instrument Type	Reference Method	Parameter	NAAQS	2019 Concentrations
Thermo 42i	EQOA-0880-047	NO, NO_2, NO_X	53 ppb (annual)	2.16 ppb
			100 ppb (1-hour)	18.1 ppb
Thermo 43i	RFCA-0981-054	SO_2	70 ppb (1-hour)	3.4 ppb
			0.5 ppm (3-Hour)	ppm
Thermo 49i	EQOA-0880-047	O_3	0.070 ppm (8-hour)	0.060 ppm
Thermo 55i	---	NMHC, CH_4	----	1 ppm

3.3.1 Recommendations for MMS

After a successful 2-year monitoring campaign, Tribal leadership has suggested relocating the MMS to another site on the reservation. Because the MMS is a non-regulatory SLAM, relocation will not adversely affect the monitoring network and its commitments to the workplan. Viable sites are currently being surveyed and are expected to be finalized by the end of FY2020. Work continues to identify and correct the equipment issues on the Thermo Scientific 55i that affect the capture of CH4/NMHC data will be corrected to improve capture rate percentage to meet 75% requirement.

4.0 Quality Assurance

Continuous monitors

The Air Quality staff performs three types of gaseous analyzer performance checks: Zero, Span and Precision Checks, and Calibrations. These audits and checks challenge the analyzer with NIST-certified gas cylinders containing known concentrations of the applicable pollutant gases. Every quarter, Air Resource Specialists (ARS) perform system audits on all the gaseous analyzer and meteorological equipment. The U.S. EPA Region VIII has performed a systems audit on the Southern Ute Indian Tribe's Air Monitoring Network and will conduct systems audits every three years. The Southern Ute Air Quality Program will conduct an internal systems audit every year that is not audited by the U.S. EPA. AQP staff conducts quality control checks nominally once every two weeks, and calibrations once every calendar quarter. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance).

Particulate Monitors

Verification checks of the continuous particulate monitor located at Ute 3 occur monthly and consist of calibrated flow rate checks, as well as temperature, pressure, leak rate and flow rate verification checks.

Meteorological Monitors

Annual calibrations and audit checks are performed on the meteorological equipment to determine proper alignment and operation of the sensors. The details and minimum standards for this program are set out in the Code of Federal Regulations (Part 58 Ambient Air Quality Surveillance).

The AQP always attempts to go above and beyond the minimum requirements. A complete description of these procedures is available in the SUIT AQP Quality Assurance Project Plan (QAPP) and the results are available from the AQP or through the national EPA AQS database.

5.0 Summary

The Southern Ute Reservation is located primarily within La Plata County with approximately 30% of the land located within Archuleta County. According to Colorado Oil and Gas Conservation Commission (COGCC), the number of oil and gas wells located within Archuleta County was approximately 136 wells with an oil production totaling 766 barrels and 14.75 BCF of gas production for 2019. The number of oil and gas wells within La Plata County for 2019 was approximately 3,201 wells with an oil and gas production totaling 15,244 barrels and 263.44 BCF, respectively (COGCC).

Per the SUIT Title V program, of the combined 3,337 wells in both counties, approximately 78% (2,614 active production) are located within the Reservation boundaries. Considering the large quantity of oil and gas wells in production within the Reservation boundaries and the operation of the SUIT AQP's air permitting programs, the AQP plans to continue operating the three air monitoring stations. The Air Quality Program is also planning to incorporate non-regulatory portable air monitors to aid in research and further community outreach.

6.0 Final Comments

The Tribe's AQP has reviewed the ambient air quality data within the AQP monitoring network and compared those findings to other ambient air quality data generated from other monitoring stations operated by other agencies within the Four Corners area (Appendix B). The gaseous pollutant data for ozone, carbon monoxide and nitrogen oxides as well as monitoring practices from both monitoring sites, Ute 1, Ute 3, and MMS were examined in detail. The AQP has determined that all data pertaining to the AQP monitoring network for the 2019 calendar year meets all QA requirements for AQS, the AQP 2019 QAPP, and tribal standard operating procedures. All the data correlates well with other agencies' monitoring stations in southwestern Colorado and northeastern New Mexico that use similar sampling methodologies and have similar oil/gas operations.

A draft of this document was made available to the public in February of 2020, at www. https://www.southernute-nsn.gov/justice-and-regulatory/epd/air-quality/ambient-monitoring/. Any comments pertaining to this document should be sent to the following contacts:

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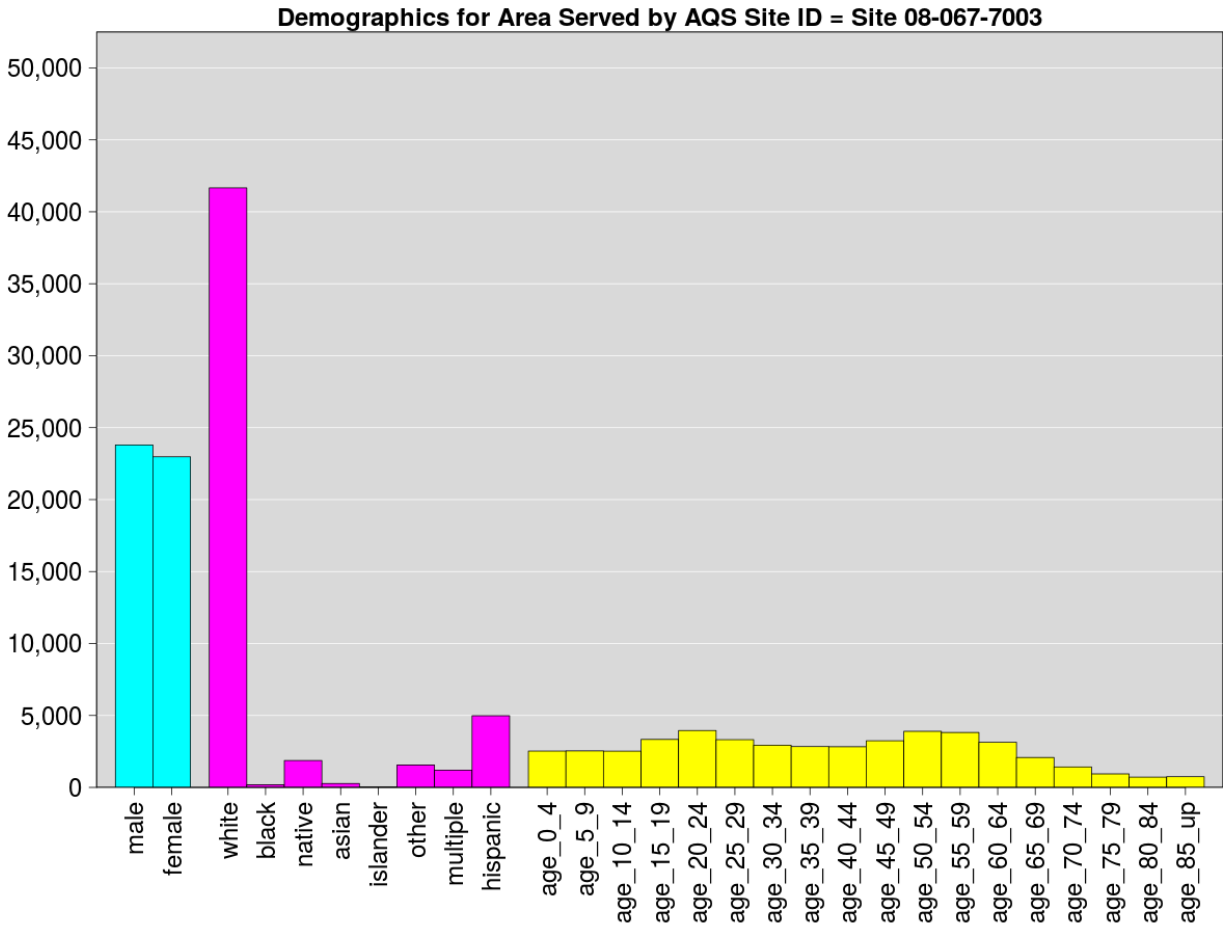
Appendix A

Population demographics and Area Served.

NetAssess2020 v1.1
Ambient Air Monitoring Network Assessment Tools
Grand Junction
Aspen
Colorado
Colorado Springs
Montrose
Gunnison
Pueblo
Monte Vista
Trinidad
Farmington
Santa Fe
Legend
Existing Site
Existing Site (selected)
New Site
New Site (selected)
Area of Interest
Area Served Polygon

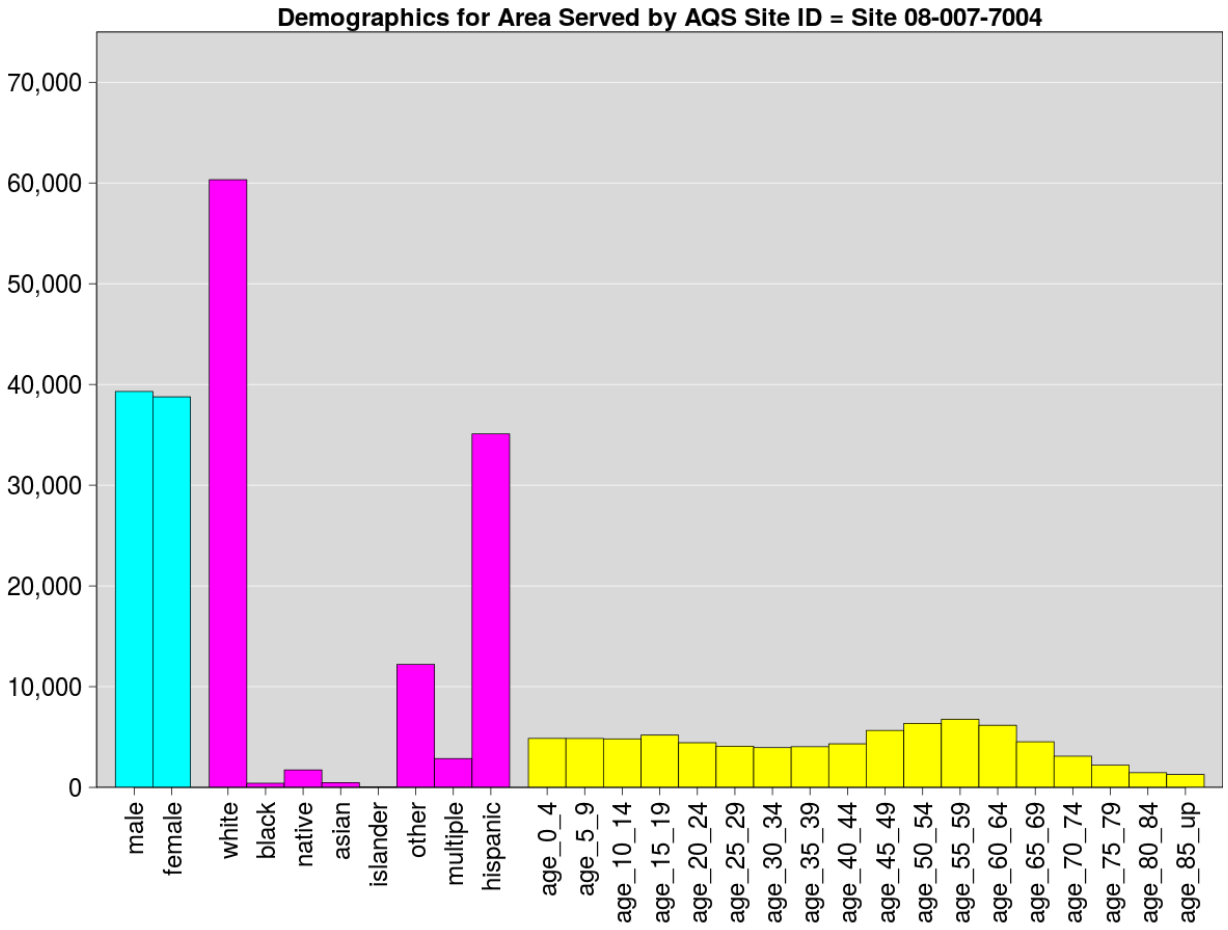
Appendix A.1

Ute 3



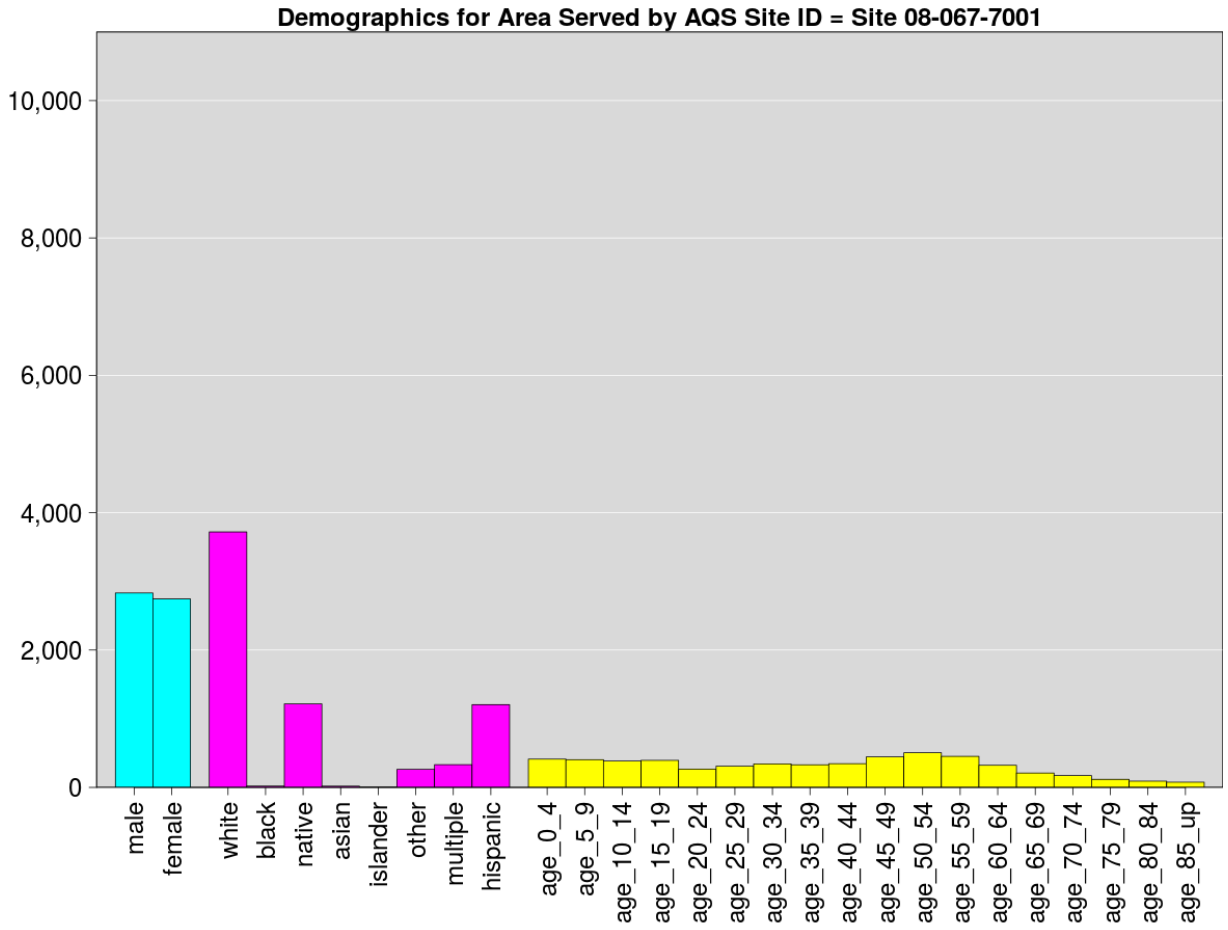
Appendix A.2

MMS



Appendix A.3

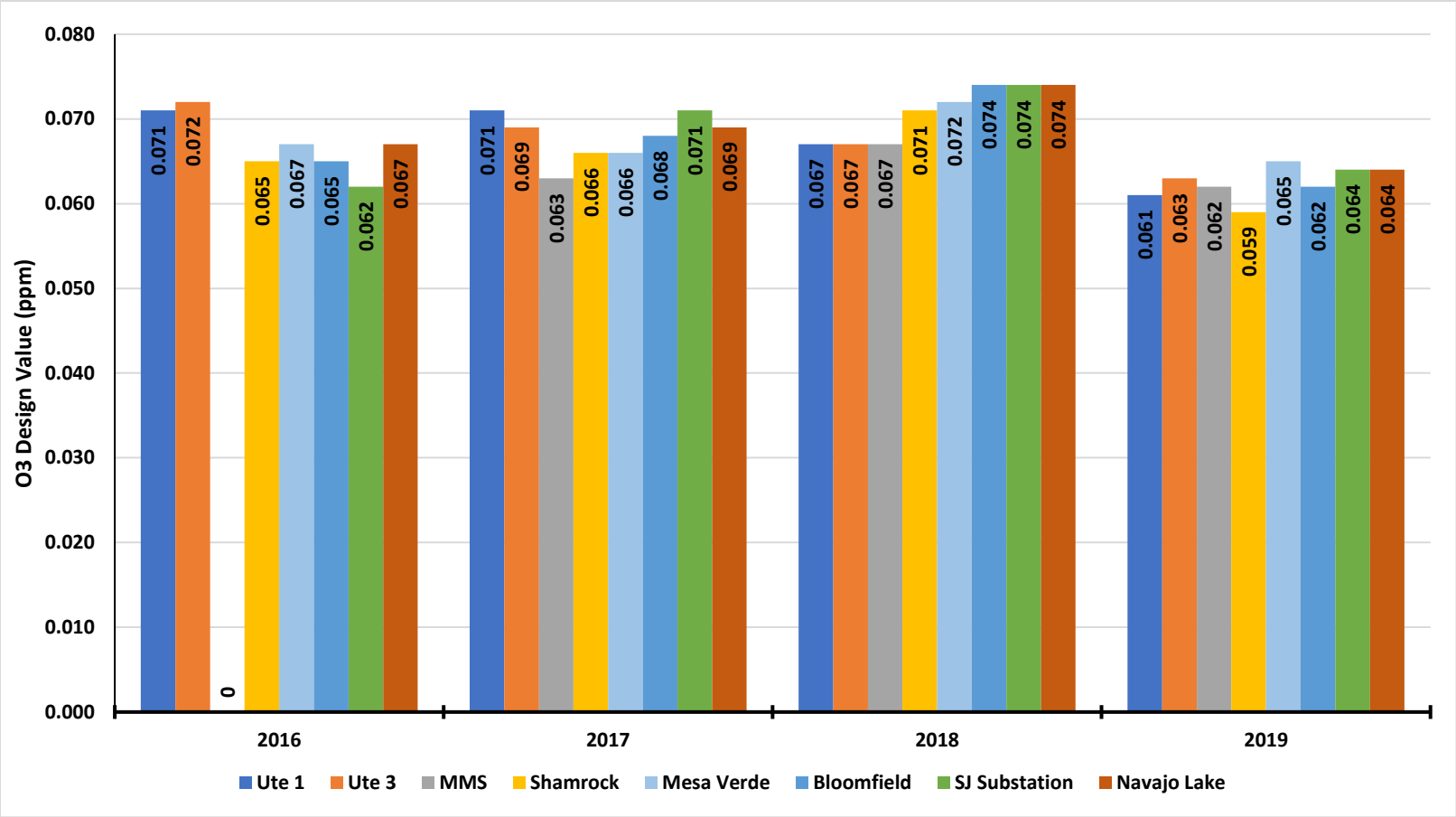
Ute 1



Appendix A.4

Appendix B

2019 Air Monitoring Data and Regional NAAQS Comparison.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0.070
0.060
0.050
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0.030
0.020
0.010
0.000
O3 Design Value (ppm)
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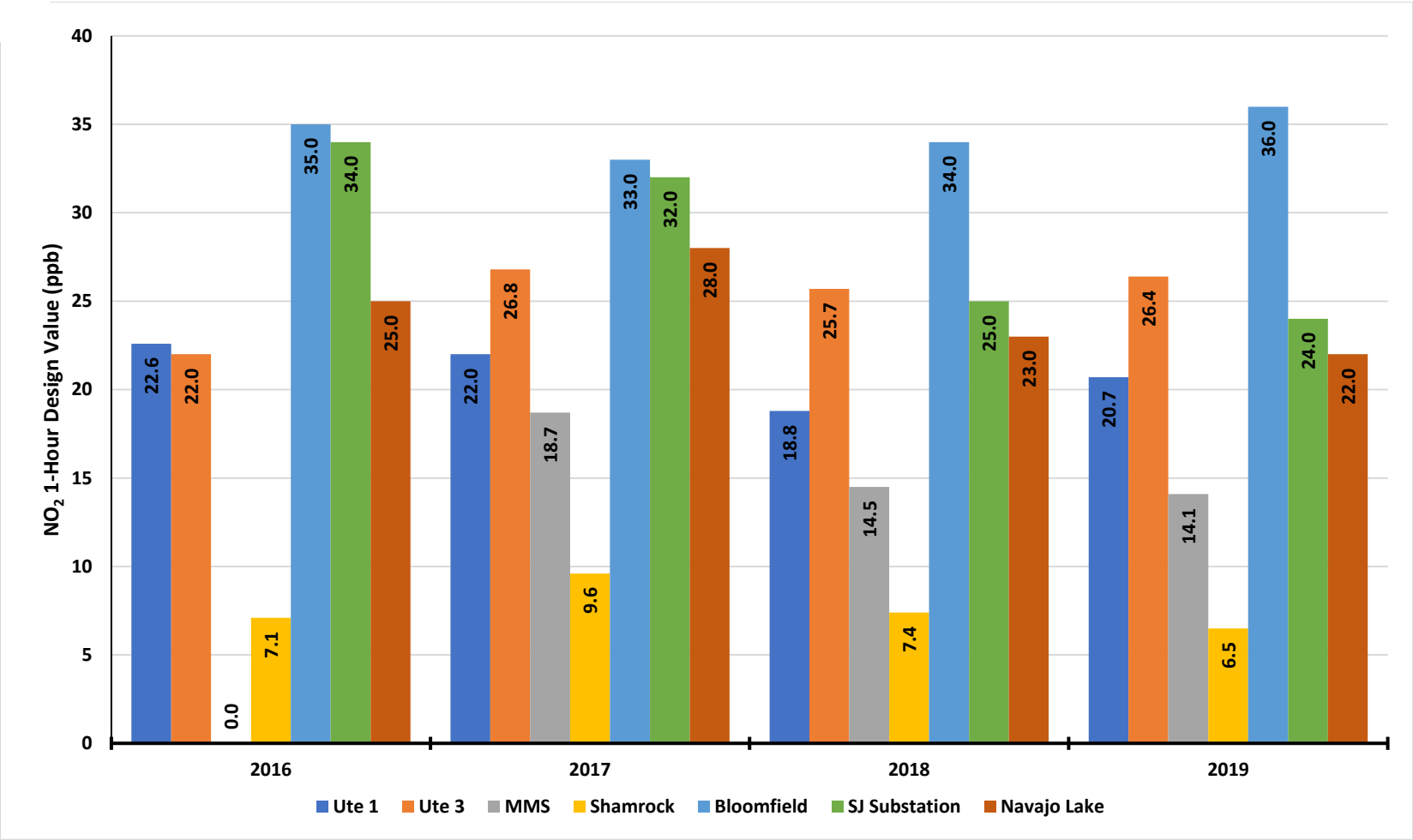
0.072
0
0.065
0.067
0.065
0.062
0.067
0.071
0.069
0.063
0.066
0.066
0.068
0.071
0.069
0.067
0.067
0.067
0.071
0.072
0.074
0.074
0.074
0.061
0.063
0.062
0.059
0.065
0.062
0.064
0.064
2016
2017
2018
2019
Ute 1
Ute 3
MMS
Shamrock
Mesa Verde
Bloomfield
SJ Substation
Navajo Lake

Appendix B.1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15
10
5
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NO_2 1-Hour Design Value (ppb)
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35.0
34.0
25.0
22.0
26.8
18.7
9.6
33.0
32.0
28.0
18.8
25.7
14.5
7.4
34.0
25.0
23.0
20.7
26.4
14.1
6.5
36.0
24.0
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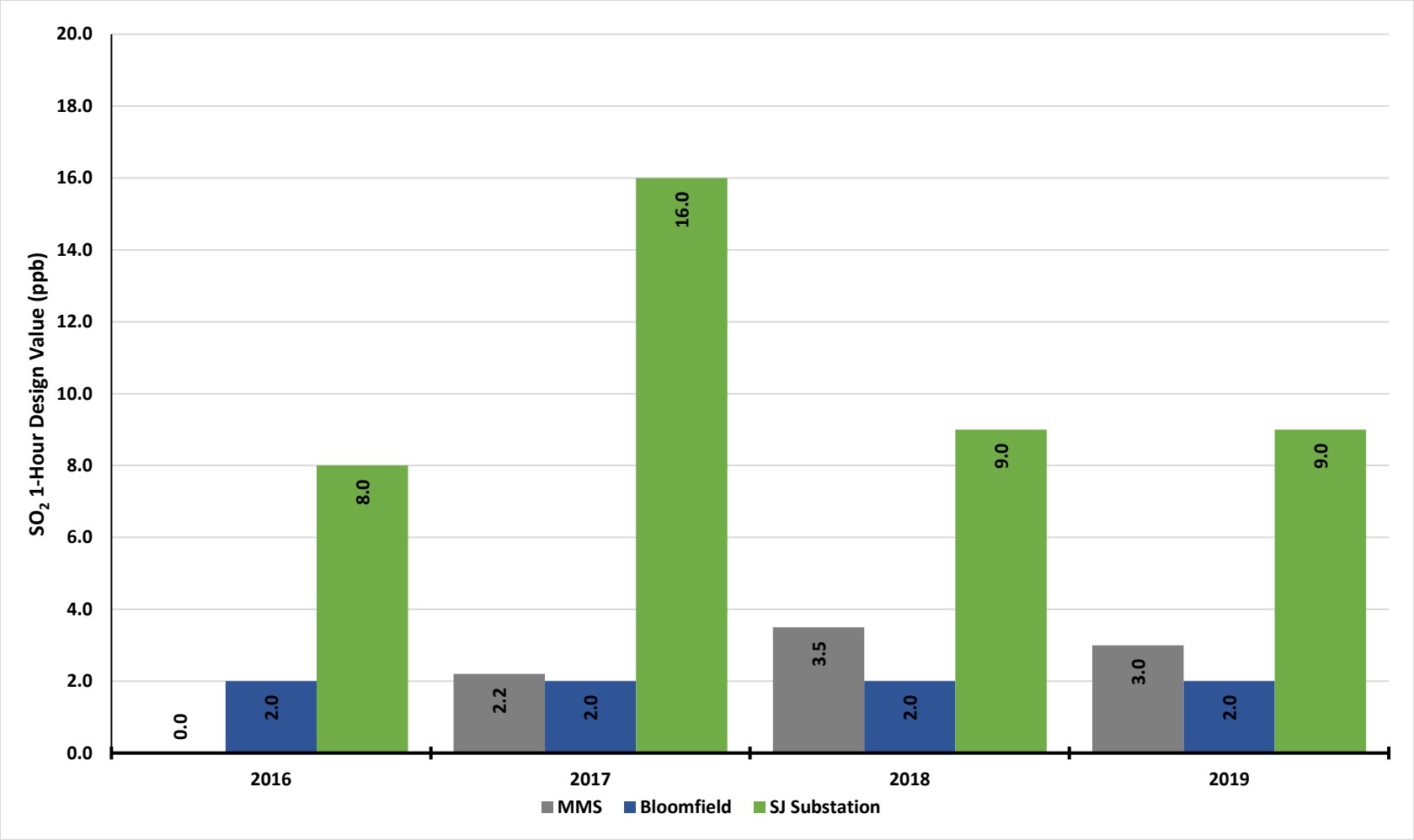
2016
2017
2018
2019
Ute 1
Ute 3
MMS
Shamrock
Bloomfield
SJ Substation
Navajo Lake

Appendix B.2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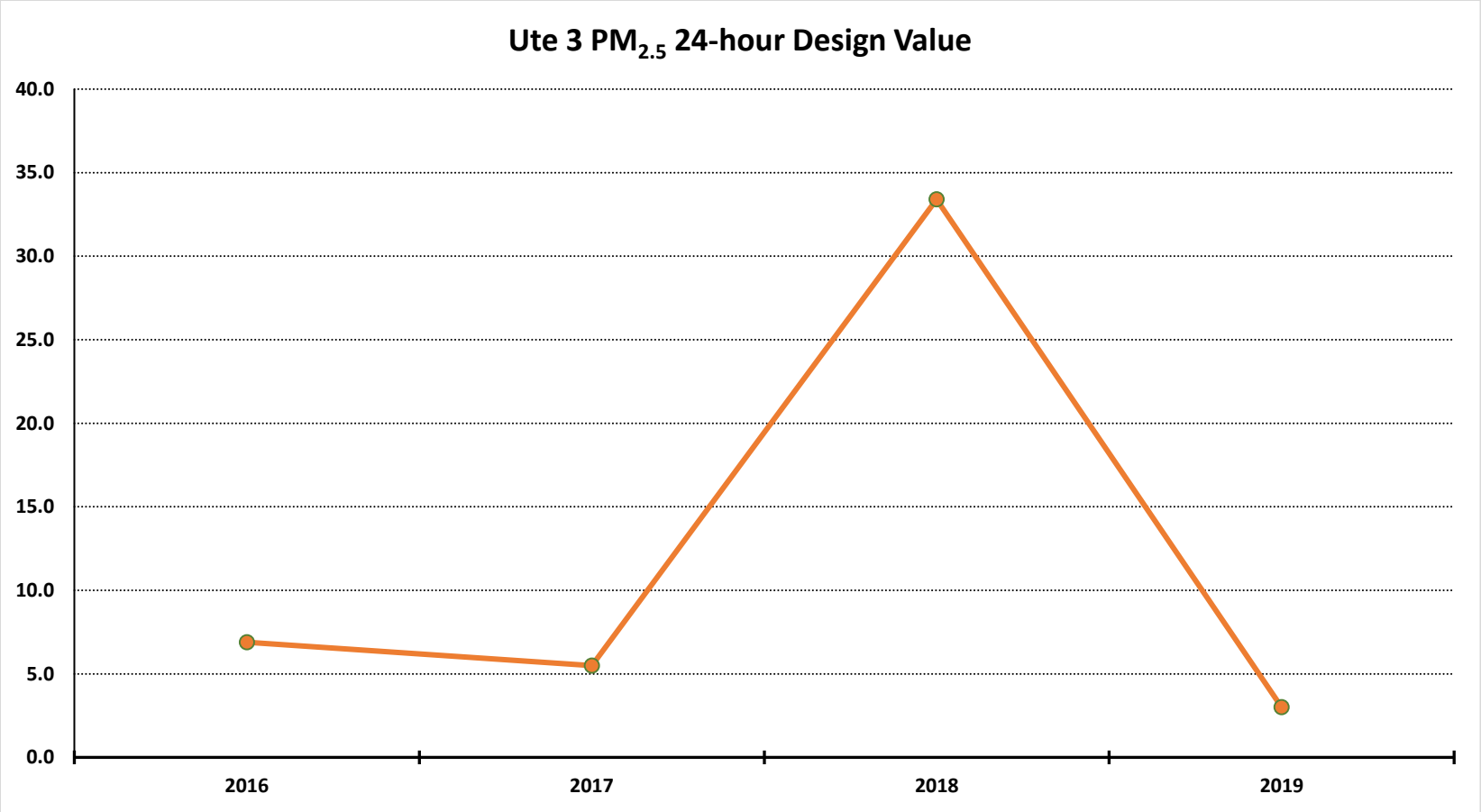
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
SO2 1-Hour Design Value (ppb)
0.0
2.0
8.0
2.2
2.0
16.0
3.5
2.0
9.0
3.0
2.0
9.0
2016
2017
2018
2019
MMS
Bloomfield
SJ Substation

Appendix B.3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25.0
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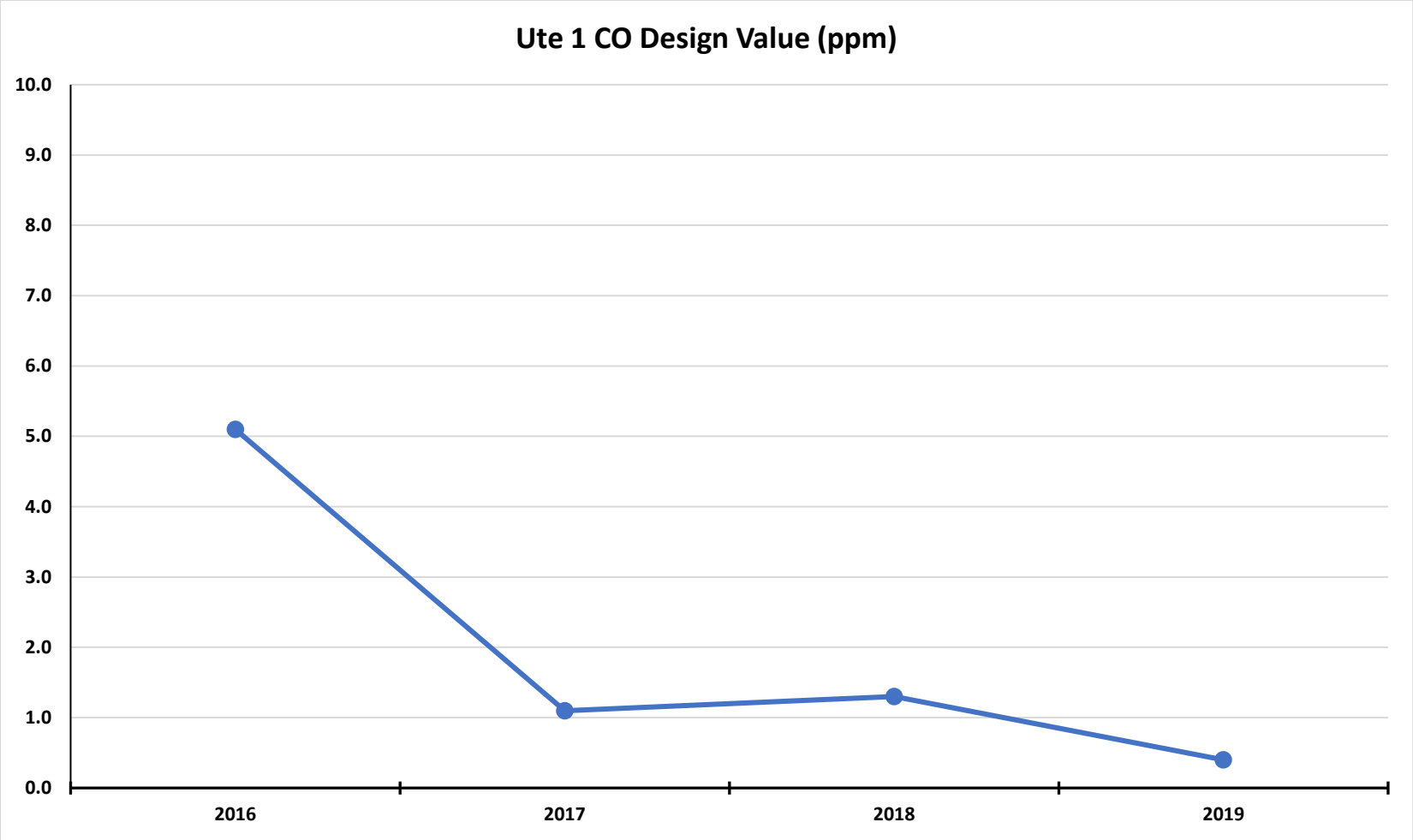
15.0
10.0
5.0
0.0
2016
2017
2018
2019

Appendix B.4


Ute 1 CO Design Value (ppm)
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9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2016
2017
2018
2019

Appendix B.5