Arkoma Operations, LLC – Ignacio Gas Treating Plant
Full Compliance Evaluation (FCE)
On-Site Inspection

Inspection Date:	June 28, 2022
Inspection Report Date:	August 26, 2022
EPA Representatives:	Colin LeCortz, Environmental Scientist, US EPA Region 8 Youn Joo Kim, Environmental Scientist, US EPA Region 8 Alexis North, Environmental Scientist, US EPA Region 8 Katelyn Bergl, Environmental Scientist, US EPA Region 8
Tribal Representatives:	David Heermance Andrew Switzer Meredith Breeden
Company Representatives:	Russell Hamm Kelly Riley Jacob Franchini
Inspection Report Prepared By:	Colin LeCortz, Environmental Scientist, US EPA Region 8 Youn Joo Kim, Environmental Scientist, US EPA Region 8
Inspection Report Reviewed By:	Scott Patefield, Manager, Enforcement and Compliance Assurance Division, Air and Toxics Enforcement Branch SCOTT PATEFIELD Digitally signed by SCOTT PATEFIELD Date: 2022.08.25 14:32:01 -06'00'
Last Inspection:	September 4, 2019 with an addendum issued by the Southern Ute Indian Tribe on September 22, 2021
Operating Status:	Operating
Applicable Requirements:	SMNSR- Tribal Minor New Source Review 40 CFR Part 60, Subpart JJJJ: Standards of Performance for New Stationary Sources (NSPS JJJJ) 40 CFR Part 63, Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (MACT ZZZZ) 40 CFR Part 63, Subpart HH: National Emissions Standards for Hazardous Pollutants from Oil and Natural Gas Production Facilities (MACT HH- area source)

Permit Number: SMNSR-SU-000052-2021.004
Replaces Permit: SMNSR-SU-000052-2018.003

Issue Date: April 18, 2022
Effective Date: April 18, 2022
Expiration Date: None

Facility Information and Emission Unit Identification

Parent Company Name:	Arkoma Operations, LLC
Mailing Address:	2121 S. Columbia Ave, Suite 101, Tulsa, Oklahoma 74114
Facility Contact:	Russell Hamm, Environmental Manager (918) 693-4833
Facility Operator & Name:	Arkoma Operations, LLC – Ignacio Gas Treating Plant
Facility Location:	Latitude 37.10N, Longitude -107.77W
County, State:	La Plata, Colorado
Reservation:	Southern Ute Indian Reservation
Tribe:	Southern Ute Indian Tribe
Responsible Official:	Jason Pugh, President
SIC Code:	1311 – Crude Petroleum and Natural Gas
AFS ID:	08-067-01108
Other CAA Permits:	There are no other CAA permits for this facility.

Enforcement History

According to information from the September 4, 2019 inspection report, with an addendum issued on September 14, 2021 by the Southern Ute Indian Tribe Air Quality Program, numerous violations were identified resulting in a $35,000 penalty. These violations pertained to failure to submit reports regarding deviations, Title V annual compliance and semi-annual monitoring reports. Additional violations pertained to MACT ZZZZ requirements. Please see the ICIS compliance monitoring ID# SU000A1552990.

An area of concern that has continued to not be addressed by Arkoma from the September 4, 2019 inspection are the differential pressure measurement not being evaluated correctly. Please see the Inspection Findings/Areas of Concern and Section C of this inspection report.

Inspection Findings/Areas of Concern

From July 18, 2021 through September 18, 2021, engine E3 recorded 13 instances where the differential pressure deviated above the established baseline limit (greater than 2 inches of water). Corrective action did not occur during this 2-month period. The catalyst was cleaned on September 20, 2021, where afterwards the change in pressure was within ±2 inches of water from the baseline pressure drop reading taken during the most recent performance test. Additionally, EPA found records of 3 instances on February 2, 2021 through March 1, 2021, where the pressure was recorded outside of the established baseline. EPA could find no records that corrective action occurred, however, notes from Arkoma indicate that the engine had a performance test conducted. Those three instances of deviations were not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

From June 29, 2021 through August 23, 2021, engine E2, EPA found records of 13 instances where the differential pressure deviated above the established baseline limit. Corrective action did not occur during this 2-month period. The engine was shut down on August 23, 2021, and the next pressure recording was within the allowable limit. Engine maintenance forms provided by Mr. Hamm note that the catalyst was cleaned on August 23, 2021. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

On September 28, 2021, engine E5 recorded one instance where the differential pressure deviated above the established baseline limit. It could not be determined if corrective action occurred during this event. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

EPA has concerns that improper catalyst operations at Ignacio have and may lead to further exceedances of permit conditions. Arkoma also should cease operating of the engine or conduct performance tests on the engines that have deviated from the operating limitations within 90 calendar days, as specified in this permit, to ensure that the emission limits are being met and to re-establish the baseline pressure drop across the catalyst bed. Performance tests or engine cessation shall occur if Arkoma had investigated or corrected the deviation in the catalytic control system via manufacturer recommended procedures, and the pressure continued to exceed ± 2 inches of water from the baseline pressure drop. However, based on the information provided, it cannot be determined what methods Arkoma completed to investigate or correct the pressure reading exceedances.

Lastly, EPA was notified of 26 instances of issues with temperature monitoring of the engines. EPA advises Arkoma to review and inspect the CPMS to look for possible errors. These occurrences do not appear to show high temperatures, but instead an issue with the data loggers or temperature-sensing devices that may not be calibrated or operated according to manufacturer specifications or equivalent specifications developed by the Permittee or vendor.

Compliance Assistance

During the records review, Mr. Hamm responded that Ignacio has been operating with a 10% variance of the ±2 inches of water standard per facility requirements established based on the MACT ZZZZ requirements to *"maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test."* Mr. Hamm stated an interpretation that this facility permit established from MACT ZZZZ allowed for 10% of the baseline pressure to be in addition to the ±2 inches of water—effectively increasing or decreasing the limit in which Ignacio would take corrective action for the catalyst. This is an incorrect interpretation of both the permit and MACT ZZZZ standards, as the ±2 inches of water requirement does not allow for any metric modification. The 10% variance assumption made by Mr. Hamm from MACT ZZZZ corresponds to the 10% variance in 100% load not the allowable pressure difference. This subject was noted as an area of concern in the previous inspection report from the Southern Ute Indian Tribe Air Quality Program from September 4, 2019, and still appears to not have been corrected.

A copy of this report, which highlights EPA's areas of concern, will be provided to Arkoma upon finalization.

Description of Operations

The Ignacio plant began initial operation in 1999. Coal bed methane natural gas produced from the surrounding area is routed to the facility through gathering pipelines. The gas is routed through the inlet separator (primary separation) to remove any entrained produced water. The produced water is routed to an atmospheric produced water storage tank. Any flashing or working and breathing losses associated with the storage tank is vented to the atmosphere. Following primary separation, the gas is sent to eight (8) compressors driven by lean-burn natural gas-fired engines. Following compression, the gas is routed to one of two (2) TEG dehydration units. Wet gas contacts glycol in the contactor/absorber column of each TEG dehydration unit, where "lean" glycol (water-free) absorbs water from the gas stream. The dehydrated gas leaves the top of the absorber contactor, while the "rich" glycol (heavy with water) sinks to the bottom of the contactor where it is removed and routed to a flash separator where hydrocarbon vapors are removed and any liquid hydrocarbons are skimmed from the glycol. Gas from the flash separator is sent to recycle compression or the onsite fuel system. The rich glycol is passed through a heat exchanger and fed to the stripping column. The stripping column consists of a still

column and reboiler designed to vaporize the water from the solution to regenerate the glycol. The glycol is recycled/reused in the contactor. The facility also uses a membrane unit to separate carbon dioxide gas from the natural gas stream, but there are no emissions of pollutants from the membrane unit. Two (2) streams exit the membrane unit – a residue gas stream with a low concentration of carbon dioxide and a permeate gas stream that contains methane and the recovered carbon dioxide. The permeate gas is sent to market via pipeline for downstream processing and treating.

In addition to the two (2) TEG dehydration units, one (1) produced water storage tank and eight (8) natural gas-fired compressor engines, the Ignacio plant also operates a standby 1.25 MMBtu/hr TEG reboiler for one of the units (disconnected from service - still vents do not operate simultaneously).

The emission units identified in Table 1 are currently installed and/or operating at the facility and would be subject to the requirements in this proposed permit. The information provided in this table is for informational purposes only and is not intended to be viewed as enforceable restrictions or open for public comment. The units and/or control requirements identified here either existed prior to the promulgation of the MNSR Permit Program or have been approved through the alternative methods as identified below. Table 2 lists the facility-wide allowable emissions of NSR regulated pollutants accounting for all legally and practicably enforceable control requirements that currently apply to the facility through MNSR permit #SMNSR-SU-000052-2016.001 and the CD and that are proposed to be permanently established under this permit.

General Inspection Observations and Commentary

On June 28, 2022 at 10:13 AM, EPA representatives Colin LeCortz, Youn Joo Kim, Alexis North, and Katelyn Bergl along with Southern Ute Indian Tribe Air Program representatives David Heermance, Andrew Switzer, and Meredith Breeden met with Arkoma representatives Russell Hamm, Kelly Riley, and James Franchini onsite at the Ignacio Gas Treating Plant (Ignacio). An opening conference was conducted, during which EPA inspectors presented credentials. A brief safety orientation was also completed, and EPA inspectors informed Arkoma representatives that the site would be surveyed using a forward looking infrared (FLIR) camera, no hot work permit was required.

After the opening conference, Mr. Franchini walked everyone through the process at Ignacio which involved the inlet, separation, compression, then dehydration of the natural gas. Liquids of produced water and lube oil from the compression process is routed to produced water and slop tanks onsite. According to information provided by Mr. Franchini during the inspection, Ignacio currently has an inlet pressure of about 20 psi and after compression the facility ramps the gas up to 790 psi. The facility has a maximum capacity of 52 MMscf/d but is operating at approximately 21 MMscf/d. Processed gas goes to the pipeline where it is routed to northwestern United States for distribution and produced water is routed offsite via pipeline. During the inspection, only one of the two dehydration units were operating. Mr. Hamm noted that the Tejas dehydration unit is kept onsite as a spare and does not regularly operate anymore. The Valeraus dehydration unit was estimated to operate at 8 strokes per minute at the glycol recirculating pump. Emissions from the reboiler, from both dehydration units if operating, are vented directly to atmosphere.

Compressor engines E1 and E4 were not operating at the time of the inspection. Mr. LeCortz and Ms. Kim verified the operating parameters from the CPMS of the engines, listed in Table 1 below. Additional information regarding serial numbers can be found in Table 2 below.

Table 1: Engine Parameters Recorded During Inspection

Unit ID	Catalyst Inlet Temperature (°F)	Pressure Drop (inches of water)	Baseline Pressure (inches of water)
E1	NA	NA	4.27
E2	864	4.28	4.20

E3	830.3	6.11	6.30
E4	NA	NA	5.80
E5	696.0	4.52	4.90
E6	784.9	4.33	5.10
E7	835.5	6.27	6.60
E8	797.2	3.87	4.00

Emissions via FLIR from the slop oil tank were observed and recorded (mov_2981.mp4) while EPA inspectors were onsite however there are no controls required for either the produced water tank or slop oil tank. EPA and Southern Ute Indian Tribe air quality representatives met with Arkoma representatives for a brief closing conference. The EPA did not have any concerns during the onsite inspection.

EPA and tribal staff departed the facility at 11:38 AM. An email to request relevant compliance-related information and records was sent to Mr. Hamm on July 25, 2022. Mr. Hamm provided the requested information to EPA via email on August 8, 2022.

Permit Number SMNSR-SU-000052-2021.004 Requirements and Compliance Status

Inspector notes discussing compliance status will follow each relevant permit requirement in **bold blue** font.

A. Facility Emission Points

Table 2 - Emission Units and Emission Generator Activities

Unit/Emissions Description	Controls	Observations
One (1) high pressure TEG dehydration unit (Tejas Production Service Contactor, serial number (SN) 4501), 40 MMscfd maximum capacity throughput, with one (1) TEG reboiler rated at 0.5 million British thermal units per hour (MMBtu/hr) (Tejas Production Service, SN 4758). One (1) standby TEG reboiler rated at 1.25 MMBtu/hr (disconnected from service – does not operate simultaneously with 0.5 MMBtu/hr reboiler)	Flash tank and elevated dispersion stack on reboiler still vent	Operating Status: Locked out. Not operating.
One (1) low pressure TEG dehydration unit (Valerus Contactor, SN S07-171), 12 MMscfd maximum capacity throughput, with one (1) TEG reboiler rated at 1.0 MMBtu/hr (Valerus, SN P2162).	Flash tank	Recirculation Pump: 4515 Kimray, model # 45010 Boiler temp: 369.91 degrees F Operating Status: On
Four (4) natural gas-fired 4-stroke lean-burn (4SLB) reciprocating internal combustion engines (RICE), 1,276 site rated horsepower (hp) (1,366 nameplate rated hp).	Oxidation catalyst	E1 Serial Number: WPW0024J Nameplate hp: 1396 E2 Serial Number:WPW00621 Nameplate hp: 1396 E3 Serial Number: WPW02193 Nameplate hp: 1360 E4 Serial Number: 4EK00164 Nameplate hp: 1340
Two (2) natural gas-fired 4SLB RICE, 1,192 site rated hp (1,265 nameplate rated hp).	Oxidation catalyst	E5 Serial Number: 4EK01675 Nameplate hp: 1265 Rebuilt in 2021 E6 Serial Number:4EK03210 (nameplate painted over) Nameplate hp: 1265 Rebuilt in 2021
Two (2) natural gas-fired 4SLB RICE, 1,156 site rated hp (1,340 nameplate rated hp).	Oxidation catalyst	E7 Serial Number: WPW01578 Nameplate hp: 1340 E8 Serial Number: WPW01691 (nameplate fell off) Nameplate hp: 1340

Unit/Emissions Description	Controls	Observations
One (1) 80 barrel produced water atmospheric storage tank	None	Observations: None

Potential to Emit with Legally and Practicable Enforceable Controls(PTE)

Table 3 – Potential-to-Emit With Legally and Practicably Enforceable Controls

	NO_X	**CO**	**VOC**	**PM**	**SO_2**	**CH_2O**	**Total HAPs**
E1	6.59	2.24	2.53	0.42	0.02	1.25	1.27
E2	6.59	2.24	2.53	0.42	0.02	1.25	1.27
E3	6.59	2.24	2.53	0.42	0.02	1.25	1.27
E4	6.59	2.24	2.53	0.42	0.02	1.25	1.27
E5	12.20	1.50	1.47	0.41	0.02	0.59	0.61
E6	12.20	1.50	1.47	0.41	0.02	0.59	0.61
E7	12.93	1.50	1.47	0.43	0.02	0.62	0.64
E8	12.93	1.50	1.47	0.43	0.02	0.62	0.64
11b	0.22	0.19	0.01	0.02	-	-	-
12b	-	-	10.53	-	-	-	4.73
13	0.44	0.37	0.02	0.03	0.01	-	-
14	-	-	5.94	-	-	-	4.00
IEU's	0.79	0.64	7.44	0.06	0.01	-	0.10
TOTAL	**78.06**	**16.54**	**39.94**	**3.48**	**0.23**	**7.43**	**16.43**

NOx= nitrogen oxide; CO = carbon monoxide; VOC = volatile organic compound; PM = particulate matter; SO2 = sulfur dioxide; CH2O = formaldehyde; HAP = hazardous air pollutant

B. Requirements for TEG Dehydration Systems

1. Construction and Operational Limits

(a) The Permittee may install and operate no more than one Tejas TEG dehydration system meeting the following specifications:

(i) Limited to a maximum natural gas processing capacity of 12 million standard cubic feet (Mscf) per day (MMscfd);
(ii) Equipped with a natural gas-fired TEG regenerator limited to a maximum heat input capacity of 0.5 million British thermal units per hour (MMBtu/hr); and
(iii) Equipped with no more than one primary TEG recirculation pump and one backup TEG recirculation pump, each limited to a maximum pump rate of 3.5 gallons per minute (gpm).

Observation: The Tejas TEG dehydration unit was locked out but not disconnected from the gas stream. According to information provided by Mr. Hamm, the facility does not have enough throughput to warrant the use of the Tejas dehydration unit therefore it only acts as a backup if the Valerus dehydration unit is not operational.

(b) The Permittee may install and operate no more than one Valerus TEG dehydration system meeting the following specifications:

(i) Limited to a maximum natural gas processing capacity of 40 MMscfd;
(ii) Equipped with a natural gas-fired TEG regenerator limited to a maximum heat input capacity of 1.0 MMBtu/hr; and
(iii) Equipped with no more than one primary TEG recirculation pump and one backup TEG recirculation pump, each limited to a maximum pump rate of 5.73 gpm.

(c) Only the TEG dehydration systems that are operated and controlled as specified in this permit may be installed and operated.

Observation: The Valerus dehydration unit was operating. Mr. LeCortz measured approximately 4-8 strokes per minute through the glycol pump and the boiler operated at approximately 370° F. The outlet temperature of the dehydrated natural gas was 64°F at 1940 Mscf.

2. Emissions Limits: Actual average emissions of benzene from the process vents to the atmosphere for each of the TEG dehydration units approved in this permit for installation and operation at the facility shall be maintained at less than 0.9 megagrams (Mg), or 1 ton, in any consecutive 12-month period. The emission limits shall apply at all times.

Observation: Mr. Hamm provided emissions calculations for the period of June 1, 2020 through December 31, 2021 as well as GYLCALC model runs and wet gas analysis to show compliance with this requirement. Based on the information provided by Mr. Hamm, the benzene has been maintained below 0.9 Mg throughout this entire timeframe.

3. Emissions Calculation Requirements: The Permittee shall meet the following requirements for each TEG dehydration unit:

(a) Actual average benzene emissions shall be calculated and recorded on an annual basis. The first emissions calculations period shall cover the first calendar month that this permit is effective through December 31st of 2022. Thereafter the emissions calculation period shall cover January 1st through December 31st of each year. Actual average benzene emissions shall be calculated, and recorded, in Mg and tons.

(b) Prior to 12 calendar months of benzene emissions calculations, the Permittee shall add the emissions for that month to the calculated emissions for all previous months since the effective date of the permit and record the total. Thereafter, the Permittee shall add the emissions for each month to the calculated emissions for the preceding 11 months and record a new 12-month total.

Observation: Mr. Hamm provided emissions calculations for the period of June 1, 2020 through December 31, 2021 as well as GYLCALC model runs and wet gas analysis to show compliance with this requirement. The recent GLYCALC model runs were dated August 21, 2021 and July 27, 2020. The recent wet gas analysis taken on August 13, 2021 and June 18, 2020 recorded 0.0% benzene, therefore benzene emissions are also zero from the dehydration units after that analysis.

(c) Actual average benzene emissions shall be calculated for each calendar month using GRI-GLYCalc™ model, Version 4.0 or higher, and the following input parameters:

(i) The inlet wet gas stream properties provided in the most recent annual extended wet gas analysis required in Section I.C.5. of this permit;
(ii) The temperature and pressure of the inlet wet gas provided in the most recent annual extended wet gas analysis;
(iii) The average natural gas throughput for the current year in Mscfd, calculated and recorded according to Section I.C.6.(d) of this permit.
(iv) The monthly TEG recirculation pump rate in gallons per minute (gpm), as determined according to Section I.C.6(c)(v) of this permit;

(v) The water content of the dry gas, in pounds water per MMscf, shall be based on sales contract specifications; and

(vi) The flash tank temperature and pressure shall be measured based upon actual annual average operating conditions at the time of calculations. If the flash tank vents to the atmosphere, those emissions shall be added to the regenerator emissions.

Observation: Mr. Hamm provided the previous 2 years of GYLCALC model runs and wet gas analysis. The recent GLYCALC model runs were dated August 21, 2021 and July 27, 2020.

4. Control and Operational Requirements: The Permittee shall meet the following requirements for the TEG dehydration units:

(a) Each TEG dehydration system shall be equipped with a flash gas separator that removes and routes all flash gas emissions to a compressor to be recycled or recompressed or to the TEG regenerator burner for fuel.

Observation:As confirmed during the September 4, 2019 inspection by the Southern Ute Indian Tribe, Ignacio is equipped with a flash gas separator.

(b) Each TEG dehydration system shall be equipped with a calibrated natural gas flow meter or dedicated sales meter for each system to monitor system throughput.

Observation: Mr. LeCortz and Ms. Kim viewed the natural gas flow meter onsite and recorded 1940 Mscf at the time of inspection.

(c) For each TEG dehydration system, only one TEG recirculation pump shall operate at any given time.

Observation: Mr. LeCortz and Ms. Kim witnessed that only one TEG recirculation pump operated while onsite.

(d) The Tejas TEG dehydration system shall be equipped with an elevated dispersion stack on the TEG regenerator still vent column.[1]

(e) The Permittee shall install, calibrate, operate and maintain an electronically controlled

[1] The dispersion stack was installed on the Tejas TEG dehydration system on June 28, 2016 to comply with the May 2, 2016 Settlement Agreement with the SUIT.

temperature-sensing device on each TEG dehydration system regenerator still vent column capable of continuously measuring and recording the operating temperature of the steam exiting the regenerator still vent column, such as a thermocouple and data logger. Each temperature-sensing device shall collect and record data at least once every 15 minutes. Each TEG dehydration system regenerator shall also be equipped with a high temperature shut-down device that is set to automatically shut down the unit and notify the operator if the steam exiting the regenerator exceeds the temperature limit specified in this permit.

(f) The Permittee shall ensure that the operating temperature of the steam exiting each regenerator still vent column does not exceed 400 ºF.

(g) The Permittee shall follow, for all the components of each TEG dehydration system, including each temperature-sensing device, recording device, high-temperature shut-down device and natural gas flow meter, the manufacturer's recommended maintenance schedule and procedures to ensure optimum performance and compliance with the requirements of this permit.

Observation: Mr. Hamm provided information to the EPA to evaluate the temperature of steam exiting the regenerator still column vent since January 1, 2020 – December 31, 2021. There were no instances of regenerator still column steam temperatures exceeding 400°F.

(h) The Permittee shall minimize leaks of hydrocarbon emissions from all vent lines, connections, fittings, valves, relief valves or any other appurtenance employed to contain, collect and transport gases, vapors and fumes from the flash gas separators to the compressors to be recycled or recompressed or to the TEG regenerator burner for fuel.

Observation: EPA inspectors brought a FLIR camera and did not record leaks of hydrocarbon emissions from the dehydration units.

5. Testing Requirements: The Permittee shall obtain an extended wet gas analysis of the inlet wet gas stream to the absorber tower of each TEG dehydration system at least once per calendar year, with no more than 14 months separating each sampling event. The initial analysis shall be obtained within 180 days of the effective date of this permit. The analysis shall include the inlet gas temperature and pressure at which the sample was taken.

Observation: Mr. Hamm provided the previous 2 years of wet gas analysis' to show compliance with this requirement. The recent wet gas analysis taken on August 13, 2021 and June 18, 2020.

6. Monitoring and Recordkeeping Requirements

(a) The Permittee shall manually read and record the temperature of the steam exiting the regenerator still vent and inspect the temperature sensing and recording devices and the

logged temperature data at least once every calendar month to ensure the high-temperature shutdown device is functioning properly, beginning with the first calendar month that this permit is effective.

Observation: Mr. Hamm provided information to the EPA during the records review to verify regenerator still vent temperature.

(b) The Permittee shall use a lock-out tag-out system for each TEG recirculation pump connected to each TEG dehydration unit that is not in service, to demonstrate compliance with the requirement that only one pump operate at any given time.

Observation: Mr. Franchini pointed out the locked-out TEG recirculating pump on the Valerus dehydration unit and noted that they cannot run at the same time. The Tejas unit was not operating during the onsite inspection.

(c) The Permittee shall manually read and record the glycol pump recirculation rate of each operating TEG recirculation pump connected to each TEG dehydration unit at least once every calendar month, beginning with the first calendar month that this permit is effective, with no more than 31 days separating each reading.

Observation: Mr. Hamm provided information to the EPA to evaluate the temperature of steam exiting the regenerator still column vent since June 1, 2020 - Present.

(d) The Permittee shall manually read and record the flow of natural gas through each TEG dehydration system at least once per calendar year. The first manual reading shall be made within 7 days of the effective date of this permit. The first measurement period shall cover the period from the first reading through December 31, 2022. Thereafter each measurement period shall cover January 1st through December 31st of each year. The Permittee shall calculate and record the average throughput for each TEG dehydration unit for the measurement period in Mscfd. The throughput shall be calculated by subtracting the previous manual reading in Mscf from the current manual reading in Mscf and dividing the throughput by the number of days since the last manual reading.

(e) The Permittee shall also keep records of the following:

(i) The annual benzene emissions calculations, the GRI-GLYCalc™ model input parameters (Input Summary Report) and the GRI-GLYCalc™ model output reports (Emissions Summary Report) for each TEG dehydration unit;

(ii) The manufacturer's or vendor's written, site-specific engineering specifications, operating instructions, operating procedures and maintenance schedules for each TEG dehydration system, regenerator still vent column temperature sensing and recording device, and high-temperature shut-down device;

(iii) Reports of all required extended wet gas analyses of the inlet wet gas stream to each TEG dehydration system;
(iv) Any instances of an exceedance of the maximum operating temperature of the steam exiting any regenerator still vent column specified in this permit, including:

(A) The date and time the unit began operating above the maximum regenerator still vent column operating temperature specified in this permit and the high temperature shutdown device was activated;
(B) The date, time and temperature recorded at the time when the system subsequently began compliant operation; and
(C) Any corrective actions taken, and preventative measures adopted to bring the operating temperature back into compliance.

(v) The operating hours of each TEG recirculation pump connected to each TEG dehydration unit, including the startup date and time and subsequent shut down date and time for each pump;
(vi) The monthly TEG recirculation pump rates;
(vii) Copies of natural gas sales contract specifications documenting the water content of the dry gas used in calculating actual average benzene emissions according to Condition I.C.3(c) of this permit; and
(viii) Any instances in which the temperature-sensing device installed to measure the operating temperature in each TEG dehydration unit regenerator still vent column or the temperature data logger is not operational, including:

(A) The date, time and duration of the malfunction; and
(B) Any corrective actions taken, and any preventative measures adopted to avoid such malfunction.

Observation: Mr. Hamm provided the following reports as requested for calendar year 2020 and 2021: benzene emissions calculations, GLYCalc model inputs and outputs for each dehydration unit, wet gas analysis, operating temperature of the regenerator still vent column, dehydration unit operating hours and glycol pump rates, and instances of temperature-sensing device deviations.

Mr. Hamm provided records to the EPA showing the flow of natural gas through each TEG dehydration system since June 1, 2020 – December 2021. During this period the Tejas dehydration unit did not operated and the Valerus operated at an average of 25.4 MMscfd.

C. Requirements for 4SLB Compressor Engines

1. Construction and Operational Requirements

(a) The Permittee shall install, continuously operate and maintain emissions controls as specified in this permit on eight existing engines used for field gas compression, all

meeting the following specifications:

(i) Operated as a 4-stroke lean-burn (4SLB) engine;
(ii) Fired with natural gas;
(iii) Equipped with a non-resettable hours of operation meter; and
(iv) Four engines limited to a maximum site rating of 1,198 hp (nameplate rating of 1340 hp), two engines limited to a maximum site rating of 1,192 hp (nameplate rating of 1,265 hp) and two engines limited to a maximum site rating of 1,156 hp (nameplate rating of 1,340 hp).[2]

(b) Only the engines that are operated and controlled as specified in this permit are approved for installation under this permit.

2. Emissions Limits

(a) The Permittee shall meet the following emissions limits for engines E1, E2, E3 and E4 each with nameplate rating of 1,340 hp:

(i) NO_X emissions shall not exceed 1.55 pounds per hour (lb/hr) and 6.77 tons in any 12 consecutive calendar months;
(ii) CO emissions shall not exceed 2.81 lb/hr and 12.31 tons in any 12 consecutive calendar months;
(iii) VOC emissions shall not exceed 0.79 lb/hr and 3.45 tons in any 12 consecutive calendar months; and
(iv) Formaldehyde emissions shall not exceed 0.27 lb/hr and 1.17 tons in any 12 consecutive calendar months.

(b) The Permittee shall meet the following emissions limits for engines E5 and E6, each with nameplate rating of 1,265 hp:

(i) NO_X emissions shall not exceed 4.07 lb/hr and 17.83 tons in any 12 consecutive calendar months;
(ii) CO emissions shall not exceed 2.63 lb/hr and 11.50 tons in any 12 consecutive calendar months;
(iii) VOC emissions shall not exceed 2.10 lb/hr and 9.20 tons in any 12 consecutive calendar months; and
(iv) Formaldehyde emissions shall not exceed 0.13 lb/hr and 0.56 tons in any 12 consecutive calendar months.

(c) The Permittee shall meet the following emissions limits for engines E7 and E8, each with nameplate rating of 1,340 hp:

[2]Engine conditions herein after refer to the nameplate rated hp for ease of compliance inspection.

(i) NO_X emissions shall not exceed 3.95 lb/hr and 17.29 tons in any 12 consecutive calendar months;
(ii) CO emissions shall not exceed 2.55 lb/hr and 11.15 tons in any 12 consecutive calendar months;
(iii) VOC emissions shall not exceed 2.04 lb/hr and 8.92 tons in any 12 consecutive calendar months; and
(iv) Formaldehyde emissions shall not exceed 0.12 lb/hr and 0.54 tons in any 12 consecutive calendar months.

(d) Emissions limits shall apply at all times, unless otherwise specified in this permit.

Observation: The performance tests can be found in Table 4 below. While onsite, Mr. LeCortz and Ms. Kim recorded different horsepower name plate ratings on the engines E1, E2, and E3 compared to what is permitted (see Table 2 for observations). According to information provided by Mr. Hamm, The conversion to WPW Plus engines for units E1-E4 and the likely lack of change to the data plates could cause some confusion at onsite inspection. Manufacture gas engine rating pro (GERP) runs account for the site specific hp with de-ratings based on fuel input and altitude impacts.

3. Control, Operation and Maintenance Requirements

(a) The Permittee shall install, continuously operate and maintain a catalytic control system on each engine that reduces the uncontrolled emissions of CO, VOC and formaldehyde such that the emissions limits in this permit are met at all times the engine and catalytic control system are operating.

Observation: During the inspection, Mr. LeCortz verified the engines were equipped with catalytic control systems on each engine.

(b) The Permittee shall change the oil and filter and inspect and, as necessary, replace the spark plugs hoses and belts of each engine every 2,160 hours of operation, or once every 12 calendar months, whichever comes first.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine maintenance plans and maintenance conducted for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022. Each engine appeared to have the oil and oil filter changed prior to 2,160 hours of operation and the components inspected at least monthly.

(c) The Permittee shall follow, for each engine and its respective catalytic control system, the manufacturer's recommended maintenance schedule and procedures or equivalent procedures developed by the Permittee or vendor, to ensure optimum performance of

each engine and its respective catalytic control system to ensure compliance with the required NO_X, CO, VOC and formaldehyde emissions limits and control efficiencies in this permit.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine maintenance plans and maintenance conducted for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022.

(d) The Permittee shall install, operate and maintain electronically controlled temperature-sensing devices on each engine that measure and record the exhaust temperatures at the inlet and exhaust of each catalyst bed, such as thermocouple or resistance temperature detectors and data loggers. Each temperature-sensing device shall be calibrated and operated according to manufacturer specifications or equivalent specifications developed by the Permittee or vendor. Each temperature-sensing device shall collect and record data at least once every week. For measuring temperature range, the temperature sensor shall have a minimum tolerance of 2.8 °C (5 °F) or 1% of the measurement range, whichever is larger.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine temperature records for the inlet and exhaust for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022 for calendar years 2020 and 2021.

Based on information provided by Mr. Hamm, 4 instances exceeded the 15-minute monitoring requirement at 1:15 am on March 14, 2021 for engines E2, E3, E4 and E8. Mr. Hamm noted that this may indicate a potential software glitch.

Additionally, from June 30, 2020 through December 31, 2021, engine E7 recorded 22 intervals and 5.5 hours total of "random skips" of temperature monitoring. EPA advises Arkoma to review and inspect the CPMS to look for possible errors. These occurrences do not appear to show high temperatures, but instead an issue with the data loggers or temperature-sensing devices that may not be calibrated or operated according to manufacturer specifications or equivalent specifications developed by the Permittee or vendor.

(e) The Permittee shall install, continuously operate and maintain an electronically controlled high temperature shut down device at the inlet to the catalyst bed for each engine that detects if the catalyst inlet temperature exceeds the maximum temperature specified in paragraph (f). The device shall be equipped with an alarm that notifies operating personnel each time the engine is shut down.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine temperature records for the inlet and exhaust for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022. It appeared that at no point did the catalyst inlet temperature exceeded 1,350°F. Instances of temperatures below 450°F appeared well marked to denote engine nonoperating/startup status.

(f) Except during startups, which shall not exceed 30 minutes, the exhaust temperature of each engine at the inlet to the catalyst bed shall be maintained, at all times the engines operate, between 450 ºF and 1,350 ºF.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine temperature records for the inlet and exhaust for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022. It appeared that at no point did the catalyst inlet temperature exceeded 1,350°F. Instances of temperatures below 450°F appeared well marked to denote engine nonoperating/startup status.

(g) The Permittee shall install, operate and maintain pressure sensing devices before and after the catalyst bed to obtain direct readings of the pressure drop across the catalyst bed (also referred to as the differential pressure). *[Explanatory Note to Permittee: Differential pressure measurements, in general, are used to show the pressure across the filter elements. This information will determine when the elements in the catalyst bed are fouling, blocked or blown out and thus require cleaning or replacement.]*

Observation: During the inspection Mr. LeCortz and Ms. Kim verified the pressure drop parameters for each engine at Ignacio. See Table 1 above. Mr. LeCortz and Ms. Kim noted that some engines pressure sensing devices appeared to vary by greater than 0.25 inches of H2O during the onsite inspection, specifically engine E6, however the engine operating percentage did not fluctuate. EPA advises Arkoma to review and inspect the pressure sensing devices or catalyst for possible issues to avoid possible errors.

Additionally, during the records review, Mr. Hamm responded that Ignacio has been operating with a 10% variance of the ±2 inches of water standard. Mr. Hamm believed that the permit derived from MACT ZZZZ allowed for 10% of the baseline pressure to be in addition to the ±2 inches of water—effectively increasing or decreasing the limit in which Ignacio would take corrective action for the catalyst. This is an incorrect interpretation of both the permit and MACT ZZZZ standards, as the ±2 inches of water requirement does not allow for any metric modification.

(h) During operation the pressure drop across the catalyst bed on each engine shall be maintained to within ±2 inches of water from the baseline pressure drop reading taken during the most recent performance test. The baseline pressure drop for the catalyst bed shall be determined at 90% or higher of the engine load, as measured during the most recent performance test.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine baseline pressure and change in pressure for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022.

From July 18, 2021 through September 18, 2021, engine E3 recorded 13 instances where the differential pressure deviated above the established baseline limit (greater than 2 inches of water). Corrective action did not occur during this 2 month period. The catalyst was cleaned on September 20, 2021 where afterwards the change in pressure was within ±2 inches of water from the baseline pressure drop reading taken during the most recent performance test. Additionally, EPA found records of 3 instances on February 2, 2021 through March 1, 2021 where the pressure was recorded outside of the established baseline. EPA could find no records that corrective action occurred however notes from Arkoma indicate that the engine had a performance test conducted. That deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

From June 29, 2021 through August 23, 2021, engine E2, EPA found records of 12 instances where the differential pressure deviated above the established baseline limit. The established baseline was recorded as 3.37. Corrective action did not occur during this 2 month period. The engine was shut down on August 23, 2021 and the next pressure recording was within the allowable limit. Engine maintenance forms provided by Mr. Hamm note that the catalyst was cleaned on August 23, 2021. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

On September 28, 2021, engine E5 recorded one instance where the differential pressure deviated above the established baseline limit. It could not be determined if corrective action occurred during this event as required by Section F of permit #SMNSR-SU-000052-2021.004.

Additionally, during the records review, Mr. Hamm responded that Ignacio has been operating with a 10% variance of the ±2 inches of water standard. Mr. Hamm believed that the permit derived from MACT ZZZZ allowed for 10% of the baseline pressure to be in addition to the ±2 inches of water—effectively increasing or decreasing the limit in which Ignacio would take corrective action for the catalyst. This is an incorrect interpretation of both the permit and MACT ZZZZ standards, as the ±2 inches of water requirement does not allow for any metric modification.

EPA has concerns that improper control, operations and maintenance at Ignacio may lead to further exceedances of permit conditions.

(i) The Permittee shall only fire each engine with natural gas that is discharged from the facility and has been accepted as pipeline-quality for sales in all respects except that the carbon dioxide (CO_2) concentration in the gas is not required to be within pipeline-quality.

(j) The Permittee may rebuild an existing permitted engine or replace an existing permitted engine with a 4SLB engine of the same nameplate hp rating and configured to operate in the same manner as the engine being rebuilt or replaced. Any operational requirements, control technologies, testing or other provisions that apply to the engines that are rebuilt or replaced shall also apply to the replacement engines.

(k) The Permittee may resume operation without the catalytic control system during an engine break-in period, not to exceed 200 operating hours, for any rebuilt or replaced engines.

4. Performance Test Requirements

(a) Performance tests shall be conducted on each engine and associated catalytic control system for measuring NO_X, CO, VOC and formaldehyde to demonstrate compliance with the emission limits and control efficiency requirements specified in this permit. The performance tests shall be conducted in accordance with the procedures specified in 40 CFR, part 60, appendix A, Methods 1-4 and 3A, and the procedures specified in ASTM D6348-03,[3] provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique). Each test shall be conducted using a Fourier Transform Infra-Red (FTIR) gas analyzer. Reference methods 1-4 shall be used to determine the exhaust flow rate. Reference method 3A shall be used to determine oxygen (O_2) content. A thermocouple shall be used to determine the stack temperature and the reading shall be verified using a calibrated thermometer. All exhaust flow measurements shall be taken at the point of sampling. The moisture content and CO_2 shall be measured throughout the test using the FTIR.

Observation: during the records review, Mr. LeCortz reviewed the recent performance tests reference methods. The tests were conducted using a Fourier Transform Infra-Red (FTIR) gas analyzer, following reference method ASTM D6348–03 as incorporated by reference in 40 CFR 60.4244 (NSPS, Subpart JJJJ).

(i) An initial performance test shall be conducted no later than 60 calendar days after the effective date of this permit, as well as no later than 60 calendar days after installation of a catalytic control system on an engine that is rebuilt or replaced, or if a catalytic element has been replaced. The pressure drop across the catalyst and the catalyst inlet temperature shall be manually read and recorded during the initial performance test. The results of initial performance tests conducted prior to the effective date of this permit may be used to demonstrate compliance with the initial performance test requirements, provided the tests were conducted in an equivalent manner as the performance test requirements in this permit.

(ii) Subsequent performance tests shall be conducted semi-annually on each engine. After compliance is demonstrated for two consecutive tests, the testing frequency may be reduced to annually. If an annual test indicates non-compliance, then the Permittee shall resume semi-annual testing.

[3] You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

Observation: Upon request, Mr. Hamm provided the performance tests for each engine during calendar year 2021 and 2022. Engine tests are now being conducted annually after compliance was demonstrated for two consecutive tests. The results are found below in Table 4.

EPA has concerns that improper catalyst operations at Ignacio have and may lead to further exceedances of permit conditions. Arkoma also should cease operating of the engine or conduct performance tests on the engines that have deviated from the operating limitations within 90 calendar days, as specified in this permit, to ensure that the emission limits are being met and to re-establish the baseline pressure drop across the catalyst bed. Performance tests or engine cessation shall occur if Arkoma had investigated or corrected the deviation in the catalytic control system via manufacturer recommended procedures, and the pressure continued to exceed ± 2 inches of water from the baseline pressure drop. However, based on the information provided, it cannot be determined what methods Arkoma completed to investigate or correct the pressure reading exceedances.

Table 4: Annual Performance Test Results

Emission Unit	Test Date	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	CH2O (lb/hr)	Pass (Yes/ No)
E1	3/1/2021	1.11	0.04	0.22	0.14	Yes
E2	3/1/2021	1.12	0.12	0.15	0.15	Yes
E3	3/2/2021	1.21	0.13	0.19	0.15	Yes
E4	3/3/2021	1.20	0.05	0.17	0.03	Yes
E5	3/2/2021	1.56	0.20	0.10	0.12	Yes
E6	Not tested (like-kind engine installed 3/24/2021)					NA
E7	3/3/2021	3.30	0.09	0.12	0.05	Yes
E8	3/3/2021	3.38	0.08	0.20	0.12	Yes
E1	3/14/2021	0.95	0.12	0.25	0.18	Yes
E2	3/17/2022	1.21	0.14	0.12	0.11	Yes
E3	3/18/2022	1.00	0.16	0.13	0.05	Yes
E4	3/17/2022	1.34	0.04	0.07	0.05	Yes
E5	3/14/2022	3.06	0.07	0.08	0.10	Yes
E6	3/16/2022	3.58	0.08	0.14	0.10	Yes
E7	3/16/2022	3.58	0.03	0.69	0.11	Yes
E8	3/18/2022	3.50	0.07	0.10	0.11	Yes

(b) The Permittee may submit to the EPA a written request for approval of alternate test methods but shall only use the alternate test methods after obtaining written approval

from the EPA.

(c) The Permittee shall not perform engine tuning or make any adjustments to engine settings, catalytic control system settings, processes or operational parameters immediately prior to the engine testing or during the engine testing. Any such tuning or adjustments may result in a determination by the EPA that the test is invalid.

(d) The Permittee shall not abort any engine tests that demonstrate non-compliance with the emission limits specified in this permit.

(e) All performance tests conducted on the engines shall meet the following requirements:

(i) Each test shall be conducted at 90% load or higher and according to the requirements in 40 CFR 60.8 and under the specific conditions that are specified in Appendix A of this permit (Requirements for Performance Tests). It is not necessary to artificially load the engine in order to perform the test;

Observation: All performance tests reviewed were conducted at greater than 90% of site-rated HP based on the information provided.

(ii) Performance tests shall not be conducted during periods of startup, shutdown or malfunction, as specified in 40 CFR 60.8(c);

Observation: All performance tests reviewed were conducted during periods of normal operations.

(iii) Each test required in this permit shall consist of at least three separate 1-hour or longer test runs, as specified in 40 CFR 60.8(f);

Observation: during the records review, Mr. LeCortz reviewed the recent performance tests. Each of the three runs lasted just over an hour.

(iv) During each test run, data shall be collected on all parameters necessary to document how emissions were measured or calculated (such as test run length, minimum sample volume, volumetric flow rate, moisture and oxygen corrections, etc.);

(v) Regarding tests for formaldehyde emissions, the percent R shall be greater than or equal to 70 and less than or equal to 130, and the formaldehyde concentration shall be at 15% O_2, dry basis;

(vi) The engine hp shall either be provided by the Permittee or determined using manufacturer specifications;

(vii) Results from all performance tests shall be reported in units of lb/hr;

(A) To determine compliance with the NO_X emission limits in this permit, first

convert the concentration of NO_X in the engine exhaust using Equation 1 of this permit:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 1)}$$

Where:
ER = Emission rate of NO_X in grams per hp-hour (g/hp-hr)
C_d = Measured NO_X concentration in parts per million by volume (ppmv)
1.92 x 10^{-3} = Conversion constant for ppm NO_X to grams per standard cubic meter at 20 degrees Celsius
Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.
T = Time of test run, in hours
Hp-hr = Brake work of the engine, in hp-hr

Then, convert the concentration of NO_X in g/hp-hr to pounds per hour (lb/hr) using the following equation: (NO_X g/hp-hr) x (hp) ÷ (454 g/lb).

(B) To determine compliance with the CO emission limits in this permit, convert the concentration of CO in the engine exhaust using Equation 2 of the permit:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 2)}$$

Where:
ER = Emission rate of CO in g/hp-hr.
C_d = Measured CO concentration in ppmv.
1.164 × 10^{-3} = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in hp-hr.

Then, convert the concentration of CO in g/hp-hr to pounds per hour (lb/hr) using the following equation: (CO g/hp-hr) x (hp) ÷ (454 g/lb).

(C) For purposes of this permit, when calculating emissions of VOC, emissions of formaldehyde shall not be included. To determine compliance with the VOC emission limits in this permit, convert the concentration of VOC in the engine exhaust using Equation 3 of this permit:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 3)}$$

Where:
ER = Emission rate of VOC in g/hp-hr.
C_d = VOC concentration measured as propane in ppmv.
1.833×10^{-3} = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in hp-hr.

Then, convert the concentration of VOC in g/hp-hr to pounds per hour (lb/hr) using the following equation: (VOC g/hp-hr) x (hp) ÷ (454 g/lb).

(viii) If the engine and control system fail to meet any emission limit specified in this permit, appropriate steps shall be taken to correct the deficiency and the engine and control system shall be retested within 30 days after the failed test;

(ix) Performance test plans for alternate test methods shall be submitted to the EPA for approval at least 60 calendar days prior to the date the test is planned; and

(x) Alternate test plans shall include and address the following elements:

(A) Purpose of the test;
(B) Engines and catalytic control systems to be tested;
(C) Expected engine operating rate(s) during the test;
(D) Sampling and analysis procedures (sampling locations and test methods);
(E) Quality assurance plan (calibration procedures and frequency and field documentation; and
(F) Data processing and reporting (description of data handling and quality control procedures, report content).

Observation: Mr. LeCortz reviewed the recent performance tests, which included information satisfying Conditions C.4.iv through x above.

(f) The Permittee shall notify the EPA at least 30 calendar days prior to scheduled performance testing. The Permittee shall notify the EPA at least 1 week prior to scheduled performance testing if the testing cannot be performed.

(g) If a permitted engine is not operating, the Permittee does not need to start up the engine solely to conduct the subsequent performance test. The subsequent performance test requirements apply when the engine is restarted and operates more than 720 consecutive hours (or 30 consecutive days) in a given semi-annual period. If an engine for which the EPA has been notified of a scheduled test is permanently shut down prior to testing, the Permittee does not need to start up the engine solely to conduct the performance test.

5. Monitoring Requirements

(a) The Permittee shall manually read and record the exhaust temperatures of each engine at the inlet and outlet to each catalyst bed and the pressure drop across each catalyst bed at least once per calendar week, beginning with the first week that this permit is effective. Subsequent manual readings shall be at least 6 days apart. On the same day as each weekly manual temperature reading, the permittee shall review the logged temperature data from the electronically controlled temperature-sensing devices on each engine to verify that the engine exhaust temperature at the inlet to each catalyst bed has been maintained within the acceptable range specified in this permit since the previous manual reading. Subsequent performance tests, as required in this permit, can be used to meet the weekly periodic temperature and pressure drop monitoring requirements provided the test occurs within the same period in which the reading would have been required. The readings may be a one-time measurement, the average of performance test runs conducted, or an average of all the measurements taken if continuous readings are taken.

Observation: Following the onsite inspection, Mr. LeCortz requested the engine temperature records for the inlet and exhaust, and the engine baseline pressure and change in pressure for each engine. Mr. Hamm provided the information as requested via email on August 8, 2022 for calendar years 2020 and 2021.

From July 18, 2021 through September 18, 2021, engine E3 recorded 13 instances where the differential pressure deviated above the established baseline limit (greater than 2 inches of water). Corrective action did not occur during this 2 month period. The catalyst was cleaned on September 20, 2021 where afterwards the change in pressure was within ±2 inches of water from the baseline pressure drop reading taken during the most recent performance test. Additionally, EPA found records of 3 instances on February 2, 2021 through March 1, 2021 where the pressure was recorded outside of the established baseline. EPA could find no records that corrective action occurred however notes from Arkoma indicate that the engine had a performance test conducted.

That deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

From June 29, 2021 through August 23, 2021, engine E2, EPA found records of 12 instances where the differential pressure deviated above the established baseline limit. The established baseline was recorded as 3.37. Corrective action did not occur during this 2 month period. The engine was shut down on August 23, 2021 and the next pressure recording was within the allowable limit. Engine maintenance forms provided by Mr. Hamm note that the catalyst was cleaned on August 23, 2021. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

On September 28, 2021, engine E5 recorded one instance where the differential pressure deviated above the established baseline limit. It could not be determined if corrective action occurred during this event. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

Additionally, during the records review, Mr. Hamm responded that Ignacio has been operating with a 10% variance of the ±2 inches of water standard. Mr. Hamm believed that the permit derived from MACT ZZZZ allowed for 10% of the baseline pressure to be in addition to the ±2 inches of water—effectively increasing or decreasing the limit in which Ignacio would take corrective action for the catalyst. This is an incorrect interpretation of both the permit and MACT ZZZZ standards, as the ±2 inches of water requirement does not allow for any metric modification.

EPA has concerns that improper monitoring at Ignacio may lead to further exceedances of permit conditions.

(b) Thirty minutes after each engine startup, the Permittee shall manually read and record the engine exhaust temperature at the inlet to the catalyst bed.

Observation: Engine temperature records data provided by Mr. Hamm appears to show confirmation of exhaust temperatures after startup which notes proper inlet temperature to the catalyst for each engine.

(c) Except during startups, which shall not exceed 30 minutes, if the engine exhaust temperature at the inlet to the catalyst bed on any engine deviates from the acceptable range specified in this permit, then the following actions shall be taken. The Permittee's completion of any or all of these actions shall not constitute, nor qualify as, an exemption from any other emission limits in this permit.

(i) Within 24 hours of determining a deviation of the engine exhaust temperature at the inlet to the catalyst bed, the Permittee shall investigate. The investigation shall include testing the temperature sensing device, inspecting the engine for performance problems and assessing the catalytic control system for possible damage that could affect catalytic system effectiveness (including, but not limited to, catalyst housing damage, and fouled, destroyed or poisoned catalyst).

(ii) If the engine exhaust temperature at the inlet to the catalyst bed can be corrected by following the engine manufacturer recommended procedures or equivalent procedures developed by the Permittee or vendor, and the catalytic control system has not been damaged, then the Permittee shall correct the engine exhaust temperature at the inlet to the catalyst bed within 24 hours of inspecting the engine and catalytic control system.

(iii) If the engine exhaust temperature at the inlet to the catalyst bed cannot be corrected using the engine manufacturer recommended procedures or equivalent procedures developed by the Permittee or vendor, or the catalytic control system has been damaged, then the affected engine shall cease operating immediately and shall not be returned to routine service until the following has been met:

(A) The engine exhaust temperature at the inlet to the catalyst bed is measured and found to be within the acceptable temperature range for that engine; and

(B) The catalytic control system has been repaired or replaced, if necessary.

Observation: Engine temperature records data provided by Mr. Hamm appears to show confirmation of exhaust temperatures after startup which notes proper inlet temperature to the catalyst for each engine.

(d) If the pressure drop reading exceeds ± 2 inches of water from the baseline pressure drop established during the most recent performance test, then the following actions shall be taken. The Permittee's completion of any or all of these actions shall not constitute, nor qualify as, an exemption from any other emission limits in this permit.

(i) Within 24 hours of determining a deviation of the pressure drop across the catalyst bed, the Permittee shall investigate. The investigation shall include testing the pressure transducers and assessing the catalytic control system for possible damage that could affect catalytic system effectiveness (including, but not limited to, catalyst housing damage, and plugged, fouled, destroyed or poisoned catalyst).

(ii) If the pressure drop across the catalyst bed can be corrected by following the catalytic control system manufacturer recommended procedures or equivalent procedures developed by the Permittee or vendor, and the catalytic control system has not been damaged, then the Permittee shall correct the problem within 24

hours of inspecting the catalytic control system.

(iii) If the pressure drop across the catalyst bed cannot be corrected using the catalytic control system manufacturer recommended procedures or equivalent procedures developed by the Permittee or vendor, or the catalytic control system is damaged, then the Permittee shall do one of the following:

(A) Conduct a performance test within 90 calendar days, as specified in this permit to ensure that the emission limits are being met, and to re-establish the baseline pressure drop across the catalyst bed; or

(B) Cease operating the affected engine immediately. The engine shall not be returned to routine service until the pressure drop is measured and found to be within the acceptable pressure range for that engine, as determined from the most recent performance test. Corrective action may include removal and cleaning of the catalyst or replacement of the catalyst.

Observation: From July 18, 2021 through September 18, 2021, engine E3 recorded 13 instances where the differential pressure deviated above the established baseline limit (greater than 2 inches of water). Corrective action did not occur during this 2 month period. The catalyst was cleaned on September 20, 2021 where afterwards the change in pressure was within ±2 inches of water from the baseline pressure drop reading taken during the most recent performance test. Additionally, EPA found records of 3 instances on February 2, 2021 through March 1, 2021 where the pressure was recorded outside of the established baseline. EPA could find no records that corrective action occurred however notes from Arkoma indicate that the engine had a performance test conducted. That deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

From June 29, 2021 through August 23, 2021, engine E2, EPA found records of 12 instances where the differential pressure deviated above the established baseline limit. The established baseline was recorded as 3.37. Corrective action did not occur during this 2 month period. The engine was shut down on August 23, 2021 and the next pressure recording was within the allowable limit. Engine maintenance forms provided by Mr. Hamm note that the catalyst was cleaned on August 23, 2021. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

On September 28, 2021, engine E5 recorded one instance where the differential pressure deviated above the established baseline limit. It could not be determined if corrective action occurred during this event. This deviation was not reported as required by Section F of permit #SMNSR-SU-000052-2021.004.

Additionally, during the records review, Mr. Hamm responded that Ignacio has been operating with a 10% variance of the ±2 inches of water standard. Mr. Hamm believed that the permit derived from MACT ZZZZ allowed for 10% of the baseline pressure to be in addition to the ±2 inches of water—effectively increasing or decreasing the limit in which Ignacio would take

corrective action for the catalyst. This is an incorrect interpretation of both the permit and MACT ZZZZ standards, as the ±2 inches of water requirement does not allow for any metric modification.

EPA has concerns that improper catalyst operations at Ignacio have and may lead to further exceedances of permit conditions. Arkoma also should cease operating of the engine or conduct performance tests on the engines that have deviated from the operating limitations within 90 calendar days, as specified in this permit, to ensure that the emission limits are being met and to re-establish the baseline pressure drop across the catalyst bed. Performance tests or engine cessation shall occur if Arkoma had investigated or corrected the deviation in the catalytic control system via manufacturer recommended procedures, and the pressure continued to exceed ± 2 inches of water from the baseline pressure drop. However, based on the information provided, it cannot be determined what methods Arkoma completed to investigate or correct the pressure reading exceedances.

(e) The Permittee is not required to conduct emissions monitoring of exhaust temperature and catalyst differential pressure on engines that have not operated during the monitoring period. The Permittee shall certify that the engine did not operate during the monitoring period in the semi-annual report required in this permit.

Observation: There was nothing to evaluate regarding this condition.

6. Emissions Calculation Requirements: The Permittee shall meet the following requirements for each of the eight existing engines:

(a) Actual NO_X, CO, VOC and formaldehyde emissions shall be calculated and recorded at the end of each calendar year. The first calculation period shall cover the period from the effective date of this permit through December 31, 2022. Thereafter each calculation period shall cover the period from January 1st through December 31st of each year. Actual emissions shall be calculated and recorded in tons, at the end of each calendar year, for each calendar month in the 12-month period.

(b) At the end of the first emissions calculation period, the Permittee shall, add the emissions for each calendar month in that period, beginning with the first calendar month this permit is effective, and record the total. Thereafter, at the end of each calendar year, the Permittee shall, add the emissions for each month in the calculation period to the calculated emissions for the preceding 11 months and record new 12-month totals.

(c) Emissions shall be calculated as follows:

(i) NO_X, CO, VOC and formaldehyde emissions shall be calculated by multiplying the most recent performance test results and calculated emission rate for each engine in lb/hr by the number of operating hours for the engine for each calendar year in the calculation period and then by converting that amount to tons; and

(ii) Emissions calculations for the reporting period shall account for any engine break-in period where the engine was operated without the catalytic control system installed. Emissions during break-in periods shall be calculated by multiplying the manufacturer-specified emission factors in lb/hr for an uncontrolled engine by the hours the engine operated without the catalytic control system installed for that period.

Observation: Mr. LeCortz reviewed the annual emissions inventory provided by Arkoma for calendar year 2021. There were no exceedances of the permitted emissions limits based on the information provided. The results are found below in Table 5.

Table 5: Annual Engine Emissions Inventory

Emissions Unit	Calendar Year	NOx (tpy)	CO (tpy)	VOC (tpy)	CH2O (tpy)
E1	2021	5.287	0.246	1.082	0.583
E2	2021	4.761	0.554	0.720	0.563
E3	2021	3.552	0.378	0.045	0.384
E4	2021	2.413	0.103	0.365	0.244
E5	2021	5.218	0.684	0.351	1.689
E6	2021	13.825	0.211	0.106	0.114
E7	2021	15.405	0.505	0.543	0.214
E8	2021	15.791	0.379	0.960	0.514

7. Recordkeeping Requirements

(a) Records shall be kept of manufacturer and/or vendor specifications and maintenance requirements developed by the manufacturer, vendor, or Permittee for each engine, catalytic control system, temperature-sensing device, high-temperature shut down device, pressure-measuring device and FTIR.

(b) Records shall be kept of all calibration and maintenance conducted for each engine, catalytic control system, temperature-sensing device, high-temperature shut down device, pressure-measuring device and FTIR.

(c) Records shall be kept that are sufficient to demonstrate that the fuel used for each engine is pipeline quality natural gas in all respects, with the exception of the CO_2 concentration.

(d) Records shall be kept of all required performance testing in this permit. The records shall include the following:

(i) The date, place and time of the performance test;
(ii) The company or entity that performed the test;
(iii) The analytical techniques or methods used;
(iv) The results of such measurements; and
(v) The operating conditions as existing at the time of measurement.

(e) Records shall be kept of all temperature measurements required in this permit, as well as a description of any corrective actions taken due to deviations pursuant to this permit.

(f) Records shall be kept of all pressure drop measurements required in this permit, as well as a description of any corrective actions taken due to deviations pursuant to this permit.

(g) Records shall be kept of annual hours of operation for each engine.

(h) Records shall be kept of all catalyst replacements, engine rebuilds and engine replacements.

(i) Records shall be kept of all monthly and consecutive 12-month emissions calculations, including all input parameters and calculations used to determine the annual emissions from each engine.

(j) Records shall be kept of each engine startup period not to exceed 30 minutes, pursuant to the requirements of this permit.

(k) Records shall be kept of each rebuilt or replaced engine break-in period, pursuant to the requirements of this permit, where the existing engine that has been rebuilt resumes operation without the catalyst control system for a period not to exceed 200 hours.

(l) Records shall be kept of each date and time any engine is shut-down due to a deviation in the inlet temperature to the catalyst bed or pressure drop across a catalyst bed. The Permittee shall include in the record the cause of the problem, the corrective action taken, and the timeframe for bringing the pressure drop and inlet temperature range into compliance.

8. Requirements under **Section D. Requirements for 4SLB Compressor Engines** shall be effective upon issuance of this permit.

D. Requirements for Records Retention

1. The Permittee shall retain all records required by this permit for a period of at least 5 years from the date the record was created.

2. Records shall be kept in the vicinity of the facility, such as at the facility, the location that has day-to-day operational control over the facility, or the location that has day-to-day responsibility for compliance of the facility.

E. Requirements for Reporting

1. The Permittee shall submit an annual written report of compliance with the conditions of this permit no later than April 1st each year. The report shall cover the previous calendar year. The report shall include: a summary of all testing, inspection and monitoring results and recordkeeping required under this permit for the reporting period; all required calculations of actual annual benzene emissions from each TEG dehydration system and actual NO_X, CO, VOC and formaldehyde emissions from each engine for the reporting period; and a clear identification of all instances of deviations from permit requirements and corrective actions taken during the reporting period. All required reports must be certified by the person primarily responsible for CAA compliance of the Permittee.

2. All documents required to be submitted under this permit shall be submitted to:

U.S. Environmental Protection Agency, Region 8
Air and Radiation Division
Tribal Air Permitting Program, 8ARD-PM
1595 Wynkoop Street
Denver, Colorado 80202

The report may be submitted via electronic mail to r8AirPermitting@epa.gov.

Branch Chief, Air and Toxics Enforcement Branch, 8ENF-AT
Enforcement and Compliance Assurance Division
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, Colorado 80202-1129

Documents may be submitted electronically to r8airreportenforcement@epa.gov

and by

United States Postal Service:
Southern Ute Indian Tribe Environmental Programs Division
Air Quality Program
Part 70 Program

P.O. Box 737, Mail Slot #84
Ignacio, Colorado 81137

or by

Common Carrier:
Southern Ute Indian Tribe Environmental Programs Division
Air Quality Program
Part 70 Program
398 Ouray Drive
Ignacio, Colorado 81137

Documents may be submitted via email to airquality@southernute-nsn.gov.

3. The Permittee shall promptly submit to the EPA a written report of any deviations of permit requirements, a description of the probable cause of such deviations, and any corrective actions or preventative measures taken. A "prompt" deviation report is one that is post marked or submitted via electronic mail to r8airreportenforcement@epa.gov as follows:

   (a) Within 30 days from the discovery of any deviation of conditions in this permit that would cause the Permittee to exceed the benzene, NO_X, CO, VOC or formaldehyde emissions limits or operational limits in this permit if left un-corrected for more than 5 days after discovering the deviation; and

   (b) By April 1st or October 1st, for the discovery of a deviation of recordkeeping or other permit conditions during the preceding reporting period that do not affect the Permittee's ability to meet the emissions limits.

4. The Permittee shall submit a written report for any required performance tests to the EPA within 60 days after completing the tests.

5. The Permittee shall submit any record or report required by this permit upon EPA request.

Observation: Following the onsite inspection, Mr. LeCortz requested multiple records. Mr. Hamm provided the information as requested.

APPENDIX B: Photo Log

File Name	Description	Photographer
MOV_2981	Slop Oil Tank	K. Bergl

F. NSPS JJJJ

Mr. LeCortz has reviewed the applicable regulations in NSPS JJJJ and determined that the requirements in Section B. of this permit, SMNSR-SU-000052-2021.004, are sufficient to maintain compliance with NSPS JJJJ for the applicable engines.

G. MACT HH

Mr. LeCortz has reviewed the applicable regulations in MACT ZZZZ and determined that the requirements in Section B. of this permit, SMNSR-SU-000052-2021.004, are sufficient to maintain compliance with MACT HH for both dehydration units.

H. MACT ZZZZ

Mr. LeCortz has reviewed the applicable regulations in MACT ZZZZ and determined that the requirements in Section C. of this permit, SMNSR-SU-000052-2021.004, are sufficient to maintain compliance with MACT ZZZZ for all engines.