May 1, 2020

Gregory Sopkin
Region 8 Administrator
U.S. Environmental Protection Agency
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Wyoming's Designation Recommendations for the 2010 one-hour Sulfur Dioxide Primary National Ambient Air Quality Standard - Areas Subject to EPA's Data Requirements Rule (Round 4 Designations)

Dear Administrator Sopkin,

Pursuant to the Clean Air Act, the State of Wyoming recommends that EPA designate all remaining areas in Wyoming as "Attainment" for the 2010 one-hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS). These areas are subject to "Round 4" of the EPA's Data Requirements Rule (DRR). 42 U.S.C. § 7407(d)(3); 40 C.F.R. §§ 51.1200 - 51.1205. Wyoming's Round 4 recommendations are based on ambient monitoring performed pursuant to EPA's Data Requirements Rule, and other EPA guidance. My recommendations supplement Wyoming's previous recommendations made on May 24, 2011, October 27, 2015, and January 13, 2017.

I. Background

On June 22, 2010, the EPA replaced the 24-hour and annual SO_2 national standard with a new one-hour standard of 75 parts per billion (ppb). Primary National Ambient Air Quality Standard for Sulfur Dioxide; Final Rule, 75 Fed. Reg. 35520 (June 22, 2010); (codified at 40 C.F.R. § 50.17). The EPA's adoption of this new national standard also triggered the requirement for each state governor to submit designation recommendations to EPA. 42 U.S.C. § 7407(d). Therefore, on May 24, 2011, Wyoming recommended that EPA designate all counties within Wyoming as "unclassifiable," excepting those portions under Tribal jurisdiction. *See* Letter from Governor Matt Mead to James B. Martin, Regional Administrator, EPA Region 8 (May 24, 2011).

On August 3, 2012, the EPA announced that it had extended its deadline to complete the designations. Extensions of Deadline for Promulgating Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard, 77 Fed. Reg. 46295 (Aug. 3, 2012). Six months after extending the deadline, EPA Region 8 responded to Wyoming's May 2011 recommendations. *See* Letter from James B. Martin, EPA Region 8 Administrator, to Governor Matt Mead (Feb. 6, 2013). EPA determined that its "review of the most recent monitored air quality data from 2009-2011 shows no violations of the 2010 SO_2 standard in any areas in Wyoming. . . and is, therefore,

200 WEST 24TH STREET
CHEYENNE, WY 82002-0010

MARK GORDON
GOVERNOR OF WYOMING

307.777.7434 • GOVERNOR@WYO.GOV
HTTP://GOVERNOR.WYO.GOV

currently deferring action to designate areas in Wyoming." *Id.* at 1. Wyoming concurred with EPA's "no violations" determination. *See* Letter from Todd Parfitt, Wyoming DEQ Director, submitted to Docket ID No. EPA-HQ-OAR-2012-0233 (March 29, 2013). However, Wyoming disagreed with EPA's deferral decision and renewed its request that EPA act on Governor Mead's 2011 recommendations and designate all areas within Wyoming as "unclassifiable." *Id.* The EPA noted that it would address these areas in "separate future actions." Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard, 78 Fed. Reg. 47191 (Aug. 5, 2013).

The deadlines by which the EPA must complete its designations for the one-hour SO_2 standard were established via Consent Decree. *See* Order Granting Joint Motion to Approve and Enter Consent Decree and Denying Other Motions as Moot, *Sierra Club v. McCarthy,* No. 3:13-cv-03953 (N.D. Cal. Mar. 2, 2015). The Court Order directed the EPA to complete designations in three additional rounds: July 2, 2016 (Round 2), December 31, 2017 (Round 3), and December 31, 2020 (Round 4).

A. Round 2 Designations

With respect to Round 2, Wyoming recommended that Carbon County remain unclassified and be included in the EPA's fourth round of designations. *See* Letter from Governor Matt Mead to Shaun McGrath, EPA Administrator Region 8 (Oct. 27, 2015). The EPA concurred and did not designate any areas in Wyoming as part of Round 2. Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard – Round 2, 81 Fed. Reg. 45039 (July 12, 2016).

B. Round 3 Designations

In 2015, the EPA directed states to provide additional modeling or monitoring information on a schedule consistent with the deadlines in the Consent Decree. Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS), 80 Fed. Reg. 51052 (Aug. 21, 2015); (codified at 40 C.F.R. pt. 51, subpt. BB). Wyoming facilities subject to EPA's Rule were tasked by the DEQ-AQD with providing data to characterize ambient air quality through modeling or monitoring.

In 2016, the Wyoming Department of Environmental Quality, Air Quality Division (DEQ-AQD or Division) submitted to EPA a list of applicable Wyoming SO_2 sources and the method selected by the source to characterize ambient air quality. *See* Letters from Wyoming Air Quality Division to EPA Region 8, dated Jan. 13, 2016 and July 1, 2016; *see also* Wyoming Ambient Air Monitoring Annual Network Plan 2016, submitted June 15, 2016, supplemented August 8, 2016.

On January 13, 2017, Wyoming submitted its "Round 3" recommendations to EPA. Subsequently, EPA designated all Wyoming counties as "attainment/unclassifiable" with the

exception of Carbon, Converse, and portions of Fremont and Sweetwater counties. Air Quality Designation for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard – Round 3, 81 Fed. Reg. 1098 (January 9, 2018).

II. Round 4 Designation Recommendations

Today, I submit Wyoming's "Round 4" designation recommendations. The applicable facilities located in Carbon, Converse, and portions of Fremont and Sweetwater counties have pursued the ambient air quality monitoring pathway to characterize one-hour SO_2 concentrations. Under the ambient monitoring pathway, the 2010 one-hour SO_2 primary National Ambient Air Quality Standard is met at "an ambient air quality monitoring site when the three-year average of the annual (99^{th} percentile) of the daily maximum 1-hour average concentrations is less than or equal to 75 ppb, as determined in accordance with appendix T of this part." 40 C.F.R. § 50.17.

A. Carbon County

Sinclair Wyoming Refining Company's Sinclair Refinery is located in Carbon County, Wyoming. Sinclair operated three (3) SO_2 ambient monitors from January 1, 2017 – December 31, 2019. The 1-hour SO_2 design values for each of these ambient monitors for calendar years 2017, 2018, 2019, and the 3-year average are:

Monitor Name	AQS ID	County	99^{th} Percentile in ppb ^			
			2017	2018	2019	3-year average
Sinclair – In Town	56-007-0008	Carbon	7*	7*	3	6*
Sinclair – Northeast	56-007-0009	Carbon	11*	13	4	9
Sinclair - Southwest	56-007-0010	Carbon	30	11	28	23

* Incomplete data year/design value according to 40 CFR Part 50 Appendix T

^ 99^{th} percentile is reported from EPA's AQS report AMP480

Sinclair Wyoming Refining Company prepared a Three Year Summary Report (Feb. 20, 2020) and a Supplement (March 27, 2020). Copies of these reports are attached hereto as Attachment #1. As demonstrated in these reports, the three-year average of the annual (99^{th} percentile) of the daily maximum 1-hour average concentration of SO_2 is less than or equal to 75 ppb, thereby in attainment of the ambient standard. Therefore, the State of Wyoming requests EPA classify Carbon County "Attainment".

B. Converse County

PacifiCorp's Dave Johnston Power Plant is located in Converse County, Wyoming. PacifiCorp operated one (1) SO_2 ambient monitor from January 1, 2017 – December 31, 2019. The 1-hour SO_2 design value for that ambient monitor for calendar years 2017, 2018, 2019, and the 3-year average are:

Monitor Name	AQS ID	County	99th Percentile in ppb ^			
			2017	2018	2019	3-year average
Dave Johnston	56-009-0011	Natrona	14	16	13	14

^ 99th percentile is reported from EPA's AQS report AMP480

PacifiCorp prepared a Three-Year Summary Report (April 1, 2020). A copy of this report is attached hereto as Attachment #2. As demonstrated in this report, the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentration of SO_2 is less than or equal to 75 ppb, thereby in attainment of the ambient standard. Therefore, the State of Wyoming requests EPA classify Converse County as "Attainment".

C. Fremont County (partial)

Burlington Resources Oil & Gas Company's Lost Cabin Gas Plant is located in a portion of Fremont County, east of the western border of Township 40 North – Range 93 West, T39N – R93W, and T38N – R93W, and North of US Route 20. Burlington Resources operated one (1) SO_2 ambient monitor from January 1, 2017 – December 31, 2019. The 1-hour SO_2 design value for that ambient monitor for calendar years 2017, 2018, 2019, and the 3-year average are:

Monitor Name	AQS ID	County	99th Percentile in ppb ^			
			2017	2018	2019	3-year average
Lost Cabin	56-013-0003	Fremont	65	50	64	59

^ 99th percentile is reported from EPA's AQS report AMP480

Burlington Resources prepared a Three-Year Summary Report (February 2020). A copy of this report is attached hereto as Attachment #3. As demonstrated in this report, the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentration of SO_2 is less than or equal to 75 ppb, thereby in attainment of the ambient standard. Therefore, the State of Wyoming requests EPA classify the remaining portion of Fremont County as "Attainment".

D. Sweetwater County (partial)

Genesis Alkali, Tata Chemicals, and Solvay Chemicals each own and operate several trona facilities and comprise the Trona Environmental Subcommittee (TES) that was formed by the Wyoming Mining Association. These trona facilities are located in a portion of Sweetwater County, west of US Route 191. The TES operated two (2) SO_2 ambient monitors from January 1,

2017 – December 31, 2019. The 1-hour SO_2 design value for those ambient monitors for calendar years 2017, 2018, 2019, and the 3-year average are:

Monitor Name	AQS ID	County	99th Percentile in ppb ^			
			2017	2018	2019	3-year average
TES – Site 2	56-037-0021	Sweetwater	29	32	12	24
TES – Site 4	56-037-0014	Sweetwater	20	45	13	26

^ 99th percentile is reported from EPA's AQS report AMP480

The TES prepared a Three-Year Summary Report. A copy of this report is attached hereto as Attachment #4. As demonstrated in this report, the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentration of SO_2 is less than or equal to 75 ppb, thereby in attainment of the ambient standard. Therefore, the State of Wyoming requests EPA classify the remaining portion of Sweetwater County as "Attainment".

I look forward to working with the EPA to finalize attainment designations for these areas of Wyoming.

Sincerely,

Mark Gordon
Governor

Encl.

1. Sinclair Wyoming Refining Company
2. PacifiCorp - Dave Johnston Power Plant
3. Burlington Resources Oil & Gas - Lost Cabin Gas Plant
4. Trona Environmental Subcommittee

cc: Todd Parfitt, Director, Wyoming Department of Environmental Quality

200 WEST 24TH STREET
CHEYENNE, WY 82002-0010

MARK GORDON
GOVERNOR OF WYOMING

307.777.7434 • GOVERNOR@WYO.GOV
HTTP://GOVERNOR.WYO.GOV

Attachment 1

Sinclair Wyoming Refining Company

- Letter Dated February 20, 2020 – Southwest Monitor
- Letter Dated March 27, 2020 – Northeast and Town of Sinclair Monitor

Impact Submittal: MGRP000054

February 20, 2020

Ms. Nancy Vehr, Administrator
Wyoming Department of Environmental Quality
Air Quality Division
200 West 17th Street, 3rd Floor
Cheyenne, WY 82002

Subject: Sinclair Wyoming Refining Company (SWRC)
SO_2 Data Requirements Rule
Submittal of 3-Year Summary Report (2017-2019)

Dear Ms. Vehr:

As directed by the Division in its 10/29/19 presentation to industry[1], SWRC is submitting its 3-year ambient SO_2 monitoring summary report covering the 2017 through 2019 time period. This report is required to be uploaded via IMPACT no later than 2/28/20.

As shown in the attached report, the design values for the 1-hour and 3-hour ambient SO_2 standards are below their respective NAAQS. In addition, this ambient monitor (Southwest Monitor) may be eligible for shut down upon Agency approval because both the 1-hour and 3-hour design values are no greater than 50% of the NAAQS (re: 40 CFR 51.1203(c)(3)).

Should you have any questions or concerns regarding this submittal contact Mr. Thomas Fisk, Environmental Manager, at (307) 328-8009.

Sincerely,

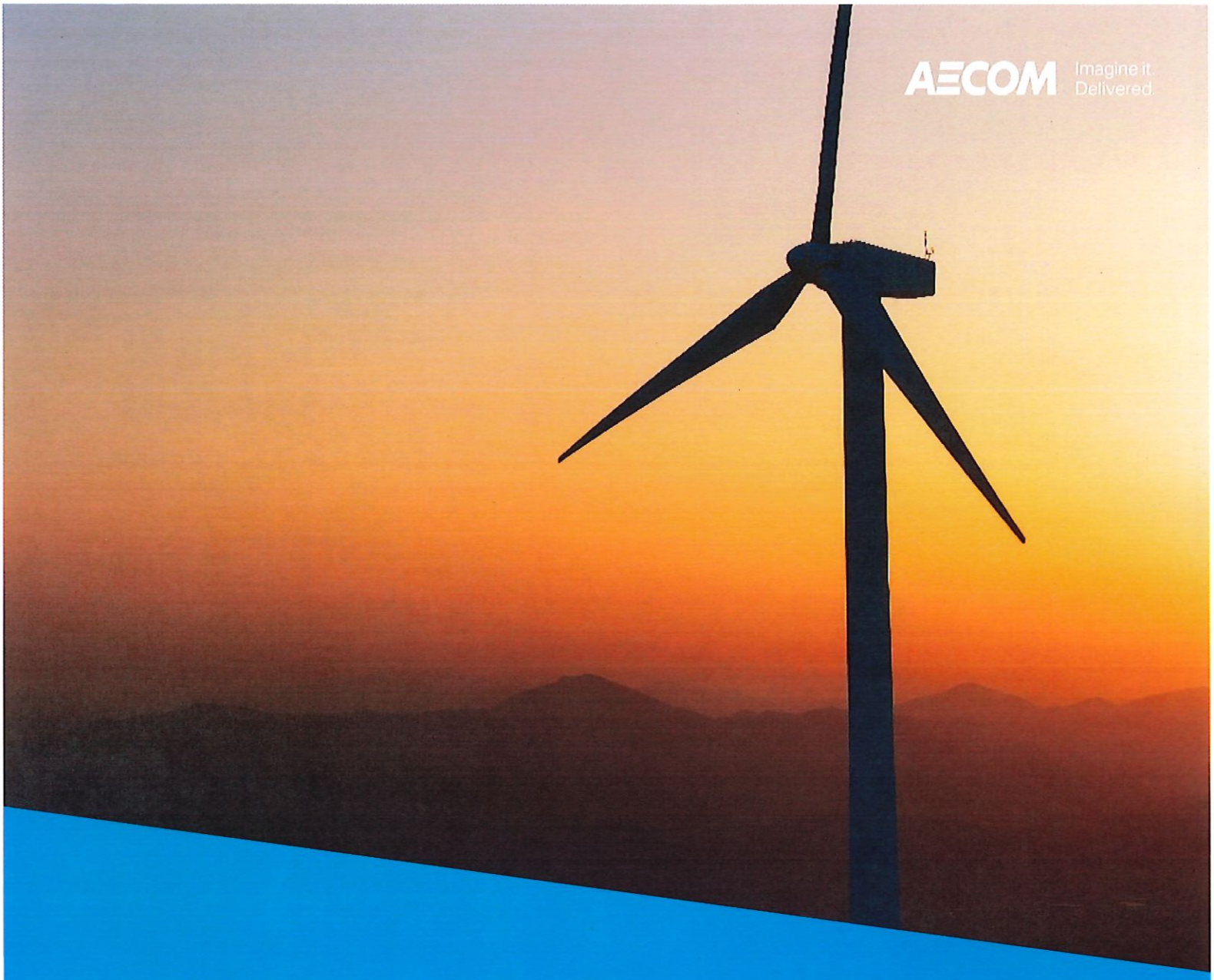
Michael Whatley
Refinery Manager

Attachment

cc: M. Serres

cc electronic: T. Fisk, D. Pernell, S. Greene, L. Hart, Environmental Reader File

[1] SO_2 Designation for Round 4.



Sinclair Wyoming Refining Company

3-Year Data Summary Report
January 1, 2017 through December 31, 2019

Project reference: Sinclair Ambient Monitoring Program

February 19, 2020

Quality information

Prepared by

Anthony Galligan
Project Manager

Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for: Sinclair Wyoming Refining Company

Prepared by:

Anthony Galligan
Project Manager
T: 970-530-3360
M: 970-980-1068
E: anthony.galligan@aecom.com

AECOM
1601 Prospect Park Way
Fort Collins, CO 80525
aecom.com

Table of Contents

Tables

1. Air Quality Three Year Data Summary

This report provides a summary of ambient air quality collected between January 1, 2017 and December 31, 2019 at the South West monitoring station of the Sinclair Wyoming Refining Company's (SWRC) ambient air monitoring program. Data was collected at this in accordance with and to satisfy requirements of the Data Requirements Rule (DRR). Monitoring at this station was conducted under the auspices of the SWRC ambient monitoring program Quality Assurance Project Plan and Quality management Plan (QAPP/QMP) approved by the United States Environmental Protection Agency (USEPA) and Wyoming Department of Environmental Quality (WDEQ) in June 2018.

The purpose of this report is present the design values measured at the monitoring station, in accordance with 40 CFR Parts 50 and 53 and demonstrate compliance with the 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS).

Table 1-1 presents the primary (1-hr) and secondary (3-hr) NAAQS, as well as the form of the standard.

Table 1-1 Compliance Assessment

Pollutant	Averaging Period	Value	How Compliance is Assessed
Sulfur Dioxide (SO_2)	1-hour (Primary)	75-ppb	Compliance is assessed by comparison of the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentration.
	3-hour (Secondary)	0.5-ppm	Not to be exceeded more than once per year. Compliance is assessed by comparison to the measured second-highest 3-hour maximum.

1.1 Air Quality Data Summary

Table 1-2 and **Table 1-3** present a summary of the 1-hour SO_2 design values measured at the SWRC South West monitor for the 2017, 2018, and 2019 calendar years. Design values that are greater than or equal to 80% of the 1-hr SO_2 NAAQS are indicated in bold red font.

Table 1-2 1-hour Sulfur Dioxide (SO_2)

Year	Design Value (ppb) [1]	3-Year Average (ppb) [2]	Value of Standard (ppb) [2]	% of Standard (%)
2017	30			
2018	11	23	75	30.7
2019	28			

[1] Design value represents the 99th percentile of the daily maximum 1-hour average SO_2 concentrations measured during each calendar year.

[2] Compliance is assessed by comparison of the 3-year average of the annual 99th percentile of the daily maximum 1-hr average concentration to the standard.

Table 1-3 3-hour Sulfur Dioxide (SO_2)

Year	Design Value (ppb) [1]	Value of Standard (ppm) [2]	% of Standard (%)
2017	0.036		7.2
2018	0.007	0.500	1.4
2019	0.023		4.6

[1] Design value represents the 2nd highest value measured annually for each calendar year.

[2] Compliance is assessed by comparison to the measured second-highest 3-hour maximum.

1.2 Air Quality Completeness Summary

Table 1-4 presents the quarterly data recovery statistics for the SWRC South West monitor.

Table 1-5 presents the annual precision and bias statistics for the SWRC South West monitor.

As shown in **Table 1-4** and **Table 1-5**, data measured by the SWRC South West monitor met the quarterly data completeness goals for all monitoring quarters and satisfied the precision and bias requirements during each monitoring year.

Table 1-4 3-hour Sulfur Dioxide (SO_2)

Year	First Quarter Jan – Mar (%)	Second Quarter Apr – Jun (%)	Third Quarter Jul – Sep (%)	Fourth Quarter Oct – Dec (%)	Goal (%)
2017	94.6	91.3	95.2	95.3	80
2018	95.4	93.9	95.7	94.4	80
2018	94.9	95.5	94.2	94.7	80

Table 1-5 Systematic Criteria Evaluation Summary

Precision and Bias Estimates	Year 2017	2018	2019	Goal
Number of Precision Checks (N) [1]	124	114	112	25
Coefficient of Variation (CV) [2]	3.38	2.64	3.20	± 10
Bias (BA) [2]	+3.52	±2.31	+3.24	± 10

[1] Precision count goal is based on the number of precision checks required per quarter in accordance with 40 CFR 58 App. A Section 3.2.1.

[2] CV and BA values were calculated using the USEPA Data Assessment Statistical Calculator

1.3 Calibrations and Performance Audit Summary

The SWRC South West ambient monitoring station passed each of its respective quarterly calibration checks and independent performance audits. Performance audits were conducted on a quarterly basis following the National Performance Audit Program (NPAP) through-the-probe (TTP) criteria. While only one NPAP TTP check is required annually, quarterly audits were performed. However, a standard performance audit was not conducted. This was noted as a minor finding in USEPA's Technical Systems Audit (TSA) report dated October 2019. Despite the finding, USEPA did not consider this oversight to detrimental to the overall quality and validity of the data.

Quarterly calibration and performance audit results are summarized in the respective quarterly data summary reports. Please see those reports for additional discussion of quarterly calibration check and independent quality assurance audit results and for the calibration check forms and audit reports.

1.4 USEPA Technical Systems Audit Summary

The USEPA conducted a TSA in May 2019. In their report dated October 2019, USEPA noted 1 major finding, 13 minor findings, and 4 concerns. The major finding did not affect the SWRC South West monitor because the South West monitor did not have zero checks exceed the 3.1-ppb criterion for 24-hour zero checks. **Table 1-6** summarizes findings by the USEPA as well as the corrective actions taken to address each issue. Because the major finding noted by USEPA did not affect the SWRC South West monitor, it Is not listed in the table. The TSA report and full corrective action report can be found in Appendix C and Appendix E of the Fourth Quarter 2019 SWRC Data Summary Report.

It should be noted that corrective actions are implemented on a program-wide basis and that not all findings, or actions taken to address those findings, directly impacted the SWRC South West monitor.

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Minor Findings			
1. Incorrect calibrator mass flow controller calibration/verification frequency and inaccurate reporting.	AECOM reviewed the calibration check forms, but could not find sufficient documentation that the mass flow controllers (MFCs) were verified during the Q4 2017, Q1 2018, and Q3 2018 calibration check site visits. While flow meter information was provided using in-certification equipment, additional evidence that the MFCs were actually verified was not available. Calibration check forms were revised to contain the documented MFC verification dates.	Completed December 31, 2019	☒ No
2. South West Station inlet too close to the shelter.	AECOM will increase the height of the station inlet to 2 meters. Materials were not available for the fourth quarter 2019 calibration check site visit.	AECOM is anticipating delivery and plans to raise the inlet height during the first quarter 2020.	☒ No
3. Inlets and sampling train contain unapproved materials.	AECOM will replace the North East and In-Town inlet heads to use only approved materials. Materials were not available for the fourth quarter 2019 calibration check site visit. Please note this finding does not affect the SWRC South West monitor.	AECOM has ordered replacement sample hoods and is awaiting delivery.	☒ No
4. The shelter temperature probes are not verified as detailed and required in the data validation template.	AECOM installed secondary temperature probes at each monitoring station that can be better tested against a NIST-traceable reference standard.	Completed November 19, 2019.	☒ Yes Equipment listings will be updated in the QAPP/QMP.
5. Two gas standard cylinders are in the incorrect shelters.	AECOM adjusted the calibrator settings at the In-Town and South West sites to reflect the calibration gas cylinders they are connected to.	Completed August 28, 2019.	☒ No
6. Maintenance records are not thorough and organized.	AECOM provided updated station check forms and checklists in 3-ring binders (with "D"-rings) and provided instruction to better keep these records organized.	Completed November 20, 2019.	☒ Yes Maintenance schedules to be updated in the QAPP/QMP.
7. There is a lack of training and training documentation.	AECOM provided training to the site technicians concerning their routine checks as well as training for the updated station check forms and checklists.	Completed November 20, 2019.	☒ No
8. Performance Evaluations and National Performance Audit Program (NPAP) audits are not conducted with independent personnel and equipment.	AECOM staff from the Fort Collins, CO office have begun conducting quarterly calibration check site visits of the ambient air quality monitoring stations. AECOM staff from the Austin, TX office are now conducting the annual performance evaluations and EE&MS will continue to conduct the NPAP audits. Annual performance evaluations will occur quarterly per PSD regulations found in 40 CFR 58, Appendix B; however, only one NPAP audit will be conducted annually.	Completed during the fourth quarter 2019.	☒ Yes The QAPP/QMP will be updated to reflect the change in roles and responsibilities of the calibration technician, annual performance evaluation technician, and EE&MS.

Continued on the next page…

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Minor Findings (contd.)			
9. Incomplete data quality systems audits.	Data quality systems audits are not required by regulation and so will be removed from the QAPP/QMP.	QAPP revision to be completed during the first quarter 2020	☒ Yes The section concerning data quality systems audits will be removed.
10. Calibration action limits have been exceeded without any recorded corrective action.	There are times when a calibration point will exceed the value of the action limit, but not result in an immediate adjustment. In these instances, it will be documented and discussed in the quarterly reports.	Effective beginning the fourth quarter 2019.	☒ Yes Action limits listed in the QAPP/QMP will be updated. Guidance will also be provided to discuss what actions, if any, are to be take when the action limits are exceeded.
11. Corrective actions are not initiated in a timely manner.	AECOM has budgeted to visit the monitoring sites monthly (as needed) to provide better response times when audit or nightly calibration checks are found to be outside the action limit.	Effective beginning the fourth quarter 2019.	
12. Quarterly reports have multiple errors on the calibration dates.	The quarterly reports were updated to reflect corrective actions taken as a part of this corrective action plan. All quarterly reports since the fourth quarter 2016 were updated.	Completed January 30, 2020.	☒ No
13. Zero air generators are not challenged on a regular basis as detailed in the QA Handbook Volume II.	AECOM is actively reviewing approved methods for conducting this test and will begin challenging zero air generators on a regular basis, at least once annually per Volume II	QAPP revision to be completed by January 31, 2019. This check will be implemented during the first quarter 2020.	☒ Yes The QAPP/QMP will be updated to provide the method used to challenge the zero-air generators.
Areas of Concern			
1. It appears the South West Station needs more frequent maintenance.	As mentioned previously, AECOM will plan to visit the monitoring sites monthly. Additionally, the site technicians were made aware of the need for increased maintenance in May 2019.	The Site technicians were alerted to the need for more frequent maintenance in May 2019. QAPP revision to be completed during the first quarter 2020.	☒ Yes Maintenance schedules listed in the QAPP/QMP will be updated.
2. The monitoring shelters are missing documentation and contain obsolete documentation.	AECOM has provided a printed copy of the QAPP/QMP revision at each monitoring station. A USB flash drive was also provided that contains electronic copies of the QAPP/QMP, SOPs, station check forms, and instrument manuals.	Completed November 20, 2019.	☒ No

Continued on the next page…

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Areas of Concern (contd.)			
3. There is poor shelter maintenance and cleanliness.	AECOM increased its own efforts and training of the site technicians to ensure shelters are maintained and clean.	Completed November 20, 2019. QAPP revision to be completed during the first quarter 2020.	☒ Yes Roles and responsibilities of the AECOM and site technicians will be updated to provide clearer guidance for keeping each station maintained and orderly.
4. Sampling conduit appears to be open from the shelter to the inlet at two sites.	AECOM inspected the inlets at all sites and found that conduit was adequately sealed. AECOM will seal up conduit openings within the shelters to dispel any questions.	Completed November 20, 2019 Interior openings will be sealed during the first quarter 2020.	☒ No

IMPACT Submittal MRPT003342

March 27, 2020

Ms. Nancy Vehr, Administrator
Wyoming Department of Environmental Quality
Air Quality Division
200 West 17th Street, 3rd Floor
Cheyenne, WY 82002

Subject: Sinclair Wyoming Refining Company (SWRC)
SO_2 Data Requirements Rule
Submittal of 3-Year Summary Report (2017-2019) for the Northeast and Town of Sinclair Monitors – resubmittal removing NO_2 data

Dear Ms. Vehr:

As requested by the Division in its 3/24/20 email[1], SWRC is submitting its 3-year ambient SO_2 monitoring summary report covering the 2017 through 2019 time period for the Northeast and Town of Sinclair monitors, removing the NO_2 data discussion. This report is intended to supplement the 3-year summary report for the Southwest monitor submitted on 2/25/20.

As shown in the report, the design values for the 1-hour and 3-hour ambient SO_2 standards are below their respective NAAQS. Please note the Town of Sinclair ambient monitor may be eligible for shut down upon Agency approval because both the 1-hour and 3-hour design values are no greater than 50% of the NAAQS (re: 40 CFR 51.1203(c)(3)).

Should you have any questions or concerns regarding this submittal contact Mr. Thomas Fisk, Environmental Manager, at (307) 328-8009.

Sincerely,

Michael Whatley
Refinery Manager

Attachment

cc: M. Serres
T. Fisk (electronic)
D. Pernell (electronic)
S. Greene (electronic)
L. Hart (electronic)
Environmental Reader File

[1] 3/24/20 email from C. Keslar to M. Serres.

Sinclair Wyoming Refining Company
P.O. BOX 277, SINCLAIR, WYOMING 82334
AREA CODE (307) 324-3404

Sinclair Wyoming Refining Company

3-Year Data Summary Report
January 1, 2017 through December 31, 2019
Supplemental

Project reference: Sinclair Ambient Monitoring Program

March 1, 2020
Revised March 26, 2020

Quality information

Prepared by

Anthony Galligan
Project Manager

Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for: Sinclair Wyoming Refining Company

Prepared by:

Anthony Galligan
Project Manager
T: 970-530-3360
M: 970-980-1068
E: anthony.galligan@aecom.com

AECOM
1601 Prospect Park Way
Fort Collins, CO 80525
aecom.com

Table of Contents

Tables

1. Air Quality Three Year Data Summary

This report is supplemental to the original three year data summary report dated February 20, 2020 and provides a summary of ambient air quality collected between January 1, 2017 and December 31, 2019 at the North East and In-Town monitoring stations of the Sinclair Wyoming Refining Company's (SWRC) ambient air monitoring program. Data were collected at these sites in accordance with 40 CFR, Part 58 appendices A and B and supplement data measured at the South West monitoring station which was installed to satisfy the Data Requirements Rule (DRR). Monitoring at these stations was conducted under the auspices of the SWRC ambient monitoring program Quality Assurance Project Plan and Quality management Plan (QAPP/QMP) approved by the United States Environmental Protection Agency (USEPA) and Wyoming Department of Environmental Quality (WDEQ) in June 2018.

The purpose of this report is to present the design values measured at the North East and In-Town monitoring stations, in accordance with 40 CFR Parts 50 and 53 and demonstrate compliance with the 1-hour primary and 3-hr secondary sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS).

Table 1-1 presents the primary (1-hr) and secondary (3-hr) NAAQS, as well as the form of the standard.

Table 1-1 Compliance Assessment

Pollutant	Averaging Period	Value	How Compliance is Assessed
Sulfur Dioxide (SO_2)	1-hour (Primary)	75-ppb	Compliance is assessed by comparison of the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentration.
	3-hour (Secondary)	0.5-ppm	Not to be exceeded more than once per year. Compliance is assessed by comparison to the measured second-highest 3-hour maximum.

1.1 Air Quality Data Summary

Table 1-2 and **Table 1-3** present a summary of the SO_2 design values measured at the SWRC North East and In-Town monitors for the 2017, 2018, and 2019 calendar years. Design values that were greater than or equal to 80% of their respective NAAQS value are indicated in bold red font.

Table 1-2 1-hour Sulfur Dioxide (SO_2)

Year	Design Value (ppb) [1]	3-Year Average (ppb) [2]	Value of Standard (ppb) [2]	% of Standard (%)
		North East Monitoring Station		
2017	11			
2018	13	10	75	13.3
2019	5			
		In-Town Monitoring Station		
2017	7			
2018	7	6	75	8.0
2019	3			

1 Design value represents the 99th percentile of the daily maximum 1-hour average SO_2 concentrations measured during each calendar year.

2 Compliance is assessed by comparison of the 3-year average of the annual 99th percentile of the daily maximum 1-hr average concentration to the standard.

Table 1-3 3-hour Sulfur Dioxide (SO_2)

Year	Design Value (ppm) [1]	Value of Standard (ppm) [2]	% of Standard (%)
	North East Monitoring Station		
2017	0.015		3.0
2018	0.012	0.500	2.4
2019	0.003		0.6
	In-Town Monitoring Station		
2017	0.007		1.4
2018	0.010	0.500	2.0
2019	0.004		0.8

1 Design value represents the 2nd highest value measured annually for each calendar year.

2 Compliance is assessed by comparison to the measured second-highest 3-hour maximum.

1.2 Air Quality Completeness Summary

Table 1-4 presents the quarterly data recovery statistics for the SWRC North East and In-Town monitors.

As shown in **Table 1-4**, data measured by the SWRC North East and In-Town monitors did not meet the quarterly data completeness goals for some monitoring quarters. This was primarily due to data that were invalidated consistent with the Corrective Action Plan following the USEPA TSA. Please refer to the respective revised quarterly data summary report for discussions concerning data completeness for quarters during which the completeness goal was not met.

Table 1-5 presents the annual precision and bias metrics for the SWRC North East and In-Town monitors. As shown in **Table 1-5**, the annual precision and bias metrics were met at each monitoring site during the 2017, 2018, and 2019 calendar years.

Table 1-4 SO_2 Quarterly Data Recovery Statistics

Year	First Quarter Jan – Mar (%)	Second Quarter Apr – Jun (%)	Third Quarter Jul – Sep (%)	Fourth Quarter Oct – Dec (%)	Goal (%)
North East Monitoring Station					
2017	56.9	72.6	69.8	54.2	80
2018	81.4	91.7	93.0	93.5	80
2019	88.6	89.3	89.6	97.6	80
In-Town Monitoring Station					
2017	90.7	96.5	81.3	0.0	80
2018	60.4	95.7	95.6	95.4	80
2019	95.2	94.6	96.4	95.4	80

Table 1-5 SO_2 Systematic Criteria Evaluation Summary

Precision and Bias Estimates	Year 2017	2018	2019	Goal
North East Monitoring Station				
Number of Precision Checks (N) [1]	114	50	85	25
Coefficient of Variation (CV) [2]	3.00	2.95	3.29	± 10
Bias (BA) [2]	- 3.91	- 4.41	-5.15	± 10
In-Town Monitoring Station				
Number of Precision Checks (N) [1]	122	123	94	25
Coefficient of Variation (CV) [2]	3.19	3.96	3.48	± 10
Bias (BA) [2]	± 2.55	± 3.39	- 3.55	± 10

[1] Precision count goal is based on the number of precision checks required per quarter in accordance with 40 CFR 58 App. A Section 3.2.1.

[2] CV and BA values were calculated using the USEPA Data Assessment Statistical Calculator

1.3 Calibrations and Performance Audit Summary

The SWRC North East and In-Town monitors passed each of their respective quarterly calibration checks and independent performance audits. Performance audits were conducted on a quarterly basis following the National Performance Audit Program (NPAP) through-the-probe (TTP) criteria. While only one NPAP TTP check is required annually, quarterly audits were performed. However, a standard performance audit was not conducted. This was noted as a minor finding in USEPA's Technical Systems Audit (TSA) report dated October 2019. Despite the finding, USEPA did not consider this oversight to detrimental to the overall quality and validity of the data.

Quarterly calibration and performance audit results are summarized in the respective quarterly data summary reports. Please see those reports for additional discussion of quarterly calibration check and independent quality assurance audit results and for the calibration check forms and audit reports.

1.4 USEPA Technical Systems Audit Summary

The USEPA conducted a TSA in May 2019. In their report dated October 2019, USEPA noted 1 major finding, 13 minor findings, and 4 concerns. The major finding only directly affected the North East and In-Town monitors. As a result of the major finding, several hours of data were invalidated due the daily zero check being outside the criteria for 24-hour zero checks of ± 3.1-ppb as discussed in **Table 1-6**.

Table 1-6 summarizes findings by the USEPA as well as the corrective actions taken to address each issue. The TSA report and full corrective action report can be found in Appendix C and Appendix E of the Fourth Quarter 2019 SWRC Data Summary Report.

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Major Findings			
1. Zero check action limit in the QMP/QAPP is greater than the data validation acceptance limit.	Beginning with the fourth quarter 2016, data associated with zero checks that exceeded the 3.1-ppb criteria for 24-hour checks were invalidated per the TSA report. All zero checks were reviewed also reviewed for validity. While most checks were considered to be valid checks, some zero checks were considered invalid based on machine malfunction or clear evidence using surrounding checks that data logger timing may have affected the zero check reading. Data invalidations for SO_2 data measured at the North East monitoring station (AQS ID 56-007-0009) resulted in the quarterly data completeness goals being missed for the fourth quarter 2016 and each calendar quarter of 2017. However, during a discussion with USEPA and WDEQ on December 20, 2019, USEPA stated that these data should still be considered as "weight-of-evidence". Further, senior modeling staff at AECOM also recommend that this data can still be used to fulfill program objectives associated with PSD monitoring and modeling.	Completed January 31, 2020.	☒ Yes QAPP/QMP will be updated using the most recent criteria listed in the USEPA QA Handbook Volume II data validation templates.
Minor Findings			
1. Incorrect calibrator mass flow controller calibration/verification frequency and inaccurate reporting.	AECOM reviewed the calibration check forms, but could not find sufficient documentation that the mass flow controllers (MFCs) were verified during the Q4 2017, Q1 2018, and Q3 2018 calibration check site visits. While flow meter information was provided using in-certification equipment, additional evidence that the MFCs were actually verified was not available. Calibration check forms were revised to contain the documented MFC verification dates.	Completed December 31, 2019	☒ No
2. South West Station inlet too close to the shelter.	AECOM will increase the height of the station inlet to 2 meters. Materials were not available for the fourth quarter 2019 calibration check site visit.	AECOM is anticipating delivery and plans to raise the inlet height during the first quarter 2020.	☒ No
3. Inlets and sampling train contain unapproved materials.	AECOM will replace the North East and In-Town inlet heads to use only approved materials. Materials were not available for the fourth quarter 2019 calibration check site visit. Please note this finding does not affect the SWRC South West monitor.	AECOM has ordered replacement sample hoods and is awaiting delivery.	☒ No

Continued on the next page…

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Minor Findings (contd.)			
4. The shelter temperature probes are not verified as detailed and required in the data validation template.	AECOM installed secondary temperature probes at each monitoring station that can be better tested against a NIST-traceable reference standard.	Completed November 19, 2019.	☒ Yes Equipment listings will be updated in the QAPP/QMP.
5. Two gas standard cylinders are in the incorrect shelters.	AECOM adjusted the calibrator settings at the In-Town and South West sites to reflect the calibration gas cylinders they are connected to.	Completed August 28, 2019.	☒ No
6. Maintenance records are not thorough and organized.	AECOM provided updated station check forms and checklists in 3-ring binders (with "D"-rings) and provided instruction to better keep these records organized.	Completed November 20, 2019.	☒ Yes Maintenance schedules to be updated in the QAPP/QMP.
7. There is a lack of training and training documentation.	AECOM provided training to the site technicians concerning their routine checks as well as training for the updated station check forms and checklists.	Completed November 20, 2019.	☒ No
8. Performance Evaluations and National Performance Audit Program (NPAP) audits are not conducted with independent personnel and equipment.	AECOM staff from the Fort Collins, CO office have begun conducting quarterly calibration check site visits of the ambient air quality monitoring stations. AECOM staff from the Austin, TX office are now conducting the annual performance evaluations and EE&MS will continue to conduct the NPAP audits. Annual performance evaluations will occur quarterly per PSD regulations found in 40 CFR 58, Appendix B; however, only one NPAP audit will be conducted annually.	Completed during the fourth quarter 2019.	☒ Yes The QAPP/QMP will be updated to reflect the change in roles and responsibilities of the calibration technician, annual performance evaluation technician, and EE&MS.
9. Incomplete data quality systems audits.	Data quality systems audits are not required by regulation and so will be removed from the QAPP/QMP.	QAPP revision to be completed during the first quarter 2020	☒ Yes The section concerning data quality systems audits will be removed.
10. Calibration action limits have been exceeded without any recorded corrective action.	There are times when a calibration point will exceed the value of the action limit, but not result in an immediate adjustment. In these instances, it will be documented and discussed in the quarterly reports.	Effective beginning the fourth quarter 2019.	☒ Yes Action limits listed in the QAPP/QMP will be updated. Guidance will also be provided to discuss what actions, if any, are to be take when the action limits are exceeded.
11. Corrective actions are not initiated in a timely manner.	AECOM has budgeted to visit the monitoring sites monthly (as needed) to provide better response times when audit or nightly calibration checks are found to be outside the action limit.	Effective beginning the fourth quarter 2019.	
12. Quarterly reports have multiple errors on the calibration dates.	The quarterly reports were updated to reflect corrective actions taken as a part of this corrective action plan. All quarterly reports since the fourth quarter 2016 were updated.	Completed January 30, 2020.	☒ No

Continued on the next page...

Table 1-6 Sinclair Ambient Monitoring Program Corrective Action Plan

Finding	Corrective Action(s) Taken	Date of Completion *(or Estimated Date of Completion for outstanding items)*	QAPP/QMP Update?
Minor Findings (contd.)			
13. Zero air generators are not challenged on a regular basis as detailed in the QA Handbook Volume II.	AECOM is actively reviewing approved methods for conducting this test and will begin challenging zero air generators on a regular basis, at least once annually per Volume II	QAPP revision to be completed by January 31, 2019. This check will be implemented during the first quarter 2020.	☒ Yes The QAPP/QMP will be updated to provide the method used to challenge the zero-air generators.
Areas of Concern			
1. It appears the South West Station needs more frequent maintenance.	As mentioned previously, AECOM will plan to visit the monitoring sites monthly. Additionally, the site technicians were made aware of the need for increased maintenance in May 2019.	The Site technicians were alerted to the need for more frequent maintenance in May 2019. QAPP revision to be completed during the first quarter 2020.	☒ Yes Maintenance schedules listed in the QAPP/QMP will be updated.
2. The monitoring shelters are missing documentation and contain obsolete documentation.	AECOM has provided a printed copy of the QAPP/QMP revision at each monitoring station. A USB flash drive was also provided that contains electronic copies of the QAPP/QMP, SOPs, station check forms, and instrument manuals.	Completed November 20, 2019.	☒ No
3. There is poor shelter maintenance and cleanliness.	AECOM increased its own efforts and training of the site technicians to ensure shelters are maintained and clean.	Completed November 20, 2019. QAPP revision to be completed during the first quarter 2020.	☒ Yes Roles and responsibilities of the AECOM and site technicians will be updated to provide clearer guidance for keeping each station maintained and orderly.
4. Sampling conduit appears to be open from the shelter to the inlet at two sites.	AECOM inspected the inlets at all sites and found that conduit was adequately sealed. AECOM will seal up conduit openings within the shelters to dispel any questions.	Completed November 20, 2019 Interior openings will be sealed during the first quarter 2020.	☒ No

Attachment 2

PacifiCorp – Dave Johnston Power Plant

April, 1 2020

PACIFICORP

DAVE JOHNSTON STEAM ELECTRIC PLANT

1591 TANK FARM ROAD • GLENROCK, WYOMING 82637 • PHONE (307) 995-5000 • FAX (307) 995-5020

April 1, 2020

Ms. Nancy Vehr
Air Quality Administrator
Wyoming Department of Environmental Quality Air Quality Division
200 West 17th Street
Cheyenne, WY 82002

RE: Dave Johnston Power Plant SO_2 Ambient Monitor Three-Year Summary - Updated

Dear Ms. Vehr:

PacifiCorp Dave Johnston Power Plant (PacifiCorp) is respectfully providing this updated letter to the Wyoming Department of Environmental Quality Air Quality Division (WDEQ-AQD) to replace the three-year summary submitted on March 30, 2020. This letter summarizes the ambient air quality data, including design value calculations, for the most recent three-year period (2017 through 2019) in support of the Governor's Round 4 area designation recommendations for the 2010 National Ambient Air Quality Standard (NAAQS) for one-hour sulfur dioxide (SO_2).

The PacifiCorp Dave Johnston Power Plant SO_2 ambient monitoring station (Air Quality System (AQS) ID 56-009-0011) collected ambient SO_2 concentration data from January 1, 2017 through December 31, 2019 to satisfy the requirements of the SO_2 Data Requirements Rule (DRR).

On January 13, 2017, Wyoming Governor Matt Mead sent a Round 3 designation recommendation to Region VIII for the 2010 one-hour SO_2 NAAQS for the area surrounding the PacifiCorp Dave Johnston Power Plant based on the modeling pathway under the DRR. Although the Governor's recommended attainment of the standard for the area surrounding the Dave Johnston Power Plant, the ambient monitoring pathway was also pursued to characterize peak SO_2 concentrations for Round 4 designations by December 31, 2020.

Design Value Summary

Title 40 Code of Federal Regulations (CFR) Part 50, Appendix T provides the general data handling and computation methodologies necessary for determining if the primary one-hour SO_2 NAAQS are met at an air quality monitoring site. The primary SO_2 air quality standard is being attained when the average of three annual 99th-percentile of the daily maximum one-hour concentrations is below 75 parts per billion (ppb). Table 1 in 40 CFR Part 50, Appendix T provides the ranking number of the daily maximum value given the number of valid monitoring days in the year. Table 1 (below) presents the Design Values, by year for 2017 through 2019. The three-year average is also presented in Table 1.

The 2019 design value (DV) for the Dave Johnston Power Plant SO_2 monitoring station is 14 ppb. Table 1 below presents the 99th-percentile for 2017 through 2019 and the three-year average DV.

Table 1 2017-2019 Design Value Dave Johnston SO_2 Monitor

Statistic	99th-percentile of the one-hour daily maximum concentrations			2019 DV[1]
Year	2017	2018	2019	3-year Average
Concentration (ppb)	14.2	15.8	12.7	14

[1]Per 40 CFR, Part 50, Appendix T, Section 4(c), the one-hour primary standard is rounded to the nearest whole number in ppb.

Data Completeness

Title 40 CFR Part 50, Appendix T, Section 3(b) provides the data completeness requirements for a valid design value calculation for the station. An SO_2 1-hour primary standard design value is valid if it encompasses three consecutive calendar years of complete data. A year meets data completeness requirements when all four quarters are complete. A quarter is complete when at least 75 percent of the sampling days for each quarter have complete data. A sampling day has complete data if 75 percent of the hourly concentration values, including State-flagged data affected by exceptional events which have been approved for exclusion by the Administrator, are reported.

Table 2 provides the SO_2 data capture rate, by quarter, for the three-year monitoring period at the Dave Johnston Power Plant SO_2 ambient monitoring station. As can be seen from the table, each monitoring year had four complete quarters and the data capture rates for the station were well above the regulatory requirements as presented in 40 CFR, Part 50, Appendix T.

Table 2 Data Capture Rate at Dave Johnston SO_2 Monitor

Year	Quarter	Number of Valid Days	Possible Number of Days	Data Capture Rate	Complete Quarter?	Complete Year?
2017	Q1	91	90	100%	Yes	Yes
	Q2	91	91	100%	Yes	
	Q3	86	92	93.5%	Yes	
	Q4	91	92	98.9%	Yes	
2018	Q1	90	90	100%	Yes	Yes
	Q2	90	91	98.9%	Yes	
	Q3	92	92	100%	Yes	
	Q4	92	92	100%	Yes	
2019	Q1	90	90	100%	Yes	Yes
	Q2	91	91	100%	Yes	
	Q3	92	92	100%	Yes	
	Q4	92	92	100%	Yes	

Exceedances, Causes, and Remedial Actions

No exceedances of the one-hour NAAQS were observed at the Dave Johnston SO_2 monitor. The maximum one-hour concentration measured at the site was 24.8 ppb on January 1, 2018.

Annual Performance/NPAP Evaluations

Performance evaluations are a type of audit in which the quantitative data generated in a measurement system are obtained independently and compared with routinely obtained data to evaluate the proficiency of an analyst or a laboratory. Title 40 CFR, Part 58, Appendix A, Sections 3 details the measurement quality check requirements for assessing data quality. Section 3.1.2 requires each monitor to have a performance evaluation (PE) once a year and Section 3.1.3 requires that, in a year, 20 percent of the PQAOs monitors receive a National Performance Audit Program (NPAP) through the probe (TTP) evaluation audit. Table 3 below presents the dates and types of each performance evaluation and the result of the evaluation.

Table 3 Performance Audit Evaluations

Type of Audit	Date	Result
Annual PE	12/20/2016	Pass
NPAP-TTP	03/21/2017	Pass
Annual PE	06/29/2017	Pass
Annual PE	06/26/2018	Pass
NPAP-TTP	04/02/2019	Pass
Annual PE	05/28/2019	Pass

Due to scheduling conflicts, the 2018 NPAP audit did not occur. However, Dave Johnston Plant believes that the data are not invalid or compromised due to this performance evaluation not being performed. In support of data validity and in accordance with 40 CFR 58 Appendix A Section 3.1.2, an annual performance evaluation was conducted on June 26, 2018 and showed the monitor was within acceptance criteria.

Technical Systems Audit

Title 40 CFR, Part 58, Appendix A, Section 2.5 requires Technical Systems Audits (TSA) of primary quality assurance organizations (PQAOs) to be performed at least once every three years by the appropriate EPA Regional Office. The purpose of the TSA is to assess the ambient air monitoring program to determine its compliance with established regulations and guidance governing the collection, analysis, validation and reporting of ambient air quality data.

In July 2018, the United States Environmental Protection Agency (US EPA) Region VIII conducted a TSA on the Dave Johnston Power Plant ambient air monitoring program which included interviews and a site visit between July 9 through July 11, 2018. The TSA assessment was accomplished through the review of a pre-audit questionnaire, the review of quality system documents, interviews with PacifiCorp personnel and their contractor Meteorological Solutions Inc. a Trinity Consultants Company (MSI Trinity), observations of data and records, and on-site inspections of monitoring equipment at the monitoring site.

Per the EPA Quality Assurance Guidance Document on TSAs[1], audit findings are ranked into four categories or tiers: Major Findings, Minor Findings, Concerns, and Observations. Major findings are items identified during the TSA which may affect the validity of ambient air data submitted to Air Quality System (AQS). Minor findings are items identified during the TSA which violate established guidance, regulation, or best practice, but are not currently affecting the validity of ambient air data. Concerns are identified practices that can potentially result in a detrimental effect on the ambient air monitoring program's operational effectiveness or the quality of sampling or measurement results. Observations are items identified during the TSA which do not violate any established guidance or regulation, but for which the auditor noted a potential for improvement.

During the July 2018 TSA, USEPA Region VIII had no major findings were identified. Below is a list of the minor findings noted by USEPA, including corrective actions implemented after the TSA:

1. *"A limited number of required equipment maintenance activities specified in the monitoring program's SO_2 QMP/QAPP were not performed as scheduled".*

    - Corrective Action Implemented: Checklists which include quarterly and annual activities were added to contractor's field duties for quarterly site visits. These activities are tracked by a field duty log matrix and electronic logbooks.

2. *"The monitoring project reports (audit reports, quarterly data summaries, corrective action reports, and response to corrective action reports) were not distributed to Josh Rickard, the EPA Region VIII SO_2 monitoring contact listed on the distribution list in the [Dave Johnston Power Plant] SO_2 QMP/QAPP".*

    - Corrective Action Implemented: PacifiCorp will send a copy of the reports to the EPA Region VIII representative and all individuals listed in the distribution list in the QMP/QAPP.

3. *"The shelter temperature device for monitoring the interior temperature of the monitor shelter had not been checked by a NIST-traceable standard; and, it was not evident that the daily calculation of standard deviation of shelter temperature over 24 hours was performed".*

    - Corrective Action Implemented: The shelter temperature probe was checked at a minimum of once every 180 days. The standard deviation of temperature was calculated and charted in quarterly reports. The standard deviation of shelter temperature was added to daily quality control checks.

Other issues noted in the audit did not rise to the level of audit findings but were included in the TSA report as "Concerns" and "Observations." Concerns listed by EPA Region VIII in the TSA and corrective action implemented are listed below:

1. *It was noted that the organizational chart found in the [Dave Johnston Power Plant] SO_2 QMP/QAPP and provided in response to the TSA Questionnaire was not accurate and up to date with respect to MSI personnel duties. It appeared independence of data collection activities from data quality assurance activities could be lacking due to personnel and role changes.*

---

[1] Quality Assurance Guidance Document, *Conducting Technical Systems Audits of Ambient Air Monitoring Programs*, EPA-454/B-17-004, November 2017.

- Corrective Action Implemented: During the annual QMP/QAPP review in 2019, the Dave Johnston SO_2 QMP/QAPP was updated to reflect recommendations from EPA Region VIII as well as any quality assurance and quality control changes to the program. These changes were submitted to WDEQ-AQD and EPA Region VIII in June 2019.

2. *The hard copy logbook located with the SO_2 monitoring station had no entries detailing site visits prior to the first entry dated June 17, 2017. Based on review of electronic logbook entries and discussion with [PacifiCorp and MSI Trinity] personnel it appeared there was no hard copy station logbook on site prior to the first entry. Often [PacifiCorp] personnel assist [MSI Trinity] with troubleshooting operations (they are available on site) and both [PacifiCorp] and [MSI Trinity] entries are recorded in the hard copy logbook. Because [PacifiCorp] personnel do not have access to the electronic logbook (One-Note) used by [MSI Trinity], it is necessary to have both a hard copy and an electronic logbook. Not all entries made in the hard copy logbook were signed.*

- Corrective Action Implemented: All personnel associated with the monitoring project now have access to the electronic logbook (OneNote) and are required to provide digital signatures to the entries.

Observations provided by EPA Region VII and corrective action implemented are provided below:

1. *"It was noted that the corrective action reports from September of 2017 were not summarized in the quarterly data summary. Corrective action reports should be included or summarized in the quarterly data summaries in order to explain associated data anomalies."*

- Corrective Action Implemented: All corrective action reports are now listed in the quarterly data summary reports.

2. *"It was observed that one carbon copy of a site visit entry had not been retrieved from the hard copy logbook. Carbon copies of site visit entries should be retrieved per the QMP/QAPP."*

- Corrective Action Implemented: Carbon copies are now retrieved on quarterly visits and posted to electronic logbook.

Please accept PacifiCorp Dave Johnston Power Plant's summary as accurate to the best of PacifiCorp Dave Johnston Power Plant's knowledge, taking into consideration the quality assurance findings.

Sincerely,

James A. Bolinger
Plant Managing Director and Responsible Official

JAB/aks

Attachment 3

Burlington Resources Oil & Gas - Lost Cabin Gas Plant

February 2020

LOST CABIN GAS PLANT

SO_2 Monitoring Station Three-Year Data Summary Report

January 2017 – December 2019

Air Quality System ID: 56-013-0003

Prepared for:

Burlington Resources Oil & Gas

February 2020

Lost Cabin Gas Plant
SO2 Monitoring Station Three-Year Data Summary Report

January 2017 – December 2019

Prepared for:
Burlington Resources Oil & Gas
165 Lost Cabin Road
Lysite, Wyoming 82642

This document has been prepared by SLR International Corporation (SLR). The material and data in this report were prepared under the supervision and direction of the undersigned.

Abigail Stewart
Staff Scientist

Patrick McKean, CCM
Principal Scientist

CONTENTS

TABLES

1. INTRODUCTION

Burlington Resources Oil & Gas[1] (Burlington Resources) operates the Lost Cabin Gas Plant (LCGP), which is located 7 km east-northeast of Lysite, Wyoming in Fremont County. The facility operates under Operating Permit No. 3-2-157-2.

The United States Environmental Protection Agency (EPA) promulgated a 1-hour SO_2 Primary National Ambient Air Quality Standard (NAAQS) on June 2, 2010, and at the same time revoked the 24-hour and annual SO_2 standards that had been in place, while retaining the 3-hour SO_2 standard. The Data Requirements Rule (DRR) for the 2010 SO_2 NAAQS, which specifies how county-wide attainment (or non-attainment) with the 1-hour standard will be determined, became effective on September 21, 2015. The LCGP is subject to the DRR and is required under 40 CFR 51.1203 to characterize ambient SO_2 concentrations. Characterization of ambient SO_2 concentrations under the DRR can be done through three different pathways: modeling, ambient monitoring, or emissions limitation. Burlington Resources elected to initiate an ambient SO_2 monitoring program to characterize ambient SO_2 concentrations under 40 CFR 51.1203(c).

The draft project Quality Management Plan/Quality Assurance Project Plan (QMP/QAPP) was approved by the Wyoming Department of Environmental Quality (WDEQ) on January 25, 2017 (SLR 2017a). EPA Region 8 provided comments on the draft QMP/QAPP on May 4, 2017. Burlington Resources submitted written responses to EPA's comments (Burlington Resources 2017), and a final QMP/QAPP (SLR 2017b), to the WDEQ on September 18, 2017. The final QMP/QAPP incorporated EPA's requested changes, where appropriate, as described in Burlington Resources (2017). The final QMP/QAPP was approved by EPA on January 11, 2018 (WDEQ 2018). The monitoring station was installed in late December 2016 and has been operating in conformance with the final QMP/QAPP since January 1, 2017.

On September 5, 2019, the EPA released guidance pertaining to all areas that have not yet been designated for the 2010 SO_2 NAAQS. This guidance is called "Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard – Round 4". This guidance applies to LCGP in addition to other areas that elected to collect ambient monitoring data under the SO_2 DRR. The purpose of this report is to provide a three-year summary of ambient SO_2 concentrations measured near the LCGP to support the Governor's recommendation on 2010 SO_2 NAAQS attainment status.

This report provides summaries of the data collected from January 2017 through December 2019. Section 2 contains a summary of the measured 1-hour SO_2 design value and data completeness for the reporting period. Section 3 provides a discussion of exceedances of the numerical value of the 2010 SO_2 NAAQS including their causes and remedial actions taken. A summary of the Technical Systems Audit (TSA) conducted by EPA in July 2018 can be found in Section 4. Section 5 provides a list of references.

[1] Burlington Resources Oil & Gas, a limited partnership of ConocoPhillips, is the operator of the Lost Cabin Gas Plant.

2. DESIGN VALUE AND DATA COMPLETENESS SUMMARY

This section provides a summary of the 99th percentile of 1-hour daily maximum SO_2 concentrations by year, the design value, and data completeness for reporting years 2017 through 2019.

2.1 Design Values

This sub-section provides a summary of SO_2 concentrations for calendar years 2017 through 2019, and the design value. The design value is the three-year average of the 99th percentile of 1-hour daily maximum SO_2 concentrations measured for each year.

The 99th percentile of 1-hour daily maximum SO_2 concentrations measured for 2017, 2018, and 2019 were 65.1 parts per billion (ppb), 49.6 ppb, and 63.6 ppb, respectively. The design value for the 3-year period is 59.4 ppb. These values are also presented in Table 1.

Table 1 SO_2 Concentration Data for Calendar Years 2017 Through 2019

Year	99th Percentile of 1-Hour Daily Maximum Concentrations [2]
	SO_2 (ppb)
2017	65.1
2018	49.6
2019	63.6
2017 – 2019 Design Value [1]	**59.4**

[1] The design value represents the 3-year averaged of the 99th percentile of 1-hour daily maximum SO_2 concentrations for each year.

[2] Data in this table were obtained from the EPA Air Quality System Quick Look Reports (AMP 450) for calendar years 2017 through 2019.

2.2 Data Completeness

Data completeness percentages for 1-hour SO_2 have been calculated based on the total number of hours of valid data collected versus the total number of possible hours in the reporting period, consistent with 40 CFR 50, Appendix T, Section 3. Missing data due to routine maintenance, calibration checks, quality assurance audits, and data that did not satisfy performance criteria for accuracy and quality assurance were considered invalid when calculating data completeness, consistent with the approved QMP/QAPP.

Table 2 provides a listing of quarterly data completeness statistics for calendar years 2017 through 2019, along with the corresponding data completeness requirement for 1-hour SO_2. Quarterly data completeness goals were met for all quarters for all three years.

Table 2 SO_2 Data Completeness Statistics

Year	**Quarter 1** Jan – Mar (%)	**Quarter 2** Apr – Jun (%)	**Quarter 3** Jul – Sep (%)	**Quarter 4** Oct – Dec (%)	**Data Completeness Requirement (% Per Quarter)**
2017	96.3	98.4	98.3	98.1	75
2018	97.1	97.7	92.2	98.1	75
2019	97.9	97.3	98.1	98.1	75

Data in this table were obtained from SLR's SO_2 Monitoring Station Quarterly Data Reports for Lost Cabin Gas Plant for reporting years 2017, 2018, and 2019.

3. MONITORED EXCEEDANCE SUMMARY

This section provides a summary of monitored exceedances of the numerical value of the 2010 SO_2 NAAQS including the event causes and a summary of remedial actions taken. All 1-hour SO_2 concentrations measured in excess of 75 ppb are included in this section.

All monitored exceedances of the numerical value of the 2010 SO_2 NAAQS were bracketed by SO_2 monitor quality control (QC) checks, including daily zero/span checks, every-three-day one-point QC checks, quarterly calibration checks, or annual National Performance Audit Program (NPAP) audits, as applicable. All of these QC check results showed that the monitor was operating within acceptable limits at the time of the monitored exceedances. In addition, no personnel were present on-site performing work on the monitoring system that would have affected the monitor response during the measured exceedances. All monitored exceedances discussed in this summary were therefore considered valid measurements of ambient SO_2 concentrations as described in the corresponding quarterly data reports submitted to WDEQ.

Initial e-mail notifications and detailed letter reports regarding each monitored exceedance were submitted to WDEQ within seven days of each monitored exceedance and within 60 days of the end of the quarter, respectively, in accordance with WDEQ (2017). Meteorological conditions were included with each e-mail notification or detailed letter report.

The brief summaries presented below were prepared from the initial e-mail notifications and detailed letter reports submitted to WDEQ.

3.1 May 21, 2017

On May 21, 2017 at hour ending 1700 MST, the SO_2 monitor recorded a 1-hour average SO_2 concentration of 80.4 ppb. During the time of the measured exceedance, LCGP was in turnaround for Train 3 with no gas being processed. Trains 1 and 2 experienced an abrupt process outage on May 20, 2017. Although Train 1 was successfully brought back online, process issues persisted and Train 2 was still in startup mode when the monitored exceedance occurred. Higher levels of SO_2 from the incinerator were the result of challenges due to the abrupt nature of the outage and associated train shutdown. No gas was being flared and the incinerator was handling normal H_2S vapors from the process and educted sulfur vapors from the sulfur tanks, as permitted.

As part of the corrective action taken following this event, LCGP developed a Learning Team to investigate the cause of the exceedance with the goal to identify opportunities associated with startup operations that could mitigate and/or minimize SO_2 emissions while in startup. This team implemented updated procedures for operators to use during startup to minimize emissions during a similar scenario.

3.2 September 27, 2018

On September 27, 2018 at hour ending 2200 MST, the SO_2 monitor recorded a 1-hour average concentration of 88.4 ppb.

During the time of the measured exceedance, LCGP was in startup of Train 3 following a power module failure. This caused the sulfur recovery unit (SRU) and tail gas unit (TGU) to shut down. Higher levels of SO_2 from the incinerator were the result of these operational challenges due to the abrupt nature of the outage and associated train re-startup. After it became apparent that the plant could not be brought back online due to the RGG issues, the Abnormal Operating Procedures (AOP) as stipulated in Title V Operating Permit No 3-2-157-2 were followed and the plant was shut down.

After the event, LCGP consulted with the logic control power supplier to determine the cause of the power supply voltage fluctuations and requested recommendations on how to mitigate power supply vulnerabilities. LCGP placed power supply controllers on the facility defect elimination list to improve reliability. Lastly, LCGP investigated logic solver parameter anomalies to determine additional preventative measures.

3.3 December 31, 2018

On December 31, 2018, at hours ending 0500 MST and 0600 MST, the SO_2 monitor recorded 1-hour average SO_2 concentrations of 88.5 ppb and 119.5 ppb, respectively.

During the time of the measured exceedances, LCGP was experiencing multiple Safety Critical Protection System faults in Train 2, which caused uncontrolled furnace trips in the SRU and TGU. Higher levels of SO_2 from the incinerator and flare were the result of these challenges while attempting a re-start of the process train. The AOP as stipulated in Title V Operating Permit No. 3-2-157-2 was attempted, but was unsuccessful in retuning the plant to stable operations. The AOP was abandoned and emergency measures were taken to prevent a complete loss of the process and plant.

Compounding the challenges to restart the plant, when the outages occurred there was no residue gas available to keep the Train 2 process pressured and heated, or to maintain steam production. Residue gas was not available from the Train 3 process because it was offline following an earlier emergency. Further, buy-back gas was not available from the pipeline company due to the pipeline's valve not immediately opening as designed and a manual reset was required. This reset took several hours.

The emergency measures taken included cycling produced well gas into the plant to re-establish the steam system and restore the process systems, SRU, and TGU. The implications of remaining within the AOP would have resulted in major freezing of sour systems resulting in probable loss of containment and danger to public health and the environment.

The following measures were taken by LCGP to minimize emissions immediately prior to and during this emergency:

- Attempted to follow the AOP
- Reduced feed and associated sales at or below AOP limits
- Cut sales completely as the AOP could not be followed
- Did not return to sales until the plant was stable.

3.4 November 20, 2019

On November 20, 2019 at hour ending 0300 MST, the SO_2 monitor recorded a 1-hour SO_2 average concentration of 181.9 ppb. During the time of the measured exceedance, the produced water stripper (PWS) pressure setpoint was reduced while replacing the line between the PWS and the SRU inlet scrubber. During this time, the ambient SO_2 monitor concentrations started climbing and it was assumed that the PWS was the source of the SO_2 emissions. Gas was then flared and the concentrations from the ambient SO_2 monitor remained unchanged in the control room data feed so the gas plant operator decided to reduce sales gas. The ambient SO_2 concentrations in the control room data feed still didn't change (*see discussion in the following paragraph*), so the operator reduced plant sales to the minimum rates, in order to comply with the AOP in the Title V permit. As a result of the rapid cut to gas sales, the air/acid gas control to the sulfur plant became significantly off ratio, which caused a plant upset. To minimize the impact of the upset on the TGU, the operator bypassed the quench and diverted tail gas directly to the incinerator at 01:55 MST, resulting in increased SO_2 emissions from the incinerator that likely contributed to the NAAQS exceedance.

Unknown to the operator during the series of actions and reactions described above was that the ambient SO_2 monitor was undergoing an automated one-point QC check. When the QC check begins, the ambient SO_2 monitor's readout in the control room is locked on the last reading the SO_2 monitor collected before the QC check starts. The ambient SO_2 concentration remains locked in the control room display until the QC check has ended and a new data collection cycle begins. Therefore, any actions taken to reduce emissions by the control room operator during this time period would not be measured by the ambient SO_2 monitor until after the QC check had ended and routine measurements had resumed. The operator had responded to the high SO_2 alarms according to plant operating instructions and written guidance but was unaware as to why the ambient SO_2 monitor readings did not appear to be reducing in response to the adjustments. Therefore, the operator continued to make process adjustments until the plant upset occurred, which resulted in increased emissions from the incinerator. Once the ambient SO_2 monitor readings resumed on the control room display, the plant had already gone into upset conditions. The sales gas had to be flared for several hours until the plant was re-stabilized and emissions reduced to appropriate levels.

Because the root cause of the event was related to how the control room data feed from the ambient SO_2 monitor was evaluated by the operator, LCGP will modify the control room data feed by creating a simple alarm banner that will notify operators any time the ambient SO_2 monitor is in calibration mode. The alarm will clearly state the ambient SO_2 monitor is in a calibration and the SO_2 reading does not represent actual ambient concentrations. This will better enable the operator to understand and respond to what is happening at the SO_2 monitoring station and to know if the reading being displayed is current or is locked on the last actual value just prior to the calibration initiating.

4. TECHNICAL SYSTEMS AUDIT SUMMARY

This section provides a summary of the July 11 through July 13, 2018 Technical Systems Audit (TSA) and the correction actions that were implemented.

4.1 Summary

The purpose of the July 2018 TSA was to assess LCGP's ambient monitoring program by evaluating its compliance with established regulations and guidance that dictate collection, analysis, validation, and reporting of data collected by the program. The EPA concluded that Burlington Resources and its contractor, SLR International Corporation (SLR), operate a successful ambient SO_2 monitoring program. There were no major findings identified; however there were minor findings, concerns, and observations noted that could be improved or corrected as described below.

4.2 Findings and Corrective Actions

As described in Section 7 of EPA (2018), a minor finding is a nonconformance with or absence of a specified requirement or a deviation from guidance which is not currently affecting the validity of ambient air data submitted to EPA's Air Quality System (AQS). A concern is an identified practice with a potentially detrimental effect on the ambient air monitoring program's operational effectiveness or the quality of sampling or measurement results. An observation is an item identified during the TSA which does not violate any established guidance or regulation, but for which the auditor noted a potential for improvement.

All TSA findings were addressed through a letter from Burlington Resources to the EPA (Burlington Resources 2018). Subsequently, Burlington Resources provided more detailed responses via the *SO_2 DRR Monitoring Annual Quality Assurance Document Review and Report* (Burlington Resources 2019).

Minor Finding 1 - Zero Air Generators should be challenged according to QAPP and QA Handbook Volume II.

- The EPA stated that without this zero air check, there is no acceptance criteria which determines how well the zero air generator (ZAG) is performing. Appendix K of the 2017 QA Handbook Volume II presents guidance for the use and verifications of ZAG systems. This document should be reviewed and a practice established to ensure the installation ZAG is providing an acceptable zero air.
- Project standard operating procedures (SOPs) and forms to respond to this minor finding were developed and provided to EPA on May 31, 2019 (Burlington Resources 2019). These procedures were implemented for the audit ZAG in Quarter 1 2019 and the in-station ZAG in Quarter 2 2019.

Minor Finding 2 - The Zero Air Generator maintenance schedule needs to be updated with current practices and documented accordingly.

- The EPA advised that a maintenance schedule should be created for the project ZAGs and documented in the QMP/QAPP or an SOP. The resulting maintenance should be completed and documented in project records. This schedule should be based on the QA Handbook Volume II validation templates, the manufacturer's recommendations, and professional experience.
- At the time of the TSA the in-station ZAG maintenance schedule and documentation of such maintenance was being, and continues to be, implemented. A preventative maintenance schedule for the audit ZAG and corresponding forms/documentation were developed to address this minor finding (Burlington Resources 2019). These were implemented in Quarter 1 2019.

Concern 1 - The annual performance audit workbook (and potentially actual practice) does not completely adhere to the project SOP or the QA Handbook Volume II.

- The EPA recommended that the audit workbook should be updated to include a location for a zero test point. The auditor should follow the SOP and record the zero value on the appropriate line.
- The audit workbook has been revised to address this concern (Burlington Resources 2019) and has been in use since Quarter 1 2019.

Concern 2 - A limited number of maintenance items were not completed as scheduled.

- The EPA advised that care should be taken to follow the maintenance schedules presented in the QMP/QAPP. Schedules are to be adjusted through updates to the QMP/QAPP during a minor or major revision process.
- Calibration forms and the SO_2 monitor Operation and Maintenance (O&M) SOP have been updated to more clearly define the preventive maintenance activities and schedules (Burlington Resources 2019), and have been in use since Quarter 1 2019.

Concern 3 - The method employed to control SOP and project form updates is not specified in the QMP/QAPP.

- The EPA suggested that a method to control any QMP/QAPP revisions (including revisions to SOPs and forms) should be identified and documented in the QMP/QAPP. Whereas major revisions necessitate the full approval process, and associated signatures, an alternative method can be employed for minor revisions.
- An SOP outlining the required methods for controlling, documenting, and distributing the QMP/QAPP, SOPs, and form revisions was developed (Burlington Resources 2019). These document control procedures were implemented in Quarter 2 2019.

Concern 4 - The SO_2 monitor exhaust is not properly vented to the outside atmosphere.

- The EPA recommended following the instrument manual and adding a vent line that terminates outside of the shelter air.

- LCGP worked with EPA on an alternative response to this TSA concern. The concern was related to the health and safety of technicians at the SO_2 monitoring shelter rather than a data quality-related issue. During Quarter 4 2018 a sign was installed on the shelter door in response to EPA's concern notifying technicians to leave the shelter door open to allow adequate ventilation while working inside the shelter.

Observation 1 - The maintenance portion of the calibration forms are not always completed, and in some instances, are inaccurate.

- The EPA suggested that project personnel should take the time and ensure that forms are complete and correct. When an item was considered, but intentionally not completed, a mark should be made on the appropriate space. This leaves no room for interpretation of the results.
- In response to EPA's comments, the field calibration forms and SOPs were updated in Quarter 1 2019 to include a "not applicable (n/a)" entry for all preventative maintenance items that are not applicable during a calibration check visit. Forms were also updated to indicate whether a given calibration check was quarterly, semi-annual, or annual. Preventative maintenance also requires notation if the maintenance was performed, not performed, or not applicable according to the preventative maintenance schedule (Burlington Resources 2019). Supplemental training was provided to SLR field staff in Quarter 2 2019 emphasizing that all preventative maintenance schedules outlined in the project O&M SOPs must be followed and that calibration check forms must be completely filled out. The updated field calibration forms and procedures have been in use since Quarter 1 2019.

Observation 2 - Calibrations and maintenance activities were not technically performed in Q2 of 2017.

- The EPA stated that it is not advisable to deviate from the commitments as they appear in the approved QMP/QAPP. If a conscious decision is made to deviate from the QMP/QAPP, the project manager is advised to consider how this could affect all project commitments and resulting data quality. A memo describing the details of the situation could be maintained in project documents for future reference.
- Burlington Resources agreed to add supplemental training for SLR field staff emphasizing that all calibration checks and preventative maintenance must follow the schedules outlined in the QMP/QAPP and SOPs (Burlington Resources 2018). This supplemental training was added to the annual monitoring systems calibration and routine station operation training agenda beginning in April 2019. All trainings are documented in training logs that are already in use for the monitoring program.

5. REFERENCES

Burlington Resources Oil & Gas (Burlington Resources). 2017. Response to EPA Comments on the Lost Cabin Gas Plant SO_2 Monitoring Station Quality Management Plan/Quality Assurance Project Plan. September 18, 2017.

_____. 2018. Letter from M. Lane (Burlington Resources) to E. Brown (EPA Region 8) providing responses to the Draft 2018 Technical Systems Audit for the Lost Cabin Gas Plant SO_2 Monitoring Program. October 11, 2018.

_____. 2019. Burlington Resources Oil & Gas Lost Cabin Gas Plant SO_2 DRR Monitoring Annual Quality Assurance Document Review and Report. May 31, 2019.

SLR International Corporation (SLR). 2017a. ConocoPhillips Lost Cabin Gas Plant SO_2 Monitoring Station Quality Management Plan/Quality Assurance Project Plan. January 24, 2017 (Approved by the Wyoming Department of Environmental Quality-Air Quality Division on January 25, 2017).

_____. 2017b. Burlington Resources Lost Cabin Gas Plant SO_2 Monitoring Station Quality Management Plan/Quality Assurance Project Plan. September 17, 2017.

United States Environmental Protection Agency (EPA). 2018. Technical Systems Audit Report for the Lost Cabin Gas Plant. November 1, 2018.

Wyoming Department of Environmental Quality (WDEQ). 2017. Letter from N. Vehr (WDEQ) to Industrial Monitoring Facilities Regarding Ambient Monitoring Exceedance Documentation Update 2017. August 25, 2017.

_____. 2018. E-mail from D. Sharon (WDEQ) to P. McKean (SLR) providing date of EPA Region 8 approval of the final QMP/QAPP. April 23, 2018.

Attachment 4

Trona Environmental Subcommittee

April, 1 2020

TRONA ENVIRONMENTAL SUBCOMMITTEE
AMBIENT SULFUR DIOXIDE MONITORING

DRR Attainment Designation
3 Year Summary

2017 – 2019

Prepared by:

IML Air Science
a division of Pace Analytical Services, LLC
555 Absaraka Street
Sheridan, Wyoming 82801
(307) 674-7506
www.imlairscience.com

Table of Contents

LIST OF TABLES

1. Network Operation

The operation of this sulfur dioxide monitoring network adheres to the Trona Environmental Subcommittee (TES) *Quality Assurance Project Plan and Quality Management Plan for Ambient Air SO_2 Monitoring*.

The monitoring locations are provided below in Table 1.

Table 1. TES Monitoring Locations

Site	UTM (meters) Zone 12T, NAD83		Elevation (feet)
	Northing	Easting	
Site 2	4,609,503	608,147	6,607
Site 4	4,606,586	603,769	6,399

The systems continuously measure the concentration of Sulfur Dioxide (SO_2) in ambient air with Thermo Scientific 43i analyzers, method designation EQSA-0486-060 for SO_2. The instrument's measurement range is set at 0-200 ppb. Monitoring equipment is summarized in Table 2.

Table 2. TES AQS Site IDs

Site ID	AQS Site ID	AQS POC Code 1 hour	AQS POC Code 5 minute
Site 2	56-037-0021	1	2
Site 4	56-037-0014	1	2

Table 3. TES Gaseous Monitor Descriptions

Component	Manufacturer	Model
SO_2 Analyzer	Thermo Scientific	43i
Calibrator	Thermo Scientific	146i
Zero Air Generator	Thermo Scientific	1160
Datalogger	Campbell Scientific	CR6

Installation of the monitoring systems was completed December 12, 2016 with actual reported data collection commencing on January 1, 2017.

2. Network Field Service

The following is a summary of the calibrations performed for the network. More detail and results for each activity are available upon request.

Site 2 Calibration Summary

- The startup calibration was performed on December 13, 2016 following the site installation.
- Remote calibration was performed on March 23, 2017 and August 31, 2017 to address span checks approaching the upper limits. An MFC verification was performed on December 12, 2017.
- The sample pump and Teflon sample line were replaced during the May 8, 2018 calibration.
- The sample pump,Teflon line and zero air scrubber charcoal were replaced during the October 9, 2019 calibration. The sample pump was replaced on November 6, 2019

Site 4 Calibration Summary

- The startup calibration was performed on December 13, 2016 following the site installation.
- A calibration was performed on May 9, 2017 following the annual performance evaluation.
- A remote calibration was performed on August 28, 2017 to address span checks approaching the upper limits.
- The sample pump and Teflon sample line was replaced during the May 7, 2018 calibration.
- A remote calibration was performed on August 7, 2019 to address zero checks approaching the upper limits.
- The sample pump,Teflon sample line and the zero air scrubber charcoal were replaced during the October 8, 2019 calibration. The sample pump was changed on November 6, 2019.

3. Results

Table 4 lists National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS) for sulfur dioxide. Table 5 shows project-to-date results for the 1-hour 99th percentiles. Tables 6 and 7 show project-to-date data recovery.

Table 4. NAAQS and WAAQS for SO_2

Reporting Period	Limit	Form
Primary: 1-hour	75 ppb	99th Percentile of hourly data only reported at the end of the calendar year; 99th percentile of 1-hour daily maximum concentrations averaged over 3 years.
Secondary: 3-hour	0.5 ppm	3-Hour Secondary Standard is not to be exceeded more than once per year.

Five-minute and hourly data are collected. However, only hourly data is summarized in this report. 1-hour daily maximum concentrations are summarized and data recovery for the monitoring period are provided.

Table 5. 1-Hour Project-to-Date Summary

Site	99th Percentile			Three Year Design Value
	2017	2018	2019	
Site 2	28.5	32.1	12.2	24
Site 4	19.5	45.3	13.3	26

The design values for the network were calculated by both procedures provided in 40 CFR 50, Appendix T. The values were the same for each site and well below 50% of the NAAQs. The value for each site is provided below.

- Site 2 design value: 24 ppb
- Site 4 design value: 26 ppb

High Hourly Concentrations

As indicated in the table previously, the design values for each site are well below the NAAQS. Three daily maximum hourly concentrations exceeded the 75 ppb standard.

Site 2 exceeded 75 ppb on February 15, 2017 and April 15, 2018. Site 4 exceeded the 75 ppb hourly concentration threshold on April 13, 2017. Following is a list and brief description for each event. Additional details for each event are available upon request.

- **Site 2 February 15, 2017:** The daily hourly maximum concentration of 94.7 ppb was recorded at 6:00 am. Hourly concentrations surrounding the maximum value remained below the NAAQS. Operations for all facilities were normal. Very stable meteorological conditions persisted, leading up to and throughout the period. Very light westerly winds switched to the northeast during the hour of high concentration. The convergence likely attributed to the higher concentration.
- **Site 4 April 13, 2017:** The daily hourly maximum concentration of 143.4 ppb was recorded at 9:00 pm. Hourly concentrations surrounding the maximum value remained below the NAAQS. Normal operations for the facilities were ongoing. Concentrations recorded by the station for the hours preceding showed a gradual increase leading up to the max followed by a sharp decrease to near two ppb. Fairly stable meteorological conditions persisted, leading up to and throughout the period. Moderate southerly winds switched to westerly winds during the hour of high concentration. The convergence likely attributed to the higher concentration.
- **Site 2 April 15, 2018:** The daily hourly maximum concentration of 167.8 ppb was recorded at 6:00 am. Concentrations recorded by the station for the hour preceding and two hours after were near one and two ppb respectively. Operations for all facilities were normal. Very light winds and stable conditions were present. The light winds and inversion likely kept emissions from facilities and the region trapped in the drainage.

4. Measurement Quality Assessment

Completeness

SO_2 data recovery was 99.83% at Site 2 and 99.20% at Site 4. As indicated by the data recovery, no significant downtime occurred at either site. The following tables summarize data recovery for each quarter and calendar year.

Table 6. Site 2 PTD Data Recovery (%)

Monitor Site	Quarter (%)	Year (%)
1Q17	99.86	
2Q17	99.77	
3Q17	99.95	
4Q17	99.95	99.89
1Q18	100	
2Q18	99.63	
3Q18	100	
4Q18	99.86	99.87
1Q19	100	
2Q19	99.68	
3Q19	99.50	
4Q19	99.77	99.74

Table 7. Site 4 PTD Data Recovery (%)

Monitor Site	Quarter (%)	Year (%)
1Q17	100	
2Q17	99.68	
3Q17	99.77	
4Q17	100	99.86
1Q18	100	
2Q18	99.68	
3Q18	94.84	
4Q18	100	98.62
1Q19	100	
2Q19	99.73	
3Q19	99.37	
4Q19	97.46	99.13

Accuracy

Annual performance evaluations (PE) were performed on each system. The network received various audits throughout the three-year period in addition to the annual PE. An NPAP audit was performed on one of the sites in the network each year. Department of Environmental Quality – Air Quality Division (WDEQ) conducted an independent audit on each system in May 2017.The following sub sections provide a brief narrative of the results for each audit.

Site 2 Audit Summary

The system passed the annual PE performed on May 10, 2017 with the largest percent difference at 4.6%. The system passed the WDEQ audit performed on May 31, 2017 with the largest percent difference at 7.9%.

The system passed the May 8, 2018 annual PE with the largest percent difference at 6.6%. The system passed the November 30, 2018 NPAP audit with the largest percent difference at -4.4%.

The system passed the April 29–30, 2019 annual PE with the largest percent difference at -12.4%. The April 29–30, 2019 PE showed that the SO_2 audit cylinder was no longer within specification. The cylinder from Site 4 was utilized

for the audit. An additional PE was performed on October 29, 2019 with a new audit cylinder and the system passed the PE with the largest percent difference at -1.9%.

Site 4 Audit Summary

The system passed the annual PE performed on May 9, 2017 with the largest percent difference at 3.4%. The system passed the WDEQ audit performed on May 31, 2017 with the largest percent difference at 6.0%. The system passed the July 14, 2018 NPAP audit with the largest percent difference at 4.9%.

The system passed the May 7 and 8, 2018 annual PE with the largest percent difference at -6.6% on May 7 and -12.6% on May 8. The system was verified prior to a calibration being performed and again after the calibration was completed.

The system passed the April 29–30, 2019 annual PE with the largest percent difference at -7.2%. The April 29–30, 2019 PE showed that the SO_2 audit cylinder was no longer within specification; the cylinder from Site 2 was utilized for the PE. The system passed the October 8, 2019 NPAP audit with the largest percent difference at -3.6%.
An additional annual performance evaluation was performed on October 29, 2019 with a new audit cylinder and the system passed the PE with the largest percent difference at -2.9%.

EPA Region 8 TSA Summary

No major findings were found during the May 2019 TSA performed on the network by EPA Region 8. TES has investigated each of the findings, concerns, and observations. Below are items noted during the closing of the TSA and corresponding corrective actions. All items have been addressed at this time.

Minor Findings:

1. **Preventive Maintenance**
   Replace ZAG charcoal once per year – *Annual charcoal replacement has been added to preventive maintenance schedule.*
   Add preventive maintenance to log book – *Preventive maintenance is now documented in site logs.*
2. **Inlet**
   Stainless steel protrudes beyond inlet. (Needs to be borosilicate or Teflon) – *The stainless steel rings were replaced with Teflon rings.*
3. **Calibration Verification**
   Appendix D requirement– Multipoint verification (zero plus 4 points) – *Multipoint verifications (before and after) have been added to calibration procedure. Calibration only performed if system fails as found verification.*

4. **Zero Air Challenge**
   EPA Handbook Volume II: Appendix D calls for a zero air challenge. (Follows guidance in appendix K) – *ZAG testing procedure has been developed and performed on the network.*

Concern:

1. **Inspections**
   Four of ten items listed in QAPP not being recorded in logbook. *Items have been added to the site inspection form.*

Observation:

1. **Action Limits on QC Checks**

   Action limits and responses are currently not defined in the QAPP/QMP. –*Action limits and responses have been added to the latest revision of the QAPP/QMP.*

The *EPA TSA Draft Report* and T*ES TSA Corrective Action Response* are available upon request.

The design, implementation, and operation of the network followed guidance from the references listed on the following page.

5. References

Ambient Air SO_2 Network Justification and Monitoring Protocol, Trona Environmental Subcommittee: Green River Basin Trona Patch SO_2 Attainment Designation; Sweetwater County, Wyoming; April 2016; IML Air Science

QA Handbook for Air Pollution Measurement Systems: Volume II: Ambient Air Quality Monitoring Program EPA-454/B-173-001, January 2017; U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards

40 CFR 50, Appendix A-1, Reference Method for the Determination of Sulfur Dioxide in the Atmosphere (Ultraviolet Fluorescence Method)

40 CFR 50, Appendix T, Interpretation of the Primary National Ambient Air Quality Standards for Oxides of Sulfur (Sulfur Dioxide)

40 CFR 51, Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)

40 CFR 58, Appendix A; Quality Assurance Requirements for Monitors Used in Evaluations of National Ambient Air Quality Standards

Quality Assurance Project Plan and Quality Management Plan for Ambient Air SO_2 Monitoring, Wyoming Mining Association – Trona Environmental Subcommittee, Approved November, 2017, IML Air Science