

Revision History W305171 EPA TO-17

March 14, 2024

Richard Fox

Thirty four tenax thermal desorption tubes were received by RJ Lee laboratory on May 23, 2024.

The Work order, Chains of Custody, and Sample descriptions follow.

WORK ORDER		Printed: 5/23/2023 4:15:52PM													
W305171															
RJ Lee Group Inc															
Client: Kansas State University Project: Air Sampling COC #: TO-17		Project Manager: L. Joe Sears Project Number: KSU Institute for Env Research SDG Number:													
Report To: Kansas State University Byron Jones 245 Levee Drive Manhattan, KS 66502 Phone: (785) 410-0625 Fax:		Invoice To: Kansas State University Accounts Payable 245 Levee Drive Manhattan, KS 66502 Phone: (602) 359-7868 Fax:													
Date Due: 7/7/2023 (30 day TAT) Received By: JJ Furlong Logged In By: JJ Furlong		Date Received: 05/23/23 10:45 Date Logged In: 05/23/23 13:56													
<table border="1"> <tr> <td>Samples Received at:</td> <td>15.1°C</td> </tr> <tr> <td>Custody Seals</td> <td>No</td> </tr> <tr> <td>Containers Intact</td> <td>Yes</td> </tr> <tr> <td>COC/Labels Agree</td> <td>Yes</td> </tr> <tr> <td>Preservation Confirmed</td> <td>No</td> </tr> <tr> <td>Received On Ice</td> <td>Yes</td> </tr> </table>				Samples Received at:	15.1°C	Custody Seals	No	Containers Intact	Yes	COC/Labels Agree	Yes	Preservation Confirmed	No	Received On Ice	Yes
Samples Received at:	15.1°C														
Custody Seals	No														
Containers Intact	Yes														
COC/Labels Agree	Yes														
Preservation Confirmed	No														
Received On Ice	Yes														
RJLG ID	Sample Name	Analysis	Matrix	Date Sampled	TAT	Date Due									
W305171-01	Shipping Blank - 673935 1	TO-17	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-02	Field Blank - 673923 2	TO-17	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-03	Baseline - 300 C - Ambient - 673924 3	TO-17 Comments: 1.95 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-04	Baseline - 300 C - Ozone In - 67391 4	TO-17 Comments: 2.7 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-05	Baseline - 300 C - Ozone Out - 4636 5	TO-17 Comments: 1.8 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-06	Baseline - 300 C - Condenser - 67391 6	TO-17 Comments: 1.95 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-07	MJ-II - 315 C - 5ppmW - Ambient - 7	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-08	MJ-II - 315 C - 5ppmW - Ozone In - 8	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									
W305171-09	MJ-II - 315 C - 5ppmW - Ozone Out 9	TO-17 Comments: 3 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023									

WORK ORDER

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W305171

RJ Lee Group Inc

Client: Kansas State University
 Project: Air Sampling
 COC #: TO-17

PO #: 2022004-20-FAA-1

Project Manager: L. Joe Sears
 Project Number: KSU Institute for Env Research
 SDG Number:

RJLG ID	Sample Name	Analysis	Matrix	Date Sampled	TAT	Date Due
W305171-10	MJ-II - 315 C - 5ppmW - Coalescent 10	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/16/2023	30	7/7/2023
W305171-11	Field Blank - 673919 11	TO-17	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-12	Baseline - 300 C - Ambient - 673921 12	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-13	Baseline - 300 C - Ozone In - 46363 13	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-14	Baseline - 300 C - Ozone Out - 6739 14	TO-17 Comments: 2.7 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-15	Baseline - 300 C - Coalescer - 46363 15	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-16	2197 - 312 C - 5ppmW - Ambient - 4 16	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-17	2197 - 312 C - 5ppmW - Ozone In - 17	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-18	2197 - 312 C - 5ppmW - Ozone Out 18	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-19	2197 - 312 C - 5ppmW - Coalescer - 19	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-20	2197 - 220 C - 5ppmW - Ambient - 6 20	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-21	2197 - 220 C - 5ppmW - Ozone In - 21	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-22	2197 - 220 C - 5ppmW - Ozone Out 22	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-23	2197 - 220 C - 5ppmW - Coalescer - 23	TO-17 Comments: 3 L	Air/Emissions w/ V	5/17/2023	30	7/7/2023
W305171-24	MJ-II - 220 C - 10 ppmW - Ambient 24	TO-17 Comments: 3 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023

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RJ Lee Group Inc

Client: Kansas State University
 Project: Air Sampling
 COC #: TO-17

PO #: 2022004-20-FAA-1

Project Manager: L. Joe Sears
 Project Number: KSU Institute for Env Research
 SDG Number:

RJLG ID	Sample Name	Analysis	Matrix	Date Sampled	TAT	Date Due
W305171-25	MJ-II - 220 C - 10 ppmW - Ozon In 25	TO-17 Comments: 2.85 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-26	MJ-II - 220 C - 10 ppmW - Ozon O 26	TO-17 Comments: 3 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-27	MJ-II - 220 C - 10 ppmW - Coalesce 27	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-28	Baseline - 220 C - Ozon In - 46365 28	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-29	Baseline - 220 C - Ozon Out - 6739 29	TO-17 Comments: 3 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-30	Baseline - 220 C - Coalesce - 67393 30	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-31	Skydrol - 220C - 5 ppmW - Ambient 31	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-32	Skydrol - 220C - 5 ppmW - Ozon In 32	TO-17 Comments: 3 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-33	Skydrol - 220C - 5 ppmW - Ozon O 33	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023
W305171-34	Skydrol - 220C - 5 ppmW - Coalesce 34	TO-17 Comments: 3.15 L	Air/Emissions w/ V	5/18/2023	30	7/7/2023

W305171

ATTENTION TO: Joe Sears

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

Washington
Columbia Basin Analytical Laboratories
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Pasco, WA 99301
509.545.4363 Phone
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PL 0317201A

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Page 2 of 3

Pennsylvania - HQ
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11/305171

ATTENTION TO: Joe Seand

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Washington
Columbia Basin Analytical Laboratories
2710 North 20th Avenue
Pasco, WA 99301
509.545.4960 Phone



May 16 th 2023	N/A	Shipping Blank
N/A	N/A	N/A
EPA TO-17 Thermal Desorption Tube	Sample # 1 673935	N/A
N/A	N/A	N/A

May 16 th 2023	N/A	Shipping Blank
N/A	N/A	N/A
EPA TO-17 Thermal Desorption Tube	Sample # 2 672923	N/A
N/A	N/A	N/A

May 16 th 2023	15:21	Ambient
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 3 673924	Total Sample Volume – 1.95 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.13 LPM

May 16 th 2023	17:30	Ambient
MJ-II - 315 C	Fluid Injection Rate – 5ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 7 673912	Total Sample Volume – 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.21 LPM

May 16 th 2023	15:21	Ozone In
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 4 673916	Total Sample Volume – 2.7 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.18 LPM

May 16 th 2023	17:30	Ozone In
MJ-II - 315 C	Fluid Injection Rate – 5ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 8 463623	Total Sample Volume – 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.19 LPM

May 16 th 2023	15:21	Ozone Out
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 5 463626	Total Sample Volume – 1.8 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.12 LPM

May 16 th 2023	17:30	Ozone Out
MJ-II - 315 C	Fluid Injection Rate – 5ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 9 673925	Total Sample Volume – 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.2 LPM

May 16 th 2023	15:21	Coalescer
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 6 673917	Total Sample Volume – 1.95 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.13 LPM

May 16 th 2023	17:30	Coalescer
MJ-II - 315 C	Fluid Injection Rate – 5ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 10 673915	Total Sample Volume – 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.19 LPM

May 17 th 2023	N/A	Field Blank
N/A	N/A	N/A
EPA TO-17 Thermal Desorption Tube	Sample # 11 673919	N/A
N/A	N/A	N/A

May 17 th 2023	10:35	Ambient
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 12 673921	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.2 LPM

May 17 th 2023	12:30	Ambient
Eastman 2197 312 C	Fluid Injection Rate - 5 ppm/V	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 16 463648	Total Sample Volume - 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.19 LPM

May 17 th 2023	10:35	Ozone In
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 13 463636	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.2 LPM

May 17 th 2023	12:30	Ozone In
Eastman 2197 312 C	Fluid Injection Rate - 5 ppm/V	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 17 673922	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.2 LPM

May 17 th 2023	10:35	Ozone Out
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 14 673938	Total Sample Volume - 2.7 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.18 LPM

May 17 th 2023	12:30	Ozone Out
Eastman 2197 312 C	Fluid Injection Rate - 5 ppm/V	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 18 673914	Total Sample Volume - 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.19 LPM

May 17 th 2023	10:35	Coalescer
Baseline 300 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 15 463638	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.2 LPM

May 17 th 2023	12:30	Coalescer
Eastman 2197 312 C	Fluid Injection Rate - 5 ppm/V	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 19 463635	Total Sample Volume - 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.19 LPM

May 17 th 2023	Time	Ambient
Low Temp 2197	Fluid Injection Rate	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample #	Total Sample Volume
Sample Temp	Sample Duration	Sample Flow Rate

May 17 th 2023	16:45	Ambient
Eastman 2197 220 C	Fluid Injection Rate – 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 20 673918	Total Sample Volume – 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.2 LPM

May 17 th 2023	16:45	Ozone In
Eastman 2197 220 C	Fluid Injection Rate – 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 21 673933	Total Sample Volume – 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.2 LPM

May 17 th 2023	16:45	Ozone out
Eastman 2197 220 C	Fluid Injection Rate – 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 22 463625	Total Sample Volume – 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.2 LPM

May 17 th 2023	16:45	Coalescer
Eastman 2197 220 C	Fluid Injection Rate – 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 23 673927	Total Sample Volume – 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.2 LPM

May 18 th 2023	17:05	Coalescer
Skydrol 220C	Fluid Injection Rate – 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 34 463644	Total Sample Volume – 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate – 0.21 LPM

May 18 th 2023	11:58	Ambient
MJ-II 220 C	Fluid Injection Rate - 10 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 24 463634	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate

May 18 th 2023	15:40	Ozone Out
Baseline 220 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 29 673928	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.2 LPM

May 18 th 2023	11:58	Ozone In
MJ-II 220 C	Fluid Injection Rate - 10 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 25 673940	Total Sample Volume - 2.85 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate

May 18 th 2023	15:40	Coalescer
Baseline 220 C	Fluid Injection Rate	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 30 673936	Total Sample Volume - 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.21 LPM

May 18 th 2023	11:58	Ozone Out
MJ-II 220 C	Fluid Injection Rate - 10 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 26 463642	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate

May 18 th 2023	17:05	Ambient
Skydrol 220C	Fluid Injection Rate - 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 31 673932	Total Sample Volume - 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.21 LPM

May 18 th 2023	11:58	Coalescer
MJ-II 220 C	Fluid Injection Rate - 10 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 27 673937	Total Sample Volume - 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate

May 18 th 2023	17:05	Ozone In
Skydrol 220C	Fluid Injection Rate - 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 32 463624	Total Sample Volume - 3 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.21 LPM

May 18 th 2023	15:40	Ozone In
Baseline 220 C	Fluid Injection Rate - 0	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 28 463650	Total Sample Volume 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.21 LPM

May 18 th 2023	17:05	Ozone Out
Skydrol 220C	Fluid Injection Rate - 5 ppmW	Bleed Air Exit Temp
EPA TO-17 Thermal Desorption Tube	Sample # 33 463647	Total Sample Volume - 3.15 L
Sample Temp 25 C	Sample Duration 15 min	Sample Flow Rate - 0.21 LPM

The initial version of the EDD File and final report were received on September 19, 2023.

A revision to the EDD file was received on October 4, 2023, and it was merged with data from W305169 and W305170.

A revision to the EDD file was issued on October 20, 2023 which included the organic acids. The EDD file was revised to W305171 EDD Rev1.

KSU determined after a review of the EPA TO-17 data sets and comparing with data acquired in a different location that the Ambient Sample Identification for sampling the Tenax cartridges was reversed with the pack exit sample line. A revised chain of custody was created and sent to RL Lee for incorporation into the report on November 29, 2023. The revisions identified which sample labels had been reversed.

RJ Lee issued a revision to the report and to the EDD on November 17, 2023. The new chain of custody was not included in the report, and the original sample identification still referred to coalescer, rather than pack exit.

RJ Lee stated the following revisions were made in Revision 1 and Revision 2.

Revised Report; Rev 2. – Rev.1 issued November 17, 2023

This report has been revised to correct the samples names issued on the original Chain of Custody.

Revised Report; Rev. 1 – Original Issued on September 19, 2022

This report has been revised to correct the following (all corrections pertain to the full list TO-17 analyses – the organic acids reports are unchanged):

- 1) The calculation of the Reporting Limit for those results having units of ppbv in the full list TO-17 analyses. Some of the reporting limits for the tentatively identified compounds in the original report may have been in error.*
- 2) Revised the Electronic Data Deliverable to change the reporting units of $\mu\text{g}/\text{m}^3$ to $\mu\text{g}/\text{tube}$ and the $\mu\text{g}/\text{tube}$ units to $\mu\text{g}/\text{m}^3$ and to incorporate any result changes that may have been affected by item 3, below.*
- 3) The calculated result for all samples for the $\mu\text{g}/\text{m}^3$ results were based on an estimated MDL reporting limit rather than the lowest calibration point. This may have resulted in some analytes in the samples being reported at levels less than the actual reporting limit.*

RJ Lee issued Revision 3 to the final report and Revision 4 to the EDD file on January 30, 2024/

The stated reasons for the revision of Version 3 is as follows:

Revised Report; Rev 3. – Rev.2 issued December 5, 2023

This report has been revised to eliminate reporting doubles, fix CAS#s and MW of analytes.

Revised Report; Rev 2. – Rev.1 issued November 17, 2023

This report has been revised to correct the samples names issued on the original Chain of Custody.

Revised Report; Rev. 1 – Original Issued on September 19, 2022

This report has been revised to correct the following (all corrections pertain to the full list TO-17 analyses – the organic acids reports are unchanged):

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- 3) The calculated result for all samples for the $\mu\text{g}/\text{m}^3$ results were based on an estimated MDL reporting limit rather than the lowest calibration point. This may have resulted in some analytes in the samples being reported at levels less than the actual reporting limit.*