

APPENDICES

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APPENDIX A

REGULATORY CORRESPONDENCE, REVISION TRACKING, AND PERMITS

REGULATORY CORRESPONDENCE, REVISION TRACKING, AND PERMITS

A-1 Regulatory Correspondence

NMED Notice of Disapproval

Response to Comments

Approval for the Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests

Bioventing Respiration Pilot Testing Approval

A-2 Revision Tracking/Redline Documents

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APPENDIX A-1
REGULATORY CORRESPONDENCE

NMED NOTICE OF DISAPPROVAL



Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau

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James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

SEP 23 2020

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Base Commander
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2000 Wyoming Blvd SE
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Lt. Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil Engineer Division
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**RE: DISAPPROVAL
BIOVENTILATION CONSTRUCTION AND INITIATION REPORT
BULK FUELS FACILITY SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-20-001**

Dear Colonel Miller and Lt. Colonel Acosta:

The New Mexico Environment Department (NMED) is in receipt of Kirtland Air Force Base's (Permittee) *Bioventilation Construction and Initiation Report* (Report), dated January 2020. NMED has reviewed the Report and deficiencies were identified throughout the Report. NMED hereby issues this Disapproval with comments.

Although NMED is disapproving the Report we recommend continuation of the long-term pilot test. Continuation of data collection will help address many of the attached comments and will assist in ascertaining the long-term effectiveness of the bioventing technology.

The Permittee must submit a revised Report that addresses all comments contained in this letter. Two hard copies and an electronic version of the revised Report must be submitted to the NMED. Please include a redline-strikeout version in electronic format showing where all revisions to the Report have been made. The revised Report must be accompanied with a response letter that details where all revisions have been made, cross-referencing NMED's

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numbered comments. The Revised Report must be submitted to NMED no later than **April 30, 2021**.

Should you have any questions or wish to meet with us to discuss these comments, please contact me at (505) 476-6035.

Sincerely,

Kevin
Pierard

Digitally signed by Kevin Pierard
Date: 2020.09.23 12:40:15 -0600'

Kevin Pierard
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
L. King EPA Region 6 (6LCRRC)
S. Kottkamp, KAFB
K. Lynnes, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

Attachment

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SPECIFIC COMMENTS

1. Executive Summary, ES-1, Installation of Bioventing Monitoring Wells, page ES-1

Permittee Statement: "Each SVMW is comprised of six 0.75-inch outside diameter nested vapor probes with 2 feet (ft) of screen each targeting different depths of the vadose zone. Vapor probes were installed at depths varying between 102 and 262.5 ft below ground surface to facilitate discrete vertical monitoring of the vadose zone."

NMED Comment: According to the *Bioventing Respiration Pilot Testing Procedure* (Procedure), dated September 2018, lengths of the screened intervals for the nested vapor probes were indicated as 2.5 feet, rather than two feet. Clarify whether the vapor probes have two- or 2.5-foot screened intervals in the revised Report. Revise all applicable sections of the Report, as appropriate. In addition, the depths of both wells KAFB-106V1 and KAFB-106V2 were reported as 102.5 to 272.5 feet below ground surface (bgs) in Table 1-1. Provide an explanation for or resolve the discrepancies in the revised Report.

2. Section 1.2, Bioventing Pilot Test Objectives and Scope, page 1-1

Permittee Statement: "The bioventing pilot test is being performed to evaluate the feasibility of this technology for the Corrective Measures Evaluation Report."

NMED Comment: According to Table 3-12, *Summary of Hydrocarbon Analytical Results*, the elevated TPH-GRO concentrations in soil vapor samples collected from all pilot test monitoring wells indicate that free phase and adsorbed hydrocarbons may be present in the vicinity of the pilot test area. In order to maximize the effectiveness of remediation, delineation of the extent of hydrocarbon contamination is crucial regardless of the technology that is ultimately proposed through corrective measures evaluation (CME).

In order to effectively remediate the extent of hydrocarbon contamination where free phase hydrocarbon is present, the Permittee must clarify whether the extent has been fully delineated. Either confirm that the extent of contamination has been fully delineated through previous investigations in the revised Report or submit a work plan to delineate the extent of the vadose zone contamination (e.g., Laser-Induced Fluorescence), if necessary. If the work plan is deemed necessary, submit the work plan no later than **July 30, 2021**.

3. Section 1.2, Bioventing Pilot Test Objectives and Scope, page 1-1

Permittee Statement: "The rate of oxygen utilization is directly proportional to the aerobic biodegradation rate of fuel hydrocarbons in the subsurface and can be used as an indication of the effectiveness of bioventing to achieve site cleanup."

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NMED Comment: The reduction of oxygen levels in monitoring and injection wells does not necessarily mean that all of the oxygen is utilized for biodegradation of hydrocarbons. Although oxygen utilization may be an indicator, it is not clear that this is directly proportional due to a variety of factors including diffusion of oxygen-depleted soil gas from soil pore space and dissipation of injected air toward the low-pressure gradient outside of the test cell boundary. Other monitoring parameters (e.g., isotope analysis) may be necessary to confirm evidence of biodegradation. Because the Permittee continues to evaluate the effectiveness of the bioventing technology through the long-term pilot testing, additional monitoring parameters may be useful to confirm the occurrence of biodegradation. Evaluate the necessity of additional monitoring parameters to confirm evidence of biodegradation and provide a discussion in the revised Report (see Comment 34). Evidence of biodegradation does not necessarily indicate its effectiveness as a remedial alternative. In order for this technology to be considered as viable remedial alternative, the pilot test must demonstrate reduction of hydrocarbon concentrations.

4. Section 1.2, Bioventing Pilot Test Objectives and Scope, page 1-2, and Section 5.4, Bioventing Pilot Test Performance Assessment, page 5-2

Permittee Statements: "Status reports will be provided quarterly as an appendix to the appropriate Groundwater Monitoring Report."
and,
"Respiration and analytical data collected from each quarter will be reported in the appropriate quarterly groundwater monitoring report."

NMED Comment: The pilot test is not associated with groundwater remediation and groundwater is not monitored as part of this test. Inclusion of the status report in an appendix of a separate report is not appropriate. Status reports must be submitted separately from the quarterly groundwater monitoring reports. Please revise the Report accordingly.

5. Section 2, Background Information, page 2-1

NMED Comment: A discussion regarding fuel release (e.g., release date range, contaminants of concern, area where fuel was released, range of estimated volumes released) is not included in this section of the Report. Please include the discussion in the revised Report.

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6. Section 2.2, Site History, page 2-1

Permittee Statement: "Impacted soil was excavated in the release area to a depth of approximately 20 feet (ft) below ground surface in the area shown on Figure 1-2. Soil vapor extraction activities were performed at the site between 2003 and 2015 to reduce the mass of contaminants in the vadose zone."

NMED Comment: Figure 1-2, *Bioventing Pilot Test Area*, does not depict the area where contaminated soil was excavated. Please revise the figure or include a new figure to present the area where the soil was excavated. Additionally, explain whether the soil vapor extraction (SVE) system is still present at the Bulk Fuels Facility Site. Even if the SVE system alone did not achieve effective mass removal, the combination of SVE and bioventing technologies may increase the effectiveness of each technology. Please evaluate the feasibility and benefits of operating both systems concurrently and provide a discussion in the revised Report.

7. Section 2.3, Ongoing Soil Vapor Monitoring, page 2-1

Permittee Statement: "A total of 284 soil vapor monitoring points at 56 soil vapor monitoring locations are being sampled semiannually. The results from the vapor monitoring data indicate that the majority of the petroleum hydrocarbon concentrations found in the vadose zone are located in the vicinity of the release area."

NMED Comment: Please include a separate figure presenting locations of all soil vapor monitoring wells with designations in the revised Report.

8. Section 3.2, Bioventing Equipment Installation, page 3-1

Permittee Statements: "The [1.5-horsepower regenerative] blower unit provides injection air to the SVEWs through a 2-inch polyethylene conveyance line that manifolds to the individual SVEWs."

and,

"Due to high head losses associated with high volume injection flow rates through the 0.5-inch diameter SVMWs, the regenerative blower could not be used for air injection due to pressure limitations. As a result, injection air is provided to the SVMWs via two 1-horsepower Gast rotary vane pumps."

NMED Comment: It is not clear whether or not the 1.5-horsepower regenerative blower was concurrently used with rotary vane pumps during the pilot test. Please provide a clarification in the revised Report. In addition, it is not clear whether the two 1-horsepower rotary pumps provided sufficient power to deliver air to SVMWs or all wells. Please provide

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head loss calculations to demonstrate that the pumps were adequate in the revised Report.

9. Section 3.3, Baseline Respirometry and Vapor Sampling, page 3-2

Permittee Statement: "Well purging was performed by removing one well volume (casing volume plus the filter pack pore space volume of the screened interval) from the monitoring well utilizing a Gast rotary vane pump."

NMED Comment: The rotary vane pumps were used to inject air into SVMWs. Explain whether the same pump was used for the purpose of purging in the revised Report.

10. Section 3.3, Baseline Respirometry and Vapor Sampling, page 3-2

Permittee Statement: "Analytical samples were collected using 6-liter Summa canisters and..."

NMED Comment: The September 2018 Procedure indicates that the size of Summa canisters proposed to be used was one liter. Explain the basis for the deviation. All deviations from the work plan must be described in the revised Report. Please revise the Report to include a section that discusses deviations from the work plan.

11. Section 3.4, Respirometry Field Testing, page 3-2, and Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statements: "The water injection was performed on May 23 and 24, 2019. After the water was injected, the test cells were allowed approximately 4 weeks to acclimate prior to the start of the wet respiration testing."

and,

"The results suggest little or no change to soil vapor humidity as the result of moisture addition."

NMED Comment: The September 2018 Procedure states, "[t]he water is radially forced into the formation." The pressurized water injection method was unlikely to distribute moisture radially throughout the pore space. Rather, injected water likely followed the least resistant (preferential) flow paths. The water may have infiltrated into deeper soils by gravity rather than providing moisture to soils in the target pore space during the acclimation period. As a result, changes to soil vapor humidity were not observed after water injection. The Executive Summary, *ES-4 Respiration Testing*, page ES-2, states, "[o]xygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing indicating that the moisture addition did not increase the rate of biodegradation." Because the water was likely not evenly distributed within the test cell, the results obtained from wet respiration test are not reliable and must not be used for decision-making

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purposes. The Permittee must not draw any conclusions related to the wet respiration test. In addition, the Executive Summary, *ES-4 Respiration Testing*, page ES-2, states, “[t]he need to add moisture will be further assessed during the long-term bioventing pilot test.” NMED agrees that further assessment through the long-term pilot test is appropriate and supports the injection of cool mist rather than pressurized water. Mist injected with air may provide more uniform distribution of moisture in the formation. Propose this approach in the revised Report.

12. Section 3.4, Respirometry Field Testing, page 3-2

Permittee Statement: “No measurable degradation was observed due to the high concentration of hydrocarbons and the limited amount of ambient air supplied to the subsurface.”

NMED Comment: Tables 4-2 through 4-13 provide volatile organic compound (VOC) concentrations measured in the monitoring wells. Air was continuously injected for more than 30 days between October 7 and November 5, 2019. However, the VOC concentrations appear to be persistent and relatively unchanged from the baseline levels in most monitoring locations. Considering the immediate effect of dilution with air, it is not clear why hydrocarbon concentrations are not declining after 30 days of air injection. It is possible that a major fraction of the injected air may have followed the preferential flow paths (e.g., fractures) and did not directly flow into the monitoring locations. Please evaluate the causes of persistent VOC concentrations and provide a discussion in the revised Report.

13. Section 3.4.1.1, [Dry Respirometry Testing] Air Injection and Pressure Monitoring, page 3-3, Section 3.4.3.1, [Wet Respirometry Testing] Air Injection and Pressure Monitoring, page 3-4, and Section 5.2, Long-Term Pilot Test Operational Parameters, page 5-1

Permittee Statement: “A 15-ft radius from the injection well was assumed for the calculation of each test cell control volume. The thickness of each test cell control volume was the filter pack length, plus 5 ft above and below to account for vertical air flow. The injection rate was calculated based on the addition of four pore volumes of the test cell in each well.”

and,

“The remediation area for the long-term bioventing test is defined as a control radius of 70 ft (the farthest distance between injection wells and observation wells) along with the filter pack thickness of the injection well to obtain a volume of impacted soil.”

NMED Comment: The estimated test cell volume was significantly increased for the long-term pilot test. In the revised Report, provide a table presenting (1) soil types at the screened intervals of injection and monitoring wells, (2) all input values (e.g., thickness,

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control radius, porosity) for the short- and long-term pilot tests, (3) calculated pore volumes based on the input values, (4) target volumes of air to be injected, and (5) actual volumes of air injected.

14. Section 3.4.1.1, [Dry Respirometry Testing] Air Injection and Pressure Monitoring, page 3-3

Permittee Statement: "Air injection flow rates and well head pressures were recorded daily and are presented in Tables 3-13 through 3-15. During air injection, well head pressures were monitored in wells KAFB-106V1 and KAFB-106V2 and are presented in Tables 3-16 and 3-17."

NMED Comment: Tables 3-13 through 3-17 provide data collected during air injection for the dry (April 22 – 28) and wet (June 20 – 26) respiration tests. Although respiration monitoring was conducted for the dry (April 28 – May 9) and wet (June 26 – July 5) respiration tests without air injection, these tables do not indicate that subsequent monitoring was conducted. Section 3.4, *Respirometry Field Testing*, states that the dry and wet respiration pilot tests were conducted between April 22 and May 9, 2019 and between June 20 and July 5, 2019, respectively. However, since the timeline of the events was not clearly described in the Report, the tables may be perceived as incomplete and cause confusion among readers. In the revised Report, provide a table presenting timeline for the short- and long-term pilot tests including dates for (1) baseline data collection, (2) air injection periods, and (3) post-injection respiration monitoring periods.

15. Section 3.4.1.2, Dry Respirometry, page 3-3

Permittee Statement: "Oxygen concentration within the subsurface was plotted against time for each well location and a linear regression was applied to determine the oxygen utilization rate."

NMED Comment: The plots were included in Appendix D, *Oxygen Utilization Plots*. However, it is more appropriate to include these plots in the Report, rather than the appendix because the slope of linear regression is interpreted as an oxygen utilization rate, which is the key parameter to estimate the biodegradation rate and long-term bioventing flow rate. Please include the plots in the figures section of the revised Report.

16. Section 3.4.2, Water Injection, page 3-3

Permittee Statement: "Prior to injection, the water was field tested for residual chlorine in order to reduce the possibility that chlorinated water could inhibit microbial growth in the subsurface."

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NMED Comment: Explain what kind of field test was conducted to determine residual chlorine level in the water. If field notes that record testing procedures and results are available, include them in the revised Report.

17. Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statement: "If the oxygen and carbon dioxide readings were at atmospheric conditions of 20.9 and 0.0%, respectively, then the field readings were accepted as correct."

NMED Comment: The statement indicates that the instrument is unable to detect changes in oxygen and carbon dioxide levels less than one thousand parts per million. The instrument may be adequate to monitor overall changes in oxygen and carbon dioxide concentrations in subsurface after air injection, but it is not clear whether such instrument is suitable for quantification of microbial activity. Please explain why the instrument is appropriate for the pilot tests in the revised Report.

18. Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statement: "While variability of oxygen/carbon dioxide was observed in many of the wells during the respiration testing, the changes were more prevalent within the SVEWs, possibly due to the longer screen intervals that would be more greatly affected by barometric pressure changes."

NMED Comment: Discuss the correlation between barometric pressure, subsurface oxygen/carbon dioxide levels and screen length in the revised Report. Additionally, provide example data to support the discussion.

19. Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statement: "However, oxygen concentrations overall consistently declined during the respiration testing providing clear evidence of oxygen demand and hydrocarbon biodegradation."

NMED Comment: The decrease in oxygen levels and increase in carbon dioxide levels in injection wells may also be attributed to diffusion of soil gas, dilution of injected air, and desorption/volatilization of organic compounds. Influx of soil gas and efflux of air may be the primary causes of an increase in carbon dioxide and a decrease in oxygen concentrations. Revise the statement for accuracy in the revised Report.

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20. Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statement: "A safety factor of 4 times the calculated oxygen utilization rate is being supplied to ensure oxygen is being delivered at a rate much greater than it is being utilized."

NMED Comment: If multiple pore volumes of air were applied to the test cell, air flow would have extended beyond the test cell boundary likely through the same flow paths originally created by initial application of air (e.g., fractures). Injection of multiple pore volumes of air may dilute soil gas within the test cell and push soil gas beyond the test cell boundary. However, excess air may not necessarily increase the microbial oxygen utilization rate. A large volume of the injected air may move contamination round in the subsurface. Revise the statement to acknowledge this possibility.

21. Section 4.1, Respiration Data Analysis, page 4-1

Permittee Statement: "As can be seen in the data, substantially lower relative humidity was measured during the wet respiration testing than the dry. It appears this is an artifact of timing; ambient air temperatures were warmer during the wet test. Measurement instability occurs when a soil vapor sample is extracted above ground and run through the instrument. On warm days, the sample temperature increases to near ambient, which decreases relative humidity. As the ambient temperature fluctuates, so does the relative humidity."

NMED Comment: The method used to measure relative humidity is not appropriate. The relative humidity data must not be affected by fluctuations of the ambient temperature. Subsurface temperature is likely more stable than that of the ambient air; the measurements should have been conducted to minimize the influence of changes in ambient temperatures. Please evaluate alternative methods for relative humidity measurement and provide a discussion in the revised Report.

Since the relative humidity was higher during the dry respiration test compared to the wet respiration test, the relative humidity data does not make sense. The relative humidity data must be converted to absolute humidity values and its acceptability for use evaluated. If the converted data makes sense, revise all applicable tables to present absolute humidity, rather than relative humidity. Otherwise, remove all data and discussions regarding relative humidity from the revised Report.

22. Section 4.1, Respiration Data Analysis, pages 4-1 and 4-2

Permittee Statement: "In some of the locations, the absolute humidity appears marginally higher in the wet test; however, the reasons for this are unclear. The water injected into the

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wells for the wet test was likely warmer than the soils resulting in warmer soil immediately surrounding the sampling point screens. This could account for the absolute humidity differences.”

NMED Comment: Since water was injected prior to the wet respiration test, the higher absolute humidity readings during the wet respiration pilot test make sense; however, the readings were only marginally higher than those observed during the dry respiration test. This observation suggests that the method used to distribute moisture (pressurized water injection) was not effective. The moisture addition method must be evaluated during the long-term pilot test. During the evaluation, other moisture distribution methods (e.g., cool mist injection) must be evaluated.

Additionally, soil vapor temperatures were generally higher than ambient air temperatures according to Tables 3-2 through 3-10. The water temperature is lower than, or equivalent to, the ambient air temperature. It may be more reasonable to assume that soil temperature was higher than that of the water which would make the Permittee’s statement incorrect. Revise the statement accordingly.

23. Section 4.2.1, Oxygen Utilization Rate, page 4-2

Permittee Statement: “Oxygen utilization rates for the dry respiration testing varied between 0.163 and 0.475% per day for the SVMWs and between 0.497 and 0.639% per day for the SVEWs (Appendix D-1 and Table 4-1). The oxygen utilization rate averaged 0.340% per day for the SVMWs while averaging 0.563% per day for the SVEWs. The overall average oxygen utilization rate for the dry respiration test was 0.414% per day.”

NMED Comment: According to Appendix D-1, *Oxygen Utilization*, the daily oxygen concentrations are plotted for each injection well. Each slope of the curve is reported as “oxygen utilization rate”. However, the reduction in oxygen levels may be attributed to dilution of injected air and is not necessarily limited to oxygen utilized for hydrocarbon biodegradation (see Comment 19).

Additionally, elevated hydrocarbon concentrations (e.g., 250 parts per million benzene) reportedly inhibit aerobic biodegradation. The level of hydrocarbons at the site is high enough to affect the results. In order for aerobic biodegradation to be induced at the site, the concentrations may initially need to be diluted with air. The observed reduction in oxygen levels must not be assumed to be the result of microbial activity. The referenced oxygen utilization rate is more appropriately referred to as “oxygen reduction rate”. Please revise the Report for accuracy.

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24. Section 4.2.2, Biodegradation Rate, page 4-2

Permittee Statement: “Biodegradation rates during the dry respiration testing ranged between 0.096 and 0.281 milligrams per kilogram per day (mg/kg/day) for the SVMWs and between 0.294 and 0.378 mg/kg/day for the SVEWs (Table 4-1). Biodegradation rates during the wet respiration testing ranged between 0.081 and 0.308 mg/kg/day for the SVMWs and between 0.012 and 0.371 mg/kg/day for the SVEWs.”

NMED Comment: According to Appendix E-1, *Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and Oxygen Radius of Influence*, the biodegradation rates were calculated as a function of oxygen utilization rates. However, the observed oxygen reduction is not entirely accounted for by microbial oxygen utilization (see Comments 19 and 23). Therefore, the biodegradation rates must not be calculated from the observed oxygen reduction rates. Remove the discussion from the revised Report.

25. Section 4.2.3, Oxygen Demand Air Flow Rate, page 4-3

Permittee Statement: “The oxygen demand flow rate represents the minimum ambient air injection flow rate required to maintain the biodegradation rates obtained in the respirometry calculations. The oxygen demand air flow rate was calculated based on the oxygen utilization rate and corresponding biodegradation rates for each well under both the dry and wet respiration conditions (Appendix E-1).”

NMED Comment: The oxygen demand flow rates were calculated as a function of oxygen utilization rates. The calculated flow rates do not represent the minimum air flow rates required to maintain biodegradation rates. However, the minimum air injection flow rates required to compensate the loss of oxygen can be calculated from the observed oxygen reduction rates. Modify the formula provided in Section 3.1.6 of the *Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests* (Work Plan), dated November 2017, and calculate the required air injection flow rates. Revise the Report accordingly.

26. Section 4.2.4, Intrinsic Permeability, page 4-3

Permittee Statement: “Intrinsic permeability was calculated for the SVEWs under both the dry and wet respiration conditions (Table 4-1). The calculations are provided in Appendix E-2.”

NMED Comment: According to Appendix E-2, *Intrinsic Permeability Calculations*, intrinsic permeability was calculated based on well vacuum. A positive pressure was applied to the wells as air was injected from the wells; however, the formula used to calculate intrinsic permeability required vacuum (negative) pressure. Please provide an explanation for the discrepancy in the revised Report.

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In addition, the radii of influence (ROIs) used to calculate intrinsic permeability were different from the ROIs reported in Table 4-1. For example, the ROI used to calculate intrinsic permeability was 113 feet for well SVEW-01-260 during the dry respiration test according to Appendix E-2-1. However, the ROI reported in Table 4-1 was 143 feet for the same well. Correct, or provide an explanation for, the discrepancy in the revised Report.

27. Section 4.2.4, Intrinsic Permeability, page 4-3

Permittee Statement: “Intrinsic permeability was not calculated for the SVMWs as the large amount of head loss that occurred in the 0.5-inch diameter wells did not allow for accurate pressure monitoring at the injection point.”

NMED Comment: Section 3.2 indicates that the issue associated with head loss was resolved by replacing the 1.5-horsepower regenerative blower with two 1-horsepower rotary vane pumps. Please provide further clarification of the issue and resolution in the revised Report. In addition, the well head pressure readings during and after air injection for SVMWs are reported in Tables 3-13, 3-14 and 3-2 through 3-7, respectively. This data should not be included in the Report or it must be qualified to account for the inaccurate pressure readings for SVMWs in the revised Report.

28. Section 4.2.5, Radius of Influence, page 4-3

Permittee Statement: “[T]he oxygen ROI was calculated using the oxygen utilization rates and long-term bioventing operation flow rates as described in the Work Plan (Kirtland AFB, 2017a)... The oxygen ROI varied between 138 and 143 ft for the dry respiration test and between 138 and 152 ft for the wet respiration test.”

NMED Comment: The ROI was calculated based on oxygen utilization rates. However, the observed oxygen reduction is not entirely accounted for by microbial oxygen utilization. Therefore, the method used to estimate the ROI is not appropriate. Use pressure response data to estimate the ROIs, where applicable, or if appropriate, modify the formula provided in Section 3.1.8 of the November 2017 Work Plan, and calculate the ROIs. Revise the Report accordingly.

29. Section 4.2.6, Soil Vapor Analytical Results, page 4-3

Permittee Statement: “Soil vapor analytical data and the analytical laboratory reports are provided in Appendix B-2. TPH-GRO, BTEX, and EDB concentrations were collected and are provided in Table 3-12.”

NMED Comment: According to Appendix B-2, *Soil Vapor Analytical Results*, EDB was only analyzed with EPA Method TO-15. The Permittee’s April 3, 2017 letter states, “[Method]

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CARB 422 may be used for individual tasks where it is important to evaluate EDB in soil vapor in the presence of high concentrations of HC in relation to EDB concentrations, such as monitoring the effectiveness of bioventing or air-lifting interim measures in the source area. In these instances, CARB 422 will be included where appropriate in the individual work plan for that task." Since hydrocarbon molecules do not interfere with the measurement of EDB by Method CARB 422, lower limits of quantitation (LOQ) are achievable with the method, allowing for more accurate detection of EDB in soil vapor than with Method TO-15. Elevated hydrocarbon concentrations were observed in soil vapor samples at the site; therefore, it is appropriate to analyze EDB samples using both Methods CARB 422 and TO-15. Include this provision during the long-term pilot test.

30. Section 4.2.6.1, [Soil Vapor Analytical Results] Baseline Respiration Sampling, page 4-4

Permittee Statement: "The sum of BTEX ranged from 2,400,000 to 9,130,000 $\mu\text{g}/\text{m}^3$."

NMED Comment: Although Table 3-12, *Summary of Hydrocarbon Analytical Results*, records concentrations of benzene (B), toluene (T), ethylbenzene (E), and total xylenes (X) separately, the sum of these constituents is not recorded in the table. Revise the table to include the sum of BTEX.

31. Section 4.2.6.2, [Soil Vapor Analytical Results] Post-Dry Respiration Sampling, page 4-4

Permittee Statement: "TPH-GRO ranged from 52,000,000 to 210,000,000 $\mu\text{g}/\text{m}^3$."

NMED Comment: Out of 12 monitoring points, the TPH-GRO concentrations after the air injection were recorded as higher in six locations, the same in three locations, and lower in two locations compared to the baseline concentrations. Longer-term monitoring is necessary to evaluate the effectiveness of the pilot test because the results of the short-term pilot test indicate that the bioventing technology is not effective. Please provide a submission schedule for the required status reports in the revised Report (see Comment 4).

32. Section 4.2.6.3, [Soil Vapor Analytical Results] Post-Wet Respiration Sampling, page 4-4

Permittee Statement: "Data collected during the respiration tests will be used as baseline data to assess the biodegradation throughout the full-scale bioventing test."

NMED Comment: Currently, full-scale bioventing as a means to remediate vadose zone hydrocarbons is not recommended based on the analytical results of the short-term pilot tests. However, longer-term monitoring will be necessary to fully evaluate the effectiveness of the bioventing system for hydrocarbon removal from the vadose zone (see Comment 31).

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33. Table 3-18, Bioventing Respiration Pilot Test Water Injection Summary

NMED Comment: The September 2018 Procedure states that the water volume for the wet respiration test was designed to be 1% of the pore volume. However, it is not clear whether the design protocol was followed during water injection. For example, the length of screened intervals for wells SVMW-11-250 and SVMW-11-260 was identical at 2.5 feet; however, water injection volumes for these wells were 325 and 625 gallons, respectively, according to Table 3-18. In Table 3-14, *Bioventing Respiration Pilot Test Air Injection Summary – SVMW-11*, the pore volumes were estimated as 4,278 and 8,036 cubic feet, respectively. It is not clear how the volumes were so different even though the length of screened intervals was identical. Provide an explanation for the difference in the estimated pore volumes among the test cells in the revised Report.

34. Tables 4-2 through 4-13, Respiration Monitoring

NMED Comment: According to the tables, after the long-term bioventing pilot test was initiated, the oxygen levels in all monitoring locations increased and reached a plateau in less than one month. Since hydrocarbons are still abundant in all monitoring locations, microbes could have utilized oxygen to degrade hydrocarbons and produce carbon dioxide and water. However, the carbon dioxide concentrations decreased as oxygen concentrations increased. Similarly, relative humidity readings were lower than those of the baseline in most locations. The carbon dioxide and water production were not obvious at any location. It appears that air is diluting soil gas at the monitoring locations but is not utilized for biodegradation. It is possible that the high level of hydrocarbons may hinder microbial activity. Discuss the kinetics of aerobic biodegradation in comparison to the rate of dilution in the revised Report. Additionally, please propose additional analytical methods to verify biodegradation (e.g., isotope analysis) and evaluate the applicability of such methods during the long-term pilot test (see Comment 3).

RESPONSE TO COMMENTS

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1.	ES-1	ES-1	According to the <i>Bioventing Respiration Pilot Testing Procedure</i> (Procedure), dated September 2018, lengths of the screened intervals for the nested vapor probes were indicated as 2.5 feet, rather than two feet. Clarify whether the vapor probes have two- or 2.5-foot screened intervals in the revised Report. Revise all applicable sections of the Report, as appropriate. In addition, the depths of both wells KAFB-106V1 and KAFB-106V2 were reported as 102.5 to 272.5 feet below ground surface (bgs) in Table 1-1. Provide an explanation for or resolve the discrepancies in the revised Report.	Screen lengths for wells KAFB-106V1 and KAFB-106V2 are 2 feet in length. Final placement of each screen was determined in the field based on lithology and are correctly recorded in the well construction diagrams located in Appendix C. The report has been revised in Section ES-1 to list correct installation depth. "Vapor probes were installed at depths varying between 102.1 and 262.6 ft below ground surface (bgs) for well KAFB-106V1 and at depths varying between 102.2 and 269.5 ft bgs for KAFB-106V2. The variation in vapor probe depth allows discrete vertical monitoring of the vadose zone." Well Installation deviation are discussed in Section 3.5 Deviation from Work Plan: "Soil vapor monitoring wells KAFB-106V1 and KAFB-106V2 were constructed with 2-foot screened intervals (standard available length) in place of the 2.5-foot intervals as described in the work plan (Kirtland AFB, 2017b). The 2-foot screen length does not impact vapor sampling. Final placement of each screen within the nested well was determined in the field based on lithology and are correctly recorded in the well construction diagrams located in Appendix C."
2	1.2	1-1	According to Table 3-12, <i>Summary of Hydrocarbon Analytical Results</i> , the elevated TPH-GRO concentrations in soil vapor samples collected from all pilot test monitoring wells indicate that free phase and adsorbed hydrocarbons may be present in the vicinity of the pilot test area. In order to maximize the effectiveness of remediation, delineation of the extent of hydrocarbon contamination is crucial regardless of the technology that is ultimately proposed through corrective measures evaluation (CME). In order to effectively remediate the extent of hydrocarbon contamination where free phase hydrocarbon is present, the Permittee must clarify whether the extent has been fully delineated. Either confirm that the extent of contamination has been fully delineated through previous investigations in the revised Report or submit a work plan to delineate the extent of the vadose zone contamination (e.g., Laser-Induced Fluorescence), if necessary. If the work plan is deemed necessary, submit the work plan no later than July 30, 2021 .	This pilot test is not the appropriate vehicle for directing the Air Force to develop a work plan to define the nature and extent of free phase hydrocarbons. The sole objective of the approved work plan (Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, BFF, SWMUs ST-106/SS-111 [Kirtland AFB, 2017a]) was to evaluate the efficacy of bioventing technology as a corrective measure. This report is intended to document the work performed under this approved scope. This pilot was never intended to delineate the extent of free phase hydrocarbons and, therefore, this discussion is not included in the revised report. The Air Force is open to meeting either NMED to discuss how sufficient data has been collected over the history of this project to assess the extent of vadose zone contamination.
3	1.2	1-1	The reduction of oxygen levels in monitoring and injection wells does not necessarily mean that all of the oxygen is utilized for biodegradation of hydrocarbons. Although oxygen utilization may be an indicator, it is not clear that this is directly proportional due to a variety of factors including diffusion of oxygen-depleted soil gas from soil pore space and dissipation of injected air toward the low-pressure gradient outside of the test cell boundary. Other monitoring parameters (e.g., isotope analysis) may be necessary to confirm evidence of biodegradation. Because the Permittee continues to evaluate the effectiveness of the bioventing technology through the long-term pilot testing, additional monitoring parameters may be useful to confirm the occurrence of biodegradation. Evaluate the necessity of additional monitoring parameters to confirm evidence of biodegradation and provide a discussion in the revised Report (see Comment 34). Evidence of biodegradation does not necessarily indicate its effectiveness as a remedial alternative. In order for this technology to be considered as viable remedial alternative, the pilot test must demonstrate reduction of hydrocarbon concentrations.	The Bioventilation Construction and Initiation Report did not include an assessment of bioventing as sufficient data had not been collected before this report was due to NMED. The bioventing respiration pilot testing was performed in accordance with the approved work plan (Kirtland AFB, 2017a) and operating procedure. A preventative safeguard was used to decrease the likelihood of vapor diffusion and dissipation (the injection of 4 times the test cell pore volume) and parameters and analytical samples were collected as specified in the approved work plan and testing procedure. Bioventing Respiration Pilot Testing Procedure Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST 106/SS-111, Kirtland Air Force Base, New Mexico. [Kirtland AFB, 2018a]. The relationship between the low oxygen utilization rates and the rate of air injection is discussed in the response to comment 34 below. Oxygen utilization was continually monitored throughout the long-term bioventing pilot test as the primary method to evaluate biodegradation. Oxygen utilization and biodegradation will be discussed in detail in the Final Bioventilation Pilot Testing Report. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). A pilot test is a focused, limited-scale test of a technology that is used to determine potential effectiveness under field conditions and the feasibility of including the technology in the final remedy. The potential viability of this technology will be evaluated in the CME. Based on the low oxygen utilization rates, it is likely that this technology will not meet the remedy threshold criteria in the RCRA Permit Part 6.2.2.2.5.1.

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4	1.2 & 5.4	1-2 & 5-2	The pilot test is not associated with groundwater remediation and groundwater is not monitored as part of this test. Inclusion of the status report in an appendix of a separate report is not appropriate. Status reports must be submitted separately from the quarterly groundwater monitoring reports. Please revise the Report accordingly.	The bioventing status reports have been removed from the quarterly reports as of the Q3 2020 Quarterly Monitoring Report. Per NMED concurrence, as stated in the formal correspondence letter to the Permittee on February 11, 2021; the bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns. Analysis of the bioventing pilot test will be provided as a stand-alone document as the Final Bioventilation Pilot Testing Report Wells associated with the bioventing pilot test will be placed within the semi-annual soil vapor monitoring regimen starting in Q2 2021.
5	2	2-1	A discussion regarding fuel release (e.g., release date range, contaminants of concern, area where fuel was released, range of estimated volumes released) is not included in this section of the Report. Please include the discussion in the revised Report.	This information on the history of the fuel release was presented in the RFI Phase I Report (Kirtland AFB, 2018b). The background discussion in this report focused on what was applicable to the pilot. No changes were made to the text.
6	2.2	2-1	Figure 1-2, <i>Bioventing Pilot Test Area</i> , does not depict the area where contaminated soil was excavated. Please revise the figure or include a new figure to present the area where the soil was excavated. Additionally, explain whether the soil vapor extraction (SVE) system is still present at the Bulk Fuels Facility Site. Even if the SVE system alone did not achieve effective mass removal, the combination of SVE and bioventing technologies may increase the effectiveness of each technology. Please evaluate the feasibility and benefits of operating both systems concurrently and provide a discussion in the revised Report.	<p>A summary of the soil excavation activities in the source area was presented in the RFI Phase I Report. Documentation of the soil excavation is provided in the Former Fuel Offloading Rack Excavation Report, Bulk Fuels Facility (BFF) Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico (Kirtland AFB, 2015a). Figure 1-2 has been revised to show the area of excavation.</p> <p>The SVE system was decommissioned in January 2017. As stated in the Q4 2015 Quarterly Monitoring Report, "The decision to decommission the CATOX SVE system was made during the October 2015 federal and regulator project team meeting, based on results from the SVE shutdown test and Q4 2015 soil-vapor sampling. A letter outlining decommissioning procedures was submitted to the Albuquerque Environmental Health Department on November 20, 2015"</p> <p>A pilot test is a focused, limited-scale test of a technology that is used to determine potential effectiveness under field conditions and the feasibility of including the technology in the final remedy. The potential viability of this technology alone or with SVE will be evaluated in the CME, as appropriate.</p>
7	2.3	2-1	Please include a separate figure presenting locations of all soil vapor monitoring wells with designations in the revised Report.	Figure 2-1 Soil Vapor Monitoring Locations, has been added to the revised report.

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8	3.2	3-1	It is not clear whether or not the 1.5-horsepower regenerative blower was concurrently used with rotary vane pumps during the pilot test. Please provide a clarification in the revised Report. In addition, it is not clear whether the two 1-horsepower rotary pumps provided sufficient power to deliver air to SVMWs or all wells. Please provide head loss calculations to demonstrate that the pumps were adequate in the revised Report.	<p>Each rotary vane pump is providing injection air to a single SVMW location (3 separate injection intervals). Head loss calculation for pressurized pipe flow have been added to the revised report in Appendix D-1.</p> <p>Section 3.2 has been revised as follows: "Air injection is performed using a 1.5-HP regenerative blower and two 1-HP rotary vane pumps. Air injection is performed concurrently at all locations utilizing the regenerative blower and both rotary vane pumps.</p> <p>The 1.5-horsepower regenerative blower is part of a turnkey Geotech air injection blower skid equipped with a high-pressure shutoff and pressure relief valve. The blower is used for the SVEWs that have a 2-inch diameter. These wells consist of SVEW-01-260, SVEW-02/03, and SVEW-04/05 (Figure 1-2). The diameter of these wells reduces the head loss through the wells and allows for sufficient air injection. The blower unit provides injection air to the SVEWs through a 2-inch polyethylene conveyance line that manifolds to the individual SVEWs. Each SVEW is equipped with a direct read-out flowmeter located at the well head. Conveyance piping is connected to the well head via rubber couplings.</p> <p>Due to head losses associated with high volume injection flow rates through the 0.5-inch diameter SVMWs (Appendix D-1), it was determined that the blower may not be capable of overcoming pressure losses within the SVMWs while maintaining the desired flowrates. As a result, injection air is provided to the SVMWs via a dedicated 1-horsepower Gast rotary vane pump located at each wellhead (total of two wellheads and pumps). These wells consist of SVMW-10 and SVMW-11 (Figure 1-2). These rotary vane pumps are capable of producing a maximum pressure of approximately 15 psig. Each vane pump is equipped with a copper cooling coil, galvanized steel manifold, direct read-out rotameters, and quick connect fittings."</p>
9	3.3	3-2	The rotary vane pumps were used to inject air into SVMWs. Explain whether the same pump was used for the purpose of purging in the revised Report.	<p>Rotary vane pumps used for air injection are dedicated for air injection at the well head location. A third pump is used for sampling purposes. The statement in the following sections have been revised.</p> <p>Section 3.2: "As a result, injection air is provided to the SVMWs via <i>dedicated</i> 1-horsepower Gast rotary vane pump located at each wellhead (total of two wellheads and pumps)."</p> <p>Section 3.3: "Well purging was performed by removing one well volume (casing volume plus the filter pack pore space volume of the screened interval) from the monitoring well utilizing a Gast rotary vane pump <i>that is dedicated for sampling purposes</i>"</p>
10	3.3	3-2	The September 2018 Procedure indicates that the size of Summa cannisters proposed to be used was one liter. Explain the basis for the deviation. All deviations from the work plan must be described in the revised Report. Please revise the Report to include a section that discusses deviations from the work plan.	<p>During the bioventing pilot test, 6-liter summa canisters were used in place of the 1-liter canisters to provide sufficient volume to allow for analysis of all required parameters. Documentation of laboratory confirmation of the sample canister size is provided in Appendix D-2 of the revised report.</p> <p>Section 3.5, Deviations from Work Plan, has been added to the revised report. Deviations from the approved work plan (Kirtland AFB, 2017a) are listed in the section.</p>

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11	3.4 & 4.1	3-2 & 4-1	The September 2018 Procedure states, "[t]he water is radially forced into the formation." The pressurized water injection method was unlikely to distribute moisture radially throughout the pore space. Rather, injected water likely followed the least resistant (preferential) flow paths. The water may have infiltrated into deeper soils by gravity rather than providing moisture to soils in the target pore space during the acclimation period. As a result, changes to soil vapor humidity were not observed after water injection. The Executive Summary, <i>ES-4 Respiration Testing</i> , page ES-2, states, "[o]xygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing indicating that the moisture addition did not increase the rate of biodegradation." Because the water was likely not evenly distributed within the test cell, the results obtained from wet respiration test are not reliable and must not be used for decision-making purposes. The Permittee must not draw any conclusions related to the wet respiration test. In addition, the Executive Summary, <i>ES-4 Respiration Testing</i> , page ES-2, states, "[t]he need to add moisture will be further assessed during the long-term bioventing pilot test." NMED agrees that further assessment through the long-term pilot test is appropriate and supports the injection of cool mist rather than pressurized water. Mist injected with air may provide more uniform distribution of moisture in the formation. Propose this approach in the revised Report.	The water injection was performed in accordance with approved work plan (Kirtland AFB, 2017a) and Pilot Testing Procedure (Kirtland AFB, 2018a). Additionally, the long-term bioventing pilot test was performed dry for the first quarter of operation and has since been modified to include quarterly water injection of approximately 100 gallons within each SVMW well injection interval. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). The Final Bioventilation Pilot Testing Report will summarize all pilot-related field activities. The potential viability of this technology will be evaluated in the CME. The statement in ES-4 has been revised to state "The overall average oxygen utilization rate for the wet respiration test was 0.316% per day. Oxygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing. The need to add moisture will be further assessed during the long-term bioventing pilot test." Additionally, the following statement was removed from Section 4.2.1: "Oxygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing indicating that the moisture addition did not increase the rate of biodegradation."
12	3.4	3-2	Tables 4-2 through 4-13 provide volatile organic compound (VOC) concentrations measured in the monitoring wells. Air was continuously injected for more than 30 days between October 7 and November 5, 2019. However, the VOC concentrations appear to be persistent and relatively unchanged from the baseline levels in most monitoring locations. Considering the immediate effect of dilution with air, it is not clear why hydrocarbon concentrations are not declining after 30 days of air injection. It is possible that a major fraction of the injected air may have followed the preferential flow paths (e.g., fractures) and did not directly flow into the monitoring locations. Please evaluate the causes of persistent VOC concentrations and provide a discussion in the revised Report.	The subsurface is a porous media and if it contains preferential pathways, they are related to heterogeneity of the media. It is possible that the injection air followed a preferential higher permeability flow path. However, the increase in subsurface oxygen observed throughout all monitoring locations suggests that distribution of injection air throughout the subsurface is occurring. Persistent VOC concentrations are likely due to the partitioning of hydrocarbons adsorbed to the soil to the vapor phase. Reduction in the VOC or analytical concentrations were not expected during the respiration testing due to the limited duration of the testing and is stated in Section 4.2.5.3: "Significant changes in contaminant concentration due to biodegradation were not expected to be observed during the respiration pilot testing due to the limited injection periods." The Bioventilation Construction and Initiation report was submitted to document the construction and initiation of the pilot testing. In order to meet the NMED required deadline for the report, sufficient data had not been collected at the time of the report submittal to allow for analysis of the pilot test. Discussion of persistent VOC concentrations and analysis of the bioventing pilot test will be discussed in the Final Bioventing Pilot Testing Report. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021).
13	3.4.1.1, 3.4.3.4, & 5.2	3-3, 3-4, & 5-1	The estimated test cell volume was significantly increased for the long-term pilot test. In the revised Report, provide a table presenting (1) soil types at the screened intervals of injection and monitoring wells, (2) all input values (e.g., thickness, control radius, porosity) for the short- and long-term pilot tests, (3) calculated pore volumes based on the input values, (4) target volumes of air to be injected, and (5) actual volumes of air injected.	Table 1-1 has been revised to include soil types within the screened interval. Table 3-14 Respiration Flow Design has been added to the revised report. The table includes input values, test cell pore volumes, target volumes for air and moisture injection, and volumes of injected air and moisture. The table is referenced in Section 3.4.1. Table 5-1 Long-Term Bioventing Flow Design has been added to the revised report and is referenced in Section 5.2. Additionally, there is not a target volume of injected air for the long-term bioventing pilot test. The goal is to continually provide the oxygen needed to maintain biodegradation rates.

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14	3.4.1.1	3-3	Tables 3-13 through 3-17 provide data collected during air injection for the dry (April 22 - 28) and wet (June 20- 26) respiration tests. Although respiration monitoring was conducted for the dry (April 28 - May 9) and wet (June 26-July 5) respiration tests without air injection, these tables do not indicate that subsequent monitoring was conducted. Section 3.4, <i>Respirometry Field Testing</i> , states that the dry and wet respiration pilot tests were conducted between April 22 and May 9, 2019 and between June 20 and July 5, 2019, respectively. However, since the timeline of the events was not clearly described in the Report, the tables may be perceived as incomplete and cause confusion among readers. In the revised Report, provide a table presenting timeline for the short- and long-term pilot tests including dates for (1) baseline data collection, (2) air injection periods, and (3) post-injection respiration monitoring periods.	Table 3-12 Chronology of Events, has been added to the revised report.
15	3.4.1.2	3-3	The plots were included in Appendix D, <i>Oxygen Utilization Plots</i> . However, it is more appropriate to include these plots in the Report, rather than the appendix because the slope of linear regression is interpreted as an oxygen utilization rate, which is the key parameter to estimate the biodegradation rate and long-term bioventing flow rate. Please include the plots in the figures section of the revised Report.	Oxygen utilization charts have been moved to figures in the revised report and are presented as Figures 4-1 through 4-18 and are appropriately referenced in the report.
16	3.4.2	3-3	Explain what kind of field test was conducted to determine residual chlorine level in the water. If field notes that record testing procedures and results are available, include them in the revised Report.	Chlorine levels of the injection water were tested using a Reagent Pillow Pouch testing field kit. Chlorine readings from the injection water were compared to levels in deionized water for confirmation. Field records have been provided in the revised report within Appendix B.
17	4.1	4-1	The statement indicates that the instrument is unable to detect changes in oxygen and carbon dioxide levels less than one thousand parts per million. The instrument may be adequate to monitor overall changes in oxygen and carbon dioxide concentrations in subsurface after air injection, but it is not clear whether such instrument is suitable for quantification of microbial activity. Please explain why the instrument is appropriate for the pilot tests in the revised Report.	Field parameters were collected in accordance with the approved work plan (Kirtland AFB, 2017a) and operating procedure. The range of detection of the instrument is between 0.0 and 30.0% with a 0.1 % accuracy as stated in Table 3-1. According to Principles and Practices of Bioventing (Leeson and Hinchee, 1996), oxygen utilization rates greater than 1% per day are a good indicator that bioventing may be feasible at the site. The low range on the instrument is 0.1% demonstrating that it is capable of detecting changes in oxygen that would support biodegradation as a result of bioventing. Section 3.3 has been revised to include discussion of the oxygen detection limits of the instrument. "After purging was completed, volatile organic compound (VOC), oxygen, carbon dioxide, methane, and barometric pressure readings were collected. Barometric pressure and methane readings were collected using a calibrated Landtec GEM 5000 portable gas analyzer. Oxygen, carbon dioxide, and VOC readings were collected using the Horiba Mexa-584L. The range of oxygen detection of the instrument is between 0.0 and 30.0% with a 0.1 % accuracy as stated in Table 3-1. According to Principles and Practices of Bioventing (Leeson and Hinchee, 1996), oxygen utilization rates greater than 1% per day are a good indicator that bioventing may be feasible at the site. The low range on the instrument is 0.1% demonstrating that it is capable of detecting changes in oxygen that would support biodegradation as a result of bioventing. Baseline respirometry readings were recorded and are presented in Tables 3-2 through 3-10."
18	4.1	4-1	Discuss the correlation between barometric pressure, subsurface oxygen/carbon dioxide levels and screen length in the revised Report. Additionally, provide example data to support the discussion.	Section 4.1 has been revised as follows: "Soil vapor variability of this kind is not unusual and can have a variety of causes including barometric pressure driven flow, temperature, precipitation, gravitational effects (e.g., Pitchford et al., 1989; Contaminated Land: Applications in Real Environments, 2011; Hartman, 2002). While variability of oxygen/carbon dioxide was observed in many of the wells during the respiration testing, the changes were more prevalent within the SVEWs. The subsurface is a porous media and thus subject to barometric pumping. Barometric pumping is more likely to be observed in longer screened wells (the SVEWs) as the long screen interval increases the likelihood of exposure to permeable zones that respond more rapidly to barometric pressure changes. If the well screen is subject to a permeable zone, it is likely that injection air or ambient soil vapor is pushed in and out of the test cell when barometric pressure swings occur."

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19	4.1	4-1	The decrease in oxygen levels and increase in carbon dioxide levels in injection wells may also be attributed to diffusion of soil gas, dilution of injected air, and desorption/volatilization of organic compounds. Influx of soil gas and efflux of air may be the primary causes of an increase in carbon dioxide and a decrease in oxygen concentrations. Revise the statement for accuracy in the revised Report.	While diffusion of soil gas is a possibility for the variation in oxygen and carbon dioxide readings, a volume of air equivalent to 4 times the test cell volume was injected into each point (as shown on the new table 3-14 and existing tables 3-15 through 3-17 as the "Target Air Injection Volume") to safeguard against diffusion (as stated in the approved work plan [Kirtland AFB, 2017a]). Additionally, the observed oxygen concentrations during the first month of the long-term bioventing plateaued at concentrations below ambient concentration indicating that oxygen is being utilized within the subsurface. Furthermore, these oxygen utilization rates have been confirmed through the operation of the long-term bioventing pilot test where injection air is added continuously, except for short periods to assess oxygen utilization, significantly reducing the possibility of influx and efflux. The following statement has been added to Section 4.1: "While diffusion of soil gas is a possibility for the variation in oxygen and carbon dioxide readings, a volume of air equivalent to 4 times the test cell volume was injected into each point to safeguard against diffusion. Volumes of injected air are provided in Tables 3-14 through 3-17. In addition, if diffusion was the primary reason for variation, increases in the oxygen concentration would not have been observed as the ambient soil vapor that is diffusing into the test cell is depleted in oxygen."
20	4.1	4-1	If multiple pore volumes of air were applied to the test cell, air flow would have extended beyond the test cell boundary likely through the same flow paths originally created by initial application of air (e.g., fractures). Injection of multiple pore volumes of air may dilute soil gas within the test cell and push soil gas beyond the test cell boundary. However, excess air may not necessarily increase the microbial oxygen utilization rate. A large volume of the injected air may move contamination round in the subsurface. Revise the statement to acknowledge this possibility.	Section 4.1 has been revised to state: "A safety factor of 4 times the calculated oxygen utilization rate is being supplied to ensure oxygen is being delivered at a rate much greater than it is being utilized. While this may safeguard against variations due to influx and diffusion, the elevated flow rate may increase the chance of pushing contaminated soil vapor through the subsurface. However, this risk is mitigated by soil vapor sampling that will indicate if vapor migration is occurring." The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). Sufficient data has been collected to assess the bioventing technology under current conditions. Assessment of the long-term bioventing pilot test will be provided in the Final Bioventilation Pilot Testing Report.
21	4.1	4-1	The method used to measure relative humidity is not appropriate. The relative humidity data must not be affected by fluctuations of the ambient temperature. Subsurface temperature is likely more stable than that of the ambient air; the measurements should have been conducted to minimize the influence of changes in ambient temperatures. Please evaluate alternative methods for relative humidity measurement and provide a discussion in the revised Report. Since the relative humidity was higher during the dry respiration test compared to the wet respiration test, the relative humidity data does not make sense. The relative humidity data must be converted to absolute humidity values and its acceptability for use evaluated. If the converted data makes sense, revise all applicable tables to present absolute humidity, rather than relative humidity. Otherwise, remove all data and discussions regarding relative humidity from the revised Report.	The method for collecting relative humidity readings was performed in accordance with the work plan letter (Kirtland AFB, 2017a). Discussion regarding relative humidity will be removed from the revised report. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). Therefore no alternative methods for the measurement of relative humidity will be considered.
22	4.1	4-1 & 4-2	Since water was injected prior to the wet respiration test, the higher absolute humidity readings during the wet respiration pilot test make sense; however, the readings were only marginally higher than those observed during the dry respiration test. This observation suggests that the method used to distribute moisture (pressurized water injection) was not effective. The moisture addition method must be evaluated during the long-term pilot test. During the evaluation, other moisture distribution methods (e.g., cool mist injection) must be evaluated. Additionally, soil vapor temperatures were generally higher than ambient air temperatures according to Tables 3-2 through 3-10. The water temperature is lower than, or equivalent to, the ambient air temperature. It may be more reasonable to assume that soil temperature was higher than that of the water which would make the Permittee's statement incorrect. Revise the statement accordingly.	See response to comment 11 regarding moisture addition. Discussion of relative humidity and soil vapor temperature in relation to absolute humidity will be removed from the revised report. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). Therefore no alternative methods for the measurement of relative humidity will be considered.

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23	4.2.1	4-2	<p>According to Appendix D-1, <i>Oxygen Utilization</i>, the daily oxygen concentrations are plotted for each injection well. Each slope of the curve is reported as "oxygen utilization rate". However, the reduction in oxygen levels may be attributed to dilution of injected air and is not necessarily limited to oxygen utilized for hydrocarbon biodegradation (see Comment 19).</p> <p>Additionally, elevated hydrocarbon concentrations (e.g., 250 parts per million benzene) reportedly inhibit aerobic biodegradation. The level of hydrocarbons at the site is high enough to affect the results. In order for aerobic biodegradation to be induced at the site, the concentrations may initially need to be diluted with air. The observed reduction in oxygen levels must not be assumed to be the result of microbial activity. The referenced oxygen utilization rate is more appropriately referred to as "oxygen reduction rate". Please revise the Report for accuracy.</p>	<p>Oxygen utilization rates are calculated in accordance with the approved work plan (Kirtland AFB, 2017a) and pilot testing procedure (Kirtland AFB, 2018a), as well as using the methods established in Leeson and Hinchee, 1996. Although there are alternative explanations for the oxygen utilization, these explanations cannot be quantified using methods specified in the approved work plan. These factors affecting the oxygen consumption will result in a lower biodegradation rate than what is calculated using the approved methods and the text has been revised to reflect this issue. The bioventing system was shut down in November 2020 due to low oxygen utilization rates and operational concerns.</p> <p>Section 4.2.1 has been revised to state the following: "The oxygen utilization rates obtained from the respiration testing do not account for other factors that could result in the decrease of oxygen concentrations. These factors include influx of ambient soil vapor into the test cell, diffusion of oxygen into the surrounding soil vapor, and movement of soil vapor as a result of barometric pressure influences. Further evaluation of the oxygen utilization rates will be performed throughout the long-term bioventing pilot test. Continuous air injection should alleviate the concern associated with influencing factors as the ambient soil vapor will be displaced by the supplied air. Discussion of the oxygen utilization rates will be discussed in the Final Bioventilation Pilot Testing Report."</p>
24	4.2.2	4-2	<p>According to Appendix E-1, <i>Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and Oxygen Radius of Influence</i>, the biodegradation rates were calculated as a function of oxygen utilization rates. However, the observed oxygen reduction is not entirely accounted for by microbial oxygen utilization (see Comments 1.9 and 23). Therefore, the biodegradation rates must not be calculated from the observed oxygen reduction rates. Remove the discussion from the revised Report.</p>	<p>See response to comment 23 regarding oxygen utilization. Section 4.2.2 has been revised to state: "These biodegradation rates may be affected by additional factors influencing oxygen utilization as discussed in Section 4.2.1 above. Further evaluation of the oxygen utilization rates, and corresponding biodegradation rates will be performed throughout the long-term bioventing pilot test. Discussion of the oxygen utilization rates will be discussed in the Final Bioventilation Pilot Testing Report."</p>
25	4.2.3	4-3	<p>The oxygen demand flow rates were calculated as a function of oxygen utilization rates. The calculated flow rates do not represent the minimum air flow rates required to maintain biodegradation rates. However, the minimum air injection flow rates required to compensate the loss of oxygen can be calculated from the observed oxygen reduction rates. Modify the formula provided in Section 3.1.6 of the <i>Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests</i> (Work Plan), dated November 2017, and calculate the required air injection flow rates. Revise the Report accordingly.</p>	<p>See response to comment 23 regarding oxygen utilization. Section 4.2.3 has been revised to state: "These oxygen demand flow rates may be affected by additional factors influencing oxygen utilization as discussed in Section 4.2.1 above. Further evaluation of the oxygen utilization rates, and corresponding oxygen demand flow rates will be performed throughout the long-term bioventing pilot test. Discussion of the oxygen demand flow rates will be provided in the Final Bioventilation Pilot Testing Report."</p>
26	4.2.4	4-3	<p>According to Appendix E-2, <i>Intrinsic Permeability Calculations</i>, intrinsic permeability was calculated based on well vacuum. A positive pressure was applied to the wells as air was injected from the wells; however, the formula used to calculate intrinsic permeability required vacuum (negative) pressure. Please provide an explanation for the discrepancy in the revised Report.</p> <p>In addition, the radii of influence (ROIs) used to calculate intrinsic permeability were different from the ROIs reported in Table 4-1. For example, the ROI used to calculate intrinsic permeability was 113 feet for well SVEW-01-260 during the dry respiration test according to Appendix E-2-1. However, the ROI reported in Table 4-1 was 143 feet for the same well. Correct, or provide an explanation for, the discrepancy in the revised Report.</p>	<p>The equation listed in the approved work plan (Kirtland AFB, 2017a) is only applicable under applied vacuum situations. Therefore, since all data collected during the pilot testing was under positive pressure application, the equation cannot be used to determine the intrinsic permeability with the available data. The calculations and discussion for intrinsic permeability have been removed from the revised report.</p> <p>The ROI used for the calculation was the oxygen ROI, however, the values used in Appendix E-2 were determined using preliminary data and should have been updated with the values presented in Table 4-1.</p>
27	4.2.4	4-3	<p>Section 3.2 indicates that the issue associated with head loss was resolved by replacing the 1.5-horsepower regenerative blower with two 1-horsepower rotary vane pumps. Please provide further clarification of the issue and resolution in the revised Report. In addition, the well head pressure readings during and after air injection for SVMWs are reported in Tables 3-13, 3-14 and 3-2 through 3-7, respectively. This data should not be included in the Report or it must be qualified to account for the inaccurate pressure readings for SVMWs in the revised Report.</p>	<p>The 1.5 horsepower regenerative blower was not replaced, it was augmented with two additional 1-horsepower rotary vane pumps. Additional discussion of the air injection blower and vane pumps has been added to Section 3.2 as well as Section 3.5. The statement in Section 3.2 has been revised as follows: "Air injection is performed using a combination of a 1.5-HP regenerative blower and two 1-HP rotary vane pumps. Air injection is performed concurrently at all locations utilizing the regenerative blower and both rotary vane pumps."</p> <p>The specified well head pressure readings have been removed from the tables.</p>

Common Comment and Response Worksheet (Version 3)				
Date	Reviewer		Document Title (version)	Contract/TO Number
05 Feb 2021	NMED HWB		Bioventilation Construction and Initiation Report Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111	EPA ID# NM9570024423
Item	Section	Page	Comment	Response
28	4.2.5	4-3	The ROI was calculated based on oxygen utilization rates. However, the observed oxygen reduction is not entirely accounted for by microbial oxygen utilization. Therefore, the method used to estimate the ROI is not appropriate. Use pressure response data to estimate the RO Is, where applicable, or if appropriate, modify the formula provided in Section 3.1.8 of the November 2017 Work Plan, and calculate the ROIs. Revise the Report accordingly.	The ROI was calculated in accordance with the approved work plan (Kirtland AFB, 2017a). See response to comment 23 regarding oxygen utilization. Physical ROI cannot be established as the injection pressure is too low under current operation conditions as stated in Section 4.2.4: "However, due to low injection flow rates, pressures, and short injection periods that could not overcome the variability in barometric pressure, a reliable pressure ROI was not obtained." As a result, the ROI was calculated as described in the approved work plan. The report was not revised.
29	4.2.6	4-3	According to Appendix B-2, <i>Soil Vapor Analytical Results</i> , EDB was only analyzed with EPA Method TO-15. The Permittee's April 3, 2017 letter states, "[Method] CARB 422 may be used for individual tasks where it is important to evaluate EDB in soil vapor in the presence of high concentrations of HC in relation to EDB concentrations, such as monitoring the effectiveness of bioventing or air-lifting interim measures in the source area. In these instances, CARB 422 will be included where appropriate in the individual work plan for that task." Since hydrocarbon molecules do not interfere with the measurement of EDB by Method CARB 422, lower limits of quantitation (LOQ) are achievable with the method, allowing for more accurate detection of EDB in soil vapor than with Method TO-15. Elevated hydrocarbon concentrations were observed in soil vapor samples at the site; therefore, it is appropriate to analyze EDB samples using both Methods CARB 422 and TO-15. Include this provision during the long-term pilot test.	Laboratory samples were analyzed as specified in the approved work plan. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021).
30	4.2.6.1	4-4	Although Table 3-12, <i>Summary of Hydrocarbon Analytical Results</i> , records concentrations of benzene (B), toluene (T), ethylbenzene (E), and total xylenes (X) separately, the sum of these constituents is not recorded in the table. Revise the table to include the sum of BTEX.	Table 3-13 (formerly Table 3-12) has been revised to include the sum of the constituents benzene, toluene, ethylbenzene, and total xylenes.
31	4.2.6.2	4-4	Out of 12 monitoring points, the TPH-GRO concentrations after the air injection were recorded as higher in six locations, the same in three locations, and lower in two locations compared to the baseline concentrations. Longer-term monitoring is necessary to evaluate the effectiveness of the pilot test because the results of the short-term pilot test indicate that the bioventing technology is not effective. Please provide a submission schedule for the required status reports in the revised Report (see Comment 4).	Sampling was performed on a quarterly basis for the duration of the long-term pilot test as specified in the approved work plan (Kirtland AFB, 2017a). Analysis of hydrocarbon degradation will be provided in the Final Bioventilation Pilot Testing Report.
32	4.2.6.3	4-4	Currently, full-scale bioventing as a means to remediate vadose zone hydrocarbons is not recommended based on the analytical results of the short-term pilot tests. However, longer-term monitoring will be necessary to fully evaluate the effectiveness of the bioventing system for hydrocarbon removal from the vadose zone (see Comment 31).	Data presented within the Bioventing Construction and Initiation Report is not used for the determination for feasibility of bioventing as a corrective measure. At the time of submission, sufficient data had not been collected to support conclusions. Additional data was collected throughout the long-term bioventing pilot test and assessment of the long-term bioventing pilot test, as well as the feasibility of bioventing as a corrective measure, will be provided in the Final Bioventilation Pilot Testing Report. Sufficient data has been collected to suggest that current site conditions are not suitable for bioventing to be used as a corrective measure. The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). The Final Bioventilation Pilot Testing Report will summarize all pilot-related field activities. The potential viability of this technology will be evaluated in the CME.
33	Table 3-18		The September 2018 Procedure states that the water volume for the wet respiration test was designed to be 1% of the pore volume. However, it is not clear whether the design protocol was followed during water injection. For example, the length of screened intervals for wells SVMW-11-250 and SVMW-11-260 was identical at 2.5 feet; however, water injection volumes for these wells were 325 and 625 gallons, respectively, according to Table 3-18. In Table 3-14, <i>Bioventing Respiration Pilot Test Air Injection Summary-SVMW-11</i> , the pore volumes were estimated as 4,278 and 8,036 cubic feet, respectively. It is not clear how the volumes were so different even though the length of screened intervals was identical. Provide an explanation for the difference in the estimated pore volumes among the test cells in the revised Report.	There is not a discrepancy between what was performed and what was specified in the approved work plan (Kirtland AFB, 2017a). Table 3-14, showing prescribed and performed water injection volumes has been added to the revised text. In addition, Table 3-20 (formerly Table 3-19) shows both the "target volume" and "total volume" of injected water.

Common Comment and Response Worksheet (Version 3)				
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05 Feb 2021	NMED HWB		Bioventilation Construction and Initiation Report Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111	EPA ID# NM9570024423
Item	Section	Page	Comment	Response
34	Tables 4-2 through 4-13		<p>According to the tables, after the long-term bioventing pilot test was initiated, the oxygen levels in all monitoring locations increased and reached a plateau in less than one month. Since hydrocarbons are still abundant in all monitoring locations, microbes could have utilized oxygen to degrade hydrocarbons and produce carbon dioxide and water. However, the carbon dioxide concentrations decreased as oxygen concentrations increased. Similarly, relative humidity readings were lower than those of the baseline in most locations. The carbon dioxide and water production were not obvious at any location. It appears that air is diluting soil gas at the monitoring locations but is not utilized for biodegradation. It is possible that the high level of hydrocarbons may hinder microbial activity. Discuss the kinetics of aerobic biodegradation in comparison to the rate of dilution in the revised Report. Additionally, please propose additional analytical methods to verify biodegradation (e.g., isotope analysis) and evaluate the applicability of such methods during the long-term pilot test (see Comment 3).</p>	<p>Oxygen is being supplied to the subsurface a rate that is 4 times higher than it is being utilized. This supply of ambient air is likely flushing the pore space faster than the carbon dioxide can be produced. During respiration testing, carbon dioxide levels were always lowest immediately after the blower was shutdown (see respiration data from April 28, 2019 and June 26, 2019 in Tables 3-2 through 3-10). After the supplied air was stopped, the oxygen would be utilized, and carbon dioxide would be produced over the course of the respiration monitoring. This is primarily due to the low oxygen utilization rates as carbon dioxide cannot be produced until the oxygen is utilized. Low carbon dioxide production was also observed throughout the length of the long-term bioventing pilot test.</p> <p>The kinetics of aerobic biodegradation as specified in Leeson and Hincee, 1996, along with equations for calculating bioventing parameters have been added to Section 4.2 of the revised report. Analytical sampling was performed in accordance with the approved work plan (Kirtland AFB, 2018a).</p> <p>The bioventing pilot test was concluded in November 2020 due to low oxygen utilization rates and operational concerns (NMED correspondence dated February 11, 2021). The Final Bioventilation Pilot Testing Report will summarize all pilot-related field activities. The potential viability of this technology will be evaluated in the CME.</p>

**APPROVAL FOR THE WORK PLAN FOR BIOVENTING AND AIR-LIFT
ENHANCED BIOREMEDIATION PILOT TESTS**



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

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BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 6, 2018

Colonel Richard W. Gibbs
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Mr. Chris Segura
Chief, Installation Support Section
AFCEC/CZOW
2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

**RE: WORK PLAN FOR BIOVENTING AND AIR-LIFT ENHANCED BIOREMEDIATION PILOT TESTS
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-13-MISC**

Dear Colonel Gibbs and Mr. Segura:

The New Mexico Environment Department (“NMED”) is in receipt of the Kirtland Air Force Base (“KAFB”) (“Permittee”) *Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests* (“Work Plan”), dated November 2017. The objective of the Work Plan is to detail the activities to be implemented in performing treatability studies to support the future Corrective Measures Evaluation (“CME”) for the Bulk Fuels Facility (“BFF”) source area and groundwater solute plume.

As explained in the Work Plan, bioventing includes the delivery of oxygen to the contaminated vadose zone (unsaturated soils) via air injection to stimulate biodegradation. The bioventing pilot testing will include short-duration “dry” and “moist” respiration tests (approximately three weeks), followed by two longer-term (two years in duration) pilot tests conducted simultaneously. The goal of the bioventing pilot test is to measure the oxygen utilization rate by microbes in the subsurface. The rate of oxygen utilization is directly proportional to the aerobic biodegradation rate of fuel hydrocarbons in the subsurface, and is therefore an indication of the effectiveness of bioventing to achieve site cleanup in a timely manner. Contaminant mass

Col. Gibbs and Mr. Segura
April 6, 2018
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destruction rate, cleanup time, and cost of corrective measure implementation can be estimated to support the future CME.

Air-lift enhanced bioremediation includes stimulating microbes within the aquifer matrix by creating a circulation cell through the injection of air below the water table. The injected air forces entrained water out of the lower portion of the well screen and "lifts" it above the static water level where it flows outward into the capillary fringe and upper portion of the water table. While lifting, contaminants are stripped and the groundwater is oxygenated. This "aerated" water flows out into the upper portion of the water table, a zone of the solute plume typically with high solute and residual contamination, where it adds oxygen to enhance aerobic biodegradation. The air-lift enhanced bioremediation pilot test is scheduled to operate for a period of two years.

The Work Plan is hereby approved subject to the following conditions:

1. The Permittee shall replace (as a single page replacement) the original Figure 3-1 with a revised version showing the locations of groundwater monitoring wells in the vicinity of the pilot test areas.
2. It is acknowledged that the screened intervals for nested soil vapor wells KAFB-106V1 and KAFB-106V2 were selected based on the lithology and screened intervals of nearby soil vapor wells. If, during the installation of KAFB-106V1 and KAFB-106V2, substantially different lithology is encountered, the Permittee and NMED shall meet to discuss the need for possible adjustments to screened intervals.
3. During the course of the pilot tests, the Permittee shall identify the source(s) of water that will be used for soil moisture addition. If any water source to be used is disinfected with chlorine, the Permittee shall describe what measures will be taken to ensure that chlorine residual concentrations will not adversely affect the ability of soil bacteria to biodegrade fuel contaminants.

If you have any questions regarding this letter, please contact NMED Chief Scientist Dennis McQuillan at (505) 827-2140.

Sincerely,



Juan Carlos Borrego
Deputy Secretary
Environment Department

cc: Col. M. Harner, KAFB
K. Lynnes, KAFB
B. Renaghan, AFCEC
S. Clark, KAFB-AFCEC

Col. Gibbs and Mr. Segura
April 6, 2018
Page 3

H. O'Grady, KAFB-AFCEC
T. Simpler, USACE
B. Faris, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
B. Salem, NMED-HWB
A. Romero, NMED-GWQB
M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

File: KAFB 2018 Bulk Fuels Facility Spill

BIOVENTING RESPIRATION PILOT TESTING APPROVAL



MICHELLE LUJAN
GRISHAM
Governor

HOWIE MORALES
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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JAMES C. KENNEY
Cabinet Secretary

JENNIFER J. PRUETT
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 25, 2019

Colonel Richard W. Gibbs
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Mr. Chris Segura
Chief, Installation Support Section
AFCEC/CZOW
2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

**RE: BULK FUELS FACILITY SPILL;
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
HWB-KAFB-19-MISC**

Dear Colonel Gibbs and Mr. Segura:

The New Mexico Environment Department (NMED) provides this letter to address several projects that Kirtland Air Force Base (Permittee) is undertaking as investigative or interim corrective measures related to the implementation of the Resource Conservation and Recovery Act (RCRA) *Hazardous Waste Treatment Facility Operating Permit EPA ID No. NM9570024423* dated July 2010.

Item 1

NMED received the Permittee's *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision R1* dated December 15, 2017. The Work Plan proposed additional vadose zone and groundwater investigation and monitoring, and was approved by NMED on February 23, 2018. Well drilling and vadose zone coring activities are ongoing since 2018 and expected to be complete within several weeks. The Permittee shall submit a report to NMED summarizing the LNAPL investigation findings by November 1, 2019.

Col. Gibbs and Mr. Segura
February 25, 2019
Page 2

Item 2

The Permittee's *Risk Assessment Report, Bulk Fuels Facility Spill; Solid Waste Management Unit ST-106/SS-111* (Report), dated July 15, 2017 was received by NMED on July 21, 2017. The Report concluded that contaminant exposure via vapor intrusion into indoor air in buildings located off-Base was an incomplete pathway. However, off-Base soil vapor data are limited to nested vapor probes, the shallowest of which are approximately 25 feet below ground surface, and none of which are located in the residential area north of Ridgecrest or amid buildings on the Veteran Affairs (VA) hospital campus. The Permittee must confirm this conclusion by collecting additional data to demonstrate that there is no risk to off-site receptors located north of the Base. The Permittee shall send a work plan to NMED no later than May 30, 2019 that proposes to collect shallow soil vapor samples to evaluate for the presence of benzene, ethylene dibromide (EDB), and other volatile organic compounds (if present) in the residential area north of Ridgecrest, and on the campus of the VA Hospital.

The work plan shall select analytical methods for soil vapor analysis that comply with the requirements of Permit Section 6.5.18. (Laboratory Analyses Requirements for all Environmental Media). The work plan also shall include a schedule for at least two soil vapor sampling events, one in the summer and one in the winter, that shall be timed to verify that bioventing pilot testing is not causing an increase in shallow soil vapor contaminant levels in the residential and VA hospital areas.

Item 3

The Permittee has been conducting an EDB in-situ biodegradation pilot test in accordance with the work plan dated October 26, 2016, as most recently amended with NMED's August 7, 2018 approval letter. The Permittee shall submit a report summarizing the results of the in-situ biodegradation pilot test by May 1, 2019.

Item 4

The Permittee submitted a work plan for a bioventing pilot test that NMED approved by letter dated April 6, 2018. The Permittee submitted proposed bioventing respiration pilot testing procedures by letter dated September 7, 2018. The Permittee's proposed bioventing respiration pilot testing procedures are hereby approved subject to the following condition. Prior to the initiation of the dry and wet short-term pilot tests, the Permittee shall measure relative humidity (water activity) in the soil vapor probes that will be used for pilot testing in order to determine whether underlying groundwater caused relative humidity to increase following the 2015 shutdown of the soil vapor extraction system and subsequent biorespiration monitoring. Since the approved bioventing work plan involves delivering moisture to soil bacteria that were desiccated by 12 years of soil vapor extraction, the Permittee shall measure relative humidity prior to

Col. Gibbs and Mr. Segura
February 25, 2019
Page 3

initiation of bioventing pilot tests. The Permittee shall submit the result the results of the bioventing pilot tests by January 31, 2020.

Pursuant to the RCRA corrective action permit, the Permittee shall submit to NMED by certified mail or hand delivery all reports, notifications, or other submittals. The Permittee shall submit two hard (paper) copies and one electronic copy of such reports to:

John Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

The Permittee shall also submit one hard (paper) copy and one electronic copy of such reports to:

Jennifer J. Pruett, Deputy Secretary
New Mexico Environment Department
1190 St. Francis Drive, Room N-4050
Santa Fe, New Mexico 87505-6303

Pursuant to 40 C.F.R. § 270.11(d)(1), all corrective action documents, including those outlined in this letter, shall include a certification, signed by a responsible official, stating:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Failure to submit any of the work plans, schedules, reports, and other deliverable documents described in this letter may be deemed a violation of the permit and subject the Permittee to enforcement action under § 74-4-10 of the Hazardous Waste Act (HWA), or other applicable provisions of law, which may include fines, civil penalties, or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be noncompliance with this Permit. The Department may grant extensions of written requests for due dates for submittals of reports and other deliverables, provided that the Permittee includes a written justification showing good

Col. Gibbs and Mr. Segura
February 25, 2019
Page 4

cause and a proposed schedule for submittal.

If you have any questions regarding this letter, please contact me at 505-476-6035.

Sincerely,



John Kieling
Bureau Chief

JP:DM

cc: J. Kenney, NMED Cabinet Secretary
J. Pruett, NMED Deputy Secretary
Col. J. Alvarez, KAFB
K. Lynnes, KAFB
B. Renaghan, AFCEC
S. Clark, KAFB-AFCEC
B. Faris, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
A. Romero, NMED-GWQB
M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

File: KAFB 2019 Bulk Fuels Facility Spill and Reading

APPENDIX A-2
REVISION TRACKING/REDLINE DOCUMENT

**KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO**

**BIOVENTILATION CONSTRUCTION AND
INITIATION -REPORT
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS S ST-106/SS-111
REVISION 1**

JANUARY 2020 APRIL 2021



**377 MSG/CEI
2050 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117-5270**

**KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO**

**Bioventilation Construction and Initiation Report
Bulk Fuels Facility
Solid Waste Management Units ST-106/SS-111
Revision 1**

~~January 2020~~ APRIL 2021

Prepared for

Kirtland Air Force Base
2050 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117-5270

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
320 Gold Avenue Southwest, Suite 1300
Albuquerque, New Mexico 87102
Contract No. W9128F-13-D-0006
Delivery Order DM02

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.				
1. REPORT DATE (DD-MM-YYYY) 30-01-2020		2. REPORT TYPE Revision <u>01</u>		3. DATES COVERED (From - To) 25- <u>02</u> -2019 – 05-11-2019
4. TITLE AND SUBTITLE Bioventilation Construction and Initiation Report Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111 Kirtland Air Force Base, New Mexico			5a. CONTRACT NUMBER W9128F-13-D-0006-DM02	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) EA Engineering, Science, and Technology, Inc., PBC			5d. PROJECT NUMBER 62735DM02	
			5e. TASK NUMBER 1038	
			5f. WORK UNIT NUMBER Not applicable	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) EA Engineering, Science, and Technology, Inc., PBC 320 Gold Avenue Southwest, Suite 1300 Albuquerque, New Mexico 87102			8. PERFORMING ORGANIZATION REPORT NUMBER Not assigned	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers–Albuquerque District 4101 Jefferson Plaza Northeast Albuquerque, New Mexico 87109-3435			10. SPONSOR/MONITOR'S ACRONYM(S)	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT This Bioventilation Construction and Initiation Report details the events that occurred in both dry and wet respiration pilot tests and provides operational parameters that were used in the installation and implementation of the bioventing pilot test.				
15. SUBJECT TERMS Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, bioventing, respiration testing				
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT ABSTRACT	18. NUMBER OF PAGES 772
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED		19a. NAME OF RESPONSIBLE PERSON Scott Clark Sheen Kottkamp
				19b. TELEPHONE NUMBER (include area code) 505-846-9017

Standard Form 298
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40 CFR 270.11 DOCUMENT CERTIFICATION

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DAVID S MILLER, Colonel, U.S. Air Force
Commander, 377th Air Base Wing

Date

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KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

Date

PREFACE

This report was prepared for Kirtland Air Force Base under U.S. Army Corps of Engineers Contract Number W9128F-13-D-0006, Delivery Order DM02 by EA Engineering, Science, and Technology, Inc., PBC. The report pertains to bioventing pilot testing performed at the Bulk Fuels Facility, Solid Waste Management Unit_s ST-106/SS 111, located in Albuquerque, New Mexico. -The dry and wet respiration pilot tests were conducted between April and July 2019. The data obtained from these tests were used to provide operational parameters that are being used for the implementation of the bioventing pilot test.

This report was prepared in accordance with applicable federal, state, and local laws and regulations, including the New Mexico Hazardous Waste Act, New Mexico Statutes Annotated 1978, New Mexico Hazardous Waste Management Regulations, Resource Conservation and Recovery Act, and regulatory correspondence between the New Mexico Environment Department Hazardous Waste Bureau and the U.S. Air Force, dated March 25 and May 20, 2016.

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LIST OF ACRONYMS AND ABBREVIATIONS

$\mu\text{g}/\text{m}^3$	microgram(s) per cubic meter
%	percent
AFB	Air Force Base
BFF	Bulk Fuels Facility
BTEX	benzene, toluene, ethylbenzene, and total xylenes
EDB	ethylene dibromide
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
GRO	gasoline range organics
<u>KAFB</u>	<u>Kirtland Air Force Base</u>
mg/kg/day	milligram(s) per kilogram per day
NMED	New Mexico Environment Department
RCRA	Resource Conservation and Recovery Act
ROI	radius of <u>i</u> nfluence
scfm	standard cubic feet per minute
SIM	selected ion monitoring
SVEW	soil vapor extraction well
SVMW	soil vapor monitoring well
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

EXECUTIVE SUMMARY

The investigation and remediation of the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) leak (Solid Waste Management Units [SWMUs] ST-106/SS 111) are being implemented pursuant to the Resource Conservation and Recovery Act (RCRA) corrective action provisions in Part 6 of Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423 [RCRA Permit]) (New Mexico Environment Department [NMED], 2010). A Notice of Disapproval (NOD) of the Bioventilation Construction and Initiation Report, Bulk-Fuels-Facility Solid-Waste-Management Units ST-106/SS-111 (New-Mexico-Environment-Department, 2020) was received on September 23, 2020. This revised report addresses the comments received from the-NMED and This report summarizes the installation of the bioventing system, baseline monitoring, and respiration testing performed to provide operational parameters and implementation of the long-term bioventing pilot test. The-NMED's September 23, 2020 letter and a response to comments matrix are is-provided in Appendix A.

A historic release of petroleum hydrocarbons occurred at the BFF and the use of bioventing is being evaluated to assess its effectiveness at site remediation. The goal of the bioventing respiration pilot test is to measure the oxygen utilization rate by microbes in the subsurface. The rate of oxygen utilization is directly proportional to the aerobic biodegradation rate of fuel hydrocarbons in the subsurface and can be used as an indication of the effectiveness of bioventing to achieve site cleanup.

The bioventing pilot test is being performed in accordance with the Bioventing Respiration Pilot Testing Procedure (Kirtland AFB, 2018) and the Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, dated November 2017 (Kirtland AFB, 2017a). These documents were approved by the NMED in letters dated February 25, 2019 (NMED, 2019) and April 6, 2018 (NMED, 2018a), respectively, and are provided in Appendix A. The bioventing soil vapor monitoring wells (SVMWs) KAFB-106V1 and KAFB-106V2 were installed under the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Revision 1 dated December 2017 (Kirtland AFB, 2017b). This Work Plan was approved by the NMED in a letter dated February 23, 2018 (NMED, 2018b).

The scope of work described in the Work Plan included the following tasks:

1. Installation of bioventing monitoring wells-
2. Installation of the bioventing pilot testing system-
3. Collection of baseline respirometry parameters and analytical samples-
4. Performance of short-term respiration tests, both dry and wet, in nine bioventing test wells-
5. Performance of a long-term (2-year) bioventing pilot test utilizing the data from the short-term respiration tests to determine the air injection parameters.

This report describes the activities for Tasks 1 through 5 above that were performed at the BFF between March and November 2019. Currently, the long-term bioventing pilot test has been initiated and data are being collected.

ES-1 Installation of Bioventing Monitoring Wells

The bioventing respiration pilot test utilizes existing soil vapor extraction wells (SVEWs) and existing

SVMWs for air injection. Installation of two nested SVMWs (KAFB-106V1 and KAFB-106V2) was completed in the first quarter of 2019 as part of the Work Plan (Figure 1-2). Each SVMW is comprised of six 0.75-inch outside diameter nested vapor probes with 2 feet (ft) of screen each targeting different depths of the vadose zone. Vapor probes were installed at depths varying between 102.1 and 262.5-6 ft below ground surface ~~(bgs)~~ for well KAFB-106V1 and at depths varying between 102.2 and 269.5 ft below ground surface ~~bgs~~ for KAFB-106V2. ~~The variation in vapor probe depths allowsto facilitate~~ discrete vertical monitoring of the vadose zone. Well installation activities were initiated in October 2018, and were concluded in March 2019. The SVMWs were used for baseline monitoring, post-dry respiration monitoring, post-wet respiration monitoring, and long-term bioventing pilot test monitoring. The SVMWs were installed in accordance with the Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Work Plan (Kirtland AFB, 2017b).

ES-2 Installation of Bioventing System

Installation of the bioventing equipment was performed between February 25 and March 5, 2019. The bioventing equipment utilized for the pilot test includes a 1.5-horsepower regenerative blower used to inject air into the SVEWs and two 1-horsepower Gast rotary vane pumps used to inject air into the SVMWs. Power service to the equipment is provided via a 100-amp breaker from Building 1033 within the BFF. The service is equipped with a digital meter, a main disconnect, and service breakers to the blower and each rotary vane pump. The electrical service was inspected and tested prior to startup and was installed in accordance with local and state electrical code.

ES-3 Baseline Respirometry and Vapor Sampling

Baseline respirometry readings and laboratory analytical sampling were performed prior to the initiation of the respiration test to assess background respirometry parameters and hydrocarbon concentrations within the source area.

ES-4 Respiration Testing

Respiration testing was performed to determine the optimal air inflow rates and other operational parameters for bioventilation. Oxygen utilization rates and biodegradation rates were calculated based on respiration testing data to assess operational air and moisture inputs. Intrinsic permeability and radius of influence calculations were made to assess the effective zone or area of remedial effect for the pilot test. Analytical data ~~were was~~ collected to determine contaminant concentrations and trends that will be assessed subsequent to further operation of the bioventilation pilot test.

The oxygen utilization rates and corresponding biodegradation rates were calculated for both dry and wet conditions as described. The overall average oxygen utilization rate for the dry respiration test was 0.414 percent (%) per day. The overall average oxygen utilization rate for the wet respiration test was 0.316% per day. Oxygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing ~~indicating that the moisture addition did not increase the rate of biodegradation~~. The need to add moisture will be further assessed during the long-term bioventing pilot test.

Biodegradation rates were generally low for both the dry and wet respiration tests. The dry respiration testing ranged between 0.096 and 0.378 milligrams per kilogram per day (mg/kg/day). Biodegradation rates during the wet respiration testing ranged between 0.081 and 0.371 mg/kg/day. In general, the dry respiration testing indicated slightly higher biodegradation rates.

Oxygen demand flow rates for the dry respiration test varied between 0.49 and 3.74 standard cubic feet per minute (scfm). Oxygen demand flow rates for the wet respiration test varied between 0.42 and 0.366 scfm. The oxygen demand flow rate was marginally higher for the dry respiration testing due to the higher oxygen utilization rates.

~~Intrinsic permeability was calculated for the SVEWs under both the dry and wet respiration conditions. Intrinsic permeability varied between 16 and 25 darcys and was marginally higher during the dry respiration test compared to the wet respiration test. Intrinsic permeability was not calculated for the SVMWs as the large amount of head loss that occurred in the 0.5-inch diameter wells did not allow for accurate pressure monitoring at the injection point.~~

The radius of influence (ROI) was monitored using two methods: physical or pressure response and oxygen response. Due to low injection flow rates, pressures, and short injection periods, a reliable pressure ROI was not obtained. As a result, the oxygen ROI was calculated using the oxygen utilization. The oxygen ROI varied between 138 and 143 ft for the dry respiration test and between 140 and 152 ft for the wet respiration test. The ROI may have been marginally higher for the wet respiration test due to the overall lower oxygen utilization rates. ROI data will be assessed on a quarterly basis as the pilot test progresses.

ES-5 Long-Term Bioventing Pilot Test

The long-term bioventing pilot test was initiated on October 7, 2019, utilizing operational parameters obtained from the data analysis of the respiration tests. Monitoring of the long-term bioventing pilot test is ongoing. Data obtained from the first month of the long-term bioventing pilot test operation indicated that oxygen is being sufficiently delivered within the vadose zone. Pilot test operation and monitoring will continue in accordance with the Work Plan (Kirtland AFB, 2017a). ~~Respiration and analytical data collected throughout the long-term pilot testing will be assessed in the Final Bioventilation Pilot Testing Report. Respiration and analytical data collected from each quarter will be reported in the appropriate quarterly groundwater monitoring report. An annual report for the first year of bioventing pilot test operation is anticipated to be included within the appropriate quarterly groundwater monitoring report.~~

1. INTRODUCTION

Solid Waste Management Units (SWMUs) ST-106/SS-111 ~~are~~ located at Kirtland Air Force Base (AFB) in Bernalillo County, New Mexico. Kirtland AFB is located southeast of, and adjacent to, the City of Albuquerque and the Albuquerque International Sunport. The approximate area of the base is 52,287 acres. The Bulk Fuels Facility (BFF or Site) is located in the northwestern portion of Kirtland AFB (Figure 1-1).

1.1 Planning and Regulatory Framework

Environmental restoration efforts at the BFF are being performed pursuant to the corrective action provisions in Part 6 of the Resource Conservation and Recovery Act (RCRA) Permit Number NM9570024423 (RCRA Permit). The New Mexico Environment Department (NMED) is the lead regulatory agency (NMED, 2010). This work has been performed under U.S. Army Corps of Engineers (USACE) Contract Number W9128F-13-D-0006, Delivery Order DM02. This report is the compliance deliverable for the Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests (Kirtland AFB, 2017a) per the February 25, 2019 NMED letter requirement (NMED, 2019).

The bioventing pilot test is being performed in accordance with the Bioventing Respiration Pilot Testing Procedure (Kirtland AFB, 2018) and the Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, dated November 2017 (Work Plan [Kirtland AFB, 2017a]). These documents were approved by ~~the~~ NMED in letters dated February 25, 2019 (NMED, 2019) and April 6, 2018 (NMED, 2018a), respectively. The bioventing soil vapor monitoring wells (SVMWs) KAFB-106V1 and KAFB-106V2 were installed under the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Revision 1 dated December 2017 (Kirtland AFB, 2017b). This ~~W~~ork ~~P~~lan was approved by ~~the~~ NMED in a letter dated February 23, 2018 (NMED, 2018b). This report is being submitted in accordance with the NMED's letter dated February 25, 2019; please note that the bioventing pilot test has not been completed and further assessment of bioventing technology as a corrective measure will be performed in the Final Bioventilation Pilot Testing Report.

A Notice of Disapproval (NOD) of the Bioventilation Construction and Initiation Report, Bulk Fuels Facility Solid Waste Management Units ST--106/SS-111 (New Mexico Environment Department, 2020) was received on September 23, 2020. This revised report addresses the comments received from ~~the~~ NMED. The Notice of Disapproval ~~and~~ letter and a response to ~~their~~ comments matrix ~~are~~ provided in Appendix A.

1.2 Bioventing Pilot Test Objectives and Scope

The bioventing pilot test is being performed to evaluate the feasibility of this technology for the Corrective Measures Evaluation Report. The goal of the bioventing pilot test is to measure oxygen utilization rate by microbes in the subsurface. The rate of oxygen utilization is directly proportional to the aerobic biodegradation rate of fuel hydrocarbons in the subsurface and can be used as an indication of the effectiveness of bioventing to achieve site cleanup.

Dr. Robert Hinchee, co-author of Principles and Practices of Bioventing, Volume 2: Bioventing Design (Leeson and Hinchee, 1996), acted as subject matter expert for the pilot test. Dr. Hinchee provided technical guidance on pilot test operation, reviewed data, and assisted with the data interpretation.

The bioventing respiration pilot test utilizes existing soil vapor extraction wells (SVEWs) and existing SVMWs for air injection (Kirtland AFB, 2017a, 2018) and two new SVMW clusters at KAFB-106V1 and

KAFB-106V2 (Kirtland AFB, 2017b) for observation. Well details are provided in Table 1-1 and well locations are shown on Figure 1-2. Components of the bioventing pilot test that have been implemented thus far include the following:

- Installation of bioventing SVMWs-
- Installation of the bioventing pilot test system-
- Collection of baseline respirometry field parameters and analytical soil vapor samples-
- Short duration dry and wet bioventing respiration tests (approximately 3 weeks per test)-
- Implementation of the long-term bioventing pilot test.

Data collected from the short-duration respiration tests were used to provide operational parameters for the long-term bioventing pilot test, which was started on October 7, 2019. Operation and monitoring of the long-term bioventing pilot test are currently ongoing and are being conducted in accordance with the approved Work Plan (Kirtland AFB, 2017a).

~~Respiration and analytical data collected over the course of the long-term bioventing pilot test will be analyzed in the Final Bioventilation Pilot Testing Report. Status reports will be provided quarterly as an appendix to the appropriate Groundwater Monitoring Report. A summary report will be provided at the end of four quarters of data collection that will summarize the results of the previous year's data.~~

2. BACKGROUND INFORMATION

2.1 Site Description

Kirtland AFB is located in Bernalillo County, in central New Mexico, southeast of and adjacent to the City of Albuquerque and the Albuquerque International Sunport (Figure 1-1). The approximate area of the base is 52,287 acres. The BFF site is located in the northwestern portion of Kirtland AFB.

2.2 Site History

The BFF and associated infrastructure operated from 1953 until 1999. During this time, the fueling area was separated into a tank holding area where bulk shipments of fuel were received and a fuel loading area where individual fuels trucks were filled. Kirtland AFB removed the underground piping at the facility from service in 1999 due to discovery of underground leakage.

To comply with NMED Hazardous Waste Bureau requirements, Interim Measures were implemented for soil. Impacted soil was excavated in the release area to a depth of approximately 20 feet (ft) below ground surface in the area shown on Figure 1-2. Soil vapor extraction activities were performed at the site between 2003 and 2015 to reduce the mass of contaminants in the vadose zone. The soil vapor extraction system was shut down in the second quarter of 2015 due to low mass removal rates (Kirtland AFB, 2017a). The use of bioventing as a remedial method is being assessed to determine if additional contaminant mass destruction can be achieved in the vadose zone.

2.2.3 Ongoing Soil Vapor Monitoring

Semiannual soil vapor monitoring has been ongoing as part of the SWMUs ST-106/SS-111 investigation to monitor the nature and extent of soil vapor concentrations in the vadose zone. A total of 284 soil vapor monitoring points at 56 soil vapor monitoring locations are being sampled semiannually (Figure 2-1). The results from the vapor monitoring data indicate that the majority of the petroleum hydrocarbon concentrations found in the vadose zone are located in the vicinity of the release area.

3. SCOPE OF ACTIVITIES

This section describes the field activities for the bioventing pilot test. Section 3.1 provides a brief summary of the SVMW installation. Section 3.2 provides a summary of the bioventing equipment and installation. Section 3.3 provides a summary of the baseline respirometry and baseline vapor sampling activities. Section 3.4 provides a summary of the dry respiration field test, water injection, and wet respiration field test activities. Field activities were conducted in accordance with the NMED-approved Work Plan (Kirtland AFB, 2017a). Field forms documenting bioventing activities, excluding SVMW installation, are provided in Appendix B.

3.1 Soil Vapor Monitoring Well Installation

Implementation of the vadose zone coring and well installation project was initiated in October 2018 in accordance with the Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Work Plan (Kirtland AFB, 2017b). Two nested SVMWs (KAFB-106V1 and KAFB-106V2) were completed in the first quarter of 2019 as part of the Work Plan (Figure 1-2). Each SVMW is comprised of six 0.75-inch outside diameter nested vapor probes with 2 ft of screen each targeting different depths of the vadose zone. Vapor probes were installed at depths varying between 102.1 and 270-269.5 ft below ground surface. Table 1-1 provides the screened intervals. Each probe is isolated from the others using a bentonite chip seal. The lithologic logs and well construction diagrams for KAFB-106V1 and KAFB-106V2 are provided in Appendix AAppendix C.

3.2 Bioventing Equipment Installation

Installation of the bioventing system began in February 2019. A 230-volt, 3-phase electrical service was installed between February 25 and March 5, 2019. Power was pulled from panel B in Building 1033 within the BFF and consists of the following components:

- 100-amp breaker within Building 1033-
- Overhead power line installed across the service road-
- Electrical panel with disconnect-
- Digital electric meter-
- Connection of the 1.5-horsepower regenerative blower-
- Buried electrical completed with surface-mounted outlets for rotary vane pump power supply.

Air injection is performed using a combination of a 1.5-horsepowerHP regenerative blower and two 1-horsepowerHP rotary vane pumps. Air injection is performed concurrently at all locations utilizing the regenerative blower and both rotary vane pumps.

The 1.5-horsepower regenerative blower is part of a turnkey Geotech air injection blower skid equipped with a high-pressure shutoff and pressure relief valve. The blower is used for the SVEWs-wells that have a 2--inch diameter. These wells consist of SVEW-01-260, SVEW-02/03, and SVEW-04/05. The diameter of these wells reduces the head loss through the wells and allows for sufficient air injection. The blower unit provides injection air to the SVEWs through a 2-inch polyethylene conveyance line that manifolds to the individual SVEWs. Each SVEW is equipped with a direct read-out flowmeter located at the well-head. Conveyance piping is connected to the well-head via rubber couplings.

Due to high head losses associated with high volume injection flow rates through the 0.5-inch diameter SVMWs (Appendix D-1), the regenerative blower could not be used for air injection due to pressure limitationsit was determined that the blower may not be capable of overcoming pressure losses within the

SVMWs while maintaining the desired flow rates. -As a result, injection air is provided to the SVMWs via a dedicated 1-horsepower Gast rotary vane pumps located at each wellhead (total of two wellheads and pumps). These wells consist of SVMW-10 and SVMW-11. These rotary vane pumps are capable of producing a maximum pressure of approximately 15 pounds per square inch gauge psi. Each vane pump is equipped with a copper cooling coil, galvanized steel manifold, direct read-out rotameters, and quick connect fittings.

3.3 Baseline Respirometry and Vapor Sampling

Background respirometry was performed on the testing wells identified in Table 1-1. Respirometry field parameters were collected in accordance with Table 3-1. Respirometry readings were collected using the following method: a sample train, consisting of 0.5-inch fluorinated ethylene propylene tubing and 4-way stainless-steel cross equipped with quick connects, was connected to the well-head. Well head pressures were collected using a digital manometer.

Well purging was performed by removing one well volume (casing volume plus the filter pack pore space volume of the screened interval) from the monitoring well utilizing a Gast rotary vane pump that is dedicated for sampling purposes. Each well was purged at a predetermined flow rate for a given amount of time to ensure adequate volume removal. Soil vapor relative humidity and temperature were collected during purging by placing an Amprobe TH 3 humidity meter inside a clear flow cell and positioning the instrument where the extracted soil vapor passes directly over the sensor. Relative humidity and temperature readings were collected just prior to completing the purge to allow stabilization. After purging was completed, volatile organic compound (VOC), oxygen, ~~and~~ carbon dioxide, methane, and barometric pressure readings were collected. Barometric pressure and methane readings were collected using a calibrated Landtec GEM 5000 portable gas analyzer. Oxygen, carbon dioxide, and VOC readings were collected using the Horiba Mexa-584L. The range of oxygen detection of the instrument is between 0.0 and 30.0 percent (%) with a 0.1-% accuracy as stated in Table 3-1. According to Principles and Practices of Bioventing (Leeson and Hinchee, 1996), oxygen utilization rates greater than 1% per day are a good indicator that bioventing may be feasible at the site. -The low range on the instrument is 0.1%, indicating that it is capable of detecting changes in oxygen that would support biodegradation as a result of bioventing. Field calibration was performed prior to each use and is provided in the field forms (Appendix B). ~~;-barometric pressure and methane readings were collected using a calibrated Landtec GEM 5000 portable gas analyzer.~~ Baseline respirometry readings were recorded and are presented in Tables 3-2 through 3--10.

Immediately after collection of field parameters, analytical samples were collected from each well screen depth on SVMWs KAFB-106V1 and KAFB-106V2. Analytical samples were collected using 6-liter Summa cannisters and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX)/total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) by U.S. Environmental Protection Agency (EPA) Method TO-3, VOCs by EPA Method TO 15 selected ion monitoring (SIM), and fixed gases/C1--C5 hydrocarbon compounds by ASTM International D1945 (Table 3-11). Samples were shipped to Eurofins Air Toxics under chain-of-custody documentation.

3.4 Respirometry Field Testing

The main objective of the bioventing respiration pilot testing was to assess oxygen utilization rates and corresponding biodegradation rates for both the natural state (dry) and moisture added (wet) conditions. Field activities included the following are listed below and a chronology of events is provided in Table 3-12:

- The dry respiration pilot test was conducted between April 22 and May 9, 2019.
- Post-dry respiration sampling was performed on May 9, 2019.
- The water injection was performed on May 23 and 24, 2019. After the water was injected, the test cells were allowed approximately 4 weeks to acclimate prior to the start of the wet respiration testing. Prior to the start of air injection, another set of respirometry measurements was collected from the bioventing test wells to provide a baseline reading for the wet respiration pilot test.
- The wet respiration pilot test was conducted between June 20 and July 5, 2019.
- Post-wet respiration sampling was performed on July 5, 2019.

Analytical samples were collected after each of the respiration tests to evaluate hydrocarbon degradation (Table 3-~~12~~~~13~~). No measurable degradation was observed due to the high concentration of hydrocarbons and the limited amount of ambient air supplied to the subsurface.

3.4.1 Dry Respirometry Testing

3.4.1.1 Air Injection and Pressure Monitoring

Table 3-14 presents the design inputs, prescribed injection volumes, and air injection volumes performed in the field. Injection of ambient air was performed between April 22 and 28, 2019, and consisted of the injection of air into each well sufficient to achieve the estimated pore volume of air (porosity assumed to be 35-~~percent~~ [%]). A 15-ft radius from the injection well was assumed for the calculation of each test cell control volume. The thickness of each test cell control volume was the filter pack length, plus 5 ft above and below to account for vertical air flow. The injection rate was calculated based on the addition of four pore volumes of the test cell in each well. Air injection was monitored and controlled using rotameters located at the injection wellhead. A 1-horsepower Gast rotary vane pump was used for air injection into wells SVMW-10 and SVMW-11. A skid-mounted, 1.5-horsepower Rotron 454 regenerative blower was used for air injection into wells SVEW-01, SVEW-02/03, and SVEW-04/05. Air injection flow rates and well-head pressures were recorded daily and are presented in Tables 3-~~13~~~~15~~ through 3-~~15~~~~17~~. During air injection, well-head pressures were monitored in wells KAFB-106V1 and KAFB-106V2 and are presented in Tables 3-~~16~~~~18~~ and 3-~~17~~~~19~~.

3.4.1.2 Dry Respirometry

Dry respirometry data collection began immediately after the air injection was completed and was performed in the same manner as the baseline monitoring, as described above. Respirometry data were collected between April 28 and May 8, 2019. Respirometry data are presented in Tables 3-2 through 3-10. Oxygen concentration within the subsurface was plotted against time for each well location and a linear regression was applied to determine the oxygen utilization rate. Collection of respirometry data was performed in accordance with the Work Plan (Kirtland AFB, 2017a).

3.4.1.3 Dry Respirometry Vapor Sampling

Vapor samples were collected following the dry respirometry testing from each well screen on wells KAFB-106V1 and KAFB-106V2 on May 9, 2019. Analytical samples were collected using 6-liter Summa canisters and were analyzed for BTEX/TPH-GRO by EPA Method TO-3, VOCs by EPA

Method TO-15 SIM, and fixed gases/C1-C5 hydrocarbon compounds by ASTM International D1945. Samples were shipped to Eurofins Air Toxics under chain-of-custody documentation. Analytical results are discussed and presented in Section 4.

3.4.2 Water Injection

Water was injected into the respiration testing wells on May 23 and 24, 2019 after completion of the dry respiration field test. The injection was performed in batches utilizing 250-gallon graduated polyethylene totes staged at the well-heads. The water utilized for injection was obtained from the Kirtland AFB BFF groundwater treatment system. The water was staged in lined roll-off containers until laboratory results were received and it was confirmed that no hydrocarbon contamination was present (Appendix [BE-1](#)). Prior to injection, the water was field tested for residual chlorine in order to reduce the possibility that chlorinated water could inhibit microbial growth in the subsurface. This was performed in accordance with the NMED approval letter for Bioventing Air Lift Bioremediation (NMED, 2018a). Upon confirmation that residual chlorine was not present ([field notes are provided in Appendix B](#)), the water injection proceeded.

Water was delivered to the totes using a 500-gallon, trailer-mounted water tank. The totes were filled to a graduated marking and then gravity drained into the wells. Batch volumes were recorded in the field notes. Injections on wells SVMW-10 and SVMW-11 were performed directly down the well casing. Injections on wells SVEW-01, SVEW-02/03, and SVEW-04/05 were performed through a 1-inch diameter cross-linked polyethylene tremie pipe that was placed near the bottom of the screen. Injection totals for each well are provided in [Table 3-1820](#). [Table 3-14 presents the design inputs, prescribed injection volumes, and water injection totals performed in the field.](#)

3.4.2.1 Post-Water Injection Respirometry

Post-water injection respirometry was performed on the testing wells, prior to air injection, identified in [Table 1-1](#). Respirometry field parameters were collected in accordance with [Table 3-1](#). Respirometry readings were collected to provide a baseline for the wet respirometry testing; analytical vapor samples were not collected.

3.4.3 Wet Respirometry Testing

3.4.3.1 Air Injection and Pressure Monitoring

[Table 3-14 presents the design inputs, prescribed injection volumes, and air injection totals performed in the field.](#) Injection of ambient air was performed between June 20 and 26, 2019, and consisted of the injection of air into each well sufficient to achieve the estimated pore volume of air (porosity assumed to be 35%). A 15-ft radius from the injection well was assumed for the calculation of each test cell control volume. The thickness of each test cell control volume was equal to the filter pack length, plus 5 ft above and below to account for vertical air flow. The injection rate was calculated based on the addition of four pore volumes of the test cell in each well. Air injection was monitored and controlled using rotameters located at the injection wellhead. A Gast rotary vane pump was used for air injection into wells SVMW-10 and SVMW-11. A skid-mounted, 1.5-horsepower Rotron 454 regenerative blower was used for air injection into wells SVEW-01, SVEW-02/03, and SVEW-04/05. Air injection flow rates and well head pressures were recorded daily and are presented in [Tables 3-13-15](#) through [3-1517](#). During air injection, well-head pressures were monitored in wells KAFB-106V1 and KAFB-106V2 and are presented in [Tables 3-16-18](#) and [3-1719](#).

3.4.3.2 Wet Respirometry

Wet respirometry data collection began immediately after the air injection was completed and was performed in the same manner as the baseline monitoring, as described above. Respirometry data were collected between June 26 and July 5, 2019. Respirometry data are presented in [Tables 3-2](#) through [3-10](#).

Oxygen concentration within the subsurface was plotted against time for each well location and a linear regression was applied to determine the oxygen utilization rate. Collection of respirometry data was performed in accordance with the Work Plan (Kirtland AFB, 2017a).

3.4.3.3 *Post-Wet Respirometry Vapor Sampling*

Post-wet respirometry samples were collected from all depths on wells KAFB-106V1 and KAFB-106V2 on July 5, 2019. Analytical samples were collected using 6-liter Summa canisters and analyzed for BTEX/TPH-GRO by EPA Method TO-3, VOCs by EPA Method TO-15 SIM, and fixed gases/C1-C5 hydrocarbon compounds by ASTM International D1945. Samples were shipped to Eurofins Air Toxics under chain-of-custody documentation.

3.5 DEVIATIONS FROM WORK PLAN

Deviations from the approved Work Plan are discussed below.

3.5.1 Soil Vapor Monitoring Wells

SVMWs KAFB-106V1 and KAFB-106V2 were constructed with 2-foot screened intervals (standard available length) in place of the 2.5-foot intervals as described in the Work Plan (Kirtland AFB, 2017b). The 2-foot screen length does not impact vapor sampling. Final placement of each screen within the nested well was determined in the field based on lithology and is are-correctly recorded in the well construction diagrams provided located-in Appendix C.

3.5.2 Bioventing Blowers

The 1.5-horsepower regenerative blower could not be used to provide injection air to SVMW-10 and SVMW-11 due to the head loss associated with air flow through the 0.51/2"-inch wells. Using a flow rate of 4.0 standard cubic feet per minute (scfm) (SVMW-11-250 design flow rate from the testing procedure [Kirtland AFB, 2018]) and supply pressure of 1.6 pounds per square inch psi-(maximum blower pressure), a total head loss of 1.39 pounds per square inchpsi/100- feet of pipe was determined. Over the total length of the injection wellwell this head loss is greater than the maximum applied pressure provided by the blower; -and-thus, it was determined that the blower is not sufficient for air injection into the SVMWs. As a result, a dedicated rotary vane pump capable of producing 12.5 scfm at 10 pounds per square inch psi-was placed at each SVMW. The vane pumps produced sufficient pressure to overcome losses while maintaining the needed flow rate. Head loss calculations for air flow through a 0.51/2-inch pipe are provided in Appendix D-1.

3.5.3 Air Injection Timeframe

Clean air injection for both the dry and the moist respiration tests occurred over a time period of approximately 7- days instead of the proposed 3- days. The injection timeframe was increased to ensure the full volume of air, as specified in the approved Work Plan testing procedure, was delivered to the subsurface. The total volume of air injected into each location is provided in Tables 3-14 through 3-17. This extended injection timeframe was used to-due to the limitations of injecting high volume of air through the 0.5-1/2-inch SVMWs as discussed in Section 3.5.2 above.

3.5.4 Intrinsic Permeability Calculation

Intrinsic permeability could not be calculated as specified in the Work Plan as the provided equation is not applicable under pressure injection situations. As a result, discussion of the intrinsic permeability is not included in this report. However, this does not affect the overall usability of the bioventing pilot test as oxygen utilization and biodegradation parameters can still be calculated and used to assess the viability of bioventing as a corrective remedy.

3.5.5 Vapor Sample Containers

During the bioventing pilot test, 6-liter summa cannisters were used in place of the 1-liter cannisters to

provide sufficient volume to allow for analysis of all required parameters. Documentation of laboratory confirmation of the sample cannister size is provided in Appendix D-2.

4. FIELD INVESTIGATION RESULTS

Analysis of collected data and the calculation of the long-term bioventing operational parameters are discussed below.

4.1 Respiration Data Analysis

Field measurements were collected from each testing well over an 11-day period for the dry respiration test and over a 9-day period for the wet respiration test. Both tests were conducted with technical guidance from Dr. Robert Hinchee.

Upon collection of the data, it was observed that oxygen and carbon dioxide concentrations varied from day to day. This was more prevalent within the SVEWs (which have 15-ft long screens) than in the SVMWs (which have 2-ft long screens). The Horiba unit was field checked against atmospheric oxygen and carbon dioxide conditions any time a large change in the concentration of oxygen or carbon dioxide occurred to check that the instrument was functioning properly. To perform this check, the instrument was disconnected from the sample train and a fresh air sample was analyzed. If the oxygen and carbon dioxide readings were at atmospheric conditions of 20.9 and 0.0%, respectively, then the field readings were accepted as correct. None of the instrument readings collected during respirometry were considered suspect.

While diffusion of soil gas is a possibility for the variation in oxygen and carbon dioxide readings, a volume of air equivalent to four 4-times the test cell volume was injected into each point to safeguard against diffusion. Volumes of injected air are provided in Tables 3-14 and Tables 3-15 through 3-17. In addition, if diffusion was the primary reason for variation, increases in the oxygen concentration would not have been observed as the ambient soil vapor that is diffusing into the test cell is very low in oxygen.

Soil vapor variability of this kind is not unusual and can have a variety of causes including barometric pressure driven flow, temperature, precipitation, gravitational effects (e.g., Pitchford et al., 1989; Contaminated Land: Applications in Real Environments, 2011; Hartman, 2002). While variability of oxygen/carbon dioxide was observed in many of the wells during the respiration testing, the changes were more prevalent within the SVEWs, ~~possibly due to the longer screen intervals that would be more greatly affected by barometric pressure changes.~~ The subsurface is a porous media and thus subject to barometric pumping. Barometric pumping is more likely to be observed in longer screened wells (the SVEWs) as the long screen interval increases the likelihood of exposure to permeable zones that respond more rapidly to barometric pressure changes. If the well screen is subject to a permeable zone, it is likely that injection air or ambient soil vapor is pushed in and out of the test cell when barometric pressure swings occur.

Barometric pressure was plotted versus the oxygen data (Appendix ~~CF-1~~). While increases and decreases in barometric pressure may influence subsurface pumping, they do not account for all the variability observed; other factors, discussed above, likely also influenced the data. However, oxygen concentrations overall ~~consistently appear to declined~~ during the respiration testing ~~providing indicating clear evidence of oxygen demand utilization~~ and hydrocarbon biodegradation. ~~The impact of this variability is taken into account by applying a safety factor to the bioventing operational flow rate. A safety factor of four 4-times the calculated oxygen utilization rate is being supplied to ensure oxygen is being delivered at a rate much greater than it is being utilized. While this may safeguard against variations due to influx and diffusion, the elevated flow rate may increase the chance of pushing contaminated soil vapor through the subsurface. However, this risk is mitigated by soil vapor sampling that will indicate if vapor migrations is occurring.~~

~~Relative humidity measurements were conducted as requested by the NMED approval letter dated February 25, 2019 (NMED, 2019) and are presented in Tables 3-2 through 3-10. The results suggest little or no change to soil vapor humidity as the result of moisture addition. The relative humidity measurements were significantly impacted by ambient air temperatures as shown in the Relative Humidity vs. Temperature graphs provided in Appendix C-2. As can be seen in the data, substantially lower relative humidity was measured during the wet respiration testing than the dry. It appears this is an artifact of timing; ambient air temperatures were warmer during the wet test. Measurement instability occurs when a soil vapor sample is extracted above ground and run through the instrument. On warm days, the sample temperature increases to near ambient, which decreases relative humidity. As the ambient temperature fluctuates, so does the relative humidity.~~

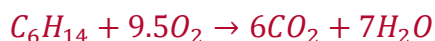
~~For comparison purposes, absolute humidity was estimated for both the dry and wet respirometry in select wells and is provided in Appendix C 3. In some of the locations, the absolute humidity appears marginally higher in the wet test; however, the reasons for this are unclear. The water injected into the wells for the wet test was likely warmer than the soils resulting in warmer soil immediately surrounding the sampling point screens. This could account for the absolute humidity differences.~~

4.2 ~~Bioventing Parameters~~Bioventing Parameters

Data collected during the respiration pilot tests were utilized to calculate oxygen utilization rates and corresponding biodegradation rates. These data were used to calculate long-term bioventing pilot test operational parameters including bioventing flow rate, and estimate intrinsic permeability, and radius of influence (ROI). Field data from both the dry and wet respiration tests are provided in Tables 3-2 through 3-10. Bioventing assessment and operational parameters were calculated using the field data that were collected and calculated as described in Work Plan (Kirtland AFB, 2017a). Discussion of the operational parameters is provided below.

4.2.1 Oxygen Utilization Rate

Oxygen utilization in aerobic degradation is generally estimated stoichiometrically using a representative straight chain aliphatic. Leeson and Hincee (1996) use hexane degradation to establish oxygen utilization as such:



This stoichiometric relationship renders the relation that 1.0 pound of fuel hydrocarbon is degraded with 3.5 pounds of oxygen, and this mass relationship is applicable for all hydrogen-saturated alkanes. If the oxygen utilization rate due to biodegradation is known, the vent rate to supply required oxygen mass can be calculated.

The oxygen utilization rate (~~k_o~~) is determined by the respiration test data by plotting oxygen content in soil gas versus time (Leeson and Hincee 1996). The roughly linear slope during early oxygen depletion (decreasing from approximately 20% to 5% oxygen by volume) yields the oxygen utilization rate~~k_o~~, the oxygen utilization rate. Note that oxygen data collection ceased before oxygen concentrations reached 5%, with concurrence from Dr. -Hincee, due to the possibility of influx of ambient soil vapor.

Field measurements were collected during the respiration tests and data were plotted versus time (Appendix D-Figures 4-1 through 4-9 provides graphs of oxygen utilization and Appendix D-2-Figures 4-10 through 4-18 provides corresponding carbon dioxide production). A linear regression was applied to determine the oxygen utilization rate.

Oxygen utilization rates for the dry respiration testing varied between 0.163 and 0.475% per day for the SVMWs and between 0.497 and 0.639% per day for the SVEWs (Appendix D-1-Figures 4-1 through 4-9 and Table 4-1). The oxygen utilization rate averaged 0.340% per day for the SVMWs while averaging 0.563% per day for the SVEWs. The overall average oxygen utilization rate for the dry respiration test was 0.414% per day.

Oxygen utilization rates for the wet respiration testing ranged between 0.138 and 0.520% per day for the SVMWs and between 0.020 and 0.626% per day for the SVEWs (Figures 4-1 through 4-9Appendix D-1, Table 4-1). The oxygen utilization rate averaged 0.307% per day for the SVMWs while averaging 0.335% per day for the SVEWs. The overall average oxygen utilization rate for the wet respiration test was

0.316% per day. ~~Oxygen utilization rates were marginally higher during the dry respiration testing compared to the wet respiration testing indicating that the moisture addition did not increase the rate of biodegradation.~~

~~The oxygen utilization rates obtained from the respiration testing do not account for additional factors that would result in the decrease of oxygen concentrations. These factors include influx of ambient soil vapor into the test cell, diffusion of oxygen into the surrounding soil vapor, and high-volume movement of soil vapor as a result of barometric pressure influences. Further evaluation of the oxygen utilization rates will be performed throughout the long-term bioventing pilot test. Continuous air injection should alleviate some of the concerns associated with the additional factors as the ambient soil vapor will be displaced by the supplied air. Discussion of the oxygen utilization rates will be provided in the Final Bioventilation Pilot Testing Report.~~

4.2.2 Biodegradation Rate

~~Biodegradation rates for each well were calculated in accordance with the Work Plan (Kirtland AFB, 2017a) as specified in Leeson and Hinchee (1996). The formula below was used to calculate the biodegradation rates and rates and calculations are is provided in Appendix E-1. The degradation of hexane was used to establish the oxygen utilization in accordance with the work plan (Kirtland AFB, 2017a) and Leeson and Hinchee (1996).~~

$$k_b = \frac{-\frac{k_o}{100} \theta_a \frac{1 L}{1000 \text{ cm}^3} \rho_{O_2} C}{\rho_k \left(\frac{1 \text{ kg}}{1000 \text{ g}} \right)} = \frac{-k_o \theta_a \rho_{O_2} C (0.01)}{\rho_k}$$

Where:

k_b	=	Biodegradation rate (milligrams per kilogram per day [mg/kg-day]).
k_o	=	Oxygen utilization rate (% percent /day).
θ_a	=	Gas-filled pore space (volumetric content at the vapor phase, cubic meters m^3_{gas}/cubic centimeter $\text{cm}^3_{\text{soil}}$).
ρ_{O_2}	=	Density of oxygen (milligrams per liter g/L).
C	=	Mass ratio of hydrocarbons to oxygen required for mineralization (=1/3.5 for hexane-equivalent).
ρ_k	=	Soil bulk density (grams per cubic centimeter g/cm^3).

~~Biodegradation rates for each well were calculated in accordance with the Work Plan (Kirtland AFB, 2017a). The formula used to calculate the biodegradation rates is provided in Appendix E-1. The degradation of hexane was used to establish the oxygen utilization in accordance with the work plan (Kirtland AFB, 2017a) and Leeson and Hinchee (1996).~~

Biodegradation rates during the dry respiration testing ranged between 0.096 and 0.281 milligrams per kilogram per day (mg/kg/day) for the SVMWs and between 0.294 and 0.378 mg/kg/day for the SVEWs (Table 4-1). Biodegradation rates during the wet respiration testing ranged between 0.081 and 0.308 mg/kg/day for the SVMWs and between 0.012 and 0.371 mg/kg/day for the SVEWs.

~~These biodegradation rates may be affected by additional factors influencing oxygen utilization as discussed in Section 4.2.1 above. Further evaluation of the oxygen utilization rates, and corresponding biodegradation rates will be performed throughout the long-term bioventing pilot test. Discussion of the oxygen utilization rates will be provided in the Final Bioventilation Pilot Testing Report.~~

4.2.3 Oxygen Demand Air Flow Rate

The required bioventing flow rate is determined from the oxygen utilization rate established from the respiration test (Leeson and Hinchee, 1996).

$$Q = \frac{k_o V \theta_a}{(20.9\% - 5\%) \times 60 \frac{\text{min}}{\text{hr}}}$$

Where:

<u>Q</u>	=	<u>Flow rate (cubic feet per minute ft³/min).</u>
<u>k_o</u>	=	<u>Oxygen utilization rate (% per hour).</u>
<u>V</u>	=	<u>Volume of contaminated soil (cubic feet ft³).</u>
<u>θ_a</u>	=	<u>Gas-filled pore space (cubic centimeter cm³_{air}/cubic centimeter cm³_{soil}, ~ 0.2 or 0.3).</u>

The oxygen demand flow rate represents the minimum ambient air injection flow rate required to maintain the biodegradation rates obtained in the respirometry calculations. The oxygen demand air flow rate was calculated based on the oxygen utilization rate and corresponding biodegradation rates for each well under both the dry and wet respiration conditions (Appendix ~~EG-1~~). The long-term operational bioventing flow rate is based on the oxygen demand air flow rate times a safety factor (in this case, four times the oxygen demand air flow rate [Section 5.2 below]).

Oxygen demand flow rates for the dry respiration test varied between 0.49 and 0.79 ~~standard cubic feet per minute (scfm)~~ for the SVMWs and between 2.50 and 3.74 scfm for the SVEWs. Oxygen demand flow rates for the wet respiration test varied between 0.42 and 0.86 scfm for the SVMWs and between 0.11 and 3.66 scfm for the SVEWs. The oxygen demand flow rate was marginally higher for the dry respiration testing due to the higher oxygen utilization rates. The calculated flow rate for each well is provided on Table 4-1.

These oxygen demand flow rates may be affected by additional factors influencing oxygen utilization as discussed in Section 4.2.1 above. Further evaluation of the oxygen utilization rates, and corresponding oxygen demand flow rates will be performed throughout the long-term bioventing pilot test. Discussion of the oxygen demand flow rates will be provided in the Final Bioventilation Pilot Testing Report.

~~4.2.4 Intrinsic Permeability~~

~~Intrinsic permeability was calculated for the SVEWs under both the dry and wet respiration conditions (Table 4-1). The calculations are provided in Appendix E-2. Intrinsic permeability varied between 16 and 25 darcys and was marginally higher during the dry respiration test compared to the wet respiration test. Intrinsic permeability was not calculated for the SVMWs as the large amount of head loss that occurred in the 0.5-inch diameter wells did not allow for accurate pressure monitoring at the injection point.~~

~~4.2.54.2.4 Radius of Influence~~

In accordance with the Work Plan (Kirtland AFB, 2017a), the ROI was monitored using two methods: physical or pressure response and oxygen response. Physical pressure monitoring was performed during the ambient air injections (Tables 3-~~13-15~~ through 3-~~15-17~~). However, due to low injection flow rates, pressures, and short injection periods that could not overcome the variability in barometric pressure, a reliable pressure ROI was not obtained.

As a result, the oxygen ROI was calculated using the oxygen utilization rates and long-term bioventing operation flow rates as described in the Work Plan (Kirtland AFB, 2017a). The oxygen ROI for each well under both the dry and wet respiration conditions is presented in Table 4-1 and calculations are provided in Appendix ~~EG-1~~. The oxygen ROI varied between 138 and 143 ft for the dry respiration test and between ~~138-140~~ and 152 ft for the wet respiration test. The ROI was marginally higher for the wet respiration test due to the overall lower oxygen utilization rates. ROI data will be assessed on a quarterly basis as the pilot test progresses.

4.2.6.4.2.5 Soil Vapor Analytical Results

Laboratory analytical samples were collected from each of the screened intervals in SVMWs KAFB-106V1 and KAFB-106V2 to evaluate the contaminant destruction rate and the degradation of BTEX, ethylene dibromide (EDB), and TPH-GRO. Field parameters collected during sampling are provided in Tables 4-2 through 4-13.

Analytical samples were collected prior to the air injection for the dry respiration test, after the dry respiration test was completed, and after the wet respiration test was completed. Soil vapor analytical data and the analytical laboratory reports are provided in Appendix ~~BE-2~~. TPH-GRO, BTEX, and EDB concentrations were collected and are provided in Table 3-~~12~~13. A summary of all soil vapor analytical data is provided in Appendix E-3.

4.2.6.14.2.5.1 Baseline Respiration Sampling

The following is a summary of the laboratory analytical results for the samples collected in April 2019 prior to the dry respiration testing:

TPH-GRO ranged from 43,000,000 to 370,000,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

- The sum of BTEX ranged from 2,400,000 to 9,130,000 $\mu\text{g}/\text{m}^3$.
- EDB ranged from 2,500 J to 23,000 $\mu\text{g}/\text{m}^3$.

4.2.6.24.2.5.2 *Post-Dry Respiration Sampling*

The following is a summary of the laboratory analytical results for the samples collected in May 2019 after the dry respiration testing but before the wet respiration testing:

- TPH-GRO ranged from 52,000,000 to 210,000,000 $\mu\text{g}/\text{m}^3$.
- The sum of BTEX ranged from 2,820,000 to 7,950,000 $\mu\text{g}/\text{m}^3$. These sums include a mixture of non-qualified and J-qualified results.
- EDB ranged from 1,900 J to 15,000 $\mu\text{g}/\text{m}^3$.

4.2.6.34.2.5.3 *Post-Wet Respiration Sampling*

The following is a summary of the laboratory analytical results for the samples collected in July 2019 after the wet respiration testing:

- TPH-GRO ranged from 76,000,000 to 220,000,000 $\mu\text{g}/\text{m}^3$.
- The sum of BTEX ranged from 2,270,000 to 9,530,000 $\mu\text{g}/\text{m}^3$. The results for each of the analytes included in the sum were J-qualified.
- EDB ranged from 1,600 J to 24,000 $\mu\text{g}/\text{m}^3$.

Significant changes in contaminant concentration due to biodegradation were not expected to be observed during the respiration pilot testing due to the limited injection periods. Data collected during the respiration tests will be used as baseline data to assess the biodegradation throughout the full-scale bioventing test.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Respirometry Testing Conclusions

Respiration pilot tests were completed for both dry and wet conditions. While oxygen and carbon dioxide concentrations varied from day to day for both the dry and wet respiration test, a clear decline in subsurface oxygen was observed. Data collected during the dry and wet respiration tests were utilized to determine the oxygen utilization rates and other operational parameters. Comparing the oxygen utilization rates and operational parameters between the dry respiration test and the wet respiration test, it appears that moisture addition is not beneficial for increasing biodegradation rates. As a result, the bioventing pilot test operational parameters were determined using the data obtained from the dry respiration test. Moisture will be added in the event that hydrocarbon concentration degradation does not appear to be occurring or stalls.

5.2 Long-Term Pilot Test Operational Parameters

The bioventing pilot test system is designed to supply oxygen to the remediation area at a rate equal to or greater than the oxygen utilization rates. The oxygen demand air flow rate is calculated from the oxygen utilization rate and is the minimum flow required to provide sufficient oxygen throughout the remediation area. The remediation area for the long-term bioventing test is defined as a control radius of 70 ft (the farthest distance between injection wells and observation wells) along with the filter pack thickness of the injection well to obtain a volume of impacted soil. Table 5-1 presents the design inputs and calculated pore volumes.

Due to the low oxygen utilization rates, the corresponding biodegradation rates and oxygen demand air flow rates were also low. As a result, a long-term bioventing pilot test operational design flow rate of approximately four times the oxygen demand flow rate is specified to ensure that oxygen is delivered to the subsurface at a rate greater than it is being utilized. Design operational flow rates for the bioventing pilot test are presented in Table 4-1. The air flow rates were calculated based on the method approved in the Work Plan (Kirtland AFB, 2017a). The calculations are presented in Appendix ~~EG-1~~ and the flow rate for each well is presented on Table 4-1.

Utilizing the calculated oxygen utilization rates and long-term bioventing pilot test operation flow rates, the oxygen ROI was calculated for each well under both the dry and wet respiration conditions. These oxygen ROIs are presented in Table 4-1 and calculations are provided in Appendix ~~EG-1~~. The oxygen ROI varied between 138 and 143 ft for the dry respiration test and between ~~138-140~~ and 152 ft for the wet respiration test. The calculated oxygen ROIs are much greater than the 70-ft radius control area indicating that the long-term bioventing pilot test operational flow rates are adequate to provide oxygen throughout the remediation area.

5.3 Bioventing Pilot Test Implementation

Prior to startup of the bioventing pilot test, process ~~piping~~ and flow-meters were connected to the well-heads and inspected for leaks and loose fittings. On October 7, 2019, the bioventing blowers were started. The flow rates for the long-term bioventing pilot test were calculated as described in Section 4.1, above, and are provided on Table 4-1. The process piping and equipment were re-inspected for leaks and tightness after the startup of the bioventing equipment. Initial startup injection parameters of pressure, flow rate, oxygen, and carbon dioxide concentrations were collected.

5.4 Bioventing Pilot Test Performance Assessment

Performance monitoring of the long-term bioventing pilot test is being conducted in accordance with the Work Plan (Kirtland AFB, 2017a). Table 4-1 lists the wells to be used for air injection. Wells KAFB-106V1 and KAFB-106V2 will be used for monitoring. Field parameters are being collected from the screened intervals in Wells KAFB-106V1 and KAFB-106V2. Data collected during the long-term bioventing pilot test will consist of ambient temperature, barometric pressure, well pressures, and flow rates; hydrocarbon concentration, oxygen, and carbon dioxide concentrations; relative humidity; and vapor temperature. Vapor samples are being collected and submitted to an analytical laboratory for analysis of BTEX/TPH-GRO by EPA Method TO-3, VOCs by EPA Method TO-15 SIM, and fixed gases/C1-C5 hydrocarbon compounds by ASTM International D1945. Samples are collected on a quarterly basis and submitted to Eurofins Air Toxics under chain-of-custody documentation.

The first month of long-term bioventing pilot testing data is presented in Tables 4-2 through 4-13. The data collected during the first month of the long-term bioventing pilot test ~~indicate that oxygen has been distributed throughout the subsurface show elevated oxygen concentrations of hydrocarbons adsorbed to the soil. Increases in oxygen concentration are being observed~~ in each monitoring point within ~~W~~wells KAFB-106V1 and KAFB-106V2. This indicates that operational flow rates are sufficient to distribute oxygen throughout the bioventing pilot testing area.

Monitoring will continue in accordance with the Work Plan (Kirtland AFB, 2017a). Respiration and analytical data collected ~~from each quarter will be reported in the appropriate quarterly groundwater monitoring report over the course of the long-term bioventing pilot test will be analyzed in the Final Bioventilation Pilot Testing Report.~~ The reports will include:

- Text describing quarterly activities and deviations from the Work Plan.
- Summary tables for field and analytical laboratory data.
- Calculations of assessment parameters.
- Assessment of ~~pilot test progress bioventing for use as a corrective measure.~~
- Field data forms and laboratory reports.

6. REFERENCES

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FIGURES

TABLES

**Table 1-1
Bioventing Respiration Pilot Test Well Details and Function**

Well ID	Screened Interval (ft bgs)	Diameter (inches)	USCS Soil Classification	Status	Well Use	Applicable Tests^a	Attendant Observation Wells^b	Radial Distance between Observation and Injection Well (ft)
SVMW-11-100	100-102.5	0.5	SP	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-102	36
							KAFB-106V2-102	57
SVMW-11-250	250-252.5	0.5	SP	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-252	36
							KAFB-106V2-252	57
SVMW-11-260	260-262.5	0.5	SP	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-252	36
							KAFB-106V2-252	57
SVEW-01-260	245-260	4	SP	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V2-252	31
							KAFB-106V1-252	22
SVMW-10-100	100-102.5	0.5	SW	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-102	37
							KAFB-106V2-102	73
SVMW-10-150	150-152.5	0.5	SW	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-160	37
							KAFB-106V2-160	73
SVMW-10-250	250-252.5	0.5	SP	Existing	Air Injection	"Dry" Respiration "Moist" Respiration Long-Term Bioventing	KAFB-106V1-252	37
							KAFB-106V2-252	73
SVEW-02/03-160	145-160	2	SP	Existing	Air Injection	"Dry" Respiration "Moist" Respiration Long-Term Bioventing	KAFB-106V2-160	41
							KAFB-106V1-160	13
SVEW-04/05-313	298-313	2	SW	Existing	Air Injection	"Dry" Respiration "Wet" Respiration Long-Term Bioventing	KAFB-106V1-263	24
							KAFB-106V2-270	34

**Table 1-1
Bioventing Respiration Pilot Test Well Details and Function**

Well ID	Screened Interval (ft bgs)	Diameter (inches)	USCS Soil Classification	Status	Well Use	Applicable Tests ^a	Attendant Observation Wells ^b	Radial Distance between Observation and Injection Well (ft)
KAFB-106V1	100.1-102.1	0.75	SP	Existing	Observation	Long-Term Bioventing	NA	NA
	110.6-112.6	0.75	SW/SC				NA	NA
	157.6-159.6	0.75	SP				NA	NA
	215.1-217.1	0.75	SP/SW				NA	NA
	250.1-252.1	0.75	SP				NA	NA
	260.6-262.6	0.75	SP				NA	NA
KAFB-106V2	100.2-102.2	0.75	SP	Existing	Observation	Long-Term Bioventing	NA	NA
	115.1-117.1	0.75	ML/CL				NA	NA
	157.9-159.9	0.75	SM/SW				NA	NA
	215.1-217.1	0.75	SP				NA	NA
	250.2-252.2	0.75	SP				NA	NA
	267.55-269.55	0.75	SW/CL				NA	NA

^a Three types of treatability tests will be conducted: (1) single well "push-pull" respiration **without** moisture addition, (2) single well "push-pull" respiration **with** moisture addition, and (3) long-term bioventing with multiple injection points operating in concert.

^b Observation wells will be used during respiration tests for pressure measurements and physical radius of influence only. During the long-term bioventing test, observation wells will also be used for respiration measurements.

bgs = below ground surface

ft = foot/feet

ID = identification

NA = not applicable

USCS = unified soil classification system

**Table 3-1
Bioventing Respiration Pilot Testing Field Measurement Equipment and Regimen**

Parameter	Field Measurement	Media	Instrument^a	Range/ Tolerance	Data Use	Respiration Test Frequency^b	Long-Term Test Frequency^c
Water Activity	Relative Humidity	Soil gas	Amprobe TH-3	0-100 % ± 3% R.H. at 23°C ^d	Determine relative humidity	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter
Pressure/ Vacuum	Injection/ Extraction Pressure	Vadose zone	Dwyer 477-A7	0.05 inches water column	Evaluate pressure	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter
Carbon Dioxide	Concentration in percent	Soil gas	Horiba	0-30% ± 0.3% by volume	Evaluate contaminant destruction rate	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter
Oxygen	Concentration in percent	Soil gas	Horiba	0-30% ± 0.1% by volume	Evaluate contaminant destruction rate	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter
Total Petroleum Hydrocarbons	Concentration in parts per million	Soil gas	Horiba	0-10,000 ppmv ± 10 ppmv	Evaluate soil vapor hydrocarbons	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; monthly thereafter
Methane	Concentration in percent	Soil gas	Landtec GEM 5000	0-5% ±0.3% by volume	Evaluate contaminant destruction rate	Daily for first 3 days; days 5 and 7; biweekly thereafter	NA
Flow Rate	Rotameter	Soil gas	Brooks 2520A4A37BNBN	0.3-3 scfm	Verify injection/purge rates	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter
Temperature	Temperature	Soil gas	Amprobe TH-3	-20-60°C ± 0.8°C	Evaluate temperature	Daily for first 3 days; days 5 and 7; biweekly thereafter	Daily for first 3 days; weekly for first month; quarterly thereafter

^a The instrument may be substituted for an engineer approved equivalent.

^b Schedule may be adjusted based on observed oxygen utilization rates; the goal is 5-10 data points in the early linear portion of the oxygen decay curve.

^c Schedule may be adjusted based on observed oxygen utilization rates in short-term respiration tests.

^d This range and tolerance are based on instrument performance. Due to temperature variation and condensation, the actual field measurements will be less accurate. Test will be terminated when oxygen percent measurements have five linear points and/or oxygen is less than 5%.

% = percent

° C = degree Celsius

ppmv = part per million (by volume)

R.H. = relative humidity

scfm = standard cubic feet per minute

**Table 3-2
SVMW-10-100 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post- Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 13:46	0.0/0.0	1	15.1	28,990	69.5	58.1	52	23.34	0.95	11.00	0.0
Dry Respirometry											
Post-Injection											
4/28/2019 11:59	0.7/0.5	2	65.2	10	9.2	80.5	72	24.6	20.88	0.02	0.0
4/28/2019 16:15	0.9/0.9	2	143	76	5.8	85.0	83	24.52	20.73	0.02	0.0
4/29/2019 11:56	0.0/0.0	2	58.8	355	18.4	77.3	72	24.62	20.56	0.04	0.0
4/29/2019 17:05	0.0/0.0	2	55.6	556	23.6	73.8	73	24.52	20.51	0.10	0.0
4/30/2019 15:44	0.5/0.5	2	63.1	966	27.1	73.5	72	24.55	20.23	0.24	0.0
5/1/2019 15:06	0.6/0.6	2	49.0	1,486	27.8	81.8	74	24.60	19.88	0.34	0.0
5/3/2019 13:13	0.9/0.9	2	49.1	2,190	36.8	77.4	70	24.70	19.19	0.62	0.0
5/5/2019 11:08	0.6/0.0	2	48.0	3,500	42.1	77.1	72	24.64	18.30	1.02	0.0
5/9/2019 16:30	0.0/0.0	2	61.4	5,660	48.7	70.0	64	24.56	16.29	2.04	0.0
Wet Respirometry											
Pre-Injection											
6/20/2019 9:40	0.0/0.0	2	51.7	18,530	43.1	83.5	77	24.68	6.62	7.52	0.0
Post-Injection											
6/26/2019 9:31	0.0/0.0	2	49.9	5	6.2	84.0	82	24.79	20.92	0.02	0.0
6/26/2019 15:19	0.0/0.0	2	48.0	10	5.3	89.2	92	24.74	20.88	0.02	0.0
6/27/2019 8:03	0.0/0.0	2	51.5	77	17.7	74.6	72	24.87	20.90	0.06	0.0
6/27/2019 13:46	0.0/0.0	2	50.3	121	14.8	85.7	91	24.84	20.80	0.02	0.0
6/28/2019 11:46	0.0/0.0	2	50.0	269	16.2	87.5	86	24.88	20.75	0.06	0.0
6/30/2019 12:23	0.0/0.0	2	50.1	974	18.2	93.0	90	24.83	20.26	0.20	0.0
7/2/2019 9:51	0.0/0.0	2	50.1	1,679	33.4	82.8	77	24.77	19.82	0.38	0.0
7/5/2019 11:45	0.0/0.0	2	50.0	2,400	26.6	90.4	88	24.81	18.36	0.90	0.0

% = percent
 °F = degrees Fahrenheit
 CH₄ = methane
 CO₂ = carbon dioxide
 in-Hg = inches of mercury
 in-WC = inches of water column

O₂ = oxygen
 ppmv = parts per million by volume
 scfm = standard cubic feet per minute
 VOC = volatile organic compound

**Table 3-3
SVMW-10-150 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post- Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 14:03	2.3/2.3	1	17.0	24,460	76.4	56.5	63	24.32	3.44	8.14	0.0
Dry Respirometry Post-Injection											
4/28/2019 12:05	0.8/0.7	2	52.0	11	13.6	78.5	73	24.60	21.27	0.00	0.0
4/28/2019 16:22	2.4/2.4	2	142.4	33	8.0	83.2	83	24.52	21.16	0.02	0.0
4/29/2019 12:00	0.5/0.0	2	104.4	215	13.1	76.9	72	24.62	20.73	0.06	0.0
4/29/2019 17:09	1.6/1.6	2	58.9	306	17.9	74.2	73	24.53	20.75	0.10	0.0
4/30/2019 15:52	1.2/1.1	2	61.0	519	23.3	71.5	72	24.55	20.62	0.16	0.0
5/1/2019 15:12	0.7/0.7	2	52.1	741	23.2	81.2	74	24.60	20.35	0.24	0.0
5/3/2019 13:06	0.0/0.0	2	52.0	1,413	34.6	77.7	70	24.70	19.34	0.78	0.0
5/5/2019 11:18	0.8/0.8	2	49.8	1,123	36.6	78.0	72	24.64	19.47	0.52	0.0
5/9/2019 16:34	0.0/0.0	2	72.3	1,541	44.2	69.8	64	24.56	18.20	1.06	0.0
Wet Respirometry Pre-Injection											
6/20/2019 9:59	0.5/0.6	2	49.1	3,880	47.3	83.0	79	24.68	7.56	6.04	0.0
Post-Injection											
6/26/2019 9:40	-1.4/-1.4	2	52.5	64	7.0	85.8	82	24.79	20.80	0.00	0.0
6/26/2019 15:25	-0.5/-0.5	2	53.1	166	5.5	89.6	92	24.74	20.78	0.00	0.0
6/27/2019 8:10	-1.2/-1.2	2	58.0	506	20.7	74.2	72	24.87	20.40	0.18	0.0
6/27/2019 13:50	-1.4/-1.5	2	53.0	462	13.3	87.3	91	24.84	20.20	0.22	0.0
6/28/2019 11:52	-2.2/-2.2	2	54.8	647	12.6	91.9	86	24.88	19.72	0.54	0.0
6/30/2019 12:29	-0.6/0.0	2	47.9	616	15.5	95.0	90	24.83	19.57	0.70	0.0
7/2/2019 9:56	0.0/0.0	2	50.4	354	24.4	84.4	77	24.77	19.65	0.54	0.0
7/5/2019 11:49	-1.0/-0.9	2	51.8	835	22.8	91.0	88	24.81	18.16	1.12	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-4
SVMW-10-250 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post- Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 14:24	2.3/2.2	1	18.3	14,580	80.2	55.3	53	24.33	0.34	11.16	0.1 ^a
Dry Respirometry Post-Injection											
4/28/2019 12:11	0.6/0.5	2	66.4	254	16.2	78.3	73	24.60	21.24	0.00	0.0
4/28/2019 16:27	2.5/2.5	2	164	535	9.7	83.1	83	24.52	20.57	0.00	0.0
4/29/2019 12:05	0.0/0.0	2	94.2	989	25.2	76.5	72	24.62	20.48	0.08	0.0
4/29/2019 17:13	1.6/1.6	2	62.1	1,316	34.2	74.1	73	24.53	20.45	0.10	0.0
4/30/2019 16:01	1.4/1.4	2	65.3	1,904	42.5	71.2	72	24.55	20.23	0.20	0.0
5/1/2019 15:16	0.8/0.8	2	58.2	2,450	34.5	80.9	74	24.60	19.82	0.26	0.0
5/3/2019 12:59	-0.5/0.0	2	57.4	3,220	40.7	77.8	70	24.70	19.32	0.48	0.0
5/5/2019 11:29	1.0/1.0	2	53.8	3,730	40.2	78.5	72	24.64	18.62	0.66	0.0
5/9/2019 16:37	0.5/0.5	2	74.6	4,550	47.0	69.6	64	24.56	16.97	1.32	0.0
Wet Respirometry Pre-Injection											
6/20/2019 10:05	0.5/0.5	2	51.4	7,870	40.4	82.7	77	24.68	6.59	6.84	0.0
Post-Injection											
6/26/2019 9:45	-1.5/-1.6	2	56.2	118	8.1	86.8	82	24.79	20.82	0.04	0.0
6/26/2019 15:30	0.0/0.0	2	58.9	309	11.2	90.3	92	24.74	20.71	0.00	0.0
6/27/2019 8:15	-1.2/-1.2	2	59.9	894	30.9	73.8	72	24.87	20.19	0.20	0.0
6/27/2019 13:56	-1.7/-1.7	2	55.5	1,039	21.1	88.2	91	24.84	20.03	0.32	0.0
6/28/2019 11:57	-2.2/-2.4	2	56.0	1,546	21.6	93.2	86	24.88	19.57	0.56	0.0
6/30/2019 12:33	0.0/0.0	2	53.7	1,990	22.0	96.4	90	24.83	19.28	0.62	0.0
7/2/2019 10:00	0.0/0.0	2	58.7	2,010	33.3	85.0	77	24.77	19.29	0.44	0.0
7/5/2019 11:52	-0.9/-0.8	2	56.2	2,700	27.7	91.7	88	24.71	17.75	0.96	0.0

^a CH₄ reading is suspect and likely the result of hydrocarbon breakthrough on the carbon filter.

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-5
SVMW-11-100 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 12:35	0.7/0.7	2	14.9	30,900	73.1	59.7	53	24.36	0.42	11.26	0.0
Dry Respirometry											
Post-Injection											
4/28/2019 11:28	0.9/0.0	2	50.8	188	10.0	81.5	72	24.60	20.89	0.00	0.0
4/28/2019 15:47	1.1/1.1	2	68.1	1,456	7.4	86.6	83	24.53	20.77	0.00	0.0
4/29/2019 11:33	0.0/0.0	2	39.9	3,290	18.1	80.0	72	24.63	20.68	0.00	0.0
4/29/2019 16:45	0.0/0.0	2	43.9	4,530	26.2	76.2	73	24.53	20.59	0.00	0.0
4/30/2019 15:04	0.7/0.5	2	62.9	5,970	33.6	73.4	68	24.57	20.16	0.00	0.0
5/1/2019 14:46	0.5/0.6	2	50.5	6,870	29.1	85.4	74	24.60	19.81	0.02	0.0
5/3/2019 12:33	0.0/0.0	2	53.9	8,100	43.8	75.2	70	24.70	18.79	0.16	0.0
5/5/2019 10:42	1.2/1.1	2	46.2	10,160	37.5	81.9	70	24.60	17.73	0.44	0.0
5/9/2019 16:15	0.5/0.5	2	63.2	12,270	45.7	72.6	65	24.56	15.65	1.66	0.0
Wet Respirometry											
Pre-Injection											
6/20/2019 10:16	1.0/1.0	2	47.2	21,650	48.5	83.0	81	24.68	5.34	8.56	0.0
Post-Injection											
6/26/2019 9:57	-0.6/-0.7	2	30.3	28	5.0	87.4	82	24.79	20.88	0.00	0.0
6/26/2019 15:40	0.0/0.0	2	50.0	179	4.8	89.8	92	24.74	20.85	0.00	0.0
6/27/2019 8:25	0.0/0.0	2	49.6	651	19.8	74.0	72	24.87	20.74	0.04	0.0
6/27/2019 14:05	0.0/0.0	2	49.2	896	12.0	88.4	91	24.84	20.61	0.04	0.0
6/28/2019 12:03	0.0/0.0	2	48.1	1,525	14.2	94.0	86	24.88	20.20	0.06	0.0
6/30/2019 12:44	0.0/0.0	2	47.0	3,220	18.6	98.2	90	24.83	18.92	0.26	0.0
7/2/2019 10:08	0.0/0.0	2	51.9	5,090	32.7	84.8	77	24.77	17.85	0.56	0.0
7/5/2019 11:57	0.0/0.0	2	51.6	6,170	27.3	92.3	88	24.81	16.39	1.28	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-6
SVMW-11-250 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post- Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 13:01	2.3/2.2	1	17.2	26,320	72.2	60.6	53	24.37	0.08	11.34	0.0
Dry Respirometry Post-Injection											
4/28/2019 11:42	0.9/0.9	2	108.3	240	13.6	79.4	72	24.60	21.05	0.14	0.0
4/28/2019 15:57	2.6/2.6	2	158.6	531	8.1	85.4	83	24.53	20.80	0.14	0.0
4/29/2019 11:40	0.8/0.7	2	64.6	2,170	29.4	78.2	72	24.63	19.58	0.50	0.0
4/29/2019 16:52	1.7/1.7	2	65.9	2,460	37.2	73.2	73	24.52	19.50	0.56	0.0
4/30/2019 15:20	1.1/1.2	2	64.8	3,260	43.9	72.1	68	24.37	19.18	0.68	0.0
5/1/2019 14:52	0.8/0.8	2	52.6	3,870	35.5	83.4	74	24.60	18.88	0.80	0.0
5/3/2019 12:25	-0.7/-0.8	2	56.0	4,960	48.5	74.9	70	24.70	18.10	1.08	0.0
5/5/2019 10:47	1.0/1.0	2	52.6	5,750	40.8	79.7	70	24.60	17.31	1.36	0.0
5/9/2019 16:16	0.6/0.6	2	65.5	7,480	49.3	71.5	65	24.56	15.71	2.24	0.0
Wet Respirometry Pre-Injection											
6/20/2019 10:21	0.0/0.0	2	55.0	15,220	48.6	83.2	81	24.71	5.77	7.90	0.0
Post-Injection											
6/26/2019 10:03	-1.2/-1.3	2	57.2	101	8.3	87.5	82	24.79	20.44	0.14	0.0
6/26/2019 15:46	-0.7/-0.8	2	56.3	362	10.7	89.1	92	24.74	20.00	0.32	0.0
6/27/2019 8:31	-2.0/-2.0	2	57.4	1,476	38.2	74.3	72	24.87	19.18	0.86	0.0
6/27/2019 14:08	-1.8/-1.9	2	58.3	2,030	26.3	88.5	91	24.84	18.72	1.06	0.0
6/28/2019 12:07	-1.8/-1.7	2	56.2	4,180	24.6	95.3	86	24.88	17.46	1.78	0.0
6/30/2019 12:49	-0.7/-0.7	2	53.9	4,890	25.1	98.0	90	24.83	17.21	1.94	0.0
7/2/2019 10:11	0.0/0.0	2	54.6	3,060	39.0	84.2	77	24.77	17.80	1.38	0.0
7/5/2019 12:00	-0.7/-0.7	2	56.8	3,940	29.0	92.8	90	24.81	16.45	1.90	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-7
SVMW-11-260 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post- Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 13:22	0.0/0.0	1	14.4	18390	76.4	59.4	53	24.36	1.15	13.20	0.0
Dry Respirometry											
Post-Injection											
4/28/2019 11:48	0.0/0.0	2	142.0	5.0	16.4	80.0	72	24.60	21.32	0.04	0.0
4/28/2019 16:02	1.0/1.0	2	124.6	11	22.6	86.3	83	24.53	20.55	0.02	0.0
4/29/2019 11:46	0.0/0.0	2	58.5	29	39.8	78.4	73	24.63	20.41	0.02	0.0
4/29/2019 16:57	0.0/0.0	2	57.2	49	44.1	74.1	73	24.52	20.43	0.02	0.0
4/30/2019 15:28	0.0/0.0	2	57.7	131	47.7	72.2	70	24.56	20.37	0.06	0.0
5/1/2019 14:57	0.8/0.7	2	47.3	219	37.8	82.3	74	24.60	20.38	0.04	0.0
5/3/2019 12:16	0.0/0.0	2	48.3	374	50	73.4	70	24.70	19.67	0.08	0.0
5/5/2019 10:55	0.7/0.7	2	49.8	846	41.5	78.4	70	24.60	19.71	0.06	0.0
5/9/2019 16:23	0.0/0.0	2	61.1	2,110	50.1	71.0	65	24.56	18.74	0.08	0.0
Wet Respirometry											
Pre-Injection											
6/20/2019 10:28	0.0/0.0	2	46.6	7380	49.0	83.5	82	24.71	6.35	2.24	0.0
Post-Injection											
6/26/2019 10:10	0.0/0.0	2	47.5	3	22.0	87.5	82	24.82	20.67	0.02	0.0
6/26/2019 15:50	0.0/0.0	2	58.7	8	28.5	88.8	92	24.74	20.48	0.04	0.0
6/27/2019 8:36	0.0/0.0	2	48.8	16	52.5	74.5	72	24.87	20.44	0.06	0.0
6/27/2019 14:13	0.0/0.0	2	47.8	16	34.0	88.4	91	24.84	20.37	0.04	0.0
6/28/2019 12:13	0.0/0.0	2	47.4	22	24.2	94.3	86	24.88	20.17	0.02	0.0
6/30/2019 12:54	0.0/0.0	2	58.1	61	23.7	98.5	90	24.83	19.89	0.08	0.0
7/2/2019 10:15	0.0/0.0	2	49.2	175	42.6	83.3	77	24.77	19.86	0.06	0.0
7/5/2019 12:04	0.0/0.0	2	47.8	382	30.5	93.3	90	24.81	19.28	0.10	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-8
SVEW-01-260 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/13/2019 13:09	0.0/0.0	3	64.6	16,970	33.1	71.4	60	24.51	0.30	12.02	0.1
Dry Respirometry											
Post-Injection											
4/28/2019 12:30	1.1/1.0	3	66.1	7	10.4	80.6	78	24.60	20.77	0.00	0.0
4/28/2019 16:45	2.7/2.7	3	181.1	30	1.7	83.5	83	24.50	20.79	0.02	0.0
4/29/2019 12:29	0.0/0.0	3	65.4	216	15.9	77.3	72	24.62	20.68	0.00	0.0
4/29/2019 17:30	1.6/1.6	3	65.5	320	20.6	73.3	73	24.54	20.63	0.04	0.0
4/30/2019 16:25	1.5/1.3	3	67.8	641	30.3	71.1	72	24.55	20.25	0.14	0.0
5/1/2019 15:33	1.1/1.2	3	69.9	728	25.3	79.8	74	24.60	19.27	0.44	0.0
5/3/2019 11:29	0.0/0.0	3	63.8	1,055	35.0	73.4	70	24.67	13.39	3.88	0.0
5/5/2019 10:19	0.7/0.9	3	65.8	1,442	30.0	80.1	70	24.60	18.08	1.02	0.0
5/6/2019 14:11	0.9/0.6	3	67.6	1,852	20.7	88.8	81	24.58	17.36	1.42	0.0
5/6/2019 14:18	0.0/0.0	3	68.1	1,918	21.1	88.4	81	24.58	17.29	1.44	0.0
5/6/2019 14:23	0.5/0.5	3	68.4	1,953	21.5	88.5	81	24.58	17.18	1.44	0.0
5/9/2019 16:52	0.6/0.5	3	77.7	1,823	40.1	68.3	64	24.56	13.83	3.84	0.0
Wet Respirometry											
Pre-Injection											
6/20/2019 10:49	0.5/0.5	3	65.5	4,720	26.7	89.6	82	24.71	6.55	8.06	0.0
Post-Injection											
6/26/2019 10:43	0.0/0.0	3	67.7	540	17.5	91.0	82	24.82	18.56	1.50	0.0
6/26/2019 16:09	-0.5/-0.6	3	80.5	270	21.6	91.2	88	24.74	13.54	3.96	0.0
6/27/2019 9:05	-2.3/-2.3	3	70.0	87	43.1	77.8	73	24.87	12.88	5.36	0.0
6/27/2019 14:28	-1.2/-1.2	3	69.3	89	29.7	88.5	91	24.84	13.14	5.42	0.0
6/28/2019 12:29	-1.8/-2.0	3	70.0	65	23.5	95.9	86	24.88	14.48	5.14	0.0
6/30/2019 13:13	-0.6/-0.5	3	68.0	106	20.7	100.9	91	24.83	15.45	4.98	0.0
7/2/2019 10:29	0.0/0.0	3	69.9	1,404	35.9	82.4	77	24.77	13.93	5.70	0.0
7/5/2019 12:14	-0.6/-0.6	3	68.3	275	23.9	95.4	90	24.81	14.96	4.44	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-9
SVEW-02/03-160 Respiration Monitoring**

Date and Time	Well Head- Pressure Pre/Post Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/13/2019 13:35	0-0/0-0	2	40.7	14,640	48.2	71.9	60	24.82	0.24	12.52	0.0
Dry Respirometry											
Post-Injection											
4/28/2019 12:38	1-0/1-1	3	163.3	66	1.9	80.3	78	24.60	20.79	0.02	0.0
4/28/2019 16:54	2-6/2-5	3	178.3	163	3.5	82.6	83	24.50	20.79	0.04	0.0
4/29/2019 12:38	0-0/0-0	3	65.2	316	17.0	75.8	72	24.62	20.58	0.12	0.0
4/29/2019 17:38	1-5/1-5	3	65.2	444	21.7	72.8	73	24.53	20.39	0.14	0.0
4/30/2019 16:36	1-2/1-0	3	66.8	622	26.5	70.3	72	24.55	19.87	0.36	0.0
5/1/2019 15:42	1-2/1-2	3	67.3	826	26.9	80.0	74	24.60	19.05	0.72	0.0
5/3/2019 12:00	0-6/0-8	3	64.9	4,220	36.8	73.3	70	24.70	9.81	5.48	0.0
5/5/2019 10:31	1-2/1-3	3	66.8	1,354	28.4	86.3	70	24.60	16.99	1.68	0.0
5/6/2019 14:30	0-8/0-7	3	65.4	1,343	19.5	89.0	81	24.58	16.50	1.88	0.0
5/6/2019 14:35	1-1/1-2	3	65.2	1,429	19.5	89.5	81	24.58	16.10	2.06	0.0
5/6/2019 14:39	1-1/1-1	3	65.7	1,395	19.5	89.5	81	24.59	16.20	1.98	0.0
5/9/2019 17:01	0-0/0-0	3	71.5	2,090	42.3	66.7	63	24.56	13.59	3.48	0.1
Wet Respirometry											
Pre-Injection											
6/20/2019 10:39	0-0/0-0	3	64.8	7,200	29.2	86.2	81	24.71	2.15	10.66	0.0
Post-Injection											
6/26/2019 10:24	-1-0/-0.8	3	68.0	855	19.5	88.9	82	24.82	18.08	2.16	0.0
6/26/2019 16:17	-0-7/-0-7	3	72.2	5,480	22.0	91.3	88	24.74	8.16	8.40	0.0
6/27/2019 8:49	-2-0/-1-9	3	69.2	3,480	41.1	76.5	73	24.87	13.20	3.50	0.0
6/27/2019 14:22	-1-2/-1-2	3	69.5	7,230	26.0	88.3	91	24.84	6.27	9.52	0.0
6/28/2019 12:20	-1-6/-1-7	3	68.0	7,250	20.6	96.6	86	24.88	4.51	10.62	0.0
6/30/2019 13:22	0-0/0-0	3	67.1	9,060	17.9	102.9	92	24.83	2.31	12.20	0.0
7/2/2019 10:21	0-0/0-0	3	69.0	1,951	33.3	82.0	77	24.77	13.61	3.80	0.0
7/5/2019 12:08	-0-6/-0-7	3	68.0	4,950	24.8	94.8	90	24.81	4.56	9.92	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

Table 3-10
SVEW-04/05-313 Respiration Monitoring

Date and Time	Well Head- Pressure Pre/Post Purge (in-WC)	Flow Rate (scfm)	Vacuum (in-WC)	VOC (ppmv)	Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure (in-Hg)	O ₂ (%)	CO ₂ (%)	CH ₄ (%)
Baseline Respirometry											
4/11/2019 14:44	2.9/3.1	3	65.0	1757	59.5	55.6	53	24.33	14.43	2.70	0.0
Dry Respirometry											
Post-Injection											
4/28/2019 12:18	1.2/1.1	3	80.5	4	5.6	79.5	73	24.60	20.77	0.04	0.0
4/28/2019 16:36	2.8/2.8	3	180.7	5	6.5	83.9	83	24.52	20.66	0.06	0.0
4/29/2019 12:17	0.6/0.6	3	66.8	26	28.9	77.3	72	24.62	16.91	1.84	0.0
4/29/2019 17:20	1.8/1.8	3	65.7	12	32.7	73.9	72	24.54	19.99	0.30	0.0
4/30/2019 16:13	1.8/1.8	3	66.3	41	39.0	71.2	72	24.55	15.31	2.98	0.0
5/1/2019 15:25	0.9/1.0	3	68.7	25	29.4	80.8	74	24.60	14.51	3.30	0.0
5/3/2019 11:19	0.0/0.0	3	66.3	148	36.5	72.4	70	24.67	12.63	3.60	0.0
5/5/2019 10:05	0.0/0.5	3	66.9	55	29.8	79.2	70	24.60	17.89	1.00	0.0
5/6/2019 13:54	0.6/0.6	3	68.8	21	21.5	88.1	81	24.58	13.72	3.84	0.0
5/6/2019 14:00	0.8/0.9	3	68.6	43	21.8	88.5	81	24.58	15.86	2.54	0.0
5/6/2019 14:05	1.1/1.1	3	68.0	57	21.7	89.3	81	24.58	16.95	1.64	0.0
5/9/2019 16:44	0.6/0.6	3	81.6	100	39.6	69.5	64	24.56	12.77	3.88	0.0
Wet Respirometry											
Pre-Injection											
6/20/2019 10:59	0.7/0.9	3	65.6	1311	24.7	91.2	82	24.71	12.77	3.29	0.0
Post-Injection											
6/26/2019 10:56	0.0/0.0	3	62.9	78	20.11	90.9	82	24.82	14.58	2.95	0.0
6/26/2019 16:01	-0.7/-0.7	3	81.0	25	22.0	90.4	92	24.74	19.68	0.54	0.0
6/27/2019 9:17	-2.4/-2.3	3	69.8	56	37.8	79.5	73	24.87	19.44	0.56	0.0
6/27/2019 14:40	-1.4/-1.4	3	70.2	52	27.4	88.6	91	24.84	19.43	0.48	0.0
6/28/2019 12:41	-2.2/-2.1	3	69.8	146	21.2	97.6	86	24.88	19.16	0.40	0.0
6/30/2019 13:03	-0.9/-0.9	3	69.6	295	20.3	99.3	91	24.83	18.58	0.50	0.0
7/2/2019 10:36	0.0/0.0	3	69.1	72	36.4	83.7	77	24.77	18.94	0.22	0.0
7/5/2019 12:20	-0.8/-0.8	3	67.4	342	25.1	95.1	90	24.81	13.36	2.96	0.0

% = percent

°F = degrees Fahrenheit

CH₄ = methane

CO₂ = carbon dioxide

in-Hg = inches of mercury

in-WC = inches of water column

O₂ = oxygen

ppmv = parts per million by volume

scfm = standard cubic feet per minute

VOC = volatile organic compound

**Table 3-12
Chronology of Events**

Dates	Activity
December 11, 2018 - January 24, 2019	Installation of soil vapor monitoring wells KAFB-106V1 and KAFB-106V2.
February 25, 2019 - March 6, 2019	Installation of electrical service and air injection blowers at the bioventing pilot test area.
April 10, 2019 - April 11, 2019	Collection of baseline respirometry readings.
April 22, 2019 - April 28, 2019	Dry respirometry air injection.
April 28, 2019 - May 9, 2019	Collection of dry respirometry data.
May 23, 2019 - May 24, 2019	Injection of water for wet respiration pilot testing.
May 24, 2019 - June 20, 2019	Soil moisture acclimation period.
June 20, 2019 - June 26, 2019	Wet respirometry air injection.
June 26, 2019 - July 5, 2019	Collection of wet respirometry data.
October 7, 2019	Initiation of the long-term bioventing pilot test.

Respirometry data collected includes both field data and analytical samples.
Bioventing parameter assessment is performed on a quarterly basis.

**Table 3-13
Summary of Hydrocarbon Analytical Results**

Well ID	Sample Event	Sample Date	Analyte													
			1,2-Dibromoethane (EDB)		Benzene		Ethylbenzene		Toluene		Xylenes, Total		Total BTEX		TPH-GRO (C6-C10)	
			µg/m ³		µg/m ³		µg/m ³		µg/m ³		µg/m ³		µg/m ³		µg/m ³	
Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	
KAFB-106V1-102	Baseline	4/10/2019	3,800	J	2,100,000	--	170,000	--	1,900,000	--	350,000	--	4,520,000	--	120,000,000	--
	Post-Dry	5/9/2019	3,500	J	2,300,000	--	280,000	--	2,100,000	--	610,000	--	5,290,000	--	120,000,000	--
	Post-Wet	7/5/2019	3,100	J	2,000,000	--	190,000	J	1,800,000	--	400,000	J	4,390,000	J	110,000,000	--
KAFB-106V1-113	Baseline	4/10/2019	3,800	J	1,600,000	--	190,000	--	1,700,000	--	410,000	--	3,900,000	J	120,000,000	--
	Post-Dry	5/9/2019	2,800	J	1,400,000	--	200,000	--	1,500,000	--	420,000	--	3,520,000	--	74,000,000	--
	Post-Wet	7/5/2019	5,000	J	1,500,000	--	220,000	J	2,200,000	--	460,000	J	4,380,000	J	110,000,000	--
KAFB-106V1-160	Baseline	4/10/2019	2,800	J	1,300,000	--	280,000	--	2,200,000	--	790,000	--	4,570,000	--	110,000,000	--
	Post-Dry	5/9/2019	2,600	J	1,600,000	--	390,000	--	2,800,000	--	1,200,000	--	5,990,000	--	130,000,000	--
	Post-Wet	7/5/2019	2,700	J	1,600,000	J	330,000	J	1,800,000	J	920,000	J	4,650,000	J	130,000,000	--
KAFB-106V1-217	Baseline	4/10/2019	4,500	--	1,700,000	--	460,000	--	4,200,000	--	1,800,000	--	8,160,000	--	160,000,000	--
	Post-Dry	5/9/2019	3,000	J	1,600,000	--	360,000	--	3,400,000	J	1,400,000	--	6,760,000	J	170,000,000	--
	Post-Wet	7/5/2019	4,400	J	1,600,000	--	470,000	J	3,200,000	J	1,800,000	J	7,070,000	J	170,000,000	--
KAFB-106V1-252	Baseline	4/10/2019	18,000	--	870,000	--	400,000	--	5,400,000	--	1,500,000	--	8,170,000	--	140,000,000	--
	Post-Dry	5/9/2019	12,000	--	810,000	--	360,000	--	4,200,000	J	1,400,000	--	6,770,000	J	150,000,000	--
	Post-Wet	7/5/2019	18,000	J	800,000	--	470,000	J	4,200,000	J	1,800,000	J	7,270,000	J	150,000,000	--
KAFB-106V1-263	Baseline	4/10/2019	23,000	--	920,000	--	410,000	--	6,400,000	--	1,400,000	--	9,130,000	--	160,000,000	--
	Post-Dry	5/9/2019	15,000	--	840,000	--	320,000	--	4,700,000	J	1,100,000	--	6,960,000	J	160,000,000	--
	Post-Wet	7/5/2019	24,000	J	780,000	J	460,000	J	5,500,000	J	1,500,000	J	8,240,000	J	150,000,000	--
KAFB-106V2-102	Baseline	4/11/2019	20,000	J	2,100,000	J	280,000	J	5,100,000	--	890,000	J	8,370,000	J	370,000,000	--
	Post-Dry	5/9/2019	15,000	--	1,800,000	--	330,000	--	4,400,000	J	1,000,000	--	7,530,000	J	210,000,000	--
	Post-Wet	7/5/2019	24,000	J	1,800,000	--	440,000	J	4,500,000	J	1,400,000	J	8,140,000	J	200,000,000	--
KAFB-106V2-117	Baseline	4/11/2019	9,700	--	1,800,000	--	390,000	--	3,300,000	--	1,200,000	--	6,690,000	--	180,000,000	--
	Post-Dry	5/9/2019	9,900	J	2,100,000	--	350,000	--	3,900,000	J	1,600,000	--	7,950,000	J	210,000,000	--
	Post-Wet	7/5/2019	17,000	J	2,300,000	J	430,000	J	5,200,000	J	1,600,000	J	9,530,000	J	220,000,000	--
KAFB-106V2-160	Baseline	4/11/2019	2,500	J	550,000	--	150,000	--	1,200,000	--	500,000	--	2,400,000	--	43,000,000	--
	Post-Dry	5/9/2019	1,900	J	630,000	--	170,000	--	1,300,000	--	720,000	--	2,820,000	--	52,000,000	--
	Post-Wet	7/5/2019	1,600	J	660,000	J	120,000	J	990,000	J	500,000	J	2,270,000	J	76,000,000	--
KAFB-106V2-217	Baseline	4/11/2019	6,000	--	1,500,000	--	230,000	--	2,800,000	--	690,000	--	5,220,000	--	140,000,000	--
	Post-Dry	5/9/2019	4,800	J	1,600,000	--	300,000	--	3,000,000	J	900,000	--	5,800,000	J	140,000,000	--
	Post-Wet	7/5/2019	7,300	J	1,400,000	--	340,000	J	2,600,000	J	1,000,000	J	5,340,000	J	140,000,000	--
KAFB-106V2-252	Baseline	4/11/2019	12,000	--	650,000	--	230,000	--	3,400,000	--	680,000	--	4,960,000	--	90,000,000	--
	Post-Dry	5/9/2019	11,000	--	770,000	--	310,000	--	3,500,000	--	980,000	--	5,560,000	--	89,000,000	--
	Post-Wet	7/5/2019	13,000	J	950,000	J	300,000	J	2,800,000	J	930,000	J	4,980,000	J	87,000,000	--
KAFB-106V2-270	Baseline	4/11/2019	9,200	--	440,000	--	190,000	--	3,000,000	--	540,000	--	4,170,000	--	94,000,000	--
	Post-Dry	5/9/2019	7,500	--	590,000	--	180,000	--	3,900,000	J	550,000	--	5,220,000	J	120,000,000	--
	Post-Wet	7/5/2019	14,000	J	1,200,000	J	320,000	J	4,400,000	J	1,000,000	J	6,920,000	J	140,000,000	--

µg/m³ = microgram per cubic meter
 BTEX = Sum of benzene, toluene, ethylbenzene, and total xylenes
 EDB = ethylene dibromide (1,2-dibromoethane)
 GRO = gasoline range organics
 ID = identification
 TPH = total petroleum hydrocarbons
 J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
 -- = Validation qualifier not assigned.

**Table 3-15
Bioventing Respiration Pilot Test Air Injection Summary - SVMW-10**

Well ID	SVMW-10-100			SVMW-10-150			SVMW-10-250		
Pore Volume ^a (ft ³)	4,426			4,822			5,020		
Target Air Injection Volume ^b (ft ³)	17,704			19,288			20,080		
Dry Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
4/22/2019 14:40	2.5	83.5	0	2.75	107	0	3.0	126.6	0
4/22/2019 15:20	2.25	80.8	90	2.5	99.0	100	2.5	117.5	100
4/23/2019 8:35	2.25	68.4	2,419	2.5	91.7	2,688	2.5	121.3	2,688
4/23/2019 15:45	2.25	46.3	3,386	2.5	92.1	3,763	2.5	113.3	3,763
4/24/2019 9:55	2.25	58.5	5,839	2.5	93.2	6,488	2.5	1136.4	6,488
4/24/2019 14:56	2.25	57.9	6,516	2.5	102.8	7,240	2.5	110.5	7,240
4/25/2019 8:55	2.25	75.2	8,944	2.5	112.1	9,938	2.5	143.5	9,938
4/26/2019 13:05	2.25	53	12,746	2.5	103.5	14,163	2.5	90.1	14,163
4/27/2019 10:10	2.25	68.2	15,593	2.5	94.7	17,325	2.5	105.1	17,325
4/28/2019 10:05	2.25	43.9	18,821	2.5	94.6	20,913	2.5	105.0	20,913
Wet Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
6/20/2019 13:40	2.25	65.1	0	2.5	98.1	0	2.5	103.3	0
6/21/2019 9:30	2.25	64.2	2,678	2.5	99	2,975	2.5	105.3	2,975
6/22/2019 15:25	2.25	64.3	6,716	2.5	97.2	7,462	2.5	105.9	7,462
6/23/2019 13:35	2.25	63.1	9,709	2.5	96.3	10,787	2.5	101.6	10,787
6/24/2019 10:50	2.25	64.3	12,578	2.5	96.4	13,975	2.5	102.4	13,975
6/25/2019 9:25	2.25	62.1	15,627	2.5	94.6	17,362	2.5	99.8	17,363
6/26/2019 8:15	2.25	64.3	18,709	2.5	94.7	20,787	2.5	101.4	20,787

**Table 3-15
Bioventing Respiration Pilot Test Air Injection Summary - SVMW-10**

Long-Term Bioventing Pilot Test									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
10/7/2019 8:30	2.5	81.4	0	2.0	65.5	0	2.8	129.0	0
10/8/2019 11:43	2.5	81.0	4,083	2.0	68.9	3,266	2.8	130.3	4,572
10/9/2019 11:49	2.5	80.3	7,697	2.0	68.5	6,158	2.8	132.6	8,621
10/15/2019 13:00	2.5	83.3	29,475	2.0	69.0	23,580	2.8	134.6	33,012
10/22/2019 11:51	2.5	82.7	54,503	2.0	62.7	43,602	2.8	132.5	61,043
10/31/2019 10:58	2.5	88.9	86,770	2.0	63.9	69,416	2.8	138.4	97,182
11/5/2019 11:38	2.5	80.4	104,870	2.0	65.8	83,896	2.8	126.7	117,454

^a Pore volume is the test cell pore volume as determined from Table 2 in the Bioventing Respiration Pilot Test Injection Design in the Bioventing Respiration Pilot Testing Procedure (Kirtland AFB, 2018).

^b Target volume is the target volume for air injection, approximately 4 times the pore volume.

ft³ = cubic feet

ID = identification

in-WC = inches of water column

scfm = standard cubic feet per minute

Kirtland AFB, 2018. *Bioventing Respiration Pilot Testing Procedure, Rev.0*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE-Albuquerque District Contract No. W9128F-13-D-0006. September.

**Table 3-16
Bioventing Respiration Pilot Test Air Injection Summary - SVMW-11**

Well ID	SVMW-11-100			SVMW-11-250			SVMW-11-260		
Pore Volume ^a (ft ³)	4,500			4,278			8,036		
Target Air Injection Volume ^b (ft ³)	18,002			17,111			32,146		
Dry Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
4/22/2019 14:30	2.25	52.3	0	2.25	153.2	0	4.25	163.2	0
4/22/2019 15:15	2.25	64.0	101	2.25	146.3	101	4.0	148.8	180
4/23/2019 8:40	2.25	48.8	2,453	2.25	58.8	2,453	4.0	156.0	4,360
4/23/2019 15:40	2.25	64.3	3,398	2.25	94.1	3,398	4.0	152.6	6,040
4/24/2019 10:00	2.25	56.9	5,873	2.25	49.5	5,873	4.0	142.7	10,440
4/24/2019 14:51	2.25	62.6	6,527	2.25	99.1	6,527	4.0	140.9	11,604
4/25/2019 9:03	2.25	61.5	8,984	2.25	96.8	8,984	4.0	159.9	15,972
4/26/2019 13:10	2.25	55.5	12,780	2.25	87.6	12,780	4.0	153.1	22,720
4/27/2019 10:15	2.25	54.2	15,626	2.25	87.1	15,626	4.0	155.4	27,780
4/28/2019 10:00	2.25	55.1	18,833	2.25	88.5	18,833	4.0	154.0	33,480
Wet Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
6/20/2019 13:45	2.25	57.2	0	2.25	91.9	0	4.0	146.0	0
6/21/2019 9:28	2.25	58.4	2,662	2.25	91.8	2,662	4.0	149.4	4,732
6/22/2019 15:35	2.25	58.3	6,728	2.25	90.5	6,728	4.0	151.2	11,960
6/23/2019 13:30	2.25	57.7	9,686	2.25	89.7	9,686	4.0	149.1	17,220
6/24/2019 11:00	2.25	56.2	12,589	2.25	88.2	12,589	4.0	145.0	22,380
6/25/2019 9:15	2.25	58.5	15,593	2.25	89.3	15,593	4.0	152.9	27,720
6/26/2019 8:20	2.25	56.9	18,709	2.25	88.0	18,709	4.0	144.2	33,260

**Table 3-16
Bioventing Respiration Pilot Test Air Injection Summary - SVMW-11**

Long-Term Bioventing Pilot Test									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
10/7/2019 8:30	3.3	111.9	0	2.5	92.5	0	3.0	78.2	0
10/8/2019 11:45	3.3	107.1	5,396	2.5	86.7	4,088	3.0	71.0	4,905
10/9/2019 11:52	3.3	111.2	10,171	2.5	76.4	7,705	3.0	73.2	9,246
10/15/2019 13:02	3.3	104.1	38,914	2.5	87.4	29,480	3.0	68.8	35,376
10/22/2019 11:54	3.3	103.4	71,953	2.5	87.5	54,510	3.0	73.2	65,412
10/31/2019 11:43	3.3	104.7	114,685	2.5	86.2	86,883	3.0	74.8	104,259
11/5/2019 11:41	3.3	100.3	138,438	2.5	84.5	104,878	3.0	75.6	125,853

^a Pore volume is the test cell pore volume as determined from Table 2 in the Bioventing Respiration Pilot Test Injection Design in the Bioventing Respiration Pilot Testing Procedure (Kirtland AFB, 2018).

^b Target volume is the target volume for air injection, approximately 4 times the pore volume.

ft³ = cubic feet

ID = identification

in-WC = inches of water column

scfm = standard cubic feet per minute

Kirtland AFB, 2018. *Bioventing Respiration Pilot Testing Procedure, Rev.0*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE-Albuquerque District Contract No. W9128F-13-D-0006. September.

**Table 3-17
Bioventing Respiration Pilot Test Air Injection Summary - SVEWs**

Well ID	SVEW-01-260			SVEW-02/03-160			SVEW-04/05-313		
Pore Volume ^a (ft ³)	8,902			9,644			8,655		
Target Air Injection Volume ^b (ft ³)	35,608			38,575			34,619		
Dry Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
4/22/2019 14:50	5.0	NM	0	5.5	NM	0	5.0	NM	0
4/22/2019 15:15	5.0	NM	125	5.5	NM	137	5.0	NM	125
4/23/2019 8:30	5.0	NM	125	5.5	NM	137	5.0	NM	125
4/23/2019 13:30	5.0	0.8	1,625	5.5	0.5	1,788	5.0	0.0	1,625
4/24/2019 10:05	5.0	0.0	7,800	5.5	0.5	8,580	5.0	0.0	7,800
4/24/2019 15:00	5.0	1.7	9,275	5.5	1.3	10,203	5.0	1.3	9,275
4/25/2019 10:25	5.0	0.0	15,100	5.5	0.5	16,610	5.0	0.0	15,100
4/26/2019 13:15	5.0	0.8	23,150	5.5	0.9	25,465	5.0	0.5	23,150
4/27/2019 10:20	5.0	0.5	29,475	5.5	0.5	32,423	5.0	0.0	29,475
4/28/2019 10:10	5.0	1.0	36,625	5.5	1.0	40,287	5.0	1.0	36,625
Wet Respiration Testing									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
6/21/2019 9:10	5.0	1.3	0	5.5	1.4	0	5.0	1.1	0
6/22/2019 15:40	5.0	1.7	9,150	5.5	1.9	10,065	5.0	1.6	9,150
6/23/2019 13:25	5.0	0.0	15,675	5.5	0.0	17,243	5.0	0.0	15,675
6/24/2019 11:10	5.0	0.0	22,200	5.5	0.0	24,420	5.0	0.0	22,200
6/25/2019 9:30	5.0	0.0	28,900	5.5	0.0	31,790	5.0	0.0	28,900
6/26/2019 8:25	5.0	0.0	35,775	5.5	0.0	39,353	5.0	-0.7	35,775

**Table 3-17
Bioventing Respiration Pilot Test Air Injection Summary - SVEWs**

Long-Term Bioventing Pilot Test									
Date and Time	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)	Flow Rate (scfm)	Well Head Pressure (in-WC)	Total Volume Injected (ft ³)
10/7/2019 8:30	12	-1.1	0	15.0	-0.7	0	10.0	-1.7	0
10/8/2019 11:45	12	2.1	19,620	15.0	2.8	0	10.0	2.0	16,350
10/9/2019 11:52	12	2.6	36,984	15.0	3.3	21,705	10.0	2.7	30,820
10/15/2019 13:02	12	0.6	141,504	15.0	1.2	152,355	10.0	0.0	117,920
10/22/2019 11:54	12	0	261,648	15.0	0	302,535	10.0	-1.0	218,040
10/31/2019 11:43	12	-1.7	417,036	15.0	-1.5	496,770	10.0	-2.2	347,530
11/5/2019 11:41	12	0.8	503,412	15.0	1.2	604,740	10.0	0.5	419,510

^a Pore volume is the test cell pore volume as determined from Table 2 in the Bioventing Respiration Pilot Test Injection Design in the Bioventing Respiration Pilot Testing Procedure (Kirtland AFB, 2018).

^b Target volume is the target volume for air injection, approximately 4 times the pore volume.

On October 7, 2019 at 1330, the flowmeter to SVEW-02/03-160 was damaged. Air injection on that well was shut off. On October 8, 2019 at 0720, the flowmeter was repaired and air injection was resumed.

ft³ = cubic feet

ID = identification

in-WC = inches of water column

NM = not measured

scfm = standard cubic feet per minute

Kirtland AFB, 2018. *Bioventing Respiration Pilot Testing Procedure, Rev.0*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE-Albuquerque District Contract No. W9128F-13-D-0006. September.

**Table 3-14
Respiration Flow Design**

Respiration Testing Design Inputs								
Injection Well	Screened Interval (ft bgs)	Screen Length (ft)	Screen Diameter (in.)	Casing Volume (ft ³)	Filter Pack Thickness (ft)	Assumed Venting Thickness (ft) ¹	Control Radius (ft)	Test Cell Pore Volume (ft ³)
SVMW-11-100	100-102.5	2.5	0.5	0.140	8.2	18.2	15	4,500
SVMW-11-250	250-252.5	2.5	0.5	0.344	7.3	17.3	15	4,278
SVMW-11-260	260-262.5	2.5	0.5	0.358	22.5	32.5	15	8,036
SVEW-01-260	245-260	15	4	22.678	26	36	15	8,902
SVMW-10-100	100-102.5	2.5	0.5	0.140	7.9	17.9	15	4,426
SVMW-10-150	150-152.5	2.5	0.5	0.208	9.5	19.5	15	4,822
SVMW-10-250	250-252.5	2.5	0.5	0.344	10.3	20.3	15	5,020
SVMW-02/03-160	145-160	15	2	3.489	29	39	15	9,644
SVEW-04/05-313	298-313	15	2	6.825	25	35	15	8,655

¹ Vertical leakance into formation assumed 5 feet above and 5 below filter pack interval
Assumed porosity = 35%

Respiration Testing Air Injection Parameters									
Injection Well	Prescribed in Work Plan				Performed in Field				
	Target Moisture Volume (gallons) ¹	Air Injection Period (days)	Design Flow Rate (cfm)	Target Air Injection Volume (ft ³) ²	Added Moisture Volume (gallons)	Air Injection Period (days)	Flow Rate (cfm)	Air Injection Volume (ft ³)	
								Dry	Wet
SVMW-11-100	337	3	4.2	18,002	350	6	2.3	18,833	18,709
SVMW-11-250	320	3	4.0	17,111	325	6	2.3	18,833	18,709
SVMW-11-260	601	3	7.4	32,146	625	6	4.0	33,480	33,260
SVEW-01-260	666	3	8.2	35,608	675	6	5.0	36,625	35,775
SVMW-10-100	331	3	4.1	17,705	350	6	2.3	18,821	18,709
SVMW-10-150	361	3	4.5	19,287	375	6	2.5	20,913	20,787
SVMW-10-250	375	3	4.6	20,079	375	6	2.5	20,913	20,787
SVMW-02/03-160	721	3	8.9	38,575	725	6	5.5	40,287	39,353
SVEW-04/05-313	647	3	8.0	34,619	650	6	5.0	36,625	35,775

¹ Moisture added at 1 % of pore volume

² Prescribed air injection volume is 4 times the test cell pore volume

**Table 5-1
Long-Term Bioventing Flow Design**

Injection Well	Screened Interval (ft bgs)	Screen Length (ft)	Screen Diameter (in.)	Casing Volume (cubic ft)	Filter Pack Thickness (ft)	Control Radius (ft)	Control Area (square ft)	Control Cell Pore Volume (cubic ft)	Total Volume Injected (cubic ft)¹
SVMW-11-100	100-102.5	2.5	0.5	0.140	8.2	70	15,400	37,884	138,438
SVMW-11-250	250-252.5	2.5	0.5	0.344	7.3	70	15,400	33,726	104,878
SVMW-11-260	260-262.5	2.5	0.5	0.358	22.5	70	15,400	103,950	125,853
SVEW-01-260	245-260	15	4	22.678	26	70	15,400	120,120	503,412
SVMW-10-100	100-102.5	2.5	0.5	0.140	7.9	70	15,400	36,498	104,870
SVMW-10-150	150-152.5	2.5	0.5	0.208	9.5	70	15,400	43,890	83,896
SVMW-10-250	250-252.5	2.5	0.5	0.344	10.3	70	15,400	47,586	117,454
SVMW-02/03-160	145-160	15	2	3.489	29	70	15,400	133,980	604,740
SVEW-04/05-313	298-313	15	2	6.825	25	70	15,400	115,500	419,510

¹ = Total injected volume during the long-term bioventing pilot test as of November 5, 2019

Control cell volume is calculated using a venting thickness equivalent to the filter pack thickness

Assumed porosity = 30% (KAFB-106V air filled porosity = 32.6%, KAFB-106V2 air filled porosity = 21.4%)

Control radius is equal to the farthest distance between injection and observation wells

bgs = below ground surface

ft = foot/feet

in. = inch(es)

APPENDICES

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APPENDIX A

**REGULATORY CORRESPONDENCE, REVISION TRACKING, AND
PERMITSSPONSE TO COMMENTS AND DOCUMENT REVISIONS**

APPENDIX A-1
REGULATORY CORRESPONDENCE APPENDIX

APPENDIX A-2
REVISION TRACKING/REDLINE DOCUMENTS

APPENDIX A-3
REGULATORY PERMIT CROSS REFERENCE REGULATORY
CORRESPONDENCE

APPENDIX AB

**~~LITHOLOGIC BORING LOGS AND WELL COMPLETION DIAGRAMS
FOR SOIL VAPOR MONITORING WELLS KAFB-106V1 AND KAFB-
106V2~~FIELD FORMS**

APPENDIX BC

**LABORATORY ANALYTICAL DATA LITHOLOGIC BORING LOGS AND
WELL COMPLETION DIAGRAMS -FOR SOIL VAPOR MONITORING
WELLS -KAFB--106V1 -AND KAFB-106V2**

APPENDIX D
DEVIATIONS

APPENDIX BD-1

~~INJECTION WATER LABORATORY ANALYTICAL~~
RESULTSINJECTION WELL HEAD LOSS CALCULATIONS

APPENDIX ~~BD-2~~

**~~SOIL VAPOR ANALYTICAL RESULTS~~ LABORATORY
CORRESPONDENCE**

APPENDIX ~~BE-3~~

**~~SUMMARY OF SOIL VAPOR ANALYTICAL DATA~~ LABORATORY
ANALYTICAL DATA**

APPENDIX E-1
INJECTION WATER LABORATORY ANALYTICAL RESULTS

APPENDIX E-2
SOIL VAPOR LABORATORY ANALYTICAL DATA

APPENDIX E-3
SUMMARY OF SOIL VAPOR ANALYTICAL DATA

APPENDIX ~~CF~~
BAROMETRIC PRESSURE VERSUS OXYGEN

APPENDIX C-1
OXYGEN VS. BAROMETRIC PRESSURE

APPENDIX C-2
RELATIVE HUMIDITY VS. TEMPERATURE

APPENDIX C-3
ABSOLUTE HUMIDITY CONVERSION

APPENDIX D
OXYGEN UTILIZATION PLOTS

APPENDIX D-1
OXYGEN UTILIZATION

APPENDIX D-2
CARBON DIOXIDE PRODUCTION

~~APPENDIX E~~
CALCULATIONS

~~APPENDIX E-1~~
~~BIODEGRADATION, OXYGEN DEMAND FLOW RATE,~~
~~AND RADIUS OF INFLUENCE CALCULATIONS~~

APPENDIX ~~G~~APPENDIX E-2

BIODEGRADATION, OXYGEN DEMAND FLOW RATE, AND
RADIUS OF INFLUENCE CALCULATIONS ~~INTRINSIC PERMEABILITY~~
CALCULATION

APPENDIX A-3
REGULATORY PERMIT CROSS REFERENCE

RCRA Permit Part	Permit Requirement	Reference Location in Work Plan for Groundwater Monitoring
Part 6	Corrective Action	Section 1.1 Planing and Regulatory Overview
6.5.1	Standard Operating Procedures	Executive Summary Section 1.1 Planing and Regulatory Overview
Part 6.5.2	Documentation of Field Activities	Section 3. Scope of Activities
Part 6.5.4	Field Equipment Calibration Procedures	Section 3.3 Baseline Respirometry and Vapor Sampling and Appendix B Field Forms
Part 6.5.5	Sample Handling, Shipping, and Custody Requirements	Section 3.3 Baseline Respirometry and Vapor Sampling
Part 6.5.6	In-Situ Testing and Other Tests	Executive Summary Section 1.1 Planing and Regulatory Overview
Part 6.5.16	Requirements	Section 3.3 Baseline Respirometry and Vapor Sampling
Part 6.5.18	Laboratory Analyses Requirements for all Environmental Media	Section 3.3 Baseline Respirometry and Vapor Sampling and Table 3-11

QA/QC = quality assurance/quality control
 RCRA = Resource Conservation and Recovery Act

APPENDIX B
FIELD FORMS

APPENDIX B
FIELD FORMS

DAILY QUALITY CONTROL FORMS

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: SSite/site manager

DATE: 4-8-19

WEATHER: _____

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Tyler Corley</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
<u>C. Montoya</u>	
<u>K. Robinson</u>	
<u>J. Livingston</u>	
<u>P. Ferrari</u>	
2. OPERATING EQUIPMENT	
<u>Vane pump</u>	
<u>Hosika</u>	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
<u>0830</u>	<u>Onsite</u>
	<u>H&S w/ C. Montoya & K Robinson</u>
	<u>Calibrate Equipment</u>
	<u>Set-up on 10601 to perform</u>

Reviewed by: _____

Initials: _____

Reviewed date: _____


Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

DATE: 4-8-19

4. WORK PERFORMED (Continued)	
	Baseline sampling on 106V1-1021.
1100	The GEM unit is not working properly and is reading CH ₄ % @ 700%. Call geotech to troubleshoot. Geotech stated that the GEM unit will not work properly w/ the VOC concentrations that we have been seeing.
	Talk to B. Beckish & D. Jercinovic. Decide to hold off on base line sampling until we can get a methane meter that will work. Did NOT collect vapor sample on 106V1-1021.
1200	Start pecon up
1230	offsite, will check into other rental options for methane meters.

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Carley
Name


Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
 Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4-10-19

WEATHER: _____

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Tyler Cutler</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
<u>Kylian Robinson</u>	
2. OPERATING EQUIPMENT	
<u>Vortex pump</u>	
<u>Horiba</u>	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	<u>Collected sample from 10GV1.</u>
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
<u>0730</u>	<u>Carbon filters arrive, head to AAFB</u>
<u>0850</u>	<u>on-site, H&S</u>
	<u>Calibrate equipment.</u>
<u>0930</u>	<u>Set up on 10GV1 for baseline sampling</u>

Reviewed by: _____

Initials: _____

Reviewed date: _____

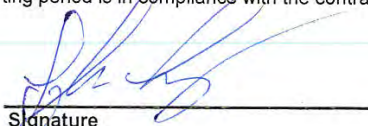
Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

DATE: 4-10-19

4. WORK PERFORMED (Continued)	
0946	Start Sampling 10GV1-100.1
1005	Start ^{ing} Carbon filter is working properly as the methane meter is not giving @ >>>1000 reading.
1005	Start sampling 10GV1-112.6
1032	Start sampling 10GV1-159.6
1056	Start sampling 10GV1-217.1
1113	Start sampling 10GV1-252.1
1130	Start Sampling 10GV1-262.6
	Methane did not read above 0.0% during any of the well purges.
1145	Start clean up
1215	Forgot to collect the second sample can on each well. Will set up and collect a grab sample from each well.
1301	Collect sample from 10GV1-100.1
1308	Collect sample from 10GV1-112.6
1311	" " 10GV1-159.6
1315	" " 10GV1-217.1
1319	" " 10GV1-252.1
1323	" " 10GV1-262.6
	Purged sample train for 2 minutes between each well.
	Clean up due to high winds.
1430	off site

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Carkey
Name


Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
 Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4-11-19

WEATHER: Partly Cloudy

WELL ID: BFF

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Curley	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
Kylian Robinson	
2. OPERATING EQUIPMENT	
SUM sampling equipment	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	Collected base line samples from BV wells.
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
0705	Onsite, HES briefing
	Calibrate equipment
	Set up on 10C02 to sample
	Sample 10C02-102.2

Reviewed by: _____

Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

DATE: 4-11-19

4. WORK PERFORMED (Continued)	
	Sample 10GV2 117.1, collected Dip sample
	Sample 10GV2 159.9
	Sample 10 Attempted to sample 217.1 but the pump is not operational. Trouble shot pump, must have had dirt in the motor housing.
	Sample 10GV2 217.1
	Sample 10GV2-252.2, collected Dip
	Sample 10GV2-26, IL can from ALS does not have enough vacuum sample. Will have to have ALS ship more cans for tomorrow. Will push ^{SE} air injection to monday.
1140	Resampled 10GV2-26 due to leaky canister.
	Sample SVMV-11-100
	Cut conveyance @ SVE-01, SVE-02/03, & SVE-04/05. Capped conveyance lines w/ fences.
	Sample SUMW-11-250
	Collect field parameters from SUMW-11-260
	Sample SUMW-10-100
	Sample SUMW-10-150
	Sample SUMW-10-250, observed CH ₄ @ 0.1%
	Sample SUMW-10 SVE-04/05, observed CH ₄ @ 0.1%. Changed carbon filter to confirm reading => 0.0%. CH ₄ reading on SVE-04/05 & SUMW-10-250 is suspect.
	Remaining suma cans, do not contain sufficient vacuum for sampling. ^{SE}
	Start clean up & sample prep

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name _____

Signature _____

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____

Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 4-11-19

4. WORK PERFORMED (Continued)	
1530	Start site walk w/ USACE.
	Decide to push BV injection unit out to avoid holiday conflict.
1550	USACE onsite.
1600	Pack sample and take to UPS/Fedex.
1620	Offsite.

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Curley
Name

[Signature]
Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____

Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: Sif manager

DATE: 4-13-10

WEATHER: Sunny 60°F

WELL ID: BFF

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>T. Carley</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
<u>SIM equipment</u>	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	<u>Sampled SVF-01 + SVF-02/03</u>
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
	<u>Onsite</u>
	<u>Calibrate equipment, verified methane can be read through the carbon filters on the GLEUS000 = 7.161% CH₄ with cal gas at 15% CH₄ + 15% CO₂</u>

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4-22-19

WEATHER: Overcast

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Cutler	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
BV blower	
Vane pumps	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	Began Air injection into SWMW-10 & SWMW-11
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
0800	On site
	Start setting vane pumps on SWMW-10 & SWMW-11
	Connect heat exchangers to vane pumps and establish well head connections.

Reviewed by: _____ Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 4-22-19

4. WORK PERFORMED (Continued)	
930	Connect to SVEW well heads Waiting on sample receipt confirmation to start air injection. Will help out w/ SVM until receipt.
1400	Pam Moss has gotten notice of a delivery, however has not received the sample check in. Can not get ahead of Kate Kierco w/ ALS to confirm samples are there
1410	Talk w/ Devin Jercinac and David Cleade to start air injection
1430	Start injection
1530	After balancing flows, SVEW well were turned off. ^{at 1515} so that the injection will be completed in all wells on Sunday. Flow in SUMW-co #4 is lower than expected.
1545	off site.

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name Tyler Carley

Signature 

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4-23-19

WEATHER: Raining

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Curley	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
BV Blower	
Vane pumps	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	Take injection flow rate reading
	Start injection @ SVEW wells
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
0830	start injection @ SVEW-01, 02/03, + 04/05
	collect @ readings from SWMW-10 @ 11.
0900	at site.
	Electrical meter @ 0900 => 52kWh @ 2.7kW

Reviewed by: _____ Initials: _____ Reviewed date: _____

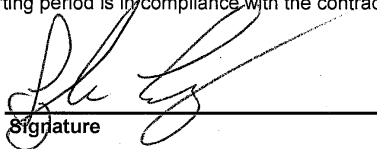
Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

DATE: _____

4. WORK PERFORMED (Continue)	
	Electrical meter @ 0850 = 56 kWh @ 3.9 kW
1525	Onsite
	Collect Q/P readings
	Electric meter = 82 kWh @ 3.6 kW
1552	Offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Carley
Name _____


Signature _____

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4-24-19

WEATHER: Sunny

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Cortez	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
BV Blower	
Vane pumps.	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
0950	Onsite
	Collect Q/P readings from injection wells
1010	Electric meter => 150 kWh @ 3.5kW
	Collect well head pressure readings from V1 & V2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 4-24-19

4. WORK PERFORMED (Continued)				
	V2	102.5	=>	0.0 in WC
	V2	117.5	=>	0.0 in WC
	V2	160	=>	0.0 in WC
	V2	217.5	=>	0.0 in WC
	V2	250	=>	0.0 in WC
	V2	267	=>	0.0 in WC
	V1	102.5	=>	0.0 in WC
	V1	113	=>	0.0 in WC
	V1	160	=>	-0.5 in WC
	V1	217.5	=>	-0.5 in WC
	V1	252.5	=>	-0.5 in WC
	V1	263	=>	-0.5 in WC
1445	Collect Q/P readings			
	Collect well head pressure readings			
	V ₁	P	V ₂	P
1515	102.5	0.5	102.5	0.0
	113	0.5	117.5	0.5
	160	0.6	217.5 160	0.6
	217.5	0.5	25 217.5	0.6
	252.5	0.7	250	0.9
	263	0.7	267	0.7
	Electric meter 169 kWh → @ 34 kW			
1540	offsite			

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Carley
Name

[Signature]
Signature

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility GWTS Expansion/Monitoring -- 62599DM01
Daily Quality Control Report -- Non-Construction

ROLE: Technician

DATE: 4-25-19

WEATHER:

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
<u>Tyler Cumbay</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
<u>Pete Ferraro</u>	EA

2. OPERATING EQUIPMENT

Team #1

Team #2

Spare

YSI Professional Plus 15K101398 Wh0003 <input type="checkbox"/>	YSI Professional Plus 15K101396 Wh0004 <input type="checkbox"/>	YSI Professional Plus 15L100541 Wh0002 <input type="checkbox"/>
MiniRAE 3000 592-915778 Wh0005 <input type="checkbox"/>	MiniRAE 3000 592-915790 Wh0004 <input type="checkbox"/>	MiniRAE 3000 592-915579 Wh0006 <input type="checkbox"/>
Hach 2100Q 15100C046034 Wh0008 <input type="checkbox"/>	Hach 2100Q 15100C046033 Wh0009 <input type="checkbox"/>	Hach 2100Q 15100C046025 Wh0007 <input type="checkbox"/>
Solinst Water Level Meter 253054 <input type="checkbox"/>	Solinst Water Level Meter 253053 <input checked="" type="checkbox"/>	Solinst Water Level Meter 253056 <input type="checkbox"/>

BU Blower
Vane Pumps

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0815 0845	ON-SITE
0820 0850	SVM 11 Temps 168°C Motor 137°C Outlet SVM 10 " 156°C Motor 128°C Outlet
0830 0915	off-site for western disposal at field office

Reviewed by: _____ Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility GWTS Expansion/Monitoring -- 62599DM01
Daily Quality Control Report - Non-Construction

DATE: 4-25-19

0930

4. WORK PERFORMED (Continued)	
0850	Back on-site - readings
0945	off-site, I + C Solidator
1025	Back-on-site
1040	leave again - Scott Clark
1130	V2 102.5 in WC P 0.0 P in WC
	V2 117.5 0.0 +
	V2 160 -0.6
	V2 217.5 -0.8 2.0
	V2 250 -0.6 4.7
	V2 267 -0.7
	V1 102.5 0.0
	V1 113 0.0
	V1 160 -0.6
	V1 217.5 -0.7
	V1 252.5 -0.5
	V1 263 -0.5
	3.3 kW load
	241 kWh
12:00-13:00	Put up reflective screens
1305	OFF-site
PT	

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications above.

Pete Ferraro
Name

Pete Ferraro
Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____

Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 6-26-19 4-20-19

WEATHER: Overcast 80°F

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
	BV Blower
	Vane pumps
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
	Collect flow reading for air injection.
	Inspect equipment
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
1420	Onsite
	Set up & collect R/P readings
	Collect well head pressure readings from V ₁ + V ₂
	See next page

Reviewed by: _____ Initials: _____

Reviewed date: _____


**Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report -- Non-Construction**

DATE: 4-26-19

4. WORK PERFORMED (Continued)

	<u>LOG V₁</u>	<u>P (inwc)</u>	<u>LOG V₂</u>	<u>P (inwc)</u>
	102.5	0.9	102.5	0.5
	113	1.2	117.5	0.6
	160	0.0	160	0.0
	217.5	0.0	217.5	0.0
	252.5	0.0	250	0.0
	263	0.0	267	0.0
1530	offsite after clean up.			

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Curley

 Name Signature

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02

Daily Quality Control Report - Non-Construction

ROLE: Site manager

DATE: 4-27-19

WEATHER: Sunny 70°

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Tyler Curley	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office

2. OPERATING EQUIPMENT

BU Blower
Vacuum Pumps

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

Collect injection readings.

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

1000 Onsite
Collect G/P readings from injection wells
Electrical meter = 400 KWH @ 3.3
Collect well head pressure reading

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 4-27-19

4. WORK PERFORMED (Continued)				
	<u>106V1</u>	<u>P</u>	<u>106V2</u>	<u>- P</u>
	102.5	0.0	102.5	0.0
	113	0.0	117.5	0.0
	160	0.0	160	0.0
	217.5	0.0	217.5	0.0
	252.5	0.0	250	0.0
	263	0.0	267	0.0
104	off site			

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name Signature

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
 Daily Quality Control Report – Non-Construction

ROLE: Site manager

DATE: 4/28/19

WEATHER: _____

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Cutley	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
0930	onsite
	Collect Q/P readings from injection wells
1012	Collect well head pressures from V1 + V2
	Electrical = 479

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report -- Non-Construction

DATE: 4-28-19

4. WORK PERFORMED (Continued)			
1012	Turn injection pumps off		
	106V1	P	106V2 P
	102.5	0.0	102.5 0.0
	113	0.0	117.5 0.0
	160	0.5	160 0.7
	217.5	0.5	217.9 0.5
	252.9	0.9	250 0.7
	263	0.5	267 0.7
	Set up for respirometry		
1120	Start respirometry monitoring		
1310	Complete respirometry monitoring		
1533	Start respirometry		
1735	Complete respirometry, off site		

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Curley
Name


Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 4-29-19

Team #				
1. ONSITE PERSONNEL (including subcontractors and government employees)				
Name	Organization			
Carlos Montoya <u>Tyler Curtis</u>	EA - Site Manager/Supervisor			
2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)				
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)				
1000	Onsite			
	Calibrate GCAN 50000			
	↳ CO ₂ = 15% CH ₄ = 15% → pass			
1100	Calibrate Horiba			
	Pre O ₂ = 20.70	CO ₂ = 12.4	VOC = 808	
	cal O ₂ = 20.80	CO ₂ = 13.0	VOC = 806	
	Post O ₂ = 20.99	CO ₂ = 12.82	VOC = 769 809	
1130	Collect respirometry readings			
1250	Complete monitoring			
1300	offsite			
1600	onsite			

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

DATE: 4-29-19

4. WORK PERFORMED (Continued)	
	start respiration monitoring
	O2 in SVG-04/05 increased from 19.91 to 19.99
	since 1217. Removed all tubing and verified that
	there were no leaks, confirmed O2 + CO2 readings.
1745	Complete respiration readings
1800	outside

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name Tyler Carley

Signature [Signature]

DQCR Page 2 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

ROLE: _____

DATE: 4-30-19

Team #

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
-Carlos Montoya <u>Tyler Curley</u>	EA - Site Manager/Supervisor

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

	Onsite																
	Calibrate Equipment																
1410 - 1615	GEM 5000, Fresh air cal ↳ Bump test w/ 15% CO ₂ + 15% CH ₄ → 138% + 141.6%																
	Calibrate Horiba																
	<table border="1"> <thead> <tr> <th> </th> <th>O₂</th> <th>CO₂</th> <th>VOC</th> </tr> </thead> <tbody> <tr> <td>Dr.</td> <td>20.93</td> <td>12.86</td> <td>820</td> </tr> <tr> <td>cal</td> <td>20.80</td> <td>12.98</td> <td>822</td> </tr> <tr> <td>Bst</td> <td>20.94</td> <td>12.96</td> <td>804</td> </tr> </tbody> </table>		O ₂	CO ₂	VOC	Dr.	20.93	12.86	820	cal	20.80	12.98	822	Bst	20.94	12.96	804
	O ₂	CO ₂	VOC														
Dr.	20.93	12.86	820														
cal	20.80	12.98	822														
Bst	20.94	12.96	804														
1500	Start resp respirometry readings																
1645	Complete respirometry readings																
1700	Onsite																

Tyler Curley

[Signature]
DQCR Page 1 of 2

4-30-19

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: site manager

DATE: 5-1-19

Team #				
1. ONSITE PERSONNEL (including subcontractors and government employees)				
Name		Organization		
Carlos Mentoya Tyler Curley		EA - Site Manager/Supervisor		
2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)				
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)				
1350	Onsite			
	Hds			
	Calibrate Equipment			
	GEM 5000			
	Perform fresh air enter cal			
	Bump test w/ cal gas of 15% CH ₄ + 15% CO ₂			
	Reading: 15.3% CH ₄ 14.7% CO ₂			
	Horiba	CO ₂	CO ₂	VOC
	Pre	20.40	13.22	808
	Cal	20.80	12.96	822
	Post	21.22	12.96	792
1430	Start respirometry			

Reviewed by: _____

Reviewed date: _____

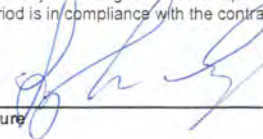
Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 4 5-1-19

4. WORK PERFORMED (Continued)	
1004 1010	Complete respirometry monitoring off site

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name Tyler Curley

Signature 

DQCR Page 2 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
 Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 5-319

Team #

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Montoya <i>Tyler C. C. C.</i>	EA - Site Manager/Supervisor

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

Onsite			
Calibrate Equipment			
GEM 15000			
Perform fresh air calibration			
Bump test GEM w/ 15% CH ₄ & 15% CO ₂			
↳ reading 15.19% CH ₄ & 15.1% CO ₂			
Calibrate Horiba			
	O ₂ (20.9%)	CO ₂ (13.00%)	VOC (1580 ppm Direct)
Pre	21.56	12.86	817
Cal	20.80	12.98	822
Post	21.0	12.96	812

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction


DATE: 5-3-19

4. WORK PERFORMED (Continued)

1100	Start respirometry monitoring
1330	End respirometry monitoring

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Sasha Livingston
 Name


 Signature

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 5/5/19

Team #				
1. ONSITE PERSONNEL (including subcontractors and government employees)				
Name	Organization			
Carlos Montoya Josh. Livings	EA - Site Manager/Supervisor			
2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)				
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)				
Onsite				
Calibrate Equipment				
GEM 5000				
Perform fresh air calibration				
Bump test GEM w/ 15% CH ₄ + 15% CO ₂				
↳ reading 14.8% CH ₄ + 15.2% CO ₂				
Calibrate Horiba				
O ₂ (20.8%) CO ₂ (13.0%) VOC (1580 ppm prepared)				
Pre	19.97	12.98	823	
Cal	20.79	13.00	822	
Post	21.39	12.60	788	

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 5/5/19

4. WORK PERFORMED (Continued)	
1000	Start respirometry monitoring
1140	End respirometry monitoring

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Dosh Livingston
Name

[Signature]
Signature

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 5-9-19

Team #				
1. ONSITE PERSONNEL (including subcontractors and government employees)				
Name		Organization		
Carlos Montoya <u>Tyler Carley</u>		EA - Site Manager/Supervisor		
2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	
<u>EA-1</u>				
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)				
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)				
<u>1100</u>	<u>Onsite</u>			
	<u>Leak test sample train</u>			
	<u>Cal equipment</u>			
<u>1200</u>	<u>Start collecting respirometry readings on 10GV2, collected lab samples from all points</u>			
<u>1400</u>	<u>Start collecting respirometry readings on 10GV1, collected lab samples from all points, observed elevated O₂ readings on both</u>			
<u>1500</u>	<u>10GV1 + 10GV2. Verified that no leaks were occurring after recording O₂ data.</u>			
<u>1600</u>	<u>Start collecting respirometry readings on SWM-11, lab samples were not collected</u>			

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
 Daily Quality Control Report - Non-Construction

DATE: 5-9-19

4. WORK PERFORMED (Continued)	
	per SOP.
1630	start collecting respiratory readings on SWMU-10, no lab samples collected
1644	Collect respiratory readings on the SUEW wells, no lab samples were collected per SOP.
1740	clean up offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name

Signature

DQCR Page 2 of 2

Reviewed by: _____

Reviewed date: _____

**Kirtland AFB Bulk Fuels Facility Bioventing Pilot Test - 62735DM02
Daily Quality Control Report – Non-Construction**

ROLE: _____

DATE: 5-23-19

WEATHER: _____

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Tyler Corley	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
1300	Onsite
1305	Hook up trailer, all site to fill up gas
1340	Onsite, test roll offs for chlorine
	East roll off = 0.02

Reviewed by: _____

Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 5-23-19

4. WORK PERFORMED (Continued)			
	middle roll off = 0.01		
	West West roll off = 0.01		
	Test DE water for chlorine = 0.02		
	Fill water trailer out of west roll off		
1424	Set up @ SUMW-11		
1455	Set up hoses as below, add water to hoses		
	SUMW-100	→ 200 75 gal	337 gal tot
	SUMW-250	→ 200 gal	300 gal tot
	SUMW-260	→ 200 gal	601 gal tot
1500	Start injection		
		SUMW-100	SUMW-250 SUMW-260
	Batch 1	75	200 200
1620	Batch 2	125 200	125 250
	5-23-19 Total	200	325 450
1640	Complete water injection in SUMW-250		
1730	On site, all hoses are empty and wells are secured.		

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name: Tyler Carley

Signature: 

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 5-24-19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Carlos Montoya	EA - Site Manager/Supervisor
<u>Tyler Curtis</u>	

2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

Onsite		
fill water trailer		
set up on SUMW-11		
SUMW-11-250 is completed		
@ 0900 start injection	SUMW-11-100	SUMW-11-260
5-23-19	200 gal	450 gal
5-24-19	150 gal	175 gal
Total	350 gal	625 gal
set up @ SUMW-10		
	SUMW-10-100	SUMW-10-150
Target Vol (gal)	350	375
		SUMW-10-250
		375

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 5-21-19

4. WORK PERFORMED (Continued)			
	SWMW-10-100	SWMW-10-150	SWMW-10-250
Batch 1	200	125	200
Batch 2	150	250	175
	350	375	375
Total			
0935	Start injection in SWMW-10-100		
0942	Complete injection in SWMW-11-100		
0955	Complete injection in SWMW-11-200		
1006	Start injecting into SWMW-10-250 & 10-150		
1028	Complete injection in SWMW-10-100		
1050	Complete injection in SWMW-10-150		
1100	Set up on SVEW-01, will inject 650 gal		
1100	Start injecting in SVEW-04		
1236	Complete injection on SVEW-01 → 650 gal Set up on SVEW-01, will inject 675 gallons		
1250	Start injection		
1315	Complete injection		
1330	Off site to help take w/ 239, disinfection		
1400	Back @ GWTS to fill w/ water, noticed that the hose fell out of the roll off & spilled approx 1 gal of water onto the ground & the street. Notified Devon Tercinovic after stopping leak.		
1430	Set up on SVE-03, will inject 725 gal		
1530	Start injection		
1630	Complete injection		
1700	Off site after clean up.		

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Carley
Name

[Signature]
Signature

EA Engineering, Science and Technology Inc., PBC

DQCR Page 2 of 2

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 6/20/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Joseph Carlos Montoya</u>	EA - Site Manager/Supervisor

2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

	<u>On site</u>			
	<u>Calibrate Equipment</u>			
	<u>GEM 5000</u>			
	<u>Perform fresh air calibration</u>			
	<u>Bump test GEM w/ 15% CH₄ + 15% CO₂</u>			
	<u>↳ reading (with carbon filter on) 15% CH₄ + 14.1% CO₂</u>			
	<u>Calibrate Horiba</u>			
	<u>O₂ (20.8%)</u>	<u>CO₂ (13.0%)</u>	<u>NO_x (1980 ppb propane)</u>	
<u>Pre</u>	<u>20.70</u>	<u>12.84</u>	<u>819</u>	
<u>C-1</u>	<u>20.80</u>	<u>12.96</u>	<u>822</u>	
<u>Post</u>	<u>20.84</u>	<u>12.78</u>	<u>806</u>	

Reviewed by: _____

Reviewed date: _____

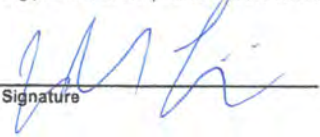
Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 6/20/19

4. WORK PERFORMED (Continued)	
0930	Begin respiratory
1300	End respiratory
	Electrical = 498 kWh
1323	Begin air injections
1456	Off site

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name John Livings

Signature 

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

ROLE: Bioventilation Field Hand

DATE: 6/21/19

Team #

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Carlos Montoya</u>	<u>EA - Site Manager/Supervisor</u>
<u>Josh Livingston</u>	

2. OPERATING EQUIPMENT			
Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

Electrical = 547 kWh

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)					
0900	<u>Onsite</u>				
0910	<u>Recorded</u> <u>Began SUMW air injections, took</u> <u>initial pressure/flow readings</u>				
0930	<u>Recorded</u> <u>SUMW pressures/flow readings</u>				
0950	<u>Recorded</u> <u>V1+V2</u> <u>Pressure readings</u>				
	<u>106 V1</u>	<u>P</u>	<u>106 V2</u>	<u>P</u>	
	<u>102.5</u>	<u>0.5</u>	<u>102.5</u>	<u>0.5</u>	
	<u>113</u>	<u>0.6</u>	<u>117.5</u>	<u>0.5</u>	
	<u>160</u>	<u>0.8</u>	<u>160</u>	<u>0.9</u>	
	<u>217.5</u>	<u>0.7</u>	<u>217.5</u>	<u>0.8</u>	
	<u>252.9</u>	<u>0.8</u>	<u>250</u>	<u>1.0</u>	
	<u>263</u>	<u>0.8</u>	<u>267</u>	<u>0.9</u>	
1000	<u>Offsite</u>				

DQCR Page 1 of 2

Reviewed by: _____

Reviewed date: _____

Josh Livingston JLH [Signature]

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
 Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 6-22-19

WEATHER: Sunny / Windy

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Tyler Corley</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office
2. OPERATING EQUIPMENT	
3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
<u>1510</u>	<u>Onsite</u>
	<u>Grab equipment to collect injection readings</u>
<u>1520</u>	<u>Collect injection readings</u>
<u>1545</u>	<u>Collect well head pressures</u>

Reviewed by: _____ Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report -- Non-Construction

DATE: G-22-19

4. WORK PERFORMED (Continued)				
	106 V2	P	106 V1	P
1550	102.9	0.8	102.9	1.0
	117.5	0.8	113	1.0
	160	1.9	160	1.4
	217.5	1.4	217.5	1.4
	250	1.4	252.9	1.5
	267	1.5	263	1.5
1555	Electrical Meter = 7 GSI KWH @ 3.2 KW			
1600	on site			

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Taylor Curley _____
Name Signature

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 6-23-19

WEATHER: Sunny / Hot

WELL ID: _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
<u>Tyler Curbey</u>	EA - Site Manager/Supervisor
	EA - Site Health and Safety Office

2. OPERATING EQUIPMENT	

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)	
<u>1315</u>	<u>Onsite</u>

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)	
<u>1315</u>	<u>Onsite</u>
	<u>Setup to take flow measurements</u>
	<u>Collect Q/P readings</u>
	<u>Air temp at both pumps on SUMW-10+11 is ~91°F going into the well, ~1700 @ pump head.</u>

DQCR Page 1 of 2

Reviewed by: _____ Initials: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility Vadose Zone Coring -- 62735DM02
Daily Quality Control Report – Non-Construction

DATE: 6-23-19

4. WORK PERFORMED (Continued)				
	Take well head pressures @ 106V1 & V2			
1346	106V1	P (in WC)	106V2	P (in WC)
	102.5	0.7	102.5	0.5
	113	0.6	117.5	0.0
	160	0.0	160	0.0
	217.5	0.0	217.5	0.0
	252.5	0.0	250	0.0
	263	0.0	267	0.0
	Electrical meter = 725 kWh @ 3.2 kW/hr			
1350	offsite			

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Cuskey
Name

[Signature]
Signature

EA Engineering, Science and Technology Inc., PBC

Reviewed by: _____ Initials: _____ Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 6/24/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
JM Carlos Montoya	EA - Site Manager/Supervisor
Josh Livingston	

2. OPERATING EQUIPMENT				
Horiba	Sample System	Manometer	Vacuum Pump	

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)				
1047	onsite			
1050	measured SVMW pressures/flows			
1100	measured SVMW pressures/flows			
	measured V1+V2 pressures:			
	V1	P	V2	P
	102.5	0.0	102.5	0.0
	113	0.0	117.5	0.0
	160	-0.9	160	-0.9
	217.5	-1.0	217.5	-1.1
	252.5	-0.9	250	-0.8
	263	-0.9	267	-1.0
1120	offsite			

Reviewed by: _____

Reviewed date: _____

Josh Livingston

John Lin

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 6/25/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Montoya Josh Livingston	EA - Site Manager/Supervisor

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0907	Onsite			
0925	Measured SVMW pressures/flows			
0935	Measured SVEW pressures/flows			
0938	Measured V1+V2 pressures:			
	V1	P	V2	P
	102.5	0.0	102.5	0.0
	113	0.0	117.5	0.0
	160	-0.7	160	-0.7
	217.5	-0.9	217.5	-0.9
	252.5	-0.7	250	-0.6
	263	-0.7	267	-0.8
0940	OFFSITE			

DQCR Page 1 of 2

Reviewed by: _____

Reviewed date: _____

John Lisch

Josh Livingston

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 6-26-19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Mentoya	EA - Site Manager/Supervisor
Tyler Cutley	

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0700	Onsite				
	Set up to collect Q/Readings				
	Collect well head pressures				
0828	106v1	P	106v2	P	
		0.0		0.0	
		0.0		-0.5	
		-1.3		-1.5	
		-1.4		-1.4	
		-1.4		-1.4	
		-1.5		-1.5	
0830	Shut off blowers.				
	Electrical meter = 947 kWh				
0900	Offsite				

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

ROLE: _____

DATE: 6/26/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Montoya - Josh Livingston	EA - Site Manager/Supervisor

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0800	Onsite
0834	Calibrate Equipment GEM 5000 Performed fresh air calibration Bump tested GEM w/ 15% CH ₄ + 15% CO ₂ ↳ readings 15.2% CH ₄ + 15.1% CO ₂
0900	Calibrate Horiba O ₂ (20.8%) CO ₂ (13.0%) VOC (1580 ppm propane)
Pre	20.79 13.06 822
Cal	20.79 12.96 823
Post	21.04 12.86 812

DQCR Page 1 of 2

Reviewed by: _____

Reviewed date: _____

Josh Livingston

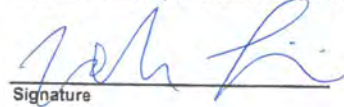
Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 6/26/19

4. WORK PERFORMED (Continued)																	
0920	Began respiratory Finished respiratory vrc Offsite vrc																
1109	Oxygen readings are abnormally ^{vrc} high low for SVEW wells. Ambient air correctly reads 20.87% O ₂ while SVEW wells read between 14.5% and 18.5%																
1120	Respiration finished/offsite																
1430	T. Curley Onsite Set up equipment Calibrate GEM CH ₄ → 15% = 15.1% CO ₂ → 15% = 13.7% Calibrate Norion																
	<table border="1"> <thead> <tr> <th></th> <th>Pre cal</th> <th>cal</th> <th>post</th> </tr> </thead> <tbody> <tr> <td>O₂ (008)</td> <td>20.67</td> <td>20.81</td> <td>20.91</td> </tr> <tr> <td>CO₂ (13)</td> <td>12.96</td> <td>12.00</td> <td>12.76</td> </tr> <tr> <td>VOC (150)</td> <td>826</td> <td>821</td> <td>795</td> </tr> </tbody> </table>		Pre cal	cal	post	O ₂ (008)	20.67	20.81	20.91	CO ₂ (13)	12.96	12.00	12.76	VOC (150)	826	821	795
	Pre cal	cal	post														
O ₂ (008)	20.67	20.81	20.91														
CO ₂ (13)	12.96	12.00	12.76														
VOC (150)	826	821	795														
1448	Leak test sample train, passed (110.0 to 109.4 in 18min) Collected readings																
1645	Offsite after clean up.																

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name Josh Livingston

Signature 

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility – 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 6/27/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Montoya	EA - Site Manager/Supervisor
Josh Livingston	

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0722	On site
	Calibrate Equipment
	GEM 5000
	Performed fresh air calibration
	Bump tested GEM w/ 15% CH ₄ + 15% CO ₂
	↳ readings: 15.1% CH ₄ + 15.0% CO ₂
	Calibrated Horiba
	O ₂ (20.8%) CO ₂ (13.0%) VOCs (1580ppm propane)
	Pre 20.62 13.02 816
	cal 20.80 13.00 821
	Post 20.99 12.92 807

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility - 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 6/27/19

4. WORK PERFORMED (Continued)

0803	Begin respirometry
0930	Finished respirometry
0945	Offsite
1303	Back on site
	Calibrate Equipment
	GEM 5000
	Performed Fresh Air Calibration
	Bump tested GEM w/ 15% CH ₄ + 15% CO ₂
	↳ readings 15.0% CH ₄ & 14.2% CO ₂
	Calibrate Horiba
	O ₂ (20.8%) CO ₂ (13.0%) VOC (1580ppm propane)
	Ave 20.52 13.08 824
	Cal. 20.74 13.00 823
	Post 20.91 12.71 808
1345	Begin respirometry
1458	Finish respirometry
1503	offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name: Josh Livingston

Signature: [Signature]

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility – 62735DM02
Daily Quality Control Report – Non-Construction

ROLE: _____

DATE: 6/28/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Gerlos Montoya	EA - Site Manager/Supervisor
Josh Livingston	

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (Include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

1113	Onsite
	Calibrate Equipment
	GEM 5000
	Performed fresh air calibration
	Bump tested w/ 15% CH ₄ + 15% CO ₂
	↳ readings 15.1% CH ₄ + 14.9% CO ₂
	Calibrated Horiba:
	O ₂ (20.8%) CO ₂ (13.0%) VOCs (1500 ppm range)
	Pre 20.33 12.99 825
	Cal 20.80 12.98 822
	Post 20.90 12.82 808

DQCR Page 1 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility - 62735DM02
Daily Quality Control Report - Non-Construction

6/28/19

DATE:

4. WORK PERFORMED (Continued)	
1147	Begin respiratory
1249	Finish respiratory
1300	Offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications above.

Name: John Livingston Signature: [Handwritten Signature]

DQCR Page 2 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

ROLE: _____

DATE: 6-30-19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
Carlos Montoya	EA - Site Manager/Supervisor
Tyler Carlen	

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

114	Onsite
	Calibrate equipment
	GEM 50000
	Fresh air cal
	Bump test CH ₄ (18%) = 15.1
	CO ₂ (15%) = 14.8
	Horiba
	O ₂ (20.8%) CO ₂ (13%) VEC (823)
	Ave 19.92 12.94 823
	Cal 20.80 13.00 823
	Post 20.97 12.66 775
	Leak test sample train 1081 → 1069 over 10 min, pass

DQCR Page 1 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 6-30-19

4. WORK PERFORMED (Continued)	
	Set up to collect Bv readings
	Note: All vapor temperatures are elevated due to ambient heat. Temp probe was within a shaded cooler.
1340	Complete re-proton monitoring
1345	off site

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Tyler Curley
Name

[Signature]
Signature

DQCR Page 2 of 2

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

ROLE: _____

DATE: 7/2/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)

Name	Organization
<u>Carlos Montoya</u>	EA - Site Manager/Supervisor
<u>Josh Livingston</u>	

2. OPERATING EQUIPMENT

Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0920	onsite
	Calibrate Equipment
	GEN 5000
	Fresh air calibration
	Bump test CO ₂ (15%) = 15.1
	CO ₂ (15%) = 14.9
	Calibrate Horiba
	O ₂ (20.8%) CO ₂ (13.0%) VOCs (1580 ppm propane)
Pre	20.29 13.04 818
Cal	20.80 13.02 822
Post	20.84 12.72 799

DQCR Page 1 of 2

Reviewed by: _____

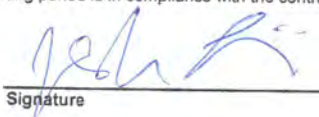
Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

DATE: 7/2/19

4. WORK PERFORMED (Continued)	
0950	Begin respiratory
1046	Finished respiratory
1100	Offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Name: John Livingston
Signature: 

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report -- Non-Construction

ROLE: _____

DATE: 7/5/19

Team # _____

1. ONSITE PERSONNEL (including subcontractors and government employees)	
Name	Organization
Carlos Montoya	EA - Site Manager/Supervisor
Josh Livingston	

2. OPERATING EQUIPMENT			
Horiba	Sample System	Manometer	Vacuum Pump

3. DAILY SUMMARY (include QC samples collected, deviations from planning documents, conversations with the public and governmental employees, and problems encountered and remedies applied)

4. WORK PERFORMED (Indicate location, time, and description of work performed by prime and/or subcontractors)

0720	Onsite		
	Calibrate Equipment		
	GEM 5000		
	Fresh air calibration		
	Bump test CH ₄ (15%) = 15.1%		
	CO ₂ (15%) = 15%		
	Calibrate Horiba		
	O ₂ (20.8%) CO ₂ (13.0%) VOCs (1500ppm propane)		
	Pre	20.88	13.02
	Cal	20.80	13.00
	Post	20.85	12.74

Reviewed by: _____

Reviewed date: _____

Kirtland AFB Bulk Fuels Facility -- 62735DM02
Daily Quality Control Report - Non-Construction

DATE: 7/5/19

4. WORK PERFORMED (Continued)	
0800	Began respirometry
0815	sampled V1 102.1
0838	sampled V1 112.6
0901	sampled V1 159.6
0912	sampled V1 217.1
0928	sampled V1 252.1
0943	sampled V1 262.6
0958	sampled V2 102.2
1018	sampled V2 117.1
1031	sampled V2 159.9
1043	sampled V2 217.1
1110	sampled V2 252.2
1122	sampled V2 269.5
1230	Finished respirometry
1241	Packed up samples to ship
1330	Offsite

5. CONTRACTOR'S VERIFICATION: I certify that to the best of my knowledge the above report is complete and correct. All equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications noted above.

Josh Livingston
Name

[Signature]
Signature

Reviewed by: _____

Reviewed date: _____

INJECTION FIELD FORMS

Bioventing Pilot Test Respiration Data									
Job Name & Number: <u>KAFB Bioventing</u>									
Personnel: <u>T. Conroy</u>									
Air Injection									
Date & Time	Well ID								
	SVEW-01-260			SVEW-02/03-160			SVEW-04/05-313		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)
4-23-19 4-23-19 1452	5.6	NM	0	5.5	NM	0	5.5	NM	0
1515	off		125	off		137.5	off		125
4-23-19 0820	5.0	NM	125	5.5	NM	127.5	5.0	NM	125
1330	5.0	0.8	7800	5.5	0.8	1748	5.0	0.0	1675
4-24-19 1605	5.0	0.0	475	5.5	0.9	8580	5.0	0.0	7800
4-24-19 2903	5.0	1.7	1510	5.5	1.3	10203	5.0	1.3	9275
4-25-19 1025	5.0	0.0	15100	5.5-6.0	0.5	16610	5.0	0.0	15100
4-26-19 1315	5.0	0.9	22850	5.5	0.9	25137	5.0	0.5	22850
4-27-19 1000	5.0	0.5	29475	5.5	0.5	32423	5.0	0.0	29475
4-28-19 1010	5.0	1.0	36625	5.5	1.0	40287	5.0	1.0	36625

inWC = inches water column
 scfm = standard cubic feet per minute
 ft³ = cubic feet

Bioventing Pilot Test Respiration Data									
Job Name & Number: <u>KAFB Bioventing</u>					Personnel: <u>T. Costley</u>				
Air Injection									
Date & Time	Well ID								
	SWMU-10-100			SWMU-10-150			SWMU-10-250		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)
4-22-19 1440	2.5	83.5	0	2.75	107	0	3.0	126.6	0
1520	2.25	80.8	90	2.5	99.0	100	2.5	117.5	100
4-23-19 0835	2.25	68.4	2418.75	2.5	91.7	2687.5	2.5	121.3	2687.5
1545	2.25	46.3	3386	2.5	92.1	3386	2.5	113.3	6020
4-24-19 0955	2.25	58.5	5839	2.5	93.2	5839	2.5	113.4	10380
4-24-19 1456	2.25	57.9	6516	2.5	102.8	6516	2.5	110.5	11584
4-25-19 0855	2.25	75.2	8944	2.5	112.1	8944	2.5	143.5	15900
4-26-19 1205	2.25	53.0	17716	2.5	103.5	17716	2.5	90.1	27660
4-27-19 1010	2.25	68.2	15593	2.5	94.7	15593	2.5	105.1	27740
4-28-19 1005	2.25	43.9	18821	2.5	94.6	18821	2.5	105.0	32460
inWC = inches water column scfm = standard cubic feet per minute ft ³ = cubic feet									

Bioventing Pilot Test Respiration Data									
Job Name & Number: <u>KAFB Bioventing</u>									
Personnel: <u>T. Curley</u>									
Air Injection									
Date & Time	Well ID								
	SVMW-11-100			SVMW-11-250			SVMW-11-260		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)
4-22-19 1430	2.25	52.3	0	2.25	153.2	0	4.25	163.2	0
" " 1515	2.25	64.0	101.25	2.25	146.3	101.25	4.0	148.8	180
4-23-19 0840	2.25	46.8	2452.5	2.25	58.6	2452.5	4.0	156.0	4360
" " 1540	2.25	64.3	3398	2.25	94.1	3398	4.0	152.6	6040
4-24-19 1000	2.25	56.9	5873	2.25	49.5	5873	4.0	142.7	10440
4-24-19 1451	2.25	62.6	6527	2.25	99.1	6527	4.0	140.9	11604
4-25-19 0903	2.25	61.5	8984	2.25	96.8	8984	4.0	159.9	15972
4-26-19 1310	2.25	59.5	10645 1780	2.25	87.4	10645 1780	4.0	153.1	15440 2780
4-27-19 1015	2.25	54.2	15626	2.25	87.1	15626	4.0	155.4	27780
4-28-19 1000	2.25	55.1	18333	2.25	88.5	18333	4.0	154.2	33480
inWC = inches water column scfm = standard cubic feet per minute ft ³ = cubic feet									

Bioventing Pilot Test Wet Respiration Data									
Job Name & Number: <u>KAFB Bioventing</u>									
Personnel: <u>Joch Livingston</u>									
Air Injection									
Date & Time	Well ID								
	SVMW-10-100			SVMW-10-150			SVMW-10-280		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)
6/20/19 1340	2.25	65.1	0	2.5	98.1	0	2.5	103.3	0
6/21/19 0430	2.25	64.2	2,678	2.5	99.0	2,975	2.5	105.3	2,975
6-22-19 1525	2.25	64.3	6,716	2.5	97.2	7,462	2.5	105.9	7,462
6-23-19 1355	2.25	63.1	9,789	2.5	96.3	10,787	2.5	101.6	10,787
6/24/19 1050	2.25	64.3	12,578	2.5	96.4	13,975	2.5	102.7	13,975
6/25/19 0925	2.25	62.1	15,627	2.5	94.6	17,363	2.5	99.8	17,363
6-26-19 0815	2.25	64.3	18,709	2.5	94.7	20,787	2.5	101.4	20,787

inWC = inches water column
 scfm = standard cubic feet per minute
 ft³ = cubic feet

Bioventing Pilot Test Wet Respiration Data									
Job Name & Number: <u>KAFB Bioventy</u>									
Personnel: <u>Josh Livingston</u>									
Air Injection									
Date & Time	Well ID								
	SVMW-11-106			SVMW-11-250			SVMW-11-260		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft ³)
6/20/19 1328-1348	2.25	57.2	0	2.25	91.9	0	4.0	146.0	0
6/21/19 0918	2.25	58.4	2,662	2.25	91.8	2,662	4.0	149.4	4,732
6-22-19 1335	2.25	58.3	6,728	2.25	90.5	6,728	4.0	151.2	11,960
6-23-19 1330	2.25	57.7	9,686	2.25	89.7	9,686	4.0	149.1	17,270
6/24/19 1100	2.25	56.2	12,589	2.25	88.2	12,589	4.0	145.0	22,580
6/25/19 0915	2.25	58.5	15,543	2.25	89.3	15,543	4.0	152.9	27,720
6-26-19 0920	2.25	56.9	18,709	2.25	86.0	18,709	4.0	144.2	33,260

inWC = inches water column
scfm = standard cubic feet per minute
ft³ = cubic feet

Bioventing Pilot Test Wet Respiration Data

Job Name & Number: KAFB Bioventing

Personnel: Josh Livingston

Air Injection

Date & Time	Well ID								
	SVEW-01-260			SVEW-02/03-160			SVEW-04/05-313		
	Flowrate (scfm)	Pressure (inWC)	Volume (ft³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft³)	Flowrate (scfm)	Pressure (inWC)	Volume (ft³)
6/21/19 910	5.0	1.3	0	5.5	1.4	0	5.0	1.1	0
6-22-19 1540	5.0	1.7	9,180	5.5	1.9	10,065	5.0	1.6	9,150
6-23-19 1325	5.0	0.0	15,675	5.5	0.0	17,243	5.0	0.0	15,675
6/24/19 1110	5.0	0.0	22,200	5.5	0.0	24,420	5.0	0.0	22,200
6/25/19 0930	5.0	0.0	28,900	5.5	0.0	31,790	5.0	0.0	28,900
6-26-19 0825	5.0	0.0	35,775	5.5	0.0	39,353	5.0	-0.7	35,775

inWC = inches water column
 scfm = standard cubic feet per minute
 ft³ = cubic feet

RESPIROMETRY FIELD FORMS

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G173521102</u>													
Personnel: <u>F. Guley K. Robinson</u>													
Well ID: <u>KAFB SWMU-10-100</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
11-4-19	1346	0.0/0.0	2	15.1	29990	69.5	58.1	52	23.34	0.95	11.00	0.0	
4-28-19	1159	0.7/0.5	2	46.2	10	4.2	80.5	72	24.6	20.88	0.02	0.0	
4-28-19	1615	0.9/0.9	2	14.3	74	8.8	85.0	83	24.52	20.73	0.02	0.0	
4-29-19	1150	0.0/0.0	2	58.8	355	18.4	77.3	72	24.62	20.56	0.04	0.0	
4-29-19	1709	0.0/0.0	2	55.0	550	23.0	73.8	73	24.52	20.51	0.10	0.0	
4/30/19	1544	0.5/0.5	2	63.1	900	27.1	73.5	72	24.55	20.23	0.24	0.0	
5/1/19	1506	0.6/0.0	2	49.0	1486	27.8	81.2	74	24.6	19.88	0.34	0.0	
5/2/19	1313	0.9/0.9	2	49.1	2190	36.8	77.7	70	24.70	19.19	0.62	0.0	
5/5/19	1108	0.6/0.0	2	48.0	3500	42.1	77.1	72	24.64	18.30	1.02	0.0	
5-9-19	1630	0.0/0.0	2	61.4	5000	48.7	70.0	64	24.56	16.29	0.04	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage <div style="font-family: cursive; font-size: 1.2em;"> Purge Volume = 0.1549 ft³ Purge time = 17 sec @ 2 SCFM </div>													

Bioventing Pilot Test Respiration Data														
Job Name & Number: <u>KAFB Bioventing G2733 DMCD</u>														
Personnel: <u>T. Catey K. Robinson</u>														
Well ID: <u>KAFB SWMW-10-150</u>														
Soil Gas														
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes	
4-4-19	1403	2.3/2.3	1	-17.0	24460	76.9	66.5	53	24.32	2.44	8.17	0.0		
4-28-19	1205	0.8/0.7	2	+52.0	11	13.6	78.15	73	24.60	21.27	0.00	0.0		
4-28-19	1622	2.4/2.4	2	142.4	33	8.0	83.2	83	24.52	21.16	0.02	0.0		
4-29-19	1200	0.9/0.0	2	104.4	215	13.1	76.9	72	24.62	20.73	0.06	0.0		
4-29-19	1709	1.6/1.6	2	58.9	306	17.9	74.2	73	24.93	20.75	0.10	0.0		
4-30-19	1552	1.2/1.1	2	61.0	519	23.3	71.5	72	24.55	20.62	0.16	0.0		
5-1-19	1512	0.7/0.7	2	52.1	741	23.2	81.2	74	24.60	20.35	0.24	0.0		
5-3-19	1306	2.0/2.0	2	52.0	1423	34.6	77.7	70	24.70	19.34	0.78	0.0		
5/5/19	1118	0.8/0.8	2	49.8	1123	36.6	78.0	72	24.64	19.47	0.52	0.0		
5-9-19	1634	3.0/3.0	2	72.3	1541	44.2	69.8	64	24.56	18.20	1.06	0.0		

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 0.617 ft³
 Purge time = 19 sec @ 25CFM

Job Name & Number: KAFB Bioventing GA735 IMC Bioventing Pilot Test Respiration Data

Personnel: T. Carley M. Robinson

Well ID: KAFB SWMU-10-250

Soil Gas

Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-14-19	1424	2.3/2	2 -- 1	18.3	14580	80.2	55.3	53	24.33	5.34	11.16	0.1*	
4-28-19	1211	0.6/0.5	2	69.4	254	16.2	78.3	73	24.60	21.24	0.00	0.0	
4-28-19	1627	2.5/2.5	2	16.4	535	9.7	83.1	83	24.52	20.57	0.00	0.0	
4-29-19	1205	0.0/0.0	2	94.2	989	22.2	76.5	72	24.61	20.48	0.08	0.0	
4-29-19	1713	1.6/1.6	2	62.1	1316	34.2	74.1	73	24.53	20.45	0.10	0.0	
4-30-19	1601	1.4/1.4	2	65.3	1904	42.5	71.2	72	24.55	20.23	0.20	0.0	
5-1-19	1516	0.8/0.8	2	58.2	2450	34.5	80.9	74	24.60	19.82	0.26	0.0	
5-3-19	1259	0.5/0.0	2	57.4	3220	40.7	77.8	70	24.70	19.32	0.48*	0.0	*CO ₂ 0.48
5/5/19	1129	1.0/1.0	2	53.8	5730	42	78.5	72	24.64	18.62	0.66	0.0	
5-9-19	1637	0.5/0.5	2	74.6	4550	47.0	69.6	64	24.56	16.97	1.32	0.0	

4-14-19 →

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 0.783 ft³
 Purge time = 23 sec @ 2 SCFM

* Likely break through of VOCs on carbon filter

0

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing 07-350M02

Personnel: J. Carley K. Robinson

Well ID: KAFB SWMU-106

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	1235	0.7/0.7	2	14.9	30900	73.1	59.7	53	24.36	0.42	11.26	0.0	
4-28-19	1128	0.9/0.0	2	50.8	188	10.0	81.5	72	24.60	20.89	0.00	0.0	
4-28-19	1347	1.1/		14.0		28.5	80.1						C
4-28-19	1547	1.1/1.1	2	65.1	1456	7.4	80.6	83	24.53	20.77	0.00	0.0	
4-28-19	1133	0.0/0.0	2	39.9	3290	15.1	80.0	72	24.63	20.68	0.00	0.0	
4-29-19	1645	0.0/0.0	2	43.9	4530	20.2	76.2	73	24.53	20.59	0.00	0.0	
4-30-19	1504	0.7/0.5	2	62.9	5970	23.6	73.4	68	24.57	20.16	0.00	0.0	
5-1-19	1410	0.5/0.6	2	50.5	6870	29.1	85.4	74	24.60	19.81	0.02	0.0	
5-3-19	1233	0.0/0.0	2	53.9	8100	43.8	75.2	70	24.70	18.79	0.16	0.0	
5/5/19	1042	1.2/1.1	2	46.2	10,160	37.5	81.9	70	24.60	17.73	0.44	0.0	
5-9-19	1619	0.5/0.5	2	63.2	12,270	45.7	72.6	65	24.56	15.65	1.62	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 0.549 ft³
 Purge time = 17 sec @ 28scfm

Bioventing Pilot Test Respiration Data													
Job Name & Number:		KAFB Bioventing		62735 D.102									
Personnel:		T. Cudley		K. Robinson									
Well ID:		KAFB		SWMU-11-280									
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-4-19	1301	2.3/2	2	17.2	26320	72.2	60.4	53	24.37	0.08	11.34	0.0	
4-28-19	1142	0.9/0.9	2	108.3	240	13.6	79.4	72	24.60	21.05	0.14	0.0	
4-28-19	1557	2.6/2.6	2	158.6	531	8.1	85.4	83	24.53	20.80	0.14	0.0	
4-28-19	1140	0.8/0.7	2	64.6	2170	29.4	78.2	72	24.63	19.58	0.50	0.0	
4-29-19	1652	1.7/1.7	2	65.9	2460	37.2	73.2	73	24.52	19.50	0.56	0.0	O ₂ = 19.50
4-30-19	1520	1.1/1.2	2	64.8	3260	43.9	72.1	68	24.57	19.18	0.68	0.1	CH ₄ → new filter
5-1-19	1452	0.8/0.8	2	52.6	3870	35.5	83.4	74	24.60	18.88	0.80	0.0	
5-3-19	1225	0.7/0.8	2	56.0	4960	48.5	79.9	70	24.70	18.10	1.08	0.0	
5/5/19	1047	1.0/1.0	2	52.6	5750	40.8	79.7	70	24.60	17.31	1.36	0.0	
5-9-19	1616	0.6/0.6	2	65.5	7480	49.3	71.5	65	24.56	15.71	2.24	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 0.753 ft³
 Purge time = 23 sec @ 2 SCFM

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing G2735 DM02
 Personnel: T. Curley K Robinson
 Well ID: KAFB SWMU-11-260

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
11-4-19	1322	0.0/0.0	2	14.4	14390	76.4	59.4	53.0	24.36	1.15	13.20	0.0	
4-25-19	1148	0.0/0.0	2	+142.0	8.0	10.4	80.0	72	24.60	21.32	0.04	0.0	
4-28-19	1602	0.0/0.0	2	124.6	11	22.6	86.3	82	24.53	20.55	0.02	0.0	
4-29-19	1146	0.0/0.0	2	58.5	29	39.8	78.4	73	24.63	20.41	0.02	0.0	
4-29-19	1657	0.0/0.0	2	57.2	49	41.1	74.1	73	24.52	20.43	0.02	0.0	
4-30-19	1528	0.0/0.0	2	57.7	131	47.7	72.2	70	24.56	20.37	0.06	0.0	
5-1-19	1457	0.8/0.7	2	47.3	219	37.8	62.3	74	24.60	20.38	0.04	0.0	
5/3/19	1216	0.0/0.0	2	48.3	374	50	73.4	70	24.70	19.67	0.08	0.0	
5/5/19	1055	0.7/0.7	2	49.8	846	41.5	78.4	70	24.60	19.71	0.06	0.0	
5-9-19	1623	0.0/0.0	2	61.0	210	50.1	71.0	65	24.56	18.74	0.08	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 0.767 ft³
 Purge time = 24sec @ 2 SCFM

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G735DM02</u>													
Personnel: <u>T. Curley, K. Robinson</u>													
Well ID: <u>KAFB SWE W-01-260</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-23-19	1304	0.0/0.0	3.0	64.6	16970	83.1	76.4	60	24.51	20.30	12.02	0.1	
4-28-19	1230	1.1/1.0	3.0	66.1	7	10.4	80.6	78	24.60	20.77	0.00	0.0	
4-28-19	1649	2.7/2.7	3.0	181.1	30	1.7	83.5	83	24.90	20.79	0.02	0.0	
4-29-19	1229	0.0/0.0	3.0	65.4	216	19.9	77.3	72	24.67	20.68	0.00	0.0	
4-29-19	1730	1.6/1.6	3.0	69.9	320	20.6	73.3	73	24.84	20.63	0.04	0.0	
4-29-19	1735	1.5	3.0	65.2		21.7	72.8	73					TC
4-30-19	1625	1.5/1.3	3.0	67.8	641	30.3	76.1	72	24.55	20.25	0.14	0.0	
5-1-19	1533	1.1/1.2	3.0	69.9	728	25.3	79.8	74	24.60	19.27	0.44	0.0	temp = 79.8
5-3-19	1129	0.0/0.0	3.0	63.8	1055	35.0	73.4	70	24.67	13.39	3.88	0.0	
5/5/19	1019	0.7/0.9	3	65.8	1442	30.0	80.1	70	24.66	18.08	1.02	0.0	
5/6/19	1411	0.9/0.6	3	67.6	1852	20.7	88.8	81	24.58	17.36	1.42	0.0	Multiple readings as directed by T. Curley
	1418	0.0/0.0	3	68.1	1918	21.1	88.4	81	24.58	17.29	1.44	0.0	full purge 1.5x purge 2xpurge
	1423	0.5/0.5	3	68.4	1953	21.5	88.5	81	24.58	17.28	1.44	0.0	
5-9-19	1652	0.6/0.5	3	77.7	1825	40.1	69.3	64	24.56	13.83	3.84	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 8.176 ft³
 Purge time = 2min 43 sec @ 3 scfm

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G2739 D.M.C.2</u>													
Personnel: <u>T. Curley A. Wilkinson</u>													
Well ID: <u>KAFB SVEW-02/03-160</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-13-19	1355	0.0/0.0	2.0	60.7	101640	46.7	71.9	60	24.82	0.74	0.52	0.0	
4-28-19	1238	1.0/1.1	3.0	103.3	60	1.9	80.3	78	24.60	20.79	0.02	0.0	
4-28-19	1654	2.6/2.5	3.0	178.3	163	3.5	82.6	83	24.50	20.79	0.04	0.0	
4-29-19	1238	0.0/0.0	3.0	65.2	316	17.0	75.8	72	24.62	20.58	0.12	0.0	
4-29-19	1738	1.5/1.5	3.0	65.2	444	21.7	72.8	73	24.53	20.39	0.14	0.0	
4/30/19	1636	1.2/0.0	3	66.8	622	26.5	70.3	72	24.55	19.87	0.36	0.0	
5/1/19	1542	1.2/1.2	3.0	67.3	826	26.9	80.6	74	24.60	19.05	0.72	0.0	
5/3/19	1200	0.6/0.8	3.0	64.9	422.0	36.8	73.3	70	24.70	9.81	5.48	0.0	
5/5/19	1031	1.2/1.3	3	66.8	1354	28.4	86.3	70	24.60	16.99	1.68	0.0	
5/6/19	1430	0.8/0.7	3	65.4	1343	19.5	81.0	81	24.58	16.50	1.88	0.0	Multiple readings
	1435	1.1/1.2	3	65.2	1429	19.5	89.5	81	24.58	16.10	2.06	0.0	as directed by
	1439	1.1/1.1	3	65.7	1395	19.5	89.5	81	24.59	16.20	1.98	0.0	T. Curley
5-9-19	1701	0.0/0.0	3	71.5	2090	42.3	66.7	63	24.56	13.87	3.48	0.1	full purge 1.5x purge 2x purge

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Volume = 5.945 ft³

Purge time = 1 min 59 sec @ 3 scfm

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing G2735 M402
 Personnel: T. Curley A. Robinson
 Well ID: KAFB SWMU-04/05-313

Soil Gas

Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	1444	2.9/3	3	65.0	59.5, RR	59.5	55.6	53	24.33	14.93	2.70	0.0	
					17574								
4-28-19	1218	1.2/1.1	3	80.50	4	2.6	79.5	73	24.6	20.77	0.04	0.0	
4-28-19	1636	2.8/2.8	3	180.7	5	6.5	83.9	83	24.52	20.66	0.06	0.0	
4-29-19	1217	0.6/0.6	3	66.8	26	28.9	77.3	72	24.62	16.91	1.84	0.0	
4-29-19	1720	1.8/1.8	3	69.7	12	32.7	73.9	72	24.94	19.99	0.30	0.0	
4/30/19	1613	1.8/1.8	3	66.3	41	31.0	71.2	72	24.55	15.31	2.18	0.0	
5/1/19	1525	0.9/1.0	3	62.7	25	29.4	80.8	74	24.60	14.51	3.30	0.0	
5/3/19	1119	0.6/0.6	3	66.3	148	36.5	72.4	70	24.67	12.63	3.60	0.0	
5/5/19	1005	0.9/0.5	3	66.9	55	29.8	79.2	70	24.60	17.81	1.00	0.0	
5/6/19	1354	0.6/0.6	3	68.8	21	21.5	88.1	81	24.58	13.72	3.84	0.0	Multiple readings
	1400	0.8/0.9	3	68.6	43	21.8	88.5	81	24.58	15.86	2.54	0.0	taken as directed
	1405	1.1/1.1	3	68.0	57	21.7	89.3	81	24.58	16.95	1.64	0.0	by T. Curley
5-9-19	1614	3.6/0.6	3	81.6	100	39.6	69.5	61	24.56	12.77	3.88	0.0	full purge 1.5x purge 2x purge

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge volume = 9.283 ft³
 Purge time = 3 min 6 sec @ 3 scfm

Job Name & Number: KAFB Bioventing GA735 DM02 Bioventing Pilot Test Respiration Data

Personnel: T. Curley K. Robinson

Well ID: KAFB 106VI-102.1

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-10-19	0942	10/0.0	1.0	2.0	2430	66.7	66.0	61.0	24.24	0.30	12.38	0.0	
3-9-11	1435	5.0/1	2.0	50.41	10480	50.8	69.7	69.0	24.60	8.02	9.19	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Farenheit
 inHG = inches mercury
 % = percentage

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing (G)735D(MO)													
Personnel: T. Coffey, M. Robinson													
Well ID: KAFB 10661-112.6													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-10-19	1005	1.3/1.2	1.9	10.6	22,800	78.9	64.2	63	24.23	0.10	12.26	0.0	
5-9-19	1450	2.0/0.0	2.0	57.7	19,230	55.5	70.9	65	24.60	8.16	8.70	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage													

Appendix B

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G2735 DM02</u>													
Personnel: <u>J. Cutler K. Robinson</u>													
Well ID: <u>KAFB MCVI-159.6</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-10-19	1032	50/49	2.6	5.6	21,480	71.4	64.6	63	24.22	0.16	12.22	0.0	
5-7-19	1803	20/20	2.0	5.71	22,000	47.7	73.3	69.0	24.60	12.80	7.40	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing G2735 MW2													
Personnel: J. Carley K. Robinson													
Well ID: KAFB 106 VI-217.1													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-10-19	1056	52/49	2.0	379	24,270	62.6	64.3	63	24.62	0.09	11.20	0.0	
5-9-19	1526	51/1	2.0	352	24,970	47.1	54.5	65	24.60	0.11	11.50	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHg = inches mercury % = percentage													

Bioventing Pilot Test Respiration Data														
Job Name & Number: <u>KAFB Bioventing G2735 D/MO2</u>														
Personnel: <u>T. Curley A Robinson</u>														
Well ID: <u>KAFB 106VI-252-1</u>														
Soil Gas														
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes	
4-10-19	1113	4.8/4.8	2.0	42.1	22,740	62.9	63.4	63	24.22	0.13	11.86	0.0		
5-9-19	1539	0.6/0.0	2.0	63.2	22,570	67.0	74.1	65	24.60	9.80	7.80	0.0		
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage														

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G2735 DM02</u>													
Personnel: <u>T. Foley Robinson</u>													
Well ID: <u>KAFB 106-01-2616</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-18-19	1130	51/51	2.0	40.3	23,530	64.0	64.4	63	24.27	0.31	11.26	0.0	
5-4-19	1350	20/20	2.0	62.9	23,310	45.9	74.4	65	24.68	9.74	7.54	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Appendix B

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G2735 DMO2</u> Personnel: <u>T. Cistey K. Robinson</u> Well ID: <u>KAFB 106VA-102.2</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-1-19	10:03	20/0.0	2.0	44.5	20,350	66.5	44.1	44	24.33	0.20	12.14	0.0	
5-4-19	12:06	20/0.0	2.0	55.5	27,600	66.5	63.8	61	24.67	3.40	9.96	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Bioventing Pilot Test Respiration Data													
Job Name & Number: <i>KAFB Bioventing G7735 DMC2</i>													
Personnel: <i>T. Corley Robinson</i>													
Well ID: <i>KAFB 106VJ-1171</i>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	09:56	0.9/0.9	2.0	40.3	26,810	63.4	52.9	44	24.34	0.77	12.02	0.0	
5-9-19	12:52	0.6/0.6	2.0	54.0	27,820	63.5	61.5	61	24.67	4.23	8.96	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage													

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing</u>													
Personnel: <u>T. Catey A. Robinson</u>													
Well ID: <u>KAFB 10662-19A9</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	0927	2.7/2.6	2.0	41.6	9,060	94.7	55.4	46	24.74	0.53	12.95	0.0	
5-9-19	1317	6.0/6.0	2.0	56.9	9,770	99.5	64.7	62	24.62	13.78	4.08	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Farenheit inHG = inches mercury % = percentage													

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing G2735 AMO2

Personnel: T. Carley K Robinson

Well ID: KAFB 106V2-217.1

Soil Gas

Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	10:58	22/22	2.0	47.8	21,340	66.6	57.6	32	24.35	0.38	12.08	0.0	
5-9-19	13:25	20/20	2.0	60.6	21,960	58.3	58.3/64.8	34.6/32	24.62	1.39	11.82	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Farenheit
 inHG = inches mercury
 % = percentage

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing G2735DM02

Personnel: J. Culey M. Robinson

Well ID: KAFB 100V2-252.2

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	1036	2.3	2.4 - 2	47.6	14,710	69.3	55.5	48°	24.33	7.14	7.74	0.0	
5-9-19	1738	0.0/0.0	2	59.2	14,010	61.4	65.0	62	24.62	12.85	9.04	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Bioventing Pilot Test Respiration Data													
Job Name & Number: <u>KAFB Bioventing G1735DMC2</u>													
Personnel: <u>T. Gately, Richardson</u>													
Well ID: <u>KAFB 106602-289.5</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
4-11-19	1109	25/24	2	41.1	14610	64.4	55.6		24.36	8.63	6.98	0.0	
5-9-19	1350	0.0/0.0	2	59.8	1818	99.0	65.1	62	24.67	11.73	5.66	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08												Personnel: T Curley, J Livingston	
Well ID: KAFB SUMW-10-188													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	0940	0.0/0.0	2	51.7	18530	43.1	83.5	77	24.68	6.62	7.52	0.0	
6/26/19	0931	0.0/0.0	2	49.9	5	6.2	84.0	82	24.74	20.92	0.02	0.0	
6/26/19	1519	0.0/0.0	2	48.0	10	5.7	84.2	82	24.74	20.88	0.02	0.0	
6/27/19	0903	0.0/0.0	2	51.5	77	17.7	74.6	72	24.87	20.90	0.06	0.0	
6/27/19	1346	0.0/0.0	2	50.3	121	14.8	85.7	91	24.84	20.80	0.02	0.0	
6/28/19	1146	0.0/0.0	2	50.0	269	16.2	87.5	86	24.88	20.75	0.06	0.0	
6/30/19	1223	0.0/0.0	2	50.1	974	18.2	93.0	90	24.83	20.26	0.20	0.0	
7/2/19	0951	0.0/0.0	2	50.1	1679	33.4	82.8	77	24.77	19.82	0.38	0.0	
7/5/19	1145	0.0/0.0	2	50.0	2400	20.6	90.4	88	24.81	18.36	0.90	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge vol = 0.549 ft³
 Purge time = 17 sec @ 2.5 CFM

Bioventing Pilot Test Respiration Data														
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08														
Personnel: T Curley, J Livingston														
Well ID: KAFB SWMU-10-150														
Soil Gas														
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes	
6/24/19	0959	0.5/0.0	2	49.1	3880	47.3	83.0	79	24.68	7.56	6.04	0.0		
6/26/19	0940	-1.4/1.4	2	52.5	64	7.0	85.5	82	24.79	20.80	0.00	0.0		
6/26/19	1529	-0.9/0.5	2	53.1	166	5.0	89.6	87	24.74	20.78	0.00	0.0		
6/27/19	0816	-1.2/1.2	2	58.0	506	20.7	88.0 87.1	72	24.87	20.40	0.18	0.0		
6/27/19	1350	-1.3/1.5	2	53.0	462	13.3	87.3	91	24.84	20.20	0.22	0.0		
6/28/19	1152	-2.2/2.2	2	54.8	647	12.6	91.9	86	24.88	19.72	0.54	0.0		
6/30/19	1229	-0.6/0.0	2	47.9	616	15.5	95.0	90	24.83	19.57	0.70	0.0		
7/2/19	0956	0.0/0.0	2	50.4	359	24.4	84.4	77	24.77	19.65	0.54	0.0		
7/5/19	1149	-1.0/0.9	2	51.8	855	22.8	91.0	88	24.81	18.16	1.2	0.0		
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage Purge Vol = 0.617 ft ³ Purge time = 19 sec @ 2 SCFM														

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08
 Personnel: T Curley, J Livingston

Well ID: **KAFB SWMU-10-250**

Soil Gas

Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1005	0.5/0.5	2	51.4	7870	40.4	82.7	77	24.68	6.59	6.84	0.0	
6/26/19	0945	-1.5/-1.6	2	56.2	118	8.1	86.8	82	24.79	20.82	0.04	0.0	
6/26/19	1530	2.0/1.0	2	58.9	304	11.2	90.3	92	24.74	20.71	0.00	0.0	
6/27/19	0815	-1.2/-1.2	2	59.9	892	30.9	73.8	72	24.87	20.19	0.20	0.0	
6/27/19	1336	-1.7/-1.7	2	55.5	1039	21.1	88.2	91	24.84	20.03	0.32	0.0	
6/28/19	1157	2.4/2.1	2	58.0	1546	21.6	93.2	86	24.88	19.57	0.56	0.0	
6/30/19	1233	0.0/0.0	2	53.7	1900	22.0	46.4	90	24.93	19.78	0.62	0.0	
7/2/19	1000	0.0/0.0	2	58.7	2010	33.3	55.0	77	24.77	19.29	0.94	0.0	
7/5/19	1152	0.9/0.8	2	56.2	2700	27.7	91.7	88	24.81	17.75	0.96	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage Purge vol = 0.753 f+3 Purge Air = 23 sec @ 2 scfm													

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: T Curley, J Livingston													
Well ID: KAFB SWM-11-100													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1016	1.0/1.0	2	47.2	21650	48.5	83.0	81	24.68	5.34	8.56	0.0	
6/26/19	0957	0.0/0.0	2	50.3	28	5.0	87.4	82	24.79	20.88	0.00	0.0	
6/26/19	1540	0.0/0.0	8	50.0	179	4.8	89.6	82	24.74	20.85	0.00	0.0	
6/27/19	0825	0.0/0.0	2	49.6	651	19.8	74.0	72	24.87	20.74	0.04	0.0	
6/27/19	1405	8.0/2.0	2	49.2	896	12.0	88.4	91	24.84	20.61	0.04	0.0	
6/28/19	1203	0.0/0.0	2	48.1	1525	14.2	99.0	86	24.88	20.20	0.06	0.0	
6/30/19	1244	0.0/0.0	2	47.0	3220	18.6	98.2	90	24.83	18.82	0.06	0.0	
7/2/19	1008	0.0/0.0	2	51.9	5090	22.7	84.8	77	24.77	17.85	0.56	0.0	
7/5/19	1157	0.0/0.0	2	51.6	6170	27.3	92.3	88	24.81	16.39	1.28	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage													
Purge vol = 0.549 ft ³ Purge time = 17 sec @ 2 SCFM													

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08
 Personnel: T Curley, J Livingston
 Well ID: KAFB SWMU-11-250

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/12/19	1022	0.0/0.0	2	55.0	15220	48.6	83.2	81	24.71	5.77	7.90	0.0	
6/26/19	1003	-1.2/4.3	2	57.2	101	8.3	87.5	82	24.79	20.44	0.14	0.0	
6/30/19	1546	-0.7/0.8	2	56.3	362	10.7	89.1	82	24.74	20.00	0.32	0.0	
6/27/19	0831	-2.0/6.0	2	57.4	1476	38.2	74.3	72	24.87	19.18	0.86	0.0	
6/27/19	1408	-1.8/1.9	2	58.3	2030	26.3	88.5	91	24.84	18.72	1.06	0.0	
6/28/19	1207	-1.8/1.9	2	56.2	4180	24.0	85.3	86	24.88	17.46	1.78	0.0	
6/30/19	1249	0.7/2.7	2	53.0	4490	25.1	88.0	90	24.83	17.21	1.91	0.0	
7/2/19	1011	0.0/0.0	2	54.6	3060	39.0	84.2	77	24.77	17.80	0.38	0.0	
7/5/19	1200	-0.7/0.3	2	56.8	3949	29.0	92.8	90	24.81	16.45	1.90	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Vol = 0.753 ft³
 Purge Time = 23 sec @ 2 scfm

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08
 Personnel: T Curley, J Livingston
 Well ID: KAFB **SWMU-106-269**

Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/24/19	10:25	0.0/0.0	2	46.6	7380	49.0	83.5	82	24.71	20.35	2.24	0.0	
6/26/19	10:10	0.0/0.0	2	47.5	3	27.0	87.5	82	24.82	20.67	0.02	0.0	
6-26-19	1:50	0.0/0.0	2	58.7	8	28.5	86.8	82	24.74	20.18	0.04	0.0	
6/27/19	0836	0.0/0.0	2	48.8	16	52.5	74.5	72	24.87	20.44	0.06	0.0	
6/27/19	1413	0.0/0.0	2	47.8	16	34.0	88.4	91	24.84	20.37	0.04	0.0	
6/28/19	1213	0.0/0.0	2	47.4	22	24.2	94.3	86	24.88	20.17	0.02	0.0	
6-30-19	1254	0.0/0.0	2	58.1	61	23.7	99.5	90	24.83	19.89	0.02	0.0	
7/2/19	1015	0.0/0.0	2	49.2	175	42.6	83.3	77	24.77	19.86	0.06	0.0	
7/5/19	1204	0.0/0.0	2	47.8	382	30.5	93.3	90	24.81	19.28	0.10	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge vol = 0.767 ft³
 Purge time = 24 sec @ 3 scfm

Bioventing Pilot Test Respiration Data

Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08
 Personnel: T Curley, J Livingston
 Well ID: **KAFB 5VEW-01-200**

Soil Gas

Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1049	0.5/0.5	3	65.5	4720	26.7	89.6	82	24.71	6.55	5.06	0.0	
6/26/19	1043	0.0/0.0	3	67.7	540	17.5	91.0	82	24.82	18.56	1.50	0.0	
6-26-19	1609	-0.5/-0.6	3	80.5	270	82.6	96.6	88	24.74	13.54	3.96	0.0	
6/27/19	0905	-2.3/2.7	3	70.0	87	43.1	77.8	73	24.87	12.88	5.36	0.0	
6/27/19	1128	-1.2/2.7	3	69.3	89	29.7	85.5	91	24.84	13.14	5.42	0.0	
6/28/19	1229	-1.8/2.0	3	70.0	65	23.5	95.9	86	24.88	14.48	5.14	0.0	
6/29/19	1313	-0.6/0.05	3	68.0	106	20.7	100.9	91	24.83	15.45	4.99	0.0	
7/2/19	1029	0.0/0.0	3	69.9	1904	35.9	82.4	77	24.77	13.93	5.70	0.0	
7/5/19	1214	-0.6/0.6	3	68.3	275	23.9	95.4	90	24.81	14.96	4.44	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge Vol = 8.126 ft³
 Purge Time = 2 hr 43 sec @ 3 SCFM

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: T Curley, J Livingston													
Well ID: KAFB SVEW-02/03-100													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1039	0.0/0.0	3	64.8	7200	29.2	86.2	81	24.71	2.15	10.66	0.0	
6/26/19	1024	-1.0/-0.8	3	68.0	855	19.5	88.9	82	24.82	18.08	2.16	0.0	
6/26/19	1617	-0.7/-0.9	3	72.2	5480	22.0	91.3	88	24.74	8.16	8.40	0.0	*
6/27/19	0849	-2.0/-1.9	3	69.2	3480	41.1	76.5	73	24.87	13.20	5.50	0.0	*
6/27/19	1422	-1.2/-1.2	3	89.5	7230	26.0	88.3	91	24.84	6.77	9.52	0.0	*
6/28/19	1220	1.6/-1.9	3	68.0	7250	20.6	96.6	86	24.88	4.51	10.62	0.0	*
6/28/19	1522	0.0/0.0	3	67.1	9060	17.9	102.9	92	24.83	2.31	12.80	0.0	*
7/2/19	1021	0.0/0.0	3	64.0	4950	33.3	82.0	77	24.77	13.61	3.80	0.0	*
7/5/19	1208	-2.6/-0.9	3	68.0	4950	24.8	99.8	90	24.81	4.56	9.92	0.0	*

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Purge vol = 5.945 ft³
 Purge time = 1 min 59 sec @ 3 SCFM

* verified that O₂/CO₂ was working properly via fresh air check

Bioventing Pilot Test Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test				62735DM02.1038.08									
Personnel: T Curley, J Livingston													
Well ID: KAFB SVEW-04/05-313													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1059	0.7/0.9	3	65.6	13.11	24.7	91.2	82	24.71	12.77	3.24	0.0	
6/26/19	1056	0.9/0.0	3	62.9	7.8	20.11	90.9	82	24.82	12.58	2.95	0.0	
6-28-19	1601	-0.7/-0.7	3	81.0	25	20.0	90.4	92	24.74	19.08	0.54	0.0	
6/27/19	0917	2.1/2.3	3	69.8	56	37.8	79.5	73	24.87	19.44	0.56	0.0	
6/27/19	1440	7.4/1.4	3	70.2	52	27.4	88.0	91	24.84	19.43	0.48	0.0	
6/28/19	1291	2.2/2.1	3	69.8	146	21.2	97.6	86	24.88	19.16	0.40	0.0	
6-30-19	1303	-0.9/0.8	3	69.6	295	20.0	94.0	91	24.83	18.58	0.50	0.0	
7/2/19	1036	0.0/0.0	3	69.1	72	36.4	83.7	77	24.77	18.94	0.22	0.0	
7/5/19	1220	-0.8/0.8	3	67.4	342	25.1	95.1	90	24.81	13.36	2.96	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Purge Vol = 9.283 AB

Purge Rate = 3 min 6 sec @ 3 SCFM

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: <u>Josh Livingston</u>													
Well ID: <u>V7/102 SW</u> KAFB <u>106VI-102.1</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1202	0.0/0.0	2	43.3	19650	31.7	92.8	87	24.70	5.61	9.44	0.0	
7/3/19	0808	0.0/0.0	2	47.2	18810	51.8	77.5	79	24.81	10.81	7.38	0.0	
inWC = inches water column				Purge vol: 0.723 ft ³									
scfm = standard cubic feet per minute				Purge time: 22 sec @ 2 SCFM									
ppmv = parts per million volume													
°F = degree Farenheit													
inHG = inches mercury													
% = percentage													

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08 Personnel: <u>Josh Livingston</u> Well ID: <u>V1/H3 JRC</u> <u>KAFB</u> <u>106VI-112-8</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1158	0.0/6.0	2	43.0	21420	32.6	92.4	86	29.70	4.10	10.54	0.0	
7/5/19	0832	2.0/6.0	2	47.8	20800	51.1	75.0	79	29.81	8.90	8.68	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage				Purge Vol: 0.769 A ³ Purge Area: 23 sec @ 2 scfm									

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test		62735DM02.1038.08											
Personnel: Josh Livingston													
Well ID: VI-160 ²²		KAFB 106VI-159.6											
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1151	0.0/0.0	2	44.3	22900	32.0	92.3	86	24.71	2.70	9.96	0.0	
7/5/19	0850	-1.1/-1.1	2	50.1	21640	54.1	79.5	79	24.81	11.48	6.78	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHg = inches mercury % = percentage			Purge Vol. = 0.900 ft ³ Purge time: 27 sec @ 2 scfm										

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number:		KAFB Bioventing Wet Respiration Test				62735DM02.1038.08							
Personnel: <i>Josh Livingston</i>													
Well ID: <i>V1/217.5 Jm KAFB 106VI-217-1</i>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
<i>6/20/19</i>	<i>1142</i>	<i>0.06.0</i>	<i>2</i>	<i>45.0</i>	<i>25730</i>	<i>33.6</i>	<i>92.1</i>	<i>84</i>	<i>24.71</i>	<i>0.17</i>	<i>12.02</i>	<i>0.0</i>	
<i>7/15/19</i>	<i>0921</i>	<i>~1.2</i>	<i>2</i>	<i>50.1</i>	<i>24480</i>	<i>49.3</i>	<i>80.5</i>	<i>81</i>	<i>24.81</i>	<i>0.47</i>	<i>11.98</i>	<i>0.0</i>	

Purge volume = 1076 ft³
Purge time = 33 sec @ 2 SCFM

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number:		KAFB Bioventing Wet Respiration Test		62735DM02.1038.08									
Personnel:		Josh Livingston											
Well ID:		KAPB 106V1-252-1											
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1136	2.06.0	2	44.8	23030	333	91.6	84	29.71	6.12	7.92	0.0	
7/5/19	0937	-1.1/1.1	2	53.6	22420	46.7	81.5	81	29.81	12.62	5.34	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Farenheit inHG = inches mercury % = percentage													
Purge volume = 1.184 ft ³ Purge time = 36 sec @ 2 SCFM													

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test					62735DM02.1038.08								
Personnel: <u>Joseph Livingston</u>													
Well ID: <u>269701 JRC</u> <u>KAFB 106V1-202.0</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F) <small>70.3</small>	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/24/19	1125	2.080	2	49.9	23830	33.5	70.3	84	24.71	6.2	7.32	0.0	
7/5/19	0952	2.960	2	49.7	23160	43.9	82.3	81	24.81	12.80	5.10	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

$\text{Purge Volume} = 1.245 \text{ ft}^3$
 $\text{Purge Time} = 38 \text{ sec @ } 2 \text{ SCFM}$

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test				62735DM02.1038.08									
Personnel: <i>Josh Livingston</i>													
Well ID: <i>V2/102-SM</i>				<i>KAFB 106V2-102 I</i>									
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
<i>6/20/19</i>	<i>1250</i>	<i>0.0/0.0</i>	<i>2</i>	<i>46.2</i>	<i>29260</i>	<i>23.9</i>	<i>98.7</i>	<i>88</i>	<i>29.70</i>	<i>2.12</i>	<i>11.06</i>	<i>0.0</i>	
<i>7/5/19</i>	<i>1022</i>	<i>0.0/0.0</i>	<i>2</i>	<i>45.8</i>	<i>27940</i>	<i>40.0</i>	<i>83.5</i>	<i>82</i>	<i>29.81</i>	<i>3.69</i>	<i>10.32</i>	<i>0.0</i>	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage													

purge vol: 0.723 ft³
 purge time: 22 sec @ 2 SCFM

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: <i>Josh Livingston</i>													
Well ID: <i>V27-117.5² KAFB 100V2-117.1</i>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
<i>6/20/19</i>	<i>1245</i>	<i>0.0/0.0</i>	<i>2</i>	<i>46.8</i>	<i>30890</i>	<i>29.6</i>	<i>98-1</i>	<i>88</i>	<i>29.70</i>	<i>0.70</i>	<i>11.40</i>	<i>0.0</i>	
<i>7/5/19</i>	<i>1026</i>	<i>0.0/0.0</i>	<i>2</i>	<i>46.4</i>	<i>29660</i>	<i>39.1</i>	<i>89.6</i>	<i>82</i>	<i>29.51</i>	<i>3.48</i>	<i>10.02</i>	<i>0.0</i>	
<i>Purge vol: 0.769 ft³</i> <i>Purge time: 23 sec @ 2 scfm</i>													
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage													

Appendix B

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: Josh Livingston													
Well ID: V2/160 ^{JAC} KAFB 106V2-159.9													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1240	0.580	2	45.1	10120	25.5	97.3	88	29.70	0.84	11.36	0.0	
7/5/19	1052	-1.260	2	47.2	9630	37.5	86.3	86	29.81	12.80	4.22	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage Purge vol: 0.900 ft ³ Purge time: 27 sec @ 2 scfm													

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: Josh C. ...													
Well ID: V2/217-SJAL KAFB 106V2-217.1													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1233	0.560	2	45.2	23260	28.6	95.7	88	24.70	0.87	12.10	0.0	
7/5/19	1106	1.3613	2	50.9	22650	39.1	87.5	87	24.81	1.40	11.92	0.0	

inWC = inches water column
scfm = standard cubic feet per minute
ppmv = parts per million volume
°F = degree Fahrenheit
inHG = inches mercury
% = percentage

Purge vol: 1,076 ft³
Purge time: 33 Sec @ 2.5 CFM

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test											62735DM02.1038.08		
Personnel: <u>Josh Kirby, Steve [unclear]</u>													
Well ID: <u>42/250</u> <u>KAFB 106U2-252.2</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	1228	0.5/0.5	2	46.9	14790	29.2	95.7	88	24.70	5.47	8.58	0.0	
7/15/19	1117	-0.9/0.9	2	47.7	14430	41.5	88.4	88	24.81	15.09	2.92	0.0	

inWC = inches water column
 scfm = standard cubic feet per minute
 ppmv = parts per million volume
 °F = degree Fahrenheit
 inHG = inches mercury
 % = percentage

purge vol = 1.184 ft³
purge time = 36 sec @ 2 scfm

Bioventing Pilot Test Wet Respiration Data													
Job Name & Number: KAFB Bioventing Wet Respiration Test 62735DM02.1038.08													
Personnel: <u>Josh Livingston</u>													
Well ID: <u>V2-267-J21</u> KAFB <u>106V2-269.5</u>													
Soil Gas													
Date	Time	Well Head Pressure Pre/Post Purge (inWC)	Well Vapor Flow Rate (scfm)	Applied Vacuum (inWC)	Vapor Concentration VOC (By Horiba) (ppmv)	Water Activity Relative Humidity (%)	Vapor Temperature (°F)	Ambient Temperature (°F)	Barometric Pressure inHg	O ₂ (%)	CO ₂ (%)	CH ₄ (%)	Notes
6/20/19	12:21	0.0/6.0	2	47.3	20420	29.3	94.5	88	29.70	5.37	8.56	0.0	
7/5/19	11:29	-1.3/-6.0	2	50.0	20050	35.2	89.2	88	29.81	13.54	4.58	0.0	
inWC = inches water column scfm = standard cubic feet per minute ppmv = parts per million volume °F = degree Fahrenheit inHG = inches mercury % = percentage Purge vol: 1.295 ft ³ Purge time: 38 sec @ 2 SCFM													


APPENDIX C

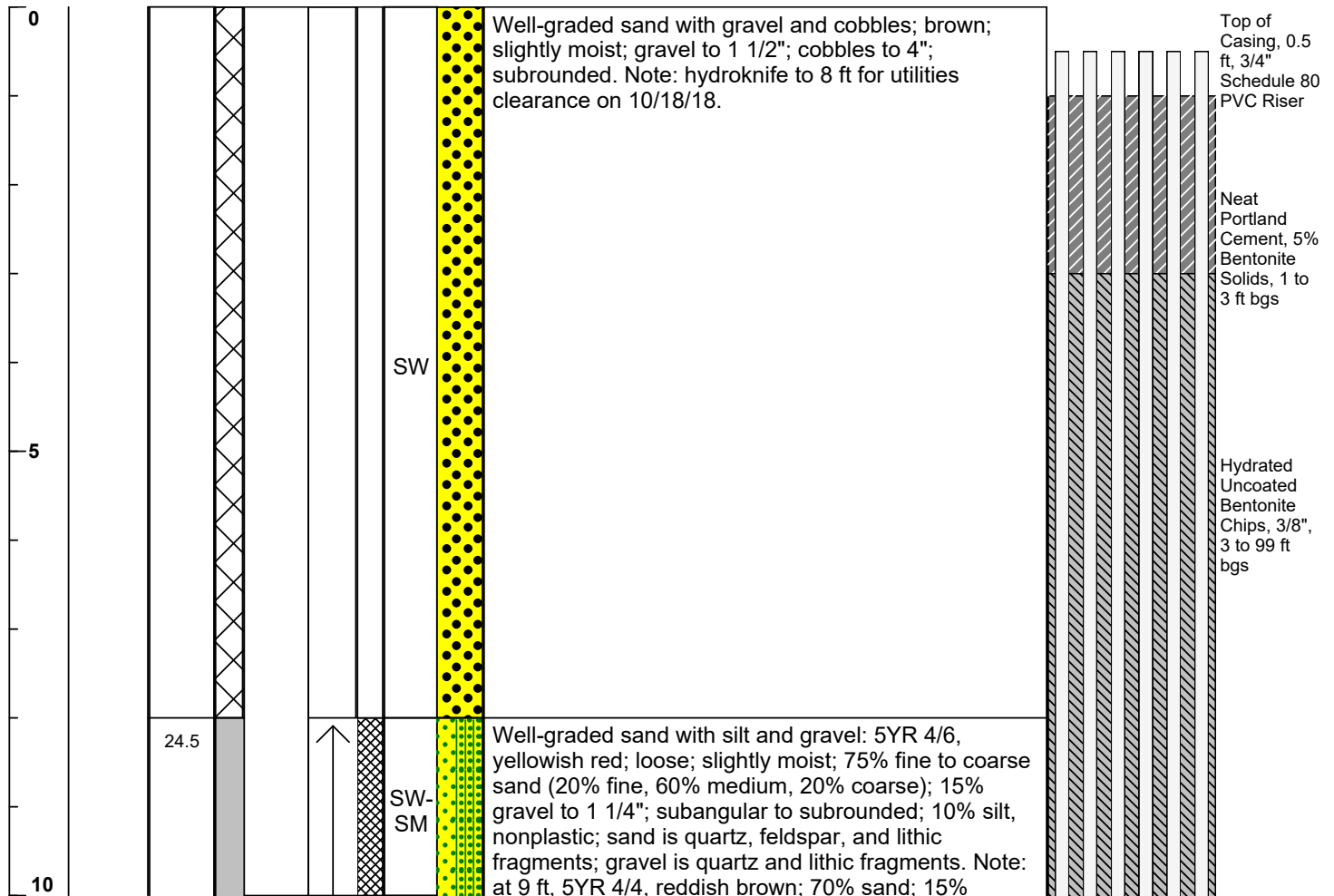
**LITHOLOGIC BORING LOGS AND WELL COMPLETION
DIAGRAMS FOR SOIL VAPOR MONITORING
WELLS KAFB-106V1 AND KAFB-106V2**

APPENDIX C

**LITHOLOGIC BORING LOGS AND WELL COMPLETION
DIAGRAMS FOR SOIL VAPOR MONITORING
WELLS KAFB-106V1 AND KAFB-106V2**




LITHOLOGIC BORING LOGS

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019	WELL LOG Well ID: KAFB-106V1 Page: 1 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



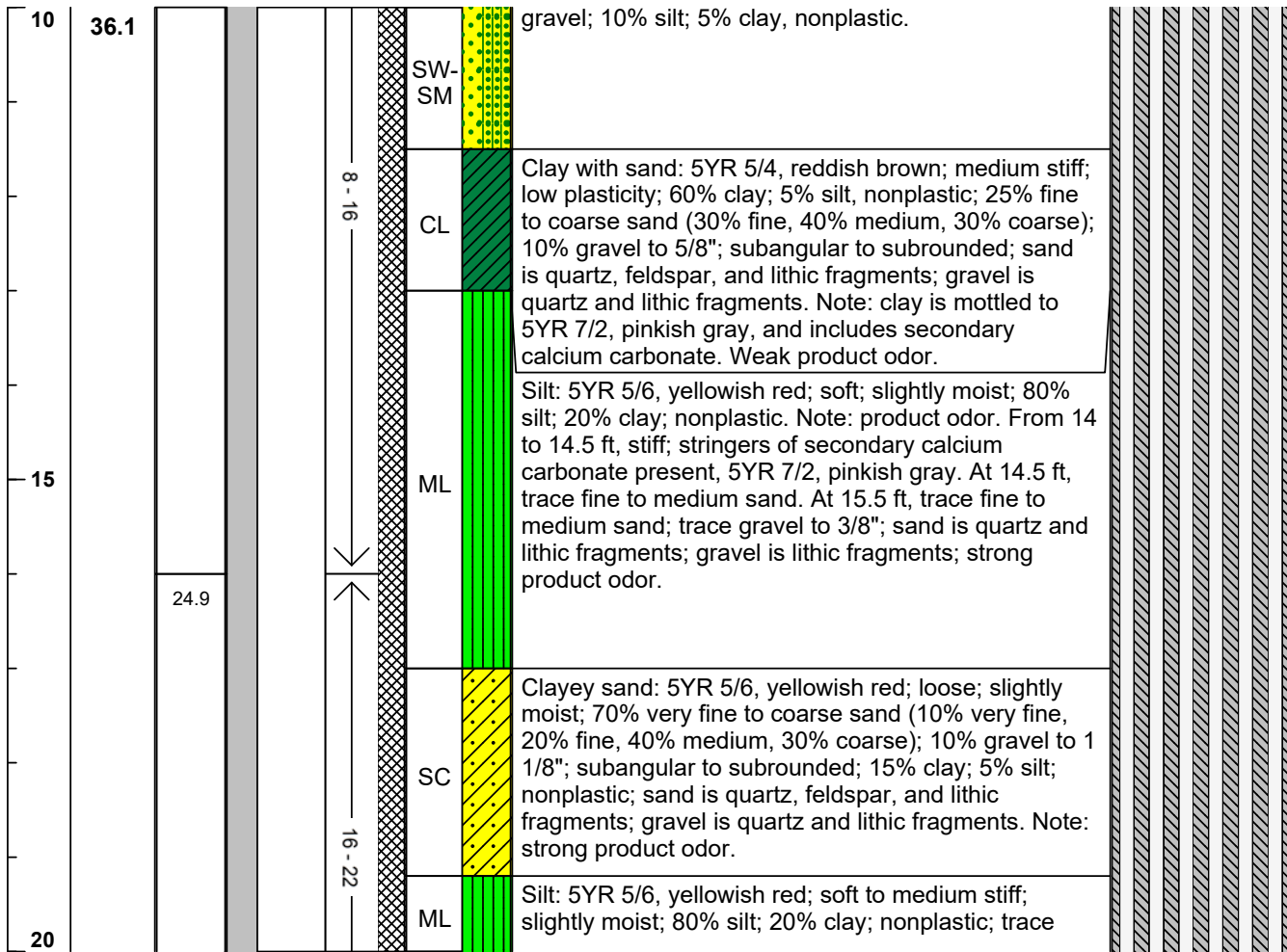
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **2 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

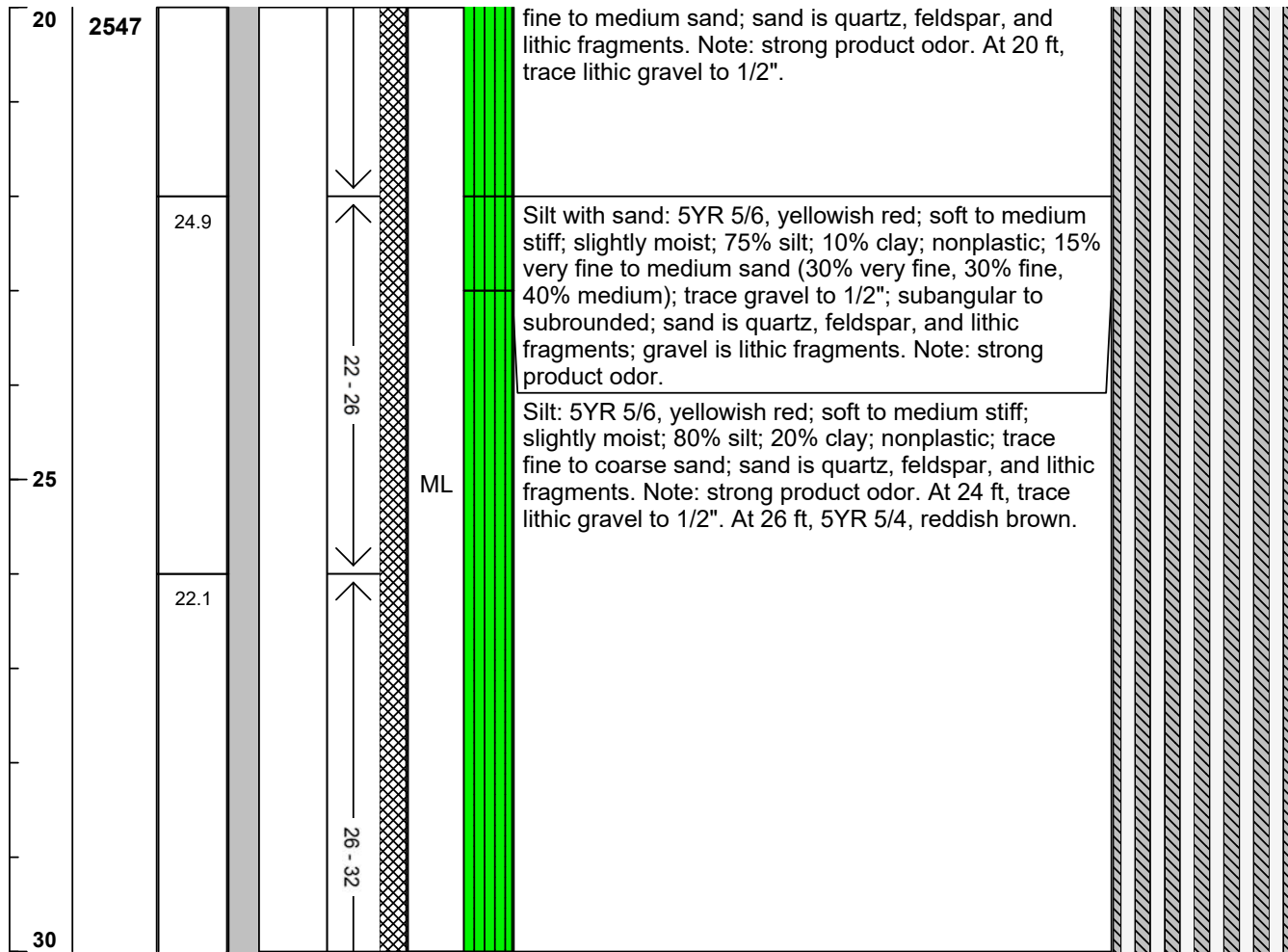
	Not Tested		None
	Interval Fluoresced		

Core Recovery




	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019	WELL LOG Well ID: KAFB-106V1 Page: 3 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



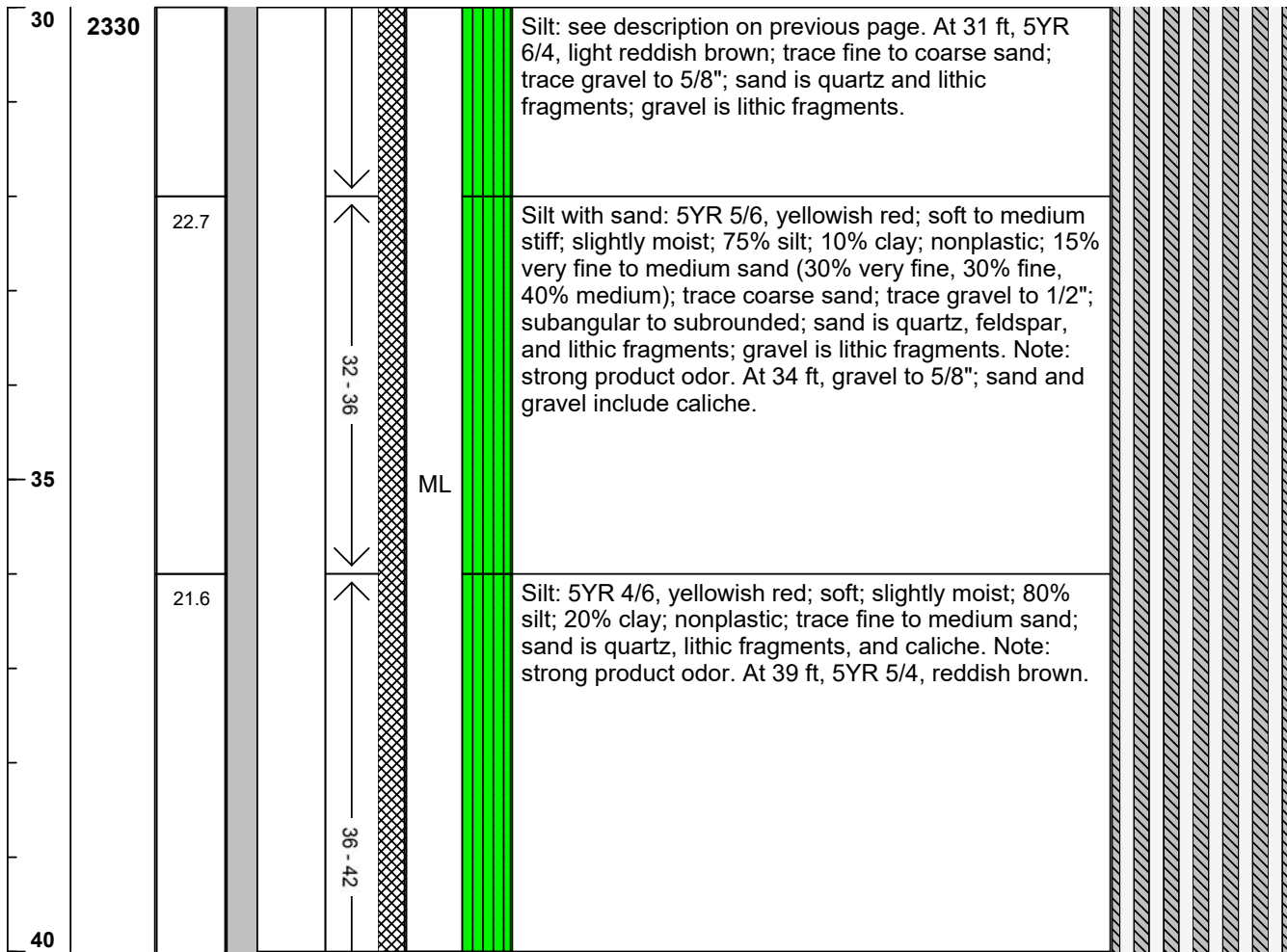
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **4 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



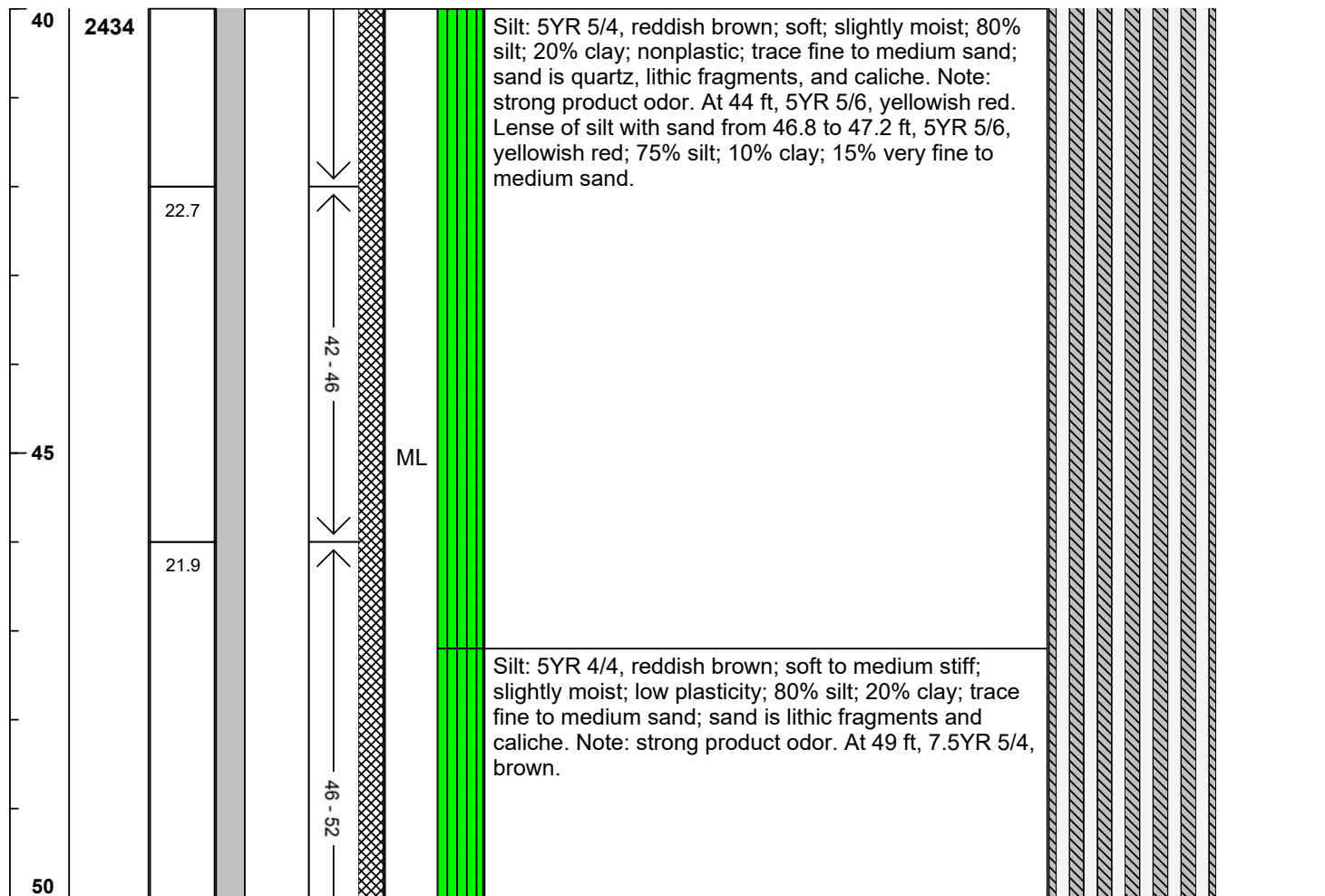
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **5 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



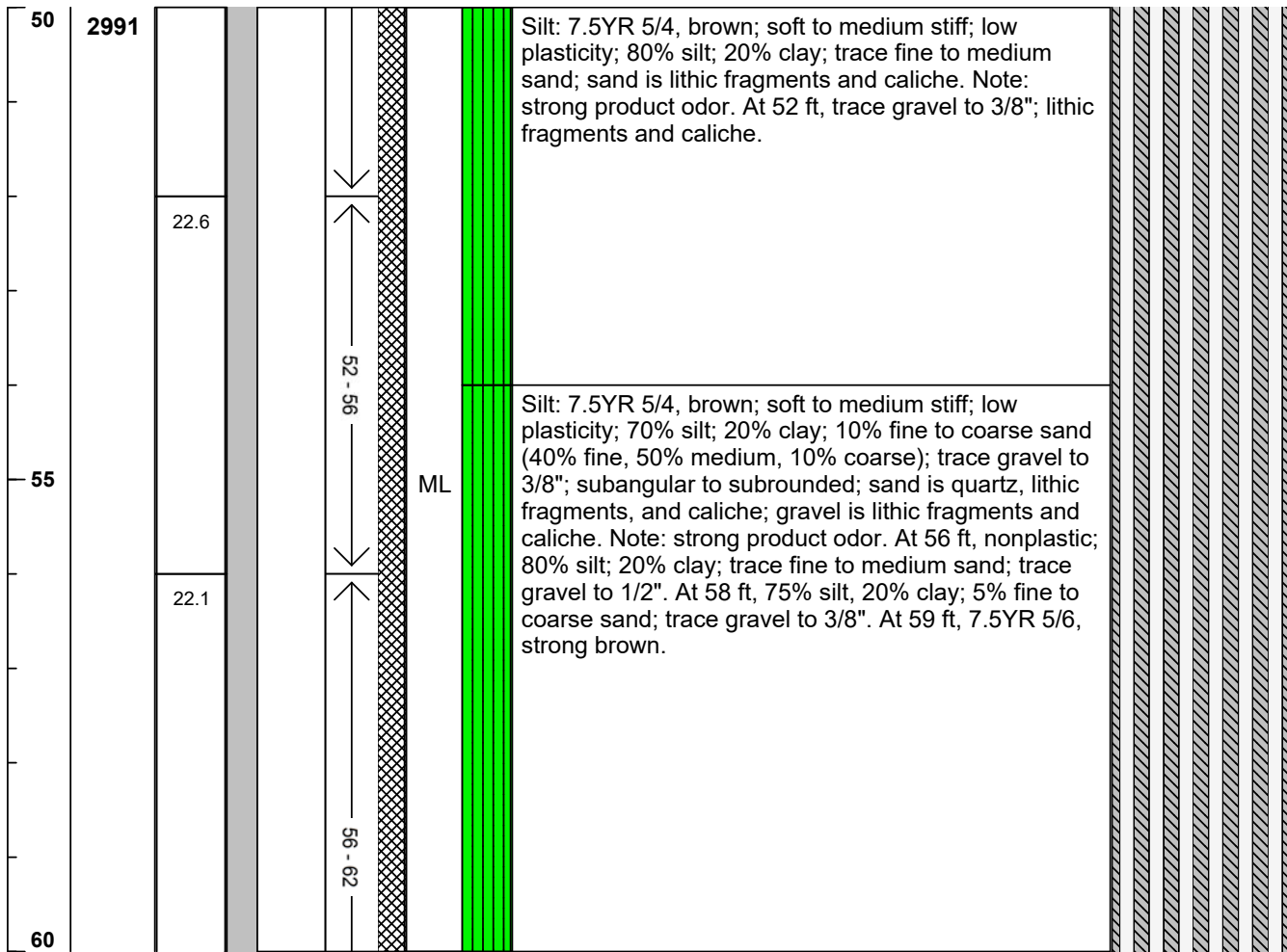
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **6 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



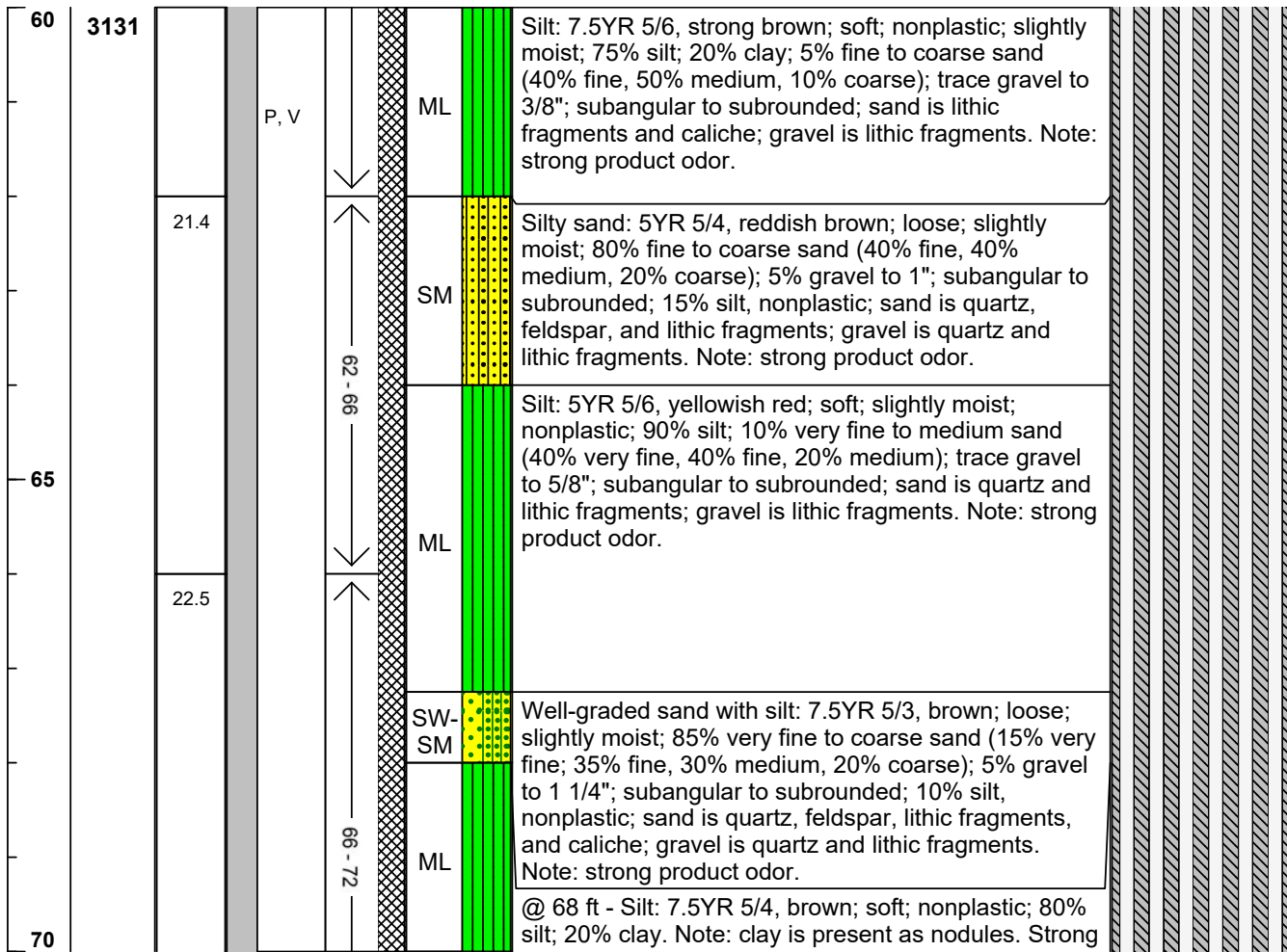
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **7 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

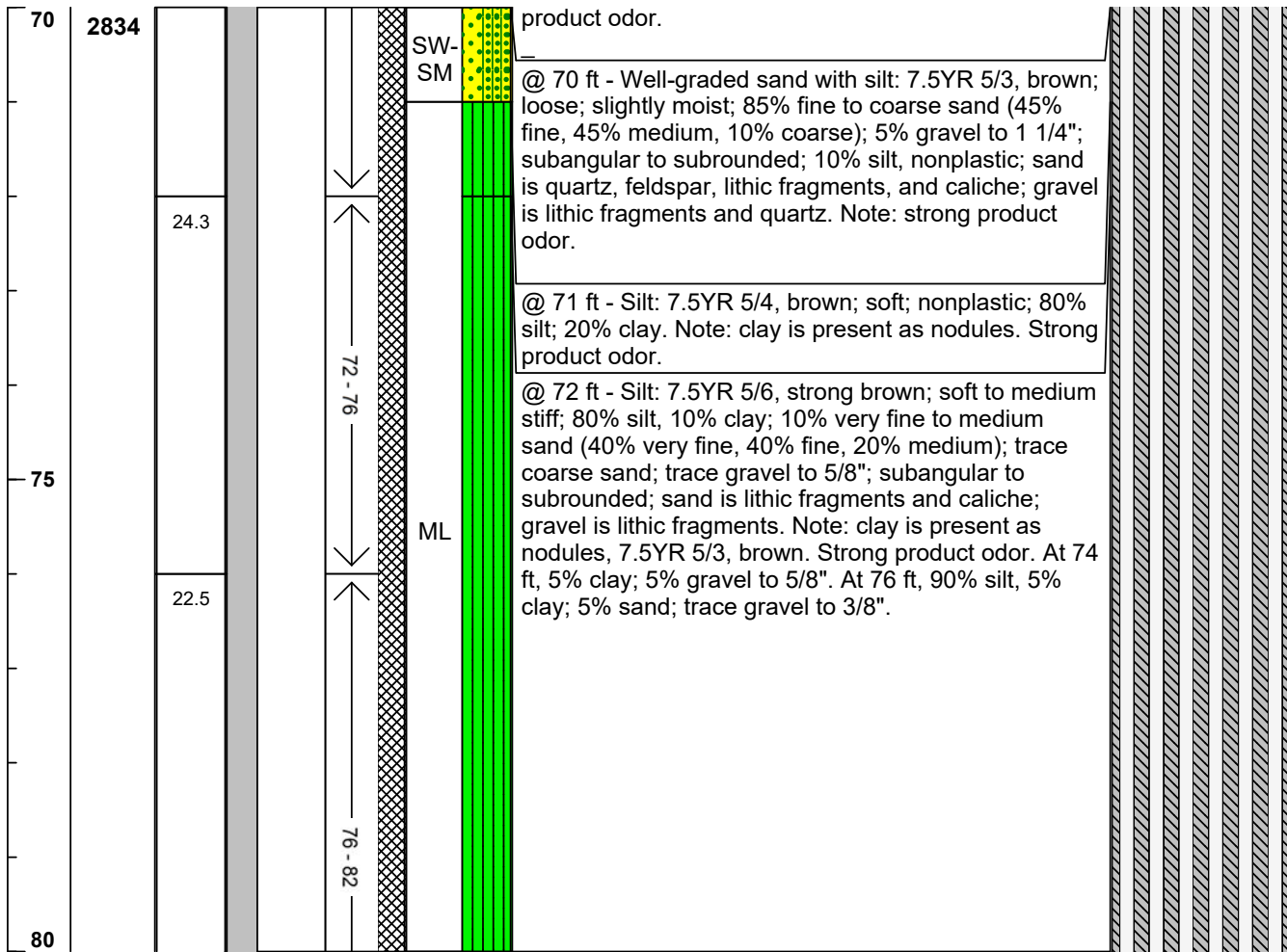


Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG
 Well ID: **KAFB-106V1**
 Page: **8 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



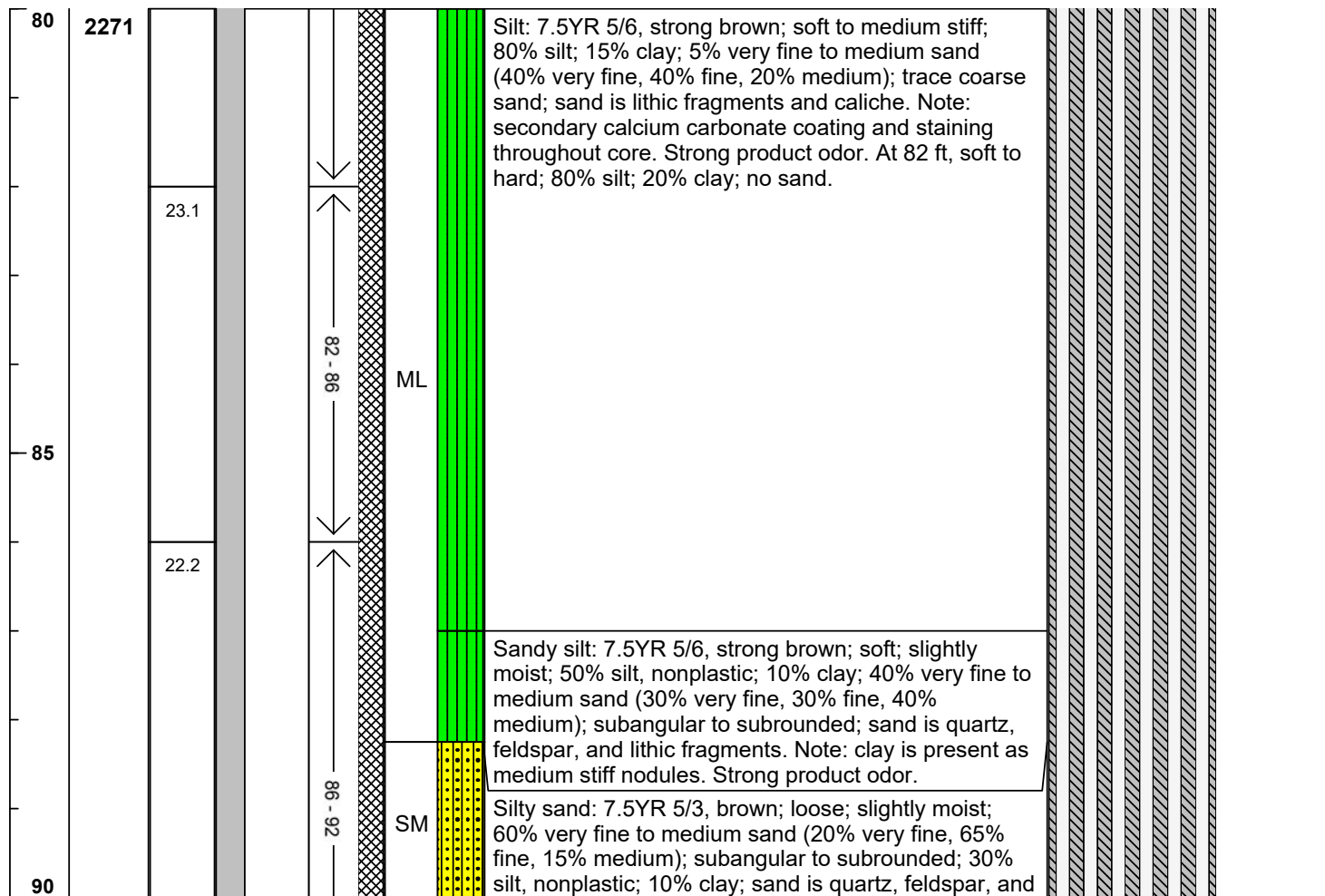
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **9 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

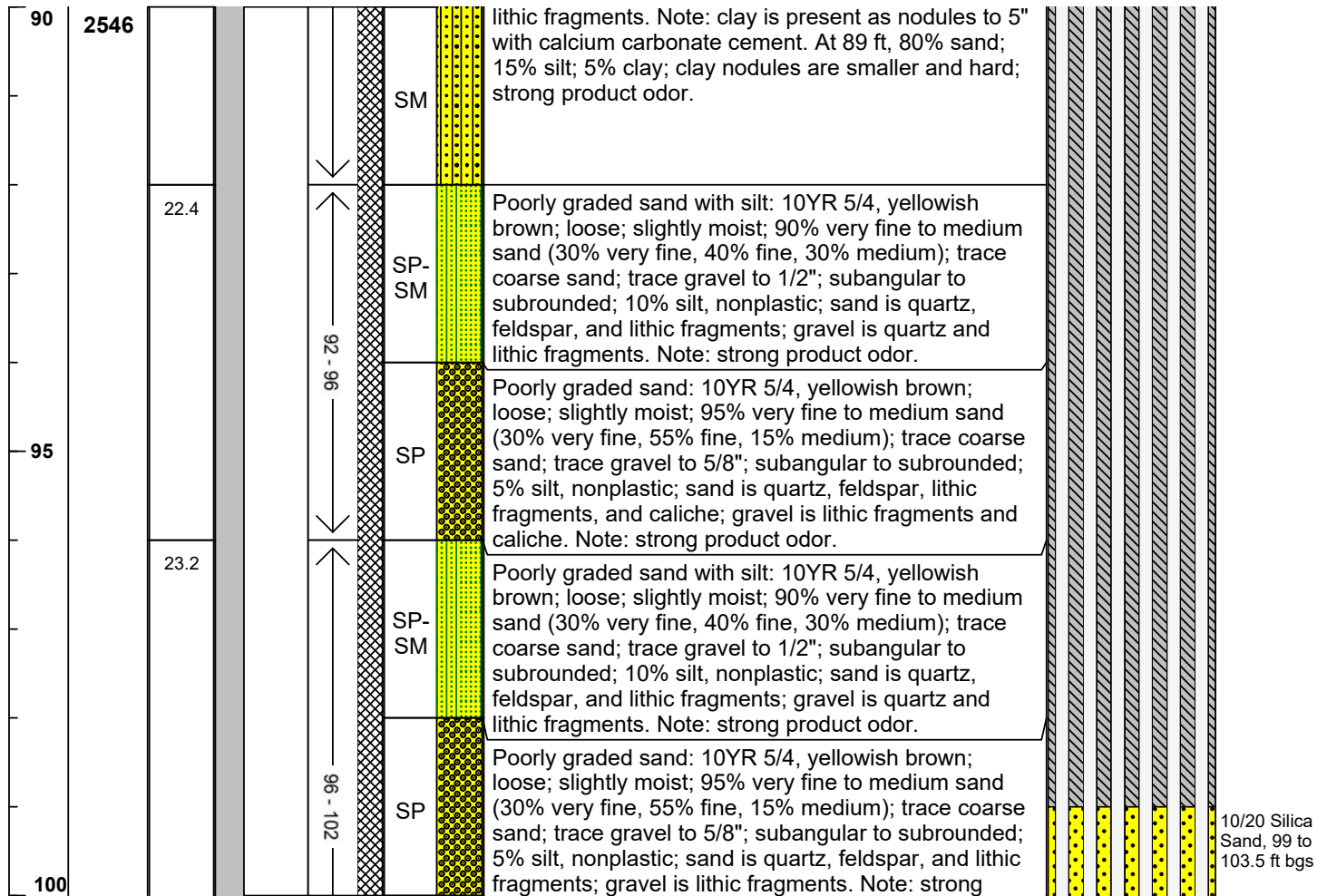
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V1							
	Start Date: 12/16/2018	Page: 10 of 29								
	Completion Date: 1/24/2019									
Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,								
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

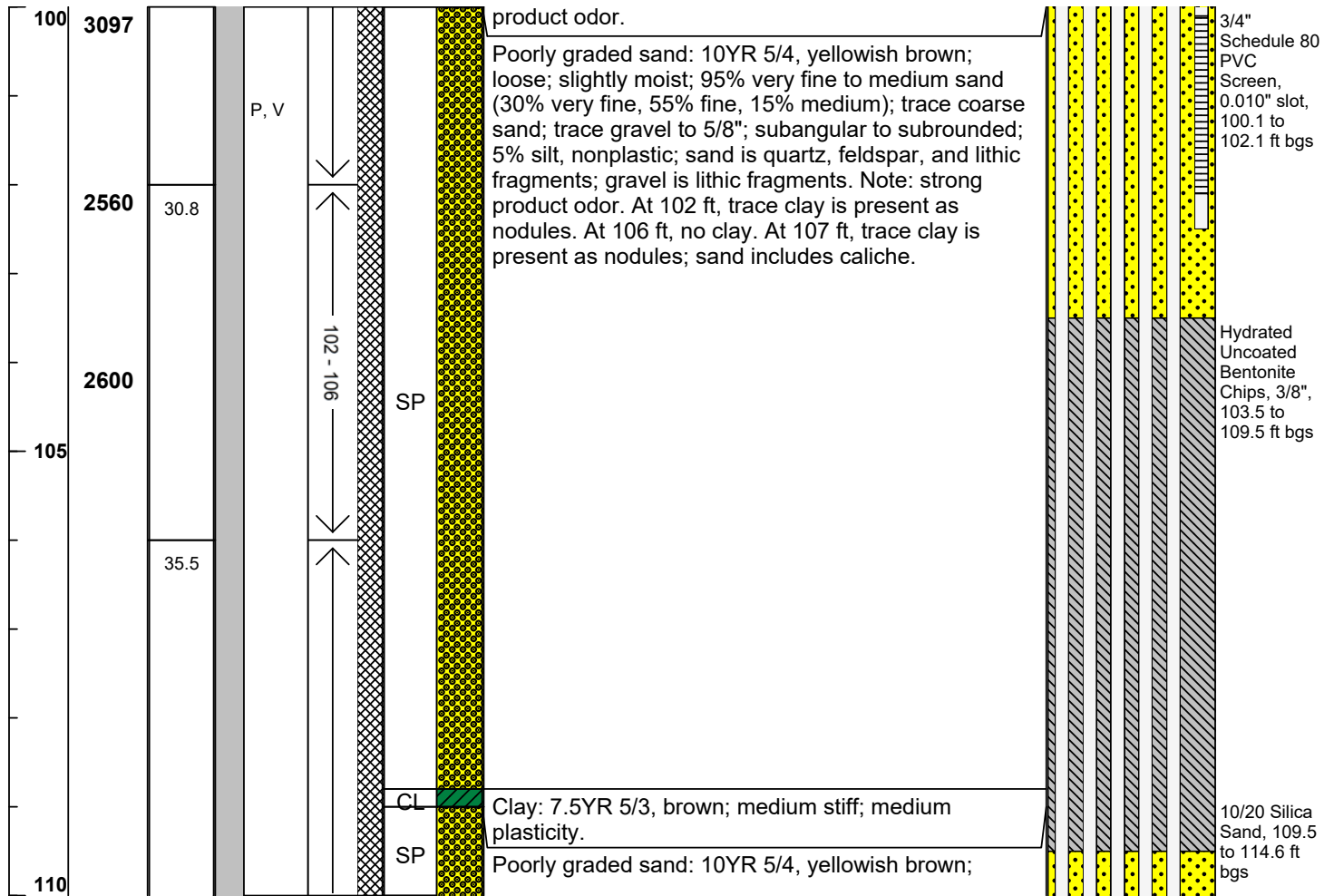
	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.




	Project: 62735DM02.1017	<h2 style="margin: 0;">WELL LOG</h2>
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/16/2018	
	Completion Date: 1/24/2019	




Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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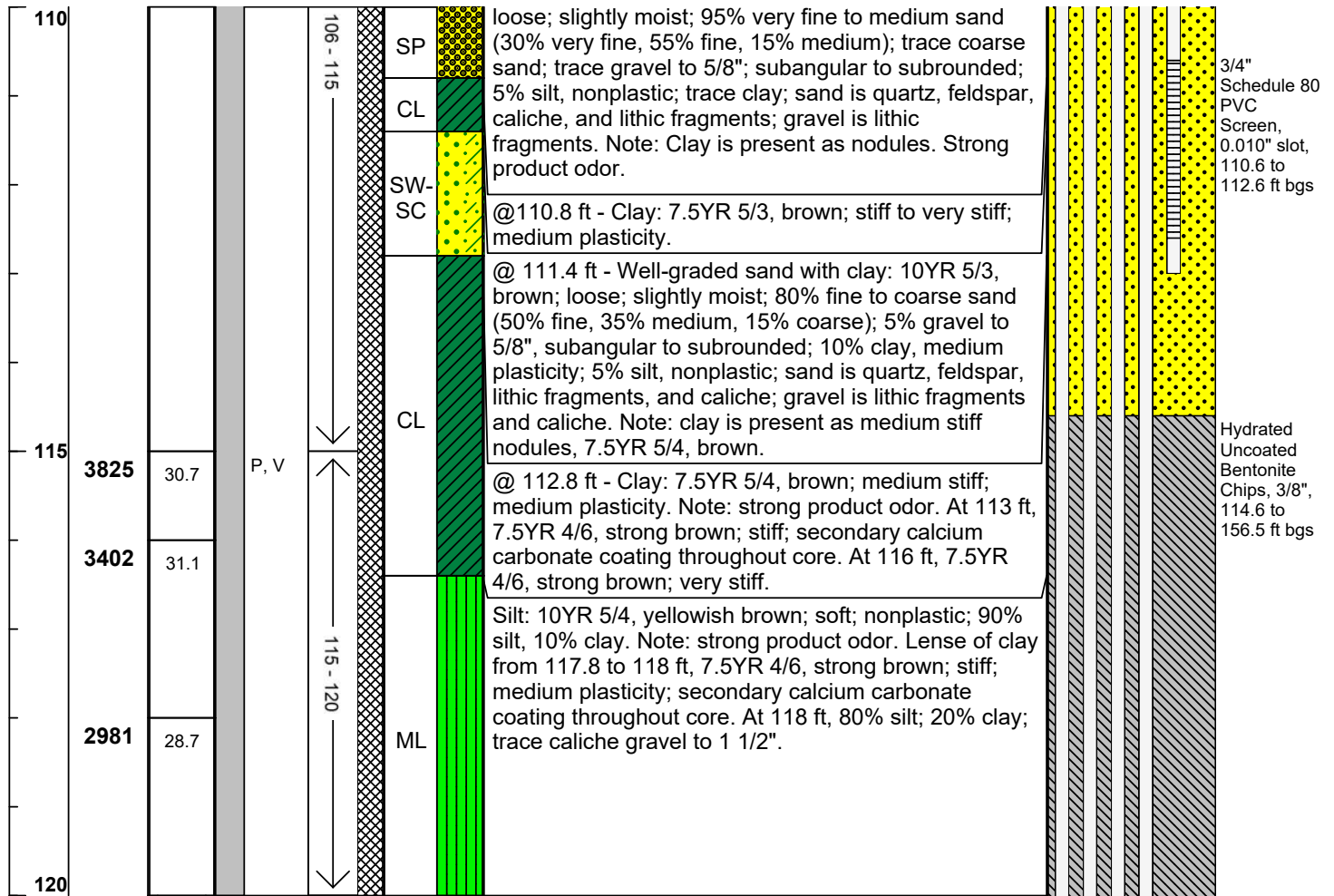
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None




Core Recovery	
	No Recovery
	Disturbed Core
	Complete




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V1							
	Start Date: 12/16/2018	Page: 12 of 29								
	Completion Date: 1/24/2019									
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger		Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC								
		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



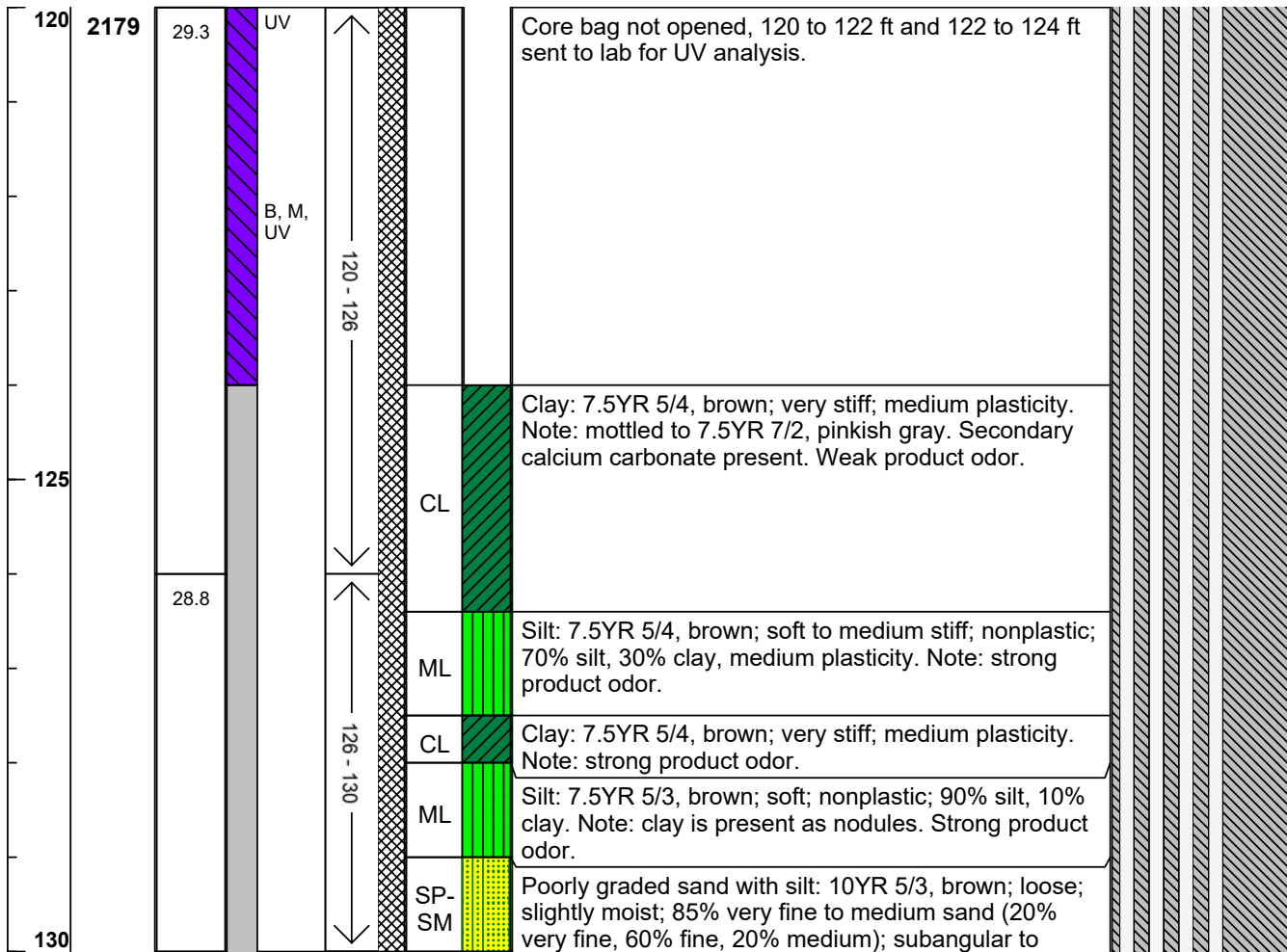
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **13 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



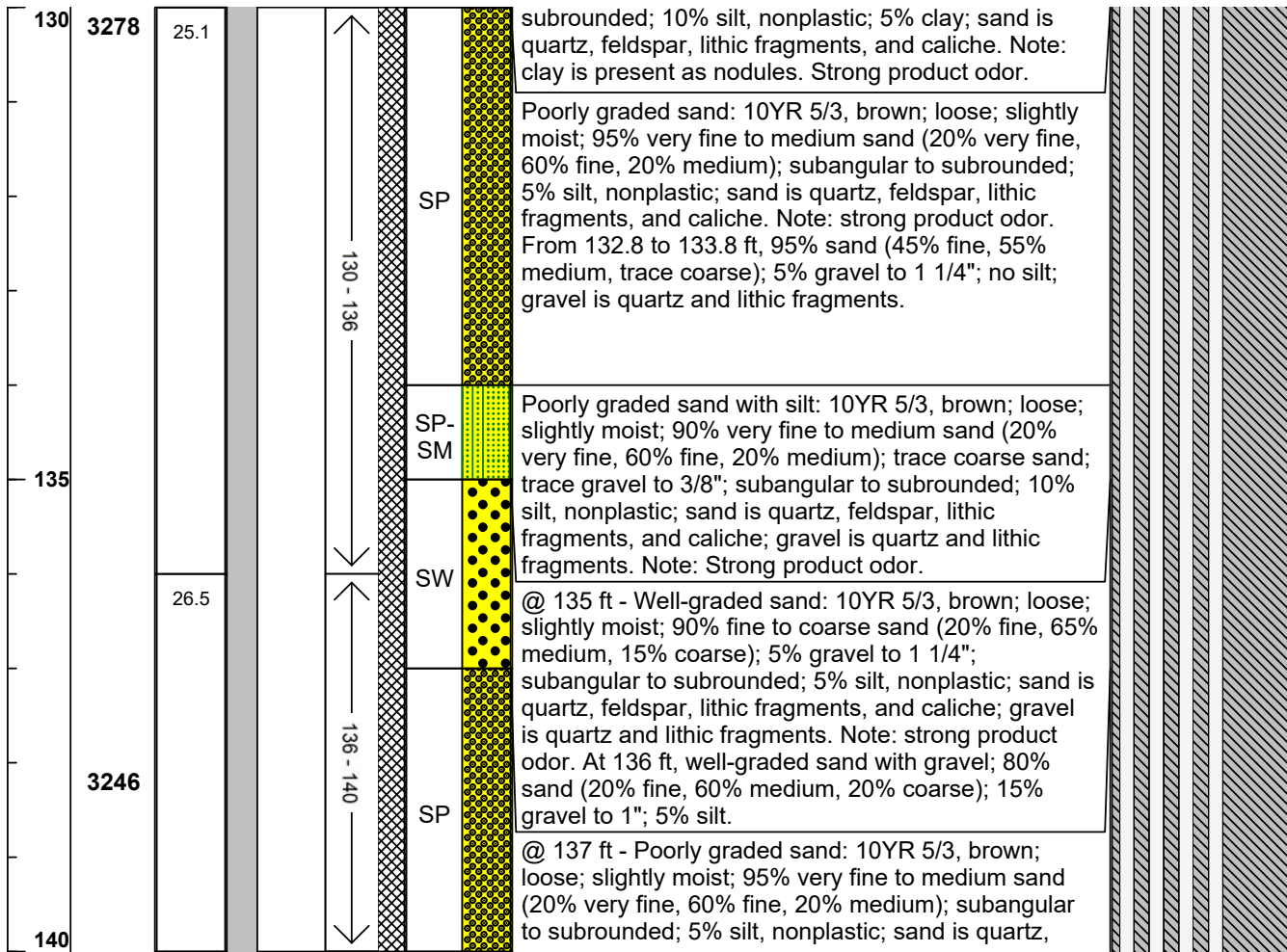
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **14 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



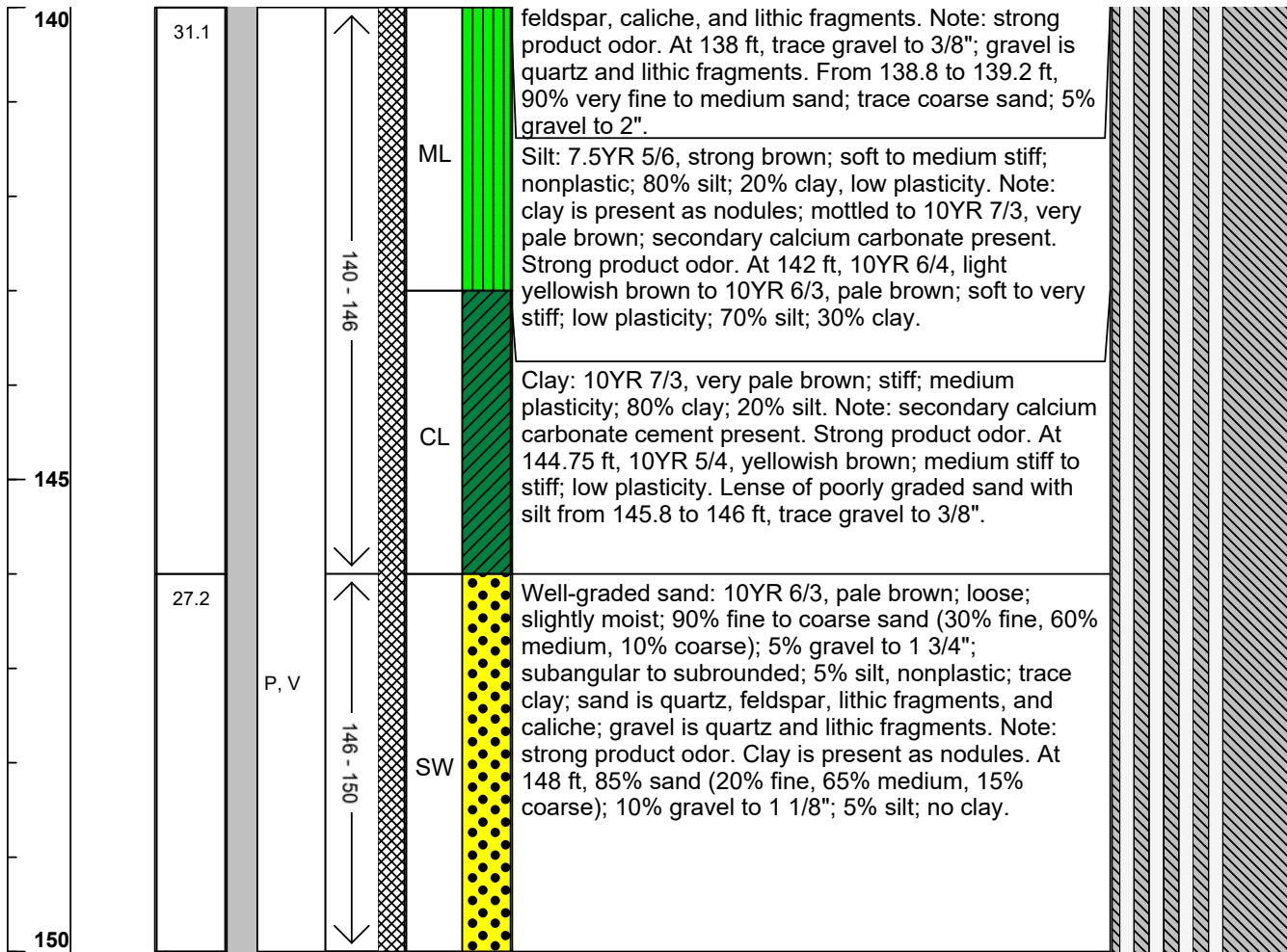
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **15 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

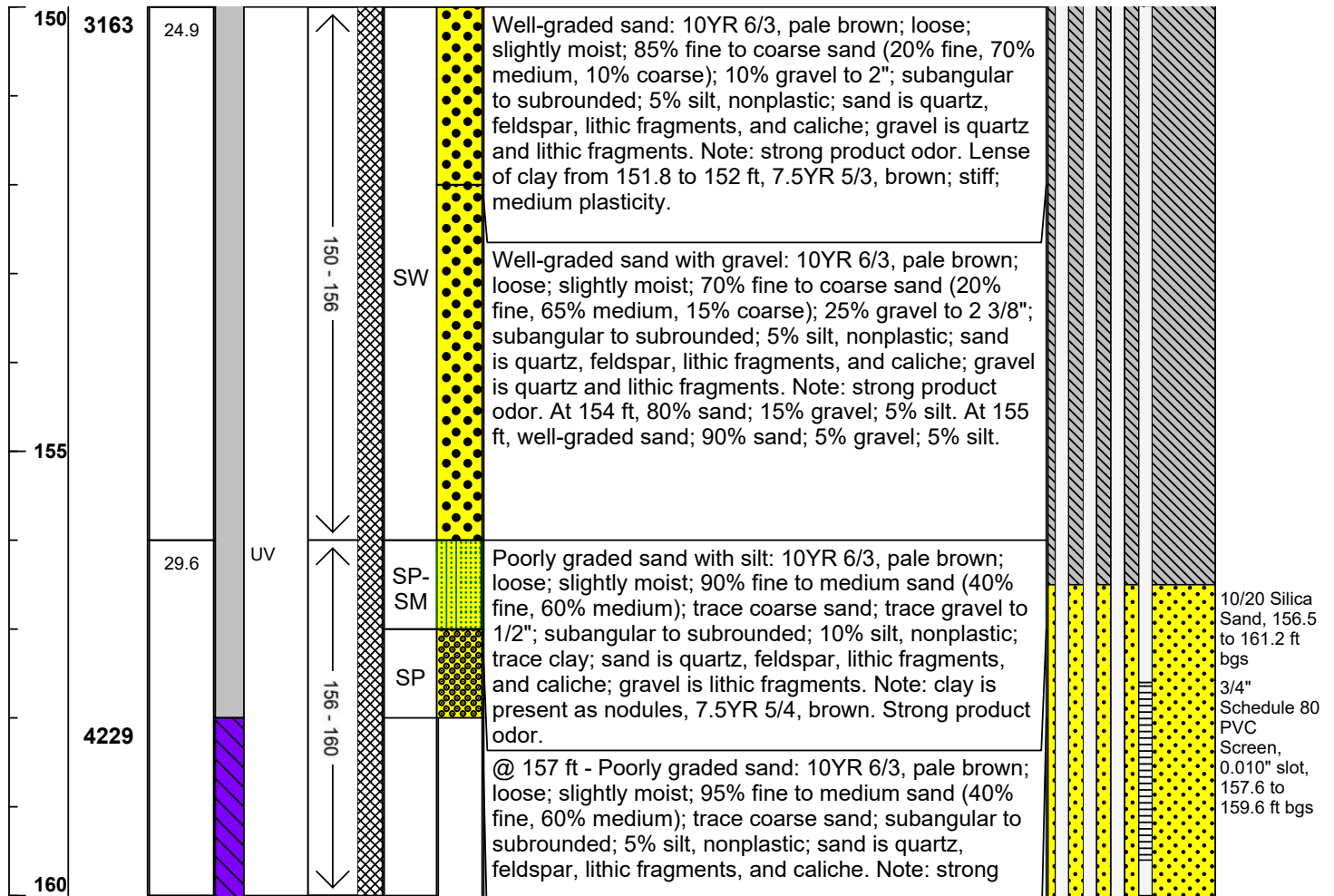
	Not Tested		None
	Interval Fluoresced		

Core Recovery




	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019	WELL LOG Well ID: KAFB-106V1 Page: 16 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details




Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

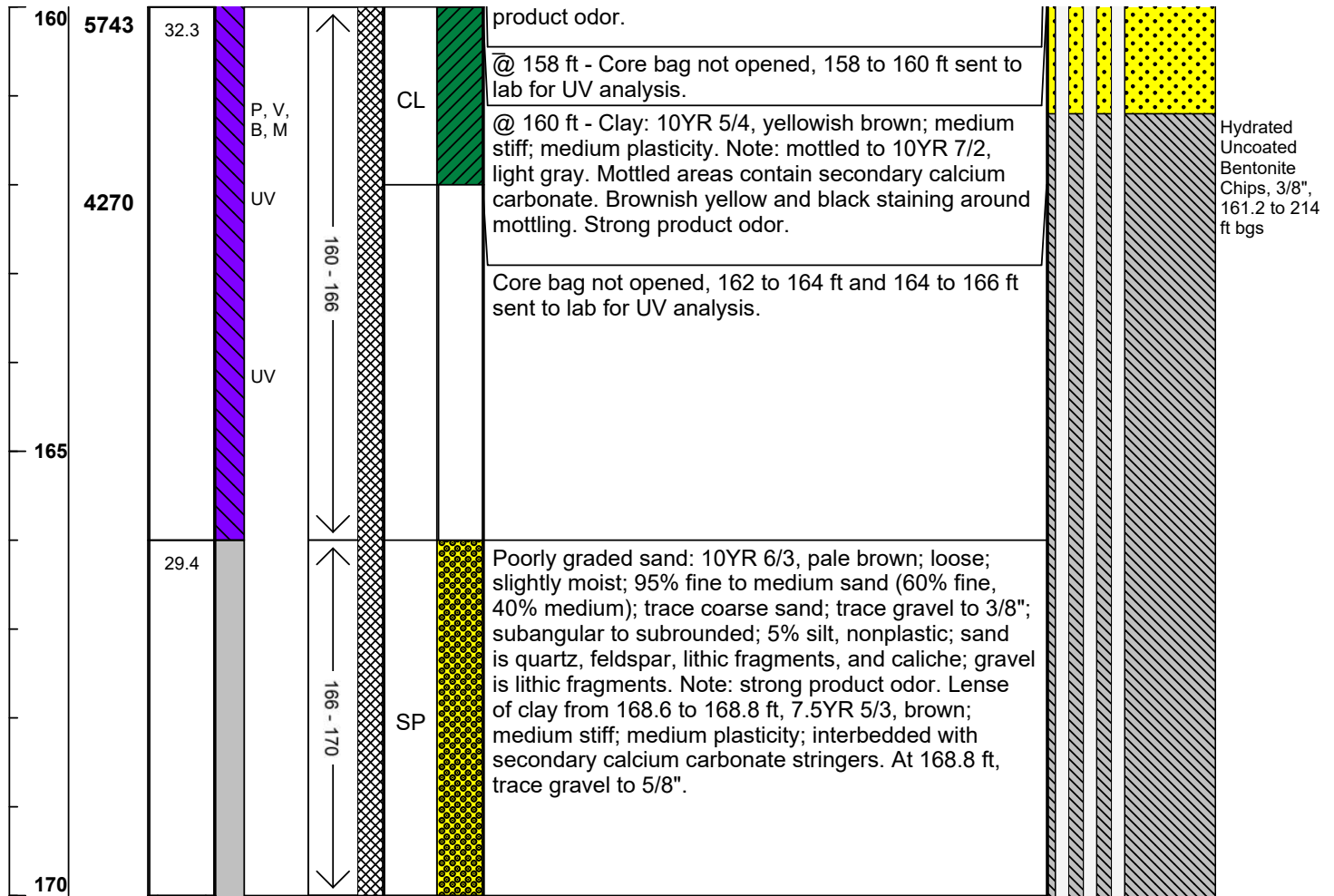
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG Well ID: KAFB-106V1 Page: 17 of 29
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/16/2018	
	Completion Date: 1/24/2019	

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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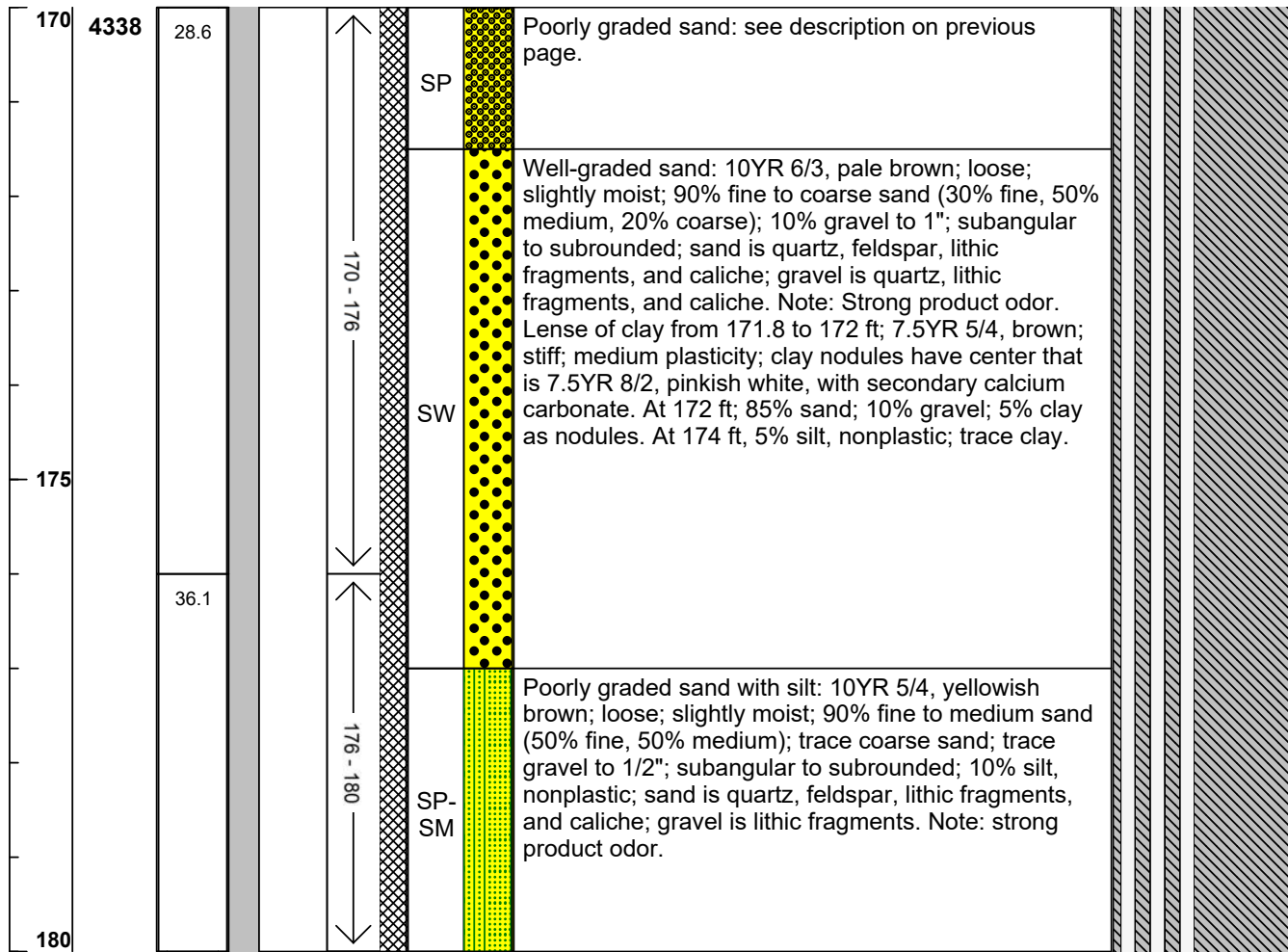
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019		WELL LOG Well ID: KAFB-106V1 Page: 18 of 29						
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



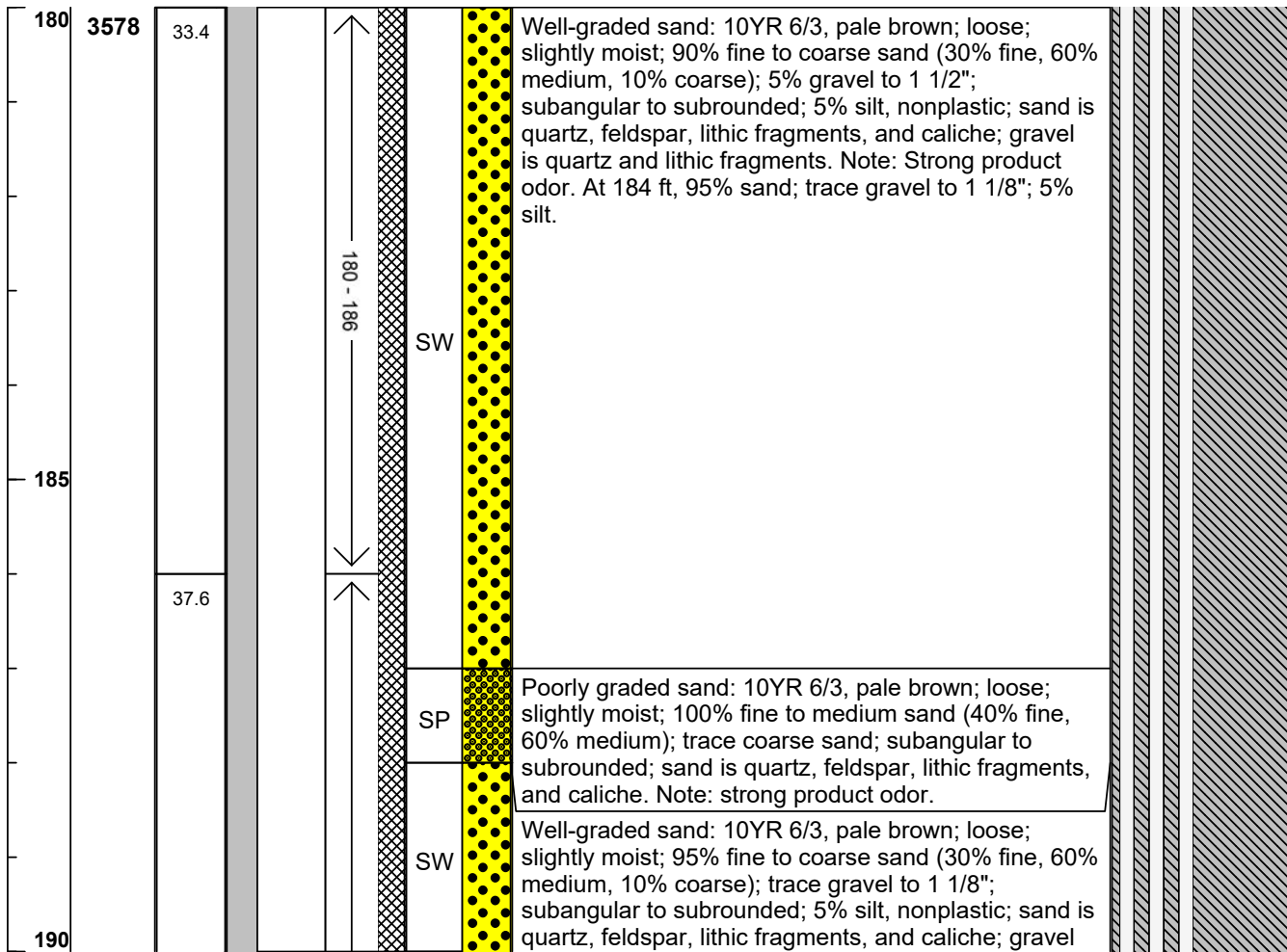
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
 Page: **19 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

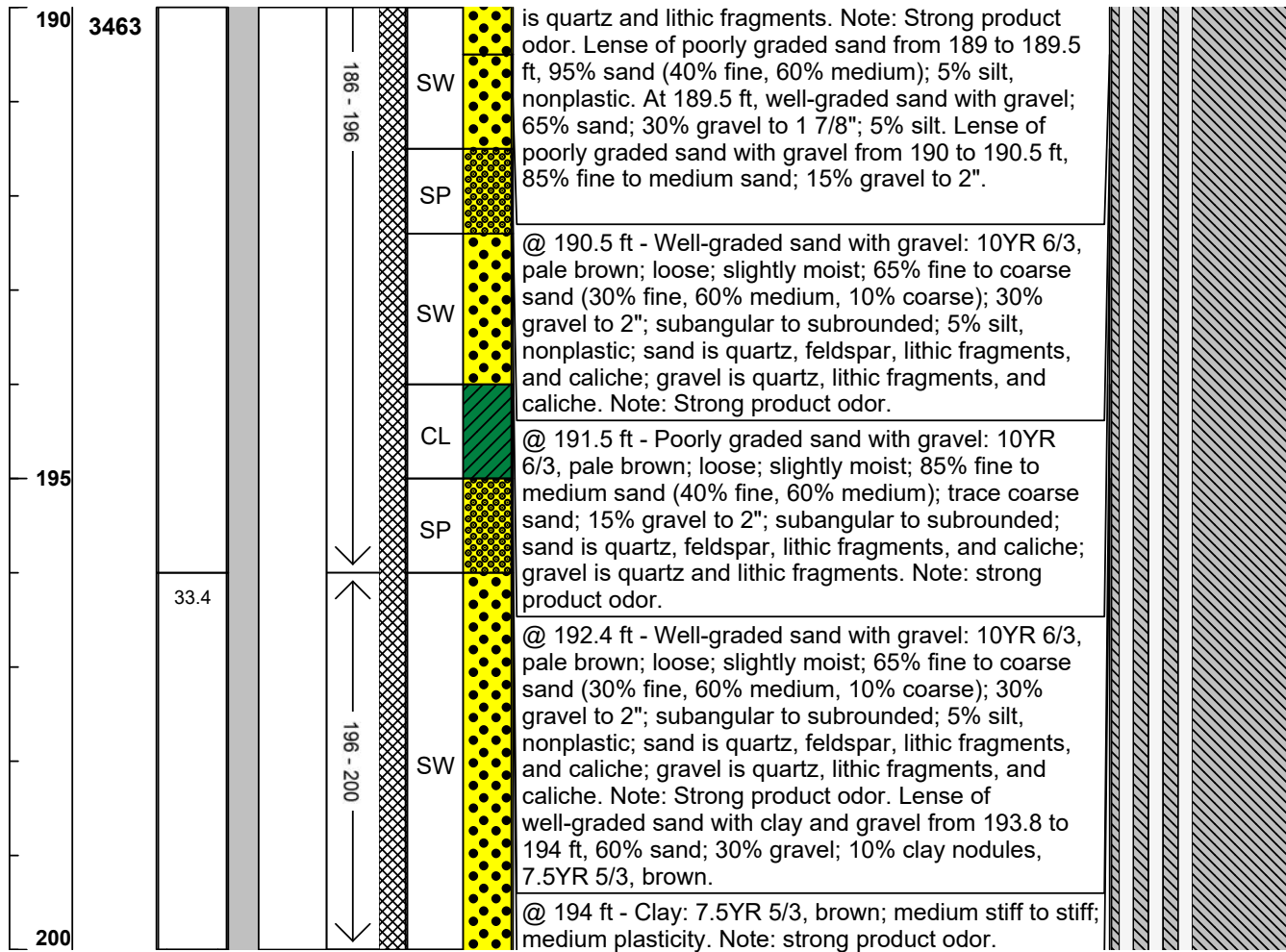
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019		WELL LOG Well ID: KAFB-106V1 Page: 20 of 29						
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

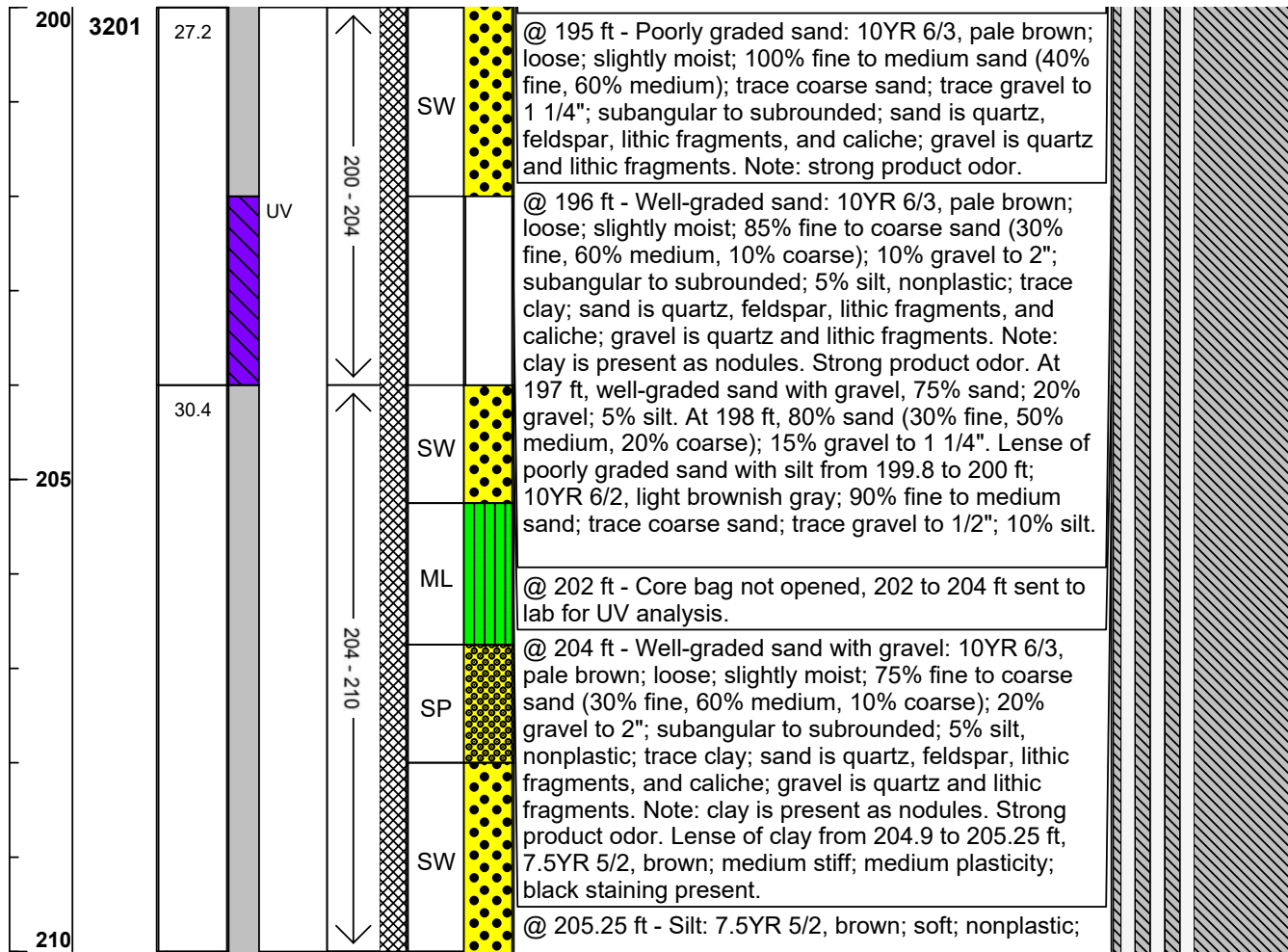
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019		WELL LOG Well ID: KAFB-106V1 Page: 21 of 29						
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

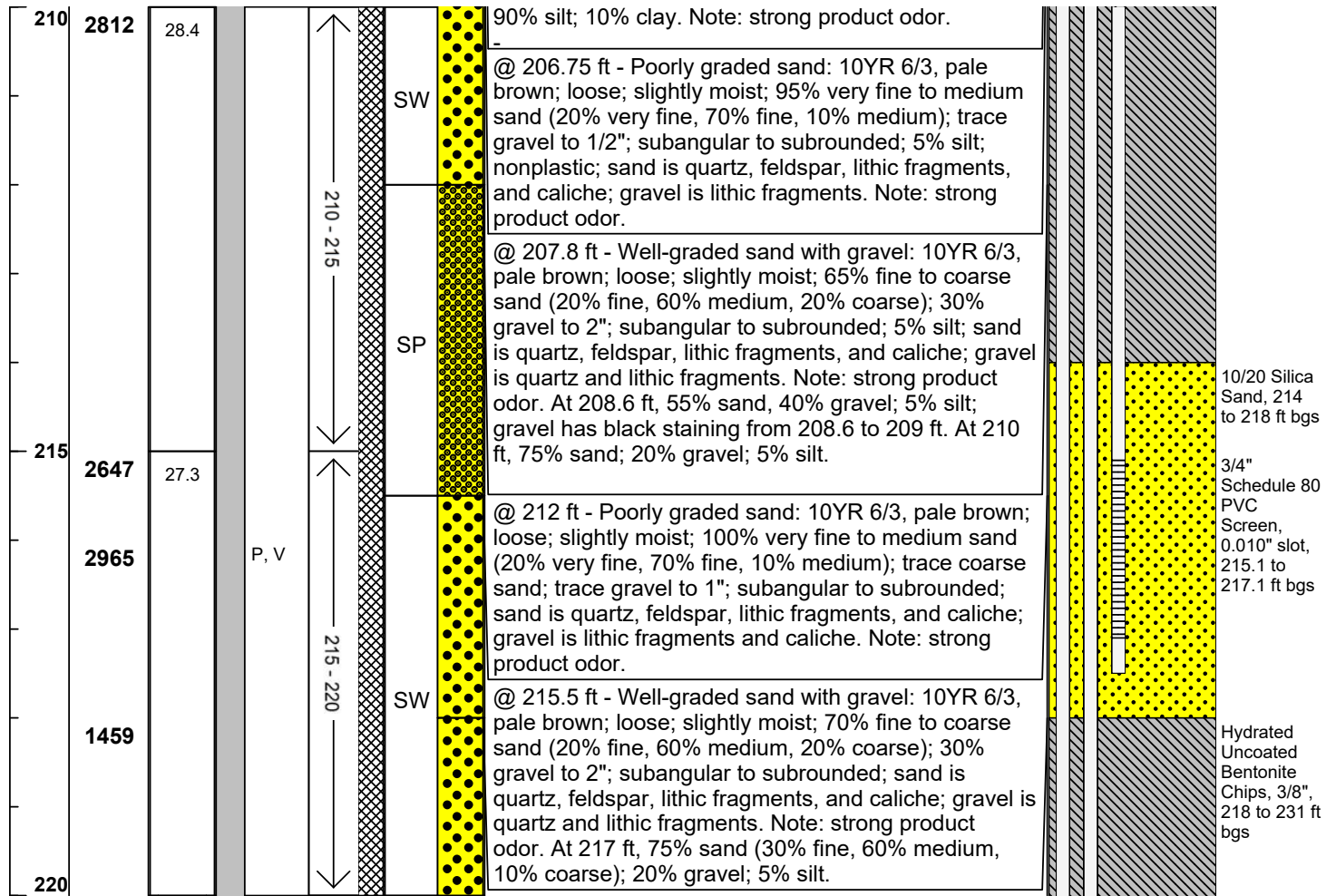
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V1							
	Start Date: 12/16/2018	Page: 22 of 29								
	Completion Date: 1/24/2019									
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger		Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC								
		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

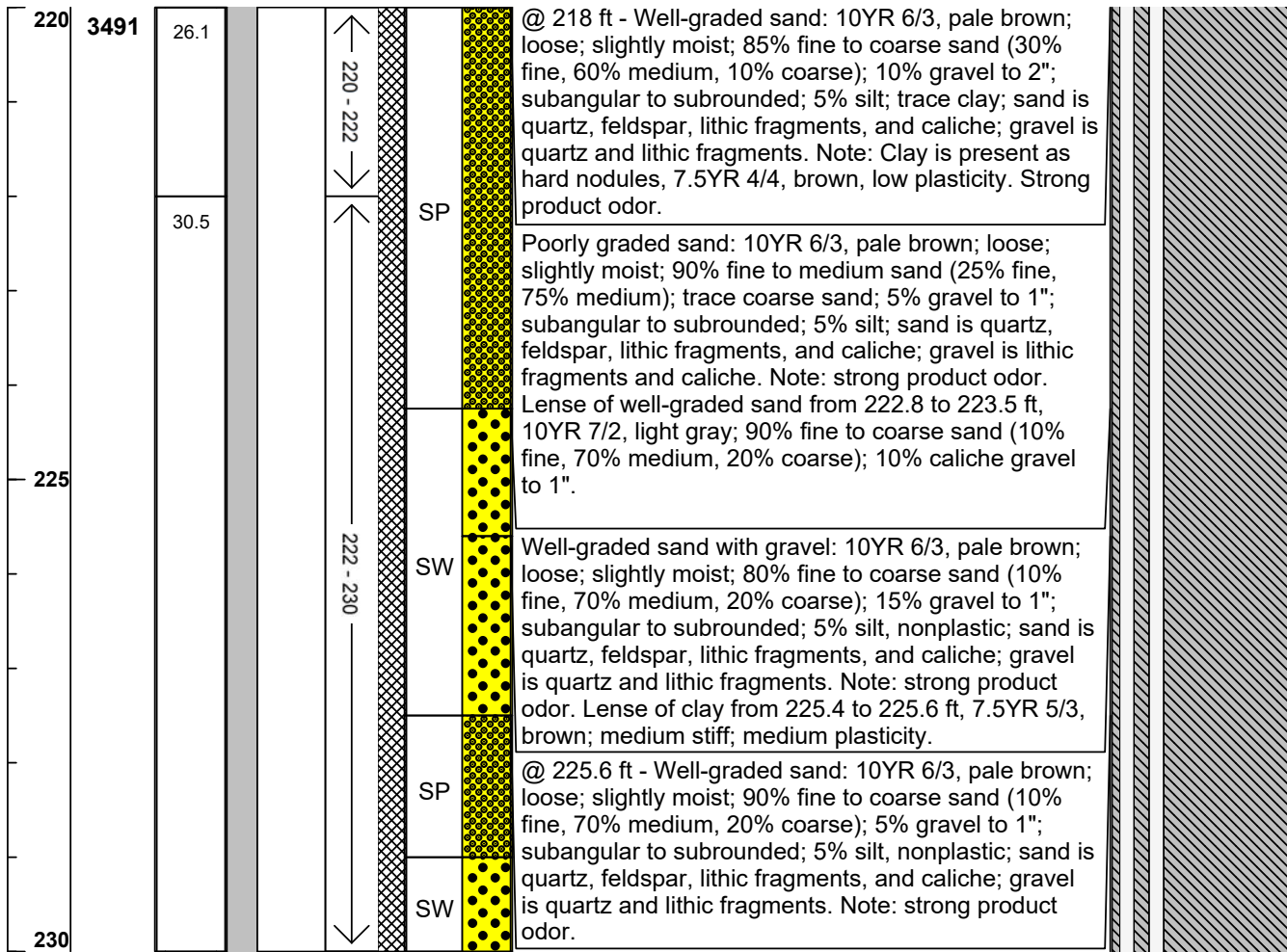


Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/16/2018**
 Completion Date: **1/24/2019**

WELL LOG
 Well ID: **KAFB-106V1**
 Page: **23 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

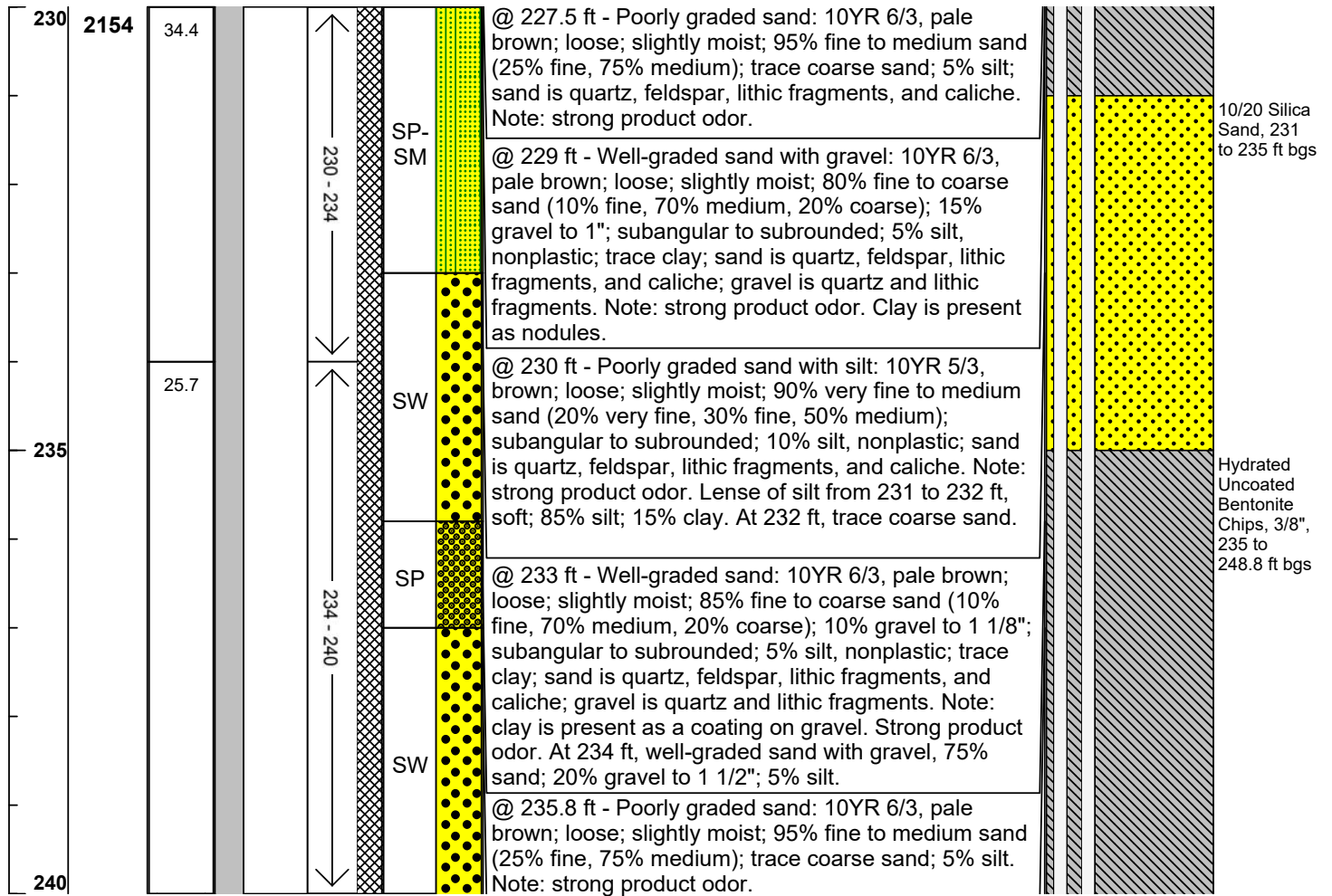
	Not Tested		None
	Interval Fluoresced		

Core Recovery




	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V1							
	Start Date: 12/16/2018	Page: 24 of 29								
	Completion Date: 1/24/2019									
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger		Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC								
		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details




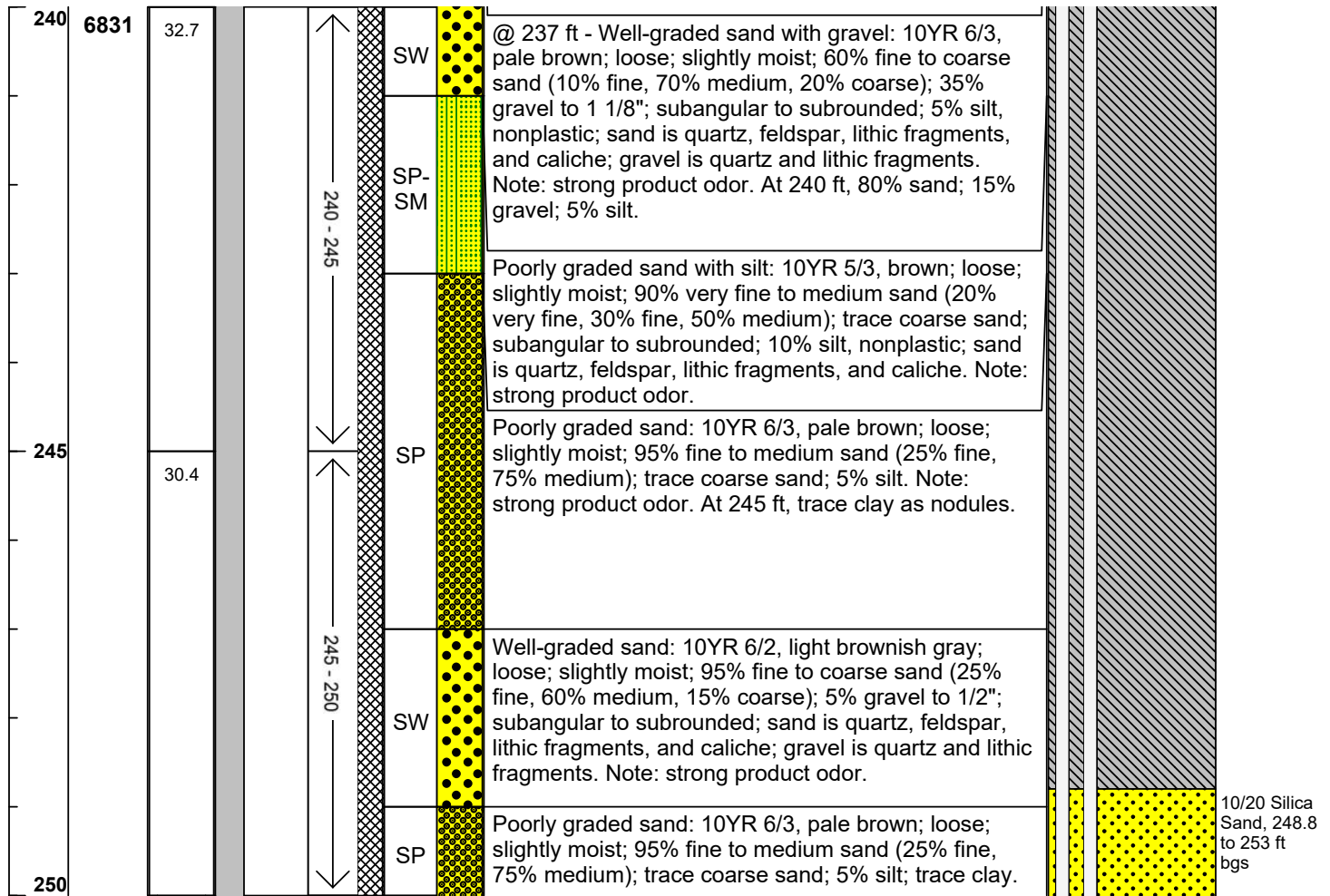
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019	WELL LOG Well ID: KAFB-106V1 Page: 25 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

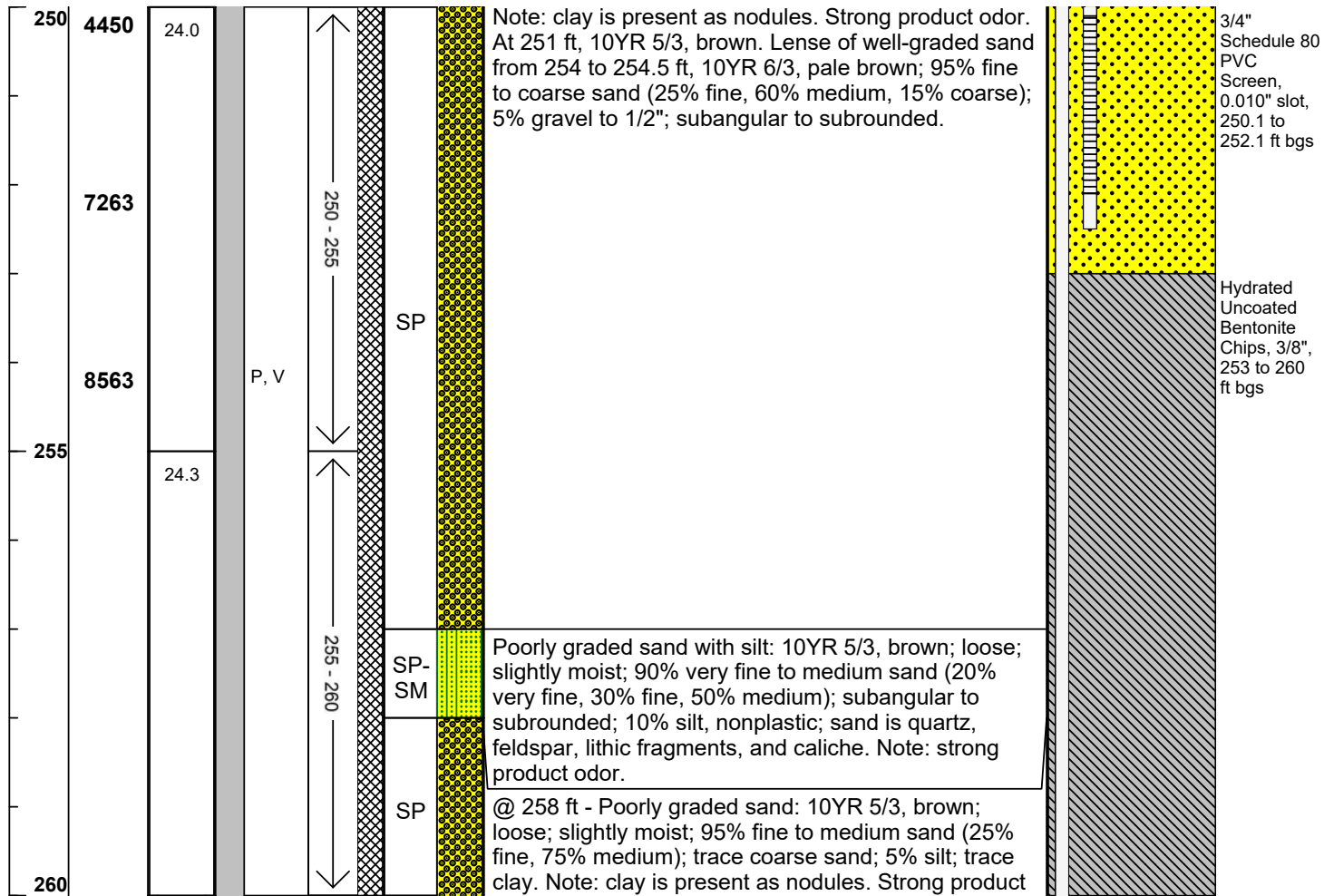
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V1							
	Start Date: 12/16/2018	Page: 26 of 29								
	Completion Date: 1/24/2019									
Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,								
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

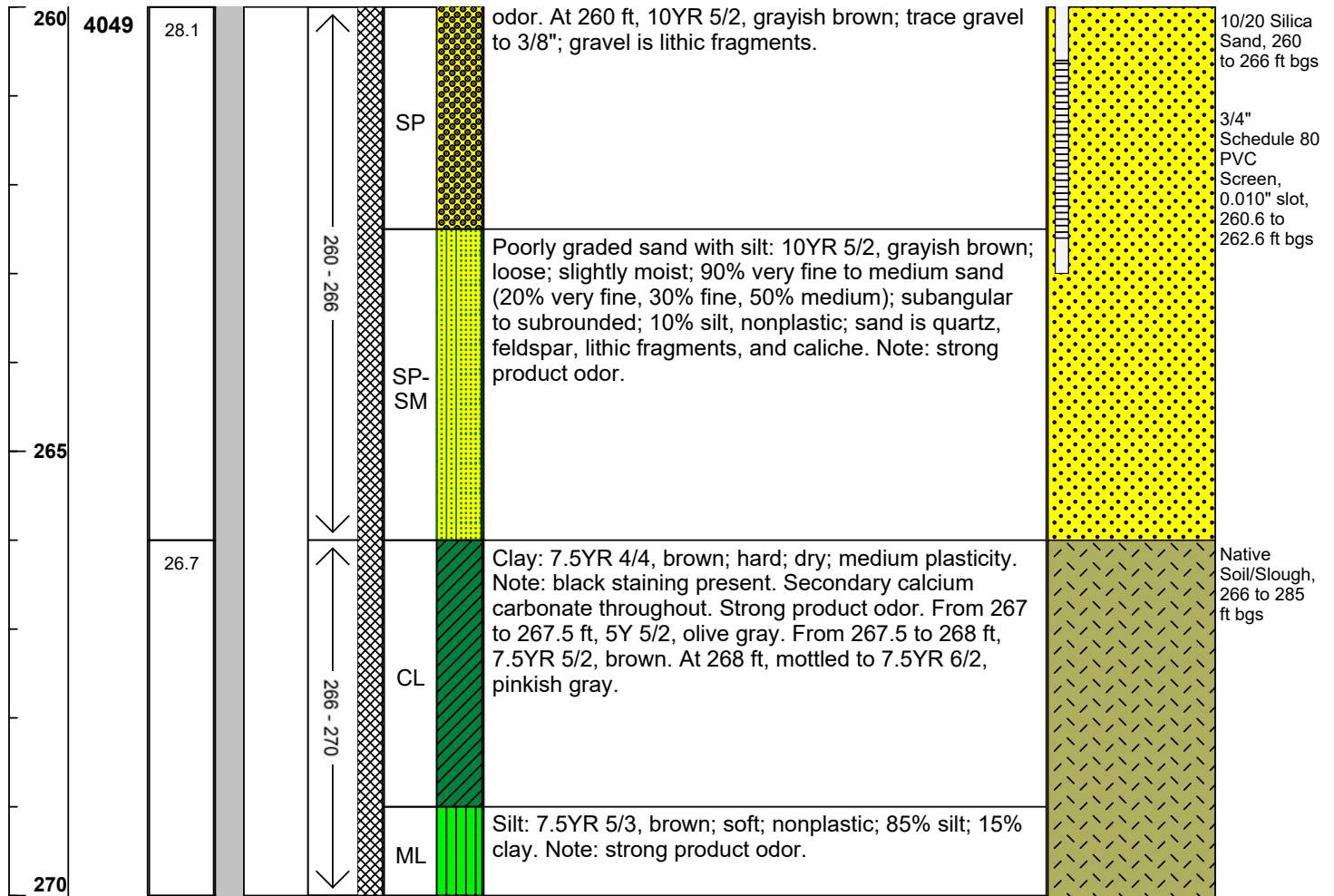
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019	WELL LOG Well ID: KAFB-106V1 Page: 27 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

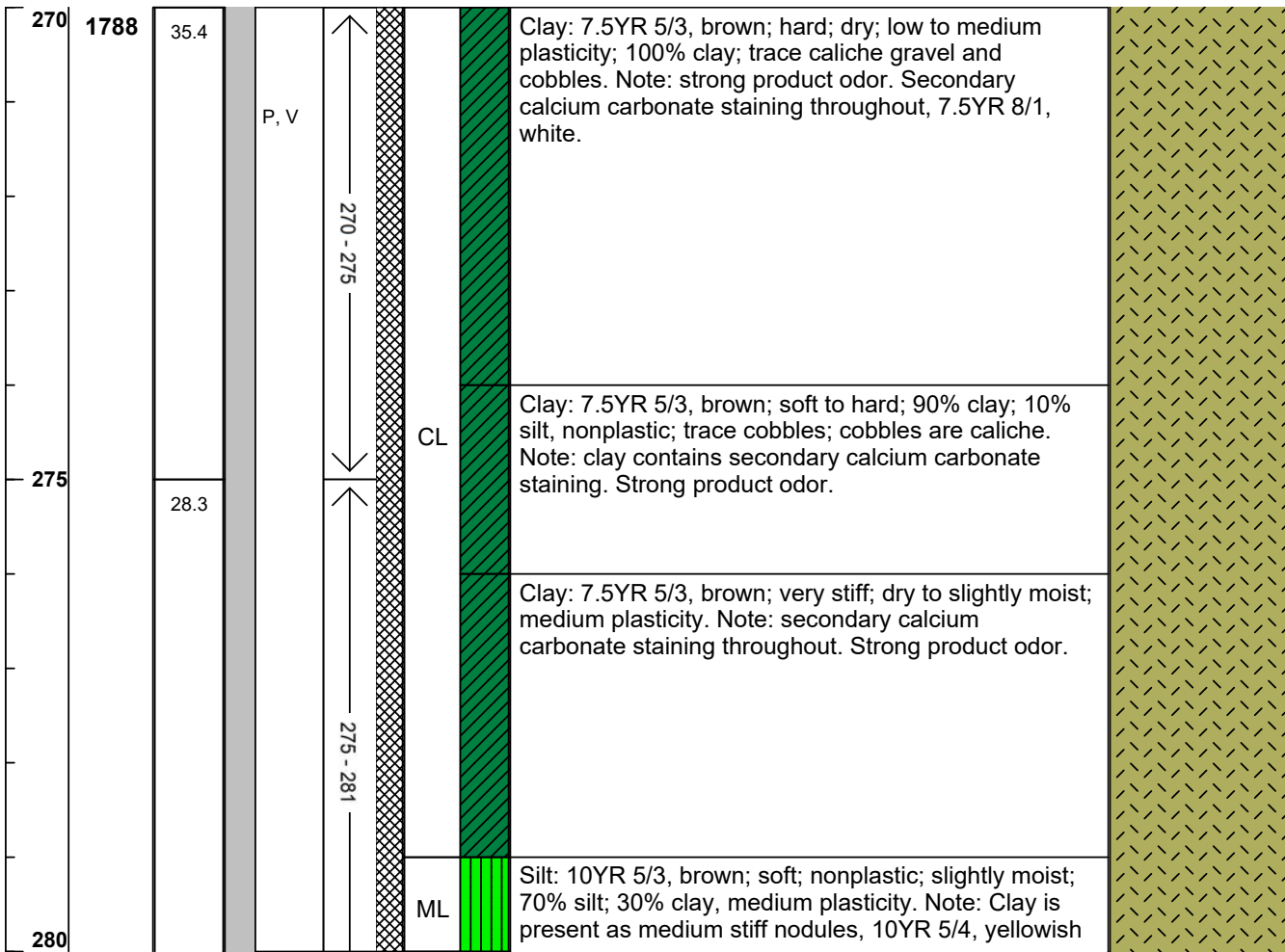
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019			WELL LOG Well ID: KAFB-106V1 Page: 28 of 29					
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

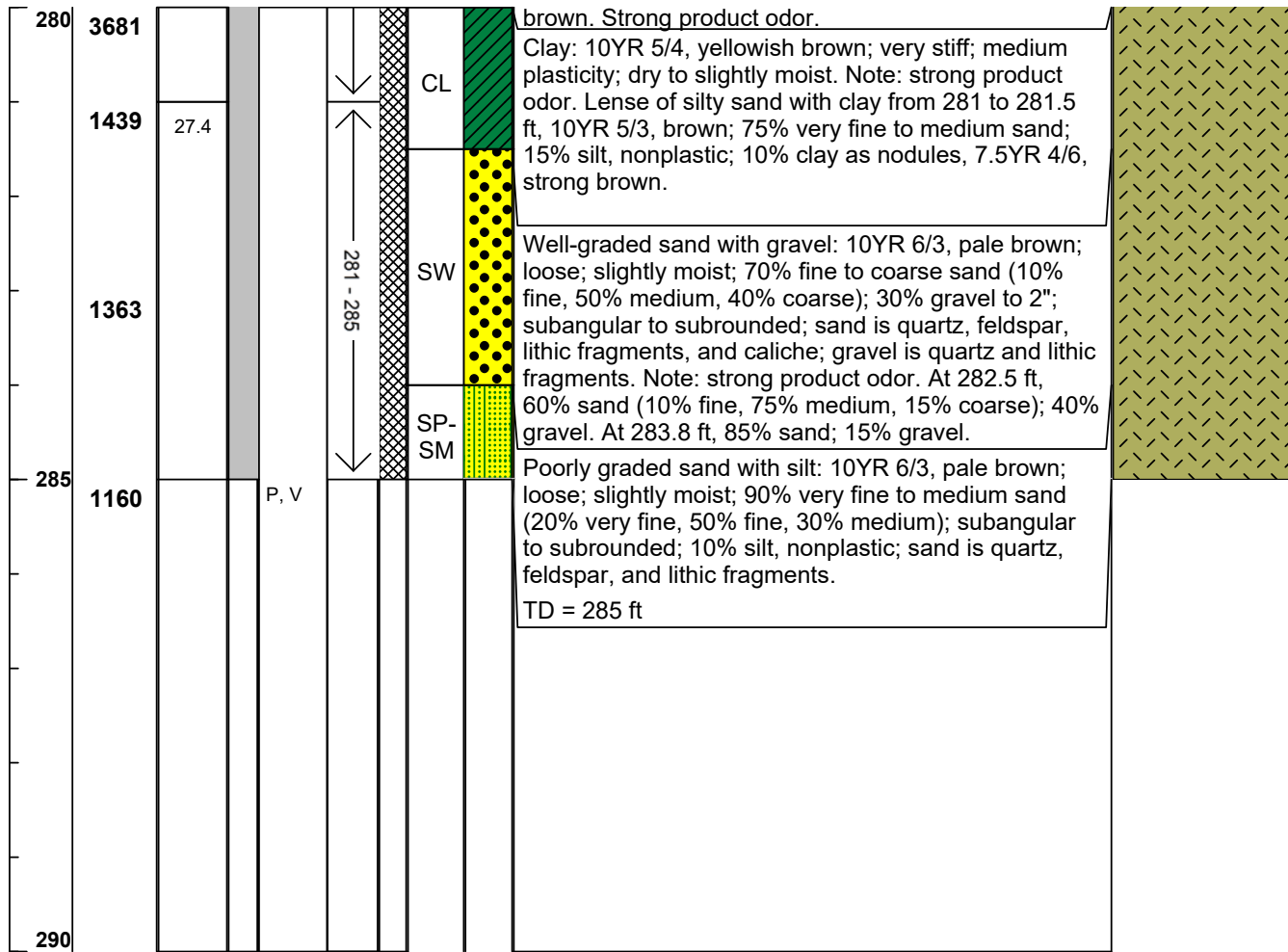
	Not Tested		None
	Interval Fluoresced		

Core Recovery




	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/16/2018 Completion Date: 1/24/2019		WELL LOG Well ID: KAFB-106V1 Page: 29 of 29						
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details




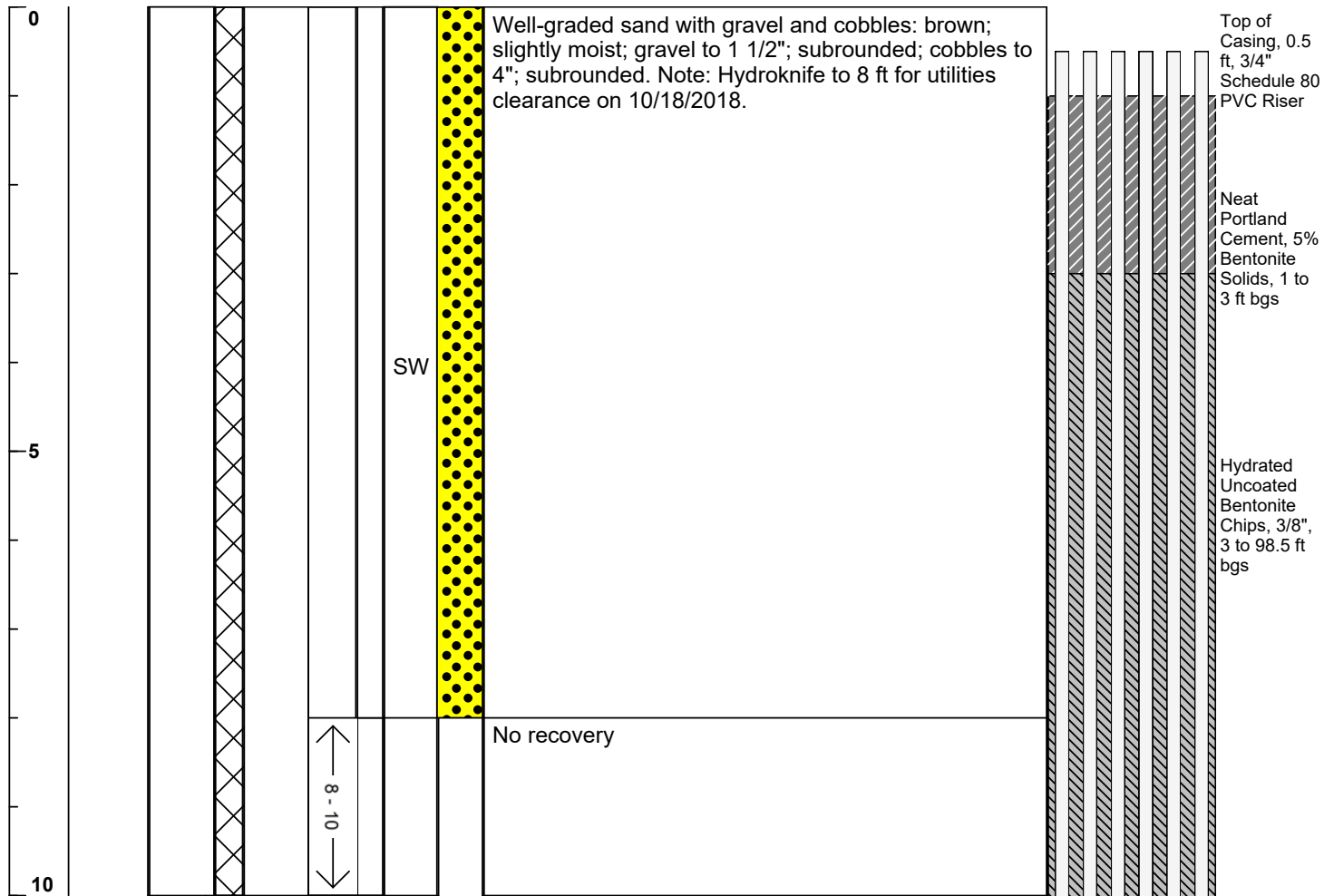
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG Well ID: KAFB-106V2 Page: 1 of 29								
	Location: Kirtland AFB, New Mexico									
Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;								
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



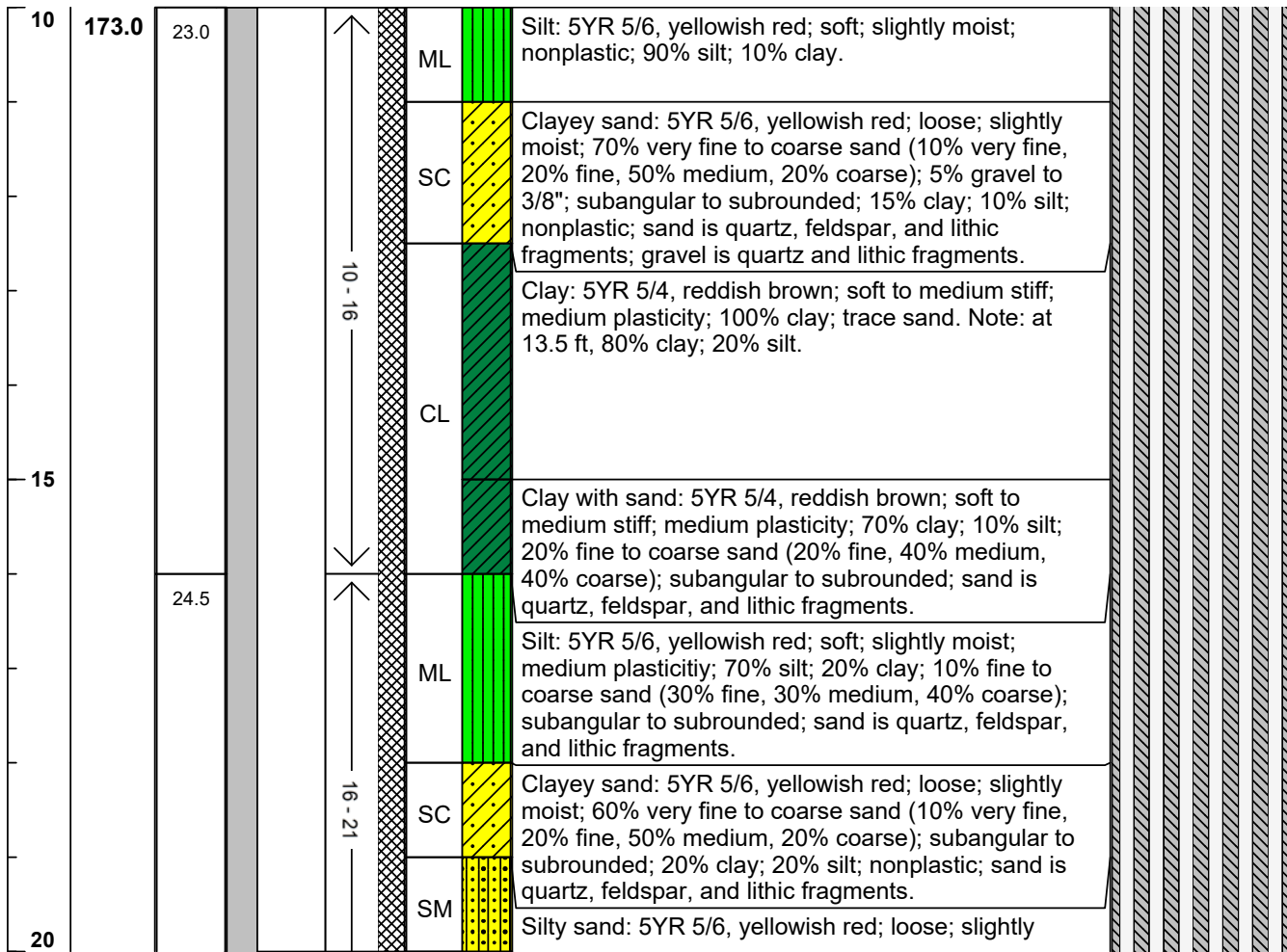
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **2 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



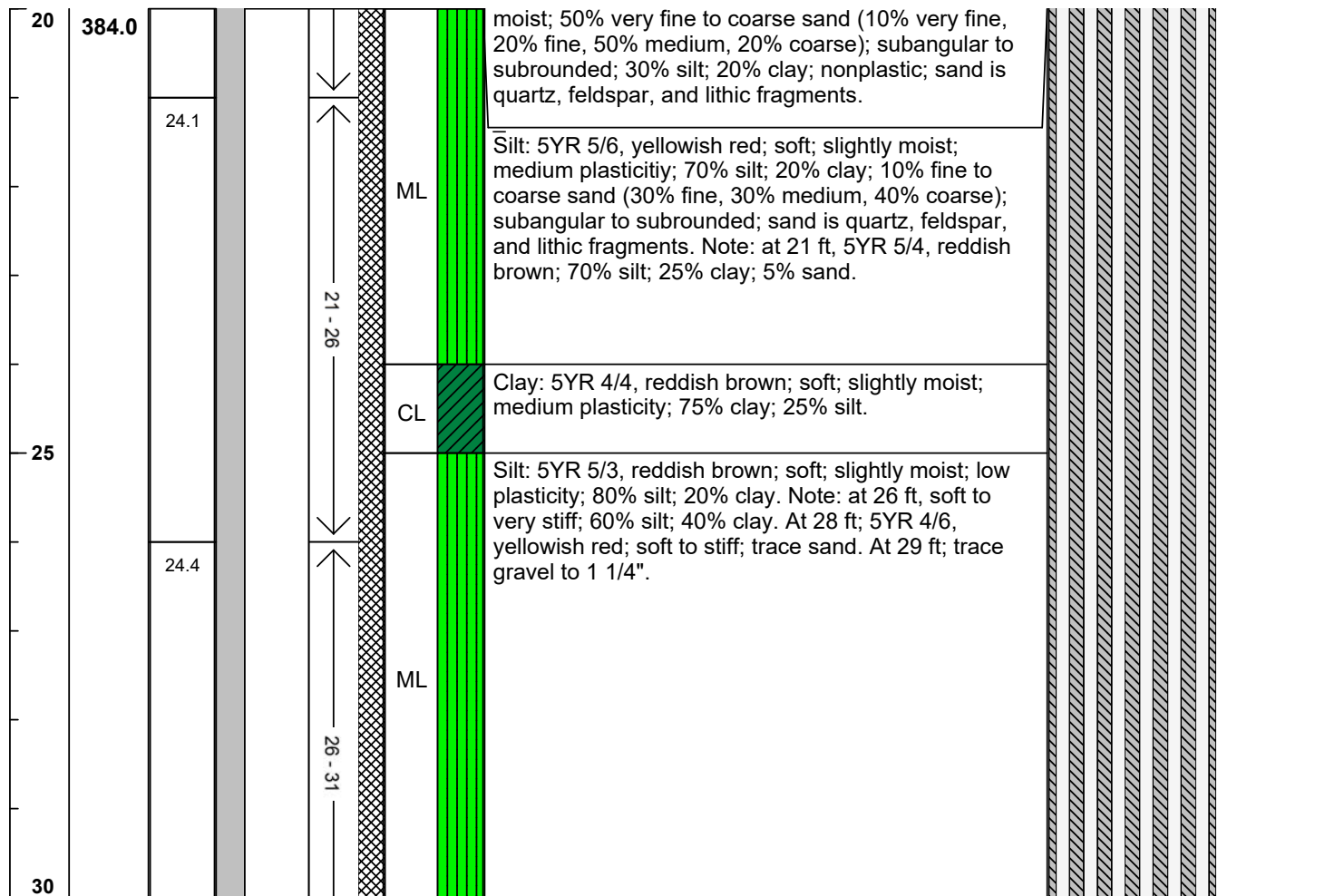
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **3 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



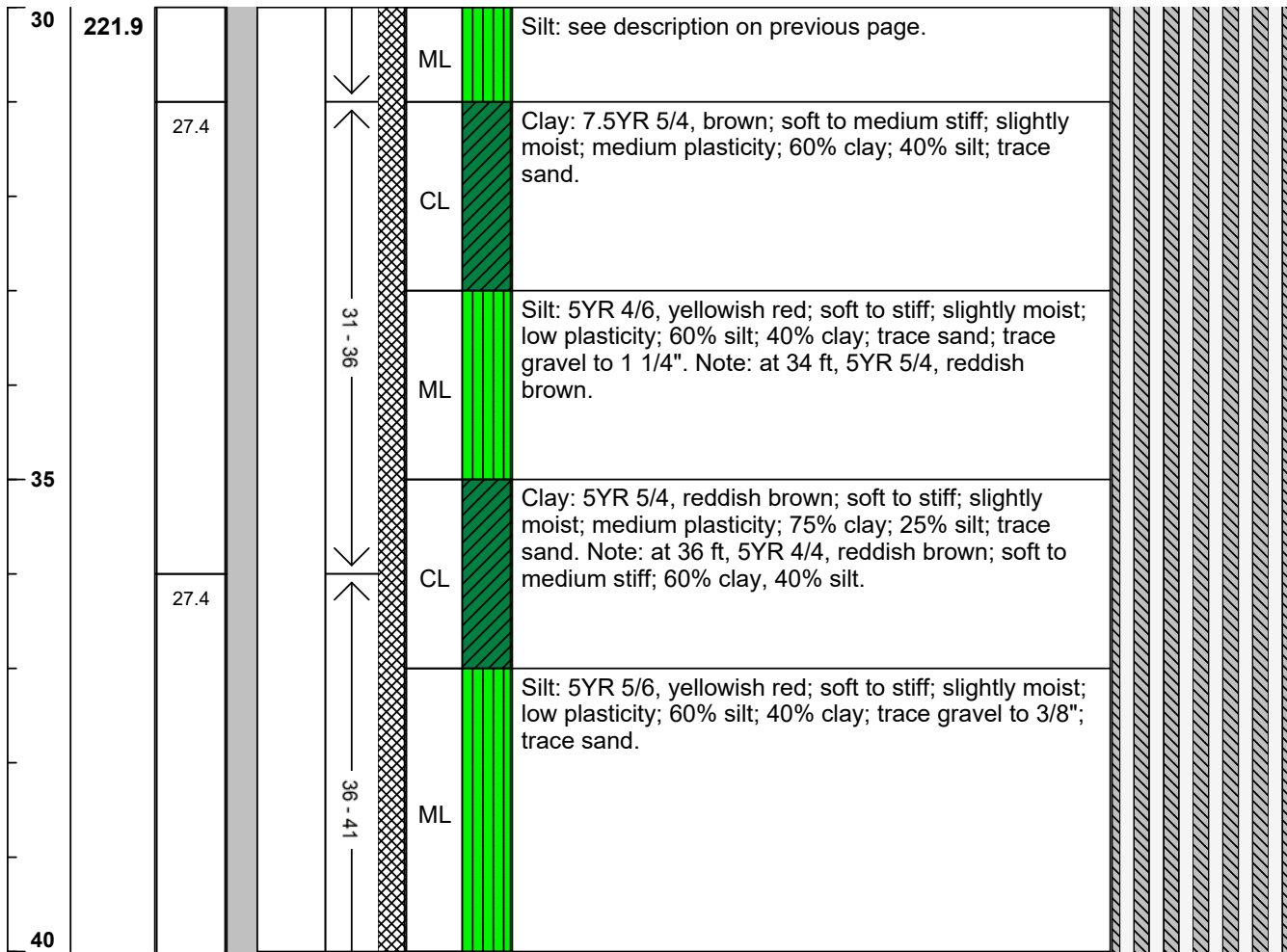
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **4 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

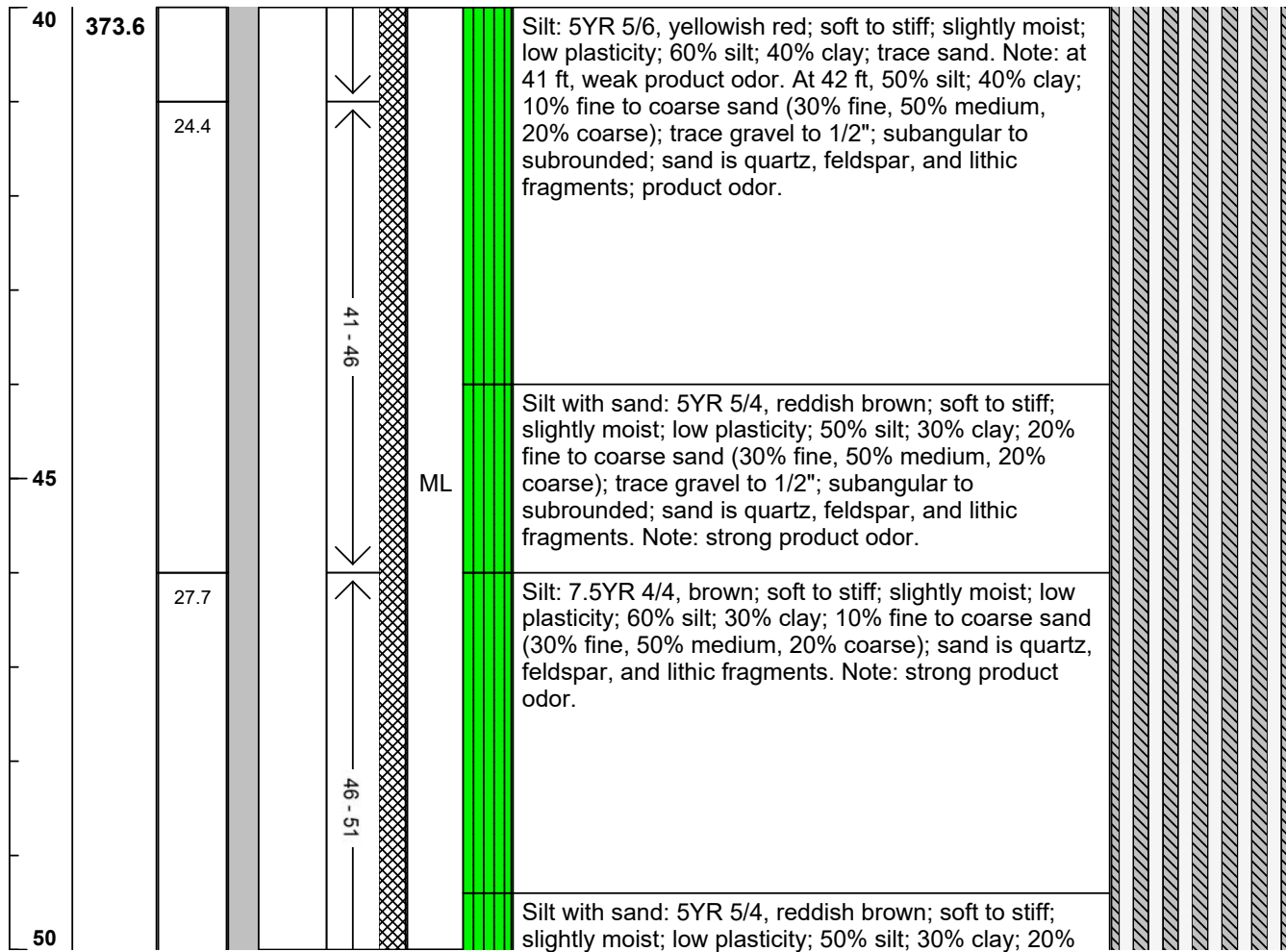
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/11/2018 Completion Date: 1/24/19	WELL LOG Well ID: KAFB-106V2 Page: 5 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



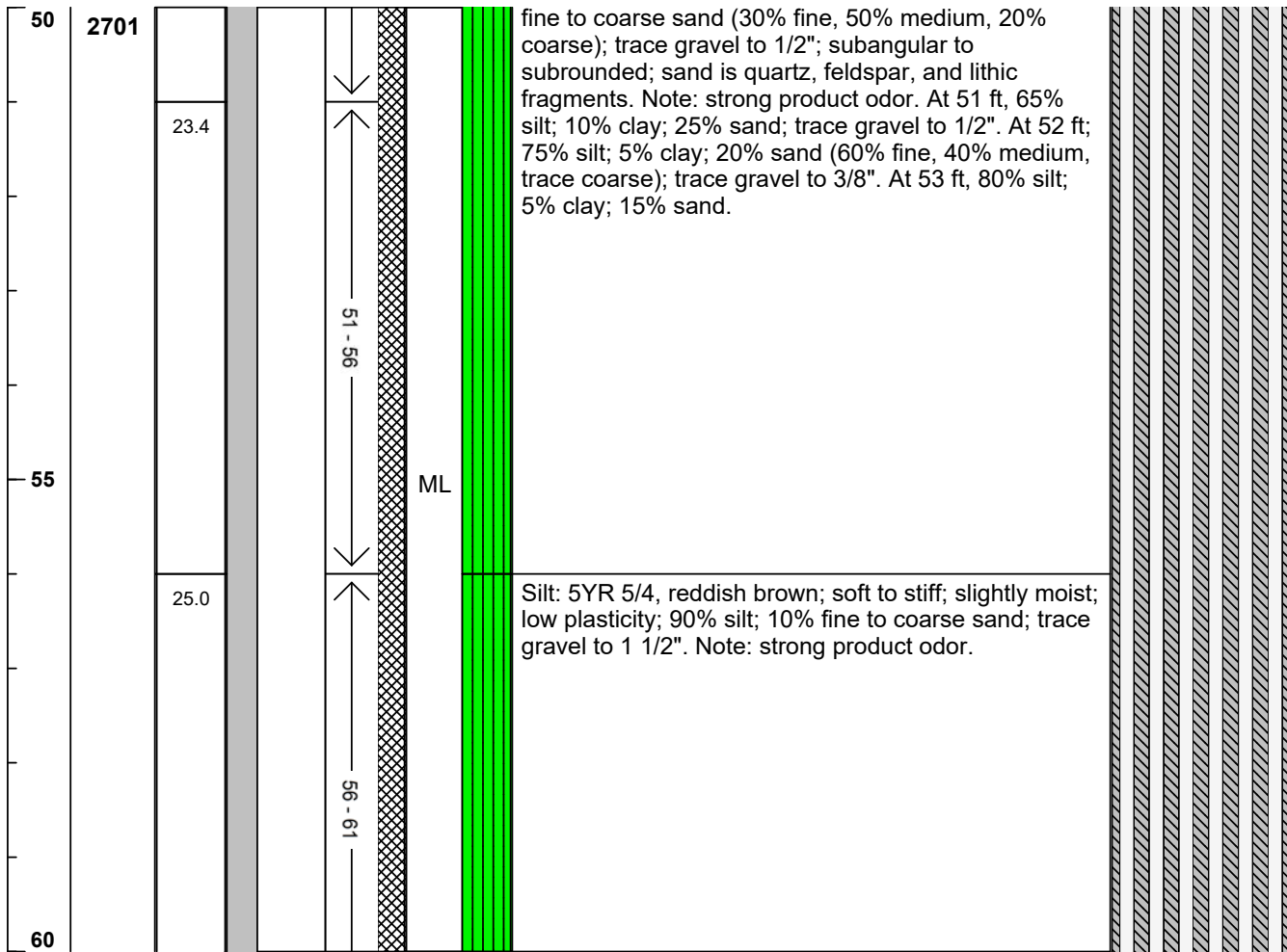
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **6 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



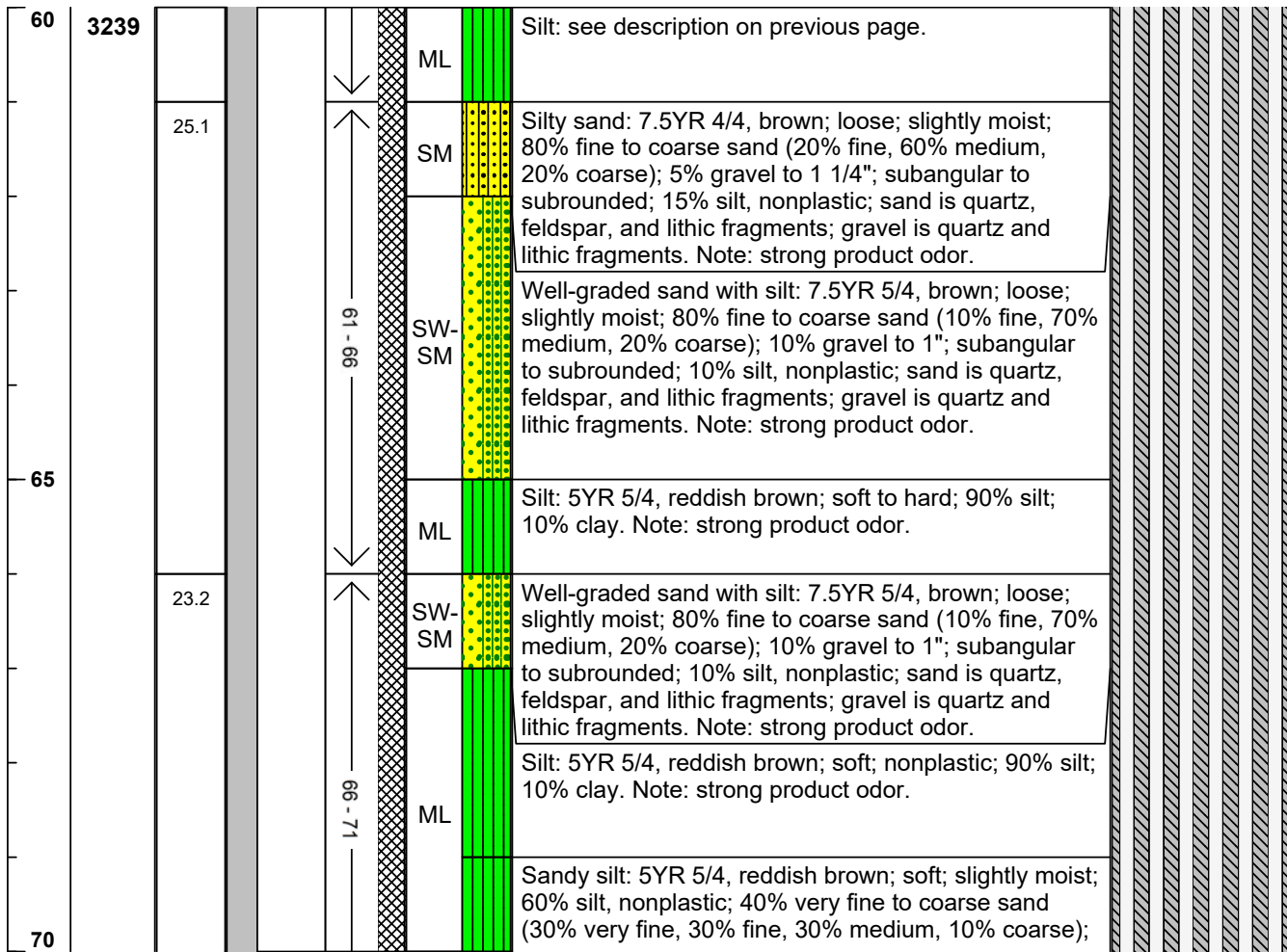
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **7 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

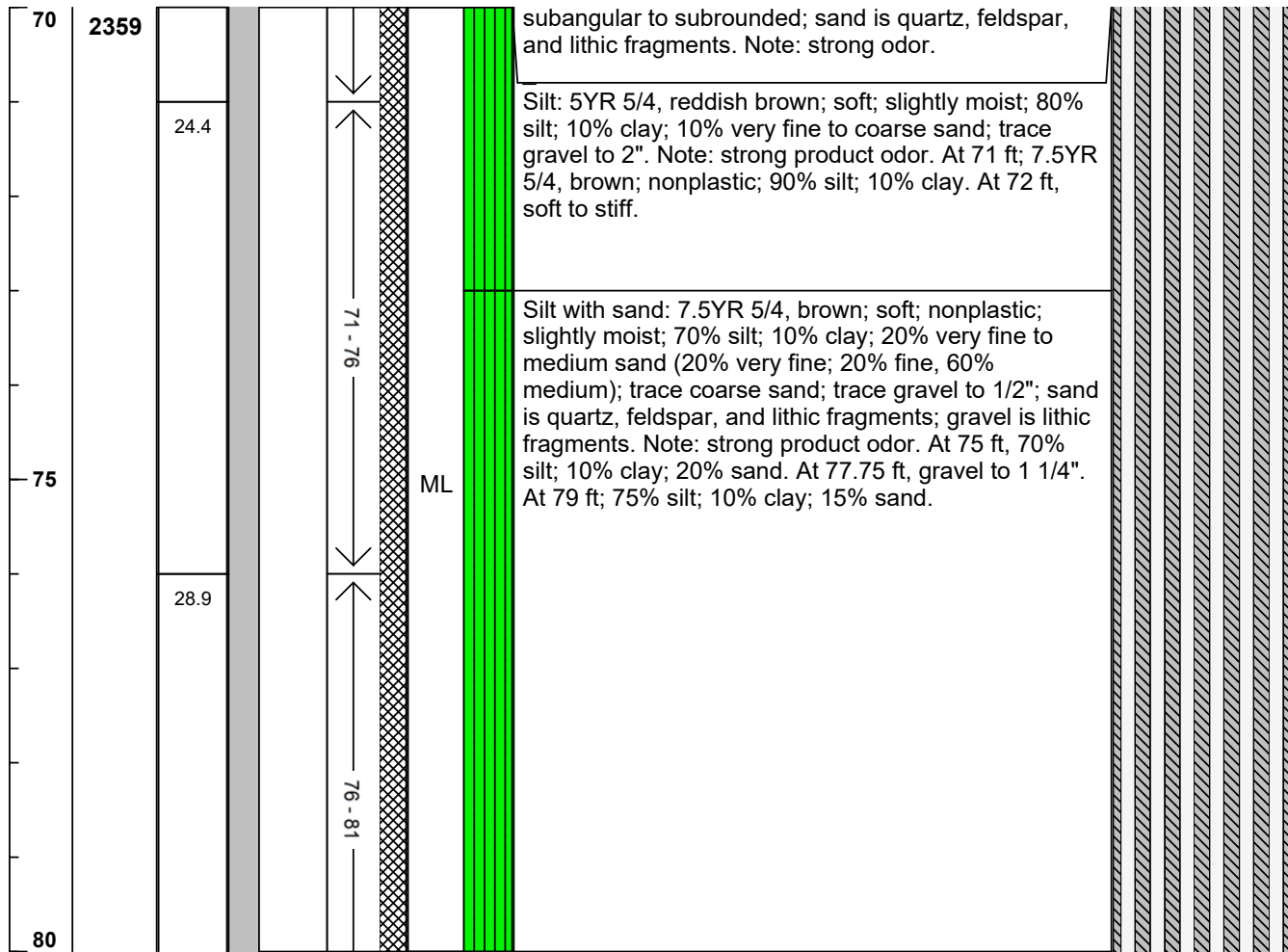
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/11/2018 Completion Date: 1/24/19	WELL LOG Well ID: KAFB-106V2 Page: 8 of 29								
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand							
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



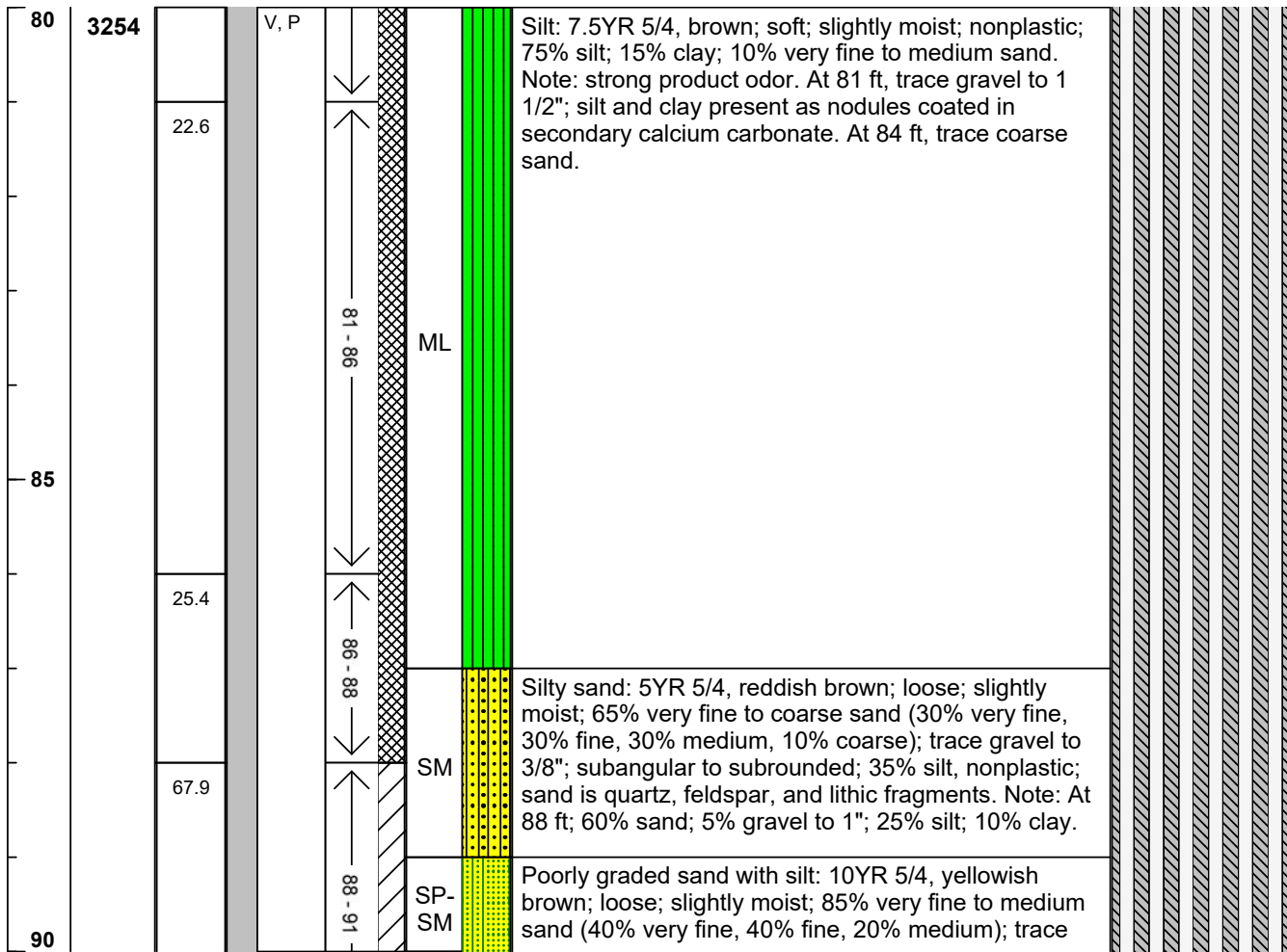
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **9 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

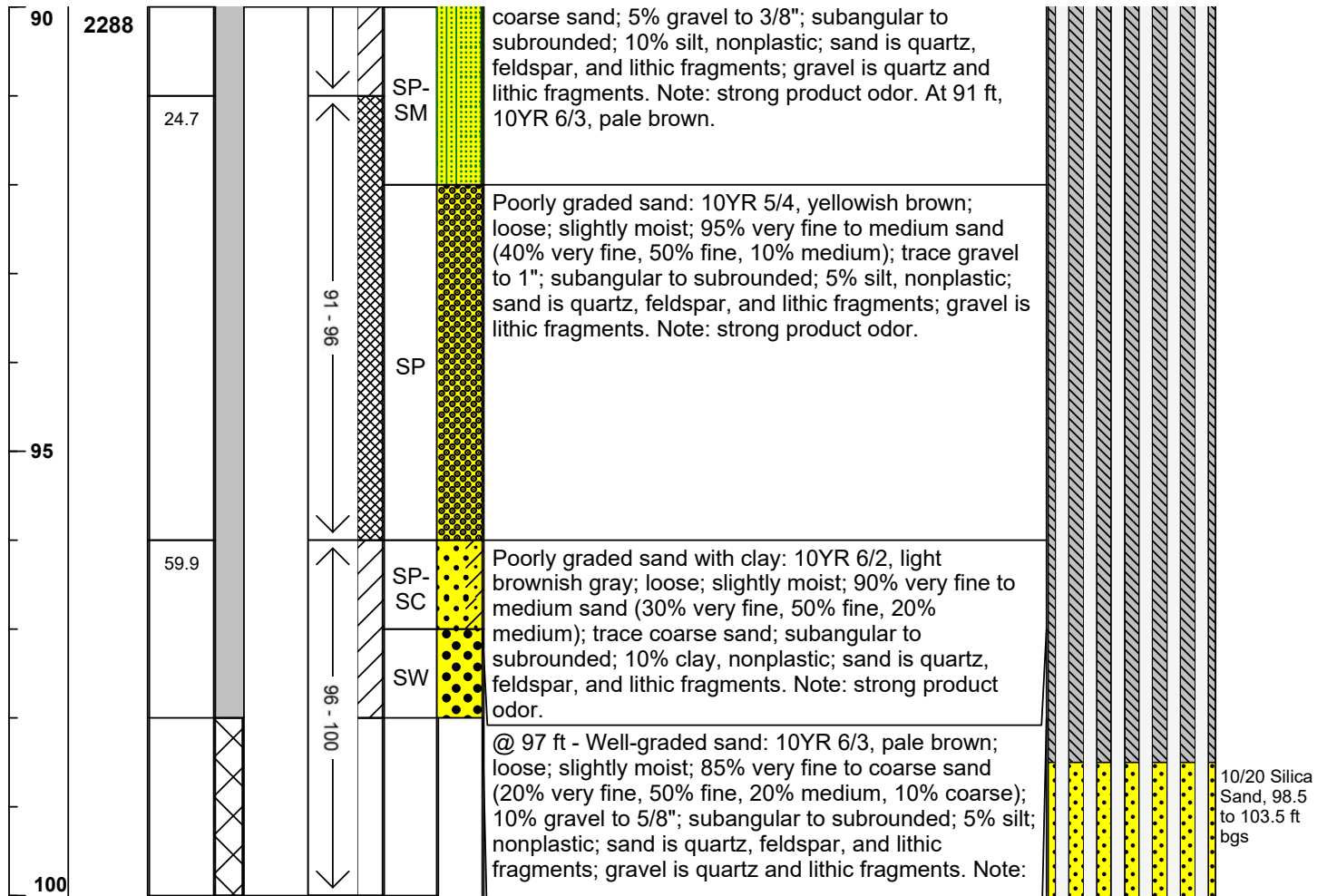
	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.




	Project: 62735DM02.1017	<h2 style="margin: 0;">WELL LOG</h2>
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/11/2018	
	Completion Date: 1/24/19	




Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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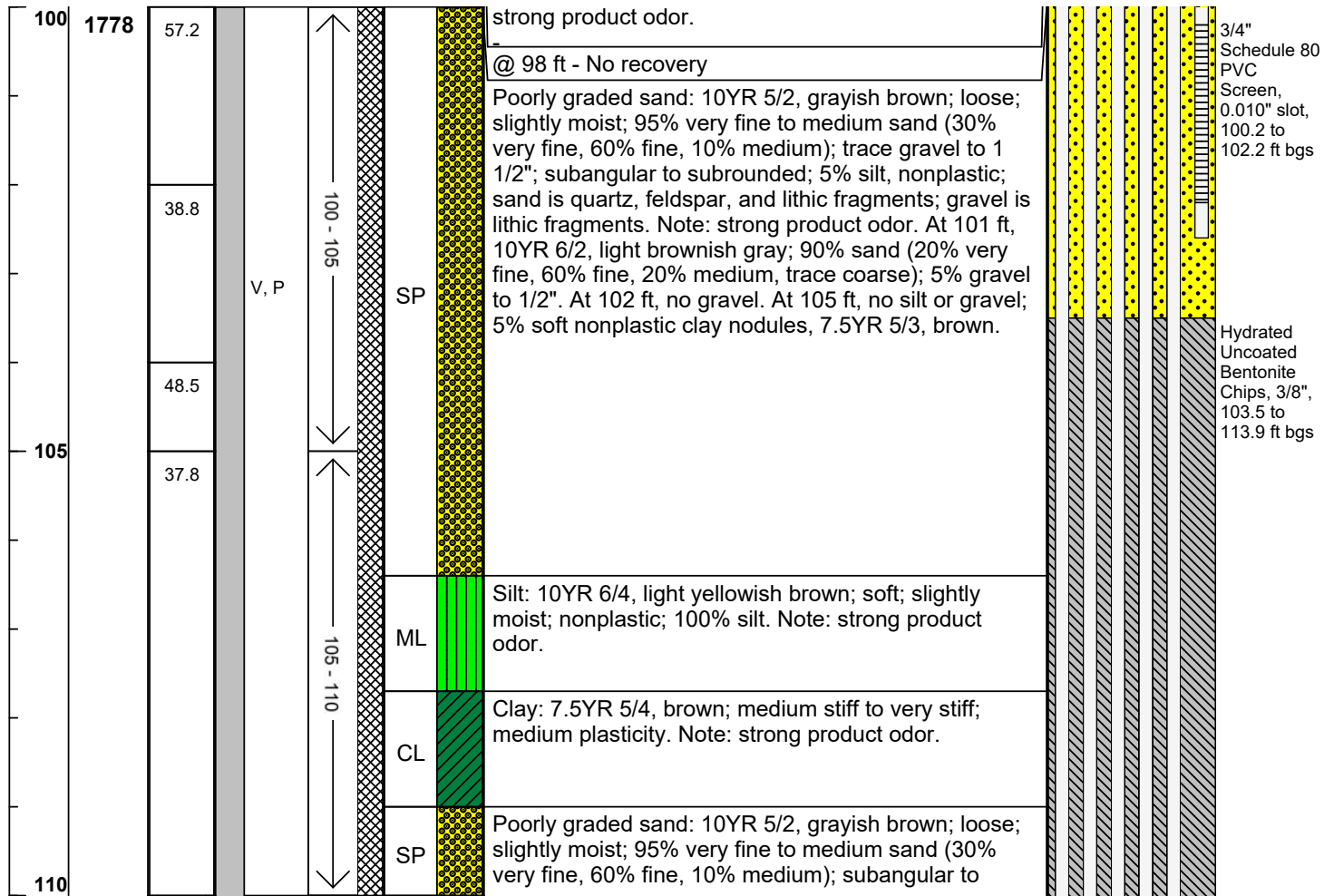
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/11/2018 Completion Date: 1/24/19	WELL LOG Well ID: KAFB-106V2 Page: 11 of 29
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

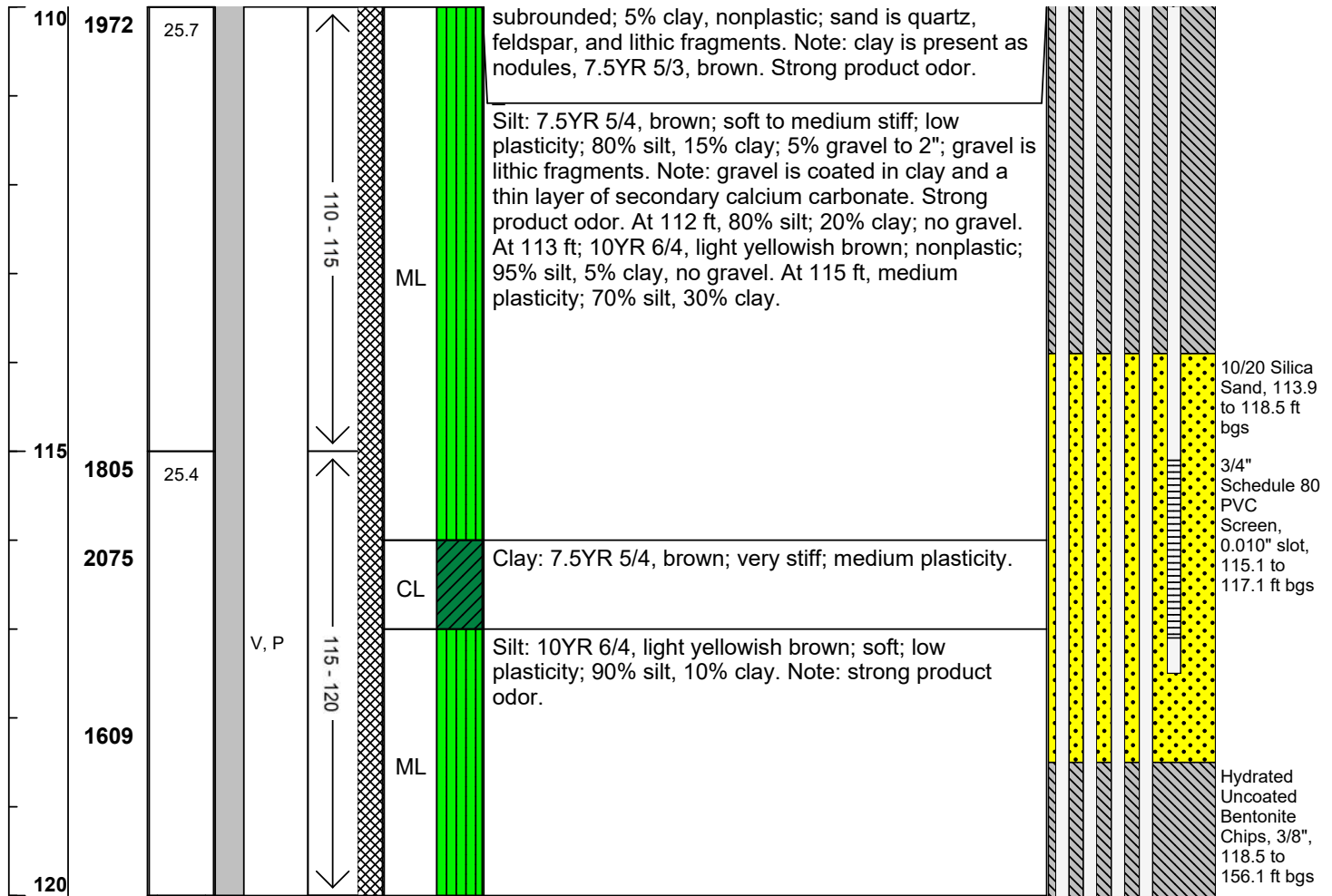
	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG Well ID: KAFB-106V2 Page: 12 of 29
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/11/2018	
	Completion Date: 1/24/19	

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriquez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



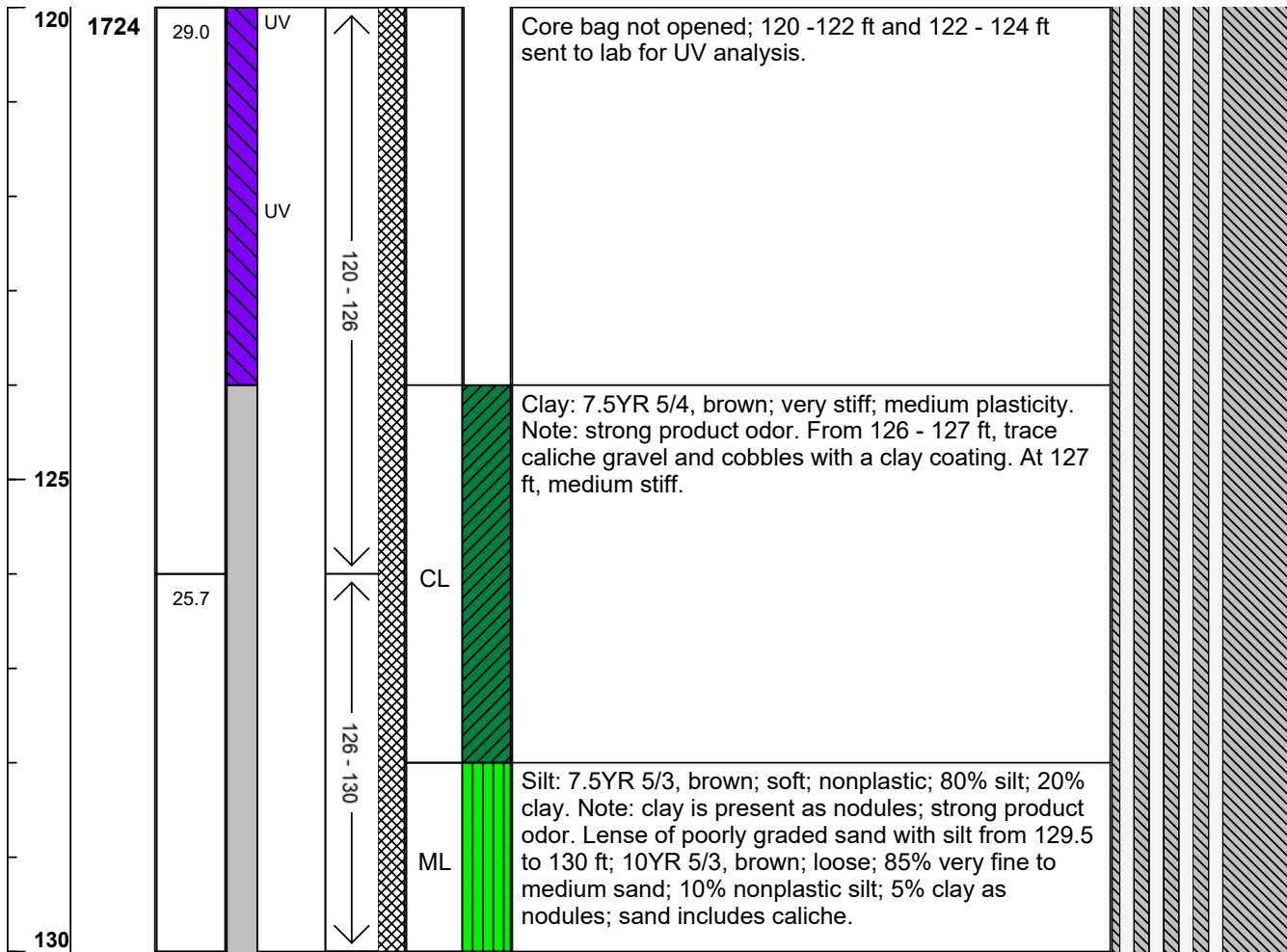
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **13 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

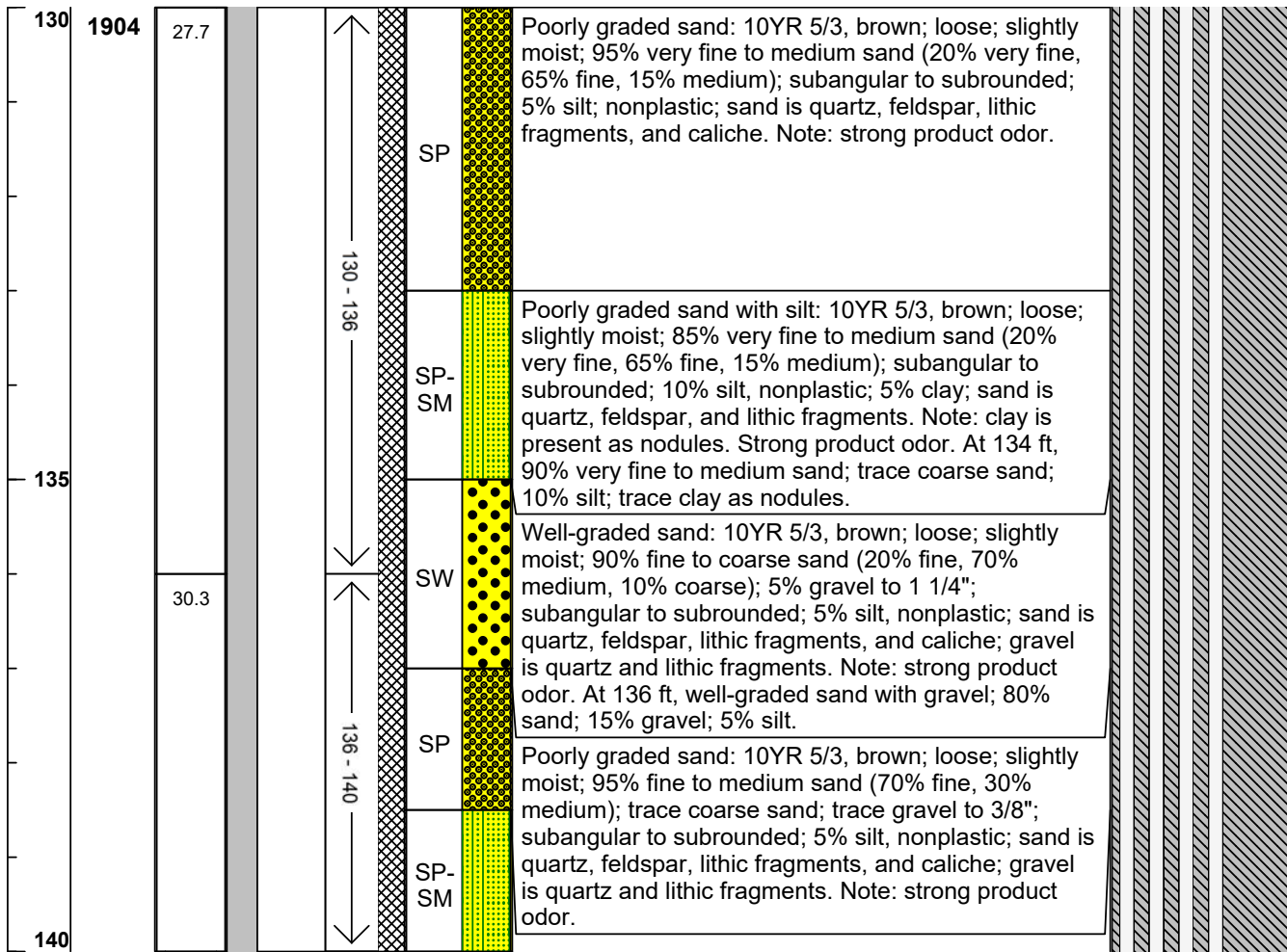
Well ID: **KAFB-106V2**
 Page: **14 of 29**

Drilling Company: **Cascade**
 Drilling Method: **Sonic Coring**
 Drill Bit: **Sonic Core Barrel, 6" ID**
 Driller: **Roger Rodriguez**
 Geologist: **J. Messenger**

Boring Depth (ft): **287**
 Boring Diameter (in): **7"**
 Well Diameter: **3/4" ID**
 DTW After Completion (ft bgs): **N/A**
 Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
 Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
 Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



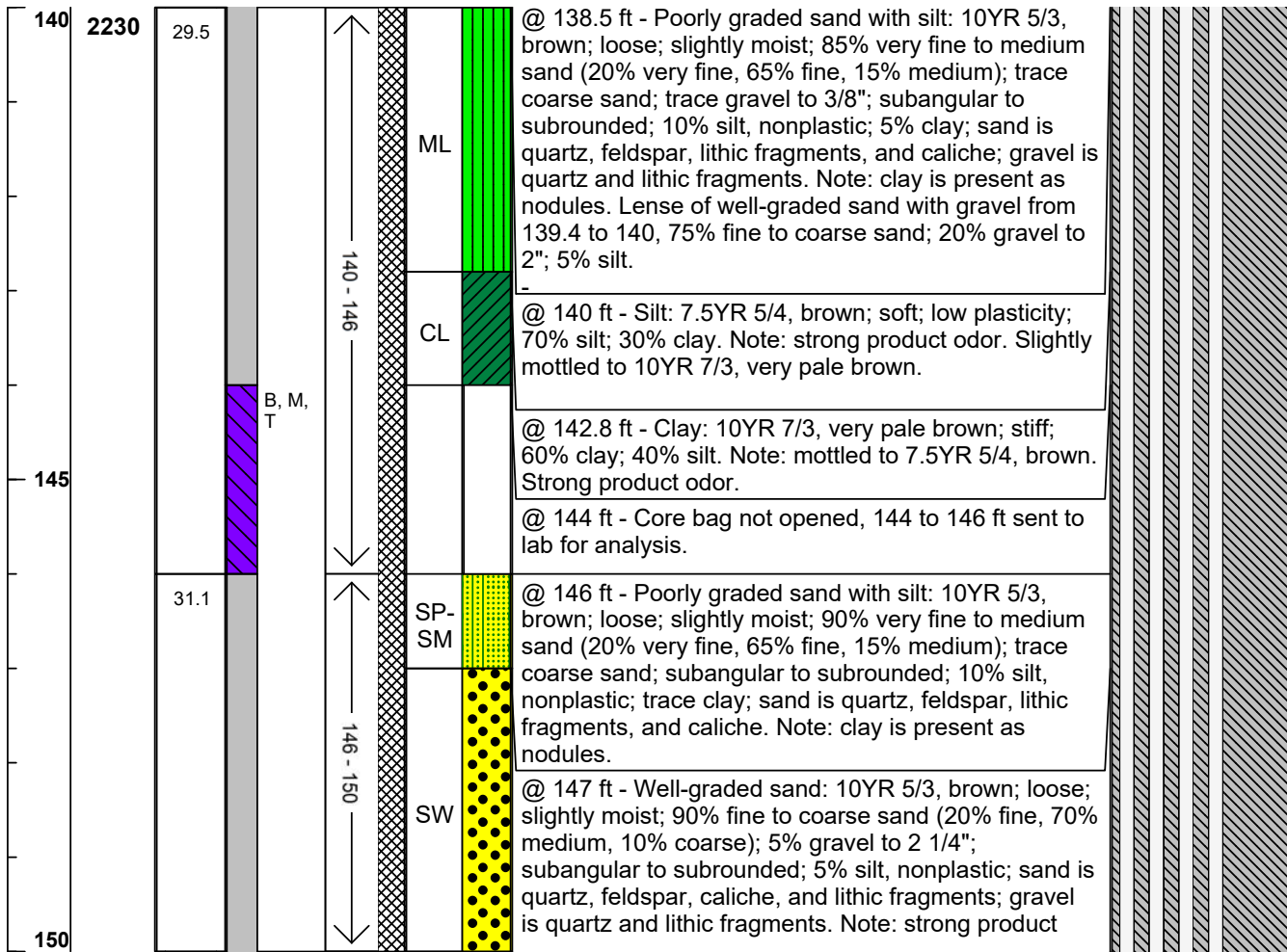
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **15 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

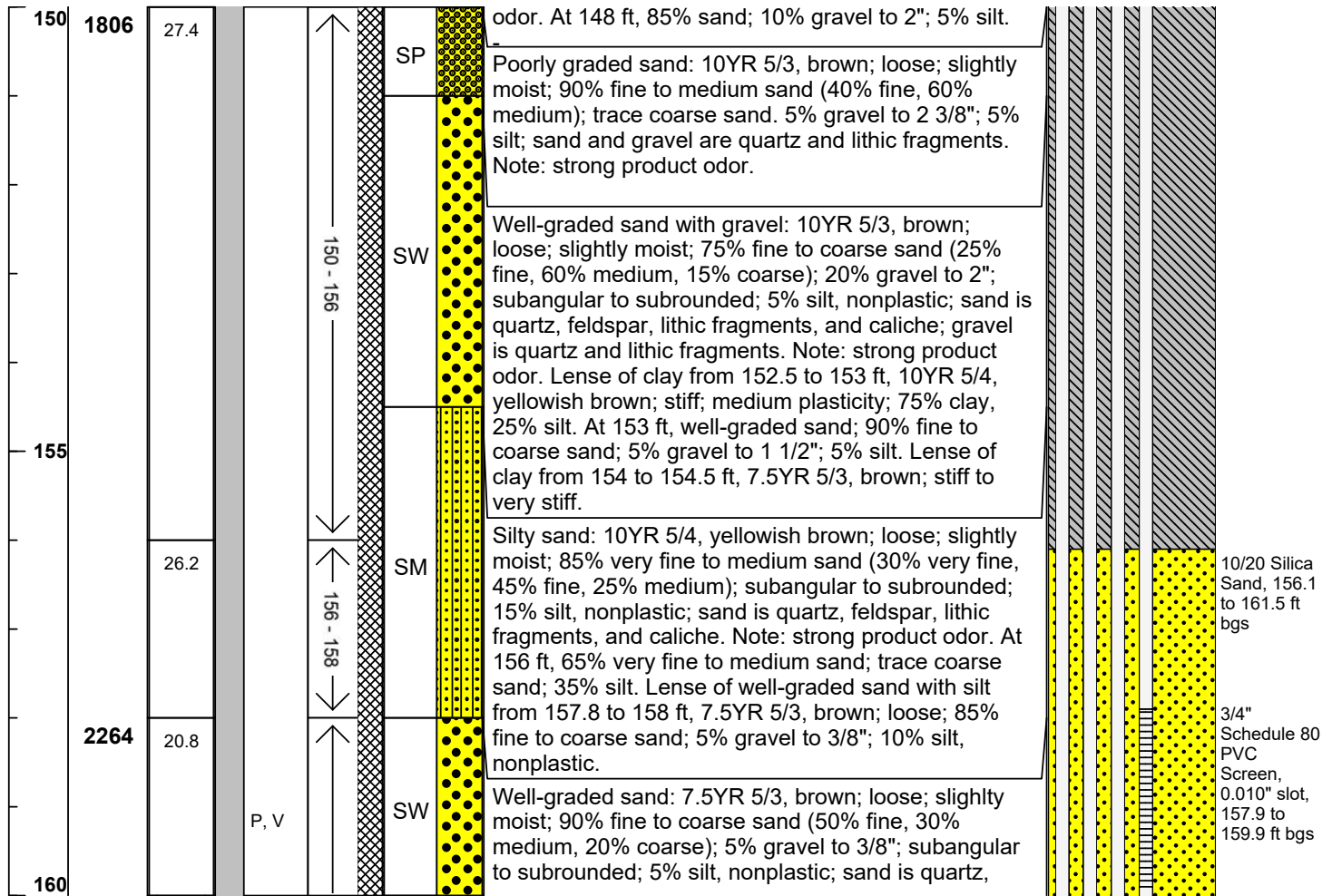
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG Well ID: KAFB-106V2 Page: 16 of 29								
	Location: Kirtland AFB, New Mexico									
Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;								
Driller: Roger Rodriquez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

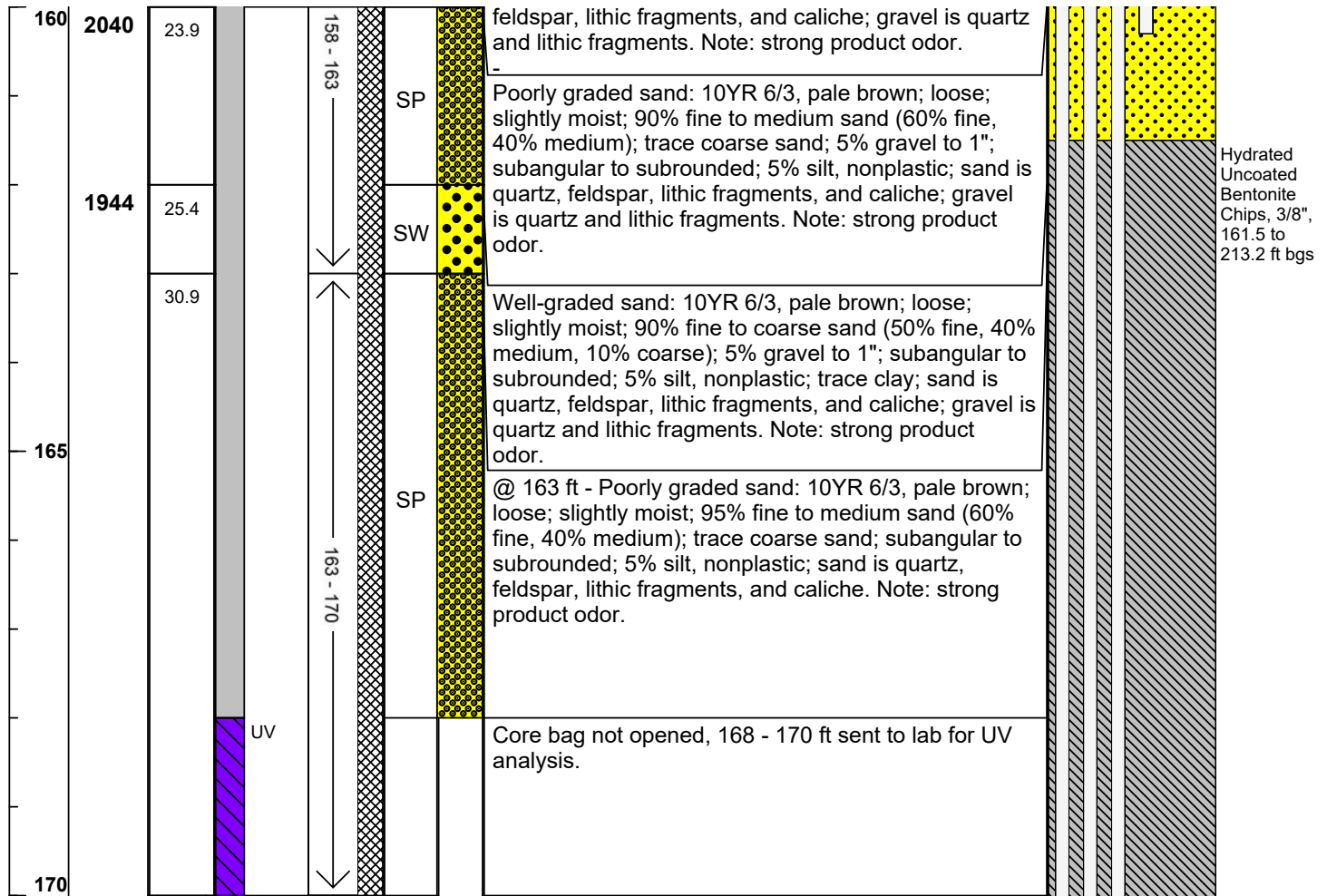
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V2							
	Start Date: 12/11/2018	Page: 17 of 29								
	Completion Date: 1/24/19									
Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;								
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



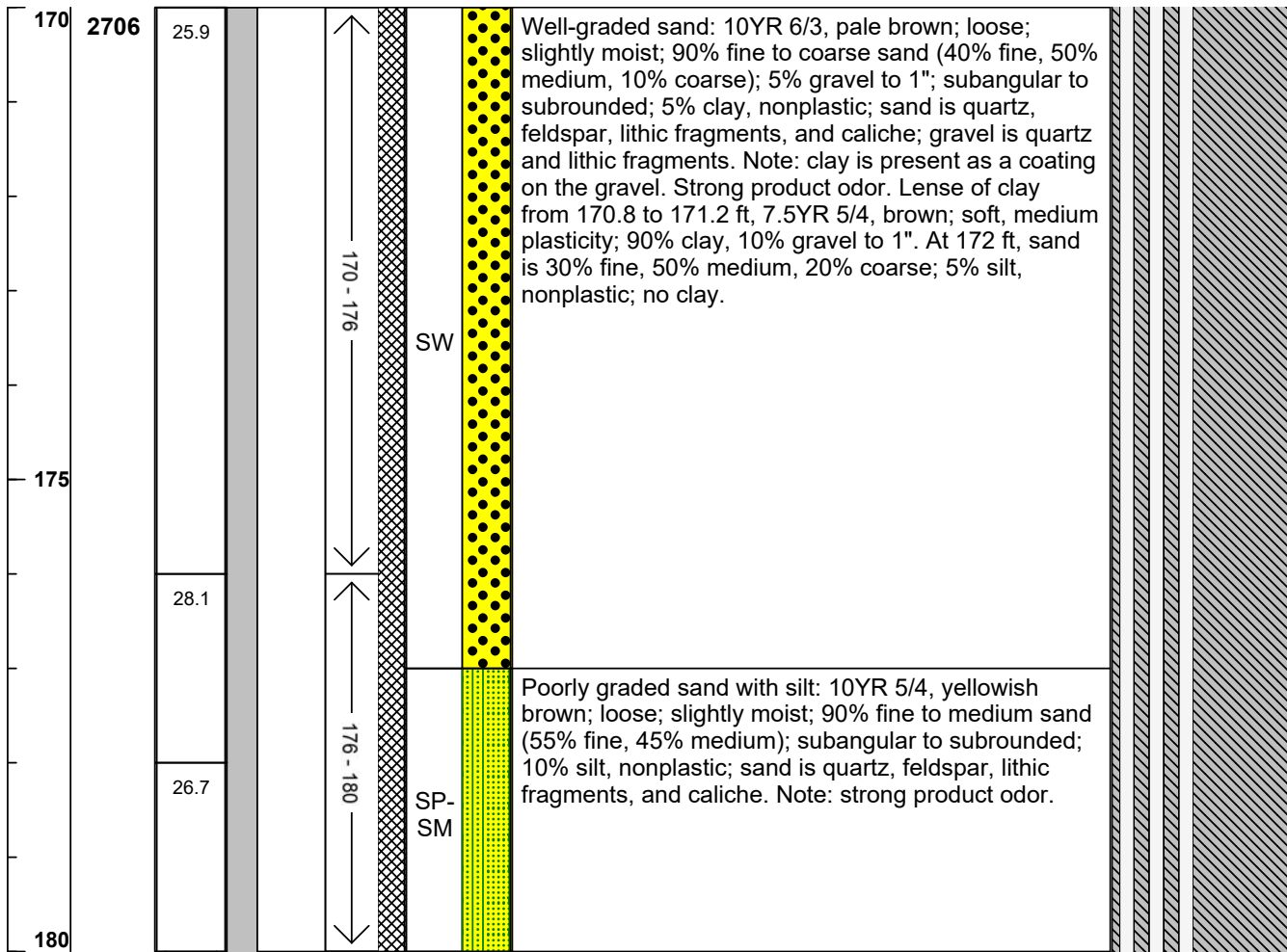
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **18 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



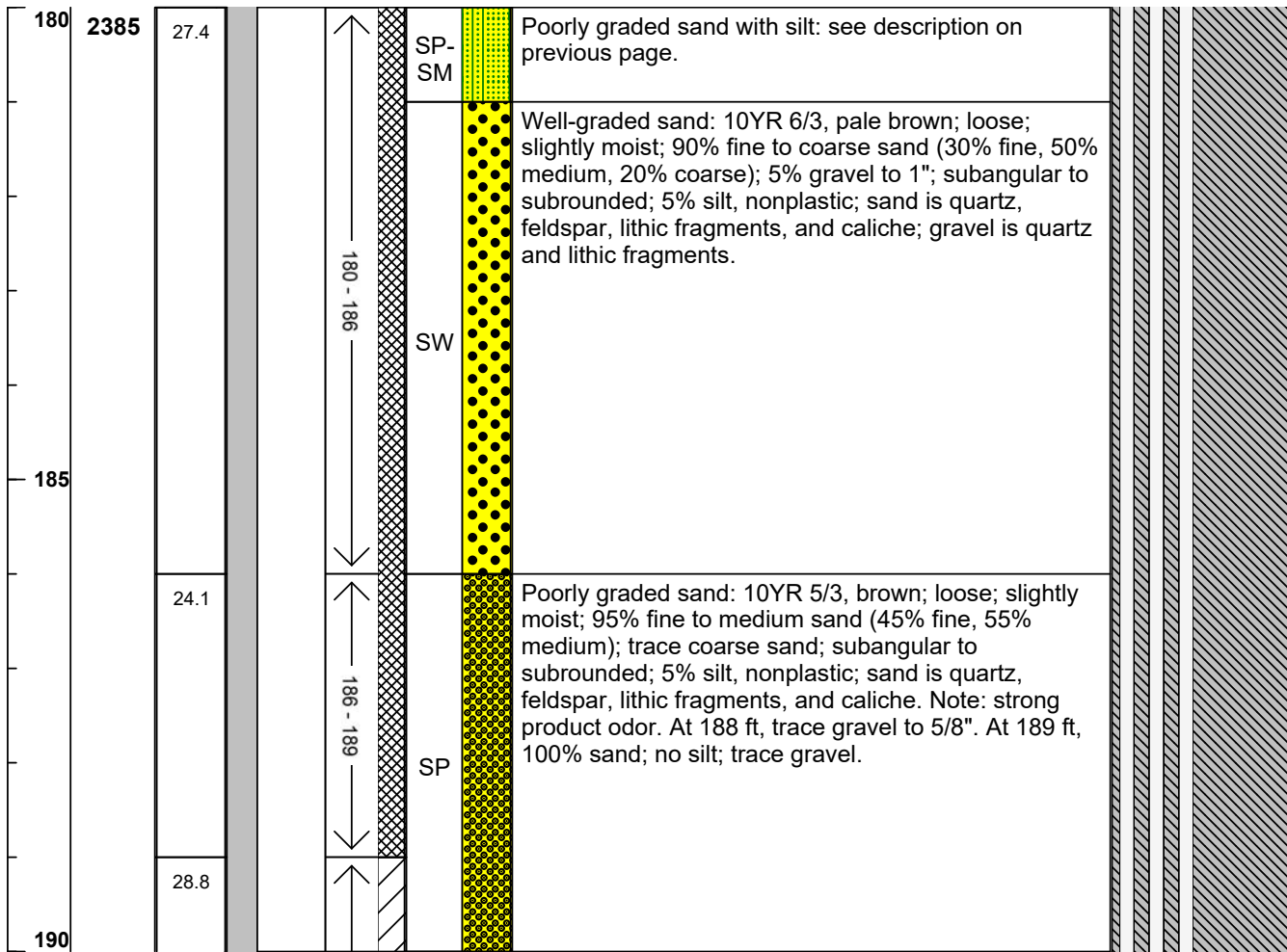
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **19 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



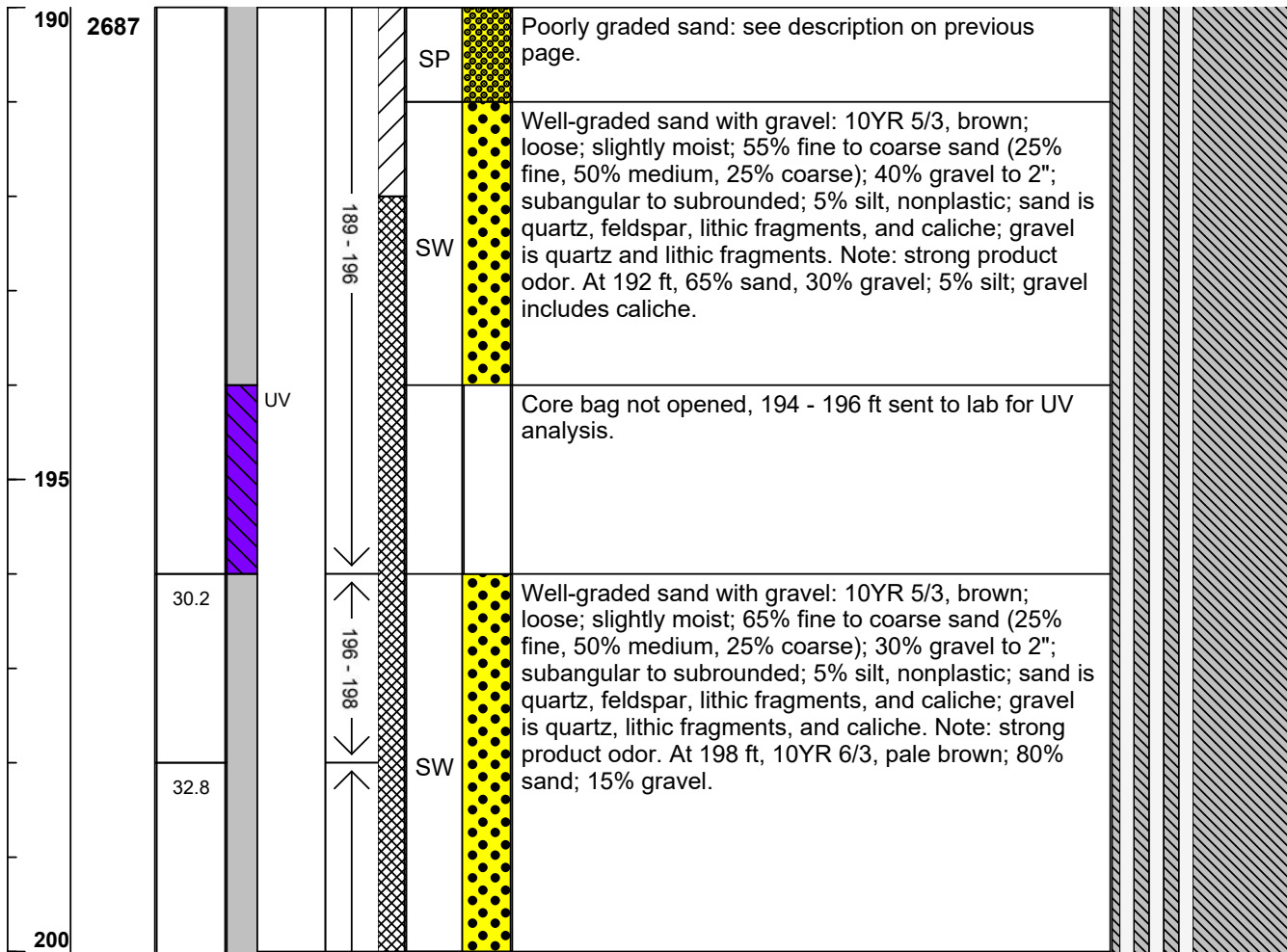
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **20 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



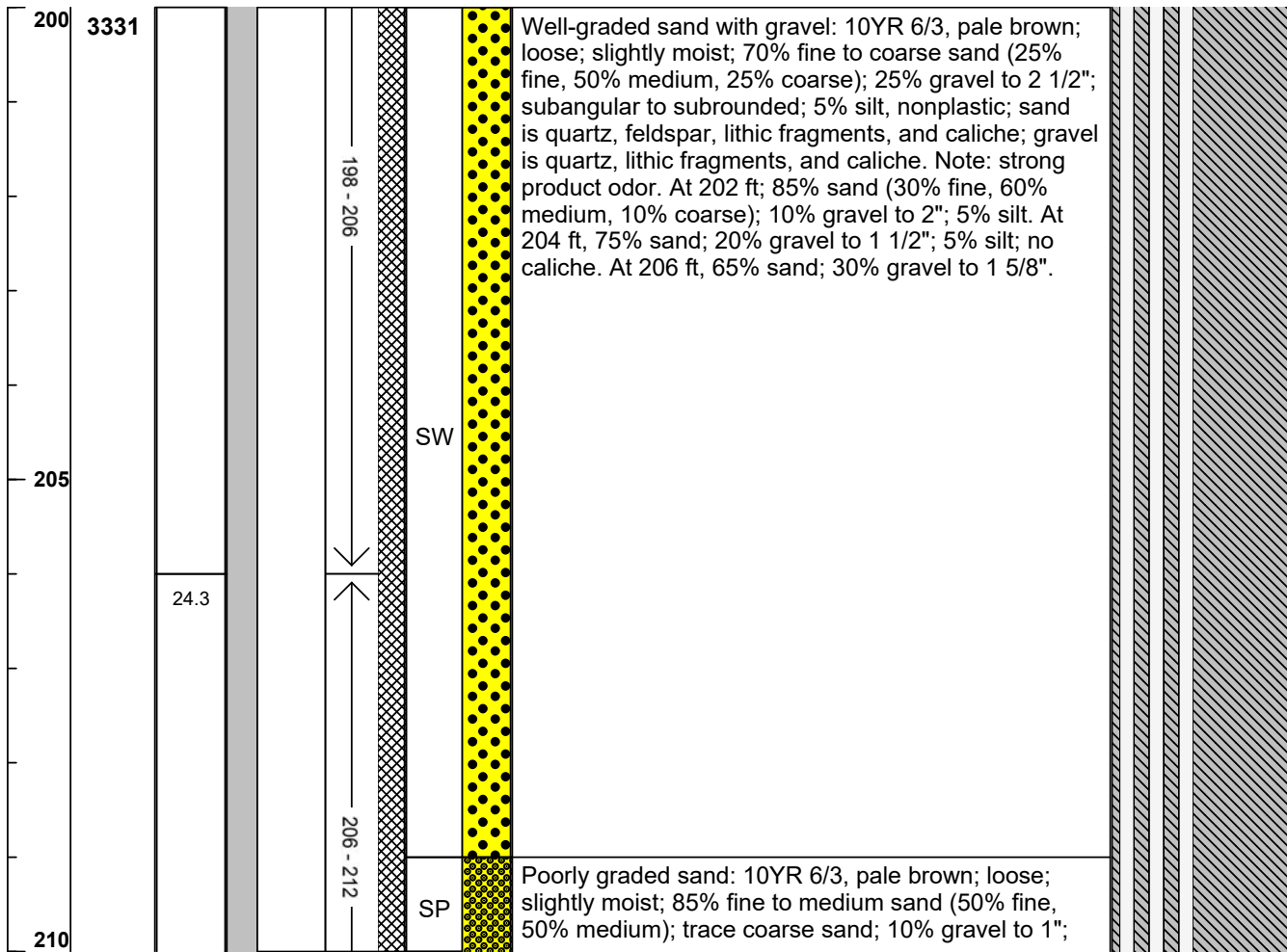
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **21 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

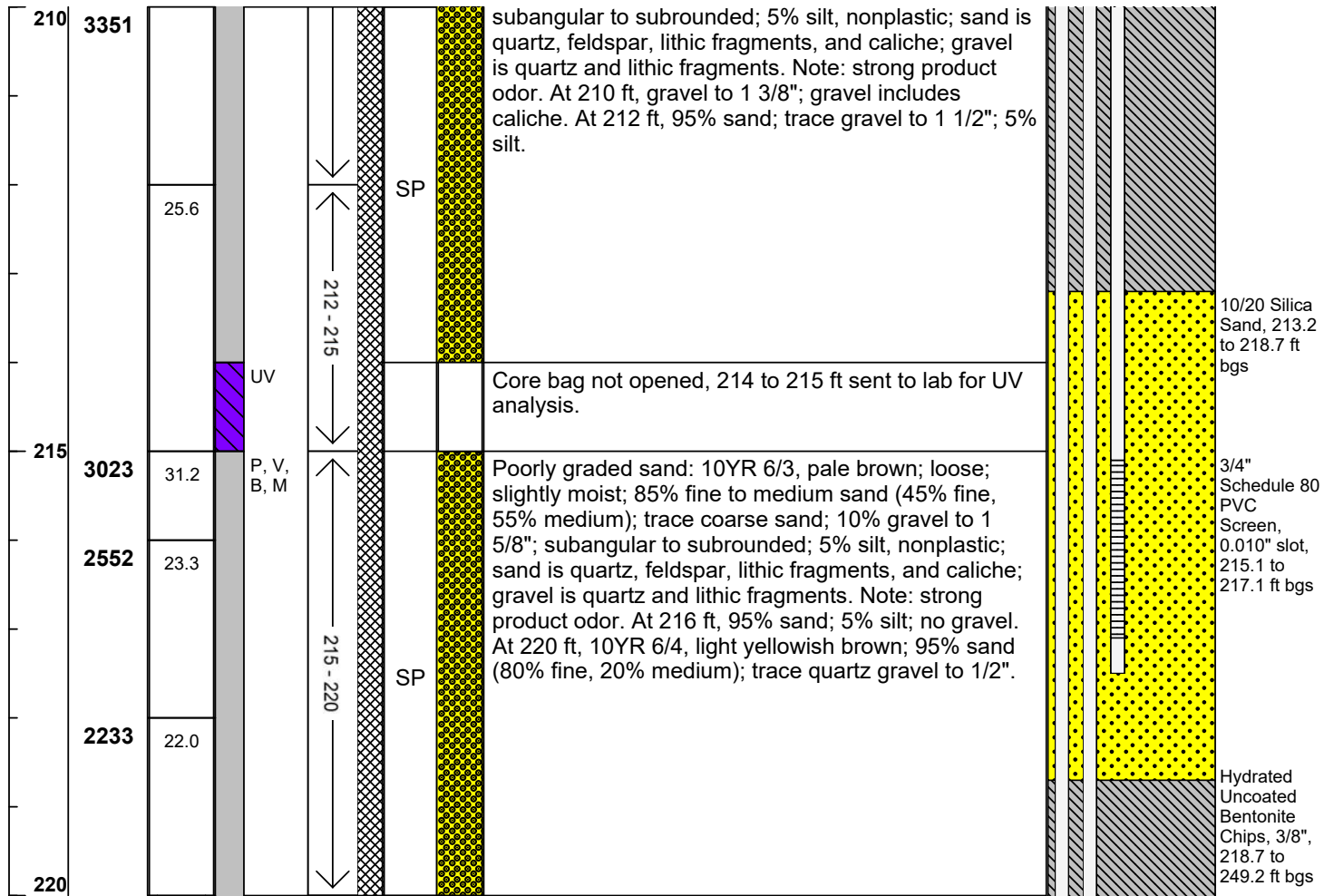
	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.




	Project: 62735DM02.1017	WELL LOG
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/11/2018	Page: 22 of 29
	Completion Date: 1/24/19	




Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

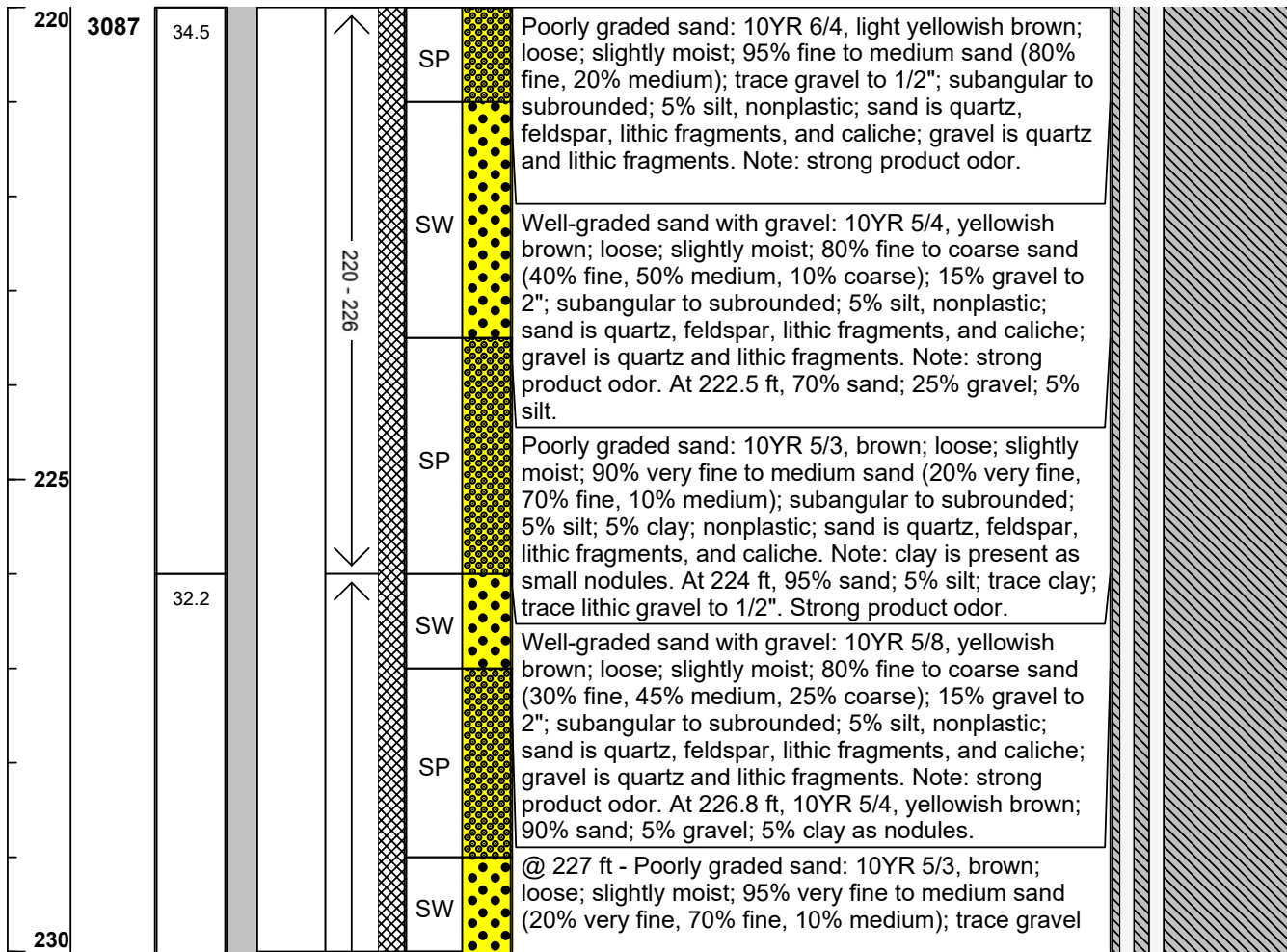
Well ID: **KAFB-106V2**
 Page: **23 of 29**

Drilling Company: **Cascade**
 Drilling Method: **Sonic Coring**
 Drill Bit: **Sonic Core Barrel, 6" ID**
 Driller: **Roger Rodriguez**
 Geologist: **J. Messenger**

Boring Depth (ft): **287**
 Boring Diameter (in): **7"**
 Well Diameter: **3/4" ID**
 DTW After Completion (ft bgs): **N/A**
 Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
 Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
 Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



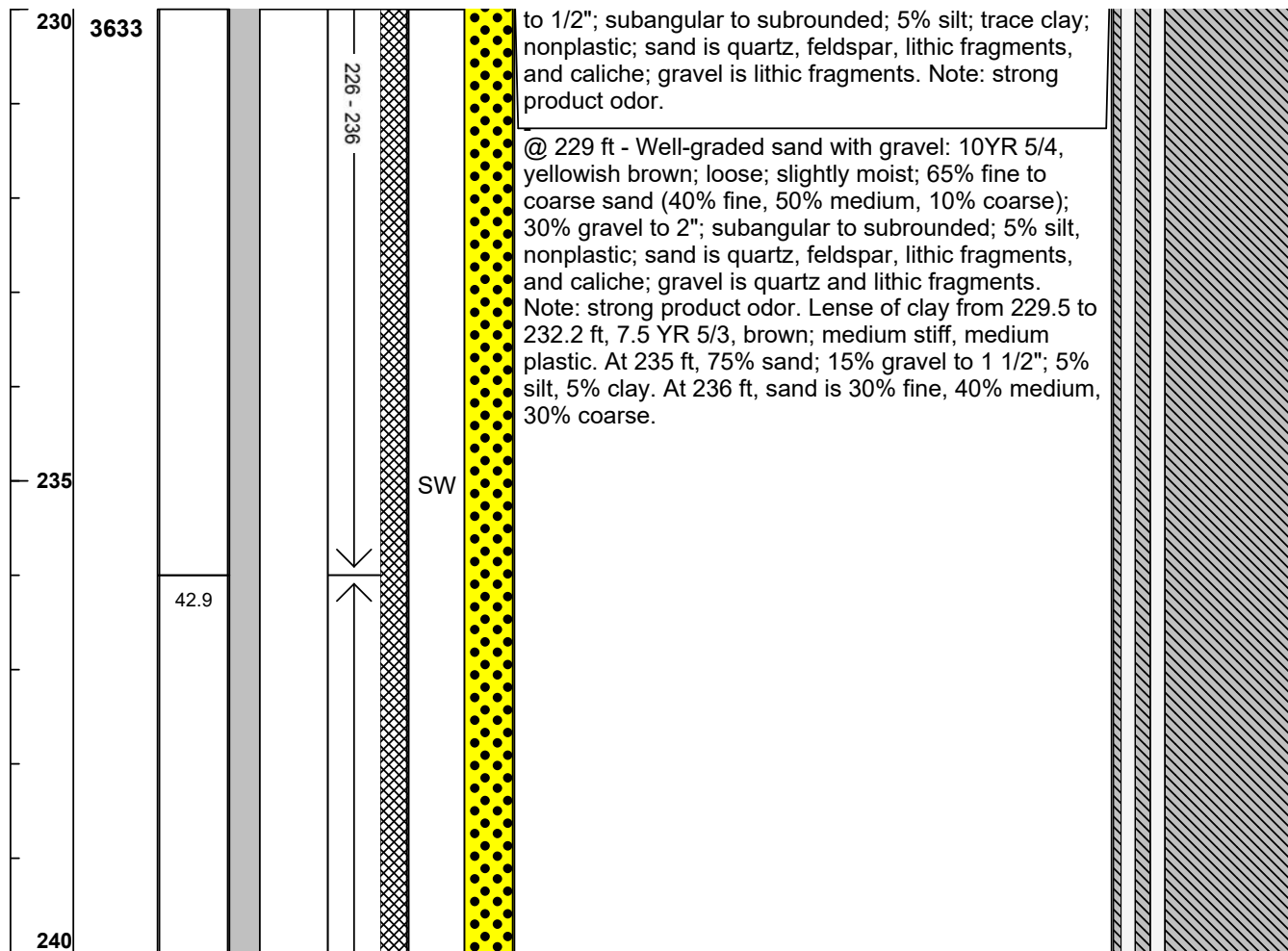
Project: **62735DM02.1017**
 Location: **Kirtland AFB, New Mexico**
 Start Date: **12/11/2018**
 Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
 Page: **24 of 29**

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

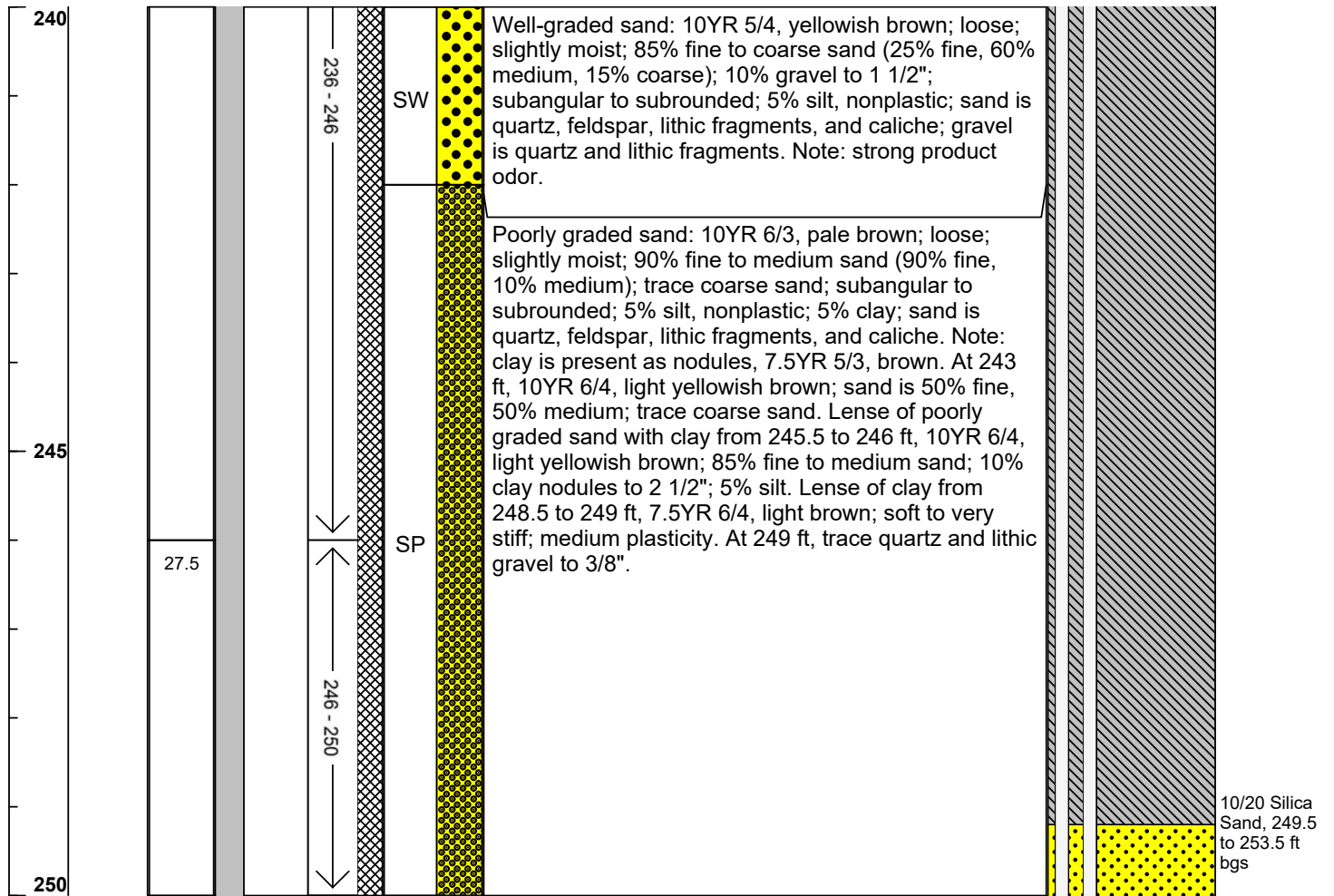
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.




		Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/11/2018 Completion Date: 1/24/19		WELL LOG Well ID: KAFB-106V2 Page: 25 of 29						
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger			Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC		Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand					
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

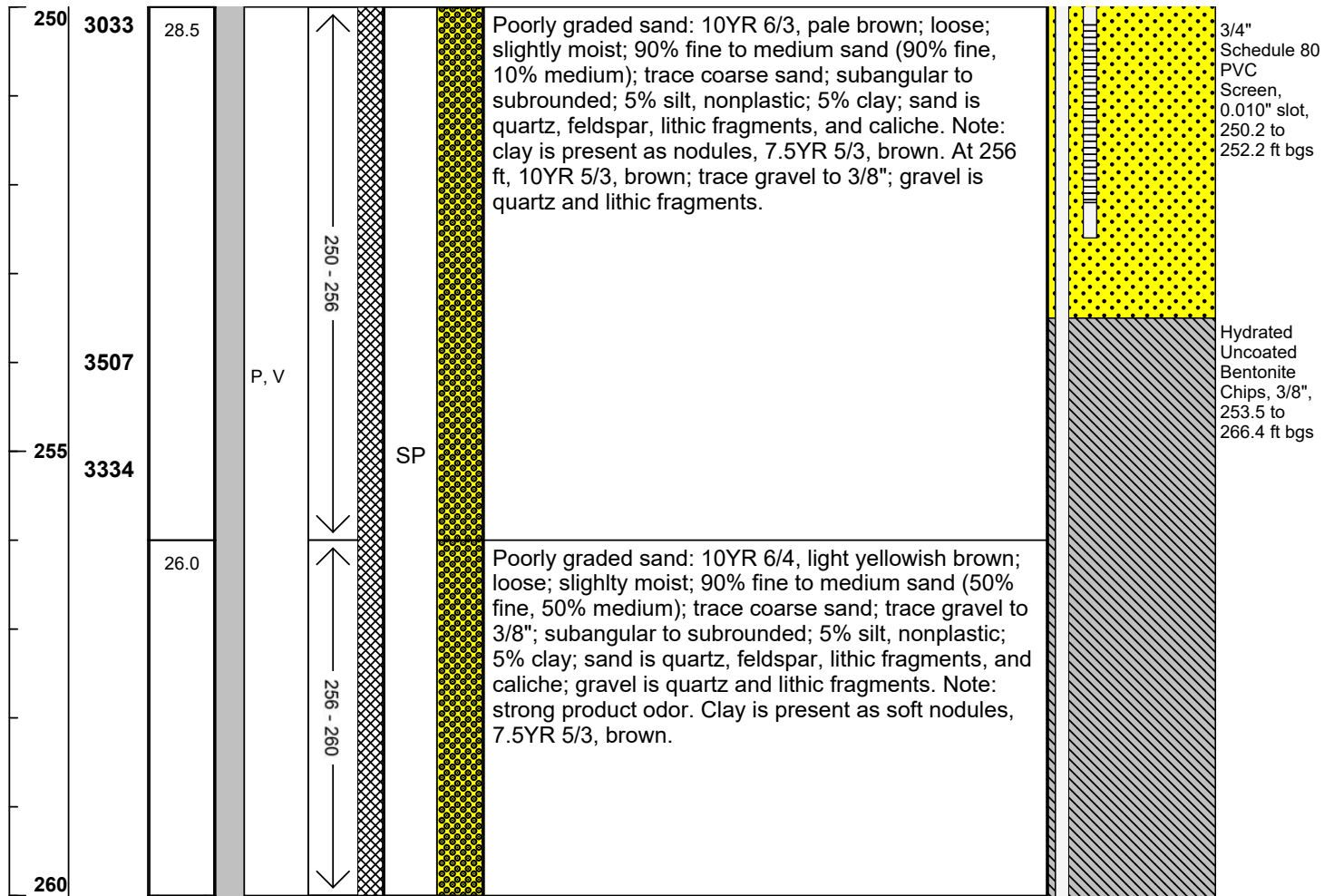
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

There is a 0.4 ft sump underlying each screen.




	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V2							
	Start Date: 12/11/2018	Page: 26 of 29								
	Completion Date: 1/24/19									
Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger		Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC								
		Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

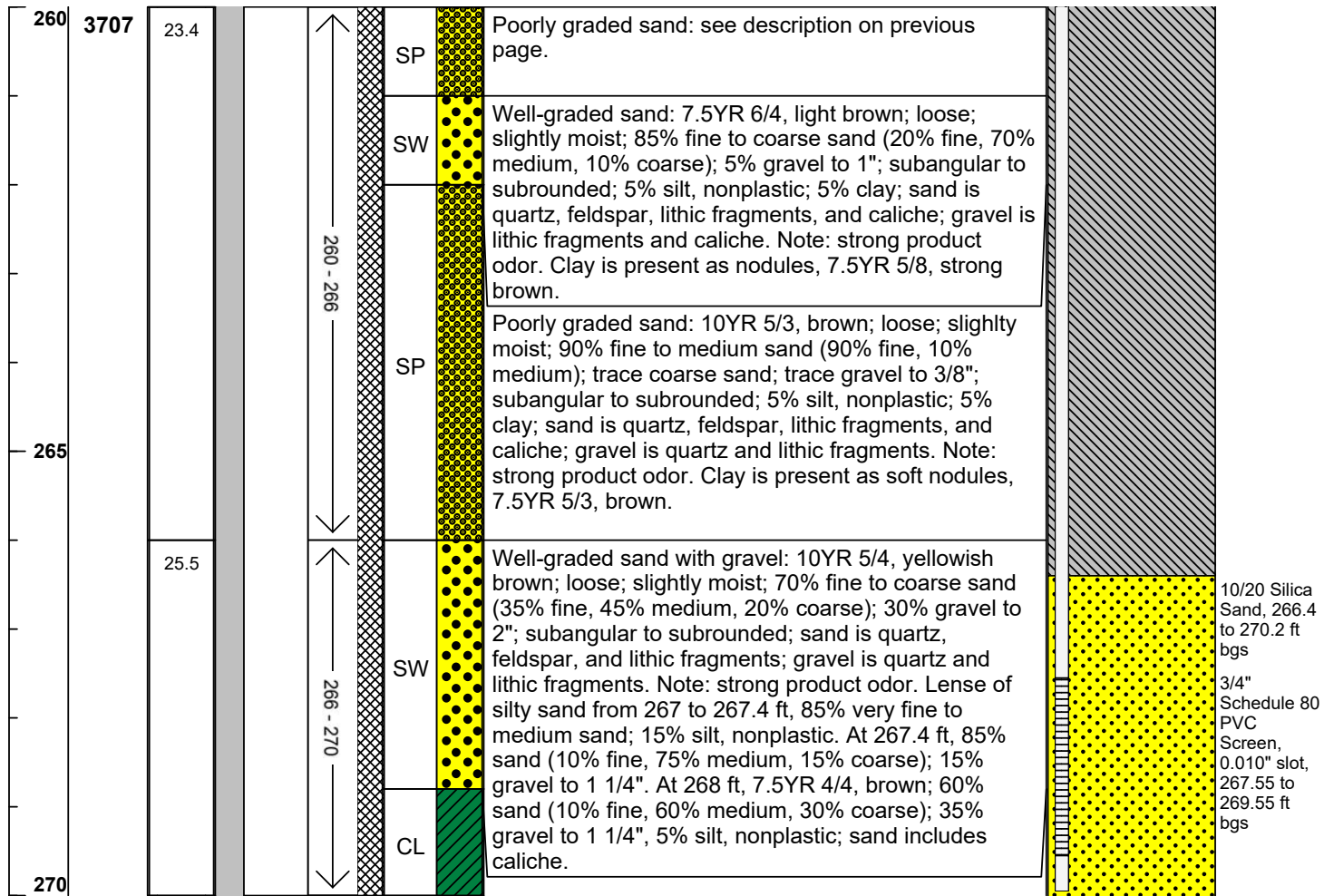
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		




Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017	WELL LOG								
	Location: Kirtland AFB, New Mexico		Well ID: KAFB-106V2							
	Start Date: 12/11/2018	Page: 27 of 29								
	Completion Date: 1/24/19									
Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC								
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen								
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;								
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout								
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand								
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details






Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

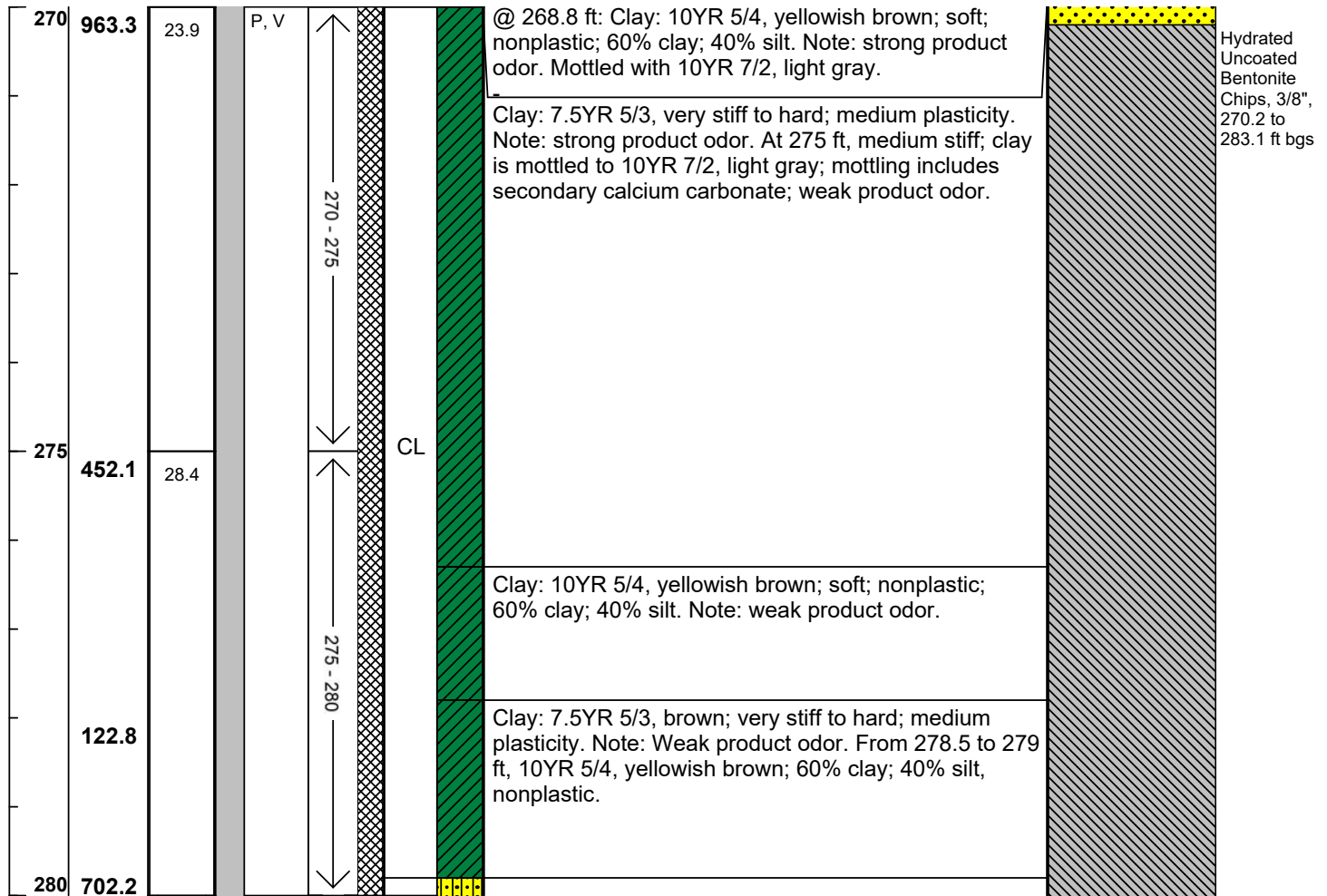
	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

	Project: 62735DM02.1017 Location: Kirtland AFB, New Mexico Start Date: 12/11/2018 Completion Date: 1/24/19	WELL LOG Well ID: KAFB-106V2 Page: 28 of 29
	Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System


UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

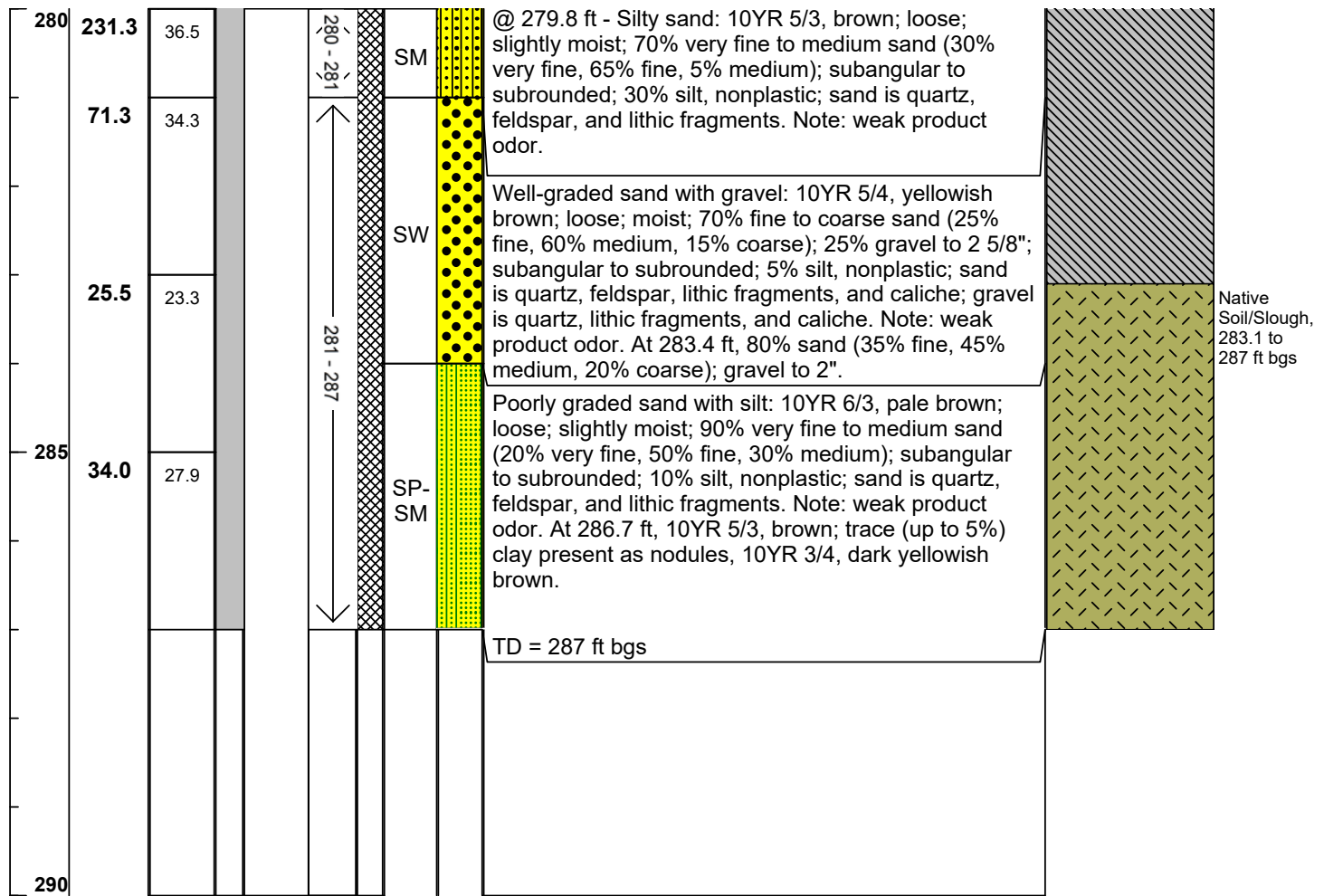
	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.




	Project: 62735DM02.1017	WELL LOG Well ID: KAFB-106V2 Page: 29 of 29
	Location: Kirtland AFB, New Mexico	
	Start Date: 12/11/2018	
	Completion Date: 1/24/19	




Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger	Boring Depth (ft): 287 Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC	Screen Material: 3/4" Sch. 80 PVC 0.010" slot screen Seal Material(s): Cement; Bentonite; High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand
---	---	---

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
------------	------------	-----------	----------	-------------------	---------------	----------	------	-----------	--------------------	--------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

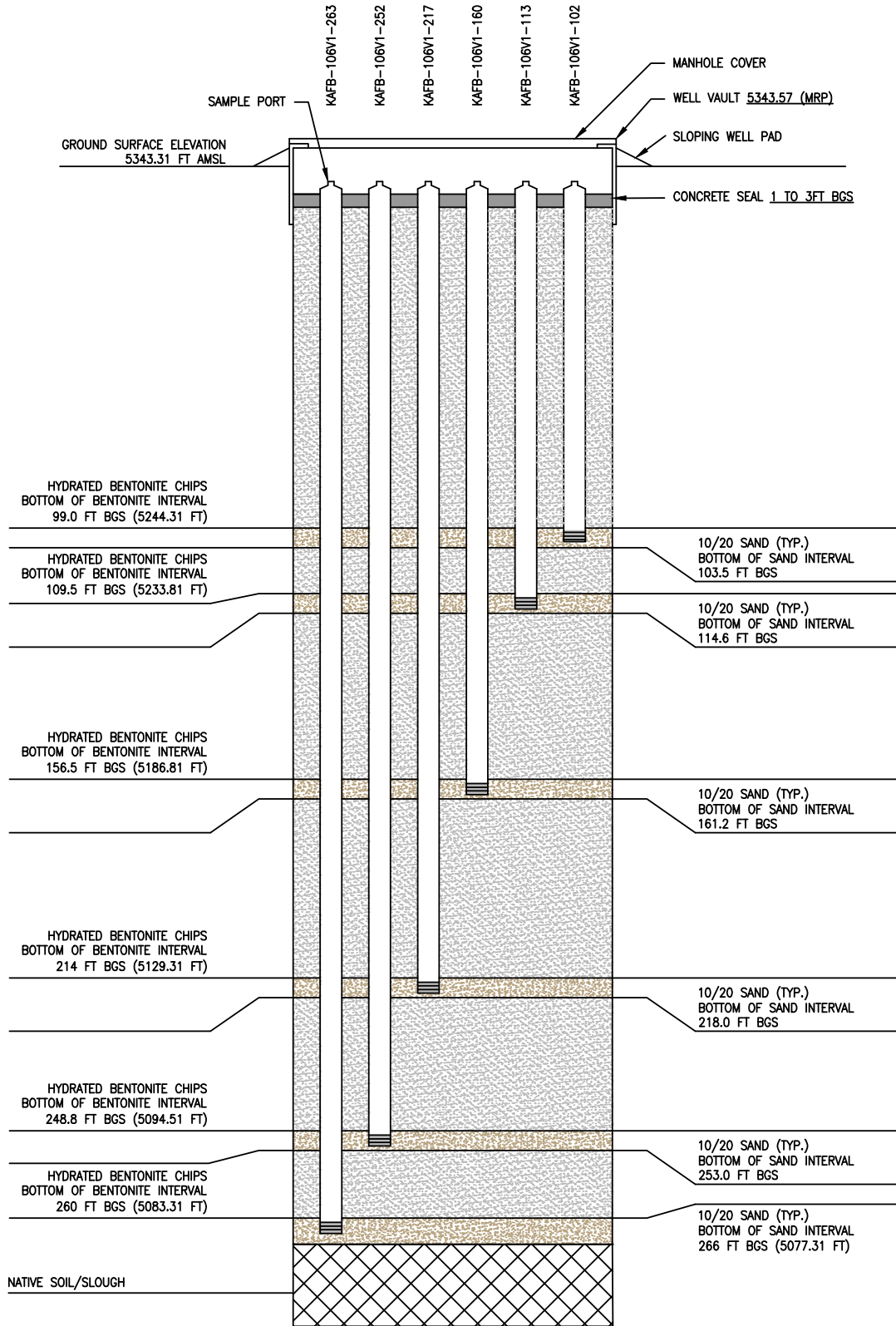
Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

WELL COMPLETION DIAGRAMS

FIGURE B-2: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V1

PLOT DATE/TIME: 4/12/2019 - 12:38pm

CAD FILE: F:\Active Projects\62735DM02 Kirtland Vapors Zone\01.1.VZ Coring Work Plan_RO\04_VZ WP App B_RO-Wall Construction\CADD\Well Completion Diagram - KAFB-106V1.dwg



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
 ASML = ABOVE MEAN SEA LEVEL
 MRP = MEASUREMENT REFERENCE POINT
 ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

TOTAL BORING DEPTH
 285 FT BGS

NOT TO SCALE
 BGS = BELOW GROUND SURFACE
 FT = FEET



320 Gold Avenue, SW Suite 1300
 Albuquerque, NM 87102
 Phone: (505) 224-9013
 Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE

INSTALLATION START DATE/TIME:
 16DEC18

INSTALLATION END DATE/TIME:
 10JAN19

PROJECT NO.:
 62735DM02.1017

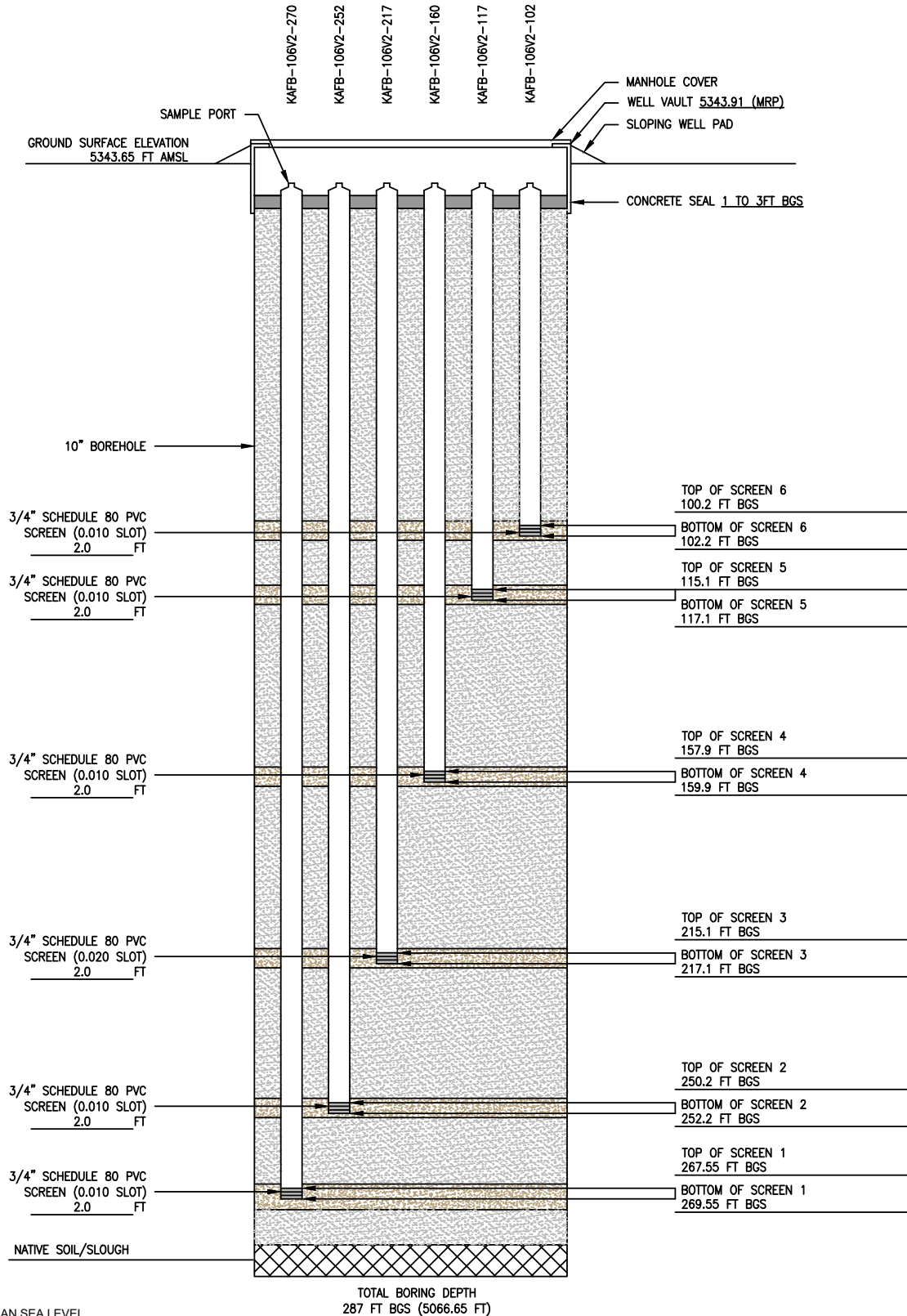
WELL ID:
 KAFB-106V1

GEOLOGIST:
 J. MESSENGER /
 C. MONTOYA

DRILLER:
 R. RODRIGUEZ /
 F. CHATTIN-EVANS

FIGURE B-4: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2

CAD FILE: P:\Active Projects\62735DM02 Kirtland Air Force Base\Zone\01\1_VZ Coring Work\Plan_R0\04_VZ WP Appendices\RD\VZ WP App B_R0- Well Construction\CAD\Well Completion Diagram - KAFB-106V2.dwg
 PLOT DATE/TIME: 4/12/2019 - 12:37pm



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
 ASML = ABOVE MEAN SEA LEVEL
 MRP = MEASUREMENT REFERENCE POINT
 ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
 BGS = BELOW GROUND SURFACE
 FT = FEET



320 Gold Avenue, SW Suite 1300
 Albuquerque, NM 87102
 Phone: (505) 224-9013
 Fax: (505) 224-9016

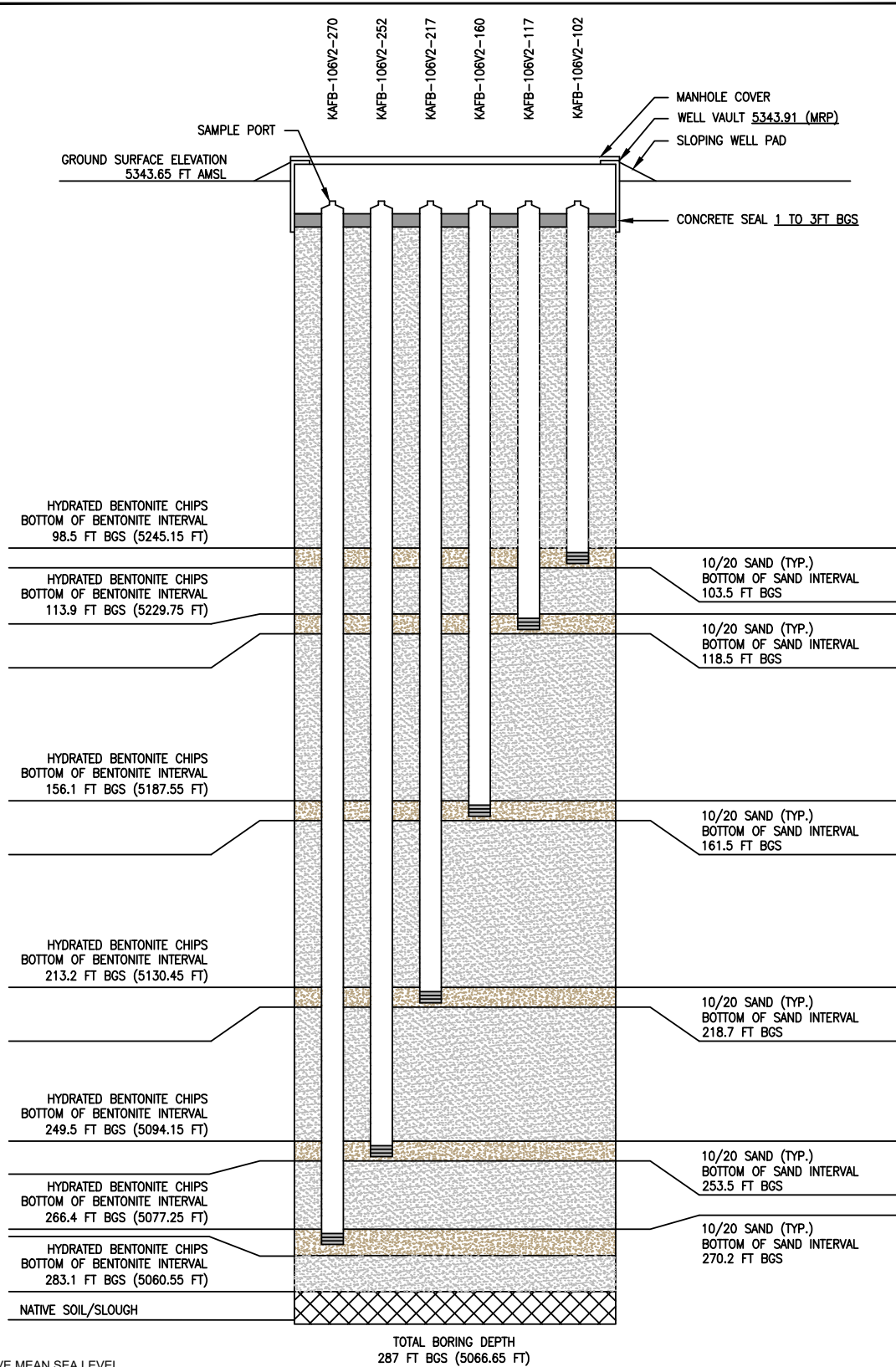
KIRTLAND AIR FORCE BASE

INSTALLATION START DATE/TIME: 12DEC18	INSTALLATION END DATE/TIME: 10JAN19
GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V2
--------------------------------	------------------------

FIGURE B-5: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2

PLOT DATE/TIME: 4/12/2019 - 12:38pm
 CAD FILE: P:\Active Projects\62735DM02_Kirtland Vobase Zone\01_1_VZ Coring Work Plan_R0\04_VZ WP Appendices_R0\VZ WP App B_R0- Well Construction\CADD\Well Completion Diagram - KAFB-106V2.dwg



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
 ASML = ABOVE MEAN SEA LEVEL
 MRP = MEASUREMENT REFERENCE POINT
 ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
 BGS = BELOW GROUND SURFACE
 FT = FEET



320 Gold Avenue, SW Suite 1300
 Albuquerque, NM 87102
 Phone: (505) 224-9013
 Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE

INSTALLATION START DATE/TIME:
 12DEC18

INSTALLATION END DATE/TIME:
 10JAN19

PROJECT NO.:
 62735DM02.1017

WELL ID:
 KAFB-106V2

GEOLOGIST:
 J. MESSENGER /
 C. MONTOYA

DRILLER:
 R. RODRIGUEZ /
 F. CHATTIN-EVANS

APPENDIX D
DEVIATIONS

CALCULATION D-1. PRESSURE LOSS

OBJECTIVE: Estimate pressure loss in 1/2-inch pipe

REFERENCE: Civil Engineering Reference Manual. M. Linderburg. 2001
Section 17. Fluid Dynamics. Friction Losses for Steam and Gases

INPUT:

$p_0 := 12.13 \text{ psi}$ At approximately 5200 ft msl

$p_a := 1.6 \text{ psi}$ Anticipated applied pressure (maximum blower pressure)

$p_1 := p_0 + p_a = 13.7 \text{ psi}$ Blower Applied Pressure

$L := 100 \text{ ft}$ Longest Run

$R' := \frac{0.08206 \text{ atm L}}{\text{mol K}}$ Universal Constant

$T := 80 \text{ }^\circ\text{F}$ Vapor average temperature

$D := .5 \text{ in} = 0.0417 \text{ ft}$ Selected pipe diameter - existing pipe

$MW := 28.98 \frac{\text{g}}{\text{mol}}$ Air

$Q := \frac{4.0 \text{ ft}^3}{\text{min}}$ Design volumetric flowrate - SVMW-11-250 design flowrate in the approved Bioventing Respiration Pilot Testing Procedure.

$d := 1.293 \frac{\text{kg}}{\text{m}^3}$ Density of air at 0 degrees Celcius

$\mu := 1.709 \cdot 10^{-5} \text{ Pa s}$ Absolute viscosity of air at 0 degrees Celcius

$e := 5 \cdot 10^{-6} \text{ ft}$ Specific Roughness for Plastic Pipe

53.7

Calculations:

$$\text{Area} := \frac{3.14 \cdot D^2}{4} = 0.0014 \text{ ft}^2 \quad \text{Area of pipe}$$

$$m := Q \cdot d \cdot \frac{p1}{1 \text{ atm}} \cdot \frac{32 \text{ }^\circ\text{F}}{T} = 0.0021 \frac{\text{kg}}{\text{s}} \quad \text{Mass flowrate}$$

$$G := \frac{m}{\text{Area}} = 16.4094 \frac{\text{kg}}{\text{m}^2 \text{ s}} \quad \text{Mass flowrate per area}$$

$$\text{Re} := \frac{D \cdot G}{\mu} = 12194 \quad \text{Reynold's Number}$$

$$\text{er} := \frac{e}{D} = 0.0001 \quad \text{Relative roughness}$$

$$f := 0.031 \quad \text{From Moody diagram for er 0.00006 and Re } 1.2 \cdot 10^4$$

$$B := \frac{f \cdot L \cdot G^2 \cdot R' \cdot T}{D \cdot MW} = 1.7233 \cdot 10^9 \frac{\text{kg Pa}}{\text{m s}^2}$$

$$p2 := \sqrt{p1^2 - B} = 85077.3077 \text{ Pa} \quad \text{Final pressure at discharge}$$

$$dP := p1 - p2 = 9587.71 \text{ Pa}$$

$$dP = 1.3906 \text{ psi} \quad \text{Pressure loss in pipe per 100-feet}$$

Curley, Tyler

From: Moss, Pamela
Sent: Wednesday, March 13, 2019 12:39 PM
To: Curley, Tyler
Subject: FW: Kirtland Bioventing testing April
Attachments: TO-15 LL - Kirtland AFB.PDF

Hi Tyler will the 6L cans work for you thx.

From: Brian Whittaker <BrianWhittaker@eurofinsUS.com>
Sent: Wednesday, March 13, 2019 12:13 PM
To: Moss, Pamela <pmoss@eaest.com>; Curley, Tyler <tcurlley@eaest.com>
Subject: RE: Kirtland Bioventing testing April

Hi Pam,

Our canister certification group confirms that a 6L canister is needed in order to achieve the SIM level RLs by TO-15. I can update the attached Low Level VOC list to include the available compounds by SIM and substitute 6L canisters for 1L canisters, unless there objections from EA to the 6L size.

Since these are grab samples, that shouldn't make much of a difference in terms of sample duration. (~1 minute for 1L vs. 2-3 minutes for 6L).

I should have the project file set up by tomorrow and the order confirmations will follow shortly.

Please let me know if you have any questions.

Kind Regards,
Brian Whittaker
Project Manager

Eurofins Air Toxics, LLC
180 Blue Ravine Road, Suite B
FOLSOM, CA 95630
USA
Phone: 916-605-3355
Fax: 916-351-8279
Email: BrianWhittaker@eurofinsUS.com
Website: www.eurofinsus.com

From: Moss, Pamela [<mailto:pmoss@eaest.com>]
Sent: Wednesday, March 13, 2019 10:53 AM
To: Curley, Tyler; Brian Whittaker
Subject: RE: Kirtland Bioventing testing April

EXTERNAL EMAIL*

Hi Brian,

Did you check into the question on the TO15LL vs TO15 SIM ? thx.

From: Curley, Tyler <tcurley@eaest.com>
Sent: Wednesday, March 13, 2019 7:43 AM
To: Brian Whittaker <BrianWhittaker@eurofinsUS.com>; Moss, Pamela <pmoss@eaest.com>
Subject: RE: Kirtland Bioventing testing April

Hi Brian,

I think we will be good with a summa with the built in pressure gauge, a filter, and a connecting ferrule set. Lets set up the first to arrive 3 weeks after the first but please confirm with me prior to shipping. The third set of can will have to come at a later date, I am not sure when this will happen yet but I can give you a months' notice.

Thanks,

Tyler

From: Brian Whittaker <BrianWhittaker@eurofinsUS.com>
Sent: Tuesday, March 12, 2019 1:54 PM
To: Moss, Pamela <pmoss@eaest.com>
Cc: Curley, Tyler <tcurley@eaest.com>
Subject: RE: Kirtland Bioventing testing April

Hi Pam,

Thank you for the update.

Yes, we can analyze Methane by ASTM D-1945 and media delivery is available for the last week of March. Just have Tyler send me a summary of all required sampling equipment and I'll get the order placed right away. A recurring order can be set for the 2 other rounds of sampling.

However, the attached table indicates 1L canisters for TO-15 SIM analysis. I believe we quoted TO-15 Low Level for this project, so please let me know if TO-15 Low Level would be a problem.

Also, we initially quoted this as a DoD QSM 5.0 project, but are now accredited for DoD QSM 5.1 and would follow that criteria. This means I will need to send you an updated variance table that is specific to QSM 5.1. I should have that available for you by tomorrow.

Please contact me if you have any questions or concerns.

Kind Regards,
Brian Whittaker
Project Manager

Eurofins Air Toxics, LLC
180 Blue Ravine Road, Suite B
FOLSOM, CA 95630
USA
Phone: 916-605-3355
Fax: 916-351-8279
Email: BrianWhittaker@eurofinsUS.com
Website: www.eurofinsus.com

From: Moss, Pamela [<mailto:pmoss@eaest.com>]
Sent: Tuesday, March 12, 2019 10:53 AM
To: Brian Whittaker
Cc: Curley, Tyler
Subject: Kirtland Bioventing testing April
Importance: High

EXTERNAL EMAIL*

Hi Brian,

We will be awarding you a PO for this upcoming testing at Kirtland. plz see attached table. I was working with you on the scoping last year for the work plan.

We may also need to add methane, can that be run with the D1945 I assume so. I see it was included in the reporting limits table you sent to me.

Tyler plans to start sampling the first week of April, will you be able to deliver the supplies in time. There will be a total of 3 rounds of sampling but I am not sure when the second or the third round will occur. To start lets set the delivery of the second set of samples approximately 3 weeks after the first set, and we will keep you posted. We will collect 14 samples.

Plz let me know if you can support this thx.

Pam

Pamela J. Moss
Senior Scientist
EA Engineering, Science, and Technology, Inc., PBC
7995 E. Prentice Ave, Suite 206E
Greenwood Village, CO 80111
303-590-9143 (office)
303-810-6903 (cell)
pmoss@eaest.com



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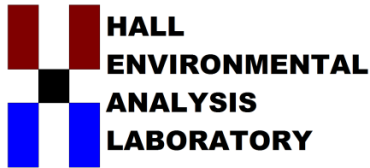
* WARNING - EXTERNAL: This email originated from outside of Eurofins. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!

Notify us [here](#) to report this email as spam.

APPENDIX E
LABORATORY ANALYTICAL DATA

APPENDIX E
LABORATORY ANALYTICAL DATA

APPENDIX E-1
INJECTION WATER LABORATORY ANALYTICAL RESULTS



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

May 23, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Bioventing Pilot Test

OrderNo.: 1905A53

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 3 sample(s) on 5/21/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a white background.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: GWTS-233EFF2-052119

Project: Kirtland BFF Bioventing Pilot Test

Collection Date: 5/21/2019 10:18:00 AM

Lab ID: 1905A53-001

Matrix: AQUEOUS

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB							Analyst: CLP
1,2-Dibromoethane	ND	0.0095		µg/L	1	5/22/2019 4:27:20 PM	45114
EPA METHOD 8260B: VOLATILES							Analyst: RAA
Benzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Toluene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Ethylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Naphthalene	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
2-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Acetone	ND	10		µg/L	1	5/21/2019 9:58:00 PM	R60022
Bromobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Bromodichloromethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Bromoform	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Bromomethane	ND	3.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
2-Butanone	ND	10		µg/L	1	5/21/2019 9:58:00 PM	R60022
Carbon disulfide	ND	10		µg/L	1	5/21/2019 9:58:00 PM	R60022
Carbon Tetrachloride	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Chlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Chloroethane	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Chloroform	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Chloromethane	ND	3.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
2-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
4-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
cis-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Dibromochloromethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Dibromomethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,3-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,4-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Dichlorodifluoromethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1-Dichloroethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1-Dichloroethene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

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Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: GWTS-233EFF2-052119

Project: Kirtland BFF Bioventing Pilot Test

Collection Date: 5/21/2019 10:18:00 AM

Lab ID: 1905A53-001

Matrix: AQUEOUS

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: RAA
1,3-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
2,2-Dichloropropane	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Hexachlorobutadiene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
2-Hexanone	ND	10		µg/L	1	5/21/2019 9:58:00 PM	R60022
Isopropylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
4-Isopropyltoluene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
4-Methyl-2-pentanone	ND	10		µg/L	1	5/21/2019 9:58:00 PM	R60022
Methylene Chloride	ND	3.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
n-Butylbenzene	ND	3.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
n-Propylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
sec-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Styrene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
tert-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
trans-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1,1-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,1,2-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Trichloroethene (TCE)	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Trichlorofluoromethane	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
1,2,3-Trichloropropane	ND	2.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Vinyl chloride	ND	1.0		µg/L	1	5/21/2019 9:58:00 PM	R60022
Xylenes, Total	ND	1.5		µg/L	1	5/21/2019 9:58:00 PM	R60022
Surr: 1,2-Dichloroethane-d4	92.2	70-130		%Rec	1	5/21/2019 9:58:00 PM	R60022
Surr: 4-Bromofluorobenzene	94.2	70-130		%Rec	1	5/21/2019 9:58:00 PM	R60022
Surr: Dibromofluoromethane	91.9	70-130		%Rec	1	5/21/2019 9:58:00 PM	R60022
Surr: Toluene-d8	98.4	70-130		%Rec	1	5/21/2019 9:58:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: GWTS-233EFF2DUP-052119

Project: Kirtland BFF Bioventing Pilot Test

Collection Date: 5/21/2019 10:18:00 AM

Lab ID: 1905A53-002

Matrix: AQUEOUS

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB							Analyst: CLP
1,2-Dibromoethane	ND	0.0094		µg/L	1	5/22/2019 4:42:31 PM	45114
EPA METHOD 8260B: VOLATILES							Analyst: RAA
Benzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Toluene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Ethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Naphthalene	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
2-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Acetone	ND	10		µg/L	1	5/21/2019 10:22:00 PM	R60022
Bromobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Bromodichloromethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Bromoform	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Bromomethane	ND	3.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
2-Butanone	ND	10		µg/L	1	5/21/2019 10:22:00 PM	R60022
Carbon disulfide	ND	10		µg/L	1	5/21/2019 10:22:00 PM	R60022
Carbon Tetrachloride	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Chlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Chloroethane	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Chloroform	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Chloromethane	ND	3.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
2-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
4-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
cis-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Dibromochloromethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Dibromomethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,3-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,4-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Dichlorodifluoromethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1-Dichloroethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1-Dichloroethene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

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Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: GWTS-233EFF2DUP-052119

Project: Kirtland BFF Bioventing Pilot Test

Collection Date: 5/21/2019 10:18:00 AM

Lab ID: 1905A53-002

Matrix: AQUEOUS

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: RAA
1,3-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
2,2-Dichloropropane	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Hexachlorobutadiene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
2-Hexanone	ND	10		µg/L	1	5/21/2019 10:22:00 PM	R60022
Isopropylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
4-Isopropyltoluene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
4-Methyl-2-pentanone	ND	10		µg/L	1	5/21/2019 10:22:00 PM	R60022
Methylene Chloride	ND	3.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
n-Butylbenzene	ND	3.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
n-Propylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
sec-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Styrene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
tert-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
trans-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1,1-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,1,2-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Trichloroethene (TCE)	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Trichlorofluoromethane	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
1,2,3-Trichloropropane	ND	2.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Vinyl chloride	ND	1.0		µg/L	1	5/21/2019 10:22:00 PM	R60022
Xylenes, Total	ND	1.5		µg/L	1	5/21/2019 10:22:00 PM	R60022
Surr: 1,2-Dichloroethane-d4	93.8	70-130		%Rec	1	5/21/2019 10:22:00 PM	R60022
Surr: 4-Bromofluorobenzene	93.4	70-130		%Rec	1	5/21/2019 10:22:00 PM	R60022
Surr: Dibromofluoromethane	92.7	70-130		%Rec	1	5/21/2019 10:22:00 PM	R60022
Surr: Toluene-d8	97.5	70-130		%Rec	1	5/21/2019 10:22:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: Trip Blank

Project: Kirtland BFF Bioventing Pilot Test

Collection Date:

Lab ID: 1905A53-003

Matrix: TRIP BLANK

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB							Analyst: CLP
1,2-Dibromoethane	ND	0.0094		µg/L	1	5/22/2019 5:27:47 PM	45114
EPA METHOD 8260B: VOLATILES							Analyst: RAA
Benzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Toluene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Ethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Naphthalene	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
2-Methylnaphthalene	ND	4.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Acetone	ND	10		µg/L	1	5/21/2019 10:46:00 PM	R60022
Bromobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Bromodichloromethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Bromoform	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Bromomethane	ND	3.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
2-Butanone	ND	10		µg/L	1	5/21/2019 10:46:00 PM	R60022
Carbon disulfide	ND	10		µg/L	1	5/21/2019 10:46:00 PM	R60022
Carbon Tetrachloride	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Chlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Chloroethane	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Chloroform	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Chloromethane	ND	3.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
2-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
4-Chlorotoluene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
cis-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Dibromochloromethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Dibromomethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,3-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,4-Dichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Dichlorodifluoromethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1-Dichloroethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1-Dichloroethene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

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Analytical Report

Lab Order 1905A53

Date Reported: 5/23/2019

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology

Client Sample ID: Trip Blank

Project: Kirtland BFF Bioventing Pilot Test

Collection Date:

Lab ID: 1905A53-003

Matrix: TRIP BLANK

Received Date: 5/21/2019 11:34:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: RAA
1,3-Dichloropropane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
2,2-Dichloropropane	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Hexachlorobutadiene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
2-Hexanone	ND	10		µg/L	1	5/21/2019 10:46:00 PM	R60022
Isopropylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
4-Isopropyltoluene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
4-Methyl-2-pentanone	ND	10		µg/L	1	5/21/2019 10:46:00 PM	R60022
Methylene Chloride	ND	3.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
n-Butylbenzene	ND	3.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
n-Propylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
sec-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Styrene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
tert-Butylbenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
trans-1,2-DCE	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1,1-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,1,2-Trichloroethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Trichloroethene (TCE)	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Trichlorofluoromethane	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
1,2,3-Trichloropropane	ND	2.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Vinyl chloride	ND	1.0		µg/L	1	5/21/2019 10:46:00 PM	R60022
Xylenes, Total	ND	1.5		µg/L	1	5/21/2019 10:46:00 PM	R60022
Surr: 1,2-Dichloroethane-d4	90.7	70-130		%Rec	1	5/21/2019 10:46:00 PM	R60022
Surr: 4-Bromofluorobenzene	91.7	70-130		%Rec	1	5/21/2019 10:46:00 PM	R60022
Surr: Dibromofluoromethane	94.0	70-130		%Rec	1	5/21/2019 10:46:00 PM	R60022
Surr: Toluene-d8	98.4	70-130		%Rec	1	5/21/2019 10:46:00 PM	R60022

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Page 6 of 10

QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**WO#: **1905A53****23-May-19****Client:** EA Engineering Science & Technology**Project:** Kirtland BFF Bioventing Pilot Test

Sample ID: MB-45114	SampType: MBLK	TestCode: EPA Method 8011/504.1: EDB								
Client ID: PBW	Batch ID: 45114	RunNo: 60087								
Prep Date: 5/22/2019	Analysis Date: 5/22/2019	SeqNo: 2029153	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID: LCS-45114	SampType: LCS	TestCode: EPA Method 8011/504.1: EDB								
Client ID: LCSW	Batch ID: 45114	RunNo: 60087								
Prep Date: 5/22/2019	Analysis Date: 5/22/2019	SeqNo: 2029155	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.095	0.010	0.1000	0	94.7	70	130			

Sample ID: 1905A53-002BMS	SampType: MS	TestCode: EPA Method 8011/504.1: EDB								
Client ID: GWTS-233EFF2DUP	Batch ID: 45114	RunNo: 60087								
Prep Date: 5/22/2019	Analysis Date: 5/22/2019	SeqNo: 2029158	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.089	0.0094	0.09409	0	94.5	65	135			

Sample ID: 1905A53-002BMSD	SampType: MSD	TestCode: EPA Method 8011/504.1: EDB								
Client ID: GWTS-233EFF2DUP	Batch ID: 45114	RunNo: 60087								
Prep Date: 5/22/2019	Analysis Date: 5/22/2019	SeqNo: 2029159	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.082	0.0094	0.09383	0	87.1	65	135	8.38	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Page 7 of 10

QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**

WO#: 1905A53

23-May-19

Client: EA Engineering Science & Technology**Project:** Kirtland BFF Bioventing Pilot Test

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	91.5	70	130			
Toluene	20	1.0	20.00	0	99.9	70	130			
Chlorobenzene	22	1.0	20.00	0	108	70	130			
1,1-Dichloroethene	18	1.0	20.00	0	88.8	70	130			
Trichloroethene (TCE)	17	1.0	20.00	0	86.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		90.7	70	130			
Surr: 4-Bromofluorobenzene	9.1		10.00		90.6	70	130			
Surr: Dibromofluoromethane	9.4		10.00		94.4	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Page 8 of 10

QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**

WO#: 1905A53

23-May-19

Client: EA Engineering Science & Technology**Project:** Kirtland BFF Bioventing Pilot Test

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Page 9 of 10

QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**WO#: **1905A53****23-May-19****Client:** EA Engineering Science & Technology**Project:** Kirtland BFF Bioventing Pilot Test

Sample ID: rb	SampType: MBLK		TestCode: EPA Method 8260B: VOLATILES							
Client ID: PBW	Batch ID: R60022		RunNo: 60022							
Prep Date:	Analysis Date: 5/21/2019		SeqNo: 2027494		Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.2		10.00		82.1	70	130			
Surr: 4-Bromofluorobenzene	8.9		10.00		89.2	70	130			
Surr: Dibromofluoromethane	8.9		10.00		88.6	70	130			
Surr: Toluene-d8	10		10.00		103	70	130			

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

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Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb

Work Order Number: 1905A53

ReptNo: 1

Received By: Yazmine Garduno 5/21/2019 11:34:00 AM

Yazmine Garduno

Completed By: Leah Baca 5/21/2019 12:41:51 PM

Leah Baca

Reviewed By: DAD 5/21/19

LD 5/21/19

Labeled by 1

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes No NA
4. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes No
6. Sufficient sample volume for indicated test(s)? Yes No
7. Are samples (except VOA and ONG) properly preserved? Yes No
8. Was preservative added to bottles? Yes No NA
9. VOA vials have zero headspace? Yes No No VOA Vials
10. Were any sample containers received broken? Yes No
11. Does paperwork match bottle labels? Yes No
- (Note discrepancies on chain of custody)
12. Are matrices correctly identified on Chain of Custody? Yes No
13. Is it clear what analyses were requested? Yes No
14. Were all holding times able to be met? Yes No
- (If no, notify customer for authorization.)

of preserved bottles checked for pH: _____
 (<2 or >12 unless noted)
 Adjusted? _____
 Checked by: *YG 5/21/19*

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____

By Whom: _____ Via: eMail Phone Fax In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	12.3	Good	Yes			

Chain-of-Custody Record

Client: EA Engineering
320 Gold Ave Sw Ste 1300
 Mailing Address:
ABQ NM 87102
 Phone #: (505) 401-1181
 email or Fax#: djercinovic@easton
 QA/QC Package:
 Standard Level 4 (Full Validation)
 Accreditation: Az Compliance
 NELAC Other
 EDD (Type)

Turn-Around Time:
 Standard Rush 48 hrs
 Project Name: Kirtland BFF Bioindas Pilot Test
 Project #: 62735DM02
 Project Manager: Devon Jercinovic
 Sampler: JRL
 On Ice: Yes No
 # of Coolers: 1
 Cooler Temp (including CP): 12.3a

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.
5/21/19	1018	H ₂ O	GWTS-233EFF2-052119	2x40ml EDB 3x40ml 8260 ml HgCl ₂	M ₂ S ₂ O ₃	1905A53
5/21/19	1018	H ₂ O	GWTS-233EFF2DUP-052119	↓	↓	↓
5/21/19	---	H ₂ O	TRIP BLANK	1x40ml EDB 2x40ml 8260	↓	↓

Analysis Request	
BTEX / MTBE / TMB's (8021)	
TPH:8015D(GRO / DRO / MRO)	
8081 Pesticides/8082 PCB's	
EDB (Method 504.1)	X
PAHs by 8310 or 8270SIMS	
RCRA 8 Metals	
Cl, F, Br, NO ₃ , NO ₂ , PO ₄ , SO ₄	X
8260 (VOA)	X
8270 (Semi-VOA)	
Total Coliform (Present/Absent)	



HALL ENVIRONMENTAL ANALYSIS LABORATORY
 www.hallenvironmental.com
 4901 Hawkins NE - Albuquerque, NM 87109
 Tel. 505-345-3975 Fax 505-345-4107

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
5/21/19	1134	Joshua Livingston-JMT	YJV	CDU	5/21/19	1134

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

APPENDIX E-2
SOIL VAPOR LABORATORY ANALYTICAL DATA

LABORATORY REPORT

May 17, 2019

Pamela Moss
EA Engineering, Science, and Technology, Inc.
9702 Bay Hill Drive
Lone Tree, CO 80124

RE: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Dear Pamela:

Your report P1902156 for samples submitted on April 17, 2019 has been amended to correct the MDL limits for the EPA TO-3M data pages. The sample results have not changed. The data sheets have been corrected and indicated by "Revised Page" footer located on the bottom right of each affected page. (Page 9-26)

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental



By Kate Kaneko at 3:19 pm, 05/17/19

Kate Kaneko
Laboratory Director

Client: EA Engineering, Science, and Technology, Inc. Service Request No: P1902156
Project: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

CASE NARRATIVE

The samples were received intact under chain of custody on April 17, 2019 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Methane, Ethene & Ethane Analysis

The samples were analyzed for methane, ethane and ethane, per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID). This procedure is described in laboratory SOP VOA-TO3C1C6. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

Manual integrations were performed on the following sample(s) and analyte(s). Refer to the raw data for additional information.

Sample Identification(s)	Analyte(s)
P1902156-002, 011, 014, 015	Acetone
P1902156-006	Propene
P1902156-008	Acetone, o-Xylene

Client: EA Engineering, Science, and Technology, Inc. Service Request No: P1902156
Project: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1521096
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-006
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-18-9
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272018-9
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

is

DETAIL SUMMARY REPORT

Client: EA Engineering, Science, and Technology, Inc.
 Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Service Request: P1902156

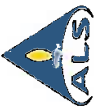
Date Received: 4/17/2019
 Time Received: 09:00

TO-3 Modified - MEAPP Can	TO-15 - VOC Cans
---------------------------	------------------

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - MEAPP Can	TO-15 - VOC Cans
SVMW-10-100	P1902156-001	Air	4/11/2019	13:54	1SC01168	-2.46	5.76	X	X
SVMW-10-150	P1902156-002	Air	4/11/2019	14:10	1SC00586	-1.65	5.36	X	X
SVMW-10-250	P1902156-003	Air	4/11/2019	14:30	1SC01006	-3.67	5.13	X	X
SVMW-11-100	P1902156-004	Air	4/11/2019	12:40	1SS00895	-2.21	5.42	X	X
SVMW-11-250	P1902156-005	Air	4/11/2019	13:11	1SS00187	-2.24	5.74	X	X
SVEW-04/05-313	P1902156-006	Air	4/11/2019	15:05	1SS00911	-3.16	5.16	X	X
KAFB-106V1 102.1	P1902156-007	Air	4/10/2019	13:01	1SS00737	-2.96	5.19	X	X
KAFB-106V1 112.6	P1902156-008	Air	4/10/2019	13:08	1SS00929	-5.09	5.25	X	X
KAFB-106V1 159.6	P1902156-009	Air	4/10/2019	13:11	1SC00131	-3.78	5.24	X	X
KAFB-106V1 217.1	P1902156-010	Air	4/10/2019	13:15	1SS00955	-2.65	5.48	X	X
KAFB-106V1 252.1	P1902156-011	Air	4/10/2019	13:19	1SC01159	-5.00	5.33	X	X
KAFB-106V1 262.6	P1902156-012	Air	4/10/2019	13:23	1SC00474	-3.65	5.24	X	X
KAFB-106V2 102.2	P1902156-013	Air	4/11/2019	08:33	1SS00239	-1.95	5.25	X	X
KAFB-106V2 117.1	P1902156-014	Air	4/11/2019	09:03	1SC00874	-4.92	5.27	X	X
KAFB-106V2 159.6	P1902156-015	Air	4/11/2019	09:33	1SC00674	-3.31	5.28	X	X
KAFB-106V2 252.2	P1902156-017	Air	4/11/2019	10:47	1SC00905	-3.75	5.29	X	X
KAFB-106V2 269.5	P1902156-018	Air	4/11/2019	11:46	1SC01205	-3.12	5.25	X	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1



2655 Park Center Drive, Suite A
 Simi Valley, California 93065
 Phone (805) 526-7161
 Fax (805) 526-7270

Company Name & Address (Reporting Information)		Project Name		Requested Turnaround Time in Business Days (Surcharges) please circle		ALS Project #			
EA Engineering		KAFB Bioventilation		1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Days-Standard		R-910215			
Project Manager: Dejon Jercinovic		Project Number: 6770A-G735 DM02.1038		ALS Contact:		Analysis Method			
P.O. # / Billing Information		Sampler (Print & Sign): Tivier Cutler		EPA 703		EPA 706			
Phone: 503-244-9012		Fax: 17682		Sample Volume		Comments			
Email Address for Result Reporting: pm05@ea-engineering.com		Carrier ID (Bar code # - AC, SC, etc.)		Carrier Start Pressure (Hg)		e.g. Actual Preservative or specific instructions			
Laboratory ID Number		Flow Controller ID (Bar code # - FC #)		Carrier End Pressure (Hg)					
Date Collected		Time Collected							
1	4-11-19	1554	1554	1500168	NA	-24.5	-2	X	
2	4-11-19	1411	1411	1500586	NA	-21.5	-1.0	X	
3	4-11-19	1430	1430	1500106	NA	-25	-5.0	X	
4	4-11-19	1210	1210	1500585	NA	-24.5	0.0	X	
5	4-11-19	1311	1311	1500187	NA	-24.5	0.0	X	
6	4-11-19	1505	1505	1500911	NA	-35.0	-2.5	X	
7	4-10-19	1301	1301	1500737	NA	-22.5	0.0	X	
8	4-10-19	1308	1308	1500939	NA	-24.0	-2.0	X	
9	4-10-19	1311	1311	1500931	NA	-23.0	-2.0	X	
10	4-10-19	1315	1315	1500995	NA	-22.0	-0.5	X	
11	4-10-19	1319	1319	1500159	NA	-22.0	-6.0	X	
12	4-10-19	1323	1323	1500474	NA	-27.0	-4.0	X	
13	4-11-19	0933	0933	1500939	NA	-25.0	0.0	X	
14	4-11-19	0903	0903	1500974	NA	-24.0	-5.0	X	
15	4-11-19	0933	0933	1500974	NA	-22.5	-3.0	X	
16	4-11-19	1015	1015	1500985	NA	-26.0	-1.5	X	
17	4-11-19	1047	1047	1500995	NA	-23	-5.0	X	
18	4-11-19	1146	1146	15001805	NA	-24	-2.5	X	

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____ Tier III (Results + QC & Calibration Summaries) _____

Tier II (Results + QC Summaries) X _____ Tier IV (Data Validation Package) 10% Surcharge _____

Relinquished by: (Signature) *[Signature]* Date: 4-11-19 Time: 1:00

Relinquished by: (Signature) *[Signature]* Date: 4/11/19 Time: 1:00

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, OAPP) _____

Cooler / Blank Temperature _____ °C

**ALS Environmental
Sample Acceptance Check Form**

Client: EA Engineering, Science, and Technology, Inc. Work order: P1902156
 Project: Kirtland AFB Bulk Fuels Facility / 62735DM02
 Sample(s) received on: 4/17/19 Date opened: 4/17/19 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

- | | | Yes | No | N/A |
|----|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 | Were sample containers properly marked with client sample ID? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Did sample containers arrive in good condition? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Were chain-of-custody papers used and filled out? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Did sample container labels and/or tags agree with custody papers? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | Was sample volume received adequate for analysis? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | Are samples within specified holding times? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | Was proper temperature (thermal preservation) of cooler at receipt adhered to? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8 | Were custody seals on outside of cooler/Box/Container? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Location of seal(s)? _____ Sealing Lid? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were signature and date included? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were seals intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9 | Do containers have appropriate preservation , according to method/SOP or Client specified information? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Is there a client indication that the submitted samples are pH preserved? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were VOA vials checked for presence/absence of air bubbles? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10 | Tubes: Are the tubes capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11 | Badges: Are the badges properly capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Are dual bed badges separated and individually capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1902156-001.01	1.0 L Source Can					
P1902156-002.01	1.0 L Source Can					
P1902156-003.01	1.0 L Source Can					
P1902156-004.01	1.0 L Source Silonite Canister					
P1902156-005.01	1.0 L Source Silonite Canister					
P1902156-006.01	1.0 L Source Silonite Canister					
P1902156-007.01	1.0 L Source Silonite Canister					
P1902156-008.01	1.0 L Source Silonite Canister					
P1902156-009.01	1.0 L Source Can					
P1902156-010.01	1.0 L Source Silonite Canister					
P1902156-011.01	1.0 L Source Can					
P1902156-012.01	1.0 L Source Can					
P1902156-013.01	1.0 L Source Silonite Canister					
P1902156-014.01	1.0 L Source Can					
P1902156-015.01	1.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-001

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01168

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.46 Final Pressure (psig): 5.76

Container Dilution Factor: 1.67

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	120	1.1	0.31	190	1.7	0.47	
74-85-1	Ethene	9.8	0.60	0.14	8.5	0.50	0.12	
74-84-0	Ethane	38	0.60	0.087	31	0.50	0.070	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-150
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-002

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00586

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -1.65 Final Pressure (psig): 5.36

Container Dilution Factor: 1.54

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	34	1.0	0.28	52	1.5	0.43	
74-85-1	Ethene	19	0.50	0.13	17	0.46	0.11	
74-84-0	Ethane	20	0.60	0.080	16	0.46	0.065	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-003

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01006

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.13

Container Dilution Factor: 1.80

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	43	1.2	0.33	65	1.8	0.50	
74-85-1	Ethene	67	0.60	0.15	58	0.54	0.13	
74-84-0	Ethane	65	0.70	0.094	53	0.54	0.076	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-004

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00895

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.21 Final Pressure (psig): 5.42

Container Dilution Factor: 1.61

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	99	1.1	0.30	150	1.6	0.45	
74-85-1	Ethene	8.3	0.60	0.14	7.2	0.48	0.12	
74-84-0	Ethane	31	0.60	0.084	25	0.48	0.068	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-005

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00187

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.24 Final Pressure (psig): 5.74

Container Dilution Factor: 1.64

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	39	1.1	0.30	59	1.6	0.46	
74-85-1	Ethene	47	0.60	0.14	41	0.49	0.12	
74-84-0	Ethane	76	0.60	0.085	62	0.49	0.069	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-04/05-313
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-006

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00911

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.16 Final Pressure (psig): 5.16

Container Dilution Factor: 1.72

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	7.4	1.1	0.32	11	1.7	0.48	
74-85-1	Ethene	3.1	0.60	0.14	2.7	0.52	0.13	
74-84-0	Ethane	4.0	0.60	0.089	3.3	0.52	0.072	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 102.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-007

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00737

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.19

Container Dilution Factor: 1.69

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	130	1.1	0.31	200	1.7	0.47	
74-85-1	Ethene	15	0.60	0.14	13	0.51	0.13	
74-84-0	Ethane	42	0.60	0.088	34	0.51	0.071	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 112.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-008

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00929

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -5.09 Final Pressure (psig): 5.25

Container Dilution Factor: 2.08

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	150	1.4	0.38	230	2.1	0.58	
74-85-1	Ethene	19	0.70	0.17	16	0.62	0.15	
74-84-0	Ethane	48	0.80	0.11	39	0.62	0.087	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-009

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00131

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.24

Container Dilution Factor: 1.83

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	71	1.2	0.34	110	1.8	0.51	
74-85-1	Ethene	18	0.60	0.15	16	0.55	0.14	
74-84-0	Ethane	32	0.70	0.095	26	0.55	0.077	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 217.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-010

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00955

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.65 Final Pressure (psig): 5.48

Container Dilution Factor: 1.67

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	34	1.1	0.31	51	1.7	0.47	
74-85-1	Ethene	34	0.60	0.14	30	0.50	0.12	
74-84-0	Ethane	33	0.60	0.087	27	0.50	0.070	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 252.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-011

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01159

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -5.00 Final Pressure (psig): 5.33

Container Dilution Factor: 2.06

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	39	1.4	0.38	60	2.1	0.58	
74-85-1	Ethene	49	0.70	0.17	43	0.62	0.15	
74-84-0	Ethane	64	0.80	0.11	52	0.62	0.087	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 262.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-012

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00474

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.65 Final Pressure (psig): 5.24

Container Dilution Factor: 1.80

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	43	1.2	0.33	65	1.8	0.50	
74-85-1	Ethene	54	0.60	0.15	47	0.54	0.13	
74-84-0	Ethane	77	0.70	0.094	62	0.54	0.076	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 102.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-013

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00239

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -1.95 Final Pressure (psig): 5.25

Container Dilution Factor: 1.56

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	120	1.0	0.29	180	1.6	0.44	
74-85-1	Ethene	15	0.50	0.13	13	0.47	0.12	
74-84-0	Ethane	34	0.60	0.081	28	0.47	0.066	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 117.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-014

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00874

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.92 Final Pressure (psig): 5.27

Container Dilution Factor: 2.04

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	110	1.3	0.38	170	2.0	0.57	
74-85-1	Ethene	14	0.70	0.17	12	0.61	0.15	
74-84-0	Ethane	33	0.80	0.11	27	0.61	0.086	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-015

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00674

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.31 Final Pressure (psig): 5.28

Container Dilution Factor: 1.75

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	44	1.1	0.32	67	1.8	0.49	
74-85-1	Ethene	12	0.60	0.15	11	0.53	0.13	
74-84-0	Ethane	20	0.60	0.091	16	0.53	0.074	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 252.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-017

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00905

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.75 Final Pressure (psig): 5.29

Container Dilution Factor: 1.83

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	17	1.2	0.34	26	1.8	0.51	
74-85-1	Ethene	15	0.60	0.15	13	0.55	0.14	
74-84-0	Ethane	20	0.70	0.095	17	0.55	0.077	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.12 Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	18	1.1	0.32	27	1.7	0.48	
74-85-1	Ethene	16	0.60	0.14	14	0.52	0.13	
74-84-0	Ethane	22	0.60	0.089	18	0.52	0.072	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190429-MB

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	0.18	0.70	0.18	0.28	1.0	0.28	U
74-85-1	Ethene	0.084	0.30	0.084	0.074	0.30	0.074	U
74-84-0	Ethane	0.052	0.40	0.052	0.042	0.30	0.042	U

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190429-DLCS

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount LCS / DLCS ppmV	Result		% Recovery		ALS			Data Qualifier
			LCS ppmV	DLCS ppmV	LCS	DLCS	Acceptance Limits	RPD	RPD Limit	
74-82-8	Methane	1.50	1.49	1.59	99	106	70-130	7	15	
74-85-1	Ethene	1.50	1.49	1.59	99	106	70-130	7	15	
74-84-0	Ethane	1.50	1.50	1.57	100	105	70-130	5	15	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC01168

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.46 Final Pressure (psig): 5.76

Container Dilution Factor: 1.67

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	25,000	25,000	15,000	6,300	J
75-71-8	Dichlorodifluoromethane (CFC 12)	5,200	8,800	5,200	1,500	U
74-87-3	Chloromethane	12,000	20,000	12,000	3,500	U
75-01-4	Vinyl Chloride	5,600	17,000	5,600	1,900	U
106-99-0	1,3-Butadiene	12,000	20,000	12,000	3,300	U
75-00-3	Chloroethane	9,800	16,000	9,800	2,100	U
64-17-5	Ethanol	42,000	230,000	36,000	16,000	J
67-64-1	Acetone	2,500,000	190,000	95,000	42,000	
75-69-4	Trichlorofluoromethane	4,800	7,900	4,800	1,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	130,000	71,000	21,000	7,500	
75-09-2	Methylene Chloride	7,700	13,000	7,700	3,600	U
76-13-1	Trichlorotrifluoroethane	1,900	5,800	1,900	830	U
75-15-0	Carbon Disulfide	14,000	30,000	14,000	4,300	U
75-34-3	1,1-Dichloroethane	6,400	11,000	6,400	1,600	U
78-93-3	2-Butanone (MEK)	460,000	28,000	8,800	3,100	
141-78-6	Ethyl Acetate	15,000	25,000	15,000	6,500	U
110-54-3	n-Hexane	2,500,000	13,000	7,600	2,600	
67-66-3	Chloroform	2,900	9,200	2,900	1,200	U
109-99-9	Tetrahydrofuran (THF)	4,800	15,000	4,800	1,900	U
71-43-2	Benzene	860,000	14,000	4,400	2,000	
56-23-5	Carbon Tetrachloride	2,300	6,900	2,300	980	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

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RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01168

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.46 Final Pressure (psig): 5.76

Container Dilution Factor: 1.67

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	2,200,000	24,000	8,000	3,600	
75-27-4	Bromodichloromethane	2,100	6,600	2,100	960	U
79-01-6	Trichloroethene	2,600	8,200	2,600	1,100	U
123-91-1	1,4-Dioxane	3,900	12,000	3,900	1,500	U
142-82-5	n-Heptane	2,000,000	11,000	6,500	1,700	
108-10-1	4-Methyl-2-pentanone	25,000	11,000	3,500	1,500	
108-88-3	Toluene	1,900,000	12,000	3,800	1,400	
591-78-6	2-Hexanone	3,500	11,000	3,500	1,300	U
124-48-1	Dibromochloromethane	1,700	5,300	1,700	690	U
106-93-4	1,2-Dibromoethane	8,600	5,900	1,800	670	
127-18-4	Tetrachloroethene	2,100	6,500	2,100	850	U
100-41-4	Ethylbenzene	66,000	10,000	3,300	1,400	
179601-23-1	m,p-Xylenes	170,000	21,000	6,500	2,700	
75-25-2	Bromoform	2,600	4,300	2,600	890	U
100-42-5	Styrene	6,300	10,000	6,300	1,700	U
95-47-6	o-Xylene	44,000	10,000	3,300	1,500	
108-67-8	1,3,5-Trimethylbenzene	1,700	9,000	2,900	1,300	J
95-63-6	1,2,4-Trimethylbenzene	2,600	9,000	2,900	1,300	J
120-82-1	1,2,4-Trichlorobenzene	3,600	6,000	3,600	1,500	U
95-50-1	1,2-Dichlorobenzene	2,400	7,500	2,400	1,100	U
91-20-3	Naphthalene	4,900	8,100	4,900	2,100	U
1330-20-7	Xylenes, Total	220,000	21,000	6,500	2,700	

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

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RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-150
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00586

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.65 Final Pressure (psig): 5.36

Container Dilution Factor: 1.54

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	24,000	23,000	14,000	5,800	
75-71-8	Dichlorodifluoromethane (CFC 12)	4,800	8,100	4,800	1,400	U
74-87-3	Chloromethane	11,000	19,000	11,000	3,200	U
75-01-4	Vinyl Chloride	5,100	16,000	5,100	1,700	U
106-99-0	1,3-Butadiene	11,000	18,000	11,000	3,100	U
75-00-3	Chloroethane	9,000	15,000	9,000	1,900	U
64-17-5	Ethanol	20,000	210,000	34,000	15,000	J
67-64-1	Acetone	820,000	180,000	88,000	39,000	
75-69-4	Trichlorofluoromethane	4,400	7,300	4,400	1,100	U
67-63-0	2-Propanol (Isopropyl Alcohol)	58,000	66,000	19,000	6,900	J
75-09-2	Methylene Chloride	7,100	12,000	7,100	3,300	U
76-13-1	Trichlorotrifluoroethane	1,700	5,300	1,700	760	U
75-15-0	Carbon Disulfide	13,000	27,000	13,000	4,000	U
75-34-3	1,1-Dichloroethane	5,900	9,900	5,900	1,500	U
78-93-3	2-Butanone (MEK)	90,000	26,000	8,100	2,900	
141-78-6	Ethyl Acetate	14,000	24,000	14,000	6,000	U
110-54-3	n-Hexane	1,800,000	12,000	7,000	2,400	
67-66-3	Chloroform	2,700	8,500	2,700	1,100	U
109-99-9	Tetrahydrofuran (THF)	4,400	14,000	4,400	1,700	U
71-43-2	Benzene	470,000	13,000	4,100	1,900	
56-23-5	Carbon Tetrachloride	2,100	6,400	2,100	910	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

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RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-150
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00586

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.65 Final Pressure (psig): 5.36

Container Dilution Factor: 1.54

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,100,000	22,000	7,400	3,400	
75-27-4	Bromodichloromethane	2,000	6,100	2,000	890	U
79-01-6	Trichloroethene	2,400	7,600	2,400	1,000	U
123-91-1	1,4-Dioxane	3,600	11,000	3,600	1,300	U
142-82-5	n-Heptane	870,000	10,000	6,000	1,600	
108-10-1	4-Methyl-2-pentanone	3,200	10,000	3,200	1,400	U
108-88-3	Toluene	560,000	11,000	3,500	1,300	
591-78-6	2-Hexanone	3,200	10,000	3,200	1,200	U
124-48-1	Dibromochloromethane	1,500	4,900	1,500	630	U
106-93-4	1,2-Dibromoethane	1,700	5,400	1,700	620	U
127-18-4	Tetrachloroethene	1,900	6,000	1,900	780	U
100-41-4	Ethylbenzene	25,000	9,200	3,000	1,300	
179601-23-1	m,p-Xylenes	59,000	20,000	6,000	2,500	
75-25-2	Bromoform	2,400	3,900	2,400	820	U
100-42-5	Styrene	5,800	9,600	5,800	1,600	U
95-47-6	o-Xylene	17,000	9,400	3,000	1,400	
108-67-8	1,3,5-Trimethylbenzene	1,900	8,300	2,700	1,200	J
95-63-6	1,2,4-Trimethylbenzene	3,400	8,300	2,700	1,200	J
120-82-1	1,2,4-Trichlorobenzene	3,300	5,500	3,300	1,300	U
95-50-1	1,2-Dichlorobenzene	2,200	6,900	2,200	1,000	U
91-20-3	Naphthalene	4,600	7,500	4,600	1,900	U
1330-20-7	Xylenes, Total	76,000	20,000	6,000	2,500	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01006

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.13

Container Dilution Factor: 1.80

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	75,000	11,000	6,500	2,700	
75-71-8	Dichlorodifluoromethane (CFC 12)	2,300	3,800	2,300	630	U
74-87-3	Chloromethane	5,200	8,700	5,200	1,500	U
75-01-4	Vinyl Chloride	2,400	7,500	2,400	800	U
106-99-0	1,3-Butadiene	5,000	8,500	5,000	1,400	U
75-00-3	Chloroethane	4,200	7,000	4,200	900	U
64-17-5	Ethanol	11,000	97,000	16,000	7,100	J
67-64-1	Acetone	530,000	82,000	41,000	18,000	
75-69-4	Trichlorofluoromethane	2,100	3,400	2,100	520	U
67-63-0	2-Propanol (Isopropyl Alcohol)	34,000	31,000	9,100	3,200	
75-09-2	Methylene Chloride	3,300	5,600	3,300	1,600	U
76-13-1	Trichlorotrifluoroethane	800	2,500	800	360	U
75-15-0	Carbon Disulfide	6,200	13,000	6,200	1,900	U
75-34-3	1,1-Dichloroethane	2,800	4,600	2,800	690	U
78-93-3	2-Butanone (MEK)	130,000	12,000	3,800	1,300	
141-78-6	Ethyl Acetate	6,500	11,000	6,500	2,800	U
110-54-3	n-Hexane	690,000	5,500	3,300	1,100	
67-66-3	Chloroform	1,300	4,000	1,300	520	U
109-99-9	Tetrahydrofuran (THF)	2,100	6,500	2,100	820	U
71-43-2	Benzene	200,000	5,900	1,900	870	
56-23-5	Carbon Tetrachloride	970	3,000	970	420	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-003

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC01006

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.13

Container Dilution Factor: 1.80

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	490,000	10,000	3,500	1,600	
75-27-4	Bromodichloromethane	910	2,800	910	410	U
79-01-6	Trichloroethene	1,100	3,600	1,100	480	U
123-91-1	1,4-Dioxane	1,700	5,300	1,700	630	U
142-82-5	n-Heptane	720,000	4,700	2,800	750	
108-10-1	4-Methyl-2-pentanone	8,000	4,700	1,500	640	
108-88-3	Toluene	680,000	5,100	1,600	620	
591-78-6	2-Hexanone	1,500	4,700	1,500	580	U
124-48-1	Dibromochloromethane	720	2,300	720	300	U
106-93-4	1,2-Dibromoethane	4,500	2,500	800	290	
127-18-4	Tetrachloroethene	900	2,800	900	370	U
100-41-4	Ethylbenzene	35,000	4,300	1,400	620	
179601-23-1	m,p-Xylenes	160,000	9,100	2,800	1,200	
75-25-2	Bromoform	1,100	1,800	1,100	380	U
100-42-5	Styrene	2,700	4,500	2,700	730	U
95-47-6	o-Xylene	41,000	4,400	1,400	640	
108-67-8	1,3,5-Trimethylbenzene	2,500	3,900	1,200	560	J
95-63-6	1,2,4-Trimethylbenzene	3,800	3,900	1,200	540	J
120-82-1	1,2,4-Trichlorobenzene	1,600	2,600	1,600	630	U
95-50-1	1,2-Dichlorobenzene	1,000	3,200	1,000	470	U
91-20-3	Naphthalene	2,100	3,500	2,100	890	U
1330-20-7	Xylenes, Total	200,000	9,100	2,800	1,200	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-004

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00895

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000015 Liter(s)

Initial Pressure (psig): -2.21 Final Pressure (psig): 5.42

Container Dilution Factor: 1.61

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	15,000	32,000	19,000	8,100	J
75-71-8	Dichlorodifluoromethane (CFC 12)	6,700	11,000	6,700	1,900	U
74-87-3	Chloromethane	16,000	26,000	16,000	4,500	U
75-01-4	Vinyl Chloride	7,100	22,000	7,100	2,400	U
106-99-0	1,3-Butadiene	15,000	25,000	15,000	4,300	U
75-00-3	Chloroethane	13,000	21,000	13,000	2,700	U
64-17-5	Ethanol	47,000	290,000	47,000	21,000	U
67-64-1	Acetone	1,500,000	240,000	120,000	54,000	
75-69-4	Trichlorofluoromethane	6,100	10,000	6,100	1,500	U
67-63-0	2-Propanol (Isopropyl Alcohol)	48,000	92,000	27,000	9,600	J
75-09-2	Methylene Chloride	9,900	17,000	9,900	4,600	U
76-13-1	Trichlorotrifluoroethane	2,400	7,400	2,400	1,100	U
75-15-0	Carbon Disulfide	19,000	38,000	19,000	5,500	U
75-34-3	1,1-Dichloroethane	8,200	14,000	8,200	2,100	U
78-93-3	2-Butanone (MEK)	210,000	36,000	11,000	4,000	
141-78-6	Ethyl Acetate	19,000	33,000	19,000	8,300	U
110-54-3	n-Hexane	2,300,000	16,000	9,700	3,400	
67-66-3	Chloroform	3,700	12,000	3,700	1,600	U
109-99-9	Tetrahydrofuran (THF)	6,200	19,000	6,200	2,400	U
71-43-2	Benzene	730,000	17,000	5,700	2,600	
56-23-5	Carbon Tetrachloride	2,900	8,900	2,900	1,300	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00895

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000015 Liter(s)

Initial Pressure (psig): -2.21 Final Pressure (psig): 5.42

Container Dilution Factor: 1.61

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	2,000,000	31,000	10,000	4,700	
75-27-4	Bromodichloromethane	2,700	8,500	2,700	1,200	U
79-01-6	Trichloroethene	3,400	11,000	3,400	1,400	U
123-91-1	1,4-Dioxane	5,100	16,000	5,100	1,900	U
142-82-5	n-Heptane	1,600,000	14,000	8,400	2,200	
108-10-1	4-Methyl-2-pentanone	4,500	14,000	4,500	1,900	U
108-88-3	Toluene	1,700,000	15,000	4,800	1,900	
591-78-6	2-Hexanone	4,500	14,000	4,500	1,700	U
124-48-1	Dibromochloromethane	2,100	6,800	2,100	880	U
106-93-4	1,2-Dibromoethane	5,300	7,500	2,400	870	J
127-18-4	Tetrachloroethene	2,700	8,400	2,700	1,100	U
100-41-4	Ethylbenzene	58,000	13,000	4,200	1,900	
179601-23-1	m,p-Xylenes	130,000	27,000	8,400	3,500	
75-25-2	Bromoform	3,300	5,500	3,300	1,100	U
100-42-5	Styrene	8,100	13,000	8,100	2,200	U
95-47-6	o-Xylene	31,000	13,000	4,200	1,900	
108-67-8	1,3,5-Trimethylbenzene	3,700	12,000	3,700	1,700	U
95-63-6	1,2,4-Trimethylbenzene	2,300	12,000	3,700	1,600	J
120-82-1	1,2,4-Trichlorobenzene	4,600	7,700	4,600	1,900	U
95-50-1	1,2-Dichlorobenzene	3,000	9,600	3,000	1,400	U
91-20-3	Naphthalene	6,300	10,000	6,300	2,700	U
1330-20-7	Xylenes, Total	160,000	27,000	8,400	3,500	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-005

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00187

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/3/19
Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -2.24 Final Pressure (psig): 5.74

Container Dilution Factor: 1.64

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	24,000	9,900	5,900	2,500	
75-71-8	Dichlorodifluoromethane (CFC 12)	2,100	3,500	2,100	580	U
74-87-3	Chloromethane	4,800	7,900	4,800	1,400	U
75-01-4	Vinyl Chloride	2,200	6,800	2,200	730	U
106-99-0	1,3-Butadiene	4,600	7,700	4,600	1,300	U
75-00-3	Chloroethane	3,900	6,300	3,900	820	U
64-17-5	Ethanol	14,000	89,000	14,000	6,400	U
67-64-1	Acetone	640,000	75,000	37,000	17,000	
75-69-4	Trichlorofluoromethane	1,900	3,100	1,900	470	U
67-63-0	2-Propanol (Isopropyl Alcohol)	12,000	28,000	8,300	2,900	J
75-09-2	Methylene Chloride	3,000	5,100	3,000	1,400	U
76-13-1	Trichlorotrifluoroethane	730	2,300	730	330	U
75-15-0	Carbon Disulfide	5,700	12,000	5,700	1,700	U
75-34-3	1,1-Dichloroethane	2,500	4,200	2,500	630	U
78-93-3	2-Butanone (MEK)	120,000	11,000	3,400	1,200	
141-78-6	Ethyl Acetate	5,900	10,000	5,900	2,500	U
110-54-3	n-Hexane	210,000	5,000	3,000	1,000	
67-66-3	Chloroform	1,100	3,600	1,100	480	U
109-99-9	Tetrahydrofuran (THF)	1,900	5,900	1,900	750	U
71-43-2	Benzene	99,000	5,300	1,700	790	
56-23-5	Carbon Tetrachloride	890	2,700	890	390	U

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-005

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00187

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -2.24 Final Pressure (psig): 5.74

Container Dilution Factor: 1.64

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	330,000	9,500	3,100	1,400	
75-27-4	Bromodichloromethane	830	2,600	830	380	U
79-01-6	Trichloroethene	1,000	3,200	1,000	440	U
123-91-1	1,4-Dioxane	1,500	4,800	1,500	570	U
142-82-5	n-Heptane	820,000	4,300	2,600	680	
108-10-1	4-Methyl-2-pentanone	1,400	4,200	1,400	580	U
108-88-3	Toluene	510,000	4,600	1,500	570	
591-78-6	2-Hexanone	1,400	4,300	1,400	530	U
124-48-1	Dibromochloromethane	650	2,100	650	270	U
106-93-4	1,2-Dibromoethane	730	2,300	730	260	U
127-18-4	Tetrachloroethene	820	2,600	820	330	U
100-41-4	Ethylbenzene	14,000	3,900	1,300	570	
179601-23-1	m,p-Xylenes	46,000	8,300	2,600	1,100	
75-25-2	Bromoform	1,000	1,700	1,000	350	U
100-42-5	Styrene	2,500	4,100	2,500	660	U
95-47-6	o-Xylene	11,000	4,000	1,300	580	
108-67-8	1,3,5-Trimethylbenzene	600	3,500	1,100	510	J
95-63-6	1,2,4-Trimethylbenzene	990	3,500	1,100	490	J
120-82-1	1,2,4-Trichlorobenzene	1,400	2,300	1,400	570	U
95-50-1	1,2-Dichlorobenzene	930	2,900	930	430	U
91-20-3	Naphthalene	1,900	3,200	1,900	810	U
1330-20-7	Xylenes, Total	56,000	8,300	2,600	1,100	

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-04/05-313
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-006

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00911

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.0020 Liter(s)
 0.00050 Liter(s)

Initial Pressure (psig): -3.16 Final Pressure (psig): 5.16

Container Dilution Factor: 1.72

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	1,800	260	150	65	
75-71-8	Dichlorodifluoromethane (CFC 12)	54	90	54	15	U
74-87-3	Chloromethane	120	210	120	36	U
75-01-4	Vinyl Chloride	57	180	57	19	U
106-99-0	1,3-Butadiene	120	200	120	34	U
75-00-3	Chloroethane	100	170	100	22	U
64-17-5	Ethanol	370	2,300	370	170	U
67-64-1	Acetone	980	2,000	980	430	U
75-69-4	Trichlorofluoromethane	49	81	49	12	U
67-63-0	2-Propanol (Isopropyl Alcohol)	220	740	220	77	U
75-09-2	Methylene Chloride	79	130	79	37	U
76-13-1	Trichlorotrifluoroethane	34	59	19	8.5	J
75-15-0	Carbon Disulfide	150	300	150	44	U
75-34-3	1,1-Dichloroethane	66	110	66	17	U
78-93-3	2-Butanone (MEK)	96	290	90	32	J
141-78-6	Ethyl Acetate	160	260	160	67	U
110-54-3	n-Hexane	26,000	530	310	110	D
67-66-3	Chloroform	30	95	30	13	U
109-99-9	Tetrahydrofuran (THF)	50	150	50	20	U
71-43-2	Benzene	7,400	140	46	21	
56-23-5	Carbon Tetrachloride	23	71	23	10	U

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-04/05-313
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-006

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00911

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.0020 Liter(s)
 0.00050 Liter(s)

Initial Pressure (psig): -3.16 Final Pressure (psig): 5.16

Container Dilution Factor: 1.72

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	49,000	1,000	330	150	D
75-27-4	Bromodichloromethane	22	68	22	9.9	U
79-01-6	Trichloroethene	27	85	27	12	U
123-91-1	1,4-Dioxane	41	130	41	15	U
142-82-5	n-Heptane	22,000	450	270	71	D
108-10-1	4-Methyl-2-pentanone	36	110	36	15	U
108-88-3	Toluene	7,200	120	39	15	
591-78-6	2-Hexanone	36	110	36	14	U
124-48-1	Dibromochloromethane	17	55	17	7.1	U
106-93-4	1,2-Dibromoethane	19	60	19	6.9	U
127-18-4	Tetrachloroethene	22	67	22	8.8	U
100-41-4	Ethylbenzene	490	100	34	15	
179601-23-1	m,p-Xylenes	2,100	220	67	28	
75-25-2	Bromoform	27	44	27	9.2	U
100-42-5	Styrene	65	110	65	17	U
95-47-6	o-Xylene	630	100	34	15	
108-67-8	1,3,5-Trimethylbenzene	210	93	30	13	
95-63-6	1,2,4-Trimethylbenzene	270	93	30	13	
120-82-1	1,2,4-Trichlorobenzene	37	61	37	15	U
95-50-1	1,2-Dichlorobenzene	24	77	24	11	U
91-20-3	Naphthalene	51	84	51	21	U
1330-20-7	Xylenes, Total	2,700	220	67	28	

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 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
 D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 102.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-007

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00737

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.19

Container Dilution Factor: 1.69

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	23,000	26,000	15,000	6,400	J
75-71-8	Dichlorodifluoromethane (CFC 12)	5,300	8,900	5,300	1,500	U
74-87-3	Chloromethane	12,000	20,000	12,000	3,500	U
75-01-4	Vinyl Chloride	5,600	18,000	5,600	1,900	U
106-99-0	1,3-Butadiene	12,000	20,000	12,000	3,400	U
75-00-3	Chloroethane	9,900	16,000	9,900	2,100	U
64-17-5	Ethanol	77,000	230,000	37,000	17,000	J
67-64-1	Acetone	1,700,000	190,000	96,000	43,000	
75-69-4	Trichlorofluoromethane	4,800	8,000	4,800	1,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	110,000	72,000	21,000	7,600	
75-09-2	Methylene Chloride	7,800	13,000	7,800	3,600	U
76-13-1	Trichlorotrifluoroethane	1,900	5,800	1,900	840	U
75-15-0	Carbon Disulfide	15,000	30,000	15,000	4,300	U
75-34-3	1,1-Dichloroethane	6,500	11,000	6,500	1,600	U
78-93-3	2-Butanone (MEK)	210,000	29,000	8,900	3,200	
141-78-6	Ethyl Acetate	15,000	26,000	15,000	6,600	U
110-54-3	n-Hexane	2,100,000	13,000	7,700	2,600	
67-66-3	Chloroform	2,900	9,300	2,900	1,200	U
109-99-9	Tetrahydrofuran (THF)	4,900	15,000	4,900	1,900	U
71-43-2	Benzene	540,000	14,000	4,500	2,000	
56-23-5	Carbon Tetrachloride	2,300	7,000	2,300	990	U

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 102.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-007

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00737

Date Collected: 4/10/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.19

Container Dilution Factor: 1.69

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,100,000	25,000	8,100	3,700	
75-27-4	Bromodichloromethane	2,100	6,700	2,100	970	U
79-01-6	Trichloroethene	2,700	8,300	2,700	1,100	U
123-91-1	1,4-Dioxane	4,000	12,000	4,000	1,500	U
142-82-5	n-Heptane	610,000	11,000	6,600	1,800	
108-10-1	4-Methyl-2-pentanone	3,500	11,000	3,500	1,500	U
108-88-3	Toluene	410,000	12,000	3,800	1,500	
591-78-6	2-Hexanone	3,500	11,000	3,500	1,400	U
124-48-1	Dibromochloromethane	1,700	5,400	1,700	690	U
106-93-4	1,2-Dibromoethane	1,900	5,900	1,900	680	U
127-18-4	Tetrachloroethene	2,100	6,600	2,100	860	U
100-41-4	Ethylbenzene	33,000	10,000	3,300	1,500	
179601-23-1	m,p-Xylenes	53,000	21,000	6,600	2,700	
75-25-2	Bromoform	2,600	4,300	2,600	900	U
100-42-5	Styrene	6,400	11,000	6,400	1,700	U
95-47-6	o-Xylene	17,000	10,000	3,300	1,500	
108-67-8	1,3,5-Trimethylbenzene	3,700	9,100	2,900	1,300	J
95-63-6	1,2,4-Trimethylbenzene	11,000	9,100	2,900	1,300	
120-82-1	1,2,4-Trichlorobenzene	3,600	6,000	3,600	1,500	U
95-50-1	1,2-Dichlorobenzene	2,400	7,600	2,400	1,100	U
91-20-3	Naphthalene	5,000	8,200	5,000	2,100	U
1330-20-7	Xylenes, Total	70,000	21,000	6,600	2,700	

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 112.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-008

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00929

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.09 Final Pressure (psig): 5.25

Container Dilution Factor: 2.08

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	23,000	25,000	15,000	6,300	J
75-71-8	Dichlorodifluoromethane (CFC 12)	5,200	8,800	5,200	1,500	U
74-87-3	Chloromethane	12,000	20,000	12,000	3,500	U
75-01-4	Vinyl Chloride	5,500	17,000	5,500	1,900	U
106-99-0	1,3-Butadiene	12,000	20,000	12,000	3,300	U
75-00-3	Chloroethane	9,800	16,000	9,800	2,100	U
64-17-5	Ethanol	72,000	230,000	36,000	16,000	J
67-64-1	Acetone	980,000	190,000	95,000	42,000	
75-69-4	Trichlorofluoromethane	4,700	7,800	4,700	1,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	52,000	71,000	21,000	7,400	J
75-09-2	Methylene Chloride	7,700	13,000	7,700	3,600	U
76-13-1	Trichlorotrifluoroethane	1,800	5,800	1,800	830	U
75-15-0	Carbon Disulfide	14,000	29,000	14,000	4,300	U
75-34-3	1,1-Dichloroethane	6,400	11,000	6,400	1,600	U
78-93-3	2-Butanone (MEK)	110,000	28,000	8,700	3,100	
141-78-6	Ethyl Acetate	15,000	25,000	15,000	6,500	U
110-54-3	n-Hexane	2,000,000	13,000	7,600	2,600	
67-66-3	Chloroform	2,900	9,200	2,900	1,200	U
109-99-9	Tetrahydrofuran (THF)	4,800	15,000	4,800	1,900	U
71-43-2	Benzene	470,000	14,000	4,400	2,000	
56-23-5	Carbon Tetrachloride	2,200	6,900	2,200	980	U

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 112.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-008

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00929

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.09 Final Pressure (psig): 5.25

Container Dilution Factor: 2.08

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,000,000	24,000	8,000	3,600	
75-27-4	Bromodichloromethane	2,100	6,600	2,100	960	U
79-01-6	Trichloroethene	2,600	8,200	2,600	1,100	U
123-91-1	1,4-Dioxane	3,900	12,000	3,900	1,500	U
142-82-5	n-Heptane	600,000	11,000	6,500	1,700	
108-10-1	4-Methyl-2-pentanone	3,500	11,000	3,500	1,500	U
108-88-3	Toluene	340,000	12,000	3,800	1,400	
591-78-6	2-Hexanone	3,500	11,000	3,500	1,300	U
124-48-1	Dibromochloromethane	1,700	5,300	1,700	680	U
106-93-4	1,2-Dibromoethane	1,800	5,800	1,800	670	U
127-18-4	Tetrachloroethene	2,100	6,500	2,100	850	U
100-41-4	Ethylbenzene	25,000	10,000	3,300	1,400	
179601-23-1	m,p-Xylenes	39,000	21,000	6,500	2,700	
75-25-2	Bromoform	2,600	4,300	2,600	890	U
100-42-5	Styrene	6,300	10,000	6,300	1,700	U
95-47-6	o-Xylene	12,000	10,000	3,300	1,500	
108-67-8	1,3,5-Trimethylbenzene	1,900	9,000	2,900	1,300	J
95-63-6	1,2,4-Trimethylbenzene	4,900	9,000	2,900	1,300	J
120-82-1	1,2,4-Trichlorobenzene	3,600	5,900	3,600	1,500	U
95-50-1	1,2-Dichlorobenzene	2,400	7,500	2,400	1,100	U
91-20-3	Naphthalene	4,900	8,100	4,900	2,100	U
1330-20-7	Xylenes, Total	51,000	21,000	6,500	2,700	

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-009

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00131

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.24

Container Dilution Factor: 1.83

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	23,000	18,000	11,000	4,600	
75-71-8	Dichlorodifluoromethane (CFC 12)	3,800	6,400	3,800	1,100	U
74-87-3	Chloromethane	8,900	15,000	8,900	2,500	U
75-01-4	Vinyl Chloride	4,100	13,000	4,100	1,400	U
106-99-0	1,3-Butadiene	8,600	14,000	8,600	2,400	U
75-00-3	Chloroethane	7,200	12,000	7,200	1,500	U
64-17-5	Ethanol	60,000	170,000	27,000	12,000	J
67-64-1	Acetone	1,200,000	140,000	69,000	31,000	
75-69-4	Trichlorofluoromethane	3,500	5,800	3,500	880	U
67-63-0	2-Propanol (Isopropyl Alcohol)	190,000	52,000	15,000	5,500	
75-09-2	Methylene Chloride	5,600	9,500	5,600	2,600	U
76-13-1	Trichlorotrifluoroethane	1,400	4,200	1,400	610	U
75-15-0	Carbon Disulfide	11,000	22,000	11,000	3,100	U
75-34-3	1,1-Dichloroethane	4,700	7,800	4,700	1,200	U
78-93-3	2-Butanone (MEK)	61,000	21,000	6,400	2,300	
141-78-6	Ethyl Acetate	11,000	19,000	11,000	4,700	U
110-54-3	n-Hexane	1,700,000	9,300	5,500	1,900	
67-66-3	Chloroform	2,100	6,700	2,100	890	U
109-99-9	Tetrahydrofuran (THF)	3,500	11,000	3,500	1,400	U
71-43-2	Benzene	440,000	9,900	3,200	1,500	
56-23-5	Carbon Tetrachloride	1,600	5,000	1,600	720	U

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-009

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00131

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.24

Container Dilution Factor: 1.83

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,100,000	18,000	5,900	2,700	
75-27-4	Bromodichloromethane	1,500	4,800	1,500	700	U
79-01-6	Trichloroethene	1,900	6,000	1,900	820	U
123-91-1	1,4-Dioxane	2,900	9,000	2,900	1,100	U
142-82-5	n-Heptane	950,000	8,000	4,800	1,300	
108-10-1	4-Methyl-2-pentanone	2,500	7,900	2,500	1,100	U
108-88-3	Toluene	620,000	8,600	2,800	1,100	
591-78-6	2-Hexanone	2,500	8,000	2,500	980	U
124-48-1	Dibromochloromethane	1,200	3,900	1,200	500	U
106-93-4	1,2-Dibromoethane	1,300	4,300	1,300	490	U
127-18-4	Tetrachloroethene	1,500	4,800	1,500	620	U
100-41-4	Ethylbenzene	59,000	7,300	2,400	1,100	
179601-23-1	m,p-Xylenes	130,000	15,000	4,800	2,000	
75-25-2	Bromoform	1,900	3,100	1,900	650	U
100-42-5	Styrene	4,600	7,600	4,600	1,200	U
95-47-6	o-Xylene	39,000	7,400	2,400	1,100	
108-67-8	1,3,5-Trimethylbenzene	5,400	6,600	2,100	960	J
95-63-6	1,2,4-Trimethylbenzene	14,000	6,600	2,100	920	
120-82-1	1,2,4-Trichlorobenzene	2,600	4,400	2,600	1,100	U
95-50-1	1,2-Dichlorobenzene	1,700	5,500	1,700	800	U
91-20-3	Naphthalene	3,600	5,900	3,600	1,500	U
1330-20-7	Xylenes, Total	170,000	15,000	4,800	2,000	

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 217.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-010

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00955

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.65 Final Pressure (psig): 5.48

Container Dilution Factor: 1.67

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	40,000	25,000	15,000	6,300	
75-71-8	Dichlorodifluoromethane (CFC 12)	5,200	8,800	5,200	1,500	U
74-87-3	Chloromethane	12,000	20,000	12,000	3,500	U
75-01-4	Vinyl Chloride	5,600	17,000	5,600	1,900	U
106-99-0	1,3-Butadiene	12,000	20,000	12,000	3,300	U
75-00-3	Chloroethane	9,800	16,000	9,800	2,100	U
64-17-5	Ethanol	36,000	230,000	36,000	16,000	U
67-64-1	Acetone	2,000,000	190,000	95,000	42,000	
75-69-4	Trichlorofluoromethane	4,800	7,900	4,800	1,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	30,000	71,000	21,000	7,500	J
75-09-2	Methylene Chloride	7,700	13,000	7,700	3,600	U
76-13-1	Trichlorotrifluoroethane	1,900	5,800	1,900	830	U
75-15-0	Carbon Disulfide	14,000	30,000	14,000	4,300	U
75-34-3	1,1-Dichloroethane	6,400	11,000	6,400	1,600	U
78-93-3	2-Butanone (MEK)	140,000	28,000	8,800	3,100	
141-78-6	Ethyl Acetate	15,000	25,000	15,000	6,500	U
110-54-3	n-Hexane	1,900,000	13,000	7,600	2,600	
67-66-3	Chloroform	2,900	9,200	2,900	1,200	U
109-99-9	Tetrahydrofuran (THF)	4,800	15,000	4,800	1,900	U
71-43-2	Benzene	460,000	14,000	4,400	2,000	
56-23-5	Carbon Tetrachloride	2,300	6,900	2,300	980	U

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 217.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-010

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00955

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.65 Final Pressure (psig): 5.48

Container Dilution Factor: 1.67

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,300,000	24,000	8,000	3,600	
75-27-4	Bromodichloromethane	2,100	6,600	2,100	960	U
79-01-6	Trichloroethene	2,600	8,200	2,600	1,100	U
123-91-1	1,4-Dioxane	3,900	12,000	3,900	1,500	U
142-82-5	n-Heptane	1,300,000	11,000	6,500	1,700	
108-10-1	4-Methyl-2-pentanone	3,500	11,000	3,500	1,500	U
108-88-3	Toluene	670,000	12,000	3,800	1,400	
591-78-6	2-Hexanone	3,500	11,000	3,500	1,300	U
124-48-1	Dibromochloromethane	1,700	5,300	1,700	690	U
106-93-4	1,2-Dibromoethane	1,800	5,900	1,800	670	U
127-18-4	Tetrachloroethene	2,100	6,500	2,100	850	U
100-41-4	Ethylbenzene	46,000	10,000	3,300	1,400	
179601-23-1	m,p-Xylenes	130,000	21,000	6,500	2,700	
75-25-2	Bromoform	2,600	4,300	2,600	890	U
100-42-5	Styrene	6,300	10,000	6,300	1,700	U
95-47-6	o-Xylene	35,000	10,000	3,300	1,500	
108-67-8	1,3,5-Trimethylbenzene	3,400	9,000	2,900	1,300	J
95-63-6	1,2,4-Trimethylbenzene	6,200	9,000	2,900	1,300	J
120-82-1	1,2,4-Trichlorobenzene	3,600	6,000	3,600	1,500	U
95-50-1	1,2-Dichlorobenzene	2,400	7,500	2,400	1,100	U
91-20-3	Naphthalene	4,900	8,100	4,900	2,100	U
1330-20-7	Xylenes, Total	160,000	21,000	6,500	2,700	

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 252.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-011

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC01159

Date Collected: 4/10/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.00 Final Pressure (psig): 5.33

Container Dilution Factor: 2.06

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	70,000	25,000	15,000	6,200	
75-71-8	Dichlorodifluoromethane (CFC 12)	5,200	8,700	5,200	1,500	U
74-87-3	Chloromethane	12,000	20,000	12,000	3,400	U
75-01-4	Vinyl Chloride	5,500	17,000	5,500	1,800	U
106-99-0	1,3-Butadiene	12,000	19,000	12,000	3,300	U
75-00-3	Chloroethane	9,700	16,000	9,700	2,100	U
64-17-5	Ethanol	36,000	220,000	36,000	16,000	U
67-64-1	Acetone	510,000	190,000	94,000	42,000	
75-69-4	Trichlorofluoromethane	4,700	7,800	4,700	1,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	12,000	70,000	21,000	7,400	J
75-09-2	Methylene Chloride	7,600	13,000	7,600	3,600	U
76-13-1	Trichlorotrifluoroethane	1,800	5,700	1,800	820	U
75-15-0	Carbon Disulfide	14,000	29,000	14,000	4,200	U
75-34-3	1,1-Dichloroethane	6,300	11,000	6,300	1,600	U
78-93-3	2-Butanone (MEK)	92,000	28,000	8,700	3,100	
141-78-6	Ethyl Acetate	15,000	25,000	15,000	6,400	U
110-54-3	n-Hexane	1,200,000	13,000	7,500	2,600	
67-66-3	Chloroform	2,900	9,100	2,900	1,200	U
109-99-9	Tetrahydrofuran (THF)	4,800	15,000	4,800	1,900	U
71-43-2	Benzene	290,000	13,000	4,400	2,000	
56-23-5	Carbon Tetrachloride	2,200	6,800	2,200	970	U

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 252.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-011

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01159

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.00 Final Pressure (psig): 5.33

Container Dilution Factor: 2.06

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	930,000	24,000	7,900	3,600	
75-27-4	Bromodichloromethane	2,100	6,500	2,100	950	U
79-01-6	Trichloroethene	2,600	8,100	2,600	1,100	U
123-91-1	1,4-Dioxane	3,900	12,000	3,900	1,400	U
142-82-5	n-Heptane	1,800,000	11,000	6,400	1,700	
108-10-1	4-Methyl-2-pentanone	3,400	11,000	3,400	1,500	U
108-88-3	Toluene	1,200,000	12,000	3,700	1,400	
591-78-6	2-Hexanone	3,400	11,000	3,400	1,300	U
124-48-1	Dibromochloromethane	1,600	5,200	1,600	680	U
106-93-4	1,2-Dibromoethane	1,700	5,800	1,800	670	J
127-18-4	Tetrachloroethene	2,100	6,400	2,100	840	U
100-41-4	Ethylbenzene	83,000	9,900	3,200	1,400	
179601-23-1	m,p-Xylenes	250,000	21,000	6,500	2,700	
75-25-2	Bromoform	2,600	4,200	2,600	880	U
100-42-5	Styrene	6,200	10,000	6,200	1,700	U
95-47-6	o-Xylene	68,000	10,000	3,200	1,500	
108-67-8	1,3,5-Trimethylbenzene	5,000	8,900	2,900	1,300	J
95-63-6	1,2,4-Trimethylbenzene	9,900	8,900	2,900	1,200	
120-82-1	1,2,4-Trichlorobenzene	3,600	5,900	3,600	1,400	U
95-50-1	1,2-Dichlorobenzene	2,300	7,400	2,300	1,100	U
91-20-3	Naphthalene	4,900	8,000	4,900	2,000	U
1330-20-7	Xylenes, Total	320,000	21,000	6,500	2,700	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 262.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-012

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00474

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -3.65 Final Pressure (psig): 5.24

Container Dilution Factor: 1.80

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	61,000	27,000	16,000	6,800	
75-71-8	Dichlorodifluoromethane (CFC 12)	5,600	9,500	5,600	1,600	U
74-87-3	Chloromethane	13,000	22,000	13,000	3,700	U
75-01-4	Vinyl Chloride	6,000	19,000	6,000	2,000	U
106-99-0	1,3-Butadiene	13,000	21,000	13,000	3,600	U
75-00-3	Chloroethane	11,000	17,000	11,000	2,300	U
64-17-5	Ethanol	39,000	240,000	39,000	18,000	U
67-64-1	Acetone	730,000	200,000	100,000	45,000	
75-69-4	Trichlorofluoromethane	5,100	8,500	5,100	1,300	U
67-63-0	2-Propanol (Isopropyl Alcohol)	20,000	77,000	23,000	8,100	J
75-09-2	Methylene Chloride	8,300	14,000	8,300	3,900	U
76-13-1	Trichlorotrifluoroethane	2,000	6,200	2,000	890	U
75-15-0	Carbon Disulfide	16,000	32,000	16,000	4,600	U
75-34-3	1,1-Dichloroethane	6,900	12,000	6,900	1,700	U
78-93-3	2-Butanone (MEK)	150,000	31,000	9,500	3,400	
141-78-6	Ethyl Acetate	16,000	27,000	16,000	7,000	U
110-54-3	n-Hexane	840,000	14,000	8,200	2,800	
67-66-3	Chloroform	3,100	10,000	3,100	1,300	U
109-99-9	Tetrahydrofuran (THF)	5,200	16,000	5,200	2,000	U
71-43-2	Benzene	260,000	15,000	4,800	2,200	
56-23-5	Carbon Tetrachloride	2,400	7,400	2,400	1,100	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 262.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-012

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00474

Date Collected: 4/10/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -3.65 Final Pressure (psig): 5.24

Container Dilution Factor: 1.80

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	760,000	26,000	8,600	3,900	
75-27-4	Bromodichloromethane	2,300	7,100	2,300	1,000	U
79-01-6	Trichloroethene	2,800	8,900	2,800	1,200	U
123-91-1	1,4-Dioxane	4,200	13,000	4,200	1,600	U
142-82-5	n-Heptane	1,700,000	12,000	7,000	1,900	
108-10-1	4-Methyl-2-pentanone	3,700	12,000	3,700	1,600	U
108-88-3	Toluene	1,200,000	13,000	4,100	1,600	
591-78-6	2-Hexanone	3,700	12,000	3,700	1,500	U
124-48-1	Dibromochloromethane	1,800	5,700	1,800	740	U
106-93-4	1,2-Dibromoethane	1,900	6,300	2,000	730	J
127-18-4	Tetrachloroethene	2,300	7,000	2,300	920	U
100-41-4	Ethylbenzene	65,000	11,000	3,500	1,600	
179601-23-1	m,p-Xylenes	170,000	23,000	7,000	2,900	
75-25-2	Bromoform	2,800	4,600	2,800	960	U
100-42-5	Styrene	6,800	11,000	6,800	1,800	U
95-47-6	o-Xylene	43,000	11,000	3,500	1,600	
108-67-8	1,3,5-Trimethylbenzene	3,300	9,700	3,100	1,400	J
95-63-6	1,2,4-Trimethylbenzene	7,500	9,700	3,100	1,400	J
120-82-1	1,2,4-Trichlorobenzene	3,900	6,400	3,900	1,600	U
95-50-1	1,2-Dichlorobenzene	2,500	8,100	2,500	1,200	U
91-20-3	Naphthalene	5,300	8,800	5,300	2,200	U
1330-20-7	Xylenes, Total	220,000	23,000	7,000	2,900	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 102.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-013

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00239

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.95 Final Pressure (psig): 5.25

Container Dilution Factor: 1.56

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	21,000	24,000	14,000	5,900	J
75-71-8	Dichlorodifluoromethane (CFC 12)	4,900	8,200	4,900	1,400	U
74-87-3	Chloromethane	11,000	19,000	11,000	3,200	U
75-01-4	Vinyl Chloride	5,200	16,000	5,200	1,700	U
106-99-0	1,3-Butadiene	11,000	18,000	11,000	3,100	U
75-00-3	Chloroethane	9,200	15,000	9,200	2,000	U
64-17-5	Ethanol	20,000	210,000	34,000	15,000	J
67-64-1	Acetone	1,600,000	180,000	89,000	39,000	
75-69-4	Trichlorofluoromethane	4,400	7,400	4,400	1,100	U
67-63-0	2-Propanol (Isopropyl Alcohol)	20,000	67,000	20,000	7,000	U
75-09-2	Methylene Chloride	7,200	12,000	7,200	3,400	U
76-13-1	Trichlorotrifluoroethane	1,700	5,400	1,700	770	U
75-15-0	Carbon Disulfide	14,000	28,000	14,000	4,000	U
75-34-3	1,1-Dichloroethane	6,000	10,000	6,000	1,500	U
78-93-3	2-Butanone (MEK)	190,000	26,000	8,200	2,900	
141-78-6	Ethyl Acetate	14,000	24,000	14,000	6,100	U
110-54-3	n-Hexane	2,100,000	12,000	7,100	2,400	
67-66-3	Chloroform	2,700	8,600	2,700	1,100	U
109-99-9	Tetrahydrofuran (THF)	4,500	14,000	4,500	1,800	U
71-43-2	Benzene	560,000	13,000	4,200	1,900	
56-23-5	Carbon Tetrachloride	2,100	6,500	2,100	920	U

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 102.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-013

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00239

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.95 Final Pressure (psig): 5.25

Container Dilution Factor: 1.56

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,500,000	23,000	7,500	3,400	
75-27-4	Bromodichloromethane	2,000	6,200	2,000	900	U
79-01-6	Trichloroethene	2,500	7,700	2,500	1,000	U
123-91-1	1,4-Dioxane	3,700	11,000	3,700	1,400	U
142-82-5	n-Heptane	1,400,000	10,000	6,100	1,600	
108-10-1	4-Methyl-2-pentanone	3,200	10,000	3,200	1,400	U
108-88-3	Toluene	960,000	11,000	3,500	1,300	
591-78-6	2-Hexanone	3,200	10,000	3,200	1,300	U
124-48-1	Dibromochloromethane	1,600	4,900	1,600	640	U
106-93-4	1,2-Dibromoethane	1,700	5,500	1,700	630	U
127-18-4	Tetrachloroethene	2,000	6,100	2,000	790	U
100-41-4	Ethylbenzene	46,000	9,300	3,100	1,300	
179601-23-1	m,p-Xylenes	110,000	20,000	6,100	2,500	
75-25-2	Bromoform	2,400	4,000	2,400	830	U
100-42-5	Styrene	5,900	9,700	5,900	1,600	U
95-47-6	o-Xylene	29,000	9,500	3,100	1,400	
108-67-8	1,3,5-Trimethylbenzene	1,900	8,400	2,700	1,200	J
95-63-6	1,2,4-Trimethylbenzene	3,500	8,400	2,700	1,200	J
120-82-1	1,2,4-Trichlorobenzene	3,400	5,600	3,400	1,400	U
95-50-1	1,2-Dichlorobenzene	2,200	7,000	2,200	1,000	U
91-20-3	Naphthalene	4,600	7,600	4,600	1,900	U
1330-20-7	Xylenes, Total	140,000	20,000	6,100	2,500	

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 117.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-014

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00874

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -4.92 Final Pressure (psig): 5.27

Container Dilution Factor: 2.04

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	18,000	21,000	12,000	5,100	J
75-71-8	Dichlorodifluoromethane (CFC 12)	4,300	7,200	4,300	1,200	U
74-87-3	Chloromethane	9,900	16,000	9,900	2,800	U
75-01-4	Vinyl Chloride	4,500	14,000	4,500	1,500	U
106-99-0	1,3-Butadiene	9,500	16,000	9,500	2,700	U
75-00-3	Chloroethane	8,000	13,000	8,000	1,700	U
64-17-5	Ethanol	30,000	180,000	30,000	13,000	U
67-64-1	Acetone	520,000	150,000	77,000	34,000	
75-69-4	Trichlorofluoromethane	3,900	6,400	3,900	980	U
67-63-0	2-Propanol (Isopropyl Alcohol)	27,000	58,000	17,000	6,100	J
75-09-2	Methylene Chloride	6,300	11,000	6,300	2,900	U
76-13-1	Trichlorotrifluoroethane	1,500	4,700	1,500	670	U
75-15-0	Carbon Disulfide	12,000	24,000	12,000	3,500	U
75-34-3	1,1-Dichloroethane	5,200	8,700	5,200	1,300	U
78-93-3	2-Butanone (MEK)	85,000	23,000	7,200	2,500	
141-78-6	Ethyl Acetate	12,000	21,000	12,000	5,300	U
110-54-3	n-Hexane	2,000,000	10,000	6,200	2,100	
67-66-3	Chloroform	2,400	7,500	2,400	990	U
109-99-9	Tetrahydrofuran (THF)	3,900	12,000	3,900	1,500	U
71-43-2	Benzene	540,000	11,000	3,600	1,600	
56-23-5	Carbon Tetrachloride	1,800	5,600	1,800	800	U

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 117.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-014

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00874

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -4.92 Final Pressure (psig): 5.27

Container Dilution Factor: 2.04

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	1,400,000	20,000	6,500	3,000	
75-27-4	Bromodichloromethane	1,700	5,400	1,700	780	U
79-01-6	Trichloroethene	2,200	6,700	2,200	910	U
123-91-1	1,4-Dioxane	3,200	10,000	3,200	1,200	U
142-82-5	n-Heptane	1,200,000	9,000	5,300	1,400	
108-10-1	4-Methyl-2-pentanone	2,800	8,800	2,800	1,200	U
108-88-3	Toluene	830,000	9,600	3,100	1,200	
591-78-6	2-Hexanone	2,800	9,000	2,800	1,100	U
124-48-1	Dibromochloromethane	1,400	4,300	1,400	560	U
106-93-4	1,2-Dibromoethane	790	4,800	1,500	550	J
127-18-4	Tetrachloroethene	1,700	5,300	1,700	690	U
100-41-4	Ethylbenzene	84,000	8,100	2,700	1,200	
179601-23-1	m,p-Xylenes	250,000	17,000	5,300	2,200	
75-25-2	Bromoform	2,100	3,500	2,100	720	U
100-42-5	Styrene	5,100	8,500	5,100	1,400	U
95-47-6	o-Xylene	68,000	8,300	2,700	1,200	
108-67-8	1,3,5-Trimethylbenzene	1,300	7,300	2,400	1,100	J
95-63-6	1,2,4-Trimethylbenzene	1,900	7,300	2,400	1,000	J
120-82-1	1,2,4-Trichlorobenzene	2,900	4,900	2,900	1,200	U
95-50-1	1,2-Dichlorobenzene	1,000	6,100	1,900	890	J
91-20-3	Naphthalene	4,000	6,600	4,000	1,700	U
1330-20-7	Xylenes, Total	320,000	17,000	5,300	2,200	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-015

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00674

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000065 Liter(s)

Initial Pressure (psig): -3.31 Final Pressure (psig): 5.28

Container Dilution Factor: 1.75

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	15,000	8,100	4,900	2,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	1,700	2,800	1,700	470	U
74-87-3	Chloromethane	3,900	6,500	3,900	1,100	U
75-01-4	Vinyl Chloride	1,800	5,600	1,800	600	U
106-99-0	1,3-Butadiene	3,800	6,300	3,800	1,100	U
75-00-3	Chloroethane	3,200	5,200	3,200	670	U
64-17-5	Ethanol	12,000	73,000	12,000	5,300	U
67-64-1	Acetone	230,000	61,000	31,000	14,000	
75-69-4	Trichlorofluoromethane	1,500	2,500	1,500	390	U
67-63-0	2-Propanol (Isopropyl Alcohol)	4,800	23,000	6,800	2,400	J
75-09-2	Methylene Chloride	2,500	4,200	2,500	1,200	U
76-13-1	Trichlorotrifluoroethane	600	1,900	600	270	U
75-15-0	Carbon Disulfide	4,700	9,500	4,700	1,400	U
75-34-3	1,1-Dichloroethane	2,100	3,500	2,100	520	U
78-93-3	2-Butanone (MEK)	18,000	9,100	2,800	1,000	
141-78-6	Ethyl Acetate	4,900	8,200	4,900	2,100	U
110-54-3	n-Hexane	610,000	4,100	2,400	840	
67-66-3	Chloroform	940	3,000	940	390	U
109-99-9	Tetrahydrofuran (THF)	1,600	4,800	1,600	610	U
71-43-2	Benzene	170,000	4,400	1,400	650	
56-23-5	Carbon Tetrachloride	730	2,200	730	320	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-015

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00674

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000065 Liter(s)

Initial Pressure (psig): -3.31 Final Pressure (psig): 5.28

Container Dilution Factor: 1.75

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	400,000	7,800	2,600	1,200	
75-27-4	Bromodichloromethane	680	2,100	680	310	U
79-01-6	Trichloroethene	850	2,700	850	360	U
123-91-1	1,4-Dioxane	1,300	4,000	1,300	470	U
142-82-5	n-Heptane	390,000	3,500	2,100	560	
108-10-1	4-Methyl-2-pentanone	1,100	3,500	1,100	480	U
108-88-3	Toluene	270,000	3,800	1,200	460	
591-78-6	2-Hexanone	1,100	3,600	1,100	430	U
124-48-1	Dibromochloromethane	540	1,700	540	220	U
106-93-4	1,2-Dibromoethane	220	1,900	600	220	J
127-18-4	Tetrachloroethene	680	2,100	680	270	U
100-41-4	Ethylbenzene	24,000	3,200	1,100	470	
179601-23-1	m,p-Xylenes	65,000	6,800	2,100	870	
75-25-2	Bromoform	830	1,400	830	290	U
100-42-5	Styrene	2,000	3,400	2,000	540	U
95-47-6	o-Xylene	20,000	3,300	1,100	480	
108-67-8	1,3,5-Trimethylbenzene	2,900	2,900	930	420	
95-63-6	1,2,4-Trimethylbenzene	7,600	2,900	930	410	
120-82-1	1,2,4-Trichlorobenzene	1,200	1,900	1,200	470	U
95-50-1	1,2-Dichlorobenzene	760	2,400	760	350	U
91-20-3	Naphthalene	1,600	2,600	1,600	670	U
1330-20-7	Xylenes, Total	85,000	6,800	2,100	870	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 252.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-017

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00905

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000040 Liter(s)

Initial Pressure (psig): -3.75 Final Pressure (psig): 5.29

Container Dilution Factor: 1.83

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	19,000	14,000	8,200	3,500	
75-71-8	Dichlorodifluoromethane (CFC 12)	2,900	4,800	2,900	810	U
74-87-3	Chloromethane	6,600	11,000	6,600	1,900	U
75-01-4	Vinyl Chloride	3,000	9,500	3,000	1,000	U
106-99-0	1,3-Butadiene	6,400	11,000	6,400	1,800	U
75-00-3	Chloroethane	5,400	8,800	5,400	1,100	U
64-17-5	Ethanol	20,000	120,000	20,000	9,000	U
67-64-1	Acetone	880,000	100,000	52,000	23,000	
75-69-4	Trichlorofluoromethane	2,600	4,300	2,600	660	U
67-63-0	2-Propanol (Isopropyl Alcohol)	54,000	39,000	12,000	4,100	
75-09-2	Methylene Chloride	4,200	7,100	4,200	2,000	U
76-13-1	Trichlorotrifluoroethane	1,000	3,200	1,000	450	U
75-15-0	Carbon Disulfide	12,000	16,000	7,900	2,400	J
75-34-3	1,1-Dichloroethane	3,500	5,900	3,500	880	U
78-93-3	2-Butanone (MEK)	96,000	16,000	4,800	1,700	
141-78-6	Ethyl Acetate	8,300	14,000	8,300	3,600	U
110-54-3	n-Hexane	500,000	7,000	4,200	1,400	
67-66-3	Chloroform	1,600	5,100	1,600	670	U
109-99-9	Tetrahydrofuran (THF)	2,600	8,200	2,600	1,000	U
71-43-2	Benzene	190,000	7,400	2,400	1,100	
56-23-5	Carbon Tetrachloride	1,200	3,800	1,200	540	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 252.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-017

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00905

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000040 Liter(s)

Initial Pressure (psig): -3.75 Final Pressure (psig): 5.29

Container Dilution Factor: 1.83

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	570,000	13,000	4,400	2,000	
75-27-4	Bromodichloromethane	1,200	3,600	1,200	530	U
79-01-6	Trichloroethene	1,300	4,500	1,400	610	J
123-91-1	1,4-Dioxane	2,200	6,700	2,200	800	U
142-82-5	n-Heptane	930,000	6,000	3,600	950	
108-10-1	4-Methyl-2-pentanone	1,900	5,900	1,900	820	U
108-88-3	Toluene	670,000	6,400	2,100	790	
591-78-6	2-Hexanone	1,900	6,000	1,900	740	U
124-48-1	Dibromochloromethane	910	2,900	910	380	U
106-93-4	1,2-Dibromoethane	1,100	3,200	1,000	370	J
127-18-4	Tetrachloroethene	410,000	3,600	1,100	470	
100-41-4	Ethylbenzene	41,000	5,500	1,800	790	
179601-23-1	m,p-Xylenes	98,000	12,000	3,600	1,500	
75-25-2	Bromoform	1,400	2,300	1,400	490	U
100-42-5	Styrene	3,400	5,700	3,400	920	U
95-47-6	o-Xylene	27,000	5,600	1,800	810	
108-67-8	1,3,5-Trimethylbenzene	3,400	4,900	1,600	720	J
95-63-6	1,2,4-Trimethylbenzene	8,900	4,900	1,600	690	
120-82-1	1,2,4-Trichlorobenzene	2,000	3,300	2,000	800	U
95-50-1	1,2-Dichlorobenzene	1,300	4,100	1,300	600	U
91-20-3	Naphthalene	2,700	4,500	2,700	1,100	U
1330-20-7	Xylenes, Total	120,000	12,000	3,600	1,500	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-018

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC01205

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12 Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	21,000	15,000	8,900	3,700	
75-71-8	Dichlorodifluoromethane (CFC 12)	3,100	5,200	3,100	860	U
74-87-3	Chloromethane	7,100	12,000	7,100	2,000	U
75-01-4	Vinyl Chloride	3,300	10,000	3,300	1,100	U
106-99-0	1,3-Butadiene	6,900	12,000	6,900	2,000	U
75-00-3	Chloroethane	5,800	9,500	5,800	1,200	U
64-17-5	Ethanol	21,000	130,000	21,000	9,700	U
67-64-1	Acetone	830,000	110,000	56,000	25,000	
75-69-4	Trichlorofluoromethane	2,800	4,600	2,800	710	U
67-63-0	2-Propanol (Isopropyl Alcohol)	37,000	42,000	12,000	4,400	J
75-09-2	Methylene Chloride	4,500	7,600	4,500	2,100	U
76-13-1	Trichlorotrifluoroethane	1,100	3,400	1,100	490	U
75-15-0	Carbon Disulfide	8,500	17,000	8,500	2,500	U
75-34-3	1,1-Dichloroethane	3,800	6,300	3,800	950	U
78-93-3	2-Butanone (MEK)	120,000	17,000	5,200	1,800	
141-78-6	Ethyl Acetate	8,900	15,000	8,900	3,800	U
110-54-3	n-Hexane	380,000	7,500	4,500	1,500	
67-66-3	Chloroform	1,700	5,400	1,700	710	U
109-99-9	Tetrahydrofuran (THF)	2,800	8,800	2,800	1,100	U
71-43-2	Benzene	150,000	8,000	2,600	1,200	
56-23-5	Carbon Tetrachloride	1,300	4,100	1,300	580	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12 Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	550,000	14,000	4,700	2,100	
75-27-4	Bromodichloromethane	1,200	3,900	1,200	570	U
79-01-6	Trichloroethene	1,600	4,800	1,600	660	U
123-91-1	1,4-Dioxane	2,300	7,200	2,300	860	U
142-82-5	n-Heptane	1,000,000	6,500	3,800	1,000	
108-10-1	4-Methyl-2-pentanone	2,000	6,400	2,000	880	U
108-88-3	Toluene	770,000	6,900	2,200	850	
591-78-6	2-Hexanone	2,000	6,500	2,000	790	U
124-48-1	Dibromochloromethane	980	3,100	980	400	U
106-93-4	1,2-Dibromoethane	1,100	3,500	1,100	400	J
127-18-4	Tetrachloroethene	1,200	3,800	1,200	500	U
100-41-4	Ethylbenzene	47,000	5,900	1,900	850	
179601-23-1	m,p-Xylenes	110,000	12,000	3,800	1,600	
75-25-2	Bromoform	1,500	2,500	1,500	520	U
100-42-5	Styrene	3,700	6,100	3,700	990	U
95-47-6	o-Xylene	29,000	6,000	1,900	870	
108-67-8	1,3,5-Trimethylbenzene	4,500	5,300	1,700	770	J
95-63-6	1,2,4-Trimethylbenzene	12,000	5,300	1,700	740	
120-82-1	1,2,4-Trichlorobenzene	2,100	3,500	2,100	860	U
95-50-1	1,2-Dichlorobenzene	1,400	4,400	1,400	650	U
91-20-3	Naphthalene	2,900	4,800	2,900	1,200	U
1330-20-7	Xylenes, Total	140,000	12,000	3,800	1,600	

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	0.18	0.30	0.18	0.076	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.063	0.11	0.063	0.018	U
74-87-3	Chloromethane	0.15	0.24	0.15	0.042	U
75-01-4	Vinyl Chloride	0.067	0.21	0.067	0.022	U
106-99-0	1,3-Butadiene	0.14	0.24	0.14	0.040	U
75-00-3	Chloroethane	0.12	0.19	0.12	0.025	U
64-17-5	Ethanol	0.44	2.7	0.44	0.20	U
67-64-1	Acetone	1.1	2.3	1.1	0.51	U
75-69-4	Trichlorofluoromethane	0.057	0.094	0.057	0.014	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.25	0.85	0.25	0.090	U
75-09-2	Methylene Chloride	0.092	0.16	0.092	0.043	U
76-13-1	Trichlorotrifluoroethane	0.022	0.069	0.022	0.0099	U
75-15-0	Carbon Disulfide	0.17	0.35	0.17	0.051	U
75-34-3	1,1-Dichloroethane	0.077	0.13	0.077	0.019	U
78-93-3	2-Butanone (MEK)	0.11	0.34	0.11	0.037	U
141-78-6	Ethyl Acetate	0.18	0.31	0.18	0.078	U
110-54-3	n-Hexane	0.091	0.15	0.091	0.031	U
67-66-3	Chloroform	0.035	0.11	0.035	0.015	U
109-99-9	Tetrahydrofuran (THF)	0.058	0.18	0.058	0.023	U
71-43-2	Benzene	0.053	0.16	0.053	0.024	U
56-23-5	Carbon Tetrachloride	0.027	0.083	0.027	0.012	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	0.096	0.29	0.096	0.044	U
75-27-4	Bromodichloromethane	0.025	0.079	0.025	0.011	U
79-01-6	Trichloroethene	0.032	0.099	0.032	0.013	U
123-91-1	1,4-Dioxane	0.047	0.15	0.047	0.017	U
142-82-5	n-Heptane	0.078	0.13	0.078	0.021	U
108-10-1	4-Methyl-2-pentanone	0.041	0.13	0.041	0.018	U
108-88-3	Toluene	0.045	0.14	0.045	0.017	U
591-78-6	2-Hexanone	0.042	0.13	0.042	0.016	U
124-48-1	Dibromochloromethane	0.020	0.063	0.020	0.0082	U
106-93-4	1,2-Dibromoethane	0.022	0.070	0.022	0.0081	U
127-18-4	Tetrachloroethene	0.025	0.078	0.025	0.010	U
100-41-4	Ethylbenzene	0.039	0.12	0.039	0.017	U
179601-23-1	m,p-Xylenes	0.078	0.25	0.078	0.032	U
75-25-2	Bromoform	0.031	0.051	0.031	0.011	U
100-42-5	Styrene	0.075	0.12	0.075	0.020	U
95-47-6	o-Xylene	0.039	0.12	0.039	0.018	U
108-67-8	1,3,5-Trimethylbenzene	0.035	0.11	0.035	0.016	U
95-63-6	1,2,4-Trimethylbenzene	0.035	0.11	0.035	0.015	U
120-82-1	1,2,4-Trichlorobenzene	0.043	0.071	0.043	0.018	U
95-50-1	1,2-Dichlorobenzene	0.028	0.090	0.028	0.013	U
91-20-3	Naphthalene	0.059	0.097	0.059	0.025	U
1330-20-7	Xylenes, Total	0.078	0.25	0.078	0.032	U

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 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	0.18	0.30	0.18	0.076	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.063	0.11	0.063	0.018	U
74-87-3	Chloromethane	0.15	0.24	0.15	0.042	U
75-01-4	Vinyl Chloride	0.067	0.21	0.067	0.022	U
106-99-0	1,3-Butadiene	0.14	0.24	0.14	0.040	U
75-00-3	Chloroethane	0.12	0.19	0.12	0.025	U
64-17-5	Ethanol	0.44	2.7	0.44	0.20	U
67-64-1	Acetone	1.1	2.3	1.1	0.51	U
75-69-4	Trichlorofluoromethane	0.057	0.094	0.057	0.014	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.25	0.85	0.25	0.090	U
75-09-2	Methylene Chloride	0.092	0.16	0.092	0.043	U
76-13-1	Trichlorotrifluoroethane	0.022	0.069	0.022	0.0099	U
75-15-0	Carbon Disulfide	0.17	0.35	0.17	0.051	U
75-34-3	1,1-Dichloroethane	0.077	0.13	0.077	0.019	U
78-93-3	2-Butanone (MEK)	0.11	0.34	0.11	0.037	U
141-78-6	Ethyl Acetate	0.18	0.31	0.18	0.078	U
110-54-3	n-Hexane	0.091	0.15	0.091	0.031	U
67-66-3	Chloroform	0.035	0.11	0.035	0.015	U
109-99-9	Tetrahydrofuran (THF)	0.058	0.18	0.058	0.023	U
71-43-2	Benzene	0.053	0.16	0.053	0.024	U
56-23-5	Carbon Tetrachloride	0.027	0.083	0.027	0.012	U

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 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	0.096	0.29	0.096	0.044	U
75-27-4	Bromodichloromethane	0.025	0.079	0.025	0.011	U
79-01-6	Trichloroethene	0.032	0.099	0.032	0.013	U
123-91-1	1,4-Dioxane	0.047	0.15	0.047	0.017	U
142-82-5	n-Heptane	0.078	0.13	0.078	0.021	U
108-10-1	4-Methyl-2-pentanone	0.041	0.13	0.041	0.018	U
108-88-3	Toluene	0.045	0.14	0.045	0.017	U
591-78-6	2-Hexanone	0.042	0.13	0.042	0.016	U
124-48-1	Dibromochloromethane	0.020	0.063	0.020	0.0082	U
106-93-4	1,2-Dibromoethane	0.022	0.070	0.022	0.0081	U
127-18-4	Tetrachloroethene	0.025	0.078	0.025	0.010	U
100-41-4	Ethylbenzene	0.039	0.12	0.039	0.017	U
179601-23-1	m,p-Xylenes	0.078	0.25	0.078	0.032	U
75-25-2	Bromoform	0.031	0.051	0.031	0.011	U
100-42-5	Styrene	0.075	0.12	0.075	0.020	U
95-47-6	o-Xylene	0.039	0.12	0.039	0.018	U
108-67-8	1,3,5-Trimethylbenzene	0.035	0.11	0.035	0.016	U
95-63-6	1,2,4-Trimethylbenzene	0.035	0.11	0.035	0.015	U
120-82-1	1,2,4-Trichlorobenzene	0.043	0.071	0.043	0.018	U
95-50-1	1,2-Dichlorobenzene	0.028	0.090	0.028	0.013	U
91-20-3	Naphthalene	0.059	0.097	0.059	0.025	U
1330-20-7	Xylenes, Total	0.078	0.25	0.078	0.032	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	0.18	0.30	0.18	0.076	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.063	0.11	0.063	0.018	U
74-87-3	Chloromethane	0.15	0.24	0.15	0.042	U
75-01-4	Vinyl Chloride	0.067	0.21	0.067	0.022	U
106-99-0	1,3-Butadiene	0.14	0.24	0.14	0.040	U
75-00-3	Chloroethane	0.12	0.19	0.12	0.025	U
64-17-5	Ethanol	0.44	2.7	0.44	0.20	U
67-64-1	Acetone	1.1	2.3	1.1	0.51	U
75-69-4	Trichlorofluoromethane	0.057	0.094	0.057	0.014	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.25	0.85	0.25	0.090	U
75-09-2	Methylene Chloride	0.092	0.16	0.092	0.043	U
76-13-1	Trichlorotrifluoroethane	0.022	0.069	0.022	0.0099	U
75-15-0	Carbon Disulfide	0.17	0.35	0.17	0.051	U
75-34-3	1,1-Dichloroethane	0.077	0.13	0.077	0.019	U
78-93-3	2-Butanone (MEK)	0.11	0.34	0.11	0.037	U
141-78-6	Ethyl Acetate	0.18	0.31	0.18	0.078	U
110-54-3	n-Hexane	0.091	0.15	0.091	0.031	U
67-66-3	Chloroform	0.035	0.11	0.035	0.015	U
109-99-9	Tetrahydrofuran (THF)	0.058	0.18	0.058	0.023	U
71-43-2	Benzene	0.053	0.16	0.053	0.024	U
56-23-5	Carbon Tetrachloride	0.027	0.083	0.027	0.012	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P190503-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/3/19
Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	0.096	0.29	0.096	0.044	U
75-27-4	Bromodichloromethane	0.025	0.079	0.025	0.011	U
79-01-6	Trichloroethene	0.032	0.099	0.032	0.013	U
123-91-1	1,4-Dioxane	0.047	0.15	0.047	0.017	U
142-82-5	n-Heptane	0.078	0.13	0.078	0.021	U
108-10-1	4-Methyl-2-pentanone	0.041	0.13	0.041	0.018	U
108-88-3	Toluene	0.045	0.14	0.045	0.017	U
591-78-6	2-Hexanone	0.042	0.13	0.042	0.016	U
124-48-1	Dibromochloromethane	0.020	0.063	0.020	0.0082	U
106-93-4	1,2-Dibromoethane	0.022	0.070	0.022	0.0081	U
127-18-4	Tetrachloroethene	0.025	0.078	0.025	0.010	U
100-41-4	Ethylbenzene	0.039	0.12	0.039	0.017	U
179601-23-1	m,p-Xylenes	0.078	0.25	0.078	0.032	U
75-25-2	Bromoform	0.031	0.051	0.031	0.011	U
100-42-5	Styrene	0.075	0.12	0.075	0.020	U
95-47-6	o-Xylene	0.039	0.12	0.039	0.018	U
108-67-8	1,3,5-Trimethylbenzene	0.035	0.11	0.035	0.016	U
95-63-6	1,2,4-Trimethylbenzene	0.035	0.11	0.035	0.015	U
120-82-1	1,2,4-Trichlorobenzene	0.043	0.071	0.043	0.018	U
95-50-1	1,2-Dichlorobenzene	0.028	0.090	0.028	0.013	U
91-20-3	Naphthalene	0.059	0.097	0.059	0.025	U
1330-20-7	Xylenes, Total	0.078	0.25	0.078	0.032	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah/Topacio De Leon
Sampling Media: 1.0 L Summa Canister(s) / 1.0 L Silonite Summa Canister(s)
Test Notes:

Date(s) Collected: 4/10 - 4/11/19

Date(s) Received: 4/17/19

Date(s) Analyzed: 4/30 - 5/3/19

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P190430-MB	105	97	101	70-130	
Method Blank	P190501-MB	99	99	104	70-130	
Method Blank	P190503-MB	96	103	97	70-130	
Lab Control Sample	P190430-LCS	103	97	105	70-130	
Lab Control Sample	P190501-LCS	97	98	106	70-130	
Lab Control Sample	P190503-LCS	94	102	99	70-130	
Duplicate Lab Control Sample	P190430-DLCS	102	97	105	70-130	
Duplicate Lab Control Sample	P190501-DLCS	97	98	106	70-130	
Duplicate Lab Control Sample	P190503-DLCS	95	102	99	70-130	
SVMW-10-100	P1902156-001	99	98	104	70-130	
SVMW-10-150	P1902156-002	99	99	105	70-130	
SVMW-10-250	P1902156-003	101	93	103	70-130	
SVMW-11-100	P1902156-004	100	99	104	70-130	
SVMW-11-250	P1902156-005	93	102	100	70-130	
SVEW-04/05-313	P1902156-006	100	91	98	70-130	
KAFB-106V1 102.1	P1902156-007	98	99	105	70-130	
KAFB-106V1 112.6	P1902156-008	100	99	105	70-130	
KAFB-106V1 159.6	P1902156-009	100	98	105	70-130	
KAFB-106V1 217.1	P1902156-010	97	98	107	70-130	
KAFB-106V1 252.1	P1902156-011	99	97	105	70-130	
KAFB-106V1 262.6	P1902156-012	99	97	106	70-130	
KAFB-106V2 102.2	P1902156-013	98	98	106	70-130	
KAFB-106V2 117.1	P1902156-014	97	98	106	70-130	
KAFB-106V2 159.6	P1902156-015	98	98	107	70-130	
KAFB-106V2 252.2	P1902156-017	97	99	106	70-130	
KAFB-106V2 269.5	P1902156-018	97	98	106	70-130	
KAFB-106V2 269.5	P1902156-018DUP	97	98	105	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS / DLCS	LCS	DLCS	Acceptance	RPD			
		ppbV	ppbV	ppbV	ppbV	% Recovery	Limits	Limit	Qualifier	
115-07-1	Propene	123	112	121		91 98	57-136	7	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	42.6	39.8	42.5		93 100	59-128	7	25	
74-87-3	Chloromethane	102	89.8	95.2		88 93	59-132	6	25	
75-01-4	Vinyl Chloride	83.7	79.1	83.2		95 99	64-127	4	25	
106-99-0	1,3-Butadiene	95.1	93.4	97.4		98 102	66-134	4	25	
75-00-3	Chloroethane	81.1	75.6	80.9		93 100	63-127	7	25	
64-17-5	Ethanol	544	552	574		101 106	59-125	5	25	
67-64-1	Acetone	446	448	461		100 103	58-128	3	25	
75-69-4	Trichlorofluoromethane	37.6	36.6	38.2		97 102	62-126	5	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	168	183	186		109 111	52-125	2	25	
75-09-2	Methylene Chloride	62.4	63.3	64.8		101 104	62-115	3	25	
76-13-1	Trichlorotrifluoroethane	28.1	26.4	27.1		94 96	66-126	2	25	
75-15-0	Carbon Disulfide	69.9	74.2	75.8		106 108	57-134	2	25	
75-34-3	1,1-Dichloroethane	53.3	51.2	52.0		96 98	68-126	2	25	
78-93-3	2-Butanone (MEK)	70.4	81.2	81.9		115 116	67-130	0.9	25	
141-78-6	Ethyl Acetate	121	139	140		115 116	65-128	0.9	25	
110-54-3	n-Hexane	61.2	64.3	65.3		105 107	63-120	2	25	
67-66-3	Chloroform	44.4	45.3	45.7		102 103	68-123	1	25	
109-99-9	Tetrahydrofuran (THF)	73.3	82.4	83.1		112 113	64-123	0.9	25	
71-43-2	Benzene	66.1	65.8	65.6		100 99	69-119	1	25	
56-23-5	Carbon Tetrachloride	33.7	34.7	34.3		103 102	68-132	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		% Recovery		DOD		Data
		LCS / DLCS	ppbV	LCS	DLCS	LCS	DLCS	Acceptance	RPD	
110-82-7	Cyclohexane	121	122	122	122	101	101	70-117	0	25
75-27-4	Bromodichloromethane	32.0	35.3	35.4	35.4	110	111	72-128	0.9	25
79-01-6	Trichloroethene	39.7	38.7	39.2	39.2	97	99	71-123	2	25
123-91-1	1,4-Dioxane	59.4	63.5	64.0	64.0	107	108	71-122	0.9	25
142-82-5	n-Heptane	52.5	54.1	54.4	54.4	103	104	69-123	1	25
108-10-1	4-Methyl-2-pentanone	51.1	58.4	58.3	58.3	114	114	67-130	0	25
108-88-3	Toluene	56.3	53.6	54.5	54.5	95	97	66-119	2	25
591-78-6	2-Hexanone	52.3	59.9	60.6	60.6	115	116	62-128	0.9	25
124-48-1	Dibromochloromethane	25.0	28.0	28.3	28.3	112	113	70-130	0.9	25
106-93-4	1,2-Dibromoethane	28.1	30.0	30.5	30.5	107	109	74-122	2	25
127-18-4	Tetrachloroethene	31.4	29.5	30.2	30.2	94	96	66-124	2	25
100-41-4	Ethylbenzene	48.9	47.5	48.1	48.1	97	98	70-124	1	25
179601-23-1	m,p-Xylenes	98.2	98.3	99.0	99.0	100	101	61-134	1	25
75-25-2	Bromoform	20.6	24.5	24.6	24.6	119	119	66-139	0	25
100-42-5	Styrene	49.8	56.7	57.0	57.0	114	114	73-127	0	25
95-47-6	o-Xylene	49.3	49.3	49.6	49.6	100	101	67-125	1	25
108-67-8	1,3,5-Trimethylbenzene	43.5	43.0	43.1	43.1	99	99	67-130	0	25
95-63-6	1,2,4-Trimethylbenzene	43.8	46.2	45.8	45.8	105	105	66-132	0	25
120-82-1	1,2,4-Trichlorobenzene	28.9	29.6	29.8	29.8	102	103	55-142	1	25
95-50-1	1,2-Dichlorobenzene	35.9	37.5	37.4	37.4	104	104	63-129	0	25
91-20-3	Naphthalene	38.7	42.4	42.4	42.4	110	110	57-138	0	25

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		ppbV	ppbV	ppbV	LCS	DLCS	Limits	Limit	Qualifier	
115-07-1	Propene	123	128	132	104	107	57-136	3	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	42.6	44.4	45.0	104	106	59-128	2	25	
74-87-3	Chloromethane	102	108	109	106	107	59-132	0.9	25	
75-01-4	Vinyl Chloride	83.7	90.2	92.3	108	110	64-127	2	25	
106-99-0	1,3-Butadiene	95.1	103	105	108	110	66-134	2	25	
75-00-3	Chloroethane	81.1	91.0	92.7	112	114	63-127	2	25	
64-17-5	Ethanol	544	615	629	113	116	59-125	3	25	
67-64-1	Acetone	446	485	493	109	111	58-128	2	25	
75-69-4	Trichlorofluoromethane	37.6	40.3	40.5	107	108	62-126	0.9	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	168	199	202	118	120	52-125	2	25	
75-09-2	Methylene Chloride	62.4	69.3	70.7	111	113	62-115	2	25	
76-13-1	Trichlorotrifluoroethane	28.1	30.1	30.4	107	108	66-126	0.9	25	
75-15-0	Carbon Disulfide	69.9	81.3	82.0	116	117	57-134	0.9	25	
75-34-3	1,1-Dichloroethane	53.3	57.3	58.0	108	109	68-126	0.9	25	
78-93-3	2-Butanone (MEK)	70.4	87.7	88.2	125	125	67-130	0	25	
141-78-6	Ethyl Acetate	121	145	146	120	121	65-128	0.8	25	
110-54-3	n-Hexane	61.2	66.9	67.9	109	111	63-120	2	25	
67-66-3	Chloroform	44.4	47.6	47.9	107	108	68-123	0.9	25	
109-99-9	Tetrahydrofuran (THF)	73.3	88.2	89.3	120	122	64-123	2	25	
71-43-2	Benzene	66.1	70.8	71.0	107	107	69-119	0	25	
56-23-5	Carbon Tetrachloride	33.7	36.3	36.4	108	108	68-132	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	ppbV	LCS	DLCS	% Recovery	Acceptance			
110-82-7	Cyclohexane	121	129	131	107	108	70-117	0.9	25	
75-27-4	Bromodichloromethane	32.0	37.2	37.6	116	118	72-128	2	25	
79-01-6	Trichloroethene	39.7	42.4	42.7	107	108	71-123	0.9	25	
123-91-1	1,4-Dioxane	59.4	67.1	67.9	113	114	71-122	0.9	25	
142-82-5	n-Heptane	52.5	57.7	58.0	110	110	69-123	0	25	
108-10-1	4-Methyl-2-pentanone	51.1	61.3	61.9	120	121	67-130	0.8	25	
108-88-3	Toluene	56.3	58.7	59.1	104	105	66-119	1	25	
591-78-6	2-Hexanone	52.3	63.6	63.8	122	122	62-128	0	25	
124-48-1	Dibromochloromethane	25.0	30.4	30.7	122	123	70-130	0.8	25	
106-93-4	1,2-Dibromoethane	28.1	33.0	33.3	117	119	74-122	2	25	
127-18-4	Tetrachloroethene	31.4	33.0	33.3	105	106	66-124	0.9	25	
100-41-4	Ethylbenzene	48.9	51.6	51.7	106	106	70-124	0	25	
179601-23-1	m,p-Xylenes	98.2	105	105	107	107	61-134	0	25	
75-25-2	Bromoform	20.6	26.4	26.5	128	129	66-139	0.8	25	
100-42-5	Styrene	49.8	61.6	61.8	124	124	73-127	0	25	
95-47-6	o-Xylene	49.3	52.9	53.1	107	108	67-125	0.9	25	
108-67-8	1,3,5-Trimethylbenzene	43.5	45.6	45.6	105	105	67-130	0	25	
95-63-6	1,2,4-Trimethylbenzene	43.8	48.0	48.1	110	110	66-132	0	25	
120-82-1	1,2,4-Trichlorobenzene	28.9	30.8	31.1	107	108	55-142	0.9	25	
95-50-1	1,2-Dichlorobenzene	35.9	39.8	39.9	111	111	63-129	0	25	
91-20-3	Naphthalene	38.7	39.4	39.8	102	103	57-138	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		ppbV	ppbV	ppbV	LCS	DLCS	Limits	Limit	Qualifier	
115-07-1	Propene	123	109	112	89	91	57-136	2	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	42.6	36.6	37.0	86	87	59-128	1	25	
74-87-3	Chloromethane	102	93.1	94.8	91	93	59-132	2	25	
75-01-4	Vinyl Chloride	83.7	72.5	74.0	87	88	64-127	1	25	
106-99-0	1,3-Butadiene	95.1	82.8	85.4	87	90	66-134	3	25	
75-00-3	Chloroethane	81.1	77.0	78.5	95	97	63-127	2	25	
64-17-5	Ethanol	544	522	533	96	98	59-125	2	25	
67-64-1	Acetone	446	400	408	90	91	58-128	1	25	
75-69-4	Trichlorofluoromethane	37.6	32.5	32.8	86	87	62-126	1	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	168	169	172	101	102	52-125	1	25	
75-09-2	Methylene Chloride	62.4	58.3	59.2	93	95	62-115	2	25	
76-13-1	Trichlorotrifluoroethane	28.1	26.0	26.1	93	93	66-126	0	25	
75-15-0	Carbon Disulfide	69.9	68.3	68.4	98	98	57-134	0	25	
75-34-3	1,1-Dichloroethane	53.3	48.3	49.0	91	92	68-126	1	25	
78-93-3	2-Butanone (MEK)	70.4	73.6	74.4	105	106	67-130	0.9	25	
141-78-6	Ethyl Acetate	121	119	120	98	99	65-128	1	25	
110-54-3	n-Hexane	61.2	53.4	54.4	87	89	63-120	2	25	
67-66-3	Chloroform	44.4	39.1	39.7	88	89	68-123	1	25	
109-99-9	Tetrahydrofuran (THF)	73.3	74.5	75.4	102	103	64-123	1	25	
71-43-2	Benzene	66.1	59.1	59.5	89	90	69-119	1	25	
56-23-5	Carbon Tetrachloride	33.7	30.3	30.5	90	91	68-132	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		% Recovery		DOD	RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	ppbV	LCS	DLCS	Acceptance			
110-82-7	Cyclohexane	121	108	109	89	90	70-117	1	25		
75-27-4	Bromodichloromethane	32.0	30.9	31.4	97	98	72-128	1	25		
79-01-6	Trichloroethene	39.7	35.7	36.0	90	91	71-123	1	25		
123-91-1	1,4-Dioxane	59.4	58.2	59.1	98	99	71-122	1	25		
142-82-5	n-Heptane	52.5	48.0	48.8	91	93	69-123	2	25		
108-10-1	4-Methyl-2-pentanone	51.1	53.8	54.5	105	107	67-130	2	25		
108-88-3	Toluene	56.3	52.6	52.6	93	93	66-119	0	25		
591-78-6	2-Hexanone	52.3	61.8	62.0	118	119	62-128	0.8	25		
124-48-1	Dibromochloromethane	25.0	27.6	27.7	110	111	70-130	0.9	25		
106-93-4	1,2-Dibromoethane	28.1	30.2	30.3	107	108	74-122	0.9	25		
127-18-4	Tetrachloroethene	31.4	29.8	29.9	95	95	66-124	0	25		
100-41-4	Ethylbenzene	48.9	46.3	46.2	95	94	70-124	1	25		
179601-23-1	m,p-Xylenes	98.2	92.3	92.6	94	94	61-134	0	25		
75-25-2	Bromoform	20.6	23.9	24.1	116	117	66-139	0.9	25		
100-42-5	Styrene	49.8	55.9	56.0	112	112	73-127	0	25		
95-47-6	o-Xylene	49.3	46.7	46.8	95	95	67-125	0	25		
108-67-8	1,3,5-Trimethylbenzene	43.5	40.8	40.8	94	94	67-130	0	25		
95-63-6	1,2,4-Trimethylbenzene	43.8	42.5	42.2	97	96	66-132	1	25		
120-82-1	1,2,4-Trichlorobenzene	28.9	30.9	31.0	107	107	55-142	0	25		
95-50-1	1,2-Dichlorobenzene	35.9	35.8	35.9	100	100	63-129	0	25		
91-20-3	Naphthalene	38.7	42.4	42.5	110	110	57-138	0	25		

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018DUP

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12

Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

Compound	Sample Result ppbV	Duplicate Sample Result ppbV	Average ppbV	% RPD	RPD Limit	Data Qualifier
Propene	21,000	21,000	21000	0	25	
Dichlorodifluoromethane (CFC 12)	ND	ND	-	-	25	
Chloromethane	ND	ND	-	-	25	
Vinyl Chloride	ND	ND	-	-	25	
1,3-Butadiene	ND	ND	-	-	25	
Chloroethane	ND	ND	-	-	25	
Ethanol	ND	ND	-	-	25	
Acetone	830,000	810,000	820000	2	25	
Trichlorofluoromethane	ND	ND	-	-	25	
2-Propanol (Isopropyl Alcohol)	37,000	36,000	36500	3	25	J
Methylene Chloride	ND	ND	-	-	25	
Trichlorotrifluoroethane	ND	ND	-	-	25	
Carbon Disulfide	ND	ND	-	-	25	
1,1-Dichloroethane	ND	ND	-	-	25	
2-Butanone (MEK)	120,000	120,000	120000	0	25	
Ethyl Acetate	ND	ND	-	-	25	
n-Hexane	380,000	380,000	380000	0	25	
Chloroform	ND	ND	-	-	25	
Tetrahydrofuran (THF)	ND	ND	-	-	25	
Benzene	150,000	150,000	150000	0	25	
Carbon Tetrachloride	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018DUP

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12

Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

Compound	Sample Result ppbV	Duplicate Sample Result ppbV	Average ppbV	% RPD	RPD Limit	Data Qualifier
Cyclohexane	550,000	540,000	545000	2	25	
Bromodichloromethane	ND	ND	-	-	25	
Trichloroethene	ND	ND	-	-	25	
1,4-Dioxane	ND	ND	-	-	25	
n-Heptane	1,000,000	1,000,000	1000000	0	25	
4-Methyl-2-pentanone	ND	ND	-	-	25	
Toluene	770,000	760,000	765000	1	25	
2-Hexanone	ND	ND	-	-	25	
Dibromochloromethane	ND	ND	-	-	25	
1,2-Dibromoethane	1,100	1,100	1100	0	25	J
Tetrachloroethene	ND	ND	-	-	25	
Ethylbenzene	47,000	47,000	47000	0	25	
m,p-Xylenes	110,000	110,000	110000	0	25	
Bromoform	ND	ND	-	-	25	
Styrene	ND	ND	-	-	25	
o-Xylene	29,000	29,000	29000	0	25	
1,3,5-Trimethylbenzene	4,500	4,400	4450	2	25	J
1,2,4-Trimethylbenzene	12,000	12,000	12000	0	25	
1,2,4-Trichlorobenzene	ND	ND	-	-	25	
1,2-Dichlorobenzene	ND	ND	-	-	25	
Naphthalene	ND	ND	-	-	25	
Xylenes, Total	140,000	140,000	140000	0	25	

ND = Compound was analyzed for, but not detected.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 04301901.D
Analyst: Topacio De Leon Date Analyzed: 4/30/19
Sampling Media: 1.0 L Summa Canister(s) Time Analyzed: 02:30
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	108999	11.25	485835	13.36	267405	17.67
Upper Limit	152599	11.58	680169	13.69	374367	18.00
Lower Limit	65399	10.92	291501	13.03	160443	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)
		AREA #	RT #	AREA #
01	Method Blank	94379	11.23	430328
02	Lab Control Sample	108837	11.25	481193
03	Duplicate Lab Control Sample	113335	11.25	504272
04	SVMW-10-100	106974	11.24	479274
05	SVEW-04/05-313 (Dilution)	115639	11.23	520793
06	SVEW-04/05-313	118284	11.23	536905
07	SVMW-10-150	108552	11.23	487213
08	SVMW-11-100	103445	11.24	462501
09	SVMW-10-250	99611	11.23	446395
10	KAFB-106V1 102.1	121663	11.23	543362
11	KAFB-106V1 112.6	111525	11.23	505822
12	KAFB-106V1 159.6	112169	11.23	504998
13	KAFB-106V1 252.1	101845	11.23	458943
14	KAFB-106V1 262.6	103758	11.23	462931
15	KAFB-106V2 102.2	103367	11.23	468433
16	KAFB-106V2 252.2	112705	11.23	510617
17	KAFB-106V2 269.5	112291	11.23	510430
18	KAFB-106V2 269.5 (Lab Duplicate)	111218	11.23	503611
19				
20				

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05011902.D
Analyst: Raneem Sahtah Date Analyzed: 5/1/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 02:50
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	119814	11.24	531603	13.36	271778	17.67
Upper Limit	167740	11.57	744244	13.69	380489	18.00
Lower Limit	71888	10.91	318962	13.03	163067	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)
01	Method Blank	106769	11.22	480100
02	Lab Control Sample	115499	11.24	508349
03	Duplicate Lab Control Sample	115284	11.24	509059
04	KAFB-106V1 217.1	119081	11.23	535830
05	KAFB-106V2 117.1	102360	11.23	456052
06	KAFB-106V2 159.6	107700	11.23	493202
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05031903.D
Analyst: Raneem Sahtah Date Analyzed: 5/3/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 03:17
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	158810	11.24	700551	13.36	335733	17.67
Upper Limit	222334	11.57	980771	13.69	470026	18.00
Lower Limit	95286	10.91	420331	13.03	201440	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)		
		AREA #	RT #	AREA #	RT #	AREA #
01	Method Blank	141105	11.22	633060	13.35	305909
02	Lab Control Sample	154721	11.24	672595	13.36	322608
03	Duplicate Lab Control Sample	152231	11.25	664099	13.36	322236
04	SVMW-11-250	150604	11.23	668615	13.36	329108
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01168

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.46 Final Pressure (psig): 5.76

Container Dilution Factor: 1.67

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	43,000	43,000	26,000	11,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	26,000	43,000	26,000	7,300	U
74-87-3	Chloromethane	25,000	42,000	25,000	7,200	U
75-01-4	Vinyl Chloride	14,000	44,000	14,000	4,800	U
106-99-0	1,3-Butadiene	26,000	43,000	26,000	7,300	U
75-00-3	Chloroethane	26,000	43,000	26,000	5,500	U
64-17-5	Ethanol	78,000	430,000	68,000	31,000	J
67-64-1	Acetone	5,900,000	450,000	230,000	100,000	U
75-69-4	Trichlorofluoromethane	27,000	44,000	27,000	6,800	U
67-63-0	2-Propanol (Isopropyl Alcohol)	320,000	180,000	52,000	18,000	U
75-09-2	Methylene Chloride	27,000	45,000	27,000	13,000	U
76-13-1	Trichlorotrifluoroethane	14,000	44,000	14,000	6,300	U
75-15-0	Carbon Disulfide	45,000	92,000	45,000	13,000	U
75-34-3	1,1-Dichloroethane	26,000	43,000	26,000	6,500	U
78-93-3	2-Butanone (MEK)	1,400,000	84,000	26,000	9,200	U
141-78-6	Ethyl Acetate	54,000	92,000	54,000	23,000	U
110-54-3	n-Hexane	8,900,000	45,000	27,000	9,200	U
67-66-3	Chloroform	14,000	45,000	14,000	5,900	U
109-99-9	Tetrahydrofuran (THF)	14,000	44,000	14,000	5,600	U
71-43-2	Benzene	2,700,000	43,000	14,000	6,400	U
56-23-5	Carbon Tetrachloride	14,000	43,000	14,000	6,200	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01168

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.46 Final Pressure (psig): 5.76

Container Dilution Factor: 1.67

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	7,500,000	84,000	28,000	13,000	
75-27-4	Bromodichloromethane	14,000	44,000	14,000	6,400	U
79-01-6	Trichloroethene	14,000	44,000	14,000	6,000	U
123-91-1	1,4-Dioxane	14,000	44,000	14,000	5,300	U
142-82-5	n-Heptane	8,200,000	45,000	27,000	7,100	
108-10-1	4-Methyl-2-pentanone	100,000	44,000	14,000	6,100	
108-88-3	Toluene	7,000,000	44,000	14,000	5,400	
591-78-6	2-Hexanone	14,000	45,000	14,000	5,500	U
124-48-1	Dibromochloromethane	14,000	45,000	14,000	5,800	U
106-93-4	1,2-Dibromoethane	66,000	45,000	14,000	5,200	
127-18-4	Tetrachloroethene	14,000	44,000	14,000	5,800	U
100-41-4	Ethylbenzene	290,000	43,000	14,000	6,300	
179601-23-1	m,p-Xylenes	760,000	92,000	28,000	12,000	
75-25-2	Bromoform	27,000	44,000	27,000	9,200	U
100-42-5	Styrene	27,000	44,000	27,000	7,200	U
95-47-6	o-Xylene	190,000	44,000	14,000	6,400	
108-67-8	1,3,5-Trimethylbenzene	8,500	44,000	14,000	6,400	J
95-63-6	1,2,4-Trimethylbenzene	13,000	44,000	14,000	6,200	J
120-82-1	1,2,4-Trichlorobenzene	27,000	44,000	27,000	11,000	U
95-50-1	1,2-Dichlorobenzene	14,000	45,000	14,000	6,600	U
91-20-3	Naphthalene	26,000	43,000	26,000	11,000	U
1330-20-7	Xylenes, Total	950,000	92,000	28,000	12,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-150
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00586

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.65 Final Pressure (psig): 5.36

Container Dilution Factor: 1.54

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	41,000	40,000	24,000	10,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	24,000	40,000	24,000	6,700	U
74-87-3	Chloromethane	23,000	39,000	23,000	6,600	U
75-01-4	Vinyl Chloride	13,000	41,000	13,000	4,400	U
106-99-0	1,3-Butadiene	24,000	40,000	24,000	6,800	U
75-00-3	Chloroethane	24,000	39,000	24,000	5,100	U
64-17-5	Ethanol	38,000	390,000	63,000	28,000	J
67-64-1	Acetone	1,900,000	420,000	210,000	92,000	
75-69-4	Trichlorofluoromethane	25,000	41,000	25,000	6,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	140,000	160,000	48,000	17,000	J
75-09-2	Methylene Chloride	25,000	42,000	25,000	12,000	U
76-13-1	Trichlorotrifluoroethane	13,000	41,000	13,000	5,900	U
75-15-0	Carbon Disulfide	42,000	85,000	42,000	12,000	U
75-34-3	1,1-Dichloroethane	24,000	40,000	24,000	6,000	U
78-93-3	2-Butanone (MEK)	270,000	77,000	24,000	8,500	
141-78-6	Ethyl Acetate	50,000	85,000	50,000	22,000	U
110-54-3	n-Hexane	6,500,000	42,000	25,000	8,500	
67-66-3	Chloroform	13,000	42,000	13,000	5,500	U
109-99-9	Tetrahydrofuran (THF)	13,000	41,000	13,000	5,200	U
71-43-2	Benzene	1,500,000	40,000	13,000	5,900	
56-23-5	Carbon Tetrachloride	13,000	40,000	13,000	5,700	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-150
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00586

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.65 Final Pressure (psig): 5.36

Container Dilution Factor: 1.54

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	3,900,000	77,000	25,000	12,000	
75-27-4	Bromodichloromethane	13,000	41,000	13,000	5,900	U
79-01-6	Trichloroethene	13,000	41,000	13,000	5,500	U
123-91-1	1,4-Dioxane	13,000	41,000	13,000	4,900	U
142-82-5	n-Heptane	3,500,000	42,000	25,000	6,500	
108-10-1	4-Methyl-2-pentanone	13,000	41,000	13,000	5,600	U
108-88-3	Toluene	2,100,000	41,000	13,000	5,000	
591-78-6	2-Hexanone	13,000	42,000	13,000	5,100	U
124-48-1	Dibromochloromethane	13,000	42,000	13,000	5,400	U
106-93-4	1,2-Dibromoethane	13,000	42,000	13,000	4,800	U
127-18-4	Tetrachloroethene	13,000	41,000	13,000	5,300	U
100-41-4	Ethylbenzene	110,000	40,000	13,000	5,800	
179601-23-1	m,p-Xylenes	260,000	85,000	26,000	11,000	
75-25-2	Bromoform	25,000	41,000	25,000	8,500	U
100-42-5	Styrene	25,000	41,000	25,000	6,600	U
95-47-6	o-Xylene	75,000	41,000	13,000	5,900	
108-67-8	1,3,5-Trimethylbenzene	9,400	41,000	13,000	5,900	J
95-63-6	1,2,4-Trimethylbenzene	17,000	41,000	13,000	5,700	J
120-82-1	1,2,4-Trichlorobenzene	25,000	41,000	25,000	10,000	U
95-50-1	1,2-Dichlorobenzene	13,000	42,000	13,000	6,100	U
91-20-3	Naphthalene	24,000	39,000	24,000	10,000	U
1330-20-7	Xylenes, Total	330,000	85,000	26,000	11,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01006

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.13

Container Dilution Factor: 1.80

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	130,000	19,000	11,000	4,700	
75-71-8	Dichlorodifluoromethane (CFC 12)	11,000	19,000	11,000	3,100	U
74-87-3	Chloromethane	11,000	18,000	11,000	3,100	U
75-01-4	Vinyl Chloride	6,100	19,000	6,100	2,100	U
106-99-0	1,3-Butadiene	11,000	19,000	11,000	3,200	U
75-00-3	Chloroethane	11,000	18,000	11,000	2,400	U
64-17-5	Ethanol	21,000	180,000	30,000	13,000	J
67-64-1	Acetone	1,300,000	190,000	97,000	43,000	
75-69-4	Trichlorofluoromethane	12,000	19,000	12,000	2,900	U
67-63-0	2-Propanol (Isopropyl Alcohol)	85,000	76,000	22,000	7,900	
75-09-2	Methylene Chloride	12,000	19,000	12,000	5,400	U
76-13-1	Trichlorotrifluoroethane	6,100	19,000	6,100	2,700	U
75-15-0	Carbon Disulfide	19,000	40,000	19,000	5,800	U
75-34-3	1,1-Dichloroethane	11,000	19,000	11,000	2,800	U
78-93-3	2-Butanone (MEK)	370,000	36,000	11,000	4,000	
141-78-6	Ethyl Acetate	23,000	40,000	23,000	10,000	U
110-54-3	n-Hexane	2,400,000	19,000	12,000	4,000	
67-66-3	Chloroform	6,100	19,000	6,100	2,600	U
109-99-9	Tetrahydrofuran (THF)	6,100	19,000	6,100	2,400	U
71-43-2	Benzene	650,000	19,000	6,100	2,800	
56-23-5	Carbon Tetrachloride	6,100	19,000	6,100	2,700	U

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-10-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01006

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.13

Container Dilution Factor: 1.80

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	1,700,000	36,000	12,000	5,400	
75-27-4	Bromodichloromethane	6,100	19,000	6,100	2,800	U
79-01-6	Trichloroethene	6,100	19,000	6,100	2,600	U
123-91-1	1,4-Dioxane	6,100	19,000	6,100	2,300	U
142-82-5	n-Heptane	2,900,000	19,000	12,000	3,100	
108-10-1	4-Methyl-2-pentanone	33,000	19,000	6,100	2,600	
108-88-3	Toluene	2,600,000	19,000	6,100	2,300	
591-78-6	2-Hexanone	6,100	19,000	6,100	2,400	U
124-48-1	Dibromochloromethane	6,100	19,000	6,100	2,500	U
106-93-4	1,2-Dibromoethane	35,000	19,000	6,100	2,200	
127-18-4	Tetrachloroethene	6,100	19,000	6,100	2,500	U
100-41-4	Ethylbenzene	150,000	19,000	6,100	2,700	
179601-23-1	m,p-Xylenes	710,000	40,000	12,000	5,000	
75-25-2	Bromoform	12,000	19,000	12,000	4,000	U
100-42-5	Styrene	12,000	19,000	12,000	3,100	U
95-47-6	o-Xylene	180,000	19,000	6,100	2,800	
108-67-8	1,3,5-Trimethylbenzene	12,000	19,000	6,100	2,800	J
95-63-6	1,2,4-Trimethylbenzene	19,000	19,000	6,100	2,700	J
120-82-1	1,2,4-Trichlorobenzene	12,000	19,000	12,000	4,700	U
95-50-1	1,2-Dichlorobenzene	6,100	19,000	6,100	2,800	U
91-20-3	Naphthalene	11,000	18,000	11,000	4,700	U
1330-20-7	Xylenes, Total	880,000	40,000	12,000	5,000	

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00895

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000015 Liter(s)

Initial Pressure (psig): -2.21 Final Pressure (psig): 5.42

Container Dilution Factor: 1.61

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	25,000	56,000	33,000	14,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	33,000	56,000	33,000	9,300	U
74-87-3	Chloromethane	32,000	54,000	32,000	9,200	U
75-01-4	Vinyl Chloride	18,000	57,000	18,000	6,100	U
106-99-0	1,3-Butadiene	33,000	56,000	33,000	9,400	U
75-00-3	Chloroethane	33,000	55,000	33,000	7,100	U
64-17-5	Ethanol	88,000	550,000	88,000	40,000	U
67-64-1	Acetone	3,600,000	580,000	290,000	130,000	
75-69-4	Trichlorofluoromethane	34,000	57,000	34,000	8,700	U
67-63-0	2-Propanol (Isopropyl Alcohol)	120,000	230,000	67,000	24,000	J
75-09-2	Methylene Chloride	34,000	58,000	34,000	16,000	U
76-13-1	Trichlorotrifluoroethane	18,000	57,000	18,000	8,200	U
75-15-0	Carbon Disulfide	58,000	120,000	58,000	17,000	U
75-34-3	1,1-Dichloroethane	33,000	56,000	33,000	8,400	U
78-93-3	2-Butanone (MEK)	630,000	110,000	33,000	12,000	
141-78-6	Ethyl Acetate	70,000	120,000	70,000	30,000	U
110-54-3	n-Hexane	8,100,000	58,000	34,000	12,000	
67-66-3	Chloroform	18,000	58,000	18,000	7,600	U
109-99-9	Tetrahydrofuran (THF)	18,000	57,000	18,000	7,200	U
71-43-2	Benzene	2,300,000	56,000	18,000	8,300	
56-23-5	Carbon Tetrachloride	18,000	56,000	18,000	7,900	U

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-100
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00895

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000015 Liter(s)

Initial Pressure (psig): -2.21 Final Pressure (psig): 5.42

Container Dilution Factor: 1.61

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	7,000,000	110,000	35,000	16,000	
75-27-4	Bromodichloromethane	18,000	57,000	18,000	8,300	U
79-01-6	Trichloroethene	18,000	57,000	18,000	7,700	U
123-91-1	1,4-Dioxane	18,000	57,000	18,000	6,800	U
142-82-5	n-Heptane	6,600,000	58,000	34,000	9,100	
108-10-1	4-Methyl-2-pentanone	18,000	57,000	18,000	7,800	U
108-88-3	Toluene	6,200,000	57,000	18,000	7,000	
591-78-6	2-Hexanone	18,000	58,000	18,000	7,100	U
124-48-1	Dibromochloromethane	18,000	58,000	18,000	7,500	U
106-93-4	1,2-Dibromoethane	41,000	58,000	18,000	6,700	J
127-18-4	Tetrachloroethene	18,000	57,000	18,000	7,400	U
100-41-4	Ethylbenzene	250,000	56,000	18,000	8,100	
179601-23-1	m,p-Xylenes	550,000	120,000	36,000	15,000	
75-25-2	Bromoform	34,000	57,000	34,000	12,000	U
100-42-5	Styrene	34,000	57,000	34,000	9,200	U
95-47-6	o-Xylene	140,000	57,000	18,000	8,300	
108-67-8	1,3,5-Trimethylbenzene	18,000	57,000	18,000	8,300	U
95-63-6	1,2,4-Trimethylbenzene	11,000	57,000	18,000	7,900	J
120-82-1	1,2,4-Trichlorobenzene	34,000	57,000	34,000	14,000	U
95-50-1	1,2-Dichlorobenzene	18,000	58,000	18,000	8,500	U
91-20-3	Naphthalene	33,000	55,000	33,000	14,000	U
1330-20-7	Xylenes, Total	680,000	120,000	36,000	15,000	

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-005

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00187

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -2.24 Final Pressure (psig): 5.74

Container Dilution Factor: 1.64

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	41,000	17,000	10,000	4,300	
75-71-8	Dichlorodifluoromethane (CFC 12)	10,000	17,000	10,000	2,900	U
74-87-3	Chloromethane	9,800	16,000	9,800	2,800	U
75-01-4	Vinyl Chloride	5,600	17,000	5,600	1,900	U
106-99-0	1,3-Butadiene	10,000	17,000	10,000	2,900	U
75-00-3	Chloroethane	10,000	17,000	10,000	2,200	U
64-17-5	Ethanol	27,000	170,000	27,000	12,000	U
67-64-1	Acetone	1,500,000	180,000	89,000	39,000	
75-69-4	Trichlorofluoromethane	10,000	17,000	10,000	2,700	U
67-63-0	2-Propanol (Isopropyl Alcohol)	29,000	69,000	20,000	7,200	J
75-09-2	Methylene Chloride	10,000	18,000	10,000	4,900	U
76-13-1	Trichlorotrifluoroethane	5,600	17,000	5,600	2,500	U
75-15-0	Carbon Disulfide	18,000	36,000	18,000	5,200	U
75-34-3	1,1-Dichloroethane	10,000	17,000	10,000	2,600	U
78-93-3	2-Butanone (MEK)	360,000	33,000	10,000	3,600	
141-78-6	Ethyl Acetate	21,000	36,000	21,000	9,200	U
110-54-3	n-Hexane	730,000	18,000	10,000	3,600	
67-66-3	Chloroform	5,600	18,000	5,600	2,300	U
109-99-9	Tetrahydrofuran (THF)	5,600	17,000	5,600	2,200	U
71-43-2	Benzene	320,000	17,000	5,600	2,500	
56-23-5	Carbon Tetrachloride	5,600	17,000	5,600	2,400	U

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVMW-11-250
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-005

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00187

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -2.24 Final Pressure (psig): 5.74

Container Dilution Factor: 1.64

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	1,100,000	33,000	11,000	4,900	
75-27-4	Bromodichloromethane	5,600	17,000	5,600	2,500	U
79-01-6	Trichloroethene	5,600	17,000	5,600	2,400	U
123-91-1	1,4-Dioxane	5,600	17,000	5,600	2,100	U
142-82-5	n-Heptane	3,400,000	18,000	10,000	2,800	
108-10-1	4-Methyl-2-pentanone	5,600	17,000	5,600	2,400	U
108-88-3	Toluene	1,900,000	17,000	5,600	2,100	
591-78-6	2-Hexanone	5,600	18,000	5,600	2,200	U
124-48-1	Dibromochloromethane	5,600	18,000	5,600	2,300	U
106-93-4	1,2-Dibromoethane	5,600	18,000	5,600	2,000	U
127-18-4	Tetrachloroethene	5,600	17,000	5,600	2,300	U
100-41-4	Ethylbenzene	59,000	17,000	5,600	2,500	
179601-23-1	m,p-Xylenes	200,000	36,000	11,000	4,600	
75-25-2	Bromoform	10,000	17,000	10,000	3,600	U
100-42-5	Styrene	10,000	17,000	10,000	2,800	U
95-47-6	o-Xylene	46,000	17,000	5,600	2,500	
108-67-8	1,3,5-Trimethylbenzene	3,000	17,000	5,600	2,500	J
95-63-6	1,2,4-Trimethylbenzene	4,900	17,000	5,600	2,400	J
120-82-1	1,2,4-Trichlorobenzene	10,000	17,000	10,000	4,300	U
95-50-1	1,2-Dichlorobenzene	5,600	18,000	5,600	2,600	U
91-20-3	Naphthalene	10,000	17,000	10,000	4,300	U
1330-20-7	Xylenes, Total	240,000	36,000	11,000	4,600	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
 J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-04/05-313
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-006

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00911

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 4/30/19
Volume(s) Analyzed: 0.0020 Liter(s)
0.00050 Liter(s)

Initial Pressure (psig): -3.16 Final Pressure (psig): 5.16

Container Dilution Factor: 1.72

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	3,000	450	270	110	
75-71-8	Dichlorodifluoromethane (CFC 12)	270	450	270	75	U
74-87-3	Chloromethane	260	430	260	74	U
75-01-4	Vinyl Chloride	150	460	150	49	U
106-99-0	1,3-Butadiene	270	450	270	76	U
75-00-3	Chloroethane	270	440	270	57	U
64-17-5	Ethanol	710	4,400	710	320	U
67-64-1	Acetone	2,300	4,600	2,300	1,000	U
75-69-4	Trichlorofluoromethane	280	460	280	70	U
67-63-0	2-Propanol (Isopropyl Alcohol)	530	1,800	530	190	U
75-09-2	Methylene Chloride	280	460	280	130	U
76-13-1	Trichlorotrifluoroethane	260	460	150	65	J
75-15-0	Carbon Disulfide	460	950	460	140	U
75-34-3	1,1-Dichloroethane	270	450	270	67	U
78-93-3	2-Butanone (MEK)	280	860	270	95	J
141-78-6	Ethyl Acetate	560	950	560	240	U
110-54-3	n-Hexane	91,000	1,900	1,100	380	D
67-66-3	Chloroform	150	460	150	61	U
109-99-9	Tetrahydrofuran (THF)	150	460	150	58	U
71-43-2	Benzene	24,000	450	150	66	
56-23-5	Carbon Tetrachloride	150	450	150	64	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-04/05-313
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-006

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00911

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.0020 Liter(s)
 0.00050 Liter(s)

Initial Pressure (psig): -3.16 Final Pressure (psig): 5.16

Container Dilution Factor: 1.72

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	170,000	3,400	1,100	520	D
75-27-4	Bromodichloromethane	150	460	150	66	U
79-01-6	Trichloroethene	150	460	150	62	U
123-91-1	1,4-Dioxane	150	460	150	54	U
142-82-5	n-Heptane	90,000	1,900	1,100	290	D
108-10-1	4-Methyl-2-pentanone	150	460	150	63	U
108-88-3	Toluene	27,000	460	150	56	
591-78-6	2-Hexanone	150	460	150	57	U
124-48-1	Dibromochloromethane	150	460	150	60	U
106-93-4	1,2-Dibromoethane	150	460	150	53	U
127-18-4	Tetrachloroethene	150	460	150	59	U
100-41-4	Ethylbenzene	2,100	450	150	65	
179601-23-1	m,p-Xylenes	9,200	950	290	120	
75-25-2	Bromoform	280	460	280	95	U
100-42-5	Styrene	280	460	280	74	U
95-47-6	o-Xylene	2,800	460	150	66	
108-67-8	1,3,5-Trimethylbenzene	1,100	460	150	66	
95-63-6	1,2,4-Trimethylbenzene	1,300	460	150	64	
120-82-1	1,2,4-Trichlorobenzene	280	460	280	110	U
95-50-1	1,2-Dichlorobenzene	150	460	150	68	U
91-20-3	Naphthalene	270	440	270	110	U
1330-20-7	Xylenes, Total	12,000	950	290	120	

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 102.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-007

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00737

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.19

Container Dilution Factor: 1.69

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	40,000	44,000	26,000	11,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	26,000	44,000	26,000	7,400	U
74-87-3	Chloromethane	25,000	42,000	25,000	7,300	U
75-01-4	Vinyl Chloride	14,000	45,000	14,000	4,800	U
106-99-0	1,3-Butadiene	26,000	44,000	26,000	7,400	U
75-00-3	Chloroethane	26,000	43,000	26,000	5,600	U
64-17-5	Ethanol	140,000	430,000	69,000	31,000	J
67-64-1	Acetone	4,000,000	460,000	230,000	100,000	U
75-69-4	Trichlorofluoromethane	27,000	45,000	27,000	6,800	U
67-63-0	2-Propanol (Isopropyl Alcohol)	260,000	180,000	52,000	19,000	U
75-09-2	Methylene Chloride	27,000	46,000	27,000	13,000	U
76-13-1	Trichlorotrifluoroethane	14,000	45,000	14,000	6,400	U
75-15-0	Carbon Disulfide	46,000	93,000	46,000	14,000	U
75-34-3	1,1-Dichloroethane	26,000	44,000	26,000	6,600	U
78-93-3	2-Butanone (MEK)	630,000	85,000	26,000	9,300	U
141-78-6	Ethyl Acetate	55,000	93,000	55,000	24,000	U
110-54-3	n-Hexane	7,400,000	46,000	27,000	9,300	U
67-66-3	Chloroform	14,000	46,000	14,000	6,000	U
109-99-9	Tetrahydrofuran (THF)	14,000	45,000	14,000	5,700	U
71-43-2	Benzene	1,700,000	44,000	14,000	6,500	U
56-23-5	Carbon Tetrachloride	14,000	44,000	14,000	6,300	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 102.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-007

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00737

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.19

Container Dilution Factor: 1.69

CAS #	Compound	Result μg/m ³	LOQ μg/m ³	LOD μg/m ³	MDL μg/m ³	Data Qualifier
110-82-7	Cyclohexane	3,900,000	85,000	28,000	13,000	
75-27-4	Bromodichloromethane	14,000	45,000	14,000	6,500	U
79-01-6	Trichloroethene	14,000	45,000	14,000	6,100	U
123-91-1	1,4-Dioxane	14,000	45,000	14,000	5,300	U
142-82-5	n-Heptane	2,500,000	46,000	27,000	7,200	
108-10-1	4-Methyl-2-pentanone	14,000	45,000	14,000	6,200	U
108-88-3	Toluene	1,500,000	45,000	14,000	5,500	
591-78-6	2-Hexanone	14,000	46,000	14,000	5,600	U
124-48-1	Dibromochloromethane	14,000	46,000	14,000	5,900	U
106-93-4	1,2-Dibromoethane	14,000	46,000	14,000	5,200	U
127-18-4	Tetrachloroethene	14,000	45,000	14,000	5,800	U
100-41-4	Ethylbenzene	150,000	44,000	14,000	6,300	
179601-23-1	m,p-Xylenes	230,000	93,000	29,000	12,000	
75-25-2	Bromoform	27,000	45,000	27,000	9,300	U
100-42-5	Styrene	27,000	45,000	27,000	7,300	U
95-47-6	o-Xylene	73,000	45,000	14,000	6,500	
108-67-8	1,3,5-Trimethylbenzene	18,000	45,000	14,000	6,500	J
95-63-6	1,2,4-Trimethylbenzene	54,000	45,000	14,000	6,300	
120-82-1	1,2,4-Trichlorobenzene	27,000	45,000	27,000	11,000	U
95-50-1	1,2-Dichlorobenzene	14,000	46,000	14,000	6,700	U
91-20-3	Naphthalene	26,000	43,000	26,000	11,000	U
1330-20-7	Xylenes, Total	300,000	93,000	29,000	12,000	

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 J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 112.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-008

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00929

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.09 Final Pressure (psig): 5.25

Container Dilution Factor: 2.08

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	40,000	43,000	26,000	11,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	26,000	43,000	26,000	7,200	U
74-87-3	Chloromethane	25,000	42,000	25,000	7,200	U
75-01-4	Vinyl Chloride	14,000	44,000	14,000	4,700	U
106-99-0	1,3-Butadiene	26,000	43,000	26,000	7,300	U
75-00-3	Chloroethane	26,000	42,000	26,000	5,500	U
64-17-5	Ethanol	140,000	420,000	68,000	31,000	J
67-64-1	Acetone	2,300,000	450,000	220,000	100,000	
75-69-4	Trichlorofluoromethane	27,000	44,000	27,000	6,700	U
67-63-0	2-Propanol (Isopropyl Alcohol)	130,000	170,000	52,000	18,000	J
75-09-2	Methylene Chloride	27,000	45,000	27,000	12,000	U
76-13-1	Trichlorotrifluoroethane	14,000	44,000	14,000	6,300	U
75-15-0	Carbon Disulfide	45,000	92,000	45,000	13,000	U
75-34-3	1,1-Dichloroethane	26,000	43,000	26,000	6,500	U
78-93-3	2-Butanone (MEK)	330,000	83,000	26,000	9,200	
141-78-6	Ethyl Acetate	54,000	92,000	54,000	23,000	U
110-54-3	n-Hexane	7,100,000	45,000	27,000	9,200	
67-66-3	Chloroform	14,000	45,000	14,000	5,900	U
109-99-9	Tetrahydrofuran (THF)	14,000	44,000	14,000	5,600	U
71-43-2	Benzene	1,500,000	43,000	14,000	6,400	
56-23-5	Carbon Tetrachloride	14,000	43,000	14,000	6,200	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 112.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-008

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00929

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.09 Final Pressure (psig): 5.25

Container Dilution Factor: 2.08

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	3,600,000	83,000	27,000	12,000	
75-27-4	Bromodichloromethane	14,000	44,000	14,000	6,400	U
79-01-6	Trichloroethene	14,000	44,000	14,000	6,000	U
123-91-1	1,4-Dioxane	14,000	44,000	14,000	5,200	U
142-82-5	n-Heptane	2,400,000	45,000	27,000	7,100	
108-10-1	4-Methyl-2-pentanone	14,000	44,000	14,000	6,100	U
108-88-3	Toluene	1,300,000	44,000	14,000	5,400	
591-78-6	2-Hexanone	14,000	45,000	14,000	5,500	U
124-48-1	Dibromochloromethane	14,000	45,000	14,000	5,800	U
106-93-4	1,2-Dibromoethane	14,000	45,000	14,000	5,200	U
127-18-4	Tetrachloroethene	14,000	44,000	14,000	5,700	U
100-41-4	Ethylbenzene	110,000	43,000	14,000	6,200	
179601-23-1	m,p-Xylenes	170,000	92,000	28,000	12,000	
75-25-2	Bromoform	27,000	44,000	27,000	9,200	U
100-42-5	Styrene	27,000	44,000	27,000	7,200	U
95-47-6	o-Xylene	50,000	44,000	14,000	6,400	
108-67-8	1,3,5-Trimethylbenzene	9,200	44,000	14,000	6,400	J
95-63-6	1,2,4-Trimethylbenzene	24,000	44,000	14,000	6,200	J
120-82-1	1,2,4-Trichlorobenzene	27,000	44,000	27,000	11,000	U
95-50-1	1,2-Dichlorobenzene	14,000	45,000	14,000	6,600	U
91-20-3	Naphthalene	26,000	42,000	26,000	11,000	U
1330-20-7	Xylenes, Total	220,000	92,000	28,000	12,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-009

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00131

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.24

Container Dilution Factor: 1.83

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	40,000	32,000	19,000	7,900	
75-71-8	Dichlorodifluoromethane (CFC 12)	19,000	32,000	19,000	5,300	U
74-87-3	Chloromethane	18,000	31,000	18,000	5,200	U
75-01-4	Vinyl Chloride	10,000	32,000	10,000	3,500	U
106-99-0	1,3-Butadiene	19,000	32,000	19,000	5,400	U
75-00-3	Chloroethane	19,000	31,000	19,000	4,000	U
64-17-5	Ethanol	110,000	310,000	50,000	23,000	J
67-64-1	Acetone	2,900,000	330,000	160,000	73,000	
75-69-4	Trichlorofluoromethane	20,000	32,000	20,000	4,900	U
67-63-0	2-Propanol (Isopropyl Alcohol)	470,000	130,000	38,000	13,000	
75-09-2	Methylene Chloride	20,000	33,000	20,000	9,200	U
76-13-1	Trichlorotrifluoroethane	10,000	32,000	10,000	4,600	U
75-15-0	Carbon Disulfide	33,000	67,000	33,000	9,800	U
75-34-3	1,1-Dichloroethane	19,000	32,000	19,000	4,800	U
78-93-3	2-Butanone (MEK)	180,000	61,000	19,000	6,700	
141-78-6	Ethyl Acetate	40,000	67,000	40,000	17,000	U
110-54-3	n-Hexane	6,000,000	33,000	20,000	6,700	
67-66-3	Chloroform	10,000	33,000	10,000	4,300	U
109-99-9	Tetrahydrofuran (THF)	10,000	32,000	10,000	4,100	U
71-43-2	Benzene	1,400,000	32,000	10,000	4,700	
56-23-5	Carbon Tetrachloride	10,000	32,000	10,000	4,500	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-009

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00131

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.24

Container Dilution Factor: 1.83

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	3,600,000	61,000	20,000	9,200	
75-27-4	Bromodichloromethane	10,000	32,000	10,000	4,700	U
79-01-6	Trichloroethene	10,000	32,000	10,000	4,400	U
123-91-1	1,4-Dioxane	10,000	32,000	10,000	3,800	U
142-82-5	n-Heptane	3,900,000	33,000	20,000	5,200	
108-10-1	4-Methyl-2-pentanone	10,000	32,000	10,000	4,500	U
108-88-3	Toluene	2,300,000	32,000	10,000	4,000	
591-78-6	2-Hexanone	10,000	33,000	10,000	4,000	U
124-48-1	Dibromochloromethane	10,000	33,000	10,000	4,300	U
106-93-4	1,2-Dibromoethane	10,000	33,000	10,000	3,800	U
127-18-4	Tetrachloroethene	10,000	32,000	10,000	4,200	U
100-41-4	Ethylbenzene	250,000	32,000	10,000	4,600	
179601-23-1	m,p-Xylenes	590,000	67,000	21,000	8,500	
75-25-2	Bromoform	20,000	32,000	20,000	6,700	U
100-42-5	Styrene	20,000	32,000	20,000	5,200	U
95-47-6	o-Xylene	170,000	32,000	10,000	4,700	
108-67-8	1,3,5-Trimethylbenzene	27,000	32,000	10,000	4,700	J
95-63-6	1,2,4-Trimethylbenzene	69,000	32,000	10,000	4,500	
120-82-1	1,2,4-Trichlorobenzene	20,000	32,000	20,000	7,900	U
95-50-1	1,2-Dichlorobenzene	10,000	33,000	10,000	4,800	U
91-20-3	Naphthalene	19,000	31,000	19,000	7,900	U
1330-20-7	Xylenes, Total	760,000	67,000	21,000	8,500	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 217.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-010

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00955

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.65 Final Pressure (psig): 5.48

Container Dilution Factor: 1.67

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	68,000	43,000	26,000	11,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	26,000	43,000	26,000	7,300	U
74-87-3	Chloromethane	25,000	42,000	25,000	7,200	U
75-01-4	Vinyl Chloride	14,000	44,000	14,000	4,800	U
106-99-0	1,3-Butadiene	26,000	43,000	26,000	7,300	U
75-00-3	Chloroethane	26,000	43,000	26,000	5,500	U
64-17-5	Ethanol	68,000	430,000	68,000	31,000	U
67-64-1	Acetone	4,700,000	450,000	230,000	100,000	
75-69-4	Trichlorofluoromethane	27,000	44,000	27,000	6,800	U
67-63-0	2-Propanol (Isopropyl Alcohol)	75,000	180,000	52,000	18,000	J
75-09-2	Methylene Chloride	27,000	45,000	27,000	13,000	U
76-13-1	Trichlorotrifluoroethane	14,000	44,000	14,000	6,300	U
75-15-0	Carbon Disulfide	45,000	92,000	45,000	13,000	U
75-34-3	1,1-Dichloroethane	26,000	43,000	26,000	6,500	U
78-93-3	2-Butanone (MEK)	420,000	84,000	26,000	9,200	
141-78-6	Ethyl Acetate	54,000	92,000	54,000	23,000	U
110-54-3	n-Hexane	6,900,000	45,000	27,000	9,200	
67-66-3	Chloroform	14,000	45,000	14,000	5,900	U
109-99-9	Tetrahydrofuran (THF)	14,000	44,000	14,000	5,600	U
71-43-2	Benzene	1,500,000	43,000	14,000	6,400	
56-23-5	Carbon Tetrachloride	14,000	43,000	14,000	6,200	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 217.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-010

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00955

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -2.65 Final Pressure (psig): 5.48

Container Dilution Factor: 1.67

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	4,500,000	84,000	28,000	13,000	
75-27-4	Bromodichloromethane	14,000	44,000	14,000	6,400	U
79-01-6	Trichloroethene	14,000	44,000	14,000	6,000	U
123-91-1	1,4-Dioxane	14,000	44,000	14,000	5,300	U
142-82-5	n-Heptane	5,200,000	45,000	27,000	7,100	
108-10-1	4-Methyl-2-pentanone	14,000	44,000	14,000	6,100	U
108-88-3	Toluene	2,500,000	44,000	14,000	5,400	
591-78-6	2-Hexanone	14,000	45,000	14,000	5,500	U
124-48-1	Dibromochloromethane	14,000	45,000	14,000	5,800	U
106-93-4	1,2-Dibromoethane	14,000	45,000	14,000	5,200	U
127-18-4	Tetrachloroethene	14,000	44,000	14,000	5,800	U
100-41-4	Ethylbenzene	200,000	43,000	14,000	6,300	
179601-23-1	m,p-Xylenes	560,000	92,000	28,000	12,000	
75-25-2	Bromoform	27,000	44,000	27,000	9,200	U
100-42-5	Styrene	27,000	44,000	27,000	7,200	U
95-47-6	o-Xylene	150,000	44,000	14,000	6,400	
108-67-8	1,3,5-Trimethylbenzene	17,000	44,000	14,000	6,400	J
95-63-6	1,2,4-Trimethylbenzene	30,000	44,000	14,000	6,200	J
120-82-1	1,2,4-Trichlorobenzene	27,000	44,000	27,000	11,000	U
95-50-1	1,2-Dichlorobenzene	14,000	45,000	14,000	6,600	U
91-20-3	Naphthalene	26,000	43,000	26,000	11,000	U
1330-20-7	Xylenes, Total	710,000	92,000	28,000	12,000	

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 252.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-011

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01159

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.00 Final Pressure (psig): 5.33

Container Dilution Factor: 2.06

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	120,000	43,000	26,000	11,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	26,000	43,000	26,000	7,200	U
74-87-3	Chloromethane	25,000	41,000	25,000	7,100	U
75-01-4	Vinyl Chloride	14,000	44,000	14,000	4,700	U
106-99-0	1,3-Butadiene	26,000	43,000	26,000	7,300	U
75-00-3	Chloroethane	26,000	42,000	26,000	5,400	U
64-17-5	Ethanol	68,000	420,000	68,000	30,000	U
67-64-1	Acetone	1,200,000	440,000	220,000	99,000	
75-69-4	Trichlorofluoromethane	26,000	44,000	26,000	6,700	U
67-63-0	2-Propanol (Isopropyl Alcohol)	30,000	170,000	51,000	18,000	J
75-09-2	Methylene Chloride	26,000	44,000	26,000	12,000	U
76-13-1	Trichlorotrifluoroethane	14,000	44,000	14,000	6,300	U
75-15-0	Carbon Disulfide	44,000	91,000	44,000	13,000	U
75-34-3	1,1-Dichloroethane	26,000	43,000	26,000	6,400	U
78-93-3	2-Butanone (MEK)	270,000	82,000	26,000	9,100	
141-78-6	Ethyl Acetate	54,000	91,000	54,000	23,000	U
110-54-3	n-Hexane	4,100,000	44,000	26,000	9,100	
67-66-3	Chloroform	14,000	44,000	14,000	5,900	U
109-99-9	Tetrahydrofuran (THF)	14,000	44,000	14,000	5,500	U
71-43-2	Benzene	920,000	43,000	14,000	6,300	
56-23-5	Carbon Tetrachloride	14,000	43,000	14,000	6,100	U

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 252.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-011

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01159

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -5.00 Final Pressure (psig): 5.33

Container Dilution Factor: 2.06

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	3,200,000	82,000	27,000	12,000	
75-27-4	Bromodichloromethane	14,000	44,000	14,000	6,300	U
79-01-6	Trichloroethene	14,000	44,000	14,000	5,900	U
123-91-1	1,4-Dioxane	14,000	44,000	14,000	5,200	U
142-82-5	n-Heptane	7,200,000	44,000	26,000	7,000	
108-10-1	4-Methyl-2-pentanone	14,000	44,000	14,000	6,000	U
108-88-3	Toluene	4,500,000	44,000	14,000	5,400	
591-78-6	2-Hexanone	14,000	44,000	14,000	5,400	U
124-48-1	Dibromochloromethane	14,000	44,000	14,000	5,800	U
106-93-4	1,2-Dibromoethane	13,000	44,000	14,000	5,100	J
127-18-4	Tetrachloroethene	14,000	44,000	14,000	5,700	U
100-41-4	Ethylbenzene	360,000	43,000	14,000	6,200	
179601-23-1	m,p-Xylenes	1,100,000	91,000	28,000	12,000	
75-25-2	Bromoform	26,000	44,000	26,000	9,100	U
100-42-5	Styrene	26,000	44,000	26,000	7,100	U
95-47-6	o-Xylene	290,000	44,000	14,000	6,300	
108-67-8	1,3,5-Trimethylbenzene	25,000	44,000	14,000	6,300	J
95-63-6	1,2,4-Trimethylbenzene	49,000	44,000	14,000	6,100	
120-82-1	1,2,4-Trichlorobenzene	26,000	44,000	26,000	11,000	U
95-50-1	1,2-Dichlorobenzene	14,000	44,000	14,000	6,500	U
91-20-3	Naphthalene	26,000	42,000	26,000	11,000	U
1330-20-7	Xylenes, Total	1,400,000	91,000	28,000	12,000	

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J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 262.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-012

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00474

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -3.65 Final Pressure (psig): 5.24

Container Dilution Factor: 1.80

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	110,000	47,000	28,000	12,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	28,000	47,000	28,000	7,800	U
74-87-3	Chloromethane	27,000	45,000	27,000	7,700	U
75-01-4	Vinyl Chloride	15,000	48,000	15,000	5,100	U
106-99-0	1,3-Butadiene	28,000	47,000	28,000	7,900	U
75-00-3	Chloroethane	28,000	46,000	28,000	5,900	U
64-17-5	Ethanol	74,000	460,000	74,000	33,000	U
67-64-1	Acetone	1,700,000	490,000	240,000	110,000	
75-69-4	Trichlorofluoromethane	29,000	48,000	29,000	7,300	U
67-63-0	2-Propanol (Isopropyl Alcohol)	49,000	190,000	56,000	20,000	J
75-09-2	Methylene Chloride	29,000	49,000	29,000	14,000	U
76-13-1	Trichlorotrifluoroethane	15,000	48,000	15,000	6,800	U
75-15-0	Carbon Disulfide	49,000	99,000	49,000	14,000	U
75-34-3	1,1-Dichloroethane	28,000	47,000	28,000	7,000	U
78-93-3	2-Butanone (MEK)	430,000	90,000	28,000	9,900	
141-78-6	Ethyl Acetate	59,000	99,000	59,000	25,000	U
110-54-3	n-Hexane	3,000,000	49,000	29,000	9,900	
67-66-3	Chloroform	15,000	49,000	15,000	6,400	U
109-99-9	Tetrahydrofuran (THF)	15,000	48,000	15,000	6,000	U
71-43-2	Benzene	820,000	47,000	15,000	6,900	
56-23-5	Carbon Tetrachloride	15,000	47,000	15,000	6,700	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V1 262.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-012

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00474

Date Collected: 4/10/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -3.65 Final Pressure (psig): 5.24

Container Dilution Factor: 1.80

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	2,600,000	90,000	30,000	14,000	
75-27-4	Bromodichloromethane	15,000	48,000	15,000	6,900	U
79-01-6	Trichloroethene	15,000	48,000	15,000	6,500	U
123-91-1	1,4-Dioxane	15,000	48,000	15,000	5,700	U
142-82-5	n-Heptane	6,900,000	49,000	29,000	7,700	
108-10-1	4-Methyl-2-pentanone	15,000	48,000	15,000	6,600	U
108-88-3	Toluene	4,300,000	48,000	15,000	5,900	
591-78-6	2-Hexanone	15,000	49,000	15,000	5,900	U
124-48-1	Dibromochloromethane	15,000	49,000	15,000	6,300	U
106-93-4	1,2-Dibromoethane	14,000	49,000	15,000	5,600	J
127-18-4	Tetrachloroethene	15,000	48,000	15,000	6,200	U
100-41-4	Ethylbenzene	280,000	47,000	15,000	6,800	
179601-23-1	m,p-Xylenes	760,000	99,000	31,000	13,000	
75-25-2	Bromoform	29,000	48,000	29,000	9,900	U
100-42-5	Styrene	29,000	48,000	29,000	7,700	U
95-47-6	o-Xylene	190,000	48,000	15,000	6,900	
108-67-8	1,3,5-Trimethylbenzene	16,000	48,000	15,000	6,900	J
95-63-6	1,2,4-Trimethylbenzene	37,000	48,000	15,000	6,700	J
120-82-1	1,2,4-Trichlorobenzene	29,000	48,000	29,000	12,000	U
95-50-1	1,2-Dichlorobenzene	15,000	49,000	15,000	7,100	U
91-20-3	Naphthalene	28,000	46,000	28,000	12,000	U
1330-20-7	Xylenes, Total	940,000	99,000	31,000	13,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 102.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-013

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00239

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.95 Final Pressure (psig): 5.25

Container Dilution Factor: 1.56

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	36,000	41,000	24,000	10,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	24,000	41,000	24,000	6,800	U
74-87-3	Chloromethane	23,000	39,000	23,000	6,700	U
75-01-4	Vinyl Chloride	13,000	41,000	13,000	4,400	U
106-99-0	1,3-Butadiene	24,000	41,000	24,000	6,900	U
75-00-3	Chloroethane	24,000	40,000	24,000	5,100	U
64-17-5	Ethanol	38,000	400,000	64,000	29,000	J
67-64-1	Acetone	3,700,000	420,000	210,000	94,000	
75-69-4	Trichlorofluoromethane	25,000	41,000	25,000	6,300	U
67-63-0	2-Propanol (Isopropyl Alcohol)	48,000	160,000	48,000	17,000	U
75-09-2	Methylene Chloride	25,000	42,000	25,000	12,000	U
76-13-1	Trichlorotrifluoroethane	13,000	41,000	13,000	5,900	U
75-15-0	Carbon Disulfide	42,000	86,000	42,000	12,000	U
75-34-3	1,1-Dichloroethane	24,000	41,000	24,000	6,100	U
78-93-3	2-Butanone (MEK)	560,000	78,000	24,000	8,600	
141-78-6	Ethyl Acetate	51,000	86,000	51,000	22,000	U
110-54-3	n-Hexane	7,500,000	42,000	25,000	8,600	
67-66-3	Chloroform	13,000	42,000	13,000	5,500	U
109-99-9	Tetrahydrofuran (THF)	13,000	41,000	13,000	5,200	U
71-43-2	Benzene	1,800,000	41,000	13,000	6,000	
56-23-5	Carbon Tetrachloride	13,000	41,000	13,000	5,800	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 102.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-013

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00239

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000020 Liter(s)

Initial Pressure (psig): -1.95 Final Pressure (psig): 5.25

Container Dilution Factor: 1.56

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	5,200,000	78,000	26,000	12,000	
75-27-4	Bromodichloromethane	13,000	41,000	13,000	6,000	U
79-01-6	Trichloroethene	13,000	41,000	13,000	5,600	U
123-91-1	1,4-Dioxane	13,000	41,000	13,000	4,900	U
142-82-5	n-Heptane	5,800,000	42,000	25,000	6,600	
108-10-1	4-Methyl-2-pentanone	13,000	41,000	13,000	5,700	U
108-88-3	Toluene	3,600,000	41,000	13,000	5,100	
591-78-6	2-Hexanone	13,000	42,000	13,000	5,100	U
124-48-1	Dibromochloromethane	13,000	42,000	13,000	5,500	U
106-93-4	1,2-Dibromoethane	13,000	42,000	13,000	4,800	U
127-18-4	Tetrachloroethene	13,000	41,000	13,000	5,400	U
100-41-4	Ethylbenzene	200,000	41,000	13,000	5,900	
179601-23-1	m,p-Xylenes	500,000	86,000	27,000	11,000	
75-25-2	Bromoform	25,000	41,000	25,000	8,600	U
100-42-5	Styrene	25,000	41,000	25,000	6,700	U
95-47-6	o-Xylene	130,000	41,000	13,000	6,000	
108-67-8	1,3,5-Trimethylbenzene	9,200	41,000	13,000	6,000	J
95-63-6	1,2,4-Trimethylbenzene	17,000	41,000	13,000	5,800	J
120-82-1	1,2,4-Trichlorobenzene	25,000	41,000	25,000	10,000	U
95-50-1	1,2-Dichlorobenzene	13,000	42,000	13,000	6,200	U
91-20-3	Naphthalene	24,000	40,000	24,000	10,000	U
1330-20-7	Xylenes, Total	620,000	86,000	27,000	11,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
 J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 117.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-014

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00874

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -4.92 Final Pressure (psig): 5.27

Container Dilution Factor: 2.04

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	32,000	35,000	21,000	8,800	J
75-71-8	Dichlorodifluoromethane (CFC 12)	21,000	35,000	21,000	5,900	U
74-87-3	Chloromethane	20,000	34,000	20,000	5,800	U
75-01-4	Vinyl Chloride	12,000	36,000	12,000	3,900	U
106-99-0	1,3-Butadiene	21,000	35,000	21,000	6,000	U
75-00-3	Chloroethane	21,000	35,000	21,000	4,500	U
64-17-5	Ethanol	56,000	350,000	56,000	25,000	U
67-64-1	Acetone	1,200,000	370,000	180,000	82,000	
75-69-4	Trichlorofluoromethane	22,000	36,000	22,000	5,500	U
67-63-0	2-Propanol (Isopropyl Alcohol)	65,000	140,000	42,000	15,000	J
75-09-2	Methylene Chloride	22,000	37,000	22,000	10,000	U
76-13-1	Trichlorotrifluoroethane	12,000	36,000	12,000	5,200	U
75-15-0	Carbon Disulfide	37,000	75,000	37,000	11,000	U
75-34-3	1,1-Dichloroethane	21,000	35,000	21,000	5,300	U
78-93-3	2-Butanone (MEK)	250,000	68,000	21,000	7,500	
141-78-6	Ethyl Acetate	44,000	75,000	44,000	19,000	U
110-54-3	n-Hexane	7,000,000	37,000	22,000	7,500	
67-66-3	Chloroform	12,000	37,000	12,000	4,800	U
109-99-9	Tetrahydrofuran (THF)	12,000	36,000	12,000	4,600	U
71-43-2	Benzene	1,700,000	35,000	12,000	5,200	
56-23-5	Carbon Tetrachloride	12,000	35,000	12,000	5,000	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

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RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 117.1
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-014

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00874

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000030 Liter(s)

Initial Pressure (psig): -4.92 Final Pressure (psig): 5.27

Container Dilution Factor: 2.04

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	4,800,000	68,000	22,000	10,000	
75-27-4	Bromodichloromethane	12,000	36,000	12,000	5,200	U
79-01-6	Trichloroethene	12,000	36,000	12,000	4,900	U
123-91-1	1,4-Dioxane	12,000	36,000	12,000	4,300	U
142-82-5	n-Heptane	5,000,000	37,000	22,000	5,800	
108-10-1	4-Methyl-2-pentanone	12,000	36,000	12,000	5,000	U
108-88-3	Toluene	3,100,000	36,000	12,000	4,400	
591-78-6	2-Hexanone	12,000	37,000	12,000	4,500	U
124-48-1	Dibromochloromethane	12,000	37,000	12,000	4,800	U
106-93-4	1,2-Dibromoethane	6,100	37,000	12,000	4,200	J
127-18-4	Tetrachloroethene	12,000	36,000	12,000	4,700	U
100-41-4	Ethylbenzene	370,000	35,000	12,000	5,100	
179601-23-1	m,p-Xylenes	1,100,000	75,000	23,000	9,500	
75-25-2	Bromoform	22,000	36,000	22,000	7,500	U
100-42-5	Styrene	22,000	36,000	22,000	5,800	U
95-47-6	o-Xylene	290,000	36,000	12,000	5,200	
108-67-8	1,3,5-Trimethylbenzene	6,500	36,000	12,000	5,200	J
95-63-6	1,2,4-Trimethylbenzene	9,200	36,000	12,000	5,000	J
120-82-1	1,2,4-Trichlorobenzene	22,000	36,000	22,000	8,800	U
95-50-1	1,2-Dichlorobenzene	6,100	37,000	12,000	5,400	J
91-20-3	Naphthalene	21,000	35,000	21,000	8,800	U
1330-20-7	Xylenes, Total	1,400,000	75,000	23,000	9,500	

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
ALS Sample ID: P1902156-015

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00674

Date Collected: 4/11/19
Date Received: 4/17/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000065 Liter(s)

Initial Pressure (psig): -3.31 Final Pressure (psig): 5.28

Container Dilution Factor: 1.75

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	26,000	14,000	8,300	3,500	
75-71-8	Dichlorodifluoromethane (CFC 12)	8,300	14,000	8,300	2,300	U
74-87-3	Chloromethane	8,100	13,000	8,100	2,300	U
75-01-4	Vinyl Chloride	4,600	14,000	4,600	1,500	U
106-99-0	1,3-Butadiene	8,300	14,000	8,300	2,400	U
75-00-3	Chloroethane	8,300	14,000	8,300	1,800	U
64-17-5	Ethanol	22,000	140,000	22,000	10,000	U
67-64-1	Acetone	540,000	150,000	73,000	32,000	
75-69-4	Trichlorofluoromethane	8,600	14,000	8,600	2,200	U
67-63-0	2-Propanol (Isopropyl Alcohol)	12,000	57,000	17,000	5,900	J
75-09-2	Methylene Chloride	8,600	15,000	8,600	4,000	U
76-13-1	Trichlorotrifluoroethane	4,600	14,000	4,600	2,000	U
75-15-0	Carbon Disulfide	15,000	30,000	15,000	4,300	U
75-34-3	1,1-Dichloroethane	8,300	14,000	8,300	2,100	U
78-93-3	2-Butanone (MEK)	53,000	27,000	8,300	3,000	
141-78-6	Ethyl Acetate	18,000	30,000	18,000	7,500	U
110-54-3	n-Hexane	2,200,000	15,000	8,600	3,000	
67-66-3	Chloroform	4,600	15,000	4,600	1,900	U
109-99-9	Tetrahydrofuran (THF)	4,600	14,000	4,600	1,800	U
71-43-2	Benzene	530,000	14,000	4,600	2,100	
56-23-5	Carbon Tetrachloride	4,600	14,000	4,600	2,000	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 159.6
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-015

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00674

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000065 Liter(s)

Initial Pressure (psig): -3.31 Final Pressure (psig): 5.28

Container Dilution Factor: 1.75

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	1,400,000	27,000	8,900	4,000	
75-27-4	Bromodichloromethane	4,600	14,000	4,600	2,100	U
79-01-6	Trichloroethene	4,600	14,000	4,600	1,900	U
123-91-1	1,4-Dioxane	4,600	14,000	4,600	1,700	U
142-82-5	n-Heptane	1,600,000	15,000	8,600	2,300	
108-10-1	4-Methyl-2-pentanone	4,600	14,000	4,600	2,000	U
108-88-3	Toluene	1,000,000	14,000	4,600	1,800	
591-78-6	2-Hexanone	4,600	15,000	4,600	1,800	U
124-48-1	Dibromochloromethane	4,600	15,000	4,600	1,900	U
106-93-4	1,2-Dibromoethane	1,700	15,000	4,600	1,700	J
127-18-4	Tetrachloroethene	4,600	14,000	4,600	1,900	U
100-41-4	Ethylbenzene	100,000	14,000	4,600	2,000	
179601-23-1	m,p-Xylenes	280,000	30,000	9,200	3,800	
75-25-2	Bromoform	8,600	14,000	8,600	3,000	U
100-42-5	Styrene	8,600	14,000	8,600	2,300	U
95-47-6	o-Xylene	87,000	14,000	4,600	2,100	
108-67-8	1,3,5-Trimethylbenzene	14,000	14,000	4,600	2,100	
95-63-6	1,2,4-Trimethylbenzene	37,000	14,000	4,600	2,000	
120-82-1	1,2,4-Trichlorobenzene	8,600	14,000	8,600	3,500	U
95-50-1	1,2-Dichlorobenzene	4,600	15,000	4,600	2,100	U
91-20-3	Naphthalene	8,300	14,000	8,300	3,500	U
1330-20-7	Xylenes, Total	370,000	30,000	9,200	3,800	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 252.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-017

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00905

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000040 Liter(s)

Initial Pressure (psig): -3.75 Final Pressure (psig): 5.29

Container Dilution Factor: 1.83

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	33,000	24,000	14,000	5,900	
75-71-8	Dichlorodifluoromethane (CFC 12)	14,000	24,000	14,000	4,000	U
74-87-3	Chloromethane	14,000	23,000	14,000	3,900	U
75-01-4	Vinyl Chloride	7,800	24,000	7,800	2,600	U
106-99-0	1,3-Butadiene	14,000	24,000	14,000	4,000	U
75-00-3	Chloroethane	14,000	23,000	14,000	3,000	U
64-17-5	Ethanol	38,000	230,000	38,000	17,000	U
67-64-1	Acetone	2,100,000	250,000	120,000	55,000	
75-69-4	Trichlorofluoromethane	15,000	24,000	15,000	3,700	U
67-63-0	2-Propanol (Isopropyl Alcohol)	130,000	96,000	28,000	10,000	
75-09-2	Methylene Chloride	15,000	25,000	15,000	6,900	U
76-13-1	Trichlorotrifluoroethane	7,800	24,000	7,800	3,500	U
75-15-0	Carbon Disulfide	38,000	50,000	25,000	7,300	J
75-34-3	1,1-Dichloroethane	14,000	24,000	14,000	3,600	U
78-93-3	2-Butanone (MEK)	280,000	46,000	14,000	5,000	
141-78-6	Ethyl Acetate	30,000	50,000	30,000	13,000	U
110-54-3	n-Hexane	1,800,000	25,000	15,000	5,000	
67-66-3	Chloroform	7,800	25,000	7,800	3,200	U
109-99-9	Tetrahydrofuran (THF)	7,800	24,000	7,800	3,100	U
71-43-2	Benzene	610,000	24,000	7,800	3,500	
56-23-5	Carbon Tetrachloride	7,800	24,000	7,800	3,400	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 252.2
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-017

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00905

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.000040 Liter(s)

Initial Pressure (psig): -3.75 Final Pressure (psig): 5.29

Container Dilution Factor: 1.83

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	2,000,000	46,000	15,000	6,900	
75-27-4	Bromodichloromethane	7,800	24,000	7,800	3,500	U
79-01-6	Trichloroethene	6,800	24,000	7,800	3,300	J
123-91-1	1,4-Dioxane	7,800	24,000	7,800	2,900	U
142-82-5	n-Heptane	3,800,000	25,000	15,000	3,900	
108-10-1	4-Methyl-2-pentanone	7,800	24,000	7,800	3,300	U
108-88-3	Toluene	2,500,000	24,000	7,800	3,000	
591-78-6	2-Hexanone	7,800	25,000	7,800	3,000	U
124-48-1	Dibromochloromethane	7,800	25,000	7,800	3,200	U
106-93-4	1,2-Dibromoethane	8,100	25,000	7,800	2,800	J
127-18-4	Tetrachloroethene	2,800,000	24,000	7,800	3,200	
100-41-4	Ethylbenzene	180,000	24,000	7,800	3,400	
179601-23-1	m,p-Xylenes	430,000	50,000	16,000	6,400	
75-25-2	Bromoform	15,000	24,000	15,000	5,000	U
100-42-5	Styrene	15,000	24,000	15,000	3,900	U
95-47-6	o-Xylene	120,000	24,000	7,800	3,500	
108-67-8	1,3,5-Trimethylbenzene	17,000	24,000	7,800	3,500	J
95-63-6	1,2,4-Trimethylbenzene	44,000	24,000	7,800	3,400	
120-82-1	1,2,4-Trichlorobenzene	15,000	24,000	15,000	5,900	U
95-50-1	1,2-Dichlorobenzene	7,800	25,000	7,800	3,600	U
91-20-3	Naphthalene	14,000	23,000	14,000	5,900	U
1330-20-7	Xylenes, Total	540,000	50,000	16,000	6,400	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12 Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	36,000	26,000	15,000	6,400	
75-71-8	Dichlorodifluoromethane (CFC 12)	15,000	26,000	15,000	4,300	U
74-87-3	Chloromethane	15,000	25,000	15,000	4,200	U
75-01-4	Vinyl Chloride	8,400	26,000	8,400	2,800	U
106-99-0	1,3-Butadiene	15,000	26,000	15,000	4,300	U
75-00-3	Chloroethane	15,000	25,000	15,000	3,200	U
64-17-5	Ethanol	40,000	250,000	40,000	18,000	U
67-64-1	Acetone	2,000,000	270,000	130,000	59,000	
75-69-4	Trichlorofluoromethane	16,000	26,000	16,000	4,000	U
67-63-0	2-Propanol (Isopropyl Alcohol)	91,000	100,000	30,000	11,000	J
75-09-2	Methylene Chloride	16,000	27,000	16,000	7,400	U
76-13-1	Trichlorotrifluoroethane	8,400	26,000	8,400	3,700	U
75-15-0	Carbon Disulfide	27,000	54,000	27,000	7,900	U
75-34-3	1,1-Dichloroethane	15,000	26,000	15,000	3,800	U
78-93-3	2-Butanone (MEK)	350,000	49,000	15,000	5,400	
141-78-6	Ethyl Acetate	32,000	54,000	32,000	14,000	U
110-54-3	n-Hexane	1,300,000	27,000	16,000	5,400	
67-66-3	Chloroform	8,400	27,000	8,400	3,500	U
109-99-9	Tetrahydrofuran (THF)	8,400	26,000	8,400	3,300	U
71-43-2	Benzene	470,000	26,000	8,400	3,800	
56-23-5	Carbon Tetrachloride	8,400	26,000	8,400	3,600	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12 Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

CAS #	Compound	Result μg/m ³	LOQ μg/m ³	LOD μg/m ³	MDL μg/m ³	Data Qualifier
110-82-7	Cyclohexane	1,900,000	49,000	16,000	7,400	
75-27-4	Bromodichloromethane	8,400	26,000	8,400	3,800	U
79-01-6	Trichloroethene	8,400	26,000	8,400	3,500	U
123-91-1	1,4-Dioxane	8,400	26,000	8,400	3,100	U
142-82-5	n-Heptane	4,300,000	27,000	16,000	4,200	
108-10-1	4-Methyl-2-pentanone	8,400	26,000	8,400	3,600	U
108-88-3	Toluene	2,900,000	26,000	8,400	3,200	
591-78-6	2-Hexanone	8,400	27,000	8,400	3,200	U
124-48-1	Dibromochloromethane	8,400	27,000	8,400	3,400	U
106-93-4	1,2-Dibromoethane	8,500	27,000	8,400	3,000	J
127-18-4	Tetrachloroethene	8,400	26,000	8,400	3,400	U
100-41-4	Ethylbenzene	200,000	26,000	8,400	3,700	
179601-23-1	m,p-Xylenes	490,000	54,000	17,000	6,900	
75-25-2	Bromoform	16,000	26,000	16,000	5,400	U
100-42-5	Styrene	16,000	26,000	16,000	4,200	U
95-47-6	o-Xylene	130,000	26,000	8,400	3,800	
108-67-8	1,3,5-Trimethylbenzene	22,000	26,000	8,400	3,800	J
95-63-6	1,2,4-Trimethylbenzene	60,000	26,000	8,400	3,600	
120-82-1	1,2,4-Trichlorobenzene	16,000	26,000	16,000	6,400	U
95-50-1	1,2-Dichlorobenzene	8,400	27,000	8,400	3,900	U
91-20-3	Naphthalene	15,000	25,000	15,000	6,400	U
1330-20-7	Xylenes, Total	620,000	54,000	17,000	6,900	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	0.31	0.52	0.31	0.13	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.31	0.52	0.31	0.087	U
74-87-3	Chloromethane	0.30	0.50	0.30	0.086	U
75-01-4	Vinyl Chloride	0.17	0.53	0.17	0.057	U
106-99-0	1,3-Butadiene	0.31	0.52	0.31	0.088	U
75-00-3	Chloroethane	0.31	0.51	0.31	0.066	U
64-17-5	Ethanol	0.82	5.1	0.82	0.37	U
67-64-1	Acetone	2.7	5.4	2.7	1.2	U
75-69-4	Trichlorofluoromethane	0.32	0.53	0.32	0.081	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.62	2.1	0.62	0.22	U
75-09-2	Methylene Chloride	0.32	0.54	0.32	0.15	U
76-13-1	Trichlorotrifluoroethane	0.17	0.53	0.17	0.076	U
75-15-0	Carbon Disulfide	0.54	1.1	0.54	0.16	U
75-34-3	1,1-Dichloroethane	0.31	0.52	0.31	0.078	U
78-93-3	2-Butanone (MEK)	0.31	1.0	0.31	0.11	U
141-78-6	Ethyl Acetate	0.65	1.1	0.65	0.28	U
110-54-3	n-Hexane	0.32	0.54	0.32	0.11	U
67-66-3	Chloroform	0.17	0.54	0.17	0.071	U
109-99-9	Tetrahydrofuran (THF)	0.17	0.53	0.17	0.067	U
71-43-2	Benzene	0.17	0.52	0.17	0.077	U
56-23-5	Carbon Tetrachloride	0.17	0.52	0.17	0.074	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	0.33	1.0	0.33	0.15	U
75-27-4	Bromodichloromethane	0.17	0.53	0.17	0.077	U
79-01-6	Trichloroethene	0.17	0.53	0.17	0.072	U
123-91-1	1,4-Dioxane	0.17	0.53	0.17	0.063	U
142-82-5	n-Heptane	0.32	0.54	0.32	0.085	U
108-10-1	4-Methyl-2-pentanone	0.17	0.53	0.17	0.073	U
108-88-3	Toluene	0.17	0.53	0.17	0.065	U
591-78-6	2-Hexanone	0.17	0.54	0.17	0.066	U
124-48-1	Dibromochloromethane	0.17	0.54	0.17	0.070	U
106-93-4	1,2-Dibromoethane	0.17	0.54	0.17	0.062	U
127-18-4	Tetrachloroethene	0.17	0.53	0.17	0.069	U
100-41-4	Ethylbenzene	0.17	0.52	0.17	0.075	U
179601-23-1	m,p-Xylenes	0.34	1.1	0.34	0.14	U
75-25-2	Bromoform	0.32	0.53	0.32	0.11	U
100-42-5	Styrene	0.32	0.53	0.32	0.086	U
95-47-6	o-Xylene	0.17	0.53	0.17	0.077	U
108-67-8	1,3,5-Trimethylbenzene	0.17	0.53	0.17	0.077	U
95-63-6	1,2,4-Trimethylbenzene	0.17	0.53	0.17	0.074	U
120-82-1	1,2,4-Trichlorobenzene	0.32	0.53	0.32	0.13	U
95-50-1	1,2-Dichlorobenzene	0.17	0.54	0.17	0.079	U
91-20-3	Naphthalene	0.31	0.51	0.31	0.13	U
1330-20-7	Xylenes, Total	0.34	1.1	0.34	0.14	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	0.31	0.52	0.31	0.13	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.31	0.52	0.31	0.087	U
74-87-3	Chloromethane	0.30	0.50	0.30	0.086	U
75-01-4	Vinyl Chloride	0.17	0.53	0.17	0.057	U
106-99-0	1,3-Butadiene	0.31	0.52	0.31	0.088	U
75-00-3	Chloroethane	0.31	0.51	0.31	0.066	U
64-17-5	Ethanol	0.82	5.1	0.82	0.37	U
67-64-1	Acetone	2.7	5.4	2.7	1.2	U
75-69-4	Trichlorofluoromethane	0.32	0.53	0.32	0.081	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.62	2.1	0.62	0.22	U
75-09-2	Methylene Chloride	0.32	0.54	0.32	0.15	U
76-13-1	Trichlorotrifluoroethane	0.17	0.53	0.17	0.076	U
75-15-0	Carbon Disulfide	0.54	1.1	0.54	0.16	U
75-34-3	1,1-Dichloroethane	0.31	0.52	0.31	0.078	U
78-93-3	2-Butanone (MEK)	0.31	1.0	0.31	0.11	U
141-78-6	Ethyl Acetate	0.65	1.1	0.65	0.28	U
110-54-3	n-Hexane	0.32	0.54	0.32	0.11	U
67-66-3	Chloroform	0.17	0.54	0.17	0.071	U
109-99-9	Tetrahydrofuran (THF)	0.17	0.53	0.17	0.067	U
71-43-2	Benzene	0.17	0.52	0.17	0.077	U
56-23-5	Carbon Tetrachloride	0.17	0.52	0.17	0.074	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	0.33	1.0	0.33	0.15	U
75-27-4	Bromodichloromethane	0.17	0.53	0.17	0.077	U
79-01-6	Trichloroethene	0.17	0.53	0.17	0.072	U
123-91-1	1,4-Dioxane	0.17	0.53	0.17	0.063	U
142-82-5	n-Heptane	0.32	0.54	0.32	0.085	U
108-10-1	4-Methyl-2-pentanone	0.17	0.53	0.17	0.073	U
108-88-3	Toluene	0.17	0.53	0.17	0.065	U
591-78-6	2-Hexanone	0.17	0.54	0.17	0.066	U
124-48-1	Dibromochloromethane	0.17	0.54	0.17	0.070	U
106-93-4	1,2-Dibromoethane	0.17	0.54	0.17	0.062	U
127-18-4	Tetrachloroethene	0.17	0.53	0.17	0.069	U
100-41-4	Ethylbenzene	0.17	0.52	0.17	0.075	U
179601-23-1	m,p-Xylenes	0.34	1.1	0.34	0.14	U
75-25-2	Bromoform	0.32	0.53	0.32	0.11	U
100-42-5	Styrene	0.32	0.53	0.32	0.086	U
95-47-6	o-Xylene	0.17	0.53	0.17	0.077	U
108-67-8	1,3,5-Trimethylbenzene	0.17	0.53	0.17	0.077	U
95-63-6	1,2,4-Trimethylbenzene	0.17	0.53	0.17	0.074	U
120-82-1	1,2,4-Trichlorobenzene	0.32	0.53	0.32	0.13	U
95-50-1	1,2-Dichlorobenzene	0.17	0.54	0.17	0.079	U
91-20-3	Naphthalene	0.31	0.51	0.31	0.13	U
1330-20-7	Xylenes, Total	0.34	1.1	0.34	0.14	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	0.31	0.52	0.31	0.13	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.31	0.52	0.31	0.087	U
74-87-3	Chloromethane	0.30	0.50	0.30	0.086	U
75-01-4	Vinyl Chloride	0.17	0.53	0.17	0.057	U
106-99-0	1,3-Butadiene	0.31	0.52	0.31	0.088	U
75-00-3	Chloroethane	0.31	0.51	0.31	0.066	U
64-17-5	Ethanol	0.82	5.1	0.82	0.37	U
67-64-1	Acetone	2.7	5.4	2.7	1.2	U
75-69-4	Trichlorofluoromethane	0.32	0.53	0.32	0.081	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.62	2.1	0.62	0.22	U
75-09-2	Methylene Chloride	0.32	0.54	0.32	0.15	U
76-13-1	Trichlorotrifluoroethane	0.17	0.53	0.17	0.076	U
75-15-0	Carbon Disulfide	0.54	1.1	0.54	0.16	U
75-34-3	1,1-Dichloroethane	0.31	0.52	0.31	0.078	U
78-93-3	2-Butanone (MEK)	0.31	1.0	0.31	0.11	U
141-78-6	Ethyl Acetate	0.65	1.1	0.65	0.28	U
110-54-3	n-Hexane	0.32	0.54	0.32	0.11	U
67-66-3	Chloroform	0.17	0.54	0.17	0.071	U
109-99-9	Tetrahydrofuran (THF)	0.17	0.53	0.17	0.067	U
71-43-2	Benzene	0.17	0.52	0.17	0.077	U
56-23-5	Carbon Tetrachloride	0.17	0.52	0.17	0.074	U

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 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	0.33	1.0	0.33	0.15	U
75-27-4	Bromodichloromethane	0.17	0.53	0.17	0.077	U
79-01-6	Trichloroethene	0.17	0.53	0.17	0.072	U
123-91-1	1,4-Dioxane	0.17	0.53	0.17	0.063	U
142-82-5	n-Heptane	0.32	0.54	0.32	0.085	U
108-10-1	4-Methyl-2-pentanone	0.17	0.53	0.17	0.073	U
108-88-3	Toluene	0.17	0.53	0.17	0.065	U
591-78-6	2-Hexanone	0.17	0.54	0.17	0.066	U
124-48-1	Dibromochloromethane	0.17	0.54	0.17	0.070	U
106-93-4	1,2-Dibromoethane	0.17	0.54	0.17	0.062	U
127-18-4	Tetrachloroethene	0.17	0.53	0.17	0.069	U
100-41-4	Ethylbenzene	0.17	0.52	0.17	0.075	U
179601-23-1	m,p-Xylenes	0.34	1.1	0.34	0.14	U
75-25-2	Bromoform	0.32	0.53	0.32	0.11	U
100-42-5	Styrene	0.32	0.53	0.32	0.086	U
95-47-6	o-Xylene	0.17	0.53	0.17	0.077	U
108-67-8	1,3,5-Trimethylbenzene	0.17	0.53	0.17	0.077	U
95-63-6	1,2,4-Trimethylbenzene	0.17	0.53	0.17	0.074	U
120-82-1	1,2,4-Trichlorobenzene	0.32	0.53	0.32	0.13	U
95-50-1	1,2-Dichlorobenzene	0.17	0.54	0.17	0.079	U
91-20-3	Naphthalene	0.31	0.51	0.31	0.13	U
1330-20-7	Xylenes, Total	0.34	1.1	0.34	0.14	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah/Topacio De Leon
Sampling Media: 1.0 L Summa Canister(s) / 1.0 L Silonite Summa Canister(s)
Test Notes:

Date(s) Collected: 4/10 - 4/11/19

Date(s) Received: 4/17/19

Date(s) Analyzed: 4/30 - 5/3/19

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P190430-MB	105	97	101	70-130	
Method Blank	P190501-MB	99	99	104	70-130	
Method Blank	P190503-MB	96	103	97	70-130	
Lab Control Sample	P190430-LCS	102	96	105	70-130	
Lab Control Sample	P190501-LCS	97	98	106	70-130	
Lab Control Sample	P190503-LCS	94	102	99	70-130	
Duplicate Lab Control Sample	P190430-DLCS	102	97	105	70-130	
Duplicate Lab Control Sample	P190501-DLCS	98	98	106	70-130	
Duplicate Lab Control Sample	P190503-DLCS	95	102	99	70-130	
SVMW-10-100	P1902156-001	99	98	104	70-130	
SVMW-10-150	P1902156-002	100	99	105	70-130	
SVMW-10-250	P1902156-003	101	94	103	70-130	
SVMW-11-100	P1902156-004	100	99	104	70-130	
SVMW-11-250	P1902156-005	93	103	100	70-130	
SVEW-04/05-313	P1902156-006	100	91	98	70-130	
KAFB-106V1 102.1	P1902156-007	99	99	105	70-130	
KAFB-106V1 112.6	P1902156-008	100	99	105	70-130	
KAFB-106V1 159.6	P1902156-009	100	97	105	70-130	
KAFB-106V1 217.1	P1902156-010	97	98	107	70-130	
KAFB-106V1 252.1	P1902156-011	100	96	105	70-130	
KAFB-106V1 262.6	P1902156-012	99	97	106	70-130	
KAFB-106V2 102.2	P1902156-013	98	98	106	70-130	
KAFB-106V2 117.1	P1902156-014	97	97	106	70-130	
KAFB-106V2 159.6	P1902156-015	99	98	107	70-130	
KAFB-106V2 252.2	P1902156-017	98	99	106	70-130	
KAFB-106V2 269.5	P1902156-018	98	98	106	70-130	
KAFB-106V2 269.5	P1902156-018DUP	97	98	105	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits		Limit	Qualifier
115-07-1	Propene	211	193	207	91	98	57-136	7	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	197	210	94	100	59-128	6	25	
74-87-3	Chloromethane	211	185	197	88	93	59-132	6	25	
75-01-4	Vinyl Chloride	214	202	213	94	100	64-127	6	25	
106-99-0	1,3-Butadiene	210	207	215	99	102	66-134	3	25	
75-00-3	Chloroethane	214	200	213	93	100	63-127	7	25	
64-17-5	Ethanol	1,020	1040	1080	102	106	59-125	4	25	
67-64-1	Acetone	1,060	1060	1090	100	103	58-128	3	25	
75-69-4	Trichlorofluoromethane	211	206	215	98	102	62-126	4	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	413	450	458	109	111	52-125	2	25	
75-09-2	Methylene Chloride	217	220	225	101	104	62-115	3	25	
76-13-1	Trichlorotrifluoroethane	216	202	207	94	96	66-126	2	25	
75-15-0	Carbon Disulfide	218	231	236	106	108	57-134	2	25	
75-34-3	1,1-Dichloroethane	216	207	210	96	97	68-126	1	25	
78-93-3	2-Butanone (MEK)	208	239	242	115	116	67-130	0.9	25	
141-78-6	Ethyl Acetate	436	502	504	115	116	65-128	0.9	25	
110-54-3	n-Hexane	216	227	230	105	106	63-120	0.9	25	
67-66-3	Chloroform	217	221	223	102	103	68-123	1	25	
109-99-9	Tetrahydrofuran (THF)	216	243	245	113	113	64-123	0	25	
71-43-2	Benzene	211	210	209	100	99	69-119	1	25	
56-23-5	Carbon Tetrachloride	212	218	216	103	102	68-132	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190430-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Topacio De Leon
 Sampling Media: 1.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/30/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		% Recovery		DOD		Data
		LCS / DLCS	LCS / DLCS	LCS	DLCS	LCS	DLCS	Acceptance	RPD	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	Limits	Limit	Limit	Qualifier	
110-82-7	Cyclohexane	416	421	420	101	101	70-117	0	25	
75-27-4	Bromodichloromethane	215	237	237	110	110	72-128	0	25	
79-01-6	Trichloroethene	213	208	211	98	99	71-123	1	25	
123-91-1	1,4-Dioxane	214	229	230	107	107	71-122	0	25	
142-82-5	n-Heptane	215	222	223	103	104	69-123	1	25	
108-10-1	4-Methyl-2-pentanone	209	239	239	114	114	67-130	0	25	
108-88-3	Toluene	212	202	205	95	97	66-119	2	25	
591-78-6	2-Hexanone	214	245	248	114	116	62-128	2	25	
124-48-1	Dibromochloromethane	213	238	241	112	113	70-130	0.9	25	
106-93-4	1,2-Dibromoethane	216	231	234	107	108	74-122	0.9	25	
127-18-4	Tetrachloroethene	213	200	205	94	96	66-124	2	25	
100-41-4	Ethylbenzene	212	206	209	97	99	70-124	2	25	
179601-23-1	m,p-Xylenes	426	427	430	100	101	61-134	1	25	
75-25-2	Bromoform	213	253	255	119	120	66-139	0.8	25	
100-42-5	Styrene	212	241	242	114	114	73-127	0	25	
95-47-6	o-Xylene	214	214	215	100	100	67-125	0	25	
108-67-8	1,3,5-Trimethylbenzene	214	211	212	99	99	67-130	0	25	
95-63-6	1,2,4-Trimethylbenzene	215	227	225	106	105	66-132	0.9	25	
120-82-1	1,2,4-Trichlorobenzene	214	219	221	102	103	55-142	1	25	
95-50-1	1,2-Dichlorobenzene	216	226	225	105	104	63-129	1	25	
91-20-3	Naphthalene	203	222	222	109	109	57-138	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits	Limit	Qualifier	
115-07-1	Propene	211	221	227	105	108	57-136	3	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	219	222	104	106	59-128	2	25	
74-87-3	Chloromethane	211	223	225	106	107	59-132	0.9	25	
75-01-4	Vinyl Chloride	214	231	236	108	110	64-127	2	25	
106-99-0	1,3-Butadiene	210	228	233	109	111	66-134	2	25	
75-00-3	Chloroethane	214	240	245	112	114	63-127	2	25	
64-17-5	Ethanol	1,020	1160	1180	114	116	59-125	2	25	
67-64-1	Acetone	1,060	1150	1170	108	110	58-128	2	25	
75-69-4	Trichlorofluoromethane	211	226	227	107	108	62-126	0.9	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	413	488	496	118	120	52-125	2	25	
75-09-2	Methylene Chloride	217	241	245	111	113	62-115	2	25	
76-13-1	Trichlorotrifluoroethane	216	230	233	106	108	66-126	2	25	
75-15-0	Carbon Disulfide	218	253	255	116	117	57-134	0.9	25	
75-34-3	1,1-Dichloroethane	216	232	235	107	109	68-126	2	25	
78-93-3	2-Butanone (MEK)	208	259	260	125	125	67-130	0	25	
141-78-6	Ethyl Acetate	436	524	525	120	120	65-128	0	25	
110-54-3	n-Hexane	216	236	239	109	111	63-120	2	25	
67-66-3	Chloroform	217	232	234	107	108	68-123	0.9	25	
109-99-9	Tetrahydrofuran (THF)	216	260	263	120	122	64-123	2	25	
71-43-2	Benzene	211	226	227	107	108	69-119	0.9	25	
56-23-5	Carbon Tetrachloride	212	228	229	108	108	68-132	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		% Recovery		DOD		Data
		LCS / DLCS	LCS	DLCS	LCS	DLCS	Acceptance	RPD	RPD	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits	Limit	Qualifier	
110-82-7	Cyclohexane	416	445	451	107	108	70-117	0.9	25	
75-27-4	Bromodichloromethane	215	249	252	116	117	72-128	0.9	25	
79-01-6	Trichloroethene	213	228	229	107	108	71-123	0.9	25	
123-91-1	1,4-Dioxane	214	242	245	113	114	71-122	0.9	25	
142-82-5	n-Heptane	215	236	238	110	111	69-123	0.9	25	
108-10-1	4-Methyl-2-pentanone	209	251	254	120	122	67-130	2	25	
108-88-3	Toluene	212	221	223	104	105	66-119	1	25	
591-78-6	2-Hexanone	214	260	261	121	122	62-128	0.8	25	
124-48-1	Dibromochloromethane	213	259	261	122	123	70-130	0.8	25	
106-93-4	1,2-Dibromoethane	216	254	256	118	119	74-122	0.8	25	
127-18-4	Tetrachloroethene	213	224	226	105	106	66-124	0.9	25	
100-41-4	Ethylbenzene	212	224	224	106	106	70-124	0	25	
179601-23-1	m,p-Xylenes	426	455	457	107	107	61-134	0	25	
75-25-2	Bromoform	213	273	274	128	129	66-139	0.8	25	
100-42-5	Styrene	212	262	263	124	124	73-127	0	25	
95-47-6	o-Xylene	214	230	230	107	107	67-125	0	25	
108-67-8	1,3,5-Trimethylbenzene	214	224	224	105	105	67-130	0	25	
95-63-6	1,2,4-Trimethylbenzene	215	236	236	110	110	66-132	0	25	
120-82-1	1,2,4-Trichlorobenzene	214	228	231	107	108	55-142	0.9	25	
95-50-1	1,2-Dichlorobenzene	216	239	240	111	111	63-129	0	25	
91-20-3	Naphthalene	203	206	209	101	103	57-138	2	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits	Limit	Qualifier	
115-07-1	Propene	211	187	193	89	91	57-136	2	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	181	183	86	87	59-128	1	25	
74-87-3	Chloromethane	211	192	196	91	93	59-132	2	25	
75-01-4	Vinyl Chloride	214	185	189	86	88	64-127	2	25	
106-99-0	1,3-Butadiene	210	183	189	87	90	66-134	3	25	
75-00-3	Chloroethane	214	203	207	95	97	63-127	2	25	
64-17-5	Ethanol	1,020	983	1000	96	98	59-125	2	25	
67-64-1	Acetone	1,060	951	969	90	91	58-128	1	25	
75-69-4	Trichlorofluoromethane	211	183	184	87	87	62-126	0	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	413	414	423	100	102	52-125	2	25	
75-09-2	Methylene Chloride	217	203	205	94	94	62-115	0	25	
76-13-1	Trichlorotrifluoroethane	216	199	200	92	93	66-126	1	25	
75-15-0	Carbon Disulfide	218	213	213	98	98	57-134	0	25	
75-34-3	1,1-Dichloroethane	216	195	198	90	92	68-126	2	25	
78-93-3	2-Butanone (MEK)	208	217	219	104	105	67-130	1	25	
141-78-6	Ethyl Acetate	436	430	432	99	99	65-128	0	25	
110-54-3	n-Hexane	216	188	192	87	89	63-120	2	25	
67-66-3	Chloroform	217	191	194	88	89	68-123	1	25	
109-99-9	Tetrahydrofuran (THF)	216	220	222	102	103	64-123	1	25	
71-43-2	Benzene	211	189	190	90	90	69-119	0	25	
56-23-5	Carbon Tetrachloride	212	190	192	90	91	68-132	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P190503-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/3/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		% Recovery		DOD		Data
		LCS / DLCS	LCS	DLCS	LCS	DLCS	Acceptance	RPD	RPD	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits	Limit	Qualifier	
110-82-7	Cyclohexane	416	370	374	89	90	70-117	1	25	
75-27-4	Bromodichloromethane	215	207	210	96	98	72-128	2	25	
79-01-6	Trichloroethene	213	192	193	90	91	71-123	1	25	
123-91-1	1,4-Dioxane	214	209	213	98	100	71-122	2	25	
142-82-5	n-Heptane	215	197	200	92	93	69-123	1	25	
108-10-1	4-Methyl-2-pentanone	209	220	223	105	107	67-130	2	25	
108-88-3	Toluene	212	198	198	93	93	66-119	0	25	
591-78-6	2-Hexanone	214	253	254	118	119	62-128	0.8	25	
124-48-1	Dibromochloromethane	213	235	236	110	111	70-130	0.9	25	
106-93-4	1,2-Dibromoethane	216	232	232	107	107	74-122	0	25	
127-18-4	Tetrachloroethene	213	202	203	95	95	66-124	0	25	
100-41-4	Ethylbenzene	212	201	201	95	95	70-124	0	25	
179601-23-1	m,p-Xylenes	426	401	402	94	94	61-134	0	25	
75-25-2	Bromoform	213	247	249	116	117	66-139	0.9	25	
100-42-5	Styrene	212	238	239	112	113	73-127	0.9	25	
95-47-6	o-Xylene	214	203	203	95	95	67-125	0	25	
108-67-8	1,3,5-Trimethylbenzene	214	201	200	94	93	67-130	1	25	
95-63-6	1,2,4-Trimethylbenzene	215	209	208	97	97	66-132	0	25	
120-82-1	1,2,4-Trichlorobenzene	214	229	230	107	107	55-142	0	25	
95-50-1	1,2-Dichlorobenzene	216	215	216	100	100	63-129	0	25	
91-20-3	Naphthalene	203	222	223	109	110	57-138	0.9	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018DUP

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12

Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

Compound	Sample Result µg/m ³	Duplicate Sample Result µg/m ³	Average µg/m ³	% RPD	RPD Limit	Data Qualifier
Propene	36,000	35,000	35500	3	25	
Dichlorodifluoromethane (CFC 12)	ND	ND	-	-	25	
Chloromethane	ND	ND	-	-	25	
Vinyl Chloride	ND	ND	-	-	25	
1,3-Butadiene	ND	ND	-	-	25	
Chloroethane	ND	ND	-	-	25	
Ethanol	ND	ND	-	-	25	
Acetone	2,000,000	1,900,000	1950000	5	25	
Trichlorofluoromethane	ND	ND	-	-	25	
2-Propanol (Isopropyl Alcohol)	91,000	90,000	90500	1	25	J
Methylene Chloride	ND	ND	-	-	25	
Trichlorotrifluoroethane	ND	ND	-	-	25	
Carbon Disulfide	ND	ND	-	-	25	
1,1-Dichloroethane	ND	ND	-	-	25	
2-Butanone (MEK)	350,000	360,000	355000	3	25	
Ethyl Acetate	ND	ND	-	-	25	
n-Hexane	1,300,000	1,300,000	1300000	0	25	
Chloroform	ND	ND	-	-	25	
Tetrahydrofuran (THF)	ND	ND	-	-	25	
Benzene	470,000	470,000	470000	0	25	
Carbon Tetrachloride	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: KAFB-106V2 269.5
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

ALS Project ID: P1902156
 ALS Sample ID: P1902156-018DUP

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC01205

Date Collected: 4/11/19
 Date Received: 4/17/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000035 Liter(s)

Initial Pressure (psig): -3.12

Final Pressure (psig): 5.25

Container Dilution Factor: 1.72

Compound	Sample Result µg/m ³	Duplicate Sample Result µg/m ³	Average µg/m ³	% RPD	RPD Limit	Data Qualifier
Cyclohexane	1,900,000	1,900,000	1900000	0	25	
Bromodichloromethane	ND	ND	-	-	25	
Trichloroethene	ND	ND	-	-	25	
1,4-Dioxane	ND	ND	-	-	25	
n-Heptane	4,300,000	4,200,000	4250000	2	25	
4-Methyl-2-pentanone	ND	ND	-	-	25	
Toluene	2,900,000	2,900,000	2900000	0	25	
2-Hexanone	ND	ND	-	-	25	
Dibromochloromethane	ND	ND	-	-	25	
1,2-Dibromoethane	8,500	8,400	8450	1	25	J
Tetrachloroethene	ND	ND	-	-	25	
Ethylbenzene	200,000	200,000	200000	0	25	
m,p-Xylenes	490,000	490,000	490000	0	25	
Bromoform	ND	ND	-	-	25	
Styrene	ND	ND	-	-	25	
o-Xylene	130,000	120,000	125000	8	25	
1,3,5-Trimethylbenzene	22,000	22,000	22000	0	25	J
1,2,4-Trimethylbenzene	60,000	58,000	59000	3	25	
1,2,4-Trichlorobenzene	ND	ND	-	-	25	
1,2-Dichlorobenzene	ND	ND	-	-	25	
Naphthalene	ND	ND	-	-	25	
Xylenes, Total	620,000	610,000	615000	2	25	

ND = Compound was analyzed for, but not detected.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 04301901.D
Analyst: Topacio De Leon Date Analyzed: 4/30/19
Sampling Media: 1.0 L Summa Canister(s) Time Analyzed: 02:30
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	108999	11.25	485835	13.36	267405	17.67
Upper Limit	152599	11.58	680169	13.69	374367	18.00
Lower Limit	65399	10.92	291501	13.03	160443	17.34

Client Sample ID							
01	Method Blank	94379	11.23	430328	13.35	229919	17.67
02	Lab Control Sample	108837	11.25	481193	13.36	258269	17.67
03	Duplicate Lab Control Sample	113335	11.25	504272	13.36	265610	17.67
04	SVMW-10-100	106974	11.24	479274	13.36	257344	17.67
05	SVEW-04/05-313 (Dilution)	115639	11.23	520793	13.36	282235	17.67
06	SVEW-04/05-313	118284	11.23	536905	13.36	313384	17.67
07	SVMW-10-150	108552	11.23	487213	13.36	254525	17.67
08	SVMW-11-100	103445	11.24	462501	13.36	245825	17.67
09	SVMW-10-250	99611	11.23	446395	13.36	251578	17.67
10	KAFB-106V1 102.1	121663	11.23	543362	13.36	282606	17.67
11	KAFB-106V1 112.6	111525	11.23	505822	13.36	262777	17.67
12	KAFB-106V1 159.6	112169	11.23	504998	13.36	269431	17.67
13	KAFB-106V1 252.1	101845	11.23	458943	13.36	249147	17.67
14	KAFB-106V1 262.6	103758	11.23	462931	13.36	249807	17.67
15	KAFB-106V2 102.2	103367	11.23	468433	13.36	246904	17.67
16	KAFB-106V2 252.2	112705	11.23	510617	13.36	267015	17.67
17	KAFB-106V2 269.5	112291	11.23	510430	13.36	270921	17.67
18	KAFB-106V2 269.5 (Lab Duplicate)	111218	11.23	503611	13.36	267030	17.67
19							
20							

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05011902.D
Analyst: Raneem Sahtah Date Analyzed: 5/1/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 02:50
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	119814	11.24	531603	13.36	271778	17.67
Upper Limit	167740	11.57	744244	13.69	380489	18.00
Lower Limit	71888	10.91	318962	13.03	163067	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)
		AREA #	RT #	AREA #
01	Method Blank	106769	11.22	480100
02	Lab Control Sample	115499	11.24	508349
03	Duplicate Lab Control Sample	115284	11.24	509059
04	KAFB-106V1 217.1	119081	11.23	535830
05	KAFB-106V2 117.1	102360	11.23	456052
06	KAFB-106V2 159.6	107700	11.23	493202
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

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RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902156
Client Project ID: Kirtland AFB Bulk Fuels Facility / 62735DM02.1038

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05031903.D
Analyst: Raneem Sahtah Date Analyzed: 5/3/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 03:17
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	158810	11.24	700551	13.36	335733	17.67
Upper Limit	222334	11.57	980771	13.69	470026	18.00
Lower Limit	95286	10.91	420331	13.03	201440	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)		
		AREA #	RT #	AREA #	RT #	AREA #
01	Method Blank	141105	11.22	633060	13.35	305909
02	Lab Control Sample	154721	11.24	672595	13.36	322608
03	Duplicate Lab Control Sample	152231	11.25	664099	13.36	322236
04	SVMW-11-250	150604	11.23	668615	13.36	329108
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

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RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

LABORATORY REPORT

May 17, 2019

Pamela Moss
EA Engineering, Science, and Technology, Inc.
9702 Bay Hill Drive
Lone Tree, CO 80124

RE: Kirtland Air Force Base / 6273DM02.1038.08

Dear Pamela:

Your report P1902214 for samples submitted on April 22, 2019 has been amended to correct the MDL limits for the EPA TO-3M data pages. The sample results have not changed. The data sheets have been corrected and indicated by "Revised Page" footer located on the bottom right of each affected page. (pages 7-9)

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental



By Kate Kaneko at 3:29 pm, 05/17/19

Kate Kaneko
Laboratory Director

Client: EA Engineering, Science, and Technology, Inc.
 Project: Kirtland Air Force Base / 6273DM02.1038.08

Service Request No: P1902214

CASE NARRATIVE

The samples were received intact under chain of custody on April 22, 2019 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Methane, Ethene and Ethane Analysis

The samples were analyzed for methane, ethene and ethane per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID). This procedure is described in laboratory SOP VOA-TO3C1C6. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

Manual integrations were performed on the following sample(s) and analyte(s). Refer to the raw data for additional information.

Sample Identification(s)	Analyte(s)
P1902214-001, 002	Acetone

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1521096
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-006
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413- 18-9
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA01627201 8-9
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946
<p>Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.</p> <p>Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.</p>		

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: EA Engineering, Science, and Technology, Inc.
 Project ID: Kirtland Air Force Base / 6273DM02.1038.08

Service Request: P1902214

Date Received: 4/22/2019
 Time Received: 09:30

TO-3 Modified - MEPP Can	TO-15 - VOC Cans
--------------------------	------------------

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - MEPP Can	TO-15 - VOC Cans
SVEW-01-260	P1902214-001	Air	4/13/2019	13:20	1SS00946	-4.25	7.15	X	X
SVEW-02/03-160	P1902214-002	Air	4/13/2019	13:44	1SC00749	-3.99	6.21	X	X

Air - Chain of Custody Record & Analytical Service Request

Page _____ of _____



2855 Park Center Drive, Suite A
 Simi Valley, California 93065
 Phone (805) 526-7161
 Fax (805) 526-7270

Company Name & Address (Reporting Information)		Project Name		Requested Turnaround Time In Business Days (Surcharges) please circle		ALS Project #	
EA Engineering 320 Gold Ave Ste 1300 Albuquerque, NM 87102		Kirtland Air Force Base		1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard		17882	
Project Manager Devon Jerichovic		P.O. # / Billing Information		Analysis Method		Comments e.g. Actual Preservative or specific instructions	
Phone 505-224-9013		17882		EPA TO-15			
Email Address for Result Reporting dmoss@eaest.com		Sampler (Print & Sign) Tyler Cutler		M PA TO-3 (Methane, Ethane, Ethene)			
Laboratory ID Number		Flow Controller ID (Barcode # - FC #)		Canister End Pressure -kg/psig		Sample Volume	
SVEW-01-260		NA		-24.5		-4.5	
SVEW-02/03-160		NA		-24.5		-4	
Date Collected		Time Collected		Canister Start Pressure -kg			
4/13/2019		13:20					
4/13/2019		13:44					
Laboratory ID Number		Date Collected		Time Collected		Chain of Custody Seal (Circle)	
						INTACT BROKEN ABSENT	
Tier I - Results (Default if not specified)		Tier III (Results + QC & Calibration Summaries)		EDD required Yes / No		Units:	
Tier II (Results + QC Summaries) X		Tier IV (Data Validation Package) 10% Surcharge		Type:		Received by: (Signature)	
Relinquished by: (Signature)		Date: 4-13-19		Time: 1000		Date: 4/22/19	
Relinquished by: (Signature)		Date:		Time:		Cooler / Blank Temperature °C	

**ALS Environmental
Sample Acceptance Check Form**

Client: EA Engineering, Science, and Technology, Inc. Work order: P1902214
 Project: Kirtland Air Force Base / 6273DM02.1038.08
 Sample(s) received on: 4/22/19 Date opened: 4/22/19 by: SEAN.KNEPPER

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

- | | | Yes | No | N/A |
|----|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 | Were sample containers properly marked with client sample ID? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Did sample containers arrive in good condition? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Were chain-of-custody papers used and filled out? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Did sample container labels and/or tags agree with custody papers? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | Was sample volume received adequate for analysis? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | Are samples within specified holding times? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | Was proper temperature (thermal preservation) of cooler at receipt adhered to? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8 | Were custody seals on outside of cooler/Box/Container? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Location of seal(s)? _____ Sealing Lid? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were signature and date included? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were seals intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9 | Do containers have appropriate preservation , according to method/SOP or Client specified information? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Is there a client indication that the submitted samples are pH preserved? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were VOA vials checked for presence/absence of air bubbles? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10 | Tubes: Are the tubes capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11 | Badges: Are the badges properly capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Are dual bed badges separated and individually capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1902214-001.01	1.0 L Source Silonite Canister					
P1902214-002.01	1.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-01-260
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-001

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00946

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 7.15

Container Dilution Factor: 2.09

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	39	1.4	0.38	60	2.1	0.59	
74-85-1	Ethene	50	0.70	0.18	43	0.63	0.15	
74-84-0	Ethane	59	0.80	0.11	48	0.63	0.088	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-02/03-160
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-002

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00749

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 6.21

Container Dilution Factor: 1.95

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	73	1.3	0.36	110	2.0	0.55	
74-85-1	Ethene	16	0.70	0.16	14	0.59	0.14	
74-84-0	Ethane	27	0.70	0.10	22	0.59	0.082	

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190429-MB

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result mg/m ³	MRL mg/m ³	MDL mg/m ³	Result ppmV	MRL ppmV	MDL ppmV	Data Qualifier
74-82-8	Methane	0.18	0.70	0.18	0.28	1.0	0.28	U
74-85-1	Ethene	0.084	0.30	0.084	0.074	0.30	0.074	U
74-84-0	Ethane	0.052	0.40	0.052	0.042	0.30	0.042	U

U = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190429-DLCS

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Wade Henton
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 4/29/19
 Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount LCS / DLCS ppmV	Result		% Recovery		ALS		Data Qualifier
			LCS ppmV	DLCS ppmV	LCS	DLCS	Acceptance Limits	RPD Limit	
74-82-8	Methane	1.50	1.49	1.59	99	106	70-130	7	15
74-85-1	Ethene	1.50	1.49	1.59	99	106	70-130	7	15
74-84-0	Ethane	1.50	1.50	1.57	100	105	70-130	5	15

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-01-260
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00946

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 7.15

Container Dilution Factor: 2.09

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	87,000	22,000	13,000	5,400	
75-71-8	Dichlorodifluoromethane (CFC 12)	13,000	22,000	13,000	3,600	U
74-87-3	Chloromethane	13,000	21,000	13,000	3,600	U
75-01-4	Vinyl Chloride	7,100	22,000	7,100	2,400	U
106-99-0	1,3-Butadiene	13,000	22,000	13,000	3,700	U
75-00-3	Chloroethane	13,000	21,000	13,000	2,800	U
64-17-5	Ethanol	34,000	210,000	34,000	15,000	U
67-64-1	Acetone	280,000	230,000	110,000	50,000	
75-69-4	Trichlorofluoromethane	13,000	22,000	13,000	3,400	U
67-63-0	2-Propanol (Isopropyl Alcohol)	23,000	88,000	26,000	9,200	J
75-09-2	Methylene Chloride	13,000	23,000	13,000	6,300	U
76-13-1	Trichlorotrifluoroethane	7,100	22,000	7,100	3,200	U
75-15-0	Carbon Disulfide	23,000	46,000	23,000	6,700	U
75-34-3	1,1-Dichloroethane	13,000	22,000	13,000	3,300	U
78-93-3	2-Butanone (MEK)	52,000	42,000	13,000	4,600	
141-78-6	Ethyl Acetate	27,000	46,000	27,000	12,000	U
110-54-3	n-Hexane	2,500,000	23,000	13,000	4,600	
67-66-3	Chloroform	7,100	23,000	7,100	3,000	U
109-99-9	Tetrahydrofuran (THF)	7,100	22,000	7,100	2,800	U
71-43-2	Benzene	680,000	22,000	7,100	3,200	
56-23-5	Carbon Tetrachloride	7,100	22,000	7,100	3,100	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-01-260
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00946

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 7.15

Container Dilution Factor: 2.09

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	2,100,000	42,000	14,000	6,300	
75-27-4	Bromodichloromethane	7,100	22,000	7,100	3,200	U
79-01-6	Trichloroethene	7,100	22,000	7,100	3,000	U
123-91-1	1,4-Dioxane	7,100	22,000	7,100	2,600	U
142-82-5	n-Heptane	3,600,000	23,000	13,000	3,600	
108-10-1	4-Methyl-2-pentanone	9,800	22,000	7,100	3,100	J
108-88-3	Toluene	2,400,000	22,000	7,100	2,700	
591-78-6	2-Hexanone	7,100	23,000	7,100	2,800	U
124-48-1	Dibromochloromethane	7,100	23,000	7,100	2,900	U
106-93-4	1,2-Dibromoethane	8,700	23,000	7,100	2,600	J
127-18-4	Tetrachloroethene	7,100	22,000	7,100	2,900	U
100-41-4	Ethylbenzene	180,000	22,000	7,100	3,100	
179601-23-1	m,p-Xylenes	510,000	46,000	14,000	5,900	
75-25-2	Bromoform	13,000	22,000	13,000	4,600	U
100-42-5	Styrene	13,000	22,000	13,000	3,600	U
95-47-6	o-Xylene	140,000	22,000	7,100	3,200	
108-67-8	1,3,5-Trimethylbenzene	23,000	22,000	7,100	3,200	
95-63-6	1,2,4-Trimethylbenzene	59,000	22,000	7,100	3,100	
120-82-1	1,2,4-Trichlorobenzene	13,000	22,000	13,000	5,400	U
95-50-1	1,2-Dichlorobenzene	7,100	23,000	7,100	3,300	U
91-20-3	Naphthalene	13,000	21,000	13,000	5,400	U
1330-20-7	Xylenes, Total	660,000	46,000	14,000	5,900	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
 J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-02/03-160
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00749

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 6.21

Container Dilution Factor: 1.95

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	39,000	41,000	24,000	10,000	J
75-71-8	Dichlorodifluoromethane (CFC 12)	24,000	41,000	24,000	6,800	U
74-87-3	Chloromethane	23,000	39,000	23,000	6,700	U
75-01-4	Vinyl Chloride	13,000	41,000	13,000	4,400	U
106-99-0	1,3-Butadiene	24,000	41,000	24,000	6,900	U
75-00-3	Chloroethane	24,000	40,000	24,000	5,100	U
64-17-5	Ethanol	64,000	400,000	64,000	29,000	U
67-64-1	Acetone	540,000	420,000	210,000	94,000	
75-69-4	Trichlorofluoromethane	25,000	41,000	25,000	6,300	U
67-63-0	2-Propanol (Isopropyl Alcohol)	26,000	160,000	48,000	17,000	J
75-09-2	Methylene Chloride	25,000	42,000	25,000	12,000	U
76-13-1	Trichlorotrifluoroethane	13,000	41,000	13,000	5,900	U
75-15-0	Carbon Disulfide	42,000	86,000	42,000	12,000	U
75-34-3	1,1-Dichloroethane	24,000	41,000	24,000	6,100	U
78-93-3	2-Butanone (MEK)	55,000	78,000	24,000	8,600	J
141-78-6	Ethyl Acetate	51,000	86,000	51,000	22,000	U
110-54-3	n-Hexane	4,900,000	42,000	25,000	8,600	
67-66-3	Chloroform	13,000	42,000	13,000	5,500	U
109-99-9	Tetrahydrofuran (THF)	13,000	41,000	13,000	5,200	U
71-43-2	Benzene	960,000	41,000	13,000	6,000	
56-23-5	Carbon Tetrachloride	13,000	41,000	13,000	5,800	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-02/03-160
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00749

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 6.21

Container Dilution Factor: 1.95

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	2,700,000	78,000	26,000	12,000	
75-27-4	Bromodichloromethane	13,000	41,000	13,000	6,000	U
79-01-6	Trichloroethene	13,000	41,000	13,000	5,600	U
123-91-1	1,4-Dioxane	13,000	41,000	13,000	4,900	U
142-82-5	n-Heptane	2,000,000	42,000	25,000	6,600	
108-10-1	4-Methyl-2-pentanone	13,000	41,000	13,000	5,700	U
108-88-3	Toluene	980,000	41,000	13,000	5,100	
591-78-6	2-Hexanone	13,000	42,000	13,000	5,100	U
124-48-1	Dibromochloromethane	13,000	42,000	13,000	5,500	U
106-93-4	1,2-Dibromoethane	13,000	42,000	13,000	4,800	U
127-18-4	Tetrachloroethene	13,000	41,000	13,000	5,400	U
100-41-4	Ethylbenzene	74,000	41,000	13,000	5,900	
179601-23-1	m,p-Xylenes	210,000	86,000	27,000	11,000	
75-25-2	Bromoform	25,000	41,000	25,000	8,600	U
100-42-5	Styrene	25,000	41,000	25,000	6,700	U
95-47-6	o-Xylene	69,000	41,000	13,000	6,000	
108-67-8	1,3,5-Trimethylbenzene	15,000	41,000	13,000	6,000	J
95-63-6	1,2,4-Trimethylbenzene	39,000	41,000	13,000	5,800	J
120-82-1	1,2,4-Trichlorobenzene	25,000	41,000	25,000	10,000	U
95-50-1	1,2-Dichlorobenzene	13,000	42,000	13,000	6,200	U
91-20-3	Naphthalene	24,000	40,000	24,000	10,000	U
1330-20-7	Xylenes, Total	270,000	86,000	27,000	11,000	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
115-07-1	Propene	0.31	0.52	0.31	0.13	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.31	0.52	0.31	0.087	U
74-87-3	Chloromethane	0.30	0.50	0.30	0.086	U
75-01-4	Vinyl Chloride	0.17	0.53	0.17	0.057	U
106-99-0	1,3-Butadiene	0.31	0.52	0.31	0.088	U
75-00-3	Chloroethane	0.31	0.51	0.31	0.066	U
64-17-5	Ethanol	0.82	5.1	0.82	0.37	U
67-64-1	Acetone	2.7	5.4	2.7	1.2	U
75-69-4	Trichlorofluoromethane	0.32	0.53	0.32	0.081	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.62	2.1	0.62	0.22	U
75-09-2	Methylene Chloride	0.32	0.54	0.32	0.15	U
76-13-1	Trichlorotrifluoroethane	0.17	0.53	0.17	0.076	U
75-15-0	Carbon Disulfide	0.54	1.1	0.54	0.16	U
75-34-3	1,1-Dichloroethane	0.31	0.52	0.31	0.078	U
78-93-3	2-Butanone (MEK)	0.31	1.0	0.31	0.11	U
141-78-6	Ethyl Acetate	0.65	1.1	0.65	0.28	U
110-54-3	n-Hexane	0.32	0.54	0.32	0.11	U
67-66-3	Chloroform	0.17	0.54	0.17	0.071	U
109-99-9	Tetrahydrofuran (THF)	0.17	0.53	0.17	0.067	U
71-43-2	Benzene	0.17	0.52	0.17	0.077	U
56-23-5	Carbon Tetrachloride	0.17	0.52	0.17	0.074	U

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 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	LOQ µg/m ³	LOD µg/m ³	MDL µg/m ³	Data Qualifier
110-82-7	Cyclohexane	0.33	1.0	0.33	0.15	U
75-27-4	Bromodichloromethane	0.17	0.53	0.17	0.077	U
79-01-6	Trichloroethene	0.17	0.53	0.17	0.072	U
123-91-1	1,4-Dioxane	0.17	0.53	0.17	0.063	U
142-82-5	n-Heptane	0.32	0.54	0.32	0.085	U
108-10-1	4-Methyl-2-pentanone	0.17	0.53	0.17	0.073	U
108-88-3	Toluene	0.17	0.53	0.17	0.065	U
591-78-6	2-Hexanone	0.17	0.54	0.17	0.066	U
124-48-1	Dibromochloromethane	0.17	0.54	0.17	0.070	U
106-93-4	1,2-Dibromoethane	0.17	0.54	0.17	0.062	U
127-18-4	Tetrachloroethene	0.17	0.53	0.17	0.069	U
100-41-4	Ethylbenzene	0.17	0.52	0.17	0.075	U
179601-23-1	m,p-Xylenes	0.34	1.1	0.34	0.14	U
75-25-2	Bromoform	0.32	0.53	0.32	0.11	U
100-42-5	Styrene	0.32	0.53	0.32	0.086	U
95-47-6	o-Xylene	0.17	0.53	0.17	0.077	U
108-67-8	1,3,5-Trimethylbenzene	0.17	0.53	0.17	0.077	U
95-63-6	1,2,4-Trimethylbenzene	0.17	0.53	0.17	0.074	U
120-82-1	1,2,4-Trichlorobenzene	0.32	0.53	0.32	0.13	U
95-50-1	1,2-Dichlorobenzene	0.17	0.54	0.17	0.079	U
91-20-3	Naphthalene	0.31	0.51	0.31	0.13	U
1330-20-7	Xylenes, Total	0.34	1.1	0.34	0.14	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister(s) / 1.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 4/13/19
Date(s) Received: 4/22/19
Date(s) Analyzed: 5/1/19

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P190501-MB	99	99	104	70-130	
Lab Control Sample	P190501-LCS	97	98	106	70-130	
Duplicate Lab Control Sample	P190501-DLCS	98	98	106	70-130	
SVEW-01-260	P1902214-001	99	96	106	70-130	
SVEW-02/03-160	P1902214-002	100	97	108	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits		Limit	Qualifier
115-07-1	Propene	211	221	227	105	108	57-136	3	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	219	222	104	106	59-128	2	25	
74-87-3	Chloromethane	211	223	225	106	107	59-132	0.9	25	
75-01-4	Vinyl Chloride	214	231	236	108	110	64-127	2	25	
106-99-0	1,3-Butadiene	210	228	233	109	111	66-134	2	25	
75-00-3	Chloroethane	214	240	245	112	114	63-127	2	25	
64-17-5	Ethanol	1,020	1160	1180	114	116	59-125	2	25	
67-64-1	Acetone	1,060	1150	1170	108	110	58-128	2	25	
75-69-4	Trichlorofluoromethane	211	226	227	107	108	62-126	0.9	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	413	488	496	118	120	52-125	2	25	
75-09-2	Methylene Chloride	217	241	245	111	113	62-115	2	25	
76-13-1	Trichlorotrifluoroethane	216	230	233	106	108	66-126	2	25	
75-15-0	Carbon Disulfide	218	253	255	116	117	57-134	0.9	25	
75-34-3	1,1-Dichloroethane	216	232	235	107	109	68-126	2	25	
78-93-3	2-Butanone (MEK)	208	259	260	125	125	67-130	0	25	
141-78-6	Ethyl Acetate	436	524	525	120	120	65-128	0	25	
110-54-3	n-Hexane	216	236	239	109	111	63-120	2	25	
67-66-3	Chloroform	217	232	234	107	108	68-123	0.9	25	
109-99-9	Tetrahydrofuran (THF)	216	260	263	120	122	64-123	2	25	
71-43-2	Benzene	211	226	227	107	108	69-119	0.9	25	
56-23-5	Carbon Tetrachloride	212	228	229	108	108	68-132	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	LCS	DLCS	Limits	Limit	Qualifier	
110-82-7	Cyclohexane	416	445	451	107	108	70-117	0.9	25	
75-27-4	Bromodichloromethane	215	249	252	116	117	72-128	0.9	25	
79-01-6	Trichloroethene	213	228	229	107	108	71-123	0.9	25	
123-91-1	1,4-Dioxane	214	242	245	113	114	71-122	0.9	25	
142-82-5	n-Heptane	215	236	238	110	111	69-123	0.9	25	
108-10-1	4-Methyl-2-pentanone	209	251	254	120	122	67-130	2	25	
108-88-3	Toluene	212	221	223	104	105	66-119	1	25	
591-78-6	2-Hexanone	214	260	261	121	122	62-128	0.8	25	
124-48-1	Dibromochloromethane	213	259	261	122	123	70-130	0.8	25	
106-93-4	1,2-Dibromoethane	216	254	256	118	119	74-122	0.8	25	
127-18-4	Tetrachloroethene	213	224	226	105	106	66-124	0.9	25	
100-41-4	Ethylbenzene	212	224	224	106	106	70-124	0	25	
179601-23-1	m,p-Xylenes	426	455	457	107	107	61-134	0	25	
75-25-2	Bromoform	213	273	274	128	129	66-139	0.8	25	
100-42-5	Styrene	212	262	263	124	124	73-127	0	25	
95-47-6	o-Xylene	214	230	230	107	107	67-125	0	25	
108-67-8	1,3,5-Trimethylbenzene	214	224	224	105	105	67-130	0	25	
95-63-6	1,2,4-Trimethylbenzene	215	236	236	110	110	66-132	0	25	
120-82-1	1,2,4-Trichlorobenzene	214	228	231	107	108	55-142	0.9	25	
95-50-1	1,2-Dichlorobenzene	216	239	240	111	111	63-129	0	25	
91-20-3	Naphthalene	203	206	209	101	103	57-138	2	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902214
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05011902.D
Analyst: Raneem Sahtah Date Analyzed: 5/1/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 02:50
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	119814	11.24	531603	13.36	271778	17.67
Upper Limit	167740	11.57	744244	13.69	380489	18.00
Lower Limit	71888	10.91	318962	13.03	163067	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)
		AREA #	RT #	AREA #
01	Method Blank	106769	11.22	480100
02	Lab Control Sample	115499	11.24	508349
03	Duplicate Lab Control Sample	115284	11.24	509059
04	SVEW-01-260	111887	11.23	504505
05	SVEW-02/03-160	99791	11.23	450276
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-01-260
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
ALS Sample ID: P1902214-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister
Test Notes:
Container ID: 1SS00946

Date Collected: 4/13/19
Date Received: 4/22/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 7.15

Container Dilution Factor: 2.09

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	50,000	13,000	7,500	3,200	
75-71-8	Dichlorodifluoromethane (CFC 12)	2,600	4,400	2,600	740	U
74-87-3	Chloromethane	6,100	10,000	6,100	1,700	U
75-01-4	Vinyl Chloride	2,800	8,700	2,800	930	U
106-99-0	1,3-Butadiene	5,900	9,800	5,900	1,700	U
75-00-3	Chloroethane	4,900	8,100	4,900	1,000	U
64-17-5	Ethanol	18,000	110,000	18,000	8,200	U
67-64-1	Acetone	120,000	95,000	48,000	21,000	
75-69-4	Trichlorofluoromethane	2,400	3,900	2,400	600	U
67-63-0	2-Propanol (Isopropyl Alcohol)	9,500	36,000	11,000	3,700	J
75-09-2	Methylene Chloride	3,900	6,500	3,900	1,800	U
76-13-1	Trichlorotrifluoroethane	930	2,900	930	410	U
75-15-0	Carbon Disulfide	7,300	15,000	7,300	2,100	U
75-34-3	1,1-Dichloroethane	3,200	5,400	3,200	810	U
78-93-3	2-Butanone (MEK)	18,000	14,000	4,400	1,600	
141-78-6	Ethyl Acetate	7,500	13,000	7,500	3,200	U
110-54-3	n-Hexane	700,000	6,400	3,800	1,300	
67-66-3	Chloroform	1,500	4,600	1,500	610	U
109-99-9	Tetrahydrofuran (THF)	2,400	7,500	2,400	950	U
71-43-2	Benzene	210,000	6,800	2,200	1,000	
56-23-5	Carbon Tetrachloride	1,100	3,500	1,100	490	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-01-260
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:
 Container ID: 1SS00946

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000050 Liter(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 7.15

Container Dilution Factor: 2.09

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	610,000	12,000	4,000	1,800	
75-27-4	Bromodichloromethane	1,100	3,300	1,100	480	U
79-01-6	Trichloroethene	1,300	4,100	1,300	560	U
123-91-1	1,4-Dioxane	2,000	6,200	2,000	730	U
142-82-5	n-Heptane	880,000	5,500	3,300	870	
108-10-1	4-Methyl-2-pentanone	2,400	5,400	1,700	740	J
108-88-3	Toluene	630,000	5,900	1,900	720	
591-78-6	2-Hexanone	1,700	5,500	1,700	670	U
124-48-1	Dibromochloromethane	830	2,700	830	340	U
106-93-4	1,2-Dibromoethane	1,100	2,900	930	340	J
127-18-4	Tetrachloroethene	1,000	3,300	1,000	430	U
100-41-4	Ethylbenzene	42,000	5,000	1,600	720	
179601-23-1	m,p-Xylenes	120,000	11,000	3,300	1,300	
75-25-2	Bromoform	1,300	2,100	1,300	440	U
100-42-5	Styrene	3,100	5,200	3,100	840	U
95-47-6	o-Xylene	33,000	5,100	1,600	740	
108-67-8	1,3,5-Trimethylbenzene	4,700	4,500	1,400	650	
95-63-6	1,2,4-Trimethylbenzene	12,000	4,500	1,400	630	
120-82-1	1,2,4-Trichlorobenzene	1,800	3,000	1,800	730	U
95-50-1	1,2-Dichlorobenzene	1,200	3,800	1,200	550	U
91-20-3	Naphthalene	2,500	4,100	2,500	1,000	U
1330-20-7	Xylenes, Total	150,000	11,000	3,300	1,300	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-02/03-160
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
ALS Sample ID: P1902214-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00749

Date Collected: 4/13/19
Date Received: 4/22/19
Date Analyzed: 5/1/19
Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 6.21

Container Dilution Factor: 1.95

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	23,000	24,000	14,000	5,900	J
75-71-8	Dichlorodifluoromethane (CFC 12)	4,900	8,200	4,900	1,400	U
74-87-3	Chloromethane	11,000	19,000	11,000	3,200	U
75-01-4	Vinyl Chloride	5,200	16,000	5,200	1,700	U
106-99-0	1,3-Butadiene	11,000	18,000	11,000	3,100	U
75-00-3	Chloroethane	9,200	15,000	9,200	2,000	U
64-17-5	Ethanol	34,000	210,000	34,000	15,000	U
67-64-1	Acetone	230,000	180,000	89,000	39,000	
75-69-4	Trichlorofluoromethane	4,400	7,400	4,400	1,100	U
67-63-0	2-Propanol (Isopropyl Alcohol)	11,000	67,000	20,000	7,000	J
75-09-2	Methylene Chloride	7,200	12,000	7,200	3,400	U
76-13-1	Trichlorotrifluoroethane	1,700	5,400	1,700	770	U
75-15-0	Carbon Disulfide	14,000	28,000	14,000	4,000	U
75-34-3	1,1-Dichloroethane	6,000	10,000	6,000	1,500	U
78-93-3	2-Butanone (MEK)	19,000	26,000	8,200	2,900	J
141-78-6	Ethyl Acetate	14,000	24,000	14,000	6,100	U
110-54-3	n-Hexane	1,400,000	12,000	7,100	2,400	
67-66-3	Chloroform	2,700	8,600	2,700	1,100	U
109-99-9	Tetrahydrofuran (THF)	4,500	14,000	4,500	1,800	U
71-43-2	Benzene	300,000	13,000	4,200	1,900	
56-23-5	Carbon Tetrachloride	2,100	6,500	2,100	920	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: SVEW-02/03-160
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P1902214-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Summa Canister
 Test Notes:
 Container ID: 1SC00749

Date Collected: 4/13/19
 Date Received: 4/22/19
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.000025 Liter(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 6.21

Container Dilution Factor: 1.95

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	800,000	23,000	7,500	3,400	
75-27-4	Bromodichloromethane	2,000	6,200	2,000	900	U
79-01-6	Trichloroethene	2,500	7,700	2,500	1,000	U
123-91-1	1,4-Dioxane	3,700	11,000	3,700	1,400	U
142-82-5	n-Heptane	490,000	10,000	6,100	1,600	
108-10-1	4-Methyl-2-pentanone	3,200	10,000	3,200	1,400	U
108-88-3	Toluene	260,000	11,000	3,500	1,300	
591-78-6	2-Hexanone	3,200	10,000	3,200	1,300	U
124-48-1	Dibromochloromethane	1,600	4,900	1,600	640	U
106-93-4	1,2-Dibromoethane	1,700	5,500	1,700	630	U
127-18-4	Tetrachloroethene	2,000	6,100	2,000	790	U
100-41-4	Ethylbenzene	17,000	9,300	3,100	1,300	
179601-23-1	m,p-Xylenes	47,000	20,000	6,100	2,500	
75-25-2	Bromoform	2,400	4,000	2,400	830	U
100-42-5	Styrene	5,900	9,700	5,900	1,600	U
95-47-6	o-Xylene	16,000	9,500	3,100	1,400	
108-67-8	1,3,5-Trimethylbenzene	3,000	8,400	2,700	1,200	J
95-63-6	1,2,4-Trimethylbenzene	8,000	8,400	2,700	1,200	J
120-82-1	1,2,4-Trichlorobenzene	3,400	5,600	3,400	1,400	U
95-50-1	1,2-Dichlorobenzene	2,200	7,000	2,200	1,000	U
91-20-3	Naphthalene	4,600	7,600	4,600	1,900	U
1330-20-7	Xylenes, Total	63,000	20,000	6,100	2,500	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	0.18	0.30	0.18	0.076	U
75-71-8	Dichlorodifluoromethane (CFC 12)	0.063	0.11	0.063	0.018	U
74-87-3	Chloromethane	0.15	0.24	0.15	0.042	U
75-01-4	Vinyl Chloride	0.067	0.21	0.067	0.022	U
106-99-0	1,3-Butadiene	0.14	0.24	0.14	0.040	U
75-00-3	Chloroethane	0.12	0.19	0.12	0.025	U
64-17-5	Ethanol	0.44	2.7	0.44	0.20	U
67-64-1	Acetone	1.1	2.3	1.1	0.51	U
75-69-4	Trichlorofluoromethane	0.057	0.094	0.057	0.014	U
67-63-0	2-Propanol (Isopropyl Alcohol)	0.25	0.85	0.25	0.090	U
75-09-2	Methylene Chloride	0.092	0.16	0.092	0.043	U
76-13-1	Trichlorotrifluoroethane	0.022	0.069	0.022	0.0099	U
75-15-0	Carbon Disulfide	0.17	0.35	0.17	0.051	U
75-34-3	1,1-Dichloroethane	0.077	0.13	0.077	0.019	U
78-93-3	2-Butanone (MEK)	0.11	0.34	0.11	0.037	U
141-78-6	Ethyl Acetate	0.18	0.31	0.18	0.078	U
110-54-3	n-Hexane	0.091	0.15	0.091	0.031	U
67-66-3	Chloroform	0.035	0.11	0.035	0.015	U
109-99-9	Tetrahydrofuran (THF)	0.058	0.18	0.058	0.023	U
71-43-2	Benzene	0.053	0.16	0.053	0.024	U
56-23-5	Carbon Tetrachloride	0.027	0.083	0.027	0.012	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Method Blank
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-MB

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 1.00 Liter(s)

Container Dilution Factor: 1.00

CAS #	Compound	Result ppbV	LOQ ppbV	LOD ppbV	MDL ppbV	Data Qualifier
110-82-7	Cyclohexane	0.096	0.29	0.096	0.044	U
75-27-4	Bromodichloromethane	0.025	0.079	0.025	0.011	U
79-01-6	Trichloroethene	0.032	0.099	0.032	0.013	U
123-91-1	1,4-Dioxane	0.047	0.15	0.047	0.017	U
142-82-5	n-Heptane	0.078	0.13	0.078	0.021	U
108-10-1	4-Methyl-2-pentanone	0.041	0.13	0.041	0.018	U
108-88-3	Toluene	0.045	0.14	0.045	0.017	U
591-78-6	2-Hexanone	0.042	0.13	0.042	0.016	U
124-48-1	Dibromochloromethane	0.020	0.063	0.020	0.0082	U
106-93-4	1,2-Dibromoethane	0.022	0.070	0.022	0.0081	U
127-18-4	Tetrachloroethene	0.025	0.078	0.025	0.010	U
100-41-4	Ethylbenzene	0.039	0.12	0.039	0.017	U
179601-23-1	m,p-Xylenes	0.078	0.25	0.078	0.032	U
75-25-2	Bromoform	0.031	0.051	0.031	0.011	U
100-42-5	Styrene	0.075	0.12	0.075	0.020	U
95-47-6	o-Xylene	0.039	0.12	0.039	0.018	U
108-67-8	1,3,5-Trimethylbenzene	0.035	0.11	0.035	0.016	U
95-63-6	1,2,4-Trimethylbenzene	0.035	0.11	0.035	0.015	U
120-82-1	1,2,4-Trichlorobenzene	0.043	0.071	0.043	0.018	U
95-50-1	1,2-Dichlorobenzene	0.028	0.090	0.028	0.013	U
91-20-3	Naphthalene	0.059	0.097	0.059	0.025	U
1330-20-7	Xylenes, Total	0.078	0.25	0.078	0.032	U

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
 LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc.
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Raneem Sahtah
Sampling Media: 1.0 L Silonite Summa Canister(s) / 1.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 4/13/19
Date(s) Received: 4/22/19
Date(s) Analyzed: 5/1/19

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P190501-MB	99	99	104	70-130	
Lab Control Sample	P190501-LCS	97	98	106	70-130	
Duplicate Lab Control Sample	P190501-DLCS	97	98	106	70-130	
SVEW-01-260	P1902214-001	99	96	106	70-130	
SVEW-02/03-160	P1902214-002	99	97	108	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	LCS	DLCS	% Recovery	Acceptance	RPD			
		ppbV	ppbV	ppbV	LCS	DLCS	Limits	Limit	Qualifier	
115-07-1	Propene	123	128	132	104	107	57-136	3	25	
75-71-8	Dichlorodifluoromethane (CFC 12)	42.6	44.4	45.0	104	106	59-128	2	25	
74-87-3	Chloromethane	102	108	109	106	107	59-132	0.9	25	
75-01-4	Vinyl Chloride	83.7	90.2	92.3	108	110	64-127	2	25	
106-99-0	1,3-Butadiene	95.1	103	105	108	110	66-134	2	25	
75-00-3	Chloroethane	81.1	91.0	92.7	112	114	63-127	2	25	
64-17-5	Ethanol	544	615	629	113	116	59-125	3	25	
67-64-1	Acetone	446	485	493	109	111	58-128	2	25	
75-69-4	Trichlorofluoromethane	37.6	40.3	40.5	107	108	62-126	0.9	25	
67-63-0	2-Propanol (Isopropyl Alcohol)	168	199	202	118	120	52-125	2	25	
75-09-2	Methylene Chloride	62.4	69.3	70.7	111	113	62-115	2	25	
76-13-1	Trichlorotrifluoroethane	28.1	30.1	30.4	107	108	66-126	0.9	25	
75-15-0	Carbon Disulfide	69.9	81.3	82.0	116	117	57-134	0.9	25	
75-34-3	1,1-Dichloroethane	53.3	57.3	58.0	108	109	68-126	0.9	25	
78-93-3	2-Butanone (MEK)	70.4	87.7	88.2	125	125	67-130	0	25	
141-78-6	Ethyl Acetate	121	145	146	120	121	65-128	0.8	25	
110-54-3	n-Hexane	61.2	66.9	67.9	109	111	63-120	2	25	
67-66-3	Chloroform	44.4	47.6	47.9	107	108	68-123	0.9	25	
109-99-9	Tetrahydrofuran (THF)	73.3	88.2	89.3	120	122	64-123	2	25	
71-43-2	Benzene	66.1	70.8	71.0	107	107	69-119	0	25	
56-23-5	Carbon Tetrachloride	33.7	36.3	36.4	108	108	68-132	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 2

Client: EA Engineering, Science, and Technology, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

ALS Project ID: P1902214
 ALS Sample ID: P190501-DLCS

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Raneem Sahtah
 Sampling Media: 1.0 L Silonite Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/1/19
 Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount		Result		DOD		RPD	RPD	Data
		LCS / DLCS	ppbV	LCS	DLCS	% Recovery	Acceptance			
110-82-7	Cyclohexane	121	129	131	107	108	70-117	0.9	25	
75-27-4	Bromodichloromethane	32.0	37.2	37.6	116	118	72-128	2	25	
79-01-6	Trichloroethene	39.7	42.4	42.7	107	108	71-123	0.9	25	
123-91-1	1,4-Dioxane	59.4	67.1	67.9	113	114	71-122	0.9	25	
142-82-5	n-Heptane	52.5	57.7	58.0	110	110	69-123	0	25	
108-10-1	4-Methyl-2-pentanone	51.1	61.3	61.9	120	121	67-130	0.8	25	
108-88-3	Toluene	56.3	58.7	59.1	104	105	66-119	1	25	
591-78-6	2-Hexanone	52.3	63.6	63.8	122	122	62-128	0	25	
124-48-1	Dibromochloromethane	25.0	30.4	30.7	122	123	70-130	0.8	25	
106-93-4	1,2-Dibromoethane	28.1	33.0	33.3	117	119	74-122	2	25	
127-18-4	Tetrachloroethene	31.4	33.0	33.3	105	106	66-124	0.9	25	
100-41-4	Ethylbenzene	48.9	51.6	51.7	106	106	70-124	0	25	
179601-23-1	m,p-Xylenes	98.2	105	105	107	107	61-134	0	25	
75-25-2	Bromoform	20.6	26.4	26.5	128	129	66-139	0.8	25	
100-42-5	Styrene	49.8	61.6	61.8	124	124	73-127	0	25	
95-47-6	o-Xylene	49.3	52.9	53.1	107	108	67-125	0.9	25	
108-67-8	1,3,5-Trimethylbenzene	43.5	45.6	45.6	105	105	67-130	0	25	
95-63-6	1,2,4-Trimethylbenzene	43.8	48.0	48.1	110	110	66-132	0	25	
120-82-1	1,2,4-Trichlorobenzene	28.9	30.8	31.1	107	108	55-142	0.9	25	
95-50-1	1,2-Dichlorobenzene	35.9	39.8	39.9	111	111	63-129	0	25	
91-20-3	Naphthalene	38.7	39.4	39.8	102	103	57-138	1	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: EA Engineering, Science, and Technology, Inc. ALS Project ID: P1902214
Client Project ID: Kirtland Air Force Base / 6273DM02.1038.08

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Lab File ID: 05011902.D
Analyst: Raneem Sahtah Date Analyzed: 5/1/19
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 02:50
Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
24 Hour Standard	119814	11.24	531603	13.36	271778	17.67
Upper Limit	167740	11.57	744244	13.69	380489	18.00
Lower Limit	71888	10.91	318962	13.03	163067	17.34

Client Sample ID		IS1 (BCM)	IS2 (DFB)	IS3 (CBZ)
		AREA #	RT #	AREA #
01	Method Blank	106769	11.22	480100
02	Lab Control Sample	115499	11.24	508349
03	Duplicate Lab Control Sample	115284	11.24	509059
04	SVEW-01-260	111887	11.23	504505
05	SVEW-02/03-160	99791	11.23	450276
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits.



4/26/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904263A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/11/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker".

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1904263A

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/11/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/26/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-15	15.0 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified TO-15	12.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified TO-15	10.5 "Hg	5 psi
04A	KAFB-106V1 217.1	Modified TO-15	9.5 "Hg	5 psi
04B	KAFB-106V1 217.1	Modified TO-15	9.5 "Hg	5 psi
05A	KAFB-106V1 252.1	Modified TO-15	12.0 "Hg	5 psi
05B	KAFB-106V1 252.1	Modified TO-15	12.0 "Hg	5 psi
06A	KAFB-106V1 262.6	Modified TO-15	11.0 "Hg	5 psi
06B	KAFB-106V1 262.6	Modified TO-15	11.0 "Hg	5 psi
07A	Lab Blank	Modified TO-15	NA	NA
07B	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
08B	CCV	Modified TO-15	NA	NA
08C	CCV	Modified TO-15	NA	NA
08D	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA
09AA	LCS	Modified TO-15	NA	NA
09B	LCS	Modified TO-15	NA	NA
09BB	LCS	Modified TO-15	NA	NA

CERTIFIED BY:



Technical Director

DATE: 04/26/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Page 2 of 46

LABORATORY NARRATIVE
DoD QSM 5.1 TO-15 LL/SIM
EA Engineering
Workorder# 1904263A

Six 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on April 11, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liter of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modification taken to run these samples is summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-15 LL/SIM</i>	<i>ATL Modifications</i>
Blank and standards	Zero air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

The Chain of Custody (COC) information for sample KAFB-106V1 102.1 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Sample KAFB-106V1 102.1 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Analytical Notes

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

Samples were analyzed in two analytical batches on MSD-14 on 4/24/19 and 4/25/19. The initial continuing calibration verification (CCV) for the batch were reported as lab fractions 08A and 08C and the ending CCV were reported as lab fractions 08B and 08D

Naphthalene exceeded initial calibration project acceptance criterion of $\leq 30\%$ Relative Standard Deviation (RSD).

Chloroethane was manually integrated in the initial calibration.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A Limit of Detection (LOD) study and Method Detection Limit (MDL) study is not maintained for non-standard compounds.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and O-Xylene.

The per analytical batch duplicate analysis required for this project is associated with work order 1404325A.

All samples were transferred from SIM/Low Level analysis to full scan TO-15 due to high levels of target compounds.

Dilution was performed on samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 217.1, KAFB-106V1 252.1 and KAFB-106V1 262.6 due to the presence of high level target species.

Acetone exceeded the instrument's calibration range for samples KAFB-106V1 102.1, KAFB-106V1 159.6 and KAFB-106V1 217.1 and was flagged accordingly.

Hexane exceeded the instrument's calibration range for samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 159.6 and KAFB-106V1 217.1 and was flagged accordingly.

2-Butanone (Methyl Ethyl Ketone) exceeded the instrument's calibration range for samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 217.1 and KAFB-106V1 262.6 and was flagged accordingly.

Cyclohexane exceeded the instrument's calibration range for samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 159.6 and KAFB-106V1 217.1 and was flagged accordingly.

Heptane exceeded the instrument's calibration range for samples KAFB-106V1 217.1, KAFB-106V1 252.1 and KAFB-106V1 262.6 and was flagged accordingly.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	4/24/19 10:09 PM
Lab ID:	1904263A-01A	Dilution Factor:	134
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	msd14.i / 14042420
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	750	1600	2700	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	8000	9900	20000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	620	2000	3300	54000
1,2-Dibromoethane (EDB)	106-93-4	910	3100	5100	3800 J
1,2-Dichlorobenzene	95-50-1	970	2400	4000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	550	2000	3300	19000
1,3-Butadiene	106-99-0	460	890	1500	Not Detected U
1,4-Dioxane	123-91-1	2600	4800	9600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1900	4000	7900	780000 J
2-Hexanone	591-78-6	4100	5500	11000	Not Detected U
2-Propanol	67-63-0	840	3300	6600	270000
4-Methyl-2-pentanone	108-10-1	1300	1600	2700	Not Detected U
Acetone	67-64-1	930	3200	6400	4400000 J
Benzene	71-43-2	300	1300	2100	2100000
Bromodichloromethane	75-27-4	450	2700	4500	Not Detected U
Bromoform	75-25-2	960	4200	6900	Not Detected U
Carbon Disulfide	75-15-0	1300	4200	8300	Not Detected U
Carbon Tetrachloride	56-23-5	1000	2500	4200	Not Detected U
Chloroethane	75-00-3	2000	3500	7100	Not Detected U
Chloroform	67-66-3	560	2000	3300	Not Detected U
Chloromethane	74-87-3	1200	2800	5500	Not Detected U
Cyclohexane	110-82-7	510	1400	2300	5300000 J
Dibromochloromethane	124-48-1	1200	3400	5700	Not Detected U
Ethanol	64-17-5	1100	2500	5000	160000



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	4/24/19 10:09 PM
Lab ID:	1904263A-01A	Dilution Factor:	134
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	msd14.i / 14042420
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	9600	Not Detected U
Ethyl Benzene	100-41-4	580	1700	2900	170000
Freon 11	75-69-4	560	2200	3800	Not Detected U
Freon 113	76-13-1	910	3100	5100	Not Detected U
Freon 12	75-71-8	740	2000	3300	Not Detected U
Heptane	142-82-5	930	1600	2700	3100000
Hexane	110-54-3	580	1400	2400	8500000 J
m,p-Xylene	108-38-3	550	1700	2900	270000
Methylene Chloride	75-09-2	1400	4600	9300	Not Detected U
Naphthalene	91-20-3	1100	7000	14000	Not Detected U
o-Xylene	95-47-6	780	1700	2900	82000
Propylene	115-07-1	790	2300	4600	42000
Styrene	100-42-5	540	1700	2800	Not Detected U
Tetrachloroethene	127-18-4	1600	2700	4500	Not Detected U
Tetrahydrofuran	109-99-9	700	1200	2000	Not Detected U
Toluene	108-88-3	450	1500	2500	1900000
Total Xylene	1330-20-7	NA	D	2900	350000
Trichloroethene	79-01-6	1100	2200	3600	Not Detected U
Vinyl Chloride	75-01-4	590	1000	1700	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
------------	------	--------	-----------

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	4/24/19 10:09 PM
Lab ID:	1904263A-01A	Dilution Factor:	134
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	msd14.i / 14042420
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	116
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	4/24/19 10:43 PM
Lab ID:	1904263A-02A	Dilution Factor:	112
Date/Time Collected:	4/10/19 10:14 AM	Instrument/Filename:	msd14.i / 14042421
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	630	1400	2300	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6700	8300	17000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	520	1600	2800	58000
1,2-Dibromoethane (EDB)	106-93-4	760	2600	4300	3800 J
1,2-Dichlorobenzene	95-50-1	810	2000	3400	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	460	1600	2800	19000
1,3-Butadiene	106-99-0	390	740	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	4000	8100	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	3300	6600	370000 J
2-Hexanone	591-78-6	3400	4600	9200	Not Detected U
2-Propanol	67-63-0	700	2800	5500	120000
4-Methyl-2-pentanone	108-10-1	1100	1400	2300	Not Detected U
Acetone	67-64-1	780	2700	5300	2500000
Benzene	71-43-2	250	1100	1800	1600000
Bromodichloromethane	75-27-4	380	2200	3800	Not Detected U
Bromoform	75-25-2	800	3500	5800	Not Detected U
Carbon Disulfide	75-15-0	1100	3500	7000	Not Detected U
Carbon Tetrachloride	56-23-5	840	2100	3500	Not Detected U
Chloroethane	75-00-3	1700	3000	5900	Not Detected U
Chloroform	67-66-3	470	1600	2700	Not Detected U
Chloromethane	74-87-3	970	2300	4600	Not Detected U
Cyclohexane	110-82-7	430	1200	1900	4300000 J
Dibromochloromethane	124-48-1	980	2900	4800	Not Detected U
Ethanol	64-17-5	920	2100	4200	140000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	4/24/19 10:43 PM
Lab ID:	1904263A-02A	Dilution Factor:	112
Date/Time Collected:	4/10/19 10:14 AM	Instrument/Filename:	msd14.i / 14042421
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	8100	Not Detected U
Ethyl Benzene	100-41-4	490	1400	2400	190000
Freon 11	75-69-4	460	1900	3100	Not Detected U
Freon 113	76-13-1	760	2600	4300	Not Detected U
Freon 12	75-71-8	610	1700	2800	Not Detected U
Heptane	142-82-5	780	1400	2300	2900000
Hexane	110-54-3	480	1200	2000	6900000 J
m,p-Xylene	108-38-3	460	1400	2400	320000
Methylene Chloride	75-09-2	1200	3900	7800	Not Detected U
Naphthalene	91-20-3	900	5900	12000	980 J
o-Xylene	95-47-6	660	1400	2400	95000
Propylene	115-07-1	660	1900	3800	37000
Styrene	100-42-5	450	1400	2400	Not Detected U
Tetrachloroethene	127-18-4	1300	2300	3800	Not Detected U
Tetrahydrofuran	109-99-9	580	990	1600	Not Detected U
Toluene	108-88-3	380	1300	2100	1700000
Total Xylene	1330-20-7	NA	D	2400	410000
Trichloroethene	79-01-6	890	1800	3000	Not Detected U
Vinyl Chloride	75-01-4	500	860	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	4/24/19 10:43 PM
Lab ID:	1904263A-02A	Dilution Factor:	112
Date/Time Collected:	4/10/19 10:14 AM	Instrument/Filename:	msd14.i / 14042421
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	116
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	4/24/19 11:15 PM
Lab ID:	1904263A-03A	Dilution Factor:	103
Date/Time Collected:	4/10/19 10:40 AM	Instrument/Filename:	msd14.i / 14042422
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	580	1200	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6200	7600	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	480	1500	2500	78000
1,2-Dibromoethane (EDB)	106-93-4	700	2400	4000	2800 J
1,2-Dichlorobenzene	95-50-1	750	1800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	420	1500	2500	28000
1,3-Butadiene	106-99-0	360	680	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	3700	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3000	6100	170000
2-Hexanone	591-78-6	3200	4200	8400	Not Detected U
2-Propanol	67-63-0	640	2500	5100	390000
4-Methyl-2-pentanone	108-10-1	1000	1300	2100	Not Detected U
Acetone	67-64-1	710	2400	4900	2600000 J
Benzene	71-43-2	230	990	1600	1300000
Bromodichloromethane	75-27-4	340	2100	3400	Not Detected U
Bromoform	75-25-2	730	3200	5300	Not Detected U
Carbon Disulfide	75-15-0	980	3200	6400	Not Detected U
Carbon Tetrachloride	56-23-5	770	1900	3200	Not Detected U
Chloroethane	75-00-3	1600	2700	5400	Not Detected U
Chloroform	67-66-3	430	1500	2500	Not Detected U
Chloromethane	74-87-3	890	2100	4200	Not Detected U
Cyclohexane	110-82-7	390	1100	1800	3800000 J
Dibromochloromethane	124-48-1	900	2600	4400	Not Detected U
Ethanol	64-17-5	850	1900	3900	110000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	4/24/19 11:15 PM
Lab ID:	1904263A-03A	Dilution Factor:	103
Date/Time Collected:	4/10/19 10:40 AM	Instrument/Filename:	msd14.i / 14042422
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected U
Ethyl Benzene	100-41-4	450	1300	2200	280000
Freon 11	75-69-4	430	1700	2900	Not Detected U
Freon 113	76-13-1	700	2400	3900	Not Detected U
Freon 12	75-71-8	560	1500	2500	Not Detected U
Heptane	142-82-5	710	1300	2100	3600000
Hexane	110-54-3	450	1100	1800	5300000 J
m,p-Xylene	108-38-3	420	1300	2200	620000
Methylene Chloride	75-09-2	1100	3600	7200	Not Detected U
Naphthalene	91-20-3	830	5400	11000	Not Detected U
o-Xylene	95-47-6	600	1300	2200	180000
Propylene	115-07-1	610	1800	3500	32000
Styrene	100-42-5	420	1300	2200	Not Detected U
Tetrachloroethene	127-18-4	1200	2100	3500	Not Detected U
Tetrahydrofuran	109-99-9	540	910	1500	Not Detected U
Toluene	108-88-3	350	1200	1900	2200000
Total Xylene	1330-20-7	NA	D	2200	790000
Trichloroethene	79-01-6	820	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	460	790	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	4/24/19 11:15 PM
Lab ID:	1904263A-03A	Dilution Factor:	103
Date/Time Collected:	4/10/19 10:40 AM	Instrument/Filename:	msd14.i / 14042422
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	116
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/24/19 08:26 PM
Lab ID:	1904263A-04A	Dilution Factor:	98.0
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	msd14.i / 14042417
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	550	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5900	7300	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	460	1400	2400	98000
1,2-Dibromoethane (EDB)	106-93-4	660	2200	3800	4500
1,2-Dichlorobenzene	95-50-1	710	1800	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	400	1400	2400	41000
1,3-Butadiene	106-99-0	340	650	1100	Not Detected U
1,4-Dioxane	123-91-1	1900	3500	7100	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2900	5800	500000 J
2-Hexanone	591-78-6	3000	4000	8000	Not Detected U
2-Propanol	67-63-0	610	2400	4800	58000
4-Methyl-2-pentanone	108-10-1	980	1200	2000	Not Detected U
Acetone	67-64-1	680	2300	4600	4900000 J
Benzene	71-43-2	220	940	1600	1700000
Bromodichloromethane	75-27-4	330	2000	3300	Not Detected U
Bromoform	75-25-2	700	3000	5100	Not Detected U
Carbon Disulfide	75-15-0	930	3000	6100	Not Detected U
Carbon Tetrachloride	56-23-5	730	1800	3100	Not Detected U
Chloroethane	75-00-3	1500	2600	5200	Not Detected U
Chloroform	67-66-3	410	1400	2400	Not Detected U
Chloromethane	74-87-3	850	2000	4000	Not Detected U
Cyclohexane	110-82-7	370	1000	1700	5800000 J
Dibromochloromethane	124-48-1	860	2500	4200	Not Detected U
Ethanol	64-17-5	810	1800	3700	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/24/19 08:26 PM
Lab ID:	1904263A-04A	Dilution Factor:	98.0
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	msd14.i / 14042417
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7100	Not Detected U
Ethyl Benzene	100-41-4	420	1300	2100	460000
Freon 11	75-69-4	410	1600	2800	Not Detected U
Freon 113	76-13-1	670	2200	3800	Not Detected U
Freon 12	75-71-8	540	1400	2400	Not Detected U
Heptane	142-82-5	680	1200	2000	6600000 J
Hexane	110-54-3	420	1000	1700	7200000 J
m,p-Xylene	108-38-3	400	1300	2100	1400000
Methylene Chloride	75-09-2	1000	3400	6800	Not Detected U
Naphthalene	91-20-3	790	5100	10000	Not Detected U
o-Xylene	95-47-6	570	1300	2100	400000
Propylene	115-07-1	580	1700	3400	62000
Styrene	100-42-5	400	1200	2100	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3300	Not Detected U
Tetrahydrofuran	109-99-9	510	870	1400	Not Detected U
Toluene	108-88-3	330	1100	1800	Not Detected U
Total Xylene	1330-20-7	NA	D	2100	1800000
Trichloroethene	79-01-6	780	1600	2600	Not Detected U
Vinyl Chloride	75-01-4	430	750	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/24/19 08:26 PM
Lab ID:	1904263A-04A	Dilution Factor:	98.0
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	msd14.i / 14042417
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	133
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	110

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/25/19 04:08 PM
Lab ID:	1904263A-04B	Dilution Factor:	196
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	msd14.i / 14042512
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	660	2200	3700	4200000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	113
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	107

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/24/19 09:03 PM
Lab ID:	1904263A-05A	Dilution Factor:	112
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	msd14.i / 14042418
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	630	1400	2300	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6700	8300	17000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	520	1600	2800	50000
1,2-Dibromoethane (EDB)	106-93-4	760	2600	4300	18000
1,2-Dichlorobenzene	95-50-1	810	2000	3400	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	460	1600	2800	22000
1,3-Butadiene	106-99-0	390	740	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	4000	8100	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	3300	6600	280000
2-Hexanone	591-78-6	3400	4600	9200	Not Detected U
2-Propanol	67-63-0	700	2800	5500	27000
4-Methyl-2-pentanone	108-10-1	1100	1400	2300	Not Detected U
Acetone	67-64-1	780	2700	5300	1100000
Benzene	71-43-2	250	1100	1800	870000
Bromodichloromethane	75-27-4	380	2200	3800	Not Detected U
Bromoform	75-25-2	800	3500	5800	Not Detected U
Carbon Disulfide	75-15-0	1100	3500	7000	Not Detected U
Carbon Tetrachloride	56-23-5	840	2100	3500	Not Detected U
Chloroethane	75-00-3	1700	3000	5900	Not Detected U
Chloroform	67-66-3	470	1600	2700	Not Detected U
Chloromethane	74-87-3	970	2300	4600	Not Detected U
Cyclohexane	110-82-7	430	1200	1900	3500000
Dibromochloromethane	124-48-1	980	2900	4800	Not Detected U
Ethanol	64-17-5	920	2100	4200	2400 J



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/24/19 09:03 PM
Lab ID:	1904263A-05A	Dilution Factor:	112
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	msd14.i / 14042418
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	8100	Not Detected U
Ethyl Benzene	100-41-4	490	1400	2400	400000
Freon 11	75-69-4	460	1900	3100	Not Detected U
Freon 113	76-13-1	760	2600	4300	Not Detected U
Freon 12	75-71-8	610	1700	2800	Not Detected U
Heptane	142-82-5	780	1400	2300	7200000 J
Hexane	110-54-3	480	1200	2000	3700000
m,p-Xylene	108-38-3	460	1400	2400	1200000
Methylene Chloride	75-09-2	1200	3900	7800	Not Detected U
Naphthalene	91-20-3	900	5900	12000	Not Detected U
o-Xylene	95-47-6	660	1400	2400	320000
Propylene	115-07-1	660	1900	3800	100000
Styrene	100-42-5	450	1400	2400	Not Detected U
Tetrachloroethene	127-18-4	1300	2300	3800	Not Detected U
Tetrahydrofuran	109-99-9	580	990	1600	Not Detected U
Toluene	108-88-3	380	1300	2100	Not Detected U
Total Xylene	1330-20-7	NA	D	2400	1500000
Trichloroethene	79-01-6	890	1800	3000	Not Detected U
Vinyl Chloride	75-01-4	500	860	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/24/19 09:03 PM
Lab ID:	1904263A-05A	Dilution Factor:	112
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	msd14.i / 14042418
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	121
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	112

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/25/19 04:38 PM
Lab ID:	1904263A-05B	Dilution Factor:	223
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	msd14.i / 14042513
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	760	2500	4200	5400000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	124
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	110

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/24/19 09:39 PM
Lab ID:	1904263A-06A	Dilution Factor:	106
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	msd14.i / 14042419
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	600	1300	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6400	7900	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	68000
1,2-Dibromoethane (EDB)	106-93-4	720	2400	4100	23000
1,2-Dichlorobenzene	95-50-1	770	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	430	1600	2600	27000
1,3-Butadiene	106-99-0	370	700	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3800	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3100	6200	510000 J
2-Hexanone	591-78-6	3200	4300	8700	Not Detected U
2-Propanol	67-63-0	660	2600	5200	50000
4-Methyl-2-pentanone	108-10-1	1000	1300	2200	Not Detected U
Acetone	67-64-1	740	2500	5000	1800000
Benzene	71-43-2	240	1000	1700	920000
Bromodichloromethane	75-27-4	360	2100	3600	Not Detected U
Bromoform	75-25-2	760	3300	5500	Not Detected U
Carbon Disulfide	75-15-0	1000	3300	6600	Not Detected U
Carbon Tetrachloride	56-23-5	790	2000	3300	Not Detected U
Chloroethane	75-00-3	1600	2800	5600	Not Detected U
Chloroform	67-66-3	440	1600	2600	Not Detected U
Chloromethane	74-87-3	920	2200	4400	Not Detected U
Cyclohexane	110-82-7	400	1100	1800	3300000
Dibromochloromethane	124-48-1	930	2700	4500	Not Detected U
Ethanol	64-17-5	870	2000	4000	12000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/24/19 09:39 PM
Lab ID:	1904263A-06A	Dilution Factor:	106
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	msd14.i / 14042419
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected U
Ethyl Benzene	100-41-4	460	1400	2300	410000
Freon 11	75-69-4	440	1800	3000	Not Detected U
Freon 113	76-13-1	720	2400	4100	Not Detected U
Freon 12	75-71-8	580	1600	2600	Not Detected U
Heptane	142-82-5	730	1300	2200	8100000 J
Hexane	110-54-3	460	1100	1900	3100000
m,p-Xylene	108-38-3	430	1400	2300	1100000
Methylene Chloride	75-09-2	1100	3700	7400	Not Detected U
Naphthalene	91-20-3	860	5600	11000	Not Detected U
o-Xylene	95-47-6	620	1400	2300	280000
Propylene	115-07-1	620	1800	3600	110000
Styrene	100-42-5	430	1400	2200	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3600	Not Detected U
Tetrahydrofuran	109-99-9	550	940	1600	Not Detected U
Toluene	108-88-3	360	1200	2000	Not Detected U
Total Xylene	1330-20-7	NA	D	2300	1400000
Trichloroethene	79-01-6	840	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	470	810	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/24/19 09:39 PM
Lab ID:	1904263A-06A	Dilution Factor:	106
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	msd14.i / 14042419
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	126
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	114

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/25/19 10:21 PM
Lab ID:	1904263A-06B	Dilution Factor:	353
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	msd14.i / 14042524
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	1200	4000	6600	6400000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	105
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904263A-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	5.6	12	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	60	74	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	4.7	15	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	6.8	23	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	7.3	18	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	4.1	15	24	Not Detected U
1,3-Butadiene	106-99-0	3.5	6.6	11	Not Detected U
1,4-Dioxane	123-91-1	20	36	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	29	59	Not Detected U
2-Hexanone	591-78-6	31	41	82	Not Detected U
2-Propanol	67-63-0	6.3	24	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	10	12	20	Not Detected U
Acetone	67-64-1	6.9	24	48	Not Detected U
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	20	34	Not Detected U
Bromoform	75-25-2	7.1	31	52	Not Detected U
Carbon Disulfide	75-15-0	9.5	31	62	Not Detected U
Carbon Tetrachloride	56-23-5	7.5	19	31	Not Detected U
Chloroethane	75-00-3	15	26	53	Not Detected U
Chloroform	67-66-3	4.2	15	24	Not Detected U
Chloromethane	74-87-3	8.7	21	41	Not Detected U
Cyclohexane	110-82-7	3.8	10	17	Not Detected U
Dibromochloromethane	124-48-1	8.8	26	42	Not Detected U
Ethanol	64-17-5	8.2	19	38	Not Detected U



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904263A-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected U
Ethyl Benzene	100-41-4	4.3	13	22	Not Detected U
Freon 11	75-69-4	4.2	17	28	Not Detected U
Freon 113	76-13-1	6.8	23	38	Not Detected U
Freon 12	75-71-8	5.5	15	25	Not Detected U
Heptane	142-82-5	6.9	12	20	Not Detected U
Hexane	110-54-3	4.3	10	18	Not Detected U
m,p-Xylene	108-38-3	4.1	13	22	Not Detected U
Methylene Chloride	75-09-2	11	35	69	Not Detected U
Naphthalene	91-20-3	8.1	52	100	Not Detected U
o-Xylene	95-47-6	5.9	13	22	Not Detected U
Propylene	115-07-1	5.9	17	34	Not Detected U
Styrene	100-42-5	4.0	13	21	Not Detected U
Tetrachloroethene	127-18-4	12	20	34	Not Detected U
Tetrahydrofuran	109-99-9	5.2	8.8	15	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	8.0	16	27	Not Detected U
Vinyl Chloride	75-01-4	4.4	7.7	13	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	98

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904263A-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/25/19 11:27 AM
Lab ID:	1904263A-07B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042507a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	3.4	11	19	5.7 J

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904263A-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	106
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	99
1,2-Dichlorobenzene	95-50-1	97
1,3,5-Trimethylbenzene	108-67-8	103
1,3-Butadiene	106-99-0	102
1,4-Dioxane	123-91-1	102
2-Butanone (Methyl Ethyl Ketone)	78-93-3	100
2-Hexanone	591-78-6	102
2-Propanol	67-63-0	101
4-Methyl-2-pentanone	108-10-1	105
Acetone	67-64-1	102
Benzene	71-43-2	95
Bromodichloromethane	75-27-4	96
Bromoform	75-25-2	99
Carbon Disulfide	75-15-0	100
Carbon Tetrachloride	56-23-5	101
Chloroethane	75-00-3	110
Chloroform	67-66-3	98
Chloromethane	74-87-3	103
Cyclohexane	110-82-7	102
Dibromochloromethane	124-48-1	99
Ethanol	64-17-5	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904263A-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	110
Ethyl Benzene	100-41-4	97
Freon 11	75-69-4	103
Freon 113	76-13-1	101
Freon 12	75-71-8	102
Heptane	142-82-5	94
Hexane	110-54-3	102
m,p-Xylene	108-38-3	96
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	125
o-Xylene	95-47-6	97
Propylene	115-07-1	94
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	96
Tetrahydrofuran	109-99-9	102
Toluene	108-88-3	95
Total Xylene	1330-20-7	96
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	103

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	97

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904263A-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904263A-08B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	95
1,2,4-Trimethylbenzene	95-63-6	98
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	99
1,3,5-Trimethylbenzene	108-67-8	106
1,3-Butadiene	106-99-0	98
1,4-Dioxane	123-91-1	106
2-Butanone (Methyl Ethyl Ketone)	78-93-3	111
2-Hexanone	591-78-6	105
2-Propanol	67-63-0	102
4-Methyl-2-pentanone	108-10-1	110
Acetone	67-64-1	117
Benzene	71-43-2	100
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	103
Carbon Tetrachloride	56-23-5	94
Chloroethane	75-00-3	110
Chloroform	67-66-3	99
Chloromethane	74-87-3	100
Cyclohexane	110-82-7	112
Dibromochloromethane	124-48-1	96
Ethanol	64-17-5	111

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904263A-08B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	110
Ethyl Benzene	100-41-4	99
Freon 11	75-69-4	99
Freon 113	76-13-1	104
Freon 12	75-71-8	99
Heptane	142-82-5	105
Hexane	110-54-3	110
m,p-Xylene	108-38-3	102
Methylene Chloride	75-09-2	98
Naphthalene	91-20-3	107
o-Xylene	95-47-6	99
Propylene	115-07-1	97
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	98
Tetrahydrofuran	109-99-9	100
Toluene	108-88-3	104
Total Xylene	1330-20-7	100
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	93

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904263A-08B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/25/19 07:38 AM
Lab ID:	1904263A-08C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042502a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	98

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	93
4-Bromofluorobenzene	460-00-4	83-115	104
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/25/19 10:51 PM
Lab ID:	1904263A-08D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042525
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	96

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	93
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904263A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	107
1,2,4-Trichlorobenzene	120-82-1	132
1,2,4-Trimethylbenzene	95-63-6	103
1,2-Dibromoethane (EDB)	106-93-4	104
1,2-Dichlorobenzene	95-50-1	109
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	106
1,4-Dioxane	123-91-1	116
2-Butanone (Methyl Ethyl Ketone)	78-93-3	106
2-Hexanone	591-78-6	126
2-Propanol	67-63-0	110
4-Methyl-2-pentanone	108-10-1	109
Acetone	67-64-1	109
Benzene	71-43-2	101
Bromodichloromethane	75-27-4	104
Bromoform	75-25-2	105
Carbon Disulfide	75-15-0	90
Carbon Tetrachloride	56-23-5	106
Chloroethane	75-00-3	115
Chloroform	67-66-3	103
Chloromethane	74-87-3	104
Cyclohexane	110-82-7	107
Dibromochloromethane	124-48-1	103
Ethanol	64-17-5	118

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904263A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	111
Freon 113	76-13-1	104
Freon 12	75-71-8	109
Heptane	142-82-5	102
Hexane	110-54-3	106
m,p-Xylene	108-38-3	99
Methylene Chloride	75-09-2	104
Naphthalene	91-20-3	114
o-Xylene	95-47-6	101
Propylene	115-07-1	95
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	103
Tetrahydrofuran	109-99-9	104
Toluene	108-88-3	99
Total Xylene	1330-20-7	100
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	110

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904263A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904263A-09AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	103
1,2,4-Trichlorobenzene	120-82-1	121
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	104
1,2-Dichlorobenzene	95-50-1	108
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	102
1,4-Dioxane	123-91-1	118
2-Butanone (Methyl Ethyl Ketone)	78-93-3	109
2-Hexanone	591-78-6	124
2-Propanol	67-63-0	111
4-Methyl-2-pentanone	108-10-1	112
Acetone	67-64-1	107
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	103
Bromoform	75-25-2	106
Carbon Disulfide	75-15-0	92
Carbon Tetrachloride	56-23-5	102
Chloroethane	75-00-3	106
Chloroform	67-66-3	103
Chloromethane	74-87-3	105
Cyclohexane	110-82-7	104
Dibromochloromethane	124-48-1	104
Ethanol	64-17-5	124

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904263A-09AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	111
Freon 113	76-13-1	103
Freon 12	75-71-8	105
Heptane	142-82-5	100
Hexane	110-54-3	102
m,p-Xylene	108-38-3	100
Methylene Chloride	75-09-2	105
Naphthalene	91-20-3	105
o-Xylene	95-47-6	104
Propylene	115-07-1	98
Styrene	100-42-5	105
Tetrachloroethene	127-18-4	103
Tetrahydrofuran	109-99-9	103
Toluene	108-88-3	100
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	108

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904263A-09AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/25/19 08:59 AM
Lab ID:	1904263A-09B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042504a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	92
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/25/19 09:35 AM
Lab ID:	1904263A-09BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042505a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	102

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	92
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	103

* % Recovery is calculated using unrounded analytical results.



4/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904263B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/11/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

**WORK ORDER #: 1904263B**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/11/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-3	15.0 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified TO-3	12.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified TO-3	10.5 "Hg	5 psi
04A	KAFB-106V1 217.1	Modified TO-3	9.5 "Hg	5 psi
05A	KAFB-106V1 252.1	Modified TO-3	12.0 "Hg	5 psi
06A	KAFB-106V1 262.6	Modified TO-3	11.0 "Hg	5 psi
06AA	KAFB-106V1 262.6 Lab Duplicate	Modified TO-3	11.0 "Hg	5 psi
07A	Lab Blank	Modified TO-3	NA	NA
08A	LCS	Modified TO-3	NA	NA
08AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Technical Director

DATE: 04/24/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 TO-3
EA Engineering
Workorder# 1904263B

Six 6 Liter Summa Canister (100% SIM certified DoD 5.1) samples were received on April 11, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

The Chain of Custody (COC) information for sample KAFB-106V1 102.1 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Sample KAFB-106V1 102.1 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	4/17/19 04:19 PM
Lab ID:	1904263B-01A	Dilution Factor:	5360
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	gcd.i / d041711
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	310000	440000	550000	120000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	96

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	4/17/19 03:28 PM
Lab ID:	1904263B-02A	Dilution Factor:	4460
Date/Time Collected:	4/10/19 10:14 AM	Instrument/Filename:	gcd.i / d041710
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	260000	360000	460000	120000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	100



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	4/17/19 02:19 PM
Lab ID:	1904263B-03A	Dilution Factor:	4120
Date/Time Collected:	4/10/19 10:40 AM	Instrument/Filename:	gcd.i / d041709
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	240000	340000	420000	110000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	101



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/17/19 12:38 PM
Lab ID:	1904263B-04A	Dilution Factor:	4900
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	gcd.i / d041707
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	290000	400000	500000	160000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	98



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/17/19 12:00 PM
Lab ID:	1904263B-05A	Dilution Factor:	4460
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	gcd.i / d041706
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	260000	360000	460000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	99

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/17/19 11:12 AM
Lab ID:	1904263B-06A	Dilution Factor:	4240
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	gcd.i / d041705
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	250000	350000	430000	160000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 262.6 Lab Duplicate		
Lab ID:	1904263B-06AA	Date/Time Analyzed:	4/17/19 01:41 PM
Date/Time Collected:	4/10/19 11:36 AM	Dilution Factor:	4240
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	gcd.i / d041708

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	250000	350000	430000	150000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	118



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/17/19 09:25 AM
Lab ID:	1904263B-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041703
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	96

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/17/19 08:37 AM
Lab ID:	1904263B-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041702
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		104
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	97

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/17/19 05:05 PM
Lab ID:	1904263B-08AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041712
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		100

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102

* % Recovery is calculated using unrounded analytical results.



4/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904263C

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/11/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1904263C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/11/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified ASTM D-1945	15.0 "Hg	5 psi
01AA	KAFB-106V1 102.1 Lab Duplicate	Modified ASTM D-1945	15.0 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified ASTM D-1945	12.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified ASTM D-1945	10.5 "Hg	5 psi
04A	KAFB-106V1 217.1	Modified ASTM D-1945	9.5 "Hg	5 psi
05A	KAFB-106V1 252.1	Modified ASTM D-1945	12.0 "Hg	5 psi
06A	KAFB-106V1 262.6	Modified ASTM D-1945	11.0 "Hg	5 psi
07A	Lab Blank	Modified ASTM D-1945	NA	NA
07B	Lab Blank	Modified ASTM D-1945	NA	NA
08A	LCS	Modified ASTM D-1945	NA	NA
08AA	LCSD	Modified ASTM D-1945	NA	NA
08B	LCS	Modified ASTM D-1945	NA	NA
08BB	LCSD	Modified ASTM D-1945	NA	NA

CERTIFIED BY:



Technical Director

DATE: 04/24/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

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LABORATORY NARRATIVE
DoD QSM 5.1 ASTM D1945
EA Engineering
Workorder# 1904263C

Six 6 Liter Summa Canister (100% SIM certified DoD 5.1) samples were received on April 11, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+)
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

The Chain of Custody (COC) information for sample KAFB-106V1 102.1 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Sample KAFB-106V1 102.1 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Methane was manually integrated in sample KAFB-106V1 102.1.

Methane and Ethane were manually integrated in samples KAFB-106V1 102.1 Lab Duplicate, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 217.1, KAFB-106V1 252.1 and KAFB-106V1 262.6.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	4/18/19 07:01 PM
Lab ID:	1904263C-01A	Dilution Factor:	2.68
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	gc10.i / 10041909
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000038	0.00029	0.0027	0.0089
Carbon Dioxide	124-38-9	0.0029	0.013	0.027	12
Carbon Monoxide	630-08-0	0.0035	0.013	0.027	Not Detected U
Ethane	74-84-0	0.000067	0.00029	0.0027	0.0039
Hydrogen	1333-74-0	0.0040	0.017	0.027	Not Detected U
Methane	74-82-8	0.000072	0.00013	0.00027	0.025
Nitrogen	7727-37-9	0.18	0.18	0.27	85
Oxygen	7782-44-7	0.050	0.048	0.27	1.4
Pentane	109-66-0	0.000067	0.00029	0.0027	0.18
Propane	74-98-6	0.000080	0.00029	0.0027	0.0017 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 80

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate	Date/Time Analyzed:	4/18/19 09:11 PM
Lab ID:	1904263C-01AA	Dilution Factor:	2.68
Date/Time Collected:	4/10/19 09:52 AM	Instrument/Filename:	gc10.i / 10041912
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000038	0.00029	0.0027	0.0090
Carbon Dioxide	124-38-9	0.0029	0.013	0.027	12
Carbon Monoxide	630-08-0	0.0035	0.013	0.027	Not Detected U
Ethane	74-84-0	0.000067	0.00029	0.0027	0.0039
Hydrogen	1333-74-0	0.0040	0.017	0.027	Not Detected U
Methane	74-82-8	0.000072	0.00013	0.00027	0.025
Nitrogen	7727-37-9	0.18	0.18	0.27	85
Oxygen	7782-44-7	0.050	0.048	0.27	1.4
Pentane	109-66-0	0.000067	0.00029	0.0027	0.18
Propane	74-98-6	0.000080	0.00029	0.0027	0.0017 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 79

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	4/18/19 10:58 PM
Lab ID:	1904263C-02A	Dilution Factor:	2.23
Date/Time Collected:	4/10/19 10:14 AM	Instrument/Filename:	gc10.i / 10041915
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000031	0.00024	0.0022	0.011
Carbon Dioxide	124-38-9	0.0024	0.011	0.022	12
Carbon Monoxide	630-08-0	0.0030	0.011	0.022	Not Detected U
Ethane	74-84-0	0.000056	0.00024	0.0022	0.0040
Hydrogen	1333-74-0	0.0034	0.014	0.022	Not Detected U
Methane	74-82-8	0.000060	0.00011	0.00022	0.025
Nitrogen	7727-37-9	0.15	0.15	0.22	85
Oxygen	7782-44-7	0.041	0.040	0.22	1.2
Pentane	109-66-0	0.000056	0.00024	0.0022	0.24
Propane	74-98-6	0.000067	0.00024	0.0022	0.0018 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 88

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	4/19/19 09:17 AM
Lab ID:	1904263C-03A	Dilution Factor:	2.06
Date/Time Collected:	4/10/19 10:40 AM	Instrument/Filename:	gc10.i / 10041918
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0069
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	12
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0029
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.013
Nitrogen	7727-37-9	0.14	0.14	0.21	85
Oxygen	7782-44-7	0.038	0.037	0.21	1.2
Pentane	109-66-0	0.000052	0.00023	0.0021	0.18
Propane	74-98-6	0.000062	0.00023	0.0021	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 79

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	4/19/19 10:26 AM
Lab ID:	1904263C-04A	Dilution Factor:	1.96
Date/Time Collected:	4/10/19 11:01 AM	Instrument/Filename:	gc10.i / 10041921
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00022	0.0020	0.0025
Carbon Dioxide	124-38-9	0.0021	0.0094	0.020	12
Carbon Monoxide	630-08-0	0.0026	0.0094	0.020	0.0054 J
Ethane	74-84-0	0.000049	0.00022	0.0020	0.0029
Hydrogen	1333-74-0	0.0029	0.012	0.020	Not Detected U
Methane	74-82-8	0.000053	0.000098	0.00020	0.0056
Nitrogen	7727-37-9	0.13	0.13	0.20	85
Oxygen	7782-44-7	0.036	0.035	0.20	1.3
Pentane	109-66-0	0.000049	0.00022	0.0020	0.081
Propane	74-98-6	0.000059	0.00022	0.0020	0.0019 J

J = Estimated value.

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. =86

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	4/19/19 11:45 AM
Lab ID:	1904263C-05A	Dilution Factor:	2.23
Date/Time Collected:	4/10/19 11:19 AM	Instrument/Filename:	gc10.i / 10041924
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000031	0.00024	0.0022	0.0039
Carbon Dioxide	124-38-9	0.0024	0.011	0.022	12
Carbon Monoxide	630-08-0	0.0030	0.011	0.022	0.0081 J
Ethane	74-84-0	0.000056	0.00024	0.0022	0.0058
Hydrogen	1333-74-0	0.0034	0.014	0.022	Not Detected U
Methane	74-82-8	0.000060	0.00011	0.00022	0.0070
Nitrogen	7727-37-9	0.15	0.15	0.22	86
Oxygen	7782-44-7	0.041	0.040	0.22	1.2
Pentane	109-66-0	0.000056	0.00024	0.0022	0.051
Propane	74-98-6	0.000067	0.00024	0.0022	0.0060

J = Estimated value.

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 61

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	4/19/19 12:56 PM
Lab ID:	1904263C-06A	Dilution Factor:	2.12
Date/Time Collected:	4/10/19 11:36 AM	Instrument/Filename:	gc10.i / 10041927
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0054
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	11
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	0.013 J
Ethane	74-84-0	0.000053	0.00023	0.0021	0.0065
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0070
Nitrogen	7727-37-9	0.14	0.14	0.21	88
Oxygen	7782-44-7	0.039	0.038	0.21	1.4
Pentane	109-66-0	0.000053	0.00023	0.0021	0.059
Propane	74-98-6	0.000064	0.00023	0.0021	0.0071

J = Estimated value.

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 66



NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/18/19 05:57 PM
Lab ID:	1904263C-07A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041907
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/18/19 06:27 PM
Lab ID:	1904263C-07B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041908c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/18/19 03:43 PM
Lab ID:	1904263C-08A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041903a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	99
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	101
Methane	74-82-8	102
Nitrogen	7727-37-9	91
Oxygen	7782-44-7	104
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/18/19 04:08 PM
Lab ID:	1904263C-08AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041904a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	101
Methane	74-82-8	102
Nitrogen	7727-37-9	91
Oxygen	7782-44-7	104
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/18/19 04:49 PM
Lab ID:	1904263C-08B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041905c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/18/19 05:28 PM
Lab ID:	1904263C-08BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041906c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.



4/25/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904325A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/12/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com



WORK ORDER #: 1904325A

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/12/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/25/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 102.2	Modified TO-15	9.2 "Hg	5.1 psi
01AA	KAFB-106V2 102.2 Lab Duplicate	Modified TO-15	9.2 "Hg	5.1 psi
01B	KAFB-106V2 102.2	Modified TO-15	9.2 "Hg	5.1 psi
01BB	KAFB-106V2 102.2 Lab Duplicate	Modified TO-15	9.2 "Hg	5.1 psi
02A	KAFB-106V2 117.1	Modified TO-15	9.4 "Hg	4.8 psi
03A	KAFB-106V2 117.1 DUP	Modified TO-15	9.4 "Hg	5 psi
04A	KAFB-106V2 159.9	Modified TO-15	10.6 "Hg	5 psi
05A	KAFB-106V2 217.1	Modified TO-15	11.2 "Hg	5.1 psi
06A	KAFB-106V2 252.2	Modified TO-15	9.8 "Hg	5.3 psi
07A	KAFB-106V2 252.2 DUP	Modified TO-15	9.6 "Hg	5.3 psi
08A	KAFB-106V2 269.5	Modified TO-15	10.4 "Hg	4.9 psi
09A	Lab Blank	Modified TO-15	NA	NA
09B	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
10B	CCV	Modified TO-15	NA	NA
10C	CCV	Modified TO-15	NA	NA
10D	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA
11B	LCS	Modified TO-15	NA	NA
11BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: 
 Technical Director

DATE: 04/25/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8 , LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
 Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.
 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 - TO-15
EA Engineering
Workorder# 1904325A

Eight 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on April 12, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for samples KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5 did not match the entries on the sample tags with regard to sample identification. Therefore the information on the COC was used to process and report the samples.

Analytical Notes

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

Samples were analyzed in two analytical batches on MSD-14 on 4/24/19 and 4/25/19. The initial continuing calibration verification (CCV) for the batch were reported as lab fractions 10A, 10B and the ending CCV were reported as lab fractions 10C and 10D.

Naphthalene exceeded initial calibration project acceptance criterion of $\leq 30\%$ Relative Standard Deviation (RSD).

Chloromethane was manually integrated in the initial calibration

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A Limit of Detection (LOD) study and Method Detection Limit (MDL) study is not maintained for non-standard compounds.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and

O-Xylene.

A Limit of Detection (LOD) and Method Detection Limit (MDL) study are not maintained for Total Xylenes.

Samples KAFB-106V2 102.2, KAFB-106V2 102.2 Lab Duplicate, KAFB-106V2 102.2 , KAFB-106V2 102.2 Lab Duplicate, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5 were transferred from SIM/Low Level analysis to full scan TO-15 due to high levels of target compounds.

Dilution was performed on samples KAFB-106V2 102.2, KAFB-106V2 102.2 Lab Duplicate, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5 due to the presence of high level target species.

2-Butanone (Methyl Ethyl Ketone), Acetone, Cyclohexane, Hexane and Heptane exceeded the instrument's calibration range for samples KAFB-106V2 102.2, KAFB-106V2 102.2 Lab Duplicate and KAFB-106V2 217.1 and were flagged accordingly.

Cyclohexane, Hexane and Heptane exceeded the instrument's calibration range for samples KAFB-106V2 117.1 and KAFB-106V2 117.1 DUP and were flagged accordingly.

2-Butanone (Methyl Ethyl Ketone) and Heptane exceeded the instrument's calibration range for samples KAFB-106V2 252.2 and KAFB-106V2 252.2 DUP and were flagged accordingly.

2-Butanone (Methyl Ethyl Ketone) exceeded the instrument's calibration range for sample KAFB-106V2 269.5 and was flagged accordingly.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample KAFB-106V2 102.2 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.



UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/24/19 02:55 PM
Lab ID:	1904325A-01A	Dilution Factor:	97.0
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	msd14.i / 14042408
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	540	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5800	7200	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	450	1400	2400	23000
1,2-Dibromoethane (EDB)	106-93-4	660	2200	3700	20000
1,2-Dichlorobenzene	95-50-1	700	1700	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	400	1400	2400	12000
1,3-Butadiene	106-99-0	340	640	1100	Not Detected U
1,4-Dioxane	123-91-1	1900	3500	7000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2900	5700	610000 J
2-Hexanone	591-78-6	3000	4000	7900	Not Detected U
2-Propanol	67-63-0	610	2400	4800	260000
4-Methyl-2-pentanone	108-10-1	960	1200	2000	Not Detected U
Acetone	67-64-1	670	2300	4600	3500000 J
Benzene	71-43-2	220	930	1500	2100000
Bromodichloromethane	75-27-4	320	1900	3200	Not Detected U
Bromoform	75-25-2	690	3000	5000	Not Detected U
Carbon Disulfide	75-15-0	920	3000	6000	Not Detected U
Carbon Tetrachloride	56-23-5	730	1800	3000	Not Detected U
Chloroethane	75-00-3	1500	2600	5100	Not Detected U
Chloroform	67-66-3	410	1400	2400	Not Detected U
Chloromethane	74-87-3	840	2000	4000	Not Detected U
Cyclohexane	110-82-7	370	1000	1700	7000000 J
Dibromochloromethane	124-48-1	850	2500	4100	Not Detected U
Ethanol	64-17-5	800	1800	3600	41000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/24/19 02:55 PM
Lab ID:	1904325A-01A	Dilution Factor:	97.0
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	msd14.i / 14042408
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7000	Not Detected
Ethyl Benzene	100-41-4	420	1300	2100	280000
Freon 11	75-69-4	400	1600	2700	Not Detected U
Freon 113	76-13-1	660	2200	3700	Not Detected U
Freon 12	75-71-8	530	1400	2400	Not Detected U
Heptane	142-82-5	670	1200	2000	7200000 J
Hexane	110-54-3	420	1000	1700	8300000 J
m,p-Xylene	108-38-3	400	1300	2100	710000
Methylene Chloride	75-09-2	1000	3400	6700	Not Detected U
Naphthalene	91-20-3	780	5100	10000	Not Detected U
o-Xylene	95-47-6	570	1300	2100	180000
Propylene	115-07-1	570	1700	3300	33000
Styrene	100-42-5	390	1200	2100	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3300	Not Detected U
Tetrahydrofuran	109-99-9	510	860	1400	Not Detected U
Total Xylene	1330-20-7	9000	D	2100	890000
Trichloroethene	79-01-6	770	1600	2600	Not Detected U
Vinyl Chloride	75-01-4	430	740	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/24/19 02:55 PM
Lab ID:	1904325A-01A	Dilution Factor:	97.0
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	msd14.i / 14042408
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	148 Q
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	110

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2 Lab Duplicate	Date/Time Analyzed:	4/24/19 03:27 PM
Lab ID:	1904325A-01AA	Dilution Factor:	97.0
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	msd14.i / 14042409
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	540	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5800	7200	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	450	1400	2400	20000
1,2-Dibromoethane (EDB)	106-93-4	660	2200	3700	18000
1,2-Dichlorobenzene	95-50-1	700	1700	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	400	1400	2400	10000
1,3-Butadiene	106-99-0	340	640	1100	Not Detected U
1,4-Dioxane	123-91-1	1900	3500	7000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2900	5700	620000 J
2-Hexanone	591-78-6	3000	4000	7900	Not Detected U
2-Propanol	67-63-0	610	2400	4800	260000
4-Methyl-2-pentanone	108-10-1	960	1200	2000	Not Detected U
Acetone	67-64-1	670	2300	4600	3500000 J
Benzene	71-43-2	220	930	1500	2000000
Bromodichloromethane	75-27-4	320	1900	3200	Not Detected U
Bromoform	75-25-2	690	3000	5000	Not Detected U
Carbon Disulfide	75-15-0	920	3000	6000	Not Detected U
Carbon Tetrachloride	56-23-5	730	1800	3000	Not Detected U
Chloroethane	75-00-3	1500	2600	5100	Not Detected U
Chloroform	67-66-3	410	1400	2400	Not Detected U
Chloromethane	74-87-3	840	2000	4000	Not Detected U
Cyclohexane	110-82-7	370	1000	1700	6600000 J
Dibromochloromethane	124-48-1	850	2500	4100	Not Detected U
Ethanol	64-17-5	800	1800	3600	41000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2 Lab Duplicate		
Lab ID:	1904325A-01AA	Date/Time Analyzed:	4/24/19 03:27 PM
Date/Time Collected:	4/11/19 08:33 AM	Dilution Factor:	97.0
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14042409

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7000	Not Detected
Ethyl Benzene	100-41-4	420	1300	2100	260000
Freon 11	75-69-4	400	1600	2700	Not Detected U
Freon 113	76-13-1	660	2200	3700	Not Detected U
Freon 12	75-71-8	530	1400	2400	Not Detected U
Heptane	142-82-5	670	1200	2000	6700000 J
Hexane	110-54-3	420	1000	1700	7900000 J
m,p-Xylene	108-38-3	400	1300	2100	630000
Methylene Chloride	75-09-2	1000	3400	6700	Not Detected U
Naphthalene	91-20-3	780	5100	10000	Not Detected U
o-Xylene	95-47-6	570	1300	2100	160000
Propylene	115-07-1	570	1700	3300	33000
Styrene	100-42-5	390	1200	2100	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3300	Not Detected U
Tetrahydrofuran	109-99-9	510	860	1400	Not Detected U
Total Xylene	1330-20-7	9000	D	2100	790000
Trichloroethene	79-01-6	770	1600	2600	Not Detected U
Vinyl Chloride	75-01-4	430	740	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	137

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2 Lab Duplicate		
Lab ID:	1904325A-01AA	Date/Time Analyzed:	4/24/19 03:27 PM
Date/Time Collected:	4/11/19 08:33 AM	Dilution Factor:	97.0
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14042409

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/25/19 02:11 PM
Lab ID:	1904325A-01B	Dilution Factor:	194
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	msd14.i / 14042508
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	660	2200	3600	5100000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	124
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2 Lab Duplicate		
Lab ID:	1904325A-01BB	Date/Time Analyzed:	4/25/19 02:33 PM
Date/Time Collected:	4/11/19 08:33 AM	Dilution Factor:	194
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14042509

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	660	2200	3600	5100000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	121
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	107

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	4/24/19 03:59 PM
Lab ID:	1904325A-02A	Dilution Factor:	96.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042410
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	540	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5800	7200	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	450	1400	2400	6500
1,2-Dibromoethane (EDB)	106-93-4	650	2200	3700	9700
1,2-Dichlorobenzene	95-50-1	700	1700	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	390	1400	2400	3900
1,3-Butadiene	106-99-0	340	640	1100	Not Detected U
1,4-Dioxane	123-91-1	1900	3500	7000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2800	5700	270000
2-Hexanone	591-78-6	3000	4000	7900	Not Detected U
2-Propanol	67-63-0	600	2400	4700	65000
4-Methyl-2-pentanone	108-10-1	960	1200	2000	Not Detected U
Acetone	67-64-1	670	2300	4600	1500000
Benzene	71-43-2	220	920	1500	1800000
Bromodichloromethane	75-27-4	320	1900	3200	Not Detected U
Bromoform	75-25-2	690	3000	5000	Not Detected U
Carbon Disulfide	75-15-0	910	3000	6000	Not Detected U
Carbon Tetrachloride	56-23-5	720	1800	3000	Not Detected U
Chloroethane	75-00-3	1500	2500	5100	Not Detected U
Chloroform	67-66-3	400	1400	2400	Not Detected U
Chloromethane	74-87-3	840	2000	4000	Not Detected U
Cyclohexane	110-82-7	370	1000	1700	5600000 J
Dibromochloromethane	124-48-1	850	2500	4100	Not Detected U
Ethanol	64-17-5	800	1800	3600	11000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	4/24/19 03:59 PM
Lab ID:	1904325A-02A	Dilution Factor:	96.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042410
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7000	Not Detected
Ethyl Benzene	100-41-4	420	1200	2100	390000
Freon 11	75-69-4	400	1600	2700	Not Detected U
Freon 113	76-13-1	660	2200	3700	Not Detected U
Freon 12	75-71-8	530	1400	2400	Not Detected U
Heptane	142-82-5	670	1200	2000	5100000 J
Hexane	110-54-3	420	1000	1700	7100000 J
m,p-Xylene	108-38-3	390	1200	2100	970000
Methylene Chloride	75-09-2	1000	3400	6700	Not Detected U
Naphthalene	91-20-3	780	5000	10000	Not Detected U
o-Xylene	95-47-6	560	1200	2100	230000
Propylene	115-07-1	570	1700	3300	30000
Styrene	100-42-5	390	1200	2000	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3300	Not Detected U
Tetrahydrofuran	109-99-9	500	850	1400	Not Detected U
Toluene	108-88-3	330	1100	1800	3300000
Total Xylene	1330-20-7	9000	D	2100	1200000
Trichloroethene	79-01-6	770	1600	2600	Not Detected U
Vinyl Chloride	75-01-4	430	740	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	4/24/19 03:59 PM
Lab ID:	1904325A-02A	Dilution Factor:	96.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042410
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	130
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	110

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	4/24/19 04:39 PM
Lab ID:	1904325A-03A	Dilution Factor:	97.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042411
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	550	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5800	7200	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	460	1400	2400	5600
1,2-Dibromoethane (EDB)	106-93-4	660	2200	3700	8800
1,2-Dichlorobenzene	95-50-1	710	1800	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	400	1400	2400	3400
1,3-Butadiene	106-99-0	340	650	1100	Not Detected U
1,4-Dioxane	123-91-1	1900	3500	7000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2900	5800	260000
2-Hexanone	591-78-6	3000	4000	8000	Not Detected U
2-Propanol	67-63-0	610	2400	4800	62000
4-Methyl-2-pentanone	108-10-1	970	1200	2000	Not Detected U
Acetone	67-64-1	680	2300	4600	1400000
Benzene	71-43-2	220	930	1600	1700000
Bromodichloromethane	75-27-4	330	2000	3300	Not Detected U
Bromoform	75-25-2	700	3000	5000	Not Detected U
Carbon Disulfide	75-15-0	920	3000	6100	Not Detected U
Carbon Tetrachloride	56-23-5	730	1800	3100	Not Detected U
Chloroethane	75-00-3	1500	2600	5100	Not Detected U
Chloroform	67-66-3	410	1400	2400	Not Detected U
Chloromethane	74-87-3	840	2000	4000	Not Detected U
Cyclohexane	110-82-7	370	1000	1700	5400000 J
Dibromochloromethane	124-48-1	860	2500	4200	Not Detected U
Ethanol	64-17-5	800	1800	3700	9600

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	4/24/19 04:39 PM
Lab ID:	1904325A-03A	Dilution Factor:	97.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042411
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7000	Not Detected
Ethyl Benzene	100-41-4	420	1300	2100	330000
Freon 11	75-69-4	400	1600	2700	Not Detected U
Freon 113	76-13-1	660	2200	3700	Not Detected U
Freon 12	75-71-8	540	1400	2400	Not Detected U
Heptane	142-82-5	680	1200	2000	4900000 J
Hexane	110-54-3	420	1000	1700	7000000 J
m,p-Xylene	108-38-3	400	1300	2100	870000
Methylene Chloride	75-09-2	1000	3400	6800	Not Detected U
Naphthalene	91-20-3	790	5100	10000	Not Detected U
o-Xylene	95-47-6	570	1300	2100	210000
Propylene	115-07-1	570	1700	3400	32000
Styrene	100-42-5	390	1200	2100	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3300	Not Detected U
Tetrahydrofuran	109-99-9	510	860	1400	Not Detected U
Toluene	108-88-3	330	1100	1800	3000000
Total Xylene	1330-20-7	9100	D	2100	1100000
Trichloroethene	79-01-6	780	1600	2600	Not Detected U
Vinyl Chloride	75-01-4	430	750	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	4/24/19 04:39 PM
Lab ID:	1904325A-03A	Dilution Factor:	97.5
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	msd14.i / 14042411
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	128
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	107

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	4/24/19 05:16 PM
Lab ID:	1904325A-04A	Dilution Factor:	104
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	msd14.i / 14042412
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	580	1300	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6200	7700	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	480	1500	2600	74000
1,2-Dibromoethane (EDB)	106-93-4	700	2400	4000	2500 J
1,2-Dichlorobenzene	95-50-1	760	1900	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	420	1500	2600	26000
1,3-Butadiene	106-99-0	360	690	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3700	7500	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3100	6100	44000
2-Hexanone	591-78-6	3200	4300	8500	Not Detected U
2-Propanol	67-63-0	650	2600	5100	10000
4-Methyl-2-pentanone	108-10-1	1000	1300	2100	Not Detected U
Acetone	67-64-1	720	2500	4900	650000
Benzene	71-43-2	230	1000	1700	550000
Bromodichloromethane	75-27-4	350	2100	3500	Not Detected U
Bromoform	75-25-2	740	3200	5400	Not Detected U
Carbon Disulfide	75-15-0	980	3200	6500	Not Detected U
Carbon Tetrachloride	56-23-5	780	2000	3300	Not Detected U
Chloroethane	75-00-3	1600	2700	5500	Not Detected U
Chloroform	67-66-3	440	1500	2500	Not Detected U
Chloromethane	74-87-3	900	2100	4300	Not Detected U
Cyclohexane	110-82-7	400	1100	1800	1600000
Dibromochloromethane	124-48-1	910	2600	4400	Not Detected U
Ethanol	64-17-5	860	2000	3900	2900 J

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	4/24/19 05:16 PM
Lab ID:	1904325A-04A	Dilution Factor:	104
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	msd14.i / 14042412
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7500	Not Detected
Ethyl Benzene	100-41-4	450	1400	2200	150000
Freon 11	75-69-4	430	1800	2900	Not Detected U
Freon 113	76-13-1	710	2400	4000	Not Detected U
Freon 12	75-71-8	570	1500	2600	Not Detected U
Heptane	142-82-5	720	1300	2100	1800000
Hexane	110-54-3	450	1100	1800	2100000
m,p-Xylene	108-38-3	420	1400	2200	380000
Methylene Chloride	75-09-2	1100	3600	7200	Not Detected U
Naphthalene	91-20-3	840	5400	11000	1300 J
o-Xylene	95-47-6	610	1400	2200	120000
Propylene	115-07-1	610	1800	3600	29000
Styrene	100-42-5	420	1300	2200	Not Detected U
Tetrachloroethene	127-18-4	1200	2100	3500	Not Detected U
Tetrahydrofuran	109-99-9	540	920	1500	Not Detected U
Toluene	108-88-3	350	1200	2000	1200000
Total Xylene	1330-20-7	9700	D	2200	500000
Trichloroethene	79-01-6	830	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	460	800	1300	Not Detected U

U = The analyte was not detected above the MDL.
J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	4/24/19 05:16 PM
Lab ID:	1904325A-04A	Dilution Factor:	104
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	msd14.i / 14042412
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	118
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	4/24/19 05:52 PM
Lab ID:	1904325A-05A	Dilution Factor:	108
Date/Time Collected:	4/11/19 10:15 AM	Instrument/Filename:	msd14.i / 14042413
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	610	1300	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6500	8000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	45000
1,2-Dibromoethane (EDB)	106-93-4	730	2500	4100	6000
1,2-Dichlorobenzene	95-50-1	780	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	440	1600	2600	17000
1,3-Butadiene	106-99-0	380	720	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3200	6400	360000 J
2-Hexanone	591-78-6	3300	4400	8800	Not Detected U
2-Propanol	67-63-0	680	2600	5300	400000
4-Methyl-2-pentanone	108-10-1	1100	1300	2200	Not Detected U
Acetone	67-64-1	750	2600	5100	4400000 J
Benzene	71-43-2	240	1000	1700	1500000
Bromodichloromethane	75-27-4	360	2200	3600	Not Detected U
Bromoform	75-25-2	770	3300	5600	Not Detected U
Carbon Disulfide	75-15-0	1000	3400	6700	Not Detected U
Carbon Tetrachloride	56-23-5	810	2000	3400	Not Detected U
Chloroethane	75-00-3	1600	2800	5700	Not Detected U
Chloroform	67-66-3	450	1600	2600	Not Detected U
Chloromethane	74-87-3	940	2200	4500	Not Detected U
Cyclohexane	110-82-7	410	1100	1800	4800000 J
Dibromochloromethane	124-48-1	950	2800	4600	Not Detected U
Ethanol	64-17-5	890	2000	4100	7200



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	4/24/19 05:52 PM
Lab ID:	1904325A-05A	Dilution Factor:	108
Date/Time Collected:	4/11/19 10:15 AM	Instrument/Filename:	msd14.i / 14042413
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected
Ethyl Benzene	100-41-4	470	1400	2300	230000
Freon 11	75-69-4	450	1800	3000	Not Detected U
Freon 113	76-13-1	740	2500	4100	Not Detected U
Freon 12	75-71-8	590	1600	2700	Not Detected U
Heptane	142-82-5	750	1300	2200	4700000 J
Hexane	110-54-3	470	1100	1900	6300000 J
m,p-Xylene	108-38-3	440	1400	2300	550000
Methylene Chloride	75-09-2	1200	3800	7500	Not Detected U
Naphthalene	91-20-3	870	5700	11000	Not Detected U
o-Xylene	95-47-6	630	1400	2300	140000
Propylene	115-07-1	640	1800	3700	42000
Styrene	100-42-5	440	1400	2300	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3700	Not Detected U
Tetrahydrofuran	109-99-9	560	960	1600	Not Detected U
Toluene	108-88-3	370	1200	2000	2800000
Total Xylene	1330-20-7	10000	D	2300	690000
Trichloroethene	79-01-6	860	1700	2900	Not Detected U
Vinyl Chloride	75-01-4	480	830	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	4/24/19 05:52 PM
Lab ID:	1904325A-05A	Dilution Factor:	108
Date/Time Collected:	4/11/19 10:15 AM	Instrument/Filename:	msd14.i / 14042413
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	124
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	4/24/19 06:36 PM
Lab ID:	1904325A-06A	Dilution Factor:	101
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	msd14.i / 14042414
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	570	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6000	7500	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	470	1500	2500	65000
1,2-Dibromoethane (EDB)	106-93-4	680	2300	3900	12000
1,2-Dichlorobenzene	95-50-1	730	1800	3000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	410	1500	2500	21000
1,3-Butadiene	106-99-0	350	670	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	3600	7300	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	3000	6000	340000 J
2-Hexanone	591-78-6	3100	4100	8300	Not Detected U
2-Propanol	67-63-0	630	2500	5000	130000
4-Methyl-2-pentanone	108-10-1	1000	1200	2100	Not Detected U
Acetone	67-64-1	700	2400	4800	2300000
Benzene	71-43-2	220	970	1600	650000
Bromodichloromethane	75-27-4	340	2000	3400	Not Detected U
Bromoform	75-25-2	720	3100	5200	Not Detected U
Carbon Disulfide	75-15-0	960	3100	6300	Not Detected U
Carbon Tetrachloride	56-23-5	760	1900	3200	Not Detected U
Chloroethane	75-00-3	1500	2700	5300	Not Detected U
Chloroform	67-66-3	420	1500	2500	Not Detected U
Chloromethane	74-87-3	880	2100	4200	Not Detected U
Cyclohexane	110-82-7	380	1000	1700	2600000
Dibromochloromethane	124-48-1	890	2600	4300	Not Detected U
Ethanol	64-17-5	830	1900	3800	13000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	4/24/19 06:36 PM
Lab ID:	1904325A-06A	Dilution Factor:	101
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	msd14.i / 14042414
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7300	Not Detected
Ethyl Benzene	100-41-4	440	1300	2200	230000
Freon 11	75-69-4	420	1700	2800	Not Detected U
Freon 113	76-13-1	690	2300	3900	Not Detected U
Freon 12	75-71-8	550	1500	2500	Not Detected U
Heptane	142-82-5	700	1200	2100	4700000 J
Hexane	110-54-3	440	1100	1800	1700000
m,p-Xylene	108-38-3	410	1300	2200	540000
Methylene Chloride	75-09-2	1100	3500	7000	Not Detected U
Naphthalene	91-20-3	820	5300	10000	890 J
o-Xylene	95-47-6	590	1300	2200	140000
Propylene	115-07-1	590	1700	3500	37000
Styrene	100-42-5	410	1300	2200	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3400	Not Detected U
Tetrahydrofuran	109-99-9	530	890	1500	Not Detected U
Toluene	108-88-3	340	1100	1900	3400000
Total Xylene	1330-20-7	9400	D	2200	680000
Trichloroethene	79-01-6	800	1600	2700	Not Detected U
Vinyl Chloride	75-01-4	450	770	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	4/24/19 06:36 PM
Lab ID:	1904325A-06A	Dilution Factor:	101
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	msd14.i / 14042414
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	128
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 DUP	Date/Time Analyzed:	4/24/19 07:08 PM
Lab ID:	1904325A-07A	Dilution Factor:	100
Date/Time Collected:	4/11/19 10:47 AM	Instrument/File Name:	msd14.i / 14042415
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	560	1200	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6000	7400	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	470	1500	2400	73000
1,2-Dibromoethane (EDB)	106-93-4	680	2300	3800	14000
1,2-Dichlorobenzene	95-50-1	730	1800	3000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	410	1500	2400	24000
1,3-Butadiene	106-99-0	350	660	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	3600	7200	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	2900	5900	340000 J
2-Hexanone	591-78-6	3100	4100	8200	Not Detected U
2-Propanol	67-63-0	630	2400	4900	130000
4-Methyl-2-pentanone	108-10-1	1000	1200	2000	Not Detected U
Acetone	67-64-1	690	2400	4800	2300000
Benzene	71-43-2	220	960	1600	660000
Bromodichloromethane	75-27-4	340	2000	3400	Not Detected U
Bromoform	75-25-2	710	3100	5200	Not Detected U
Carbon Disulfide	75-15-0	950	3100	6200	Not Detected U
Carbon Tetrachloride	56-23-5	750	1900	3100	Not Detected U
Chloroethane	75-00-3	1500	2600	5300	Not Detected U
Chloroform	67-66-3	420	1500	2400	Not Detected U
Chloromethane	74-87-3	870	2100	4100	Not Detected U
Cyclohexane	110-82-7	380	1000	1700	2500000
Dibromochloromethane	124-48-1	880	2600	4200	Not Detected U
Ethanol	64-17-5	820	1900	3800	12000



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 DUP	Date/Time Analyzed:	4/24/19 07:08 PM
Lab ID:	1904325A-07A	Dilution Factor:	100
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	msd14.i / 14042415
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7200	Not Detected
Ethyl Benzene	100-41-4	430	1300	2200	270000
Freon 11	75-69-4	420	1700	2800	Not Detected U
Freon 113	76-13-1	680	2300	3800	Not Detected U
Freon 12	75-71-8	550	1500	2500	Not Detected U
Heptane	142-82-5	690	1200	2000	4900000 J
Hexane	110-54-3	430	1000	1800	1600000
m,p-Xylene	108-38-3	410	1300	2200	640000
Methylene Chloride	75-09-2	1100	3500	6900	Not Detected U
Naphthalene	91-20-3	810	5200	10000	1300 J
o-Xylene	95-47-6	590	1300	2200	170000
Propylene	115-07-1	590	1700	3400	37000
Styrene	100-42-5	400	1300	2100	Not Detected U
Tetrachloroethene	127-18-4	1200	2000	3400	Not Detected U
Tetrahydrofuran	109-99-9	520	880	1500	Not Detected U
Toluene	108-88-3	340	1100	1900	3600000
Total Xylene	1330-20-7	9300	D	2200	810000
Trichloroethene	79-01-6	800	1600	2700	Not Detected U
Vinyl Chloride	75-01-4	440	770	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 DUP		
Lab ID:	1904325A-07A	Date/Time Analyzed:	4/24/19 07:08 PM
Date/Time Collected:	4/11/19 10:47 AM	Dilution Factor:	100
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14042415

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	126
4-Bromofluorobenzene	460-00-4	83-115	96
Toluene-d8	2037-26-5	86-115	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	4/24/19 07:46 PM
Lab ID:	1904325A-08A	Dilution Factor:	102
Date/Time Collected:	4/11/19 11:46 AM	Instrument/Filename:	msd14.i / 14042416
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	570	1200	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6100	7600	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	480	1500	2500	48000
1,2-Dibromoethane (EDB)	106-93-4	690	2400	3900	9200
1,2-Dichlorobenzene	95-50-1	740	1800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	420	1500	2500	17000
1,3-Butadiene	106-99-0	350	680	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	3700	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	3000	6000	340000 J
2-Hexanone	591-78-6	3100	4200	8400	Not Detected U
2-Propanol	67-63-0	640	2500	5000	78000
4-Methyl-2-pentanone	108-10-1	1000	1200	2100	Not Detected U
Acetone	67-64-1	710	2400	4800	1800000
Benzene	71-43-2	230	980	1600	440000
Bromodichloromethane	75-27-4	340	2000	3400	Not Detected U
Bromoform	75-25-2	730	3200	5300	Not Detected U
Carbon Disulfide	75-15-0	960	3200	6400	Not Detected U
Carbon Tetrachloride	56-23-5	760	1900	3200	Not Detected U
Chloroethane	75-00-3	1500	2700	5400	Not Detected U
Chloroform	67-66-3	430	1500	2500	Not Detected U
Chloromethane	74-87-3	880	2100	4200	Not Detected U
Cyclohexane	110-82-7	390	1000	1800	2000000
Dibromochloromethane	124-48-1	900	2600	4300	Not Detected U
Ethanol	64-17-5	840	1900	3800	10000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	4/24/19 07:46 PM
Lab ID:	1904325A-08A	Dilution Factor:	102
Date/Time Collected:	4/11/19 11:46 AM	Instrument/Filename:	msd14.i / 14042416
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected
Ethyl Benzene	100-41-4	440	1300	2200	190000
Freon 11	75-69-4	420	1700	2900	Not Detected U
Freon 113	76-13-1	700	2300	3900	Not Detected U
Freon 12	75-71-8	560	1500	2500	Not Detected U
Heptane	142-82-5	710	1200	2100	4200000
Hexane	110-54-3	440	1100	1800	1200000
m,p-Xylene	108-38-3	420	1300	2200	440000
Methylene Chloride	75-09-2	1100	3500	7100	Not Detected U
Naphthalene	91-20-3	820	5300	11000	Not Detected U
o-Xylene	95-47-6	600	1300	2200	100000
Propylene	115-07-1	600	1800	3500	33000
Styrene	100-42-5	410	1300	2200	Not Detected U
Tetrachloroethene	127-18-4	1200	2100	3400	Not Detected U
Tetrahydrofuran	109-99-9	530	900	1500	Not Detected U
Toluene	108-88-3	340	1200	1900	3000000
Total Xylene	1330-20-7	9500	D	2200	540000
Trichloroethene	79-01-6	810	1600	2700	Not Detected U
Vinyl Chloride	75-01-4	450	780	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	4/24/19 07:46 PM
Lab ID:	1904325A-08A	Dilution Factor:	102
Date/Time Collected:	4/11/19 11:46 AM	Instrument/Filename:	msd14.i / 14042416
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	121
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904325A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	5.6	12	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	60	74	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	4.7	15	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	6.8	23	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	7.3	18	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	4.1	15	24	Not Detected U
1,3-Butadiene	106-99-0	3.5	6.6	11	Not Detected U
1,4-Dioxane	123-91-1	20	36	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	29	59	Not Detected U
2-Hexanone	591-78-6	31	41	82	Not Detected U
2-Propanol	67-63-0	6.3	24	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	10	12	20	Not Detected U
Acetone	67-64-1	6.9	24	48	Not Detected U
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	20	34	Not Detected U
Bromoform	75-25-2	7.1	31	52	Not Detected U
Carbon Disulfide	75-15-0	9.5	31	62	Not Detected U
Carbon Tetrachloride	56-23-5	7.5	19	31	Not Detected U
Chloroethane	75-00-3	15	26	53	Not Detected U
Chloroform	67-66-3	4.2	15	24	Not Detected U
Chloromethane	74-87-3	8.7	21	41	Not Detected U
Cyclohexane	110-82-7	3.8	10	17	Not Detected U
Dibromochloromethane	124-48-1	8.8	26	42	Not Detected U
Ethanol	64-17-5	8.2	19	38	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904325A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	4.3	13	22	Not Detected U
Freon 11	75-69-4	4.2	17	28	Not Detected U
Freon 113	76-13-1	6.8	23	38	Not Detected U
Freon 12	75-71-8	5.5	15	25	Not Detected U
Heptane	142-82-5	6.9	12	20	Not Detected U
Hexane	110-54-3	4.3	10	18	Not Detected U
m,p-Xylene	108-38-3	4.1	13	22	Not Detected U
Methylene Chloride	75-09-2	11	35	69	Not Detected U
Naphthalene	91-20-3	8.1	52	100	Not Detected U
o-Xylene	95-47-6	5.9	13	22	Not Detected U
Propylene	115-07-1	5.9	17	34	Not Detected U
Styrene	100-42-5	4.0	13	21	Not Detected U
Tetrachloroethene	127-18-4	12	20	34	Not Detected U
Tetrahydrofuran	109-99-9	5.2	8.8	15	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U
Total Xylene	1330-20-7	93	D	22	Not Detected
Trichloroethene	79-01-6	8.0	16	27	Not Detected U
Vinyl Chloride	75-01-4	4.4	7.7	13	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	98

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/24/19 12:28 PM
Lab ID:	1904325A-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042406a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/25/19 11:27 AM
Lab ID:	1904325A-09B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042507a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	108-88-3	3.4	11	19	5.7 J

J = Estimated value.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94
4-Bromofluorobenzene	460-00-4	83-115	97
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904325A-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	106
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	99
1,2-Dichlorobenzene	95-50-1	97
1,3,5-Trimethylbenzene	108-67-8	103
1,3-Butadiene	106-99-0	102
1,4-Dioxane	123-91-1	102
2-Butanone (Methyl Ethyl Ketone)	78-93-3	100
2-Hexanone	591-78-6	102
2-Propanol	67-63-0	101
4-Methyl-2-pentanone	108-10-1	105
Acetone	67-64-1	102
Benzene	71-43-2	95
Bromodichloromethane	75-27-4	96
Bromoform	75-25-2	99
Carbon Disulfide	75-15-0	100
Carbon Tetrachloride	56-23-5	101
Chloroethane	75-00-3	110
Chloroform	67-66-3	98
Chloromethane	74-87-3	103
Cyclohexane	110-82-7	102
Dibromochloromethane	124-48-1	99
Ethanol	64-17-5	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904325A-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	110
Ethyl Benzene	100-41-4	97
Freon 11	75-69-4	103
Freon 113	76-13-1	101
Freon 12	75-71-8	102
Heptane	142-82-5	94
Hexane	110-54-3	102
m,p-Xylene	108-38-3	96
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	125
o-Xylene	95-47-6	97
Propylene	115-07-1	94
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	96
Tetrahydrofuran	109-99-9	102
Toluene	108-88-3	95
Total Xylene	1330-20-7	96
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	103

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	97

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 09:21 AM
Lab ID:	1904325A-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042402a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/25/19 07:38 AM
Lab ID:	1904325A-10B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042502a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	98

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	93
4-Bromofluorobenzene	460-00-4	83-115	104
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904325A-10C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	95
1,2,4-Trimethylbenzene	95-63-6	98
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	99
1,3,5-Trimethylbenzene	108-67-8	106
1,3-Butadiene	106-99-0	98
1,4-Dioxane	123-91-1	106
2-Butanone (Methyl Ethyl Ketone)	78-93-3	111
2-Hexanone	591-78-6	105
2-Propanol	67-63-0	102
4-Methyl-2-pentanone	108-10-1	110
Acetone	67-64-1	117
Benzene	71-43-2	100
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	103
Carbon Tetrachloride	56-23-5	94
Chloroethane	75-00-3	110
Chloroform	67-66-3	99
Chloromethane	74-87-3	100
Cyclohexane	110-82-7	112
Dibromochloromethane	124-48-1	96
Ethanol	64-17-5	111

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904325A-10C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	99
Freon 11	75-69-4	99
Freon 113	76-13-1	104
Freon 12	75-71-8	99
Heptane	142-82-5	105
Hexane	110-54-3	110
m,p-Xylene	108-38-3	102
Methylene Chloride	75-09-2	98
Naphthalene	91-20-3	107
o-Xylene	95-47-6	99
Propylene	115-07-1	97
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	98
Tetrahydrofuran	109-99-9	100
Toluene	108-88-3	104
Total Xylene	1330-20-7	100
Trichloroethene	79-01-6	96
Vinyl Chloride	75-01-4	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	93



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/24/19 11:51 PM
Lab ID:	1904325A-10C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042423
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	4/25/19 03:02 PM
Lab ID:	1904325A-10D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042510a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	95

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904325A-11A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	107
1,2,4-Trichlorobenzene	120-82-1	132
1,2,4-Trimethylbenzene	95-63-6	103
1,2-Dibromoethane (EDB)	106-93-4	104
1,2-Dichlorobenzene	95-50-1	109
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	106
1,4-Dioxane	123-91-1	116
2-Butanone (Methyl Ethyl Ketone)	78-93-3	106
2-Hexanone	591-78-6	126
2-Propanol	67-63-0	110
4-Methyl-2-pentanone	108-10-1	109
Acetone	67-64-1	109
Benzene	71-43-2	101
Bromodichloromethane	75-27-4	104
Bromoform	75-25-2	105
Carbon Disulfide	75-15-0	90
Carbon Tetrachloride	56-23-5	106
Chloroethane	75-00-3	115
Chloroform	67-66-3	103
Chloromethane	74-87-3	104
Cyclohexane	110-82-7	107
Dibromochloromethane	124-48-1	103
Ethanol	64-17-5	118

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904325A-11A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	111
Freon 113	76-13-1	104
Freon 12	75-71-8	109
Heptane	142-82-5	102
Hexane	110-54-3	106
m,p-Xylene	108-38-3	99
Methylene Chloride	75-09-2	104
Naphthalene	91-20-3	114
o-Xylene	95-47-6	101
Propylene	115-07-1	95
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	103
Tetrahydrofuran	109-99-9	104
Toluene	108-88-3	99
Total Xylene	1330-20-7	100
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	110

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/24/19 10:16 AM
Lab ID:	1904325A-11A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042403a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904325A-11AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	103
1,2,4-Trichlorobenzene	120-82-1	121
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	104
1,2-Dichlorobenzene	95-50-1	108
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	102
1,4-Dioxane	123-91-1	118
2-Butanone (Methyl Ethyl Ketone)	78-93-3	109
2-Hexanone	591-78-6	124
2-Propanol	67-63-0	111
4-Methyl-2-pentanone	108-10-1	112
Acetone	67-64-1	107
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	103
Bromoform	75-25-2	106
Carbon Disulfide	75-15-0	92
Carbon Tetrachloride	56-23-5	102
Chloroethane	75-00-3	106
Chloroform	67-66-3	103
Chloromethane	74-87-3	105
Cyclohexane	110-82-7	104
Dibromochloromethane	124-48-1	104
Ethanol	64-17-5	124

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904325A-11AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	111
Freon 113	76-13-1	103
Freon 12	75-71-8	105
Heptane	142-82-5	100
Hexane	110-54-3	102
m,p-Xylene	108-38-3	100
Methylene Chloride	75-09-2	105
Naphthalene	91-20-3	105
o-Xylene	95-47-6	104
Propylene	115-07-1	98
Styrene	100-42-5	105
Tetrachloroethene	127-18-4	103
Tetrahydrofuran	109-99-9	103
Toluene	108-88-3	100
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	108

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/24/19 10:54 AM
Lab ID:	1904325A-11AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042404a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/25/19 08:59 AM
Lab ID:	1904325A-11B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042504a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	92
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/25/19 09:35 AM
Lab ID:	1904325A-11BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14042505a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Toluene	108-88-3	102

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	92
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	103

* % Recovery is calculated using unrounded analytical results.



4/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904325B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/12/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

**WORK ORDER #: 1904325B**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/12/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 102.2	Modified TO-3	9.2 "Hg	5.1 psi
02A	KAFB-106V2 117.1	Modified TO-3	9.4 "Hg	4.8 psi
03A	KAFB-106V2 117.1 DUP	Modified TO-3	9.4 "Hg	5 psi
04A	KAFB-106V2 159.9	Modified TO-3	10.6 "Hg	5 psi
04AA	KAFB-106V2 159.9 Lab Duplicate	Modified TO-3	10.6 "Hg	5 psi
05A	KAFB-106V2 217.1	Modified TO-3	11.2 "Hg	5.1 psi
06A	KAFB-106V2 252.2	Modified TO-3	9.8 "Hg	5.3 psi
07A	KAFB-106V2 252.2 DUP	Modified TO-3	9.6 "Hg	5.3 psi
08A	KAFB-106V2 269.5	Modified TO-3	10.4 "Hg	4.9 psi
09A	Lab Blank	Modified TO-3	NA	NA
10A	LCS	Modified TO-3	NA	NA
10AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Technical Director

DATE: 04/24/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

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LABORATORY NARRATIVE
DoD QSM 5.1 TO-3
EA Engineering
Workorder# 1904325B

Eight 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on April 12, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

The Chain of Custody (COC) information for samples KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5 did not match the entries on the sample tags with regard to sample identification. Therefore the information on the COC was used to process and report the samples.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound

hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

TPH (Gasoline Range) and Fluorobenzene (FID) were manually integrated in sample KAFB-106V2 102.2.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B - Compound present in laboratory blank greater than reporting limit.
- J - Estimated value.
- S - Saturated peak.
- Q - Exceeds quality control limits.
- U - Compound analyzed for but not detected above the detection limit.
- M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/18/19 09:05 AM
Lab ID:	1904325B-01A	Dilution Factor:	3880
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	gcd.i / d041807
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	230000	320000	400000	370000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	112



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	4/18/19 09:54 AM
Lab ID:	1904325B-02A	Dilution Factor:	3860
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	gcd.i / d041808
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	220000	320000	390000	180000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	100



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	4/18/19 10:44 AM
Lab ID:	1904325B-03A	Dilution Factor:	3900
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	gcd.i / d041809
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	230000	320000	400000	170000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	4/18/19 11:35 AM
Lab ID:	1904325B-04A	Dilution Factor:	2760
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	gcd.i / d041810
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	160000	220000	280000	43000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	96

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 159.9 Lab Duplicate	Date/Time Analyzed:	4/18/19 06:05 PM
Lab ID:	1904325B-04AA	Dilution Factor:	2760
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	gcd.i / d041819
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	160000	220000	280000	46000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	91

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	4/18/19 02:30 PM
Lab ID:	1904325B-05A	Dilution Factor:	2870
Date/Time Collected:	4/11/19 10:15 AM	Instrument/Filename:	gcd.i / d041814
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	170000	230000	290000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	111

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	4/18/19 03:58 PM
Lab ID:	1904325B-06A	Dilution Factor:	4040
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	gcd.i / d041816
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	240000	330000	410000	90000000
Surrogates	CAS#			Limits	%Recovery
Fluorobenzene (FID)	462-06-602			53-159	102



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 DUP	Date/Time Analyzed:	4/18/19 04:41 PM
Lab ID:	1904325B-07A	Dilution Factor:	4000
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	gcd.i / d041817
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	230000	330000	410000	90000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	101

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	4/18/19 05:24 PM
Lab ID:	1904325B-08A	Dilution Factor:	2720
Date/Time Collected:	4/11/19 11:46 AM	Instrument/Filename:	gcd.i / d041818
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	160000	220000	280000	94000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/17/19 10:33 PM
Lab ID:	1904325B-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041805a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	97

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/17/19 08:24 PM
Lab ID:	1904325B-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041802a
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		98
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	99

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/17/19 09:03 PM
Lab ID:	1904325B-10AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d041803a
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		99
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	101

* % Recovery is calculated using unrounded analytical results.



8/1/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1904325CR1

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 4/12/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, flowing style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1904325CR1

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	04/12/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	04/25/2019		
DATE REISSUED:	08/01/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 102.2	Modified ASTM D-1945	9.2 "Hg	5.1 psi
01AA	KAFB-106V2 102.2 Lab Duplicate	Modified ASTM D-1945	9.2 "Hg	5.1 psi
02A	KAFB-106V2 117.1	Modified ASTM D-1945	9.4 "Hg	4.8 psi
03A	KAFB-106V2 117.1 DUP	Modified ASTM D-1945	9.4 "Hg	5 psi
04A	KAFB-106V2 159.9	Modified ASTM D-1945	10.6 "Hg	5 psi
05A	KAFB-106V2 217.1	Modified ASTM D-1945	11.2 "Hg	5.1 psi
06A	KAFB-106V2 252.2	Modified ASTM D-1945	9.8 "Hg	5.3 psi
07A	KAFB-106V2 252.2 DUP	Modified ASTM D-1945	9.6 "Hg	5.3 psi
08A	KAFB-106V2 269.5	Modified ASTM D-1945	10.4 "Hg	4.9 psi
09A	Lab Blank	Modified ASTM D-1945	NA	NA
09B	Lab Blank	Modified ASTM D-1945	NA	NA
10A	LCS	Modified ASTM D-1945	NA	NA
10AA	LCS	Modified ASTM D-1945	NA	NA
10B	LCS	Modified ASTM D-1945	NA	NA
10BB	LCS	Modified ASTM D-1945	NA	NA

CERTIFIED BY:



Technical Director

DATE: 08/01/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 ASTM D1945
EA Engineering
Workorder# 1904325CR1

Eight 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on April 12, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+)
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

The Chain of Custody (COC) information for sample KAFB-106V2 117.1 did not match the information on the canister with regard to canister barcode. The sample labeled 2712 on the COC is labeled as 9267 on the canister. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

The Chain of Custody (COC) information for samples KAFB-106V2 102.2, KAFB-106V2 117.1,

KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5 did not match the entries on the sample tags with regard to sample identification. Therefore the information on the COC was used to process and report the samples.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Methane was manually integrated in sample KAFB-106V2 159.9.

Methane and Ethane were manually integrated in samples KAFB-106V2 102.2, KAFB-106V2 102.2 Lab Duplicate, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 217.1, KAFB-106V2 252.2, KAFB-106V2 252.2 DUP and KAFB-106V2 269.5.

The workorder was reissued on 08/01/2019 to report Pentane for KAFB-106V2 159.9 as required by the project specifications.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	4/17/19 08:42 PM
Lab ID:	1904325CR1-01A	Dilution Factor:	1.94
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	gc10.i / 10041808
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00021	0.0019	0.0095
Carbon Dioxide	124-38-9	0.0021	0.0093	0.019	13
Carbon Monoxide	630-08-0	0.0026	0.0093	0.019	Not Detected U
Ethane	74-84-0	0.000048	0.00021	0.0019	0.0029
Hydrogen	1333-74-0	0.0029	0.012	0.019	Not Detected U
Methane	74-82-8	0.000052	0.000097	0.00019	0.021
Nitrogen	7727-37-9	0.13	0.13	0.19	84
Oxygen	7782-44-7	0.036	0.036	0.19	1.2
Pentane	109-66-0	0.000048	0.00021	0.0019	0.21
Propane	74-98-6	0.000058	0.00021	0.0019	0.0015 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 100

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 102.2 Lab Duplicate	Date/Time Analyzed:	4/17/19 09:13 PM
Lab ID:	1904325CR1-01AA	Dilution Factor:	1.94
Date/Time Collected:	4/11/19 08:33 AM	Instrument/Filename:	gc10.i / 10041809
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00021	0.0019	0.0097
Carbon Dioxide	124-38-9	0.0021	0.0093	0.019	13
Carbon Monoxide	630-08-0	0.0026	0.0093	0.019	Not Detected U
Ethane	74-84-0	0.000048	0.00021	0.0019	0.0030
Hydrogen	1333-74-0	0.0029	0.012	0.019	Not Detected U
Methane	74-82-8	0.000052	0.000097	0.00019	0.022
Nitrogen	7727-37-9	0.13	0.13	0.19	83
Oxygen	7782-44-7	0.036	0.036	0.19	1.2
Pentane	109-66-0	0.000048	0.00021	0.0019	0.23
Propane	74-98-6	0.000058	0.00021	0.0019	0.0015 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 120

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	4/17/19 10:12 PM
Lab ID:	1904325CR1-02A	Dilution Factor:	1.93
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	gc10.i / 10041811
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00021	0.0019	0.0093
Carbon Dioxide	124-38-9	0.0021	0.0093	0.019	13
Carbon Monoxide	630-08-0	0.0026	0.0093	0.019	Not Detected U
Ethane	74-84-0	0.000048	0.00021	0.0019	0.0028
Hydrogen	1333-74-0	0.0029	0.012	0.019	Not Detected U
Methane	74-82-8	0.000052	0.000096	0.00019	0.020
Nitrogen	7727-37-9	0.13	0.13	0.19	84
Oxygen	7782-44-7	0.036	0.036	0.19	1.3
Pentane	109-66-0	0.000048	0.00021	0.0019	0.21
Propane	74-98-6	0.000058	0.00021	0.0019	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 100

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	4/17/19 10:42 PM
Lab ID:	1904325CR1-03A	Dilution Factor:	1.95
Date/Time Collected:	4/11/19 09:03 AM	Instrument/Filename:	gc10.i / 10041812
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00021	0.0020	0.0091
Carbon Dioxide	124-38-9	0.0021	0.0094	0.020	13
Carbon Monoxide	630-08-0	0.0026	0.0094	0.020	Not Detected U
Ethane	74-84-0	0.000049	0.00021	0.0020	0.0028
Hydrogen	1333-74-0	0.0029	0.012	0.020	Not Detected U
Methane	74-82-8	0.000053	0.000098	0.00020	0.020
Nitrogen	7727-37-9	0.13	0.13	0.20	83
Oxygen	7782-44-7	0.036	0.036	0.20	1.2
Pentane	109-66-0	0.000049	0.00021	0.0020	0.22
Propane	74-98-6	0.000058	0.00021	0.0020	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 100

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	4/17/19 11:06 PM
Lab ID:	1904325CR1-04A	Dilution Factor:	2.07
Date/Time Collected:	4/11/19 09:33 AM	Instrument/Filename:	gc10.i / 10041813R1
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0035
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	12
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0023
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.0088
Nitrogen	7727-37-9	0.14	0.14	0.21	86
Oxygen	7782-44-7	0.038	0.038	0.21	1.6
Pentane	109-66-0	0.000052	0.00023	0.0021	0.085
Propane	74-98-6	0.000062	0.00023	0.0021	0.00096 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 40

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	4/17/19 11:32 PM
Lab ID:	1904325CR1-05A	Dilution Factor:	2.15
Date/Time Collected:	4/11/19 10:15 AM	Instrument/Filename:	gc10.i / 10041814
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0018 J
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	12
Carbon Monoxide	630-08-0	0.0028	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0021 J
Hydrogen	1333-74-0	0.0032	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.0050
Nitrogen	7727-37-9	0.14	0.14	0.22	85
Oxygen	7782-44-7	0.040	0.040	0.22	1.4
Pentane	109-66-0	0.000054	0.00024	0.0022	0.063
Propane	74-98-6	0.000064	0.00024	0.0022	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 80

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	4/18/19 10:08 AM
Lab ID:	1904325CR1-06A	Dilution Factor:	2.02
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	gc10.i / 10041818
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0018 J
Carbon Dioxide	124-38-9	0.0022	0.0097	0.020	7.6
Carbon Monoxide	630-08-0	0.0027	0.0097	0.020	Not Detected U
Ethane	74-84-0	0.000050	0.00022	0.0020	0.0021
Hydrogen	1333-74-0	0.0030	0.012	0.020	Not Detected U
Methane	74-82-8	0.000054	0.00010	0.00020	0.0032
Nitrogen	7727-37-9	0.14	0.14	0.20	84
Oxygen	7782-44-7	0.037	0.037	0.20	7.9
Pentane	109-66-0	0.000050	0.00022	0.0020	0.027
Propane	74-98-6	0.000061	0.00022	0.0020	0.0020 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 42

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 DUP	Date/Time Analyzed:	4/18/19 11:52 AM
Lab ID:	1904325CR1-07A	Dilution Factor:	2.00
Date/Time Collected:	4/11/19 10:47 AM	Instrument/Filename:	gc10.i / 10041821
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0018 J
Carbon Dioxide	124-38-9	0.0022	0.0096	0.020	7.5
Carbon Monoxide	630-08-0	0.0026	0.0096	0.020	Not Detected U
Ethane	74-84-0	0.000050	0.00022	0.0020	0.0020
Hydrogen	1333-74-0	0.0030	0.012	0.020	Not Detected U
Methane	74-82-8	0.000054	0.00010	0.00020	0.0032
Nitrogen	7727-37-9	0.14	0.14	0.20	84
Oxygen	7782-44-7	0.037	0.037	0.20	8.0
Pentane	109-66-0	0.000050	0.00022	0.0020	0.028
Propane	74-98-6	0.000060	0.00022	0.0020	0.0020 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 44

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	4/18/19 01:06 PM
Lab ID:	1904325CR1-08A	Dilution Factor:	2.04
Date/Time Collected:	4/11/19 11:46 AM	Instrument/Filename:	gc10.i / 10041823
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0017 J
Carbon Dioxide	124-38-9	0.0022	0.0098	0.020	6.8
Carbon Monoxide	630-08-0	0.0027	0.0098	0.020	Not Detected U
Ethane	74-84-0	0.000051	0.00022	0.0020	0.0017 J
Hydrogen	1333-74-0	0.0031	0.013	0.020	Not Detected U
Methane	74-82-8	0.000055	0.00010	0.00020	0.0026
Nitrogen	7727-37-9	0.14	0.14	0.20	83
Oxygen	7782-44-7	0.038	0.038	0.20	9.6
Pentane	109-66-0	0.000051	0.00022	0.0020	0.024
Propane	74-98-6	0.000061	0.00022	0.0020	0.0018 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 42



NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/17/19 07:49 PM
Lab ID:	1904325CR1-09A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041807
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	4/17/19 07:25 PM
Lab ID:	1904325CR1-09B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041806c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/17/19 04:38 PM
Lab ID:	1904325CR1-10A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041802a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	99
Carbon Dioxide	124-38-9	99
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	100
Methane	74-82-8	101
Nitrogen	7727-37-9	91
Oxygen	7782-44-7	105
Pentane	109-66-0	101
Propane	74-98-6	101

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/17/19 05:55 PM
Lab ID:	1904325CR1-10AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041803a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	101
Methane	74-82-8	102
Nitrogen	7727-37-9	91
Oxygen	7782-44-7	104
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	4/17/19 06:54 PM
Lab ID:	1904325CR1-10B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041805c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	4/18/19 02:05 PM
Lab ID:	1904325CR1-10BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10041824c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905302A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker".

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

**WORK ORDER #: 1905302A**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-15	12.2 "Hg	5.1 psi
01AA	KAFB-106V1 102.1 Lab Duplicate	Modified TO-15	12.2 "Hg	5.1 psi
02A	KAFB-106V1 112.6	Modified TO-15	10.4 "Hg	4.9 psi
03A	KAFB-106V1 159.6	Modified TO-15	11.2 "Hg	4.9 psi
04A	KAFB-106V1 159.6 DUP	Modified TO-15	11.4 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified TO-15	11 "Hg	5 psi
05B	KAFB-106V1 217.1	Modified TO-15	11 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified TO-15	12.4 "Hg	4.9 psi
06B	KAFB-106V1 252.1	Modified TO-15	12.4 "Hg	4.9 psi
07A	KAFB-106V1 262.6	Modified TO-15	11.6 "Hg	4.9 psi
07B	KAFB-106V1 262.6	Modified TO-15	11.6 "Hg	4.9 psi
08A	KAFB-106V2 102.2	Modified TO-15	11.4 "Hg	4.9 psi
08B	KAFB-106V2 102.2	Modified TO-15	11.4 "Hg	4.9 psi
09A	KAFB-106V2 117.1	Modified TO-15	13.3 "Hg	5 psi
09B	KAFB-106V2 117.1	Modified TO-15	13.3 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified TO-15	11.2 "Hg	5 psi
10B	KAFB-106V2 117.1 DUP	Modified TO-15	11.2 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified TO-15	11.4 "Hg	4.9 psi
11AA	KAFB-106V2 159.9 Lab Duplicate	Modified TO-15	11.4 "Hg	4.9 psi
12A	KAFB-106V2 217.1	Modified TO-15	10.8 "Hg	4.9 psi
12B	KAFB-106V2 217.1	Modified TO-15	10.8 "Hg	4.9 psi
13A	Lab Blank	Modified TO-15	NA	NA
13B	Lab Blank	Modified TO-15	NA	NA

Continued on next page

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Page 2 of 84

**WORK ORDER #: 1905302A**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
14A	CCV	Modified TO-15	NA	NA
14B	CCV	Modified TO-15	NA	NA
14C	CCV	Modified TO-15	NA	NA
14D	CCV	Modified TO-15	NA	NA
15A	LCS	Modified TO-15	NA	NA
15AA	LCSD	Modified TO-15	NA	NA
15B	LCS	Modified TO-15	NA	NA
15BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

Technical Director

DATE: 05/30/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

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LABORATORY NARRATIVE
DoD QSM 5.1 TO-15 LL/SIM
EA Engineering
Workorder# 1905302A

Twelve 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on May 15, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liter of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modification taken to run these samples is summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-15 LL/SIM</i>	<i>ATL Modifications</i>
Blank and standards	Zero air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Samples were analyzed in two analytical batches on instrument MSD-14 on 5/23/19 and 5/24/19. The initial continuing calibration verification (CCV) for the batch is reported as lab fractions 14A and 14C and the ending CCV is reported as lab fractions 14B and 14D.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and O-Xylene.

A Limit of Detection (LOD) study and Method Detection Limit (MDL) study are not maintained for

Total Xylenes and non-standard compounds.

All samples were transferred from SIM/Low Level analysis to full scan TO-15 due to high levels of target compounds.

Dilution was performed on all samples due to the presence of high level target species.

High concentrations of VOCs in samples KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP and KAFB-106V2 217.1 required an off-line dilution using a Tedlar bag. Toluene is a common contaminant in Tedlar bags, and a CN-flag was applied to Toluene concentrations to indicate a high bias.

Acetone, Hexane, 2-Butanone and Cyclohexane exceeded the instrument's calibration range for samples KAFB-106V1 102.1 and KAFB-106V1 102.1 Lab Duplicate and were flagged accordingly.

Hexane exceeded the instrument's calibration range for sample KAFB-106V1 112.6 and was flagged accordingly.

Acetone, Hexane and Cyclohexane exceeded the instrument's calibration range for sample KAFB-106V1 159.6 and was flagged accordingly.

Acetone, Hexane, Cyclohexane and Heptane exceeded the instrument's calibration range for sample KAFB-106V1 159.6 DUP and was flagged accordingly.

The Continuing Calibration Verification (CCV) analyzed on 5/23/19 and 5/24/19 did not meet project requirement control limits of 70-130% recovery (R) for Naphthalene.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	5/23/19 07:09 PM
Lab ID:	1905302A-01A	Dilution Factor:	114
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	msd14.i / 14052323
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	640	1400	2300	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6800	8500	17000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	530	1700	2800	170000
1,2-Dibromoethane (EDB)	106-93-4	770	2600	4400	3500 J
1,2-Dichlorobenzene	95-50-1	830	2000	3400	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	460	1700	2800	48000
1,3-Butadiene	106-99-0	400	760	1300	Not Detected U
1,4-Dioxane	123-91-1	2200	4100	8200	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	3400	6700	770000 J
2-Hexanone	591-78-6	3500	4700	9300	4800 J
2-Propanol	67-63-0	710	2800	5600	330000
4-Methyl-2-pentanone	108-10-1	1100	1400	2300	7600
Acetone	67-64-1	790	2700	5400	5000000 J
Benzene	71-43-2	250	1100	1800	2300000
Bromodichloromethane	75-27-4	380	2300	3800	Not Detected U
Bromoform	75-25-2	810	3500	5900	Not Detected U
Carbon Disulfide	75-15-0	1100	3600	7100	Not Detected U
Carbon Tetrachloride	56-23-5	850	2200	3600	Not Detected U
Chloroethane	75-00-3	1700	3000	6000	Not Detected U
Chloroform	67-66-3	480	1700	2800	Not Detected U
Chloromethane	74-87-3	990	2400	4700	Not Detected U
Cyclohexane	110-82-7	440	1200	2000	5400000 J
Dibromochloromethane	124-48-1	1000	2900	4800	Not Detected U
Ethanol	64-17-5	940	2100	4300	160000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	5/23/19 07:09 PM
Lab ID:	1905302A-01A	Dilution Factor:	114
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	msd14.i / 14052323
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	8200	Not Detected
Ethyl Benzene	100-41-4	490	1500	2500	280000
Freon 11	75-69-4	470	1900	3200	Not Detected U
Freon 113	76-13-1	780	2600	4400	Not Detected U
Freon 12	75-71-8	620	1700	2800	Not Detected U
Heptane	142-82-5	790	1400	2300	3000000
Hexane	110-54-3	490	1200	2000	8800000 J
m,p-Xylene	108-38-3	460	1500	2500	450000
Methylene Chloride	75-09-2	1200	4000	7900	Not Detected U
Naphthalene	91-20-3	920	6000	12000	1600 JUJ
o-Xylene	95-47-6	670	1500	2500	160000
Propylene	115-07-1	670	2000	3900	35000
Styrene	100-42-5	460	1400	2400	Not Detected U
Tetrachloroethene	127-18-4	1400	2300	3900	Not Detected U
Tetrahydrofuran	109-99-9	600	1000	1700	Not Detected U
Toluene	108-88-3	390	1300	2100	2100000
Total Xylene	1330-20-7	NA	D	2500	610000
Trichloroethene	79-01-6	910	1800	3100	Not Detected U
Vinyl Chloride	75-01-4	500	870	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	5/23/19 07:09 PM
Lab ID:	1905302A-01A	Dilution Factor:	114
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	msd14.i / 14052323
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	126
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate		
Lab ID:	1905302A-01AA	Date/Time Analyzed:	5/23/19 07:33 PM
Date/Time Collected:	5/9/19 02:42 PM	Dilution Factor:	114
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052324

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	640	1400	2300	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6800	8500	17000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	530	1700	2800	140000
1,2-Dibromoethane (EDB)	106-93-4	770	2600	4400	3200 J
1,2-Dichlorobenzene	95-50-1	830	2000	3400	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	460	1700	2800	40000
1,3-Butadiene	106-99-0	400	760	1300	Not Detected U
1,4-Dioxane	123-91-1	2200	4100	8200	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	3400	6700	740000 J
2-Hexanone	591-78-6	3500	4700	9300	4200 J
2-Propanol	67-63-0	710	2800	5600	310000
4-Methyl-2-pentanone	108-10-1	1100	1400	2300	6400
Acetone	67-64-1	790	2700	5400	4800000 J
Benzene	71-43-2	250	1100	1800	2200000
Bromodichloromethane	75-27-4	380	2300	3800	Not Detected U
Bromoform	75-25-2	810	3500	5900	Not Detected U
Carbon Disulfide	75-15-0	1100	3600	7100	Not Detected U
Carbon Tetrachloride	56-23-5	850	2200	3600	Not Detected U
Chloroethane	75-00-3	1700	3000	6000	Not Detected U
Chloroform	67-66-3	480	1700	2800	Not Detected U
Chloromethane	74-87-3	990	2400	4700	Not Detected U
Cyclohexane	110-82-7	440	1200	2000	5000000 J
Dibromochloromethane	124-48-1	1000	2900	4800	Not Detected U
Ethanol	64-17-5	940	2100	4300	150000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate		
Lab ID:	1905302A-01AA	Date/Time Analyzed:	5/23/19 07:33 PM
Date/Time Collected:	5/9/19 02:42 PM	Dilution Factor:	114
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052324

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	8200	Not Detected
Ethyl Benzene	100-41-4	490	1500	2500	240000
Freon 11	75-69-4	470	1900	3200	Not Detected U
Freon 113	76-13-1	780	2600	4400	Not Detected U
Freon 12	75-71-8	620	1700	2800	Not Detected U
Heptane	142-82-5	790	1400	2300	2800000
Hexane	110-54-3	490	1200	2000	8200000 J
m,p-Xylene	108-38-3	460	1500	2500	380000
Methylene Chloride	75-09-2	1200	4000	7900	Not Detected U
Naphthalene	91-20-3	920	6000	12000	1900 UJJ
o-Xylene	95-47-6	670	1500	2500	130000
Propylene	115-07-1	670	2000	3900	36000
Styrene	100-42-5	460	1400	2400	Not Detected U
Tetrachloroethene	127-18-4	1400	2300	3900	Not Detected U
Tetrahydrofuran	109-99-9	600	1000	1700	Not Detected U
Toluene	108-88-3	390	1300	2100	1900000
Total Xylene	1330-20-7	NA	D	2500	510000
Trichloroethene	79-01-6	910	1800	3100	Not Detected U
Vinyl Chloride	75-01-4	500	870	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate		
Lab ID:	1905302A-01AA	Date/Time Analyzed:	5/23/19 07:33 PM
Date/Time Collected:	5/9/19 02:42 PM	Dilution Factor:	114
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052324

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	122
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	5/23/19 07:57 PM
Lab ID:	1905302A-02A	Dilution Factor:	102
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	msd14.i / 14052325
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	570	1200	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6100	7600	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	480	1500	2500	94000
1,2-Dibromoethane (EDB)	106-93-4	690	2400	3900	2800 J
1,2-Dichlorobenzene	95-50-1	740	1800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	420	1500	2500	27000
1,3-Butadiene	106-99-0	350	680	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	3700	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	3000	6000	270000
2-Hexanone	591-78-6	3100	4200	8400	Not Detected U
2-Propanol	67-63-0	640	2500	5000	100000
4-Methyl-2-pentanone	108-10-1	1000	1200	2100	5700
Acetone	67-64-1	710	2400	4800	2200000
Benzene	71-43-2	230	980	1600	1400000
Bromodichloromethane	75-27-4	340	2000	3400	Not Detected U
Bromoform	75-25-2	730	3200	5300	Not Detected U
Carbon Disulfide	75-15-0	960	3200	6400	Not Detected U
Carbon Tetrachloride	56-23-5	760	1900	3200	Not Detected U
Chloroethane	75-00-3	1500	2700	5400	Not Detected U
Chloroform	67-66-3	430	1500	2500	Not Detected U
Chloromethane	74-87-3	880	2100	4200	Not Detected U
Cyclohexane	110-82-7	390	1000	1800	3300000
Dibromochloromethane	124-48-1	900	2600	4300	Not Detected U
Ethanol	64-17-5	840	1900	3800	80000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	5/23/19 07:57 PM
Lab ID:	1905302A-02A	Dilution Factor:	102
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	msd14.i / 14052325
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected
Ethyl Benzene	100-41-4	440	1300	2200	200000
Freon 11	75-69-4	420	1700	2900	Not Detected U
Freon 113	76-13-1	700	2300	3900	Not Detected U
Freon 12	75-71-8	560	1500	2500	Not Detected U
Heptane	142-82-5	710	1200	2100	2200000
Hexane	110-54-3	440	1100	1800	5300000 J
m,p-Xylene	108-38-3	420	1300	2200	310000
Methylene Chloride	75-09-2	1100	3500	7100	Not Detected U
Naphthalene	91-20-3	820	5300	11000	3100 JUJ
o-Xylene	95-47-6	600	1300	2200	100000
Propylene	115-07-1	600	1800	3500	29000
Styrene	100-42-5	410	1300	2200	Not Detected U
Tetrachloroethene	127-18-4	1200	2100	3400	Not Detected U
Tetrahydrofuran	109-99-9	530	900	1500	Not Detected U
Toluene	108-88-3	340	1200	1900	1500000
Total Xylene	1330-20-7	NA	D	2200	420000
Trichloroethene	79-01-6	810	1600	2700	Not Detected U
Vinyl Chloride	75-01-4	450	780	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	5/23/19 07:57 PM
Lab ID:	1905302A-02A	Dilution Factor:	102
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	msd14.i / 14052325
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	117
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	5/23/19 08:21 PM
Lab ID:	1905302A-03A	Dilution Factor:	106
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052326
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	600	1300	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6400	7900	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	180000
1,2-Dibromoethane (EDB)	106-93-4	720	2400	4100	2600 J
1,2-Dichlorobenzene	95-50-1	770	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	430	1600	2600	53000
1,3-Butadiene	106-99-0	370	700	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3800	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3100	6200	150000
2-Hexanone	591-78-6	3200	4300	8700	5700 J
2-Propanol	67-63-0	660	2600	5200	400000
4-Methyl-2-pentanone	108-10-1	1000	1300	2200	6400
Acetone	67-64-1	740	2500	5000	2900000 J
Benzene	71-43-2	240	1000	1700	1600000
Bromodichloromethane	75-27-4	360	2100	3600	Not Detected U
Bromoform	75-25-2	760	3300	5500	Not Detected U
Carbon Disulfide	75-15-0	1000	3300	6600	Not Detected U
Carbon Tetrachloride	56-23-5	790	2000	3300	Not Detected U
Chloroethane	75-00-3	1600	2800	5600	Not Detected U
Chloroform	67-66-3	440	1600	2600	Not Detected U
Chloromethane	74-87-3	920	2200	4400	Not Detected U
Cyclohexane	110-82-7	400	1100	1800	4400000 J
Dibromochloromethane	124-48-1	930	2700	4500	Not Detected U
Ethanol	64-17-5	870	2000	4000	93000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	5/23/19 08:21 PM
Lab ID:	1905302A-03A	Dilution Factor:	106
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052326
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected
Ethyl Benzene	100-41-4	460	1400	2300	390000
Freon 11	75-69-4	440	1800	3000	Not Detected U
Freon 113	76-13-1	720	2400	4100	Not Detected U
Freon 12	75-71-8	580	1600	2600	Not Detected U
Heptane	142-82-5	730	1300	2200	4300000
Hexane	110-54-3	460	1100	1900	5900000 J
m,p-Xylene	108-38-3	430	1400	2300	880000
Methylene Chloride	75-09-2	1100	3700	7400	Not Detected U
Naphthalene	91-20-3	860	5600	11000	Not Detected UJ
o-Xylene	95-47-6	620	1400	2300	280000
Propylene	115-07-1	620	1800	3600	29000
Styrene	100-42-5	430	1400	2200	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3600	Not Detected U
Tetrahydrofuran	109-99-9	550	940	1600	Not Detected U
Toluene	108-88-3	360	1200	2000	2800000
Total Xylene	1330-20-7	NA	D	2300	1200000
Trichloroethene	79-01-6	840	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	470	810	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	5/23/19 08:21 PM
Lab ID:	1905302A-03A	Dilution Factor:	106
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052326
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	124
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	5/23/19 08:45 PM
Lab ID:	1905302A-04A	Dilution Factor:	108
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052327
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	610	1300	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6500	8000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	200000
1,2-Dibromoethane (EDB)	106-93-4	730	2500	4100	2700 J
1,2-Dichlorobenzene	95-50-1	780	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	440	1600	2600	60000
1,3-Butadiene	106-99-0	380	720	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3200	6400	160000
2-Hexanone	591-78-6	3300	4400	8800	7300 J
2-Propanol	67-63-0	680	2600	5300	420000
4-Methyl-2-pentanone	108-10-1	1100	1300	2200	5600
Acetone	67-64-1	750	2600	5100	3000000 J
Benzene	71-43-2	240	1000	1700	1700000
Bromodichloromethane	75-27-4	360	2200	3600	Not Detected U
Bromoform	75-25-2	770	3300	5600	Not Detected U
Carbon Disulfide	75-15-0	1000	3400	6700	Not Detected U
Carbon Tetrachloride	56-23-5	810	2000	3400	Not Detected U
Chloroethane	75-00-3	1600	2800	5700	Not Detected U
Chloroform	67-66-3	450	1600	2600	Not Detected U
Chloromethane	74-87-3	940	2200	4500	Not Detected U
Cyclohexane	110-82-7	410	1100	1800	4600000 J
Dibromochloromethane	124-48-1	950	2800	4600	Not Detected U
Ethanol	64-17-5	890	2000	4100	98000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	5/23/19 08:45 PM
Lab ID:	1905302A-04A	Dilution Factor:	108
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052327
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected
Ethyl Benzene	100-41-4	470	1400	2300	430000
Freon 11	75-69-4	450	1800	3000	Not Detected U
Freon 113	76-13-1	740	2500	4100	Not Detected U
Freon 12	75-71-8	590	1600	2700	Not Detected U
Heptane	142-82-5	750	1300	2200	4700000 J
Hexane	110-54-3	470	1100	1900	6300000 J
m,p-Xylene	108-38-3	440	1400	2300	960000
Methylene Chloride	75-09-2	1200	3800	7500	Not Detected U
Naphthalene	91-20-3	870	5700	11000	Not Detected UJ
o-Xylene	95-47-6	630	1400	2300	320000
Propylene	115-07-1	640	1800	3700	31000
Styrene	100-42-5	440	1400	2300	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3700	Not Detected U
Tetrahydrofuran	109-99-9	560	960	1600	Not Detected U
Toluene	108-88-3	370	1200	2000	3100000
Total Xylene	1330-20-7	NA	D	2300	1200000
Trichloroethene	79-01-6	860	1700	2900	Not Detected U
Vinyl Chloride	75-01-4	480	830	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	5/23/19 08:45 PM
Lab ID:	1905302A-04A	Dilution Factor:	108
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	msd14.i / 14052327
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	126
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/24/19 07:05 AM
Lab ID:	1905302A-05A	Dilution Factor:	212
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	msd14.i / 14052335
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1200	2600	4300	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	13000	16000	31000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	990	3100	5200	77000
1,2-Dibromoethane (EDB)	106-93-4	1400	4900	8100	3000 J
1,2-Dichlorobenzene	95-50-1	1500	3800	6400	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	860	3100	5200	33000
1,3-Butadiene	106-99-0	740	1400	2300	Not Detected U
1,4-Dioxane	123-91-1	4200	7600	15000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3000	6200	12000	400000
2-Hexanone	591-78-6	6500	8700	17000	9500 J
2-Propanol	67-63-0	1300	5200	10000	41000
4-Methyl-2-pentanone	108-10-1	2100	2600	4300	9800
Acetone	67-64-1	1500	5000	10000	5000000
Benzene	71-43-2	470	2000	3400	1600000
Bromodichloromethane	75-27-4	710	4300	7100	Not Detected U
Bromoform	75-25-2	1500	6600	11000	Not Detected U
Carbon Disulfide	75-15-0	2000	6600	13000	Not Detected U
Carbon Tetrachloride	56-23-5	1600	4000	6700	Not Detected U
Chloroethane	75-00-3	3200	5600	11000	Not Detected U
Chloroform	67-66-3	890	3100	5200	Not Detected U
Chloromethane	74-87-3	1800	4400	8800	Not Detected U
Cyclohexane	110-82-7	810	2200	3600	5000000
Dibromochloromethane	124-48-1	1900	5400	9000	Not Detected U
Ethanol	64-17-5	1700	4000	8000	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/24/19 07:05 AM
Lab ID:	1905302A-05A	Dilution Factor:	212
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	msd14.i / 14052335
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	15000	Not Detected
Ethyl Benzene	100-41-4	920	2800	4600	360000
Freon 11	75-69-4	880	3600	6000	Not Detected U
Freon 113	76-13-1	1400	4900	8100	Not Detected U
Freon 12	75-71-8	1200	3100	5200	Not Detected U
Heptane	142-82-5	1500	2600	4300	5600000
Hexane	110-54-3	920	2200	3700	6400000
m,p-Xylene	108-38-3	860	2800	4600	1100000
Methylene Chloride	75-09-2	2300	7400	15000	Not Detected U
o-Xylene	95-47-6	1200	2800	4600	320000
Propylene	115-07-1	1200	3600	7300	57000
Styrene	100-42-5	860	2700	4500	Not Detected U
Tetrachloroethene	127-18-4	2500	4300	7200	Not Detected U
Tetrahydrofuran	109-99-9	1100	1900	3100	Not Detected U
Toluene	108-88-3	720	2400	4000	3400000 CN
Total Xylene	1330-20-7	NA	D	4600	1400000
Trichloroethene	79-01-6	1700	3400	5700	Not Detected U
Vinyl Chloride	75-01-4	940	1600	2700	Not Detected U

U = The analyte was not detected above the MDL.
 CN =See Case Narrative explanation
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/24/19 07:05 AM
Lab ID:	1905302A-05A	Dilution Factor:	212
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	msd14.i / 14052335
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	114
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	103



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/23/19 09:09 PM
Lab ID:	1905302A-05B	Dilution Factor:	106
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	msd14.i / 14052328
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	860	5600	11000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	136
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	107

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/24/19 07:30 AM
Lab ID:	1905302A-06A	Dilution Factor:	228
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	msd14.i / 14052336
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1300	2800	4600	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	14000	17000	34000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1100	3400	5600	58000
1,2-Dibromoethane (EDB)	106-93-4	1500	5200	8800	12000
1,2-Dichlorobenzene	95-50-1	1600	4100	6800	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	930	3400	5600	26000
1,3-Butadiene	106-99-0	790	1500	2500	Not Detected U
1,4-Dioxane	123-91-1	4500	8200	16000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3300	6700	13000	230000
2-Hexanone	591-78-6	7000	9300	19000	28000
2-Propanol	67-63-0	1400	5600	11000	22000
4-Methyl-2-pentanone	108-10-1	2300	2800	4700	17000
Acetone	67-64-1	1600	5400	11000	1000000
Benzene	71-43-2	510	2200	3600	810000
Bromodichloromethane	75-27-4	760	4600	7600	Not Detected U
Bromoform	75-25-2	1600	7100	12000	Not Detected U
Carbon Disulfide	75-15-0	2200	7100	14000	Not Detected U
Carbon Tetrachloride	56-23-5	1700	4300	7200	Not Detected U
Chloroethane	75-00-3	3400	6000	12000	Not Detected U
Chloroform	67-66-3	960	3300	5600	Not Detected U
Chloromethane	74-87-3	2000	4700	9400	Not Detected U
Cyclohexane	110-82-7	870	2400	3900	3000000
Dibromochloromethane	124-48-1	2000	5800	9700	Not Detected U
Ethanol	64-17-5	1900	4300	8600	3900 J



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/24/19 07:30 AM
Lab ID:	1905302A-06A	Dilution Factor:	228
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	msd14.i / 14052336
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	16000	Not Detected
Ethyl Benzene	100-41-4	990	3000	4900	360000
Freon 11	75-69-4	950	3800	6400	Not Detected U
Freon 113	76-13-1	1600	5200	8700	Not Detected U
Freon 12	75-71-8	1200	3400	5600	Not Detected U
Heptane	142-82-5	1600	2800	4700	6300000
Hexane	110-54-3	990	2400	4000	3300000
m,p-Xylene	108-38-3	930	3000	5000	1100000
Methylene Chloride	75-09-2	2400	7900	16000	Not Detected U
o-Xylene	95-47-6	1300	3000	5000	300000
Propylene	115-07-1	1300	3900	7800	85000
Styrene	100-42-5	920	2900	4800	Not Detected U
Tetrachloroethene	127-18-4	2700	4600	7700	Not Detected U
Tetrahydrofuran	109-99-9	1200	2000	3400	Not Detected U
Toluene	108-88-3	770	2600	4300	4200000 CN
Total Xylene	1330-20-7	NA	D	5000	1400000
Trichloroethene	79-01-6	1800	3700	6100	Not Detected U
Vinyl Chloride	75-01-4	1000	1700	2900	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 CN =See Case Narrative explanation
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/24/19 07:30 AM
Lab ID:	1905302A-06A	Dilution Factor:	228
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	msd14.i / 14052336
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	110
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/23/19 09:37 PM
Lab ID:	1905302A-06B	Dilution Factor:	114
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	msd14.i / 14052329
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	920	6000	12000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	127
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	113

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/24/19 07:56 AM
Lab ID:	1905302A-07A	Dilution Factor:	218
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	msd14.i / 14052337
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1200	2600	4400	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	13000	16000	32000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1000	3200	5400	52000
1,2-Dibromoethane (EDB)	106-93-4	1500	5000	8400	15000
1,2-Dichlorobenzene	95-50-1	1600	3900	6600	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	890	3200	5400	20000
1,3-Butadiene	106-99-0	760	1400	2400	Not Detected U
1,4-Dioxane	123-91-1	4300	7800	16000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3100	6400	13000	430000
2-Hexanone	591-78-6	6700	8900	18000	31000
2-Propanol	67-63-0	1400	5400	11000	48000
4-Methyl-2-pentanone	108-10-1	2200	2700	4500	21000
Acetone	67-64-1	1500	5200	10000	1800000
Benzene	71-43-2	490	2100	3500	840000
Bromodichloromethane	75-27-4	730	4400	7300	Not Detected U
Bromoform	75-25-2	1600	6800	11000	Not Detected U
Carbon Disulfide	75-15-0	2100	6800	14000	Not Detected U
Carbon Tetrachloride	56-23-5	1600	4100	6800	Not Detected U
Chloroethane	75-00-3	3300	5800	12000	Not Detected U
Chloroform	67-66-3	920	3200	5300	Not Detected U
Chloromethane	74-87-3	1900	4500	9000	Not Detected U
Cyclohexane	110-82-7	830	2200	3800	2900000
Dibromochloromethane	124-48-1	1900	5600	9300	Not Detected U
Ethanol	64-17-5	1800	4100	8200	12000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/24/19 07:56 AM
Lab ID:	1905302A-07A	Dilution Factor:	218
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	msd14.i / 14052337
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	16000	Not Detected
Ethyl Benzene	100-41-4	950	2800	4700	320000
Freon 11	75-69-4	910	3700	6100	Not Detected U
Freon 113	76-13-1	1500	5000	8400	Not Detected U
Freon 12	75-71-8	1200	3200	5400	Not Detected U
Heptane	142-82-5	1500	2700	4500	7000000
Hexane	110-54-3	940	2300	3800	2800000
m,p-Xylene	108-38-3	890	2800	4700	860000
Methylene Chloride	75-09-2	2300	7600	15000	Not Detected U
o-Xylene	95-47-6	1300	2800	4700	220000
Propylene	115-07-1	1300	3800	7500	88000
Styrene	100-42-5	880	2800	4600	Not Detected U
Tetrachloroethene	127-18-4	2600	4400	7400	Not Detected U
Tetrahydrofuran	109-99-9	1100	1900	3200	Not Detected U
Toluene	108-88-3	740	2500	4100	4700000 CN
Total Xylene	1330-20-7	NA	D	4700	1100000
Trichloroethene	79-01-6	1700	3500	5800	Not Detected U
Vinyl Chloride	75-01-4	960	1700	2800	Not Detected U

U = The analyte was not detected above the MDL.
 CN =See Case Narrative explanation
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	110

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/24/19 07:56 AM
Lab ID:	1905302A-07A	Dilution Factor:	218
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	msd14.i / 14052337
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/23/19 10:01 PM
Lab ID:	1905302A-07B	Dilution Factor:	109
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	msd14.i / 14052330
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	880	5700	11000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	131
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	114

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/24/19 06:36 PM
Lab ID:	1905302A-08A	Dilution Factor:	215
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	msd14.i / 14052420
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1200	2600	4400	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	13000	16000	32000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1000	3200	5300	64000
1,2-Dibromoethane (EDB)	106-93-4	1400	5000	8300	15000
1,2-Dichlorobenzene	95-50-1	1600	3900	6500	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	880	3200	5300	29000
1,3-Butadiene	106-99-0	750	1400	2400	Not Detected U
1,4-Dioxane	123-91-1	4300	7700	15000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3100	6300	13000	630000
2-Hexanone	591-78-6	6600	8800	18000	16000 J
2-Propanol	67-63-0	1300	5300	10000	300000
4-Methyl-2-pentanone	108-10-1	2100	2600	4400	26000
Acetone	67-64-1	1500	5100	10000	4200000
Benzene	71-43-2	480	2100	3400	1800000
Bromodichloromethane	75-27-4	720	4300	7200	Not Detected U
Bromoform	75-25-2	1500	6700	11000	Not Detected U
Carbon Disulfide	75-15-0	2000	6700	13000	Not Detected U
Carbon Tetrachloride	56-23-5	1600	4000	6800	Not Detected U
Chloroethane	75-00-3	3200	5700	11000	Not Detected U
Chloroform	67-66-3	900	3100	5200	Not Detected U
Chloromethane	74-87-3	1900	4400	8900	Not Detected U
Cyclohexane	110-82-7	820	2200	3700	6000000
Dibromochloromethane	124-48-1	1900	5500	9200	Not Detected U
Ethanol	64-17-5	1800	4000	8100	49000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/24/19 06:36 PM
Lab ID:	1905302A-08A	Dilution Factor:	215
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	msd14.i / 14052420
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	15000	Not Detected
Ethyl Benzene	100-41-4	930	2800	4700	330000
Freon 11	75-69-4	890	3600	6000	Not Detected U
Freon 113	76-13-1	1500	4900	8200	Not Detected U
Freon 12	75-71-8	1200	3200	5300	Not Detected U
Heptane	142-82-5	1500	2600	4400	6600000
Hexane	110-54-3	930	2300	3800	6700000
m,p-Xylene	108-38-3	880	2800	4700	820000
Methylene Chloride	75-09-2	2300	7500	15000	Not Detected U
o-Xylene	95-47-6	1300	2800	4700	230000
Propylene	115-07-1	1300	3700	7400	20000
Styrene	100-42-5	870	2700	4600	Not Detected U
Tetrachloroethene	127-18-4	2600	4400	7300	Not Detected U
Tetrahydrofuran	109-99-9	1100	1900	3200	Not Detected U
Toluene	108-88-3	730	2400	4000	4400000 CN
Total Xylene	1330-20-7	NA	D	4700	1000000
Trichloroethene	79-01-6	1700	3500	5800	Not Detected U
Vinyl Chloride	75-01-4	950	1600	2700	Not Detected U

U = The analyte was not detected above the MDL.
 CN =See Case Narrative explanation
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/24/19 06:36 PM
Lab ID:	1905302A-08A	Dilution Factor:	215
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	msd14.i / 14052420
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	122
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/24/19 01:58 PM
Lab ID:	1905302A-08B	Dilution Factor:	108
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	msd14.i / 14052410
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	870	5700	11000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	139
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/24/19 06:57 PM
Lab ID:	1905302A-09A	Dilution Factor:	400
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052421
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	2200	4800	8100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	24000	30000	59000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1900	5900	9800	140000
1,2-Dibromoethane (EDB)	106-93-4	2700	9200	15000	9900 J
1,2-Dichlorobenzene	95-50-1	2900	7200	12000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	1600	5900	9800	60000
1,3-Butadiene	106-99-0	1400	2600	4400	Not Detected U
1,4-Dioxane	123-91-1	7900	14000	29000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	5700	12000	24000	350000
2-Hexanone	591-78-6	12000	16000	33000	Not Detected U
2-Propanol	67-63-0	2500	9800	20000	75000
4-Methyl-2-pentanone	108-10-1	4000	4900	8200	14000
Acetone	67-64-1	2800	9500	19000	2200000
Benzene	71-43-2	890	3800	6400	2100000
Bromodichloromethane	75-27-4	1300	8000	13000	Not Detected U
Bromoform	75-25-2	2800	12000	21000	Not Detected U
Carbon Disulfide	75-15-0	3800	12000	25000	Not Detected U
Carbon Tetrachloride	56-23-5	3000	7600	12000	Not Detected U
Chloroethane	75-00-3	6000	10000	21000	Not Detected U
Chloroform	67-66-3	1700	5800	9800	Not Detected U
Chloromethane	74-87-3	3500	8300	16000	Not Detected U
Cyclohexane	110-82-7	1500	4100	6900	6100000
Dibromochloromethane	124-48-1	3500	10000	17000	Not Detected U
Ethanol	64-17-5	3300	7500	15000	11000 J



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/24/19 06:57 PM
Lab ID:	1905302A-09A	Dilution Factor:	400
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052421
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	29000	Not Detected
Ethyl Benzene	100-41-4	1700	5200	8700	350000
Freon 11	75-69-4	1700	6700	11000	Not Detected U
Freon 113	76-13-1	2700	9200	15000	Not Detected U
Freon 12	75-71-8	2200	5900	9900	Not Detected U
Heptane	142-82-5	2800	4900	8200	5900000
Hexane	110-54-3	1700	4200	7000	7700000
m,p-Xylene	108-38-3	1600	5200	8700	1200000
Methylene Chloride	75-09-2	4300	14000	28000	Not Detected U
o-Xylene	95-47-6	2300	5200	8700	390000
Propylene	115-07-1	2400	6900	14000	21000
Styrene	100-42-5	1600	5100	8500	Not Detected U
Tetrachloroethene	127-18-4	4800	8100	14000	Not Detected U
Tetrahydrofuran	109-99-9	2100	3500	5900	Not Detected U
Toluene	108-88-3	1400	4500	7500	3900000 CN
Total Xylene	1330-20-7	NA	D	8700	1600000
Trichloroethene	79-01-6	3200	6400	11000	Not Detected U
Vinyl Chloride	75-01-4	1800	3100	5100	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 CN =See Case Narrative explanation
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/24/19 06:57 PM
Lab ID:	1905302A-09A	Dilution Factor:	400
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052421
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	106
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/24/19 02:28 PM
Lab ID:	1905302A-09B	Dilution Factor:	120
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052411
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	970	6300	12000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	132
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/24/19 07:20 PM
Lab ID:	1905302A-10A	Dilution Factor:	357
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052422a
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	2000	4300	7200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	21000	26000	53000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1700	5300	8800	130000
1,2-Dibromoethane (EDB)	106-93-4	2400	8200	14000	8900 J
1,2-Dichlorobenzene	95-50-1	2600	6400	11000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	1400	5300	8800	61000
1,3-Butadiene	106-99-0	1200	2400	3900	Not Detected U
1,4-Dioxane	123-91-1	7100	13000	26000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	5100	10000	21000	340000
2-Hexanone	591-78-6	11000	15000	29000	Not Detected U
2-Propanol	67-63-0	2200	8800	18000	70000
4-Methyl-2-pentanone	108-10-1	3600	4400	7300	15000
Acetone	67-64-1	2500	8500	17000	2100000
Benzene	71-43-2	800	3400	5700	2000000
Bromodichloromethane	75-27-4	1200	7200	12000	Not Detected U
Bromoform	75-25-2	2500	11000	18000	Not Detected U
Carbon Disulfide	75-15-0	3400	11000	22000	Not Detected U
Carbon Tetrachloride	56-23-5	2700	6700	11000	Not Detected U
Chloroethane	75-00-3	5400	9400	19000	Not Detected U
Chloroform	67-66-3	1500	5200	8700	Not Detected U
Chloromethane	74-87-3	3100	7400	15000	Not Detected U
Cyclohexane	110-82-7	1400	3700	6100	6100000
Dibromochloromethane	124-48-1	3100	9100	15000	Not Detected U
Ethanol	64-17-5	2900	6700	13000	11000 J



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/24/19 07:20 PM
Lab ID:	1905302A-10A	Dilution Factor:	357
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052422a
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	26000	Not Detected
Ethyl Benzene	100-41-4	1600	4600	7800	320000
Freon 11	75-69-4	1500	6000	10000	Not Detected U
Freon 113	76-13-1	2400	8200	14000	Not Detected U
Freon 12	75-71-8	2000	5300	8800	Not Detected U
Heptane	142-82-5	2500	4400	7300	5700000
Hexane	110-54-3	1500	3800	6300	7700000
m,p-Xylene	108-38-3	1400	4600	7800	1000000
Methylene Chloride	75-09-2	3800	12000	25000	Not Detected U
o-Xylene	95-47-6	2100	4600	7800	340000
Propylene	115-07-1	2100	6100	12000	20000
Styrene	100-42-5	1400	4600	7600	Not Detected U
Tetrachloroethene	127-18-4	4300	7300	12000	Not Detected U
Tetrahydrofuran	109-99-9	1900	3200	5300	Not Detected U
Toluene	108-88-3	1200	4000	6700	3800000 CN
Total Xylene	1330-20-7	NA	D	7800	1400000
Trichloroethene	79-01-6	2800	5800	9600	Not Detected U
Vinyl Chloride	75-01-4	1600	2700	4600	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 CN =See Case Narrative explanation
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/24/19 07:20 PM
Lab ID:	1905302A-10A	Dilution Factor:	357
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052422a
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	108
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/24/19 02:54 PM
Lab ID:	1905302A-10B	Dilution Factor:	107
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	msd14.i / 14052412
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	860	5600	11000	Not Detected UJ

UJ = Analyte associated with low bias in the CCV.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	135
4-Bromofluorobenzene	460-00-4	83-115	100
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	5/24/19 06:09 PM
Lab ID:	1905302A-11A	Dilution Factor:	108
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	msd14.i / 14052419
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	610	1300	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6500	8000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	210000
1,2-Dibromoethane (EDB)	106-93-4	730	2500	4100	1900 J
1,2-Dichlorobenzene	95-50-1	780	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	440	1600	2600	61000
1,3-Butadiene	106-99-0	380	720	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3200	6400	14000
2-Hexanone	591-78-6	3300	4400	8800	Not Detected U
2-Propanol	67-63-0	680	2600	5300	5700
4-Methyl-2-pentanone	108-10-1	1100	1300	2200	3800
Acetone	67-64-1	750	2600	5100	420000
Benzene	71-43-2	240	1000	1700	630000
Bromodichloromethane	75-27-4	360	2200	3600	Not Detected U
Bromoform	75-25-2	770	3300	5600	Not Detected U
Carbon Disulfide	75-15-0	1000	3400	6700	Not Detected U
Carbon Tetrachloride	56-23-5	810	2000	3400	Not Detected U
Chloroethane	75-00-3	1600	2800	5700	Not Detected U
Chloroform	67-66-3	450	1600	2600	Not Detected U
Chloromethane	74-87-3	940	2200	4500	Not Detected U
Cyclohexane	110-82-7	410	1100	1800	1700000
Dibromochloromethane	124-48-1	950	2800	4600	Not Detected U
Ethanol	64-17-5	890	2000	4100	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	5/24/19 06:09 PM
Lab ID:	1905302A-11A	Dilution Factor:	108
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	msd14.i / 14052419
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected
Ethyl Benzene	100-41-4	470	1400	2300	170000
Freon 11	75-69-4	450	1800	3000	Not Detected U
Freon 113	76-13-1	740	2500	4100	Not Detected U
Freon 12	75-71-8	590	1600	2700	Not Detected U
Heptane	142-82-5	750	1300	2200	1800000
Hexane	110-54-3	470	1100	1900	2300000
m,p-Xylene	108-38-3	440	1400	2300	520000
Methylene Chloride	75-09-2	1200	3800	7500	Not Detected U
Naphthalene	91-20-3	870	5700	11000	Not Detected UJ
o-Xylene	95-47-6	630	1400	2300	190000
Propylene	115-07-1	640	1800	3700	8300
Styrene	100-42-5	440	1400	2300	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3700	Not Detected U
Tetrahydrofuran	109-99-9	560	960	1600	Not Detected U
Toluene	108-88-3	370	1200	2000	1300000
Total Xylene	1330-20-7	NA	D	2300	720000
Trichloroethene	79-01-6	860	1700	2900	Not Detected U
Vinyl Chloride	75-01-4	480	830	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	5/24/19 06:09 PM
Lab ID:	1905302A-11A	Dilution Factor:	108
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	msd14.i / 14052419
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	115
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9 Lab Duplicate	Date/Time Analyzed:	5/24/19 04:20 PM
Lab ID:	1905302A-11AA	Dilution Factor:	108
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	msd14.i / 14052415
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	610	1300	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6500	8000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	200000
1,2-Dibromoethane (EDB)	106-93-4	730	2500	4100	2000 J
1,2-Dichlorobenzene	95-50-1	780	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	440	1600	2600	60000
1,3-Butadiene	106-99-0	380	720	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3200	6400	13000
2-Hexanone	591-78-6	3300	4400	8800	Not Detected U
2-Propanol	67-63-0	680	2600	5300	8200
4-Methyl-2-pentanone	108-10-1	1100	1300	2200	4200
Acetone	67-64-1	750	2600	5100	430000
Benzene	71-43-2	240	1000	1700	660000
Bromodichloromethane	75-27-4	360	2200	3600	Not Detected U
Bromoform	75-25-2	770	3300	5600	Not Detected U
Carbon Disulfide	75-15-0	1000	3400	6700	Not Detected U
Carbon Tetrachloride	56-23-5	810	2000	3400	Not Detected U
Chloroethane	75-00-3	1600	2800	5700	Not Detected U
Chloroform	67-66-3	450	1600	2600	Not Detected U
Chloromethane	74-87-3	940	2200	4500	Not Detected U
Cyclohexane	110-82-7	410	1100	1800	1700000
Dibromochloromethane	124-48-1	950	2800	4600	Not Detected U
Ethanol	64-17-5	890	2000	4100	960 J

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9 Lab Duplicate		
Lab ID:	1905302A-11AA	Date/Time Analyzed:	5/24/19 04:20 PM
Date/Time Collected:	5/9/19 01:17 PM	Dilution Factor:	108
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052415

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected
Ethyl Benzene	100-41-4	470	1400	2300	180000
Freon 11	75-69-4	450	1800	3000	Not Detected U
Freon 113	76-13-1	740	2500	4100	Not Detected U
Freon 12	75-71-8	590	1600	2700	Not Detected U
Heptane	142-82-5	750	1300	2200	1800000
Hexane	110-54-3	470	1100	1900	2300000
m,p-Xylene	108-38-3	440	1400	2300	560000
Methylene Chloride	75-09-2	1200	3800	7500	Not Detected U
Naphthalene	91-20-3	870	5700	11000	Not Detected UJ
o-Xylene	95-47-6	630	1400	2300	200000
Propylene	115-07-1	640	1800	3700	8100
Styrene	100-42-5	440	1400	2300	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3700	Not Detected U
Tetrahydrofuran	109-99-9	560	960	1600	Not Detected U
Toluene	108-88-3	370	1200	2000	1300000
Total Xylene	1330-20-7	NA	D	2300	760000
Trichloroethene	79-01-6	860	1700	2900	Not Detected U
Vinyl Chloride	75-01-4	480	830	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9 Lab Duplicate	Date/Time Analyzed:	5/24/19 04:20 PM
Lab ID:	1905302A-11AA	Dilution Factor:	108
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	msd14.i / 14052415
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	117
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/24/19 07:42 PM
Lab ID:	1905302A-12A	Dilution Factor:	208
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	msd14.i / 14052423
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1200	2500	4200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	12000	15000	31000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	970	3100	5100	120000
1,2-Dibromoethane (EDB)	106-93-4	1400	4800	8000	4800 J
1,2-Dichlorobenzene	95-50-1	1500	3800	6200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	850	3100	5100	39000
1,3-Butadiene	106-99-0	720	1400	2300	Not Detected U
1,4-Dioxane	123-91-1	4100	7500	15000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3000	6100	12000	320000
2-Hexanone	591-78-6	6400	8500	17000	9400 J
2-Propanol	67-63-0	1300	5100	10000	400000
4-Methyl-2-pentanone	108-10-1	2100	2600	4300	7400
Acetone	67-64-1	1400	4900	9900	4700000
Benzene	71-43-2	460	2000	3300	1600000
Bromodichloromethane	75-27-4	700	4200	7000	Not Detected U
Bromoform	75-25-2	1500	6400	11000	Not Detected U
Carbon Disulfide	75-15-0	2000	6500	13000	Not Detected U
Carbon Tetrachloride	56-23-5	1600	3900	6500	Not Detected U
Chloroethane	75-00-3	3200	5500	11000	Not Detected U
Chloroform	67-66-3	870	3000	5100	Not Detected U
Chloromethane	74-87-3	1800	4300	8600	Not Detected U
Cyclohexane	110-82-7	790	2100	3600	4500000
Dibromochloromethane	124-48-1	1800	5300	8800	Not Detected U
Ethanol	64-17-5	1700	3900	7800	4900 J



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/24/19 07:42 PM
Lab ID:	1905302A-12A	Dilution Factor:	208
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	msd14.i / 14052423
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	15000	Not Detected
Ethyl Benzene	100-41-4	900	2700	4500	300000
Freon 11	75-69-4	860	3500	5800	Not Detected U
Freon 113	76-13-1	1400	4800	8000	Not Detected U
Freon 12	75-71-8	1100	3100	5100	Not Detected U
Heptane	142-82-5	1400	2600	4300	4700000
Hexane	110-54-3	900	2200	3700	5800000
m,p-Xylene	108-38-3	850	2700	4500	690000
Methylene Chloride	75-09-2	2200	7200	14000	Not Detected U
o-Xylene	95-47-6	1200	2700	4500	200000
Propylene	115-07-1	1200	3600	7200	39000
Styrene	100-42-5	840	2600	4400	Not Detected U
Tetrachloroethene	127-18-4	2500	4200	7000	Not Detected U
Tetrahydrofuran	109-99-9	1100	1800	3100	Not Detected U
Toluene	108-88-3	700	2400	3900	3000000 CN
Total Xylene	1330-20-7	NA	D	4500	900000
Trichloroethene	79-01-6	1600	3400	5600	Not Detected U
Vinyl Chloride	75-01-4	920	1600	2600	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 CN =See Case Narrative explanation
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/24/19 07:42 PM
Lab ID:	1905302A-12A	Dilution Factor:	208
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	msd14.i / 14052423
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	109
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/24/19 03:51 PM
Lab ID:	1905302A-12B	Dilution Factor:	104
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	msd14.i / 14052414
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	840	5400	11000	1000 JUJ

J = Estimated value.

UJ = Analyte associated with low bias in the CCV.

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	132
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	109

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/23/19 12:18 PM
Lab ID:	1905302A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/File Name:	msd14.i / 14052308c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	5.6	12	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	60	74	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	4.7	15	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	6.8	23	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	7.3	18	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	4.1	15	24	Not Detected U
1,3-Butadiene	106-99-0	3.5	6.6	11	Not Detected U
1,4-Dioxane	123-91-1	20	36	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	29	59	Not Detected U
2-Hexanone	591-78-6	31	41	82	Not Detected U
2-Propanol	67-63-0	6.3	24	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	10	12	20	Not Detected U
Acetone	67-64-1	6.9	24	48	Not Detected U
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	20	34	Not Detected U
Bromoform	75-25-2	7.1	31	52	Not Detected U
Carbon Disulfide	75-15-0	9.5	31	62	Not Detected U
Carbon Tetrachloride	56-23-5	7.5	19	31	Not Detected U
Chloroethane	75-00-3	15	26	53	Not Detected U
Chloroform	67-66-3	4.2	15	24	Not Detected U
Chloromethane	74-87-3	8.7	21	41	Not Detected U
Cyclohexane	110-82-7	3.8	10	17	Not Detected U
Dibromochloromethane	124-48-1	8.8	26	42	Not Detected U
Ethanol	64-17-5	8.2	19	38	Not Detected U



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/23/19 12:18 PM
Lab ID:	1905302A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052308c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	4.3	13	22	Not Detected U
Freon 11	75-69-4	4.2	17	28	Not Detected U
Freon 113	76-13-1	6.8	23	38	Not Detected U
Freon 12	75-71-8	5.5	15	25	Not Detected U
Heptane	142-82-5	6.9	12	20	Not Detected U
Hexane	110-54-3	4.3	10	18	Not Detected U
m,p-Xylene	108-38-3	4.1	13	22	Not Detected U
Methylene Chloride	75-09-2	11	35	69	Not Detected U
Naphthalene	91-20-3	8.1	52	100	Not Detected UJ
o-Xylene	95-47-6	5.9	13	22	Not Detected U
Propylene	115-07-1	5.9	17	34	Not Detected U
Styrene	100-42-5	4.0	13	21	Not Detected U
Tetrachloroethene	127-18-4	12	20	34	Not Detected U
Tetrahydrofuran	109-99-9	5.2	8.8	15	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	8.0	16	27	Not Detected U
Vinyl Chloride	75-01-4	4.4	7.7	13	Not Detected U

U = The analyte was not detected above the MDL.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/23/19 12:18 PM
Lab ID:	1905302A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052308c
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	99
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905302A-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	5.6	12	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	60	74	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	4.7	15	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	6.8	23	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	7.3	18	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	4.1	15	24	Not Detected U
1,3-Butadiene	106-99-0	3.5	6.6	11	Not Detected U
1,4-Dioxane	123-91-1	20	36	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	29	59	Not Detected U
2-Hexanone	591-78-6	31	41	82	Not Detected U
2-Propanol	67-63-0	6.3	24	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	10	12	20	Not Detected U
Acetone	67-64-1	6.9	24	48	Not Detected U
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	20	34	Not Detected U
Bromoform	75-25-2	7.1	31	52	Not Detected U
Carbon Disulfide	75-15-0	9.5	31	62	Not Detected U
Carbon Tetrachloride	56-23-5	7.5	19	31	Not Detected U
Chloroethane	75-00-3	15	26	53	Not Detected U
Chloroform	67-66-3	4.2	15	24	Not Detected U
Chloromethane	74-87-3	8.7	21	41	Not Detected U
Cyclohexane	110-82-7	3.8	10	17	Not Detected U
Dibromochloromethane	124-48-1	8.8	26	42	Not Detected U
Ethanol	64-17-5	8.2	19	38	Not Detected U



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905302A-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	4.3	13	22	Not Detected U
Freon 11	75-69-4	4.2	17	28	Not Detected U
Freon 113	76-13-1	6.8	23	38	Not Detected U
Freon 12	75-71-8	5.5	15	25	Not Detected U
Heptane	142-82-5	6.9	12	20	Not Detected U
Hexane	110-54-3	4.3	10	18	Not Detected U
m,p-Xylene	108-38-3	4.1	13	22	Not Detected U
Methylene Chloride	75-09-2	11	35	69	Not Detected U
Naphthalene	91-20-3	8.1	52	100	Not Detected UJ
o-Xylene	95-47-6	5.9	13	22	Not Detected U
Propylene	115-07-1	5.9	17	34	Not Detected U
Styrene	100-42-5	4.0	13	21	Not Detected U
Tetrachloroethene	127-18-4	12	20	34	Not Detected U
Tetrahydrofuran	109-99-9	5.2	8.8	15	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	8.0	16	27	Not Detected U
Vinyl Chloride	75-01-4	4.4	7.7	13	Not Detected U

U = The analyte was not detected above the MDL.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905302A-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	99
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/23/19 11:49 AM
Lab ID:	1905302A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052307a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	109
1,2,4-Trichlorobenzene	120-82-1	102
1,2,4-Trimethylbenzene	95-63-6	103
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	102
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	94
1,4-Dioxane	123-91-1	93
2-Butanone (Methyl Ethyl Ketone)	78-93-3	100
2-Hexanone	591-78-6	92
2-Propanol	67-63-0	104
4-Methyl-2-pentanone	108-10-1	99
Acetone	67-64-1	122
Benzene	71-43-2	107
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	96
Carbon Disulfide	75-15-0	96
Carbon Tetrachloride	56-23-5	107
Chloroethane	75-00-3	98
Chloroform	67-66-3	111
Chloromethane	74-87-3	97
Cyclohexane	110-82-7	106
Dibromochloromethane	124-48-1	97
Ethanol	64-17-5	98

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/23/19 11:49 AM
Lab ID:	1905302A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052307a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	125
Ethyl Benzene	100-41-4	113
Freon 11	75-69-4	107
Freon 113	76-13-1	106
Freon 12	75-71-8	91
Heptane	142-82-5	103
Hexane	110-54-3	104
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	105
Naphthalene	91-20-3	64 Q
o-Xylene	95-47-6	116
Propylene	115-07-1	101
Styrene	100-42-5	93
Tetrachloroethene	127-18-4	114
Tetrahydrofuran	109-99-9	95
Toluene	108-88-3	113
Total Xylene	1330-20-7	115
Trichloroethene	79-01-6	106
Vinyl Chloride	75-01-4	96

Q = Exceeds Quality Control limits.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	98

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/23/19 11:49 AM
Lab ID:	1905302A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052307a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 08:22 AM
Lab ID:	1905302A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052338
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	106
1,2,4-Trichlorobenzene	120-82-1	111
1,2,4-Trimethylbenzene	95-63-6	111
1,2-Dibromoethane (EDB)	106-93-4	97
1,2-Dichlorobenzene	95-50-1	99
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	93
1,4-Dioxane	123-91-1	92
2-Butanone (Methyl Ethyl Ketone)	78-93-3	99
2-Hexanone	591-78-6	87
2-Propanol	67-63-0	100
4-Methyl-2-pentanone	108-10-1	95
Acetone	67-64-1	115
Benzene	71-43-2	108
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	94
Carbon Tetrachloride	56-23-5	106
Chloroethane	75-00-3	105
Chloroform	67-66-3	107
Chloromethane	74-87-3	91
Cyclohexane	110-82-7	103
Dibromochloromethane	124-48-1	96
Ethanol	64-17-5	94

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 08:22 AM
Lab ID:	1905302A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052338
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	125
Ethyl Benzene	100-41-4	114
Freon 11	75-69-4	104
Freon 113	76-13-1	102
Freon 12	75-71-8	94
Heptane	142-82-5	103
Hexane	110-54-3	101
m,p-Xylene	108-38-3	118
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	68 Q
o-Xylene	95-47-6	114
Propylene	115-07-1	88
Styrene	100-42-5	92
Tetrachloroethene	127-18-4	110
Tetrahydrofuran	109-99-9	91
Toluene	108-88-3	114
Total Xylene	1330-20-7	116
Trichloroethene	79-01-6	108
Vinyl Chloride	75-01-4	91

Q = Exceeds Quality Control limits.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 08:22 AM
Lab ID:	1905302A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052338
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905302A-14C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	100
1,2,4-Trichlorobenzene	120-82-1	102
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	92
1,2-Dichlorobenzene	95-50-1	95
1,3,5-Trimethylbenzene	108-67-8	102
1,3-Butadiene	106-99-0	85
1,4-Dioxane	123-91-1	91
2-Butanone (Methyl Ethyl Ketone)	78-93-3	98
2-Hexanone	591-78-6	85
2-Propanol	67-63-0	94
4-Methyl-2-pentanone	108-10-1	93
Acetone	67-64-1	110
Benzene	71-43-2	103
Bromodichloromethane	75-27-4	89
Bromoform	75-25-2	93
Carbon Disulfide	75-15-0	90
Carbon Tetrachloride	56-23-5	100
Chloroethane	75-00-3	92
Chloroform	67-66-3	103
Chloromethane	74-87-3	88
Cyclohexane	110-82-7	100
Dibromochloromethane	124-48-1	90
Ethanol	64-17-5	99



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905302A-14C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	117
Ethyl Benzene	100-41-4	108
Freon 11	75-69-4	100
Freon 113	76-13-1	98
Freon 12	75-71-8	88
Heptane	142-82-5	96
Hexane	110-54-3	96
m,p-Xylene	108-38-3	110
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	67 Q
o-Xylene	95-47-6	109
Propylene	115-07-1	91
Styrene	100-42-5	89
Tetrachloroethene	127-18-4	107
Tetrahydrofuran	109-99-9	92
Toluene	108-88-3	109
Total Xylene	1330-20-7	110
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	90

Q = Exceeds Quality Control limits.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	95

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905302A-14C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905302A-14D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	105
1,2,4-Trichlorobenzene	120-82-1	105
1,2,4-Trimethylbenzene	95-63-6	108
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	99
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	91
1,4-Dioxane	123-91-1	92
2-Butanone (Methyl Ethyl Ketone)	78-93-3	99
2-Hexanone	591-78-6	92
2-Propanol	67-63-0	97
4-Methyl-2-pentanone	108-10-1	96
Acetone	67-64-1	120
Benzene	71-43-2	108
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	94
Carbon Disulfide	75-15-0	92
Carbon Tetrachloride	56-23-5	107
Chloroethane	75-00-3	103
Chloroform	67-66-3	108
Chloromethane	74-87-3	89
Cyclohexane	110-82-7	108
Dibromochloromethane	124-48-1	95
Ethanol	64-17-5	92

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905302A-14D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	117
Ethyl Benzene	100-41-4	114
Freon 11	75-69-4	102
Freon 113	76-13-1	103
Freon 12	75-71-8	92
Heptane	142-82-5	110
Hexane	110-54-3	101
m,p-Xylene	108-38-3	118
Methylene Chloride	75-09-2	99
Naphthalene	91-20-3	73
o-Xylene	95-47-6	116
Propylene	115-07-1	93
Styrene	100-42-5	93
Tetrachloroethene	127-18-4	111
Tetrahydrofuran	109-99-9	92
Toluene	108-88-3	118
Total Xylene	1330-20-7	117
Trichloroethene	79-01-6	111
Vinyl Chloride	75-01-4	88

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905302A-14D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/23/19 10:00 AM
Lab ID:	1905302A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052303a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	130
1,2,4-Trimethylbenzene	95-63-6	111
1,2-Dibromoethane (EDB)	106-93-4	94
1,2-Dichlorobenzene	95-50-1	104
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	87
1,4-Dioxane	123-91-1	88
2-Butanone (Methyl Ethyl Ketone)	78-93-3	93
2-Hexanone	591-78-6	74
2-Propanol	67-63-0	97
4-Methyl-2-pentanone	108-10-1	84
Acetone	67-64-1	110
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	96
Carbon Disulfide	75-15-0	80
Carbon Tetrachloride	56-23-5	104
Chloroethane	75-00-3	112
Chloroform	67-66-3	104
Chloromethane	74-87-3	90
Cyclohexane	110-82-7	102
Dibromochloromethane	124-48-1	93
Ethanol	64-17-5	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/23/19 10:00 AM
Lab ID:	1905302A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052303a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	111
Freon 11	75-69-4	103
Freon 113	76-13-1	98
Freon 12	75-71-8	91
Heptane	142-82-5	106
Hexane	110-54-3	98
m,p-Xylene	108-38-3	111
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	99
o-Xylene	95-47-6	115
Propylene	115-07-1	86
Styrene	100-42-5	100
Tetrachloroethene	127-18-4	106
Tetrahydrofuran	109-99-9	90
Toluene	108-88-3	107
Total Xylene	1330-20-7	113
Trichloroethene	79-01-6	105
Vinyl Chloride	75-01-4	92

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/23/19 10:00 AM
Lab ID:	1905302A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052303a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/23/19 10:25 AM
Lab ID:	1905302A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052304a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	103
1,2,4-Trichlorobenzene	120-82-1	128
1,2,4-Trimethylbenzene	95-63-6	112
1,2-Dibromoethane (EDB)	106-93-4	96
1,2-Dichlorobenzene	95-50-1	108
1,3,5-Trimethylbenzene	108-67-8	111
1,3-Butadiene	106-99-0	86
1,4-Dioxane	123-91-1	89
2-Butanone (Methyl Ethyl Ketone)	78-93-3	94
2-Hexanone	591-78-6	77
2-Propanol	67-63-0	97
4-Methyl-2-pentanone	108-10-1	88
Acetone	67-64-1	111
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	100
Carbon Disulfide	75-15-0	80
Carbon Tetrachloride	56-23-5	104
Chloroethane	75-00-3	108
Chloroform	67-66-3	104
Chloromethane	74-87-3	87
Cyclohexane	110-82-7	101
Dibromochloromethane	124-48-1	95
Ethanol	64-17-5	96

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/23/19 10:25 AM
Lab ID:	1905302A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052304a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	114
Freon 11	75-69-4	102
Freon 113	76-13-1	99
Freon 12	75-71-8	90
Heptane	142-82-5	105
Hexane	110-54-3	96
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	98
Naphthalene	91-20-3	98
o-Xylene	95-47-6	121
Propylene	115-07-1	87
Styrene	100-42-5	104
Tetrachloroethene	127-18-4	107
Tetrahydrofuran	109-99-9	86
Toluene	108-88-3	109
Total Xylene	1330-20-7	118
Trichloroethene	79-01-6	103
Vinyl Chloride	75-01-4	90

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/23/19 10:25 AM
Lab ID:	1905302A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052304a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	103
Toluene-d8	2037-26-5	86-115	101

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905302A-15B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	138
1,2,4-Trimethylbenzene	95-63-6	112
1,2-Dibromoethane (EDB)	106-93-4	94
1,2-Dichlorobenzene	95-50-1	105
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	83
1,4-Dioxane	123-91-1	87
2-Butanone (Methyl Ethyl Ketone)	78-93-3	93
2-Hexanone	591-78-6	74
2-Propanol	67-63-0	95
4-Methyl-2-pentanone	108-10-1	84
Acetone	67-64-1	114
Benzene	71-43-2	101
Bromodichloromethane	75-27-4	92
Bromoform	75-25-2	96
Carbon Disulfide	75-15-0	79
Carbon Tetrachloride	56-23-5	102
Chloroethane	75-00-3	112
Chloroform	67-66-3	102
Chloromethane	74-87-3	86
Cyclohexane	110-82-7	103
Dibromochloromethane	124-48-1	93
Ethanol	64-17-5	94

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905302A-15B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	112
Freon 11	75-69-4	102
Freon 113	76-13-1	99
Freon 12	75-71-8	92
Heptane	142-82-5	108
Hexane	110-54-3	97
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	96
Naphthalene	91-20-3	101
o-Xylene	95-47-6	118
Propylene	115-07-1	87
Styrene	100-42-5	99
Tetrachloroethene	127-18-4	105
Tetrahydrofuran	109-99-9	86
Toluene	108-88-3	106
Total Xylene	1330-20-7	116
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	89

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	98

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905302A-15B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905302A-15BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	98
1,2,4-Trichlorobenzene	120-82-1	127
1,2,4-Trimethylbenzene	95-63-6	104
1,2-Dibromoethane (EDB)	106-93-4	92
1,2-Dichlorobenzene	95-50-1	103
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	81
1,4-Dioxane	123-91-1	84
2-Butanone (Methyl Ethyl Ketone)	78-93-3	90
2-Hexanone	591-78-6	74
2-Propanol	67-63-0	89
4-Methyl-2-pentanone	108-10-1	85
Acetone	67-64-1	112
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	91
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	77
Carbon Tetrachloride	56-23-5	97
Chloroethane	75-00-3	103
Chloroform	67-66-3	100
Chloromethane	74-87-3	82
Cyclohexane	110-82-7	99
Dibromochloromethane	124-48-1	92
Ethanol	64-17-5	95

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS D	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905302A-15BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	111
Freon 11	75-69-4	98
Freon 113	76-13-1	95
Freon 12	75-71-8	86
Heptane	142-82-5	104
Hexane	110-54-3	90
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	95
Naphthalene	91-20-3	98
o-Xylene	95-47-6	115
Propylene	115-07-1	84
Styrene	100-42-5	99
Tetrachloroethene	127-18-4	106
Tetrahydrofuran	109-99-9	82
Toluene	108-88-3	108
Total Xylene	1330-20-7	114
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	86

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905302A-15BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	103

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905302B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
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www.airtoxics.com

**WORK ORDER #: 1905302B**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/22/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-3	12.2 "Hg	5.1 psi
02A	KAFB-106V1 112.6	Modified TO-3	10.4 "Hg	4.9 psi
02AA	KAFB-106V1 112.6 Lab Duplicate	Modified TO-3	10.4 "Hg	4.9 psi
03A	KAFB-106V1 159.6	Modified TO-3	11.2 "Hg	4.9 psi
04A	KAFB-106V1 159.6 DUP	Modified TO-3	11.4 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified TO-3	11 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified TO-3	12.4 "Hg	4.9 psi
07A	KAFB-106V1 262.6	Modified TO-3	11.6 "Hg	4.9 psi
08A	KAFB-106V2 102.2	Modified TO-3	11.4 "Hg	4.9 psi
09A	KAFB-106V2 117.1	Modified TO-3	13.3 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified TO-3	11.2 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified TO-3	11.4 "Hg	4.9 psi
12A	KAFB-106V2 217.1	Modified TO-3	10.8 "Hg	4.9 psi
13A	Lab Blank	Modified TO-3	NA	NA
14A	LCS	Modified TO-3	NA	NA
14AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Technical Director

DATE: 05/22/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,

TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 TO-3
EA Engineering
Workorder# 1905302B

Twelve 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on May 15, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

TPH (Gasoline Range) was manually integrated in samples KAFB-106V1 102.1 and KAFB-106V1 112.6.

Fluorobenzene (FID) was manually integrated in samples KAFB-106V1 159.6 DUP, KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP and KAFB-106V2 217.1.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	5/17/19 03:28 PM
Lab ID:	1905302B-01A	Dilution Factor:	2280
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	gcd.i / d051709
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	190000	230000	120000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	113

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	5/17/19 02:16 PM
Lab ID:	1905302B-02A	Dilution Factor:	2040
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	gcd.i / d051707
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	74000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	114

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 112.6 Lab Duplicate	Date/Time Analyzed:	5/17/19 02:56 PM
Lab ID:	1905302B-02AA	Dilution Factor:	2040
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	gcd.i / d051708
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	70000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	119



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	5/17/19 04:51 PM
Lab ID:	1905302B-03A	Dilution Factor:	2130
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	gcd.i / d051710
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	220000	130000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	104

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	5/17/19 05:43 PM
Lab ID:	1905302B-04A	Dilution Factor:	2160
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	gcd.i / d051711
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	180000	220000	130000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	91

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/17/19 06:20 PM
Lab ID:	1905302B-05A	Dilution Factor:	2120
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	gcd.i / d051712
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	220000	170000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	100

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/17/19 06:53 PM
Lab ID:	1905302B-06A	Dilution Factor:	2280
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	gcd.i / d051713
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	190000	230000	150000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	99



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/17/19 07:25 PM
Lab ID:	1905302B-07A	Dilution Factor:	2180
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	gcd.i / d051714
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	180000	220000	160000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/17/19 08:03 PM
Lab ID:	1905302B-08A	Dilution Factor:	2150
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	gcd.i / d051715
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	180000	220000	210000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	106



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/17/19 08:37 PM
Lab ID:	1905302B-09A	Dilution Factor:	2400
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	gcd.i / d051716
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	140000	200000	240000	210000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	108



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/17/19 09:14 PM
Lab ID:	1905302B-10A	Dilution Factor:	2140
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	gcd.i / d051717
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	180000	220000	210000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	106



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	5/17/19 09:50 PM
Lab ID:	1905302B-11A	Dilution Factor:	2150
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	gcd.i / d051718
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	180000	220000	52000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	98

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/17/19 10:22 PM
Lab ID:	1905302B-12A	Dilution Factor:	2080
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	gcd.i / d051719
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	99



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/17/19 12:28 PM
Lab ID:	1905302B-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051705
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	102

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/17/19 09:59 AM
Lab ID:	1905302B-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051702
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		96
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	120

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/17/19 10:39 AM
Lab ID:	1905302B-14AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051703
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		100
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	116

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905302C

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

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WORK ORDER #: 1905302C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified ASTM D-1945	12.2 "Hg	5.1 psi
01AA	KAFB-106V1 102.1 Lab Duplicate	Modified ASTM D-1945	12.2 "Hg	5.1 psi
02A	KAFB-106V1 112.6	Modified ASTM D-1945	10.4 "Hg	4.9 psi
03A	KAFB-106V1 159.6	Modified ASTM D-1945	11.2 "Hg	4.9 psi
04A	KAFB-106V1 159.6 DUP	Modified ASTM D-1945	11.4 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified ASTM D-1945	11 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified ASTM D-1945	12.4 "Hg	4.9 psi
07A	KAFB-106V1 262.6	Modified ASTM D-1945	11.6 "Hg	4.9 psi
08A	KAFB-106V2 102.2	Modified ASTM D-1945	11.4 "Hg	4.9 psi
09A	KAFB-106V2 117.1	Modified ASTM D-1945	13.3 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified ASTM D-1945	11.2 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified ASTM D-1945	11.4 "Hg	4.9 psi
11AA	KAFB-106V2 159.9 Lab Duplicate	Modified ASTM D-1945	11.4 "Hg	4.9 psi
12A	KAFB-106V2 217.1	Modified ASTM D-1945	10.8 "Hg	4.9 psi
13A	Lab Blank	Modified ASTM D-1945	NA	NA
13B	Lab Blank	Modified ASTM D-1945	NA	NA
13C	Lab Blank	Modified ASTM D-1945	NA	NA
13D	Lab Blank	Modified ASTM D-1945	NA	NA
14A	LCS	Modified ASTM D-1945	NA	NA
14AA	LCSD	Modified ASTM D-1945	NA	NA
14B	LCS	Modified ASTM D-1945	NA	NA
14BB	LCSD	Modified ASTM D-1945	NA	NA
14C	LCS	Modified ASTM D-1945	NA	NA

Continued on next page

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Air Toxics

WORK ORDER #: 1905302C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
14CC	LCSD	Modified ASTM D-1945	NA	NA
14D	LCS	Modified ASTM D-1945	NA	NA
14DD	LCSD	Modified ASTM D-1945	NA	NA

CERTIFIED BY:

Technical Director

DATE: 05/30/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
DoD QSM 5.1 ASTM D1945
EA Engineering
Workorder# 1905302C

Twelve 6 Liter Summa Canister samples were received on May 15, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

Methane and Ethane were manually integrated in samples KAFB-106V1 102.1, KAFB-106V1 102.1

Lab Duplicate, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 159.6 DUP, KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, KAFB-106V2 159.9 Lab Duplicate and KAFB-106V2 217.1.

Carbon Monoxide was manually integrated in samples KAFB-106V1 262.6 and KAFB-106V1 217.1.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	5/16/19 09:12 PM
Lab ID:	1905302C-01A	Dilution Factor:	2.28
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	gc10.i / 10051611
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000032	0.00025	0.0023	0.0056
Carbon Dioxide	124-38-9	0.0025	0.011	0.023	9.5
Carbon Monoxide	630-08-0	0.0030	0.011	0.023	Not Detected U
Ethane	74-84-0	0.000057	0.00025	0.0023	0.0031
Hydrogen	1333-74-0	0.0034	0.014	0.023	Not Detected U
Methane	74-82-8	0.000062	0.00011	0.00023	0.020
Nitrogen	7727-37-9	0.15	0.15	0.23	80
Oxygen	7782-44-7	0.042	0.042	0.23	8.8
Pentane	109-66-0	0.000057	0.00025	0.0023	0.12
Propane	74-98-6	0.000068	0.00025	0.0023	0.0015 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 75

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate	Date/Time Analyzed:	5/16/19 10:19 PM
Lab ID:	1905302C-01AA	Dilution Factor:	2.28
Date/Time Collected:	5/9/19 02:42 PM	Instrument/Filename:	gc10.i / 10051614
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000032	0.00025	0.0023	0.0060
Carbon Dioxide	124-38-9	0.0025	0.011	0.023	9.5
Carbon Monoxide	630-08-0	0.0030	0.011	0.023	Not Detected U
Ethane	74-84-0	0.000057	0.00025	0.0023	0.0034
Hydrogen	1333-74-0	0.0034	0.014	0.023	Not Detected U
Methane	74-82-8	0.000062	0.00011	0.00023	0.021
Nitrogen	7727-37-9	0.15	0.15	0.23	80
Oxygen	7782-44-7	0.042	0.042	0.23	8.8
Pentane	109-66-0	0.000057	0.00025	0.0023	0.13
Propane	74-98-6	0.000068	0.00025	0.0023	0.0017 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 78

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	5/17/19 08:38 AM
Lab ID:	1905302C-02A	Dilution Factor:	2.04
Date/Time Collected:	5/9/19 02:55 PM	Instrument/Filename:	gc10.i / 10051617
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0067
Carbon Dioxide	124-38-9	0.0022	0.0098	0.020	8.7
Carbon Monoxide	630-08-0	0.0027	0.0098	0.020	Not Detected U
Ethane	74-84-0	0.000051	0.00022	0.0020	0.0027
Hydrogen	1333-74-0	0.0031	0.013	0.020	Not Detected U
Methane	74-82-8	0.000055	0.00010	0.00020	0.017
Nitrogen	7727-37-9	0.14	0.14	0.20	81
Oxygen	7782-44-7	0.038	0.038	0.20	8.9
Pentane	109-66-0	0.000051	0.00022	0.0020	0.15
Propane	74-98-6	0.000061	0.00022	0.0020	0.0012 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 58

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	5/17/19 10:02 AM
Lab ID:	1905302C-03A	Dilution Factor:	2.13
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	gc10.i / 10051620
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0068
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	7.7
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000053	0.00023	0.0021	0.0015 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00021	0.0052
Nitrogen	7727-37-9	0.14	0.14	0.21	78
Oxygen	7782-44-7	0.039	0.039	0.21	12
Pentane	109-66-0	0.000053	0.00023	0.0021	0.18
Propane	74-98-6	0.000064	0.00023	0.0021	0.0011 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 79

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	5/17/19 11:26 AM
Lab ID:	1905302C-04A	Dilution Factor:	2.16
Date/Time Collected:	5/9/19 03:09 PM	Instrument/Filename:	gc10.i / 10051623
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0068
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	7.8
Carbon Monoxide	630-08-0	0.0028	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0015 J
Hydrogen	1333-74-0	0.0032	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.0053
Nitrogen	7727-37-9	0.15	0.15	0.22	78
Oxygen	7782-44-7	0.040	0.040	0.22	12
Pentane	109-66-0	0.000054	0.00024	0.0022	0.18
Propane	74-98-6	0.000065	0.00024	0.0022	0.0011 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 79

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	5/17/19 12:50 PM
Lab ID:	1905302C-05A	Dilution Factor:	2.12
Date/Time Collected:	5/9/19 03:30 PM	Instrument/Filename:	gc10.i / 10051626
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0026
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	12
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	0.012 J
Ethane	74-84-0	0.000053	0.00023	0.0021	0.0032
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0054
Nitrogen	7727-37-9	0.14	0.14	0.21	85
Oxygen	7782-44-7	0.039	0.039	0.21	1.2
Pentane	109-66-0	0.000053	0.00023	0.0021	0.087
Propane	74-98-6	0.000064	0.00023	0.0021	0.0022

J = Estimated value.

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 91

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	5/22/19 12:38 PM
Lab ID:	1905302C-06A	Dilution Factor:	2.28
Date/Time Collected:	5/9/19 03:43 PM	Instrument/Filename:	gc10.i / 10052209
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000032	0.00025	0.0023	0.0040
Carbon Dioxide	124-38-9	0.0025	0.011	0.023	8.2
Carbon Monoxide	630-08-0	0.0030	0.011	0.023	Not Detected U
Ethane	74-84-0	0.000057	0.00025	0.0023	0.0039
Hydrogen	1333-74-0	0.0034	0.014	0.023	Not Detected U
Methane	74-82-8	0.000062	0.00011	0.00023	0.0037
Nitrogen	7727-37-9	0.15	0.15	0.23	80
Oxygen	7782-44-7	0.042	0.042	0.23	10
Pentane	109-66-0	0.000057	0.00025	0.0023	0.052
Propane	74-98-6	0.000068	0.00025	0.0023	0.0056

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 65

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	5/22/19 02:07 PM
Lab ID:	1905302C-07A	Dilution Factor:	2.18
Date/Time Collected:	5/9/19 03:54 PM	Instrument/Filename:	gc10.i / 10052212
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0058
Carbon Dioxide	124-38-9	0.0024	0.010	0.022	8.0
Carbon Monoxide	630-08-0	0.0029	0.010	0.022	0.011 J
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0046
Hydrogen	1333-74-0	0.0033	0.014	0.022	Not Detected U
Methane	74-82-8	0.000059	0.00011	0.00022	0.0039
Nitrogen	7727-37-9	0.15	0.15	0.22	80
Oxygen	7782-44-7	0.040	0.040	0.22	10
Pentane	109-66-0	0.000054	0.00024	0.0022	0.064
Propane	74-98-6	0.000065	0.00024	0.0022	0.0066

J = Estimated value.

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 71

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	5/22/19 04:53 PM
Lab ID:	1905302C-08A	Dilution Factor:	2.15
Date/Time Collected:	5/9/19 12:42 PM	Instrument/Filename:	gc10.i / 10052216
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0056
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	11
Carbon Monoxide	630-08-0	0.0028	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0022
Hydrogen	1333-74-0	0.0032	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.018
Nitrogen	7727-37-9	0.14	0.14	0.22	82
Oxygen	7782-44-7	0.040	0.040	0.22	4.3
Pentane	109-66-0	0.000054	0.00024	0.0022	0.15
Propane	74-98-6	0.000064	0.00024	0.0022	0.0012 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 110

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	5/22/19 06:32 PM
Lab ID:	1905302C-09A	Dilution Factor:	2.40
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	gc10.i / 10052219
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000034	0.00026	0.0024	0.0069
Carbon Dioxide	124-38-9	0.0026	0.012	0.024	9.7
Carbon Monoxide	630-08-0	0.0032	0.012	0.024	Not Detected U
Ethane	74-84-0	0.000060	0.00026	0.0024	0.0021 J
Hydrogen	1333-74-0	0.0036	0.015	0.024	Not Detected U
Methane	74-82-8	0.000065	0.00012	0.00024	0.017
Nitrogen	7727-37-9	0.16	0.16	0.24	83
Oxygen	7782-44-7	0.044	0.044	0.24	5.1
Pentane	109-66-0	0.000060	0.00026	0.0024	0.21
Propane	74-98-6	0.000072	0.00026	0.0024	0.0011 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 120

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	5/22/19 07:51 PM
Lab ID:	1905302C-10A	Dilution Factor:	2.14
Date/Time Collected:	5/9/19 12:57 PM	Instrument/Filename:	gc10.i / 10052222
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0021	0.0067
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	9.6
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0021	0.0020 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00021	0.016
Nitrogen	7727-37-9	0.14	0.14	0.21	83
Oxygen	7782-44-7	0.040	0.040	0.21	5.1
Pentane	109-66-0	0.000054	0.00024	0.0021	0.20
Propane	74-98-6	0.000064	0.00024	0.0021	0.0011 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 110

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	5/22/19 09:13 PM
Lab ID:	1905302C-11A	Dilution Factor:	2.15
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	gc10.i / 10052225
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0023
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	3.9
Carbon Monoxide	630-08-0	0.0028	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.00046 J
Hydrogen	1333-74-0	0.0032	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.0020
Nitrogen	7727-37-9	0.14	0.14	0.22	81
Oxygen	7782-44-7	0.040	0.040	0.22	14
Pentane	109-66-0	0.000054	0.00024	0.0022	0.083
Propane	74-98-6	0.000064	0.00024	0.0022	0.00029 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 35

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 159.9 Lab Duplicate	Date/Time Analyzed:	5/22/19 10:03 PM
Lab ID:	1905302C-11AA	Dilution Factor:	2.15
Date/Time Collected:	5/9/19 01:17 PM	Instrument/Filename:	gc10.i / 10052227
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0023
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	3.9
Carbon Monoxide	630-08-0	0.0028	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.00046 J
Hydrogen	1333-74-0	0.0032	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.0020
Nitrogen	7727-37-9	0.14	0.14	0.22	81
Oxygen	7782-44-7	0.040	0.040	0.22	14
Pentane	109-66-0	0.000054	0.00024	0.0022	0.086
Propane	74-98-6	0.000064	0.00024	0.0022	0.00028 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 35

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	5/22/19 11:11 PM
Lab ID:	1905302C-12A	Dilution Factor:	2.08
Date/Time Collected:	5/9/19 01:27 PM	Instrument/Filename:	gc10.i / 10052230
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0019 J
Carbon Dioxide	124-38-9	0.0022	0.010	0.021	12
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0021
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.0046
Nitrogen	7727-37-9	0.14	0.14	0.21	84
Oxygen	7782-44-7	0.038	0.038	0.21	2.5
Pentane	109-66-0	0.000052	0.00023	0.0021	0.060
Propane	74-98-6	0.000062	0.00023	0.0021	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 80

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/16/19 07:25 PM
Lab ID:	1905302C-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051608
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/16/19 07:02 PM
Lab ID:	1905302C-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051607c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/22/19 11:38 AM
Lab ID:	1905302C-13C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052207
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/22/19 12:04 PM
Lab ID:	1905302C-13D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052208c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/16/19 04:29 PM
Lab ID:	1905302C-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051602DOD
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	97
Carbon Monoxide	630-08-0	88
Ethane	74-84-0	101
Methane	74-82-8	102
Nitrogen	7727-37-9	99
Oxygen	7782-44-7	103
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/16/19 05:13 PM
Lab ID:	1905302C-14AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051603DOD
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	102
Carbon Dioxide	124-38-9	97
Carbon Monoxide	630-08-0	88
Ethane	74-84-0	103
Methane	74-82-8	104
Nitrogen	7727-37-9	99
Oxygen	7782-44-7	103
Pentane	109-66-0	103
Propane	74-98-6	104

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/22/19 09:01 AM
Lab ID:	1905302C-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052202a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	97
Carbon Monoxide	630-08-0	88
Ethane	74-84-0	101
Methane	74-82-8	102
Nitrogen	7727-37-9	99
Oxygen	7782-44-7	103
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/22/19 09:27 AM
Lab ID:	1905302C-14BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052203a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	99
Carbon Dioxide	124-38-9	97
Carbon Monoxide	630-08-0	89
Ethane	74-84-0	99
Methane	74-82-8	100
Nitrogen	7727-37-9	99
Oxygen	7782-44-7	103
Pentane	109-66-0	100
Propane	74-98-6	100

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/16/19 06:14 PM
Lab ID:	1905302C-14C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051605c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	101

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/16/19 06:39 PM
Lab ID:	1905302C-14CC	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051606c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	101

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/22/19 10:30 AM
Lab ID:	1905302C-14D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052205c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	94

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/22/19 11:07 AM
Lab ID:	1905302C-14DD	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10052206c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	100

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905303A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads 'Brian Whittaker'. The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1905303A

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified TO-15	11.2 "Hg	4.8 psi
01AA	KAFB-106V2 252.2 Lab Duplicate	Modified TO-15	11.2 "Hg	4.8 psi
02A	KAFB-106V2 269.5	Modified TO-15	9.6 "Hg	4.9 psi
02B	KAFB-106V2 269.5	Modified TO-15	9.6 "Hg	4.9 psi
03A	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
04B	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:



Technical Director

DATE: 05/30/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 TO-15 LL/SIM
EA Engineering
Workorder# 1905303A

Two 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on May 15, 2019. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liter of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modification taken to run these samples is summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-15 LL/SIM</i>	<i>ATL Modifications</i>
Blank and standards	Zero air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Samples were analyzed in one analytical batch on instrument MSD-14 on 5/24/19. The initial continuing calibration verification (CCV) for the batch is reported as lab fraction 04A and the ending CCV is reported as lab fraction 04B.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and O-Xylene.

A Limit of Detection (LOD) study and Method Detection Limit (MDL) study are not maintained for

Total Xylenes and non-standard compounds.

Samples KAFB-106V2 252.2 and KAFB-106V2 269.5 were transferred from SIM/Low Level analysis to full scan TO-15 due to high levels of target compounds.

Dilution was performed on samples KAFB-106V2 252.2 and KAFB-106V2 269.5 due to the presence of high level target species.

Surrogate 1,2-Dichloroethane-d4 did not meet in-house generated control limits of 65-140% Recovery (%R) for sample KAFB-106V2 269.5 (02B). However, recovery was within maximum exceedance limits of 52-152%R.

Acetone exceeded the instrument's calibration range for sample KAFB-106V2 252.2 Lab Duplicate and was flagged accordingly.

High concentrations of VOCs in sample KAFB-106V2 269.5 required an off-line dilution using a Tedlar bag. Toluene is a common contaminant in Tedlar bags, and a CN-flag was applied to the Toluene concentration to indicate a high bias.

The Continuing Calibration Verification (CCV) analyzed on 5/24/19 did not meet project requirement control limits of 70-130% recovery (R) for Naphthalene.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	5/24/19 04:46 PM
Lab ID:	1905303A-01A	Dilution Factor:	106
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	msd14.i / 14052416
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	600	1300	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6400	7900	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	170000
1,2-Dibromoethane (EDB)	106-93-4	720	2400	4100	11000
1,2-Dichlorobenzene	95-50-1	770	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	430	1600	2600	47000
1,3-Butadiene	106-99-0	370	700	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3800	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3100	6200	290000
2-Hexanone	591-78-6	3200	4300	8700	12000
2-Propanol	67-63-0	660	2600	5200	130000
4-Methyl-2-pentanone	108-10-1	1000	1300	2200	11000
Acetone	67-64-1	740	2500	5000	2500000
Benzene	71-43-2	240	1000	1700	770000
Bromodichloromethane	75-27-4	360	2100	3600	Not Detected U
Bromoform	75-25-2	760	3300	5500	Not Detected U
Carbon Disulfide	75-15-0	1000	3300	6600	Not Detected U
Carbon Tetrachloride	56-23-5	790	2000	3300	Not Detected U
Chloroethane	75-00-3	1600	2800	5600	Not Detected U
Chloroform	67-66-3	440	1600	2600	Not Detected U
Chloromethane	74-87-3	920	2200	4400	Not Detected U
Cyclohexane	110-82-7	400	1100	1800	2500000
Dibromochloromethane	124-48-1	930	2700	4500	Not Detected U
Ethanol	64-17-5	870	2000	4000	6100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	5/24/19 04:46 PM
Lab ID:	1905303A-01A	Dilution Factor:	106
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	msd14.i / 14052416
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected
Ethyl Benzene	100-41-4	460	1400	2300	310000
Freon 11	75-69-4	440	1800	3000	Not Detected U
Freon 113	76-13-1	720	2400	4100	Not Detected U
Freon 12	75-71-8	580	1600	2600	Not Detected U
Heptane	142-82-5	730	1300	2200	3900000
Hexane	110-54-3	460	1100	1900	2100000
m,p-Xylene	108-38-3	430	1400	2300	750000
Methylene Chloride	75-09-2	1100	3700	7400	Not Detected U
Naphthalene	91-20-3	860	5600	11000	Not Detected UJ
o-Xylene	95-47-6	620	1400	2300	230000
Propylene	115-07-1	620	1800	3600	40000
Styrene	100-42-5	430	1400	2200	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3600	Not Detected U
Tetrahydrofuran	109-99-9	550	940	1600	Not Detected U
Toluene	108-88-3	360	1200	2000	3500000
Total Xylene	1330-20-7	NA	D	2300	980000
Trichloroethene	79-01-6	840	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	470	810	1400	Not Detected U

U = The analyte was not detected above the MDL.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	5/24/19 04:46 PM
Lab ID:	1905303A-01A	Dilution Factor:	106
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	msd14.i / 14052416
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	125
4-Bromofluorobenzene	460-00-4	83-115	99
Toluene-d8	2037-26-5	86-115	103

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1905303A-01AA	Date/Time Analyzed:	5/24/19 05:40 PM
Date/Time Collected:	5/9/19 01:43 PM	Dilution Factor:	106
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052418

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	600	1300	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	6400	7900	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	500	1600	2600	190000
1,2-Dibromoethane (EDB)	106-93-4	720	2400	4100	12000
1,2-Dichlorobenzene	95-50-1	770	1900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	430	1600	2600	53000
1,3-Butadiene	106-99-0	370	700	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	3800	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	3100	6200	300000
2-Hexanone	591-78-6	3200	4300	8700	13000
2-Propanol	67-63-0	660	2600	5200	140000
4-Methyl-2-pentanone	108-10-1	1000	1300	2200	14000
Acetone	67-64-1	740	2500	5000	2600000 J
Benzene	71-43-2	240	1000	1700	800000
Bromodichloromethane	75-27-4	360	2100	3600	Not Detected U
Bromoform	75-25-2	760	3300	5500	Not Detected U
Carbon Disulfide	75-15-0	1000	3300	6600	Not Detected U
Carbon Tetrachloride	56-23-5	790	2000	3300	Not Detected U
Chloroethane	75-00-3	1600	2800	5600	Not Detected U
Chloroform	67-66-3	440	1600	2600	Not Detected U
Chloromethane	74-87-3	920	2200	4400	Not Detected U
Cyclohexane	110-82-7	400	1100	1800	2600000
Dibromochloromethane	124-48-1	930	2700	4500	Not Detected U
Ethanol	64-17-5	870	2000	4000	6800

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1905303A-01AA	Date/Time Analyzed:	5/24/19 05:40 PM
Date/Time Collected:	5/9/19 01:43 PM	Dilution Factor:	106
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052418

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected
Ethyl Benzene	100-41-4	460	1400	2300	340000
Freon 11	75-69-4	440	1800	3000	Not Detected U
Freon 113	76-13-1	720	2400	4100	Not Detected U
Freon 12	75-71-8	580	1600	2600	Not Detected U
Heptane	142-82-5	730	1300	2200	4200000
Hexane	110-54-3	460	1100	1900	2200000
m,p-Xylene	108-38-3	430	1400	2300	810000
Methylene Chloride	75-09-2	1100	3700	7400	Not Detected U
Naphthalene	91-20-3	860	5600	11000	1100 JUJ
o-Xylene	95-47-6	620	1400	2300	250000
Propylene	115-07-1	620	1800	3600	43000
Styrene	100-42-5	430	1400	2200	Not Detected U
Tetrachloroethene	127-18-4	1300	2200	3600	Not Detected U
Tetrahydrofuran	109-99-9	550	940	1600	Not Detected U
Toluene	108-88-3	360	1200	2000	3700000
Total Xylene	1330-20-7	NA	D	2300	1100000
Trichloroethene	79-01-6	840	1700	2800	Not Detected U
Vinyl Chloride	75-01-4	470	810	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS

KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1905303A-01AA	Date/Time Analyzed:	5/24/19 05:40 PM
Date/Time Collected:	5/9/19 01:43 PM	Dilution Factor:	106
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14052418

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	126
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/24/19 08:03 PM
Lab ID:	1905303A-02A	Dilution Factor:	196
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	msd14.i / 14052424
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	1100	2400	4000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	12000	14000	29000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	920	2900	4800	100000
1,2-Dibromoethane (EDB)	106-93-4	1300	4500	7500	7500
1,2-Dichlorobenzene	95-50-1	1400	3500	5900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	800	2900	4800	33000
1,3-Butadiene	106-99-0	680	1300	2200	Not Detected U
1,4-Dioxane	123-91-1	3900	7100	14000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	2800	5800	12000	390000
2-Hexanone	591-78-6	6000	8000	16000	11000 J
2-Propanol	67-63-0	1200	4800	9600	100000
4-Methyl-2-pentanone	108-10-1	2000	2400	4000	17000
Acetone	67-64-1	1400	4600	9300	2400000
Benzene	71-43-2	440	1900	3100	590000
Bromodichloromethane	75-27-4	660	3900	6600	Not Detected U
Bromoform	75-25-2	1400	6100	10000	Not Detected U
Carbon Disulfide	75-15-0	1800	6100	12000	Not Detected U
Carbon Tetrachloride	56-23-5	1500	3700	6200	Not Detected U
Chloroethane	75-00-3	3000	5200	10000	Not Detected U
Chloroform	67-66-3	820	2900	4800	Not Detected U
Chloromethane	74-87-3	1700	4000	8100	Not Detected U
Cyclohexane	110-82-7	750	2000	3400	2500000
Dibromochloromethane	124-48-1	1700	5000	8300	Not Detected U
Ethanol	64-17-5	1600	3700	7400	11000



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/24/19 08:03 PM
Lab ID:	1905303A-02A	Dilution Factor:	196
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	msd14.i / 14052424
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	14000	Not Detected
Ethyl Benzene	100-41-4	850	2600	4200	180000
Freon 11	75-69-4	810	3300	5500	Not Detected U
Freon 113	76-13-1	1300	4500	7500	Not Detected U
Freon 12	75-71-8	1100	2900	4800	Not Detected U
Heptane	142-82-5	1400	2400	4000	5800000
Hexane	110-54-3	850	2100	3400	1200000
m,p-Xylene	108-38-3	800	2600	4200	430000
Methylene Chloride	75-09-2	2100	6800	14000	Not Detected U
o-Xylene	95-47-6	1100	2600	4200	120000
Propylene	115-07-1	1200	3400	6700	30000
Styrene	100-42-5	790	2500	4200	Not Detected U
Tetrachloroethene	127-18-4	2300	4000	6600	Not Detected U
Tetrahydrofuran	109-99-9	1000	1700	2900	Not Detected U
Toluene	108-88-3	660	2200	3700	3900000 CN
Total Xylene	1330-20-7	NA	D	4200	550000
Trichloroethene	79-01-6	1600	3200	5300	Not Detected U
Vinyl Chloride	75-01-4	870	1500	2500	Not Detected U

U = The analyte was not detected above the MDL.
 CN =See Case Narrative explanation
 J = Estimated value.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/24/19 08:03 PM
Lab ID:	1905303A-02A	Dilution Factor:	196
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	msd14.i / 14052424
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	133
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/24/19 05:11 PM
Lab ID:	1905303A-02B	Dilution Factor:	98.0
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	msd14.i / 14052417
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	91-20-3	790	5100	10000	970 JUJ

J = Estimated value.
 UJ = Analyte associated with low bias in the CCV.
 Q = Exceeds Quality Control limits.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	144 Q
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	108

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905303A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	5.6	12	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	60	74	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	4.7	15	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	6.8	23	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	7.3	18	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	4.1	15	24	Not Detected U
1,3-Butadiene	106-99-0	3.5	6.6	11	Not Detected U
1,4-Dioxane	123-91-1	20	36	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	29	59	Not Detected U
2-Hexanone	591-78-6	31	41	82	Not Detected U
2-Propanol	67-63-0	6.3	24	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	10	12	20	Not Detected U
Acetone	67-64-1	6.9	24	48	Not Detected U
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	20	34	Not Detected U
Bromoform	75-25-2	7.1	31	52	Not Detected U
Carbon Disulfide	75-15-0	9.5	31	62	Not Detected U
Carbon Tetrachloride	56-23-5	7.5	19	31	Not Detected U
Chloroethane	75-00-3	15	26	53	Not Detected U
Chloroform	67-66-3	4.2	15	24	Not Detected U
Chloromethane	74-87-3	8.7	21	41	Not Detected U
Cyclohexane	110-82-7	3.8	10	17	Not Detected U
Dibromochloromethane	124-48-1	8.8	26	42	Not Detected U
Ethanol	64-17-5	8.2	19	38	Not Detected U



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905303A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	4.3	13	22	Not Detected U
Freon 11	75-69-4	4.2	17	28	Not Detected U
Freon 113	76-13-1	6.8	23	38	Not Detected U
Freon 12	75-71-8	5.5	15	25	Not Detected U
Heptane	142-82-5	6.9	12	20	Not Detected U
Hexane	110-54-3	4.3	10	18	Not Detected U
m,p-Xylene	108-38-3	4.1	13	22	Not Detected U
Methylene Chloride	75-09-2	11	35	69	Not Detected U
Naphthalene	91-20-3	8.1	52	100	Not Detected UJ
o-Xylene	95-47-6	5.9	13	22	Not Detected U
Propylene	115-07-1	5.9	17	34	Not Detected U
Styrene	100-42-5	4.0	13	21	Not Detected U
Tetrachloroethene	127-18-4	12	20	34	Not Detected U
Tetrahydrofuran	109-99-9	5.2	8.8	15	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	8.0	16	27	Not Detected U
Vinyl Chloride	75-01-4	4.4	7.7	13	Not Detected U

U = The analyte was not detected above the MDL.
 UJ = Analyte associated with low bias in the CCV.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
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EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/24/19 12:52 PM
Lab ID:	1905303A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052408a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	99
4-Bromofluorobenzene	460-00-4	83-115	98
Toluene-d8	2037-26-5	86-115	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905303A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	100
1,2,4-Trichlorobenzene	120-82-1	102
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	92
1,2-Dichlorobenzene	95-50-1	95
1,3,5-Trimethylbenzene	108-67-8	102
1,3-Butadiene	106-99-0	85
1,4-Dioxane	123-91-1	91
2-Butanone (Methyl Ethyl Ketone)	78-93-3	98
2-Hexanone	591-78-6	85
2-Propanol	67-63-0	94
4-Methyl-2-pentanone	108-10-1	93
Acetone	67-64-1	110
Benzene	71-43-2	103
Bromodichloromethane	75-27-4	89
Bromoform	75-25-2	93
Carbon Disulfide	75-15-0	90
Carbon Tetrachloride	56-23-5	100
Chloroethane	75-00-3	92
Chloroform	67-66-3	103
Chloromethane	74-87-3	88
Cyclohexane	110-82-7	100
Dibromochloromethane	124-48-1	90
Ethanol	64-17-5	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905303A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	117
Ethyl Benzene	100-41-4	108
Freon 11	75-69-4	100
Freon 113	76-13-1	98
Freon 12	75-71-8	88
Heptane	142-82-5	96
Hexane	110-54-3	96
m,p-Xylene	108-38-3	110
Methylene Chloride	75-09-2	100
Naphthalene	91-20-3	67 Q
o-Xylene	95-47-6	109
Propylene	115-07-1	91
Styrene	100-42-5	89
Tetrachloroethene	127-18-4	107
Tetrahydrofuran	109-99-9	92
Toluene	108-88-3	109
Total Xylene	1330-20-7	110
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	90

Q = Exceeds Quality Control limits.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	95

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:24 AM
Lab ID:	1905303A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052402a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	102
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905303A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	105
1,2,4-Trichlorobenzene	120-82-1	105
1,2,4-Trimethylbenzene	95-63-6	108
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	99
1,3,5-Trimethylbenzene	108-67-8	109
1,3-Butadiene	106-99-0	91
1,4-Dioxane	123-91-1	92
2-Butanone (Methyl Ethyl Ketone)	78-93-3	99
2-Hexanone	591-78-6	92
2-Propanol	67-63-0	97
4-Methyl-2-pentanone	108-10-1	96
Acetone	67-64-1	120
Benzene	71-43-2	108
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	94
Carbon Disulfide	75-15-0	92
Carbon Tetrachloride	56-23-5	107
Chloroethane	75-00-3	103
Chloroform	67-66-3	108
Chloromethane	74-87-3	89
Cyclohexane	110-82-7	108
Dibromochloromethane	124-48-1	95
Ethanol	64-17-5	92

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905303A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	117
Ethyl Benzene	100-41-4	114
Freon 11	75-69-4	102
Freon 113	76-13-1	103
Freon 12	75-71-8	92
Heptane	142-82-5	110
Hexane	110-54-3	101
m,p-Xylene	108-38-3	118
Methylene Chloride	75-09-2	99
Naphthalene	91-20-3	73
o-Xylene	95-47-6	116
Propylene	115-07-1	93
Styrene	100-42-5	93
Tetrachloroethene	127-18-4	111
Tetrahydrofuran	109-99-9	92
Toluene	108-88-3	118
Total Xylene	1330-20-7	117
Trichloroethene	79-01-6	111
Vinyl Chloride	75-01-4	88

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	96

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	5/24/19 09:46 PM
Lab ID:	1905303A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052427
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905303A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	102
1,2,4-Trichlorobenzene	120-82-1	138
1,2,4-Trimethylbenzene	95-63-6	112
1,2-Dibromoethane (EDB)	106-93-4	94
1,2-Dichlorobenzene	95-50-1	105
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	83
1,4-Dioxane	123-91-1	87
2-Butanone (Methyl Ethyl Ketone)	78-93-3	93
2-Hexanone	591-78-6	74
2-Propanol	67-63-0	95
4-Methyl-2-pentanone	108-10-1	84
Acetone	67-64-1	114
Benzene	71-43-2	101
Bromodichloromethane	75-27-4	92
Bromoform	75-25-2	96
Carbon Disulfide	75-15-0	79
Carbon Tetrachloride	56-23-5	102
Chloroethane	75-00-3	112
Chloroform	67-66-3	102
Chloromethane	74-87-3	86
Cyclohexane	110-82-7	103
Dibromochloromethane	124-48-1	93
Ethanol	64-17-5	94

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905303A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	112
Freon 11	75-69-4	102
Freon 113	76-13-1	99
Freon 12	75-71-8	92
Heptane	142-82-5	108
Hexane	110-54-3	97
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	96
Naphthalene	91-20-3	101
o-Xylene	95-47-6	118
Propylene	115-07-1	87
Styrene	100-42-5	99
Tetrachloroethene	127-18-4	105
Tetrahydrofuran	109-99-9	86
Toluene	108-88-3	106
Total Xylene	1330-20-7	116
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	89

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	98

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/24/19 09:48 AM
Lab ID:	1905303A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052403a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905303A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	98
1,2,4-Trichlorobenzene	120-82-1	127
1,2,4-Trimethylbenzene	95-63-6	104
1,2-Dibromoethane (EDB)	106-93-4	92
1,2-Dichlorobenzene	95-50-1	103
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	81
1,4-Dioxane	123-91-1	84
2-Butanone (Methyl Ethyl Ketone)	78-93-3	90
2-Hexanone	591-78-6	74
2-Propanol	67-63-0	89
4-Methyl-2-pentanone	108-10-1	85
Acetone	67-64-1	112
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	91
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	77
Carbon Tetrachloride	56-23-5	97
Chloroethane	75-00-3	103
Chloroform	67-66-3	100
Chloromethane	74-87-3	82
Cyclohexane	110-82-7	99
Dibromochloromethane	124-48-1	92
Ethanol	64-17-5	95

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS D	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905303A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	111
Freon 11	75-69-4	98
Freon 113	76-13-1	95
Freon 12	75-71-8	86
Heptane	142-82-5	104
Hexane	110-54-3	90
m,p-Xylene	108-38-3	114
Methylene Chloride	75-09-2	95
Naphthalene	91-20-3	98
o-Xylene	95-47-6	115
Propylene	115-07-1	84
Styrene	100-42-5	99
Tetrachloroethene	127-18-4	106
Tetrahydrofuran	109-99-9	82
Toluene	108-88-3	108
Total Xylene	1330-20-7	114
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	86

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	65-140	94

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/24/19 10:15 AM
Lab ID:	1905303A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14052404a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-115	101
Toluene-d8	2037-26-5	86-115	103

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905303B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

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www.airtoxics.com

**WORK ORDER #: 1905303B**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/22/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified TO-3	11.2 "Hg	4.8 psi
01AA	KAFB-106V2 252.2 Lab Duplicate	Modified TO-3	11.2 "Hg	4.8 psi
02A	KAFB-106V2 269.5	Modified TO-3	9.6 "Hg	4.9 psi
03A	Lab Blank	Modified TO-3	NA	NA
04A	LCS	Modified TO-3	NA	NA
04AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Technical Director

DATE: 05/22/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM 5.1 TO-3
EA Engineering
Workorder# 1905303B

Two 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on May 15, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Fluorobenzene (FID) was manually integrated in sample KAFB-106V2 269.5.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	5/18/19 11:59 AM
Lab ID:	1905303B-01A	Dilution Factor:	2120
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	gcd.i / d051806
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	220000	89000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	122

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1905303B-01AA	Date/Time Analyzed:	5/18/19 12:43 PM
Date/Time Collected:	5/9/19 01:43 PM	Dilution Factor:	2120
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	gcd.i / d051807

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	220000	98000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	119



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/18/19 01:25 PM
Lab ID:	1905303B-02A	Dilution Factor:	1960
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	gcd.i / d051808
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	110000	160000	200000	120000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	125



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/18/19 10:11 AM
Lab ID:	1905303B-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051804
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	101

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/18/19 08:41 AM
Lab ID:	1905303B-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051802
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		96
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	114

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/18/19 09:23 AM
Lab ID:	1905303B-04AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d051803
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		100

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	128

* % Recovery is calculated using unrounded analytical results.



5/30/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1905303C

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 5/15/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

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WORK ORDER #: 1905303C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	05/15/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	05/30/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified ASTM D-1945	11.2 "Hg	4.8 psi
01AA	KAFB-106V2 252.2 Lab Duplicate	Modified ASTM D-1945	11.2 "Hg	4.8 psi
02A	KAFB-106V2 269.5	Modified ASTM D-1945	9.6 "Hg	4.9 psi
03A	Lab Blank	Modified ASTM D-1945	NA	NA
03B	Lab Blank	Modified ASTM D-1945	NA	NA
04A	LCS	Modified ASTM D-1945	NA	NA
04AA	LCSD	Modified ASTM D-1945	NA	NA
04B	LCS	Modified ASTM D-1945	NA	NA
04BB	LCSD	Modified ASTM D-1945	NA	NA

CERTIFIED BY:



Technical Director

DATE: 05/30/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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Page 2 of 13

LABORATORY NARRATIVE
DoD QSM 5.1 ASTM D1945
EA Engineering
Workorder# 1905303C

Two 6 Liter Summa Canister samples were received on May 15, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O ₂ , N ₂ , and C ₆ +)
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C ₅ and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM Version 5.1 waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Since Nitrogen is used to pressurize samples, the Nitrogen values are calculated by adding all the

sample components and subtracting from 100%.

Methane and Ethane were manually integrated in samples KAFB-106V2 252.2, KAFB-106V2 252.2 Lab Duplicate and KAFB-106V2 269.5.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	5/18/19 08:37 AM
Lab ID:	1905303C-01A	Dilution Factor:	2.12
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	gc10.i / 10051719
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0021
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	5.0
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000053	0.00023	0.0021	0.0015 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0021
Nitrogen	7727-37-9	0.14	0.14	0.21	81
Oxygen	7782-44-7	0.039	0.039	0.21	13
Pentane	109-66-0	0.000053	0.00023	0.0021	0.037
Propane	74-98-6	0.000064	0.00023	0.0021	0.0022

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 42

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate	Date/Time Analyzed:	5/18/19 11:46 AM
Lab ID:	1905303C-01AA	Dilution Factor:	2.12
Date/Time Collected:	5/9/19 01:43 PM	Instrument/Filename:	gc10.i / 10051725
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0021
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	5.0
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000053	0.00023	0.0021	0.0014 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0021
Nitrogen	7727-37-9	0.14	0.14	0.21	81
Oxygen	7782-44-7	0.039	0.039	0.21	13
Pentane	109-66-0	0.000053	0.00023	0.0021	0.036
Propane	74-98-6	0.000064	0.00023	0.0021	0.0022

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 48

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	5/18/19 10:14 AM
Lab ID:	1905303C-02A	Dilution Factor:	1.96
Date/Time Collected:	5/9/19 01:55 PM	Instrument/Filename:	gc10.i / 10051722
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00022	0.0020	0.0020
Carbon Dioxide	124-38-9	0.0021	0.0094	0.020	5.8
Carbon Monoxide	630-08-0	0.0026	0.0094	0.020	Not Detected U
Ethane	74-84-0	0.000049	0.00022	0.0020	0.0017 J
Hydrogen	1333-74-0	0.0029	0.012	0.020	Not Detected U
Methane	74-82-8	0.000053	0.000098	0.00020	0.0023
Nitrogen	7727-37-9	0.13	0.13	0.20	81
Oxygen	7782-44-7	0.036	0.036	0.20	12
Pentane	109-66-0	0.000049	0.00022	0.0020	0.029
Propane	74-98-6	0.000059	0.00022	0.0020	0.0021

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 64

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/17/19 05:30 PM
Lab ID:	1905303C-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051707
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	5/17/19 05:55 PM
Lab ID:	1905303C-03B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051708c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/17/19 03:40 PM
Lab ID:	1905303C-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051703a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	101
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	102
Methane	74-82-8	102
Nitrogen	7727-37-9	100
Oxygen	7782-44-7	104
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/17/19 04:08 PM
Lab ID:	1905303C-04AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051704a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	99
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	90
Ethane	74-84-0	100
Methane	74-82-8	101
Nitrogen	7727-37-9	100
Oxygen	7782-44-7	104
Pentane	109-66-0	100
Propane	74-98-6	100

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	5/17/19 04:41 PM
Lab ID:	1905303C-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051705ac
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	5/17/19 05:08 PM
Lab ID:	1905303C-04BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10051706ac
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	102

* % Recovery is calculated using unrounded analytical results.



7/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907216A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

**WORK ORDER #: 1907216A**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
01AA	KAFB-106V1 102.1 Lab Duplicate	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
01B	KAFB-106V1 102.1	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified TO-15 (5&20 ppbv	10.0 "Hg	5 psi
02B	KAFB-106V1 112.6	Modified TO-15 (5&20 ppbv	10.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
04A	KAFB-106V1 159.6 DUP	Modified TO-15 (5&20 ppbv	11.0 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified TO-15 (5&20 ppbv	9.5 "Hg	5 psi
05B	KAFB-106V1 217.1	Modified TO-15 (5&20 ppbv	9.5 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
06B	KAFB-106V1 252.1	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
06BB	KAFB-106V1 252.1 Lab Duplicate	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
07A	KAFB-106V1 262.6	Modified TO-15 (5&20 ppbv	10.0 "Hg	5 psi
07B	KAFB-106V1 262.6	Modified TO-15 (5&20 ppbv	10.0 "Hg	5 psi
08A	KAFB-106V2 102.2	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
08B	KAFB-106V2 102.2	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
09A	KAFB-106V2 117.1	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
09B	KAFB-106V2 117.1	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
10B	KAFB-106V2 117.1 DUP	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified TO-15 (5&20 ppbv	11.0 "Hg	5 psi
12A	KAFB-106V2 217.1	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi
12B	KAFB-106V2 217.1	Modified TO-15 (5&20 ppbv	11.5 "Hg	5 psi

Continued on next page

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Page 2 of 75

**WORK ORDER #: 1907216A**

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
13A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
13B	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
14A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
14B	CCV	Modified TO-15 (5&20 ppbv	NA	NA
14C	CCV	Modified TO-15 (5&20 ppbv	NA	NA
14D	CCV	Modified TO-15 (5&20 ppbv	NA	NA
15A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
15AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA
15B	LCS	Modified TO-15 (5&20 ppbv	NA	NA
15BB	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY:

Technical Director

DATE: 07/24/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM - TO-15
EA Engineering
Workorder# 1907216A

Twelve 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on July 10, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and O-Xylene.

A Limit of Detection (LOD) and Method Detection Limit (MDL) study are not maintained for non-standard compounds.

High concentrations of VOCs in samples KAFB-106V1 217.1 (Sample Fraction 05B), KAFB-106V1 252.1 (Sample Fraction 06B), KAFB-106V1 262.6 (Sample Fraction 07B), KAFB-106V2 102.2 (Sample Fraction 08B), KAFB-106V2 117.1 (Sample Fraction 09B), KAFB-106V2 117.1 DUP (Sample Fraction 10B), and KAFB-106V2 217.1 (Sample Fraction 12B) required an off-line dilution using a Tedlar bag. Toluene is a common contaminant in Tedlar bags, and a CN-flag was applied to Toluene concentrations to indicate a high bias.

Dilution was performed on samples KAFB-106V1 102.1, KAFB-106V1 102.1 Lab Duplicate, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 159.6 DUP, KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9, and KAFB-106V2 217.1 due to the presence of high level target species.

Due to high-level target compounds, samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, and KAFB-106V2 217.1 were analyzed twice. Both analysis and associated QCs are reported. The first analysis, file number designated with "A", includes compounds that exceeded the instrument calibration level. A second analysis, file number designated with "B", was performed using further dilution to bring Benzene and Toluene within the calibration range.

Acetone, 2-Propanol, Hexane, 2-Butanone (Methyl Ethyl Ketone), Cyclohexane, and Heptane exceeded the instrument's calibration range for samples KAFB-106V1 102.1, KAFB-106V2 102.2, and KAFB-106V2 217.1. Data is reported as qualified.

Acetone, 2-Propanol, Hexane, 2-Butanone (Methyl Ethyl Ketone), and Cyclohexane exceeded the instrument's calibration range for sample KAFB-106V1 102.1 Lab Duplicate. Data is reported as qualified.

Acetone, Hexane, 2-Butanone (Methyl Ethyl Ketone), Cyclohexane, and Heptane exceeded the instrument's calibration range for samples KAFB-106V1 112.6, KAFB-106V1 217.1, KAFB-106V1 262.6, KAFB-106V2 117.1, and KAFB-106V2 117.1 DUP. Data is reported as qualified.

Acetone, 2-Propanol, Hexane, Cyclohexane, and Heptane exceeded the instrument's calibration range for samples KAFB-106V1 159.6 and KAFB-106V1 159.6 DUP. Data is reported as qualified.

Acetone, Hexane, Cyclohexane, and Heptane exceeded the instrument's calibration range for sample KAFB-106V1 252.1. Data is reported as qualified.

Hexane exceeded the instrument's calibration range for sample KAFB-106V2 159.9. Data is reported as qualified.

Hexane exceeded the instrument's calibration range at saturated levels for samples KAFB-106V1 102.1, KAFB-106V1 102.1 Lab Duplicate, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 159.6 DUP, KAFB-106V1 217.1, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 DUP, and KAFB-106V2 217.1. Data is reported as qualified.

Heptane exceeded the instrument's calibration range at saturated levels for sample KAFB-106V2 117.1 DUP. Data is reported as qualified.

Cyclohexane exceeded the instrument's calibration range at saturated levels for samples KAFB-106V2 117.1 and KAFB-106V2 117.1 DUP. Data is reported as qualified.

The recovery of surrogate Toluene-d8 in samples KAFB-106V1 102.1 (Sample Fraction 01A),

KAFB-106V1 102.1 Lab Duplicate, KAFB-106V1 112.6 (Sample Fraction 02A), KAFB-106V1 159.6 (Sample Fraction 03A), KAFB-106V1 159.6 DUP (Sample Fraction 04A), KAFB-106V1 217.1 (Sample Fraction 05A), KAFB-106V1 252.1 (Sample Fraction 06A), KAFB-106V1 262.6 (Sample Fractions 07A & 07B), KAFB-106V2 102.2 (Sample Fraction 08A), KAFB-106V2 117.1 (Sample Fractions 09A & 09B), KAFB-106V2 117.1 DUP (Sample Fraction 10A), KAFB-106V2 159.9 (Sample Fraction 11A) and KAFB-106V2 217.1 (Sample Fraction 12A) were outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Samples were analyzed in one analytical batch on MSD-J on 07/18/2019. The initial continuing calibration verification (CCV) for the batch is reported as lab fraction 14A and the ending CCV is reported as lab fraction 14B.

Samples were analyzed in one analytical batch on MSD-14 on 07/22/2019. The initial continuing calibration verification (CCV) for the batch is reported as lab fraction 14C and the ending CCV is reported as lab fraction 14D.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/18/19 03:37 PM
Lab ID:	1907216A-01A	Dilution Factor:	109
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	msdj.i / j071807
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	390	2000	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5500	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2400	2700	110000
1,2-Dibromoethane (EDB)	106-93-4	440	3800	4200	3100 J
1,2-Dichlorobenzene	95-50-1	360	2900	3300	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2300	2400	2700	34000
1,3-Butadiene	106-99-0	510	1100	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	5900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	4800	6400	710000 J
2-Hexanone	591-78-6	3000	6700	8900	Not Detected U
2-Propanol	67-63-0	1500	4000	5400	280000 J
4-Methyl-2-pentanone	108-10-1	500	2000	2200	Not Detected U
Acetone	67-64-1	1500	3900	5200	5100000 J
Bromodichloromethane	75-27-4	360	3300	3600	Not Detected U
Bromoform	75-25-2	430	5100	5600	Not Detected U
Carbon Disulfide	75-15-0	990	5100	6800	Not Detected U
Carbon Tetrachloride	56-23-5	360	3100	3400	Not Detected U
Chloroethane	75-00-3	1400	4300	5800	Not Detected U
Chloroform	67-66-3	250	2400	2700	Not Detected U
Chloromethane	74-87-3	820	3400	4500	Not Detected U
Cyclohexane	110-82-7	220	1700	1900	4400000 J
Dibromochloromethane	124-48-1	360	4200	4600	Not Detected U
Ethanol	64-17-5	2600	3100	4100	180000
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/18/19 03:37 PM
Lab ID:	1907216A-01A	Dilution Factor:	109
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	msdj.i / j071807
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	270	2100	2400	190000
Freon 11	75-69-4	470	2800	3100	Not Detected U
Freon 113	76-13-1	750	3800	4200	Not Detected U
Freon 12	75-71-8	310	2400	2700	Not Detected U
Heptane	142-82-5	650	2000	2200	2200000 J
Hexane	110-54-3	450	1700	1900	5400000 J
m,p-Xylene	108-38-3	290	2100	2400	300000
Methylene Chloride	75-09-2	1300	5700	7600	Not Detected U
Naphthalene	91-20-3	790	5700	11000	Not Detected U
o-Xylene	95-47-6	500	2100	2400	100000
Propylene	115-07-1	990	2800	3800	26000
Styrene	100-42-5	290	2100	2300	Not Detected U
Tetrachloroethene	127-18-4	390	3300	3700	Not Detected U
Tetrahydrofuran	109-99-9	330	1400	1600	Not Detected U
Total Xylene	1330-20-7	NA	D	2400	400000
Trichloroethene	79-01-6	330	2600	2900	Not Detected U
Vinyl Chloride	75-01-4	580	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	89

EPA METHOD TO-15 GC/MS

KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/18/19 03:37 PM
Lab ID:	1907216A-01A	Dilution Factor:	109
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	msdj.i / j071807
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	135 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate		
Lab ID:	1907216A-01AA	Date/Time Analyzed:	7/18/19 04:10 PM
Date/Time Collected:	7/5/19 08:28 AM	Dilution Factor:	109
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071808

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	390	2000	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5500	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2400	2700	110000
1,2-Dibromoethane (EDB)	106-93-4	440	3800	4200	2900 J
1,2-Dichlorobenzene	95-50-1	360	2900	3300	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2300	2400	2700	34000
1,3-Butadiene	106-99-0	510	1100	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	5900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	4800	6400	700000 J
2-Hexanone	591-78-6	3000	6700	8900	Not Detected U
2-Propanol	67-63-0	1500	4000	5400	270000 J
4-Methyl-2-pentanone	108-10-1	500	2000	2200	Not Detected U
Acetone	67-64-1	1500	3900	5200	5000000 J
Bromodichloromethane	75-27-4	360	3300	3600	Not Detected U
Bromoform	75-25-2	430	5100	5600	Not Detected U
Carbon Disulfide	75-15-0	990	5100	6800	Not Detected U
Carbon Tetrachloride	56-23-5	360	3100	3400	Not Detected U
Chloroethane	75-00-3	1400	4300	5800	Not Detected U
Chloroform	67-66-3	250	2400	2700	Not Detected U
Chloromethane	74-87-3	820	3400	4500	Not Detected U
Cyclohexane	110-82-7	220	1700	1900	4300000 J
Dibromochloromethane	124-48-1	360	4200	4600	Not Detected U
Ethanol	64-17-5	2600	3100	4100	180000
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate		
Lab ID:	1907216A-01AA	Date/Time Analyzed:	7/18/19 04:10 PM
Date/Time Collected:	7/5/19 08:28 AM	Dilution Factor:	109
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071808

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	270	2100	2400	190000
Freon 11	75-69-4	470	2800	3100	Not Detected U
Freon 113	76-13-1	750	3800	4200	Not Detected U
Freon 12	75-71-8	310	2400	2700	Not Detected U
Heptane	142-82-5	650	2000	2200	2200000
Hexane	110-54-3	450	1700	1900	5400000 J
m,p-Xylene	108-38-3	290	2100	2400	290000
Methylene Chloride	75-09-2	1300	5700	7600	Not Detected U
Naphthalene	91-20-3	790	5700	11000	Not Detected U
o-Xylene	95-47-6	500	2100	2400	100000
Propylene	115-07-1	990	2800	3800	25000
Styrene	100-42-5	290	2100	2300	Not Detected U
Tetrachloroethene	127-18-4	390	3300	3700	Not Detected U
Tetrahydrofuran	109-99-9	330	1400	1600	Not Detected U
Total Xylene	1330-20-7	NA	D	2400	390000
Trichloroethene	79-01-6	330	2600	2900	Not Detected U
Vinyl Chloride	75-01-4	580	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1 Lab Duplicate	Date/Time Analyzed:	7/18/19 04:10 PM
Lab ID:	1907216A-01AA	Dilution Factor:	109
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	msdj.i / j071808
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	135 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/22/19 12:35 PM
Lab ID:	1907216A-01B	Dilution Factor:	109
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	msd14.i / 14072209
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	240	1000	1700	2000000
Toluene	108-88-3	370	1200	2000	1800000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/18/19 04:42 PM
Lab ID:	1907216A-02A	Dilution Factor:	100
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	msdj.i / j071809
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	360	1800	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5100	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2200	2400	110000
1,2-Dibromoethane (EDB)	106-93-4	410	3400	3800	5000
1,2-Dichlorobenzene	95-50-1	330	2700	3000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2200	2400	33000
1,3-Butadiene	106-99-0	470	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5400	7200	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	4400	5900	560000 J
2-Hexanone	591-78-6	2800	6100	8200	Not Detected U
2-Propanol	67-63-0	1400	3700	4900	190000
4-Methyl-2-pentanone	108-10-1	460	1800	2000	Not Detected U
Acetone	67-64-1	1400	3600	4800	4100000 J
Bromodichloromethane	75-27-4	340	3000	3400	Not Detected U
Bromoform	75-25-2	390	4600	5200	Not Detected U
Carbon Disulfide	75-15-0	910	4700	6200	1200 J
Carbon Tetrachloride	56-23-5	330	2800	3100	Not Detected U
Chloroethane	75-00-3	1200	4000	5300	Not Detected U
Chloroform	67-66-3	230	2200	2400	Not Detected U
Chloromethane	74-87-3	760	3100	4100	Not Detected U
Cyclohexane	110-82-7	200	1500	1700	4600000 J
Dibromochloromethane	124-48-1	330	3800	4200	Not Detected U
Ethanol	64-17-5	2400	2800	3800	160000
Ethyl Acetate	141-78-6	NA	D	7200	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/18/19 04:42 PM
Lab ID:	1907216A-02A	Dilution Factor:	100
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	msdj.i / j071809
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	250	2000	2200	220000
Freon 11	75-69-4	430	2500	2800	Not Detected U
Freon 113	76-13-1	690	3400	3800	Not Detected U
Freon 12	75-71-8	290	2200	2500	Not Detected U
Heptane	142-82-5	590	1800	2000	2700000 J
Hexane	110-54-3	410	1600	1800	5100000 J
m,p-Xylene	108-38-3	260	2000	2200	340000
Methylene Chloride	75-09-2	1200	5200	6900	Not Detected U
Naphthalene	91-20-3	720	5200	10000	Not Detected U
o-Xylene	95-47-6	460	2000	2200	120000
Propylene	115-07-1	900	2600	3400	30000
Styrene	100-42-5	260	1900	2100	Not Detected U
Tetrachloroethene	127-18-4	360	3000	3400	Not Detected U
Tetrahydrofuran	109-99-9	310	1300	1500	Not Detected U
Total Xylene	1330-20-7	NA	D	2200	460000
Trichloroethene	79-01-6	300	2400	2700	Not Detected U
Vinyl Chloride	75-01-4	530	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/18/19 04:42 PM
Lab ID:	1907216A-02A	Dilution Factor:	100
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	msdj.i / j071809
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	148 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/22/19 01:59 PM
Lab ID:	1907216A-02B	Dilution Factor:	100
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	msd14.i / 14072211
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	220	960	1600	1500000
Toluene	108-88-3	340	1100	1900	2200000

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	7/18/19 08:20 PM
Lab ID:	1907216A-03A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:07 AM	Instrument/Filename:	msdj.i / j071811
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	370	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5200	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2300	2500	150000
1,2-Dibromoethane (EDB)	106-93-4	420	3600	4000	2700 J
1,2-Dichlorobenzene	95-50-1	340	2800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2300	2500	51000
1,3-Butadiene	106-99-0	480	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5600	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4600	6100	140000
2-Hexanone	591-78-6	2900	6300	8400	Not Detected U
2-Propanol	67-63-0	1400	3800	5100	350000 J
4-Methyl-2-pentanone	108-10-1	480	1900	2100	Not Detected U
Acetone	67-64-1	1400	3700	4900	3100000 J
Benzene	71-43-2	210	1500	1600	1600000
Bromodichloromethane	75-27-4	340	3100	3400	Not Detected U
Bromoform	75-25-2	400	4800	5300	Not Detected U
Carbon Disulfide	75-15-0	940	4800	6400	1000 J
Carbon Tetrachloride	56-23-5	340	2900	3200	Not Detected U
Chloroethane	75-00-3	1300	4100	5400	Not Detected U
Chloroform	67-66-3	240	2300	2500	Not Detected U
Chloromethane	74-87-3	780	3200	4200	Not Detected U
Cyclohexane	110-82-7	200	1600	1800	4200000 J
Dibromochloromethane	124-48-1	340	3900	4400	Not Detected U
Ethanol	64-17-5	2400	2900	3900	97000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	7/18/19 08:20 PM
Lab ID:	1907216A-03A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:07 AM	Instrument/Filename:	msdj.i / j071811
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected
Ethyl Benzene	100-41-4	250	2000	2200	330000
Freon 11	75-69-4	440	2600	2900	Not Detected U
Freon 113	76-13-1	710	3600	3900	Not Detected U
Freon 12	75-71-8	300	2300	2500	Not Detected U
Heptane	142-82-5	610	1900	2100	3500000 J
Hexane	110-54-3	420	1600	1800	4800000 J
m,p-Xylene	108-38-3	270	2000	2200	690000
Methylene Chloride	75-09-2	1300	5400	7200	Not Detected U
Naphthalene	91-20-3	740	5400	11000	Not Detected U
o-Xylene	95-47-6	470	2000	2200	230000
Propylene	115-07-1	930	2600	3500	20000
Styrene	100-42-5	270	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	370	3100	3500	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1500	Not Detected U
Toluene	108-88-3	280	1700	1900	1800000
Total Xylene	1330-20-7	NA	D	2200	920000
Trichloroethene	79-01-6	310	2500	2800	Not Detected U
Vinyl Chloride	75-01-4	540	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	7/18/19 08:20 PM
Lab ID:	1907216A-03A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:07 AM	Instrument/Filename:	msdj.i / j071811
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	93
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	183 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	7/18/19 08:53 PM
Lab ID:	1907216A-04A	Dilution Factor:	106
Date/Time Collected:	7/5/19 09:18 AM	Instrument/Filename:	msdj.i / j071812
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	380	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5400	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2300	2600	160000
1,2-Dibromoethane (EDB)	106-93-4	430	3700	4100	2700 J
1,2-Dichlorobenzene	95-50-1	350	2900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2200	2300	2600	53000
1,3-Butadiene	106-99-0	500	1000	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	5700	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4700	6200	140000
2-Hexanone	591-78-6	3000	6500	8700	Not Detected U
2-Propanol	67-63-0	1500	3900	5200	350000 J
4-Methyl-2-pentanone	108-10-1	490	2000	2200	Not Detected U
Acetone	67-64-1	1400	3800	5000	3100000 J
Benzene	71-43-2	210	1500	1700	1600000
Bromodichloromethane	75-27-4	360	3200	3600	Not Detected U
Bromoform	75-25-2	420	4900	5500	Not Detected U
Carbon Disulfide	75-15-0	970	5000	6600	980 J
Carbon Tetrachloride	56-23-5	350	3000	3300	Not Detected U
Chloroethane	75-00-3	1300	4200	5600	Not Detected U
Chloroform	67-66-3	240	2300	2600	Not Detected U
Chloromethane	74-87-3	800	3300	4400	Not Detected U
Cyclohexane	110-82-7	210	1600	1800	4200000 J
Dibromochloromethane	124-48-1	350	4100	4500	Not Detected U
Ethanol	64-17-5	2500	3000	4000	98000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP		
Lab ID:	1907216A-04A	Date/Time Analyzed:	7/18/19 08:53 PM
Date/Time Collected:	7/5/19 09:18 AM	Dilution Factor:	106
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071812

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected
Ethyl Benzene	100-41-4	260	2100	2300	330000
Freon 11	75-69-4	460	2700	3000	Not Detected U
Freon 113	76-13-1	730	3600	4100	Not Detected U
Freon 12	75-71-8	300	2400	2600	Not Detected U
Heptane	142-82-5	630	2000	2200	3500000 J
Hexane	110-54-3	440	1700	1900	4800000 J
m,p-Xylene	108-38-3	280	2100	2300	740000
Methylene Chloride	75-09-2	1300	5500	7400	Not Detected U
Naphthalene	91-20-3	770	5600	11000	Not Detected U
o-Xylene	95-47-6	490	2100	2300	240000
Propylene	115-07-1	960	2700	3600	20000
Styrene	100-42-5	280	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	380	3200	3600	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1600	Not Detected U
Toluene	108-88-3	290	1800	2000	1800000
Total Xylene	1330-20-7	NA	D	2300	980000
Trichloroethene	79-01-6	320	2600	2800	Not Detected U
Vinyl Chloride	75-01-4	560	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	7/18/19 08:53 PM
Lab ID:	1907216A-04A	Dilution Factor:	106
Date/Time Collected:	7/5/19 09:18 AM	Instrument/Filename:	msdj.i / j071812
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	180 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/18/19 09:26 PM
Lab ID:	1907216A-05A	Dilution Factor:	98.0
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	msdj.i / j071813
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	350	1800	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5000	11000	14000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2200	2400	160000
1,2-Dibromoethane (EDB)	106-93-4	400	3400	3800	4400
1,2-Dichlorobenzene	95-50-1	320	2600	2900	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2000	2200	2400	64000
1,3-Butadiene	106-99-0	460	980	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5300	7100	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	4300	5800	500000 J
2-Hexanone	591-78-6	2700	6000	8000	Not Detected U
2-Propanol	67-63-0	1400	3600	4800	40000
4-Methyl-2-pentanone	108-10-1	450	1800	2000	Not Detected U
Acetone	67-64-1	1300	3500	4600	6000000 J
Bromodichloromethane	75-27-4	330	3000	3300	Not Detected U
Bromoform	75-25-2	380	4600	5100	Not Detected U
Carbon Disulfide	75-15-0	890	4600	6100	Not Detected U
Carbon Tetrachloride	56-23-5	320	2800	3100	Not Detected U
Chloroethane	75-00-3	1200	3900	5200	Not Detected U
Chloroform	67-66-3	220	2200	2400	Not Detected U
Chloromethane	74-87-3	740	3000	4000	Not Detected U
Cyclohexane	110-82-7	200	1500	1700	5100000 J
Dibromochloromethane	124-48-1	330	3800	4200	Not Detected U
Ethanol	64-17-5	2300	2800	3700	Not Detected U
Ethyl Acetate	141-78-6	NA	D	7100	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/18/19 09:26 PM
Lab ID:	1907216A-05A	Dilution Factor:	98.0
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	msdj.i / j071813
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	240	1900	2100	470000
Freon 11	75-69-4	420	2500	2800	Not Detected U
Freon 113	76-13-1	680	3400	3800	Not Detected U
Freon 12	75-71-8	280	2200	2400	Not Detected U
Heptane	142-82-5	580	1800	2000	5200000 J
Hexane	110-54-3	400	1600	1700	5000000 J
m,p-Xylene	108-38-3	260	1900	2100	1400000
Methylene Chloride	75-09-2	1200	5100	6800	Not Detected U
Naphthalene	91-20-3	710	5100	10000	Not Detected U
o-Xylene	95-47-6	450	1900	2100	430000
Propylene	115-07-1	890	2500	3400	68000
Styrene	100-42-5	260	1900	2100	Not Detected U
Tetrachloroethene	127-18-4	350	3000	3300	Not Detected U
Tetrahydrofuran	109-99-9	300	1300	1400	Not Detected U
Total Xylene	1330-20-7	NA	D	2100	1800000
Trichloroethene	79-01-6	290	2400	2600	Not Detected U
Vinyl Chloride	75-01-4	520	1100	1200	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	92

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/18/19 09:26 PM
Lab ID:	1907216A-05A	Dilution Factor:	98.0
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	msdj.i / j071813
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	244 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/22/19 04:35 PM
Lab ID:	1907216A-05B	Dilution Factor:	196
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	msd14.i / 14072215
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	440	1900	3100	1600000
Toluene	108-88-3	660	2200	3700	3200000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	97

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/18/19 09:58 PM
Lab ID:	1907216A-06A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	msdj.i / j071814
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	370	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5200	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2300	2500	120000
1,2-Dibromoethane (EDB)	106-93-4	420	3600	4000	18000
1,2-Dichlorobenzene	95-50-1	340	2800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2300	2500	51000
1,3-Butadiene	106-99-0	480	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5600	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4600	6100	280000
2-Hexanone	591-78-6	2900	6300	8400	Not Detected U
2-Propanol	67-63-0	1400	3800	5100	20000
4-Methyl-2-pentanone	108-10-1	480	1900	2100	Not Detected U
Acetone	67-64-1	1400	3700	4900	1300000 J
Bromodichloromethane	75-27-4	340	3100	3400	Not Detected U
Bromoform	75-25-2	400	4800	5300	Not Detected U
Carbon Disulfide	75-15-0	940	4800	6400	Not Detected U
Carbon Tetrachloride	56-23-5	340	2900	3200	Not Detected U
Chloroethane	75-00-3	1300	4100	5400	Not Detected U
Chloroform	67-66-3	240	2300	2500	Not Detected U
Chloromethane	74-87-3	780	3200	4200	Not Detected U
Cyclohexane	110-82-7	200	1600	1800	3400000 J
Dibromochloromethane	124-48-1	340	3900	4400	Not Detected U
Ethanol	64-17-5	2400	2900	3900	4600
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/18/19 09:58 PM
Lab ID:	1907216A-06A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	msdj.i / j071814
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	250	2000	2200	470000
Freon 11	75-69-4	440	2600	2900	Not Detected U
Freon 113	76-13-1	710	3600	3900	Not Detected U
Freon 12	75-71-8	300	2300	2500	Not Detected U
Heptane	142-82-5	610	1900	2100	5700000 J
Hexane	110-54-3	420	1600	1800	3800000 J
m,p-Xylene	108-38-3	270	2000	2200	1400000
Methylene Chloride	75-09-2	1300	5400	7200	Not Detected U
Naphthalene	91-20-3	740	5400	11000	Not Detected U
o-Xylene	95-47-6	470	2000	2200	410000
Propylene	115-07-1	930	2600	3500	69000
Styrene	100-42-5	270	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	370	3100	3500	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1500	Not Detected U
Total Xylene	1330-20-7	NA	D	2200	1800000
Trichloroethene	79-01-6	310	2500	2800	Not Detected U
Vinyl Chloride	75-01-4	540	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	94

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/18/19 09:58 PM
Lab ID:	1907216A-06A	Dilution Factor:	103
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	msdj.i / j071814
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	299 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/22/19 05:07 PM
Lab ID:	1907216A-06B	Dilution Factor:	206
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	msd14.i / 14072216
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	460	2000	3300	800000
Toluene	108-88-3	700	2300	3900	4200000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	107



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 252.1 Lab Duplicate		
Lab ID:	1907216A-06BB	Date/Time Analyzed:	7/22/19 05:34 PM
Date/Time Collected:	7/5/19 09:50 AM	Dilution Factor:	206
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msd14.i / 14072217

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	460	2000	3300	760000
Toluene	108-88-3	700	2300	3900	3900000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	106

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/18/19 10:31 PM
Lab ID:	1907216A-07A	Dilution Factor:	100
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	msdj.i / j071815
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	360	1800	2000	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5100	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2200	2400	110000
1,2-Dibromoethane (EDB)	106-93-4	410	3400	3800	24000
1,2-Dichlorobenzene	95-50-1	330	2700	3000	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2200	2400	42000
1,3-Butadiene	106-99-0	470	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5400	7200	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1400	4400	5900	540000 J
2-Hexanone	591-78-6	2800	6100	8200	Not Detected U
2-Propanol	67-63-0	1400	3700	4900	51000
4-Methyl-2-pentanone	108-10-1	460	1800	2000	Not Detected U
Acetone	67-64-1	1400	3600	4800	2200000 J
Bromodichloromethane	75-27-4	340	3000	3400	Not Detected U
Bromoform	75-25-2	390	4600	5200	Not Detected U
Carbon Disulfide	75-15-0	910	4700	6200	Not Detected U
Carbon Tetrachloride	56-23-5	330	2800	3100	Not Detected U
Chloroethane	75-00-3	1200	4000	5300	Not Detected U
Chloroform	67-66-3	230	2200	2400	Not Detected U
Chloromethane	74-87-3	760	3100	4100	Not Detected U
Cyclohexane	110-82-7	200	1500	1700	3400000 J
Dibromochloromethane	124-48-1	330	3800	4200	Not Detected U
Ethanol	64-17-5	2400	2800	3800	16000
Ethyl Acetate	141-78-6	NA	D	7200	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/18/19 10:31 PM
Lab ID:	1907216A-07A	Dilution Factor:	100
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	msdj.i / j071815
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	250	2000	2200	460000
Freon 11	75-69-4	430	2500	2800	Not Detected U
Freon 113	76-13-1	690	3400	3800	Not Detected U
Freon 12	75-71-8	290	2200	2500	Not Detected U
Heptane	142-82-5	590	1800	2000	6100000 J
Hexane	110-54-3	410	1600	1800	3300000 J
m,p-Xylene	108-38-3	260	2000	2200	1200000
Methylene Chloride	75-09-2	1200	5200	6900	Not Detected U
Naphthalene	91-20-3	720	5200	10000	Not Detected U
o-Xylene	95-47-6	460	2000	2200	330000
Propylene	115-07-1	900	2600	3400	72000
Styrene	100-42-5	260	1900	2100	Not Detected U
Tetrachloroethene	127-18-4	360	3000	3400	Not Detected U
Tetrahydrofuran	109-99-9	310	1300	1500	Not Detected U
Total Xylene	1330-20-7	NA	D	2200	1500000
Trichloroethene	79-01-6	300	2400	2700	Not Detected U
Vinyl Chloride	75-01-4	530	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	94

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/18/19 10:31 PM
Lab ID:	1907216A-07A	Dilution Factor:	100
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	msdj.i / j071815
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	308 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/22/19 06:24 PM
Lab ID:	1907216A-07B	Dilution Factor:	201
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	msd14.i / 14072219
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	450	1900	3200	780000
Toluene	108-88-3	680	2300	3800	5500000 CN

CN =See Case Narrative explanation
Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	125 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/18/19 11:04 PM
Lab ID:	1907216A-08A	Dilution Factor:	109
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	msdj.i / j071816
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	390	2000	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5500	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2400	2700	150000
1,2-Dibromoethane (EDB)	106-93-4	440	3800	4200	24000
1,2-Dichlorobenzene	95-50-1	360	2900	3300	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2300	2400	2700	57000
1,3-Butadiene	106-99-0	510	1100	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	5900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	4800	6400	880000 J
2-Hexanone	591-78-6	3000	6700	8900	Not Detected U
2-Propanol	67-63-0	1500	4000	5400	340000 J
4-Methyl-2-pentanone	108-10-1	500	2000	2200	Not Detected U
Acetone	67-64-1	1500	3900	5200	5900000 J
Bromodichloromethane	75-27-4	360	3300	3600	Not Detected U
Bromoform	75-25-2	430	5100	5600	Not Detected U
Carbon Disulfide	75-15-0	990	5100	6800	Not Detected U
Carbon Tetrachloride	56-23-5	360	3100	3400	Not Detected U
Chloroethane	75-00-3	1400	4300	5800	Not Detected U
Chloroform	67-66-3	250	2400	2700	Not Detected U
Chloromethane	74-87-3	820	3400	4500	Not Detected U
Cyclohexane	110-82-7	220	1700	1900	6100000 J
Dibromochloromethane	124-48-1	360	4200	4600	Not Detected U
Ethanol	64-17-5	2600	3100	4100	67000
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/18/19 11:04 PM
Lab ID:	1907216A-08A	Dilution Factor:	109
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	msdj.i / j071816
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	270	2100	2400	440000
Freon 11	75-69-4	470	2800	3100	Not Detected U
Freon 113	76-13-1	750	3800	4200	Not Detected U
Freon 12	75-71-8	310	2400	2700	Not Detected U
Heptane	142-82-5	650	2000	2200	6200000 J
Hexane	110-54-3	450	1700	1900	5600000 J
m,p-Xylene	108-38-3	290	2100	2400	1100000
Methylene Chloride	75-09-2	1300	5700	7600	Not Detected U
Naphthalene	91-20-3	790	5700	11000	Not Detected U
o-Xylene	95-47-6	500	2100	2400	330000
Propylene	115-07-1	990	2800	3800	27000
Styrene	100-42-5	290	2100	2300	Not Detected U
Tetrachloroethene	127-18-4	390	3300	3700	Not Detected U
Tetrahydrofuran	109-99-9	330	1400	1600	Not Detected U
Total Xylene	1330-20-7	NA	D	2400	1400000
Trichloroethene	79-01-6	330	2600	2900	Not Detected U
Vinyl Chloride	75-01-4	580	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	96

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/18/19 11:04 PM
Lab ID:	1907216A-08A	Dilution Factor:	109
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	msdj.i / j071816
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	101
Toluene-d8	2037-26-5	86-115	236 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/22/19 06:48 PM
Lab ID:	1907216A-08B	Dilution Factor:	217
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	msd14.i / 14072220
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	480	2100	3500	1800000
Toluene	108-88-3	740	2400	4100	4500000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/18/19 11:37 PM
Lab ID:	1907216A-09A	Dilution Factor:	103
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	msdj.i / j071817
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	370	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5200	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2300	2500	240000
1,2-Dibromoethane (EDB)	106-93-4	420	3600	4000	17000
1,2-Dichlorobenzene	95-50-1	340	2800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2300	2500	90000
1,3-Butadiene	106-99-0	480	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5600	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4600	6100	710000 J
2-Hexanone	591-78-6	2900	6300	8400	Not Detected U
2-Propanol	67-63-0	1400	3800	5100	90000
4-Methyl-2-pentanone	108-10-1	480	1900	2100	Not Detected U
Acetone	67-64-1	1400	3700	4900	4000000 J
Bromodichloromethane	75-27-4	340	3100	3400	Not Detected U
Bromoform	75-25-2	400	4800	5300	Not Detected U
Carbon Disulfide	75-15-0	940	4800	6400	1700 J
Carbon Tetrachloride	56-23-5	340	2900	3200	Not Detected U
Chloroethane	75-00-3	1300	4100	5400	Not Detected U
Chloroform	67-66-3	240	2300	2500	Not Detected U
Chloromethane	74-87-3	780	3200	4200	Not Detected U
Cyclohexane	110-82-7	200	1600	1800	6000000 J
Dibromochloromethane	124-48-1	340	3900	4400	Not Detected U
Ethanol	64-17-5	2400	2900	3900	8200
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/18/19 11:37 PM
Lab ID:	1907216A-09A	Dilution Factor:	103
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	msdj.i / j071817
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	250	2000	2200	430000
Freon 11	75-69-4	440	2600	2900	Not Detected U
Freon 113	76-13-1	710	3600	3900	Not Detected U
Freon 12	75-71-8	300	2300	2500	Not Detected U
Heptane	142-82-5	610	1900	2100	6000000 J
Hexane	110-54-3	420	1600	1800	5500000 J
m,p-Xylene	108-38-3	270	2000	2200	1200000
Methylene Chloride	75-09-2	1300	5400	7200	Not Detected U
Naphthalene	91-20-3	740	5400	11000	Not Detected U
o-Xylene	95-47-6	470	2000	2200	380000
Propylene	115-07-1	930	2600	3500	29000
Styrene	100-42-5	270	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	370	3100	3500	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1500	Not Detected U
Total Xylene	1330-20-7	NA	D	2200	1600000
Trichloroethene	79-01-6	310	2500	2800	Not Detected U
Vinyl Chloride	75-01-4	540	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	95

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/18/19 11:37 PM
Lab ID:	1907216A-09A	Dilution Factor:	103
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	msdj.i / j071817
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	102
Toluene-d8	2037-26-5	86-115	244 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/22/19 07:47 PM
Lab ID:	1907216A-09B	Dilution Factor:	206
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	msd14.i / 14072222
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	460	2000	3300	2300000
Toluene	108-88-3	700	2300	3900	5200000 CN

CN =See Case Narrative explanation
Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	127 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	7/19/19 12:10 AM
Lab ID:	1907216A-10A	Dilution Factor:	103
Date/Time Collected:	7/5/19 10:48 AM	Instrument/Filename:	msdj.i / j071818
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	370	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5200	11000	15000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1200	2300	2500	240000
1,2-Dibromoethane (EDB)	106-93-4	420	3600	4000	16000
1,2-Dichlorobenzene	95-50-1	340	2800	3100	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2100	2300	2500	86000
1,3-Butadiene	106-99-0	480	1000	1100	Not Detected U
1,4-Dioxane	123-91-1	2000	5600	7400	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4600	6100	730000 J
2-Hexanone	591-78-6	2900	6300	8400	Not Detected U
2-Propanol	67-63-0	1400	3800	5100	95000
4-Methyl-2-pentanone	108-10-1	480	1900	2100	Not Detected U
Acetone	67-64-1	1400	3700	4900	4100000 J
Bromodichloromethane	75-27-4	340	3100	3400	Not Detected U
Bromoform	75-25-2	400	4800	5300	Not Detected U
Carbon Disulfide	75-15-0	940	4800	6400	1700 J
Carbon Tetrachloride	56-23-5	340	2900	3200	Not Detected U
Chloroethane	75-00-3	1300	4100	5400	Not Detected U
Chloroform	67-66-3	240	2300	2500	Not Detected U
Chloromethane	74-87-3	780	3200	4200	Not Detected U
Cyclohexane	110-82-7	200	1600	1800	6000000 J
Dibromochloromethane	124-48-1	340	3900	4400	Not Detected U
Ethanol	64-17-5	2400	2900	3900	8900
Ethyl Acetate	141-78-6	NA	D	7400	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP		
Lab ID:	1907216A-10A	Date/Time Analyzed:	7/19/19 12:10 AM
Date/Time Collected:	7/5/19 10:48 AM	Dilution Factor:	103
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071818

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	250	2000	2200	440000
Freon 11	75-69-4	440	2600	2900	Not Detected U
Freon 113	76-13-1	710	3600	3900	Not Detected U
Freon 12	75-71-8	300	2300	2500	Not Detected U
Heptane	142-82-5	610	1900	2100	6200000 J
Hexane	110-54-3	420	1600	1800	5900000 J
m,p-Xylene	108-38-3	270	2000	2200	1200000
Methylene Chloride	75-09-2	1300	5400	7200	Not Detected U
Naphthalene	91-20-3	740	5400	11000	Not Detected U
o-Xylene	95-47-6	470	2000	2200	370000
Propylene	115-07-1	930	2600	3500	29000
Styrene	100-42-5	270	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	370	3100	3500	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1500	Not Detected U
Total Xylene	1330-20-7	NA	D	2200	1500000
Trichloroethene	79-01-6	310	2500	2800	Not Detected U
Vinyl Chloride	75-01-4	540	1200	1300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	7/19/19 12:10 AM
Lab ID:	1907216A-10A	Dilution Factor:	103
Date/Time Collected:	7/5/19 10:48 AM	Instrument/Filename:	msdj.i / j071818
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	103
Toluene-d8	2037-26-5	86-115	246 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	7/22/19 08:16 PM
Lab ID:	1907216A-10B	Dilution Factor:	206
Date/Time Collected:	7/5/19 10:48 AM	Instrument/Filename:	msd14.i / 14072223
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	460	2000	3300	2200000
Toluene	108-88-3	700	2300	3900	4200000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	105

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	7/19/19 12:43 AM
Lab ID:	1907216A-11A	Dilution Factor:	106
Date/Time Collected:	7/5/19 11:03 AM	Instrument/Filename:	msdj.i / j071819
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	380	1900	2100	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5400	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2300	2600	150000
1,2-Dibromoethane (EDB)	106-93-4	430	3700	4100	1600 J
1,2-Dichlorobenzene	95-50-1	350	2900	3200	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2200	2300	2600	54000
1,3-Butadiene	106-99-0	500	1000	1200	Not Detected U
1,4-Dioxane	123-91-1	2100	5700	7600	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1500	4700	6200	5200 J
2-Hexanone	591-78-6	3000	6500	8700	Not Detected U
2-Propanol	67-63-0	1500	3900	5200	2100 J
4-Methyl-2-pentanone	108-10-1	490	2000	2200	Not Detected U
Acetone	67-64-1	1400	3800	5000	180000
Benzene	71-43-2	210	1500	1700	660000
Bromodichloromethane	75-27-4	360	3200	3600	Not Detected U
Bromoform	75-25-2	420	4900	5500	Not Detected U
Carbon Disulfide	75-15-0	970	5000	6600	Not Detected U
Carbon Tetrachloride	56-23-5	350	3000	3300	Not Detected U
Chloroethane	75-00-3	1300	4200	5600	Not Detected U
Chloroform	67-66-3	240	2300	2600	Not Detected U
Chloromethane	74-87-3	800	3300	4400	Not Detected U
Cyclohexane	110-82-7	210	1600	1800	1700000
Dibromochloromethane	124-48-1	350	4100	4500	Not Detected U
Ethanol	64-17-5	2500	3000	4000	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	7/19/19 12:43 AM
Lab ID:	1907216A-11A	Dilution Factor:	106
Date/Time Collected:	7/5/19 11:03 AM	Instrument/Filename:	msdj.i / j071819
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	7600	Not Detected
Ethyl Benzene	100-41-4	260	2100	2300	120000
Freon 11	75-69-4	460	2700	3000	Not Detected U
Freon 113	76-13-1	730	3600	4100	Not Detected U
Freon 12	75-71-8	300	2400	2600	Not Detected U
Heptane	142-82-5	630	2000	2200	1400000
Hexane	110-54-3	440	1700	1900	2500000 J
m,p-Xylene	108-38-3	280	2100	2300	360000
Methylene Chloride	75-09-2	1300	5500	7400	Not Detected U
Naphthalene	91-20-3	770	5600	11000	Not Detected U
o-Xylene	95-47-6	490	2100	2300	130000
Propylene	115-07-1	960	2700	3600	5400
Styrene	100-42-5	280	2000	2200	Not Detected U
Tetrachloroethene	127-18-4	380	3200	3600	Not Detected U
Tetrahydrofuran	109-99-9	320	1400	1600	Not Detected U
Toluene	108-88-3	290	1800	2000	990000
Total Xylene	1330-20-7	NA	D	2300	500000
Trichloroethene	79-01-6	320	2600	2800	Not Detected U
Vinyl Chloride	75-01-4	560	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	7/19/19 12:43 AM
Lab ID:	1907216A-11A	Dilution Factor:	106
Date/Time Collected:	7/5/19 11:03 AM	Instrument/Filename:	msdj.i / j071819
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	87
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	134 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/18/19 07:47 PM
Lab ID:	1907216A-12A	Dilution Factor:	109
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	msdj.i / j071810
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	390	2000	2200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	5500	12000	16000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1300	2400	2700	160000
1,2-Dibromoethane (EDB)	106-93-4	440	3800	4200	7300
1,2-Dichlorobenzene	95-50-1	360	2900	3300	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	2300	2400	2700	57000
1,3-Butadiene	106-99-0	510	1100	1200	Not Detected U
1,4-Dioxane	123-91-1	2200	5900	7800	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1600	4800	6400	370000 J
2-Hexanone	591-78-6	3000	6700	8900	Not Detected U
2-Propanol	67-63-0	1500	4000	5400	300000 J
4-Methyl-2-pentanone	108-10-1	500	2000	2200	Not Detected U
Acetone	67-64-1	1500	3900	5200	5900000 J
Bromodichloromethane	75-27-4	360	3300	3600	Not Detected U
Bromoform	75-25-2	430	5100	5600	Not Detected U
Carbon Disulfide	75-15-0	990	5100	6800	Not Detected U
Carbon Tetrachloride	56-23-5	360	3100	3400	Not Detected U
Chloroethane	75-00-3	1400	4300	5800	Not Detected U
Chloroform	67-66-3	250	2400	2700	Not Detected U
Chloromethane	74-87-3	820	3400	4500	Not Detected U
Cyclohexane	110-82-7	220	1700	1900	4900000 J
Dibromochloromethane	124-48-1	360	4200	4600	Not Detected U
Ethanol	64-17-5	2600	3100	4100	Not Detected U
Ethyl Acetate	141-78-6	NA	D	7800	Not Detected

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/18/19 07:47 PM
Lab ID:	1907216A-12A	Dilution Factor:	109
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	msdj.i / j071810
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Benzene	100-41-4	270	2100	2400	340000
Freon 11	75-69-4	470	2800	3100	Not Detected U
Freon 113	76-13-1	750	3800	4200	Not Detected U
Freon 12	75-71-8	310	2400	2700	Not Detected U
Heptane	142-82-5	650	2000	2200	4500000 J
Hexane	110-54-3	450	1700	1900	5100000 J
m,p-Xylene	108-38-3	290	2100	2400	800000
Methylene Chloride	75-09-2	1300	5700	7600	Not Detected U
Naphthalene	91-20-3	790	5700	11000	Not Detected U
o-Xylene	95-47-6	500	2100	2400	240000
Propylene	115-07-1	990	2800	3800	42000
Styrene	100-42-5	290	2100	2300	Not Detected U
Tetrachloroethene	127-18-4	390	3300	3700	Not Detected U
Tetrahydrofuran	109-99-9	330	1400	1600	Not Detected U
Total Xylene	1330-20-7	NA	D	2400	1000000
Trichloroethene	79-01-6	330	2600	2900	Not Detected U
Vinyl Chloride	75-01-4	580	1200	1400	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	91

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/18/19 07:47 PM
Lab ID:	1907216A-12A	Dilution Factor:	109
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	msdj.i / j071810
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	199 Q



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/22/19 09:13 PM
Lab ID:	1907216A-12B	Dilution Factor:	181
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	msd14.i / 14072225
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	400	1700	2900	1400000
Toluene	108-88-3	610	2000	3400	2600000 CN

CN =See Case Narrative explanation
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	104

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/18/19 02:33 PM
Lab ID:	1907216A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/File Name:	msdj.i / j071806a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	3.6	18	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	51	110	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	12	22	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	4.1	34	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	3.3	27	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	21	22	24	Not Detected U
1,3-Butadiene	106-99-0	4.7	10	11	Not Detected U
1,4-Dioxane	123-91-1	20	54	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	44	59	Not Detected U
2-Hexanone	591-78-6	28	61	82	Not Detected U
2-Propanol	67-63-0	14	37	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	4.6	18	20	Not Detected U
Acetone	67-64-1	14	36	48	Not Detected U
Benzene	71-43-2	2.0	14	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	30	34	Not Detected U
Bromoform	75-25-2	3.9	46	52	Not Detected U
Carbon Disulfide	75-15-0	9.1	47	62	Not Detected U
Carbon Tetrachloride	56-23-5	3.3	28	31	Not Detected U
Chloroethane	75-00-3	12	40	53	Not Detected U
Chloroform	67-66-3	2.3	22	24	Not Detected U
Chloromethane	74-87-3	7.6	31	41	Not Detected U
Cyclohexane	110-82-7	2.0	15	17	Not Detected U
Dibromochloromethane	124-48-1	3.3	38	42	Not Detected U
Ethanol	64-17-5	24	28	38	Not Detected U

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/18/19 02:33 PM
Lab ID:	1907216A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071806a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	2.5	20	22	Not Detected U
Freon 11	75-69-4	4.3	25	28	Not Detected U
Freon 113	76-13-1	6.9	34	38	Not Detected U
Freon 12	75-71-8	2.9	22	25	Not Detected U
Heptane	142-82-5	5.9	18	20	Not Detected U
Hexane	110-54-3	4.1	16	18	Not Detected U
m,p-Xylene	108-38-3	2.6	20	22	Not Detected U
Methylene Chloride	75-09-2	12	52	69	Not Detected U
Naphthalene	91-20-3	7.2	52	100	Not Detected U
o-Xylene	95-47-6	4.6	20	22	Not Detected U
Propylene	115-07-1	9.0	26	34	Not Detected U
Styrene	100-42-5	2.6	19	21	Not Detected U
Tetrachloroethene	127-18-4	3.6	30	34	Not Detected U
Tetrahydrofuran	109-99-9	3.1	13	15	Not Detected U
Toluene	108-88-3	2.7	17	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	3.0	24	27	Not Detected U
Vinyl Chloride	75-01-4	5.3	12	13	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/18/19 02:33 PM
Lab ID:	1907216A-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071806a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	96
Toluene-d8	2037-26-5	86-115	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/22/19 11:19 AM
Lab ID:	1907216A-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14072207a
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	2.2	9.6	16	Not Detected U
Toluene	108-88-3	3.4	11	19	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	93

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 12:02 PM
Lab ID:	1907216A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071802a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	103
1,2,4-Trichlorobenzene	120-82-1	88
1,2,4-Trimethylbenzene	95-63-6	101
1,2-Dibromoethane (EDB)	106-93-4	96
1,2-Dichlorobenzene	95-50-1	92
1,3,5-Trimethylbenzene	108-67-8	101
1,3-Butadiene	106-99-0	87
1,4-Dioxane	123-91-1	92
2-Butanone (Methyl Ethyl Ketone)	78-93-3	92
2-Hexanone	591-78-6	95
2-Propanol	67-63-0	85
4-Methyl-2-pentanone	108-10-1	85
Acetone	67-64-1	109
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	89
Bromoform	75-25-2	93
Carbon Disulfide	75-15-0	90
Carbon Tetrachloride	56-23-5	98
Chloroethane	75-00-3	92
Chloroform	67-66-3	101
Chloromethane	74-87-3	83
Cyclohexane	110-82-7	98
Dibromochloromethane	124-48-1	92
Ethanol	64-17-5	85

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 12:02 PM
Lab ID:	1907216A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071802a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	93
Ethyl Benzene	100-41-4	102
Freon 11	75-69-4	93
Freon 113	76-13-1	98
Freon 12	75-71-8	84
Heptane	142-82-5	92
Hexane	110-54-3	97
m,p-Xylene	108-38-3	102
Methylene Chloride	75-09-2	107
Naphthalene	91-20-3	96
o-Xylene	95-47-6	102
Propylene	115-07-1	91
Styrene	100-42-5	88
Tetrachloroethene	127-18-4	104
Tetrahydrofuran	109-99-9	93
Toluene	108-88-3	102
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	101
Vinyl Chloride	75-01-4	88

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 12:02 PM
Lab ID:	1907216A-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071802a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/19/19 10:59 AM
Lab ID:	1907216A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071826
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	98
1,2,4-Trichlorobenzene	120-82-1	80
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	94
1,2-Dichlorobenzene	95-50-1	89
1,3,5-Trimethylbenzene	108-67-8	98
1,3-Butadiene	106-99-0	85
1,4-Dioxane	123-91-1	91
2-Butanone (Methyl Ethyl Ketone)	78-93-3	92
2-Hexanone	591-78-6	93
2-Propanol	67-63-0	81
4-Methyl-2-pentanone	108-10-1	83
Acetone	67-64-1	113
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	88
Bromoform	75-25-2	90
Carbon Disulfide	75-15-0	88
Carbon Tetrachloride	56-23-5	96
Chloroethane	75-00-3	89
Chloroform	67-66-3	97
Chloromethane	74-87-3	78
Cyclohexane	110-82-7	98
Dibromochloromethane	124-48-1	89
Ethanol	64-17-5	80

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/19/19 10:59 AM
Lab ID:	1907216A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071826
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	99
Freon 11	75-69-4	89
Freon 113	76-13-1	95
Freon 12	75-71-8	82
Heptane	142-82-5	96
Hexane	110-54-3	97
m,p-Xylene	108-38-3	99
Methylene Chloride	75-09-2	101
Naphthalene	91-20-3	90
o-Xylene	95-47-6	100
Propylene	115-07-1	87
Styrene	100-42-5	86
Tetrachloroethene	127-18-4	102
Tetrahydrofuran	109-99-9	91
Toluene	108-88-3	104
Total Xylene	1330-20-7	100
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	85

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	89

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/19/19 10:59 AM
Lab ID:	1907216A-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071826
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	100
Toluene-d8	2037-26-5	86-115	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/22/19 08:21 AM
Lab ID:	1907216A-14C	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14072202a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Benzene	71-43-2	100
Toluene	108-88-3	98

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/22/19 10:01 PM
Lab ID:	1907216A-14D	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14072227
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Benzene	71-43-2	78
Toluene	108-88-3	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	101

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/18/19 12:30 PM
Lab ID:	1907216A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071803a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	104
1,2,4-Trichlorobenzene	120-82-1	93
1,2,4-Trimethylbenzene	95-63-6	102
1,2-Dibromoethane (EDB)	106-93-4	95
1,2-Dichlorobenzene	95-50-1	94
1,3,5-Trimethylbenzene	108-67-8	103
1,3-Butadiene	106-99-0	88
1,4-Dioxane	123-91-1	92
2-Butanone (Methyl Ethyl Ketone)	78-93-3	94
2-Hexanone	591-78-6	101
2-Propanol	67-63-0	93
4-Methyl-2-pentanone	108-10-1	87
Acetone	67-64-1	116
Benzene	71-43-2	103
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	94
Carbon Disulfide	75-15-0	82
Carbon Tetrachloride	56-23-5	100
Chloroethane	75-00-3	95
Chloroform	67-66-3	102
Chloromethane	74-87-3	86
Cyclohexane	110-82-7	103
Dibromochloromethane	124-48-1	93
Ethanol	64-17-5	93

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/18/19 12:30 PM
Lab ID:	1907216A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071803a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	103
Freon 11	75-69-4	98
Freon 113	76-13-1	98
Freon 12	75-71-8	88
Heptane	142-82-5	95
Hexane	110-54-3	101
m,p-Xylene	108-38-3	101
Methylene Chloride	75-09-2	109
Naphthalene	91-20-3	66
o-Xylene	95-47-6	102
Propylene	115-07-1	90
Styrene	100-42-5	92
Tetrachloroethene	127-18-4	106
Tetrahydrofuran	109-99-9	96
Toluene	108-88-3	105
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	105
Vinyl Chloride	75-01-4	91

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/18/19 12:30 PM
Lab ID:	1907216A-15A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071803a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	101
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/18/19 12:58 PM
Lab ID:	1907216A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071804a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	104
1,2,4-Trichlorobenzene	120-82-1	97
1,2,4-Trimethylbenzene	95-63-6	104
1,2-Dibromoethane (EDB)	106-93-4	98
1,2-Dichlorobenzene	95-50-1	96
1,3,5-Trimethylbenzene	108-67-8	104
1,3-Butadiene	106-99-0	87
1,4-Dioxane	123-91-1	94
2-Butanone (Methyl Ethyl Ketone)	78-93-3	94
2-Hexanone	591-78-6	99
2-Propanol	67-63-0	92
4-Methyl-2-pentanone	108-10-1	86
Acetone	67-64-1	108
Benzene	71-43-2	104
Bromodichloromethane	75-27-4	92
Bromoform	75-25-2	95
Carbon Disulfide	75-15-0	81
Carbon Tetrachloride	56-23-5	98
Chloroethane	75-00-3	95
Chloroform	67-66-3	102
Chloromethane	74-87-3	86
Cyclohexane	110-82-7	99
Dibromochloromethane	124-48-1	94
Ethanol	64-17-5	97

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/18/19 12:58 PM
Lab ID:	1907216A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071804a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	102
Freon 11	75-69-4	96
Freon 113	76-13-1	98
Freon 12	75-71-8	87
Heptane	142-82-5	95
Hexane	110-54-3	98
m,p-Xylene	108-38-3	101
Methylene Chloride	75-09-2	109
Naphthalene	91-20-3	68
o-Xylene	95-47-6	106
Propylene	115-07-1	86
Styrene	100-42-5	93
Tetrachloroethene	127-18-4	105
Tetrahydrofuran	109-99-9	95
Toluene	108-88-3	103
Total Xylene	1330-20-7	104
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	91

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	88

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/18/19 12:58 PM
Lab ID:	1907216A-15AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071804a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	98

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/22/19 08:46 AM
Lab ID:	1907216A-15B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14072203a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Benzene	71-43-2	101
Toluene	108-88-3	100

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	102

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/22/19 09:32 AM
Lab ID:	1907216A-15BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msd14.i / 14072204a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Benzene	71-43-2	100
Toluene	108-88-3	98

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.



7/23/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907216B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker".

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1907216B

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/23/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified TO-3	11.5 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified TO-3	10.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified TO-3	10.5 "Hg	5 psi
04A	KAFB-106V1 159.6 DUP	Modified TO-3	11.0 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified TO-3	9.5 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified TO-3	10.5 "Hg	5 psi
07A	KAFB-106V1 262.6	Modified TO-3	10.0 "Hg	5 psi
07AA	KAFB-106V1 262.6 Lab Duplicate	Modified TO-3	10.0 "Hg	5 psi
08A	KAFB-106V2 102.2	Modified TO-3	11.5 "Hg	5 psi
09A	KAFB-106V2 117.1	Modified TO-3	10.5 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified TO-3	10.5 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified TO-3	11.0 "Hg	5 psi
12A	KAFB-106V2 217.1	Modified TO-3	11.5 "Hg	5 psi
13A	Lab Blank	Modified TO-3	NA	NA
14A	LCS	Modified TO-3	NA	NA
14AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:



Technical Director

DATE: 07/23/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

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LABORATORY NARRATIVE
DoD QSM - TO-3
EA Engineering
Workorder# 1907216B

Twelve 6 Liter Summa Canister samples were received on July 10, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

Fluorobenzene (FID) was manually integrated in samples KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V1 262.6 Lab Duplicate, KAFB-106V2 102.2 and KAFB-106V2

117.1.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/16/19 01:05 PM
Lab ID:	1907216B-01A	Dilution Factor:	2170
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	gcd.i / d071608
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	180000	220000	110000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	122

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/16/19 01:45 PM
Lab ID:	1907216B-02A	Dilution Factor:	2010
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	gcd.i / d071609
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	160000	200000	110000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	116

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	7/16/19 02:36 PM
Lab ID:	1907216B-03A	Dilution Factor:	2580
Date/Time Collected:	7/5/19 09:07 AM	Instrument/Filename:	gcd.i / d071610
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	150000	210000	260000	130000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	111

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	7/16/19 03:21 PM
Lab ID:	1907216B-04A	Dilution Factor:	2120
Date/Time Collected:	7/5/19 09:18 AM	Instrument/Filename:	gcd.i / d071611
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	220000	130000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	114

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/16/19 04:08 PM
Lab ID:	1907216B-05A	Dilution Factor:	1960
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	gcd.i / d071612
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	110000	160000	200000	170000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	119

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/16/19 04:48 PM
Lab ID:	1907216B-06A	Dilution Factor:	2060
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	gcd.i / d071613
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	150000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	119

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/16/19 05:32 PM
Lab ID:	1907216B-07A	Dilution Factor:	2010
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	gcd.i / d071614
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	160000	200000	150000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	127

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V1 262.6 Lab Duplicate		
Lab ID:	1907216B-07AA	Date/Time Analyzed:	7/16/19 06:11 PM
Date/Time Collected:	7/5/19 10:05 AM	Dilution Factor:	2010
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	gcd.i / d071615

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	160000	200000	150000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	125

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/16/19 06:49 PM
Lab ID:	1907216B-08A	Dilution Factor:	2170
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	gcd.i / d071616
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	180000	220000	200000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	128



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/16/19 08:09 PM
Lab ID:	1907216B-09A	Dilution Factor:	3430
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	gcd.i / d071618
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	200000	280000	350000	220000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	118



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	7/16/19 08:47 PM
Lab ID:	1907216B-10A	Dilution Factor:	3430
Date/Time Collected:	7/5/19 10:48 AM	Instrument/Filename:	gcd.i / d071619
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	200000	280000	350000	210000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	121



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	7/16/19 11:36 AM
Lab ID:	1907216B-11A	Dilution Factor:	848
Date/Time Collected:	7/5/19 11:03 AM	Instrument/Filename:	gcd.i / d071606
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	50000	69000	87000	76000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	106

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/16/19 09:25 PM
Lab ID:	1907216B-12A	Dilution Factor:	2710
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	gcd.i / d071620
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	160000	220000	280000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	118

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/16/19 10:38 AM
Lab ID:	1907216B-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071605
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	96

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/16/19 08:17 AM
Lab ID:	1907216B-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071602
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		102
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	122

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/16/19 08:56 AM
Lab ID:	1907216B-14AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071603
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		103

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	115

* % Recovery is calculated using unrounded analytical results.



7/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907216C

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1907216C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V1 102.1	Modified ASTM D-1945	11.5 "Hg	5 psi
02A	KAFB-106V1 112.6	Modified ASTM D-1945	10.0 "Hg	5 psi
03A	KAFB-106V1 159.6	Modified ASTM D-1945	10.5 "Hg	5 psi
04A	KAFB-106V1 159.6 DUP	Modified ASTM D-1945	11.0 "Hg	5 psi
05A	KAFB-106V1 217.1	Modified ASTM D-1945	9.5 "Hg	5 psi
06A	KAFB-106V1 252.1	Modified ASTM D-1945	10.5 "Hg	5 psi
07A	KAFB-106V1 262.6	Modified ASTM D-1945	10.0 "Hg	5 psi
08A	KAFB-106V2 102.2	Modified ASTM D-1945	11.5 "Hg	5 psi
09A	KAFB-106V2 117.1	Modified ASTM D-1945	10.5 "Hg	5 psi
09AA	KAFB-106V2 117.1 Lab Duplicate	Modified ASTM D-1945	10.5 "Hg	5 psi
10A	KAFB-106V2 117.1 DUP	Modified ASTM D-1945	10.5 "Hg	5 psi
11A	KAFB-106V2 159.9	Modified ASTM D-1945	11.0 "Hg	5 psi
12A	KAFB-106V2 217.1	Modified ASTM D-1945	11.5 "Hg	5 psi
13A	Lab Blank	Modified ASTM D-1945	NA	NA
13B	Lab Blank	Modified ASTM D-1945	NA	NA
14A	LCS	Modified ASTM D-1945	NA	NA
14AA	LCSD	Modified ASTM D-1945	NA	NA
14B	LCS	Modified ASTM D-1945	NA	NA
14BB	LCSD	Modified ASTM D-1945	NA	NA

CERTIFIED BY:



Technical Director

DATE: 07/24/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
DoD QSM - ASTM D1945
EA Engineering
Workorder# 1907216C

Twelve 6 Liter Summa Canister samples were received on July 10, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Since Nitrogen is used to pressurize samples, the Nitrogen values are calculated by adding all the

sample components and subtracting from 100%.

Methane and Ethane were manually integrated in samples KAFB-106V1 102.1, KAFB-106V1 112.6, KAFB-106V1 159.6, KAFB-106V1 159.6 DUP, KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V1 262.6, KAFB-106V2 102.2, KAFB-106V2 117.1, KAFB-106V2 117.1 Lab Duplicate, KAFB-106V2 117.1 DUP, KAFB-106V2 159.9 and KAFB-106V2 217.1.

Pentane was manually integrated in samples KAFB-106V1 217.1, KAFB-106V1 252.1, KAFB-106V2 102.2, KAFB-106V2 117.1 DUP and KAFB-106V2 159.9.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 102.1	Date/Time Analyzed:	7/16/19 11:24 AM
Lab ID:	1907216C-01A	Dilution Factor:	2.17
Date/Time Collected:	7/5/19 08:28 AM	Instrument/Filename:	gc10.i / 10071609
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0042
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	7.1
Carbon Monoxide	630-08-0	0.0029	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0022
Hydrogen	1333-74-0	0.0033	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.013
Nitrogen	7727-37-9	0.15	0.15	0.22	79
Oxygen	7782-44-7	0.040	0.039	0.22	12
Pentane	109-66-0	0.000054	0.00024	0.0022	0.10
Propane	74-98-6	0.000065	0.00024	0.0022	0.0012 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 68

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 112.6	Date/Time Analyzed:	7/16/19 12:05 PM
Lab ID:	1907216C-02A	Dilution Factor:	2.01
Date/Time Collected:	7/5/19 08:46 AM	Instrument/Filename:	gc10.i / 10071610
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0064
Carbon Dioxide	124-38-9	0.0022	0.0096	0.020	8.6
Carbon Monoxide	630-08-0	0.0026	0.0096	0.020	Not Detected U
Ethane	74-84-0	0.000050	0.00022	0.0020	0.0026
Hydrogen	1333-74-0	0.0030	0.012	0.020	Not Detected U
Methane	74-82-8	0.000054	0.00010	0.00020	0.013
Nitrogen	7727-37-9	0.14	0.14	0.20	80
Oxygen	7782-44-7	0.037	0.036	0.20	9.3
Pentane	109-66-0	0.000050	0.00022	0.0020	0.16
Propane	74-98-6	0.000060	0.00022	0.0020	0.0013 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 82

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 159.6	Date/Time Analyzed:	7/16/19 12:33 PM
Lab ID:	1907216C-03A	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 09:07 AM	Instrument/Filename:	gc10.i / 10071611
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0064
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	6.8
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.00093 J
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.0032
Nitrogen	7727-37-9	0.14	0.14	0.21	79
Oxygen	7782-44-7	0.038	0.037	0.21	12
Pentane	109-66-0	0.000052	0.00023	0.0021	0.18
Propane	74-98-6	0.000062	0.00023	0.0021	0.00073 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 84

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 159.6 DUP	Date/Time Analyzed:	7/16/19 01:12 PM
Lab ID:	1907216C-04A	Dilution Factor:	2.12
Date/Time Collected:	7/5/19 09:18 AM	Instrument/Filename:	gc10.i / 10071612
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0064
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	6.9
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000053	0.00023	0.0021	0.00092 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0033
Nitrogen	7727-37-9	0.14	0.14	0.21	79
Oxygen	7782-44-7	0.039	0.038	0.21	12
Pentane	109-66-0	0.000053	0.00023	0.0021	0.18
Propane	74-98-6	0.000064	0.00023	0.0021	0.00076 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 89

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 217.1	Date/Time Analyzed:	7/16/19 01:36 PM
Lab ID:	1907216C-05A	Dilution Factor:	1.96
Date/Time Collected:	7/5/19 09:34 AM	Instrument/Filename:	gc10.i / 10071613
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000027	0.00022	0.0020	0.0026
Carbon Dioxide	124-38-9	0.0021	0.0094	0.020	12
Carbon Monoxide	630-08-0	0.0026	0.0094	0.020	Not Detected U
Ethane	74-84-0	0.000049	0.00022	0.0020	0.0028
Hydrogen	1333-74-0	0.0029	0.012	0.020	Not Detected U
Methane	74-82-8	0.000053	0.000098	0.00020	0.0046
Nitrogen	7727-37-9	0.13	0.13	0.20	85
Oxygen	7782-44-7	0.036	0.035	0.20	1.4
Pentane	109-66-0	0.000049	0.00022	0.0020	0.086
Propane	74-98-6	0.000059	0.00022	0.0020	0.0022

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 91

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 252.1	Date/Time Analyzed:	7/16/19 02:02 PM
Lab ID:	1907216C-06A	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 09:50 AM	Instrument/Filename:	gc10.i / 10071614
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0038
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	5.5
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0021
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.0022
Nitrogen	7727-37-9	0.14	0.14	0.21	80
Oxygen	7782-44-7	0.038	0.037	0.21	13
Pentane	109-66-0	0.000052	0.00023	0.0021	0.053
Propane	74-98-6	0.000062	0.00023	0.0021	0.0038

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 75

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V1 262.6	Date/Time Analyzed:	7/16/19 03:53 PM
Lab ID:	1907216C-07A	Dilution Factor:	2.01
Date/Time Collected:	7/5/19 10:05 AM	Instrument/Filename:	gc10.i / 10071616
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000028	0.00022	0.0020	0.0046
Carbon Dioxide	124-38-9	0.0022	0.0096	0.020	5.4
Carbon Monoxide	630-08-0	0.0026	0.0096	0.020	Not Detected U
Ethane	74-84-0	0.000050	0.00022	0.0020	0.0023
Hydrogen	1333-74-0	0.0030	0.012	0.020	Not Detected U
Methane	74-82-8	0.000054	0.00010	0.00020	0.0021
Nitrogen	7727-37-9	0.14	0.14	0.20	80
Oxygen	7782-44-7	0.037	0.036	0.20	13
Pentane	109-66-0	0.000050	0.00022	0.0020	0.059
Propane	74-98-6	0.000060	0.00022	0.0020	0.0042

U = The analyte was not detected above the MDL.

Total BTU/Cu.F. = 66

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 102.2	Date/Time Analyzed:	7/16/19 04:16 PM
Lab ID:	1907216C-08A	Dilution Factor:	2.17
Date/Time Collected:	7/5/19 10:24 AM	Instrument/Filename:	gc10.i / 10071617
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0040
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	11
Carbon Monoxide	630-08-0	0.0029	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0024
Hydrogen	1333-74-0	0.0033	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.021
Nitrogen	7727-37-9	0.15	0.15	0.22	82
Oxygen	7782-44-7	0.040	0.039	0.22	4.6
Pentane	109-66-0	0.000054	0.00024	0.0022	0.096
Propane	74-98-6	0.000065	0.00024	0.0022	0.0014 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 120

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1	Date/Time Analyzed:	7/16/19 04:51 PM
Lab ID:	1907216C-09A	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	gc10.i / 10071618
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0062
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	11
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0026
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.021
Nitrogen	7727-37-9	0.14	0.14	0.21	82
Oxygen	7782-44-7	0.038	0.037	0.21	4.2
Pentane	109-66-0	0.000052	0.00023	0.0021	0.20
Propane	74-98-6	0.000062	0.00023	0.0021	0.0016 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 150

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 Lab Duplicate	Date/Time Analyzed:	7/16/19 05:43 PM
Lab ID:	1907216C-09AA	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 10:39 AM	Instrument/Filename:	gc10.i / 10071620
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0059
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	11
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0024
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.020
Nitrogen	7727-37-9	0.14	0.14	0.21	82
Oxygen	7782-44-7	0.038	0.037	0.21	4.2
Pentane	109-66-0	0.000052	0.00023	0.0021	0.18
Propane	74-98-6	0.000062	0.00023	0.0021	0.0015 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 120

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 117.1 DUP	Date/Time Analyzed:	7/16/19 06:06 PM
Lab ID:	1907216C-10A	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 10:48 AM	Instrument/Filename:	gc10.i / 10071621
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0060
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	11
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0025
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.020
Nitrogen	7727-37-9	0.14	0.14	0.21	82
Oxygen	7782-44-7	0.038	0.037	0.21	4.3
Pentane	109-66-0	0.000052	0.00023	0.0021	0.18
Propane	74-98-6	0.000062	0.00023	0.0021	0.0015 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 130

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 159.9	Date/Time Analyzed:	7/16/19 06:30 PM
Lab ID:	1907216C-11A	Dilution Factor:	2.12
Date/Time Collected:	7/5/19 11:03 AM	Instrument/Filename:	gc10.i / 10071622
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00023	0.0021	0.0014 J
Carbon Dioxide	124-38-9	0.0023	0.010	0.021	4.1
Carbon Monoxide	630-08-0	0.0028	0.010	0.021	Not Detected U
Ethane	74-84-0	0.000053	0.00023	0.0021	0.00039 J
Hydrogen	1333-74-0	0.0032	0.013	0.021	Not Detected U
Methane	74-82-8	0.000057	0.00011	0.00021	0.0025
Nitrogen	7727-37-9	0.14	0.14	0.21	82
Oxygen	7782-44-7	0.039	0.038	0.21	13
Pentane	109-66-0	0.000053	0.00023	0.0021	0.064
Propane	74-98-6	0.000064	0.00023	0.0021	0.00020 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 56

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 217.1	Date/Time Analyzed:	7/16/19 07:08 PM
Lab ID:	1907216C-12A	Dilution Factor:	2.17
Date/Time Collected:	7/5/19 11:15 AM	Instrument/Filename:	gc10.i / 10071623
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000030	0.00024	0.0022	0.0021 J
Carbon Dioxide	124-38-9	0.0023	0.010	0.022	12
Carbon Monoxide	630-08-0	0.0029	0.010	0.022	Not Detected U
Ethane	74-84-0	0.000054	0.00024	0.0022	0.0020 J
Hydrogen	1333-74-0	0.0033	0.013	0.022	Not Detected U
Methane	74-82-8	0.000058	0.00011	0.00022	0.0044
Nitrogen	7727-37-9	0.15	0.15	0.22	84
Oxygen	7782-44-7	0.040	0.039	0.22	2.4
Pentane	109-66-0	0.000054	0.00024	0.0022	0.066
Propane	74-98-6	0.000065	0.00024	0.0022	0.0015 J

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 94



NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/16/19 10:52 AM
Lab ID:	1907216C-13A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071608
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/16/19 10:28 AM
Lab ID:	1907216C-13B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071607c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/16/19 08:13 AM
Lab ID:	1907216C-14A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071602
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	101
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	85
Ethane	74-84-0	102
Methane	74-82-8	102
Nitrogen	7727-37-9	98
Oxygen	7782-44-7	103
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/16/19 08:37 AM
Lab ID:	1907216C-14AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071603
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	86
Ethane	74-84-0	101
Methane	74-82-8	101
Nitrogen	7727-37-9	98
Oxygen	7782-44-7	103
Pentane	109-66-0	101
Propane	74-98-6	101

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/16/19 09:34 AM
Lab ID:	1907216C-14B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071605c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	100

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/16/19 10:00 AM
Lab ID:	1907216C-14BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071606c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	101

* % Recovery is calculated using unrounded analytical results.



7/23/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907217A

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1907217A

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/23/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified TO-15 (5&20 ppbv	12.0 "Hg	5 psi
01AA	KAFB-106V2 252.2 Lab Duplicate	Modified TO-15 (5&20 ppbv	12.0 "Hg	5 psi
02A	KAFB-106V2 269.5	Modified TO-15 (5&20 ppbv	10.5 "Hg	5 psi
03A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
04A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
04B	CCV	Modified TO-15 (5&20 ppbv	NA	NA
05A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
05AA	LCS	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY:



Technical Director

DATE: 07/23/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Page 2 of 28

LABORATORY NARRATIVE
DoD QSM - TO-15
EA Engineering
Workorder# 1907217A

Two 6 Liter Summa Canister (100% SIM certified DOD5.1) samples were received on July 10, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A Method Detection Limit (MDL) and Limit of Detection (LOD) study are not maintained for non-standard compounds.

Total Xylenes concentration is calculated by summing the individual concentrations of m,p-Xylene and O-Xylene.

A Limit of Detection (LOD) and Method Detection Limit (MDL) study are not maintained for Total Xylenes.

Samples were analyzed in one analytical batch on MSDJ on 7/17/19. The initial continuing calibration verification (CCV) for the batch is reported as lab fraction 04A and the ending CCV is reported as lab fraction 04B.

Dilution was performed on samples KAFB-106V2 252.2, KAFB-106V2 252.2 Lab Duplicate and KAFB-106V2 269.5 due to the presence of high level target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in samples KAFB-106V2 252.2, KAFB-106V2 252.2

Lab Duplicate and KAFB-106V2 269.5 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Acetone and Heptane exceeded the instrument's calibration range for samples KAFB-106V2 252.2, KAFB-106V2 252.2 Lab Duplicate and KAFB-106V2 269.5 and were flagged accordingly.

Cyclohexane exceeded the instrument's calibration range for samples KAFB-106V2 252.2 and KAFB-106V2 252.2 Lab Duplicate and were flagged accordingly.

Hexane exceeded the instrument's calibration range for sample KAFB-106V2 252.2 and was flagged accordingly.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	7/17/19 10:49 PM
Lab ID:	1907217A-01A	Dilution Factor:	160
Date/Time Collected:	7/5/19 11:26 AM	Instrument/Filename:	msdj.i / j071719
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	580	2900	3200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	8100	18000	24000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1900	3500	3900	150000
1,2-Dibromoethane (EDB)	106-93-4	650	5500	6100	13000
1,2-Dichlorobenzene	95-50-1	530	4300	4800	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	3300	3500	3900	54000
1,3-Butadiene	106-99-0	750	1600	1800	Not Detected U
1,4-Dioxane	123-91-1	3200	8600	12000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	2300	7100	9400	320000
2-Hexanone	591-78-6	4500	9800	13000	Not Detected U
2-Propanol	67-63-0	2200	5900	7900	120000
4-Methyl-2-pentanone	108-10-1	740	2900	3300	Not Detected U
Acetone	67-64-1	2200	5700	7600	3100000 J
Benzene	71-43-2	320	2300	2600	950000
Bromodichloromethane	75-27-4	540	4800	5400	Not Detected U
Bromoform	75-25-2	630	7400	8300	Not Detected U
Carbon Disulfide	75-15-0	1400	7500	10000	Not Detected U
Carbon Tetrachloride	56-23-5	520	4500	5000	Not Detected U
Chloroethane	75-00-3	2000	6300	8400	Not Detected U
Chloroform	67-66-3	370	3500	3900	Not Detected U
Chloromethane	74-87-3	1200	5000	6600	Not Detected U
Cyclohexane	110-82-7	320	2500	2800	2900000 J
Dibromochloromethane	124-48-1	540	6100	6800	Not Detected U
Ethanol	64-17-5	3800	4500	6000	5700 J

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	7/17/19 10:49 PM
Lab ID:	1907217A-01A	Dilution Factor:	160
Date/Time Collected:	7/5/19 11:26 AM	Instrument/Filename:	msdj.i / j071719
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	12000	Not Detected
Ethyl Benzene	100-41-4	400	3100	3500	300000
Freon 11	75-69-4	690	4000	4500	Not Detected U
Freon 113	76-13-1	1100	5500	6100	Not Detected U
Freon 12	75-71-8	460	3600	4000	Not Detected U
Heptane	142-82-5	950	3000	3300	4100000 J
Hexane	110-54-3	660	2500	2800	2800000 J
m,p-Xylene	108-38-3	420	3100	3500	710000
Methylene Chloride	75-09-2	2000	8300	11000	Not Detected U
Naphthalene	91-20-3	1200	8400	17000	Not Detected U
o-Xylene	95-47-6	740	3100	3500	210000
Propylene	115-07-1	1400	4100	5500	29000
Styrene	100-42-5	420	3100	3400	Not Detected U
Tetrachloroethene	127-18-4	580	4900	5400	Not Detected U
Tetrahydrofuran	109-99-9	490	2100	2400	Not Detected U
Toluene	108-88-3	430	2700	3000	2800000
Total Xylene	1330-20-7	NA	D	3500	930000
Trichloroethene	79-01-6	480	3900	4300	Not Detected U
Vinyl Chloride	75-01-4	850	1800	2000	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	7/17/19 10:49 PM
Lab ID:	1907217A-01A	Dilution Factor:	160
Date/Time Collected:	7/5/19 11:26 AM	Instrument/Filename:	msdj.i / j071719
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	91
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	158 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1907217A-01AA	Date/Time Analyzed:	7/17/19 11:14 PM
Date/Time Collected:	7/5/19 11:26 AM	Dilution Factor:	160
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071720

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	580	2900	3200	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	8100	18000	24000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	1900	3500	3900	160000
1,2-Dibromoethane (EDB)	106-93-4	650	5500	6100	13000
1,2-Dichlorobenzene	95-50-1	530	4300	4800	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	3300	3500	3900	49000
1,3-Butadiene	106-99-0	750	1600	1800	Not Detected U
1,4-Dioxane	123-91-1	3200	8600	12000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	2300	7100	9400	310000
2-Hexanone	591-78-6	4500	9800	13000	Not Detected U
2-Propanol	67-63-0	2200	5900	7900	120000
4-Methyl-2-pentanone	108-10-1	740	2900	3300	Not Detected U
Acetone	67-64-1	2200	5700	7600	3000000 J
Benzene	71-43-2	320	2300	2600	950000
Bromodichloromethane	75-27-4	540	4800	5400	Not Detected U
Bromoform	75-25-2	630	7400	8300	Not Detected U
Carbon Disulfide	75-15-0	1400	7500	10000	Not Detected U
Carbon Tetrachloride	56-23-5	520	4500	5000	Not Detected U
Chloroethane	75-00-3	2000	6300	8400	Not Detected U
Chloroform	67-66-3	370	3500	3900	Not Detected U
Chloromethane	74-87-3	1200	5000	6600	Not Detected U
Cyclohexane	110-82-7	320	2500	2800	2900000 J
Dibromochloromethane	124-48-1	540	6100	6800	Not Detected U
Ethanol	64-17-5	3800	4500	6000	4700 J

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1907217A-01AA	Date/Time Analyzed:	7/17/19 11:14 PM
Date/Time Collected:	7/5/19 11:26 AM	Dilution Factor:	160
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071720

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	12000	Not Detected
Ethyl Benzene	100-41-4	400	3100	3500	310000
Freon 11	75-69-4	690	4000	4500	Not Detected U
Freon 113	76-13-1	1100	5500	6100	Not Detected U
Freon 12	75-71-8	460	3600	4000	Not Detected U
Heptane	142-82-5	950	3000	3300	4100000 J
Hexane	110-54-3	660	2500	2800	2800000
m,p-Xylene	108-38-3	420	3100	3500	700000
Methylene Chloride	75-09-2	2000	8300	11000	Not Detected U
Naphthalene	91-20-3	1200	8400	17000	Not Detected U
o-Xylene	95-47-6	740	3100	3500	210000
Propylene	115-07-1	1400	4100	5500	28000
Styrene	100-42-5	420	3100	3400	Not Detected U
Tetrachloroethene	127-18-4	580	4900	5400	Not Detected U
Tetrahydrofuran	109-99-9	490	2100	2400	Not Detected U
Toluene	108-88-3	430	2700	3000	2900000
Total Xylene	1330-20-7	NA	D	3500	920000
Trichloroethene	79-01-6	480	3900	4300	Not Detected U
Vinyl Chloride	75-01-4	850	1800	2000	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS

KAFB Bioventing

Client ID:	KAFB-106V2 252.2 Lab Duplicate		
Lab ID:	1907217A-01AA	Date/Time Analyzed:	7/17/19 11:14 PM
Date/Time Collected:	7/5/19 11:26 AM	Dilution Factor:	160
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	msdj.i / j071720

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	160 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	7/17/19 11:40 PM
Lab ID:	1907217A-02A	Dilution Factor:	258
Date/Time Collected:	7/5/19 11:41 AM	Instrument/Filename:	msdj.i / j071721
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	930	4700	5200	4200 J
1,2,4-Trichlorobenzene	120-82-1	13000	29000	38000	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	3100	5700	6300	240000
1,2-Dibromoethane (EDB)	106-93-4	1000	8900	9900	14000
1,2-Dichlorobenzene	95-50-1	850	7000	7800	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	5400	5700	6300	86000
1,3-Butadiene	106-99-0	1200	2600	2800	Not Detected U
1,4-Dioxane	123-91-1	5200	14000	18000	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	3700	11000	15000	630000
2-Hexanone	591-78-6	7200	16000	21000	Not Detected U
2-Propanol	67-63-0	3600	9500	13000	120000
4-Methyl-2-pentanone	108-10-1	1200	4800	5300	Not Detected U
Acetone	67-64-1	3500	9200	12000	4300000 J
Benzene	71-43-2	520	3700	4100	1200000
Bromodichloromethane	75-27-4	860	7800	8600	Not Detected U
Bromoform	75-25-2	1000	12000	13000	Not Detected U
Carbon Disulfide	75-15-0	2400	12000	16000	Not Detected U
Carbon Tetrachloride	56-23-5	840	7300	8100	1100 J
Chloroethane	75-00-3	3200	10000	14000	Not Detected U
Chloroform	67-66-3	590	5700	6300	Not Detected U
Chloromethane	74-87-3	1900	8000	11000	Not Detected U
Cyclohexane	110-82-7	520	4000	4400	4000000
Dibromochloromethane	124-48-1	860	9900	11000	Not Detected U
Ethanol	64-17-5	6100	7300	9700	11000

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	7/17/19 11:40 PM
Lab ID:	1907217A-02A	Dilution Factor:	258
Date/Time Collected:	7/5/19 11:41 AM	Instrument/Filename:	msdj.i / j071721
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	18000	Not Detected
Ethyl Benzene	100-41-4	640	5000	5600	320000
Freon 11	75-69-4	1100	6500	7200	Not Detected U
Freon 113	76-13-1	1800	8900	9900	Not Detected U
Freon 12	75-71-8	740	5700	6400	Not Detected U
Heptane	142-82-5	1500	4800	5300	7500000 J
Hexane	110-54-3	1100	4100	4500	2600000
m,p-Xylene	108-38-3	680	5000	5600	810000
Methylene Chloride	75-09-2	3200	13000	18000	Not Detected U
Naphthalene	91-20-3	1900	14000	27000	Not Detected U
o-Xylene	95-47-6	1200	5000	5600	250000
Propylene	115-07-1	2300	6700	8900	43000
Styrene	100-42-5	680	4900	5500	Not Detected U
Tetrachloroethene	127-18-4	930	7900	8800	20000
Tetrahydrofuran	109-99-9	790	3400	3800	Not Detected U
Toluene	108-88-3	700	4400	4900	4400000
Total Xylene	1330-20-7	NA	D	5600	1000000
Trichloroethene	79-01-6	780	6200	6900	800000
Vinyl Chloride	75-01-4	1400	3000	3300	Not Detected U

U = The analyte was not detected above the MDL.
 J = Estimated value.
 Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.
 D: Analyte not within the DoD scope of accreditation.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	7/17/19 11:40 PM
Lab ID:	1907217A-02A	Dilution Factor:	258
Date/Time Collected:	7/5/19 11:41 AM	Instrument/Filename:	msdj.i / j071721
Media:	6 Liter Summa Canister (100% SIM certifie		

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	89
4-Bromofluorobenzene	460-00-4	83-110	99
Toluene-d8	2037-26-5	86-115	154 Q

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/17/19 02:53 PM
Lab ID:	1907217A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071708e
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	75-34-3	3.6	18	20	Not Detected U
1,2,4-Trichlorobenzene	120-82-1	51	110	150	Not Detected U
1,2,4-Trimethylbenzene	95-63-6	12	22	24	Not Detected U
1,2-Dibromoethane (EDB)	106-93-4	4.1	34	38	Not Detected U
1,2-Dichlorobenzene	95-50-1	3.3	27	30	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	21	22	24	Not Detected U
1,3-Butadiene	106-99-0	4.7	10	11	Not Detected U
1,4-Dioxane	123-91-1	20	54	72	Not Detected U
2-Butanone (Methyl Ethyl Ketone)	78-93-3	14	44	59	Not Detected U
2-Hexanone	591-78-6	28	61	82	Not Detected U
2-Propanol	67-63-0	14	37	49	Not Detected U
4-Methyl-2-pentanone	108-10-1	4.6	18	20	Not Detected U
Acetone	67-64-1	14	36	48	Not Detected U
Benzene	71-43-2	2.0	14	16	Not Detected U
Bromodichloromethane	75-27-4	3.4	30	34	Not Detected U
Bromoform	75-25-2	3.9	46	52	Not Detected U
Carbon Disulfide	75-15-0	9.1	47	62	Not Detected U
Carbon Tetrachloride	56-23-5	3.3	28	31	Not Detected U
Chloroethane	75-00-3	12	40	53	Not Detected U
Chloroform	67-66-3	2.3	22	24	Not Detected U
Chloromethane	74-87-3	7.6	31	41	Not Detected U
Cyclohexane	110-82-7	2.0	15	17	Not Detected U
Dibromochloromethane	124-48-1	3.3	38	42	Not Detected U
Ethanol	64-17-5	24	28	38	Not Detected U



EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/17/19 02:53 PM
Lab ID:	1907217A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071708e
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethyl Acetate	141-78-6	NA	D	72	Not Detected
Ethyl Benzene	100-41-4	2.5	20	22	Not Detected U
Freon 11	75-69-4	4.3	25	28	Not Detected U
Freon 113	76-13-1	6.9	34	38	Not Detected U
Freon 12	75-71-8	2.9	22	25	Not Detected U
Heptane	142-82-5	5.9	18	20	Not Detected U
Hexane	110-54-3	4.1	16	18	Not Detected U
m,p-Xylene	108-38-3	2.6	20	22	Not Detected U
Methylene Chloride	75-09-2	12	52	69	Not Detected U
Naphthalene	91-20-3	7.2	52	100	Not Detected U
o-Xylene	95-47-6	4.6	20	22	Not Detected U
Propylene	115-07-1	9.0	26	34	Not Detected U
Styrene	100-42-5	2.6	19	21	Not Detected U
Tetrachloroethene	127-18-4	3.6	30	34	Not Detected U
Tetrahydrofuran	109-99-9	3.1	13	15	Not Detected U
Toluene	108-88-3	2.7	17	19	Not Detected U
Total Xylene	1330-20-7	NA	D	22	Not Detected
Trichloroethene	79-01-6	3.0	24	27	Not Detected U
Vinyl Chloride	75-01-4	5.3	12	13	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	91

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/17/19 02:53 PM
Lab ID:	1907217A-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071708e
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	95
Toluene-d8	2037-26-5	86-115	99

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/17/19 10:19 AM
Lab ID:	1907217A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071702a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	101
1,2,4-Trichlorobenzene	120-82-1	84
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	95
1,2-Dichlorobenzene	95-50-1	90
1,3,5-Trimethylbenzene	108-67-8	100
1,3-Butadiene	106-99-0	89
1,4-Dioxane	123-91-1	94
2-Butanone (Methyl Ethyl Ketone)	78-93-3	93
2-Hexanone	591-78-6	95
2-Propanol	67-63-0	88
4-Methyl-2-pentanone	108-10-1	86
Acetone	67-64-1	116
Benzene	71-43-2	102
Bromodichloromethane	75-27-4	90
Bromoform	75-25-2	91
Carbon Disulfide	75-15-0	91
Carbon Tetrachloride	56-23-5	99
Chloroethane	75-00-3	92
Chloroform	67-66-3	102
Chloromethane	74-87-3	82
Cyclohexane	110-82-7	97
Dibromochloromethane	124-48-1	92
Ethanol	64-17-5	87

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/17/19 10:19 AM
Lab ID:	1907217A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071702a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	89
Ethyl Benzene	100-41-4	101
Freon 11	75-69-4	95
Freon 113	76-13-1	97
Freon 12	75-71-8	87
Heptane	142-82-5	94
Hexane	110-54-3	97
m,p-Xylene	108-38-3	101
Methylene Chloride	75-09-2	111
Naphthalene	91-20-3	90
o-Xylene	95-47-6	101
Propylene	115-07-1	94
Styrene	100-42-5	88
Tetrachloroethene	127-18-4	104
Tetrahydrofuran	109-99-9	95
Toluene	108-88-3	104
Total Xylene	1330-20-7	101
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	87

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	92

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/17/19 10:19 AM
Lab ID:	1907217A-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071702a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 07:08 AM
Lab ID:	1907217A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071727
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	101
1,2,4-Trichlorobenzene	120-82-1	75
1,2,4-Trimethylbenzene	95-63-6	100
1,2-Dibromoethane (EDB)	106-93-4	94
1,2-Dichlorobenzene	95-50-1	90
1,3,5-Trimethylbenzene	108-67-8	101
1,3-Butadiene	106-99-0	85
1,4-Dioxane	123-91-1	89
2-Butanone (Methyl Ethyl Ketone)	78-93-3	95
2-Hexanone	591-78-6	97
2-Propanol	67-63-0	85
4-Methyl-2-pentanone	108-10-1	85
Acetone	67-64-1	112
Benzene	71-43-2	105
Bromodichloromethane	75-27-4	90
Bromoform	75-25-2	91
Carbon Disulfide	75-15-0	91
Carbon Tetrachloride	56-23-5	98
Chloroethane	75-00-3	92
Chloroform	67-66-3	101
Chloromethane	74-87-3	80
Cyclohexane	110-82-7	98
Dibromochloromethane	124-48-1	93
Ethanol	64-17-5	85

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 07:08 AM
Lab ID:	1907217A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071727
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	101
Freon 11	75-69-4	92
Freon 113	76-13-1	94
Freon 12	75-71-8	84
Heptane	142-82-5	94
Hexane	110-54-3	97
m,p-Xylene	108-38-3	102
Methylene Chloride	75-09-2	106
Naphthalene	91-20-3	81
o-Xylene	95-47-6	101
Propylene	115-07-1	91
Styrene	100-42-5	88
Tetrachloroethene	127-18-4	105
Tetrahydrofuran	109-99-9	93
Toluene	108-88-3	105
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	85

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	89

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	CCV	Date/Time Analyzed:	7/18/19 07:08 AM
Lab ID:	1907217A-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071727
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	97
Toluene-d8	2037-26-5	86-115	100

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/17/19 10:47 AM
Lab ID:	1907217A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071703a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	104
1,2,4-Trichlorobenzene	120-82-1	93
1,2,4-Trimethylbenzene	95-63-6	102
1,2-Dibromoethane (EDB)	106-93-4	97
1,2-Dichlorobenzene	95-50-1	94
1,3,5-Trimethylbenzene	108-67-8	103
1,3-Butadiene	106-99-0	89
1,4-Dioxane	123-91-1	95
2-Butanone (Methyl Ethyl Ketone)	78-93-3	98
2-Hexanone	591-78-6	99
2-Propanol	67-63-0	93
4-Methyl-2-pentanone	108-10-1	86
Acetone	67-64-1	118
Benzene	71-43-2	105
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	94
Carbon Disulfide	75-15-0	82
Carbon Tetrachloride	56-23-5	100
Chloroethane	75-00-3	96
Chloroform	67-66-3	103
Chloromethane	74-87-3	87
Cyclohexane	110-82-7	99
Dibromochloromethane	124-48-1	94
Ethanol	64-17-5	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/17/19 10:47 AM
Lab ID:	1907217A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071703a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	103
Freon 11	75-69-4	98
Freon 113	76-13-1	97
Freon 12	75-71-8	88
Heptane	142-82-5	98
Hexane	110-54-3	99
m,p-Xylene	108-38-3	100
Methylene Chloride	75-09-2	112
Naphthalene	91-20-3	65
o-Xylene	95-47-6	105
Propylene	115-07-1	91
Styrene	100-42-5	92
Tetrachloroethene	127-18-4	105
Tetrahydrofuran	109-99-9	96
Toluene	108-88-3	105
Total Xylene	1330-20-7	103
Trichloroethene	79-01-6	105
Vinyl Chloride	75-01-4	92

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	90

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/17/19 10:47 AM
Lab ID:	1907217A-05A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071703a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	101

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/17/19 11:15 AM
Lab ID:	1907217A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071704a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
1,1-Dichloroethane	75-34-3	104
1,2,4-Trichlorobenzene	120-82-1	95
1,2,4-Trimethylbenzene	95-63-6	103
1,2-Dibromoethane (EDB)	106-93-4	96
1,2-Dichlorobenzene	95-50-1	95
1,3,5-Trimethylbenzene	108-67-8	103
1,3-Butadiene	106-99-0	90
1,4-Dioxane	123-91-1	95
2-Butanone (Methyl Ethyl Ketone)	78-93-3	94
2-Hexanone	591-78-6	102
2-Propanol	67-63-0	95
4-Methyl-2-pentanone	108-10-1	86
Acetone	67-64-1	118
Benzene	71-43-2	103
Bromodichloromethane	75-27-4	94
Bromoform	75-25-2	94
Carbon Disulfide	75-15-0	82
Carbon Tetrachloride	56-23-5	101
Chloroethane	75-00-3	96
Chloroform	67-66-3	104
Chloromethane	74-87-3	89
Cyclohexane	110-82-7	100
Dibromochloromethane	124-48-1	94
Ethanol	64-17-5	98

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCS D	Date/Time Analyzed:	7/17/19 11:15 AM
Lab ID:	1907217A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071704a
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Ethyl Acetate	141-78-6	Not Spiked
Ethyl Benzene	100-41-4	103
Freon 11	75-69-4	101
Freon 113	76-13-1	98
Freon 12	75-71-8	90
Heptane	142-82-5	97
Hexane	110-54-3	100
m,p-Xylene	108-38-3	100
Methylene Chloride	75-09-2	113
Naphthalene	91-20-3	67
o-Xylene	95-47-6	104
Propylene	115-07-1	91
Styrene	100-42-5	92
Tetrachloroethene	127-18-4	106
Tetrahydrofuran	109-99-9	98
Toluene	108-88-3	105
Total Xylene	1330-20-7	102
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	92

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	64-133	92

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/17/19 11:15 AM
Lab ID:	1907217A-05AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	msdj.i / j071704a
Media:	NA - Not Applicable		

Surrogates	CAS#	Limits	%Recovery
4-Bromofluorobenzene	460-00-4	83-110	98
Toluene-d8	2037-26-5	86-115	100

* % Recovery is calculated using unrounded analytical results.



7/23/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907217B

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1907217B

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/23/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified TO-3	12.0 "Hg	5 psi
02A	KAFB-106V2 269.5	Modified TO-3	10.5 "Hg	5 psi
02AA	KAFB-106V2 269.5 Lab Duplicate	Modified TO-3	10.5 "Hg	5 psi
03A	Lab Blank	Modified TO-3	NA	NA
04A	LCS	Modified TO-3	NA	NA
04AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:



Technical Director

DATE: 07/23/19

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8, LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

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Page 2 of 10

LABORATORY NARRATIVE
DoD QSM - TO-3
EA Engineering
Workorder# 1907217B

Two 6 Liter Summa Canister samples were received on July 10, 2019. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/m³. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Sample Collection	In-line field method	Collection of sample in specially treated canisters or alternative inert containers for transport to and analysis by an off-site laboratory.
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch \leq 20 samples.
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Moisture Control	Nafion system	Sorbent system

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

Fluorobenzene (FID) was manually integrated in sample KAFB-106V2 269.5 Lab Duplicate.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	7/17/19 12:53 PM
Lab ID:	1907217B-01A	Dilution Factor:	2230
Date/Time Collected:	7/5/19 11:26 AM	Instrument/Filename:	gcd.i / d071707
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	130000	180000	230000	87000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	112

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	7/17/19 02:10 PM
Lab ID:	1907217B-02A	Dilution Factor:	2060
Date/Time Collected:	7/5/19 11:41 AM	Instrument/Filename:	gcd.i / d071708
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	129

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	KAFB-106V2 269.5 Lab Duplicate		
Lab ID:	1907217B-02AA	Date/Time Analyzed:	7/17/19 02:51 PM
Date/Time Collected:	7/5/19 11:41 AM	Dilution Factor:	2060
Media:	6 Liter Summa Canister (100% SIM certifie	Instrument/Filename:	gcd.i / d071709

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	120000	170000	210000	140000000

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	128



MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/17/19 12:04 PM
Lab ID:	1907217B-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071706
Media:	NA - Not Applicable		

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH (Gasoline Range)	9999-9999-208	58	82	100	Not Detected U

U = The analyte was not detected above the MDL.

Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	89

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/17/19 08:36 AM
Lab ID:	1907217B-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071702
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		108
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	124

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-3 GC/PID/FID
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/17/19 03:30 PM
Lab ID:	1907217B-04AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gcd.i / d071710
Media:	NA - Not Applicable		

Compound	CAS#		%Recovery
TPH (Gasoline Range)	9999-9999-208		105
Surrogates	CAS#	Limits	%Recovery
Fluorobenzene (FID)	462-06-602	53-159	118

* % Recovery is calculated using unrounded analytical results.



7/24/2019
Ms. Pamela Moss
EA Engineering
7995 E. Prentice Ave
Suite 206E
Greenwood Village CO 80111

Project Name: KAFB Bioventing
Project #:
Workorder #: 1907217C

Dear Ms. Pamela Moss

The following report includes the data for the above referenced project for sample(s) received on 7/10/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1945 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

A handwritten signature in black ink that reads "Brian Whittaker". The signature is written in a cursive, slightly slanted style.

Brian Whittaker
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

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www.airtoxics.com

WORK ORDER #: 1907217C

Work Order Summary

CLIENT:	Ms. Pamela Moss EA Engineering 7995 E. Prentice Ave Suite 206E Greenwood Village, CO 80111	BILL TO:	Accounts Payable - Lewisville EA Engineering 405 S. Highway 121 Suite C-100 Lewisville, TX 75067
PHONE:	303-590-9143	P.O. #	19162
FAX:		PROJECT #	KAFB Bioventing
DATE RECEIVED:	07/10/2019	CONTACT:	Brian Whittaker
DATE COMPLETED:	07/24/2019		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	KAFB-106V2 252.2	Modified ASTM D-1945	12.0 "Hg	5 psi
02A	KAFB-106V2 269.5	Modified ASTM D-1945	10.5 "Hg	5 psi
03A	Lab Blank	Modified ASTM D-1945	NA	NA
03B	Lab Blank	Modified ASTM D-1945	NA	NA
04A	LCS	Modified ASTM D-1945	NA	NA
04AA	LCSD	Modified ASTM D-1945	NA	NA
04B	LCS	Modified ASTM D-1945	NA	NA
04BB	LCSD	Modified ASTM D-1945	NA	NA

CERTIFIED BY:



Technical Director

DATE: 07/24/19

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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Page 2 of 12

LABORATORY NARRATIVE
DoD QSM - ASTM D1945
EA Engineering
Workorder# 1907217C

Two 6 Liter Summa Canister samples were received on July 10, 2019. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

<i>Requirement</i>	<i>ASTM D1945</i>	<i>ATL Modifications</i>
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor with an acceptance criterion of %RSD <= 15%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 85-115%. Normalization of data not performed.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit.

Manual integrations were performed on Methane and Ethane in samples KAFB-106V2 252.2 and

KAFB-106V2 269.5.

Manual integration was performed on Pentane in sample KAFB-106V2 269.5.

A DoD QSM waiver has been established and approved between Eurofins Air Toxics and the client. A copy of the waiver is available upon request.

The per analytical batch duplicate analysis required for this project is associated with work order 1907216C.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 252.2	Date/Time Analyzed:	7/16/19 08:10 PM
Lab ID:	1907217C-01A	Dilution Factor:	2.23
Date/Time Collected:	7/5/19 11:26 AM	Instrument/Filename:	gc10.i / 10071625
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000031	0.00024	0.0022	0.0018 J
Carbon Dioxide	124-38-9	0.0024	0.011	0.022	2.9
Carbon Monoxide	630-08-0	0.0030	0.011	0.022	Not Detected U
Ethane	74-84-0	0.000056	0.00024	0.0022	0.00072 J
Hydrogen	1333-74-0	0.0034	0.014	0.022	Not Detected U
Methane	74-82-8	0.000060	0.00011	0.00022	0.0012
Nitrogen	7727-37-9	0.15	0.15	0.22	81
Oxygen	7782-44-7	0.041	0.040	0.22	15
Pentane	109-66-0	0.000056	0.00024	0.0022	0.040
Propane	74-98-6	0.000067	0.00024	0.0022	0.0013 J

U = The analyte was not detected above the MDL.
J = Estimated value.

Total BTU/Cu.F. = 1.7

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	KAFB-106V2 269.5	Date/Time Analyzed:	7/16/19 08:33 PM
Lab ID:	1907217C-02A	Dilution Factor:	2.06
Date/Time Collected:	7/5/19 11:41 AM	Instrument/Filename:	gc10.i / 10071626
Media:	6 Liter Summa Canister (100% SIM certifie		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000029	0.00023	0.0021	0.0028
Carbon Dioxide	124-38-9	0.0022	0.0099	0.021	4.7
Carbon Monoxide	630-08-0	0.0027	0.0099	0.021	Not Detected U
Ethane	74-84-0	0.000052	0.00023	0.0021	0.0011 J
Hydrogen	1333-74-0	0.0031	0.013	0.021	Not Detected U
Methane	74-82-8	0.000056	0.00010	0.00021	0.0014
Nitrogen	7727-37-9	0.14	0.14	0.21	80
Oxygen	7782-44-7	0.038	0.037	0.21	14
Pentane	109-66-0	0.000052	0.00023	0.0021	0.046
Propane	74-98-6	0.000062	0.00023	0.0021	0.0021

U = The analyte was not detected above the MDL.

J = Estimated value.

Total BTU/Cu.F. = 70

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/16/19 10:52 AM
Lab ID:	1907217C-03A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071608
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Butane	106-97-8	0.000014	0.00011	0.0010	Not Detected U
Carbon Dioxide	124-38-9	0.0011	0.0048	0.010	Not Detected U
Carbon Monoxide	630-08-0	0.0013	0.0048	0.010	Not Detected U
Ethane	74-84-0	0.000025	0.00011	0.0010	Not Detected U
Methane	74-82-8	0.000027	0.000050	0.00010	Not Detected U
Nitrogen	7727-37-9	0.068	0.068	0.10	Not Detected U
Oxygen	7782-44-7	0.018	0.018	0.10	Not Detected U
Pentane	109-66-0	0.000025	0.00011	0.0010	Not Detected U
Propane	74-98-6	0.000030	0.00011	0.0010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	Lab Blank	Date/Time Analyzed:	7/16/19 10:28 AM
Lab ID:	1907217C-03B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071607c
Media:	NA - Not Applicable		

Compound	CAS#	MDL (%)	LOD (%)	Rpt. Limit (%)	Amount (%)
Hydrogen	1333-74-0	0.0015	0.0062	0.010	Not Detected U

U = The analyte was not detected above the MDL.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/16/19 08:13 AM
Lab ID:	1907217C-04A	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071602
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	101
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	85
Ethane	74-84-0	102
Methane	74-82-8	102
Nitrogen	7727-37-9	98
Oxygen	7782-44-7	103
Pentane	109-66-0	102
Propane	74-98-6	102

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/16/19 08:37 AM
Lab ID:	1907217C-04AA	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071603
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Butane	106-97-8	100
Carbon Dioxide	124-38-9	98
Carbon Monoxide	630-08-0	86
Ethane	74-84-0	101
Methane	74-82-8	101
Nitrogen	7727-37-9	98
Oxygen	7782-44-7	103
Pentane	109-66-0	101
Propane	74-98-6	101

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCS	Date/Time Analyzed:	7/16/19 09:34 AM
Lab ID:	1907217C-04B	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071605c
Media:	NA - Not Applicable		

Compound	CAS#	%Recovery
Hydrogen	1333-74-0	100

* % Recovery is calculated using unrounded analytical results.

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945
KAFB Bioventing

Client ID:	LCSD	Date/Time Analyzed:	7/16/19 10:00 AM
Lab ID:	1907217C-04BB	Dilution Factor:	1.00
Date/Time Collected:	NA - Not Applicable	Instrument/Filename:	gc10.i / 10071606c
Media:	NA - Not Applicable		

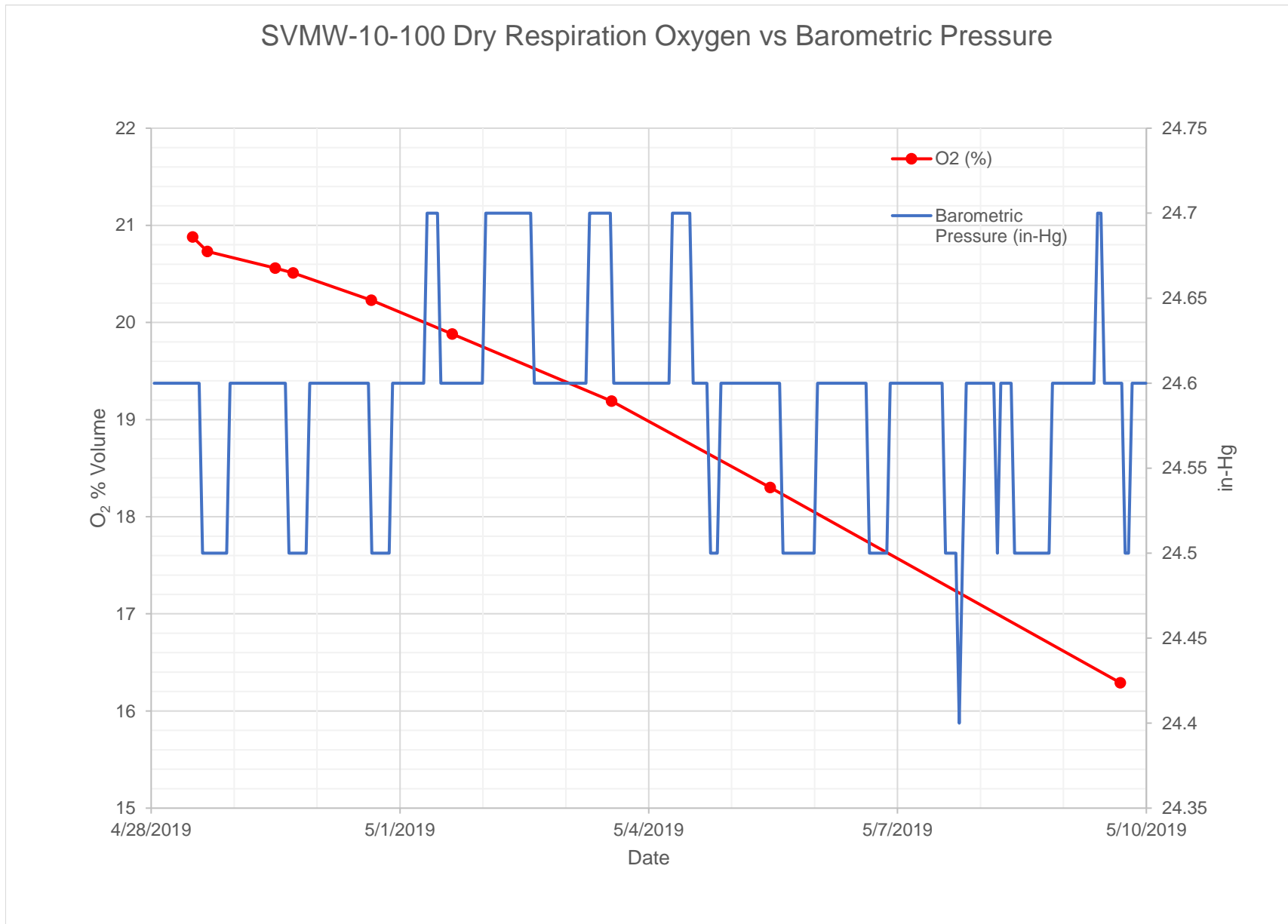
Compound	CAS#	%Recovery
Hydrogen	1333-74-0	101

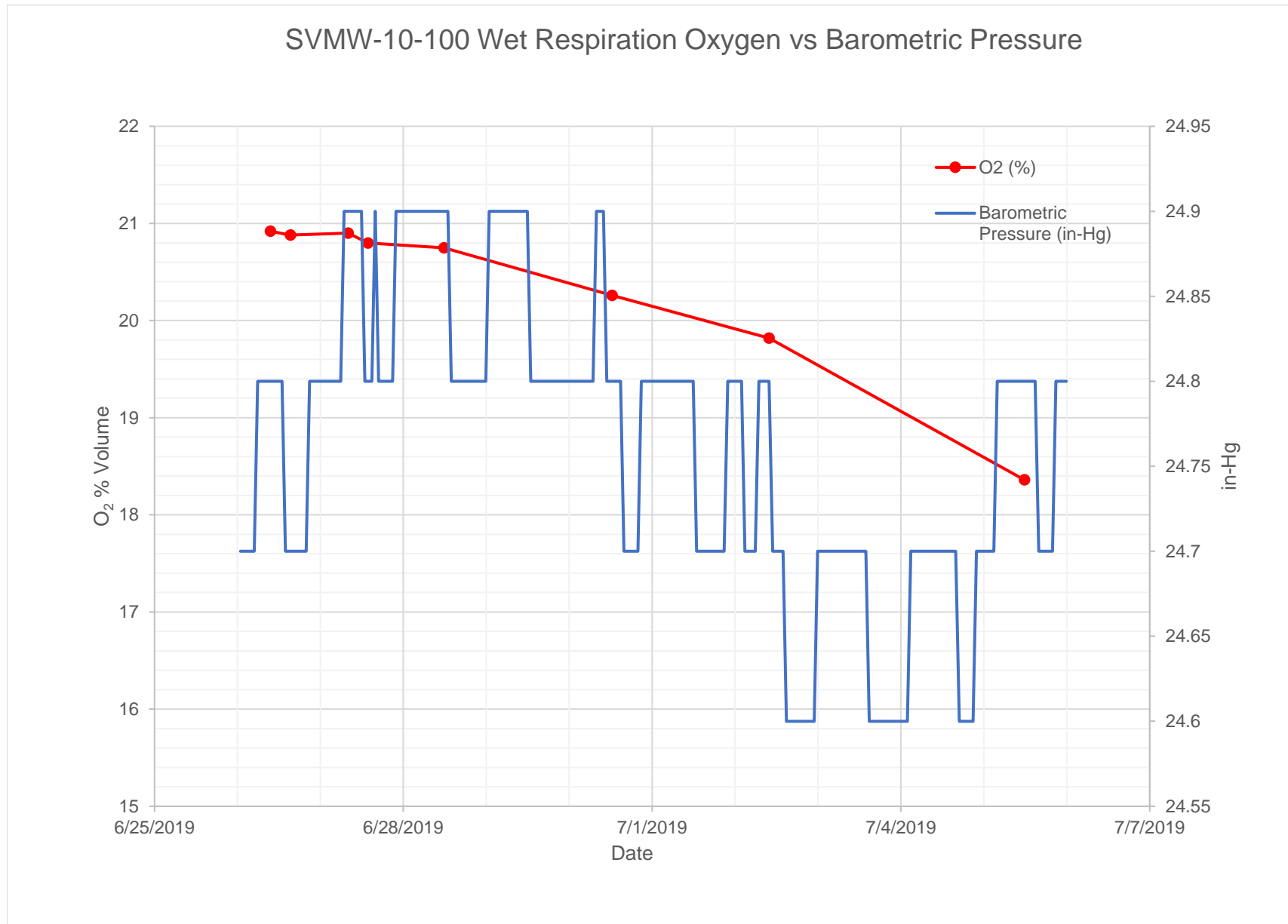
* % Recovery is calculated using unrounded analytical results.

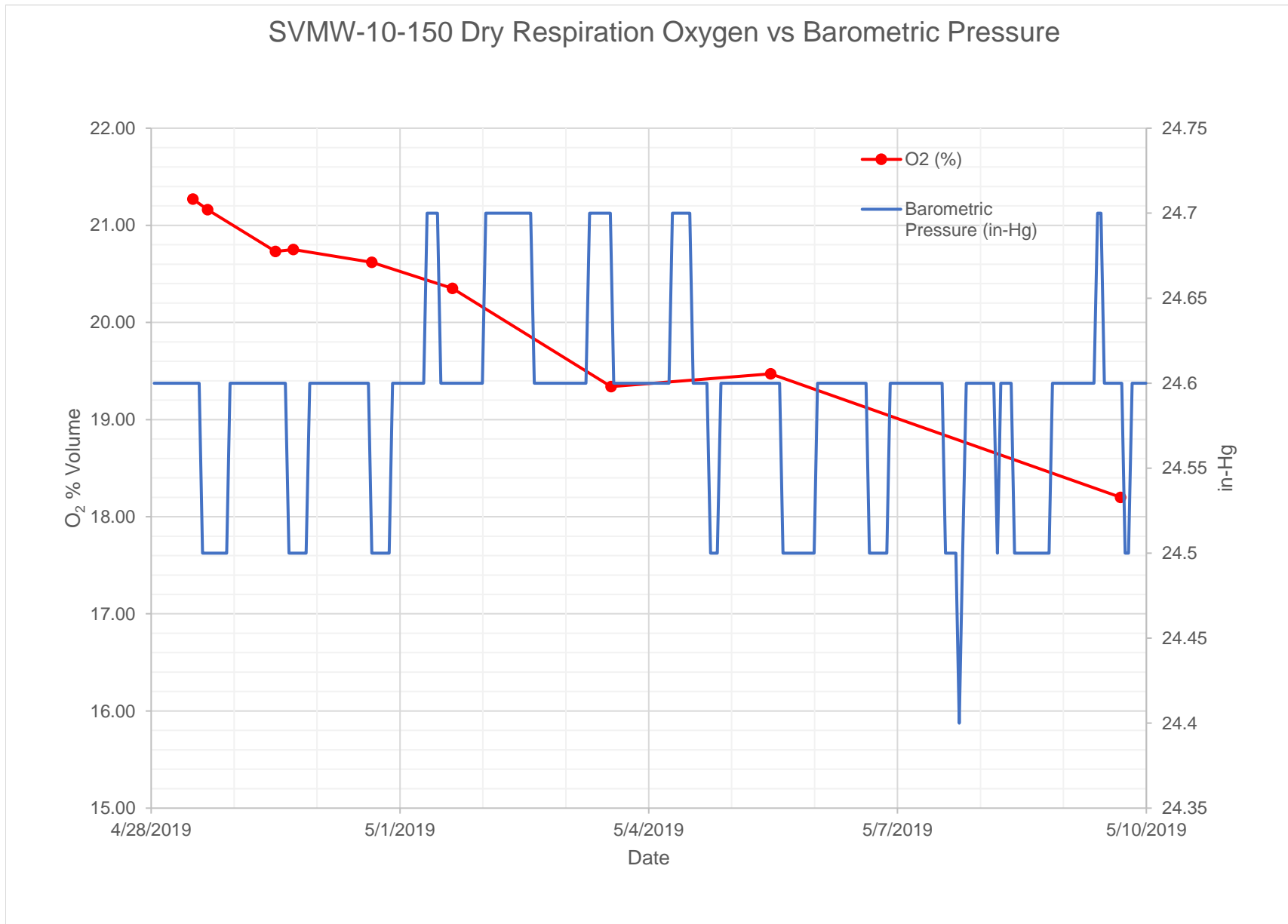
APPENDIX E-3
SUMMARY OF SOIL VAPOR ANALYTICAL DATA

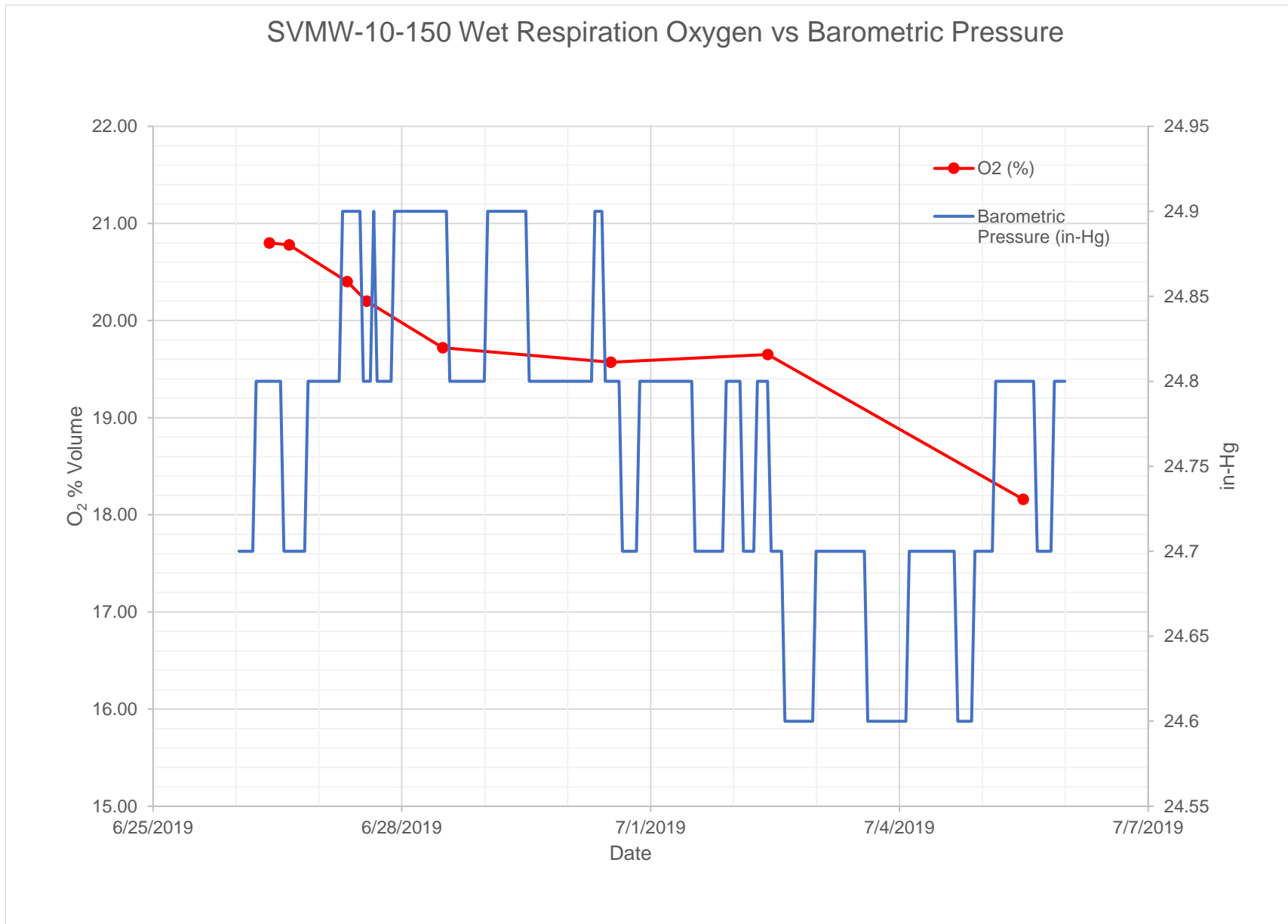
APPENDIX F
BAROMETRIC PRESSURE VERSUS OXYGEN

APPENDIX F
BAROMETRIC PRESSURE VERSUS OXYGEN

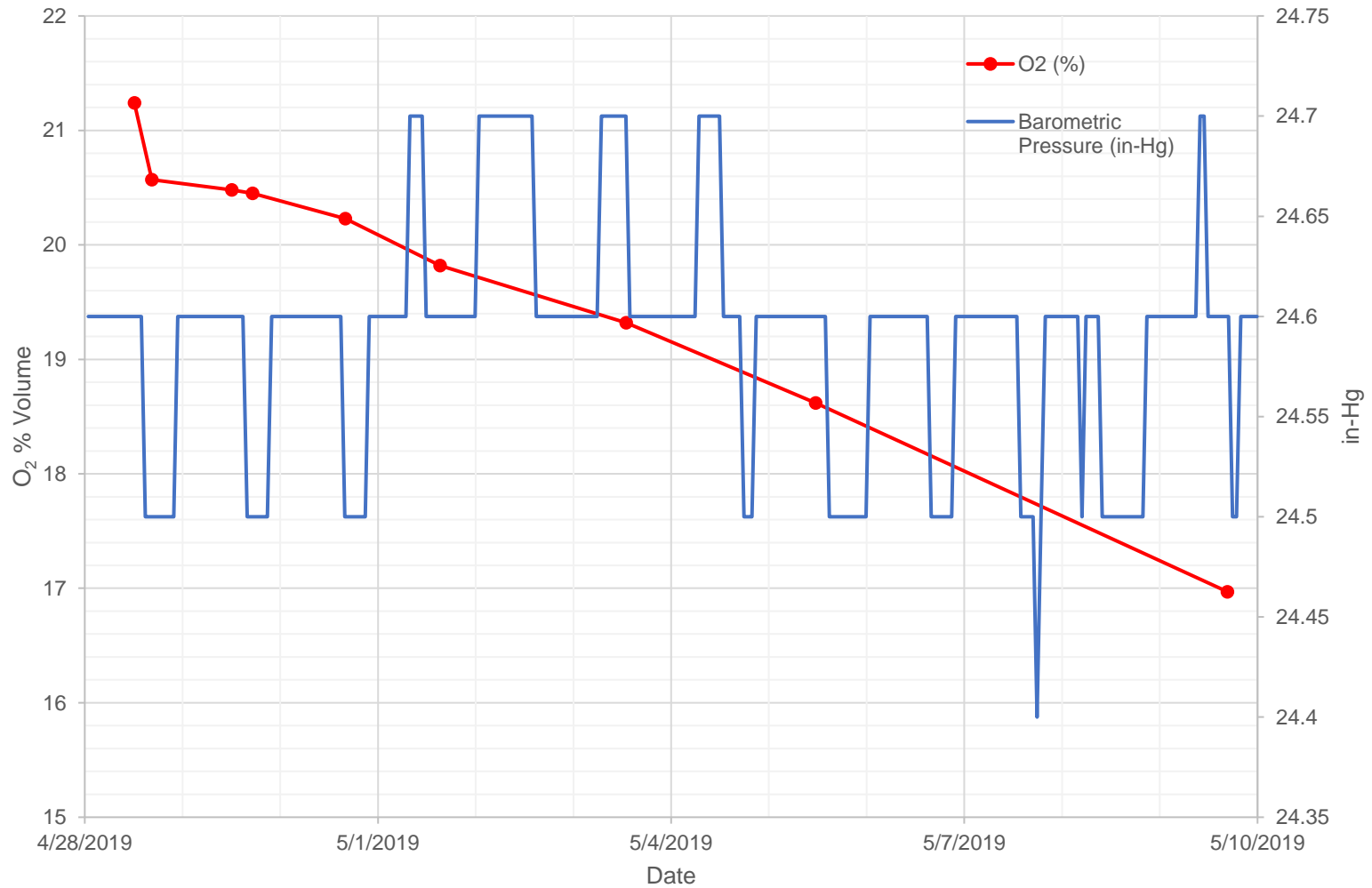


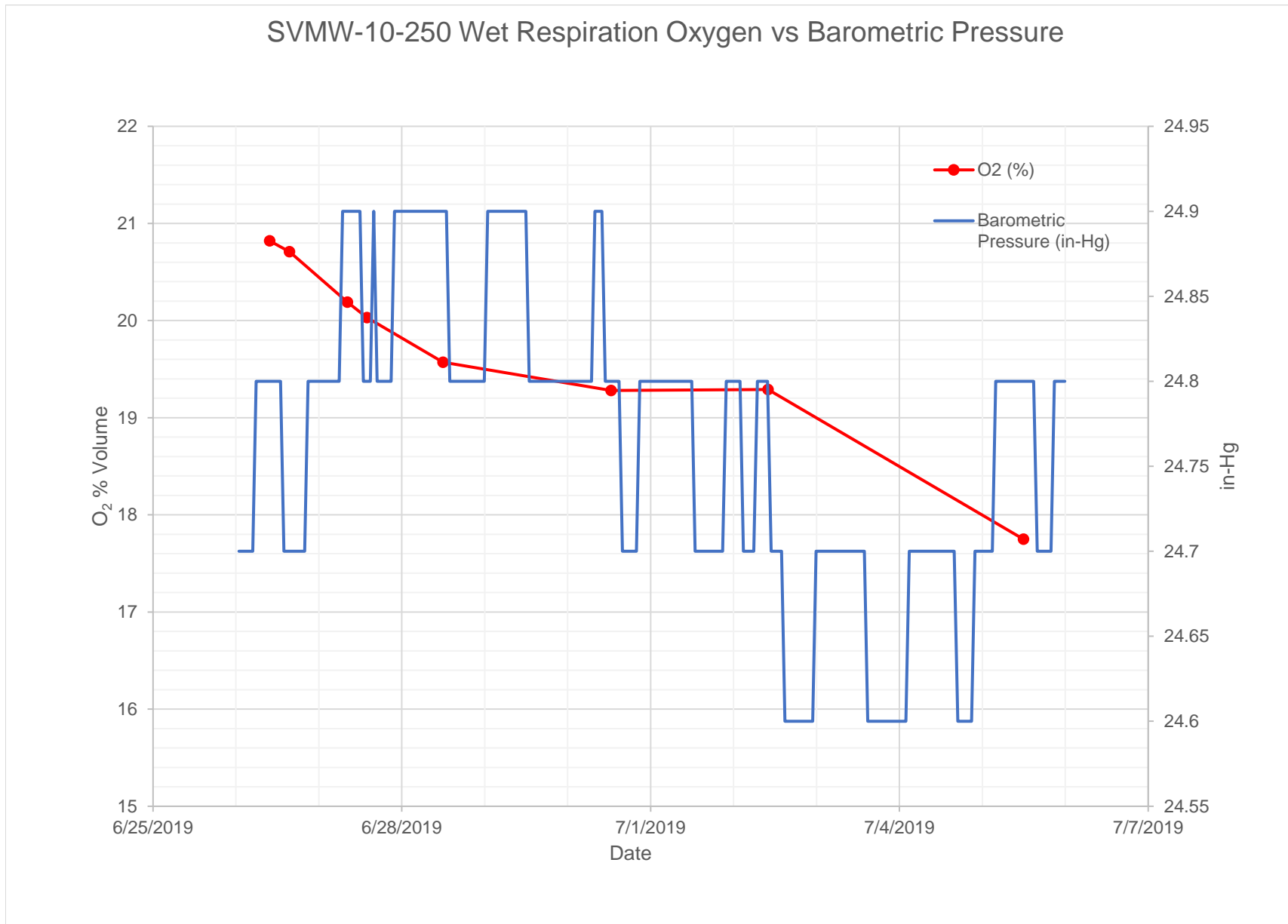


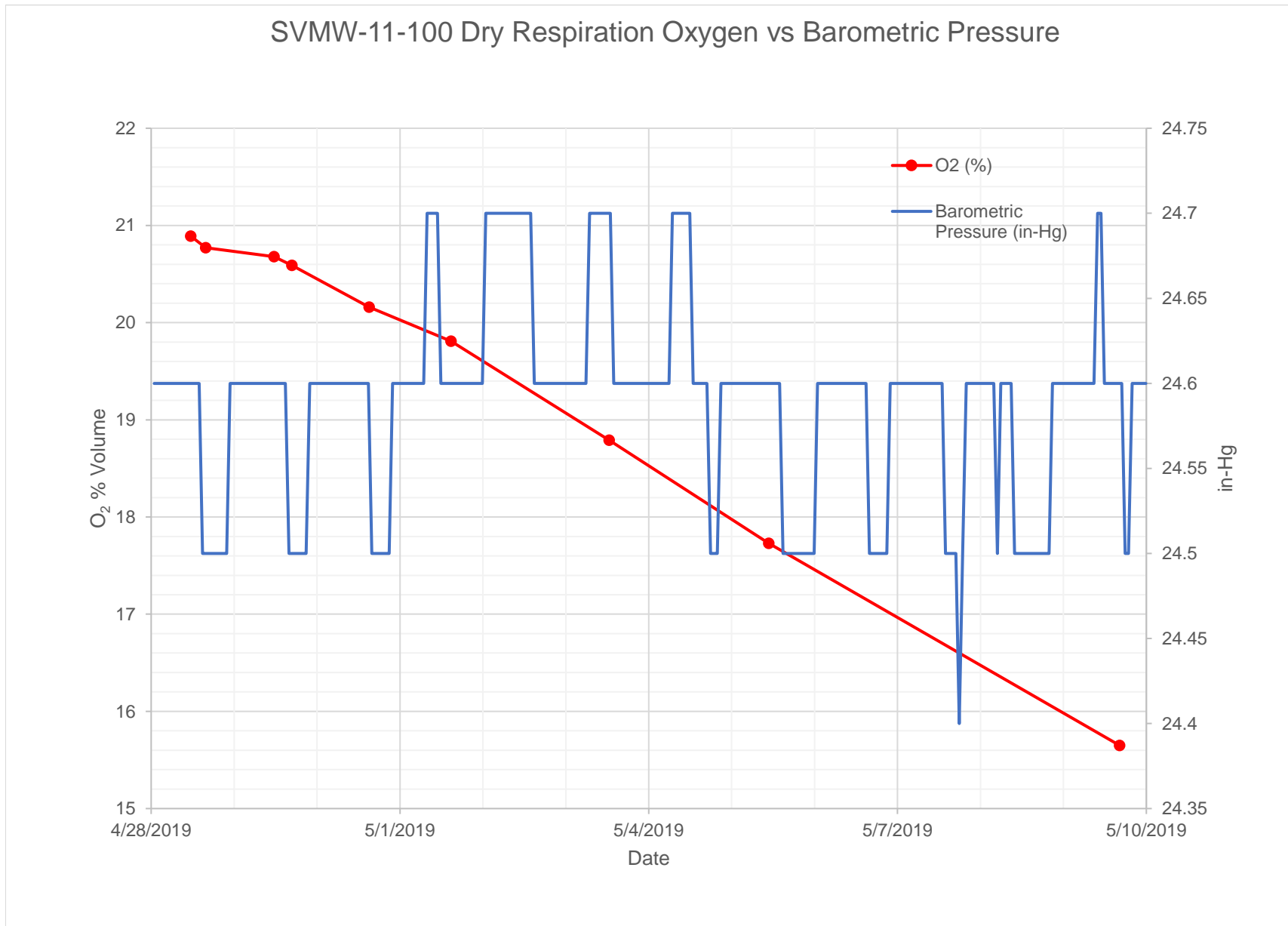




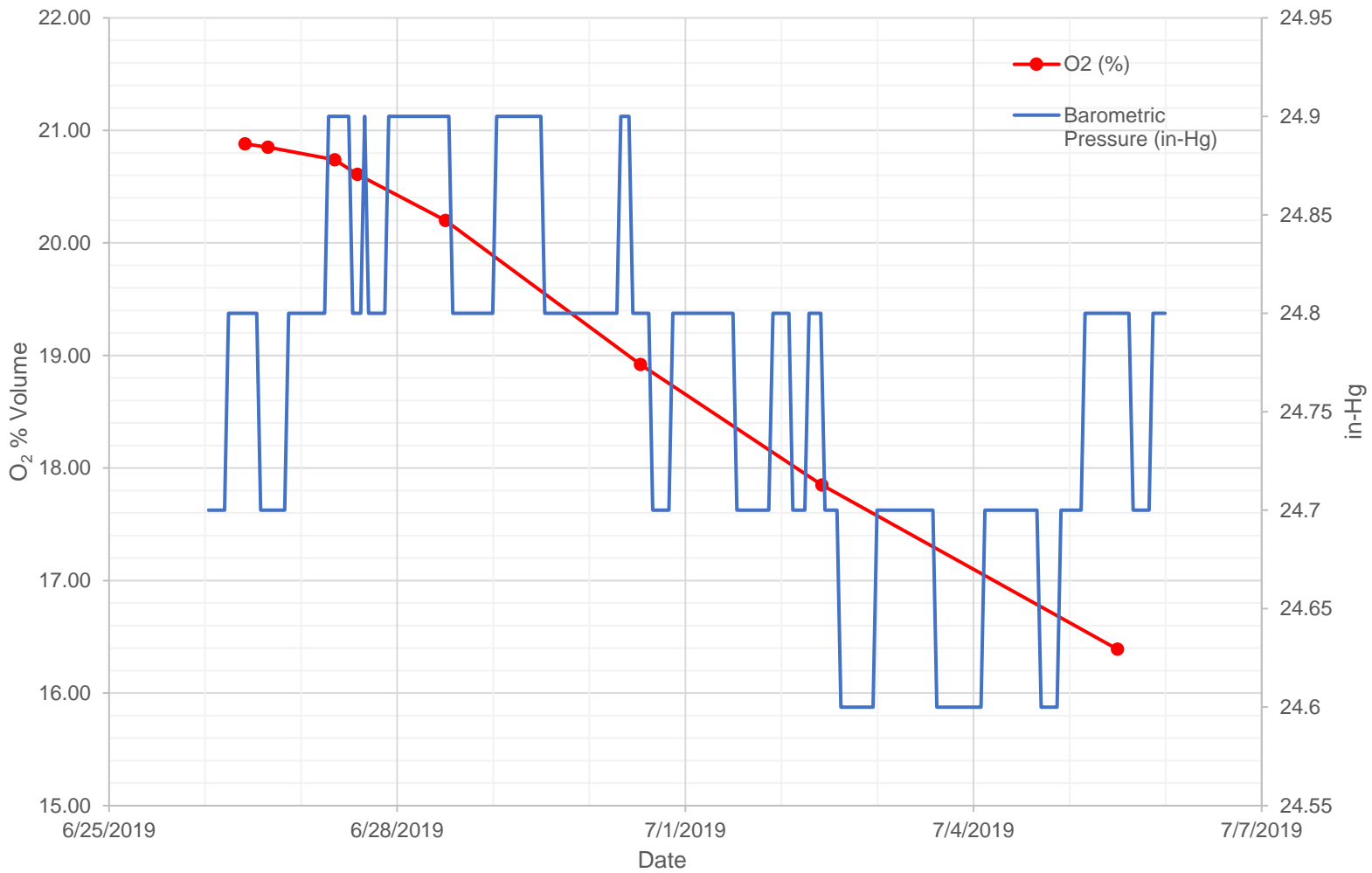
SVMW-10-250 Dry Respiration Oxygen vs Barometric Pressure

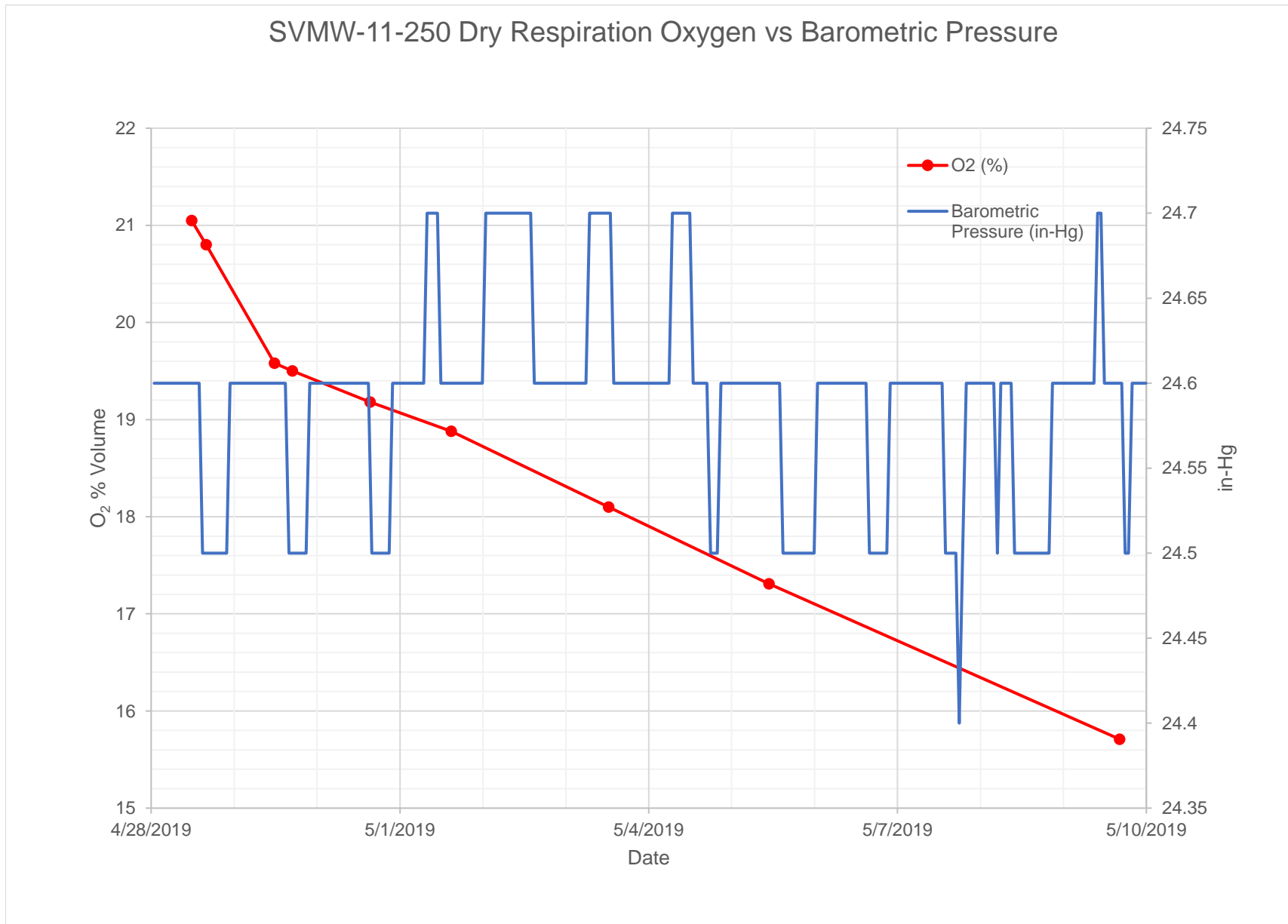


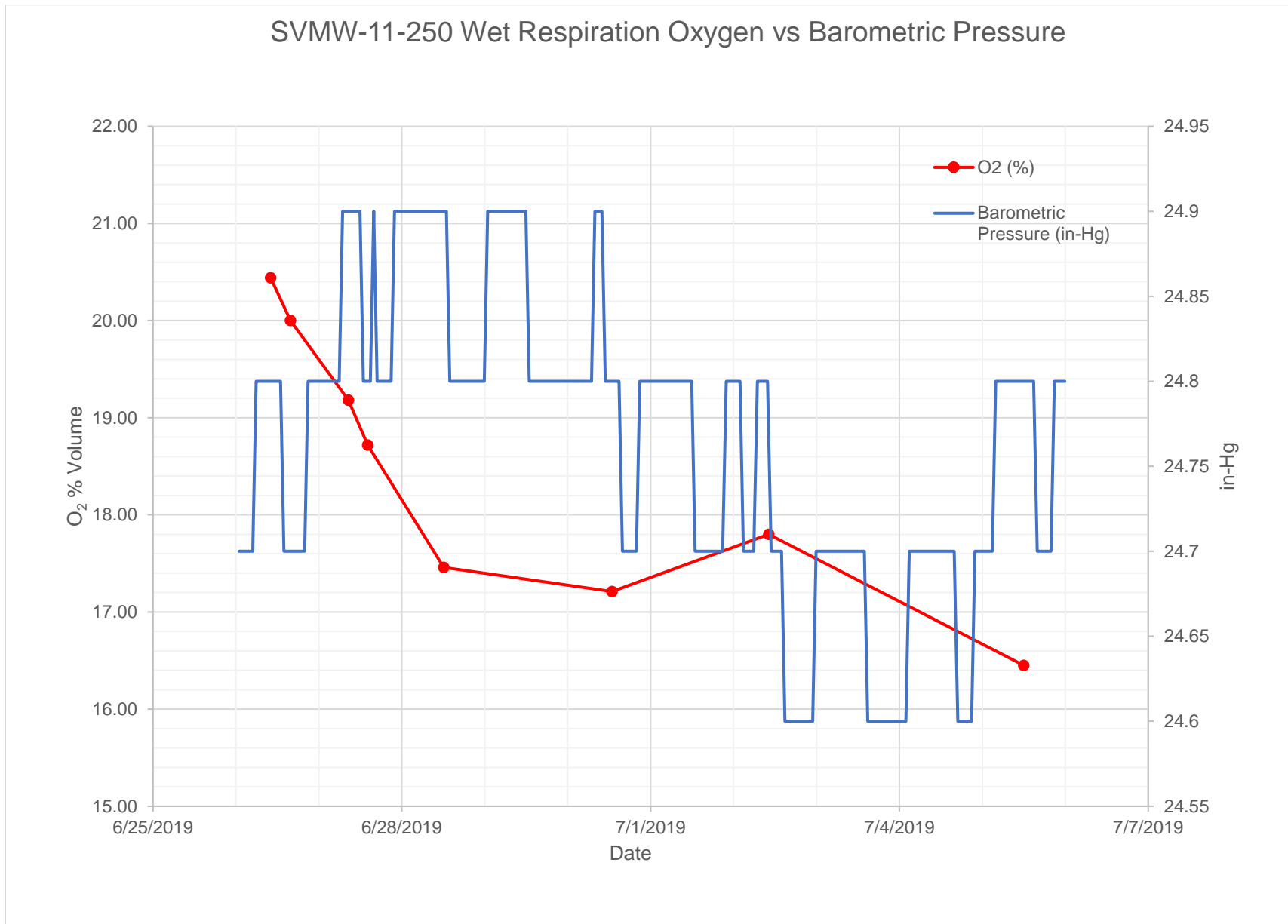


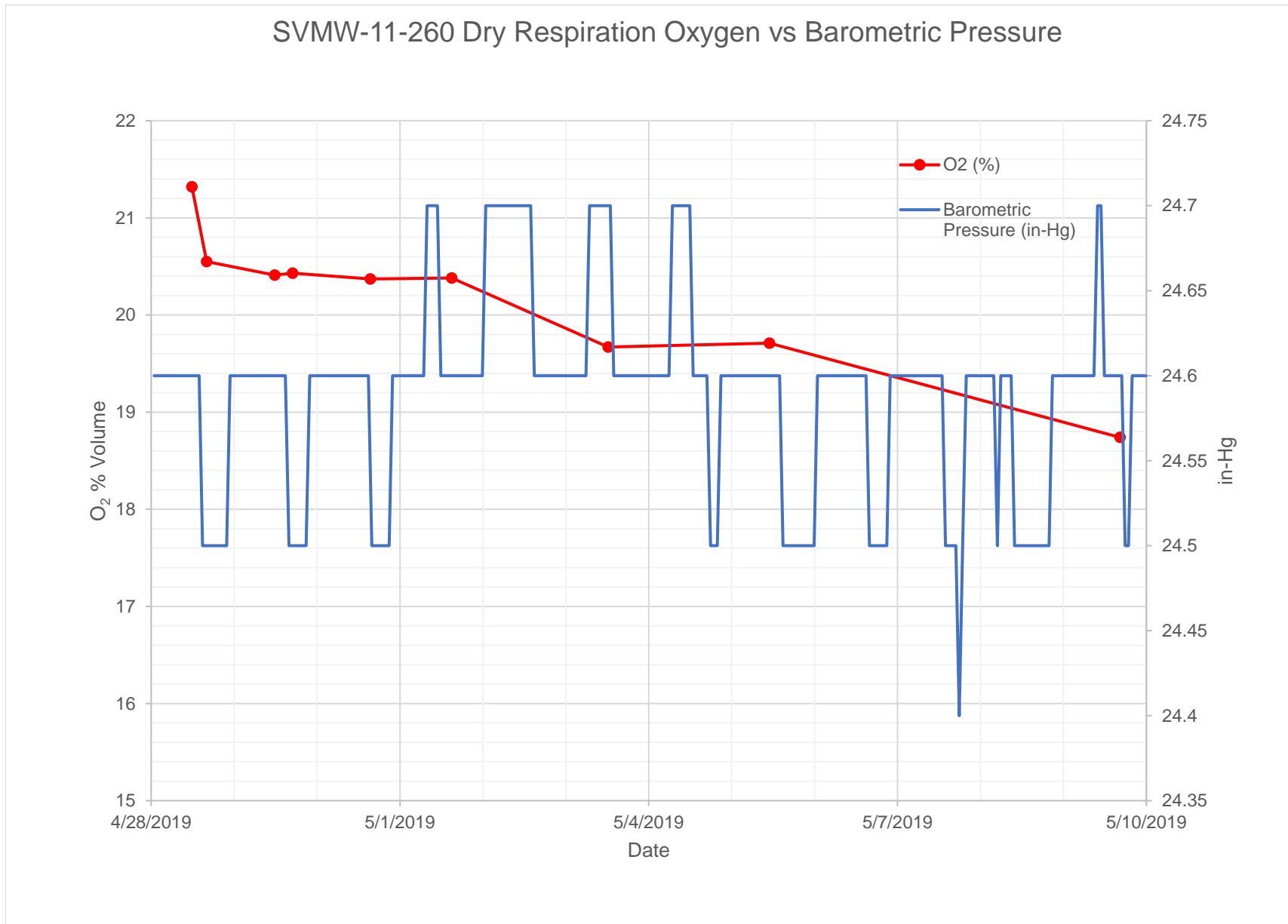


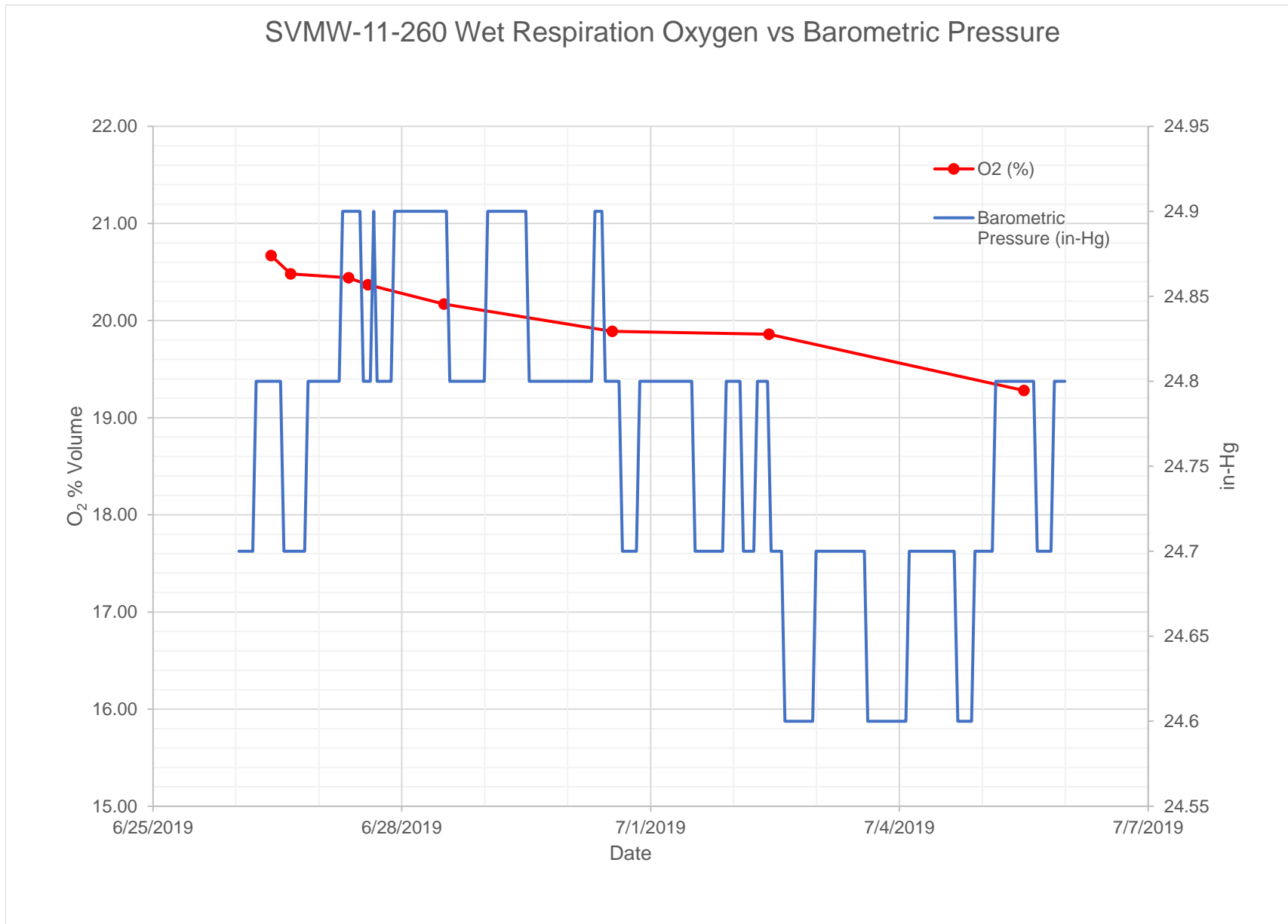
SVMW-11-100 Wet Respiration Oxygen vs Barometric Pressure



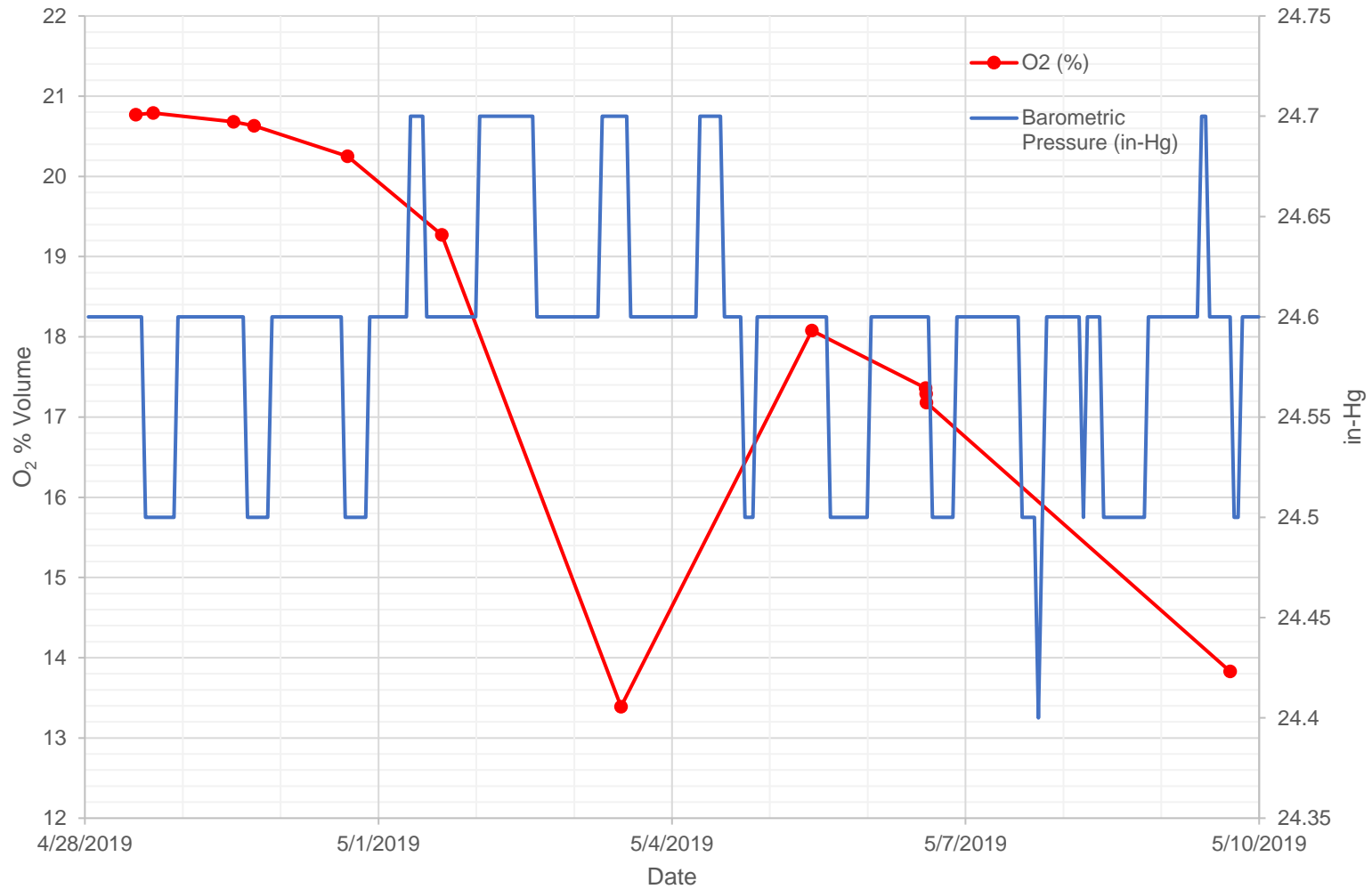


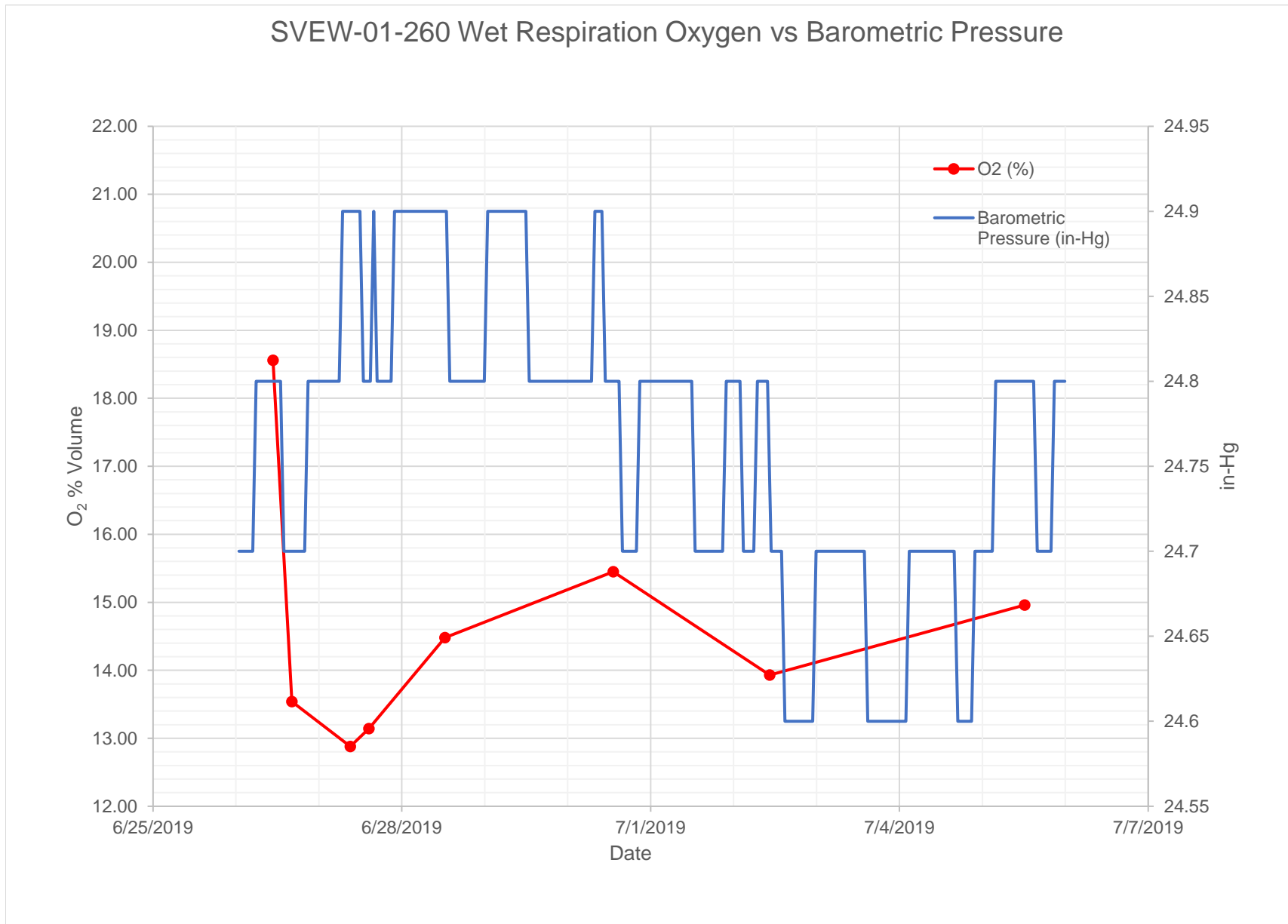




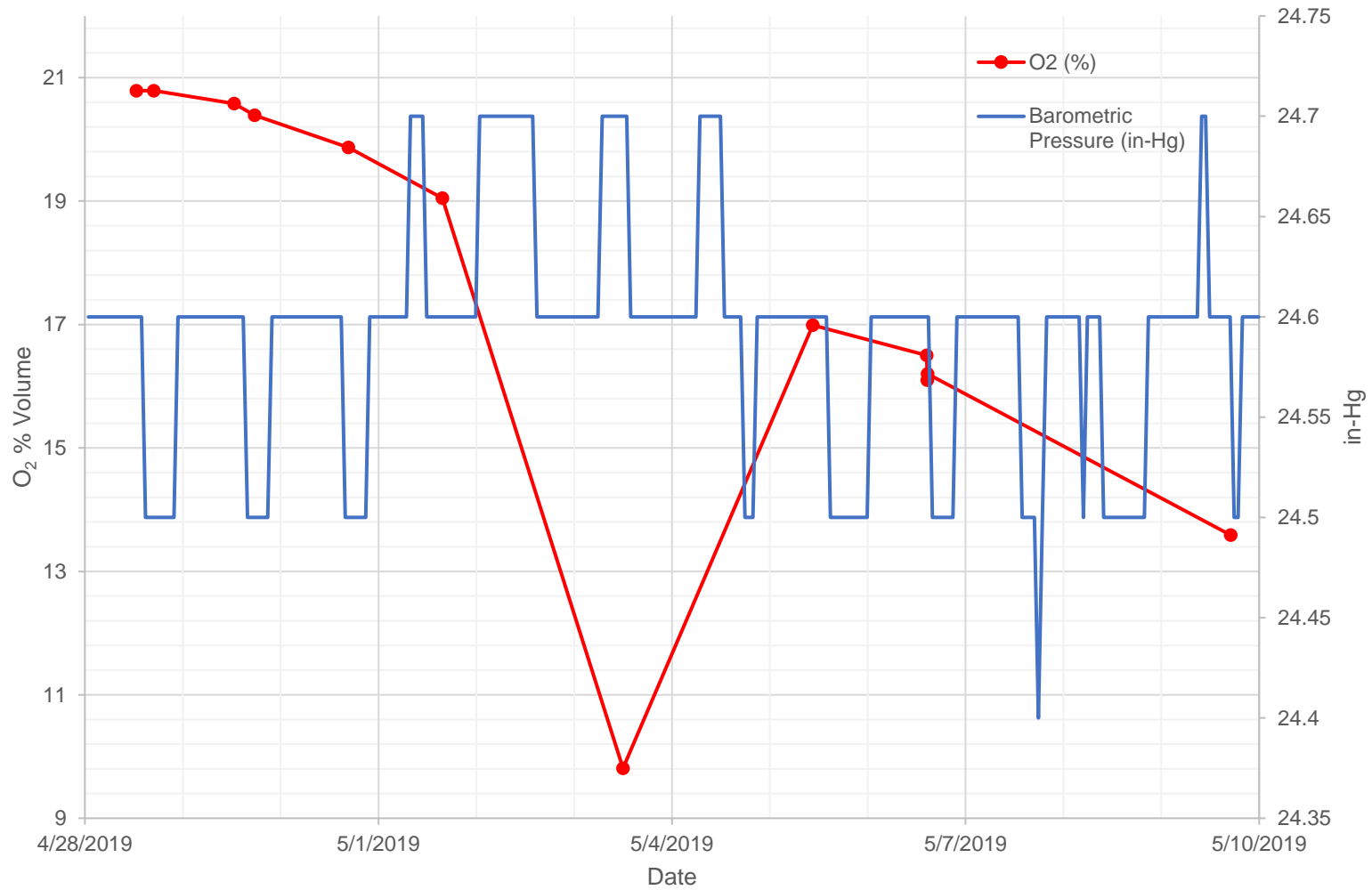


SVEW-01-260 Dry Respiration Oxygen vs Barometric Pressure

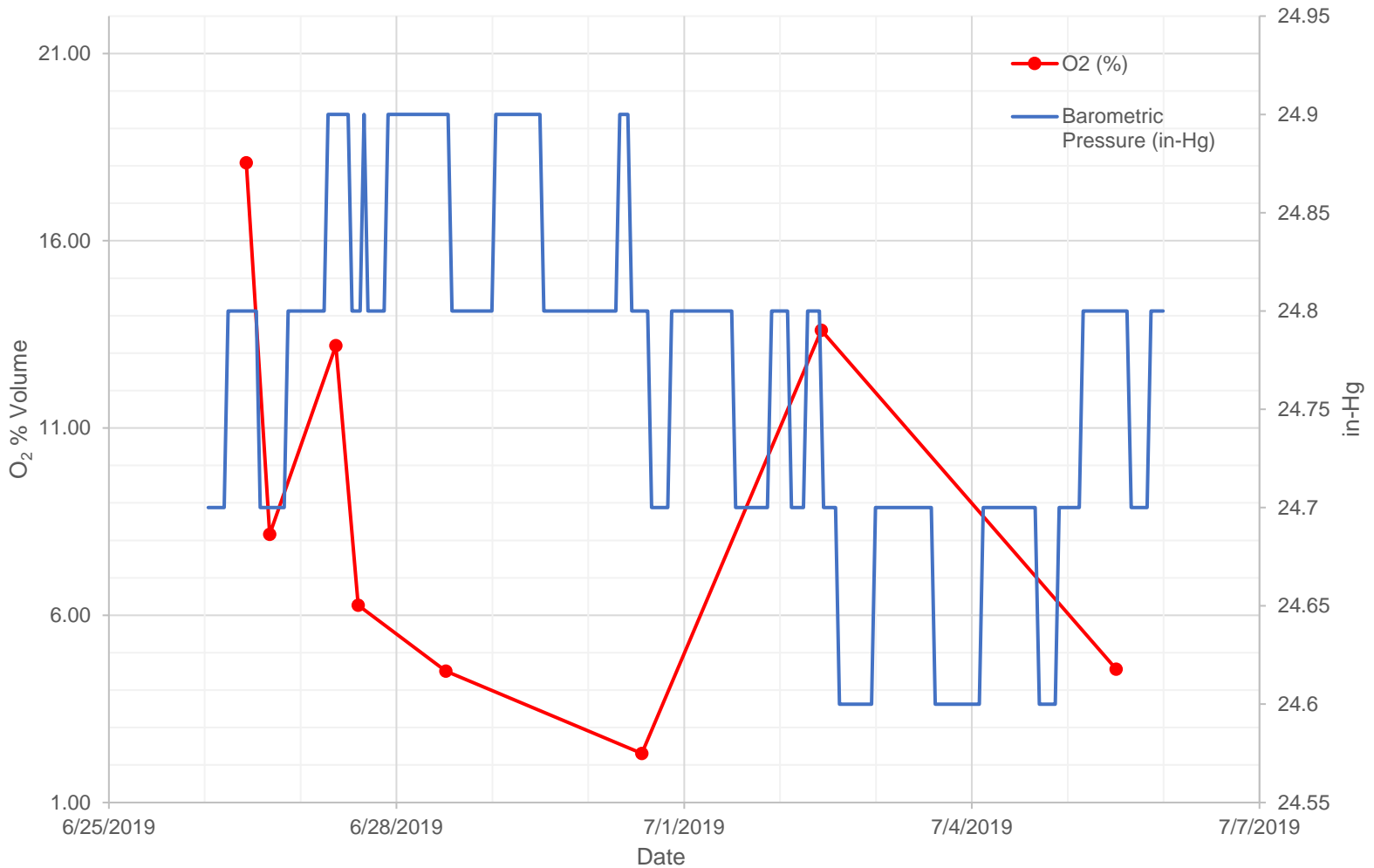




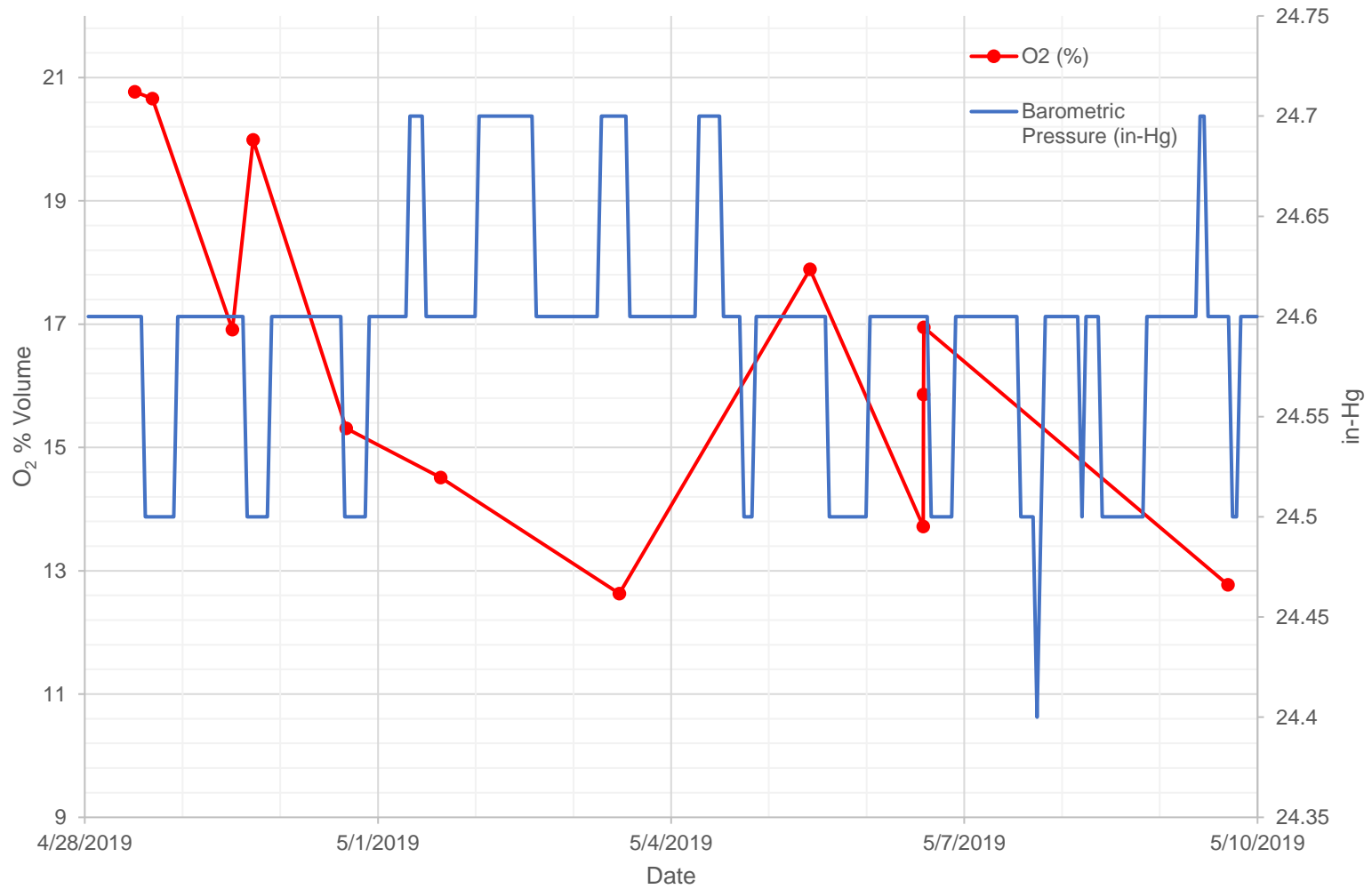
SVEW-02/03-160 Dry Respiration Oxygen vs Barometric Pressure



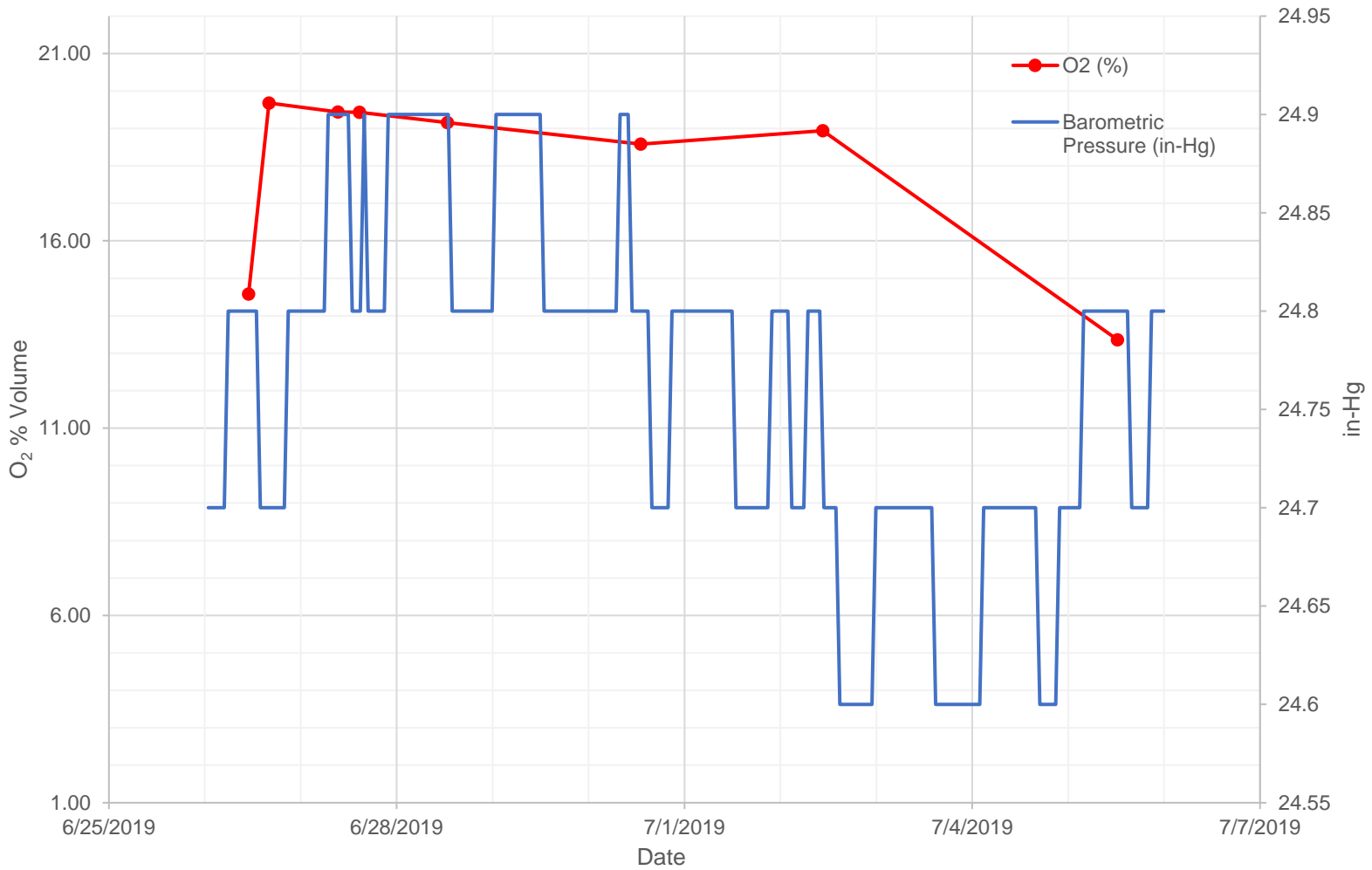
SVEW-02/03-160 Wet Respiration Oxygen vs Barometric Pressure



SVEW-04/05-313 Dry Respiration Oxygen vs Barometric Pressure



SVEW-04/05-313 Wet Respiration Oxygen vs Barometric Pressure



APPENDIX G

BIODEGRADATION, OXYGEN DEMAND FLOW RATE, AND RADIUS OF INFLUENCE CALCULATIONS

APPENDIX G

**BIODEGRADATION, OXYGEN DEMAND FLOW RATE, AND
RADIUS OF INFLUENCE CALCULATIONS**

Calculation G-1

Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and Oxygen Radius of Influence - SVMW-10-100 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-100 -Dry**

$$k_B = \text{biodegradation rate (mg/kg-day)}$$

$$k_B = [-k_0 \theta_{\text{air}} \rho_{\text{O}_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

$$Q_T = \text{Total oxygen demand air flow rate (ft}^3\text{/min)}$$

$$Q_T = (k_0 \cdot V \cdot \theta_{\text{air}}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

$$R_i = \text{Oxygen radius of influence (ft)}$$

$$R_i = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{\text{air}})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.4015	
k_0 =	Oxygen utilization rate (% per hour)	0.0167	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	121,660	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2.5	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	3,600	
h =	Aerated thickness (ft)	7.9	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.238 \text{ mg/kg-day}} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.640 \text{ ft}^3\text{/min}} \quad \text{Eq.2}$$

$$R_i = \quad \quad \quad \mathbf{138 \text{ ft}} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-2
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-10-100 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-100-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.2666	
k_0 =	Oxygen utilization rate (% per hour)	0.0111	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	121,660	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	1.8	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	2,592	
h =	Aerated thickness (ft)	7.9	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.158} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.425} \text{ ft}^3/\text{min} \quad \text{Eq.2}$$

$$R_I = \quad \quad \quad \mathbf{144} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-3

Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and Oxygen Radius of Influence - SVMW-10-150 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-150-Dry**

$$k_B = \text{biodegradation rate (mg/kg-day)} \quad \text{Page \&[Page] of \&[Pages]}$$

$$k_B = [-k_0\theta_{\text{air}}\rho_{\text{O}_2}C(0.01)]/\rho_k \quad \text{Eq. 1}$$

$$Q_T = \text{Total oxygen demand air flow rate (ft}^3\text{/min)}$$

$$Q_T = (k_0 \cdot V \cdot \theta_{\text{air}}) / [(20.9\% - 5\%)60 \text{ min/hr}] \quad \text{Eq.2}$$

$$R_I = \text{Oxygen radius of influence (ft)}$$

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{\text{air}})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.2544	
k_0 =	Oxygen utilization rate (% per hour)	0.0106	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	146,300	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	2,880	
h =	Aerated thickness (ft)	9.5	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.151 \text{ mg/kg-day}} \quad \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.488 \text{ ft}^3\text{/min}} \quad \quad \text{Eq.2}$$

$$R_I = \quad \quad \quad \mathbf{142 \text{ ft}} \quad \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-4
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-10-150 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-150-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.2521	
k_0 =	Oxygen utilization rate (% per hour)	0.0105	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	146,300	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	2,880	
h =	Aerated thickness (ft)	9.5	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.149} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.483} \text{ ft}^3/\text{min} \quad \text{Eq.2}$$

$$R_I = \quad \quad \quad \mathbf{142} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-5
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-10-250 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-250-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_i = Oxygen radius of influence (ft)

$$R_i = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.3324	
k_0 =	Oxygen utilization rate (% per hour)	0.0139	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	158,620	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2.8	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	4,032	
h =	Aerated thickness (ft)	10.3	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.197} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.691} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_i = \quad \quad \quad \mathbf{141} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-6
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-10-250 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchey, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-10-250-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C (0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.2931	
k_0 =	Oxygen utilization rate (% per hour)	0.0122	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	158,620	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2.5	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	3,600	
h =	Aerated thickness (ft)	10.3	

Calculations:

$$k_B = \mathbf{0.174} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{0.609} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{142} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-7
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-11-100 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-100-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.4752	
k_0 =	Oxygen utilization rate (% per hour)	0.0198	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	126,280	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	3.3	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	4,752	
h =	Aerated thickness (ft)	8.2	

Calculations:

$$k_B = \mathbf{0.281} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{0.786} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{143} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-8

Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and Oxygen Radius of Influence - SVMW-11-100 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-100-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.5198	
k_0 =	Oxygen utilization rate (% per hour)	0.0217	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	126,280	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	3.5	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	5,040	
h =	Aerated thickness (ft)	8.2	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.308} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.860} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \quad \quad \quad \mathbf{141} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-9
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-11-250 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-250-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.4153	
k_0 =	Oxygen utilization rate (% per hour)	0.0173	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	112,420	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2.5	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	3,600	
h =	Aerated thickness (ft)	7.3	

Calculations:

k_B = **0.246** mg/kg-day Eq. 1

Q_T = **0.612** ft³/min Eq.2

R_I = **142** ft Eq. 3

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-10
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-11-250 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-250-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.3715	
k_0 =	Oxygen utilization rate (% per hour)	0.0155	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	112,420	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	2.3	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	3,312	
h =	Aerated thickness (ft)	7.3	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.220 \text{ mg/kg-day}} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.547 \text{ ft}^3/\text{min}} \quad \text{Eq. 2}$$

$$R_I = \quad \quad \quad \mathbf{144 \text{ ft}} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-11
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-11-260 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchey, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-260-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0\theta_{air}\rho_{O_2}C(0.01)]/\rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%)60 \text{ min/hr}] \quad \text{Eq.2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.1627	
k_0 =	Oxygen utilization rate (% per hour)	0.0068	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	346,500	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	3	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	4,320	
h =	Aerated thickness (ft)	22.5	

Calculations:

$$k_B = \mathbf{0.096} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{0.739} \text{ ft}^3/\text{min} \quad \text{Eq.2}$$

$$R_I = \mathbf{141} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-12
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVMW-11-260 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVMW-11-260-Wet**

$$k_B = \text{biodegradation rate (mg/kg-day)}$$

$$k_B = [-k_0 \theta_{\text{air}} \rho_{\text{O}_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

$$Q_T = \text{Total oxygen demand air flow rate (ft}^3/\text{min)}$$

$$Q_T = (k_0 \cdot V \cdot \theta_{\text{air}}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

$$R_I = \text{Oxygen radius of influence (ft)}$$

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{\text{air}})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

$k_0 =$	Oxygen utilization rate (% per day)	0.1375	
$k_0 =$	Oxygen utilization rate (% per hour)	0.0057	
$\theta_{\text{air}} =$	Air-filled porosity (fractional)	0.3	
$\rho_{\text{O}_2} =$	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
$\rho_k =$	Soil bulk density (g/cm ³)	1.6	
$C =$	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
$V =$	Volume impacted soil (ft ³)	346,500	
$Q_d =$	Design Flow Rate (ft ³ /min) (per well)	2.5	
$Q_d =$	Design Flow Rate (ft ³ /day) (per well)	3,600	
$h =$	Aerated thickness (ft)	22.5	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.081} \text{ mg/kg-day} \quad \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{0.624} \text{ ft}^3/\text{min} \quad \quad \text{Eq.2}$$

$$R_I = \quad \quad \quad \mathbf{140} \text{ ft} \quad \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-13
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-01-260 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-01-260-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0\theta_{air}\rho_{O_2}C(0.01)]/\rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.552	
k_0 =	Oxygen utilization rate (% per hour)	0.0230	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	400,400	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	12	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	17,280	
h =	Aerated thickness (ft)	26	

Calculations:

$$k_B = \mathbf{0.327} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{2.896} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{143} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-14
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-01-260 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-01-260-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.0202	
k_0 =	Oxygen utilization rate (% per hour)	0.0008	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	400,400	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	0.5	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	720	
h =	Aerated thickness (ft)	26	

Calculations:

k_B = **0.012** mg/kg-day Eq. 1

Q_T = **0.106** ft³/min Eq. 2

R_I = **152** ft Eq. 3

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-15
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-02/03-160 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-02/03-160-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq.2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.6393	
k_0 =	Oxygen utilization rate (% per hour)	0.0266	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	446,600	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	15	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	21,600	
h =	Aerated thickness (ft)	29	

Calculations:

$$k_B = \quad \quad \quad \mathbf{0.378} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \quad \quad \quad \mathbf{3.741} \text{ ft}^3/\text{min} \quad \text{Eq.2}$$

$$R_I = \quad \quad \quad \mathbf{140} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-16
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-02/03-160 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-02/03-160 -Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0\theta_{air}\rho_{O_2}C(0.01)]/\rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.6261	
k_0 =	Oxygen utilization rate (% per hour)	0.0261	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	446,600	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	15	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	21,600	
h =	Aerated thickness (ft)	29	

Calculations:

$$k_B = \mathbf{0.371} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{3.664} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{142} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-17
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-04/05-313 Dry Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-04/05-313-Dry**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.4965	
k_0 =	Oxygen utilization rate (% per hour)	0.0207	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,104	20°C ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	385,000	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	10	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	14,400	
h =	Aerated thickness (ft)	25	

Calculations:

$$k_B = \mathbf{0.294} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{2.505} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{140} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.

Calculation G-18
Calculation of Biodegradation Rate, Oxygen Demand Flowrate, and
Oxygen Radius of Influence - SVEW-04/05-313 Wet Respiration Test

Reference:

Leeson, Andrea and Robert Hinchee, 1996. Principal and Practices of Bioventing Volume II: Bioventing Design. Battelle Memorial Institute. September 29.

Calculation of Biodegradation Rate, Air Flow Rate, and Oxygen Radius of Influence:

Test Well **SVEW-04/05-313-Wet**

k_B = biodegradation rate (mg/kg-day)

$$k_B = [-k_0 \theta_{air} \rho_{O_2} C(0.01)] / \rho_k \quad \text{Eq. 1}$$

Q_T = Total oxygen demand air flow rate (ft³/min)

$$Q_T = (k_0 \cdot V \cdot \theta_{air}) / [(20.9\% - 5\%) 60 \text{ min/hr}] \quad \text{Eq. 2}$$

R_I = Oxygen radius of influence (ft)

$$R_I = [(Q_d \cdot (20.9\% - 5\%)) / (\pi \cdot h \cdot k_0 \theta_{air})]^{1/2} \quad \text{Eq. 3}$$

Input Data:

k_0 =	Oxygen utilization rate (% per day)	0.3584	
k_0 =	Oxygen utilization rate (% per hour)	0.0149	
θ_{air} =	Air-filled porosity (fractional)	0.3	
ρ_{O_2} =	Density of oxygen in air (mg/L _{air})	1,180	80°F ABQ
ρ_k =	Soil bulk density (g/cm ³)	1.6	
C =	Mass ratio hydrocarbons to oxygen for mineralization (1:3.5)	0.286	
V =	Volume impacted soil (ft ³)	385,000	
Q_d =	Design Flow Rate (ft ³ /min) (per well)	8	
Q_d =	Design Flow Rate (ft ³ /day) (per well)	11,520	
h =	Aerated thickness (ft)	25	

Calculations:

$$k_B = \mathbf{0.227} \text{ mg/kg-day} \quad \text{Eq. 1}$$

$$Q_T = \mathbf{1.808} \text{ ft}^3/\text{min} \quad \text{Eq. 2}$$

$$R_I = \mathbf{147} \text{ ft} \quad \text{Eq. 3}$$

k_0 was derived respiration testing.

Volume of impacted soil is the area of the impacted soil multiplied by the aerated thickness.