Pinyon Environmental, Inc.
Corporate Headquarters
3222 South Vance Street, Suite 200, Lakewood, CO 80227
T: 303.980.5200 F: 303.980.0089
www.pinyon-env.com

January 25, 2024

Airborne Lead Sampling

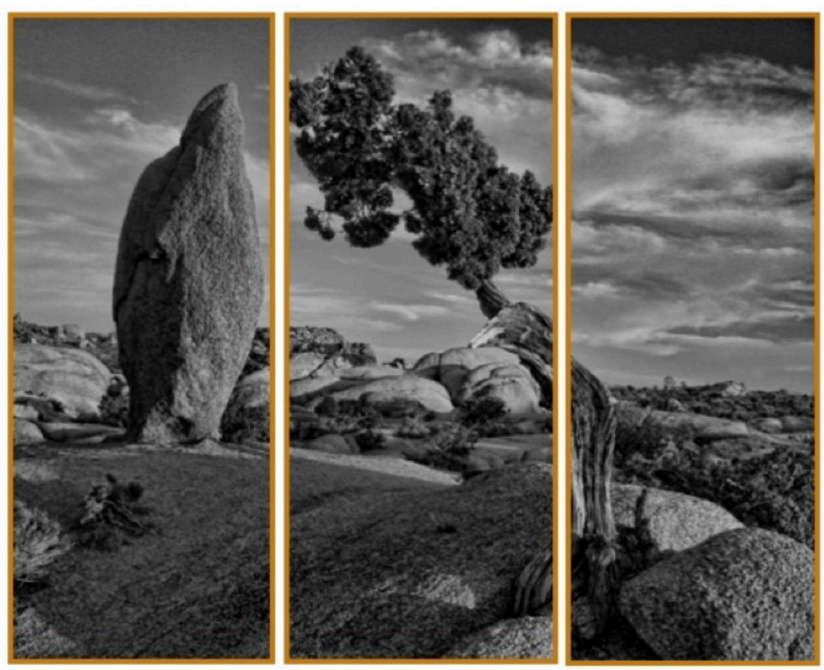
Superior, CO

Prepared for:

Leslie Clark
124 E. Coal Creek Drive
Superior, Colorado 80027

Pinyon Project No.:

1/23-2523-01.IHS009.3



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Prepared by:
Aaron Caudill
Regulatory Compliance Specialist

Reviewed by:
Tricia McCready
Technical Lead – Industrial Hygiene | Health & Safety

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Table of Contents

Appendices

1.0 INTRODUCTION

On January 3 and January 5, 2024, Pinyon Environmental, Inc. (Pinyon) completed air sampling for lead analysis at four outdoor community locations within the Town of Superior (Town). The four sampling locations were chosen by the Town with respect to each location's proximity to the Rocky Mountain Metropolitan Airport (RMMA) flight patterns (Appendix A).

This study was requested due to community concerns regarding low lead fuel emissions from small engine aircraft affiliated with the RMMA, and an increase in flight activity in recent years. This report represents data for airborne lead concentrations found in the community and is a snapshot in time. This data and associated evaluation are not to be used or interpreted as a thorough study designed to target lead emissions specifically from aircraft emissions associated with RMMA flight activities, nor should the results be used to demonstrate compliance with the U.S. Environmental Protection Agency (EPA) National Ambient Air Quality Standards for lead.

According to the Griffiths[1] study that the Town shared with Pinyon, exhaust emission particle sizes from small piston aircraft have a mean diameter as small as 13 nanometers (nm) while exhaust automobile particles average 50 nm in diameter. Air sample collection near an airport, such as RMMA, at ground level would be expected to capture exhaust emission particles from both sources but would be unable to characterize between the two sources.

Table 1.0.1- Project Details

Client Name:	Leslie Clark
Proposal Date:	December 15, 2023
Sample Location(s):	• Commons Park - Outdoor • Purple Park - Outdoor • South Pool - Outdoor • Pirate Park - Outdoor

[1] https://pubmed.ncbi.nlm.nih.gov/33100835/

2.0 SURVEY METHODS

2.1 Airborne Lead Samples

Pinyon's environmental scientist collected the airborne samples utilizing Gilian BDXII Abatement Air Sampler constant flow air sampling pumps that were calibrated to 2.5 liters per min (lpm). For each pump, Tygon® tubing was connected from the pump's inlet port to a 37-millimeter, 3-piece air sampling cassette affixed with a 0.8 micrometer Mixed Cellulose Ester filter. The pump was placed on the ground during sampling, while the cassette at the end of the tubing was securely clipped to a tripod that held that cassette about three feet above ground surface. The pumps ran continuously for approximately 7.5 to 8 hours on two separate days. Each morning, Pinyon placed each sampling pump and cassette in the designated locations, checked on them routinely throughout the day, and retrieved the pump and cassette in the evening. Each day, the four pumps were pre-calibrated and post-calibrated in the field using a TSI 4100 Series primary calibrator. Weather data was also collected and recorded during the two-day sampling event.

The airborne lead laboratory analysis was conducted using the most sensitive test for metals in air, NIOSH 7300M method performed on an Inductively Coupled Plasma Mass Spectrometer (ICP-MS). This laboratory method has a reporting limit around 0.039 micrograms per cubic meter ($\mu g/m^3$). The samples and two field blanks (one for each day) were collected and submitted under Pinyon Chain of Custody protocols to LA Testing, an American Industrial Hygiene Association Laboratory Accreditation Programs, LLC - Industrial Hygiene Laboratory Accreditation Program (AIHA LAP, LLC-IHLAP) laboratory in Huntington Beach, California.

3.0 FINDINGS

3.1 Airborne Lead Samples

The two sampling days, which fell on a Wednesday and Friday, were generally partly cloudy with mild wind and average temperatures for the time of year. No precipitation was recorded in the area. The weather conditions are presented in Table 3.1.1.

Table 3.1.1 - Weather Conditions

Date	Time Range	Average Temp (°F)	Average Humidity (%)	Average Wind Speed (mph)	General Wind Direction
January 3, 2024	7:50 am - 11:45 am	36.0	50.0	5.0	East to Southeast
	11:45 am - 3:45 pm	45.0	31.9	7.8	Southeast
January 5, 2024	7:45 am - 11:45 am	34.3	59.6	4.6	East to Southeast
	11:45 am - 3:45 pm	39.2	40.0	5.5	East to Northeast

Notes:

Temp *Temperature*
°F *Degrees Fahrenheit*
% *Percent*
mph *Miles per hour*

A total of eight samples were collected from the same four locations each day, thus providing two separate data sets. The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for six principal pollutants which can be harmful to public health and the environment. The level established for lead is not to exceed 0.15 μg/m^3 over a three-month period. All of the results for the samples during this study were below the analytical reporting limit (RL), which is 0.039 μg/m^3 to 0.047 μg/m^3. Refer to Table 3.1.2 for the sample results and Appendix C for the Laboratory Analytical Reports and Chain of Custody.

Table 3.1.2 - Airborne Lead Sample Results

Location	Sample Number	Sample Duration (min)	Flow Rate (lpm)	Volume (Liters)	Results (µg/m^3)	NAAQS for Lead (µg/m^3)
Wednesday, January 3, 2024						
Purple Park	010324-PP	445	2.57	1,141	<0.044	0.15
South Pool	010324-SP	440	2.57	1,131	<0.044	0.15
Pirate Park	010324-PIP	445	2.59	1,153	<0.043	0.15
Commons Park	010324-CP	440	2.43	1,069	<0.047	0.15
Friday, January 5, 2024						
Commons Park	010524-CP	485	2.61	1,266	<0.039	0.15
Purple Park	010524-PP	484	2.68	1,295	<0.039	0.15
South Pool	010524-SP	478	2.65	1,264	<0.040	0.15
Pirate Park	010524-PIP	474	2.64	1,251	<0.040	0.15

Notes:

min *Minutes*
lpm *liters per minute*
NAAQS *National Ambient Air Quality Standard*
µg/m3 *Microgram per cubic meter of air*
< *Less than*

4.0 RECOMMENDATIONS

The results of the two sampling events indicate that airborne lead was not detected at concentrations exceeding the NAAQS limit of 0.15 ug/m^3 for lead. For a detailed study to show correlation between small piston aircraft emission activity and community airborne lead exposure, Pinyon recommends a study with air samples collected at the airport over a period of time that correlates with the NAAQS evaluation criteria, exhaust emission sampling, and several hundred more airborne samples be collected. This sampling event was designed to provide an initial screening of airborne lead particles. The recommended detail study should follow the EPA Federal Reference Method for measuring lead in total suspended particulate matter[1].

[1]https://www.epa.gov/sites/default/files/2016-03/documents/finalrule_lead_20130626fs.pdf

5.0 LIMITATIONS

This report was prepared by Pinyon Environmental, Inc., at the request of and for the sole benefit of the Town of Superior, or any entity controlling, controlled by, or under common control with the Town of Superior. Any use a third party makes of this report, including reuse or publication of any portion of this report or any reliance on or decisions to be made based upon the results presented, are the responsibility of such third party. Pinyon Environmental, Inc., shall not be liable for any damages arising out of such reuse or publication, and accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

The results, findings, conclusions, and recommendations expressed in this report are based on conditions observed on January 3 and January 5, 2024. Changes in environmental and work conditions, such as weather, can cause changes in exposure. The information contained in this report should not be relied upon to represent conditions that existed previously or that are anticipated to occur at a future date.

Appendix A Figures

LEGEND

Site Boundary

Landing / Takeoff Area (LTO)

N

0 4000' 8000'

SCALE: 1" = 4000'

Pinyon Environmental, Inc.

SITE LOCATION

Airborne Lead Sample Locations
Town of Superior
Superior, Colorado

Site Location: Multiple Sections, T 1S, R 69W, 6th Principal Meridian	Drawn By: SJA	Figure: 1
Pinyon Project Number: 1/23-1523-01.IHS009.3	Reviewed By: AC	Date: 1/23/2024

PLOT DATE: 1/23/2024

Z:\PROJECTS\2023\1231523\01 Superior - Airborne Lead Sampling\Figures\AutoCAD\DWG\IHS01_SL.dwg

Coordinate System: NAD83 COLORADO STAET PLANES, NORTH ZONE, US FOOT - CO83-NF

Appendix B Photographic Log

Photo 1.
Pirate Park

Photo 2.
Commons Park

Photo 3.
South Pool

Photo 4.
Purple Park

Appendix C Laboratory Analytical Reports and Chain of Custody

LA Testing
5431 Industrial Drive, Huntington Beach, CA 92649
Phone: (714) 828-4999 Fax: (714) 828-4944 Email: hblab@latesting.com

Attn: **Tricia McCready**
Pinyon Environmental
3222 S. Vance Street
Suite 200
Lakewood, CO 80227

1/16/2024

Phone: (303) 980-5200
Fax: (303) 980-0089

The following analytical report covers the analysis performed on samples submitted to LA Testing on 1/9/2024. The results are tabulated on the attached data pages for the following client designated project:

123152301 SUPERIOR AIRBORNE LEAD

The reference number for these samples is EMSL Order #332400375. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (714) 828-4999.

Approved By:

Michael Chapman

Michael Chapman, Laboratory Manager

AIHA LAP, LLC-IHLAP Accredited #101650

LA Testing
5431 Industrial Drive, Huntington Beach, CA 92649
Phone/Fax: (714) 828-4999 / (714) 828-4944
http://www.LATesting.com hblab@latesting.com

LA Testing Order: 332400375
CustomerID: PINY63
CustomerPO:
ProjectID:

Attn: **Tricia McCready**
Pinyon Environmental
3222 S. Vance Street
Suite 200
Lakewood, CO 80227

Phone: (303) 980-5200
Fax: (303) 980-0089
Received: 1/9/2024 10:35 AM
Collected: 1/5/2024

Project: **123152301 SUPERIOR AIRBORNE LEAD**

Analytical Results

Client Sample Description 010324-PP PURPLE PARK — ***Collected:*** 1/3/2024 — ***Lab ID:*** *332400375-0001*

Method	Parameter	Result	RL	Units	Prep Date & Analyst		Analysis Date & Analyst	
METALS								
7300 Modified	Lead	<0.044	0.044	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010324-SP SOUTH POOL — ***Collected:*** 1/3/2024 — ***Lab ID:*** *332400375-0002*

Method	Parameter	Result	RL	Units	Prep Date & Analyst		Analysis Date & Analyst	
METALS								
7300 Modified	Lead	<0.044	0.044	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010324-PIP PIRATE PARK — ***Collected:*** 1/3/2024 — ***Lab ID:*** *332400375-0003*

Method	Parameter	Result	RL	Units	Prep Date & Analyst		Analysis Date & Analyst	
METALS								
7300 Modified	Lead	<0.043	0.043	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010324-CP COMMON PARK — ***Collected:*** 1/3/2024 — ***Lab ID:*** *332400375-0004*

Method	Parameter	Result	RL	Units	Prep Date & Analyst		Analysis Date & Analyst	
METALS								
7300 Modified	Lead	<0.047	0.047	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010324-FB FIELD BLANK — ***Collected:*** 1/3/2024 — ***Lab ID:*** *332400375-0005*

Method	Parameter	Result	RL	Units	Prep Date & Analyst		Analysis Date & Analyst	
METALS								
7300 Modified	Lead	<0.050	0.050	µg/filter	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010524-CP COMMON PARK — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0006*

Method	Parameter	Result	RL	Units	Prep Date & Analyst	Analysis Date & Analyst
METALS						

LA Testing
5431 Industrial Drive, Huntington Beach, CA 92649
Phone/Fax: (714) 828-4999 / (714) 828-4944
http://www.LATesting.com hblab@latesting.com

LA Testing Order:	332400375
CustomerID:	PINY63
CustomerPO:	
ProjectID:	

Attn: **Tricia McCready**
Pinyon Environmental
3222 S. Vance Street
Suite 200
Lakewood, CO 80227

Phone:	(303) 980-5200
Fax:	(303) 980-0089
Received:	1/9/2024 10:35 AM
Collected:	1/5/2024

Project: **123152301 SUPERIOR AIRBORNE LEAD**

Analytical Results

Client Sample Description 010524-CP COMMON PARK — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0006*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*		*Analysis Date & Analyst*	
METALS								
7300 Modified	Lead	<0.039	0.039	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010524-PP PURPLE PARK — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0007*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*		*Analysis Date & Analyst*	
METALS								
7300 Modified	Lead	<0.039	0.039	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010524-SP SOUTH POOL — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0008*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*		*Analysis Date & Analyst*	
METALS								
7300 Modified	Lead	<0.040	0.040	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010524-PIP PIRATE PARK — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0009*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*		*Analysis Date & Analyst*	
METALS								
7300 Modified	Lead	<0.040	0.040	µg/m³	1/10/2024	CM	1/10/2024	TH

Client Sample Description 010524-FB FIELD BLANK — ***Collected:*** 1/5/2024 — ***Lab ID:*** *332400375-0010*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date & Analyst*		*Analysis Date & Analyst*	
METALS								
7300 Modified	Lead	<0.050	0.050	µg/filter	1/10/2024	CM	1/10/2024	TH

AIHA LAP, LLC-IHLAP Accredited #101650

Definitions:

MDL - method detection limit
J - Result was below the reporting limit, but at or above the MDL
ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)
D - Dilution Sample required a dilution which was used to calculate final results

OrderID: 332400375

EMSL ANALYTICAL, INC.
TESTING LABS • PRODUCTS • TRAINING

Lead Chain of Custody

EMSL Order Number / Lab Use Only

#332400375

EMSL Analytical, Inc.
6340 Castleplace Drive
Indianapolis, IN 46250

PHONE: (317) 803-2997
EMAIL: indianapolislab@emsl.com

Customer Information		Billing Information	
Customer ID:	PINY63	Billing ID:	
Company Name:	Pinyon Environmental	Company Name:	
Contact Name:	Tricia McCready	Billing Contact:	
Street Address:	3222 S. Vance St., Suite 200	Street Address:	
City, State, Zip:	Lakewood, CO 80227 Country: USA	City, State, Zip:	Same Country:
Phone:	303-980-5200	Phone:	
Email(s) for Report:	mccready@pinyon-env.com	Email(s) for Invoice:	ap@pinyon-env.com

Project Information

Project Name/No:	123152301 Superior Airborne Lead	Purchase Order:	NA
EMSL LIMS Project ID: (If applicable, EMSL will provide)		US State where samples collected: CO	State of Connecticut (CT) must select project location: ☐ Commercial (Taxable) ☐ Residential (Non-Taxable)
Sampled By Name:	Aaron Caudill	Sampled By Signature:	No. of Samples in Shipment

Turn-Around-Time (TAT)

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 32 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☑ 1 Week ☐ 2 Week

Please call ahead for large projects and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

MATRIX	METHOD	INSTRUMENT	REPORTING LIMIT	SELECTION
CHIPS ☐ % by wt. ☐ ppm (mg/kg) ☐ mg/cm²	SW 846-7000B	Flame Atomic Absorption	0.008% (80ppm)	☐
*Reporting Limit based on a minimum 0.25g sample weight. **Not appropriate for Ceramic Tiles - XRF is recommended	SW 846-6010D*	ICP-OES	0.0004% (4ppm)	☐
AIR	NIOSH 7082	Flame Atomic Absorption	4µg/filter	☐
	NIOSH 7300M / NIOSH 7303M	ICP-OES	0.5µg/filter	☐
	NIOSH 7300M / NIOSH 7303M	ICP-MS	0.05µg/filter	☑
WIPE ☐ ASTM ☐ NON-ASTM	SW 846-7000B	Flame Atomic Absorption	10µg/wipe	☐
*If no box is checked, non-ASTM Wipe is assumed	SW 846-6010D*	ICP-OES	1.0µg/wipe	☐
TCLP	SW 846-1311 / 7000B / SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	SW 846-1311 / SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
SPLP	SW 846-1312 / 7000B / SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	SW 846-1312 / SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
TTLC	22 CCR App. II, 7000B	Flame Atomic Absorption	40mg/kg (ppm)	☐
	22 CCR App. II, SW 846-6010D*	ICP-OES	2mg/kg (ppm)	☐
STLC	22 CCR App. II, 7000B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	22 CCR App. II, SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
Soil	SW 846-7000B	Flame Atomic Absorption	40mg/kg (ppm)	☐
	SW 846-6010D*	ICP-OES	2mg/kg (ppm)	☐
Wastewater	SM 3111B / SW 846-7000B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
Unpreserved ☐ Preserved with HNO3 ☐ PH<2	EPA 200.7	ICP-OES	0.020 mg/L (ppm)	☐
Drinking Water	EPA 200.5	ICP-OES	0.003 mg/L (ppm)	☐
Unpreserved ☐ Preserved with HNO3 ☐ PH<2	EPA 200.8	ICP-MS	0.001 mg/L (ppm)	☐
TSP/SPM Filter	40 CFR Part 50	ICP-OES	12 µg/filter	☐
Other:				☐

Sample Number	Sample Location	Volume / Area	Date / Time Sampled
010324-PP	Purple Park	1141 @ 2.57 lpm	1/3 445 min
010324-SP	South Pool	1131 @ 2.57 lpm	1/3 440 min
010324-PIP	Pirate Park	1153 @ 2.59 lpm	1/3 445 min
010324-CP	Common Park	1069 @ 2.43 lpm	1/3 440 min
010324-FB	Field Blank	0	1/3

Method of Shipment:		Sample Condition Upon Receipt:	
Relinquished by: [signature]	Date/Time: ~~1/5/24 18:00~~	Received by: DS	Date/Time: 1·8·24 11:35A
Relinquished by:	Date/Time: 1/8/24 1130	Received by: Jonathan Santore (Fx)	Date/Time: 1/9/24 10:35a

Controlled Document - COC-25 Lead R17 05/09/2022

*6010C Available Upon Request

☑ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL ANALYTICAL, INC.
TESTING LABS • PRODUCTS • TRAINING

Lead Chain of Custody

EMSL Order Number / Lab Use Only

#332400375

EMSL Analytical, Inc.
6340 Castleplace Drive
Indianapolis, IN 46250

PHONE: (317) 803-2997
EMAIL: indianapolislab@emsl.com

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

***NIOSH 7300M / NIOSH 7303M ICP-MS 0.05µg/filter

Sample Number	Sample Location	Volume / Area	Date / Time Sampled
010524-CP	Common Park	1266 @ 2.61 lpm	1/5 485 min
010524-PP	Purple Park	1295 @ 2.68 lpm	1/5 484 min
010524-SP	South Pool	1264 @ 2.65 lpm	1/5 478 min
010524-PIP	Pirate Park	1251 @ 2.64 lpm	1/5 474 min
010524-FB	Field Blank	0	1/5

Method of Shipment:		Sample Condition Upon Receipt:	
Relinquished by:	Date/Time: ~~1/5/24 18:00~~	Received by:	Date/Time
Relinquished by:	Date/Time: 1/8/24 1130	Received by:	Date/Time

Controlled Document - COC-25 Lead R17 05/09/2022

☑ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)