

OAKLAND INTERNATIONAL HOUSING PARTNERS, L.P.  
18201 Von Karman Avenue, Suite 900  
Irvine, CA 92612  
Tel: (949) 660-7272  
Fax: (949) 660-7273

**RECEIVED**

*By Alameda County Environmental Health 11:47 am, May 30, 2017*

May 26, 2017

Alameda County Office of Environmental Health  
1131 Harbor Bay Parkway  
Alameda, CA 94502

RE: Case #R003202

To Whom It May Concern:

I hereby declare, under penalty of perjury, that the information and/or recommendations contained in the attached report is true and correct to the best of my knowledge.

Sincerely,



Colby Northridge  
Authorized Representative  
Oakland International Housing Partners, L.P.  
Responsible Party

*Via Email and GeoTracker*

May 26, 2017

Mr. Mark E. Detterman, PG, CEG  
Senior Hazardous Materials Specialist  
Local Oversight Program  
Alameda County Department of Environmental Health  
1131 Harbor Way Parkway, Suite 250  
Alameda, California 94502

**Re: Remedial Action Completion Report Addendum #2  
Site Cleanup Program Case No. RO0003202  
9400-9500 International Boulevard  
Oakland, California**

Dear Mr. Detterman:

On behalf of Oakland International Housing Partners, L.P. (the developer/owner), RPS Iris Environmental is pleased to submit this *Remedial Action Completion Report Addendum #2* (RACR Addendum) to the Alameda County Department of Environmental Health (ACDEH) for the Site located at 9400-9500 International Boulevard in Oakland, California (Site) (Figure 1). RPS Iris Environmental has most recently prepared an August 29, 2016 *Remedial Action Completion Report* (RACR) and November 15, 2016 *Excavation Report Addendum, Response to ACDEH Comments Letter Dated October 26, 2016*. This letter has been prepared in response to a request from ACDEH during a May 22, 2017 conference call.

During the May 22, 2017 conference call, ACDEH indicated they concurred with the responses in RPS Iris Environmental's November 15, 2017 *Response to Comments Letter* as well as the third-party review regarding ambient arsenic concentrations at the Site detailed in Amec Foster Wheeler's March 9, 2017 *Review of "Determination of Ambient Arsenic Concentrations"*. Based on these findings ACDEH indicated the final remaining impediment to receiving a "No Further Action" (NFA) determination at the Site was to address the alley on the northeastern portion of the Site that is not part of the redevelopment project. ACDEH indicated that either a land use covenant (LUC) is needed to protect future inhabitants from the potential for lead and arsenic that may be present in the shallow soil or additional sampling is needed to verify that the concentrations of lead and arsenic do not exceed the San Francisco Bay Regional Water Quality Control Board's Tier 1 Environmental Screening Levels for unrestricted land use (ESLs)<sup>1</sup> or a

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<sup>1</sup> California Environmental Protection Agency (Cal/EPA). 2016a. February 2016 Update to Environmental Screening Levels. California Regional Water Quality Control Board (RWQCB). San Francisco Bay Region. February 22.

background concentration. To demonstrate that a LUC is not necessary for the alley, the developer agreed to additional sampling for the characterization of shallow lead and arsenic.

Following the conference call, RPS Iris Environmental provided a confirmation email that proposed advancing five soil borings within the alley. From each of the borings RPS Iris Environmental proposed analyzing one sample at a depth of 0.5 or 1.5 feet below ground surface. ACEDH concurred with the approach; however, requested that samples from both 0.5 and 1.5 feet bgs be analyzed from each sample. This email correspondence has been included as Attachment 1.

The following sections provide a summary of the sampling activities, results, and a recommendation that the Site be issued a “No Further Action” determination for unrestricted land use.

### **FIELD SAMPLING ACTIVITIES**

On May 23, 2017, an RPS Iris Environmental staff geologist under the oversight of a California Professional Geologist traveled to the Site to collect additional samples. Based on an ACDEH request, the samples were collected from five borings as shown on Figure 2 at approximate spacing of 20-feet. Soil samples were collected by advancing a hand auger boring to the total depth explored, approximately 1.5 feet below ground surface (bgs). At each location, general observations were made of the Site lithology and soil samples were collected in to clean laboratory supplied glassware, placed on ice, and transported to McCampbell Analytical for analysis. Each sample was analyzed for lead and arsenic following the United States Environmental Protection Agency Method 6020.

### **RESULTS**

The following provides a summary of the field observations and laboratory analytical results.

#### **Visual Observations**

During sampling, non-native fill was observed in the borings extending from beneath asphalt paving to the following depths:

- IE-29 0.50 feet bgs;
- IE-30 0.75 feet bgs;
- IE-31 0.75 feet bgs;
- IE-32 1.00 feet bgs; and
- IE-33 1.00 feet bgs.

Beneath the fill was native dark brown silty clays similar in description to the Urban land-Danville soils observed throughout the rest of the Site. Based on the visual observations by the field geologist, the fill unit in the alley did not appear to be consistent with the fill located throughout the rest of the Site.

#### **Laboratory Analytical Results**

The laboratory analytical results are presented in Attachment 2 and are summarized in Table 1.

With the exception of lead in the sample collected from boring IE-32 at 0.5 feet bgs at 94 milligrams per kilogram (mg/kg) above the Tier 1 ESL (80 mg/kg), lead concentrations were not detected above the Tier 1 ESL. To evaluate the representative concentration of lead in the alley a 95% Upper Confidence Level (UCL) of the mean was calculated using the 10 samples from this investigation which resulted in a concentration of 52.47 mg/kg, well below the Tier 1 ESL of 80 mg/kg. A copy of the 95% UCL calculations is presented in Attachment 3.

Arsenic concentrations during this investigation were not detected above the background threshold level for arsenic (11 mg/kg), based upon a Bay Area-wide soil study<sup>2</sup> or above a site-specific background concentration calculated for the native clay unit (21 mg/kg).


### CONCLUSIONS AND RECOMMENDATIONS

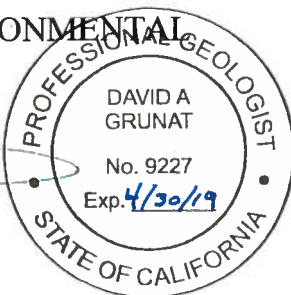
Based on the information presented in the August 29, 2016 *Remedial Action Completion Report*, the November 17, 2017 *Response to Comments Letter*, Amec Foster Wheeler's March 9, 2017 *Review of "Determination of Ambient Arsenic Concentrations"*, and this RACR Addendum, RPS Iris Environmental believes that the site has met all remedial action objectives and regulatory requirements at this time and recommends the issuance of a "No Further Action" determination for unrestricted land use.


Please do not hesitate to contact us should you have any questions.


Sincerely,

RPS IRIS ENVIRONMENTAL

  
 David A. Grunat, P.G.  
 Manager



  
 Nicholas T. Loizeaux, P.G.  
 Principal

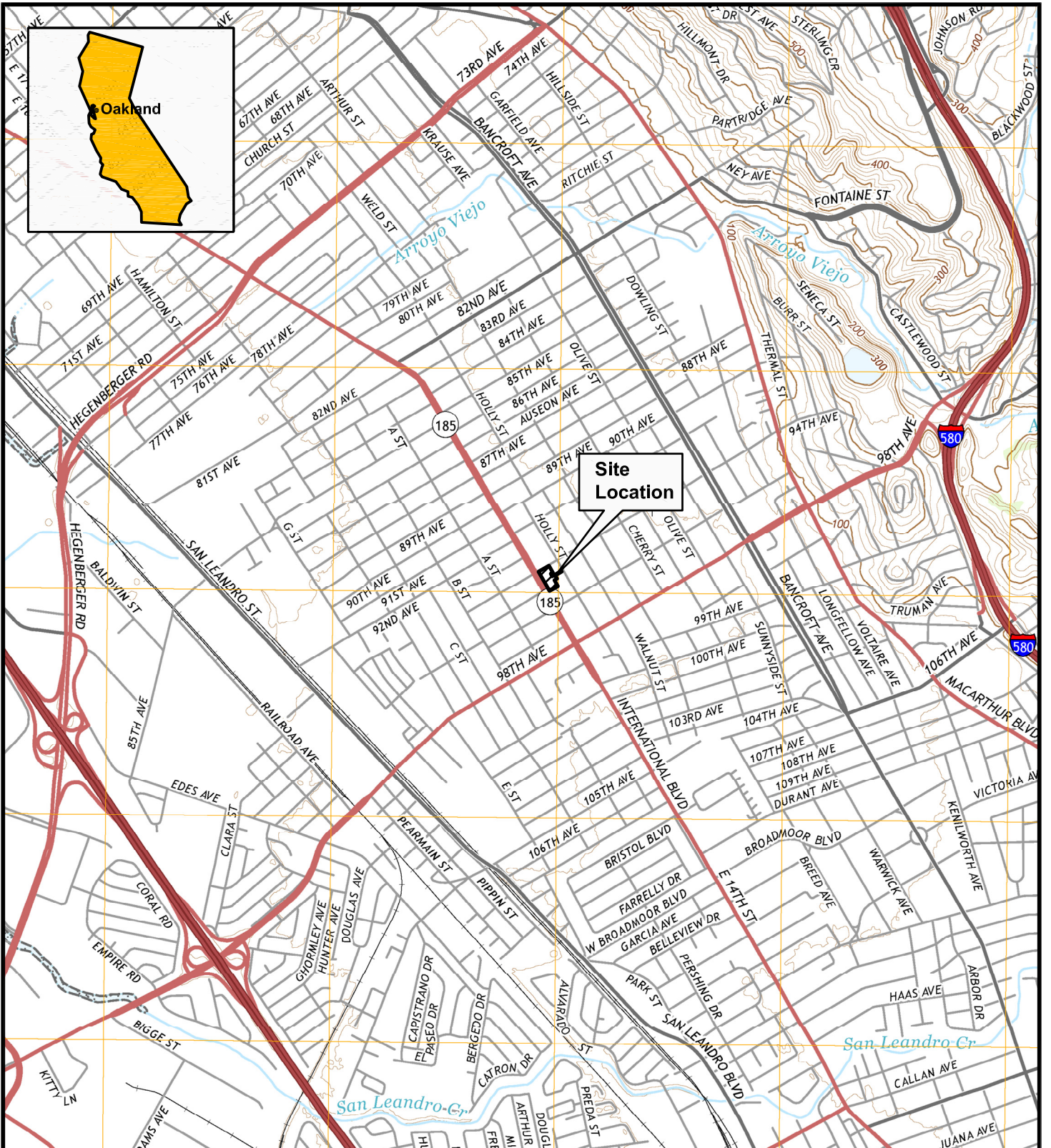


Enclosures:

- Figure 1 Site Location Map
- Figure 2 Sampling Map
- Table 1 Summary of Soil Analytical Results
- Attachment 1 Email Correspondence
- Attachment 2 Laboratory Analytical Reports
- Attachment 3 ProUCL Output for 95% UCL

<sup>2</sup> Duvergé, D.J. 2011. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region. A thesis submitted to the faculty of San Francisco State University, In partial fulfillment of The Requirements for The Degree, Master of Science in Geosciences. December.

**Figures**



Source: USGS 7.5' Quadrangle, San Leandro/Oakland East, California, 2015



**RPS<sup>®</sup> Iris Environmental**  
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**Site Location Map**  
 9400-9500 International Boulevard  
 Oakland, California

Figure  
**1**

I:\CAD\15115-1325-A\site\_location.dwg



**Tables**



**Remedial Action Completion Report Addendum**  
**9400-9500 International Boulevard**  
**Oakland, California**

**Table 1. Summary of Soil Analytical Results**

Analyte	Tier-1 ESLs	Soil Sampling Results										
	Residential (mg/kg)	IE-29-00.5 (mg/kg)	IE-29-01.5 (mg/kg)	IE-30-00.5 (mg/kg)	IE-30-01.5 (mg/kg)	IE-31-00.5 (mg/kg)	IE-31-01.5 (mg/kg)	IE-32-00.5 (mg/kg)	IE-32-01.5 (mg/kg)	IE-33-00.5 (mg/kg)	IE-33-01.5 (mg/kg)	95% UCL (mg/kg)
<i>Metals by USEPA Method 6020</i>												
Arsenic	11	7.3	11	10	8.8	6.5	8.7	4.4	7.4	2.4	7.2	8.84
Lead	80	54	19	13	31	23	14	<b><u>93</u></b>	13	67	41	52.47

Notes:

- (1) All concentrations are in milligrams per kilogram (mg/kg). Non-detect sampling results are indicated by less-than sign (<) and laboratory reporting limit.
- (2) Soil sampling results are reported on a dry-weight basis for comparison to San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Tier 1 Environmental Screening Levels (ESLs) for unrestricted land use (Cal/EPA 2016) for lead and to the background threshold value from a Bay Area wide soil study (Duvergé, D.J. 2011) for arsenic.
- (3) Soil Samples collected on Wednesday May 23, 2017.
- (4) **Bold Underlined** font indicates a detection above one or more of the screening levels used to derive the cleanup goals.
- (5) 95% UCL is the 95% Upper Confidence Limit calculated using the analytical results from this investigation.

**Attachment 1**  
**Email Correspondence**

**From:** Detterman, Mark, Env. Health  
**To:** [David Grunat](mailto:David.Grunat@irisenv.com)  
**Cc:** [Travis Wicks](mailto:Travis.Wicks@irisenv.com); [Northridge, Colby](mailto:Northridge.Colby@related.com); [Nick Loizeaux](mailto:Nick.Loizeaux@irisenv.com)  
**Subject:** RE: 94th and International Follow-Up  
**Date:** Monday, May 22, 2017 1:30:32 PM

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David,

In an effort to speed the understanding of potential contamination in the easement and thus of moving the site towards closure, ACDEH requests the analysis of lead and arsenic from both proposed depths from each soil bore, unless the data has already been analyzed such as at each of the earlier bores for one depth (for lead only in the earlier bores). ACDEH additionally requests the bores extend through any fill to native, so that the depth of the fill is identified.

Good luck out in the field.

*Mark Detterman*  
*Senior Hazardous Materials Specialist, PG, CEG*  
*1131 Harbor Bay Parkway*  
*Alameda, CA 94502*  
*Direct: 510.567.6876*  
*Fax: 510.337.9335*  
*Email: [mark.detterman@acgov.org](mailto:mark.detterman@acgov.org)*

*PDF Copies of case files can be downloaded at:*  
*<http://www.acgov.org/aceh/lop/ust.htm>*

---

**From:** David Grunat [mailto:[david@irisenv.com](mailto:david@irisenv.com)]  
**Sent:** Monday, May 22, 2017 12:06 PM  
**To:** Detterman, Mark, Env. Health <[Mark.Detterman@acgov.org](mailto:Mark.Detterman@acgov.org)>  
**Cc:** Travis Wicks <[twicks@irisenv.com](mailto:twicks@irisenv.com)>; Northridge, Colby <[CNorthridge@related.com](mailto:CNorthridge@related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** FW: 94th and International Follow-Up

Mark,

It was nice chatting with you. As we discussed, we spoke with the developer and they are comfortable moving forward with a Land Use Covenant (LUC) on the alley. They will use a ways and means approach to develop a legal description of the alley that the LUC will apply to.

While this is being worked on, we plan to travel to the Site tomorrow to collect additional samples in the hope that the soil is not impacted and a LUC is not necessary. As you requested, we have placed our proposed sampling locations on a grid with a spacing of approximately 20 feet (see attached). From each of the borings we will analyze one sample at a depth of 0.5 or 1.5 feet below ground surface. The samples depths will vary every other boring (i.e. first boring: shallow sample, second boring: deep sample, third boring: shallow sample, etc...).

After we receive the results we will prepare and submit an Addendum to our Remedial Action Completion Report to the county around June 2<sup>nd</sup>. If the results of the sampling indicate that impacted soil does not extend in to the alley, we will request closure with no further encumbrances. If the impacts we previously observed do extend on to this alley, we will prepare a LUC that will protect future users from coming in contact with the impacted soil.

If you could respond back concurring that this approach is consistent with your understanding of our conversation, I would appreciate it.

Best,

---

**David A. Grunat, P.G.**

**Senior Manager- RPS Iris Environmental**

1438 Webster Street, Suite 302,

Oakland, California, 94612.

USA

**Tel:** +1 510 834 4747 ext 48

**Fax:** +1 510 834 4199

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**Email:** [dgrunat@irisenv.com](mailto:dgrunat@irisenv.com)

**www:** [www.rpsgroup.com](http://www.rpsgroup.com) | [www.irisenv.com](http://www.irisenv.com)

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RPS Group Plc web link: <http://www.rpsgroup.com>

---

**From:** Detterman, Mark, Env. Health [<mailto:Mark.Detterman@acgov.org>]

**Sent:** Monday, May 22, 2017 10:09 AM

**To:** David Grunat <[david@irisenv.com](mailto:david@irisenv.com)>

**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>

**Subject:** RE: 94th and International Follow-Up

Hi David,  
11 am this morning would be fine.

Is there a number I should call?

*Mark Detterman*

*Senior Hazardous Materials Specialist, PG, CEG*

*1131 Harbor Bay Parkway*

*Alameda, CA 94502*

*Direct: 510.567.6876*

*Fax: 510.337.9335*

*Email: [mark.detterman@acgov.org](mailto:mark.detterman@acgov.org)*

PDF Copies of case files can be downloaded at:  
<http://www.acgov.org/aceh/lop/ust.htm>

---

**From:** David Grunat [<mailto:david@irisenv.com>]  
**Sent:** Monday, May 22, 2017 9:54 AM  
**To:** Detterman, Mark, Env. Health <[Mark.Detterman@acgov.org](mailto:Mark.Detterman@acgov.org)>  
**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** RE: 94th and International Follow-Up

Mark,

Any time between 11 and 1 works for us. Please propose a time if that works for you.

Best,

---

**David A. Grunat, P.G.**

**Senior Manager- RPS Iris Environmental**

1438 Webster Street, Suite 302,

Oakland, California, 94612.

USA

**Tel:** +1 510 834 4747 ext 48

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**Mobile:** +1 415 602 8500

**Email:** [dgrunat@irisenv.com](mailto:dgrunat@irisenv.com)

**www:** [www.rpsgroup.com](http://www.rpsgroup.com) | [www.irisenv.com](http://www.irisenv.com)

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RPS Group Plc web link: <http://www.rpsgroup.com>

---

**From:** Detterman, Mark, Env. Health [<mailto:Mark.Detterman@acgov.org>]  
**Sent:** Monday, May 22, 2017 9:51 AM  
**To:** David Grunat <[david@irisenv.com](mailto:david@irisenv.com)>  
**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** RE: 94th and International Follow-Up

Hi David,

I was out on Friday, but am around today or this week. Let me know what times would work for you.

*Mark Detterman*

*Senior Hazardous Materials Specialist, PG, CEG*

1131 Harbor Bay Parkway  
Alameda, CA 94502  
Direct: 510.567.6876  
Fax: 510.337.9335  
Email: [mark.detterman@acgov.org](mailto:mark.detterman@acgov.org)

PDF Copies of case files can be downloaded at:  
<http://www.acgov.org/aceh/lop/ust.htm>

---

**From:** David Grunat [<mailto:david@irisenv.com>]  
**Sent:** Friday, May 19, 2017 10:36 AM  
**To:** Detterman, Mark, Env. Health <[Mark.Detterman@acgov.org](mailto:Mark.Detterman@acgov.org)>  
**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** RE: 94th and International Follow-Up

Mark,

We were able to speak with Cobly earlier this morning and would like to present our path forward to get this Site closed out. Are you free today to have a 5 minute call? Any time before 3 works for us.

Best,

---

**David A. Grunat, P.G.**

**Senior Manager- RPS Iris Environmental**

1438 Webster Street, Suite 302,

Oakland, California, 94612.

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**Tel:** +1 510 834 4747 ext 48

**Fax:** +1 510 834 4199

**Mobile:** +1 415 602 8500

**Email:** [dgrunat@irisenv.com](mailto:dgrunat@irisenv.com)

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RPS Group Plc web link: <http://www.rpsgroup.com>

---

**From:** Detterman, Mark, Env. Health [<mailto:Mark.Detterman@acgov.org>]  
**Sent:** Tuesday, May 16, 2017 11:52 AM  
**To:** David Grunat <[david@irisenv.com](mailto:david@irisenv.com)>  
**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** RE: 94th and International Follow-Up

David and all,  
I'm available at 1:30 – 2 today. Hopefully that will work?

I could slide it to 1:15 if needed.

*Mark Detterman*  
*Senior Hazardous Materials Specialist, PG, CEG*  
*1131 Harbor Bay Parkway*  
*Alameda, CA 94502*  
*Direct: 510.567.6876*  
*Fax: 510.337.9335*  
*Email: [mark.detterman@acgov.org](mailto:mark.detterman@acgov.org)*

*PDF Copies of case files can be downloaded at:*  
*<http://www.acgov.org/aceh/lop/ust.htm>*

---

**From:** David Grunat [<mailto:david@irisenv.com>]  
**Sent:** Tuesday, May 16, 2017 10:10 AM  
**To:** Detterman, Mark, Env. Health <[Mark.Detterman@acgov.org](mailto:Mark.Detterman@acgov.org)>  
**Cc:** Northridge, Colby <[CNorthridge@Related.com](mailto:CNorthridge@Related.com)>; Nick Loizeaux <[nick@irisenv.com](mailto:nick@irisenv.com)>  
**Subject:** 94th and International Follow-Up  
**Importance:** High

Mark,

Thanks so much for returning my call. As you suggested, we should have a brief call to discuss the pathway forward. Rather than just calling and playing phone tag, I thought that we should try to coordinate a time to make sure we get in touch. Nick and I are free today before 2pm and tomorrow before 11am. Is there a time during this period that you are free? Colby will also attend the call if he is able. Once we agree on a time, I will send a call-in number.

Best,

---

**David A. Grunat, P.G.**

**Senior Manager- RPS Iris Environmental**

1438 Webster Street, Suite 302,

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**Tel:** +1 510 834 4747 ext 48

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**www:** [www.rpsgroup.com](http://www.rpsgroup.com) | [www.irisenv.com](http://www.irisenv.com)

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**Attachment 2**  
**Laboratory Analytical Reports**



# McC Campbell Analytical, Inc.

"When Quality Counts"

## Analytical Report

**WorkOrder:** 1705A39

**Report Created for:** Iris Environmental

1438 Webster Street, Ste. 302  
Oakland, CA 94612

**Project Contact:** David Grunat

**Project P.O.:**

**Project Name:** 15-1325; 94th & International

**Project Received:** 05/23/2017

Analytical Report reviewed & approved for release on 05/24/2017 by:

Angela Rydelius,  
Laboratory Manager

*The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.*





## Glossary of Terms & Qualifier Definitions

**Client:** Iris Environmental  
**Project:** 15-1325; 94th & International  
**WorkOrder:** 1705A39

### Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

### Quality Control Qualifiers

F10 MS/MSD outside control limits. Physical or chemical interferences exist due to sample matrix.



## Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg-dry

### Arsenic and Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-29-00.5	1705A39-001A	Soil	05/23/2017 10:00	ICP-MS2	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	7.3	0.57	1	05/24/2017 14:10
Lead	54	0.57	1	05/24/2017 14:10

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	98	70-130	05/24/2017 14:10

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-29-01.5	1705A39-002A	Soil	05/23/2017 10:10	ICP-MS3	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	11	0.64	1	05/24/2017 15:22
Lead	19	0.64	1	05/24/2017 15:22

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	05/24/2017 15:22

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-30-00.5	1705A39-003A	Soil	05/23/2017 10:50	ICP-MS2	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	10	0.59	1	05/24/2017 14:28
Lead	13	0.59	1	05/24/2017 14:28

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	99	70-130	05/24/2017 14:28

Analyst(s): MIG

(Cont.)



## Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg-dry

### Arsenic and Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-30-01.5	1705A39-004A	Soil	05/23/2017 11:00	ICP-MS2	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	8.8	0.62	1	05/24/2017 14:16
Lead	31	0.62	1	05/24/2017 14:16

Surrogates	REC (%)	Limits
Terbium	91	70-130

**Analyst(s):** MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-31-00.5	1705A39-005A	Soil	05/23/2017 11:30	ICP-MS3	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	6.5	0.59	1	05/24/2017 16:30
Lead	23	0.59	1	05/24/2017 16:30

Surrogates	REC (%)	Limits
Terbium	104	70-130

**Analyst(s):** JC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-31-01.5	1705A39-006A	Soil	05/23/2017 11:35	ICP-MS2	139403

Analytes	Result	RL	DF	Date Analyzed
Arsenic	8.7	0.62	1	05/24/2017 14:22
Lead	14	0.62	1	05/24/2017 14:22

Surrogates	REC (%)	Limits
Terbium	95	70-130

**Analyst(s):** MIG

(Cont.)



# Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg-dry

## Arsenic and Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-32-00.5	1705A39-007A	Soil	05/23/2017 12:00	ICP-MS1	139417

Analytes	Result	RL	DF	Date Analyzed
Arsenic	4.4	0.54	1	05/24/2017 14:32
Lead	93	0.54	1	05/24/2017 14:32

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	105	70-130	05/24/2017 14:32

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-32-01.5	1705A39-008A	Soil	05/23/2017 12:15	ICP-MS2	139417

Analytes	Result	RL	DF	Date Analyzed
Arsenic	7.4	0.61	1	05/24/2017 14:03
Lead	13	0.61	1	05/24/2017 14:03

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	91	70-130	05/24/2017 14:03

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-33-00.5	1705A39-009A	Soil	05/23/2017 12:45	ICP-MS2	139417

Analytes	Result	RL	DF	Date Analyzed
Arsenic	2.4	0.53	1	05/24/2017 14:34
Lead	67	0.53	1	05/24/2017 14:34

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	101	70-130	05/24/2017 14:34

Analyst(s): MIG

(Cont.)



# Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg-dry

## Arsenic and Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-33-01.5	1705A39-010A	Soil	05/23/2017 13:00	ICP-MS3	139417

Analytes	Result	RL	DF	Date Analyzed
Arsenic	7.2	0.60	1	05/24/2017 16:37
Lead	41	0.60	1	05/24/2017 16:37

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	108	70-130	05/24/2017 16:37

**Analyst(s):** JC



## Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** ASTM D2216-05  
**Analytical Method:** ASTM D2216-05  
**Unit:** wet wt%

### Percent Moisture

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-29-00.5	1705A39-001A	Soil	05/23/2017 10:00	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	12.4	0.100	1	05/24/2017 13:20

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-29-01.5	1705A39-002A	Soil	05/23/2017 10:10	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	21.7	0.100	1	05/24/2017 13:25

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-30-00.5	1705A39-003A	Soil	05/23/2017 10:50	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	14.8	0.100	1	05/24/2017 13:30

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-30-01.5	1705A39-004A	Soil	05/23/2017 11:00	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	18.9	0.100	1	05/24/2017 13:35

Analyst(s): AL

(Cont.)

 Angela Rydelius, Lab Manager





## Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** ASTM D2216-05  
**Analytical Method:** ASTM D2216-05  
**Unit:** wet wt%

### Percent Moisture

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-31-00.5	1705A39-005A	Soil	05/23/2017 11:30	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	15.7	0.100	1	05/24/2017 13:40

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-31-01.5	1705A39-006A	Soil	05/23/2017 11:35	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	19.9	0.100	1	05/24/2017 13:45

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-32-00.5	1705A39-007A	Soil	05/23/2017 12:00	WetChem	139430

Analytes	Result	RL	DF	Date Analyzed
% Moisture	6.70	0.100	1	05/24/2017 13:50

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-32-01.5	1705A39-008A	Soil	05/23/2017 12:15	WetChem	139432

Analytes	Result	RL	DF	Date Analyzed
% Moisture	17.8	0.100	1	05/24/2017 13:55

Analyst(s): AL

(Cont.)

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Iris Environmental  
**Date Received:** 5/23/17 17:35  
**Date Prepared:** 5/23/17  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**Extraction Method:** ASTM D2216-05  
**Analytical Method:** ASTM D2216-05  
**Unit:** wet wt%

### Percent Moisture

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-33-00.5	1705A39-009A	Soil	05/23/2017 12:45	WetChem	139432

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
% Moisture	5.10	0.100	1	05/24/2017 14:05

Analyst(s): AL

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
IE-33-01.5	1705A39-010A	Soil	05/23/2017 13:00	WetChem	139432

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
% Moisture	16.8	0.100	1	05/24/2017 14:10

Analyst(s): AL

 Angela Rydelius, Lab Manager



## Quality Control Report

**Client:** Iris Environmental  
**Date Prepared:** 5/23/17  
**Date Analyzed:** 5/24/17  
**Instrument:** ICP-MS2, ICP-MS3  
**Matrix:** Soil  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**BatchID:** 139403  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg  
**Sample ID:** MB/LCS-139403  
 1705A09-001AMS/MSD

### QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Arsenic	ND	49.9	0.50	50	-	100	75-125
Lead	ND	50.5	0.50	50	-	101	75-125
<b>Surrogate Recovery</b>							
Terbium	537.8	549		500	108	110	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Arsenic	48.8	50.8	50	2.669	92	96	75-125	3.98	20
Lead	50.5	51.5	50	9.341	82	84	75-125	1.80	20
<b>Surrogate Recovery</b>									
Terbium	450	459	500		90	92	70-130	2.09	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Arsenic	2.69	2.669	0.787	-
Lead	9.26	9.341	0.867	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.



## Quality Control Report

**Client:** Iris Environmental  
**Date Prepared:** 5/23/17  
**Date Analyzed:** 5/24/17  
**Instrument:** ICP-MS1  
**Matrix:** Soil  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**BatchID:** 139417  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg  
**Sample ID:** MB/LCS-139417  
 1705A39-007AMS/MSD

### QC Summary Report for Metals

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Arsenic	ND	52.6	0.50	50	-	105	75-125
Lead	ND	50.4	0.50	50	-	101	75-125
<b>Surrogate Recovery</b>							
Terbium	517.5	542		500	103	108	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Arsenic	59.8	56.8	50	4.052	112	105	75-125	5.23	20
Lead	172	158	50	86.88	170,F10	142,F10	75-125	8.50	20
<b>Surrogate Recovery</b>									
Terbium	581	536	500		116	107	70-130	8.11	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Arsenic	3.74	4.052	7.70	-
Lead	81.6	86.88	6.08	20

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.



## Quality Control Report

**Client:** Iris Environmental  
**Date Prepared:** 5/23/17  
**Date Analyzed:** 5/24/17  
**Instrument:** WetChem  
**Matrix:** Soil  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**BatchID:** 139430  
**Extraction Method:** ASTM D2216-05  
**Analytical Method:** ASTM D2216-05  
**Unit:** wet wt%

### QC Summary Report for Percent Moisture

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1705995-001A	7.43	1	7.31	1	1.61	<15

**Client:** Iris Environmental  
**Date Prepared:** 5/23/17  
**Date Analyzed:** 5/24/17  
**Instrument:** WetChem  
**Matrix:** Soil  
**Project:** 15-1325; 94th & International

**WorkOrder:** 1705A39  
**BatchID:** 139432  
**Extraction Method:** ASTM D2216-05  
**Analytical Method:** ASTM D2216-05  
**Unit:** wet wt%

### QC Summary Report for Percent Moisture

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1705A39-008A	17.8	1	17.9	1	0.30	<15

 QA/QC Officer



1534 Willow Pass Rd  
Pittsburg, CA 94565-1701  
(925) 252-9262

# CHAIN-OF-CUSTODY RECORD

WorkOrder: 1705A39

ClientCode: IEO

WaterTrax   
  WriteOn   
  EDF   
  Excel   
  EQUIS   
  Email   
  HardCopy   
  ThirdParty   
  J-flag

**Report to:**  
 David Grunat  
 Iris Environmental  
 1438 Webster Street, Ste. 302  
 Oakland, CA 94612  
 (650) 919-4955    FAX: (510) 834-4199

Email: dgrunat@irisenv.com  
 cc/3rd Party: twicks@irisenv.com;  
 PO:  
 ProjectNo: 15-1325; 94th & International

**Bill to:**  
 Julie Hayes  
 Iris Environmental  
 1438 Webster Street, Ste. 302  
 Oakland, CA 94612  
 jhayes@irisenv.com; eperney@irisenv.c

**Requested TAT: 1 day;**  
  
**Date Received: 05/23/2017**  
**Date Logged: 05/23/2017**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1705A39-001	IE-29-00.5	Soil	5/23/2017 10:00	<input type="checkbox"/>	A	A											
1705A39-002	IE-29-01.5	Soil	5/23/2017 10:10	<input type="checkbox"/>	A	A											
1705A39-003	IE-30-00.5	Soil	5/23/2017 10:50	<input type="checkbox"/>	A	A											
1705A39-004	IE-30-01.5	Soil	5/23/2017 11:00	<input type="checkbox"/>	A	A											
1705A39-005	IE-31-00.5	Soil	5/23/2017 11:30	<input type="checkbox"/>	A	A											
1705A39-006	IE-31-01.5	Soil	5/23/2017 11:35	<input type="checkbox"/>	A	A											
1705A39-007	IE-32-00.5	Soil	5/23/2017 12:00	<input type="checkbox"/>	A	A											
1705A39-008	IE-32-01.5	Soil	5/23/2017 12:15	<input type="checkbox"/>	A	A											
1705A39-009	IE-33-00.5	Soil	5/23/2017 12:45	<input type="checkbox"/>	A	A											
1705A39-010	IE-33-01.5	Soil	5/23/2017 13:00	<input type="checkbox"/>	A	A											

**Test Legend:**

1	PBASMS_TTLC_S	2	PERmoist_S	3		4	
5		6		7		8	
9		10		11		12	

Prepared by: Jena Alfaro

**Comments:** All reports require EDD and Detection summary.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### WORK ORDER SUMMARY

**Client Name:** IRIS ENVIRONMENTAL

**Project:** 15-1325; 94th & International

**Work Order:** 1705A39

**Client Contact:** David Grunat

**QC Level:** LEVEL 2

**Contact's Email:** dgrunat@irisenv.com

**Comments:** All reports require EDD and Detection summary.

**Date Logged:** 5/23/2017

WaterTrax     WriteOn     EDF     Excel     Fax     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1705A39-001A	IE-29-00.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 10:00	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-002A	IE-29-01.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 10:10	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-003A	IE-30-00.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 10:50	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-004A	IE-30-01.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 11:00	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-005A	IE-31-00.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 11:30	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-006A	IE-31-01.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 11:35	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-007A	IE-32-00.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 12:00	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-008A	IE-32-01.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 12:15	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



### WORK ORDER SUMMARY

**Client Name:** IRIS ENVIRONMENTAL

**Project:** 15-1325; 94th & International

**Work Order:** 1705A39

**Client Contact:** David Grunat

**QC Level:** LEVEL 2

**Contact's Email:** dgrunat@irisenv.com

**Comments:** All reports require EDD and Detection summary.

**Date Logged:** 5/23/2017

WaterTrax     WriteOn     EDF     Excel     Fax     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1705A39-009A	IE-33-00.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 12:45	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					
1705A39-010A	IE-33-01.5	Soil	ASTM D2216-05 (Percent Moisture)	1	16OZ GJ	<input type="checkbox"/>	5/23/2017 13:00	1 day		<input type="checkbox"/>	
			SW6020 (Arsenic & Lead)			<input type="checkbox"/>					

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



1705A39



Iris Environmental

**RUSH!**

Date: 5/23/17

Page: | of |

No 004262

1438 Webster Street, Suite 302  
Oakland, California 94612  
(510) 834-4747 tel  
(510) 834-4199 fax

**CHAIN-OF-CUSTODY**

**Analyses Required**

Sampler Name(s): Travis Wickes  
Signature(s): *Travis Wickes*

LAB ID	SAMPLE ID	DATE	TIME	MATRIX	PRES	Lead (6020)	Arsenic (6020)	% Moisture	Analyses Required							Number of Containers	
	IE-29-00.S	5/23/17	1000	Soil	None	X	X	X									1
	IE-29-01.S		1010			X	X	X									
	IE-30-00.S		1050			X	X	X									
	IE-30-01.S		1100			X	X	X									
	IE-31-00.S		1130			X	X	X									
	IE-31-01.S		1135			X	X	X									
	IE-32-00.S		1200			X	X	X									
	IE-32-01.S		1215			X	X	X									
	IE-33-00.S		1245			X	X	X									
	IE-33-01.S		1300			X	X	X									

**PROJECT INFORMATION**

Project Name: 94th + International  
 Project Number: 15-1325  
 Contact Person: David Grunat  
 E-mail: dgrunat@irisenv.com ; twickes@irisenv.com  
 Contact Telephone: (510) 834-4747

Report: Routine (Level 2) Level 3 Level 4 (EDD)  
 TAT: 10-day 5-day 72-hr 48-hr 24-hr Other:

**RELINQUISHED BY:**  
 Printed Name: Travis Wickes  
 Signature: *Travis Wickes*  
 Company: RPS Iris Environmental  
 Time/Date: 5/23/17 1735

**RECEIVED BY:**  
 Printed Name: Jena Alvaro  
 Signature: *Jena Alvaro*  
 Company: MAI  
 Time/Date: 5/23/17 1735

**Special Instructions/Comments:**  
 Report on a dry-weight basis

**RELINQUISHED BY:**  
 Printed Name:  
 Signature:  
 Company:  
 Time/Date:

**RECEIVED BY:**  
 Printed Name:  
 Signature:  
 Company:  
 Time/Date:

3140 net



### Sample Receipt Checklist

Client Name: **Iris Environmental**  
 Project Name: **15-1325; 94th & International**  
 WorkOrder No: **1705A39** Matrix: Soil  
 Carrier: Client Drop-In

Date and Time Received: **5/23/2017 17:35**  
 Date Logged: **5/23/2017**  
 Received by: **Jena Alfaro**  
 Logged by: **Jena Alfaro**

**Chain of Custody (COC) Information**

Chain of custody present? Yes  No   
 Chain of custody signed when relinquished and received? Yes  No   
 Chain of custody agrees with sample labels? Yes  No   
 Sample IDs noted by Client on COC? Yes  No   
 Date and Time of collection noted by Client on COC? Yes  No   
 Sampler's name noted on COC? Yes  No

**Sample Receipt Information**

Custody seals intact on shipping container/cooler? Yes  No  NA   
 Shipping container/cooler in good condition? Yes  No   
 Samples in proper containers/bottles? Yes  No   
 Sample containers intact? Yes  No   
 Sufficient sample volume for indicated test? Yes  No

**Sample Preservation and Hold Time (HT) Information**

All samples received within holding time? Yes  No  NA   
 Sample/Temp Blank temperature Temp: 3.4°C NA   
 Water - VOA vials have zero headspace / no bubbles? Yes  No  NA   
 Sample labels checked for correct preservation? Yes  No   
 pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes  No  NA   
 Samples Received on Ice? Yes  No   
 (Ice Type: WET ICE )

**UCMR3 Samples:**

Total Chlorine tested and acceptable upon receipt for EPA 522? Yes  No  NA   
 Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes  No  NA

Comments:

**Attachment 3**  
**ProUCL Output for 95% UCL**

User Selected Options

Date/Time of Computation ProUCL 5.15/26/2017 7:24:10 AM

From File 94th and Intl ProUCL.xls

Full Precision ON

Confidence Coefficient 95%

Number of Bootstrap Operations 2000

Lead

**General Statistics**

Total Number of Observations	10.000000	Number of Distinct Observations	9.0000000
		Number of Missing Observations	0
Minimum	13.000000	Mean	36.800000
Maximum	93.000000	Median	27.000000
SD	27.034135	Std. Error of Mean	8.5489441
Coefficient of Variation	0.7346232	Skewness	1.1453499

**Normal GOF Test**

Shapiro Wilk Test Statistic 0.8611009  
 5% Shapiro Wilk Critical Value 0.8420000  
 Lilliefors Test Statistic 0.1951374  
 5% Lilliefors Critical Value 0.2616000

**Shapiro Wilk GOF Test**

Data appear Normal at 5% Significance Level

**Lilliefors GOF Test**

Data appear Normal at 5% Significance Level

**Data appear Normal at 5% Significance Level**

**Assuming Normal Distribution**

**95% Normal UCL**

95% Student's-t UCL 52.471180

**95% UCLs (Adjusted for Skewness)**

95% Adjusted-CLT UCL (Chen-1995) 54.170261  
 95% Modified-t UCL (Johnson-1978) 52.987239

**Gamma GOF Test**

A-D Test Statistic 0.3793773  
 5% A-D Critical Value 0.7345712  
 K-S Test Statistic 0.1669580  
 5% K-S Critical Value 0.2694065

**Anderson-Darling Gamma GOF Test**

Detected data appear Gamma Distributed at 5% Significance Level

**Kolmogorov-Smirnov Gamma GOF Test**

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

**Gamma Statistics**

k hat (MLE)	2.2967000	k star (bias corrected MLE)	1.6743566
Theta hat (MLE)	16.022990	Theta star (bias corrected MLE)	21.978591
nu hat (MLE)	45.933999	nu star (bias corrected)	33.487133
MLE Mean (bias corrected)	36.800000	MLE Sd (bias corrected)	28.439623
Adjusted Level of Significance	0.0267000	Approximate Chi Square Value (0.05)	21.254871
		Adjusted Chi Square Value	19.576791

**Assuming Gamma Distribution**

95% Approximate Gamma UCL (use when n >= 50) 57.978544

95% Adjusted Gamma UCL (use when n < 50) 52.948341

**Lognormal GOF Test**

Shapiro Wilk Test Statistic 0.9220175  
 5% Shapiro Wilk Critical Value 0.8420000  
 Lilliefors Test Statistic 0.1469288  
 5% Lilliefors Critical Value 0.2616000

**Shapiro Wilk Lognormal GOF Test**

Data appear Lognormal at 5% Significance Level

**Lilliefors Lognormal GOF Test**

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

### Lognormal Statistics

Minimum of Logged Data 2.5649494

Mean of logged Data 3.3722725

Maximum of Logged Data 4.5325995

SD of logged Data 0.7164853

### Assuming Lognormal Distribution

95% H-UCL 69.438370

90% Chebyshev (MVUE) UCL 62.187797

95% Chebyshev (MVUE) UCL 73.801436

97.5% Chebyshev (MVUE) UCL 89.920716

99% Chebyshev (MVUE) UCL 121.58392

### Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

### Nonparametric Distribution Free UCLs

95% CLT UCL 50.861762

95% Jackknife UCL 52.471180

95% Standard Bootstrap UCL 50.445156

95% Bootstrap-t UCL 61.798266

95% Hall's Bootstrap UCL 57.400513

95% Percentile Bootstrap UCL 50.200000

95% BCA Bootstrap UCL 53.400000

90% Chebyshev (Mean, Sd) UCL 62.446832

95% Chebyshev (Mean, Sd) UCL 74.063983

97.5% Chebyshev (Mean, Sd) UCL 90.188139

99% Chebyshev (Mean, Sd) UCL 121.86092

### Suggested UCL to Use

95% Student's-t UCL 52.471180

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulation results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

## User Selected Options

Date/Time of Computation ProUCL 5.15/26/2017 7:24:40 AM

From File 94th and Intl ProUCL.xls

Full Precision ON

Confidence Coefficient 95%

Number of Bootstrap Operations 2000

## Arsenic

## General Statistics

Total Number of Observations	10.000000	Number of Distinct Observations	10.000000
		Number of Missing Observations	0
Minimum	2.4000000	Mean	7.3700000
Maximum	11.000000	Median	7.3500000
SD	2.5434229	Std. Error of Mean	0.8043009
Coefficient of Variation	0.3451049	Skewness	-0.661167

## Normal GOF Test

Shapiro Wilk Test Statistic 0.9554889  
 5% Shapiro Wilk Critical Value 0.8420000  
 Lilliefors Test Statistic 0.1733549  
 5% Lilliefors Critical Value 0.2616000

## Shapiro Wilk GOF Test

Data appear Normal at 5% Significance Level

## Lilliefors GOF Test

Data appear Normal at 5% Significance Level

**Data appear Normal at 5% Significance Level**

## Assuming Normal Distribution

## 95% Normal UCL

95% Student's-t UCL 8.8443745

## 95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 8.5132730

95% Modified-t UCL (Johnson-1978) 8.8163473

## Gamma GOF Test

A-D Test Statistic 0.5216546  
 5% A-D Critical Value 0.7277914  
 K-S Test Statistic 0.2265651  
 5% K-S Critical Value 0.2671278

## Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

## Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

**Detected data appear Gamma Distributed at 5% Significance Level**

## Gamma Statistics

k hat (MLE)	6.8890567	k star (bias corrected MLE)	4.8890063
Theta hat (MLE)	1.0698127	Theta star (bias corrected MLE)	1.5074638
nu hat (MLE)	137.78113	nu star (bias corrected)	97.780127
MLE Mean (bias corrected)	7.3700000	MLE Sd (bias corrected)	3.3331679
Adjusted Level of Significance	0.0267000	Approximate Chi Square Value (0.05)	5.969839
		Adjusted Chi Square Value	2.635336

## Assuming Gamma Distribution

95% Approximate Gamma UCL (use when  $n \geq 50$ ) 9.485863795% Adjusted Gamma UCL (use when  $n < 50$ ) 9.9213355

## Lognormal GOF Test

Shapiro Wilk Test Statistic 0.8445895  
 5% Shapiro Wilk Critical Value 0.8420000  
 Lilliefors Test Statistic 0.2543322  
 5% Lilliefors Critical Value 0.2616000

## Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

## Lilliefors Lognormal GOF Test

Data appear Lognormal at 5% Significance Level

**Data appear Lognormal at 5% Significance Level**

### Lognormal Statistics

Minimum of Logged Data 0.8754687

Mean of logged Data 1.9230866

Maximum of Logged Data 2.3978953

SD of logged Data 0.4470265

### Assuming Lognormal Distribution

95% H-UCL 10.413566

90% Chebyshev (MVUE) UCL 10.699405

95% Chebyshev (MVUE) UCL 12.157495

97.5% Chebyshev (MVUE) UCL 14.181268

99% Chebyshev (MVUE) UCL 18.156577

### Nonparametric Distribution Free UCL Statistics

**Data appear to follow a Discernible Distribution at 5% Significance Level**

### Nonparametric Distribution Free UCLs

95% CLT UCL 8.6929573

95% Jackknife UCL 8.8443745

95% Standard Bootstrap UCL 8.6245471

95% Bootstrap-t UCL 8.6282877

95% Hall's Bootstrap UCL 8.6621613

95% Percentile Bootstrap UCL 8.6200000

95% BCA Bootstrap UCL 8.4400000

90% Chebyshev (Mean, Sd) UCL 9.7829028

95% Chebyshev (Mean, Sd) UCL 10.875867

97.5% Chebyshev (Mean, Sd) UCL 12.392858

99% Chebyshev (Mean, Sd) UCL 15.372693

### Suggested UCL to Use

95% Student's-t UCL 8.8443745

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulation results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.**