Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 1/19/2021 8:14:02 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: RE: Can you send me a status update for West Central and Henryetta?
Attachments: ATT00001.txt

I am reviewing the data updated data tables with the applicable shading. As soon as I have completed reviewing I will send along. We are continuing to validate final data packages.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Tuesday, January 19, 2021 2:09 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: RE: Can you send me a status update for West Central and Henryetta?

**** External Email ****
Any update on Henryetta?

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, January 19, 2021 1:20 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Criner, Jeffrey J. <jeff.criner@westonsolutions.com>
Subject: RE: Can you send me a status update for West Central and Henryetta?

Gary,
Below is a summary of activities for the outstanding properties:

- 115 ½ Laguna Blvd. – Property owner discrepancies. Tax records indicate ICS Holdings LLC own the property. They have informed us that they no longer own the property. Not sure what else we can do to resolve the discrepancies.
- 1429 Central Ave – No known working phone number. Will conduct a site visit to determine property status and ownership.
- 1611 Central Ave – Left multiple messages. The owner has a mailing address in Albuquerque, Will drop off an agreement at the mailing address
- 1615 Central Ave – Left multiple messages. The owner has a mailing address in Albuquerque. Will drop off an agreement at the mailing address.
- 1617 Central Ave – Left multiple messages. Mailing and owner address are the same. Will drop off another copy of the agreement.
- 1623 Central Ave – Left multiple messages. Property is part of an estate. Estate owner is in California.
- 1701 Central Ave SW – have not been able to establish contact with the owner. Mailing and owner address are the same. Will drop off another copy of the access agreement.

Please let me know if you have any questions or need any additional information.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Tuesday, January 19, 2021 11:26 AM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: Can you send me a status update for West Central and Henryetta?

**** External Email ****

90105338

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 1/24/2022 9:52:06 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: West Central Avenue Property Ownership Information
Attachments: Iso Property Ownership Information_20220121.xlsx

Gary,
Attached is the property ownership information for West Central Avenue. There are a couple of parcels that will require some additional research due to insufficient information from the online county source.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 2/24/2022 7:53:57 PM
To: Martyne Kieling [Martyne.Kieling@state.nm.us]
CC: Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]; Ogden, Sarah, NMENV [sarah.ogden@state.nm.us]; McGlown, Anthony, NMENV [anthony.mcglown@state.nm.us]; Mark Garman [mark.garman@state.nm.us]; Cobb, Derrick [derrick.cobb@westonsolutions.com]
Subject: Re: West Central Avenue Figure

Martyne,

I am out of office till Monday. We do have a map which I believe that I sent to you. We are confirming the property addresses that we need to perform interior sampling based upon the map.
I assume that the Bell Trading Tower building has already performed sampling and mitigation. Please confirm.

Thanks
Gary

Sent from my iPhone

On Feb 23, 2022, at 11:10 AM, Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us> wrote:

Gary,

Please let me know if you have any further updates as to when to expect a final report on the soil vapor study performed in 2021. NMED continues to have inquiries from property owners in the 1400 block W Central Ave.

Please call if you have anything to add and wish to discuss.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
Innovation|Science|Collaboration|Compliance

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, December 15, 2021 8:21 AM
To: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXTERNAL] FW: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 2/4/2022 8:13:26 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: West Central Ave Plume
Attachments: Iso Property Ownership Information_20220121.xlsx; 5860 Beacon PSG Fig 3 Trichloroethene Rev2 (002).pdf

I looked at the table that you provided. I have highlighted lines that appear to have building that we may need to assess but please take a look and let me know what you think. Remember, the next stage will be doing interior building assessment. I am not sure how those in the green are within the area of potential concern. Please see the attached and lets discuss further.

Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

LOT	BLOCK	SUBDIVISIO	STREETNUMB	STREETNAME	STREETDESI
A1	0	BELL TRADING POST LOFTS	1503	CENTRAL	AVE
8A	0	BELL TRADING POST HOMES	1509	ROMA	AVE
A	0	CIBOLA ENERGY CORPORATION	1429	CENTRAL	AVE
92	0	MRGCD MAP 38	1433	CENTRAL	AVE
19A	17	PEREA ADDN	203	14TH	ST
18	17	HUNT--ROSE L	207	14TH	ST
103	0	MRGCD MAP 38	1601	CENTRAL	AVE
7A	0	BELL TRADING POST HOMES	1515	ROMA	AVE
101	0	MRGCD MAP 38	115	LAGUNA	BLVD
6A	0	BELL TRADING POST HOMES	201	LAGUNA	BLVD
95	0	MRGCD MAP 38	115	LAGUNA	BLVD
96B	0	MRGCD MAP 38	109	LAGUNA	BLVD
104	0	MRGCD MAP 38	1611	CENTRAL	AVE
102	0	MRGCD MAP 38	115	LAGUNA	BLVD
96C	0	MRGCD MAP 38	99999	CENTRAL	AVE
2A	0	WEST END ADDN	1501	CENTRAL	AVE
93	0	MRGCD MAP 38	1435	CENTRAL	AVE
7	17	LEMBKE	1420	ROMA	AVE
1	0	WEST END ADDN	1445	CENTRAL	AVE
8	17	LEMBKE	1424	ROMA	AVE
16	17	HUNT--ROSE L	207	14TH	ST
20A	17	PEREA ADDN	203	14TH	ST
17	17	HUNT--ROSE L	207	14TH	ST

STREETQUAD	APARTMENT	PIN	Jurisdiction	PARCEL_ID
NW		ABQ206470	City	101305831010945201
NW		ABQ205730	City	101305832113442302
NW		ABQ129135	City	101305833708141318
NW		ABQ128585	City	101305832909041317
NW		ABQ128832	City	101305834408541303
NW		ABQ128648	City	101305834908841304
NW		ABQ127152	City	101505736033111112
NW		ABQ205599	City	101305831713542301
NW		ABQ126946	City	101305830112731104
NW		ABQ205460	City	101305830913342316
NW		ABQ126956	City	101305830411331103
NW		ABQ127217	City	101305829611631102
NW		ABQ126914	City	101305828812331127
NW	1/2	ABQ126733	City	101305829612931105
NW		ABQ127436	City	
NW		ABQ128024	City	101305832009941314
NW		ABQ127967	City	101305832309541316
NW		ABQ127451	City	101305833711141310
NW		ABQ128510	City	101305831909941315
NW		ABQ127602	City	101305833411241311
NW		ABQ128648	City	101305834908841304
NW		ABQ128884	City	101305834508341323
NW		ABQ128648	City	101305834908841304

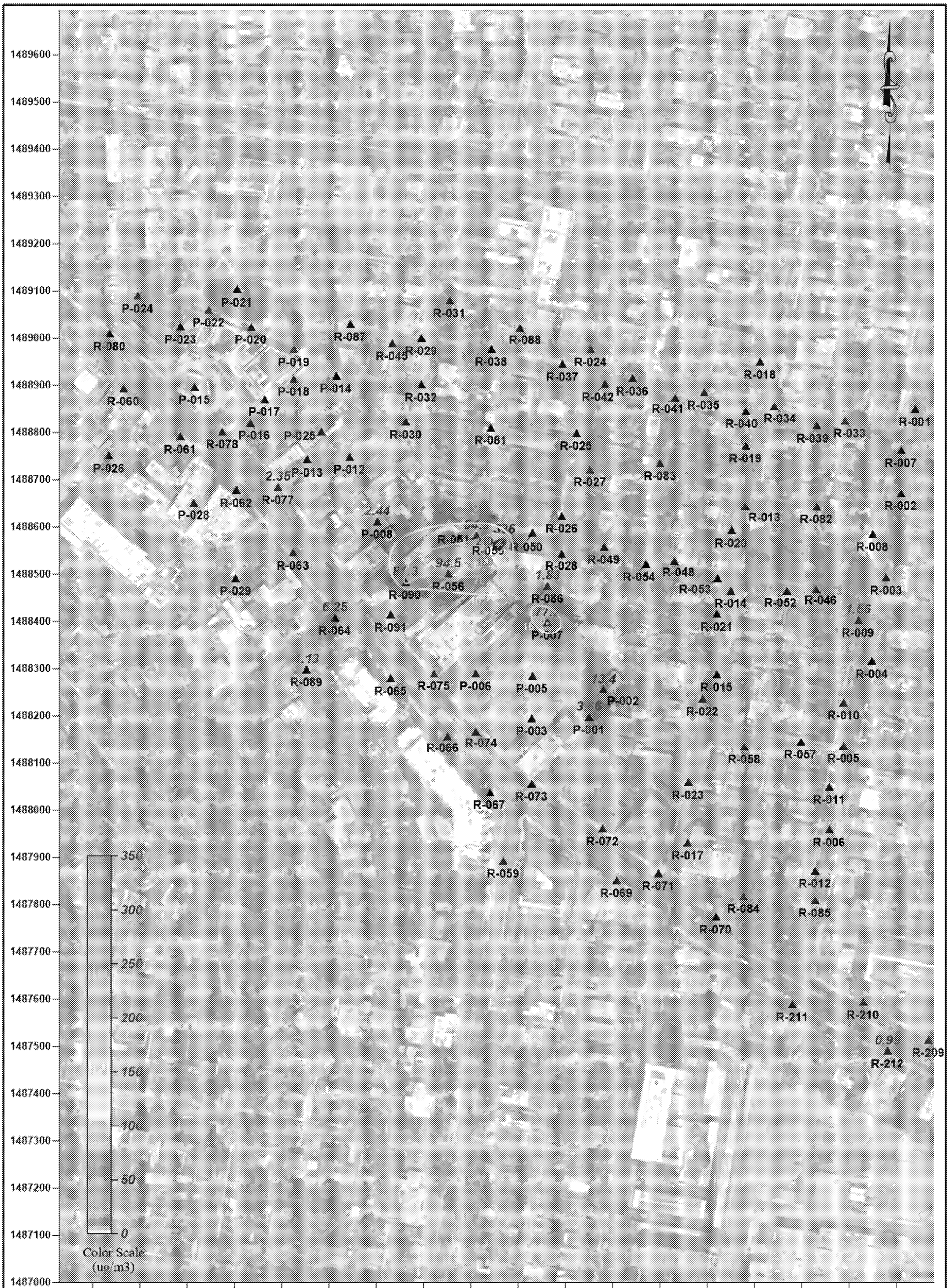
CURRENT_OWNER	PHYSICAL ADDRESS
FAMILY HOUSING DEVELOPMENT CORPORATION	1503 CENTRAL AVE NW, ALBUQUEQUE, NM 87113
NEAL RUTH E	1509 ROMA AVE NW, ALBUQUERQUE, NM 87104
CIBOLA ENERGY CORPORATION	1429 CENTRAL AVE NW, ALBUQUERQUE, NM 87104
G & L INV CO INC	1433 CENTRAL AVE NW, ALBUQUERQUE, NM 87104
RUBIN MAIDA	203 14TH ST NW, ALBUQUERQUE, NM 87104
DEL FRATE SILVIA TR DEL FRATE TRUST	207 14TH ST NW, ALBUQUERQUE, NM 87104
REGENTS OF UNM REAL ESTATE DEPT	1601 CENTRAL NE, ALBUQUERQUE, NM 87106
SKILNICK NANCY & TREVER	1515 ROMA AVE NW, ALBUQUERQUE, NM 87104
ICS HOLDINGS LLC	115 1/2 LAGUNA BLVD NW, ALBUQUERQUE, NM 87104
SHATTO NORMAN LUKE	201 LAGUNA BLVD NW, ALBUQUERQUE, NM 87104
ADOBE GOLD REALTY LLC	115 121 LAGUNA NW, ALBUQUERQUE, NM 87104
CRESPIN TED L & ADOBE GOLD REALTY LLC	109 111 LAGUNA NW ALBUQUERQUE, NM 87104
FERNANDEZ JOSHUA & JENNIFER E, REGENSBERG	1611 CENTRAL AVE NW ALBUQUERQUE, NM 87104 1139
ICS HOLDINGS LLC	115 1/2 LAGUNA BLVD NW, ALBUQUERQUE, NM 87104
BLAUGRUND LEE S,	1501 CENTRAL AVE NW ALBUQUERQUE, NM 87104 1148
GXL INV CO INC ETAL,	1435 CENTRAL AVE NW ALBUQUERQUE, NM 87104 1148
KRAMME NOREEN & OWEN,	1420 ROMA AVE NW ALBUQUERQUE, NM 87104
G L INVESTMENT CO,	1445 CENTRAL AVE NW ALBUQUERQUE, NM 87104 1148
CROMEANS JACQUELINE & BELLO ROBERT,	1424 ROMA AVE NW ALBUQUERQUE, NM 8710
DEL FRATE SILVIA TR DEL FRATE TRUST	207 14TH ST NW, ALBUQUERQUE, NM 87104
RUBIN MAIDA,	203 14TH ST NW ALBUQUERQUE, NM 87104
DEL FRATE SILVIA TR DEL FRATE TRUST	207 14TH ST NW, ALBUQUERQUE, NM 87104

OWNER_MAILING_ADDRESS	OWNER_UNIT	OWNER_CITY	OWNER_STATE
8220 LOUISIANA BLVD NE	SUITE B	ALBUQUERQUE	NM
1509 ROMA AVE NW		ALBUQUERQUE	NM
PO BOX 1668		ALBUQUERQUE	NM
317 6TH ST NW		ALBUQUERQUE	NM
203 14TH ST NW		ALBUQUERQUE	NM
207 14TH ST NW		ALBUQUERQUE	NM
MSC06-3595-1 UNIVERSITY OF NM		ALBUQUERQUE	NM
1515 ROMA AVE NW		ALBUQUERQUE	NM
PO BOX 7308	--	ALBUQUERQUE	NM
201 LAGUNA BLVD		ALBUQUERQUE	NM
911 FRUIT AVE NW		ALBUQUERQUE	NM
911 FRUIT AVE NW	--	ALBUQUERQUE	NM
12202 EAGLE ROCK AVE NE	--	ALBUQUERQUE	NM
PO BOX 7308	--	ALBUQUERQUE	NM
--	--	ALBUQUERQUE	NM
317 6TH ST NW	--	ALBUQUERQUE	NM
1420 ROMA AVE NW		ALBUQUERQUE	NM
317 6TH ST NW		ALBUQUERQUE	NM
1424 ROMA AVE NW		ALBUQUERQUE	NM
207 14TH ST NW		ALBUQUERQUE	NM
203 14TH ST NW		ALBUQUERQUE	NM
207 14TH ST NW		ALBUQUERQUE	NM

OWNER_ZIP
87113
87104
87103
87102
87104
87104
87131
87104
87194
87114

87104

87104 1966
87122 2217
87194
PO BOX 7817
87102
87104 1244
87102
87104
87104
87104 1212
87104



BEACON ENVIRONMENTAL

2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-838-8780
Beacon Project No. 5860, October 2021

Figure 3-1
Passive Soil-Gas Survey
Trichlororethene

West Central Avenue Site
Albuquerque, NM

ED_013172_00000029-00001

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/19/2020 2:28:01 PM
To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]
CC: Steven Cowan [SCowan@css-inc.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
Subject: RE: Updated West Central Avenue Proposed Sample Location Map
Attachments: Figure Soil Gas Proposed Samples DRAFT.PDF

Please see the updated proposed sample location map to include the TCE iso-concentration contour. We also identified a couple of additional public right of ways for sampling. The new proposed sample count is 319.

From: Cobb, Derrick
Sent: Thursday, March 19, 2020 8:28 AM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna (turner.ladonna@epa.gov) <turner.ladonna@epa.gov>
Cc: Steven Cowan <SCowan@css-inc.com>; Jeff.Criner@WestonSolutions.com; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Subject: Updated West Central Avenue Proposed Sample Location Map

Gary/LaDonna,
Attached is the revised proposed sample location map with the parcel boundary information. The new proposed sample count is 316 locations. Please let me know if you have any questions or concerns. I will send out conference call information later today. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

- Proposed Road Samples
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- Tax Parcels
- Area of Investigation

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 175 350

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Proposed Samples DRAFT.mxd 9:15:55 AM 3/19/2020 gardner

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 3/3/2022 2:31:19 AM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: FW: West Central Avenue Figure Request
Attachments: Figure 1-1 Trichlororethene Survey Map.pdf; Iso Property Ownership Information_20220302.xlsx; 5860 Beacon PSG Fig 3 Trichloroethene Rev2 (002).pdf

Please see the attached. Let me know when you will be available to talk. If you need for me to call one of the property owners, please let me know.

Thanks
Gary Moore

From: Moore, Gary
Sent: Wednesday, March 2, 2022 8:27 PM
To: Rauscher, Jon <Rauscher.Jon@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Subject: FW: West Central Avenue Figure Request

Please see the attached and let me know which properties you think we should perform sampling and/or install a system. Chris Petersen indicated that they did not do indoor sampling at Delfasco and that there may be some resistance at the Division level for doing this. Should the properties be limited to the plume or additional added.

Also, I will need to send out letters to those that we sampled to give them their results. We need to discuss how to go about doing this. I would love to just send them the overall maps and then indicate the sample results and the screening levels for TCE, PCE, and Benzene.

See attached.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Wednesday, March 2, 2022 10:47 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: West Central Avenue Figure Request

Gary,
Please the attached figure request showing the TCE plume boundary and parcel boundaries. We have also included the parcel ownership information. Please let us know if you have any questions or need any changes made. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

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To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]
CC: Steven Cowan [SCowan@css-inc.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
Subject: Updated West Central Avenue Proposed Sample Location Map
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Gary/LaDonna,
Attached is the revised proposed sample location map with the parcel boundary information. The new proposed sample count is 316 locations. Please let me know if you have any questions or concerns. I will send out conference call information later today. Thanks.

Derrick Cobb
Weston Solutions, Inc.
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derrick.cobb@westonsolutions.com

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LEGEND

- Proposed Road Samples
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- Tax Parcels
- Area of Investigation

NOTES:

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2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 175 350

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: MMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Proposed Samples DRAFT.mxd 7:29:18 AM 3/19/2020 gardner

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/31/2020 3:47:12 PM
To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
CC: Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; Steven Cowan [SCowan@css-inc.com]
Subject: West Central Avenue Updated Proposed Sample Locations
Attachments: Figure Soil Gas Sample Location Overview Map.pdf; Figure Soil Gas Sample Location Map_1.pdf; Figure Soil Gas Sample Location Map_2.pdf; Figure Soil Gas Sample Location Map_3.pdf; Figure Soil Gas Sample Location Map_4.pdf

Gary/LaDonna/Michelle,
Please see the attached updated proposed sample location map(s) for your review and comment (attached are subset maps to show additional details). We have added the NMED field screening data points, NMED analytical data points, street names, and further refined our proposed sample locations. Our new total sample count is 269. The reduced sample count is based on reducing duplicated sample points and we had several points that were located on private property and not in the city rights-of-way. We also looked at the areas east and west of site where property specific access agreements might be needed. With the NMED data points we may not need to pursue private property access agreements. Please let me know if you have any questions or concerns. Thanks

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PROPOSED ROAD SAMPLES (n = 269)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

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2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 200 400

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Overview Map.mxd 8:38:45 AM 3/31/2020 dequentin

WCA-1816-LOMAS-01

WCA-110-R SECO 01

WCA-1801-CENTRAL-01

WCA-1801-CENTRAL-02

WCA-1801-CENTRAL-03

WCA-1611-CENTRAL-01

WCA-C-LAGUNA-02

WCA-C-LAGUNA-03

Lomas Blvd NW

Rancho Seco Rd NW

Cmt del Lado NW

16th St NW

Fruit Ave NW

Central Ave SW

Central Ave NW

US Hwy 66

Chacoma Pl SW

Laguna Pl NW

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PROPOSED ROAD SAMPLES (n = 51)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_1.mxd 8:41:08 AM 3/31/2020 dequentin

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Fruit Ave NW

15th St NW

14th St NW

13th St NW

Roma Ave NW

Marquette Ave NW

WCA-1503-CENTRAL-02

WCA-1503-CENTRAL-03

WCA-1503-CENTRAL-01

WCA-1503-CENTRAL-04

WCA-1433-CENTRAL-05

WCA-C-14ST-03

WCA-1433-CENTRAL-02

WCA-1445-CENTRAL-01

WCA-1611-CENTRAL-03

WCA-1429-CENTRAL-01

WCA-C-14ST-02

WCA-1433-CENTRAL-03

WCA-C 14ST-01

WCA-1433-CENTRAL-01

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PROPOSED ROAD SAMPLES (n = 160)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_2.mxd 8:45:13 AM 3/31/2020 dequentin

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PROPOSED ROAD SAMPLES (n = 66)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 3
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_3.mxd 8:28:52 AM 3/31/2020 dsguenfm

WCA-1611-CENTRAL-01
WCA-1503-CENTRAL-03
WCA-1503-CENTRAL-01
WCA-C-LAGUNA-03
WCA-C-LAGUNA-02
WCA-1445-CENTRAL-01
WCA-1503-CENTRAL-08
WCA-1503-CENTRAL-04
WCA-1433-CENTRAL-05
WCA-1433-CENTRAL-02
WCA-1611-CENTRAL-03
WCA-1503-CENTRAL-05
WCA-1611-CENTRAL-03
WCA-1503-CENTRAL-07
WCA-1503-CENTRAL-06
WCA-1429-CENTRAL-01
WCA-1433-CENTRAL-03
WCA-1433-CENTRAL-01
WCA-1404-CENTRAL-02
WCA-1404-CENTRAL-01

Laguna Pl NW
15th St NW
Roma Ave NW
Laguna Blvd SW
Central Ave SW
Central Ave NW
US Hwy 66
Chacoma Pl SW
16th St SW
16th St SW
15th St SW
14th St SW
San Cristobal Rd SW
San Cristobal Rd SW

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PROPOSED ROAD SAMPLES (n = 56)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200
FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 4
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/9/2020 9:34:10 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]; Steven Cowan [SCowan@css-inc.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]
Subject: West Central Avenue Area of Investigation
Attachments: Figure Soil Gas TCE Sample Location Map_1 WORKING COPY.PDF

Gary,
Attached is an area of investigation for West Central Avenue. It is difficult to determine an exact sample count right now without knowing all the different property types within the investigation area. I have also been trying to determine groundwater flow direction for the area. I have looked at two different reports which indicate an east and/or northeast groundwater flow direction. I believe some groundwater monitoring wells need to be installed to help determine how the soil vapor is migrating (or multiple sources). I will be in Albuquerque later this week for another project as was going to take advantage of being in the area and do some scouting around in the investigation area. Please let me know if you have any questions or what me to look for something specific. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

- GROUNDWATER MONITORING WELLS
- SOIL GAS SAMPLES
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- Tax Parcels
- Area of Investigation

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100
- 500
- 1000
- 2000
- 3000
- 4000
- 5000
- 6000
- 7000

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 175 350 525

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

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QUALITY ASSURANCE SAMPLING PLAN

FOR

WEST CENTRAL AVENUE ASSESSMENT
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

Prepared For

U.S. Environmental Protection Agency Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270-2102

Contract No. EP-S5-17-02
Technical Direction Document No. 0001/20-324
WESTON Work Order No. 20600.012.001.1324
NRC No. N/A
SEMS ID NMN000607372
FPN N/A
SSID A6JT
EPA OSC Gary Moore

Prepared by

Weston Solutions, Inc.
2600 Dallas Parkway, Suite 280
Frisco, Texas 75034

May 2020

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1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) contractor, was tasked by the U.S. Environmental Protection Agency Region 6 (EPA Region 6) under Contract Number EP-S5-17-02, Technical Direction Document (TDD) Number 0001/20-324, to conduct passive soil gas (PSG) assessment activities at West Central Avenue Assessment Site (Site) located along Central Avenue NW and surrounding areas located in Albuquerque, Bernalillo County, New Mexico. A Site Location Map is provided as Figure 1-1. The Superfund Enterprise Management System (SEMS) Identification (ID) assigned to the Site is NMN000607372. START prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed at the Site as part of the assessment sampling activities.

1.1 PROJECT OBJECTIVES

START is providing technical assistance to EPA Region 6 to support EPA's determination that the Site presents or does not present, by presence of trichloroethylene (TCE) and/or tetrachloroethylene (PCE), a threat to public health or welfare of the United States or the environment in accordance with *40 Code of Federal Regulations (CFR) 300.415.*

The Project Team will consist of Jeff Criner as the START Assessment/Inspection Manager and Derrick Cobb as the START Project Team Leader (PTL) and Field Safety Officer (FSO). The PTL will be responsible for the technical quality of work performed in the field and will serve as the START liaison to EPA Region 6 during field activities. The PTL, with the concurrence of the EPA On-scene Coordinator (OSC), will determine the locations for PSG samples in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The PTL will be responsible for accurate chain-of-custody documentation for the samples collected during field activities. The PTL will oversee the packaging and shipping of samples to the designated laboratory, and enter daily sample collection into SCRIBE and observational data into Response Manager. The FSO will be responsible for providing overall Site health and safety support.

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1.2 QASP FORMAT

This QASP has been organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methodology and Data Validation
- Section 5 – Quality Assurance

All figures are provided as portable document format (pdf) files. Appendices are provided with the following information:

- Appendix A Site-Specific Data Quality Objective
- Appendix B Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (Second Edition) – Compendium Method TO-17
- Appendix C Standard Operating Procedures

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2. SITE BACKGROUND

Information regarding the Site location, description, and history is included in the following subsections.

2.1 SITE LOCATION AND DESCRIPTION

The West Central Avenue (WCA) Site is located within the city limits of Albuquerque, Bernalillo County, New Mexico. Geographically, it is located east of the Rio Grande River, south and east of Old Town Albuquerque, and west of the downtown Albuquerque area. The Site's suspected point source of contamination is located at 1503 Central Avenue NW, geographic coordinates are Latitude 35.090077° North and Longitude 106.664567° West, in Township 10N, Range 3E, Section 17. The West Central Avenue Site is bordered to the north by Lomas Boulevard NW, to the east by 10th Street, to the south by Park Avenue, and to the west by Rancho Seco Road NW. The elevation of the Site is approximately 4,951 feet above mean sea level (amsl). The Site Area Map and the Site and Study Area Layout Map are presented as Figure 2-1 and Figure 2-2, respectively.

The WCA Site is situated within a commercial and residential area. In addition to urban parks, there are eight schools within a 1 mile radius of the Site. The primary contaminants of concern are tetrachloroethylene (PCE) and trichloroethylene (TCE) chlorinated solvents. The New Mexico Environment Department (NMED) and EPA suspect the source of contamination to originate from the Bell Trading Post (BTP), the location of a former Indian jewelry manufacturing business that operated between 1947 and 1975. The business moved to the Sun Bell site located just 0.3 miles northwest from the BTP at the intersection of Central Avenue NW and Lomas Boulevard NW. The business currently operates as Rio Grande Trading (formerly the Bell Group) and distributes jewelry and supplies under the Rio Grande brand name. The exact date of release is unknown, however, it is suspected that TCE was used to degrease and clean their products and that releases occurred sometime during its operation at the Site.

The Site is located in the central portion of the Albuquerque Basin, a geologic feature filled with unconsolidated to loosely consolidated gravel, sand, silt, and clay. The ground surface near the

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Site slopes east to west toward the Rio Grande located just over 1 mile west-southwest of the Site.

The river deposits identified as the axial Rio Grande facies that underlie the Site consist of well-sorted coarse sand to gravel separated by silty and clayey fine sands. These strata have been divided into seven aquifer zones, differentiated based on geologic and hydraulic characteristics. The uppermost water-bearing zone (shallow aquifer zone) is approximately 40 feet below ground surface (bgs) beneath the western portion of the EPA Fruit Avenue Plume (FAP) Superfund (EPA ID NMD986668911) site that stretches to the west of the railroad tracks. Depth to the shallow aquifer zone west of the Site, at the former BTP property, is approximately 20 to 21 feet bgs.

The groundwater within the Albuquerque Basin at the Site can be divided into three aquifer zones: shallow, intermediate, and deep, and are defined as follows:

- Shallow (S) – wells with screen midpoint elevations at 4,894 feet amsl or higher. These S wells are typically completed across the water table at about 40 feet bgs.
- Intermediate (I) – wells with screen midpoint elevations between 4,894 and 4,834 feet amsl (roughly 60 to 120 feet bgs). This zone has been subdivided into I1 (approximately 60 to 85 feet bgs or 4,893 to 4,868 feet amsl) and I2 (86 to 120 feet bgs or 4,868 to 4,834 feet amsl).
- Deep (D) – wells having screen midpoint elevations at or below 4,834 feet amsl (generally completed below 120 feet bgs). The D zone has been further subdivided into four zones: D1 (generally 120 to 150 feet bgs or 4,834 to 4,804 feet amsl); D2 (generally 150 to 250 feet bgs or 4,804 to 4,704 feet amsl); D3 (approximately 250 to 350 feet bgs or 4,704 to 4,604 feet amsl; and D4 (350 feet and deeper or less than 4,604 feet amsl).

2.2 SITE HISTORY AND PREVIOUS INVESTIGATIONS

The WCA Site was identified by the NMED when chlorinated solvents were detected in background ground water samples collected in 2005. The samples were taken from upgradient monitoring wells of the FAP located just east of the Site, including MNW-11. The FAP site is currently in the Long Term Remedial Action (LTRA) phase of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. Suspected sources of the FAP TCE are the former Sunshine Laundry, Elite Cleaners, and American Linen

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Corporation dry-cleaning facilities. In April 1989, the City of Albuquerque discovered chlorinated solvent contamination in groundwater near the FAP site during a routine inspection of the Coca-Cola bottling plant water supply well, located at 205 Marquette Avenue NE. Undocumented releases from unknown sources are suspected to have formed the WCA groundwater contaminant plume containing PCE and its breakdown products TCE, *cis*-1,2-Dichloroethylene (cis-1,2-DCE), *trans*-1,2-Dichloroethylene (trans-1,2-DCE), and vinyl chloride (VC). The primary contaminants of concern (COCs) for this assessment are PCE and TCE. The full extent of the Site groundwater plume is not well-defined at this time.

MNW-11 is located closest to the Site. The BTP is located at 1503 Central Avenue NW, approximately 2,375 feet west-northwest of monitoring well MNW-11. Groundwater samples collected during a 2001 NMED Voluntary Remediation Program (VRP) Phase II environmental site assessment (ESA) also exhibited a TCE detection of 1.5 micrograms per liter (µg/L). During the same ESA, twelve soil gas samples were collected between 2 to 4 feet bgs. Six of twelve soil gas samples yielded TCE concentrations ranging from 0.2 µg/L (or 200 micrograms per cubic meter [µg/m^3]) to 3.4 µg/L (or 3,400 µg/m^3). In 2005, the Voluntary Remediation Completion report for BTP noted that there may have been a historical release but that the samples were inconclusive and did not exceed state water quality standards. In 2014, a VRP Limited Phase II Expanded Site Assessment was conducted to gather soil vapor and indoor air samples. Two of the three soil gas samples collected from the exterior of the BTP building contained TCE; the highest detection being 1,800 µg/m^3 from a sample collected 3 feet bgs near the intersection of Roma Avenue NW and Laguna Boulevard NW. One of two soil borings for soil vapor sampling and one of two "source" air samples collected from the interior of the building reported TCE concentrations of 14 µg/m^3 and 3.1 µg/m^3 TCE, respectively. It was concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, occurred at the BTP or within the immediate vicinity of the Site.

A former dry cleaner property, Park Avenue Cleaners, was also investigated by NMED VRP in 2000. The property is located at 1004 Park Avenue, approximately 0.45 mile southeast from the former BTP. Soil gas data from two boreholes indicated up to 76,000 µg/m^3 of PCE and 900 µg/m^3 of TCE. A monitoring well, MW-1, was also installed during the investigation; samples yielded detections up to 14 µg/L of PCE.

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In addition to the VRP ESAs, NMED Superfund Oversight Section performed a 2014 site inspection (SI), a 2016 expanded site inspection (ESI), and a 2017 site reassessment (SR) in coordination with EPA. The 2014 SI groundwater analytical results, from samples taken from six wells located approximately 3,000 feet northwest to southwest of 9th Street and Marquette Avenue NW (FAP site address) and upgradient from the BTP, did not indicate detection of any volatile organic compounds (VOCs) nor TCE. In addition to the 2014 SI, NMED VRP also tasked Intera Inc. with conducting a Limited Phase II Environmental Site Investigation (ESA) which focused on indoor air impacts. Sub-slab soil vapor samples from both the indoor and the exterior of the BTP building yielded detections of TCE above EPA Vapor Intrusion Screening Levels (VISLs).

Only soil vapor samples were collected during the 2016 ESI. The ESI data indicated three TCE hotspots and two PCE hotspots from the 1800 block to the 1400 block of Central Avenue NW; the plume appeared to stretch in an eastward direction, southeast down Central Avenue NW then breaking east along Marquette Avenue NW toward the FAP site-associated MNW-11 well. The highest TCE soil gas laboratory sample result (8,530 $\mu g/m^3$) from the ESI were collected from the former BTP property. Additional locations, like the Wash Tub Laundry were identified as an additional possible source of contamination. The former Park Avenue Cleaners property was also investigated as part of the ESI; field gas chromatograph samples yielded up to 1,727 $\mu g/m^3$ PCE and up to 104 $\mu g/m^3$ TCE.

The 2016 NMED ESI report also included FAP sample data from monitoring well samples collected from wells located over the western portion of the FAP plume. Subsequent quarterly sampling of the FAP, between 2003 and 2015, has indicated merging of its western edge with the upgradient WCA TCE plume, thus further complicating FAP remediation efforts. Two sets of data were compiled from samples taken from upgradient-located FAP site monitoring wells (NMED ESI, 2016). From that data, TCE was detected in the following wells as provided in the table below.

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Table 2-1
TCE in Groundwater Sampled from Western FAP Site Wells
NMED ESI, 2016
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Well	Aquifer subzone	2012 (µg/L)	2015 (µg/L)
MNW-11	D1 (121 - 150 ft. bgs)	46	22
SFMW-14	D1 (121 - 150 ft. bgs)	17	14.9
MNW-9	D1 (121 - 150 ft. bgs)	4.6	1.9
MNW-1	I2 (86 - 120 ft. bgs)	17	19.8
SFMW-13	I2 (86 - 120 ft. bgs)	1	0.9
WB-01	I1/I2 (61 - 120 ft. bgs)	0.9	2.6
WB-02	I1/I2 (61 - 120 ft. bgs)	0.77	0.1

Notes:
ft. bgs – feet below ground surface
µg/L – micrograms per liter

The 2017 SR activities included more air and soil vapor sample collection, and the installation of two monitoring wells. WESTON mobilized in March 2017 to conduct oversight on the installation of two monitoring wells. NMED sampled these wells the following week and released a Site Reassessment Report in September 2017. NMED reported no water samples yielded detections above regulatory limits. The soil vapor and indoor air samples were collected for analysis from public, commercial, and residential properties to generate soil gas plume maps. In lieu of groundwater data, NMED decided to use actively-pumped screening detections to generate the plume maps that further confirmed the plume map generated for the 2016 ESI. The highest TCE soil gas laboratory sample results were detected at 340 µg/m^3 and 35 µg/m^3, located at the 1433 Central Avenue NW property that borders the former BTP on the east side. The highest PCE soil gas sample results, with concentrations up to 1,700 µg/m^3, were collected at the former Park Avenue Cleaners.

In March 2020, START mobilized to the Site for a preliminary Site visit to identify suitable sample locations. During the visit, NMED provided START with additional locations of suspected sources of contaminants, namely Custom Cleaners and Silver Moon Lodge.

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3. SAMPLING APPROACH AND PROCEDURES

The specific sampling approach and procedures are presented in the following subsections.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The EPA OSC and START PTL have pre-determined the sample locations of PSG samplers within the study area. Figures 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 detail the proposed PSG sample locations. The EPA OSC and START PTL may modify, add, or delete PSG sample locations as necessary. Site access to the sample locations, located within private properties and the City of Albuquerque right-of-way areas, will be obtained prior to the initiation of field activities. The START PTL will also contact New Mexico 811 at least 48 hours prior to the sampling event to notify local utility companies (e.g., power, phone, gas, cable, sanitation, etc.) to have underground cables, lines, and pipes flagged and marked. The START PTL will also work closely with the City of Albuquerque regarding any potential utilities that may be located in the right-of-way areas where the PSG samples will be placed. The START PTL will also contact private property owners at least 48 hours prior to entry.

3.1.1 Data Quality Objective

The objective of sampling activities is to determine if PCE and TCE are present within Site soil vapor and whether those concentrations may pose a threat to human health and the environment. To accomplish this, a Data Quality Objective (DQO) has been established and is included in Appendix A:

- Confirm the presence and concentration of PCE, TCE, and other chlorinated solvent degradation products in soil vapor using PSG technology.

The DQO was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

3.1.2 Health and Safety Plan Implementation

Field activities will be conducted in accordance with the site-specific health and safety plan (HASP). The FSO will be responsible for implementation of the HASP during all field investigation activities. In accordance with WESTON's general health and safety operating

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procedures, the START field team will drive the route to the hospital specified in the HASP prior to initiating sampling activities.

3.1.3 Community Relations

Community relations may require additional EPA involvement due to the general nature of the Site. It is anticipated that the EPA OSC will be on-site at all times, and community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the START PTL, under the guidance of the START Inspection/Assessment Manager, will manage community relations in the field as directed by the EPA OSC.

3.1.4 Field Activities Review Meeting

The PTL will conduct a meeting with the START field team to familiarize them with the project scope of work, discuss the planned field activities, roles and responsibilities, and review the project HASP and other relevant standard operating procedures (SOPs). This meeting will be conducted prior to beginning any Site activities.

3.1.5 Mobilization

The START team is currently scheduled to mobilize for this sampling event sometime between June and August 2020, pending the evolving response to the COVID-19 pandemic. It is anticipated that placement and retrieval of the PSG sampler will each require approximately 7 days to complete, including mobilization and demobilization.

3.2 FIELD ACTIVITIES

START will use passive soil gas samplers to collect soil vapor from the WCA Site. A total of 278 PSG samples consisting of 241 normal, 25 duplicate, 6 trip blanks, and 6 rinsate blanks will be collected as part of the field activities. The proposed sample locations are shown in Figure 3-1. A total of 206 PSG samplers will be installed within the City of Albuquerque right-of-ways. See Figures 3-1 through 3-6. Thirty-five PSG samplers will be installed on private properties along Central Avenue. See Figures 3-1 through 3-6.

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Passive gas samplers will be installed in accordance with SOPs. WESTON SOPs and supporting SOPs are included in Appendix C. The specific sampling, decontamination, and sample handling procedures, including disposition of investigation-derived waste (IDW), are described in the following subsections.

3.2.1 PSG Installation/Retrieval

The PSG samplers will be installed in 3-foot-depth holes using a hammer drill with a ¾-inch or 1 inch-diameter drill bit according to the manufacturer's guidelines. Should the proposed sample location be covered with concrete, START will use a concrete drill bit to develop the boring hole. After the PSG samplers are installed, the holes will be sealed with the provided plug to protect the samplers and prevent potential surface vapor intrusion. START will obtain global positioning coordinates (GPS) for each sample location. The PSG samplers will remain in the subsurface for up to 21 days, then retrieved and shipped to a WESTON subcontracted laboratory for analysis. Excess soil from boreholes will be contained on-site and used to backfill the holes after the samplers are removed. For those boring holes drilled through concrete, the boring holes will be patched with concrete according to City of Albuquerque specifications.

3.2.2 Sample Handling Procedures

The PSG samplers will be installed according to the manufacturer specifications. Following PSG sample retrieval, the samplers will be stored in the appropriate containers and preserved in a manner that is appropriate for the analyses to be performed.

Any sampling equipment used for the PSG sampling effort (i.e., drill bit) will be decontaminated prior to and in between each sample location. PSG samples will remain in containers in a clean, segregated area. Sampling personnel will change gloves between each sample collection/handling to reduce the possibility of cross-contamination.

3.2.3 Quality Assurance/Quality Control Samples

A field quality control (QC) program will be implemented to ensure conformance with data quality protocols established by the EPA. The field QC program is generally comprised of additional collected field QC "duplicate" samples, including those samples described in the

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following paragraphs. Refer to Table 3-1 for QA/QC sample collection requirements. A summary of field QC samples anticipated to be collected during the assessment is summarized below:

- **Field Duplicate Samples**. Field duplicate PSG samples will be collected during the field sampling effort. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Blind PSG field duplicate samples will be collected at the rate of one duplicate for every ten samples collected. Twenty-five blind field duplicate samples are planned for this sampling effort.
- **Equipment Rinsate Samples**. Equipment rinsate blanks will be prepared by pouring laboratory-grade de-ionized water over non-disposable sampling equipment (i.e., drill bit) after it has been decontaminated, and by collecting the rinse water in sample containers for analyses. The samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. The equipment rinsate blanks will be prepared each day that non-disposable sampling equipment is used. START will collect one rinsate sample from the drill bit used to confirm that it had been properly decontaminated.
- **Trip Blank Samples.** PSG trip blank samples are collected when analyzing soil gas samples for VOCs. PSG trip blank samples are a critical requirement for all absorptive sampling programs and are used to quantify any potential blank contamination from sample transport, handling, and storage. PSG trip blank samples are samples that travel to and from the field sampling site without being opened. One trip blank sample will be placed in the shipping cooler that contains PSG samplers to be analyzed for VOCs.
- **Temperature Blank.** One temperature blank will be prepared in the field and will consist of one 40-milliliter glass sample container with a Teflon®-lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of this sample within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.

3.3 SAMPLE MANAGEMENT

Specific nomenclature that will be used by START will provide a consistent means of facilitating the sampling and overall data management for the project as defined in the WESTON SOPs provided in Appendix B. Any deviations from the sample nomenclature proposed below must be

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approved by the START PTL. Sample locations will be identified in the field as each location is sampled, independent of the physical location of the sample.

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, the PSG samplers will be maintained at 4 °C until they are submitted for laboratory analysis. No preservation of the samples is necessary. The samples will be sent to the subcontracted laboratory by overnight carrier.

The hold time is initiated when the samples are collected in the field and continues until the analysis is begun. The turnaround time is initiated when the samples are received by the laboratory and continues until the analytical results are made available to WESTON verbally or electronically for review. Samples that have been analyzed will be disposed by the designated laboratory in accordance with standard laboratory procedures.

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Table 3-1
Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Sample Matrix	Analytical Parameter	Analytical Method	Container Info	Preservation Requirements	Minimum Volume or Weight	Maximum Holding Time
Passive Soil Gas	VOCs	Modified TO-17	1 sampler per sample location	4 °C	N/A	30 days to analysis
Field Blank Samples (also Passive Soil Gas)	VOCs	Modified TO-17	1 sampler per day of sampling activity	4 °C	N/A	30 days to analysis

Notes:
°C - Degrees Celsius
N/A - Not Applicable
VOCs - Volatile Organic Compounds

3.5 INVESTIGATION-DERIVED WASTE

It is anticipated that minimal Investigation-Derived Waste (IDW) will be generated during the field sampling effort. Any excess soil and/or concrete generated during the passive gas sampler installation activities will be placed in plastic bags and disposed by START off-site within municipal trash dumpsters.

3.6 DECONTAMINATION

Non-disposable sampling equipment (i.e., drill bit) used during the PSG sampler installation process will be decontaminated before initial use, between use, and at the end of the field effort. Equipment decontamination will be completed in the following steps:

1. Non-phosphate detergent and potable water wash to clean the equipment.
2. Final potable water rinse.
3. Equipment air-dried.

Although highly unlikely, should any excess waste be generated because of equipment decontamination, it will be placed in a drum and disposed of appropriately at the end of the sampling activities. The drum will be labeled on the side with the name of the site, the contents,

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sampling location, and date. The drum will remain at the EPA soil vapor extraction facility until arrangements can be made for its disposal.

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4. ANALYTICAL METHODOLOGY AND DATA VALIDATION

Passive soil gas samples will be analyzed by a WESTON-contracted laboratory using gas chromatography/mass spectrometry (GC/MS) instrumentation, following modified EPA TO-17 procedures. The laboratory's reported quantitation levels (RQLs) for each of the VOCs associated with the modified EPA TO-17 methodology, in mass and mass per volume, will be used. Mass will be reported according the laboratory RQLs; RQLs for mass and mass per volume will be used as a screening tool to determine the presence or absence of VOCs in the passive soil gas samples. The rinsate, trip blank and field blank samples will be analyzed for VOCs by SW-846 Method 8260.

Following analysis, the laboratory will provide a preliminary data deliverable via email in PDF format. The final data deliverable will include a full Contract Laboratory Program (CLP)-like data package (Level IV data package with QC and raw data) in PDF format and a final Electronic Data Deliverable (EDD) in Microsoft Excel format. Initial data deliverables (preliminary results) will be based on a standard, 10-business-day Turn-around Time (TAT) starting when the laboratory receives the samples, unless otherwise directed by the EPA OSC. The TAT criteria will be initiated when the sample group is received by the laboratory and continues until the data deliverable is submitted to START. The final Level IV data deliverable will be submitted by the laboratory based on a 10-business-day TAT.

START-contracted laboratory data packages will be verified and validated using Stage 2B validation, as described in the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (January 2009) unless otherwise specified by the EPA OSC. Data validation qualifiers will be applied based on method-specific analytical quality control guidelines as well as Superfund CLP National Functional Guidelines for Superfund Organic Methods Data Review (January, 2017). A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. START will evaluate the following (if applicable) to verify that the analytical data is within acceptable QA/QC tolerances:

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- The completeness of the laboratory report, verifying that all required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

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5. QUALITY ASSURANCE

Quality Assurance (QA) will be conducted in accordance with the WESTON Corporate Quality Management Manual; the WESTON START Quality Management Plan; and EPA Quality Assurance/Quality Control Guidance for Removal Activities. The START PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory used during the investigation will be responsible for QA/QC related to the analytical work. START will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

5.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under the chain-of-custody procedures.

START personnel will complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to the subcontracted laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.

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- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each shipping container. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and attached to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

5.2 PROJECT DOCUMENTATION

All documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, and SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure Web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one

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site. START personnel will use SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

5.3 FIELD DOCUMENTATION

The following field documentation will be maintained.

5.3.1 Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number
- Names of personnel on-site
- Dates and times of all entries
- Description of all site activities, including site entry and exit times
- Noteworthy events and discussions
- Weather conditions
- Site observations
- Identification and description of samples and locations
- Dates and times of sample collections and chain-of-custody information
- Records of photographs
- Site sketches

5.3.2 Sample Labels

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number
- Date and time the sample was collected
- Sample preservation method
- Analysis requested
- Sampling location

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5.3.3 Chain-of-Custody Record

A chain-of-custody record will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it. The chain-of-custody is discussed in Subsection 5.1 Sample Custody Procedures.

5.3.4 Custody Seal

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

5.3.5 Photographic Documentation

START will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appeared at completion of the work.

All photographs should be taken with a digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

5.3.6 Report Preparation

At the completion of the project, START will review and validate all laboratory data and prepare a draft trip report of field activities and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.

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5.4 RESPONSE MANAGER

START will use the Response Manager module located on the EPA Web Hub, https://solutions.westonproject.net/epawebhub/, to collect and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – Site specific data including location and type of site. It also includes an area for all key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Timeline Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for targeted reconnaissance efforts. Typically, the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any an all reconnaissance activities.
- Facility Assessment Module - provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for assessments of structures. Typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle to grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifest and manifest line items, and upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for the tracking of which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property with regard to the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.

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- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the OSC in a Pollution Report (POLREP) or Situation Report (SITREP).
- HHW Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta data associated with that data file can be filled in using the photo-log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At anytime deemed necessary, POLREP and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and is backed up regularly.

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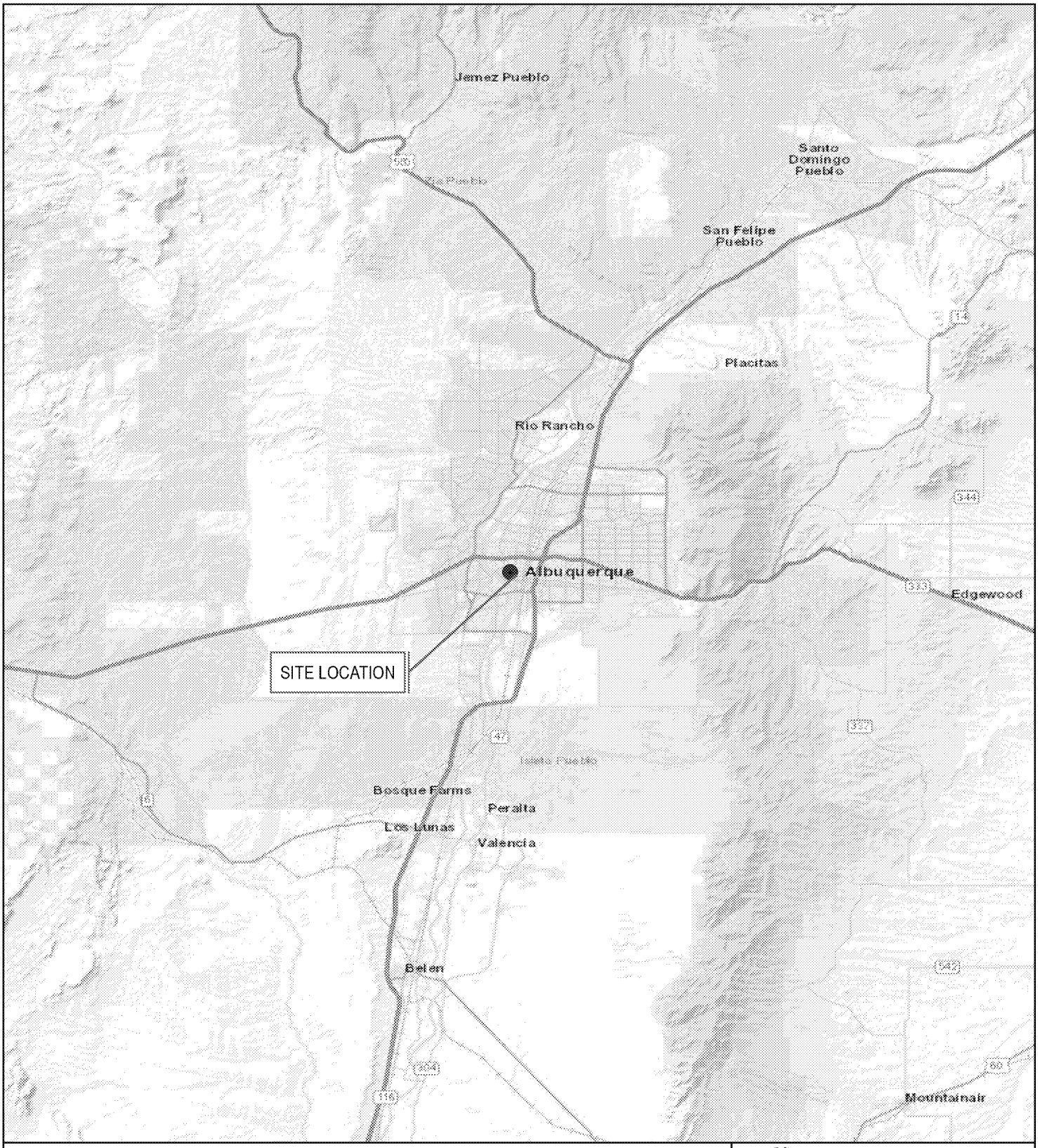
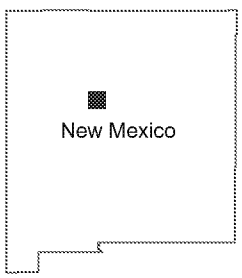


LEGEND

● SITE LOCATION



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SOURCE: WORLD STREETMAP, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
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USEPA REGION 6

FIGURE 1-1

SITE LOCATION MAP

WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 1-1 - Site Location Map.mxd 10:33:59 PM 5/13/2020 dequenlm

LEGEND

● SITE LOCATION

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FEET

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SOURCE: NATIONAL GEOGRAPHIC, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

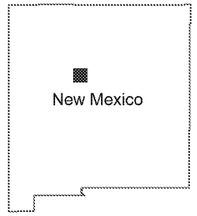
USEPA REGION 6

FIGURE 2-1

SITE AREA MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 2-1 - Site Area Map.mxd 10:35:40 PM 5/13/2020 deguenlm



LEGEND

- BELL TRADING POST PROPERTY
- GROUNDWATER MONITORING WELLS
- CITY PROPERTY
- APPROXIMATE RIGHT-OF-WAY AREAS
- PARCEL BOUNDARY
- NON-RESIDENTIAL PROPERTY
- RESIDENTIAL PROPERTY

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SOURCE: BING AERIAL, ESRI

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SEMS ID: NMN000607372
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USEPA REGION 6

FIGURE 2-2
SITE AND STUDY AREA LAYOUT MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 2-2 Site and Study Area Layout Map.mxd 3:25:39 PM 5/27/2020 dequentin

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 35)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 206)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: BING AERIAL, ESRI

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FIGURE 3-1

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

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New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 22)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 19)
- GROUNDWATER MONITORING WELLS
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

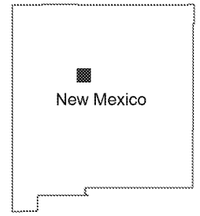
USEPA REGION 6

FIGURE 3-2

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

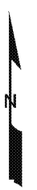
FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-2 Soil Gas Analytical and Field Sample Location Map 1.mxd 3:13:26 PM 5/27/2020 dsguenth



LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 7)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 51)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene



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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-3

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-3 Soil Gas Analytical and Field Sample Location Map 2.mxd 3:32:09 PM 5/27/2020 dequentin

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 5)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 23)
- GROUNDWATER MONITORING WELLS
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-4

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 3
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-4 Soil Gas Analytical and Field Sample Location Map 3.mxd 3:38:34 PM 5/27/2020 dsguenfm

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 8)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 21)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-5

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 4
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-5 Soil Gas Analytical and Field Sample Location Map 4.mxd 3:44:23 PM 5/27/2020 dsguertin

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 6)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 115)
- GROUNDWATER MONITORING WELL
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

N

0 210 420

FEET

SOURCE: BING AERIAL, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-6

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 5
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-6 Soil Gas Analytical and Field Sample Location Map 5.mxd 3:53:59 PM 5/27/2020 duguenin

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APPENDIX A

SITE-SPECIFIC DATA QUALITY OBJECTIVE (DQOS)

APPENDIX A

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

STEP 1. STATE THE PROBLEM	
Determine the presence and concentration of chlorinated solvent soil vapor north, east, south, and west of the West Central Avenue Assessment Site.	
STEP 2. IDENTIFY THE DECISION	
If areas are affected by chlorinated solvents, the contaminants of concern (COCs), (specifically PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride [VC]) in soil gas, additional assessment may be warranted.	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	▪ If Site COCs exceeds the EPA RSLs for soil gas vapor, the vapor represented by that sampled will be considered contaminated and will require additional attention. ▪ If Site COCs do not exceed the EPA RSLs for soil gas vapor, the vapor represented by that sample will not require additional attention.
STEP 3. IDENTIFY INPUTS TO THE DECISION	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	▪ Contaminant concentrations in soil gas vapor samples collected during sampling.
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	▪ Passive soil gas sample locations as shown on Figures 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 of the QASP. ▪ Analytical results from VOC analysis (EPA TO-17, modified).
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	Analytical data collected from the passive soil gas samplers will be used for information purposes to determine if additional assessment activities will be required.
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	Sampling techniques and analytical methods are discussed in Sections 3.0 and 4.0 and illustrated on Table 3-1 of the QASP.
STEP 4. DEFINE THE BOUNDARIES OF THE STUDY	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	Area defined as above the ground water plume identified by EPA and NMED with past sampling events.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Soil gas vapor in subsurface soils and groundwater contamination.
DEFINE THE SCALE OF DECISION MAKING.	Results of soil gas vapors will be used to establish whether vapor intrusion has occurred as a result of the contaminated ground water plume.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The data will apply until the soil vapors represented by the samples receive appropriate response actions.
DETERMINE WHEN TO COLLECT DATA.	Passive soil gas samples will be deployed sometime between June and August 2020 and retrieved approximately 3-weeks later and shipped to the laboratory for analysis.

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APPENDIX A (CONTINUED)

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	▪ Inclement weather. ▪ Access not attainable (most sample locations in right-of-ways). ▪ Possible utility lines in proposed sample locations.
STEP 5. DEVELOP A DECISION RULE	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	The sample concentrations at each sample location will be used to determine if additional assessment activities are warranted by EPA at a later date.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	The action level will be that VOCs are detected in a mass concentration (micrograms [µg]) or mass per volume (ppbV) concentration that exceeds the corresponding EPA RSLs and laboratory reporting limit, indicating that further assessment may be required.
DEVELOP A DECISION RULE.	If the COCs identified in the air samples are above the EPA RSLs, those samples and the source ground water plume will require additional investigation. If no COCs are identified in the air samples then vapor intrusion from the ground water plume has not been established and the air represented by the samples will not require additional attention.
STEP 6. SPECIFY LIMITS ON DECISION ERRORS	
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from 0.0 µg or 0.0 ppbV, to an undetermined mass and mass per volume concentration.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type I Error: Deciding that the specified area represented by the passive soil gas sample does not exceed the specified screening level when, in truth, the passive soil gas concentration of the contaminant exceeds its screening level. The consequence of this decision error is that contaminated soil vapor will remain in the source area possibly endangering human health and the environment. There may also be potential future liability associated with remedial cleanup costs of leaving contaminated soil vapor in the source area. This decision error is more severe. Type II Error: Deciding that the specified area represented by the passive soil gas sample does exceed the screening level when, in truth, it does not. The consequences of this decision error are that additional assessment activities may be warranted and unnecessary costs will be incurred.

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APPENDIX A (CONTINUED)

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	The true state of nature when the soil gas vapor is decided to be below the screening levels when in fact, it is not below the screening levels, is that the area may need additional assessment. The true state of nature when the soil gas vapor is decided to be above the screening levels when in fact, it is not above the screening levels, is that the area may not need additional assessment.
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS (H_o) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS (H_a).	H_o: The soil gas represented by the passive soil gas sample of the specified area is above the screening level. H_a: The soil gas represented by the passive soil gas sample of the specified area is below the screening level.
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	▪ False Positive Error = Type I ▪ False Negative Error = Type II
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	To be assigned based on discussions with EPA COR.
STEP 7. OPTIMIZE THE DESIGN	
REVIEW THE DQOs	Due to insufficient historical PSG data, determination of the standard deviation was not possible. Therefore, sample size calculation using traditional statistical formula may not be the optimal design. In order to select the optimal sampling program that satisfies the DQOs and is the most resource effective, other elements were considered.
DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN. A total of 278 PSG samples consisting of 241 normal, 25 duplicate, 6 trip blank and 6 rinstae blank will be collected during as part of the field activities. The PSG samples be installed along the right-of-ways in the area near the Bell Trading Post, the area of former Park Avenue Cleaners, the area near the intersection of Marquette Avenue NW and 9th Street NW, and along Central Avenue NW to determine the presence of chlorinated solvent soil gas. The samplers will be installed and allowed to equilibrate to the surrounding site conditions for up to 21 days to allow for optimal sample collection. Samples will be analyzed for volatile organic compounds (VOCs), specifically targeting PCE, TCE and degradation products by analytical method EPA TO-17, modified.	

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APPENDIX B

COMPENDIUM OF METHODS FOR THE DETERMINATION OF TOXIC ORGANIC COMPOUNDS IN AMBIENT AIR (SECOND EDITION) - COMPENDIUM METHOD TO-17

EPA/625/R-96/010b

Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air

Second Edition

Compendium Method TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

January 1999

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Method TO-17
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DISCLAIMER

This Compendium has been subjected to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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METHOD TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

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METHOD TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

1. Scope

1.1 This document describes a sorbent tube/thermal desorption/gas chromatographic-based monitoring method for volatile organic compounds (VOCs) in ambient air at 0.5 to 25 parts per billion (ppbv) concentration levels. Performance criteria are provided as part of the method in Section 14. EPA has previously published Compendium Method TO-1 describing the use of the porous polymer Tenax® GC for sampling nonpolar VOCs and Compendium Method TO-2 describing the use of carbon molecular sieve for highly volatile, nonpolar organics (1). Since these methods were developed, a new generation of thermal desorption systems as well as new types of solid adsorbents have become available commercially. These sorbents are used singly or in multisorbent packings. Tubes with more than one sorbent, packed in order of increasing sorbent strength are used to facilitate quantitative retention and desorption of VOCs over a wide volatility range. The higher molecular weight compounds are retained on the front, least retentive sorbent; the more volatile compounds are retained farther into the packing on a stronger adsorbent. The higher molecular weight compounds never encounter the stronger adsorbents, thereby improving the efficiency of the thermal desorption process.

1.2 A large amount of data on solid adsorbents is available through the efforts of the Health and Safety Laboratory, Health and Safety Executive (HSE), Sheffield, United Kingdon (UK). This group has provided written methods for use of solid adsorbent packings in monitoring workplace air. Some of their documents on the subject are referenced in Section 2.2. Also, a table of information on safe sampling volumes from their research is provided in Appendix 1.

1.3 EPA has developed data on the use of solid sorbents in multisorbent tubes for concentration of VOCs from the ambient air as part of its program for methods development of automated gas chromatographs. The experiments required to validate the use of these sorbent traps include capture and release efficiency studies for given sampling volumes. These studies establish the validity of using solid adsorbents for target sets of VOCs with minimal (at most one hour) storage time. Although questions related to handling, transport and storage of samples between the times of sampling and analysis are not addressed, these studies provide information on safe sampling volumes. Appendix 2 delineates the results of sampling a mixture of humidified zero air and the target VOCs specified in the Compendium Method TO-14 (2) using a specific multisorbent.

1.4 An EPA workshop was convened in November of 1995 to determine if a consensus could be reached on the use of solid sorbent tubes for ambient air analysis. The draft method available at the workshop has evolved through several reviews and modifications into the current document. The method is supported by data reported in the scientific literature as cited in the text, and by recent experimental tests performed as a consequence of the workshop (see Table 1).

1.5 The analytical approach using gas chromatography/mass spectroscopy (GC/MS) is identical to that mentioned in Compendium Method TO-15 and, as noted later, is adapted for this method once the sample has been thermally desorbed from the adsorption tube onto the focusing trap of the analytical system.

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1.6 Performance criteria are given in Section 14 to allow acceptance of data obtained with any of the many variations of sampling and analytical approaches.

2. Summary of Method

2.1 The monitoring procedure involves pulling a volume of air through a sorbent packing to collect VOCs followed by a thermal desorption-capillary GC/MS analytical procedure.

2.2 Conventional detectors are considered alternatives for analysis subject to the performance criteria listed in Section 14 but are not covered specifically in this method text.

2.3 Key steps of this method are listed below.

2.3.1 Selection of a sorbent or sorbent mix tailored for a target compound list, data quality objectives and sampling environment.

2.3.2 Screening the sampling location for VOCs by taking single tube samples to allow estimates of the nature and amount of sample gases.

2.3.3 Initial sampling sequences with two tubes at nominally 1 and 4 liter total sample volumes (or appropriate proportional scaling of these volumes to fit the target list and monitoring objectives).

2.3.4 Analysis of the samples and comparison to performance criteria.

2.3.5 Acceptance or rejection of the data.

2.3.6 If rejection, then review of the experimental arrangement including repeat analysis or repeat analysis with backup tubes and/or other QC features.

[Note: EPA requires the use of distributed volume pairs (see Section14.4) for monitoring to insure high quality data. However, in situations where acceptable data have been routinely obtained through use of distributed volume pairs and the ambient air is considered well characterized, cost considerations may warrant single tube sampling. Any attendant risk to data quality objectives is the responsibility of the project's decision maker.]

2.4 Key steps in sample analysis are listed below.

2.4.1 Dry purge of the sorbent tube with dry, inert gas before analysis to remove water vapor and air. The sorbent tube can be held at temperatures above ambient for the dry purge.

2.4.2 Thermal desorption of the sorbent tube (primary desorption).

2.4.3 Analyte refocusing on a secondary trap.

2.4.4 Rapid desorption of the trap and injection/transfer of target analytes into the gas chromatograph (secondary desorption).

2.4.5 Separation of compounds by high resolution capillary gas chromatography (GC).

2.4.6 Measurement by mass spectrometry (MS) or conventional GC detectors (only the MS approach is explicitly referred to in Compendium Method TO-17; an FID/ECD detector combination or other GC detector can be used if Section 14 criteria are met. However, no explicit QA guidelines are given here for those alternatives).

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2.5 The target compound list (TCL) is the same as listed in Compendium Method TO-15 (i.e., subsets of the 97 VOCs listed as hazardous pollutants in Title III of the Clean Air Act Amendments of 1990). Only a portion of these compounds has been monitored by the use of solid adsorbents. This method provides performance criteria to demonstrate acceptable performance of the method (or modifications of the method) for monitoring a given compound or set of compounds.

3. Significance

3.1 This method is an alternative to the canister-based sampling and analysis methods that are presented in Compendium Methods TO-14 and TO-15 and to the previous sorbent-based methods that were formalized as Compendium Methods TO-1 and TO-2. All of these methods are of the type that include sampling at one location, storage and transport of the sample, and analysis at another, typically more favorable site.

3.2 The collection of VOCs in ambient air samples by passage through solid sorbent packings is generally recognized to have a number of advantages for monitoring. These include the following:

- The small size and light weight of the sorbent packing and attendant equipment.
- The placement of the sorbent packing as the first element (with the possible exception of a filter or chemical scrubber for ozone) in the sampling train so as to reduce the possibility of contamination from upstream elements.
- The availability of a large selection of sorbents to match the target set of compounds including polar VOC.
- The commercial availability of thermal desorption systems to release the sample from the sorbent and into the analytical system.
- The possibility of water management using a combination of hydrophobic sorbents (to cause water breakthrough while sampling); dry gas purge of water from the sorbent after sampling; and splitting of the sample during analysis.
- The large amount of literature on the use of sorbent sampling and thermal desorption for monitoring of workplace air, particularly the literature from the Health and Safety Executive in the United Kingdom.

3.3 Accurate risk assessment of human and ecological exposure to toxic VOCs is an important goal of the U. S. Environmental Protection Agency (EPA) with increased emphasis on their role as endocrine disrupters. Accurate data is fundamental to reaching this goal. The portability and small size of typical sampling packages for sorbent-based sampling and the wide range of sorbent choices make this monitoring approach appealing for special monitoring studies of human exposure to toxic gases and to use in network monitoring to establish prevalence and trends of toxic gases. Microenvironmental and human subject studies are typical of applications for Compendium Method TO-17.

3.4 Sorbent-based monitoring can be combined with canister-based monitoring methods, on-site autoGC systems, open path instrumentation, and other specialized point monitoring instruments to address most monitoring needs for volatile organic gases. More than one of these approaches can be used simultaneously as a means to check and insure the quality of the data being produced.

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3.5 In the form specified in Compendium Method TO-17, sorbent sampling incorporates the distributed volume pair approach that provides inherently defensible data to counter questions of sample integrity, operator performance, equipment malfunction during sampling, and any other characteristic of sample collection that is not linear with sampling volume.

3.6 In keeping with the consensus of EPA scientists and science advisors, the method is performance-based such that performance criteria are provided. Any modification of the sorbent approach to monitoring for VOCs can be used provided these criteria are met.

4. Applicable Documents

4.1 ASTM Standards

- Method D1356 *Definition of Terms Relating to Atmospheric Sampling and Analysis*
- Method E260 *Recommended Practice for General Gas Chromatography*
- Method E355 *Practice for Gas Chromatography Terms and Relationships*

4.2 EPA Documents

- *Technical Assistance Document for Sampling and Analysis Toxic Organic Compounds in Ambient Air*, U. S. Environmental Protection Agency, EPA-600/4-83-027, June 1983.
- *Quality Assurance Handbook for Air Pollution Measurement Systems*, U. S. Environmental Protection Agency, EPA-600/R-94-038b, May 1994.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Methods TO-1 and TO-2*, U. S. Environmental Protection Agency, EPA 600/4-84-041, April 1984.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Method TO-14, Second Supplement*, U. S. Environmental Protection Agency, EPA 600/4-89-018, March 1989.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Method TO-15,* U. S. Environmental Protection Agency, EPA 625/R-96-010b, January 1997.

4.3 Other Documents

- MDHS 3 - Generation of Test Atmospheres of Organic Vapors by the Syringe Injection Technique, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- MDHS 4 - Generation of Test Atmospheres of Organic Vapors by the Permeation Tube Method, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- MDHS 72 - Volatile Organic Compounds in Air, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- TAD - *Technical Assistance Document (TAD) on the Use of Solid Sorbent-based Systems for Ambient Air Monitoring*, Perkin Elmer Corp., 50 Danbury Rd., Wilton, CT 06897, USA.

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5. Definitions

[Note: Definitions used in this document and any user-prepared Standard Operating Procedures (SOPs) should be consistent with those used in ASTM D1356. All abbreviations and symbols are defined within this document at the point of first use.]

5.1 Thermal Desorption-the use of heat and a flow of inert (carrier) gas to extract volatiles from a solid or liquid matrix directly into the carrier gas and transfer them to downstream system elements such as the analytical column of a GC. No solvent is required.

5.2 Two-stage Thermal Desorption-the process of thermally desorbing analytes from a solid or liquid matrix, reconcentrating them on a focusing tube and then rapidly heating the tube to ?inject" the concentrated compounds into the GC system in a narrow band of vapor compatible with high resolution capillary gas chromatography.

5.3 Sorbent Tube (Also referred to as 'tube' and 'sample tube')-stainless steel, glass or glass lined (or fused silica lined) stainless steel tube, typically 1/4 inch (6 mm) O.D. and of various lengths, with the central portion packed with greater than 200 mg of solid adsorbent material, depending on density and packing bed length. Used to concentrate VOCs from air.

5.4 Focusing Tube-narrow (typically <3mm I.D.) tube containing a small bed of sorbent, which is maintained near or below ambient temperature and used to refocus analytes thermally desorbed from the sorbent tube. Once all the VOCs have been transferred from the sorbent tube to the focusing tube, the focusing tube is heated very rapidly to transfer the analytes into the capillary GC analytical column in a narrow band of vapor.

5.5 Cryogen (Also referred to as 'cryogenic fluid')-typically liquid nitrogen, liquid argon, or liquid carbon dioxide. In the present context, cryogens are used in some thermal desorption systems to cool the focusing tube.

5.6 High Resolution Capillary Column Chromatography-conventionally describes fused silica capillary columns with an internal diameter of 320 μm or below and with a stationary phase film thickness of 5 μm or less.

5.7 Breakthrough Volume (BV)-volume of air containing a constant concentration of analyte which may be passed through a sorbent tube before a detectable level (typically 5%) of the analyte concentration elutes from the nonsampling end. Alternatively, the volume sampled when the amount of analyte collected in a back-up sorbent tube reaches a certain percentage (typically 5%) of the total amount collected by both sorbent tubes. These methods do not give identical results. For purposes in the document the former definition will be used.

5.8 Retention Volume (RV)-the volume of carrier gas required to move an analyte vapor plug through the short packed column which is the sorbent tube. The volume is determined by measuring the carrier gas volume necessary to elute the vapor plug through the tube, normally measured at the peak response as the plug exits the tube. The retention volume of methane is subtracted to account for dead volume in the tube.

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5.9 Safe Sampling Volume (SSV)-usually calculated by halving the retention volume (indirect method) or taking two-thirds of the breakthrough volume (direct method), although these two approaches do not necessarily give identical results. The latter definition is used in this document.

5.10 Sorbent Strength—term used to describe the affinity of sorbents for VOC analytes. A stronger sorbent is one which offers greater safe sampling volumes for most/all VOC analytes relative to another, weaker sorbent. Generally speaking, sorbent strength is related to surface area, though there are exceptions to this. The SSVs of most, if not all, VOCs will be greater on a sorbent with surface area ?10n" than on one with a surface area of ?n". As a general rule, sorbents are described as ?weak" if their surface area is less than 50 m^2g^{-1} (includes Tenax®, Carbopack™/trap C, and Anasorb® GCB2), ?medium strength" if the surface area is in the range 100-500 m^2g^{-1} (includes Carbopack™/trap B, Anasorb® GCBI and all the Porapaks and Chromosorbs listed in Tables 1 and 2) and ?strong" if the surface area is around 1000 m^2g^{-1} (includes Spherocarb®, Carbosieve™ S-III, Carboxen™ 1000, and Anasorb® CMS series sorbents.)

5.11 Total Ion Chromatogram (TIC)-chromatogram produced from a mass spectrometer detector operating in full scan mode.

5.12 MS-SCAN-mode of operation of a GC mass spectrometer detector such that all mass ions over a given mass range are swept over a given period of time.

5.13 MS -SIM-mode of operation of a GC mass spectrometer detector such that only a single mass ion or a selected number of discrete mass ions are monitored.

5.14 Standard Sorbent (Sample) Tube-stainless steel, glass or glass lined (or fused silica lined) stainless steel tube, 1/4 inch (6 mm) O.D. and of various lengths, with the central portion packed with ≥200 mg of solid adsorbent material depending on sorbent density. Tubes should be individually numbered and show the direction of flow.

5.15 Time Weighted Average (TWA) Monitoring-if air is sampled over a fixed time period - typically 1,3, 8 or 24 hours, the time weighted average atmospheric concentration over the monitoring period may be calculated from the total mass of analyte retained and the specific air volume sampled. Constraints on breakthrough volumes make certain combinations of sampling time and flow rates mutually exclusive.

6. Overview of Methodology

[Note: The following is intended to provide a simple and straightforward method description including the example of a specific sampling problem. Although specific equipment is listed, the document is intended only as an example and equipment mentioned in the text is usually only one of a number of equally suitable components that can be used. Hence trade names are not meant to imply exclusive endorsement for sampling and analysis using solid sorbents. Later sections in the text give guidance as to what considerations should be made for a number of VOC monitoring applications.]

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6.1 Selection of Tube and Sorbent

6.1.1 Select a tube and sorbent packing for the sampling application using guidance from Tables 1 and 2 on sorbent characteristics as well as guidance from Appendix 1 and Table 3 on safe sampling volumes and breakthrough characteristics of sorbents.

6.1.2 As an example, assume the TCL includes a subset of the compounds shown in Table 3. In this case, the multisorbent tube chosen consists of two sorbents packed in a 1/4 inch O.D., 3.5" long glass tube in the following order and amounts: 160 mg of Carbopack™ graphitized carbon black (60/80 mesh) and 70 mg of Carboxen™-1000 type carbon molecular sieve (60/80 mesh). This is an example of Tube Style 2 discussed Section 9.1.3.2.

6.1.3 Pack the tube with the adsorbent by using the guidance provided in Section 10.1 or buy a prepacked tube from a supplier. In the example, tubes were purchased from Supelco Inc., Supelco Park, Bellefonte, PA 16823-0048.

6.2 Conditioning the Tube

6.2.1 Condition newly packed tubes for at least 2 hours (30 mins for preconditioned, purchased tubes) at 350°C while passing at least 50 mL/min of pure helium carrier gas through them.

[Note: Other sorbents may require different conditioning temperatures - see Table 2 for guidance.]

Once conditioned, seal the tube with brass, 1/4 inch Swagelok® -type fittings and PTFE ferrules. Wrap the sealed tubes in uncoated aluminum foil and place the tubes in a clean, airtight, opaque container.

6.2.2 A package of clean sorbent material, e.g. activated charcoal or activated charcoal/silica gel mixture, may be added to the container to ensure clean storage conditions.

6.2.3 Store in a refrigerator (organic solvent-free) at 4°C if not to be used within a day. On second and subsequent uses, the tubes will generally not require further conditioning as above. However, tubes with an immediate prior use indicating high levels of pollutant trace gases should be reconditioned prior to continued usage.

6.3 Sampling Apparatus

6.3.1 Select a sampling apparatus with accommodations for two sampling tubes capable of independent control of sampling rate at a settable value in the range 10 to 200 mL/min. Laboratory and field blanks must also be included in the monitoring exercise.

6.3.2 Backup tubes may be required to determine the cause of any problem if performance criteria, outlined in Section 14, are not met.

6.4 Sampling Rates

6.4.1 Select sampling rates compatible with the collection of 1 and 4 liter total sample volume (or of proportionally lower/higher sampling volumes).

6.4.2 Air samples are collected over 1 hour with a sampling rate of 16.7 mL/min and 66.7 mL/min, respectively.

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6.5 Preparing for Sample Collection

6.5.1 At the monitoring location, keep the tubes in their storage and transportation container to equilibrate with ambient temperature.

6.5.2 Using clean gloves, remove the sample tubes from the container, take off their caps and attach them to the sampling lines with non-outgassing flexible tubing. Uncap and immediately reseal the required number of field blank tubes.

6.5.3 Place the field blank tubes back in the storage container. If back-up tubes are being used, attach them to the sampling tubes using clean, metal Swagelok® type unions and combined PTFE ferrules.

6.6 Set the Flow Rates

6.6.1 Set the flow rates of the pump using a mass flow monitor.

6.6.2 The sampling train includes, from front to back, an in-line particulate filter (optional), an ozone scrubber (optional), a sampling tube, a back-up tube if any is being used, and a flow controller/pump combination.

6.6.3 Place the mass flow monitor in line after the tube. Turn the pump on and wait for one minute. Establish the approximate sampling flow rate using a dummy tube of identical construction and packing as the sampling tube to be used. Record on Field Test Data Sheet (FTDS), as illustrated in Figure 1.

6.6.4 Place the sampling tubes to be used on the sampling train and make final adjustments to the flow controller as quickly as possible to avoid significant errors in the sample volume.

6.6.5 Adjust the flow rate of one tube to sample at 16.7 mL/min. Repeat the procedure for the second tube and set the flow rate to 66.7 mL/min. Record on FTDS.

6.7 Sample and Recheck Flow Rates

6.7.1 Sample over the selected sampling period (i.e., 1-hour). Recheck all the sampling flow rates at the end of the monitoring exercise just before switching off each pump and record on FTDS.

6.7.2 Make notes of all relevant monitoring parameters including locations, tube identification numbers, pump flow rates, dates, times, sampled volumes, ambient conditions etc. on FTDS.

6.8 Reseal the Tubes

6.8.1 Immediately remove the sampling tubes with clean gloves, recap the tubes with Swagelok® fittings using PTFE ferrules, rewrap the tubes with uncoated Al foil, and place the tubes in a clean, opaque, airtight container.

6.8.2 If not to be analyzed during the same day, place the container in a clean, cool (<4°C), organic solvent-free environment and leave there until time for analysis.

6.9 Selection of Thermal Desorption System

6.9.1 Select a thermal desorption system using the guidance provided in Section 8.

6.9.2 Place the thermal unit in a ready operational status.

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6.10 Dry Purge the Tubes and Prepare for Thermal Desorption

6.10.1 Remove the sampling tubes, any backup tubes being used, and blanks from the storage area and allow the tubes to come to room temperature. Using clean gloves, remove the Swagelok®-type fittings and dry purge the tubes with a forward (sampling direction) flow of, for example, 50 mL/min of dry helium for 4 minutes (see Section 7.2 concerning dry purging).

[Note: Do not dry purge the laboratory blanks.]

6.10.2 Reseal the tubes with Teflon® (or other) caps compatible with the thermal desorber operation. Place the sealed tubes on the thermal desorber (e.g., Perkin Elmer Model ATD 400 Automated System or equivalent). Other thermal desorbers may have different arrangements for automation. Alternatively, use equivalent manual desorption.

6.11 Check for System Integrity

6.11.1 Check the air tightness of the seals and the integrity of the flow path.
6.11.2 Guidance is provided in Section 11.2 of this document.

6.12 Repurge of Tube on the Thermal Desorber/Addition of Internal Standard

6.12.1 Because of tube handling after dry purge, it may be necessary to repurge each of the tubes with pure, dry helium (He) before analysis in order to eliminate any oxygen.
6.12.2 If the initial dry purge can be performed on the thermal desorber so as to prevent any further exposure of the sorbent to air, then this step is not necessary. Proceed with the addition of an internal standard to the sorbent tube or the focusing tube.

6.13 Thermally Desorb the Packing

6.13.1 Reverse the flow direction of He gas, set the flow rate to at least 30 mL/min, and heat the tube to 325°C (in this case) to achieve a transfer of VOCs onto a focusing tube at a temperature of 27°C. Thermal desorption continues until all target species are transferred to the focusing trap. The focusing trap is typically packed with 20 mg of Carbopack™ B (60/80 mesh) and 50 mg of a Carboxen™ 1000-type sorbent (60/80 mesh).

6.14 Trap Desorption and GC/MS Analysis

6.14.1 After each tube is desorbed, rapidly heat the focusing trap (to 325°C in this example) and apply a reverse flow of at least 3 mL/min of pure helium carrier gas. Sample splitting is necessary to accommodate the capillary column. Analytes are transferred to the column in a narrow band of vapor.
6.14.2 The GC run is initiated based on a time delay after the start of thermal desorption. The remaining part of the analytical cycle is described in Section 3 of Compendium Method TO-15.

6.15 Restoring the Tubes and Determine Compliance with Performance Standards

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6.15.1 When tube analysis is completed, remove the tubes from the thermal desorber and, using clean gloves, replace the Teflon® caps with Swagelok fittings and PTFE ferrules, rewrap with aluminum foil, replace in the clean, airtight container, and re-store the tubes in a cool environment (<4 °C) until the next use.

6.15.2 Using previously prepared identification and quantification subroutines, identify the target compounds and document the amount of each measured compound (refer to the Section 3 of Compendium Method TO-15). Compare the results of analysis for the distributed volume pair taken during each sampling run and use the comparison to determine whether or not the performance criteria for individual sampling events have been met. Also examine the results of any laboratory blanks, field blanks, and any backup tube being used. Accept or reject the data based on the performance criteria (see Section 14).

6.16 Record and Store Data

6.16.1 Accurately retrieve field data (including the tube identification number) from the FTDS. The data should include a sampling site identifier, time of sample initiation, duration of sampling, air pump identification, flow rate, and other information as appropriate.

6.16.2 Store GC/MS data in a permanent form both in hard copy in a notebook and in digital form on a disk. Also store the data sheet with the hard copy.

[Note: Sections 7 through 14 below elaborate on the method by providing important information and guidance appropriate to explain the method as outlined in Section 6 and also to generalize the method for many applications. Section 14 gives the performance criteria for the method.]

7. Interferences and Limitations

7.1 Interference from Sorbent Artifacts

7.1.1 Minimizing Artifact Interference.

7.1.1.1 Stringent tube conditioning (see Section 10.2.1) and careful tube capping and storage procedures (see Section 10.2.2) are essential for minimizing artifacts. System and sorbent tube conditioning must be carried out using more stringent conditions of temperature, gas flow and time than those required for sample analysis.

7.1.1.2 A reasonable objective is to **reduce artifacts to 10% or less of individual analyte masses** retained during sampling. A summary of VOC levels present in a range of different atmospheric environments and the masses of individual components collected from 1, 2 or 10 L samples of air in each case is presented in Table 4.

7.1.1.3 Given that most ambient air monitoring is carried out in areas of poor air quality, for example in urban, indoor and factory fenceline environments where VOC concentrations are typically above 1 ppb, Table 4 demonstrates that the mass of each analyte retained will, therefore, range from ~5 ng to ~10 μg in most monitoring situations. Even when monitoring 'ultraclean' environments, analyte masses retained will usually exceed 0.1 ng (3).

7.1.1.4 Typical artifact levels for 1/4 inch O.D. tubes of 3.5" length range from 0.01 ng and 0.1 ng for carbonaceous sorbents and Tenax® respectively. These levels compare well with the masses of analytes collected - even from sub-ppb atmospheric concentrations (see Table 4). Artifact levels are around 10 ng for Chromosorb® Century series and other porous polymer sorbents. However, these types of sorbents can still be used for air monitoring at low ppb levels if selective or mass spectrometer detectors are used or if the blank profile of the tube demonstrates that none of the sorbent artifacts interfere analytically with the compounds of interest.

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7.1.1.5 Some varieties of charcoal contain metals which will catalyze the degradation of some organic analytes during thermal desorption at elevated temperatures thus producing artifacts and resulting in low analyte recoveries.

7.1.2 Artifacts from Long-term Storage of Blank Tubes.

7.1.2.1 Literature reports of the levels of artifacts on (a) Carbotrap/pack™ C, Carbotrap/pack™ B and Carbosieve™ SIII multi-bed tubes and (b) Tenax® GR tubes, by workers sealing the tubes using metal Swagelok®-type caps and PTFE ferrules with multi-tube, glass storage jars are reported to be between 0.01 ng [after 1-2 months (4)] and 0.1 ng [after 6 months (5)] for (a) and (b) respectively.

7.1.2.2 Artifact levels reported for other porous polymers are higher - for example 5 ng for Chromosorb 106 after 1 week (5). More information is given in the Technical Assistance Document (TAD) referred to in Section 4.3.

7.1.3 Artifacts Generated During Sampling and Sample Storage.

7.1.3.1 Benzaldehyde, phenol and acetophenone artifacts are reported to be formed via oxidation of the polymer Tenax® when sampling high concentration (100-500 ppb) ozone atmospheres (6).

7.1.3.2 Tenax® should thus be used with an ozone scrubber when sampling low levels (<10 ppb) of these analytes in areas with appreciable ozone concentrations. Carbotrap™/pack type sorbents have not been reported to produce this level of artifact formation. Once retained on a sorbent tube, chemically stable VOCs, loaded in laboratory conditions, have been shown to give good recoveries, even under high ozone concentrations for storage of a year or more (7-9).

7.2 Minimizing Interference from Water

7.2.1 Selection of Hydrophobic Sorbents

7.2.1.1 There are three preferred approaches to reducing water interference during air monitoring using sorbent tubes. The first is to minimize water collection by selecting, where possible, a hydrophobic sorbent for the sample tube.

7.2.1.2 This is possible for compounds ranging in volatility from n-C5 (see SSVs listed in Appendix 1). Tenax®, Carbotrap™ or one of the other hydrophobic sorbents listed in Table 2 should be used.

[Note: It is essential to ensure that the temperature of the sorbent tube is the same and certainly not lower than ambient temperature at the start of sampling or moisture will be retained via condensation, however hydrophobic the sorbent.]

7.2.2 Sample Splitting

7.2.2.1 If the sample loading is high, it is usually possible to eliminate sufficient water to prevent analytical interference by using sample splitting (10).

7.2.2.2 Sample may be split either (1) between the focusing trap and the capillary column (single splitting) during trap (secondary) desorption or (2) between both the tube and the focusing trap during primary (tube) desorption and between the focusing trap and the column during secondary (trap) desorption (see Section 8.2.3) (double splitting). It may, in fact, be necessary to split the sample in some cases to prevent overloading the analytical column or detector.

7.2.3 Dry Purge

7.2.3.1 The third water management method is to ?dry purge" either the sorbent tube itself or the focusing trap or both (11-13). Dry purging the sample tube or focusing trap simply involves passing a volume of pure, dry, inert gas through the tube from the sampling end, prior to analysis.

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7.2.3.2 The tube can be heated while dry purging at slightly elevated temperatures (11). A trap packing combination and a near ambient trapping temperature must be chosen such that target analytes are quantitatively retained while water is purged to vent from either the tube or trap.

7.3 Atmospheric Pollutants not Suitable for Analysis by this Method

7.3.1 Inorganic gases not suitable for analysis by this method are oxides of carbon, nitrogen and sulfur, O_3 and other permanent gases. Exceptions include CS_2 and N_2O.

7.3.2 Other pollutants not suitable are particulate pollutants, (i.e., fumes, aerosols and dusts) and compounds too labile (reactive) for conventional GC analysis.

7.4 Detection Limits and Maximum Quantifiable Concentrations of Air Pollutants

7.4.1 Detection limits for atmospheric monitoring vary depending on several key factors. They are:

- Minimum artifact levels.
- GC detector selection.
- Volume of air sampled. The volume of air sampled is in turn dependent upon a series of variables including SSVs (see Section 10.8, Table 1 and Appendix 1), pump flow rate limitations and time-weighted-average monitoring time constraints.

7.4.2 Generally speaking, detection limits range from sub-part-per-trillion (sub-ppt) for halogenated species such as CCl_4 and the freons using an electron capture detector (ECD) to sub-ppb for volatile hydrocarbons in 1 L air samples using the GC/MS operated in the full SCAN mode.

7.4.3 Detection limits are greatly dependent upon the proper management of water for GC capillary analysis of volatile organics in air using sorbent technology (14).

7.5 Suitable Atmospheric Conditions

7.5.1 Temperature range.

7.5.1.1 The normal working range for sorbent packing is 0-40°C (8).

7.5.1.2 In general, an increase in temperature of 10°C will reduce the breakthrough volume for sorbent packings by a factor of 2.

7.5.2 Humidity.

7.5.2.1 The capacity of the analytical instrumentation to accommodate the amount of water vapor collected on tubes is usually the limitation in obtaining successful results, particularly for GC/MS applications. This limitation can be extreme, requiring the use of a combination of water management procedures (see Section 7.2).

7.5.2.2 The safe sampling volumes of VOCs on hydrophobic adsorbents such as Tenax®, other porous polymers, Carbotrap™ and Carbopack™ are relatively unaffected by atmospheric humidity. Spherocarb® or carbonized molecular sieve type sorbents such as Carbosieve™ SIII and the Carboxens® are affected by high humidity, however, and SSVs should typically be reduced by a factor of 10 at 90-95% RH (8). Hydrophilic zeolite molecular sieves cannot be used at all at high humidity.

7.5.3 Wind speeds.

7.5.3.1 Air movement is not a factor indoors or outdoors at wind speeds below 10 miles per hour (<20 km per hour).

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7.5.3.2 Above this speed, tubes should be orientated perpendicular to the prevailing wind direction and should be sheltered from the direct draft if wind speeds exceed 20 miles per hour (30-40 km per hour) (see Section 10.5).

7.5.4 High concentrations of particulates.

7.5.4.1 It may be necessary to connect a particulate filter (e.g., a 2 micron Teflon® filter or short clean tube containing a loose plug of clean glass wool) to the sampling end of the tube in areas of extremely high particulate concentrations.

7.5.4.2 Some compounds of interest may, however, be trapped on the Teflon® or on the glass wool. Particulates trapped on the sorbent tube have the potential to act as a source or sink for volatiles, and may remain on the tube through several cycles of sampling and desorption. Frequent replacement of the particulate filter is therefore recommended.

8. Apparatus Selection and Preparation

8.1 Sample Collection

8.1.1 Selection of Tube Dimensions and Materials.

8.1.1.1 The most extensively used sorbent tubes are 1/4 inch O.D. stainless steel or 6 mm O.D. stainless steel or glass. Different suppliers provide different size tubes and packing lengths; however, 3.5 inch long tubes with a 6 cm sorbent bed and 1/4 inch O.D. stainless steel (see Figure 2) were used to generate the SSV information presented in Appendix 1.

8.1.1.2 As an approximate measure, for sorbents contained in equal diameter tubes the breakthrough volume is proportional to the bed-length (weight) of sorbent. Therefore, doubling the bed-length would approximately double the SSV (15).

8.1.1.3 Stainless steel (304 or "GC" grade) is the most robust of the commonly available tube materials which include, in addition, glass, glass-lined, and fused silica lined tubing. Tube material must be chosen to be compatible with the specifics of storage and transport of the samples. For example, careful attention to packaging is required for glass tubes.

8.1.2 Tube Labeling.

8.1.2.1 Label sample tubes with a unique identification number and the direction of sampling flow. Stainless steel tubes are most conveniently labeled by engraving. Glass tubes are best labeled using a temperature resistant paint. If empty sample tubes are obtained without labels, it is important to label and condition them before they are packed with adsorbent.

8.1.2.2 Recondition prepacked, unlabeled tubes after the tube labeling process and record the blank chromatogram from each tube. Record in writing the details of the masses and/or bed lengths of sorbent(s) contained in each tube, the maximum allowable temperature for that tube and the date each tube was packed or repacked.

8.1.3 Blank and Sampled Tube Storage Apparatus.

8.1.3.1 Seal clean, blank sorbent tubes and sampled tubes using inert, Swagelok®-type fittings and PTFE ferrules. Wrap capped tubes individually in uncoated aluminum foil. Use clean, sealable glass jars or metal cans containing a small packet of activated charcoal or activated charcoal/silica gel for storage and transportation of multiple tubes. Store the multi-tube storage container in a clean environment at 4 °C.

8.1.3.2 Keep the sample tubes inside the storage container during transportation and only remove them at the monitoring location after the tubes have reached ambient temperature. Store sampled tubes in a refrigerator at 4 °C inside the multi-tube container until ready for analysis.

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[Note: The atmosphere inside the refrigerator must be clean and free of organic solvents.]

8.1.4 Selection of Sampling Pumps.

8.1.4.1 The selected monitoring pump(s) should be capable of operating in the range 10 to 200 mL/min. Label the pumps with a unique identification number and operate them according to manufacturer's guidelines.

8.1.4.2 Constant mass flow type pumps are ideal for air monitoring as they deliver a constant flow rate for a wide range of tube impedances. They thus compensate for moderate impedance variations between the sorbent tubes in use. The pump should meet US criteria for intrinsic safety where applicable. Connect the pump to the non-sampling end of the sample tube by means of flexible, nonoutgassing tubing.

8.1.5 Parallel Sampling onto Multiple Tubes with a Single Pump.

8.1.5.1 Select a sample collection system for collecting samples onto 2 tubes in parallel.

8.1.5.2 If a single pump is used for both tubes, ensure that the flow rates will be controlled at a constant flow rate during sampling and that the two flow rates can be independently controlled and stabilized.

8.1.6 Apparatus for Calibrating the Pumped Air Flow.

8.1.6.1 Calibrate the pump with the type of sorbent tube to which it will be connected during the monitoring exercise. Use the actual sampling tube to fine tune the sampling flow rate at the start of sample collection.

8.1.6.2 Use a flow meter certified traceable to NIST standards.

8.1.7 Sorbent Tube Protection During Air Sample Collection.

8.1.7.1 Protect sorbent tubes from extreme weather conditions using shelters constructed of inert materials. The shelter must not impede the ingress of ambient air.

8.1.7.2 If the atmosphere under test contains significant levels of particulates - fume, dust or aerosol, connect a Teflon® 2-micron filter or a (metal, glass, glass-lined or fused silica lined stainless) tube containing a short plug of clean glass wool prior to the sampling end of the tube and using inert, Swagelok®-type fittings and PTFE ferrules for fitting connections.

8.2 Apparatus

8.2.1 Essential Sample Protection Features of the Thermal Desorption Apparatus.

8.2.1.1 As thermal desorption is generally a one shot process, (i.e., once the sample is desorbed it cannot readily be reinjected or retrieved), stringent sample protection measures and thorough preanalysis system checks must form an integral part of the thermal desorption-GC procedure and should be systematically carried out.

8.2.1.2 The sample integrity protection measures and preanalysis checks required include:

- **Sealed tubes**. Sample tubes awaiting analysis on an automated desorption system must be completely sealed before thermal desorption to prevent ingress of VOC contaminants from the laboratory air and to prevent losses of weakly retained analytes from the tube.
- **Inert and heated sample flow path**. To eliminate condensation, adsorption and degradation of analytes within the analytical system, the sample flow path of manual and automated thermal desorbers should be uniformly heated (minimum temperature range 50° - 150°C) between the sample tube and the GC analytical column. The components of the sample flow path should also, as far as possible, be constructed of inert materials, i.e., deactivated fused silica, glass lined tubing, glass, quartz and PTFE.
- **Tube leak testing**. This activity must not jeopardize sample integrity.
- **Leak testing of the sample flow path**. This activity must not jeopardize sample integrity.
- **System purge**. Stringent, near-ambient temperature carrier gas purge to remove oxygen.
- **Analytical system**. ?Ready" status checks.

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8.2.2 Thermal Desorption Apparatus.

8.2.2.1 Two-stage thermal desorption is used for the best high resolution capillary chromatography (i.e., analytes desorbed from the sorbent tube must be refocused before being rapidly transferred to the GC analytical column). One type of analyte refocusing device which has been successfully used is a small sorbent trap (17). One cryogen-free trap cooling option is to use a multistage Peltier electrical cooler (18,19).

8.2.2.2 Closed cycle coolers are also available for use. At its low temperature, the trap must provide quantitative analyte retention for target compounds as well as quantitative and rapid desorption of target analytes as high boiling as n-C_{12}. The peak widths produced must be compatible with high resolution capillary gas chromatography.

8.2.2.3 Typical key components and operational stages of a two-stage desorption system are presented in Figure 3(a) - (f) and a stepwise description of the thermal desorber operation is presented in Section 11.3.

8.2.3 Sample Splitting Apparatus.

8.2.3.1 Sample splitting is often required to reduce water vapor interference, for the analysis of relatively high concentration (>10 ppb level) air samples, when large volume air samples are collected, or when sensitive selective detectors are in use.

8.2.3.2 Sample splitting is one of the three key approaches to water management detailed in this method (see Section 7.2). Moisture management by sample splitting is applicable to relatively high concentrations ($\geq$10 ppb) or large volume air samples or to analyses employing extremely sensitive detectors - for example, using the ECD for low levels of tetrachloroethylene. In these cases the masses of analytes retained by the sorbent tube when monitoring such atmospheres is large enough to allow, or even require, the selection of a high split ratio (>10:1) during analysis to avoid overloading the analytical column or detector. The mass of water retained by the sorbent tube during sample collection may be sufficiently reduced by the split alone to eliminate the need for further water management steps.

8.2.4 The Thermal Desorber - GC Interface.

8.2.4.1 Heat the interface between the thermal desorber and the GC uniformly. Ensure that the interface line is leak tight and lined with an inert material such as deactivated fused silica.

8.2.4.2 Alternatively, thread the capillary column itself through the heated transfer line/interface and connected directly into the thermal desorber.

[Note: Use of a metal syringe-type needle or unheated length of fused silica pushed through the septum of a conventional GC injector is not recommended as a means of interfacing the thermal desorber to the chromatograph. Such connections result in cold spots, cause band broadening and are prone to leaks.]

8.2.5 GC/MS Analytical Components. This method uses the GC/MS description as given in Compendium Method TO-15, Section 7.

8.3 Tube Conditioning Apparatus

8.3.1 Tube Conditioning Mode

8.3.1.1 Condition freshly packed tubes using the analytical thermal desorption apparatus if it supports a dedicated 'tube conditioning mode' (i.e., a mode in which effluent from highly contaminated tubes is directed to vent without passing through key parts of the sample flow path such as the focusing trap).

8.3.2 Stand Alone System

8.3.2.1 If such a tube conditioning mode is not available, use separate stand-alone tube conditioning hardware.

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8.3.2.2 The tube conditioning hardware must be leak-tight to prevent air ingress, allow precise and reproducible temperature selection (±5°C), offer a temperature range at least as great as that of the thermal desorber and support inert gas flows in the range of 50 to 100 mL/min.

[Note: Whether conditioning is carried out using a special mode on the thermal desorber or using separate hardware, pass effluent gases from freshly packed or highly contaminated tubes through a charcoal filter during the process to prevent desorbed VOCs polluting the laboratory atmosphere.]

9. Reagents and Materials

9.1 Sorbent Selection Guidelines

9.1.1 Selection of Sorbent Mesh Size.

9.1.1.1 Sieved sorbents of particle size in the range 20 to 80 mesh should be used for tube packing.

9.1.1.2 Specific surface area of different sorbents is provided in Table 2.

9.1.2 Sorbent Strength and Safe Sampling Volumes.

9.1.2.1 Many well-validated pumped and diffusive sorbent tube sampling/thermal desorption methods have been published at the relatively high atmospheric concentrations (i.e., mid-ppb to ppm) typical of workplace air and industrial/mobile source emissions (8, 20-30).

9.1.2.2 These methods show that SSVs are unaffected by analyte concentrations far in excess of the 25 ppb upper limit of this method. The effect of humidity on SSVs is discussed in Section 7.5 and Table 2.

9.1.2.3 Select a sorbent or series of sorbents of suitable strength for the analytes in question from the information given in Tables 1 and 2 and Appendices 1 and 2. Where a number of different sorbents fulfill the basic safe sampling volume criteria for the analytes in question, choose that (or those) which are hydrophobic and least susceptible to artifact formation. Keep the field sampling volumes to 80% or less of the SSV of the least well-retained analyte. Using one of the two procedures given in Section 10.8, check the safe sampling volumes for the most volatile analytes of interest on an annual basis or once every twenty uses of the sorbent tubes whichever occurs first.

9.1.3 Three General-Purpose 1/4 Inch or 6 mm O.D. Multi-Bed Tube Types.

[Note: The three general-purpose tubes presented in this section are packed with sorbents in the mesh size range of 20-80 mesh. The difference in internal diameter between standard glass and stainless steel tubes will result in different bed volumes (weights) for the same bed length.]

9.1.3.1 Tube Style 1 consists of 30 mm Tenax®GR plus 25 mm of Carbopack™ B separated by 3 mm of unsilanized, preconditioned glass or quartz wool. Suitable for compounds ranging in volatility from n-C_6 to n-C_{20} for air volumes of 2 L at any humidity. Air volumes may be extended to 5 L or more for compounds ranging in volatility from n-C_7.

9.1.3.2 Tube Style 2 consists of 35 mm Carbopack™ B plus 10 mm of Carbosieve™ SIII or Carboxen™ 1000 separated by glass/quartz wool as above. Suitable for compounds ranging in volatility from n-C_3 to n-C_{12} (such as "Compendium Method TO-14 air toxics") for air volumes of 2 L at relative humidities below 65% and temperatures below 30°C. At humidities above 65% and ambient temperatures above 30°C, air volumes should be reduced to 0.5 L. Air volumes may be extended to 5 L or more for species ranging in volatility from n-C_4. A dry purge procedure or a large split ratio must be used during analysis when humid air has been sampled on these tubes.

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9.1.3.3 Tube Style 3 consists of 13 mm Carbopack™ C, 25 mm Carbopack™ B plus 13 mm of Carbosieve™ SIII or Carboxen™ 1000 all separated by 3 mm plugs of glass/quartz wool as above. Suitable for compounds ranging in volatility from n-C_3 to n-C_{16} for air volumes of 2 L at relative humidities below 65 percent and temperatures below 30°C. At humidities above 65 percent and ambient temperatures above 30°C, air volumes should be reduced to 0.5 L. Air volumes may be extended to 5 L or more for compounds ranging in volatility from n-C_4. A dry purge procedure or a large split ratio must be used during analysis when humid air has been sampled on these tubes.

[Note: These multi-bed tubes are commercially available prepacked and preconditioned if required.]

[Note: These general purpose multi-bed tubes are only recommended for monitoring unknown atmospheres or wide volatility range sets of target analytes. Most routine monitoring of industrial air (for example at factory fencelines) only involves monitoring a few specific target analytes such as benzene, toluene, ethylbenzene, and xylenes (BTEX), carbon disulfide (CS_2) or 1,1,1-trichloroethane. Single-bed sorbent tubes selected from the options listed in Appendix 1 are typically used in these cases.]

[Note: In the interests of minimizing water retention it is advisable to stick to hydrophobic (i.e., weak and medium strength) sorbents whenever possible; this generally is the case when components more volatile than n-C_6 are not of interest.]

9.2 Gas Phase Standards

9.2.1 Standard Atmospheres.

9.2.1.1 Standard atmospheres must be stable at ambient pressure and accurate (±10%). Analyte concentrations and humidities should be similar to those in the typical test atmosphere. Standard atmospheres must be sampled onto conditioned sorbent tubes using the same pump flow rates as used for field sample collection.

9.2.1.2 If a suitable standard atmosphere is obtained commercially, manufacturer's recommendations concerning storage conditions and product lifetime should be rigidly observed.

9.2.2 Concentrated, Pressurized Gas Phase Standards.

9.2.2.1 Use accurate (± 5%), concentrated gas phase standards in pressurized cylinders such that a 0.5 - 5.0 mL gas sampling volume (GSV) loop contains approximately the same masses of analytes as will be collected from a typical air sample. Introduce the standard onto the sampling end of conditioned sorbent tubes using at least ten times the loop volume of pure helium carrier gas to completely sweep the standard from the GSV.

9.2.2.2 Manufacturer's guidelines concerning storage conditions and expected lifetime of the concentrated gas phase standard should be rigidly observed.

9.3 Liquid Standards

9.3.1 Solvent Selection.

9.3.1.1 If liquid standards are to be loaded onto sorbent tubes for calibration purposes, select a solvent for the standard that is pure (contaminants <10% of minimum analyte levels) and that, if possible, is considerably more volatile than the target analytes. This then allows the solvent to be purged and eliminated from the tube during the standard preparation process.

9.3.1.2 Methanol most commonly fills these criteria. If the target analyte range includes very volatile components, it will not be possible to do this. In these cases, select a pure solvent which is readily chromatographically resolved from the peaks/components of interest (ethyl acetate is commonly used) or use a

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gas phase standard. Test the purity of the solvent by comparing an analysis of the prepared standard with an analysis of pure solvent under identical chromatographic conditions.

9.3.2 Liquid Standard Concentrations.

9.3.2.1 Liquid standards should be prepared so that the range of analyte masses introduced onto the tubes is in the same order as the range of masses expected to be collected during sampling.

9.3.2.2 Concentrations of benzene in urban air may be expected to range from 0.5-25 ppb. Thus if 5 L air samples were to be collected at approximately 25°C, the masses of benzene collected would range from around 8 ng (0.5 ppb level) to around 400 ng (25 ppb level).

[Note: The above calculation was derived from Boyle's law (i.e., 1 mole of gas occupies around 25 L at 25°C and 760 mm Hg).

- *25 L of pure benzene vapor contains 78 g benzene*
- *5 L of pure benzene vapor contains 15.6 g benzene*
- *5 L of a 1 ppm benzene atmosphere contains 15.6 μg benzene*
- *5 L of a 100 ppb benzene atmosphere contains 1560 ng benzene*
- *5 L of a 1 ppb benzene atmosphere contains 15.6 ng benzene.]*

9.3.3 Loading Liquid Standards onto Sorbent Tubes.

9.3.3.1 Introduce 0.1 - 10 μL aliquots of the liquid standards onto the sampling end of conditioned sorbent tubes using a conventional 1/4 inch GC packed column injector and a 1, 5 or 10 μL syringe. The injector is typically unheated with a 100 mL/min flow of pure carrier gas. The solvent and analytes should completely vaporize and pass onto the sorbent bed in the vapor phase. It may be necessary to heat the injector slightly (typically to 50°C) for analytes less volatile than n-C_{12} to ensure that all the liquid vaporizes.

9.3.3.2 The sample tube should remain attached to the injector until the entire standard has been swept from the injector and onto the sorbent bed. If it has been possible to prepare the liquid standard in a solvent which will pass through the sorbent while analytes are quantitatively retained (for example, methanol on Tenax® or Carbopack™ B), the tube should not be disconnected from the injector until the solvent has been eliminated from the sorbent bed - this takes approximately 5 minutes under the conditions specified. Once the tube has been disconnected from the injector, it should be capped and placed in an appropriate storage container immediately.

[Note: In cases where it is possible to purge the solvent from the tube while quantitatively retaining the analytes, a 5-10 μL injection should be made as this can usually be introduced more accurately than smaller volumes. However, if the solvent is to be retained in the tube, the injection volume should be as small as possible (0.5 - 1.0 μL) to minimize solvent interference in the subsequent chromatogram.]

9.3.3.3 This method of introducing liquid standards onto sorbent tubes via a GC injector is considered the optimum approach to liquid standard introduction as components reach the sorbent bed in the vapor phase (i.e., in a way which most closely parallels the normal air sample collection process). Alternatively, liquid standards may be introduced directly onto the sorbent bed via the non-sampling end of the tube using a conventional GC syringe.

[Note: This approach is convenient and works well in most cases, but it may not be used for multi-bed tubes or for wide boiling range sets of analytes and does not allow solvent to be purged to vent.]

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9.4 Gas Phase Internal Standards

9.4.1 The ideal internal standard components are:

- chemically similar to the target analytes
- extremely unlikely to occur naturally in the atmosphere under test
- readily resolved and distinguished analytically from the compounds of interest
- stable in the vapor phase at ambient temperature
- compatible with metal and glass surfaces under dry and humid conditions
- certified stable in a pressurized form for a long time period (i.e., up to 1 year).

9.4.2 Deuterated or fluorinated hydrocarbons usually meet all these criteria and make perfect internal standards for MS based systems. Typical compounds include deuterated toluene, perfluorobenzene and perfluorotoluene. Multiple internal standards should be used if the target analytes cover a very wide volatility range or several different classes of compound.

9.4.3 Obtain a pressurized cylinder containing accurate (±5%) concentrations of the internal standard components selected. Typically a 0.5 to 5.0 mL volume of this standard is automatically introduced onto the back of the sorbent tube or focusing trap after the tube has passed preliminary leak tests and before it is thermally desorbed. The concentration of the gas should be such that the mass of internal standard introduced from the GSV loop is approximately equivalent to the mass of analytes which will be sampled onto the tube during sample collection. For example, a 1 L air sample with average analyte concentrations in the order of 5 ppb, would require a 10 ppm internal standard, if only 0.5 mL of the standard is introduced in each case.

9.5 Commercial, Preloaded Standard Tubes

9.5.1 Certified, preloaded commercial standard tubes are available and should be used for auditing purposes wherever possible to establish analytical quality control (see Section 14). They may also be used for routine calibration. Suitable preloaded standards should be accurate within ±5% for each analyte at the microgram level and ±10% at the nanogram level.

9.5.2 The following information should be supplied with each preloaded standard tube:

- A chromatogram of the blank tube before the standard was loaded with associated analytical conditions and date.
- Date of standard loading
- List of standard components, approximate masses and associated confidence levels
- Example analysis of an identical standard with associated analytical conditions (these should be the same as for the blank tube)
- A brief description of the method used for standard preparation
- Expiration date

9.6 Carrier Gases

Inert, 99.999% or higher purity helium should be used as carrier gas. Oxygen and organic filters should be installed on the carrier gas lines supplying the analytical system. These filters should be replaced regularly according to the manufacturer's instructions.

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10. Guidance on Sampling and Related Procedures

10.1 Packing Sorbent Tubes

10.1.1 Commercial Tubes

10.1.1.1 Sorbent tubes are commercially available either prepacked and preconditioned or empty.

10.1.1.2 When electing to purchase empty tubes and pack/condition them as required, careful attention must be paid to the appropriate manufacturer's instructions.

10.1.2 Tube Parameters

10.1.2.1 Key parameters to consider include:

- **Sorbent bed positioning within the tube**. The sampling surface of the sorbent bed is usually positioned at least 15 mm from the sampling end of the tube to minimize sampling errors due to diffusive ingress. The position of the sorbent bed must also be entirely within that section of the tube which is surrounded by the thermal desorption oven during tube desorption.
- **Sorbent bed length**. The sorbent bed must not extend outside that portion of the tube which is directly heated by the thermal desorption oven.
- **Sorbent mesh size**. 20 to 80 mesh size sorbent is recommended to prevent excessive pressure drop across the tube which may cause pump failure. It is always recommended that sorbents be sieved to remove ?fines" (undersized particles) before use.
- **Use of appropriate sorbent bed retaining hardware inside the tube**. Usually 100 mesh stainless steel gauzes and retaining springs are used in stainless steel tubes and unsilanized, preconditioned glass or quartz wool in glass tubes.
- **Correct conditioning procedures**. See Table 2 and Section 10.2.
- **Bed separation**. If a single tube is to be packed with two or three different sorbents, these must be kept in discreet beds separated by ~3 mm length plugs of unsilanized, preconditioned glass or quartz wool or glass fiber disks and arranged in order of increasing sorbent strength from the sampling end of the tube. Do not use sorbents of widely different maximum temperatures in one tube or it will be difficult to condition the more stable sorbents without exceeding the maximum recommended temperature of the less stable sorbents.

[Note: Silanized glass or quartz wool may be used for labile species such as sulfur or nitrogen containing compounds but should not be taken to temperatures above 250°C.]

- **Compression of bed**. The sorbent bed must not be compressed while packing the tube. Compression of the sorbent can lead to excessive tube impedance and may produce ?fines".

10.1.2.2 Tubes packed with porous polymer sorbents (Chromosorbs®, Porapaks® and Tenax®) should be repacked after 100 thermal cycles or if the performance criteria cannot be met. Tubes packed with carbonaceous sorbents such as Spherocarb®, Carbotrap™, Carbopack™, Carbosieve™ SIII and Carboxens® should be repacked every 200 thermal cycles or if the safe sampling volume validation procedure fails.

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10.2 Conditioning and Storage of Blank Sorbent Tubes

10.2.1 Sorbent Tube Conditioning.

10.2.1.1 The success of sorbent tube sampling for ppb and sub-ppb level air monitoring is largely dependent on artifact levels being at significantly lower levels (<10%) than the masses of analytes collected during air monitoring. A summary of recommended conditioning parameters for various individual sorbents and multibed tubes is given in Table 2. 1/4 inch O.D. sorbent tubes may be adequately conditioned using elevated temperatures and a flow of ultra-pure inert gas. Washing or any other preconditioning of the bulk sorbent is not usually necessary. Appropriate, dedicated tube conditioning hardware should be used for tube conditioning unless the thermal desorption system offers a separate tube conditioning mode.

10.2.1.2 The tube conditioning temperatures and gas flows recommended in Table 2 should be applied for at least 2 hours when a tube is packed with fresh adsorbent or when its history is unknown.

Sorbent tubes which are:

- desorbed to completion during routine analysis (as is normally the case)
- stored correctly (see Section 10.2.2)
- re-issued for air sampling within 1 month (1 week for Chromosorb®, Tenax® and Porapak® porous polymers)
- and are to be used for atmospheres with analytes at the 10 ppb level or above

do not usually require any reconditioning at all before use. However, tubes to be used for monitoring at lower levels should be both reconditioned for 10-15 minutes using the appropriate recommended conditioning parameters and put through a ?dummy" analysis using the appropriate analytical conditions to obtain blank profiles of each tube before they are issued for sampling.

10.2.1.3 Analytical system conditioning procedures are supplied by system manufacturers. Generally speaking, both system and sorbent tube conditioning processes must be carried out using more stringent conditions of temperature, gas flow and time than those required for sample analysis - within the maximum temperature constraints of all the materials and equipment involved.

10.2.2 Capping and Storage of Blank Tubes.

10.2.2.1 Blank tubes should be capped with ungreased, Swagelok®-type, metal screw-caps and combined PTFE ferrules. The screw caps should be tightened by hand and then an extra 1/4 turn with a wrench. If uncoated aluminum foil is required, tubes should be wrapped individually.

10.2.2.2 Batches of blank, sealed tubes should be stored and transported inside a suitable multi-tube container.

10.3 Record Keeping Procedures for Sorbent Tubes

Sample tubes should be indelibly labeled with a unique identification number as described in Section 8.1.2. Details of the masses and/or bed lengths of sorbent(s) contained in each tube, the maximum allowable temperature for that tube and the date each tube was packed should be permanently recorded. A record should also be made each time a tube is used and each time the safe sampling volume of that tube is retested so that its history can be monitored. If a tube is repacked at any stage, the records should be amended accordingly.

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10.4 Pump Calibration and Tube Connection

10.4.1 Tube Deployment

10.4.1.1 Once at ambient temperature, remove the tubes from the storage container, uncap and connect them to the monitoring pumps as quickly as possible using clean, non-outgassing flexible tubing. Multi-bed sorbent tubes must be orientated so that the air sample passes through the series of sorbents in order of increasing sorbent strength (i.e., weaker sorbent first). This prevents contamination of the stronger adsorbent with less volatile components.

10.4.1.2 In all cases the sampling end of the tube must be clearly identified and recorded.

10.4.1.3 A typical sampling configuration for a distributed volume pair of sampling tubes is shown in Figure 4.

10.4.2 Pump Calibration

10.4.2.1 Pumps should be calibrated according to the manufacturer's instructions, preferably at the monitoring location immediately before sampling begins or, alternatively, in a clean environment before the tubes and pumps are transported to the monitoring site. The apparatus required is described in Section 8.1.6. Details of the pump flow rate delivered with a given identified tube and the flow rate, stroke rate or pressure selected on the pump itself should be recorded together with the date.

10.4.2.2 The pump flow rate should be retested at the end of each sampling period to make sure that a constant pump rate was maintained throughout the sample collection period. The flow rate measured at the end of sampling should agree within 10% with that measured at the start of the sampling period for the sample to be considered valid and the average value should be used.

10.5 Locating and Protecting the Sample Tube

The sampling points of individual sorbent tubes or sequential tube samplers should not be unduly influenced by nearby emission sources unless the emission source itself is specifically being monitored. Common sense generally determines the appropriate placement. Field notes on the relative location of known emission sources should be part of the permanent record and identified on the FTDS. Some shelter or protection from high winds (see Section 8.1.7) other extreme weather conditions and high levels of particulates is required for the sample tube if it is to be left unattended during the monitoring period.

10.6 Selection of Pump Flow Rates and Air Sample Volumes

10.6.1 Flow Rate Selection

10.6.1.1 For 1/4 inch O.D. tubes, 50 mL/min is the theoretical optimum flow rate (31). However, negligible variation in retention volume will in fact be observed for pump flow rates varying from 5 to 200 mL/min. Pump flow rates above 10 mL/min are generally used in order to minimize errors due to ingress of VOCs via diffusion. Flow rates in excess of 200 mL/min are not recommended for standard 1/4-inch sample tubes unless for short term (e.g. 10 minute) monitoring (21).

[Note: High sampling flow rates can be used longer term for high boiling materials such as low level, vapor phase polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in air.]

10.6.1.2 One and four liter air sample volumes are recommended for this method if consistent with anticipated safe sampling volumes. Adjustments of the flow rates to accommodate low safe sampling volumes should be made by proportionally reducing both rates with the qualification that the lower flow rate result is no less than 300 mL total volume. The 300 mL sample gives adequate detection limits (<0.5 ppb per analyte) with

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full scan mass spectrometry detection for ambient air applications (see Table 4). Sensitivity is generally enhanced at least ten-fold if conventional GC detectors or selected ion monitoring are applied. However; the pump flow rate, sampling time and consequently air volume selected may be varied to suit the requirements of each individual air monitoring exercise.

10.6.1.3 Typical example pump flow rates include:

- 16 mL/min to collect 1 L air samples in 1 hour
- 67 mL/min to collect 4 L air samples in 1 hour
- 10 mL/min to collect 1800 mL air samples over 3 hours
- 40 mL/min to collect 7200 mL air samples over 3 hours

10.6.2 Pump Flow Rate Selection

10.6.2.1 The pump flow rate used is dependent upon:

- **Safe sampling volume constraints**. The flow rate must be adjusted (within the allowed range) to ensure that, for the chosen sample collection time, SSVs are not exceeded for any target analyte
- **Time weighted average monitoring requirements**. If long-term - 3, 8 or even 24 hour - time weighted average data are required, the pump flow rate must be adjusted to ensure SSVs are not exceeded during the sample collection period.
- **GC detection limits**. Within the constraints of safe sampling volumes and pump flow rate limits, air volumes selected for trace level (ambient) air monitoring, should be maximized such that the largest possible analyte masses are collected.

10.6.2.2 Typical VOC concentrations and the associated analyte masses retained from a range of different air sample volumes in various atmospheres are presented in Table 4.

10.7 Sampling Procedure Verification - Use of Blanks, Distributed Volume Pairs, Back-Up Tubes, and Distributed Volume Sets

10.7.1 Field and Laboratory Blanks

10.7.1.1 Laboratory blanks must be identically packed tubes, from the same batch, with similar history and conditioned at the same time as the tubes used for sample collection. At least two are required per monitoring exercise. They must be stored in the laboratory in clean controlled conditions (<4°C) throughout the monitoring program and analyzed at the same time as the samples-- one at the beginning and one at the end of the sequence of runs.

10.7.1.2 Field blanks are the same as laboratory blanks except that they are transported to and from the monitoring site, are uncapped and immediately resealed at the monitoring site, but do not actually have air pumped through them. One field blank tube is taken for every ten sampled tubes on a monitoring exercise and no less than two field blanks should be collected, however small the monitoring study. The field blanks should be distributed evenly throughout the set of sampled tubes to be analyzed. Guidance on acceptable performance criteria for blanks is given in Section 13.

10.7.2 Distributed Volume Pairs

10.7.2.1 When monitoring for specific analytes using a validated sorbent tube but in an uncharacterized atmosphere, it is advisable to collect distributed volume tube pairs - e.g. 1 and 4 L samples - in parallel at every monitoring location as described in Section 6. If single tube sampling is used to reduce analysis costs, a reduction in the quality assurance associated with this method has to be assumed.

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10.7.2.2 Back-up tubes (identical to those used for sample collection) should be used to investigate situations in which distributed volume pairs do not agree within acceptable tolerance. To use back-up tubes, a second identical sampling tube is placed in series with a primary (front) tube. The purpose of the backup tube is to capture compounds that pass through the primary tube because of breakthrough. Analysis of the backup tube may indicate unexpected breakthrough or give evidence of channeling of sample through the tube because of loose packing.

10.7.2.3 A significant volume of literature exists on the use of distributed volume sets to determine the occurrence of nonlinearities when different sample volumes are taken from the same sample air mix. Ideally, the quantity of material collected scales linearly with sample volume. If this is not the case, then one of a number of problems has occurred. The 4-tube distributed volume developed by Walling, Bumgardner, and co-workers (32,33) is a method by which sample collection problems can be investigated.

10.8 Determining and Validating Safe Sampling Volumes (SSV)

10.8.1 Field Test Method for Tube Breakthrough.

10.8.1.1 If SSV information is not readily available for the analytes under test on the sorbent tube selected, or if the safe sampling volumes need validating - the following field experiment may be used. Link at least 12 of the sorbent tubes under test together in series to give 6 pairs of tubes. Use inert, preferably Swagelok®-type 1/4-inch metal unions with PTFE fittings. The sampling end of the back up tube should be connected to the exit end of the front tube in each of the pairs. The tube pairs are then connected to calibrated monitoring pumps and used to simultaneously sample at least 3 different air volumes at pump flow rates between 10 and 200 mL/min with 2 replicates at each air sample volume.

10.8.1.2 The experiment should be carried out in the atmosphere to be monitored and, if possible, under worst-case conditions (i.e., highest natural humidity and highest typical VOC concentrations). The sampling points of all the tube pairs should be placed close together to ensure that, as far as possible, tubes are all sampling the same atmosphere. The sampling location selected should be well ventilated. Both the front and back-up tubes of each tube pair should subsequently be analyzed using thermal desorption - capillary GC.

10.8.1.3 If more than 5% of one or more of the target analytes is observed on any of the back-up tubes, breakthrough is shown to have occurred at that sample volume. For practical purposes, the BV for a given sorbent/analyte combination is usually considered to be the sample volume at which there is 5% breakthrough of that analyte onto the back-up tube. The SSV for that analyte/sorbent combination is then taken as two thirds (~66%) of the BV.

10.8.2 Chromatographic Test of Tube Retention Volume for Individual Analytes

10.8.2.1 Inject 0.5 mg of each analyte into a stoppered ~1L volume glass flask fitted with a septum. Check that all the analyte has evaporated.

10.8.2.2 Connect the sample tube under test to a 1/4 inch injection port inside a GC oven. Use 530 μm, uncoated fused silica capillary tubing, or other appropriate narrow bore tubing, to connect the other end of the sample tube to a FID detector. Use 1/4 inch fittings with graphite ferrules to connect to the sample tube itself.

10.8.2.3 Set a nitrogen carrier gas flow of 50 mL/min through the tube.

10.8.2.4 Inject a 0.1 mL sample of the vapor phase standard onto the tube using a gas syringe. Adjust the GC oven temperature so that the analyte peak elutes on the FID between 1 and 20 minutes.

10.8.2.5 Repeat the experiment 4 or 5 times using different GC oven temperatures. Try to ensure that at each of the GC temperatures selected, the peak elutes within 1-20 minutes.

[Note: Use the time from injection to peak crest as the retention time. This may have to be measured manually, depending on the type of integrator available.]

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10.8.2.6 Inject a sample of methane to measure the delay time of the system and subtract this from the analyte retention times determined.

10.8.2.7 Use the flow of nitrogen carrier gas and corrected retention times to calculate the analyte retention volumes at different sorbent temperatures.

10.8.2.8 A graph of $\log_{10}$ retention volume vs. 1/temp(K) should produce a straight line plot which can be readily extrapolated to ambient temperatures. Use this plot to obtain the retention volume.

A SSV for the analyte on that sorbent tube is then derived by halving the calculated retention volume at ambient temperature. When required, this experiment should be carried out for the least well retained compound(s) of interest.

10.9 Resealing Sorbent Tubes After Sample Collection

Sampled tubes should be recapped with the metal, Swagelok®-type caps and combined PTFE ferrules, rewrapped in the aluminum foil (if appropriate) and replaced in the storage container immediately after sampling. They should not be removed from the sampling container until they are in the laboratory and about to be analyzed.

10.10 Sample Storage

Samples should be refrigerated at <4 °C in a clean environment during storage and analyzed within 30 days of sample collection (within one week for limonene, carene, *bis*-chloromethyl ether and labile sulfur or nitrogen-containing volatiles). Samples taken on tubes containing multiple sorbent beds should be analyzed as soon as possible after sampling unless it is know in advance that storage will not cause significant sample recovery errors (see also Section 7.1.3 concerning artifacts).

11. Analytical Procedure

11.1 Preparation for Sample Analysis

Follow the description given in Compendium Method TO-15 for set up of the GC/MS analytical system including column selection, MS tune requirements, calibration protocols, etc.

11.2 Predesorption System Checks and Procedures

The following sample and system integrity checks and procedures must be carried out manually or automatically before thermal desorption:

- **Dry purge**. Dry purge the batch of sampled, back-up and field blank tubes (do not purge lab blanks).
- **Cap**. Cap tubes with PTFE 'analytical' caps and place on instrument carousel.
- **Leak test the tubes**. Each tube must be stringently leak tested at the GC carrier gas pressure, without heat or gas flow applied, before analysis. Tubes which fail the leak test should not be analyzed, but should be resealed and stored intact. On automated systems, the instrument should continue to leak test and analyze subsequent tubes after a given tube has failed. Automated systems should also store a record of which tubes in a sequence have failed the leak test in battery-protected system memory until the error is acknowledged by an operator. These measures prevent sample losses and help ensure data quality.

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- **Leak test the sample flow path**. All parts of the sample flow path should be stringently leak tested before each analysis without heat or gas flow applied to the sample tube. An automatic sequence of tube desorptions and GC analyses should be halted if any leak is detected in the main sample flow path.
- **Purge air**. Purge air from the tube and sample flow path at ambient temperature using carrier gas immediately before tube desorption. It helps to dry the sample and prevents analyte and sorbent oxidation thus minimizing artifact formation, ensuring data quality and extending tube lifetimes. The focusing trap should be in-line throughout the carrier gas purge to retain any ultra-volatile analytes "desorbed" from the tube prematurely.
- **Check GC/MS analytical system ready status**. The "ready" status of the GC, detector(s), data processor and all parts of the analytical system should be automatically checked by the thermal desorption device before each tube desorption. It should not be possible to desorb a tube into the analytical system if it is not ready to accept and analyze samples.
- **Internal standard**. Introduce a gas phase internal standard onto the sorbent tube or focusing trap before primary (tube) desorption, as an additional check of system integrity (optional).

A series of schematics illustrating these steps is presented in Figure 3, Steps (a) through (f).

11.3 Analytical Procedure

11.3.1 Steps Required for Reliable Thermal Desorption.

11.3.1.1 A stepwise summary of the complete thermal desorption procedure is as follows:

- Predesorption system checks (see Section 11.2).
- Introduction of a fixed volume gas phase internal standard (optional) [see Figure 3, Step (d)].
- Desorption of the sorbent tube (typically 200-300°C for 5-15 minutes with a carrier gas flow of 30-100 mL/min - see Table 2) and refocusing of the target analytes on a focusing trap held at near- ambient or subambient temperatures [see Figure 3, Step (e)].

[Note: Analytes should be desorbed from the tube in "backflush" mode, i.e., with the gas flow in the reverse direction to that of the air flow during sampling].

- Splitting the sample as it is transferred from the tube to the focusing trap (Optional). This is only required to prevent column or detector overload due to excess water accumulation or during the analysis of high concentration/large volume air samples or when using ultra-sensitive detectors such as the ECD [see Figure 3, Step (e)].
- Rapid desorption of the focusing trap (typically 40 deg/sec. to a top temperature of 250-350°C, with a "hold" time of 1-15 mins at the top temperature and an inert/carrier gas flow of 3-100 mL/min) and transfer of the analytes into the analytical column [see Figure 3, Step (f)].

[Note: Components should normally be desorbed from the focusing trap in "backflush" mode, i.e., with the gas flow through the 'cold' trap in the reverse direction to that used during analyte focusing.]

- Splitting the sample as VOCs are transferred from the focusing trap to the analytical column. (Optional). This is only required to prevent column or detector overload due to excess water accumulation or during the analysis of high concentration/large volume air samples or when using ultra-sensitive detectors such as the ECD [See Figure 3, Step (f)].
- Desorbing the focusing trap initiates the GC run. [See Figure 3, Step (f)].

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- All volatiles should be stripped from the sorbent tubes during the thermal desorption process leaving them clean and ready for reuse. The tubes should be resealed to ensure they are kept clean and ready for immediate reuse while the sequence of tube desorptions and analyses is completed.

11.3.2 GC/MS Analytical Procedure

11.3.2.1 Once the GC run has been initiated by desorption of the focusing trap, the chromatographic procedure continues as described in Compendium Method TO-15.

11.3.2.2 The precision of the analytical system should be tested using six standard tubes all loaded with a mid-concentration-range standard. This procedure should be carried out whenever the thermal desorption - GC/MS analytical method is changed and should be repeated once every tenth series of samples run with an analytical method or once every three months, whichever happens first. The report produced from the most recent precision test should be included with the final batch report generated for each series of samples.

12. Calibration of Response

Descriptions of how to load tubes from standard atmospheres, concentrated gas phase standards or liquid standards are given in Sections 9.2 and 9.3. Once the tubes are desorbed to the focusing trap and into the analytical GC/MS system the calibration procedure becomes identical to that presented in Section 3 of Compendium Method TO-15. The guidance given in Section 3 of Compendium Method TO-15 concerning multi-level calibration procedures and calibration frequencies should be followed for this Compendium method. It is also advisable to analyze a single level calibrant (i.e. tubes loaded with analyte masses in the mid-range of those expected to be collected during sampling) approximately every tenth sample during an analytical sequence, as a check on system performance. All samples processed that exceed the calibration range will require data qualifiers to be attached to the analytical results.

13. Quality Assurance

13.1 Validating the Sample Collection Procedure

13.1.1 Blanks.

13.1.1.1 Artifact levels on laboratory and field blanks should be at the low or sub-nanogram level for carbonaceous sorbents and Tenax® and at the double digit ng level for Porapaks®, Chromosorb® Century series sorbents and other porous polymers as described in Section 7.1. If artifact levels are considerably above this, careful attention must be paid to the tube conditioning and storage procedures described in Sections 10.2.1 and 10.2.2. Artifact peaks which are 10% or more of the area of average component peaks should be marked as artifacts in the final data reports. When monitoring unknown atmospheres, special care must be taken to distinguish between sorbent artifacts and analytes, using the MS to identify components which are significant in both blank and sampled tubes.

13.1.1.2 If the same profile/pattern of VOCs is observed on the field blanks as on the sampled tubes and if the level of these components is 5% or more of the sampled volatiles, careful attention must be paid to the method of sealing the tubes and other storage procedures in future studies. If the profile of volatiles on the field blanks matches that of the sampled tubes and if the areas of the peaks on the field blank are 10% or more of sampled tube levels, the sampled tube data are invalidated.

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13.1.2 Routine Checking of Sorbent Tube Safe Sampling Volumes.

13.1.2.1 The SSVs of sorbent tubes should be retested annually or once every 20 uses (whichever happens first) using one of the procedures described in Section 10.8.

13.1.2.2 If the SSV of a tube (i.e., half the RV or two thirds of the BV) falls below the normal air sample collection volume for the analytes in question, the tube should be repacked with fresh adsorbent and reconditioned.

13.2 Performance Criteria for the Monitoring Pump

Records of the pump flow rate delivered against the pump flow rate, stroke rate or pressure selected on a pump should be reviewed at least once per three months. If the performance of any pump has been found to have changed significantly over that time; for example if completely different pump settings are required to deliver the same pump flow rate, the pump should be serviced by the manufacturer or their approved agent.

Sampling pump errors can normally be presumed to be in the order of 5% (8). If the pump sampling flow rate measured at the end of sample collection varies more than 10% from that measured at the beginning of sample collection, then that sample is invalidated.

14. Performance Criteria for the Solid Adsorbent Sampling of Ambient Air

14.1 Introduction

There are four performance criteria which must be met for a system to qualify under Compendium Method TO-17. These criteria closely parallel those of Compendium Method TO-15, *"The Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)"*. These criteria are:

- A method detection limit $\leq$0.5 ppb.
- Duplicate (analytical) precision within 20% on synthetic samples of a given target gas or vapor in a typical target gas or vapor mix in humidified zero air.
- Agreement within 25% for distributed volume pairs of tubes taken in each sampling set.
- Audit accuracy within 30 percent for concentrations normally expected in contaminated ambient air (0.5 to 25 ppb). Either mass spectrometry as emphasized here, or specific detectors can be used for analysis. Details for the determination of each of the criteria follow.

14.2 Method Detection Limit

The procedure chosen to define the method detection limit is that given in the Code of Federal Regulations (40CFR136 Appendix B). The method detection limit is defined for each system by making seven replicate measurements of a concentration of the compound of interest near the expected detection limit (within a factor of five), computing the standard deviation for the seven replicate concentrations, and multiplying this value by 3.14 (the Student's t value for 99 percent confidence for seven values).

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14.3 Analytical Precision of Duplicate Pairs

The measure of analytical precision used for this method is the absolute value of the relative difference between two identical samples (same flow rate over the same time period from with a common inlet to the sample volume). The analytical precision is expressed as a percentage as follows:

$$\text{Analytical Precision} = \left(\frac{[|X1 - X2|]}{X} \right) 100$$

where:

X1 = A measurement value taken from one of the two tubes using in sampling.
X2 = A measurement value taken from the second of two tubes using in sampling.
X = Average of X1 and X2.

The analytical precision is a measure of the precision achievable for the entire sampling and analysis procedure including the sampling and thermal desorption process mentioned above and the analytical procedure that is same as the TO-15 analytical finish, although specific detector systems can also be used.

14.4 Precision for the Distributed Volume Pair

The measure of precision used for this method is the absolute value of the relative difference between the distributed volume pair expressed as a percentage as follows:

$$\text{percent difference} = \left(\frac{[|X1 - X2|]}{X} \right) 100$$

where:

X1 = One measurement value (e.g., for a defined sample volume of 1 L).
X2 = Duplicate measurement value (e.g., for a defined sample volume of 4 L taken over the same time period as the first sample).
X = Average of the two values.

There are several factors that may affect the precision of the measurement as defined above. In fact any factor that is nonlinear with sample volume may be significant enough to violate the constraint placed on distributed volume pair precision. These factors include artifact formation, compound reactions on the sorbent, breakthrough of target compounds, etc.

14.5 Audit Accuracy

A measure of audit accuracy is the degree of agreement with audit standards. Audit accuracy is defined as the relative difference between the measurement result and the nominal concentration of the audit compound:

$$\text{Audit Accuracy, \%} = \left[\frac{(\text{Spiked Value} - \text{Observed Value})}{(\text{Spiked Value})} \right] \text{x } 100$$

The choice of audit standard is left to the analyst.

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TABLE 1. GUIDELINES FOR SORBENT SELECTION

Sample Tube Sorbent	Approx. Analyte Volatility Range	Max. Temp., (°C)	Specific Surface Area, (m^2/g)	Example Analytes
CarbotrapC® CarbopackC® Anasorb® GCB2	n-C_8 to n-C_{20}	>400	12	Alkyl benzenes and aliphatics ranging in volatility from n-C to n-C .
Tenax® TA	bp 100 °C to 400 °C n-C_7 to n-C_{26}	350	35	Aromatics except benzene, Apolar components (bp>100°C) and less volatile polar components (bp>150 °C).
Tenax GR	bp 100 °C to 450 °C n-C_7 to n-C_{30}	350	35	Alkyl benzenes, vapor phase PAHs and PCBs and as above for Tenax TA.
Carbotrap® CarbopackB® Anasorb® GCB1	(n-C_4) n-C_5 to n-C_{14}	>400	100	Wide range of VOCs inc., ketones, alcohols, and aldehydes (bp>75 °C) and all apolar compounds within the volatility range specified. Plus perfluorocarbon tracer gases.
Chromosorb® 102	bp 50 °C - 200 °C	250	350	Suits a wide range of VOCs incl. oxygenated compounds and haloforms less volatile than methylene chloride.
Chromosorb 106	bp 50 °C - 200 °C	250	750	Suits a wide range of VOCs incl. hydrocarbons from n-C to n-C . Also good for volatile oxygenated compounds
Porapak Q	bp 50 °C - 200 °C n-C_5 to n-C_{12}	250	550	Suits a wide range of VOCs including oxygenated compounds.
Porapak N	bp 50 °C - 150 °C n-C_5 to n-C_8	180	300	Specifically selected for volatile nitriles; acrylonitrile, acetonitrile and propionitrile. Also good for pyridine, volatile alcohols from EtOH, MEK, etc.
Spherocarb*	-30 °C - 150 °C C_3 to n-C_8	>400	1,200	Good for very volatile compounds such as VCM, ethylene oxide, CS and CH Cl . Also good for volatile polars e.g. MeOH, EtOH and acetone.
Carbosieve SIII*® Carboxen 1000*® Anasorb® CMS*	-60 °C to 80 °C	400	800	Good for ultra volatile compounds such as C C hydrocarbons, volatile haloforms and freons.
Zeolite Molecular Sieve 13X**	-60 °C to 80 °C	350		Used specifically for 1,3- butadiene and nitrous oxide.
Coconut Charcoal* (Coconut charcoal is rarely used)	-80 °C to 50 °C	>400	>1,000	Rarely used for thermal desorption because metal content may catalyze analyte degradation. Petroleum charcoal and Anasorb® 747 are used with thermal desportion in the EPA's volatile organic sampling train (VOST), Methods 0030 and 0031.

* These sorbents exhibit some water retention. Safe sampling volumes should be reduced by a factor of 10 if sampling a high (>90%) relative humidity.
** Significantly hydrophilic. Do not use in high humidity atmospheres unless silicone membrane caps can be fitted for diffusive monitoring purposes.
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TABLE 2. GUIDELINES FOR SORBENT USE

Sample Tube Sorbent	Maximum Temp., (°C)	Hydro-phobic (?)	Temp. and Gas Flow for Conditioning	Temp. and Min. Gas Flow for Desorption	Recommended Focusing Trap Packing
CarbotrapC® CarbopackC® Anasorb® GCB2	>400	Yes	350°C and 100 mL/min	325°C and 30 mL/min	Tenax® or Carbopack C®
Tenax® TA	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax®
Tenax GR	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax®
Carbotrap® CarbopackB® Anasorb® GCB1	>400	Yes	350°C and 100 mL/min	325°C and 30 mL/min	Tenax or Carbopack B®
Chromosorb® 102	250	Yes	250°C and 100 mL/min	225°C and 30 mL/min	Dual-bed CB plus CMS trap or Chrom. 102
Chromosorb 106	250	Yes	250°C and 100 mL/min	250°C and 30 mL/min	Dual-bed CB plus CMS trap or Chrom. 106
Porapak Q	250	Yes	250°C and 100 mL/min	225°C and 30 mL/min	Dual-bed CB plus CMS trap or Porapak Q
Porapak N	180	Yes	180°C and 100 mL/min	180°C and 30 mL/min	Dual-bed CB plus CMS trap or Porapak N
Spherocarb*	>400	No	400°C and 100 mL/min	390°C and 30 mL/min	Dual-bed CB plus CMS trap or Spherocarb
CMS such as CSIII*® Carboxen 1000*® Anasorb® CMS*	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap or CMS alone
Zeolite Molecular Sieve 13X**	350	No	330°C and 100 mL/min	300°C and 30 mL/min	Dual-bed CB plus CMS trap or CMS alone
Tenax / CB : comb. Tube Type 1 (see Sect. 9.1.3)	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax
Carb B / CMS* comb. Tube Type 2 (see Sect. 9.1.3)	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap
Carb. 300 type*, comb. Tube Type 3 (see Sect. 9.1.3)	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap

* These sorbents exhibit some water retention. Safe sampling volumes should be reduced by a factor of 10 if sampling a high (>90%) relative humidity.
** Significantly hydrophilic. Do not use in high humidity atmospheres unless silicone membrane caps can be fitted for diffusive monitoring purposes.

CB is short for Carbopack B and CMS is short for carbonized molecular sieve.

CarbotrapC™, CarbopackC™, CarbopackB™, Carboxen™ and Carbosieve SIII™ are all trademarks of Supelco, Inc., USA; Tenax® is a trademark of Enka Research Institute; Chromosorb® is a trademark of Manville Corp.; Anasorb® is a trademark of SKC, Inc.; Porapak® is a trademark of Waters Corporation.

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TABLE 3 - LIST OF COMPOUNDS WITH BREAKTHROUGH VOLUMES >5L USING THE AIR TOXICS TUBE STYLE 2 LISTED IN SECTIONS 6.1.2 AND 9.1.3 OF COMPENDIUM METHOD TO-17

*[Note: The following list of compounds was determined to have breakthrough volumes of greater than 5 liters of trace levels in humidified zero air for humidities of 20%, 65% and 90% RH at 25°C. The tests were performed immediately prior to the publication of this document at the Research Triangle Institute, Research Triangle Park, NC as a result of activities leading up to the publication of this document. Compounds with an * were not tested at 90% RH.]*

Halocarbon 114
1,3,5-Trimethylbenzene
Halocarbon 11
1,2,4-Trimethylbenzene
Halocarbon 113
Dichlorobenzenes
1,1-Dichloroethene
1,2,4-Trichlorobenzene
Methylene Chloride
Hexachloro-1,3,-butadiene
1,1 Dichloroethane
*1,3 Butadiene
cis-1,2-Dichloroethene
*Acetonitrile
Chloroform
*Acetone
1,1,1-Trichloroethane
*2-Propanol
Carbon tetrachloride
*Acrylonitrile
Benzene
*Isoprene
1,2-Dichloroethane
*Methyl Acetate
Trichloroethene
*Methyl tert-Butyl Ether
1,2-Dichloropropane
*Methyl Ethyl Ketone
cis-1,3-Dichloropropene
*Ethyl Acrylate
Toluene
*Methyl Acrylate
Trans-1,3-Dichloropropene
*Methyl Isobutyl Ketone
*Furfural
Tetrachloroethene
1,2-Dibromoethane
Chlorobenzene
Ethylbenzene
m-Xylene
p-Xylene
o-Xylene
1,1,2,2-Tetrachloroethane

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TABLE 4. MASS OF AN ANALYTE 'X' COLLECTED FROM 1, 2 OR 10 L AIR SAMPLES AT DIFFERENT ATMOSPHERIC CONCENTRATIONS (ASSUMING 'X' HAS A MOLAR WEIGHT OF 100 g)

Sample type	Typical concentration	Mass collected in 1 L sample volume	Mass collected in 2 L sample volume	Mass collected in 10 L sample volume
Fenceline/severe urban area	10-250 ppb	40-1,000 ng	80 ng-2 μg	0.4-10μg
Indoor air sampling	1-100 ppb	4-400 ng	8-800 ng	40 ng-4μg
Avg. exposure to benzene	~3 ppb	11 ng	22 ng	110 ng
Normal urban area	1-10 ppb	4-40 ng	8-80 ng	40-400 ng
Normal rural area	0.1-1 ppb	0.4-4 ng	0.8-8 ng	4-40 ng
Forested area	0.25-2.5 ppb	1-10 ng	2-20 ng	10-100 ng
Mt. Everest/K2 site	0.025-7.5 ppb	0.1-30 ng	0.2-60 ng	1-300 ng
Arctic on an ultraclean day	15-50 ppt	60-200 pg	0.12-0.4 ng	0.6-2 ng

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COMPENDIUM METHOD TO-17
FIELD TEST DATA SHEET (FTDS)

I. GENERAL INFORMATION

PROJECT:_____ DATE(S) SAMPLED:_____
SITE:_____ TIME PERIOD SAMPLED:_____
LOCATION:_____ OPERATOR:_____
INSTRUMENT MODEL NO.:_____ CALIBRATED BY:_____
PUMP SERIAL NO.:_____ RAIN: ____YES _____NO

ADSORBENT CARTRIDGE INFORMATION:

	Tube 1	Tube 2
Type:	_____	_____
Adsorbent:	_____	_____
Serial No.:	_____	_____
Sample No.:	_____	_____

II. SAMPLING DATA

Tube Identification	Sampling Location	Ambient Temp., °F	Ambient Pressure, in Hg	Flow Rate (Q), mL/min		Sampling Period		Total Sampling Time, min.	Total Sample Volume, L
				Tube 1	Tube 2	Start	Stop		

III. FIELD AUDIT

	Tube 1	Tube 2
Audit Flow Check Within 10% of Set Point (Y/N)?	_	_
	pre-	pre-
	_____	_____
	post-	post-

CHECKED BY:_____
DATE:_____

Figure 1. Compendium Method TO-17 Field Test Data Sheet.

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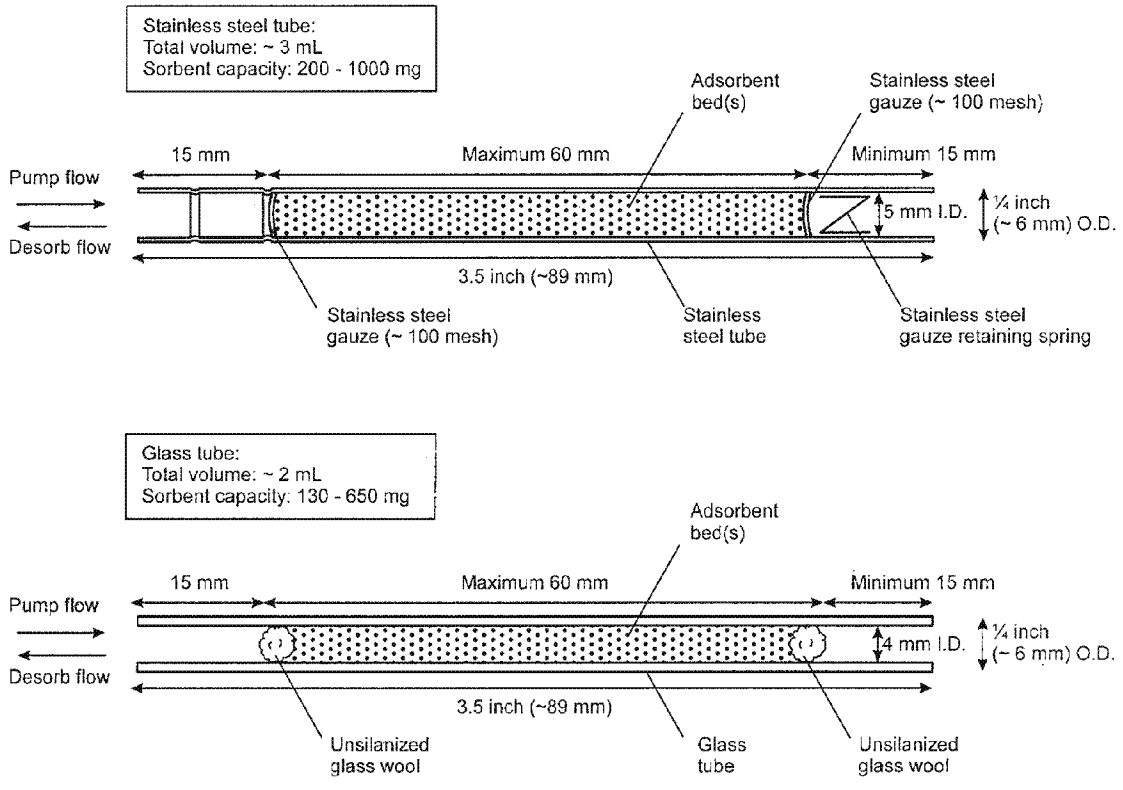

Figure 2. Example of construction of commercially available adsorbent tubes.

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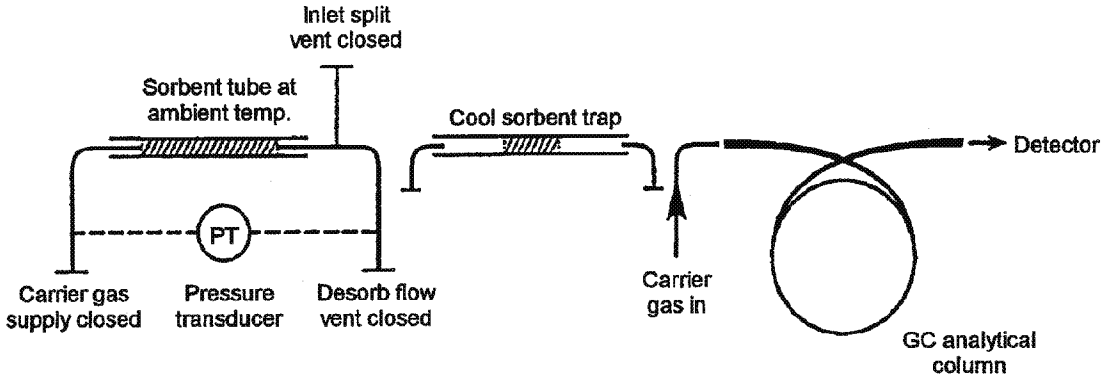
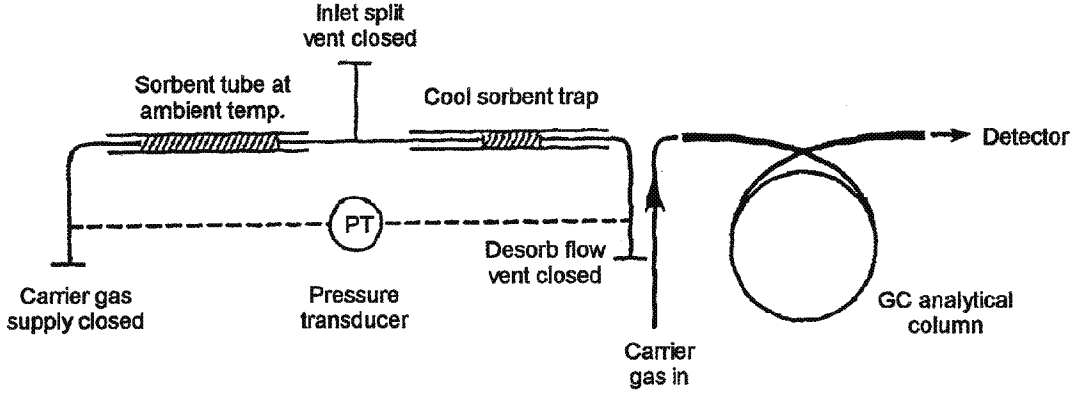


(a) Tube leak check.



(b) Leak check sample flow path.

Figure 3. Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (a) tube leak test and (b) leak check flow path.

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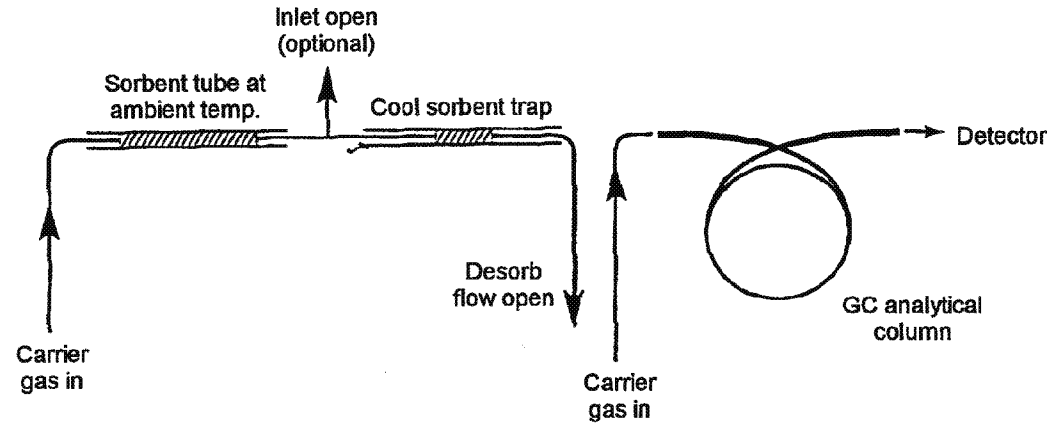
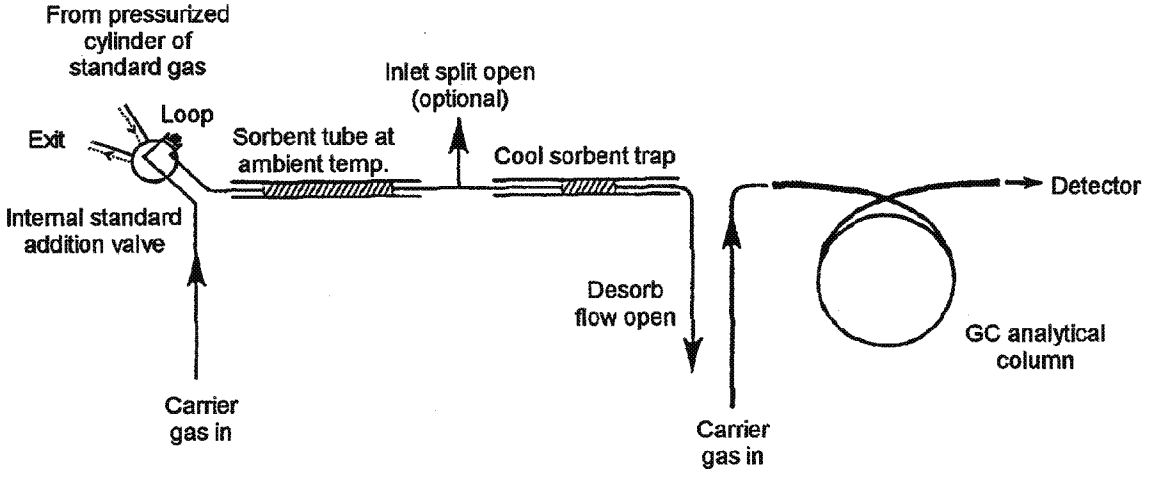


(c) Purge to remove air.



(d) Gas phase internal standard addition to sample tube.

Figure 3 (cont). Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (c) purge to remove air and (d) gas phase internal standard addition to sample tube.

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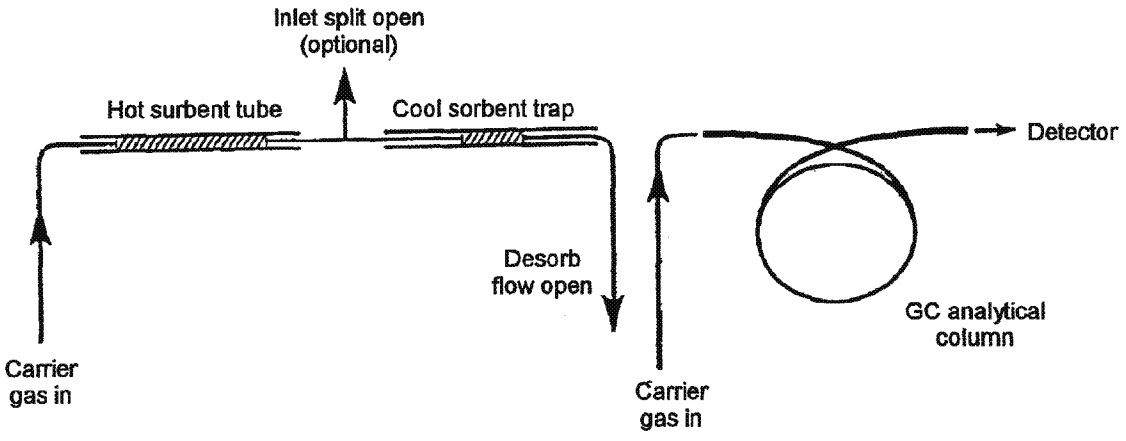
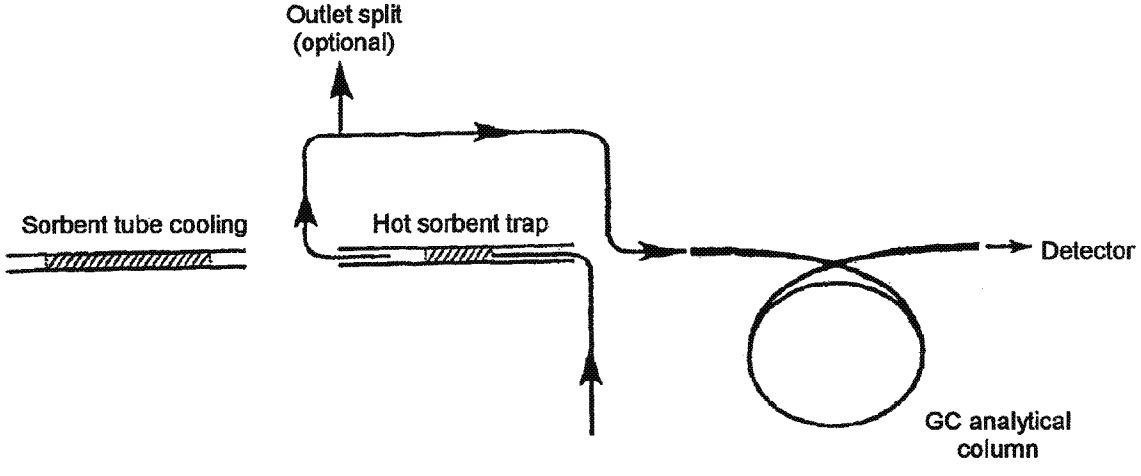


(e) Primary (tube) desorption.



(f) Secondary (trap) desorption.

Figure 3 (cont). Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (e) primary (tube) desorption and (f) secondary (trap) desorption.

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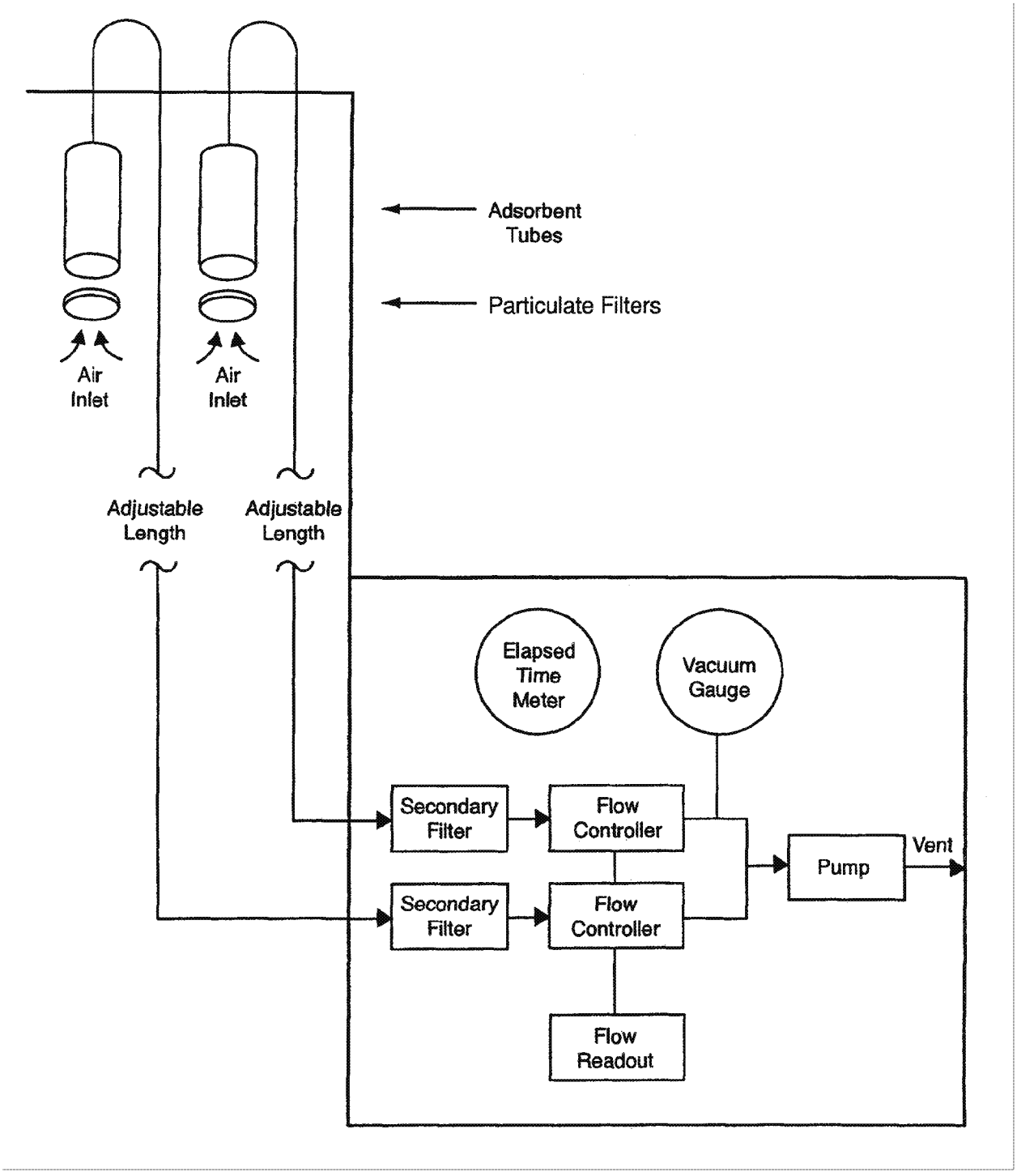

Figure 4. Example of distributive air volume using adsorbent tube technology.

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APPENDIX 1.

The following list includes safe sampling volume data generated by the UK Health and Safety Executive (4) on single sorbent bed 1/4 inch O.D. stainless steel tubes and compatible with a thermal desorption - capillary GC analytical procedure. It is provided as a resource to readers only. The recommendation for Tube Style 2 is based on the specific tube referenced in Section 6.1.2 and Table 3. Where tubes are not listed with safe sample volumes they have not been tested and their inclusion represents a suggestion only. Application to air sampling is subject to criteria listed in Section 14 of Compendium Method TO-17.

[Note: Combination tubes 1, 2, and 3 referenced in this Appendix are those adsorbent tubes described in Section 9.1.3.]

Compound	Suitable sorbents and SSV's where available
	Hydrocarbons
This procedure is suitable for all aliphatic, aromatic and cyclic hydrocarbons less volatile than ethane and more volatile than n-C20. These include:	
n-Butane	CS III, C 1000, Combination Tubes 2 or 3 or Spherocarb (SSV 820L).
n-Pentane	CS III, C 1000, Spherocarb (SSV 30,000L), Combination Tubes 2 or 3 or Chromosorb 106 (SSV 5.5L).
n-Hexane	Carbopack™ B, Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 30L).
Benzene	Carbopack™ B, Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 26L) or Tenax (SSV 6L).
n-Heptane	Carbopack™ B, Tenax (SSV 17L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 160L).
Toluene	Carbopack™ B, Tenax (SSV 38L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 80L).
n-Octane	Carbopack™ B, Tenax (SSV 700L) Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 1000L).
Ethylbenzene	Carbopack™ B, Tenax (SSV 180L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 360L).
all Xylenes	Carbopack™ B, Tenax (SSV 300L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 770L).
n-Nonane	Carbopack™ C/B, Tenax (SSV 700L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 7000L).
Styrene	Carbopack™ C/B, Tenax (SSV 300L) or Combination Tubes 1, 2 or 3.
Isopropylbenzene	Carbopack™ C/B, Tenax (SSV 480L) or Combination Tubes 1, 2 or 3.
n-Propylbenzene	Carbopack™ C/B, Tenax (SSV 850L) or Combination Tubes 1, 2 or 3.
1-Methyl-3-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.
1-Methyl-4-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available
1,3,5-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 2800).
Methylstyrene	Carbopack™ C/B, Tenax (SSV 1200L) or Combination Tubes 1, 2 or 3.
Methyl-2-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.
1,2,4-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L) or Combination Tubes 1, 2 or 3.
n-Decane	Carbopack™ C/B, Tenax (SSV 2100L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 37,000L).
1,2,3-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L) or Combination Tubes 1, 2 or 3.
n-Undecane	Carbopack™ C/B, Tenax (SSV 12,000L) or Combination Tubes 1, 2 or 3.
n-Dodecane	Carbopack™ C, Tenax (SSV 63,000L) or Combination Tubes 1 or 3.

Halogenated Hydrocarbons including PCBs

This procedure is suitable for all aliphatic, aromatic and cyclic halogenated hydrocarbons more volatile than n-C20. Examples include:

Dichloromethane	CS III, C 1000, Spherocarb (SSV 200L) or Combination Tubes 2 or 3.
1,2-Dichloroethane	CS III, C 1000, Spherocarb, Chrom. 106 (SSV 17L), Carbopack™ B, Tenax (SSV 5.4L) or Combination Tubes 1, 2 or 3.
1,1,1-Trichloroethane	Spherocarb (SSV 8,000L), Chrom. 106 (SSV 8L), Carbopack™ B, or Combination Tubes 1, 2 or 3.
Carbontetrachloride	Chrom. 106 (SSV 22L), Carbopack™ B, Tenax (SSV 6.2L) or Combination Tubes 1, 2 or 3.
Trichloroethylene	Chrom. 106, Carbopack™ B, Tenax (SSV 5.6L) or Combination Tubes 1, 2 or 3.
1,1,2-Trichloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 34L) or Combination Tubes 1, 2 or 3.
Tetrachloroethylene	Chrom. 106, Carbopack™ B, Tenax (SSV 48L) or Combination Tubes 1, 2 or 3.
Chlorobenzene	Chrom. 106, Carbopack™ B, Tenax (SSV 26L) or Combination Tubes 1, 2 or 3.
1,1,1,2-Tetrachloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 78L) or Combination Tubes 1, 2 or 3.
1,1,2,2-Tetrachloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 170L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available

Alcohols

This procedure is suitable for alcohols more volatile than n-C20 and sufficiently stable to be analyzed by conventional GC techniques. Examples include:

Methanol	CSIII, C1000, Spherocarb (SSV 130L) or Combination Tubes 2 or 3.
Ethanol	CSIII, C1000, Spherocarb (SSV 3500L) or Combination Tubes 2 or 3.
n-Propanol	Porapak N (SSV 20L), Chrom 106 (SSV 8L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Isopropanol	Chrom 106 (SSV 44L), Carbopack™ B or Combination Tubes 1, 2 or 3.
n-Butanol	Chrom 106 (SSV 50L), Carbopack™ B, Porapak N (SSV 5L), Tenax (SSV 5L) or Combination Tubes 1, 2 or 3.
iso-Butanol	Chrom 106 (SSV 30L), Carbopack™ B, Tenax (SSV 2.8L) or Combination Tubes 1, 2 or 3.
Octanol	Tenax (SSV 1400L), Carbopack™ C or Combination Tubes 1 or 3.

Esters and Gycol Ethers

This procedure is suitable for all esters and glycol ethers more volatile than n-C20 and sufficiently stable to be analyzed by conventional GC techniques. Examples include:

Methylacetate	Chromosorb 106 (SSV 2.6L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Ethylacetate	Chromosorb 106 (SSV 20L), Carbopack™ B, Tenax (SSV 3.6L) or Combination Tubes 1, 2 or 3.
Propylacetate	Chromosorb 106 (SSV 150L), Carbopack™ B, Tenax (SSV 18L) or Combination Tubes 1, 2 or 3.
Isopropylacetate	Chromosorb 106 (SSV 75L), Carbopack™ B, Tenax (SSV 6L) or Combination Tubes 1, 2 or 3.
Butylacetate	Chromosorb 106 (SSV 730L), Carbopack™ B, Tenax (SSV 85L) or Combination Tubes 1, 2 or 3.
Isobutylacetate	Chromosorb 106 (SSV 440L), Carbopack™ B, Tenax (SSV 130L) or Combination Tubes 1, 2 or 3.
Methyl-t-butyl ether	Chromosorb 106 (SSV >6L), Carbopack™ B or Combination Tubes 1, 2 or 3.
t-Butylacetate	Chromosorb 106 (SSV 160L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Methylacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 6.5L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available
Ethylacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 60L) or Combination Tubes 1, 2 or 3.
Methylmethacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 27L) or Combination Tubes 1, 2 or 3.
Methoxyethanol	Chromosorb 106 (SSV 5L), Carbopack™ B, Tenax (SSV 3L) or Combination Tubes 1, 2 or 3.
Ethoxyethanol	Chromosorb 106 (SSV 75L), Carbopack™ B, Tenax (SSV 5L) or Combination Tubes 1, 2 or 3.
Butoxyethanol	Chromosorb 106, Carbopack™ B, Tenax (SSV 35L) or Combination Tubes 1, 2 or 3.
Methoxypropanol	Chromosorb 106, Carbopack™ B, Tenax (SSV 13L) or Combination Tubes 1, 2 or 3.
Methoxyethylacetate	Chromosorb 106 (SSV 860L), Carbopack™ B, Tenax (SSV 8L) or Combination Tubes 1, 2 or 3.
Ethoxyethylacetate	Chromosorb 106 (SSV 4000L), Carbopack™ B, Tenax (SSV 15L) or Combination Tubes 1, 2 or 3.
Butoxyethylacetate	Chromosorb 106, Carbopack™ B, Tenax (SSV 150L) or Combination Tubes 1, 2 or 3.

Aldehydes and Ketones

This procedure is suitable for all aldehydes and ketones more volatile than n-C20 and sufficiently stable to be analyzed using conventional GC techniques. Examples include:

Acetone	CSIII, C1000, Spherocarb, Chrom 106 (SSV 1.5L) or Combination Tubes 2 or 3.
Methylethylketone (2-butanone)	Chromosorb 106 (SSV 10L), Tenax (SSV 3.2L), Porapak N (SSV 50L) Carbopack™ B or Combination Tubes 1, 2 or 3.
n-Butanal	Chromosorb 106, Carbopack™ B, Porapak N (SSV 50L) or Combination Tubes 1, 2 or 3.
Methylisobutylketone	Chromosorb 106 (SSV 250L), Tenax (SSV 26L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Cyclohexanone	Chromosorb 106, Tenax (SSV 170L), Carbopack™ B or Combination Tubes 1, 2 or 3.
3,5,5-Trimethylcyclohex-2-enone	Tenax (SSV 5600L), Carbopack™ B or Combination Tubes 1 or 3.
Furfural	Tenax (SSV 300L), Carbopack™ B or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available

Miscellaneous VOCs

This procedure is suitable for the analysis of most VOCs in air. It is generally compatible with all organics less volatile than ethane, more volatile than n-C20 and sufficiently stable to be analyzed using conventional GC techniques. Examples include:

Acetonitrile	Porapak N (SSV 3.5L), CSIII, C1000 or Combination Tubes 2 or 3.
Acrylonitrile	Porapak N (SSV 8L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Propionitrile	Porapak N (SSV 11L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Maleic anhydride[a]	Tenax (SSV 88L), Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Pyridine	Tenax (SSV 8L), Porapak N (SSV 200L) Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Aniline	Tenax (SSV 220L), Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Nitrobenzene	Tenax (SSV 14,000L) Carbopack™ C or Combination Tubes 1 or 3.
Acetic acid	Porapak N (SSV 50L), Carbotrap™ B or Combination Tubes 1, 2 or 3.
Phenol	Tenax (SSV 240L) or combination tube 1.

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APPENDIX 2.

LINEARITY TESTING OF ONE SORBENT TUBE/FOCUSING TUBE COMBINATION

Introduction

Automated gas chromatographs such as those used at network monitoring stations for hourly updates of volatile organic compounds (VOCs) have a solid adsorbent concentrator for the VOCs. This unit is comparable to the sorbent tubes being discussed in this document. The table below shows the results of sampling a synthetic mixture of the Compendium Method TO-14 target list in humidified zero air (approximately 70% RH at 25°C). Sampling occurred for 6, 12, and 24 min at a rate of 80 mL/min giving a total sampling volume of 480, 960, and 1920 mL. These results are similar to the determination of safe sampling volume and the amount of material collected should be related linearly to the sample period. The results indicate that breakthrough has not occurred to any appreciable extent at a sampling volume of approximately 2 L for the stated experimental conditions. The response measured is the response of chlorine from an atomic emission detector after chromatographic separation. The sorbent tube mix was Carbotrap™ C/Carbotrap™ B/Carboxen™ 1000 and the focusing tube mix was Tenax-TA/Silica Gel/Ambersorb XE-340/Charcoal. The primary tube was 6 mm O.D. with 4 mm I.D., 110 mm in length. The focusing tube was 6 mm O.D., 0.9 mm I.D., 185 mm in length. The packing lengths for the sorbent tube per sorbent type were: 1.27 cm, 2.86 cm, and 3.18 cm, respectively. The packing lengths for the focusing tube per sorbent type were: 5.08 cm, 2.54 cm, and 1.27 cm.

Linearity test

[Note: Actual sampling volumes were 490, 980, and 1960 instead of 1/2,1, and 2L as listed for convenience in the table below. The response is obtained as chlorine response on an atomic emission detector. Compounds corresponding to the numbered compounds in the table are identified on the following page.]

Cpd.	1/2 L	1 L	2 L	2L/1L	2L/(1/2L)	1L/(1/2L)	% Diff (2L/0.5L) vs. 4
1	1255.4	2402.9	5337.2	2.22	4.25	1.91	-6.28
2	711.82	1802.2	3087	1.71	4.34	2.53	-8.42
3	2079.4	4853	9386	1.93	4.51	2.33	-12.85
4	978.14	2381.3	4680.1	1.97	4.78	2.43	-19.62
6	1155.7	2357.1	4725.2	2.00	4.09	2.04	-2.22
7	3072.8	6764.4	13662	2.02	4.45	2.20	-11.15
8	2337.3	4356.1	8697.2	2.00	3.72	1.86	6.97
9	3041.7	5986.6	11525	1.93	3.79	1.97	5.28
10	1061.7	2183.6	4296.5	1.97	4.05	2.06	-1.17
11	3800.5	7726.7	15182	1.96	3.99	2.03	0.13
12	2386.9	4877.5	9669	1.98	4.05	2.04	-1.27
13	2455.4	5063.5	9986.6	1.97	4.07	2.06	-1.68
14	3972.6	8118.4	15985	1.97	4.02	2.04	-0.60
15	2430.9	4947.9	9756.1	1.97	4.01	2.04	-0.33
16	6155.4	9247.4	16942	1.83	2.75	1.50	31.19

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Cpd.	1/2 L	1 L	2 L	2L/1L	2L/(1/2L)	1L/(1/2L)	% Diff (2L/0.5L) vs. 4
18	4270.4	9233.8	18721	2.03	4.38	2.16	-9.60
19	2494.8	5115.2	10087	1.97	4.04	2.05	-1.08
20	4023.9	8379.4	16672	1.99	4.14	2.08	-3.58
21	1086.8	2295.4	4611.7	2.01	4.24	2.11	-6.08
22	793.33	1670.1	3375.2	2.02	4.25	2.11	-6.36
23	3708.2	7679	15165	1.97	4.09	2.07	-2.24
26	5094	10582	21139	2.00	4.15	2.08	-3.74
27	1265.1	2615.1	5136.9	1.96	4.06	2.07	-1.51
31	4434.9	9176.4	17975	1.96	4.05	2.07	-1.33
36	2320.7	5015.7	9827.3	1.96	4.23	2.16	-5.87
37	441.17	953.09	1894	1.99	4.29	2.16	-7.33
38	1410.7	3015	5895.2	1.96	4.18	2.14	-4.47
39	2338.7	4974.8	9858.8	1.98	4.22	2.13	-5.39
40	2640.9	6269.4	12495	1.99	4.73	2.37	-18.28
41	6796.5	14938	29274	1.96	4.31	2.20	-7.68

There are no values presented in the above table for hydrocarbons and brominated hydrocarbons (compounds numbered 5, 17, 24, 25, 28, 29, 30, 32, 33, 34, and 35) which do not respond to the chlorine detector used to collect this data.

Compendium Method TO-14
Target Compound List (TCL)

1. Dichlorodifluoromethane
2. Methyl Chloride
3. 1,2-dichloro-1,1,2,2-tetrafluoroethane
4. Vinyl Chloride
5. Methyl Bromide
6. Ethyl Chloride
7. Trichlorofluoromethane
8. 1,1-dichloroethene
9. Dichloromethane
10. 3-chloropropene
11. 1,1,2-trichloro-1,2,2-trifluoroethane
12. 1,1-dichloroethane
13. Cis-1,2-dichloroethene
14. Trichloromethane
15. 1,2-dichloroethane
16. 1,1,1-trichloroethane
17. Benzene
18. Carbon Tetrachloride
19. 1,2-dichloropropane
20. Trichloroethene
21. Cis-1,3-dichloropropene
22. Trans-1,3-dichloropropene
23. 1,1,2-trichloroethane
24. Toluene
25. 1,2-dibromoethane
26. Tetrachloroethene
27. Chlorobenzene
28. Ethylbenzene
29. m,p-xylene
30. Styrene
31. 1,1,2,2-tetrachloroethane
32. o-xylene
33. 4-ethyltoluene
34. 1,3,5-trimethylbenzene
35. 1,2,4-trimethylbenzene
36. m-dichlorobenzene
37. Benzyl Chloride
38. p-dichlorobenzene
39. o-dichlorobenzene
40. 1,2,4-trichlorobenzene
41. Hexachlorobutadiene

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APPENDIX C

STANDARD OPERATING PROCEDURES (SOPS)

SOIL GAS SAMPLING

SOP#: 2042
DATE: 06/01/96
REV. #: 0.0

1.0 SCOPE AND APPLICATION

Soil gas monitoring provides a quick means of waste site evaluation. Using this method, underground contamination can be identified, and the source, extent, and movement of the pollutants can be traced.

This standard operating procedure (SOP) outlines the methods used by U.S. EPA/ERT in installing soil gas wells; measuring organic vapor levels in the soil gas using a Photoionization Detector (PID), Flame Ionization Detector (FID) and/or other air monitoring devices; and sampling the soil gas using Tedlar bags, Tenax sorbent tubes, and/or Summa canisters.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

A 3/8" diameter hole is driven into the ground to a depth of four to five feet using a commercially available slam bar. Soil gas can also be sampled at other depths by the use of a longer bar or bar attachments. A 1/4" O.D. stainless steel probe is inserted into the hole. The hole is then sealed around the top of the probe using modeling clay. The gas contained in the interstitial spaces of the soil is sampled by pulling the sample through the probe using an air sampling pump. The sample may be stored in Tedlar bags, drawn through sorbent cartridges, or analyzed directly using a direct reading instrument. The air sampling pump is not used for Summa canister sampling of soil gas. Sampling is achieved by soil gas equilibration with the evacuated Summa canister.

Other field air monitoring devices, such as the combustible gas indicator (MSA CGI/02 Meter, Model 260) and the Organic Vapor Analyzer (Foxboro OVA, Model 128), can also be used dependent on specific site conditions. Measurement of soil temperature using a temperature probe may also be desirable. Bagged samples are usually analyzed in a field laboratory using a portable Photovac GC.

Power driven sampling probes may be utilized when soil conditions make sampling by hand unfeasible (i.e., frozen ground, very dense clays, pavement, etc.). Commercially available soil gas sampling probes (hollow, 1/2 = O.D. steel probes) can be driven to the desired depth using a power hammer (e.g., Bosch Demolition Hammer or Geoprobe™). Samples can be drawn through the probe itself, or through Teflon tubing inserted through the probe and attached to the probe point. Samples are collected and analyzed as described above.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

3.1 Tedlar Bags

Soil gas samples are generally contained in 1.0-L Tedlar bags. Bagged samples are best stored in dark plastic bags placed in coolers to protect the bags from any damage that may occur in the field or in transit. In addition, coolers insure the integrity of the samples by keeping them at a cool temperature and out of direct sunlight. Samples should be analyzed as soon as possible, preferably within 24 - 48 hours.

3.2 Tenax Tubes

Bagged samples can also be drawn onto Tenax or

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other sorbent tubes to undergo lab GC/MS analysis. If Tenax tubes are to be utilized, special care must be taken to avoid contamination. Handling of the tubes should be kept to a minimum and only while wearing nylon or other lint-free gloves. After sampling, each tube should be stored in a clean, sealed culture tube; the ends packed with clean glass wool to protect the sorbent tube from breakage. The culture tubes should be kept cool and wrapped in aluminum foil to prevent any photodegradation of samples (see Section 7.4.).

3.3 Summa Canisters

The Summa canisters used for soil gas sampling have a 6 liter sample capacity and are certified clean by GC/MS analysis before being utilized in the field. After sampling is completed, they are stored and shipped in travel cases.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

4.1 PID Measurements

A number of factors can affect the response of a PID (such as the HNu PI 101). High humidity can cause lamp fogging and decreased sensitivity. This can be significant when soil moisture levels are high, or when a soil gas well is actually in groundwater. High concentrations of methane can cause a downscale deflection of the meter. High and low temperature, electrical fields, FM radio transmission, and naturally occurring compounds, such as terpenes in wooded areas, will also affect instrument response.

Other field screening instruments can be affected by interferences. Consult the manufacturers manuals.

4.2 FID Measurements

A number of factors can affect the response of an FID (such as the OVA model 128). High humidity can cause the FID to flame out or not ignite at all. This can be significant when soil moisture levels are high, or when a soil gas well is actually in groundwater. The FID can only read organic based compounds (they must contain carbon in the molecular structure). The FID also responds poorly to hydrocarbons and halogenated hydrocarbons (such as gasoline, propane fuel). High and low temperature, electrical fields and FM radio transmission will also affect instrument response.

4.3 Factors Affecting Organic Concentrations in Soil Gas

Concentrations in soil gas are affected by dissolution, adsorption, and partitioning. Partitioning refers to the ratio of component found in a saturated vapor above an aqueous solution to the amount in the solution; this can, in theory, be calculated using the Henry's Law constants. Contaminants can also be adsorbed onto inorganic soil components or "dissolved" in organic components. These factors can result in a lowering of the partitioning coefficient.

Soil "tightness" or amount of void space in the soil matrix, will affect the rate of recharging of gas into the soil gas well.

Existence of a high, or perched, water table, or of an impermeable underlying layer (such as a clay lens or layer of buried slag) may interfere with sampling of the soil gas. Knowledge of site geology is useful in such situations, and can prevent inaccurate sampling.

4.4 Soil Probe Clogging

A common problem with this sampling method is soil probe clogging. A clogged probe can be identified by using an in-line vacuum gauge or by listening for the sound of the pump laboring. This problem can usually be eliminated by using a wire cable to clear probe (see Section 7.1.3.).

4.5 Underground Utilities

Prior to selecting sample locations, an underground utility search is recommended. The local utility companies can be contacted and requested to mark the locations of their underground lines. Sampling plans can then be drawn up accordingly. Each sample location should also be screened with a metal detector or magnetometer to verify that no underground pipes or drums exist.

5.0 EQUIPMENT/APPARATUS

5.1 Slam Bar Method

C Slam Bar (1 per sampling team).
C Soil gas probes, stainless steel tubing, 1/4" O.D., 5 ft length.
C Flexible wire or cable used for clearing the

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tubing during insertion into the well.

- C "Quick Connect" fittings to connect sampling probe tubing, monitoring instruments, and Gilian pumps to appropriate fittings on vacuum box.
- C Modeling clay.
- C Vacuum box for drawing a vacuum around Tedlar bag for sample collection (1 per sampling team).
- C Gilian pump Model HFS113A adjusted to approximately 3.0 L/min (1 to 2 per sample team).
- C 1/4" Teflon tubing, 2 ft to 3 ft lengths, for replacement of contaminated sample line.
- C 1/4" Tygon tubing, to connect Teflon tubing to probes and quick connect fittings.
- C Tedlar bags, 1.0 L, at least 1 bag per sample point.
- C Soil Gas Sampling labels, field data sheets, logbook, etc.
- C PID/FID, or other field air monitoring devices, (1 per sampling team).
- C Ice chest, for carrying equipment and for protection of samples (2 per sampling team).
- C Metal detector or magnetometer, for detecting underground utilities/pipes/drums (1 per sampling team).
- C Photovac GC, for field-lab analysis of bagged samples.
- C Summa canisters (plus their shipping cases) for sample, storage and transportation.
- C Large dark plastic garbage bags

5.2 Power Hammer Method

- C Bosch demolition hammer.
- C 1/2" O.D. steel probes, extensions, and points.
- C Dedicated aluminum sampling points.
- C Teflon tubing, 1/4".
- C "Quick Connect" fittings to connect sampling probe tubing, monitoring instruments, and Gilian pumps to appropriate fittings on vacuum box.
- C Modeling clay.
- C Vacuum box for drawing a vacuum around Tedlar bag for sample collection (1 per sampling team).
- C Gilian pump Model HFS113A adjusted to approximately 3.0 L/min (1 to 2 per sample team).
- C 1/4" Teflon tubing, 2 ft to 3 ft lengths, for replacement of contaminated sample line.
- C 1/4" Tygon tubing, to connect Teflon tubing to probes and quick connect fittings.
- C Tedlar bags, 1.0 L, at least 1 bag per sample point.
- C Soil Gas Sampling labels, field data sheets, logbook, etc.
- C HNu Model P1101, or other field air monitoring devices, (1 per sampling team).
- C Ice chest, for carrying equipment and for protection of samples (2 per sampling team).
- C Metal detector or magnetometer, for detecting underground utilities/pipes/drums (1 per sampling team).
- C Photovac GC, for field-lab analysis of bagged samples.
- C Summa canisters (plus their shipping cases) for sample, storage and transportation.
- C Generator w/extension cords.
- C High lift jack assembly for removing probes.

5.3 Geoprobe™ Method

The Geoprobe is a hydraulically-operated sampling device mounted in a customized four-wheel drive vehicle. The sampling device can be deployed from the truck and positioned over a sample location. The base of the sampling device is positioned on the ground. The weight of the vehicle is hydraulically raised on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground. A built-in hammer mechanism allows the probe to be driven past some dense stratigraphic horizons. When the probe reaches the sample depth, up to 50 feet under favorable geologic situations, samples can be collected.

Soil gas can be collected from specific depths in two general ways. One method involves withdrawing a sample directly from the probe rods, after evacuating a sufficient volume of air from the probe rods. The other method involves collecting a sample through tubing attached by an adaptor to the bottom probe rod section. Correctly used, this method provides more reliable results. Manufacturer's instructions and the SOP for the Model 5400 Geoprobe™ Operation should be followed when using this method.

6.0 REAGENTS

- C PID/FID or calibration gases for field air monitoring devices (such as methane and

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isobutylene).

- C Deionized organic-free water, for decontamination.
- C Methanol, HPLC grade, for decontamination.
- C Ultra-zero grade compressed air, for field blanks.
- C Standard gas preparations for Photovac GC calibration and Tedlar bag spikes.
- C Propane Torch (for decontamination of steel probes)

7.0 PROCEDURES

7.1 Soil Gas Well Installation

1. Initially a hole slightly deeper than the desired depth is made. For sampling up to 5 feet, a 5-ft single piston slam bar is used. For deeper depths, a piston slam bar with threaded 4-foot-long extensions can be used. Other techniques can be used, so long as holes are of narrow diameter and no contamination is introduced.

2. After the hole is made, the slam bar is carefully withdrawn to prevent collapse of the walls of the hole. The soil gas probe is then inserted.

3. It is necessary to prevent plugging of the probe, especially for deeper holes. A metal wire or cable, slightly longer than the probe, is placed in the probe prior to inserting into the hole. The probe is inserted to full depth, then pulled up three to six inches, then cleared by moving the cable up and down. The cable is removed before sampling.

4. The top of the sample hole is sealed at the surface against ambient air infiltration by using modeling clay molded around the probe at the surface of the hole.

5. If conditions preclude hand installation of the soil gas wells, the power driven system may be employed. The generator powered demolition hammer is used to drive the probe to the desired depth (up to 12 Ft may be attained with extensions). The probe is pulled up 1-3 inches if the retractable point is used. No clay is needed to seal the hole. After sampling, the probe is retrieved using the high lift jack assembly.

6. If semi-permanent soil gas wells are required, the dedicated aluminum probe points are used. These points are inserted into the bottom of the power driven probe and attached to the Teflon tubing. The probe is inserted as in step 5. When the probe is removed, the point and Teflon tube remain in the hole, which may be sealed by backfilling with clean sand, soil, or bentonite.

7.2 Screening with Field Instruments

1. The well volume must be evacuated prior to sampling. Connect the Gilian pump, adjusted to 3.0 L/min, to the sample probe using a section of Teflon tubing as a connector. The pump is turned on, and a vacuum is pulled through the probe for approximately 15 seconds. Longer time is required for sample wells of greater depths.

2. After evacuation, the monitoring instrument(s) (i.e. HNu or OVA) is connected to the probe using a Teflon connector. When the reading is stable, or peaks, the reading is recorded on soil gas data sheets.

3. Of course, readings may be above or below the range set on the field instruments. The range may be reset, or the response recorded as a greater than or less than figure. Recharge rate of the well with soil gas must be considered when resampling at a different range setting.

7.3 Tedlar Bag Sampling

1. Follow step 7.2.1 to evacuate well volume. If air monitoring instrument screening was performed prior to sample taking, evacuation is not necessary.

2. Use the vacuum box and sampling train (Figure 1) to take the sample. The sampling train is designed to minimize the introduction of contaminants and losses due to adsorption. All wetted parts are either Teflon or stainless steel. The vacuum is drawn indirectly to avoid contamination from sample pumps.

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3. The Tedlar bag is placed inside the vacuum box, and attached to the sampling port. The sample probe is attached to the sampling port via Teflon tubing and a "Quick Connect" fitting.

4. A vacuum is drawn around the outside of the bag, using a Gilian pump connected to the vacuum box evacuation port, via Tygon tubing and a "Quick Connect" fitting. The vacuum causes the bag to inflate, drawing the sample.

5. Break the vacuum by removing the Tygon line from the pump. Remove the bagged sample from the box and close valve. Record data on data sheets or in logbooks. Record the date, time, sample location ID, and the PID/FID instrument reading(s) on sample bag label.

CAUTION: Labels should not be pasted directly onto the bags, nor should bags be labeled directly using a marker or pen. Inks and adhesive may diffuse through the bag material, contaminating the sample. Place labels on the edge of the bags, or tie the labels to the metal eyelets provided on the bags. Markers with inks containing volatile organics (i.e., permanent ink markers) should not be used.

Chain of Custody Sheets must accompany all samples submitted to the field laboratory for analysis.

7.4 Tenax Tube Sampling

Samples collected in Tedlar bags may be adsorbed onto Tenax tubes for further analysis by GC/MS.

7.4.1 Additional Apparatus

A. Syringe with a luer-lock tip capable of drawing a soil gas or air sample from a Tedlar bag onto a Tenax/CMS sorbent tube. The syringe capacity is dependent upon the volume of sample begin drawn onto the sorbent tube.

B. Adapters for fitting the sorbent tube between the Tedlar bag and the sampling syringe. The adapter attaching the Tedlar bag to the sorbent tube consists of a reducing union (1/4" to 1/16" O.D. -- Swagelok cat. # SS-400-6-ILV or equivalent) with a length of 1/4" O.D. Teflon tubing replacing the nut on the 1/6" (Tedlar bag) side. A 1/4" I.D. silicone O-ring replaces the ferrules in the nut on the 1/4" (sorbent tube) side of the union.

The adapter attaching the sampling syringe to the sorbent tube consists of a reducing union (1/4" to 1/16" O.D. -- Swagelok Cat. # SS-400-6-ILV or equivalent) with a 1/4" I.D. silicone O-ring replacing the ferrules in the nut on the 1/4" (sorbent tube) side and the needle of a luer-lock syringe needle inserted into the 1/16" side. (Held in place with a 1/16" ferrule.) The luer-lock end of the needle can be attached to the sampling syringe. It is useful to have a luer-lock on/off valve situated between the syringe and the needle.

C. Two-stage glass sampling cartridge (1/4" O.D. x 1/8" I.D. x 5 1/8") contained in a flame-sealed tube (Manufacturer: Supelco Custom Tenax/Spherocarb Tubes) containing two sorbent sections retained by glass wool:

Front section: 150 mg of Tenax-GC
Back section: 150 mg of CMS (Carbonized Molecular Sieve)

These tubes are prepared and cleaned in accordance with EPA Method EMSL/RTP-SOP-EMD-013 by the vendor. The vendor sends ten tubes per lot made to the REAC GC/MS Laboratory and they are tested for cleanliness, precision, and reproductability.

D. Teflon-capped culture tubes or stainless steel tube containers for sorbent tube storage and shipping. These containers should be conditioned by baking at 120 degrees C for at least two hours. The culture tubes should contain a glass wool plug to prevent sorbent tube breakage during transport. Reconditioning of the containers should occur between uses or after extended periods of disuse (i.e., two weeks or more).

E. Nylon gloves or lint-free cloth. (Hewlett Packard Part # 8650-0030 or equivalent.)

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7.4.2 Sample Collection

Handle sorbent tubes with care, using nylon gloves (or other lint-free material) to avoid contamination.

Immediately before sampling, break one end of the sealed tube and remove the Tenax cartridge.

Connect the valve on the Tedlar bag to the sorbent tube adapter. Connect the sorbent tube to the sorbent tube adapter with the Tenax (white granular) side of the tube facing the Tedlar bag. Connect the sampling syringe assembly to the CMS (black) side of the sorbent tube. Fittings on the adapters should be finer-tight. Open the valve on the Tedlar bag. Open the on/off valve of the sampling syringe. Depending on work plan stipulations, at least 10% of the soil gas samples analyzed by this GC method must be submitted for confirmational GC/MS analysis (according to modified methods TO-1 [Tenax absorbent] and TO-2 [Carbon Molecular Sieve (CMS) absorbent]). Each soil gas sample must be absorbed on replicate Tenax/CMS tubes. The volume absorbed on a Tenax/CMS tube is dependent on the total concentration of the compounds measured by the photovac/GC or other applicable GC:

Total Concentration (ppm)	Sample Volume (mL)
>10	Use Serial Dilution
10	10 - 50
5	20-100
1	100-250

After sampling, remove the tube from the sampling train with gloves or a clean cloth. DO NOT LABEL OR WRITE ON THE TENAX/CMS TUBE.

Place the sorbent tube in a conditioned stainless steel tube holder or culture tube. Culture tube caps should be sealed with Teflon tape.

7.4.3 Sample Labeling

Each sample tube container (not tube) must be labeled with the site name, sample station number, date sampled, and volume sampled.

Chain of custody sheets must accompany all samples to the laboratory.

7.4.4 Quality Assurance (QA)

Before field use, a QA check should be performed on each batch of sorbent tubes by analyzing a tube by thermal desorption/cryogenic trapping GC/MS.

At least one blank sample must be submitted with each set of samples collected at a site. This trip blank must be treated the same as the sample tubes except no sample will be drawn through the tube.

Sample tubes should be stored out of UV light (i.e., sunlight) and kept on ice until analysis. Samples should be taken in duplicate, when possible.

7.5 Summa Canister Sampling

1. Follow step 7.2.1 to evacuate well volume. If PID/FID readings were taken prior to taking a sample, evacuation is not necessary.

2. Attach a certified clean, evacuated 6-liter Summa canister via the 1/4" Teflon tubing.

3. Open valve on Summa canister. The soil gas sample is drawn into the canister by pressure equilibration. The approximate sampling time for a 6 liter canister is 20 minutes.

4. Site name, sample location, number, and date must be recorded on a chain of custody form and on a blank tag attached to the canister.

8.0 CALCULATIONS

8.1 Field Screening Instruments

Instrument readings are usually read directly from the meter. In some cases, the background level at the soil gas station may be subtracted:

Final Reading = Sample Reading - Background

8.2 Photovac GC Analysis

Calculations used to determine concentrations of individual components by Photovac GC analysis are beyond the scope of this SOP and are covered in ERT SOP #2109, *Photovac GC Analysis for Soil Water and Air/Soil Gas.*

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9.0 CALIBRATION

9.1 Field Instruments

It is recommended that the manufacturers' manuals be consulted for correct use and calibration of all instrumentation.

9.2 Gilian Model HFS113A Air Sampling Pumps

Flow should be set at approximately 3.0 L/min; accurate flow adjustment is not necessary. Pumps should be calibrated prior to bringing into the field.

10.0 QUALITY ASSURANCE/ QUALITY CONTROL

10.1 Sample Probe Contamination

Sample probe contamination is checked between each sample by drawing ambient air through the probe via a Gilian pump and checking the response of the FID/PID. If readings are higher than background, replacement or decontamination is necessary.

Sample probes may be decontaminated simply by drawing ambient air through the probe until the HNu reading is at background. More persistent contamination can be washed out using methanol and water, then air drying. For persistent volatile contamination, use of a portable propane torch may be needed. Using a pair of pliers to hold the probe, run the torch up and down the length of the sample probe for approximately 1-2 minutes. Let the probe cool before handling. When using this method, make sure to wear gloves to prevent burns. Having more than one probe per sample team will reduce lag times between sample stations while probes are decontaminated.

10.2 Sample Train Contamination

The Teflon line forming the sample train from the probe to the Tedlar bag should be changed on a daily basis. If visible contamination (soil or water) is drawn into the sampling train, it should be changed immediately. When sampling in highly contaminated areas, the sampling train should be purged with ambient air, via a Gilian pump, for approximately 30 seconds between each sample. After purging, the sampling train can be checked using an FID or PID, or other field monitoring device, to establish the cleanliness of the Teflon line.

10.3 FID/PID Calibration

The FID and PIDs should be calibrated at least once a day using the appropriate calibration gases.

10.4 Field Blanks

Each cooler containing samples should also contain one Tedlar bag of ultra-zero grade air, acting as a field blank. The field blank should accompany the samples in the field (while being collected) and when they are delivered for analysis. A fresh blank must be provided to be placed in the empty cooler pending additional sample collection. One new field blank per cooler of samples is required. A chain of custody sheet must accompany each cooler of samples and should include the blank that is dedicated to that group of samples.

10.5 Trip Standards

Each cooler containing samples should contain a Tedlar bag of standard gas to calibrate the analytical instruments (Photovac GC, etc.). This trip standard will be used to determine any changes in concentrations of the target compounds during the course of the sampling day (e.g., migration through the sample bag, degradation, or adsorption). A fresh trip standard must be provided and placed in each cooler pending additional sample collection. A chain of custody sheet should accompany each cooler of samples and should include the trip standard that is dedicated to that group of samples.

10.6 Tedlar Bag Check

Prior to use, one bag should be removed from each lot (case of 100) of Tedlar bags to be used for sampling and checked for possible contamination as follows: the test bag should be filled with ultra-zero grade air; a sample should be drawn from the bag and analyzed via Photovac GC or whatever method is to be used for sample analysis. This procedure will ensure sample container cleanliness prior to the start of the sampling effort.

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10.7 Summa Canister Check

From each lot of four cleaned Summa canisters, one is to be removed for a GC/MS certification check. If the canister passes certification, then it is re-evacuated and all four canisters from that lot are available for sampling.

If the chosen canister is contaminated, then the entire lot of four Summas must be recleaned, and a single canister is re-analyzed by GC/MS for certification.

10.8 Options

10.8.1 Duplicate Samples

A minimum of 5% of all samples should be collected in duplicate (i.e., if a total of 100 samples are to be collected, five samples should be duplicated.) In choosing which samples to duplicate, the following criteria applies: if, after filling the first Tedlar bag, and, evacuating the well for 15 seconds, the second HN (or other field monitoring device being used) reading matches or is close to (within 50%) the first reading, a duplicate sample may be taken.

10.8.2 Spikes

A Tedlar bag spike and Tenax tube spike may be desirable in situations where high concentrations of contaminants other than the target compounds are found to exist (landfills, etc.). The additional level of QA/QC attained by this practice can be useful in determining the effects of interferences caused by these non-target compounds. Summa canisters containing samples are not spiked.

11.0 DATA VALIDATION

11.1 Blanks (Field and Tedlar Bag Check)

For each target compound, the level of concentration found in the sample must be greater than three times the level (for that compound) found in the field blank which accompanied that sample to be considered valid. The same criteria apply to target compounds detected in the Tedlar bag pre-sampling contamination check.

12.0 HEALTH AND SAFETY CONSIDERATIONS

Due to the remote nature of sampling soil gas, special considerations can be taken with regard to health and safety. Because the sample is being drawn from underground, and no contamination is introduced into the breathing zone, soil gas sampling usually occurs in Level D. Ambient air is constantly monitored using the HNu PI101 to obtain background readings during the sampling procedure. As long as the levels in ambient air do not rise above background, no upgrade of the level of protection is needed.

When conducting soil gas sampling, leather gloves should be worn, and proper slam bar techniques should be implemented (bend knees). Also, an underground utility search should be performed prior to sampling. (See Section 4.5).

13.0 REFERENCES

Gilian Instrument Corp., Instruction Manual for Hi Flow Sampler: HFS113, HFS 113 T, HFS 113U, HFS 113 UT, 1983.

HNu Systems, Inc., Instruction Manual for Model PI 101 Photoionization Analyzer, 1975.

N.J.D.E.P., Field Sampling Procedures Manual, Hazardous Waste Programs, February, 1988.

Roy F. Weston, Inc., Weston Instrumentation Manual, Volume I, 1987.

U.S.E.P.A., Characterization of Hazardous Waste Sites - A Methods Manual: Volume II, Available Sampling Methods, 2nd Edition, EPA-600/4-84-076, December, 1984.

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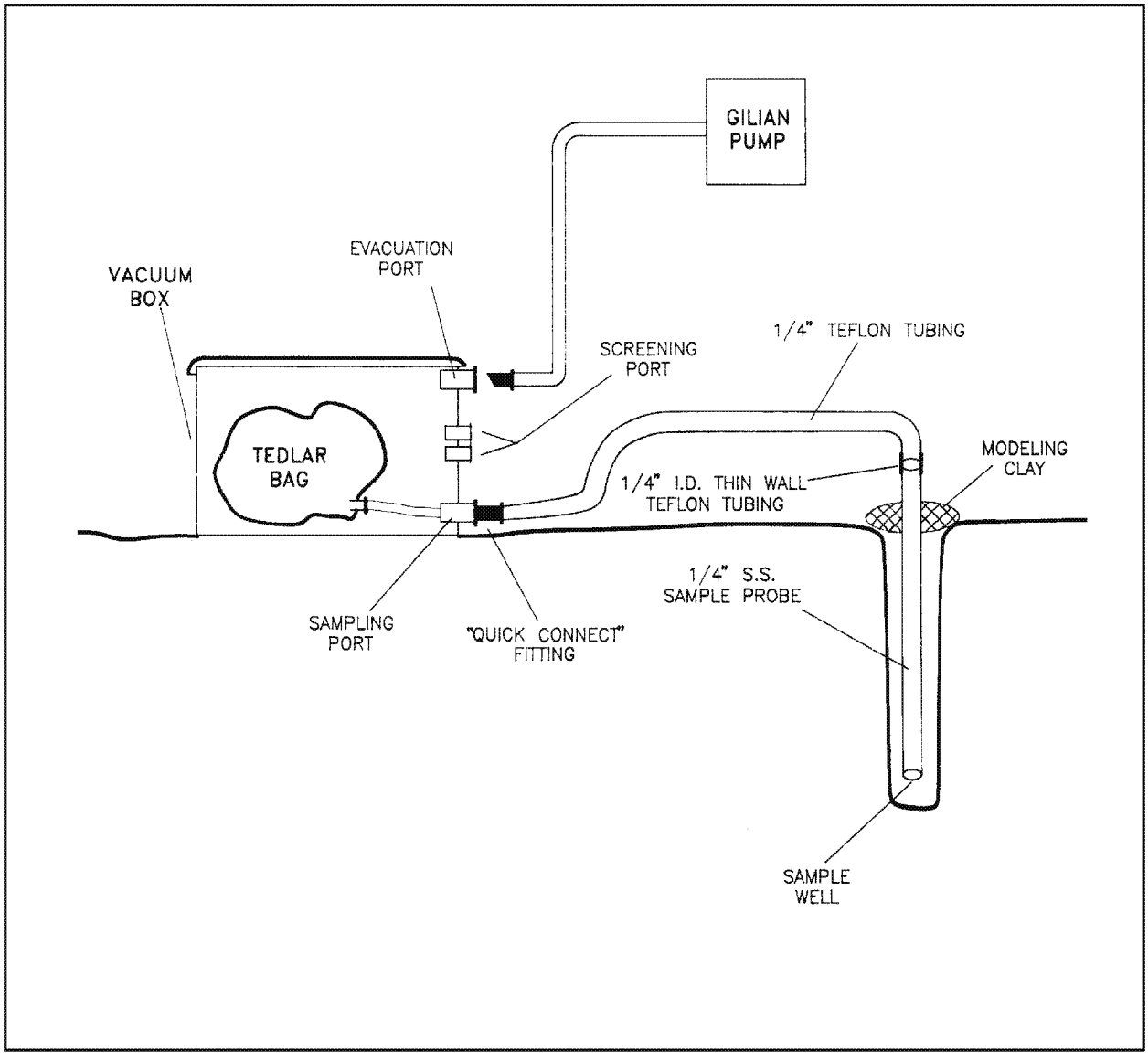
APPENDIX A

Figure

FIGURE 1. Sampling Train Schematic



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APPENDIX B

HNu Field Protocol

Field Procedure

The following sections detail the procedures that are to be followed when using the HNu in the field.

Startup Procedure

a. Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module. Use care in aligning the prongs in the probe cord with the plug in; don't force.

b. Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery are on the scale. If not, recharge the battery. If the red indicator light comes on, the battery needs recharging.

c. Turn the function switch to any range setting. Look into the end of the probe for no more than two to three seconds to see if the lamp is on. If it is on, it will give a purple glow. Do not stare into the probe any longer than three seconds. Long term exposure to UV light can damage eyes. Also, listen for the hum of the fan motor.

d. To ZERO the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.

Operational Check

a. Follow the startup procedure.

b. With the instrument set on the 0-20 range, hold a solvent-based major market near the probe tip. If the meter deflects upscale, the instrument is working.

Field Calibration Procedure

a. Follow the startup procedure and the operational check.

b. Set the function switch to the range setting for the concentration of the calibration gas.

c. Attach a regulator (HNu 101-351) to a disposable cylinder of isobutylene gas (HNu 101-351). Connect the regulator to the probe of the HNu with a piece of clean Tygon tubing. Turn on the value on the regulator.

d. After fifteen seconds, adjust the span dial until the meter reading equals the concentration of the calibration gas used. Be careful to unlock the span dial before adjusting it. If the span has to be set below 3.0, calibration internally or return to equipment maintenance for repair.

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e. Record in the field logbook: the instrument ID no. (EPA decal or serial number if the instrument is a rental); the initial and final span settings; the date and time; concentration and type of calibration has used; and the name of the person who calibrated the instrument.

Operation

a. Follow the startup procedure, operational check, and calibration check.

b. Set the function switch to the appropriate range. If the concentration of gases or vapors is unknown, set the function switch to the 0-20 ppm range. Adjust it if necessary.

c. While taking care not to permit the HNu to be exposed to excessive moisture, dirt, or contamination, monitor the work activity as specified in the Site Health and Safety Plan.

d. When the activity is completed or at the end of the day, carefully clean the outside of the HNu with a damp disposable towel to remove any visible dirt. Return the HNu to a secure area and place on charge.

e. With the exception of the probe's inlet and exhaust, the HNu can be wrapped in clear plastic to prevent it form becoming contaminated and to prevent water from getting inside in the event of precipitation.

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GENERAL AIR SAMPLING GUIDELINES

SOP#: 2008
DATE: 11/16/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) provides guidance in developing and implementing sampling plans to assess the impact of hazardous waste sites on ambient air. It presents the United States Environmental Protection Agency/Environmental Response Team's (U.S. EPA/ERT's) approach to air sampling and monitoring and identifies equipment requirements. It is not within the scope of this SOP to provide a generic air sampling plan. Experience, objectives, site characteristics, and chemical characteristics will dictate sampling strategy. This SOP does not address indoor air sampling.

Two basic approaches can be used to assess ambient air (also referred to as air pathway assessments): modeling and measurements. The modeling approach initially estimates or measures the overall site emission rate(s) and pattern(s). These data are input into an appropriate air dispersion model, which predicts either the maximum or average air concentrations at selected locations or distances during the time period of concern. This overall modeling strategy is presented in the first three volumes of the Air Superfund National Technical Guidance Series on Air Pathway Assessments[1,2,3]. Specific applications of this strategy are presented in several additional Air Superfund Technical Guidance documents[4].

The measurement approach involves actually measuring the air impact at selected locations during specific time periods. These measurements can be used to document actual air impacts during specific time intervals (i.e., during cleanup operations) or to extrapolate the probable "worst case" concentrations at that and similar locations over a longer time period than was sampled.

This SOP addresses issues associated with this second assessment strategy. This SOP also discusses the U.S. EPA/ERT's monitoring instruments, air sampling kits, and approach to air sampling and monitoring at hazardous waste sites.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, depending on site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Air monitoring is defined as the use of direct-reading instruments and other screening or monitoring equipment and techniques that provide instantaneous (real-time) data on the levels of airborne contaminants. The U.S. EPA/ERT maintains numerous monitors for real-time measurements. Examples of air monitoring equipment are hand-held photoionization detectors (PID), flame ionization detectors (FID), oxygen/combustible gas detectors, and remote optical sensors.

Air sampling is defined as those sampling and analytical techniques that require either off- or on-site laboratory analysis and therefore do not provide immediate results. Typically, air sampling occurs after use of real-time air monitoring equipment has narrowed the number of possible contaminants and has provided some qualitative measurement of contaminant concentration. Air sampling techniques are used to more accurately detect, identify and quantify specific chemical compounds relative to the majority of air monitoring technologies.

In the Superfund Removal Program, On-Scene Coordinators (OSCs) may request the U.S. EPA/ERT to conduct air monitoring and sampling during the

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following situations: emergency responses, site assessments, and removal activities. Each of these activities has a related air monitoring/sampling objective that is used to determine the potential hazards to workers and/or the community.

C Emergency Response

Emergency responses are immediate responses to a release or threatened release of hazardous substances presenting an imminent danger to public health, welfare, or the environment (i.e., chemical spills, fires, or chemical process failures resulting in a controlled release of hazardous substances). Generally these situations require rapid on-site investigation and response. A major part of this investigation consists of assessing the air impact of these releases.

C Removal Site Assessment

Removal site assessments (referred to as site assessments) are defined as any of several activities undertaken to determine the extent of contamination at a site and which help to formulate the appropriate response to a release or threatened release of hazardous substances. These activities may include a site inspection, multimedia sampling, and other data collection.

C Removal Actions

Removal actions clean up or remove hazardous substances released into the environment. Removal actions include any activity conducted to abate, prevent, minimize, stabilize, or eliminate a threat to public health or welfare, or to the environment.

Personal risk from airborne contaminants can be determined by comparing the results of on-site monitoring and sampling to health-based action levels such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs). Residential risk can be determined by comparing the results of off-site monitoring or sampling to health-based action levels such as those developed by the Agency for Toxic Substance and Disease Registry (ATSDR).

The extent to which valid inferences can be drawn from air monitoring/sampling depends on the degree to which the monitoring/sampling effort conforms to the objectives of the event. Meeting the project's objectives requires thorough planning of the monitoring/sampling activities, and implementation of the most appropriate monitoring/sampling and analytical procedures. These issues will be discussed in this SOP.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Preservation, containers, handling and storage for air samples are discussed in the specific SOPs for the technique selected. In addition, the analytical method (i.e., U.S. EPA, National Institute for Occupational Safety and Health [NIOSH], and OSHA Methods) may be consulted for storage temperature, holding times and packaging requirements. After sample collection, the sampling media (i.e., cassettes or tubes) are immediately sealed. The samples are then placed into suitable containers (i.e., whirl bags, resealable bagsor culture tubes) which are then placed into a shipping container.

Use bubble wrap or styrofoam peanuts when packing air samples for shipment. DO NOT USE VERMICULITE.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Upwind sources can contribute to sample concentration. Natural sources, such as biological waste, can produce hydrogen sulfide and methane which may contribute to the overall contaminant level. Extraneous anthropogenic contaminants (i.e., burning of fossil fuels; emissions from vehicular traffic, especially diesel; volatile compounds from petrochemical facilities; and effluvium from smoke stacks) may also contribute. Air sampling stations should be strategically placed to identify contributing sources.

Photoreactivity or reaction of the parameters of concern may occur with nonrelated compounds [i.e., nitrogen compounds and polyaromatic hydrocarbons

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(PAHs)]. Some sorbent media/samples should not be exposed to light during or after sampling due to photochemical effects (i.e., PAHs).

Various environmental factors, including humidity, temperature and pressure, also impact the air sampling methodology, collection efficiency and detection limit. Since the determination of air contaminants is specifically dependent on the collection parameters and efficiencies, the collection procedure is an integral part of the analytical method.

Detection limits depend on the contaminants being investigated and the particular site situation. It is important to know why the data are needed and how the data will be used. Care should be taken to ensure the detection limits are adequate for the intended use of the final results.

Some equipment may be sensitive to humidity and temperature extremes.

5.0 EQUIPMENT/APPARATUS

5.1 Direct Reading Instruments (Air Monitoring Instruments)

There are two general types of direct reading instruments: portable screening devices and specialized analytical instruments. Generally all these techniques involve acquiring, for a specific location or area, continuous or sequential direct air concentrations in either a real-time or semi-real-time mode. None of these instruments acquires true time-weighted average concentrations. In addition, these instruments are not capable of acquiring simultaneous concentration readings at multiple locations, although several are able to sequentially analyze samples taken remotely from different locations. The document, "Guide to Portable Instruments for Assessing Airborne Pollutants Arising from Hazardous Waste Sites[5]," provides additional information about air sampling and monitoring. The hazard levels for airborne contaminants vary. See the ACGIH TLVs and the OSHA PELs for safe working levels. Common screening devices and analytical instruments are described in Appendix A.

5.2 Air Sampling Equipment and Media/Devices

The U.S. EPA/ERT uses the following analytical methods for sampling: *NIOSH Manual of Analytical Methods*[6], *American Society for Testing and Materials (ASTM) Methods*[7], *U.S. EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*[8,9], and *OSHA Methods*[10]. Additional air sampling references include *Industrial Hygiene and Toxicology* (3rd Ed.)[11] and *Air Sampling Instruments for Evaluation of Atmospheric Contaminants*[12]. These methods typically specify equipment requirements for sampling. Since air sampling is such a diverse technology, no single method or reference is best for all applications. Common sampling equipment and media/devices are described in Appendix B.

5.3 Tools/Material and Equipment List

In addition to equipment and materials identified in Appendices A and B, the following equipment and materials may be required to conduct air sampling and monitoring at hazardous waste sites:

- C Camera
- C Site logbook
- C Clipboard
- C Chain of custody records
- C Custody seals
- C Air sampling worksheets
- C Sample labels
- C Small screwdriver set
- C Aluminum foil
- C Extension cords
- C Glass cracker
- C Multiple plug outlet
- C Whirl bags or culture tubes
- C Teflon tape
- C Calibration devices
- C Tygon and/or Teflon^{R} tubing
- C Surgical gloves
- C Lint-free gloves
- C Ice
- C Sample container

Use the following additional equipment when decontaminating glassware on site:

- C Protective equipment (i.e., gloves, splash goggles, etc.)
- C Appropriate solvent(s)
- C Spray bottles
- C Liquinox (soap)
- C Paper towels

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C Distilled/deionized water
C Five-gallon buckets
C Scrub brushes and bottle brushes

6.0 REAGENTS

Impinger sampling involves using reagents contained in a glass vial to absorb contaminants of concern (for example, NIOSH Method 3500 for formaldehyde uses 1% sodium bisulfite solution). Impinger solutions vary and are method-dependent.

Reagents such as acetone and hexane are required to decontaminate glassware and some air sampling equipment. Decontamination solutions are specified in the Sampling Equipment Decontamination SOP.

7.0 PROCEDURES

7.1 Air Monitoring Design

7.1.1 Initial Surveys

In general, the initial survey is considered to be a relatively rapid screening process for collecting preliminary data at hazardous waste sites. However, initial surveys may require many hours to complete and may consist of more than one entry.

Some information is generally known about the site; therefore, real-time instrumentation for specific compounds (i.e., detector tubes and electrochemical sensors) can be used to identify hot spots. Sufficient data should be obtained with real-time instruments during the initial entry to screen the site for various contaminants. When warranted, intrinsically safe or explosion-proof instruments should be used. An organic vapor analyzer (OVA) is typically used during this survey. These gross measurements may be used on a preliminary basis to (1) determine levels of personal protection, (2) establish site work zones, and (3) map candidate areas for more thorough qualitative and quantitative studies involving air sampling.

In some situations, the information obtained may be sufficient to preclude additional monitoring. Materials detected during the initial survey may call for a more comprehensive evaluation of hazards and analyses for specific compounds. Since site activities and weather conditions change, a continuous program to monitor the ambient atmosphere must be established.

7.1.2 Off-Site Monitoring

Typically, perimeter monitoring with the same instruments employed for on-site monitoring is utilized to determine site boundaries. Because air is a dynamic matrix, physical boundaries like property lines and fences do not necessarily delineate the site boundary or area influenced by a release. Whenever possible, atmospheric hazards in the areas adjacent to the on-site zone should be monitored with direct-reading instruments. Monitoring at the fenceline or at varying locations off site provides useful information regarding pollutant migration. Three to four locations downwind of the source (i.e., plume) at breathing-zone height, provide a basic fingerprint of the plume. Negative instrument readings off site should not be interpreted as the complete absence of airborne toxic substances; rather, they should be considered another piece of information to assist in the preliminary evaluation. The interpretation of negative readings is instrument-dependent. The lack of instrument readings off site should not be interpreted as the complete absence of all airborne toxic substances; rather, it is possible that the particular compound or class of compounds to which the monitoring instrument responds is not present or that the concentration of the compound(s) is below the instrument's detection limit.

7.2 Air Sampling Design

7.2.1 Sampling Plan Design

The goal of air sampling is to accurately assess the impact of a contaminant source(s) on ambient air quality. This impact is expressed in terms of overall average and/or maximum air concentrations for the time period of concern and may be affected by the transport and release of pollutants from both on- and off-site sources. The location of these sources must be taken into account as they impact the selection of sampling locations. Unlike soil and groundwater concentrations, air concentrations at points of interest can easily vary by orders of magnitude over the period of concern. This variability plays a major role in designing an air sampling plan.

Downwind air concentration is determined by the amount of material being released from the site into the air (the emission rate) and by the degree that the contamination is diluted as it is transported. Local

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meteorology and topography govern downwind dilution. Contaminant emission rates can also be heavily influenced by on-site meteorology and on-site activities. All of these concerns must be incorporated into an air sampling plan.

A sampling strategy can be simple or complex, depending on the sampling program objectives. Programs involving characterization of the pollutant contribution from a single point source tend to be simple, whereas sampling programs investigating fate and transport characteristics of components from diverse sources require a more complex sampling strategy. In addition, resource constraints may affect the complexity of the sampling design.

An optimal sampling strategy accounts for the following site parameters:

- Location of stationary as well as mobile sources
- Analytes of concern
- Analytical detection limit to be achieved
- Rate of release and transport of pollutants from sources
- Availability of space and utilities for operating sampling equipment
- Meteorological monitoring data
- Meteorological conditions in which sampling is to be conducted

The sampling strategy typically requires that the concentration of contaminants at the source or area of concern as well as background contributions be quantified. It is important to establish background levels of contaminants in order to develop a reference point from which to evaluate the source data. Field blanks and lot blanks, as well as various other types of QA/QC samples, can be utilized to determine other sources. The impact of extraneous sources on sampling results can frequently be accounted for by placing samplers upwind, downwind and crosswind from the subject source. The analytical data from these different sampling locations may be compared to determine statistical differences.

7.2.2 Sampling Objectives

The objectives of the sampling must be determined prior to developing the sampling plan. Does the sampling plan verify adequate levels of protection for on-site personnel, or address potential off-site impacts associated with the site or with site activities? In addition, the assumptions associated with the sampling program must be defined. These assumptions include whether the sampling is to take place under "typical," "worst case," or "one-time" conditions. If the conditions present at the time of sampling are different from those assumed during the development of the sampling plan, then quality of the data collected may be affected. The following definitions have been established:

- Typical: routine daily sampling or routine scheduled sampling at pre-established locations.

- Worst case: sampling conducted under the worst meteorological and/or site conditions which would result in elevated ambient concentrations.

- One-time: only one chance is given to collect a sample without regard to time or conditions.

Qualitative data acquired under these conditions are usually applicable only to the time period during which the data were collected and may not provide accurate information to be used in estimating the magnitude of an air impact during other periods or over a long time interval.

The sampling objectives also dictate the detection limits. Sampling methods for airborne contaminants will depend upon the nature and state (solid, liquid or gas) of the contaminant. Gases and vapors may be collected in aqueous media or adsorbents, in molecular sieves, or in suitable containers. Particulates are collected by filters or impactors. The volume of sample to be collected is dependent upon an estimate of the contaminant concentration in the air, the sensitivity of the analytical method, and the standard or desired detection limit. A sufficient amount of sample must be collected to achieve the desired detection limit without interference from other contaminants. In addition, the selected method must be able to detect the target compound(s).

7.2.3 Location and Number of Individual Sampling Points

Choose the number and location of sampling points according to the variability, or sensitivity, of the

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sampling and analytical methods being utilized, the variability of contaminant concentration over time at the site, the level of precision required and costlimitations. In addition, determine the number of locations and placement of samplers by considering the nature of the response, local terrain, meteorological conditions, location of the site (with respect to other conflicting background sources), size of the site, and the number, size, and relative proximity of separate on-site emission sources and upwind sources. The following are several considerations for sampler placement:

C Location of potential on-site emission sources, as identified from the review of site background information or from preliminary on-site inspections.

C Location of potential off-site emission sources upwind of the sampling location(s). Review local wind patterns to determine the location of off-site sources relative to wind direction.

C Topographic features that affect the dispersion and transport of airborne toxic constituents.

Avoid natural obstructions when choosing air sampling station locations, and account for channelization around those obstructions.

C Large water bodies, which affect atmospheric stability and the dispersion of air contaminants.

C Roadways (dirt or paved), which may generate dust that could mask site contaminants.

C Vegetation, such as trees and shrubs, which stabilizes soil and retards subsurface contaminants from becoming airborne. It also affects air flow and scrubs some contaminants from the air. Sometimes thick vegetation can make an otherwise ideal air monitoring location inaccessible.

Consider the duration of sampling activities when choosing the location and number of samples to be collected. For example, if the sampling period is limited to a few hours, one or two upwind and several downwind samples would typically be adequate, especially around major emission sources.

A short-term monitoring program ranges from several days to a few weeks and generally includes gathering data for site assessments, removal actions, and source determination data (for further modeling). Activities involved in a short-term sampling strategy must make the most of the limited possibilities for data collection. Consider moving upwind/downwind locations daily based on National Oceanic and Atmospheric Administration (NOAA) weather forecasts. Weather monitoring becomes critical where complex terrain and local meteorological effects frequently change wind direction. Often, a number of alternatives can fulfill the same objective.

Prevailing winds running the length of a valley usually require a minimum number of sampler locations; however, a complex valley may require more sampler locations to account for the wide variety of winds. Ocean/lake effects may require a radical plan to collect enough samples to reach a low detection limit. Two sets of samplers may be placed next to each other: one set would be activated during the sea breeze while the other set is turned off, and vice versa when there is no sea breeze. After the sampling event, the respective upwind and downwind samples would be combined. Another alternative for sampling near a large body of water may be to use automatic, wind-vector-operated samplers, which turn the sampler on only when the wind comes from a specified vector. At sites located on hillsides, wind will move down a valley and produce an upward fetch at the same time. Sampling locations may have to ring the site to measure the wind's impact.

Off-site sources may affect on-site monitoring. In this case, on-site meteorological data, concurrent with sampling data, is essential to interpreting the acquired data. Also, additional upwind sampling sites may be needed to fully characterize ambient background contaminant levels. Multiple off-site sources may require several monitoring locations, but if the sources are at a sufficient distance, only one monitoring location is needed.

Topography and weather are not the only factors in sampler location; the sampling sites must be secure from vandals and mishap. Secure all sampling locations to maintain chain of custody, and to prevent tampering with samples or loss of sampling units. High-volume sampling methods often require the use of 110 VAC electric power. When portable

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generators are used, the power quality may affect sampler operation. Also, be aware that the generators themselves could be a potential pollution source if their placement is not carefully considered.

Air quality dispersion models can be used to place samplers. The models incorporate source information, surrounding topography, and meteorological data to predict the general distance and directions of maximum ambient concentrations. Modeling results should be used to select sampling locations in areas of maximum pollutant concentrations.

7.2.4 Time, Duration and Frequency of Sampling Events

After choosing appropriate sampling or monitoring locations, determine the sampling frequency and the number of samples to be collected. The time of day, duration and frequency of sampling events is governed by:

- The effects of site activities and meteorology on emission rates
- The diurnal effect of the meteorology on downwind dispersion
- The time period(s) of concern as defined by the objective
- The variability in the impact from other non-site-related sources
- If defined, the degree of confidence needed for either the mean or maximum downwind concentrations observed
- The precision requirements for single measurements
- Cost and other logistical considerations

The duration of the removal action and the number of hours per day that site work is conducted determine the time, duration, and frequency of samples. Short-term sampling programs may require daily sampling, while long-term programs may require 24-hour sampling every sixth or twelfth day. If the site will be undergoing removal activities 24 hours a day, continuous air sampling may be warranted. However, if the site activities will be conducted for only eight hours a day, and there are no emissions likely to occur during the remaining 16 hours, then sampling would be appropriate prior to the start of daily activities, would continue during operations, and end at the conclusion of the daily activities. An off-peak sample collection can ensure that emissions are not persisting after the conclusion of daily cleanup activities. For some sites, emissions are still a factor several hours after daily site activities have been completed. Because of the typically decreased downwind dispersion in the evening, higher downwind concentrations than were present during daytime site activities may be detected. For sites where this is possible, the sampling duration needs to be lengthened accordingly.

Sampling duration and flow rate dictate the volume of air collected, and to a major degree, the detection limit. The analytical method selected will provide a reference to flow rate and volume. Flow rates are limited to the capacity of the pumps being employed and the contact time required by the collection media.

The duration or period of air sampling is commonly divided into two categories (1) samples collected over a brief time period are referred to as "instantaneous" or "grab" samples and are usually collected in less than five minutes and (2) average or integrated samples are collected over a significantly longer period of time. Integrated samples provide an average concentration over the entire sampling period. Integrated samples are not suited to determining cyclical releases of contaminants because periodic or cyclical events are averaged out by the proportionally long sampling duration.

Air quality dispersion models can predict the maximum air contaminant concentration expected from a source. The meteorological and site conditions expected to cause the highest concentration are known as worst-case conditions and can be identified by analyzing the modeling results. Depending upon the objective, one may sample when the model predicts worst-case conditions will exist.

7.2.5 Meteorological and Physical/Chemical Considerations

A meteorological monitoring program is an integral part of site monitoring activities. Meteorological data, which define local terrain impacts on air flow paths, are needed to interpret air concentration data. Meteorological data may be available from an existing station located near the site (i.e., at a local airport), otherwise a station should be set up at the site. This data will document the degree that samples actually were downwind and verify whether other worst-case assumptions were met. Meteorological parameters to

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be monitored are, at a minimum, wind speed, wind direction, and sigma theta (which is the horizontal wind direction standard deviation and an indicator of atmospheric stability). The remaining parameters primarily affect the amount of a contaminant available in the air.

C Wind Speed

When the contaminant of concern is a particulate, wind speed is critical in determining whether the particulate will become airborne, the quantity of the particulate that becomes airborne, and the distance the particulate will travel from the source. Wind speed also contributes to the volatilization of contaminants from liquid sources.

C Wind Direction

Wind direction highly influences the path of airborne contaminants. In addition, variations in wind direction increase the dispersion of pollutants from a given source.

C Atmospheric Stability

Atmospheric stability refers to the degree to which the atmosphere tends to dampen vertical and horizontal motion. Stable atmospheric conditions (i.e., evenings) result in low dispersion, and unstable atmospheric conditions (i.e., hot sunny days) result in higher dispersion.

C Temperature

Higher temperatures increase the rate of volatilization of organic and some inorganic compounds and affect the initial rise of gaseous or vapor contaminants. Therefore, worst-case emission of volatiles and semivolatiles occurs at the hottest time of day, or on the hottest day.

C Humidity

High humidity affects water-soluble chemicals and particulates. Humid conditions may dictate the sampling media used to collect the air sample, or limit the volume of air sampled and thereby increase the detection limit.

C Atmospheric Pressure

Migration of landfill gases through the landfill surface and through surrounding soils are governed by changes in atmospheric pressure. Atmospheric pressure will influence upward migration of gaseous contaminants from shallow aquifers into the basements of overlying structures.

In many cases, the transport and dispersion of air pollutants is complicated by local meteorology. Normal diurnal variations (i.e., temperature inversions) affect dispersion of airborne contaminants. Terrain features can enhance or create air inversions and can also influence the path and speed of air flow, complicating transport and dispersion patterns.

The chemical characteristics of a contaminant (i.e., molecular weight, physical state, vapor pressure, aerodynamic size, temperature, reactive compounds, and photodegradation) affects its behavior and can influence the method used to sample and analyze it.

8.0 CALCULATIONS

Volume is obtained by multiplying the sample time in minutes by the flow rate. Sample volume should be indicated on the chain of custody record. Adjustments for temperature and pressure differences may be required.

Results are usually provided in parts per million (ppm), parts per billion (ppb), milligrams per cubic meter (mg/m^3) or micrograms per cubic meter ($\mu g/m^3$).

Refer to the analytical method or regulatory guidelines for other applicable calculations.

9.0 QUALITYASSURANCE/ QUALITY CONTROL

The manufacturer's instructions should be reviewed prior to instrument use. Instruments must be utilized in accordance with manufacturer's instructions. Equipment checkout and calibration activities must

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occur prior to and after monitoring and sampling and must be documented.

9.1 QA/QC Samples

QA/QC samples provide information on the variability and usability of environmental sample results. Various QA/QC samples may be collected to detect error. QA/QC samples are submitted with the field samples for analysis to aid in identifying the origin of analytical discrepancies; then a determination can be made as to how the analytical results should be used. Collocated samples, background samples, field blanks, and lot blanks are the most commonly collected QA/QC field samples. Performance evaluation (PE) samples and matrix spikes provide additional measures of data QA/QC control. QA/QC results may suggest the need for modifying sample collection, preparation, handling, or analytical procedures if the resultant data do not meet site-specific QA or data quality objectives.

9.2 Sample Documentation

All sample and monitoring activities should be documented legibly, in ink. Any corrections or revisions should be made by lining through the incorrect entry and by initialing the error. All samples must be recorded on an Air Sampling Worksheet. A chain of custody record must be maintained from the time a sample is taken to the final deposition of the sample. Custody seals demonstrate that a sample container has not been opened or tampered with during transport or storage of samples.

10.0 DATA VALIDATION

Results for QA/QC samples should be evaluated for contamination. This information should be utilized to qualify the environmental sample results accordingly with data quality objectives.

11.0 HEALTH AND SAFETY

Personal protection equipment (PPE) requirements identified in federal and/or state regulations and 29 Code of Federal Regulations (CFR) 1910.120 for hazardous waste site work must be followed.

The majority of physical precautions involved in air sampling are related to the contaminant sampled. Attention should be given when sampling in potentially explosive, flammable or acidic atmospheres. On rare occasions, the collection media may be hazardous; for example, in the instance where an acidic or basic solution is utilized in an impinger.

When working with potentially hazardous materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

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APPENDIX A

Portable Screening Devices and Specialized Analytical Instruments

PORTABLE SCREENING DEVICES

Where possible, a datalogger should be used to minimize the length of time required for site personnel to be in a potentially contaminated area. Datalogger cable is available from manufacturers for linear output instruments and some nonlinear output instruments. U.S. EPA ERT/REAC has output cables for organic vapor analyzers (i.e., HNU and OVA), toxic gas analyzers (i.e., monitox) and real-time aerosol monitors (i.e., RAM and miniram).

C Total Hydrocarbon Analyzers

Total hydrocarbon analyzers used to detect a variety of volatile organic compounds (VOCs) at hazardous waste sites principally employ either a photoionization detector (PID) or a flame ionization detector (FID). Compounds are ionized by a flame or an ultraviolet lamp. PIDs depend on the ionization potential of the compounds. PIDs are sensitive to aromatic and olefinic (unsaturated) compounds such as benzene, toluene, styrene, xylenes, and acetylene. Greater selectivity is possible by using low-voltage lamps. The ionization potential of individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. These instruments are not compound-specific and are typically used as screening instruments. FIDs are sensitive to volatile organic vapor compounds such as methane, propanol, benzene and toluene. They respond poorly to organic compounds lacking hydrocarbon characteristics.

C Oxygen and Combustible Gas Indicators

Combustible Gas Indicators (CGIs) provide efficient and reliable methods to test for potentially explosive atmospheres. CGI meters measure the concentration of a flammable vapor or gas in air and present these measurements as a percentage of the lower explosive limit (LEL).

The measurements are temperature-dependent. The property of the calibration gas determines sensitivity. LELs for individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. If readings approach or exceed 10% of the LEL, extreme caution should be exercised in continuing the investigation. If readings approach or exceed 25% LEL, personnel should be withdrawn immediately.

CGIs typically house an electrochemical sensor to determine the oxygen concentration in ambient air. Normally, air contains approximately 20.9% oxygen by volume. Oxygen measurements are of particular importance for work in enclosed spaces, low-lying areas, or in the vicinity of accidents that have produced heavier-than-air vapors which could displace ambient air. The meters are calibrated for sea level and may indicate a false negative (i.e, O_2 content) at higher altitudes. Since the air has been displaced by other substances, these oxygen-deficient areas are also prime locations for taking additional organic vapor and combustible gas measurements. Oxygen-enriched atmospheres increase the potential for fires by their ability to contribute to combustion or to chemically react with flammable compounds and promote auto-ignition.

C Toxic Atmosphere Analyzers

The toxic atmosphere analyzer is a compound-specific instrument, designed and calibrated to identify and quantify a specific compound or class of compounds in either gaseous or vapor form. Cross-sensitivity to air pollutants not of interest may be lead to erroneous results.

U.S. EPA/ERT has the following toxic atmosphere analyzers: carbon monoxide, phosgene, nitrous oxide, hydrogen cyanide, sulfur dioxide, hydrogen sulfide, and chlorine gas.

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C Aerosol/Particulate Monitors

A Real-Time Aerosol/Particulate Monitor (RAM) displays readings for total particulates. The instrument employs a pulse light emitting diode which generates a narrow band emission in conjunction with a photovoltaic cell to detect light scattered from particulates.

The U.S. EPA/ERT uses the RAM when the contaminant of concern is associated with particulates, and when responding to fires involving hazardous materials, to identify plume levels. The instrument is very useful in determining the presence of a plume when it is not visible. The U.S. EPA/ERT typically uses RAMs on tripods to obtain particulate concentrations at the breathing zone level. Personal dataloggers are used with the RAMs to document minimum, average and maximum concentrations. This provides real-time data without requiring those in personal protective equipment to be constantly present in the plume.

C Chemical Detector Tubes (Colorimetric Tubes)

A chemical detector tube is a hollow, tube-shaped, glass body containing one or more layers of chemically impregnated inert material. To use, the fused ends are broken off and a manufacturer-specified volume of air is drawn through the tube with a pump to achieve a given detection limit. The chemicals contained within the packing material undergo a chemical reaction with the airborne pollutant present, producing a color change during the intake of each pump stroke. The concentration of a pollutant is indicated by the length of discoloration on a calibrated scale printed on the detector tube.

C Radiation Meters

Radiation meters determine the presence and level of radiation. The meters use a gas or solid ion detection media which becomes ionized when radiation is present. The meters are normally calibrated to one probe. Meters that detect alpha, beta, and gamma radiation are available.

C Gold Film (Hydrogen Sulfide and Mercury Vapor) Monitors

Hydrogen sulfide (H_2S) and Mercury (Hg) monitors operate on the principle that electric resistivity increases across a gold film as a function of H_2S and Hg concentration. The monitors provide rapid and relatively low detection limits for H_2S and Hg in air. After extensive sampling periods or high concentrations of H_2S and Hg, the gold film must be heated to remove contamination and return the monitor to its original sensitivity.

C Infrared Detectors

Infrared detectors such as the Miniature Infrared Analyzer (MIRAN) use infrared (IR) absorption as a function of specific compounds. MIRAN instruments apply to situations where the contaminants are identified but concentrations are not. MIRAN instruments generally require AC power.

SPECIALIZED ANALYTICAL INSTRUMENTS

The continuous monitors described above provide qualitative measurement of air contaminants. Quantitative measurements in the field can be obtained using more sophisticated instruments, such as portable Gas Chromatographs, to analyze grab samples.

C Direct Air Sampling Portable Gas Chromatographs (GCs)

Portable GCs use gas chromatography to identify and quantify compounds. The time it takes for a compound to move through a chromatographic column is a function of that specific compound or group of compounds. A trained technician with knowledge of the range of expected concentrations of compounds can utilize a portable GC in the field to analyze grab samples. GCs generally require AC power and shelter to operate. This method is limited by its reliance on a short-term grab sample to be representative of the air quality at a site.

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C Remote Optical Sensing

This technique, also referred to as long-path or open-path monitoring, involves transmitting either an infrared or ultraviolet light beam across a long open path and measuring the absorbance at specific wavelengths. The technique is capable of analyzing any preselected organic or inorganic volatile compound that can be resolved from compounds naturally occurring in ambient air. Current projected removal applications include perimeter monitoring during site cleanups and measurement of emission source strengths during site assessments.

C TAGA Direct Air Sampling Mass Spectrometer/Mass Spectrometer

The Trace Atmospheric Gas Analyzer (TAGA), which is operated by the U.S. EPA/ERT, is capable of real-time detection of preselected organic compounds at low parts-per-billion concentrations. The instrument has been successfully used by the U.S. EPA/ERT for isolating individual emission plumes and tracking those plumes back to their sources.

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APPENDIX B

Air Sampling Equipment and Media/Devices

AIR SAMPLING EQUIPMENT

C High-Volume, Total Suspended Particulate (TSP) Samplers

High-volume TSP samplers collect all suspended particles by drawing air across an 8- by 10-inch glass-quartz filter. The sample rate is adjusted to 40 cubic feet per minute (CFM), or 1134 liters per minute (L/min), and it is held constant by a flow controller over the sample period. The mass of TSPs can be determined by weighing the filter before and after sampling. The composition of the filter varies according to the analytical method and the detection limit required.

C PM-10 Samplers

PM-10 samplers collect particulates with a diameter of 10 microns or less from ambient air. Particulates of this size represent the respirable fraction, and thus are of special significance. PM-10 samplers can be high-volume or low-volume. The high-volume sampler operates in the same manner as the TSP sampler at a constant flow rate of 40 CFM; it draws the sample through a special impactor head which collects particulates of 10 microns or less. The particulate is collected on an 8- by 10-inch filter. The low-volume sampler operates at a rate of approximately 17 L/min. The flow must remain constant through the impactor head to maintain the 10-micron cut-off point. The low-volume PM-10 collects the sample on 37-mm Teflon filters.

C High-Volume PS-1 Samplers

High-volume PS-1 samplers draw a sample through polyurethane foam (PUF) or a combination foam and XAD-2 resin plug, and a glass quartz filter at a rate of 5-10 CFM (144 to 282 L/min). This system is excellent for measuring low concentrations of semivolatiles, PCBs, pesticides, or chlorinated dioxins in ambient air.

C Area Sampling Pumps

These pumps provide flow-rate ranges of 2-20 L/min and have a telescopic sampling mast with the sampling train. Because of the higher volume, this pump is suitable for sampling low concentrations of airborne contaminants (i.e., asbestos sampling). These pumps are also used for metals, pesticides and PAH sampling which require large sample volumes.

C Personal Sampling Pumps

Personal sampling pumps are reliable portable sampling devices that draw air samples through a number of sampling media including resin tubes, impingers, and filters. Flow rates are usually adjustable from 0.1 to 4 L/min (or 0.01 to .75 L/min with a restrictive orifice) and can remain constant for up to 8 hours on one battery charge or continuously with an AC charger/converter.

C Canister Samplers

Evacuated canister sampling systems use the pressure differential between the evacuated canister and ambient pressure to bleed air into the canister. The sample is bled into the canister at a constant rate over the sampling period using a critical orifice, a mechanically compensated regulator, or a mass flow control
device until the canister is near atmospheric pressure.

Pressure canister sampling systems use a pump to push air into the canister. To maintain a higher, more controlled flow, the pump typically controls the pressure differential across a critical orifice at the

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inlet of the canister, resulting in a pressurized canister at the completion of sampling.

AIR SAMPLING MEDIA/DEVICES

If possible, before employing a specific sampling method, consult the laboratory that will conduct the analyses. Many of the methods can be modified to provide better results or a wider range of results.

C Summa[R] Canisters

Summa canisters are highly polished passivated stainless steel cylinders. The Summa polishing process brings chrome and nickel to the surface of the canisters, which results in an inert surface. This surface restricts adsorption or reactions that occur on the canister's inner surface after collection. At the site, the canister is either placed in a sampler to control sample collection rate, or opened to collect a grab sample. Samples can be collected by allowing air to bleed into or be pumped into the canister. U.S. EPA/ERT uses 6-liter Summa canisters for VOC and permanent gas analysis.

C Passive Dosimeters

Passive dosimeters are clip-on vapor monitors (samplers) in which the diffused contaminants are absorbed on specially prepared active surfaces. Industrial hygienists commonly use dosimeters to obtain time-weighted averages or concentrations of chemical vapors, as they can trap over 130 organic compounds. Selective dosimeters have also been developed for a number of chemicals including formaldehyde, ethylene oxide, hydrogen sulfide, mercury vapor, nitrogen dioxide, sulfur dioxide, and ozone. Dosimeters must be sent to a laboratory for analysis.

C Polyurethane Foam (PUF)

PUF is a sorbent used with a glass filter for the collection of semivolatile organic compounds such as pesticides, PCBs, chlorinated dioxins and furans, and PAHs. Fewer artifacts (chemical changes that occur to collected compounds) are produced than with some other solid sorbents. PUF is used with the PS-1 sampler and U.S. EPA Method TO13. PUF can also be used with personal sampling pumps when sampling for PAHs using the Lewis/McCloud method. Breakthrough of the more volatile PCBs and PAHs may occur when using PUF.

C Sampling Bags (Tedlar[R])

Sampling bags, like canisters, transport air samples to the laboratory for analysis. Samples are generally pumped into the bags, but sometimes a lung system is used, in which a pump creates a vacuum around the bag in a vacuum box. Then the sample flows from a source into the bag. This method is used for VOCs, fixed gases (CO_2, O_2, and N_2) and methane.

C Impingers

An impinger allows an air sample to be bubbled through a solution, which collects a specific contaminant by either chemical reaction or absorption. For long sampling periods, the impinger may need to be kept in an ice bath to prevent the solution from evaporating during sampling. The sample is drawn through the impinger by using a sampling pump or more elaborate sampling trains with multiple impingers.

C Sorbent Tubes/Cartridges

A variety of sampling media are available in sorbent tubes, which are used primarily for industrial hygiene. A few examples are carbon cartridges, carbon molecular sieves, Tenax tubes and tube containing the XAD-2 polymer. Depending upon the sorbent material, tubes can be analyzed using either a solvent extraction or thermal desorption. The former technique uses standard laboratory equipment and allows for multiple analyses of the same sample. The latter technique requires special, but readily available, laboratory equipment and allows only one analysis per sample. In addition, thermal desorption typically allows for lower detection limits by two or more orders of magnitude. Whenever sorbent tubes are

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being used for thermal desorption, they should be certified as "clean" by the laboratory doing the analysis.

Thermally Desorbed Media

During thermal desorption, high-temperature gas streams are used to remove the compounds collected on a sorbent medium. The gas stream is injected and often cryofocused into an analytical instrument, such as a GC, for compound analysis:

C Tenax Tubes

Tenax tubes are made from commercially available polymer (p-phenylene oxide) packed in glass or stainless steel tubes through which air samples are drawn or sometimes pumped. These tubes are used in U.S. EPA Method TO1 and VOST for volatile nonpolar organic, some polar organic, and some of the more volatile semivolatile organics. Tenax is not appropriate for many of the highly volatile organics (with vapor pressure greater than approximately 200 mm Hg).

C Carbonized Polymers

The carbonized molecular sieve (CMS), a carbonized polymer, is a commercially available, carbon sorbent packed in stainless-steel sampling tubes through which air samples are drawn or sometimes pumped. These are used in U.S. EPA Method TO2 for highly volatile nonpolar compounds which have low-breakthrough volumes on other sorbents. When high-thermal desorption temperatures are used with CMS, more variability in analysis may occur than with other sorbents.

C Mixed Sorbent Tubes

Sorbent tubes can contain two type of sorbents. Combining the advantages of each sorbent into one tube increases the possible types of compounds to be sampled. The combination of two sorbents can also reduce the chance that highly volatile compounds will break through the sorbent media. An example of a mixed sorbent tube is the combination of Tenax and charcoal with a carbonized molecular sieve. A potential problem with mixed sorbent tubes is the breakthrough of a compound from an earlier sorbent to a later sorbent from which it cannot be desorbed.

Solvent-Extracted Media

Solvent-extracted media use the principle of chemical extraction to remove compounds collected on a sorbent media. The chemical solvent is injected into an instrument, such as a GC, for analysis of compounds. Examples of solvent-extracted media follow:

C Chemically Treated Silica Gel

Silica gel is a sorbent which can be treated with various chemicals. The chemically treated silica gel can then be used to sample for specific compounds in air. Examples include the DNPH-coated silica gel cartridge used with U.S. EPA Method TO11.

C XAD-2 Polymers

XAD-2 polymers usually are placed in tubes, custom-packed sandwich-style with polyurethane foam, and prepared for use with U.S. EPA Method TO13 or the semi-VOST method. The polymers are used for the collection of semivolatile polar and nonpolar organic compounds. The compounds collected on the XAD-2 polymer are chemically extracted for analysis.

C Charcoal Cartridges

Charcoal cartridges, consisting of primary and backup sections, trap compounds by adsorption. Ambient air is drawn through them so that the backup section verifies that breakthrough of the analytes on the first section did not occur, and the sample collection was therefore quantitative. Quantitative sample collection is evident by the presence of target chemicals on the first charcoal section and the absence on the second section. Next, the adsorbed compounds must be eluted, usually with a solvent extraction, and analyzed by GC with a detector, such as a Mass Spectrometer (MS).

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C Tenax Tubes

Cartridges are used in OSHA and NIOSH methods in a manner similar to charcoal cartridges but typically for less volatile compounds.

Particulate Filters

Particulate filters are used by having a sampling pump pass air through them. The filter collects the particulates present in the air and is then analyzed for particulate mass or chemical or radiological composition. Particulate filters are made from different materials which are described below.

C Mixed Cellulose Ester (MCE)

MCE is manufactured from mixed esters of cellulose which are a blend of nitro-cellulose and cellulose acetate. MCE filters are used often for particulate sampling.

C Glass Fiber

Glass fiber is manufactured from glass fibers without a binder. Particulate filters with glass fiber provide high flow rates, wet strength, and high, solid holding capacity. Generally, the filters are used for gravimetric analysis of particulates.

C Polyvinyl Chloride

Particulate filters with polyvinyl chloride are resistant to concentrated acids and alkalis. Their low moisture pickup and light tare weight make them ideal for gravimetric analysis.

C Teflon

Teflon is manufactured from polytetrafluorethylene (PTFE). Particulate filters with Teflon are easy to handle and exceptionally durable. Teflon filters are used for metal collection.

C Silver

Particulate filters manufactured from pure silver have high collection efficiency and uniform pore size. These filters are used for mercury collection and analysis.

C Cellulose

Particulate filters with cellulose contain less than 0.01% ash. These filters are used to collect particulates.

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SOP	**1101.01**				
GROUP	Sampling Handling				
SUB-GROUP	Sample Custody				
TITLE	Sample Custody in the Field				
DATE	**11/19/2001**	**FILE**	1101-01.DOC	**PAGE**	1 of 4

INTRODUCTION

The following Standard Operating Procedure (SOP) presents procedures for maintaining sample chain of custody (COC) during activities where samples are collected.

PROCEDURE

Sample custody is defined as being under a person's custody if any of the following conditions exist:

- it is in their possession,
- it is in their view, after being in their possession,
- it was in their possession and they locked it up, or
- it is in a designated secure area.

A designated field sampler will be personally responsible for the care and custody of collected samples until they are transferred to another person or properly dispatched to the laboratory. To the extent practicable, as few people as possible will handle the samples.

Sample tags or labels will be completed and applied to the container of each sample. When the tags or labels are being completed, waterproof ink will be used. If waterproof ink is not used, the tags or labels will be covered by transparent waterproof tape. Sample containers may also be placed in Ziploc-type storage bags to help keep them clean in the cooler. Information typically included on the sample tags or labels will include the following:

- Project Code
- Station Number and Location
- Sample Identification Number
- Date and Time of Sample Collection
- Type of Laboratory Analysis Required
- Preservation Required, if applicable
- Collector's Signature
- Priority (optional)
- Other Remarks

Additonal information may include:

- Anticipated Range of Results (Low, Medium, or High)
- Sample Analysis Priority

A COC form will be completed each time a sample or group of samples is prepared for transfer to the laboratory. The form will repeat the information on each of the sample labels and will serve as documentation of handling during shipment. The minimum information requirements of the COC form are listed in Table 1101.01-A. An example COC form is shown in Figure 1101.01-A. The completed COC must be reviewed by the Field Team Leader or Site Manager prior to sample shipment. The COC form will remain each sample shipping container at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples or in a project file.

TABLE 1101.01-A CHAIN OF CUSTODY FORM

INFORMATION	COMPLETED BY	DESCRIPTION
COC	Laboratory	enter a unique number for each chain of custody form
SHIP TO	Field Team	enter the laboratory name and address
CARRIER	Field Team	enter the name of the transporter (e.g., FedEx) or handcarried
AIRBILL	Field Team	enter the airbill number or transporter tracking number (if applicable)
PROJECT NAME	Field Team	enter the project name
SAMPLER NAME	Field Team	enter the name of the person collecting the samples
SAMPLER SIGNATURE	Field Team	signature of the person collecting the samples
SEND RESULTS TO	Field Team	enter the name and address of the prime contractor
FIELD SAMPLE ID	Field Team	enter the unique identifying number given to the field sample (includes MS, MSD, field duplicate and field blanks)
DATE	Field Team	enter the year and date the sample was collected in the format M/D (e.g., 6/3)
TIME	Field Team	enter the time the sample was collected in 24 hour format (e.g., 0900)
MATRIX	Field Team	enter the sample matrix (e.g., water, soil)
PRESERVATIVE	Field Team	enter the preservative used (e.g., HNO3) or "none"
FILTERED/ UNFILTERED	Field Team	enter "F" if the sample was filtered or "U" if the sample was not filtered
CONTAINERS	Field Team	enter the number of containers associated with the sample
MS/MSD	Field Team or Laboratory	enter "X" if the sample is designated for the MS/MSD
ANALYSES REQUESTED	Field Team	enter the method name of the analysis requested (e.g., SW6010A)
COMMENTS	Field Team	enter comments
SAMPLE CONDITION UPON RECEIPT AT LABORATORY	Laboratory	enter any problems with the condition of any sample(s)
COOLER TEMPERATURE	Laboratory	enter the internal temperature of the cooler, in degrees C, upon opening
SPECIAL INSTRUCTIONS/COMMENTS	Laboratory	enter any special instructions or comments
RELEASED BY (SIG)	Field Team and Laboratory	enter the signature of the person releasing custody of the samples
COMPANY NAME	Field Team and Laboratory	enter the company name employing the person releasing/receiving custody
RECEIVED BY (SIG)	Field Team and Laboratory	enter the signature of the person receiving custody of the samples
DATE	Field Team and Laboratory	enter the date in the format M/D/YY (e.g., 6/3/96) when the samples were released/received
TIME	Field Team and Laboratory	enter the date in 24 hour format (e.g., 0900) when the samples were released/received

FIGURE 1101.01-A CHAIN OF CUSTODY FORM

SOP	**1102.01**				
GROUP	Sample Handling				
SUB-GROUP	Sample Shipping				
TITLE	Sample Shipping				
DATE	11/19/2001	**FILE**	1102-01.DOC	**PAGE**	1 of 1

INTRODUCTION

The following Standard Operating Procedure (SOP) presents the procedures for sample shipping that will be implemented during field work involving sampling activities.

TERMS

COC - Chain-of-Custody

PROCEDURE

Prior to shipping or transferring custody of samples, they will be packed according to D.O.T. requirements with sufficient ice to maintain an internal temperature of 4°C ± 2°C during transport to the laboratory. Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

1. Samples will be accompanied by a COC record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. If sent by common carrier, a bill of lading or airbill should be used. Bill of lading and airbill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory. The designated laboratory will accept custody in the field upon sample pick-up or at the laboratory if the samples are delivered via field personnel or a courier service.
2. Samples will be properly packed in approved shipping containers for laboratory pick-up by the appropriate laboratory for analysis, with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be padlocked or custody-sealed for transfer to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to itself so that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape. The seal will then be signed. The designated laboratory will accept custody of the samples upon receipt.
3. Whenever samples are split with state representatives or other parties, the COC record will be marked to indicate with whom the samples were split.
4. The field sampler will call the designated laboratory to inform them of sample shipment and verify sample receipt as necessary.

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/31/2020 6:53:21 PM
To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
CC: Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; Steven Cowan [SCowan@css-inc.com]
Subject: Additional West Central Avenue Proposed Sample Map
Attachments: Figure Soil Gas TCE Sample Location Map_2.pdf

Gary/LaDonna/Michelle,
Attached is a proposed sample location map for the isolate soil gas plume located southwest of the site. The sample scheme was based on a 50-foot spacing between sample locations extending 1-block from the PCE plume boundary. The area to west and north were reduced slightly due to the groundwater gradient being to the east and not expecting to see any soil gas vapors associated with this isolated hot spot. Please let me know if you have any questions or need any additional information. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

- SOIL GAS SAMPLES
- PROPOSED ROAD SAMPLES (n = 143)
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TAX PARCELS

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100

NOTES:
1. All results are in ug/m³.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 150 300

FEET

SOURCE: BING AERIAL, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_2.mxd 12:47:10 PM 3/31/2020 dsguentin

Message

From: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Sent: 2/25/2022 5:07:19 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]; Ogden, Sarah, NMENV [sarah.ogden@state.nm.us]; McGlown, Anthony, NMENV [anthony.mcglown@state.nm.us]; Mark Garman [mark.garman@state.nm.us]; Cobb, Derrick [derrick.cobb@westonsolutions.com]
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure
Attachments: Justin Ball 12_08_2021 1433 Central Ave NW Environmental Analysis Technical Memorandum.pdf; 5860 Beacon PSG Fig 3 Trichloroethene Rev2.pdf

Gary, Michelle & LaDonna,

NMED -GWQB Superfund Oversight Section (SOS) would like to request a Teams meeting with you early next week to discuss the EPA's planned path forward with the Soil vapor/ Indoor air West Central Avenue study.
There have been requests to the GWQB-VRP section from the owner (G&L Investment Company, Inc.) of the Properties in Blue on the map below. Please see the attached letter for details of that request. The Superfund Section will be participating in a conference call with GWQB -VRP and the property representatives on Thursday morning 3/3/3022 and would like to be prepared to speak as to SOS's roll in the planned EPA-CERCLA process at this location an how that may affect the request for VRP involvement. NMED's staff schedule for a Teams meeting is clear Monday 9am MST, Tuesday morning. And Wednesday after 2pm MST.

To answer your question regarding sampling and mitigation at the Former Bell Trading Post. The Bell Trading Post (BTP) property now condominiums/lofts. Went through the VRP process in the 1990s and did a soil lead and asbestos removal. The Bell VRP investigation also performed soil testing for volatile organics and metals and collected 3 ground water grab samples at temporary bore holes. At that time there were no NMWQCC exceedances for TCE in the groundwater grab samples. I have been told that BTP condo management performed some limited follow-up indoor air sampling on their own after the ESI results were provided to them. I can provide a copy of the BTP –VRP reports to you if you wish. I do not have data or reports from the BTB condo management to confirm what I have been told regarding their own contracted indoor air sampling.

Please let us know your available times for a Teams Conference call.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
Innovation | Science | Collaboration | Compliance

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, February 24, 2022 12:54 PM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV <Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: [EXTERNAL] Re: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Martyne,

I am out of office till Monday. We do have a map which I believe that I sent to you. We are confirming the property addresses that we need to perform interior sampling based upon the map.
I assume that the Bell Trading Tower building has already performed sampling and mitigation. Please confirm.

Thanks
Gary

Sent from my iPhone

On Feb 23, 2022, at 11:10 AM, Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us> wrote:

Gary,

Please let me know if you have any further updates as to when to expect a final report on the soil vapor study performed in 2021. NMED continues to have inquiries from property owners in the 1400 block W Central Ave.

Please call if you have anything to add and wish to discuss.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
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Innovation|Science|Collaboration|Compliance

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, December 15, 2021 8:21 AM
To: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXTERNAL] FW: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013 Fax (505) 224-9016

December 8, 2021

Mr. Justin Ball
New Mexico Environment Department
Ground Water Quality Bureau
Remediation Oversight Section
121 Tijeras Ave NE
Albuquerque, New Mexico
87102

VIA E-MAIL

RE: NOTIFICATION OF RECORDS REVIEW – 1433 CENTRAL AVENUE NW, ALBUQUERQUE, NM

Dear Mr. Ball:

EA Engineering, Science, and Technology, Inc., PBC (EA) has been retained by G&L Investment Company, Inc. (G&L) to provide a response to your letter dated October 20, 2021, regarding former business activities at 1433 Central Avenue NW, Albuquerque, NM. Based on preliminary records review performed by New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB), a dry-cleaning operation was identified at 1433 Central Avenue NW. In addition, the October 20, 2021, letter states that the property at 1433 Central Avenue NW *"may be impacted by past releases of chlorinated solvents"*. It was requested G&L contact NMED to discuss a path forward for the site. The purpose of this submittal is to initiate contact and discussions regarding the property.

The Preliminary Assessment (PA) conducted by NMED Superfund Oversight Section (SOS) at the West Central Avenue (WCA) – Albuquerque (CERCLIS # NMN000607372) site identified the 1433 Central Avenue NW property as a potential source area. Groundwater and soil gas data have been collected at the WCA site during several phases of Site Inspection (SI) conducted by SOS over the past several years.

Based on review of available documents and data, EA has prepared the attached Technical Memorandum (TM) titled *Evaluation of Current Environmental Conditions, 1433, 1435, and 1445 Central NW, Albuquerque, NM.* For clarity, G&L and others together own the properies NMED and GWQB variously refer to as 1433, 1435 and 1445 Central Avenue NW in reports and assessment documents. This TM summarizes site status and conditions to facilitate discussions regarding the site as requested in your October 20, 2021, letter. The TM demonstrates the following:

- 1433 Central Avenue NW was never a dry cleaner. It was a dry cleaner drop station, where clothing was received and then transported to another location to be dry cleaned. It then became a wet coin-operated self-help laundromat.

- Soil gas data collected within the vicinity of 1433 Central Avenue NW do not indicate any releases of tetrachloroethene or carbon tetrachloride.

- Soil gas data collected in the vicinity of other areas owned by G&L and others – 1435 and 1445 Central NW – indicate low levels of trichloroethene (TCE).

- The TCE detections are downgradient (groundwater) of the Former Bell Trading Post, a Voluntary Remediation Program (VRP) site that used TCE.

- One TCE soil gas sample collected immediately downgradient of Bell Trading Post exceeded NMED Vapor Intrusion Screening Levels.

The properties (1433, 1435, and 1445 Central Avenue NW) have been impacted by off-site sources of contamination within the WCA site. There is no evidence of a release at any of the 1433, 1435 or 1445 Central Avenue NW properties. Because it is the desire of G&L and the other owners potentially to the develop the subject properties, EA would like to discuss the following with NMED:

- That the property at 1433 Central Avenue NW is neither a dry cleaner nor a release site and this should be formally acknowledged by NMED to eliminate any contrary perception.

- G&L and others would like to enter 1433, 1435 and 1445 Central Avenue NW properties into VRP with the intent to:

    - Separate the properties from the CERCLA action and neighboring trespass plumes;
    - Address vapor intrusion concerns for future site construction with the engineered controls consisting of: 1) vapor barriers on all new construction and 2) sub-slab depressurization as appropriate on existing structures; and
    - Obtain a Certificate of Completion and Covenant not Sue to provide permanence to the proposed remedy and allow redevelopment with minimal environmental encumbrance.

If you have any questions or concerns with this request, please feel free to contact me at (505) 400-7125. We look forward to discussions with NMED and await your response.

Sincerely;

Jay T. Snyder, P.E., P.G., CHG
Senior Hydrogeologist

Cc: Mark Garmin, SOS
Martyne Keiling, SOS

ED_013172_00000082-00002

Technical Memorandum

To: Pete Domenici, Jr., Esquire, Paula Matteucci, G&L Investment Company

From: Jay Snyder, P.E., P.G., PHG

Re: Evaluation of Current Environmental Conditions, 1433, 1435, and 1445 Central NW, Albuquerque, NM

Date: November 23, 2021

INTRODUCTION

On October 20, 2021, New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) sent a letter to G&L Investment Company (G&L) regarding past uses of a property identified by NMED as 1433 Central Avenue, NW, Albuquerque, New Mexico. NMED GWQB, through review of historic records, identified 1433 Central NW as having been a "dry cleaning operation." In addition to advising precautions to take regarding potential release of dry-cleaning chemicals, it was requested that G&L contact NMED GWQB to discuss a plan forward. This technical memorandum provides a basis to discuss path forward for 1433 Central Avenue NW and surrounding lots owned by G&L and others.

This technical memorandum summarizes environmental data collected at and near the above referenced properties (Site), and existing environmental conditions in and around the Site. The Site and surrounding areas lie west of the Fruit Avenue Plume Superfund Site. A Preliminary Assessment (PA) of the area, identified as West Central Avenue – Albuquerque, CERCLIS # NMN000607372, was conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) by the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) Superfund Oversight Section (SOS) and reported in September of 2013. Several phases of investigation have completed since the PA was completed.

The West Central Avenue site was identified in the PA as a chlorinated solvent groundwater plume with no identified source(s) located in the City of Albuquerque near the corner of 9th Street NW and Marquette Avenue NW (Exhibit 1). The West Central Avenue site was identified when chlorinated solvents were detected in monitoring wells at the Fruit Avenue Plume Superfund Site located east and downgradient of the West Central Avenue site. The principal contaminants of concern are trichloroethene (TCE) and tetrachloroethene aka perchloroethene (PCE). TCE was the principal degreaser used in automotive repair facilities in the 50's, 60's and 70's, and PCE or "Perc" the principal dry cleaner solvent after carbon tetrachloride usage ceased. As PCE degrades in the environment, it can transform to TCE which complicates "sourcing" and attribution in commingled groundwater plumes.

Along with 16 other properties, The Neighbors Laundromat (preceded by Joe's Cleaners) at 1433 Central Avenue NW was identified as a Potential Source Area (PSA) for groundwater impacts in the West Central Avenue site (Exhibit 2). Of note amongst the PSAs identified in the PA is the Former Bell Trading Post at 1503 Central Avenue NW. The Former Bell Trading Post is hydraulically upgradient of the Site which includes The Neighbors Laundromat. Bell Trading Post manufactured jewelry and used chlorinated solvent in the process and is an NMED Voluntary Remediation Program (VRP) cleanup site. Investigations related to the VRP have been conducted at the Former Bell Trading Post.

ED_013172_00000082-00003

The PA was followed by the following investigations:

1. A Site Inspection (SI) Report was completed in September of 2014. The SI summarized existing groundwater monitoring data in the Fruit Avenue Plume, and data collected during the SI from existing monitoring wells in the West Central Avenue site.

2. An Expanded Site Investigation (ESI) was completed and reported in November 2016. The ESI included expanded discussion of past operations at select PSAs (including Former Bell Trading Post) and results of active soil gas sampling and analysis conducted at part of the ESI.

3. A Site Reassessment (SR) Report was completed in September 2017. The Site Reassessment consisted of collecting groundwater, indoor air and soil vapor samples from identified areas of highest soil vapor contamination with potential residential indoor air impact. Additionally, the samples collected were to confirm or refute correlation of ESI soil vapor results and to evaluate how the areas of highest soil vapor concentrations may or may not correlate with groundwater.

4. Finally, a Passive Soil Gas (PSG) Survey of the West Central Avenue site was conducted in 2021 to refine the extent of subsurface soil gas impacts. These data in table format and figures have been provided by NMED; however, the report and conclusions of the 2021 investigation is in progress and has not been completed as of the date of this Technical Memorandum.

On October 20, 2021, NMED sent a Notification of Records Review Related to Public Health Protection to G&L Investment Company and others regarding 1433 Central Avenue NW. The notification identified 1433 Central Avenue NW (former Neighbors Laundromat in PA) as "*having had "historical land use activities ... that may have resulted in environmental contamination that could impact human health and be subject to regulatory requirements.*"

This Technical Memorandum will provide data collected during the SI and related investigations which demonstrate the properties at 1433, 1435, and 1445 (properties owned by G&L Investment Company) have not been environmentally impacted by on-Site activities, and that any environmental impacts discovered on the Site are related to Potential Source Areas other than The Neighbors Laundromat/Joe's Cleaners.

HISTORICAL ACTIVITIES AT THE FORMER NEIGHBORS LAUNDROMAT

Based on lease documents obtained from the Site property owner (Exhibit 2), the Neighbors Laundromat was restricted to traditional wet laundering and Joe's Cleaners was restricted to "picking up and delivering dry cleaning" and stipulated it "shall not be used as a dry-cleaning plant and no dry-cleaning equipment or machinery shall be placed therein." Joe's Cleaners was in business for two years from February 1950 to February 1952.

The 1959 lease for Neighbors Laundromat similarly restricted the use to wet laundry, the use described as "to be used in the operation of a self-help laundry." During this period, the facility presumably operated as a self-help coin operated wet laundry. So it does not appear it was ever used for dry cleaning or chemical handling.

RESULTS OF SITE INSPECTIONS

Soil gas sampling and limited groundwater sampling were conducted during the Expanded SI, Site Reassessment, and 2021 investigation (in progress). Sampling was conducted at the former Bell Trading Post as part of its VRP assessment. A summary of findings relative to the subject properties is provided below.

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Expanded Site Investigation / Site Reassessment

Active soil vapor sampling results from the ESI and SR in and around the Site are shown in Exhibits 4, 5, and 6 and summarized in Exhibit 6. Exhibit 4 shows the distribution of ESI samples and soil gas concentrations around the Former Bell Trading Post and Exhibit 5 shows soil gas results down hydraulic gradient of the Former Bell Trading Posta and at the Site. Exhibit 6 shows SR results for samples collected at the Site. A summary table of ESI and SR results is provided in Exhibit 7.

Passive Soil Gas Survey

A passive soil gas survey was conducted in 2021. The distribution of TCE detected by PSGs in the West Central Avenue site is shown in Exhibit 8. PCE distribution is shown in Exhibit 9. Volatile Organic Compounds (VOCs) detected during the PSG survey upgradient of the Site around the Former Bell Trading Post are summarized in Exhibits 10. Detections in the Site are summarized in Exhibit 11.

Discussion of Data

There was significant variation between the field and laboratory analyses for the soil vapor samples. For some sample locations, the FROG significantly overestimated concentrations relative to corresponding analytical laboratory analysis. For example, for samples WCA-1433-Central-03 and -04 the field analyses by FROG were 6,153 and 4,874 $\mu g/m^3$ compared to laboratory results of 35 and 13 $\mu g/m^3$, respectively. These results represent relative percent differences of 198 % and 199 %, respectively.

The laboratory analytical results compare favorably to PSG data collected nearby. The FROG data are not reliable for decision making and continued use of the FROG without having a split sample analyzed by an analytical laboratory may lead to false conclusions. For the purpose of evaluating Site data, the field analyzed FROG data are rejected and not discussed further herein.

EVALUATION OF CONTAMINATION AT SITE

There is virtually no indication the Site had a release of regulated chemical(s). It was identified in the PA as a PSA because it had been listed as a laundry; however, lease documents restricted the property use to traditional wet laundry and "self-help" laundry.

The chlorinated solvents TCE and PCE were detected in vapors on the Site. Minor detections of other chlorinated solvents (e.g., dichloroethene and trichloroethane) were observed; however, observations were at concentrations significantly below NMED Vapor Intrusion Screening Levels (VISLs). The TCE and PCE concentrations measured during the ESI and SR at the upgradient Former Bell Trading Post and those on the Site are summarized in Exhibit 7.

On the Site, the only problematic sample location is WCA-1433-Central-02, which is downgradient of high concentrations (8,530 $\mu g/m^3$ at sample location WCA 1503-Central-01) at the Former Bell Trading Post. Sample location WCA-1433-Central-02 has been sampled several times. During the ESI, a concentration of 1,350 $\mu g/m^3$ TCE was observed. The location was resampled during the SR, and the TCE concentration had dropped to 340 $\mu g/m^3$. Finally, PSG sample P-007 detected 77.2 $\mu g/m^3$. This is the only area on the site where TCE in soil vapor exceeds VISLs. Exhibit 8 which shows the distribution of TCE from the PSG survey, clearly shows the "hot spot" at and around the Former Bell Trading Post and immediately downgradient.

Only very low levels of PCE are observed at or around the Site. The PSG survey map showing distribution of PCE (Exhibit 9) shows no impacts at the Site. If the Site was a source and if the Site had dry cleaned clothing at the location, then PCE (dry cleaning solvent) would have been released at 1433

Central Avenue NW– it does not appear that any releases occurred at Joe's Cleaners or the Neighbors Laundromat.

Based on historic property use and the distribution of chlorinated solvents – principally TCE and PCE – in soil vapor, the following conclusions are made:

- Joe's Cleaners operated from 1950 to 1952 as a drop station with no on-site dry cleaning and no chemical storage, and Neighbors Laundry from 1959 to roughly 1974 as a traditional wet laundry.
- Contamination is soil vapor at the site is dominated by TCE, not PCE, which is attributed to the Former Bell Trading Post, an NMED VRP cleanup site where TCE was used;
- The virtual absence of PCE at 1433 Central Avenue NW and rest of Site indicates dry cleaner solvent was neither stored, handled, used, nor released at the Site.
- The Site should be released from the CERCLA action and its designation as a PSA; and
- It is recommended this release from the CERCLA action be effected via VRP application to document known environmental impacts and place an institutional control for vapor barriers on new construction, and vapor intrusion mitigation, where appropriate, on existing or remaining structures if redeveloped.

REFERENCES

New Mexico Environment Department (NMED) 2013. Preliminary Assessment Report, West Central Avenue – Albuquerque. CERCLIS #NM000607372. Prepared by Ground Water Quality Bureau Superfund Oversight Section. September 2013.

New Mexico Environment Department (NMED) 2014. Site Inspection Report, West Central Avenue – Albuquerque. EPA ID #NM000607372. Prepared by Ground Water Quality Bureau Superfund Oversight Section. September 2014.

New Mexico Environment Department (NMED) 2014. Site Reassessment Report, West Central Avenue – Albuquerque. EPA ID #NM000607372. Prepared by Ground Water Quality Bureau Superfund Oversight Section. September 2014.

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Exhibit 1

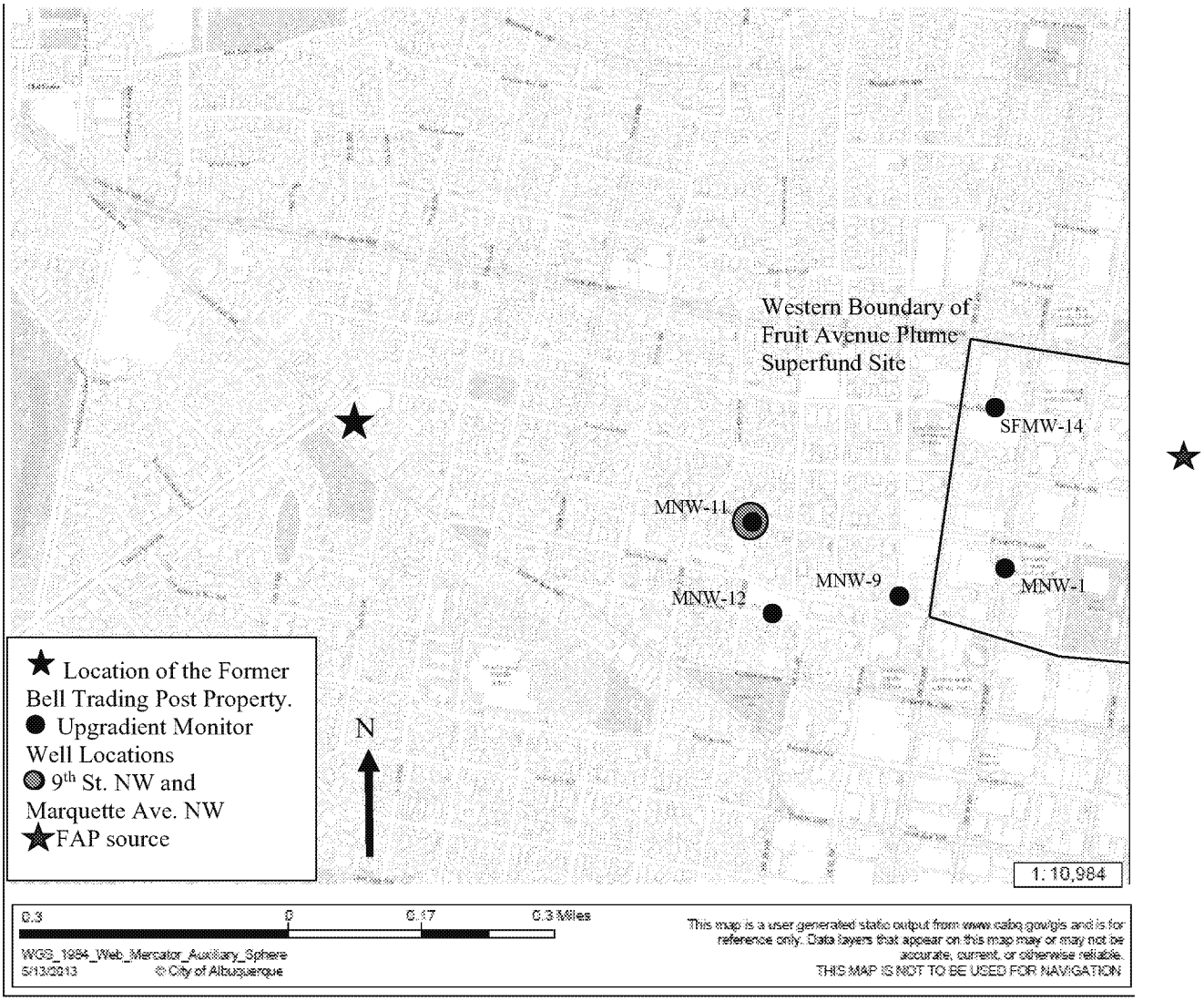

Figure 3 Monitor wells within the West Central Avenue area, Albuquerque, NM.

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LEASE—FORM 23

Exhibit 2

This Indenture, Made this 10th day of February in the year of our Lord One Thousand Nine Hundred and fifty, between Louis Giacomelli and Emma Giacomelli, his wife, and Gino J. Matteucci, and Lidia Matteucci, his wife, hereinafter denominated lessor, and Joe R. Gault, d/b/a Joe's Cleaners, and Myrtle F. Gault, his wife, hereinafter denominated lessee:

WITNESSETH: That the said lessor, for and in consideration of the covenants and agreements hereinafter mentioned, to be kept and performed by the said lessee, lessee's executors and administrators, has demised and leased to said lessee, all the premises situate, lying and being in Albuquerque, in the County of Bernalillo, and State of New Mexico, known and described as follows, to-wit:

That certain store building located at 1433 West Central Avenue, Albuquerque, New Mexico, to be used by the lessee as a station for picking up and delivering dry cleaning to lessee's customer, but shall not be used as a dry cleaning plant and no dry cleaning equipment or machinery shall be placed therein.

TO HAVE AND TO HOLD, the said above described premises with the appurtenances, unto the said lessee, lessee's executors, administrators and assigns, from the 20th day of February, 1950, for and during and until the 19th day of February, in the year of our Lord One Thousand Nine Hundred and fifty-two. And the said lessee, in consideration of the lease of the premises aforesaid, by the lessor to the said lessee, does covenant and agree with the said lessor, lessor's heirs, executors, administrators and assigns, to pay the said lessor as rent for the said described premises, the sum of

Two Thousand Four Hundred Dollars ($2400.00), payable in monthly installments of $100.00, in advance on the 20th day of each and every month. Receipt of the sum of $100.00 in payment of the first months' rent is herewith acknowledged by the lessors.

Lessees agree to pay for all public utilities used in connection with the premises. It is understood and agreed that the water meter for the premises is listed under the name of William B. Wolff, the tenant at 1431 W. Central Avenue, Albuquerque, N. M. who shall pay the minimum water charge and any amount over the minimum water charge shall be paid by the lessees hereunder directly to William B. Wolff immediately upon presentation of the bill each month, without delay.

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And the said lessee further covenants with the said lessor that the lessee received said demised premises in good order and condition, and at the expiration of the time of the lease mentioned will yield up the said premises to the said lessor in as good order and condition as when the same was entered upon by the said lessee, loss by fire or inevitable accident, or ordinary wear, excepted; and also will keep premises in good repair during the lease at lessee's own expense, and shall promptly repair and replace all damage that may occur from time to time, and the lessee hereby specifically waives all right to make any repairs at the expense of the lessor.

That the lessor shall not be liable for any damage to said leased premises, or to any part thereof, or to any property or effects therein, caused by leakage from the roof of said premises or by bursting, leakage or overflowing of any waste pipes, water pipes, tanks, drains, or stationary washstands, or by reason of any damage whatsoever caused by water from any source whatsoever.

That the lessee shall not make, or suffer or permit to be made, any alterations, additions or improvements whatever in or about said demised premises, without first obtaining the written consent of the lessor; provided, however, that such consent, if given, will be subject to the express condition that any work shall be done in accordance with and comply with the building ordinances and laws of the City of Albuquerque, New Mexico, and shall comply with all building laws of the state of New Mexico, and that in doing said work said lessee will comply with all workmen's compensation and other labor laws: that in doing and performing such work no liens of mechanics, materialmen, laborers, architects, artisans, contractors, subcontractors or any other lien of any kind whatsoever shall be created against or imposed upon, the said premises or any part thereof, and that said lessee will indemnify and save harmless the lessor from every and all liability and claims for damages, of every kind and nature which might be made or judgments rendered against lessor, or accrue against lessor on account of arising out of such improvements.

AND IT IS FURTHER AGREED, by the lessee, that neither lessee nor lessee's legal representatives will underlet said premises or assign this lease without the written assent of the said lessor first had and obtained thereto, and that lessee will not use or permit the said premises to be used for any purpose prohibited by the laws of the United States or New Mexico. If this lessee shall hold over the term created, such holding shall be construed to be a tenancy from month to month, at the monthly rental which shall have been payable at the time immediately prior to when such holding over shall have commenced, and such tenancy shall be subject to all the terms and conditions herein set forth, but such tenancy from month to month shall not be construed to be a renewal of this lease of any period whatsoever. The lessee shall not suffer or permit any nuisance in or upon any part of such premises, and shall not do, or permit or suffer to be done any act which would tend to increase the existing rate of fire insurance for said demised premises or the prevailing rate on property similarly situated.

All improvements which may be made to said premises by said lessee or lessor, except shelving, or movable furniture, whether attached to walls or floors or not, shall be the property of the lessor and shall remain upon and be surrendered with the said premises at the termination of this lease. All property which lessee is herein privileged to remove must be removed on or before the expiration of this lease.

The lessor shall not be liable for any injury or damage, either to person or property, arising from any cause whatsoever, which shall occur in any manner in or about said leased premises.

AND IT IS EXPRESSLY UNDERSTOOD AND AGREED between the parties aforesaid, that if the rent above reserved, or any part thereof, shall be behind or unpaid on the day of payment whereon the same ought to be paid as aforesaid, or if default shall be made in any of the covenants or agreements herein contained to be kept by the lessee, lessee's executors and administrators, it shall and may be lawful for the lessor, lessor's heirs, executors, administrators, agents, attorney or assigns, at lessor's election, to declare said term ended and into the said premises or any part thereof, either with or without process of law, to re-enter, and the said lessee, or any other person or persons occupying, in or upon the same, to expel, remove and put out, using such force as may be necessary in so

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doing, and the same premises again to repossess and enjoy as in its first and former state, and distrain for any rent that may be due thereon upon any property belonging to the said lessee, whether the same be exempt from execution and distress by law or not, and the said lessee in that case hereby waives all legal rights which lessee now has or may have, to hold or retain any such property under any exemption laws now in force in the State, or in any other way; meaning and intending hereby to recognize in the said lessor, the lessor's heirs, executors, administrators or assigns, a valid and first lien as provided in the laws of New Mexico, upon any and all goods, chattels and other property belonging to the said lessee and located in said premises as security for the payment of said rent and fulfillment of the faithful performance of conditions in manner aforesaid, anything hereinbefore mentioned to the contrary notwithstanding. And if at any time said term shall be ended at such election of said lessor, lessor's heirs, executors, administrators and assigns, as aforesaid, or in any other way, the lessee, lessee's executors and administrators, does hereby covenant and agree to surrender and deliver up said above described premises and property peaceably to the lessor, the lessor's heirs, executors, administrators and assigns, immediately upon the termination of said term as aforesaid and if lessee shall remain in possession of the same ten days after notice of such default, or after the termination of the lease in any of the ways above named lessee shall be deemed guilty of a forcible detainer of said premises under the statute and shall be subject to all the conditions and provisions above named, and the eviction and removal, forcible or otherwise, with or without process of law as above stated. And it is further covenanted and agreed by and between the parties hereto that the lessee shall pay and discharge all costs and attorney's fees and expenses that shall arise from enforcing the covenants of this indenture by the lessor.

The failure, neglect or omission of the lessor to terminate this lease for any one or more breaches of any of the covenants hereof, shall not be deemed a consent by him of such breach, and shall not stop, bar or prevent the lessor from thereafter terminating this lease, either for such violation or for prior or subsequent violation of such covenant.

If at any time during the term of this lease the said demised premises shall be totally or partially destroyed by fire, earthquake or other calamity, then said lessor shall have the option to rebuild or repair the same, provided such rebuilding or repairing shall be commenced within the period of thirty days after such destruction or injury, and in such case, said lessee shall re-occupy said premises upon completion of such rebuilding or repairing. In case, however, that said lessor shall within thirty days after such destruction or injury, determine not to rebuild or repair said premises. and shall so notify said lessee, then and thereupon this lease shall terminate and become null and void.

That the lessor, lessor's agent and attorneys, shall have the right at any time to enter said premises to inspect the same or to make any improvements, alterations, additions or repairs of any character upon said premises desired by said lessor, but at no time shall said lessor be compelled or required to make any improvements, alterations, additions or repairs.

At any time within thirty (30) days prior to the termination of this lease, the lessor shall have the right to place upon any part of said demised premises any "To Let" signs, of such character and at such place as lessor may select.

If the lessee should be adjudged a bankrupt, either by voluntary or involuntary proceedings, the lessor shall have the option to forthwith terminate this lease and to re-enter said demised premises and take possession thereof. In no event shall this lease be deemed an asset of the lessee after adjudication in bankruptcy.

AND IT IS FURTHER COVENANTED AND AGREED, between the parties aforesaid: The covenants herein shall extend to and be binding upon the heirs, executors and administrators of the parties to this lease.

WITNESS the hands and seals of said parties aforesaid, the day and year first above written.

Edgar Giacomelli [SEAL]

Emma Giacomelli [SEAL]

Livio Matteucci [SEAL]

Lidia Matteucci [SEAL]

Joseph Gault

Myrtle T. Gault

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STATE OF NEW MEXICO,
County of Bernalillo } ss.

On this 11th day of February, 1950, before me appeared Louis Giacomelli and Emma Giacomelli, his wife, Gino J. Matteucci and Lidia Matteucci, his wife, and Joe R. Gault and Myrtle F. Gault, his wife to me known to be the persons described in and who executed the foregoing instrument and acknowledged that they executed the same as their free act and deed.

Witness my hand and seal the day and year last above written.

Elizabeth Parsons
Notary Public.

My commission expires February 25 1951

LEASE

TO

STATE OF NEW MEXICO,
County of } ss.

I hereby certify that this instrument was filed for record on the ..... day of ....., A. D. 19....., at ..... o'clock ..... M., and recorded in Book ....., Record of Leases, Page .....

Clerk and Ex-Officio Recorder.

By ..... Deputy.

PRINTED AND FOR SALE BY VALLIANT PRINTING CO., ALBUQUERQUE

LEASE—FORM 23

This Indenture, Made this 28th day of February in the year of our Lord One Thousand Nine Hundred and Fifty-Nine, between G & L INVESTMENT CO. INC., and LOUIS GIACOMELLI and EMMA GIACOMELLI, his wife, hereinafter denominated lessor, and LEE NEIGHBORS and KATHRYN NEIGHBORS, his wife, hereinafter denominated lessee:

WITNESSETH: That the said lessor, for and in consideration of the covenants and agreements hereinafter mentioned, to be kept and performed by the said lessee, lessee's executors, and administrators, has demised and leased to said lessee, all the premises situate, lying and being in Albuquerque, in the County of Bernalillo, and State of New Mexico, known and described as follows, to-wit:

The store buildings located at 1431 and 1433 Central Avenue NW, to be used in the operation of a help-yourself laundry.

Lessees customers shall have the right to use the parking space immediately west of the building located at 1433 Central Ave NW, and in the rear of both buildings in common with all of the other tenants of the lessors and their customers.

TO HAVE AND TO HOLD, the said above described premises with the appurtenances unto the said lessee, lessee's executors, administrators and assigns, from the first day of April, in the year of our Lord One Thousand Nine Hundred and Fifty-nine for and during and until the 1st day of April, in the year of our Lord One Thousand Nine Hundred and Sixty-two. And the said lessee, in consideration of the lease of the premises aforesaid, by the lessor to the said lessee, does covenant and agree with the said lessor, lessor's heirs, executors, administrators and assigns, to pay the said lessor as rent for the said described premises, the sum of One Hundred Eighty Five Dollars ($185.00) per month, payable in advance on the first day of each month commencing April 1, 1959, said rent to be paid to Louis Giacomelli by mail at 1512 Los Alamos Avenue SW, Albuquerque, New Mexico.

Lessees agree to pay for all public utilities used in connection with the premises, including heat, water, electricity, garbage disposal and sewer tax. Lessees shall not install a neon sign on the premises without first obtaining the written consent of the lessors as to the installation of said sign. Lessees are herewith granted the right to remove the partition between 1431 and 1433 Central Avenue NW at lessees' sole expense with the understanding that the lessees shall be required to replace the partition at the termination of the original term of this lease if the lessees do not exercise the option hereinafter referred to or at the end of the three year option period hereinafter referred to if the option is exercised or at a sooner date during said three year option period if the lessors exercise the privilege of terminating said lease during said option period as provided for in said option.

Lessees shall have the right to remove all of their equipment at the termination of the lease agreement including any air conditioning system installed by the lessees on the premises except that the lessees shall pay for all repairs to the building which may be required as the result of the removal of the same and shall restore the premises to its present condition at the termination of the lease, reasonable wear and tear excepted.

Lessees shall be obliged to remove the concrete platforms placed in the building at 1433 Central NW and any concrete platforms placed in 1431 Central NW, at the termination of the lease, and to restore the floors to the condition they were in before the lessees occupied either of said buildings.

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Lessees shall be responsible for any necessary repairs to the premises and the lessees shall be responsible for any breakage of plate glass or windows at both locations during the term of this lease or the option period hereinafter referred to, if exercised.

Lessors do herewith grant unto the lessees an option to rent the premises for an additional period of three years at a rental of $105.00 per month upon condition that the lessees shall notify the lessors of their intention to exercise said option at least ninety days prior to April 1, 1961, and upon the further condition that the lessors shall have the right to terminate the lease at any time during said three year extended period by giving notice to the lessees ninety days prior to the termination of said lease, and the lessees agree to move from the premises within said ninety day period from the date of the receipt of said notice, the same to be sent by registered mail, return receipt requested.

That the lessor shall not be liable for any damage to said leased premises, or to any part thereof, or to any property effects therein, caused by leakage from the roof of said premises or by bursting, leakage or overflowing of any waste pipes, water pipes, tanks, drains, or stationary washstands, or by reason of any damage whatsoever caused by water from any sources whatsoever.

That the lessee shall not make, or suffer or permit to be made, any alterations, additions or improvements whatever in or about said demised premises, without first obtaining the written consent of the lessor; provided, however, that such consent, if given, will be subject to the express condition that any work shall be done in accordance with and comply with the building ordinances and laws of the City of Albuquerque, and shall comply with all building laws of the state of New Mexico, and that in doing said work said lessee will comply with all workmen's compensation and other labor laws; that in doing and performing such work no liens of mechanics, materialmen, laborers, architects, artisans, contractors, subcontractors, or any other lien of any kind whatsoever shall be created against or imposed upon, the said premises or any part thereof, and that said lessee will indemnify and save harmless the lessor from every and all liability and claims for damages, of every kind and nature which might be made or judgments rendered against lessor, or accrue against lessor on account of arising out of such improvements.

AND IT IS FURTHER AGREED, by the lessee, that neither lessee nor lessee's legal representatives will underlet said premises or assign this lease without the written assent of the said lessor first and obtained thereto, and that lessee will not use or permit the said premises to be used for any purpose prohibited by the laws of the United States or New Mexico. If this lease shall hold over the term created, such holding shall be construed to be a tenancy from month to month, at the montly rental which shall have been payable at the time immediately prior to when such holding over shall have commenced, and such tenancy shall be subject to all the terms and conditions herein set forth, but such tenancy from month to month shall not be construed to be a renewal of this lease or any period whatsoever. The lessee shall not suffer or permit any nuisance in or upon any part of said premises, and shall not do, or permit or suffer to be done any act which would tend to increase the existing rate of fire insurance for said demised premises or the prevailing rate on property similarly situated.

All improvements which may be made to said premises by said lessee or lessor, except shelving, or movable furniture, whether attached to walls or floors or not, shall be the property of the lessor and shall remain upon and be surrendered with the said premises at the termination of this lease. All property which lessee is herein privileged to remove must be removed on or before the expiration of this lease.

The lessor shall not be liable for any injury or damage, either to person or property, arising from any cause whatsoever, which shall occur in any manner in or about said premises.

AND IT IS EXPRESSLY UNDERSTOOD AND AGREED between the parties aforesaid, that if the rent above reserved, or any part thereof, shall be behind or unpaid on the day of payment whereon the same ought to be paid as aforesaid, or if default shall be made in any of the covenants or agreements herein contained to be kept by the lessee, lessee's executors and administrators, it shall and may be lawful for the lessor, lessor's heirs, executors, administrators, agents, attorney or assigns, at lessor's election, to declare said term ended and into the said premises or any part thereof, either with or without process of law, to re-enter, and the said lessee, or any other person or persons occupying, in or upon the same, to expel, remove and put out, using such force as may be necessary in so doing, and the same premises again to repossess and enjoy as in its first and former state, and distrain for any rent that may be

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And the said lessee further covenants with the said lessor that the lessee received said demised premises in good order and condition, and at the expiration of the time of the lease mentioned will yield up the said premises to the said lessor in as good order and condition as when the same was entered upon by the said lessee, loss by fire or inevitable accident, or ordinary wear, excepted; and also will keep premises in good repair during the lease at lessee's own expense, and shall promptly repair and replace all damage that may occur from time to time, and the lessee hereby waives all right to make any repairs at the expense of the lessor.

That the lessor shall not be liable for any damage to said leased premises, or to any part thereof, or to any property effects therein, caused by leakage from the roof of said premises or by bursting, leakage or overflowing of any waste pipes, water pipes, tanks, drains, or stationary washstands, or by reason of any damage whatsoever caused by water from any sources whatsoever.

That the lessee shall not make, or suffer or permit to be made, any alterations, additions or improvements whatever in or about said demised premises, without first obtaining the written consent of the lessor; provided, however, that such consent, if given, will be subject to the express condition that any work shall be done in accordance with and comply with the building ordinances and laws of the City of Albuquerque, and shall comply with all building laws of the state of New Mexico, and that in doing said work said lessee will comply with all workmen's compensation and other labor laws; that in doing and performing such work no liens of mechanics, materialmen, laborers, architects, artisans, contractors, subcontractors, or any other lien of any kind whatsoever shall be created against or imposed upon, the said premises or any part thereof, and that said lessee will indemnify and save harmless the lessor from every and all liability and claims for damages, of every kind and nature which might be made or judgments rendered against lessor, or accrue against lessor on account of arising out of such improvements.

AND IT IS FURTHER AGREED, by the lessee, that neither lessee nor lessee's legal representatives will underlet said premises or assign this lease without the written assent of the said lessor first and obtained thereto, and that lessee will not use or permit the said premises to be used for any purpose prohibited by the laws of the United States or New Mexico. If this lease shall hold over the term created, such holding shall be construed to be a tenancy from month to month, at the montly rental which shall have been payable at the time immediately prior to when such holding over shall have commenced, and such tenancy shall be subject to all the terms and conditions herein set forth, but such tenancy from month to month shall not be construed to be a renewal of this lease or any period whatsoever. The lessee shall not suffer or permit any nuisance in or upon any part of said premises, and shall not do, or permit or suffer to be done any act which would tend to increase the existing rate of fire insurance for said demised premises or the prevailing rate on property similarly situated.

All improvements which may be made to said premises by said lessee or lessor, except shelving, or movable furniture, whether attached to walls or floors or not, shall be the property of the lessor and shall remain upon and be surrendered with the said premises at the termination of this lease. All property which lessee is herein privileged to remove must be removed on or before the expiration of this lease.

The lessor shall not be liable for any injury or damage, either to person or property, arising from any cause whatsoever, which shall occur in any manner in or about said premises.

AND IT IS EXPRESSLY UNDERSTOOD AND AGREED between the parties aforesaid, that if the rent above reserved, or any part thereof, shall be behind or unpaid on the day of payment whereon the same ought to be paid as aforesaid, or if default shall be made in any of the covenants or agreements herein contained to be kept by the lessee, lessee's executors and administrators, it shall and may be lawful for the lessor, lessor's heirs, executors, administrators, agents, attorney or assigns, at lessor's election, to declare said term ended and into the said premises or any part thereof, either with or without process of law, to re-enter, and the said lessee, or any other person or persons occupying, in or upon the same, to expel, remove and put out, using such force as may be necessary in so doing, and the same premises again to repossess and enjoy as in its first and former state, and distrain for any rent that may be

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due thereon upon any property belonging to the said lessee, whether the same be exempt from execution and distress by law or not, and the said lessee in that case hereby waives legal rights which lessee now has or may have, to hold or retain any such property under any exemption laws now in force in the State, or in any other way; meaning and intending hereby to recognize in the said lessor, the lessor's heirs, executors, administrators or assigns, a valid and first lien as provided in the laws of New Mexico, upon any and all goods, chattels and other property belonging to the said lessee and located in said premises as security for the payment of said rent and fulfillment of the faithful performance of conditions in manner aforesaid, anything hereinbefore mentioned to the contrary notwithstanding. And if at any time said term shall be ended at such election of said lessor, lessor's heirs, executors, administrators and assigns, as aforesaid, or in any other way, the lessee, lessee's executors and administrators, does hereby covenant and agree to surrender and deliver up said above described premises and property peaceably to the lessor, heirs, executors, administrators and assigns, immediately upon the termination of said term as aforesaid and if lessee shall remain in possession of the same ten days after notice of such default, or after the terminiation of the lease in any of the ways above named lessee shall be deemed guilty of a forcible detainer of said premises under the statute and shall be subject to all the conditions and provisions above named, and the eviction and removal, forcible or otherwise, with or without process of law as above stated. And it is further covenanted and agreed by and between the parties hereto that the lessee shall pay and discharge all costs and attorneys fees and expenses that shall arise from enforcing the covenants of this indenture by the lessor.

The failure, neglect or omission of the lessor to terminate this lease for any one or more breaches of any of the covenants hereof, shall not be deemed a consent by him of such breach, and shall not stop, bar or prevent the lessor from thereafter terminating this lease, either for such violation or for prior or subsequent violation of such covenant.

If at any time during the term of this lease the said demised premises shall be totally or partially destroyed by fire, earthquake or other calamity, then said lessor shall have the option to rebuild or repair the same, provided such rebuilding or repairing shall be commenced within the period of thirty days after such destruction or injury, and in such case, said lessee shall re-occupy said premises upon completion of such rebuilding or repairing. In case, however, that said lessor shall within thirty days after such destruction or injury, determine not to rebuild or repair said premises, and shall so notify said lessee, then and thereupon this lease shall terminate and become null and void.

That the lessor, lessor's agent and attorneys, shall have the right at any time to enter said premises to inspect the same or to make any improvements, alterations, additions or repairs of any character upon said premises desired by said lessor, but at no time shall said lessor be compelled or required to make any improvements, alterations, additions or repairs.

At any time within thirty (30) days prior to the termination of this lease, the lessor shall have the right to place upon any part of said demised premises any "To Let" signs, of such character and at such place as lessor may select.

If the lessee should be adjudged a bankrupt, either by voluntary or involuntary proceedings, the lessor shall have the option to forthwith terminate this lease and to re-enter said demised premises and take possession thereof. In no event shall this lease be deemed an asset of the lessee after adjudication in bankruptcy.

AND IT IS FUTHER COVENANTED AND AGREED, between the parties aforesaid. The covenants herein shall extend to and be binding upon the heirs, executors and administrators of the parties of this lease.

WITNESS the hands and seals of said parties aforesaid, the day and year first above written.

G & L INVESTMENT CO. INC.

Attest Lidia Matteucci
Secretary

By Lino Matteucci [SEAL]
President

Louis Giacomelli [SEAL]

Emma Giacomelli [SEAL]

Lee Neighbors [SEAL]

Kathryn Neighbors

STATE OF NEW MEXICO }
County of BERNALILLO } ss.

On this 28th day of February, 1959, before me appeared Louis Giacomelli and Emma Giacomelli, his wife, and Lee Neighbors and Kathryn Neighbors, his wife to me known to be the persons described in and who executed the foregoing instrument and acknowledged that they executed the same as their free act and deed.

Witness my hand and seal the day and year last above written.

Richard C. Chacon
NotaryPublic.

My commission expires 8/2/62

STATE OF NEW MEXICO)
:ss
COUNTY OF BERNALILLO)

The foregoing instrument was acknowledged before me this 28th day of February, 1959, by Gino J. Matteucci, President on behalf of said corporation.

Richard C. Chacon
Notary Public

My commission expires:
8/2/62

LEASE

TO

STATE OF ..... }
County of ..... } ss.

I hereby certify that this instrument was filed for record on the ..... day of ....., A. D. 19....., at ..... o'clock ..... M., and recorded in Book ....., Record of Leases, Page .....

Clerk and Ex-Officio Recorder.

By ..... Deputy.

PRINTED AND FOR SALE BY VALLIANT PRINTING CO., ALBUQUERQUE

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Exhibit 3

Table 3 Potential Sources for the West Central Avenue Plume

	Site	Address	Data Source
1	Washtub Laundry	1105 Central Ave NW	Site Walk
2	Arts Transmission	1115 Central Ave NW	UST
3	Downtown Inn	1213 Central Ave NW	UST
4	Esco-Bio Chemicals Co. Inc.	1406 Central Ave. SW	City Dir - 1962
			City Dir - 1968
5	Electronics TV Laboratory	1406 Central Ave. SW	City Dir - 1973
6	Trader Duke's Corp (Jewelry Manufacture)	1408 Central Ave. SW	City Dir - 1973
			City Dir - 1978
			City Dir - 1983
7	The Neighbors Laundromat	1433 Central Ave. NW	City Dir - 1962
			City Dir - 1973
8	***Former Bell Trading Post (Jewelry Manufacture)***	***1503 Central Ave NW***	***NMED VRP***
9	Used Auto Sales	1600 Central Ave SW	Sanborn - 1951
10	Central Paint and Body	1710 Central Ave SW	RCRA - SQG
11	Filling station/Auto Repair	1712/1716 Central Ave SW	Sanborn - 1951
12	*Thriftway (Abandoned Plateau)*	*1720 Central Ave SW*	*LUST*
13	*Bulk Oil Station*	*1720/1722 Central Ave SW*	*Sanborn - 1942*
14	*World Motel (Rural Court)*	*1721 Central Ave NW*	*LUST*
15	Kelly's Transmission Exchange	1816 Central Ave. SW	Site Walk
16	Marina's Dry Cleaners	1837 Central Ave. NW	Site Walk

(Ref. 3; Table 7)

Exhibit 4

Figure 9 Sample pts for 1611, 1503, 1445 & 1433 Central NW & Laguna Pl.

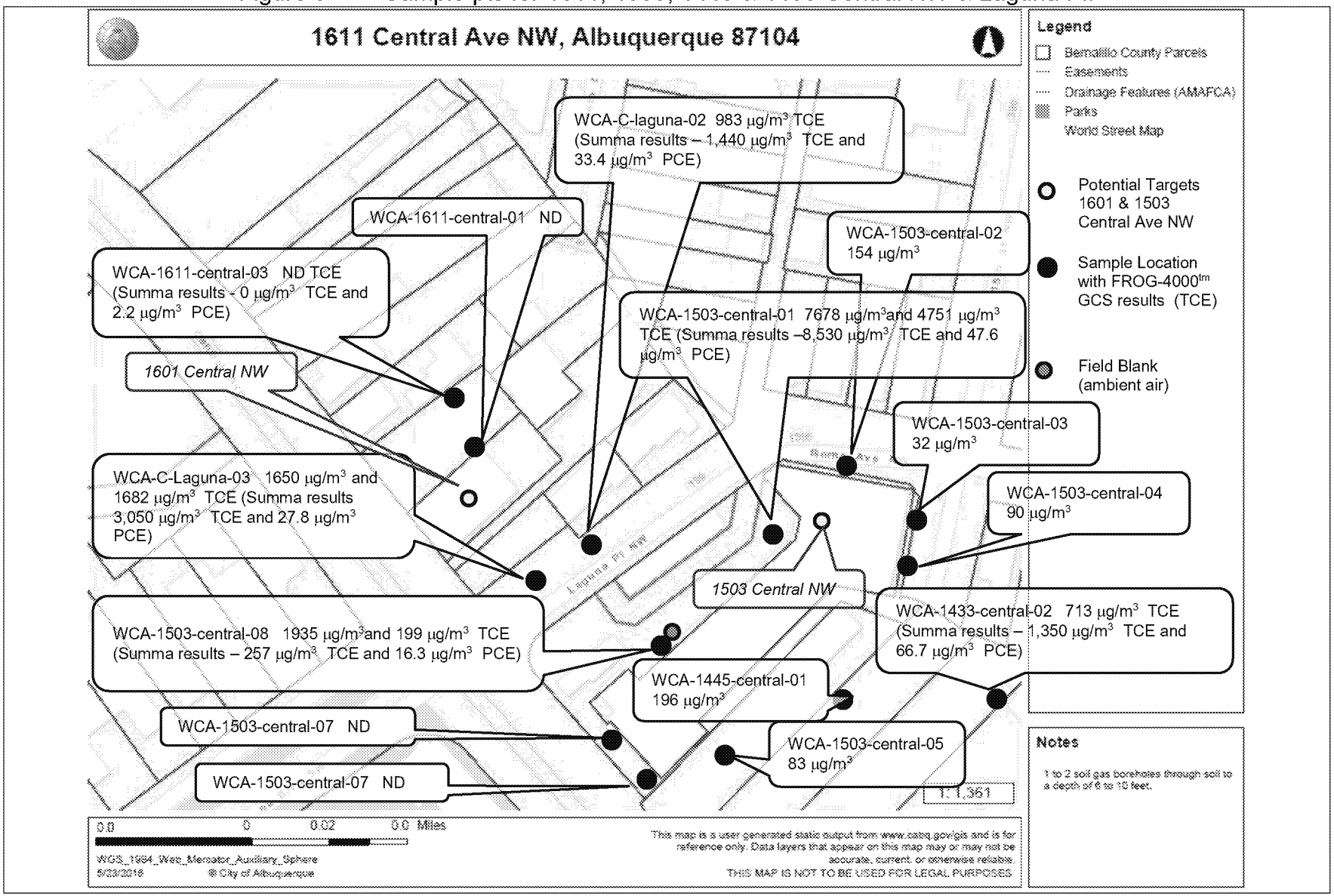

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Exhibit 5

Figure 10 Sample pts at 1445, 1433, & 1429 Central and 14 Street and Marquette

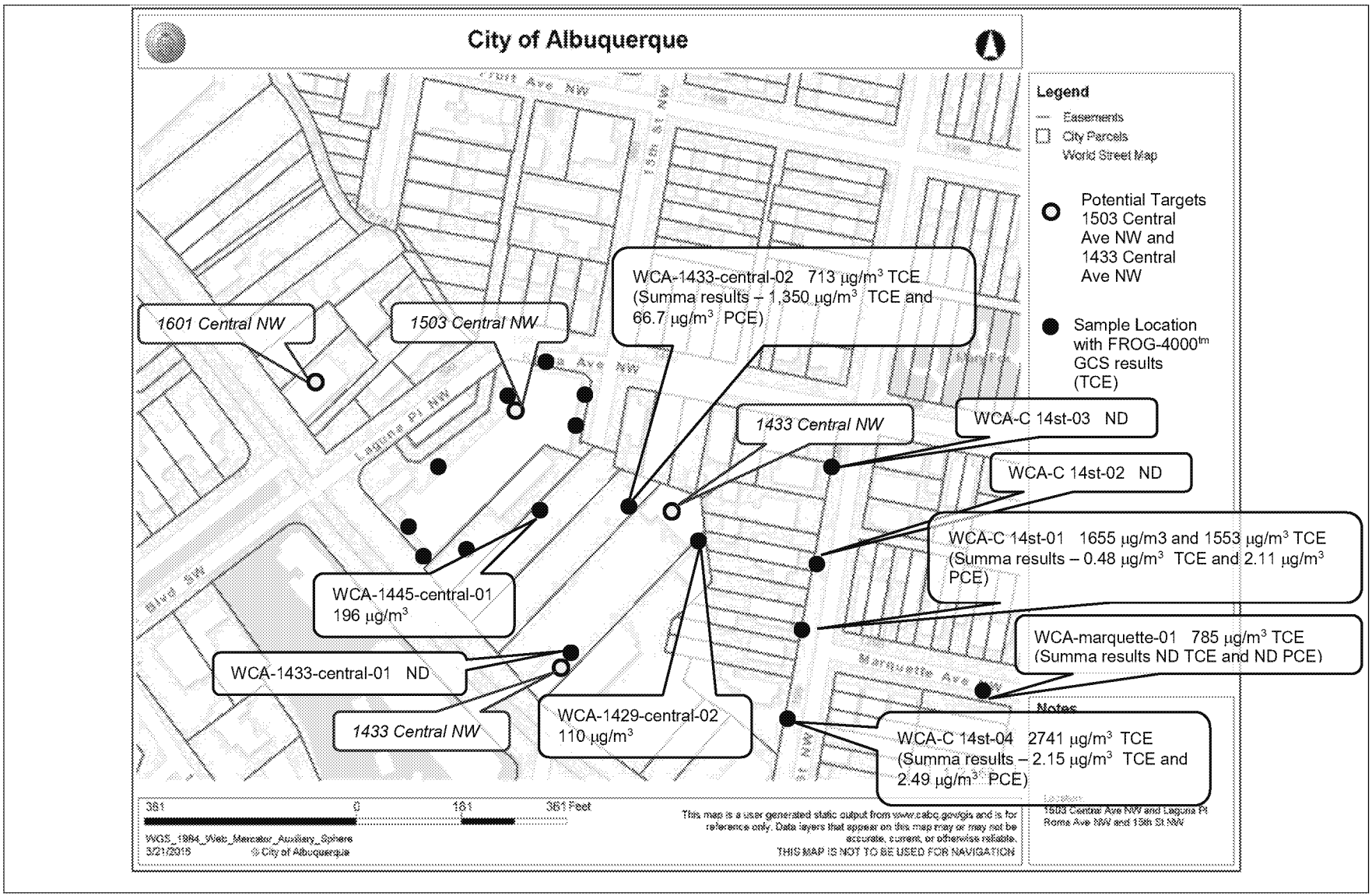

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Exhibit 6

Figure 11 ESI & SR Sample points at 1445, 1433, & 1429 Central NW

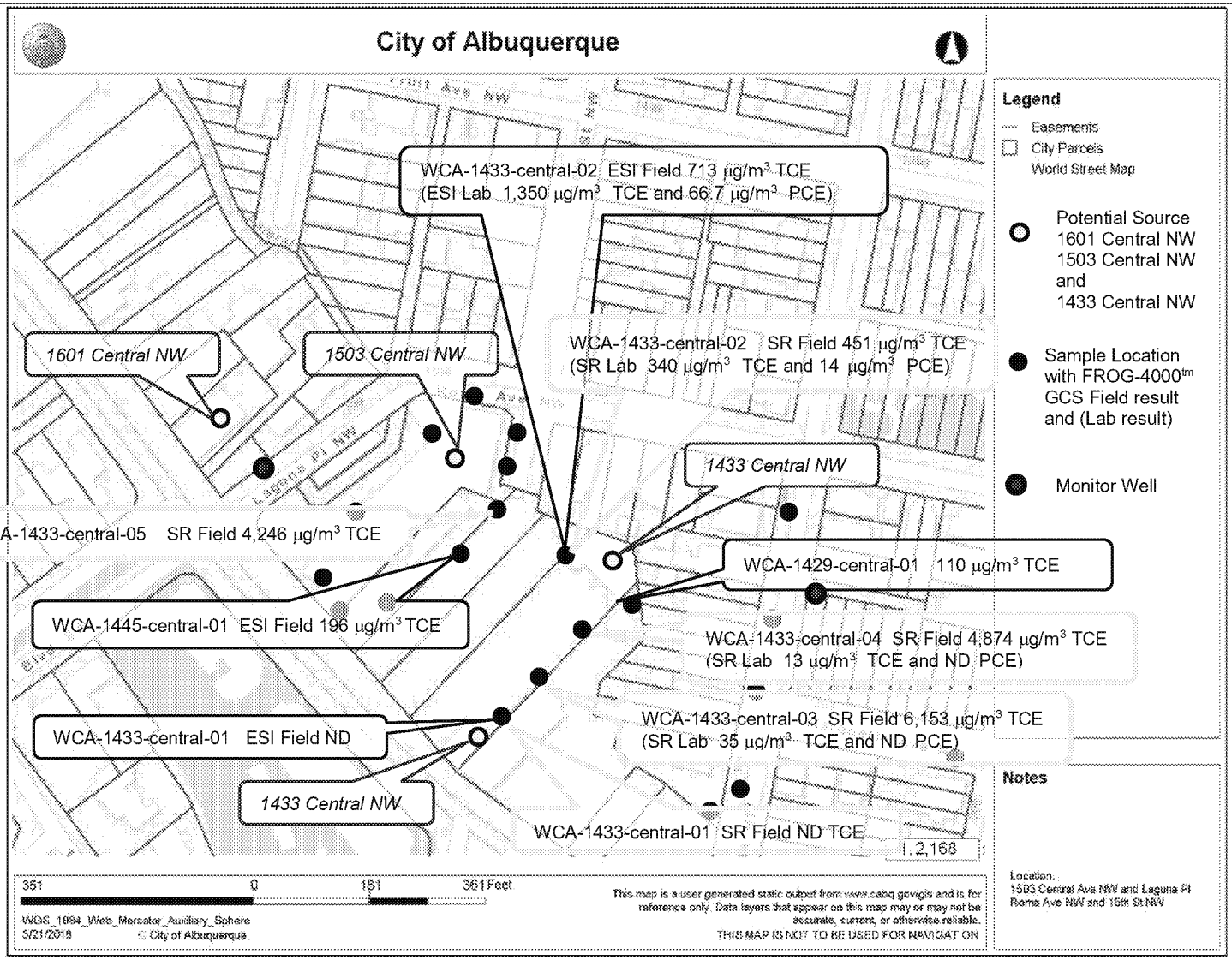

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EXHIBIT 7
SUMMARY OF SOIL VAPOR RESULTS AT BELL TRADING POST AND 1433 CENTRAL AVENUE NW, WEST CENTRAL AVENUE ALBUQUERQUE SITE

Sample Identification	Phase	Field Result		Laboratory Result		Notes
		TCE	PCE	TCE	PCE	
Upgradient Results						
WCA-1503-Central-01	ESI	7,678	4,751	8,530	47.6	Former Bell Trading Post
WCA-1503-Central-02	ESI	154	NR	NA	NA	
WCA-1503-Central-03	ESI	32	NR	NA	NA	
WCA-1503-Central-04	ESI	90	NR	NA	NA	
WCA-1503-Central-07	ESI	ND	NR	NA	NA	
WCA-1503-Central-08	ESI	1,935	199	257	16.3	Former Bell Trading Post
WCA-C-Laguna-02	ESI	983	NR	1,440	33.4	Laguna Boulevard
Site Results						
WCA-1445-Central-01	ESI	196	NR	NA	NA	
WCA-1433-Central-01	ESI	ND	ND	NA	NA	
WCA-1433-Central-02	ESI	713	NR	1,350	66.7	
WCA-1429-Central-01	ESI	110	NR	NA	NA	
WCA-1433-Central-01	SR	ND	NR	NA	NA	Collocated with ESI Sample
WCA-1433-Central-02	SR	451	NR	340	14	Collocated with ESI Sample
WCA-1433-Central-03	SR	6,153	NR	35	ND	
WCA-1433-Central-04	SR	4,874	NR	13	ND	
WCA-1433-Central-05	SR	4,246	NR	NA	NA	
NMED VISL (Residential)				**69.5**	**1,390**	
NMED VISL (Commercial)				**328**	**6,550**	

Notes:

Results in $\mu g/m^3$

ESI = Expanded Site Inspection

SR = Site Reassessment

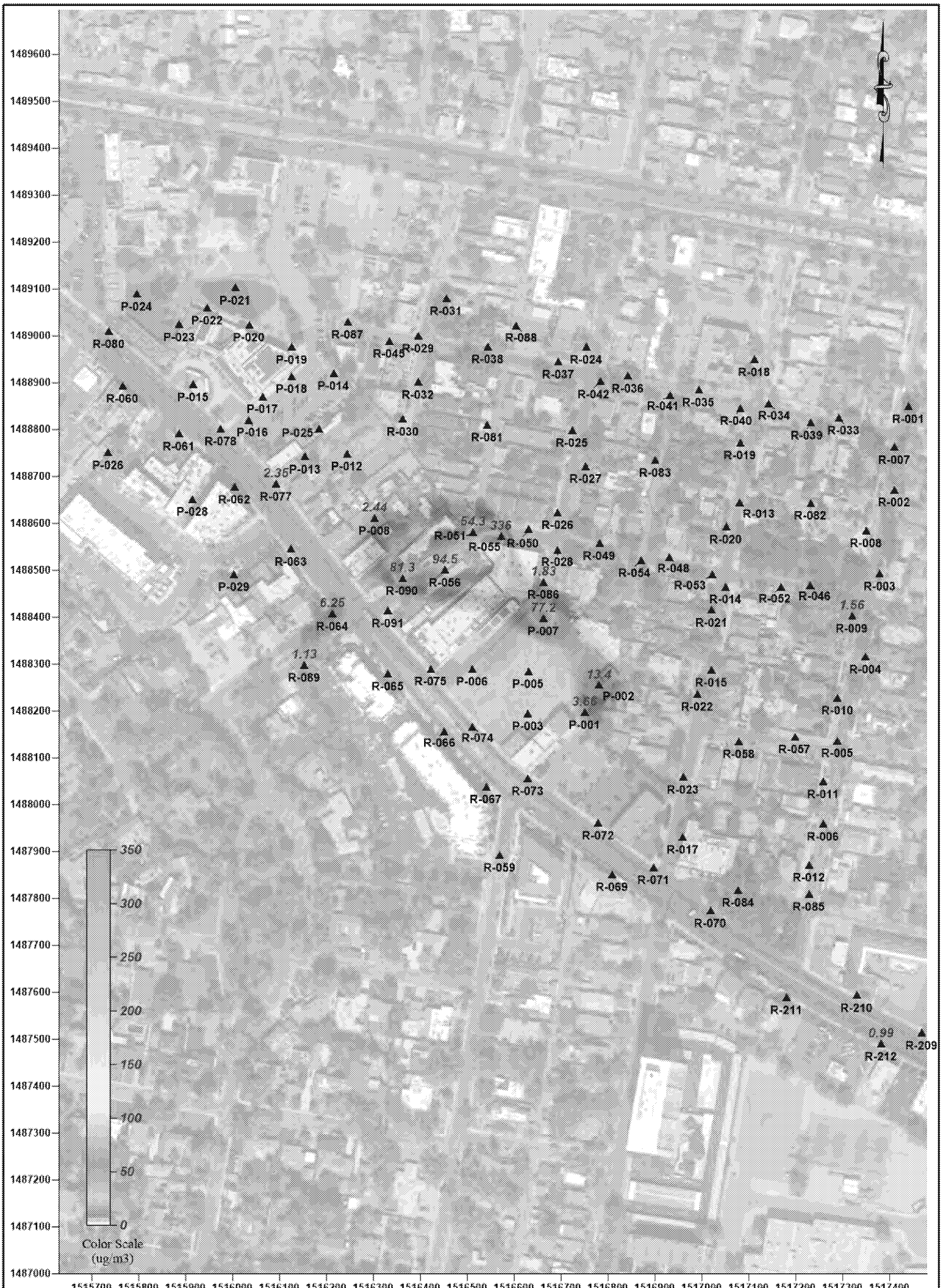
NR = Not Reported

NS = Not Sampled

ND = Non-detect

NMED VISL = New Mexico Environment Department Vapor Intrusion Screening Level

Exhibit 8



System: State Plane
Zone: New Mexico Central
Datum: NAD 1983
Coordinate Units: Feet

LEGEND

1,000 MICROGRAMS/CUBIC METER

▲ PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 200 400

Figure 3-1
Passive Soil-Gas Survey
Trichloroethene

West Central Avenue Site
Albuquerque, NM

BEACON ENVIRONMENTAL
2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-538-8780

Beacon Project No. 5860, October 2021

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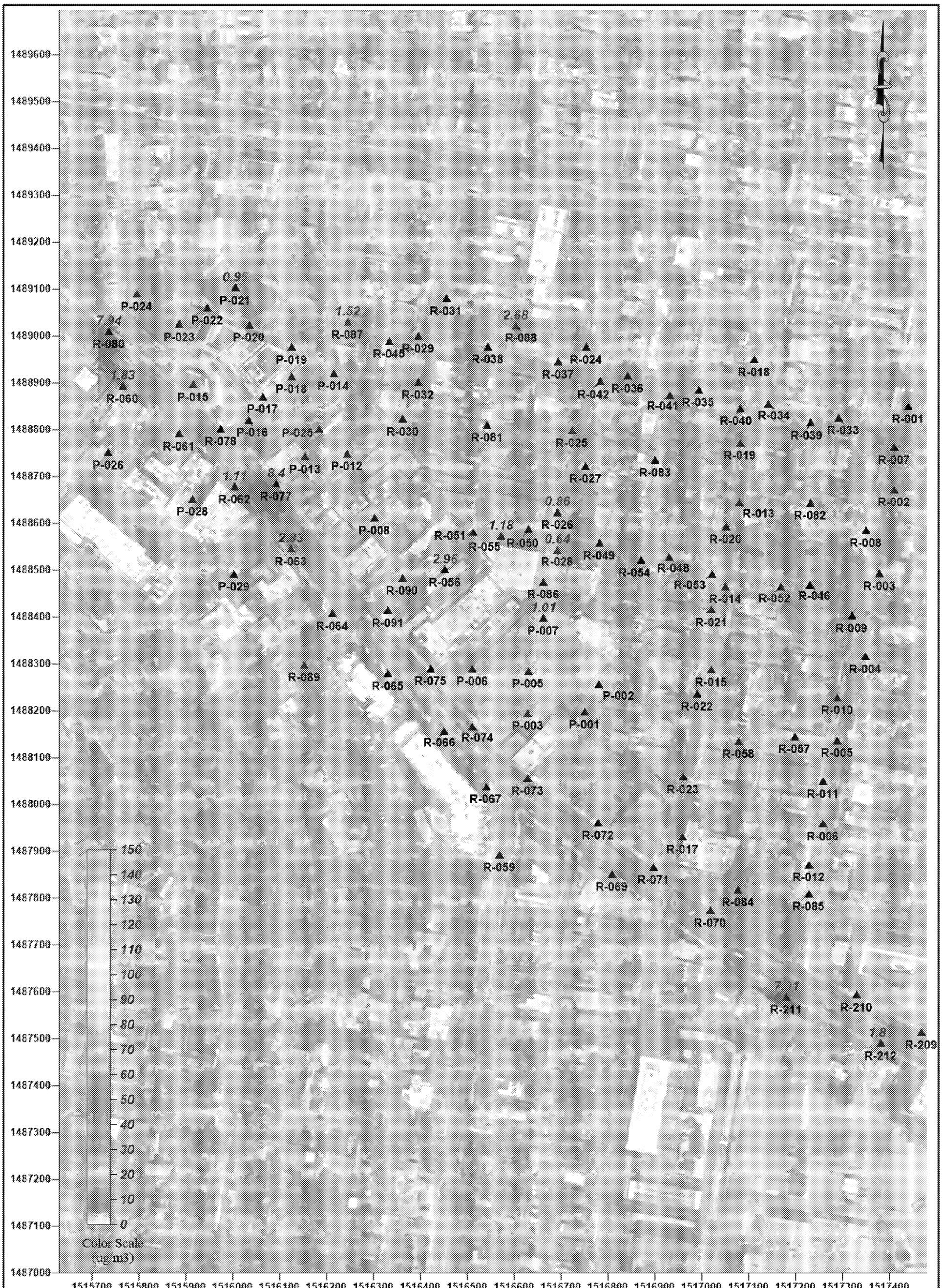
Exhibit 9



System: State Plane
Zone: New Mexico Central
Datum: NAD 1983
Coordinate Units: Feet

LEGEND

1,000 MICROGRAMS/CUBIC METER

▲ PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 200 400

Figure 4-1
Passive Soil-Gas Survey
Tetrachloroethene

West Central Avenue Site
Albuquerque, NM

BEACON ENVIRONMENTAL
2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-838-8780
Beacon Project No. 5860, October 2021

Exhibit 10

Table 1
Soil Gas Analytical Data
West Central Avenue Assessment
EPA Region 06

Analyte	CAS.NO	Units	R-050-81 7/14/2021 Roma Av FS	R-051-81 7/14/2021 Laguna Blvd and Roma Av FS	R-055-81 7/14/2021 Laguna Blvd and Roma Av FS	R-056-81 7/14/2021 Laguna Blvd FS	R-086-81 7/14/2021 15th St FS	R-090-81 7/14/2021 Laguna Blvd FS	R-091-81 7/19/2021 Central Av and Laguna Blvd FS	NMED Residential VISL	NMED Industril Commercial VISL
EPA 8260											
1,1,1-Trichloroethane	71-55-6	ug/m3	0.24 U	0.24 U	0.24 U	0.24 U	0.23 U	0.24 UJL	0.27 UJL	174,000	819,000
1,1-Dichloroethene	75-35-4	ug/m3	0.75 U	0.75 U	**2.21 JK**	**0.91**	0.73 U	**1.75 JL**	0.85 UJL	6,950	32,800
1,2,4-Trimethylbenzene	95-63-6	ug/m3	0.75 U	0.75 U	0.75 U	0.75 U	**0.79**	0.75 UJL	0.85 UJL	69.5	328
2-Methylnaphthalene	91-57-6	ug/m3	0.82 U	0.82 U	0.82 U	0.82 U	0.79 U	0.82 UJL	0.92 UJL	NA	NA
Benzene	71-43-2	ug/m3	1.17 U	**1.37**	1.17 U	1.17 U	1.13 U	**2.58 JL**	1.33 UJL	120	588
cis-1,2-Dichloroethene	156-59-2	ug/m3	0.47 U	**2.3**	**7.69 JK**	**1.59**	0.45 U	**10 JL**	0.53 UJL	NA	NA
Naphthalene	91-20-3	ug/m3	0.78 U	0.78 U	0.78 U	0.78 U	0.75 U	0.78 UJL	0.88 UJL	27.5	224
o-Xylene	95-47-6	ug/m3	0.7 U	0.71 U	0.7 U	0.71 U	**0.87**	0.71 UJL	0.8 UJL	3,480	16,400
p & m-Xylene[1]		ug/m3	0.7 U	**0.72**	0.7 U	0.71 U	**1.42**	0.71 UJL	0.8 UJL	3,480	16,400
Tetrachloroethene	127-18-4	ug/m3	0.61 U	0.61 U	**1.18**	**2.96**	0.59 U	0.61 UJL	0.69 UJL	1,390	6,550
Toluene	108-88-3	ug/m3	**2.3**	**3.95**	1.55 U	**3.13**	1.5 U	**1.75 JL**	1.76 UJL	174,000	819,000
TPH C10-C15		ug/m3	180 U	**517**	**182**	**335**	**197**	**569 JL**	**440 JL**	NA	NA
TPH C4-C9		ug/m3	210 U	**330**	210 U	**279**	204 U	**358 JL**	238 UJL	NA	NA
trans-1,2-Dichloroethene	156-60-5	ug/m3	0.56 U	**0.59**	**2.03 JK**	0.56 U	0.55 U	**2.58 JL**	0.64 UJL	2,090	9,830
Trichloroethene	79-01-6	ug/m3	0.75 U	**54.3**	**336**	**94.5**	**1.83**	**81.3**	0.85 UJL	69.5	328
Vinyl Chloride	75-01-4	ug/m3	0.31 U	0.31 U	0.31 U	0.31 U	0.3 U	0.31 UJL	0.35 UJL	55.9	1,040

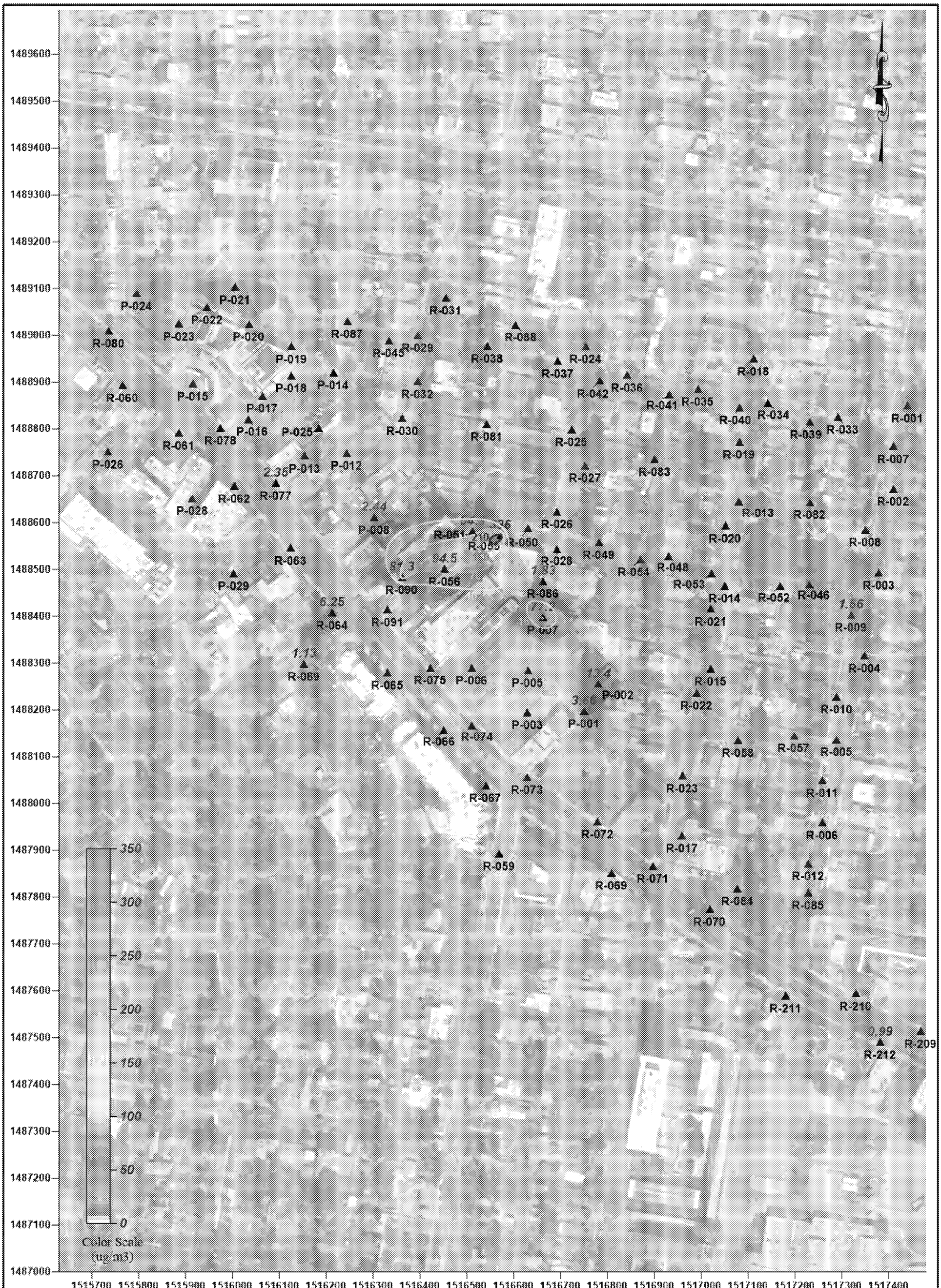
Notes:
U - Analyte was not detected
J - Value is an estimated quantity
L - Low Bias
H - High Bias
K - Unknown Bias
Q - The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.
1 VISLs applicable to para-, meta-, or combined para- and meta-xylene concentrations
Bolded values denote detected analytes
Yellow Highlighted values denoted analytes detected above minimum of screening values

Exhibit 11

Table 1
Soil Gas Analytical Data
West Central Avenue Assessment
EPA Region 06

Analyte	CAS.NO	Units	P-001-81 7/19/2021 1429 Central Av FS	P-002-81 7/19/2021 1429 Central Av FS	P-003-81 7/14/2021 1433 Central Av FS	P-005-81 7/14/2021 1435 Central Av FS	P-006-81 7/14/2021 1445 Central Av FS	P-007-81 7/14/2021 1445 Central Av FS	P-007-82 7/14/2021 1445 Central Av FD	NMED Residential VISL	NMED Industril Commercial VISL
EPA 8260											
1,1,1-Trichloroethane	71-55-6	ug/m3	0.28 U	**4.87 JL**	0.26 U	0.26 U	0.26 U	0.26 UJL	0.26 UJL	174,000	819,000
1,1-Dichloroethene	75-35-4	ug/m3	0.88 U	**18.8 JL**	0.84 U	0.84 U	0.84 U	0.84 UJL	**1.16 JL**	6,950	32,800
1,2,4-Trimethylbenzene	95-63-6	ug/m3	0.87 U	0.87 UJL	**2.64**	**1.51**	0.83 U	0.83 UJL	0.83 UJL	69.5	328
2-Methylnaphthalene	91-57-6	ug/m3	0.95 U	0.95 UJL	**1.27**	**4.31**	0.91 U	0.91 UJL	0.91 UJL	NA	NA
Benzene	71-43-2	ug/m3	1.37 U	**1.47 JL**	**1.4**	**4.74**	**1.37**	**2.56 JL**	**2.45 JL**	120	588
cis-1,2-Dichloroethene	156-59-2	ug/m3	0.55 U	0.55 UJL	0.52 U	0.52 U	0.52 U	**2.49 JK**	**4.26 JK**	NA	NA
Naphthalene	91-20-3	ug/m3	0.9 U	0.9 UJL	0.86 U	**2.52**	0.87 U	0.87 UJL	0.87 UJL	27.5	224
o-Xylene	95-47-6	ug/m3	0.82 U	0.82 UJL	0.79 U	**0.81**	**1.36**	0.79 UJL	0.79 UJL	3,480	16,400
p & m-Xylene[1]		ug/m3	0.82 U	0.82 UJL	**1.13**	**0.86**	**1.58**	0.79 UJL	0.79 UJL	3,480	16,400
Tetrachloroethene	127-18-4	ug/m3	0.71 U	0.71 UJL	0.67 U	0.67 U	0.68 U	**1.01 JL**	0.68 UJL	1,390	6,550
Toluene	108-88-3	ug/m3	1.81 U	**11.8 JL**	**5.87**	**3.19**	**5.16**	1.73 UJL	1.73 UJL	174,000	819,000
TPH C10-C15		ug/m3	210 U	**244 JL**	**855**	**775**	**1010**	**735 JL**	**661 JL**	NA	NA
TPH C4-C9		ug/m3	245 U	245 UJL	**400**	**331**	**536**	**463 JL**	**433 JL**	NA	NA
trans-1,2-Dichloroethene	156-60-5	ug/m3	0.66 U	0.66 UJL	0.63 U	0.63 U	0.63 U	**0.71 JL**	**1.41 JL**	2,090	9,830
Trichloroethene	79-01-6	ug/m3	**3.66**	**13.4 JL**	0.84 U	0.84 U	0.84 U	**77.2 JK**	**28.7 JK**	69.5	328
Vinyl Chloride	75-01-4	ug/m3	0.36 UJL	**1.14 JL**	0.34 UJK	0.34 UJK	0.34 UJK	0.34 UJK	0.34 UJK	55.9	1,040

Notes:
U - Analyte was not detected
J - Value is an estimated quantity
L - Low Bias
H - High Bias
K - Unknown Bias
Q - The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.
1 VISLs applicable to para-, meta-, or combined para- and meta-xylene concentrations
Bolded values denote detected analytes
Yellow Highlighted values denoted analytes detected above minimum of screening values



System: State Plane
Zone: New Mexico Central
Datum: NAD 1983
Coordinate Units: Feet

LEGEND

1,000 MICROGRAMS/CUBIC METER

▲ PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 200 400

Figure 3-1
Passive Soil-Gas Survey
Trichlororethene

West Central Avenue Site
Albuquerque, NM

BEACON ENVIRONMENTAL
2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-538-8780
Beacon Project No. 5860, October 2021

Message

From: Turner, LaDonna [turner.ladonna@epa.gov]
Sent: 4/9/2020 12:57:39 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: FW: Updated West Central Avenue Proposed Sample Location Maps
Attachments: Figure Soil Gas Sample Location Map_1.pdf; Figure Soil Gas Sample Location Map_4.pdf; Figure Soil Gas Sample Location Map_3.pdf; Figure Soil Gas Sample Location Map_2.pdf; Figure Soil Gas Sample Location Overview Map.pdf; Figure Soil Gas TCE Sample Location Map_2.pdf

Hi Gary.

Hope you are doing well, all is well on my end. I was wondering if you would want me to forward these to Martyne at NMED and see if she has any comments/suggestions.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Wednesday, April 08, 2020 3:43 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Cc: Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>; Steven Cowan <SCowan@css-inc.com>; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: Updated West Central Avenue Proposed Sample Location Maps

Gary/LaDonna/Michelle,
Attached are updated proposed sample location maps to include proposed locations on privately properties located northwest and east of the site. Please let me know if you have any questions or concerns. If we are in agreement with the proposed locations we will move forward with wrapping up the QASP for submittal to TeamLink and finish the cost estimate. Please let me know if you have any questions or concerns. Thanks

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 7)
- PROPOSED ROAD SAMPLES (n = 51)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_1.mxd 3:07:37 PM 4/8/2020 dsguentin

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 7)
- PROPOSED ROAD SAMPLES (n = 56)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 4
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_4_FIXED.mxd 3:13:27 PM 4/8/2020 dequentin

ED_013172_00000086-00001

WCA-1429-CENTRAL-01
WCA-C-14ST-02
WCA-1433-CENTRAL-03
WCA-1433-CENTRAL-01
WCA-C 14ST-01
Marquette Ave NW
WCA-C-14ST-04
14th St NW
13th St NW
WCA-C-MARQUETTE-01
Central Ave SW
Central Ave NW
Tijeras Ave NW
WCA-1404-CENTRAL-01
WCA-1404-CENTRAL-02
15th St SW
12th St NW
US Hwy 66
San Cristobal Rd SW
14th St SW
Kent Ave NW
WCA-1122-CENTRAL-01
WCA-1202-CENTRAL-01
Los Alamos Ave SW

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 4)
- PROPOSED ROAD SAMPLES (n = 66)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200
FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 3
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_3.mxd 2:59:47 PM 4/8/2020 dsguentin

ED_013172_00000087-00001

Fruit Ave NW

15th St NW

14th St NW

13th St NW

Roma Ave NW

Marquette Ave NW

WCA-1503-CENTRAL-02

WCA-1503-CENTRAL-03

WCA-1503-CENTRAL-01

WCA-1503-CENTRAL-04

WCA-1433-CENTRAL-05

WCA-C-14ST-03

WCA-1433-CENTRAL-02

WCA-1445-CENTRAL-01

WCA-1611-CENTRAL-03

WCA-1429-CENTRAL-01

WCA-C-14ST-02

WCA-1433-CENTRAL-03

WCA-C 14ST-01

WCA-1433-CENTRAL-01

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 7)
- PROPOSED ROAD SAMPLES (n = 160)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Map_2.mxd 3:19:48 PM 4/8/2020 dequentin

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 14)
- PROPOSED ROAD SAMPLES (n = 269)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 200 400

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Overview Map.mxd 2:46:28 PM 4/8/2020 dequentin

LEGEND

- SOIL GAS SAMPLES
- PROPOSED ROAD SAMPLES (n = 160)
- PCE SOIL GAS 2 ug/m^3 EXTENT

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 150 300

FEET

SOURCE: BING AERIAL, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MARCH 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_2.mxd 2:48:39 PM 3/30/2020 dsguentin

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 4/9/2020 5:51:10 PM
To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
CC: Steven Cowan [SCowan@css-inc.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; DeGuenther, Michael [Michael.DeGuenther@WestonSolutions.com]
Subject: Revised West Central Avenue Proposed Sample Location Map
Attachments: Figure Soil Gas TCE Sample Location Map_2.pdf; Private_Property_Ownership_Info_MD_Edit.xlsx

Gary/LaDonna/Michelle,
Attached is the updated proposed sample location map for the soil gas plume located east of the site. I have also attached property ownership and mailing information for the property owners where we currently have proposed sample locations. Please let me know if you have any questions or need any additional information. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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LEGEND

- SOIL GAS SAMPLES
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 40)
- PROPOSED ROAD SAMPLES (n = 143)
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TAX PARCELS

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100

NOTES:
1. All results are in ug/m³.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 150 300

FEET

SOURCE: BING AERIAL, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_2.mxd 12:09:30 PM 4/9/2020 dleguentin

OWNER	LOCATION	CITY	STATE
REMBE PROPERTIES LLC C/O JAY REMBE	1701 CENTRAL AVE NW	ALBUQUERQUE	NM
GARCIA WILFRED F & CLARA T (ESTATES OF)	1623 CENTRAL AVE NW	ALBUQUERQUE	NM
FERNANDEZ JOSHUA & JENNIFER E REGENSBERG	1611 CENTRAL AVE NW	ALBUQUERQUE	NM
ICS HOLDINGS LLC	115 1/2 LAGUNA BLVD NW	ALBUQUERQUE	NM
MANZANO DAY SCHOOL	1707 CENTRAL AVE NW	ALBUQUERQUE	NM
GXL INV CO INC ETAL	1435 CENTRAL AVE NW	ALBUQUERQUE	NM
G L INVESTMENT CO	1445 CENTRAL AVE NW	ALBUQUERQUE	NM
CIBOLA ENERGY CORPORATION	1429 CENTRAL AVE NW	ALBUQUERQUE	NM
G & L INV CO INC	1433 CENTRAL AVE NW	ALBUQUERQUE	NM
GARCIA EDWARD M	1617 CENTRAL AVE NW	ALBUQUERQUE	NM
VIGIL DOLORES PATRICIA	1615 CENTRAL AVE NW	ALBUQUERQUE	NM
RAWLEY JAMES	1014 CENTRAL AVE SW	ALBUQUERQUE	NM
BOARD OF EDUCATION	1101 PARK AVE SW	ALBUQUERQUE	NM

ZIP
87104
87104
87104 1139
87104
87104 1141
87104 1148
87104 1148
87104 1148
87104 1148
87104
87104
87102 2905
87102 2967

PROPERTY_DESC
MAP 38 TRACT 107 C
TRACT 106 & A PORT OF ABANDONED ALBUQUERQUE DITCH MRGCD MAP #38 CONT 0.3222 AC M/L OR 14,035 SQ FT M,
MAP 38 TRACT 104
MAP 38 TRACT 102
MAP 38 TRACT 108
TR 93 MAP 38
* 001 WEST END ADD
TR A PLAT OF TR A LANDS OF CIBOLA ENERGY CORPORATION & LOTS 19-A & 20-A BLK 17 PEREA ADDITION CONT .7511 A
TR 92 MAP 38
TR 105A MRGCD MAP 38 TOGETHER WITH A PORT OF ABANDONED DITCH
MAP 38 TR 105 B 2 CONTS 0.17 AC
* 008 050NEW MEX TOWNSITE THRU L10 & E15 FT L11
TR 119A2A MAP 40

PIN	MAILING_ADDRESS	MAILING_CITY	MAILING_STATE	MAILING_ZIP	WESTON_ID
ABQ126297	1718 CENTRAL AVE SW SUITE A	ALBUQUERQUE	NM	87104 1165	WPI-01
ABQ126231	24322 DEL PRADO	DANA POINT	CA	92629 2713	WPI-02
ABQ126914	1114 TOMAS ST SW	ALBUQUERQUE	NM	87121 8064	WPI-03
ABQ126733	P O BOX 7308	ALBUQUERQUE	NM	87194 7308	WPI-04
ABQ125489	1801 CENTRAL AVE NW	ALBUQUERQUE	NM	87104	WPI-05
ABQ127967	317 6TH ST NW	ALBUQUERQUE	NM	87102	WPI-06
ABQ128510	317 6TH ST NW	ALBUQUERQUE	NM	87102	WPI-07
ABQ129135	PO BOX 1668	ALBUQUERQUE	NM	87103 1668	WPI-08
ABQ128585	317 6TH ST NW	ALBUQUERQUE	NM	87102	WPI-09
ABQ126633	1617 CENTRAL AVE NW	ALBUQUERQUE	NM	87104 1139	WPI-10
ABQ126382	8626 PLYMOUTH ROCK RD NE	ALBUQUERQUE	NM	87109 5074	WPI-11
ABQ133965	919 GOLD AVE SW	ALBUQUERQUE	NM	87102 3082	WPI-12
ABQ134202	PO BOX 25704	ALBUQUERQUE	NM	87125 0704	WPI-13

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 4/29/2020 8:08:07 PM
To: 'Cobb, Derrick' [Derrick.Cobb@WestonSolutions.com]
Subject: RE: Revised West Central Avenue Proposed Sample Location Maps
Attachments: Figure Soil Gas Sample Location Overview Map_2.pdf

I added some additional private property samples that should show up as yellow triangles. As we discussed, you were going to try to optimize the samples again and take a look at 150 ft spacing. As I mentioned, we need to really look at the spacing we have for the private property sampling. Lets get what we think we need .

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Wednesday, April 29, 2020 11:50 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: RE: Revised West Central Avenue Proposed Sample Location Maps

Gary,
Attached is an overview map that shows all the proposed sample locations. On the viewer I am still working with David Cook on getting it populated and up and running.

I feel like we might still be a little heavy in the areas that NMED requested on our most recent conference call. I will go back and see where we can optimize sampling.

Another option would be to scale back the number of samples across the entire site as an initial screening of the area. Evaluate that data and then go back and fill in data gaps that we may see after the initial phase. Our approach to this point has been to try and not have any data gaps after the initial phase.

Right now I believe everything is based on 100-foot spacing so adjustments would be scalable. As we have made adjustments in the sampling approach I have asked the GIS group to create new layers each time as opposed to editing the layer and then possibly having to recreate stuff if we change our minds. So creating new maps should not be an issue if you want to look at different spacing.

I will work up a budgetary estimate to execute the existing scope and get it over to you as soon as I can.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, April 29, 2020 10:57 AM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: RE: Revised West Central Avenue Proposed Sample Location Maps

**** External Email ****
Derrick, Is there a chance I can get a map which shows the entire sampling area summary map (combine the maps). I need an overall perspective. Do you have a status of the viewer?

Also, I want to make sure that we are not overkilling our sampling so can you take a look and see that we are good. What would be the impact of increasing the distance between sample locations (not asking for this to be done but want to inquire)?

Also, can I get a sampling count and a rough estimate to execute?

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, April 21, 2020 12:13 AM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Cc: Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: Revised West Central Avenue Proposed Sample Location Maps

Gary/LaDonna/Michelle,
Attached are revised proposed sample location maps based on our conference call with NMED last week. We have also created a new overview map that shows relationship and scale between the investigation areas. Please let me know if you have any questions or need any additional information. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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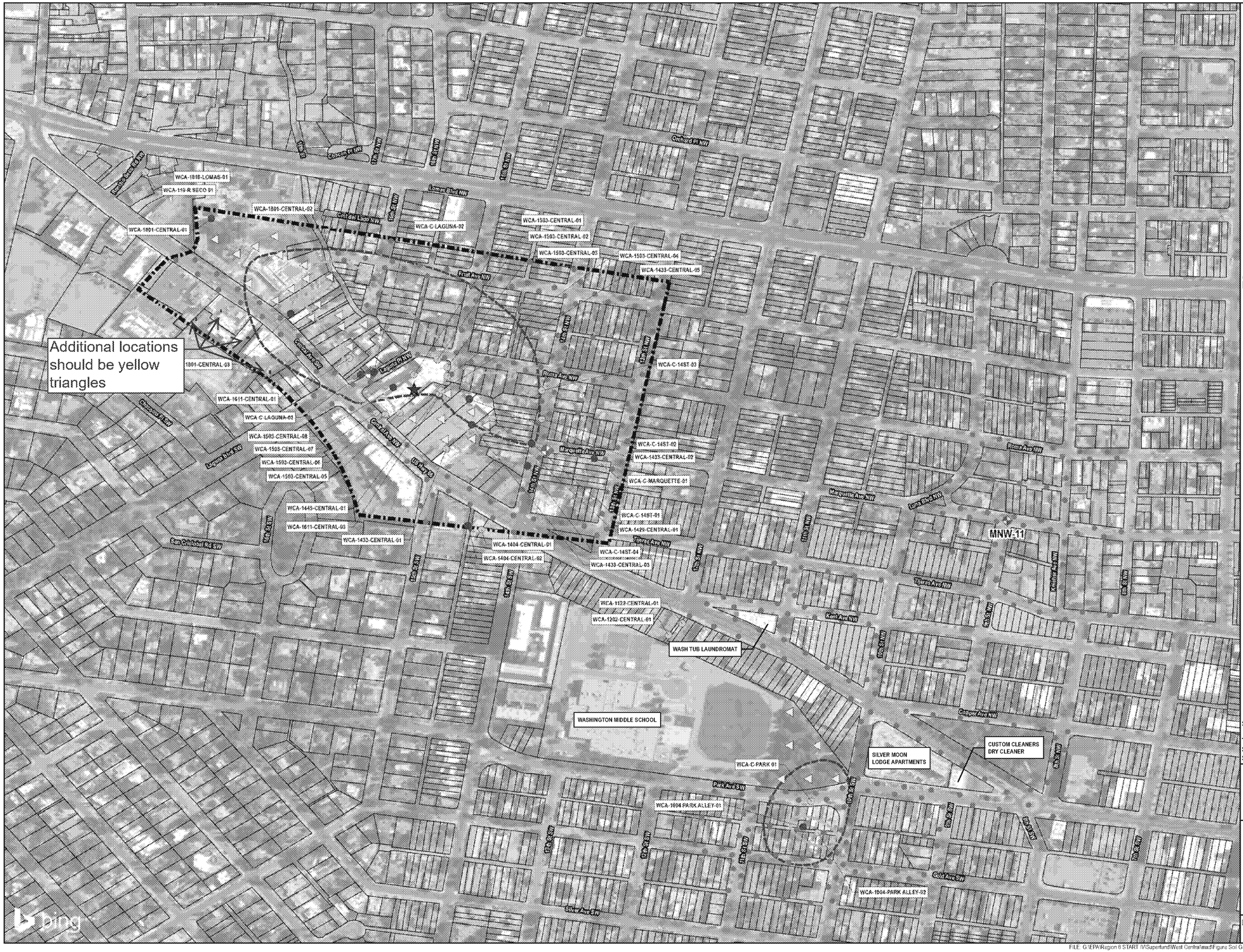

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 31)
- PROPOSED ROAD SAMPLES (n = 300)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:

1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 400 800

FEET

SOURCE: © NEARMAP, 2019

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas Sample Location Overview Map_WORKING.mxd 11:16:26 PM 4/20/2020 degaertm

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 5/8/2020 12:46:03 AM
To: Petersen, Chris [petersen.chris@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Rauscher, Jon [Rauscher.Jon@epa.gov]
Subject: West Central Avenue Plume (TCE/PCE)
Attachments: Figure Soil Gas Sample Location Overview Map_2.pdf

Chris/Bryant:

We are close to getting our sampling maps finalized for this site. I wanted to give you and update (see map)

The cost to execute this assessment is as follows:

Task 1 – Planning: $23,028
Task 2 – Labor (Field Sampling): $30,451
Task 3 – Expenses: $84,109
Task 5 – Report Prep: $38,214
TOTAL: $175,802

You guys need to let me know if you are good with proceeding with this before I move further along.

thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

LEGEND

SOIL GAS SAMPLE LOCATION

- ANALYTICAL DATA
- FIELD SCREENING DATA
- PRIVATE PROPERTY PROPOSED SAMPLES (n = 35)
- PROPOSED ROAD SAMPLES (n = 207)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT
- AREA OF INVESTIGATION
- TAX PARCELS

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 400 800

FEET

SOURCE: BING AERIAL, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure Soil Gas Sample Location Overview Map_2.mxd 8:26:00 AM 5/5/2020 dsguenth

Message

From: Turner, LaDonna [turner.ladonna@epa.gov]
Sent: 5/7/2020 3:09:15 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: FW: Informative Door Hangers West Central Ave
Attachments: Door Hangers.pub

Hi Gary.

Attached are the neighborhood door notices that NMED distributed in the areas they were working a few years ago. I don't know if Weston wants to do one or I could ask Martyne to do one and distribute since she is local.

Here are the comments from NMED on the last set up maps from Weston:

The maps look great. .... Still so many points. I like the private property coverage that should help define the two former Jewelry locations at 1611 and 1503 better. I also like the coverage at the Manzano Day School and the points further back along the old acequia trace on those private lots.

There appears to be good coverage connecting all of the sites: Park Ave cleaners, Custom cleaners, Wash Tub and MNW-11 well together. We will see if there is any pattern there or not that develops there.

Only positive feedback. Let me know if you have any questions.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Tuesday, April 28, 2020 2:43 PM
To: Nguyen, Stephen <Stephen.Nguyen@WestonSolutions.com>
Cc: Turner, LaDonna <turner.ladonna@epa.gov>; Rivera, Sabino, NMENV <sabino.rivera@state.nm.us>
Subject: FW: Informative Door Hangers West Central Ave

Door hanger example from 2016

From: Kieling, Martyne, NMENV
Sent: Thursday, July 7, 2016 2:38 PM
To: Hunter, Michelle, NMENV <Michelle.Hunter@state.nm.us>; Majure, Allison, NMENV <Allison.Majure@state.nm.us>
Cc: Garman, Mark, NMENV <Mark.Garman@state.nm.us>
Subject: RE: Informative Door Hangers West Central Ave

Allison,
I have made one adjustment to the flyer please review this one.
Thank you.

Martyne Kieling
Superfund Oversight Section
Ground Water Quality Bureau
New Mexico Environment Department
505-827-2340

From: Kieling, Martyne, NMENV
Sent: Thursday, July 07, 2016 2:29 PM
To: Hunter, Michelle, NMENV; Majure, Allison, NMENV
Cc: Garman, Mark, NMENV
Subject: Informative Door Hangers West Central Ave
Importance: High

Michelle & Allison,

As required by the City of Albuquerque Drilling/Barricading permit for the West Central Avenue Soil Gas sampling event Scheduled for July 17-21 and July 25, 2016. I need to notify residents with a printed flyer at least three days prior to work being performed. The city suggested that I do door hangers as affective method. The attached file has the hanger that I have created. Mark Garman has reviewed and has given his ok to forward on for review. These will be printed on cardstock and sliced into thirds.

I am planning on a meeting in Albuquerque on Tuesday morning **July 12**. With utility companies for the "811 Area Wide ONE CALL Meeting". I would like the flyers to be available to distribute on that day as I plan to be walking and marking all 50 drill locations at that time.

Allison please let me know if you should be contact other than me. The postcard that I distributed 2 years ago door to door had my info on it.

Please review and let me know what changes are needed.
Thank you!

Martyne Kieling
Superfund Oversight Section
Ground Water Quality Bureau
New Mexico Environment Department
505-827-2340

New Mexico Environment Department Ground Water Quality Bureau

The New Mexico Environment Department (NMED) is currently investigating the presence of chlorinated solvents, including trichloroethene (TCE), in the ground water in the West Central Avenue area. The NMED will be conducting a sampling event that includes drilling small, one inch boreholes and sampling soil vapors in your neighborhood on July 17 through 21 and July 25, 2016. The work performed will be on City of Albuquerque property between the curb and sidewalk. The work is being performed under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLIS) ID# NMN000607372.

The NMED is requesting your understanding while our sampling is underway. If you have questions, please contact Martyne Kieling at martyne.kieling@state.nm.us or phone 505-827-2340. Thank you for your assistance and patients.

New Mexico Environment Department Ground Water Quality Bureau

The New Mexico Environment Department (NMED) is currently investigating the presence of chlorinated solvents, including, trchloroethene (TCE), in the ground water in the West Central Avenue area. The NMED will be conducting a sampling event that includes drilling small, 1 inch boreholes and sampling soil vapors in your neighborhood on July 17 through 21 and July 25, 2016. The work performed will be on City of Albuquerque property between the curb and sidewalk. The work is being performed under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLIS) ID# NMN000607372.

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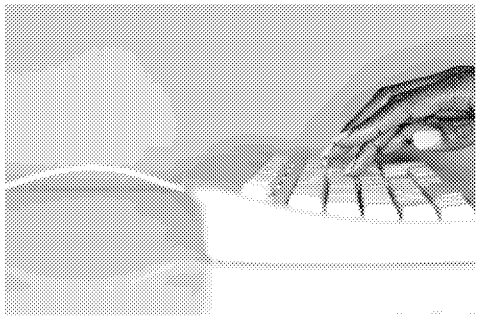

Main Inside Heading

The most important information is included here on the inside panels. Use these panels to introduce your organization and describe specific products or services. This text should be brief and should entice the reader to want to know more about the product or service.

You can use secondary headings to organize your text to make it more scannable for the reader.

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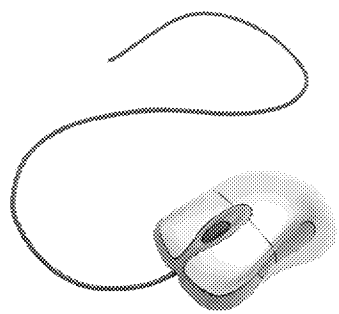

Caption describing picture or graphic

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Message

From: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Sent: 1/24/2020 6:10:39 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: FW: Older WCA Bell Trading Post Reports

LaDonna & Gary,
It looks like forwarding will work I just tried it in house.
Here are the West Central Documents (3)

Look for the other set in another email.

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Ph. 505-827-2340
www.env.nm.gov
Innovation|Science|Collaboration|Compliance

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Thursday, January 23, 2020 2:13 PM
To: turner.ladonna@epa.gov
Subject: Older WCA Bell Trading Post Reports

You have received 3 secure files from martyne.kieling@state.nm.us.
Use the secure links below to download.

LaDonna,

The Older WCA Bell Trading Post Reports.

Secure File Downloads:

Available until: **06 February 2020**

Click links to download:

Bell Phase II_FINAL_06_30_14 rev 1.pdf
5.22 MB, Fingerprint: 082b4c1982c336377a78bbbc4b185ff0 (What is this?)

Bell Trading Post Phase II ESA 2001 Report complete file.pdf
6.34 MB, Fingerprint: b15daf2737299875fca4f292560c25bf (What is this?)

COA_BELL_VRCR_Final_09_28_05_final.pdf
28.94 MB, Fingerprint: 27ce4f8a6bf3f8dacc3adda3b277e0d9 (What is this?)

You have received attachment link(s) within this email sent via Accellion Secure File Transfer. To retrieve the attachment(s), please click on the link(s)

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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 4/15/2020 4:08:21 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: FW: W. Central Figs
Attachments: Figure 4-3 - Soil Gas Plume Boundary Map.pdf; Figure 2-2 - Groundwater Plume Map.pdf

FYI

From: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Sent: Wednesday, April 15, 2020 10:43 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: W. Central Figs

FYI – figures I have developed during scoring strategy

Michelle Delgado-Brown
Site Assessment Manager
Superfund Division
U.S. EPA, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102
214-665-3154
DelgadoBrown.Michelle@epa.gov

Message

From: Turner, LaDonna [turner.ladonna@epa.gov]
Sent: 1/21/2020 9:25:19 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: FW: West Central Plume ESI Report
Attachments: Final - ESI Report WCA-ABQ 112016.pdf; Final cover letter WCA ESI Signed.pdf

FYI -

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Friday, August 30, 2019 12:41 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: West Central Plume ESI Report

LaDonna,

Attached is the WCA ESI and Cover letter. I don't have the Attachments in electronic format. Only in hard copy. Do you want me to scan or Will Weston Scan the Hard copy that you have.

Doing good here ☺
Martyne

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Friday, August 30, 2019 11:33 AM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Plume ESI Report

Hi Martyne.

Hope you are doing well. I need to forward the ESI report for West Central Plume to Weston but I don't have it electronically. Do you have an electronic copy of the report and attachments electronically that you could forward to me?

Have a good weekend.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

EXPANDED SITE INSPECTION REPORT
WEST CENTRAL AVENUE, ALBUQUERQUE
CERCLIS ID # NMN000607372
BERNALILLO COUNTY, NEW MEXICO

November 2016

New Mexico Environment Department
Ground Water Quality Bureau
Superfund Oversight Section

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Acronyms that may be used in this Document

Acronym	Description
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
amsl	above mean sea level
ATD	Automated Thermal Desorption (GCMS)
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
btoc	below top of casing
BTP	Bell Trading Post
cc	cubic centimeter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CGI	combustible gas indicator
GCS	Gas Chromatography System
cis-1,2-DCE	cis-1,2-dichloroethene
City	City of Albuquerque
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
CRQL	contract required quantitation limit
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
ESC	ESC Lab Sciences
ESB	Environmental Services Branch
ESL	environmental screening level
ESI	expanded site inspection
FAP	Fruit Avenue Plume Superfund Site
FD	field duplicate
FHDC	Family Housing Development Corporation
FROG	FROG-4000^{tm} GCS
ft	feet or foot
ft2	square feet
ft3	cubic feet
gal	gallons
gal/min	gallons/minutes
GCMS	gas chromatograph/mass spectrometer
GCS	Gas Chromatography System
GWQB	Ground Water Quality Bureau
HRS	Hazard Ranking System
ID	identification number
IDW	investigation-derived waste

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Acronym	Description
INTERA	INTERA Incorporated
LTRA	Long Term Remedial Action
µg/m3	microgram per cubic meter
µg/L	microgram per liter
mg/kg	milligram per kilogram
mL/minute	milliliter per minute
MDL	method detection limit
MS/MSD	matrix spike and matrix spike duplicate
MSA	Minimum Site Assessment
msl	mean sea level
MTBE	methyl-t-butyl ether
MCL	maximum contaminant level
NOAA	National Oceanic Atmospheric Administration
NMED	New Mexico Environment Department
NMWQCC.	New Mexico Water Quality Control Commission
OSE	New Mexico Office of the State Engineer
OWS	oil water separator
PA	Preliminary Assessment
P&A	plug and abandoned
PCE	tetrachloroethene
PID	photoionization detector
PPE	personal protective equipment
PRT	Post-Run Tubing
PSG	passive soil gas
PSTB	Petroleum Storage Tank Bureau (New Mexico Environment Department)
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	Remediation Oversight Section
RPD	relative percent difference
RSL	regional screening level
SAP	sampling and analysis plan
SCDM	Superfund Chemical Data Matrix
SI	Sight Investigation
Site	West Central Avenue, Albuquerque, New Mexico
SIM	Select Ion Monitoring
SG	soil gas
SJC	San Juan Chama Drinking Water Project
SOS	Superfund Oversight Section

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Acronym	Description
SOP	standard operating procedure
SSL	soil screening level
TCE	trichloroethene
1,1,1-TCA	1,1,1-trichloroethane
trans-1,2-DCE	trans-1,2-dichloroethene
USC	United States Code
UST	underground storage tank
VC	vinyl chloride
VISL	vapor intrusion screening level
VOC	Volatile organic compound
WCA	West Central Avenue

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Environmental Standards Relevant to Analytical Results in this Document

	MCL[1]	NMWQCC[2] Standard	EPA[3] Target Sub-Slab and Exterior Soil Gas Concentration		EPA[4] Target Indoor Air Concentration for Carcinogens		EPA[5] Target Indoor Air Concentration for Non-Carcinogens	
Analyte	Ground Water µg/L	Ground Water µg/L	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3
PCE	5	20	360	1600	11	47	42	180
TCE	5	100	16	100	0.48	3	2.1	8.8
cis-1,2-DCE	70	-	-		-		-	
trans-1,2-DCE	100	-	-	-	-		-	
Vinyl Chloride	2	1	5.6	93	0.17	2.8	100	440
1,1,1-TCA	200	60	1.7E+05	7.3E+05	5200	2.2E+04	1.22	2.2E+04
1,4Dioxane	-	-	19	82	0.56	2.5	31	130

1 Federal Drinking Water Maximum Contaminant Level (Ref. 7)
2 New Mexico Water Quality Control Commission (Ref. 8)
3 Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations -Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 38)
4 Federal Regional Indoor Air Screening Level 3.5.1 (May 2016 RSLs) Target Risk for Carcinogens (TCR) @ 1E-06 (Ref. 38)
5 Federal Regional Indoor Air Screening Level 3.5.1 (May 2016 RSLs) Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 38)
- No NMWQCC ground water standards, no inhalation toxicity information (Ref. 8 and Ref. 38)

Target Sub-Slab and Exterior Soil Gas Concentration @ Target Risk for Carcinogens (TCR)=1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 38)

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1.0 Introduction

Under the authority of the CERCLA, as amended, 42 USC §§ 9601 to 9675 CERCLA, the NMED SOS conducted an ESI of the West Central Avenue site (Site) in Albuquerque, Bernalillo County, New Mexico (Figure 1, and Figure 2), CERCLIS ID# NMN000607372. The scope of the ESI consisted of collecting soil vapor samples from identified potential source areas along West Central Avenue and near known chlorinated solvent impacted ground water locations (Figure 3). This ESI Report summarizes the sampling performed to obtain analytical data for the identification of potential source areas, and for evaluation using the HRS (Ref. 1) and the SCDM (Ref. 2) to determine if a threat to human health and the environment exist such that further action under CERCLA is warranted.

2.0 Site Description

2.1 Location

The WCA Site is located in the City of Albuquerque and is in a primarily commercial and residential setting (Figure 3). The Site is located west of the downtown area, east of the Rio Grande River and south and east of Old Town Albuquerque. Streets in the vicinity of the Site are paved and there are small neighborhood parks. There are four schools within a half a mile of the Site center point.

The Site was identified when chlorinated solvents were detected in ground water samples collected from FAP Superfund Site upgradient monitoring wells around 2005 (EPA ID# NMD986668911). The Site is centered near the corner of 9th Street NW and Marquette Avenue NW in Albuquerque, New Mexico (Figure 3) (Ref. 3, pp. 12, 24 and 34; Ref. 4; and Ref. 5). The geographical coordinates of the Site are 35º5'19.2' N latitude and 106º39'24.8" W longitude in Township 10N, Range 3E, Section 17 (Ref. 4). The elevation of the Site is approximately 4,954 ft above msl. The Site coordinates and elevation correspond with FAP monitor well MNW-11(D1), in which the Site contaminants were first identified. Monitor well MNW-11(D1) is currently considered the center point location of the WCA ground water plume (Ref. 3, Attachment 3, p. 43). To date, chlorinated solvents attributed to the Site have been detected in FAP monitor wells MNW-11(D1), SFMW-14(D1), MNW-9(D1), MNW-1(I2), SFMW-13(I2), WB-01(I1/I2) and WB-02(I1/I2) (Ref. 6, pp. 23-68).

2.2 Description

The Site is characterized as a ground water plume of chlorinated and aromatic hydrocarbon compounds consisting of TCE, cis-1,2-DCE, and trans-1,2-DCE (Site plume) (Ref. 6, pp. 15, 19, 36, 37, and 42). The full extent of the Site ground water plume is not known at this time. The current understanding of the extent of the Site ground water plume is defined by the upgradient FAP monitoring wells. The EPA oversees the FAP site which is currently in the LTRA phase of the CERCLA process

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(Ref.6, pp. 16 and 19). The target compound list for FAP includes PCE, TCE, VC, cis-1,2-DCE, and trans-1,2-DCE (Ref. 6, p. 12). The FAP upgradient wells are approximately 1,600 to 2,000 ft to the west of the FAP source area (Ref. 3, p. 34). FAP data show that the leading edge of the Site plume overlaps the western portion of the FAP site boundary (Ref. 6, p. 16). The Site plume as defined by existing FAP wells is present in the I2 and D1 aquifer zones (Ref. 6, p. 19). It should be noted that the western edge FAP monitor wells are not completed in the S (shallow) zones at MNW-11, MNW-12, MNW-9, WB-02 or WB-01. Figure 3 depicts the locations of these wells. The FAP TCE results and ground water zone depth descriptions are provided in (Table 1 and Table 2). EPA and NMWQCC maximum contaminant levels are given in the table on page vi of this report (Ref. 7 and Ref. 8)

The climate in the Albuquerque area is semiarid. During the weather monitoring recording period from 1914 to 2012, the average annual precipitation in Albuquerque was 8.65 inches; most of the precipitation occurred annually from April through October and the average total snowfall was 9.6 inches with most of the snow falling from November through March (Ref. 9). June, July, and August are the hottest months; the average maximum temperatures for these months for the period of record were between 88.9°F and 91.7°F (Ref. 9). December, January, and February are the coldest months with average minimum temperatures for the period of record between 23.6°F and 27.8°F (Ref. 9).

During the summer months the principal form of precipitation occurs as high-intensity thunderstorms and can result in flooding (Ref. 10, p.1). Annual potential evaporation in the region is substantially greater than annual precipitation with Albuquerque annual potential evapotranspiration calculated at 47.58 inches, resulting in a net annual precipitation of zero inches (Ref. 11, pp. 14 and 16). Ground water flow direction at this Site is generally west to east (Ref. 6, p. 13).

2.3 Operational History and Previous Investigations

The Site is a ground water contaminant plume of chlorinated solvents and attribution to a specific source operation(s) has not yet been determined. Business operations in the Site vicinity and upgradient areas were reviewed for this ESI. The 2014 SI Report for WCA contains details on the businesses in the vicinity of the Site and their spatial proximity to the Site; operational history; ownership; previous environmental investigations under various authorities; and brief discussions on the findings of those investigations (Ref. 12, pp 2-8). Selected business directories from 1947 to 1990 and Sanborn Fire insurance maps for the vicinity were investigated as part of this ESI. Table 3 lists the addresses of properties that are of potential concern, the business type, and years of operation (Ref. 13 and Ref. 14). Sections 2.3.1 through 2.3.5 provide additional information on properties from Table 3 that are considered to be the most likely potential sources of chlorinated solvents based on soil vapor sampling results during the ESI.

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2.3.1 Bell Trading Post Property

The Bell Trading Post property, located at 1503 Central Ave. NW, is approximately 2,375 feet west-northwest of the FAP MNW-11(D1) monitor well (Figure 4). The property originally housed an Indian jewelry manufacturing business from 1947 to 1975 (Ref. 3, p. 3 and 13). The jewelry business site moved to the Sun Bell site at the intersection of Lomas and Central 0.3 miles northwest of the Site (Ref. 3, p. 13). The business, currently called The Bell Group, distributes jewelry and supplies under the Rio Grande brand name (Ref. 3, p. 13). The Bell Group used TCE for degreasing their products and reportedly did have a release at the Lomas and Central location (Ref. 3, p. 13). The exact date of the release is unknown; however, it would have occurred at some time(s) between the years of 1947 to 1975. The 1503 Central Avenue location was then occupied by the Albuquerque Photo Lab from 1982 until 1984. (Ref. 15, p. 3). Michelson Metals offices occupied the building, from 1985 until 1992 (Ref. 15, p. 3). From 1992 until 2000 the property was vacant.

The Bell Trading Post property was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3) (Ref. 16, pp. 1, 3 and 10). The buildings were developed into "affordable housing" as defined by the U.S Department of Housing and Urban Development (Ref. 17, p. 1) and in 2008 the former Bell Trading Post building was renovated to contain 15 residential units (Ref. 18, p. 1).

The NMED first identified the presence of chlorinated solvents in the soil vapor and ground water following a sampling event conducted in 2001 for the NMED VRP Phase II Site Characterization of the Former Bell Trading Post property (Ref. 15, pp. 14, 15, 19 and 20).

- Four ground water samples were collected via Geoprobe® from the ground water table at about 23 ft bgs. One of these ground water samples and its field duplicate contained TCE at 1.5 µg/L. (Ref. 15, pp. 15, 28-31).

- Six of twelve soil gas samples contained TCE at concentrations from 0.2 µg/L or 200 µg/m^3 to 3.4 µg/L or 3,400 µg/m^3 (Ref. 15, pp. 15, 27 and 36-40). There is a typographical error in Table 2.5 of the report the units are shown as mg/L whereas in fact they are µg/L (Ref. 15, pp. 31 and 36-40).

- Ten of the twelve soil gas samples had elevated PID field screening results (Ref. 15, pp. 14 and 42-53).

In 2005, the Voluntary Remediation Completion Report for the Bell Trading Post recognized that there had been an indication of a possible historical release of chlorinated solvents (Ref. 17, p. 6). A determination was made that the analytical results for the ground water samples were inconclusive, and did not exceed the NMWQCC standards (Ref. 17, p. 6). The report concluded that no further environmental remediation at the site was needed (Ref. 17, p. 24). The site was issued

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an Affidavit of Completion of Voluntary Remediation on November 14, 2005 (Ref. 19, p. 1).

In October of 2013, a request was made by the Family Housing Development Corporation for assistance through the NMED Brownfields Program for investigation and assessment of the property based on the previous environmental studies (Ref. 20, p. 32). This request resulted in a Limited Phase II ESA with regards to indoor air impacts. In June 2014, The Bell Trading Post property was investigated by INTERA on behalf of the NMED VRP. The investigation included sample collection of soil vapor and indoor air (Ref. 20, p. 1). Details of the June 2014 results are described here.

Building Exterior (Table 4)

- Three (3) soil borings were advanced to approximately 3 ft bgs and soil vapor was extracted from each borehole for VOC laboratory analyses. TCE was identified above the reporting limit in two of the three soil gas samples at a maximum detection of 1,800 $\mu g/m^3$, which is above the recommended EPA VISL for TCE (Ref. 20, pp. 7, 8, 15, 24, 25 and 29).

- An exterior outdoor air sample representative of "ambient" conditions over an 8-hr period was collected for VOC analysis. VOC constituents did not exceed any EPA regional screening levels (Ref. 20, pp. 7, 8, 24, 26 and 30).

Building Interior (Table 4)

- Two (2) soil borings within the building crawlspace were advanced to approximately 2 ft bgs and soil vapor was extracted from each borehole for laboratory VOC analyses. One sample contained TCE at 14 $\mu g/m^3$ (Ref. 20, pp. 7, 15, 24, 25 and 29).

- Two (2) "source" air samples were collected within the crawlspace over an 8 hour period for VOC analysis. One sample contained PCE at 18 $\mu g/m^3$ (below the EPA regional screening level for indoor air) and TCE at 3.1 $\mu g/m^3$ (above the EPA regional screening level for indoor air). Both samples contained chloroform at concentrations ranging from 1.5 to 1.7 $\mu g/m^3$; both concentrations exceed its regional screening level for indoor air (Ref. 20, pp. 8, 24, 26, and 30).

- Two (2) "ambient" air samples were collected within the occupied/communal areas over an 8 hour period for VOC analysis. The VOC results for both samples were below reporting limits and/or EPA regional screening levels (Ref. 20, pp. 8, 16, 24, 26, and 30).

The Limited Phase II ESA concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, historically occurred at the Bell Trading Post property

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or within the immediate vicinity of the site. According to the report, the release most likely occurred during the site's operation as a jewelry manufacturing facility (Ref. 20, p. 17). The data indicates that TCE and chloroform are present in soil vapor within the northwest corner of the site near the corner of Roma Ave and Laguna Blvd intersection (Ref. 20, pp. 17, 23 and 25).

The Limited Phase II ESA also concluded that the VOC levels do not pose an immediate risk to the current residents of the site building (Ref. 20, p. 17). The report recommended continued operation of a well-ventilated building crawl space and monitoring of factors that may impact the indoor air VOCs (Ref. 20, pp. 17, 23, 37 and 38). Additional soil gas and indoor air monitoring recommendations for the site were proposed but have not been conducted as of the date of this report (Ref. 20, pp. 17, 18, 37 and 38).

2.3.2 Indian Silver Craft Inc.

Business directories reviewed for this ESI identified a jewelry manufacturer, Indian Silver Craft, located at 1701 Central Ave NW from 1965 to 1985 (Ref. 13, p. 15, 22, 27, 30, 35 and 41). However, a sidewalk reconnaissance of 1701 Central Ave NW revealed that this address is a private residence. Online research of the business name yielded several confirmations on the Indian Silver Craft address as 1601 Central Ave NW (Ref. 21, pp 1, 2, 3 and 4). Verbal discussions with neighborhood property owners confirmed a jewelry manufacturer at 1601 Central Ave NW that was in operation for approximately 20 years. A visual survey of the building contents confirms that it was a manufacturing operation with equipment still evident inside the building. Indian Silver Craft Inc. appears to no longer be in operation at this location.

2.3.3 Kelly's Transmission Exchange

From 1985 to 2007, Kelly's Transmission Exchange was located at 1816 Central Ave SW (Ref. 13, p. 39 and 47 and Ref. 23). From 1975 to 1980, Aamco Transmission occupied the same location (Ref. 13). 1816 Central Ave SW is located approximately 0.64 miles northwest of the FAP MNW-11(D1) monitor well (Table 3) (Ref. 3, pp. 14 and 32 and Ref. 12, p.7). In August 2006, an NMED inspection report documented 6 pairs of hydraulic lifts, an oil water separator and an oil saturated garage floor (Ref. 22). In 2007, a corrective action was performed under NMED ROS authority in the investigation and clean-up of Kelly's Transmission. Six pairs of hydraulic lifts were removed including the fluids in the fluid reservoirs. An OWS, its oil and sludge contents, and its surrounding subsurface soils were also removed. Confirmation soil sampling for the removal actions detected some TPH and PAH compounds and some metals, but no chlorinated solvents were detected (Ref. 23, pp. 1-7).

One monitor well (MW-1) was installed approximately 11 feet east-southeast of the OWS on September 13, 2006. Ground water was encountered at 16 feet bgs and the well was completed to 24 feet. The monitor well was sampled on September 14, 2006 for analysis by EPA-Method 8310 and EPA-Method 8260. Analytical results did not indicate PAH's or VOCs (Ref. 24, pp. 2 and 3). It is not known if the well completed on September 14, 2006 is still accessible.

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2.3.4 Park Ave Cleaners

The Park Ave Cleaners property at 1004 and 1006 Park Ave SW was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3). The February 2000 soil gas data indicated a PCE concentration of 66,000 $\mu g/m^3$ at 12.5 ft bgs in a sampled borehole. Another borehole exhibited detected concentrations of PCE at 76,000 $\mu g/m^3$ and TCE at 900 $\mu g/m^3$ at 10 ft bgs (Ref. 25, pp. 3 and 10).

One monitor well MW-1 was drilled on March 9, 2000 south of the building. Soil samples from the MW-1- bore hole exhibited PCE concentrations of 98.3 µg/kg at 8 to 10 ft bgs and 64.7 µg/kg at 17 ft bgs (Ref. 25, pp. 4, 8 and 10). Depth to ground water in monitor well MW-1 in March 2000 was 16.7 ft bgs (Ref. 25, p. 9). A ground water sample and duplicate collected from MW-1 on March 10, 2000 detected PCE at 14.0 µg/L and 12.2 µg/L respectively, below the NMWQCC level of 20 µg/L (Ref. 25, pp. 4 and 10). The NMED Voluntary Remediation agreement was signed on November 11, 2000 and the affidavit of completion of the VRP was signed on December 12, 2000 for the neighboring property of 1006 Park Ave SW (Ref. 26 p. 20).

On August 19, 2016, the condition of the well vault and well was checked by NMED SOS personnel. The water level measured 13.4 ft bgs and total depth of the well was recorded at 23.9 ft bgs (Ref. 27, p. 52). Water level has risen at this location 3.3 feet between March 2000 and August 2016.

2.3.5 Other Potential Source Properties

Several other properties currently lacking any detailed operational history are considered to be potential chlorinated solvent sources (Table 3) (Ref. 13, 14 and 30):

- Unique Cleaners was a dry cleaning operation located at 1837 Central Ave NW from the late 1940s until at least 1980. Marina Unique Cleaners continues to operate at this this location.
- Esco Bio-chemicals operated at 1404 – 1406 Central Ave SW from about 1962 to 1975. Electronics TV Laboratory operated at the same location from about 1975 to 1980.
- Duke's Enterprises Ltd Jewelry Manufacture operated at 1408 Central Ave SW from the mid-1970s to the mid-1980s.
- Neighbors Laundromat operated at 1433 Central Ave NW from the early 1960s to the early 1980s.
- Speed Queen Laundry and Dry Cleaning operated at 1105 Central Ave NW in the early 1970s. Laundromats have operated at the location until present day; the property is currently occupied by Wash Tub Laundry.

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3.0 Waste/Source Sampling

During the PA, SI, and ESI for the Site, NMED SOS gathered information pertaining to potential sources, and contaminated media. Potential sources were identified through the review of various environmental investigations, monitoring reports and site reconnaissance (Ref. 3; Ref. 6; Ref. 12, pp. 2-7; Ref. 17; Ref. 20; Ref. 21; Ref. 22; Ref. 23; Ref. 24; Ref. 25; Ref. 26; and Ref. 27). The facilities considered to be likely potential sources were discussed in Sections 2.3.1 through 2.3.5 of this ESI report. These sites were identified because of the nature of the business and the potential for using TCE.

TCE is used primarily in vapor degreasing of fabricated metal parts and some textiles. Less commonly, it is used as an intermediate in the production of organic chemicals and pharmaceuticals, as solvents in dry cleaning and extraction, and as a refrigerant/heat exchange liquid. Major environmental releases are from metal degreasing (Ref. 28, p. 1). TCE is also a degradation product of PCE, while cis-1,2-DCE and trans-1,2-DCE are degradation products of TCE (Ref. 29, pp. 1 and 2).

Waste source sampling was not conducted for this ESI. The source(s) for this ground water contamination plume has not yet been identified.

4.0 Ground Water Pathway

The ground water pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to ground water and whether any receptors (through drinking water wells, wellhead protection areas, resources) are likely to be exposed to hazardous substances as a result of a release. SOS has identified impacts to the ground water at this Site and has performed a limited investigation on water quality and receptors under the WCA SI performed in 2014 (Ref. 12, pp. 8-17).

The Ground Water Pathway Sections 4.0 through 4.3 of the WCA SI included discussions on the hydrology; municipal, public and domestic supply well use; the historical ground water sample locations and analytical results (Ref. 12, pp. 8-17). The WCA SI discussed ground water sampling, results and conclusions of the sampling performed for the SI in 2014 in Sections 4.4 through 4.6. (Ref. 12, pp. 17-20). Four private irrigation wells and two NMED PSTB wells were identified for SI sampling. These six well locations, approximately 3000 feet southwest of the 9th Street and Marquette Ave FAP MNW-11(D1) monitor well, were sampled on June 17, 2014 (Ref. 12, pp. 18-20). The samples were sent to EPA Region 6 Environmental Services Branch, Houston laboratory for analyses of trace VOCs using (Method 8260). Analytical results did not detect any of the primary contaminants of concern in these samples (Ref. 12, p. 20).

No ground water data was acquired during this ESI for the direct evaluation of the ground water exposure pathway. However, the focus continues to be the ground water

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pathway. Soil gas data was acquired to identify potential source location(s) and potential plume extent.

5.0 Surface Water Pathway

The surface water pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to surface water; and whether any receptors (intakes supplying drinking water, fisheries, or sensitive environments) are likely to be exposed to a hazardous substance as a result of a release. SOS has identified surface water drainages in the vicinity of the site for future consideration and has performed a limited investigation for water quality and receptors in the 2014 SI (Ref. 12, pp 20-21). No data acquisition was performed during this ESI for the evaluation of the surface water exposure pathway.

6.0 Soil Exposure Pathway

The soil exposure pathway assesses the threat to human health and the environment by direct contact with hazardous substances and areas of suspected contamination. This pathway addresses any material containing hazardous substances that is on or within 2 feet of the surface and not capped by an impermeable cover. No data acquisition was performed during this ESI for the evaluation of the soil exposure pathway. Soil gas data was collected during this ESI in order to identify potential source area(s) and is discussed in this section because vapor intrusion is a subcategory of the soil exposure pathway in HRS.

6.1 Physical Conditions

The majority of the ground surface in the area along Central Ave is capped with asphalt, concrete, homes, apartments, businesses and a school (Figure 3, Figure 4, and Figure 5) (Ref. 12, p. 22). No data acquisition was performed during this ESI for the evaluation of the soil exposure pathway. However, because the contaminants at the Site are VOCs, volatilization from soil or ground water to soil gas and air, particularly indoor air, may present an exposure pathway. There is concern for indoor air exposure within buildings and residences that overly the ground water plume or that are near a source area. The potential for an indoor air exposure pathway will be reviewed and considered based on the soil vapor data collected as part of this ESI.

6.2 Soil Vapor / Indoor Air Targets

The Site is located in a primarily, residential, commercial and light industrial setting. There are approximately 30 residential properties within 200 ft of the Site ground water plume center point (MNW-11) with the nearest residence approximately 42 ft away (Figure 3 and Figure 5). Proximity of residences, schools and business properties to the soil gas sample locations in this ESI are provided in Table 6. Proximity of the Site to schools is documented in the WCA 2014 SI Report (Ref. 12, p. 22).

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6.3 Soil Vapor Sample Locations

6.3.1 Data Acquisition Strategy

The Hudspeth Directory Company's Albuquerque City Directory for the years of 1947, 1952, 1962, 1965, 1967, 1970, 1975, 1980, 1985 and 1990 were reviewed by NMED SOS for business that potentially use TCE and PCE (Ref. 13). The street addresses reviewed were along Central Avenue West between 6th Street (600 west block) and the Rio Grande (2700 west block). Additionally, addresses along Lomas Avenue west (originally New York Ave) from 6th Street (600 west block) to Central Avenue (2000 west block). The Sanborn Fire Insurance maps for the years 1924, 1931, 1942 1951, and 1957 were reviewed for business, or structure notations that would indicate businesses of interest located in the triangular area between Lomas Avenue and Central Avenue and 2 blocks north and south of this triangular area of review (see Figure 3) (Ref. 14). A Bernalillo County property tax search was completed to assess owners of record for properties where additional investigation was flagged as a high priority (Ref. 30).

The primary objective of the ESI was to collect soil vapor samples and obtain analytical data to evaluate potential source release points for the TCE ground water plume west of MNW-11. The sampling effort resulted in soil vapor sampling from 33 sample locations for field GCS screening. Additionally, soil vapor samples were collected in Summa canisters for TO-15 analysis at 12 of the 33 sample locations. Potential source addresses included 1105 Central Ave NW, 1202 Central Ave SW, 1404 to 1408 Central Ave SW, 1433 Central Ave NW, 1503 Central Ave NW, 1601 Central Ave NW, 1701 Central Ave NW, 1816 Central Ave SW, 1837 Central Ave NW, 1420 Lomas Ave NW and 1006 Park Ave SW (see Figure 6). Additional SG sample points were planned along 14th St NW, Marquette Ave NW and Roma Ave NW to capture data both cross gradient and parallel to the local ground water flow direction.

Nine target properties were selected for soil vapor investigation for this ESI (Figure 6, Table 3). Access agreements for private properties were requested based on the property tax owner of record. In June 2016, a City of Albuquerque excavation barricade permit was obtained to gain access to city property for sample point placement. A request for utility locate was submitted to the state locate system and utilities were marked and the locations were cleared by utility companies prior to drilling. Soil gas sampling began on July 17, 2016 and was completed on July 21, 2016. Initially, one soil vapor sample was collected near each of the nine potential source properties. If a chlorinated solvent was detected using the FROG-4000tm field GCS (FROG) unit, the field team leader instructed the field crew to further investigate the location, installing additional sample point(s) and collecting soil vapor samples. For the ESI, the 33 sample locations were completed as soil vapor wells, sampled and analyzed using the field GCS. The number of points installed near each target property is noted in Table 3. The 33 soil gas sample locations are shown on the maps in Figure 7 through Figure 14. Table 5, Table 6 and Table 7 cross reference the map figure number with the address location and sample number. Sampling procedures were performed according to the July 2016 ESI Work Plan and SSHASP (Ref. 31 and Ref. 32). All field activities were

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documented in the Site log book, on field sample forms, and in the FROG data log book (Ref. 33).

6.3.2 Sampling Activities

The SG sample point installation utilized Bosch Macho Hammer Drill (Kerfoot Technologies, Inc.) (Ref. 31, pp. 30-35) to install a 5/8-inch diameter expendable vapor points and 1/8 inch ID dedicated tubing to a planned depth of approximately 6-7 feet bgs. The borehole sample depth at each location is listed in Table 7. Each boring that did not collapse upon drive stem removal was backfilled with clean graded #2/16 sand at the slotted tip, followed by approximately one foot of hydrated 8-20 mesh granular bentonite, and then one foot of clean graded #2/16 sand at a borehole mid-point. Secondary poly tubing was installed at this sanded interval for the borehole leak test. The remainder of each boring was backfilled with hydrated bentonite to ground surface.

Prior to sampling, the tubing and valve system was pressure tested with a magnehelic connected to the purge equipment using the Shut-In Test. Following the Shut-in Test, a second magnehelic linked by independent tubing to the sand interval near the midpoint of the boring depth was used to test for borehole short-circuiting using the Dodge Method (Ref. 34, pp. 6, 7, 10 and 11). Of the 33 SG sample points installed, none exhibited borehole annulus leaks during the pressure tests.

The purge volume for 10 feet of Macho 3/16 outside diameter tubing with drive point is approximately 25 cc, the system was purged using a calibrated MiniRae air analyzer at approximately 300 cc/min. The initial peak and stabilized readings were recorded on the field data sheets. The grab sample was collected in a 1 liter Tedlar bag within a vacuum box evacuated by the Gillian GilAir pump at an approximate rate of 250 cc/min. This rate was slow enough to avoid air rebound when the pump was disconnected and to avoid short circuiting air along annulus of the borehole.

Each Tedlar bag sample was analyzed in the field using the FROG. The FROG was calibrated at the Defiant Technologies Laboratory prior to the start of field work. The five point chlorinated alkene calibration enables the FROG with Elvin software to detect and measure concentrations of PCE, TCE, Cis-1,2 DCE, Trans-1,2 DCE, and VC in ppbv (Ref. 31, pp. 36-40). The field analysis was performed in an indoor environment at the NMED District 1 offices a few blocks from the work site. Air samples were transported from the field and stored in a cooler at room temperature prior to analysis.

To analyze the SG sample, the FROG air sampling adaptor is connected directly to a Tedlar bag, the analyze button is engaged and the FROG draws an adequate sample into the unit and the analysis sequence begins. The FROG, attached to a laptop computer with Elvin software, analyzes the sample. Each sample analyzed is automatically given a unique date/time stamp. Notes about the sample location are recorded along with the data results. The software allows the user to obtain a volumes of the chlorinated alkenes detected in ppbv (Ref. 31, p.38). The operator then runs the FROG through a purge cycle with indoor air pulled through a carbon filter to clean the

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system to zero prior to running the next field sample. Each sample run or purge run takes approximately 10 min. The FROG results were relayed to the field team leader in order to make drilling placement decisions throughout the sampling event.

Twelve (12) of the 33 locations were identified for off-site laboratory analysis to compare to the FROG results. The 12 grab samples, one duplicate and one background/ambient sample were collected in 6 Liter Summa canisters. Field parameters recorded included Summa valve pressure readings and fill time also daily local barometric air pressure and temperatures were recorded from the Albuquerque International Airport NOAA site http://w1.weather.gov/obhistory/KABQ.html (Table 7) (Ref. 35, pp.1-13) Canister pressure was noted prior to filling. Sample tubing was connected to the Summa canister and the valve was opened slightly, the gage was observed and the canister valve was closed prior to the tank reaching zero inches of mercury. The final tank reading was recorded; readings were typically between -3 to -5 inches of mercury. Time to fill the 6 Liter Summa canister was noted on the field log sheets (Ref. 36 pp.1-33). The fill time ranged from 30 to 80 seconds with an average fill rate of 47 seconds which equates to a sample collection rate in excess of 6000 cc/min. The Summa samples collected by NMED SOS were sent to EPA Region 6 Environmental Services Branch Laboratory for VOC analyses using TO-15 method. The Summa laboratory results are shown in Table 5 (Ref. 37, pp.1-81).

The location of each SG sample point was surveyed with GPS and recorded in the field notes. Upon completion of the sampling the tubing was capped, coiled and buried below ground surface approximately 6 to 10 inches. Two-2.5 inch nails were placed near the sample location to locate with a metal detector. (Ref. 27, pp. 49-52)

All reusable equipment used for SG measurements and sample collection were decontaminated prior to use at each sample point. Decontamination procedures included cleaning with steel brush, and soap (Liquinox) wash followed by a tap water rinse and deionized water rinse. Only limited external decontamination of the hammer drill parts was performed because equipment that comes into contact with soil vapor samples consisted of dedicated drill tip, collection tubing, Tedlar bags, and Summa canisters.

6.4 Soil Vapor Analytical Results

6.4.1 FROG Field Screening Analytical Results

Field soil vapor analytical results from an average depth of 6.5 ft bgs identified what appear to be three or four possible source areas of TCE near the western end of the ESI study area (Figure 17) and two PCE source areas in the eastern end of the study area. TCE and PCE field results reported as ppbv by the FROG/Elvin Software were manually converted to $\mu g/m^3$ using the following formulas where molecular weight in g/mole and 24.45 is at standard temperature and pressure (25C and 1 atmosphere):

$$\mu g/m3 = ppbv\ (molecular\ weight\ g/mole\ /\ 24.45)$$

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TCE μg/m3 = TCE ppbv(131.4 g/mole / 24.45)*
PCE μg/m3 = PCE ppbv(165.83 g/mole / 24.45)*

All FROG field data in ppbv and calculated μg/m^3 including duplicate analysis performed, duplicate samples, as well as Summa TO-15 Laboratory results are reported in Table 5 and Table 7.

The following sample locations exhibited elevated TCE soil vapor field results and are reported here as the calculated μg/m^3:

- Samples collected at WCA-1801-Central-01 and WCA-1801-Central-03 are located at 1801 Central Ave NW, Manzano Day School. These locations exhibited detections of TCE in the soil gas at 54 μg/m^3 and 1,516 μg/m^3 respectively (Figure 8, Figure 18, and Table 5) (Ref. 33, pp. 11 and 15). Chlorinated solvent source(s) likely exist to the west of this location; potential sources include Kellys Transmission at 1806 Central Ave SW (discussed in Section 2.3.3) and Unique Cleaners at 1837 Central Ave NW (Table 3 and Figure 7).

- Samples collected at WCA–C-Laguna-02 and WCA–C-Laguna-03 exhibited detections of TCE at 983 μg/m^3 and 1,650 μg/m^3 respectively (Figure 9, Figure 18, and Table 5) (Ref. 33, pp. 10 and 16). Field screen data indicates chlorinated solvent source(s) in the area; potential sources include Bell Trading Post at 1503 Central Ave NW and Indian Silver Craft at 1601 Central Ave NW, discussed in Sections 2.31 and 2.32, respectively.

- Samples collected from the WCA-1503-Central-01 through -05 and -08 sample locations exhibit detections of elevated TCE ranging from 32 to 7,678 μg/m^3. The downgradient WCA-1445-01 sample location exhibited a TCE detection of 1,935 μg/m^3 (Figure 9, Figure 18, and Table 5) (Ref. 33, pp. 10-12, 16 and 17). The 1503 Central Avenue NW property is the location of the former Bell Trading Post (Table 3). Field screen data indicates chlorinated solvent source(s) in the area; potential sources include Bell Trading Post at 1503 Central Ave NW and Indian Silver Craft at 1601 Central Ave NW, discussed in Sections 2.31 and 2.32, respectively.

- Samples collected at WCA-1429-Central and WCA-1433-Central exhibit TCE detections of 104 μg/m^3 and 713 μg/m^3 respectively (Figure 10, Figure 18, and Table 5) (Ref. 33, pp. 3, 5, 6, and 13). The TCE source area for these locations is likely from property to the west; potential sources include Bell Trading Post at 1503 Central Ave NW and Indian Silver Craft at 1601 Central Ave NW, discussed in Sections 2.31 and 2.32, respectively.

- Samples collected from 14th Street NW and Marquette Avenue NW area (WCA-Marquette-01, WCA-14St-01, and -04) exhibit TCE detections ranging from 785 μg/m^3 to 2,741 μg/m^3 (Figure 11, Figure 18, and Table 5) (Ref. 33,

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pp. 13, 14 and 16). The TCE source area for these locations is either a continuation of the plume from its source(s) to the west or from unidentified source(s) in the 1400 block Central NW area; potential sources in the 1400 block include former businesses at 1404 to 1408 Central Ave SW (Esco Biochemicals, Electronics TV Laboratory, Duke's Enterprises Ltd Indian Jewelry Manufacture) or the former Neighbors Laundromat at 1433 Central Ave NW (Table 3).

The following sample locations exhibited elevated PCE soil gas field results and are reported here as the calculated $\mu g/m^3$:

- Sample location WCA-11St-01 exhibited a PCE detection of 260 $\mu g/m^3$. The field screen data may suggest chlorinated solvent source(s) in the area; potential source(s) include Wash Tub Laundry (formerly Speed Queen Laundry and Dry Cleaning) at 1105 Central Ave NW (Figure 13 and Table 3, and Table 5) (Ref. 33, p. 4).

- Sample locations WCA-C-Park-01, WCA-1004-Park Alley-01 and WCA-1004-Park Alley-02 exhibited PCE detections of 716 $\mu g/m^3$, 1,727 $\mu g/m^3$, and 634 $\mu g/m^3$, respectively. TCE was also identified in the Park Alley samples at 82 $\mu g/m^3$ to 104 $\mu g/m^3$ (Figure 14, Figure 19, and Table 5) (Ref. 33, pp. 18 and 19). Field screen data suggests chlorinated solvent source(s) in the area; potential source(s) include Park Avenue Cleaners at 1004 Park Ave SW discussed in Section 2.3.4.

6.4.2 Laboratory Analytical Results

Samples were collected for laboratory analysis from 12 of the 33 soil vapor wells installed. The 12 samples were collected in 6 liter Summa canisters and sent to EPA region 6 laboratory for TO-15 analysis. Results are provided in Table 5 and Table 7. Summa grab samples were collected without a flow regulator and the sample time averaged 47 seconds to fill the Summa or an average flow rate of one liter every 7.8 seconds, which is significantly faster than the recommended flow rate of +/- 250 ml/min.

- TCE was detected in 7 of the 12 Summa samples. Detections of TCE ranged from 8.94 $\mu g/m^3$ to 8,530 $\mu g/m^3$ (Table 5). The highest Summa results analyzed by method TO-15 correlated with the highest field screen sample, WCA-1503-Central -01, located at the former Bell Trading Post location (Figure 9, Figure 15 and Table 5). Other elevated TCE Summa results came from west of the former Bell Trading Post at WCA-C-Laguna-02 and WCA-C-Laguna-03. These two sample points also correlated with the field screen results (Figure 8, Figure 15 and Table 5). At most sample locations there was reasonable correlation between the field screen FROG data and the laboratory TO-15 data. However, the TO-15 Summa TCE results from 14th Street and eastward on Marquette Ave NW (WCA-C-Marquette-01, WCA-C-

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14St-01 and WCA-C-14St-04) did not correlate with the field data collected, nor did the sample collected from WCA-1801-Central-01 and WCA-1801-Central-03 located near the Manzano Day School (Figure 8, Figure 15, and Table 5).

- PCE was detected in 9 of the 12 Summa samples. Detections of PCE range from 2.11 $\mu g/m^3$ to 939 $\mu g/m^3$ (Table 5). The PCE Summa TO-15 results did not correlate well with the field screen results except for the sample taken at WCA-11St-01 located east of the Wash Tub Laundry (formerly Speed Queen Laundry and Dry Cleaning) potential source(s) at 1105 Central Ave NW. No Summa samples were collected from the Park Avenue Cleaners location where three field screen samples detected PCE (Figure 14, Figure 19, and Table 5). In general, there were numerous low Summa TO-15 PCE detections at locations that were non-detect for PCE in FROG field screening.

- Other constituents detected in the Summa TO-15 laboratory analysis were 2.14 $\mu g/m^3$ of 1,4 dioxane from WCA-C-Laguna-02 (Figure 9) and 5.03 $\mu g/m^3$ of 1,1,1-TCA from WCA-1433-Central -02 (Figure 10) (Table 5).

7.0 Air Pathway

The air pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to the air; and whether any receptors (human population and sensitive environments) are likely to be exposed to hazardous substances as a result of a release. No data acquisition was performed for the evaluation of the air pathway in this ESI.

8.0 Summary and Conclusions

Based on ESI soil vapor data, a TCE soil gas plume extends northwest to southeast from the 1800 block of Central Ave NW to the 1400 block of Central Ave NW, where the plume signature then appears to stretch in a more eastward direction along Marquette Avenue toward ground water monitor well MNW-11 at Marquette Ave NW and 9th Street (Figure 18 and Figure 19). Soil vapor data in the ESI study area demonstrate three distinct TCE hot spots indicative of potential source areas in or around the 1800 block westward, the 1500 to 1600 block, and the 1300 to 1400 block of Central Ave NW (Figure 17 and Figure 18) (Ref. 33 and Ref. 37). Soil vapor data indicate that there are two PCE hot spots indicative of potential source areas in or around the 1100 block of Central Ave NW and the intersection of Park Ave SW and 10th Street (Ref. 33 and Ref. 37). Figure 19 depicts the PCE contamination at Park Ave SW and 10th Street.

Based on ESI soil vapor data, chlorinated solvent sources are believed to exist at or near the following locations:

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1) TCE and/or PCE source(s) in the 1800 block of Central Ave NW or hydraulically upgradient (westward); potential source(s) include Kellys Transmission at 1806 Central Ave NW (Table 5 and Figure 8), discussed in Section 2.3.3, and Unique Cleaners at 1837 Central Ave NW (Table 3 and Figure 7).
2) TCE and/or PCE sources in the 1500-1600 block of Central Ave NW (Figure 17 and Figure 18), believed to be Bell Trading Post at 1503 Central Ave NW (Ref. 3, p. 13, Ref. 15, p. 15 and Ref. 20, pp. 25, 28, 29 and 30) and Indian Silver Craft at 1601 Central Ave NW (Ref. 13 and Ref. 21), discussed in Sections 2.31 and 2.32, respectively.
3) TCE and/or PCE sources in the 1300-1400 block of Central Ave NW or hydraulically upgradient (westward) (Figure 17 and Figure 18); potential sources include former businesses at 1404 to 1408 Central Ave SW (Esco Biochemicals, Electronics TV Laboratory, Duke's Enterprises Ltd Indian Jewelry Manufacture) or the former Neighbors Laundromat at 1433 Central Ave NW (Table 3).
4) Potential PCE source in the 1100 block of Central Ave NW, believed to be Wash Tub Laundry (formerly Speed Queen Laundry and Dry Cleaning) at 1105 Central Ave NW (Figure 13, Table 3, and Table 5).
5) PCE source near the intersection of Park Ave SW and 10th Street, believed to be Park Avenue Cleaners at 1004 Park Ave SW, discussed in Section 2.3.4 (Figure 14, Figure 19, and Table 5).

The soil gas results from this ESI were compared to Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations with a Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 38, p. 2). The VISL for TCE is 16 $\mu g/m^3$ in a residential setting and 100 $\mu g/m^3$ for a commercial setting (Ref. 38. pp. 2 and 3) All FROG field screening detections of TCE in ppbv, when converted to µg/m3 exceeded the VISL for the residential setting. The commercial VISL for TCE was exceeded in all but four sample locations based on FROG field screening results. Results from sample location WCA-1801-Central-01 (collected at Manzano Day School) and sample locations WCA 1503-Central-03, -04 and -05 (at the former Bell Trading Post property) were below the commercial VISL for TCE (Table 3). Results from the TO-15 analysis confirmed the VISL exceedances in all locations that were co-sampled except results from 14th Street and eastward on Marquette Ave NW (WCA-C-Marquette-01, WCA-C-14St-01, and WCA-C-14St-04) and from WCA-1801-Central-01 and WCA-1801-Central-03 located near the Manzano Day School (Figure 8, Figure 15, and Table 5). These are the sample locations that simply did not correlate well between FROG field screening results and Summa laboratory analytical results for TCE.

The VISL for PCE is 360 $\mu g/m^3$ in a residential setting and 1,600 $\mu g/m^3$ for a commercial setting. ESI soil vapor analytical results indicate that the residential VISL for PCE is exceeded at the suspected PCE source areas in the 1100 block of Central Ave NW and near the intersection of Park Ave SW and 10th Street (sample locations WCA-C-Park-01, WCA-1004-Park Alley-01, WCA-1004-Park Alley-02, and WCA-11St-01). The PCE

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detection from sample location WCA-1004-Park Alley-01 exceeds the commercial VISL for PCE (Table 5).

There is one occupied single use residential property located less than 30 feet southeast of WCA-1801-Central-03 sample location with a field result of 1,516 $\mu g/m^3$ TCE which exceeds the residential VISL by almost 100 times (Figure 8 and Figure 18). The field samples analyzed at WCA-C-14st-01, WCA-C-14st-04 and WCA-C-Marquette-01, in a residential neighborhood, detected TCE at 1,655 $\mu g/m^3$, 2,741 $\mu g/m^3$, and 785 $\mu g/m^3$; respectively (Table 5). These results are 50 to 170 times the residential VISL. It should be noted that results from the TO-15 analysis did not correlate well with FROG field screening results in these areas (Table 5).

There are no shallow zone monitor wells in the proximity to the soil vapor plume identified during the WCA ESI soil vapor investigation. The FAP western edge monitor well clusters that have detected TCE in the I2 or D1 zones do not include shallow zone monitor wells. The local water level has risen 3 feet in the monitor well located at 1004 Park Avenue SW between 2007 and 2016 (Ref. 25, p.9 and Ref. 27, p. 52) (Table 3). This water table rise in the shallow aquifer has also been documented in the FAP wells (Ref 6, p. 14). The rising ground water table has the potential to mobilize TCE in the vadose zone at a source location into the ground water.

Further investigation in an SR is recommended for WCA:

- Additional FROG field screening and Summa TO-15 sampling at existing soil vapor wells WCA-1801-Central-03, WCA-C-14st-01, WCA-C-14st-04 and WCA-C-Marquette-01 to confirm or refute the lack of correlation in TCE results and to confirm or refute the need to collect indoor air samples at residences in these areas. If TCE contamination is confirmed, sample indoor air from at least one residence at each of the two geographic areas.

- Additional soil gas investigation in the 1800 block of Central Ave NW and hydraulically upgradient (westward) to locate the TCE and/or PCE source(s) of chlorinated solvent contamination in this area.

- Additional FROG field screening and Summa TO-15 sampling at existing soil vapor well WCA-C-Laguna-02 to confirm or refute the presence of 1,4-dioxane contamination.

- Additional soil gas investigation around the 1600 block Central Ave NW area to confirm the TCE source contribution from the former Indian Silver Craft jewelry manufacturing business. Indoor air samples should be collected at two or three residences in this area.

- Additional soil gas investigation is recommended in the 1400 block Central Ave NW area to investigate potential source(s). Additional soil gas investigation is recommended south along 14th street and east along

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Marquette Avenue and Tijeras Avenue to further define the extent of the soil gas plume toward the Fruit Ave monitor well area.

- Additional FROG field screening and Summa TO-15 sampling at existing soil vapor wells WCA-C-Park-01, WCA-1004-Park Alley-01, WCA-1004-Park Alley-02, and WCA-11St-01 to confirm or refute the lack of correlation in PCE results. Potentially perform further soil gas investigation to confirm PCE sources.

- Additional soil gas investigation near the FAP well MNW-11 at Marquette Ave and 9th Street to determine if there is TCE in the soil gas and thus potentially in the shallow aquifer zone. There are no shallow monitor wells along the western edge of the Fruit Avenue Plume.

- The installation of one shallow ground water monitor well on Laguna Place between 1503 and 1601 to determine chlorinated solvent concentrations in ground water and how it relates to the area of highest soil gas TCE detection results. Ground water sampling should include 1,4-dioxane analysis.

- The installation of one additional shallow ground water monitor well on Marquette Avenue near the intersection of 14th Street to determine chlorinated solvent concentrations in ground water. Ground water sampling should include 1,4-dioxane analysis.

Additional Recommendations based on ESI soil vapor sampling results:

- A Pre-CERCLIS Screening Assessment is recommended for the confirmed PCE release near 1105 Central Avenue NW, the location of the former Speed Queen Laundry & Dry Cleaning facility.

- A Pre-CERCLIS Screening Assessment is recommended for the confirmed PCE release at 1004 Park Avenue SW, the former Park Avenue Cleaners facility.

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FIGURES

ED_013172_00000125-00026

Figure 1 Location of Albuquerque and Bernalillo County in New Mexico.

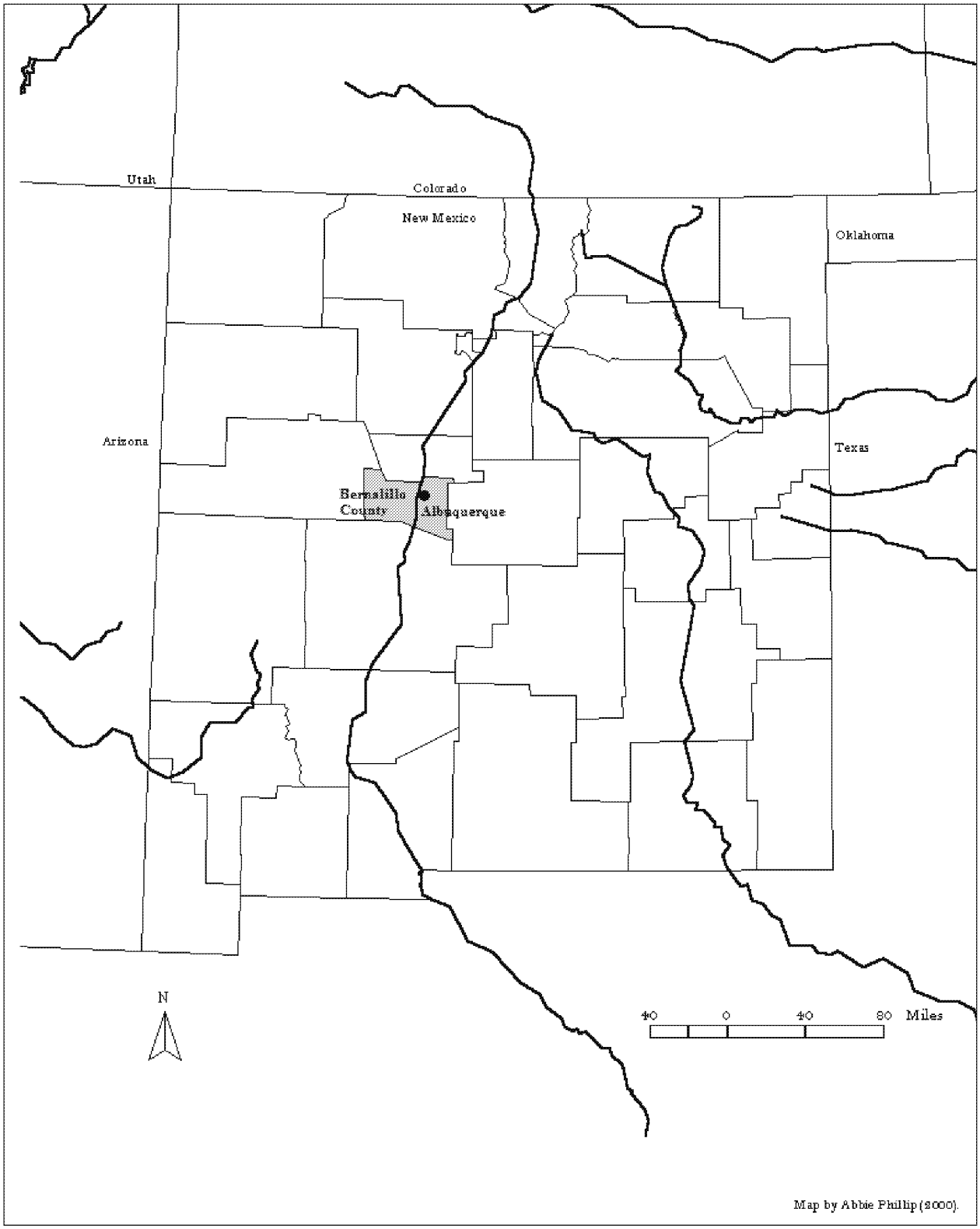

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Figure 2 Albuquerque Area Map, West Central Avenue area outlined in red.

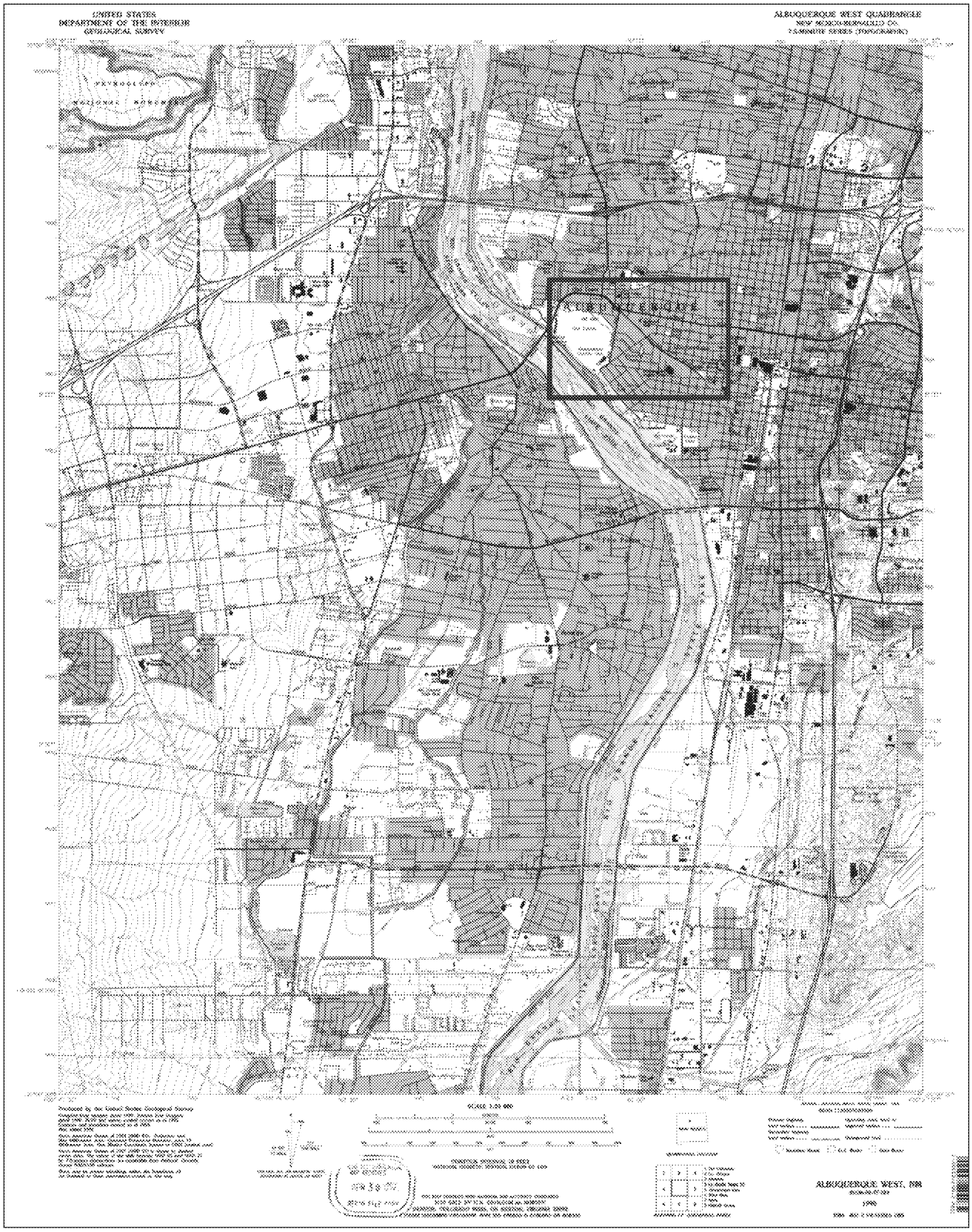

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Figure 3 Area of Review for the ESI outlined in red.

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Figure 4 VRP June 2014 Sample Locations at Bell Trading Post.

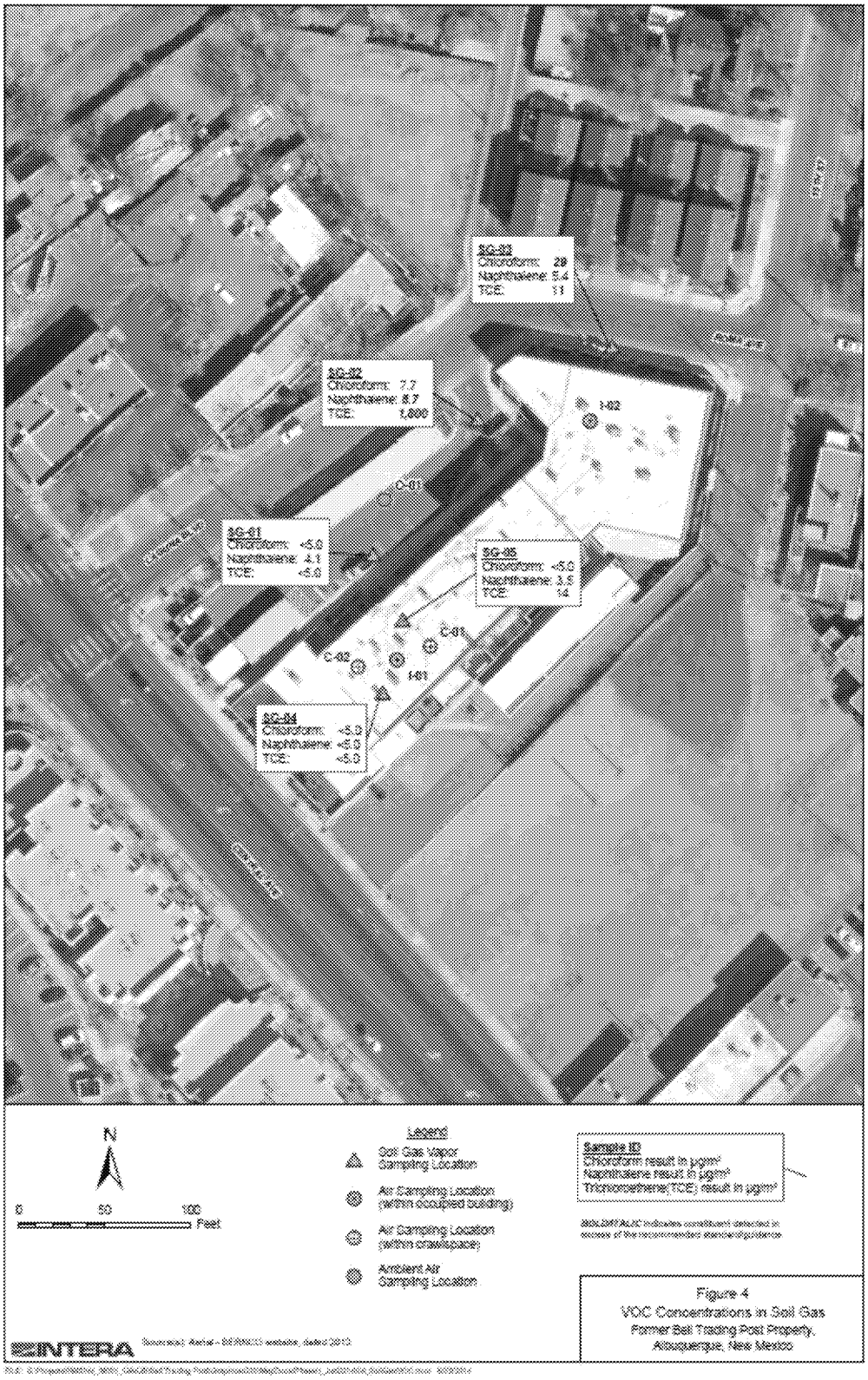

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Figure 5 Monitor Wells within the WCA Area & Base Map with Land Use

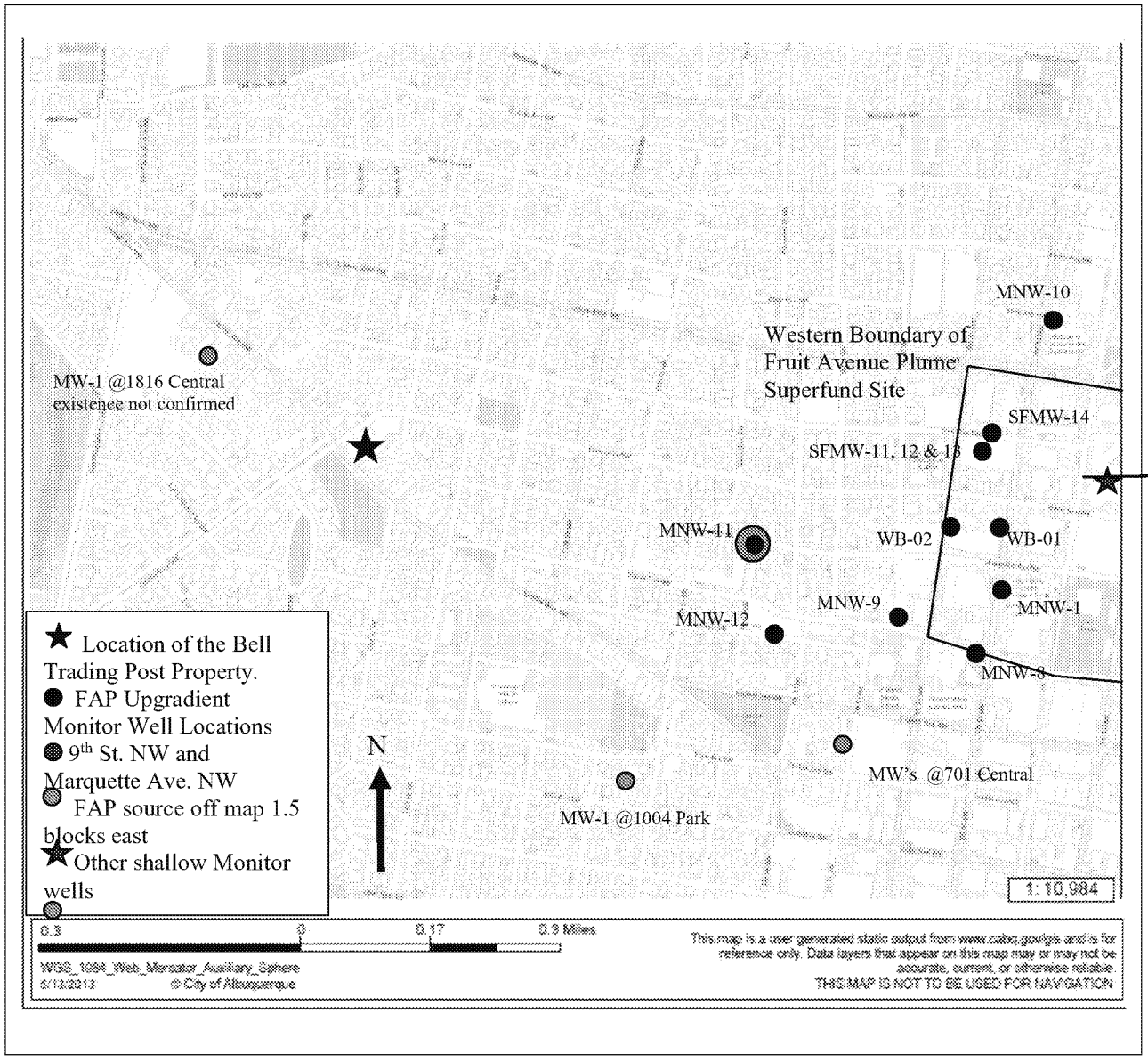

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Figure 6 Potential Source Soil Gas Sample areas for West Central Ave.

Note: Blue point is the location MNW-11 monitor well at 9th St. and Marquette Ave.
Yellow points are the Target areas invistigated.

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Figure 7 Sample points for 1816 Lomas NW & 110 Rancho Seco.

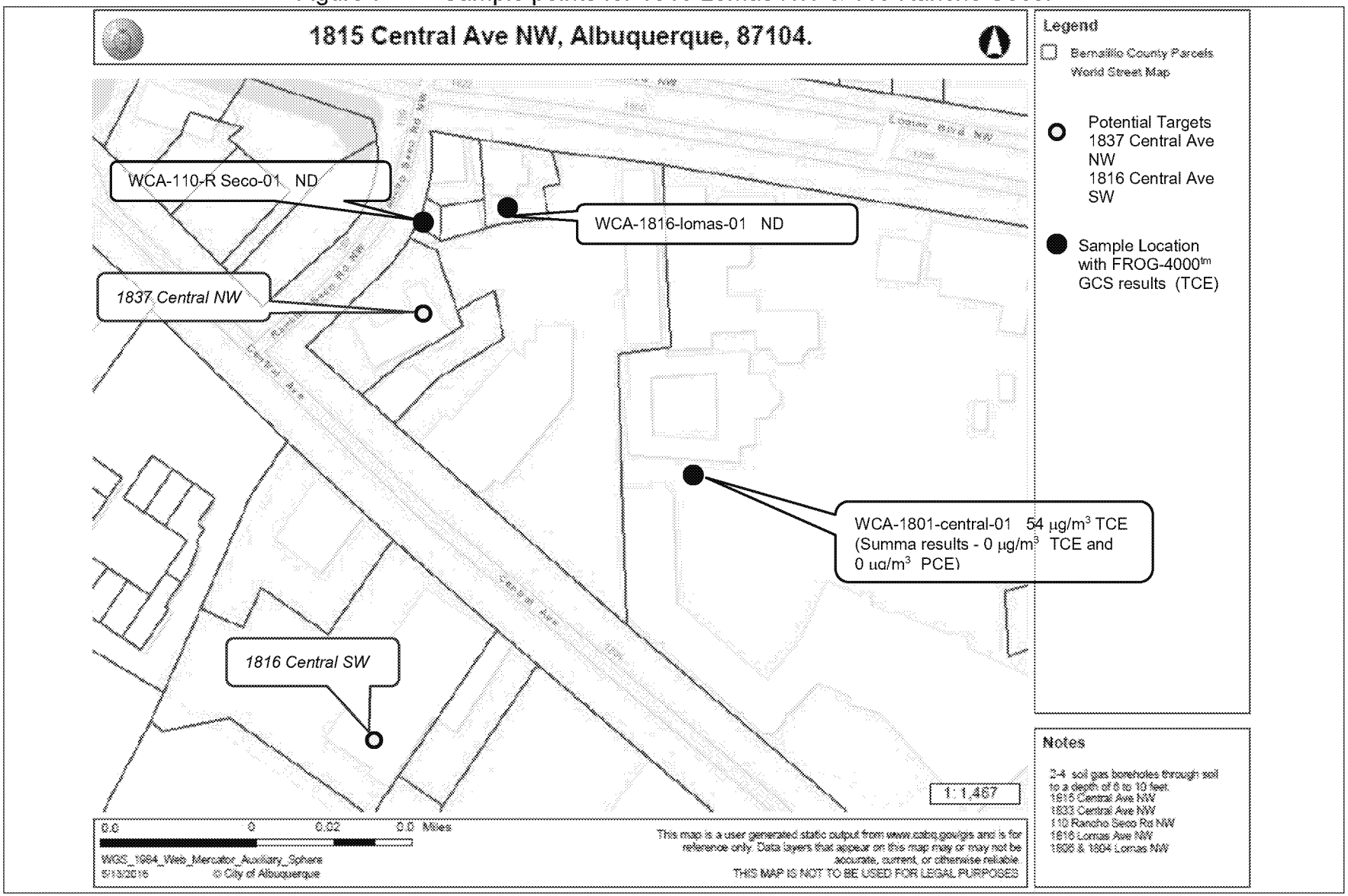

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Figure 8 Sample points for 1801 Central NW.

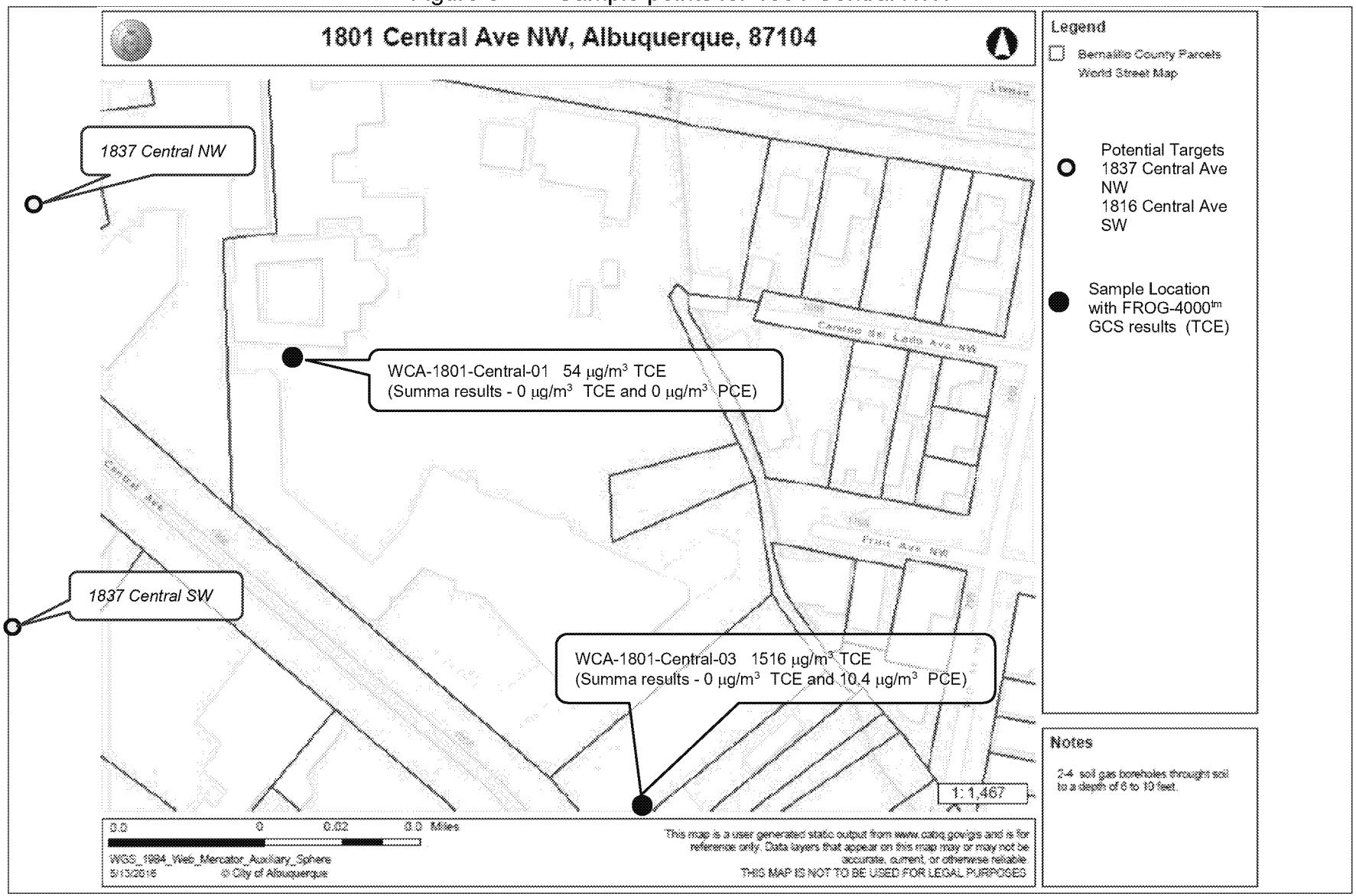

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Figure 9 Sample pts for 1611, 1503, 1445 & 1433 Central NW & Laguna Pl.

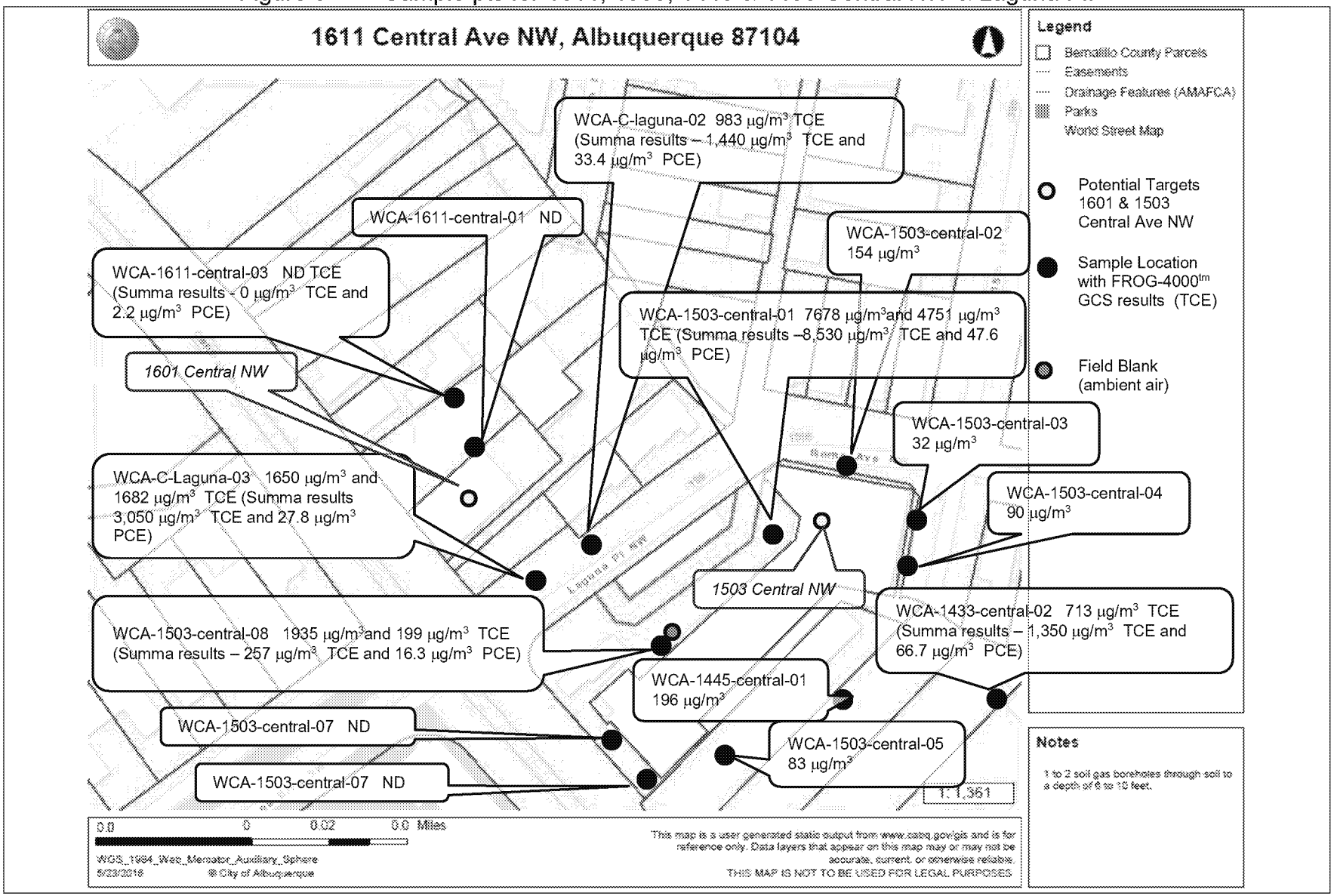

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Figure 10 Sample pts at 1445, 1433, & 1429 Central and 14 Street and Marquette

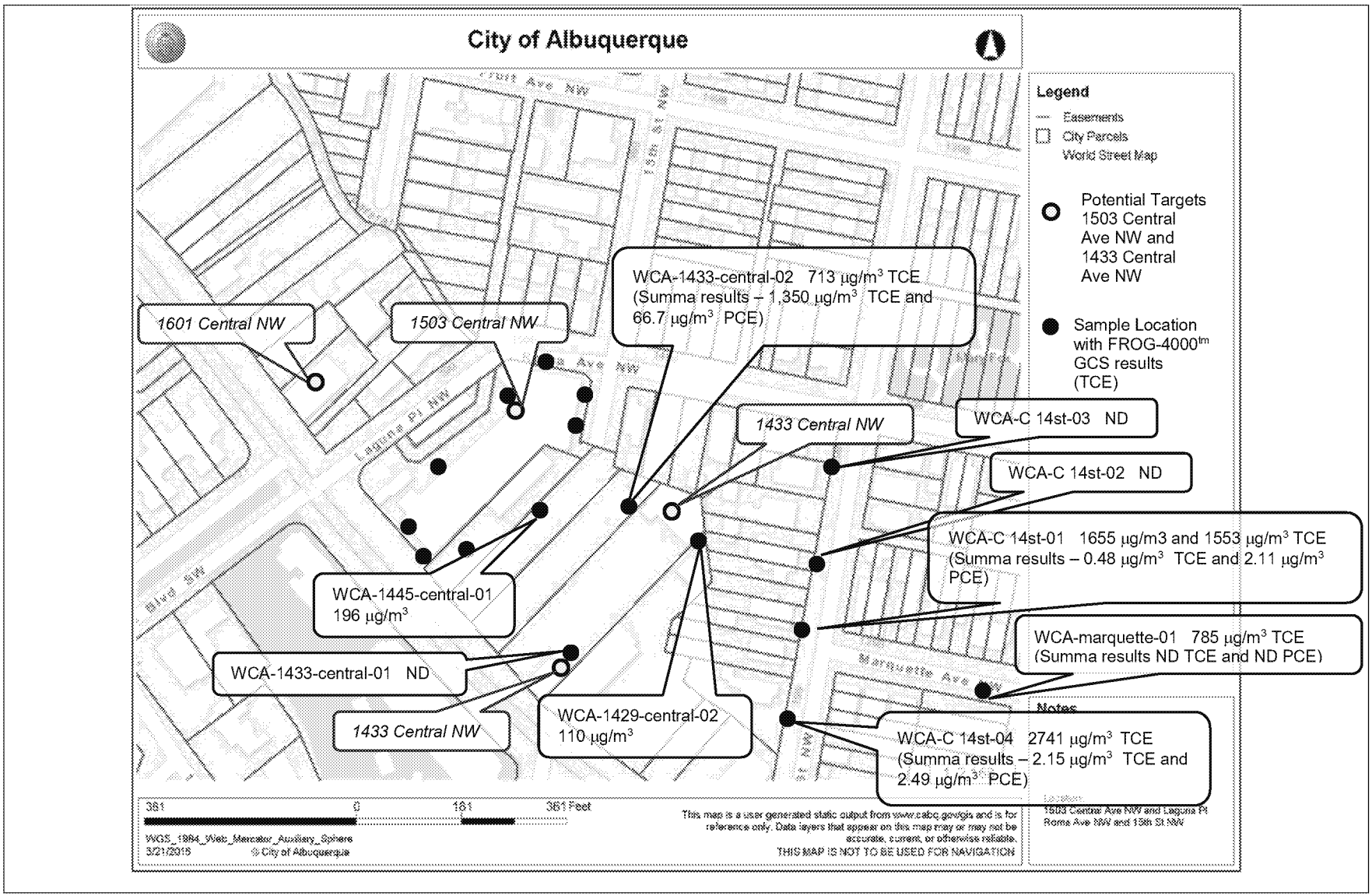

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Figure 11 Sample points for Marquett Ave. & 14th St.

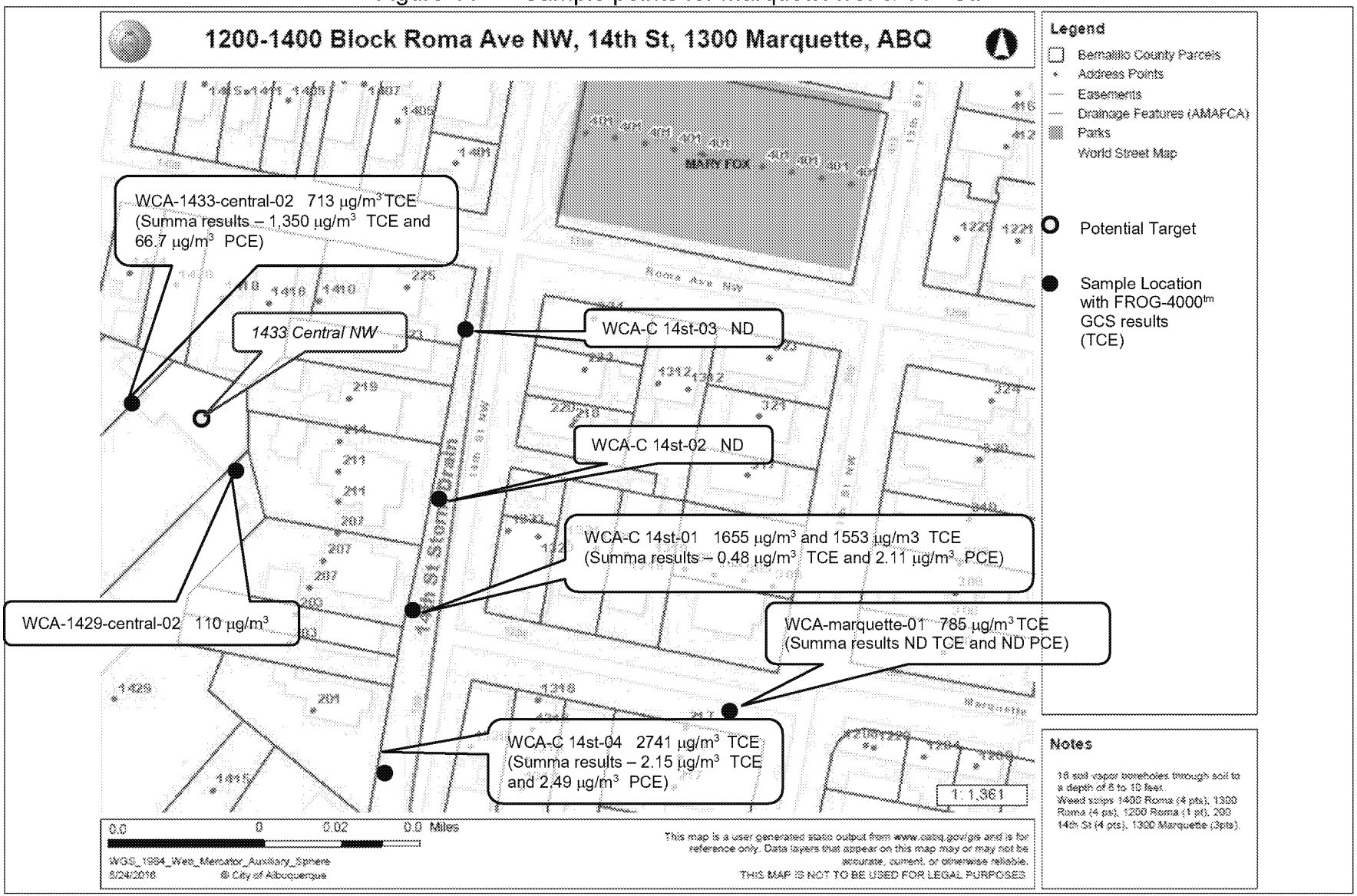

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Figure 12 Sample points 1402-1406 Central Ave SW.

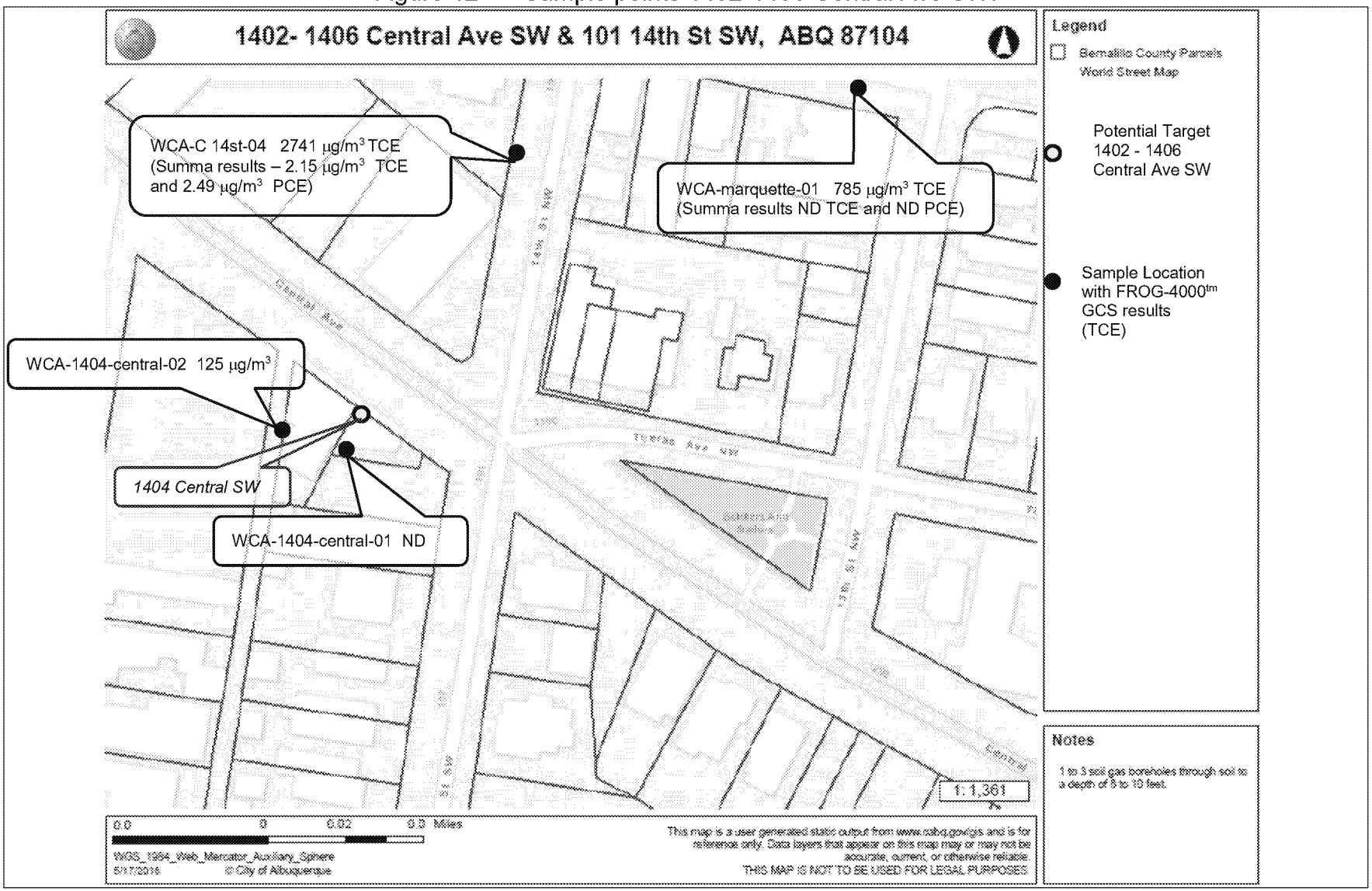

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Figure 13 Sample points for 1202, 1122 & Central, and Kent &11th St.

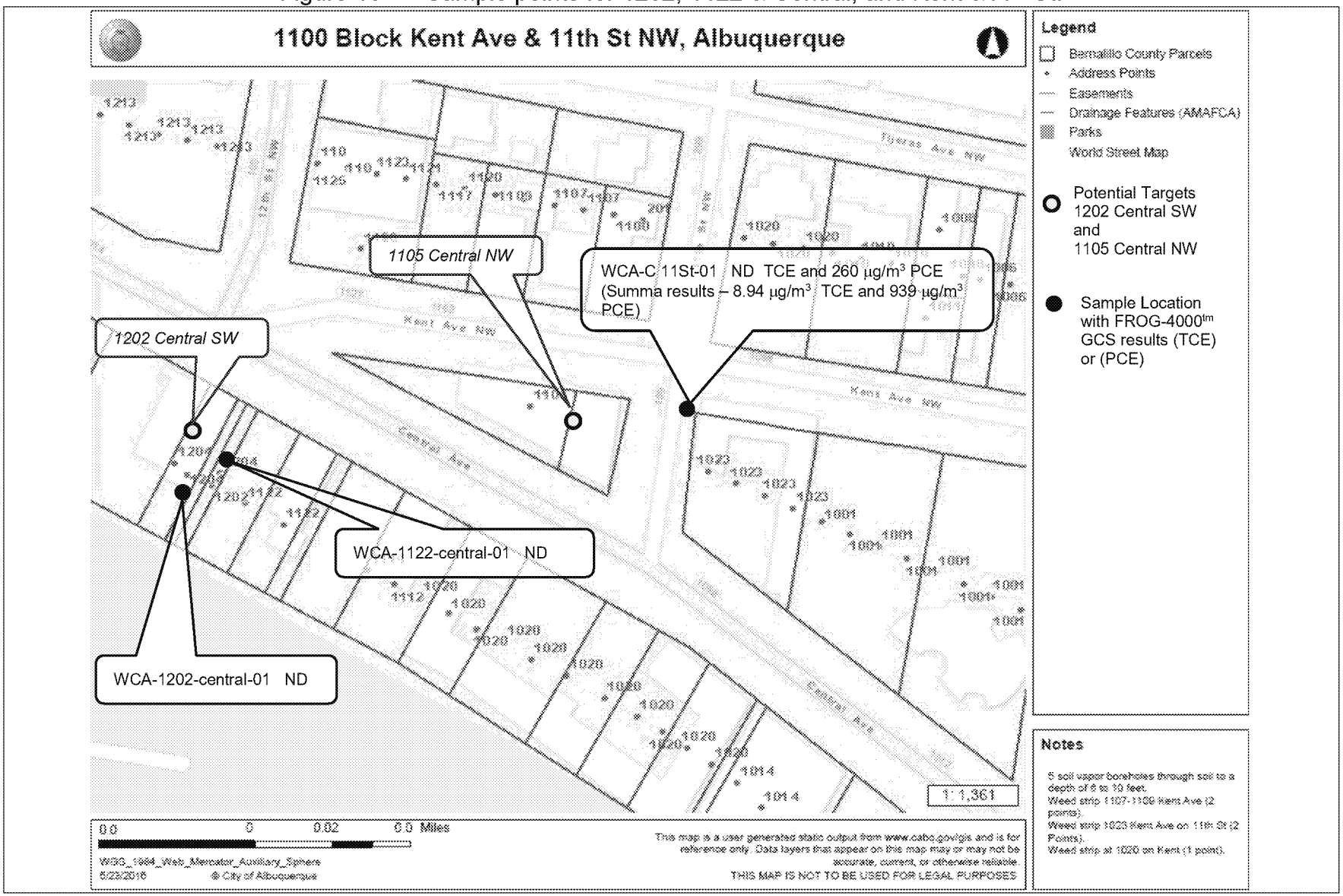

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Figure 14 Sample points for 1004 Park Ave.

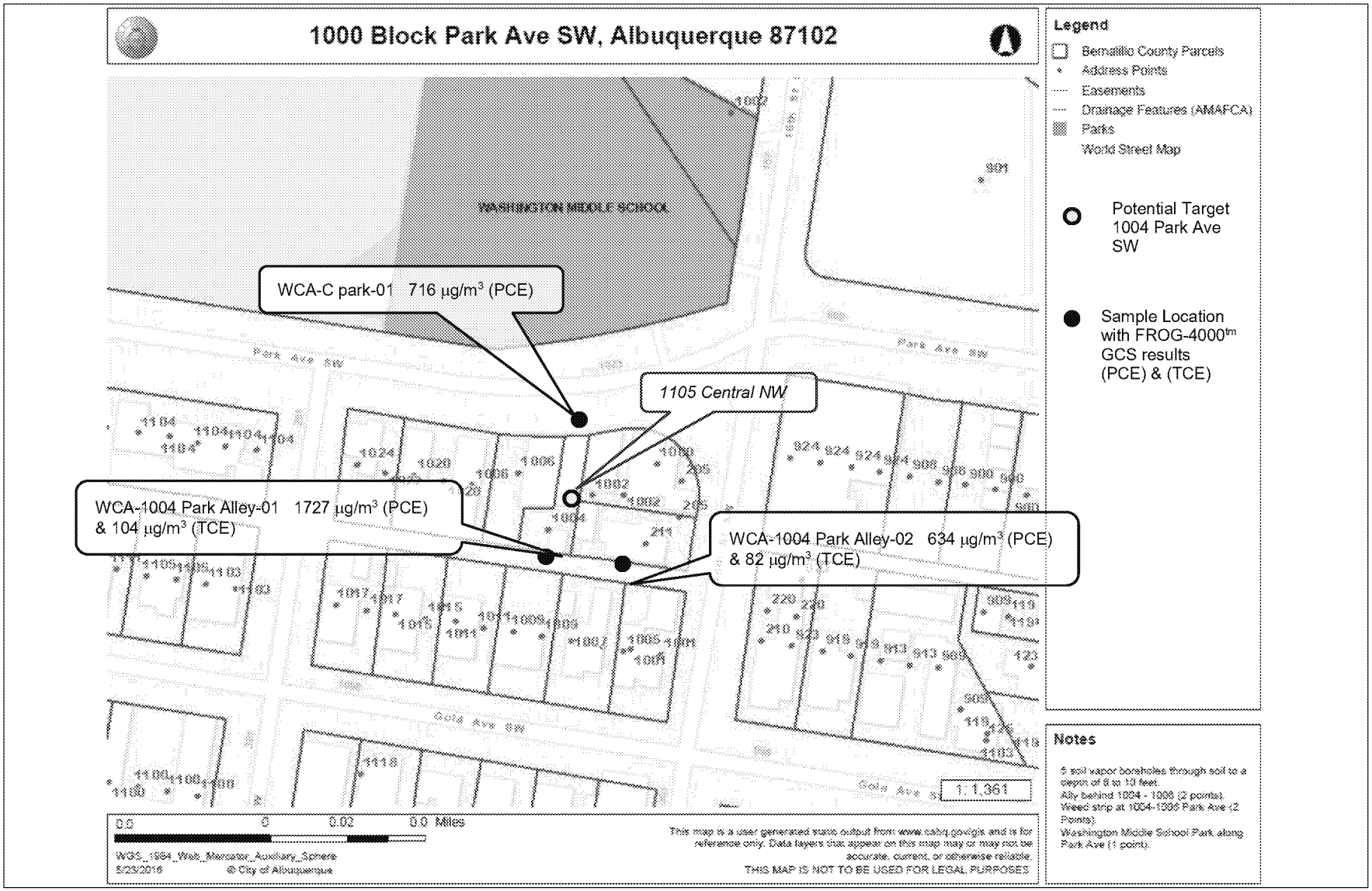

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Figure 15 TCE Field Screen FROG 4000[tm] & Summa Data Comparison

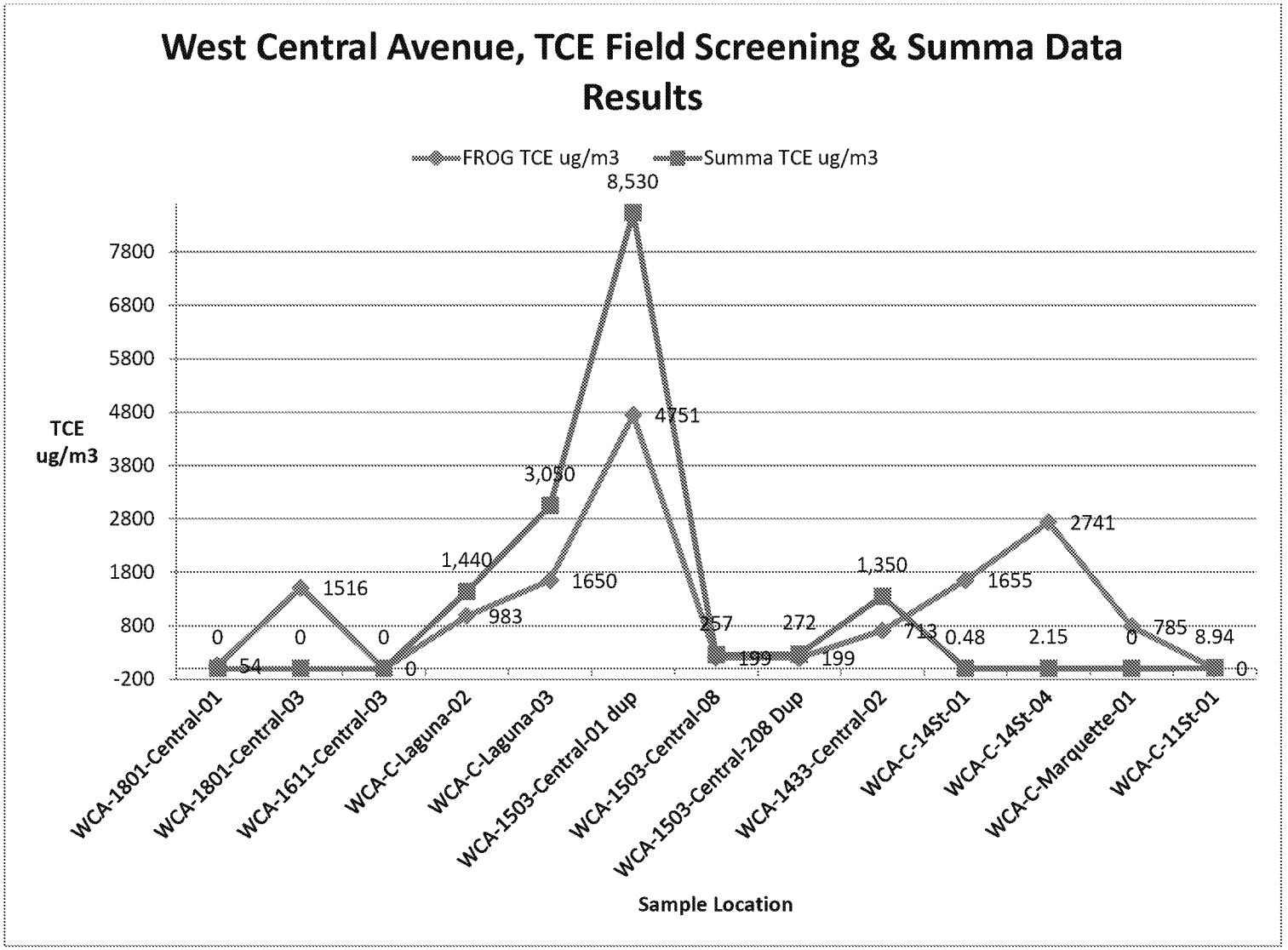

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Figure 16 PCE Field Screen FROG 4000[tm] & Summa Data Comparison

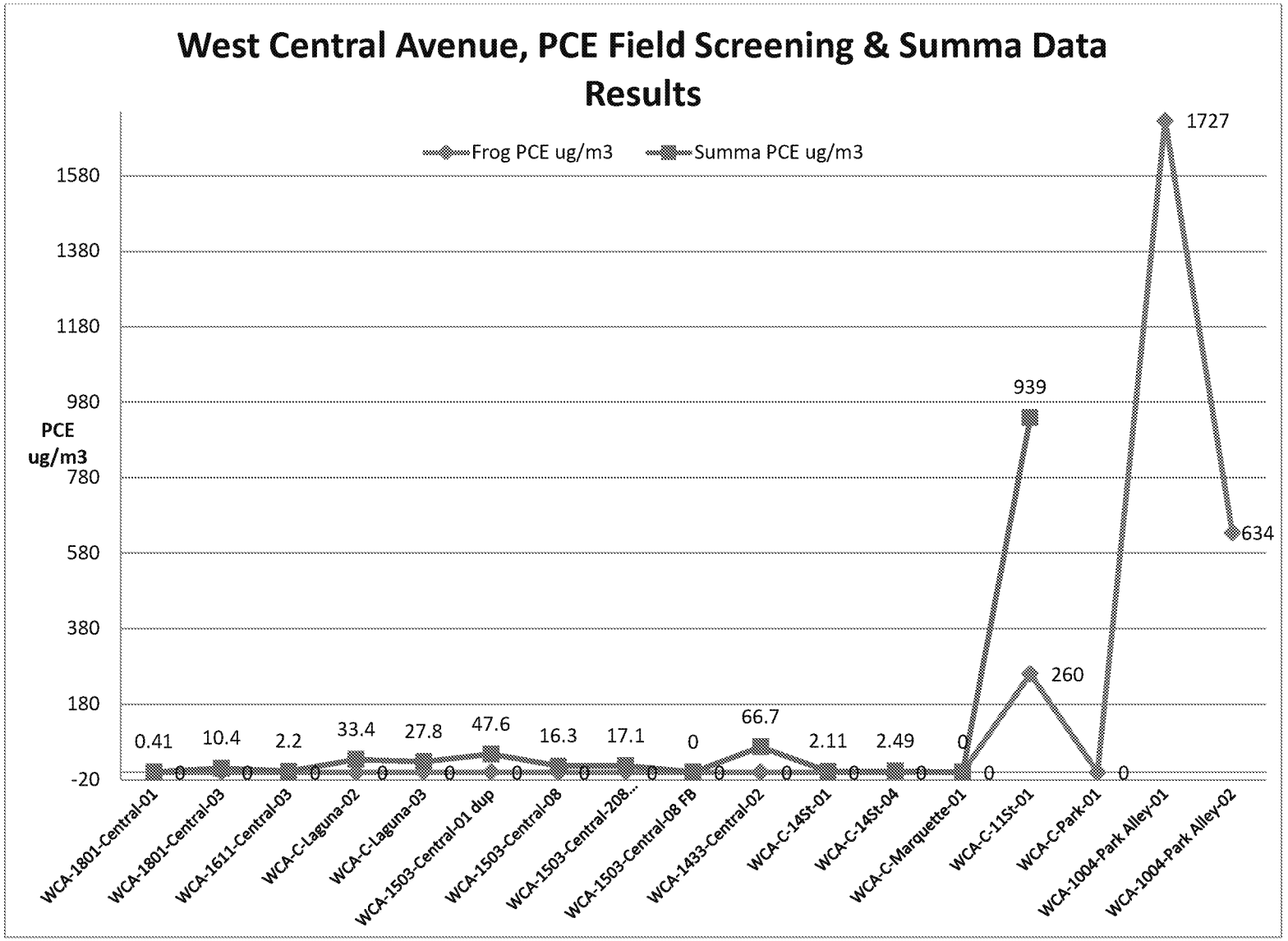

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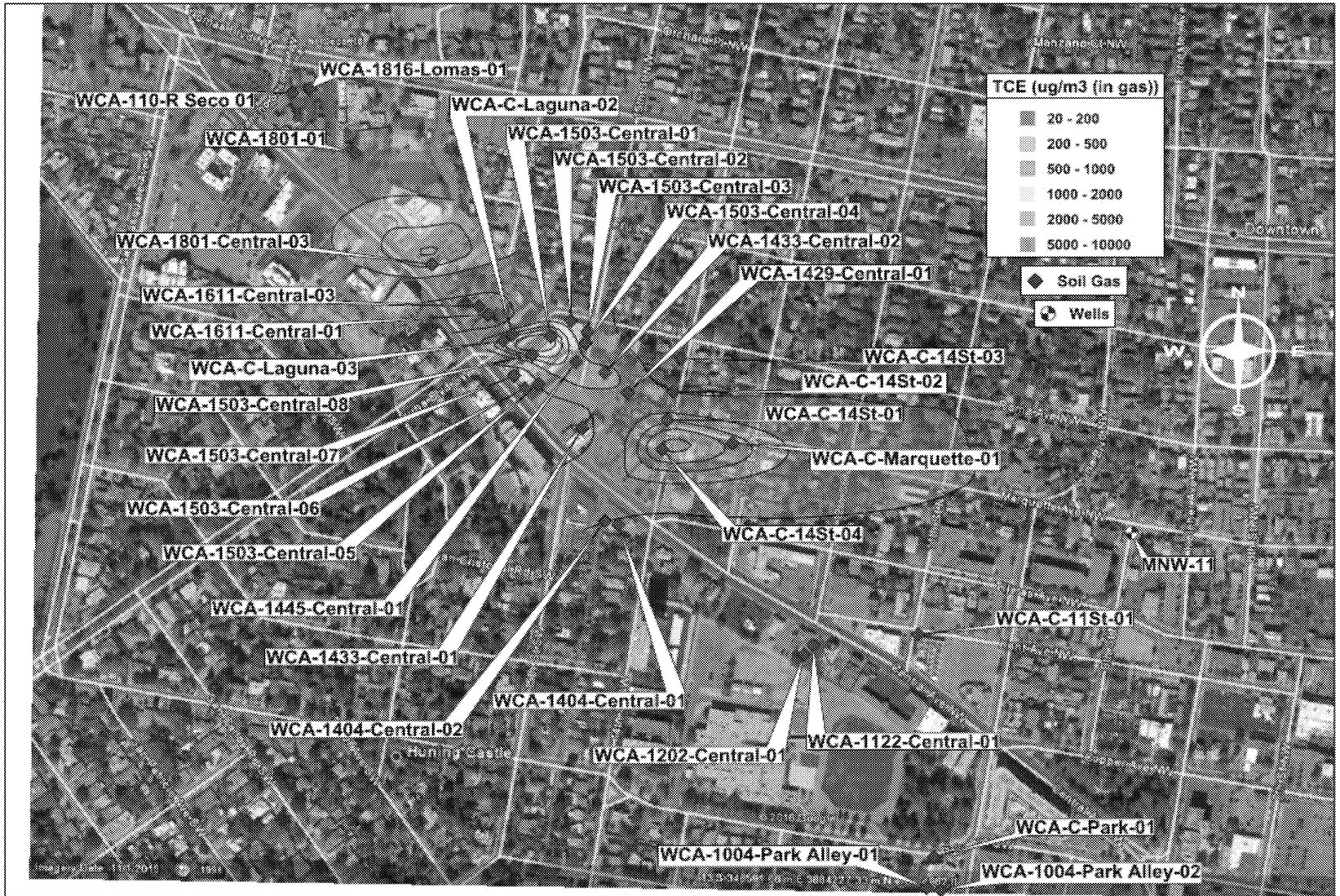
Figure 17 TCE Soil Gas Plume Field Results - West Central Ave



Trichloroethene Soil Gas Plume

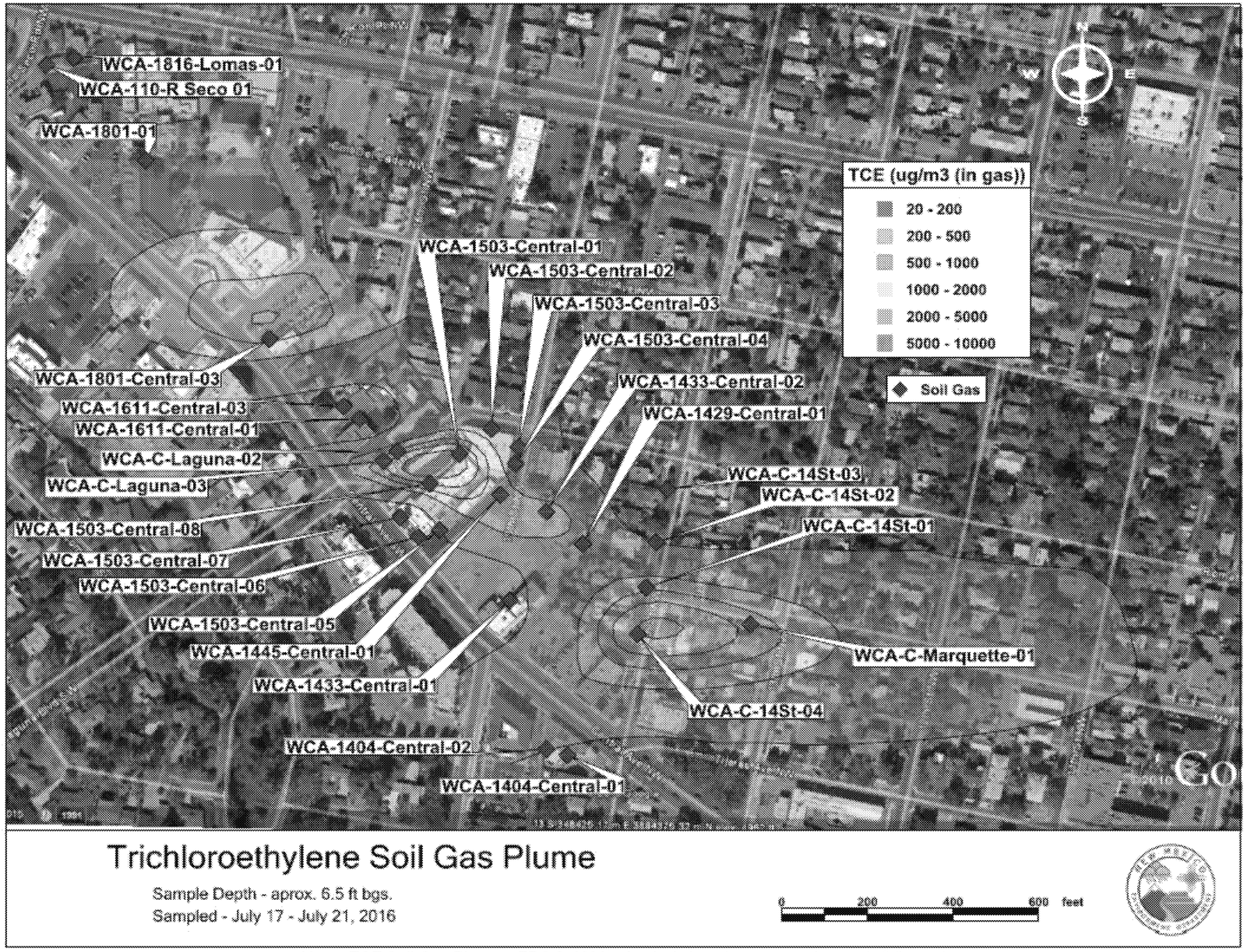
Sample Depth: -aprox. 6.5 ft bgs

Sampledd: July 17- July 21, 2016

0 300 600 900 feet

Note: TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

Figure 18 TCE Soil Gas Plume Field Results - Central & 1300-1800 Block



Note: TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

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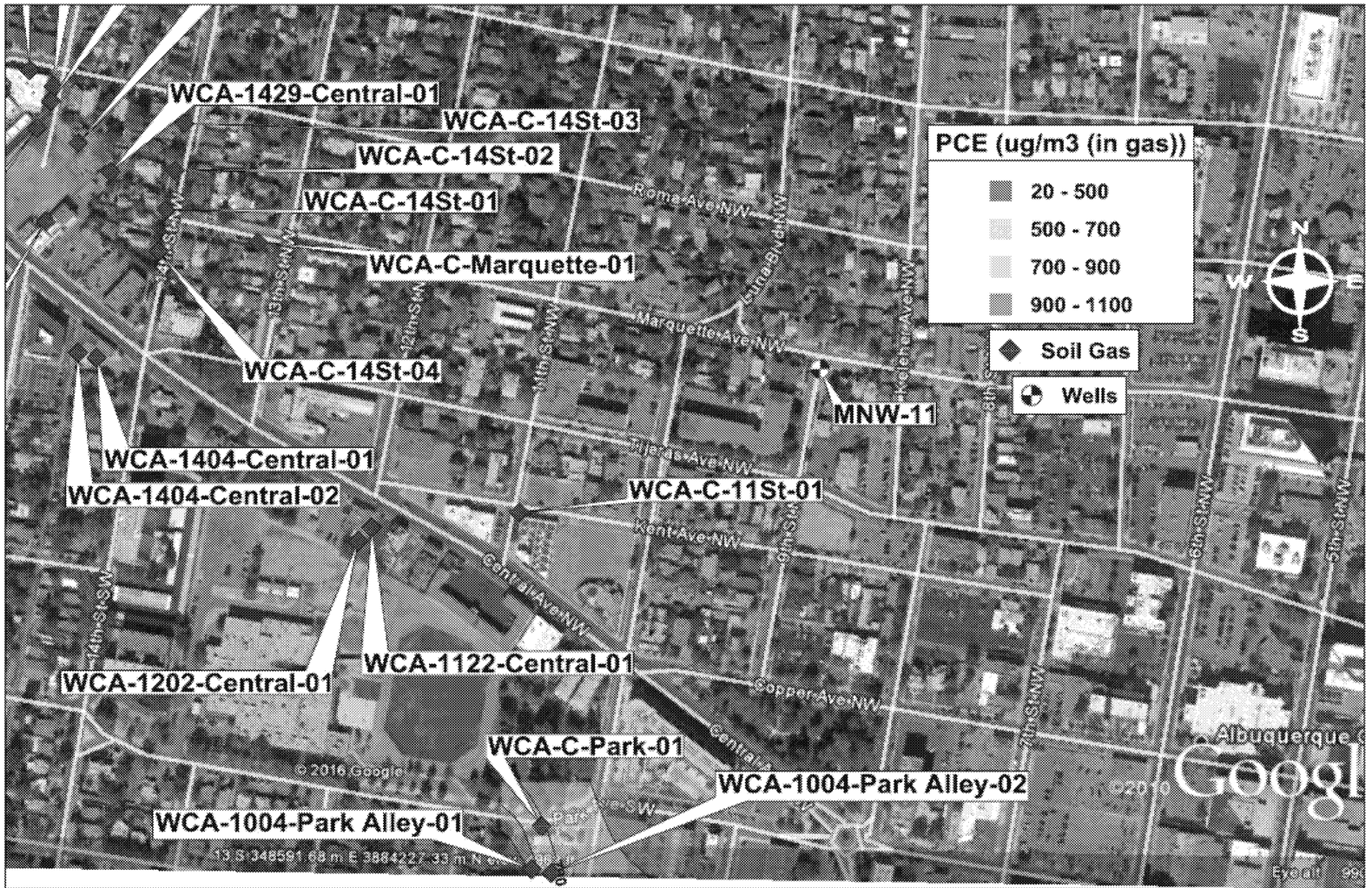
Figure 19 PCE Soil Gas Plume Field Results - 1000 block & Park Ave



Tetrachloroethene (PCE) Soil Gas Plume

Sample Depth: aprox. 6.5 ft gbs

Sampled: July 26, 2016

0 300 600 900 feet

Note: PCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

TABLES

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Table 1 Aquifer Zones at Fruit Avenue Plume Superfund Site.

Zone	Approximate Depth (ft bgs)	Elevation (ft amsl)
Shallow	0 to 60	≥ 4,894
Intermediate 1 (I1)	61 to 85	4,893 to 4,868
Intermediate 2 (I2)	86 to 120	4,867 to 4,834
Deep 1 (D1)	121 to 150	4,833 to 4,804
Deep 2 (D2)	151 to 250	4,803 to 4,704
Deep 3 (D3)	251 to 350	4,703 to 4,604
Deep 4 (D4)	>350	<4,604

bgs - below ground surface

amsl - above mean sea level

(Ref.12, p. 10).

Table 2 Trichloroethene results in Fruit Avenue Plume Monitor Wells

FAP Well ID	Intermediate wells I1/I2	TCE µg/L	
	61-120 ft bgs	August 2012	February 2015
WB-01(I1/I2)		0.9	2.6
WB-02(I1/I2)		0.77	0.1
	Intermediate wells I-2	TCE µg/L	
	86-120 ft bgs	August 2012	February 2015
MNW-1(I2)		17	19.8
SFMW-13(I2)		1	0.9
	Deep Wells D-1	TCE µg/L	
	121-150 ft bgs	August 2012	February 2015
MNW-11(D1)		46	22
SFMW-14(D1)		17	14.9
MNW-9(D1)		4.6	1.9

FAP Data (Ref. 6, pp. 59, 60, 62, 63, 64, 65, 68 and 69,)
Note: EPA MCL for TCE is 5 µg/L (Ref. 7)

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Table 3 Properties & Sample points WCA, ESI July 2016

Properties of Concern & Sample Locations West Central Avenue, ESI July 2016 (Ref. 13, 14 and 30)			
Address **Central Ave West**	**Business Type**	**Years In Business.** **Directory dates reviewed 1947, 52, 62, 65, 67, 70, 75, 80, 85 and 90**	**Sample Points**
1105	Speed Queen Laundry & Dry Cleaning70- Extra Quality Coin Laundry 75,80 - X-Tra Quality Coin Laundry Inc. 85-, Washtub Laundromat currently	1970 - 1975- 1980- 1985- /90	**1**
1202	Master Dry Cleaners	1952- 1962- 1965- 1967- 1970- /75	**2**
1404	Esco Bio-chemicals Co.	1952- /62	2
1406	Esco Bio-chemicals Co. vitamin production - Esco Bio-chemicals Co. Pharmaceuticals 67- Electronics' TV Laboratory 75 -	1962 - 1965- 1967- 1970- 1975- /80	
1408	Duke's Enterprises Ltd Indian Jewelry Manufacture	1975- 1980- /85	
1433	Neighbors Laundromat, The (1431 in 65, 67)	1962- 1965- 1967- 1970- 1975- /80	**3**
1503	Bell Indian Trading Post 47 - Bell Indian Trading Post Lmtd Jewelry manufacturers 62, 65 - SunBell Corp. Jewelry Manufactures 70, 75- Albuquerque Photo Laboratory Inc. 80- Michelson Metals 85	1947- 1962- 1965- 1967- 1970- 1975- 1980- 1985- 1990-	**9** **+5 along 14th and Marquette**
1503	Chief Weavers Ltd. - Chief Weavers The Jewelers -	1947- 1952- /	**0**
1701 most likely 1601	Indian Silver Craft	1965- 1967- 1970- 1975- 1980- 1985- /90	**4**
1816	Aamco Transmission, Kellys Transmission Co.	1975-1980 1985-1990 ROS inv 2007	**0**
1911 or 1837	Unique Cleaners - Unique Cleaners (1837 address change 1980)	1947- 1952- 1962- 1965- 1967- 1970- 1975- 1980-	**2 + 2 at 1801**
Lomas Ave West	**Business Type**	**Years in business**	**Number of samples**
1420	Moore Radio Service repair	1947- 1962- 1965- 1967- /70	0
Park Ave West	**Business Type**	**Years in business**	**Number of samples**
1006	Park Ave Cleaners	1957 – 1993 VRP in 2000	3

Note: Red Type - Jewelry manufacture
Blue Type - Dry Cleaners
Black Type - Other business types
Pink Highlight - Area with known TCE in subsurface soil, soil gas and ground water.
Green Highlight – Area with known PCE in subsurface soil gas and ground water.

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Table 4 Soil Gas Samples collected.

Sampling method	Analysis	Sample Container	Number of Sample locations
Active Soil Gas sampling 6 – 7 feet bgs.	Gas Chromatography FROG 4000^{tm} for chlorinated alkenes	1 L Tedlar bags	33
Active Soil Gas Sampling 6 – 7 feet bgs.	TO-15 Trace	6 L Summa grab	12

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Table 5 FROG 4000^{tm} Field Screening & Summa TO-15 Comparison.

Table 5 FROG 4000^{tm} Field Screening & Summa TO-15 Comparison (Ref. 36 and 37)										
MAP	Location ID	FROG 4000tm GC Field Screen Results				Labrotory TO-15 Results				Summa Canister Serial Number
Figure Number		Target Analyte List ppbv = PCE, TCE, 1,2-cis-DCE, 1,2-trans-DCE, VC	Calculated TCE ug/m3	Calculated PCE ug/m3		TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1,4 Dioxane ug/m3	
Figure 7	WCA-110-R Seco 01	TAL-ND	*	*						
	WCA-1816-Lomas-01	TAL-ND	*	*						
Figure 8	WCA-1801-Central-01	TCE 10.1, (t-DCE 242)	**54**	*		ND	0.41	ND	ND	SN# 0177
	WCA-1801-Central-03	**TCE 282**	**1516**	*		ND	10	ND	ND	SN# 283
Figure 9	WCA-1611-Central-01	t-DCE 296	*	*						
	WCA-1611-Central-03	t-DCE 195	*	*		ND	2	ND	ND	SN# H3440
	WCA-C-Laguna-02	**TCE 183**	**983**	*		**1,440**	33	ND	2.17	SN# 0190
	WCA-C-Laguna-03	**TCE 307**	**1650**	*		**3,050**	28	ND	ND	SN# H3428
	WCA-C-Laguna-03 Dup	**TCE 313**	**1682**	*		ND	ND	ND	ND	
Figure 9	WCA-1503-Central-01	**TCE 1428.75**	**7678**	*						
	WCA-1503-Central-01 dup	**TCE 884**	**4751**	*		**8,530**	48	ND	ND	SN# 0188
	WCA-1503-Central-02	TCE 28.6	**154**	*						
	WCA-1503-Central-03	TCE 5.9, (t-DCE 291)	**32**	*						
	WCA-1503-Central-04	TCE 16.8	**90**	*						

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Table 5 FROG 4000tm Field Screening & Summa TO-15 Comparison (Ref. 36 and 37)									
MAP	Location ID	FROG 4000tm GC Field Screen Results			Labrotory TO-15 Results				Summa Canister Serial Number
Figure Number		Target Analyte List ppbv = PCE, TCE, 1,2-cis-DCE, 1,2-trans-DCE, VC	Calculated TCE ug/m3	Calculated PCE ug/m3	TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1,4 Dioxane ug/m3	
	WCA-1503-Central-05	TCE 15.4 (t-DCE 252)	**83**	*					
	WCA-1503-Central-06	(t-DCE 300)	*	*					
	WCA-1503-Central-07	TAL-ND (t-DCE 187)	*	*					
	WCA-1503-Central-08	**TCE 630, c-DCE > 34,587**	**1935**	*	**257**	16	ND	ND	SN# H3423
	WCA-1503-Central-208 Dup	TCE 37.1	**199**	*	**272**	17	ND	ND	SN# 0281
	WCA-1503-Central-08 FB				ND	ND	ND	ND	SN# H3434
Figure 10	WCA-1445-Central-01	TCE 36.4	**196**	*					
	WCA-1433-Central-01	TAL-ND	*	*					
	WCA-1433-Central-02	**TCE 132.6**	**713**	*	**1,350**	67	5.03	ND	SN# 0175
	WCA-1429-Central-01	TCE 19.3	**104**	*					
	WCA-1429-Central-01 Dup	TCE 20.5	**110**	*					
Figure 11	WCA-C-Marquette-01	**TCE 146**	**785**	*	ND	ND	ND	ND	SN# H3424
	WCA-C-14St-01	**TCE 308**	**1655**	*	0.49 B	2.11	ND	ND	SN# 0182
	WCA-C-14St-01 DUP	**TCE 289**	**1553**	*					
	WCA-C-14St-02	TAL-ND	*	*					
	WCA-C-14St-02 DUP	TAL-ND	*	*					
	WCA-C-14St-03	TAL-ND	*	*					

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Table 5 FROG 4000^{tm} Field Screening & Summa TO-15 Comparison (Ref. 36 and 37)										
MAP	Location ID	FROG 4000tm GC Field Screen Results				Labrotory TO-15 Results				Summa Canister Serial Number
Figure Number		Target Analyte List ppbv = PCE, TCE, 1,2-cis-DCE, 1,2-trans-DCE, VC	Calculated TCE ug/m3	Calculated PCE ug/m3		TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1,4 Dioxane ug/m3	
	WCA-C-14St-04	**TCE 510**	**2741**	*		2.15 B	2.49 B	ND	ND	SN# 3439
Figure 12	WCA-1404-Central-01	TAL-ND	*	*						
	WCA-1404-Central-02	TCE 23.3 (t-DCE 265)	**125**							
Figure 13	WCA-1202-Central-01	TAL-ND (t-DCE 388)	*	*						
	WCA-1122-Central-01	TAL-ND (t-DCE 312)	*	*						
Figure 13	WCA-C-11St-01	**PCE 38.4**	*	260		8.94	**939**	ND	ND	SN# H3445
	WCA-C-11St-01 Dup	TAL-ND	*	*						
Figure 14	WCA-C-Park-01	**PCE 105.5**	*	**715**						
	WCA-1004-Park Alley-01	**TCE 19.4, PCE 254.6**	**104**	**1727**						
	WCA-1004-Park Alley-02	**TCE 15.2, PCE 93.5, t-DCE 273.2**	**82**	**634**						

(t-DCE) in brackets detected in GC Field Screening was believed to be false positives due to calibration drift. (Ref. 36)
Bold Face Type Exceeds Residential VISL for TCE and/or PCE

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Table 6 Property Type within 200 feet of Sample Location

Table 6 Property Type within 200 feet of Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,-dioxane ug/m3			
Figure 7	WCA-110-R Seco 01						3	6	0
	WCA-1816-Lomas-01						3	6	1
Figure 8	WCA-1801-Central-01	SN# 0177	U	0.41	U	U	0	2	1
	WCA-1801-Central-03	SN# 283	U	10.4	U	U	6	4	1
Figure 9	WCA-1611-Central-01						-	-	-
	WCA-1611-Central-03	SN# H3440	U	2.2	U	U	-	-	-
	WCA-C-Laguna-02	SN# 0190	**1,440**	33.4	U	2.17	27	3	0
	WCA-C-Laguna-03	SN# H3428	**3,050**	27.8	U	U	25	3	0
	WCA-C-Laguna-03 Dup						-	-	-
Figure 9	WCA-1503-Central-01						28	1	0
	WCA-1503-Central-01 dup	SN# 0188	**8,530**	47.6	U	U	-	-	-
	WCA-1503-Central-02						28	0	0
	WCA-1503-Central-03						27	1	0
	WCA-1503-Central-04						23	1	0
	WCA-1503-Central-05						20	1	0
	WCA-1503-Central-06								
	WCA-1503-Central-07								
	WCA-1503-Central-08	SN# H3423	**257**	16.3	U	U	21	2	0
	WCA-1503-Central-208 Dup	SN# 0281	**272**	17.1	U	U	-	-	-
	WCA-1503-Central-08 FB	SN# H3434	U	U	U	U	-	-	-
Figure 10	WCA-1445-Central-01						18	1	0
	WCA-1433-Central-01								
	WCA-1433-Central-02	SN# 0175	**1,350**	66.7	5.03	U	17	2	0
	WCA-1429-Central-01						12	2	0
	WCA-1429-Central-01 Dup						-	-	-

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Table 6 Property Type within 200 feet of Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,-dioxane ug/m3			
Figure 11	WCA-C-Marquette-01	SN# H3424	U	U	U	U	20	0	0
	WCA-C-14St-01	SN# 0182	0.48 B	2.11	U	U	14	3	0
	WCA-C-14St-01 DUP						-	-	-
	WCA-C-14St-02								
	WCA-C-14St-02 DUP								
	WCA-C-14St-03								
	WCA-C-14St-04	SN# 3439	2.15 B	2.49 B	U	U	10	2	0
Figure 12	WCA-1404-Central-01								
	WCA-1404-Central-02						4	3	0
Figure 13	WCA-1202-Central-01								
	WCA-1122-Central-01								
Figure 13	WCA-C-11St-01	SN# H3445	8.94	**939**	U	U	24	3	0
	WCA-C-11St-01 Dup								
Figure 14	WCA-C-Park-01						12	7	1
	WCA-1004-Park Alley-01						16	8	1
	WCA-1004-Park Alley-02						14	8	1

Ref. 37
U Undetected in Air TO-15 analysis
B "B" flagged because the reported values were less than ten times of the amount found in the blank.
Bold Face Type Exceeds Residential VISL for TCE and/or PCE

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Table 7 Sample Collection Field & Data Summary Sheet

	FIELD SCREEN DATA COLLECTION Ref. 33, 35 and 36												TO-15 COLLECTION DATA Ref. 37					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Spot ID	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analyte List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque Sunport to the nearest hour (Ref 35)	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
Figure 7	WCA-110-R Seco 01	N 35.09297 W106.66743	5.6	7/17/2016	4.5-0.0	7/18/2016	8:14	1531_LOG_201.xml	TAL-ND	ND	ND	29.88						
	WCA-1816-Lomas-01	N 35.09301 W106.66721	6.8	7/20/2016	0.9-0.0	7/20/2016	17:10	0938_LOG_264.xml	TAL-ND (TEX)	ND	ND	29.93						
Figure 8	WCA-1801-Central-01	N 35.0924 W106.66662	6.4	7/19/2016	0.0-0.0	7/19/2016	14:25	1724_LOG_236.xml	TCE 10.1 (t-DCE 242)	**54**	ND	29.96	7/20/2016	14:10	29.98	U	0.41	SN# 0177
	WCA-1801-Central-03	N 35.09123 W106.66565	7.3	7/20/2016	12.4-0.2	7/20/2016	16:10	0839_LOG_260.xml	**TCE 282 (TEX)**	**1516**	ND	29.94	7/21/2016	14:50	29.95	U	10.4	SN# 283
Figure 9	WCA-1611-Central-01	N 35.09069 W106.66493	6.7	7/17/2016	0.3	7/17/2016	10:55	1513_LOG_187.xml	t-DCE 296 (TEX)	ND	ND	29.88						
	WCA-1611-Central-03	N 35.09023 W106.66383	6.5	7/20/2016	0.4-0.1	7/20/2016	8:35	1138_LOG_244.xml	t-DCE 195 (TEX)	ND	ND	30.07	7/21/2016	15:36	29.91	U	2.2	SN# H3440
	WCA-C-Laguna-02	N 35.09052 W106.66463	7.3	7/19/2016	0.2-0.1	7/19/2016	11:35	1415_LOG_226.xml	**TCE 183 (TEX)**	**983**	ND	30.03	7/20/2016	14:22	29.98	**1,440**	33.4	SN# 0190
	WCA-C-Laguna-03	N 35.09049 W106.66479	7.0	7/19/2016	0.5-0.4	7/19/2016	10:55	1348_LOG_224.xml	**TCE 307 (TEX)**	**1650**	ND	30.04	7/20/2016	14:33	29.95	**3,050**	27.8	SN# H3428
	WCA-C-Laguna-03 Dup			7/19/2016	0.5-0.4	7/19/2016	10:55		**TCE 313**	**1682**	ND	30.04						
Figure 9 and 10	WCA-1503-Central-01	N 35.09049 W106.66414	7.1	7/19/2016	14.9-1.3	7/19/2016	17:10	1037_LOG_240.xml	**TCE 1428.75**	**7678**	ND	29.9						
	WCA-1503-Central-01 dup				4.9-1.2	7/21/2016	13:08	1632_LOG_273.xml	**TCE 884**	**4751**	ND	30.01	7/21/2016	13:08	30.01	**8,530**	47.6	SN# 0188
	WCA-1503-Central-02	N 35.09082 W106.66386	8.0	7/19/2016	3.9-0.1	7/19/2016	15:35		TCE 28.6 (TEX)	**154**	ND	29.91						
	WCA-1503-Central-03	N 35.09058 W106.66373	7.2	7/18/2016	0.2-0.1	7/19/2016	8:55	1440_LOG_228.xml	TCE 5.9, (t-DCE 291) (TEX)	**32**	ND	30.08						
	WCA-1503-Central-04	N 35.09047 W106.66373	7.3	7/18/2016	0.1-0.0	7/19/2016	8:30	1505_LOG_230.xml	TCE 16.8 (TEX)	**90**	ND	30.06						
	WCA-1503-Central-05	N 35.09002 W106.66431	6.9	7/18/2016	0.1	7/18/2016	16:10	1032_LOG_216.xml	TCE 15.4 (t-DCE 252)	**83**	ND	29.88						
	WCA-1503-Central-06	35.09000 W106.66449	7.0	7/18/2016	4.8-0.1	7/18/2016	15:45	1056_LOG_218.xml	(t-DCE 300)	ND	ND	29.88						

Table 7 Sample Collection Field & Data Summary Sheet

	FIELD SCREEN DATA COLLECTION Ref. 33, 35 and 36												TO-15 COLLECTION DATA Ref. 37					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Spot ID	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analyte List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque Sunport to the nearest hour (Ref 35)	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-1503-Central-07	N 35.09002 W106.66460	7.8	7/18/2016	0.1-0.0	7/18/2016	15:25	1121_LOG_220.xml	TAL-ND (t-DCE 187) (TEX)	ND	ND	29.88						
	WCA-1503-Central-08	N 35.09033 W106.66439	6.6	7/19/2016	6.2-0.1	7/18/2016	17:40	1111_LOG_242.xml	**TCE 630, c-DCE > 34,587 (TEX)**	**1935**	ND	29.85	7/21/2016	13:26	29.98	**257**	16.3	SN# H3423
	WCA-1503-Central-208 Dup					7/21/2016	13:26	1245_LOG_278.xml	TCE 37.1 (TE)	**199**	ND	29.98	7/21/2016	14:36	29.98	**272**	17.1	SN# 0281
	WCA-1503-Central-08 FB											29.98	7/21/2016	13:41	29.98	U	U	SN# H3434
Figure 10	WCA-1445-Central-01	N 35.09025 W106.66383	7.1	7/19/2016	5.2-0.0	7/20/2016	10??	0911_LOG_262.xml	TCE 36.4 (TEX)	**196**	ND	30.07						
	WCA-1433-Central-01	N 35.08958 W106.66374	6.5	7/17/2016	1.6	7/17/2016	9:01	1440_LOG_185.xml	TAL-ND (TEX)	ND	ND	29.88						
	WCA-1433-Central-02	N 35.09019 W106.66346	7.2	7/19/2016	1.0-0.2	7/20/2016	9:48	1530_LOG_246.xml	**TCE 132.6**	**713**	ND	30.07	7/21/2016	16:50	29.9	**1,350**	66.7	SN# 0175
	WCA-1429-Central-01	N 35.08995 W106.66317	6.5	7/18/2016	1.3	7/18/2016	8:38	1554_LOG_203.xml	TCE 19.3	**104**	ND	30.03						
	WCA-1429-Central-01 Dup					7/18/2016	8:38	1637_LOG_206.xml	TCE 20.5	**110**	ND	30.03						
Figure 11	WCA-C-Marquette-01	N 35.08904 W106.66206	7.0	7/21/2016	1.8	7/21/2016	15:00	1603_LOG_270.xml	**TCE 146 (TEX)**	**785**	ND	29.95	7/21/2016	15:00	29.95	U	U	SN# H3424
	WCA-C-14St-01	N 35.08965 W106.66270	7.0	7/20/2016	0.0-0.0	7/20/2016	13:10	1631_LOG_250.xml	**TCE 308 (TEX)**	**1655**	ND	30.02	7/21/2016	16:15	29.91	0.48 B	2.11	SN# 0182
	WCA-C-14St-01 DUP			7/20/2016		7/20/2016	13:10	1727_LOG_254.xml	**TCE 289**	**1553**	ND	30.02						
	WCA-C-14St-02	N 35.08994 W106.66257	7.0	7/20/2016	0.0-0.0	7/20/2016	12:40	1602_LOG_248.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-02 DUP			7/20/2016		7/20/2016	12:40	1658_LOG_252.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-03	N 35.09029 W106.66257	7.2	7/20/2016	0.7-0.1	7/20/2016	14:25	1812_LOG_256.xml	TAL-ND (TEX)	ND	ND	29.95						
	WCA-C-14St-04	N 35.08937 W106.66266	7.2	7/21/2016	20.6-0.0	7/21/2016	14:39	1530_LOG_268.xml	**TCE 510**	**2741**	ND	29.95	7/21/2016	14:39	29.95	2.15 B	2.49 B	SN# 3439
Figure 12	WCA-1404-Central-01	N 35.08859 W106.66331	6.3	7/18/2016	0	7/18/2016	10:20	0943_LOG_212.xml	TAL-ND (TEX)	ND	ND	30.01						
	WCA-1404-Central-02	N 35.08864 W106.66348	6.0	7/18/2016	8.5-0.2	7/18/2016	13:47	1006_LOG_214.xml	TCE 23.3 (t-DCE 265)	**125**	ND	29.92						
Figure 123	WCA-1202-Central-01	N 35.08730 W106.66102	5.8	7/17/2016	0	7/17/2016		1537_LOG_189.xml	TAL-ND (t-DCE 388)	ND	ND							

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Table 7 Sample Collection Field & Data Summary Sheet

	FIELD SCREEN DATA COLLECTION Ref. 33, 35 and 36												TO-15 COLLECTION DATA Ref. 37					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Spot ID	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analyte List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque Sunport to the nearest hour (Ref 35)	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-1122-Central-01	N 35.08744 W106.66085	6.8	7/17/2016	not recorded	7/17/2016	14:07	1600_LOG_191.xml	TAL-ND (t-DCE 312)	ND	ND	29.8						
Figure 13	WCA-C-11St-01	N 35.08752 W106.65951	6.2	7/17/2016	0.8	7/17/2016	16:26	1710_LOG_195.xml	PCE 38.4	ND	260	29.82	7/21/2016	14:15	29.98	8.94	**939**	SN# H3445
	WCA-C-11St-01 Dup					7/17/2016	16:26	1146_LOG_222.xml	TAL-ND	ND	ND	29.82						
Figure 14	WCA-C-Park-01	N 35.08526 W106.65927	6.5	7/21/2016	0	7/26/2016	12:15	1706_LOG_283.xml	**PCE 105.5 (TEX)**	0	**715**	29.96						
	WCA-1004-Park Alley-01	N 35.08495 W106.65937	6.8	7/21/2016	5.3-1.0	7/26/2016	11:28	1735_LOG_285.xml	**PCE 254.6, TCE 19.4, (TEX)**	**104**	**1727**	29.96						
	WCA-1004-Park Alley-02	N 35.08488 W106.65919	7.1	7/21/2016	0.9-0.2	7/26/2016	11:39	1802_LOG_287.xml	**PCE 93.5, TCE 15.2, t-DCE 273.2 (TEX)**	**82**	**634**	29.96						

Note: (TEX) Possible toluene, ethylbenzene and xylene presences indicated by FROG field screening.
Bold Face Type Exceeds Residential VISL for TCE and/or PCE

Ref. 33, 36and 37

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Governor

JOHN A. SANCHEZ
Lieutenant Governor

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BUTCH TONGATE
Cabinet Secretary - Designate

J.C. BORREGO
Acting Deputy Secretary

November 22, 2016

LaDonna Turner (6SF-R)
Site Assessment Manager
U.S. EPA, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202

Subject: Expanded Site Inspection Report for West Central Avenue, Albuquerque, Bernalillo County, New Mexico, CERCLIS No. NMN000607372

Dear Ms. Turner:

Enclosed for your review is the Expanded Site Inspection (E S I) Report for West Central Avenue (WCA), in Albuquerque, Bernalillo County, New Mexico, CERCLIS No. NMN000607372. The WCA site is located west of the downtown area, east of the Rio Grande River and southeast of Old Town Albuquerque, Bernalillo County, New Mexico. WCA is a mixed residential and commercial use area that contains four schools and several small neighborhood parks within a half mile of the Site. WCA is characterized as a ground water plume contaminated with chlorinated solvents including trichloroethene, cis-1,2-dichlorethene, trans-1,2-dichloroethene.

The groundwater pathway was investigated during the Site Inspection (SI) and an SI Report was submitted in September 2014. The full extent of the WCA ground water plume is not known at this time. This ESI investigated potential source areas using soil gas field screening and laboratory analysis at several target business. Soil gas data collected as part of this ESI identified trichloroethene (TCE) and tetrachloroethene (PCE) soil vapor contamination, indicative of potential source(s) and a possible Vapor Intrusion (VI) exposure pathway. NMED SOS recommends further investigation of the Site under CERCLA. Recommendations include additional soil gas investigation, installation of two ground water monitor wells, and collection of indoor air samples to assess the VI exposure pathway.

Please contact Martyne Kieling at (505) 827-2340 or me at (505) 827-2903, if you have any questions.

Sincerely,

Mark Garman, Manager
Superfund Oversight Section

ED_013172_00000126-00001

Encl: Expanded Site Inspection Report West Central Avenue, Albuquerque, Bernalillo County, New Mexico; CERCLIS ID No. NMN000607372

Cc w/o encl: Kathy Gibson, US EPA Region 6, Superfund State Coordinator
Shannon Martin, Manager, Grants and Planning Section
Martyne Kieling, Superfund Oversight Section
Superfund Oversight Section Read File

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 6/17/2020 8:46:39 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: West Central Avenue QASP
Attachments: Appendix B - Compendium of Methods for the Determination of Toxic Compounds in Ambient Air (Second Edition) - Compendium Method TO-17.pdf; Appendix C - Standard Operating Procedures (SOPs).pdf; Figure 1-1 Site Location Map.pdf; Figure 2-1 Site Area Map.pdf; Figure 2-2 Site and Study Area Layout Map.pdf; Figure 3-1 Soil Gas Analytical and Field Sample Location Overview Map.pdf; Figure 3-2 Soil Gas Analytical and Field Sample Location Map 1.pdf; Figure 3-3 Soil Gas Analytical and Field Sample Location Map 2.pdf; Figure 3-4 Soil Gas Analytical and Field Sample Location Map 3.pdf; Figure 3-5 Soil Gas Analytical and Field Sample Location Map 4.pdf; Figure 3-6 Soil Gas Analytical and Field Sample Location Map 5.pdf; West Central Avenue Assessment QASP.doc; Appendix A - Site-Specific Data Quality Objective.pdf

Gary,
Attached is the West Central Avenue QASP for your review and comment. Please let me know if you have any questions or concerns. Thanks.

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APPENDIX B

COMPENDIUM OF METHODS FOR THE DETERMINATION OF TOXIC ORGANIC COMPOUNDS IN AMBIENT AIR (SECOND EDITION) - COMPENDIUM METHOD TO-17

EPA/625/R-96/010b

Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air

Second Edition

Compendium Method TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

January 1999

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Method TO-17
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DISCLAIMER

This Compendium has been subjected to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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METHOD TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

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METHOD TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

1. Scope

1.1 This document describes a sorbent tube/thermal desorption/gas chromatographic-based monitoring method for volatile organic compounds (VOCs) in ambient air at 0.5 to 25 parts per billion (ppbv) concentration levels. Performance criteria are provided as part of the method in Section 14. EPA has previously published Compendium Method TO-1 describing the use of the porous polymer Tenax® GC for sampling nonpolar VOCs and Compendium Method TO-2 describing the use of carbon molecular sieve for highly volatile, nonpolar organics (1). Since these methods were developed, a new generation of thermal desorption systems as well as new types of solid adsorbents have become available commercially. These sorbents are used singly or in multisorbent packings. Tubes with more than one sorbent, packed in order of increasing sorbent strength are used to facilitate quantitative retention and desorption of VOCs over a wide volatility range. The higher molecular weight compounds are retained on the front, least retentive sorbent; the more volatile compounds are retained farther into the packing on a stronger adsorbent. The higher molecular weight compounds never encounter the stronger adsorbents, thereby improving the efficiency of the thermal desorption process.

1.2 A large amount of data on solid adsorbents is available through the efforts of the Health and Safety Laboratory, Health and Safety Executive (HSE), Sheffield, United Kingdon (UK). This group has provided written methods for use of solid adsorbent packings in monitoring workplace air. Some of their documents on the subject are referenced in Section 2.2. Also, a table of information on safe sampling volumes from their research is provided in Appendix 1.

1.3 EPA has developed data on the use of solid sorbents in multisorbent tubes for concentration of VOCs from the ambient air as part of its program for methods development of automated gas chromatographs. The experiments required to validate the use of these sorbent traps include capture and release efficiency studies for given sampling volumes. These studies establish the validity of using solid adsorbents for target sets of VOCs with minimal (at most one hour) storage time. Although questions related to handling, transport and storage of samples between the times of sampling and analysis are not addressed, these studies provide information on safe sampling volumes. Appendix 2 delineates the results of sampling a mixture of humidified zero air and the target VOCs specified in the Compendium Method TO-14 (2) using a specific multisorbent.

1.4 An EPA workshop was convened in November of 1995 to determine if a consensus could be reached on the use of solid sorbent tubes for ambient air analysis. The draft method available at the workshop has evolved through several reviews and modifications into the current document. The method is supported by data reported in the scientific literature as cited in the text, and by recent experimental tests performed as a consequence of the workshop (see Table 1).

1.5 The analytical approach using gas chromatography/mass spectroscopy (GC/MS) is identical to that mentioned in Compendium Method TO-15 and, as noted later, is adapted for this method once the sample has been thermally desorbed from the adsorption tube onto the focusing trap of the analytical system.

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1.6 Performance criteria are given in Section 14 to allow acceptance of data obtained with any of the many variations of sampling and analytical approaches.

2. Summary of Method

2.1 The monitoring procedure involves pulling a volume of air through a sorbent packing to collect VOCs followed by a thermal desorption-capillary GC/MS analytical procedure.

2.2 Conventional detectors are considered alternatives for analysis subject to the performance criteria listed in Section 14 but are not covered specifically in this method text.

2.3 Key steps of this method are listed below.

2.3.1 Selection of a sorbent or sorbent mix tailored for a target compound list, data quality objectives and sampling environment.

2.3.2 Screening the sampling location for VOCs by taking single tube samples to allow estimates of the nature and amount of sample gases.

2.3.3 Initial sampling sequences with two tubes at nominally 1 and 4 liter total sample volumes (or appropriate proportional scaling of these volumes to fit the target list and monitoring objectives).

2.3.4 Analysis of the samples and comparison to performance criteria.

2.3.5 Acceptance or rejection of the data.

2.3.6 If rejection, then review of the experimental arrangement including repeat analysis or repeat analysis with backup tubes and/or other QC features.

[Note: EPA requires the use of distributed volume pairs (see Section14.4) for monitoring to insure high quality data. However, in situations where acceptable data have been routinely obtained through use of distributed volume pairs and the ambient air is considered well characterized, cost considerations may warrant single tube sampling. Any attendant risk to data quality objectives is the responsibility of the project's decision maker.]

2.4 Key steps in sample analysis are listed below.

2.4.1 Dry purge of the sorbent tube with dry, inert gas before analysis to remove water vapor and air. The sorbent tube can be held at temperatures above ambient for the dry purge.

2.4.2 Thermal desorption of the sorbent tube (primary desorption).

2.4.3 Analyte refocusing on a secondary trap.

2.4.4 Rapid desorption of the trap and injection/transfer of target analytes into the gas chromatograph (secondary desorption).

2.4.5 Separation of compounds by high resolution capillary gas chromatography (GC).

2.4.6 Measurement by mass spectrometry (MS) or conventional GC detectors (only the MS approach is explicitly referred to in Compendium Method TO-17; an FID/ECD detector combination or other GC detector can be used if Section 14 criteria are met. However, no explicit QA guidelines are given here for those alternatives).

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2.5 The target compound list (TCL) is the same as listed in Compendium Method TO-15 (i.e., subsets of the 97 VOCs listed as hazardous pollutants in Title III of the Clean Air Act Amendments of 1990). Only a portion of these compounds has been monitored by the use of solid adsorbents. This method provides performance criteria to demonstrate acceptable performance of the method (or modifications of the method) for monitoring a given compound or set of compounds.

3. Significance

3.1 This method is an alternative to the canister-based sampling and analysis methods that are presented in Compendium Methods TO-14 and TO-15 and to the previous sorbent-based methods that were formalized as Compendium Methods TO-1 and TO-2. All of these methods are of the type that include sampling at one location, storage and transport of the sample, and analysis at another, typically more favorable site.

3.2 The collection of VOCs in ambient air samples by passage through solid sorbent packings is generally recognized to have a number of advantages for monitoring. These include the following:

- The small size and light weight of the sorbent packing and attendant equipment.
- The placement of the sorbent packing as the first element (with the possible exception of a filter or chemical scrubber for ozone) in the sampling train so as to reduce the possibility of contamination from upstream elements.
- The availability of a large selection of sorbents to match the target set of compounds including polar VOC.
- The commercial availability of thermal desorption systems to release the sample from the sorbent and into the analytical system.
- The possibility of water management using a combination of hydrophobic sorbents (to cause water breakthrough while sampling); dry gas purge of water from the sorbent after sampling; and splitting of the sample during analysis.
- The large amount of literature on the use of sorbent sampling and thermal desorption for monitoring of workplace air, particularly the literature from the Health and Safety Executive in the United Kingdom.

3.3 Accurate risk assessment of human and ecological exposure to toxic VOCs is an important goal of the U. S. Environmental Protection Agency (EPA) with increased emphasis on their role as endocrine disrupters. Accurate data is fundamental to reaching this goal. The portability and small size of typical sampling packages for sorbent-based sampling and the wide range of sorbent choices make this monitoring approach appealing for special monitoring studies of human exposure to toxic gases and to use in network monitoring to establish prevalence and trends of toxic gases. Microenvironmental and human subject studies are typical of applications for Compendium Method TO-17.

3.4 Sorbent-based monitoring can be combined with canister-based monitoring methods, on-site autoGC systems, open path instrumentation, and other specialized point monitoring instruments to address most monitoring needs for volatile organic gases. More than one of these approaches can be used simultaneously as a means to check and insure the quality of the data being produced.

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3.5 In the form specified in Compendium Method TO-17, sorbent sampling incorporates the distributed volume pair approach that provides inherently defensible data to counter questions of sample integrity, operator performance, equipment malfunction during sampling, and any other characteristic of sample collection that is not linear with sampling volume.

3.6 In keeping with the consensus of EPA scientists and science advisors, the method is performance-based such that performance criteria are provided. Any modification of the sorbent approach to monitoring for VOCs can be used provided these criteria are met.

4. Applicable Documents

4.1 ASTM Standards

- Method D1356 *Definition of Terms Relating to Atmospheric Sampling and Analysis*
- Method E260 *Recommended Practice for General Gas Chromatography*
- Method E355 *Practice for Gas Chromatography Terms and Relationships*

4.2 EPA Documents

- *Technical Assistance Document for Sampling and Analysis Toxic Organic Compounds in Ambient Air*, U. S. Environmental Protection Agency, EPA-600/4-83-027, June 1983.
- *Quality Assurance Handbook for Air Pollution Measurement Systems*, U. S. Environmental Protection Agency, EPA-600/R-94-038b, May 1994.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Methods TO-1 and TO-2*, U. S. Environmental Protection Agency, EPA 600/4-84-041, April 1984.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Method TO-14, Second Supplement*, U. S. Environmental Protection Agency, EPA 600/4-89-018, March 1989.
- *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Method TO-15,* U. S. Environmental Protection Agency, EPA 625/R-96-010b, January 1997.

4.3 Other Documents

- MDHS 3 - Generation of Test Atmospheres of Organic Vapors by the Syringe Injection Technique, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- MDHS 4 - Generation of Test Atmospheres of Organic Vapors by the Permeation Tube Method, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- MDHS 72 - Volatile Organic Compounds in Air, *Methods for the Determination of Hazardous Substances (MDHS)*, Health and Safety Laboratory, Health and Safety Executive, Sheffield, UK.
- TAD - *Technical Assistance Document (TAD) on the Use of Solid Sorbent-based Systems for Ambient Air Monitoring*, Perkin Elmer Corp., 50 Danbury Rd., Wilton, CT 06897, USA.

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5. Definitions

[Note: Definitions used in this document and any user-prepared Standard Operating Procedures (SOPs) should be consistent with those used in ASTM D1356. All abbreviations and symbols are defined within this document at the point of first use.]

5.1 Thermal Desorption-the use of heat and a flow of inert (carrier) gas to extract volatiles from a solid or liquid matrix directly into the carrier gas and transfer them to downstream system elements such as the analytical column of a GC. No solvent is required.

5.2 Two-stage Thermal Desorption-the process of thermally desorbing analytes from a solid or liquid matrix, reconcentrating them on a focusing tube and then rapidly heating the tube to ?inject" the concentrated compounds into the GC system in a narrow band of vapor compatible with high resolution capillary gas chromatography.

5.3 Sorbent Tube (Also referred to as 'tube' and 'sample tube')-stainless steel, glass or glass lined (or fused silica lined) stainless steel tube, typically 1/4 inch (6 mm) O.D. and of various lengths, with the central portion packed with greater than 200 mg of solid adsorbent material, depending on density and packing bed length. Used to concentrate VOCs from air.

5.4 Focusing Tube-narrow (typically <3mm I.D.) tube containing a small bed of sorbent, which is maintained near or below ambient temperature and used to refocus analytes thermally desorbed from the sorbent tube. Once all the VOCs have been transferred from the sorbent tube to the focusing tube, the focusing tube is heated very rapidly to transfer the analytes into the capillary GC analytical column in a narrow band of vapor.

5.5 Cryogen (Also referred to as 'cryogenic fluid')-typically liquid nitrogen, liquid argon, or liquid carbon dioxide. In the present context, cryogens are used in some thermal desorption systems to cool the focusing tube.

5.6 High Resolution Capillary Column Chromatography-conventionally describes fused silica capillary columns with an internal diameter of 320 μm or below and with a stationary phase film thickness of 5 μm or less.

5.7 Breakthrough Volume (BV)-volume of air containing a constant concentration of analyte which may be passed through a sorbent tube before a detectable level (typically 5%) of the analyte concentration elutes from the nonsampling end. Alternatively, the volume sampled when the amount of analyte collected in a back-up sorbent tube reaches a certain percentage (typically 5%) of the total amount collected by both sorbent tubes. These methods do not give identical results. For purposes in the document the former definition will be used.

5.8 Retention Volume (RV)-the volume of carrier gas required to move an analyte vapor plug through the short packed column which is the sorbent tube. The volume is determined by measuring the carrier gas volume necessary to elute the vapor plug through the tube, normally measured at the peak response as the plug exits the tube. The retention volume of methane is subtracted to account for dead volume in the tube.

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5.9 Safe Sampling Volume (SSV)-usually calculated by halving the retention volume (indirect method) or taking two-thirds of the breakthrough volume (direct method), although these two approaches do not necessarily give identical results. The latter definition is used in this document.

5.10 Sorbent Strength—term used to describe the affinity of sorbents for VOC analytes. A stronger sorbent is one which offers greater safe sampling volumes for most/all VOC analytes relative to another, weaker sorbent. Generally speaking, sorbent strength is related to surface area, though there are exceptions to this. The SSVs of most, if not all, VOCs will be greater on a sorbent with surface area ?10n" than on one with a surface area of ?n". As a general rule, sorbents are described as ?weak" if their surface area is less than 50 m^2g^{-1} (includes Tenax®, Carbopack™/trap C, and Anasorb® GCB2), ?medium strength" if the surface area is in the range 100-500 m^2g^{-1} (includes Carbopack™/trap B, Anasorb® GCBI and all the Porapaks and Chromosorbs listed in Tables 1 and 2) and ?strong" if the surface area is around 1000 m^2g^{-1} (includes Spherocarb®, Carbosieve™ S-III, Carboxen™ 1000, and Anasorb® CMS series sorbents.)

5.11 Total Ion Chromatogram (TIC)-chromatogram produced from a mass spectrometer detector operating in full scan mode.

5.12 MS-SCAN-mode of operation of a GC mass spectrometer detector such that all mass ions over a given mass range are swept over a given period of time.

5.13 MS -SIM-mode of operation of a GC mass spectrometer detector such that only a single mass ion or a selected number of discrete mass ions are monitored.

5.14 Standard Sorbent (Sample) Tube-stainless steel, glass or glass lined (or fused silica lined) stainless steel tube, 1/4 inch (6 mm) O.D. and of various lengths, with the central portion packed with ≥200 mg of solid adsorbent material depending on sorbent density. Tubes should be individually numbered and show the direction of flow.

5.15 Time Weighted Average (TWA) Monitoring-if air is sampled over a fixed time period - typically 1,3, 8 or 24 hours, the time weighted average atmospheric concentration over the monitoring period may be calculated from the total mass of analyte retained and the specific air volume sampled. Constraints on breakthrough volumes make certain combinations of sampling time and flow rates mutually exclusive.

6. Overview of Methodology

[Note: The following is intended to provide a simple and straightforward method description including the example of a specific sampling problem. Although specific equipment is listed, the document is intended only as an example and equipment mentioned in the text is usually only one of a number of equally suitable components that can be used. Hence trade names are not meant to imply exclusive endorsement for sampling and analysis using solid sorbents. Later sections in the text give guidance as to what considerations should be made for a number of VOC monitoring applications.]

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6.1 Selection of Tube and Sorbent

6.1.1 Select a tube and sorbent packing for the sampling application using guidance from Tables 1 and 2 on sorbent characteristics as well as guidance from Appendix 1 and Table 3 on safe sampling volumes and breakthrough characteristics of sorbents.

6.1.2 As an example, assume the TCL includes a subset of the compounds shown in Table 3. In this case, the multisorbent tube chosen consists of two sorbents packed in a 1/4 inch O.D., 3.5" long glass tube in the following order and amounts: 160 mg of Carbopack™ graphitized carbon black (60/80 mesh) and 70 mg of Carboxen™-1000 type carbon molecular sieve (60/80 mesh). This is an example of Tube Style 2 discussed Section 9.1.3.2.

6.1.3 Pack the tube with the adsorbent by using the guidance provided in Section 10.1 or buy a prepacked tube from a supplier. In the example, tubes were purchased from Supelco Inc., Supelco Park, Bellefonte, PA 16823-0048.

6.2 Conditioning the Tube

6.2.1 Condition newly packed tubes for at least 2 hours (30 mins for preconditioned, purchased tubes) at 350°C while passing at least 50 mL/min of pure helium carrier gas through them.

[Note: Other sorbents may require different conditioning temperatures - see Table 2 for guidance.]

Once conditioned, seal the tube with brass, 1/4 inch Swagelok® -type fittings and PTFE ferrules. Wrap the sealed tubes in uncoated aluminum foil and place the tubes in a clean, airtight, opaque container.

6.2.2 A package of clean sorbent material, e.g. activated charcoal or activated charcoal/silica gel mixture, may be added to the container to ensure clean storage conditions.

6.2.3 Store in a refrigerator (organic solvent-free) at 4°C if not to be used within a day. On second and subsequent uses, the tubes will generally not require further conditioning as above. However, tubes with an immediate prior use indicating high levels of pollutant trace gases should be reconditioned prior to continued usage.

6.3 Sampling Apparatus

6.3.1 Select a sampling apparatus with accommodations for two sampling tubes capable of independent control of sampling rate at a settable value in the range 10 to 200 mL/min. Laboratory and field blanks must also be included in the monitoring exercise.

6.3.2 Backup tubes may be required to determine the cause of any problem if performance criteria, outlined in Section 14, are not met.

6.4 Sampling Rates

6.4.1 Select sampling rates compatible with the collection of 1 and 4 liter total sample volume (or of proportionally lower/higher sampling volumes).

6.4.2 Air samples are collected over 1 hour with a sampling rate of 16.7 mL/min and 66.7 mL/min, respectively.

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6.5 Preparing for Sample Collection

6.5.1 At the monitoring location, keep the tubes in their storage and transportation container to equilibrate with ambient temperature.

6.5.2 Using clean gloves, remove the sample tubes from the container, take off their caps and attach them to the sampling lines with non-outgassing flexible tubing. Uncap and immediately reseal the required number of field blank tubes.

6.5.3 Place the field blank tubes back in the storage container. If back-up tubes are being used, attach them to the sampling tubes using clean, metal Swagelok® type unions and combined PTFE ferrules.

6.6 Set the Flow Rates

6.6.1 Set the flow rates of the pump using a mass flow monitor.

6.6.2 The sampling train includes, from front to back, an in-line particulate filter (optional), an ozone scrubber (optional), a sampling tube, a back-up tube if any is being used, and a flow controller/pump combination.

6.6.3 Place the mass flow monitor in line after the tube. Turn the pump on and wait for one minute. Establish the approximate sampling flow rate using a dummy tube of identical construction and packing as the sampling tube to be used. Record on Field Test Data Sheet (FTDS), as illustrated in Figure 1.

6.6.4 Place the sampling tubes to be used on the sampling train and make final adjustments to the flow controller as quickly as possible to avoid significant errors in the sample volume.

6.6.5 Adjust the flow rate of one tube to sample at 16.7 mL/min. Repeat the procedure for the second tube and set the flow rate to 66.7 mL/min. Record on FTDS.

6.7 Sample and Recheck Flow Rates

6.7.1 Sample over the selected sampling period (i.e., 1-hour). Recheck all the sampling flow rates at the end of the monitoring exercise just before switching off each pump and record on FTDS.

6.7.2 Make notes of all relevant monitoring parameters including locations, tube identification numbers, pump flow rates, dates, times, sampled volumes, ambient conditions etc. on FTDS.

6.8 Reseal the Tubes

6.8.1 Immediately remove the sampling tubes with clean gloves, recap the tubes with Swagelok® fittings using PTFE ferrules, rewrap the tubes with uncoated Al foil, and place the tubes in a clean, opaque, airtight container.

6.8.2 If not to be analyzed during the same day, place the container in a clean, cool (<4°C), organic solvent-free environment and leave there until time for analysis.

6.9 Selection of Thermal Desorption System

6.9.1 Select a thermal desorption system using the guidance provided in Section 8.

6.9.2 Place the thermal unit in a ready operational status.

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6.10 Dry Purge the Tubes and Prepare for Thermal Desorption

6.10.1 Remove the sampling tubes, any backup tubes being used, and blanks from the storage area and allow the tubes to come to room temperature. Using clean gloves, remove the Swagelok®-type fittings and dry purge the tubes with a forward (sampling direction) flow of, for example, 50 mL/min of dry helium for 4 minutes (see Section 7.2 concerning dry purging).

[Note: Do not dry purge the laboratory blanks.]

6.10.2 Reseal the tubes with Teflon® (or other) caps compatible with the thermal desorber operation. Place the sealed tubes on the thermal desorber (e.g., Perkin Elmer Model ATD 400 Automated System or equivalent). Other thermal desorbers may have different arrangements for automation. Alternatively, use equivalent manual desorption.

6.11 Check for System Integrity

6.11.1 Check the air tightness of the seals and the integrity of the flow path.
6.11.2 Guidance is provided in Section 11.2 of this document.

6.12 Repurge of Tube on the Thermal Desorber/Addition of Internal Standard

6.12.1 Because of tube handling after dry purge, it may be necessary to repurge each of the tubes with pure, dry helium (He) before analysis in order to eliminate any oxygen.
6.12.2 If the initial dry purge can be performed on the thermal desorber so as to prevent any further exposure of the sorbent to air, then this step is not necessary. Proceed with the addition of an internal standard to the sorbent tube or the focusing tube.

6.13 Thermally Desorb the Packing

6.13.1 Reverse the flow direction of He gas, set the flow rate to at least 30 mL/min, and heat the tube to 325°C (in this case) to achieve a transfer of VOCs onto a focusing tube at a temperature of 27°C. Thermal desorption continues until all target species are transferred to the focusing trap. The focusing trap is typically packed with 20 mg of Carbopack™ B (60/80 mesh) and 50 mg of a Carboxen™ 1000-type sorbent (60/80 mesh).

6.14 Trap Desorption and GC/MS Analysis

6.14.1 After each tube is desorbed, rapidly heat the focusing trap (to 325°C in this example) and apply a reverse flow of at least 3 mL/min of pure helium carrier gas. Sample splitting is necessary to accommodate the capillary column. Analytes are transferred to the column in a narrow band of vapor.
6.14.2 The GC run is initiated based on a time delay after the start of thermal desorption. The remaining part of the analytical cycle is described in Section 3 of Compendium Method TO-15.

6.15 Restoring the Tubes and Determine Compliance with Performance Standards

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6.15.1 When tube analysis is completed, remove the tubes from the thermal desorber and, using clean gloves, replace the Teflon® caps with Swagelok fittings and PTFE ferrules, rewrap with aluminum foil, replace in the clean, airtight container, and re-store the tubes in a cool environment (<4 °C) until the next use.

6.15.2 Using previously prepared identification and quantification subroutines, identify the target compounds and document the amount of each measured compound (refer to the Section 3 of Compendium Method TO-15). Compare the results of analysis for the distributed volume pair taken during each sampling run and use the comparison to determine whether or not the performance criteria for individual sampling events have been met. Also examine the results of any laboratory blanks, field blanks, and any backup tube being used. Accept or reject the data based on the performance criteria (see Section 14).

6.16 Record and Store Data

6.16.1 Accurately retrieve field data (including the tube identification number) from the FTDS. The data should include a sampling site identifier, time of sample initiation, duration of sampling, air pump identification, flow rate, and other information as appropriate.

6.16.2 Store GC/MS data in a permanent form both in hard copy in a notebook and in digital form on a disk. Also store the data sheet with the hard copy.

[Note: Sections 7 through 14 below elaborate on the method by providing important information and guidance appropriate to explain the method as outlined in Section 6 and also to generalize the method for many applications. Section 14 gives the performance criteria for the method.]

7. Interferences and Limitations

7.1 Interference from Sorbent Artifacts

7.1.1 Minimizing Artifact Interference.

7.1.1.1 Stringent tube conditioning (see Section 10.2.1) and careful tube capping and storage procedures (see Section 10.2.2) are essential for minimizing artifacts. System and sorbent tube conditioning must be carried out using more stringent conditions of temperature, gas flow and time than those required for sample analysis.

7.1.1.2 A reasonable objective is to **reduce artifacts to 10% or less of individual analyte masses** retained during sampling. A summary of VOC levels present in a range of different atmospheric environments and the masses of individual components collected from 1, 2 or 10 L samples of air in each case is presented in Table 4.

7.1.1.3 Given that most ambient air monitoring is carried out in areas of poor air quality, for example in urban, indoor and factory fenceline environments where VOC concentrations are typically above 1 ppb, Table 4 demonstrates that the mass of each analyte retained will, therefore, range from ~5 ng to ~10 μg in most monitoring situations. Even when monitoring 'ultraclean' environments, analyte masses retained will usually exceed 0.1 ng (3).

7.1.1.4 Typical artifact levels for 1/4 inch O.D. tubes of 3.5" length range from 0.01 ng and 0.1 ng for carbonaceous sorbents and Tenax® respectively. These levels compare well with the masses of analytes collected - even from sub-ppb atmospheric concentrations (see Table 4). Artifact levels are around 10 ng for Chromosorb® Century series and other porous polymer sorbents. However, these types of sorbents can still be used for air monitoring at low ppb levels if selective or mass spectrometer detectors are used or if the blank profile of the tube demonstrates that none of the sorbent artifacts interfere analytically with the compounds of interest.

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7.1.1.5 Some varieties of charcoal contain metals which will catalyze the degradation of some organic analytes during thermal desorption at elevated temperatures thus producing artifacts and resulting in low analyte recoveries.

7.1.2 Artifacts from Long-term Storage of Blank Tubes.

7.1.2.1 Literature reports of the levels of artifacts on (a) Carbotrap/pack™ C, Carbotrap/pack™ B and Carbosieve™ SIII multi-bed tubes and (b) Tenax® GR tubes, by workers sealing the tubes using metal Swagelok®-type caps and PTFE ferrules with multi-tube, glass storage jars are reported to be between 0.01 ng [after 1-2 months (4)] and 0.1 ng [after 6 months (5)] for (a) and (b) respectively.

7.1.2.2 Artifact levels reported for other porous polymers are higher - for example 5 ng for Chromosorb 106 after 1 week (5). More information is given in the Technical Assistance Document (TAD) referred to in Section 4.3.

7.1.3 Artifacts Generated During Sampling and Sample Storage.

7.1.3.1 Benzaldehyde, phenol and acetophenone artifacts are reported to be formed via oxidation of the polymer Tenax® when sampling high concentration (100-500 ppb) ozone atmospheres (6).

7.1.3.2 Tenax® should thus be used with an ozone scrubber when sampling low levels (<10 ppb) of these analytes in areas with appreciable ozone concentrations. Carbotrap™/pack type sorbents have not been reported to produce this level of artifact formation. Once retained on a sorbent tube, chemically stable VOCs, loaded in laboratory conditions, have been shown to give good recoveries, even under high ozone concentrations for storage of a year or more (7-9).

7.2 Minimizing Interference from Water

7.2.1 Selection of Hydrophobic Sorbents

7.2.1.1 There are three preferred approaches to reducing water interference during air monitoring using sorbent tubes. The first is to minimize water collection by selecting, where possible, a hydrophobic sorbent for the sample tube.

7.2.1.2 This is possible for compounds ranging in volatility from n-C5 (see SSVs listed in Appendix 1). Tenax®, Carbotrap™ or one of the other hydrophobic sorbents listed in Table 2 should be used.

[Note: It is essential to ensure that the temperature of the sorbent tube is the same and certainly not lower than ambient temperature at the start of sampling or moisture will be retained via condensation, however hydrophobic the sorbent.]

7.2.2 Sample Splitting

7.2.2.1 If the sample loading is high, it is usually possible to eliminate sufficient water to prevent analytical interference by using sample splitting (10).

7.2.2.2 Sample may be split either (1) between the focusing trap and the capillary column (single splitting) during trap (secondary) desorption or (2) between both the tube and the focusing trap during primary (tube) desorption and between the focusing trap and the column during secondary (trap) desorption (see Section 8.2.3) (double splitting). It may, in fact, be necessary to split the sample in some cases to prevent overloading the analytical column or detector.

7.2.3 Dry Purge

7.2.3.1 The third water management method is to ?dry purge" either the sorbent tube itself or the focusing trap or both (11-13). Dry purging the sample tube or focusing trap simply involves passing a volume of pure, dry, inert gas through the tube from the sampling end, prior to analysis.

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7.2.3.2 The tube can be heated while dry purging at slightly elevated temperatures (11). A trap packing combination and a near ambient trapping temperature must be chosen such that target analytes are quantitatively retained while water is purged to vent from either the tube or trap.

7.3 Atmospheric Pollutants not Suitable for Analysis by this Method

7.3.1 Inorganic gases not suitable for analysis by this method are oxides of carbon, nitrogen and sulfur, O_3 and other permanent gases. Exceptions include CS_2 and N_2O.

7.3.2 Other pollutants not suitable are particulate pollutants, (i.e., fumes, aerosols and dusts) and compounds too labile (reactive) for conventional GC analysis.

7.4 Detection Limits and Maximum Quantifiable Concentrations of Air Pollutants

7.4.1 Detection limits for atmospheric monitoring vary depending on several key factors. They are:

- Minimum artifact levels.
- GC detector selection.
- Volume of air sampled. The volume of air sampled is in turn dependent upon a series of variables including SSVs (see Section 10.8, Table 1 and Appendix 1), pump flow rate limitations and time-weighted-average monitoring time constraints.

7.4.2 Generally speaking, detection limits range from sub-part-per-trillion (sub-ppt) for halogenated species such as CCl_4 and the freons using an electron capture detector (ECD) to sub-ppb for volatile hydrocarbons in 1 L air samples using the GC/MS operated in the full SCAN mode.

7.4.3 Detection limits are greatly dependent upon the proper management of water for GC capillary analysis of volatile organics in air using sorbent technology (14).

7.5 Suitable Atmospheric Conditions

7.5.1 Temperature range.

7.5.1.1 The normal working range for sorbent packing is 0-40°C (8).

7.5.1.2 In general, an increase in temperature of 10°C will reduce the breakthrough volume for sorbent packings by a factor of 2.

7.5.2 Humidity.

7.5.2.1 The capacity of the analytical instrumentation to accommodate the amount of water vapor collected on tubes is usually the limitation in obtaining successful results, particularly for GC/MS applications. This limitation can be extreme, requiring the use of a combination of water management procedures (see Section 7.2).

7.5.2.2 The safe sampling volumes of VOCs on hydrophobic adsorbents such as Tenax®, other porous polymers, Carbotrap™ and Carbopack™ are relatively unaffected by atmospheric humidity. Spherocarb® or carbonized molecular sieve type sorbents such as Carbosieve™ SIII and the Carboxens® are affected by high humidity, however, and SSVs should typically be reduced by a factor of 10 at 90-95% RH (8). Hydrophilic zeolite molecular sieves cannot be used at all at high humidity.

7.5.3 Wind speeds.

7.5.3.1 Air movement is not a factor indoors or outdoors at wind speeds below 10 miles per hour (<20 km per hour).

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7.5.3.2 Above this speed, tubes should be orientated perpendicular to the prevailing wind direction and should be sheltered from the direct draft if wind speeds exceed 20 miles per hour (30-40 km per hour) (see Section 10.5).

7.5.4 High concentrations of particulates.

7.5.4.1 It may be necessary to connect a particulate filter (e.g., a 2 micron Teflon® filter or short clean tube containing a loose plug of clean glass wool) to the sampling end of the tube in areas of extremely high particulate concentrations.

7.5.4.2 Some compounds of interest may, however, be trapped on the Teflon® or on the glass wool. Particulates trapped on the sorbent tube have the potential to act as a source or sink for volatiles, and may remain on the tube through several cycles of sampling and desorption. Frequent replacement of the particulate filter is therefore recommended.

8. Apparatus Selection and Preparation

8.1 Sample Collection

8.1.1 Selection of Tube Dimensions and Materials.

8.1.1.1 The most extensively used sorbent tubes are 1/4 inch O.D. stainless steel or 6 mm O.D. stainless steel or glass. Different suppliers provide different size tubes and packing lengths; however, 3.5 inch long tubes with a 6 cm sorbent bed and 1/4 inch O.D. stainless steel (see Figure 2) were used to generate the SSV information presented in Appendix 1.

8.1.1.2 As an approximate measure, for sorbents contained in equal diameter tubes the breakthrough volume is proportional to the bed-length (weight) of sorbent. Therefore, doubling the bed-length would approximately double the SSV (15).

8.1.1.3 Stainless steel (304 or "GC" grade) is the most robust of the commonly available tube materials which include, in addition, glass, glass-lined, and fused silica lined tubing. Tube material must be chosen to be compatible with the specifics of storage and transport of the samples. For example, careful attention to packaging is required for glass tubes.

8.1.2 Tube Labeling.

8.1.2.1 Label sample tubes with a unique identification number and the direction of sampling flow. Stainless steel tubes are most conveniently labeled by engraving. Glass tubes are best labeled using a temperature resistant paint. If empty sample tubes are obtained without labels, it is important to label and condition them before they are packed with adsorbent.

8.1.2.2 Recondition prepacked, unlabeled tubes after the tube labeling process and record the blank chromatogram from each tube. Record in writing the details of the masses and/or bed lengths of sorbent(s) contained in each tube, the maximum allowable temperature for that tube and the date each tube was packed or repacked.

8.1.3 Blank and Sampled Tube Storage Apparatus.

8.1.3.1 Seal clean, blank sorbent tubes and sampled tubes using inert, Swagelok®-type fittings and PTFE ferrules. Wrap capped tubes individually in uncoated aluminum foil. Use clean, sealable glass jars or metal cans containing a small packet of activated charcoal or activated charcoal/silica gel for storage and transportation of multiple tubes. Store the multi-tube storage container in a clean environment at 4 °C.

8.1.3.2 Keep the sample tubes inside the storage container during transportation and only remove them at the monitoring location after the tubes have reached ambient temperature. Store sampled tubes in a refrigerator at 4 °C inside the multi-tube container until ready for analysis.

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[Note: The atmosphere inside the refrigerator must be clean and free of organic solvents.]

8.1.4 Selection of Sampling Pumps.

8.1.4.1 The selected monitoring pump(s) should be capable of operating in the range 10 to 200 mL/min. Label the pumps with a unique identification number and operate them according to manufacturer's guidelines.

8.1.4.2 Constant mass flow type pumps are ideal for air monitoring as they deliver a constant flow rate for a wide range of tube impedances. They thus compensate for moderate impedance variations between the sorbent tubes in use. The pump should meet US criteria for intrinsic safety where applicable. Connect the pump to the non-sampling end of the sample tube by means of flexible, nonoutgassing tubing.

8.1.5 Parallel Sampling onto Multiple Tubes with a Single Pump.

8.1.5.1 Select a sample collection system for collecting samples onto 2 tubes in parallel.

8.1.5.2 If a single pump is used for both tubes, ensure that the flow rates will be controlled at a constant flow rate during sampling and that the two flow rates can be independently controlled and stabilized.

8.1.6 Apparatus for Calibrating the Pumped Air Flow.

8.1.6.1 Calibrate the pump with the type of sorbent tube to which it will be connected during the monitoring exercise. Use the actual sampling tube to fine tune the sampling flow rate at the start of sample collection.

8.1.6.2 Use a flow meter certified traceable to NIST standards.

8.1.7 Sorbent Tube Protection During Air Sample Collection.

8.1.7.1 Protect sorbent tubes from extreme weather conditions using shelters constructed of inert materials. The shelter must not impede the ingress of ambient air.

8.1.7.2 If the atmosphere under test contains significant levels of particulates - fume, dust or aerosol, connect a Teflon® 2-micron filter or a (metal, glass, glass-lined or fused silica lined stainless) tube containing a short plug of clean glass wool prior to the sampling end of the tube and using inert, Swagelok®-type fittings and PTFE ferrules for fitting connections.

8.2 Apparatus

8.2.1 Essential Sample Protection Features of the Thermal Desorption Apparatus.

8.2.1.1 As thermal desorption is generally a one shot process, (i.e., once the sample is desorbed it cannot readily be reinjected or retrieved), stringent sample protection measures and thorough preanalysis system checks must form an integral part of the thermal desorption-GC procedure and should be systematically carried out.

8.2.1.2 The sample integrity protection measures and preanalysis checks required include:

- **Sealed tubes**. Sample tubes awaiting analysis on an automated desorption system must be completely sealed before thermal desorption to prevent ingress of VOC contaminants from the laboratory air and to prevent losses of weakly retained analytes from the tube.
- **Inert and heated sample flow path**. To eliminate condensation, adsorption and degradation of analytes within the analytical system, the sample flow path of manual and automated thermal desorbers should be uniformly heated (minimum temperature range 50° - 150°C) between the sample tube and the GC analytical column. The components of the sample flow path should also, as far as possible, be constructed of inert materials, i.e., deactivated fused silica, glass lined tubing, glass, quartz and PTFE.
- **Tube leak testing**. This activity must not jeopardize sample integrity.
- **Leak testing of the sample flow path**. This activity must not jeopardize sample integrity.
- **System purge**. Stringent, near-ambient temperature carrier gas purge to remove oxygen.
- **Analytical system**. ?Ready" status checks.

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8.2.2 Thermal Desorption Apparatus.

8.2.2.1 Two-stage thermal desorption is used for the best high resolution capillary chromatography (i.e., analytes desorbed from the sorbent tube must be refocused before being rapidly transferred to the GC analytical column). One type of analyte refocusing device which has been successfully used is a small sorbent trap (17). One cryogen-free trap cooling option is to use a multistage Peltier electrical cooler (18,19).

8.2.2.2 Closed cycle coolers are also available for use. At its low temperature, the trap must provide quantitative analyte retention for target compounds as well as quantitative and rapid desorption of target analytes as high boiling as n-C_{12}. The peak widths produced must be compatible with high resolution capillary gas chromatography.

8.2.2.3 Typical key components and operational stages of a two-stage desorption system are presented in Figure 3(a) - (f) and a stepwise description of the thermal desorber operation is presented in Section 11.3.

8.2.3 Sample Splitting Apparatus.

8.2.3.1 Sample splitting is often required to reduce water vapor interference, for the analysis of relatively high concentration (>10 ppb level) air samples, when large volume air samples are collected, or when sensitive selective detectors are in use.

8.2.3.2 Sample splitting is one of the three key approaches to water management detailed in this method (see Section 7.2). Moisture management by sample splitting is applicable to relatively high concentrations ($\geq$10 ppb) or large volume air samples or to analyses employing extremely sensitive detectors - for example, using the ECD for low levels of tetrachloroethylene. In these cases the masses of analytes retained by the sorbent tube when monitoring such atmospheres is large enough to allow, or even require, the selection of a high split ratio (>10:1) during analysis to avoid overloading the analytical column or detector. The mass of water retained by the sorbent tube during sample collection may be sufficiently reduced by the split alone to eliminate the need for further water management steps.

8.2.4 The Thermal Desorber - GC Interface.

8.2.4.1 Heat the interface between the thermal desorber and the GC uniformly. Ensure that the interface line is leak tight and lined with an inert material such as deactivated fused silica.

8.2.4.2 Alternatively, thread the capillary column itself through the heated transfer line/interface and connected directly into the thermal desorber.

[Note: Use of a metal syringe-type needle or unheated length of fused silica pushed through the septum of a conventional GC injector is not recommended as a means of interfacing the thermal desorber to the chromatograph. Such connections result in cold spots, cause band broadening and are prone to leaks.]

8.2.5 GC/MS Analytical Components. This method uses the GC/MS description as given in Compendium Method TO-15, Section 7.

8.3 Tube Conditioning Apparatus

8.3.1 Tube Conditioning Mode

8.3.1.1 Condition freshly packed tubes using the analytical thermal desorption apparatus if it supports a dedicated 'tube conditioning mode' (i.e., a mode in which effluent from highly contaminated tubes is directed to vent without passing through key parts of the sample flow path such as the focusing trap).

8.3.2 Stand Alone System

8.3.2.1 If such a tube conditioning mode is not available, use separate stand-alone tube conditioning hardware.

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8.3.2.2 The tube conditioning hardware must be leak-tight to prevent air ingress, allow precise and reproducible temperature selection (±5°C), offer a temperature range at least as great as that of the thermal desorber and support inert gas flows in the range of 50 to 100 mL/min.

[Note: Whether conditioning is carried out using a special mode on the thermal desorber or using separate hardware, pass effluent gases from freshly packed or highly contaminated tubes through a charcoal filter during the process to prevent desorbed VOCs polluting the laboratory atmosphere.]

9. Reagents and Materials

9.1 Sorbent Selection Guidelines

9.1.1 Selection of Sorbent Mesh Size.

9.1.1.1 Sieved sorbents of particle size in the range 20 to 80 mesh should be used for tube packing.

9.1.1.2 Specific surface area of different sorbents is provided in Table 2.

9.1.2 Sorbent Strength and Safe Sampling Volumes.

9.1.2.1 Many well-validated pumped and diffusive sorbent tube sampling/thermal desorption methods have been published at the relatively high atmospheric concentrations (i.e., mid-ppb to ppm) typical of workplace air and industrial/mobile source emissions (8, 20-30).

9.1.2.2 These methods show that SSVs are unaffected by analyte concentrations far in excess of the 25 ppb upper limit of this method. The effect of humidity on SSVs is discussed in Section 7.5 and Table 2.

9.1.2.3 Select a sorbent or series of sorbents of suitable strength for the analytes in question from the information given in Tables 1 and 2 and Appendices 1 and 2. Where a number of different sorbents fulfill the basic safe sampling volume criteria for the analytes in question, choose that (or those) which are hydrophobic and least susceptible to artifact formation. Keep the field sampling volumes to 80% or less of the SSV of the least well-retained analyte. Using one of the two procedures given in Section 10.8, check the safe sampling volumes for the most volatile analytes of interest on an annual basis or once every twenty uses of the sorbent tubes whichever occurs first.

9.1.3 Three General-Purpose 1/4 Inch or 6 mm O.D. Multi-Bed Tube Types.

[Note: The three general-purpose tubes presented in this section are packed with sorbents in the mesh size range of 20-80 mesh. The difference in internal diameter between standard glass and stainless steel tubes will result in different bed volumes (weights) for the same bed length.]

9.1.3.1 Tube Style 1 consists of 30 mm Tenax®GR plus 25 mm of Carbopack™ B separated by 3 mm of unsilanized, preconditioned glass or quartz wool. Suitable for compounds ranging in volatility from n-C_6 to n-C_{20} for air volumes of 2 L at any humidity. Air volumes may be extended to 5 L or more for compounds ranging in volatility from n-C_7.

9.1.3.2 Tube Style 2 consists of 35 mm Carbopack™ B plus 10 mm of Carbosieve™ SIII or Carboxen™ 1000 separated by glass/quartz wool as above. Suitable for compounds ranging in volatility from n-C_3 to n-C_{12} (such as "Compendium Method TO-14 air toxics") for air volumes of 2 L at relative humidities below 65% and temperatures below 30°C. At humidities above 65% and ambient temperatures above 30°C, air volumes should be reduced to 0.5 L. Air volumes may be extended to 5 L or more for species ranging in volatility from n-C_4. A dry purge procedure or a large split ratio must be used during analysis when humid air has been sampled on these tubes.

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9.1.3.3 Tube Style 3 consists of 13 mm Carbopack™ C, 25 mm Carbopack™ B plus 13 mm of Carbosieve™ SIII or Carboxen™ 1000 all separated by 3 mm plugs of glass/quartz wool as above. Suitable for compounds ranging in volatility from n-C_3 to n-C_{16} for air volumes of 2 L at relative humidities below 65 percent and temperatures below 30°C. At humidities above 65 percent and ambient temperatures above 30°C, air volumes should be reduced to 0.5 L. Air volumes may be extended to 5 L or more for compounds ranging in volatility from n-C_4. A dry purge procedure or a large split ratio must be used during analysis when humid air has been sampled on these tubes.

[Note: These multi-bed tubes are commercially available prepacked and preconditioned if required.]

[Note: These general purpose multi-bed tubes are only recommended for monitoring unknown atmospheres or wide volatility range sets of target analytes. Most routine monitoring of industrial air (for example at factory fencelines) only involves monitoring a few specific target analytes such as benzene, toluene, ethylbenzene, and xylenes (BTEX), carbon disulfide (CS_2) or 1,1,1-trichloroethane. Single-bed sorbent tubes selected from the options listed in Appendix 1 are typically used in these cases.]

[Note: In the interests of minimizing water retention it is advisable to stick to hydrophobic (i.e., weak and medium strength) sorbents whenever possible; this generally is the case when components more volatile than n-C_6 are not of interest.]

9.2 Gas Phase Standards

9.2.1 Standard Atmospheres.

9.2.1.1 Standard atmospheres must be stable at ambient pressure and accurate (±10%). Analyte concentrations and humidities should be similar to those in the typical test atmosphere. Standard atmospheres must be sampled onto conditioned sorbent tubes using the same pump flow rates as used for field sample collection.

9.2.1.2 If a suitable standard atmosphere is obtained commercially, manufacturer's recommendations concerning storage conditions and product lifetime should be rigidly observed.

9.2.2 Concentrated, Pressurized Gas Phase Standards.

9.2.2.1 Use accurate (± 5%), concentrated gas phase standards in pressurized cylinders such that a 0.5 - 5.0 mL gas sampling volume (GSV) loop contains approximately the same masses of analytes as will be collected from a typical air sample. Introduce the standard onto the sampling end of conditioned sorbent tubes using at least ten times the loop volume of pure helium carrier gas to completely sweep the standard from the GSV.

9.2.2.2 Manufacturer's guidelines concerning storage conditions and expected lifetime of the concentrated gas phase standard should be rigidly observed.

9.3 Liquid Standards

9.3.1 Solvent Selection.

9.3.1.1 If liquid standards are to be loaded onto sorbent tubes for calibration purposes, select a solvent for the standard that is pure (contaminants <10% of minimum analyte levels) and that, if possible, is considerably more volatile than the target analytes. This then allows the solvent to be purged and eliminated from the tube during the standard preparation process.

9.3.1.2 Methanol most commonly fills these criteria. If the target analyte range includes very volatile components, it will not be possible to do this. In these cases, select a pure solvent which is readily chromatographically resolved from the peaks/components of interest (ethyl acetate is commonly used) or use a

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gas phase standard. Test the purity of the solvent by comparing an analysis of the prepared standard with an analysis of pure solvent under identical chromatographic conditions.

9.3.2 Liquid Standard Concentrations.

9.3.2.1 Liquid standards should be prepared so that the range of analyte masses introduced onto the tubes is in the same order as the range of masses expected to be collected during sampling.

9.3.2.2 Concentrations of benzene in urban air may be expected to range from 0.5-25 ppb. Thus if 5 L air samples were to be collected at approximately 25°C, the masses of benzene collected would range from around 8 ng (0.5 ppb level) to around 400 ng (25 ppb level).

[Note: The above calculation was derived from Boyle's law (i.e., 1 mole of gas occupies around 25 L at 25°C and 760 mm Hg).

- *25 L of pure benzene vapor contains 78 g benzene*
- *5 L of pure benzene vapor contains 15.6 g benzene*
- *5 L of a 1 ppm benzene atmosphere contains 15.6 μg benzene*
- *5 L of a 100 ppb benzene atmosphere contains 1560 ng benzene*
- *5 L of a 1 ppb benzene atmosphere contains 15.6 ng benzene.]*

9.3.3 Loading Liquid Standards onto Sorbent Tubes.

9.3.3.1 Introduce 0.1 - 10 μL aliquots of the liquid standards onto the sampling end of conditioned sorbent tubes using a conventional 1/4 inch GC packed column injector and a 1, 5 or 10 μL syringe. The injector is typically unheated with a 100 mL/min flow of pure carrier gas. The solvent and analytes should completely vaporize and pass onto the sorbent bed in the vapor phase. It may be necessary to heat the injector slightly (typically to 50°C) for analytes less volatile than n-C_{12} to ensure that all the liquid vaporizes.

9.3.3.2 The sample tube should remain attached to the injector until the entire standard has been swept from the injector and onto the sorbent bed. If it has been possible to prepare the liquid standard in a solvent which will pass through the sorbent while analytes are quantitatively retained (for example, methanol on Tenax® or Carbopack™ B), the tube should not be disconnected from the injector until the solvent has been eliminated from the sorbent bed - this takes approximately 5 minutes under the conditions specified. Once the tube has been disconnected from the injector, it should be capped and placed in an appropriate storage container immediately.

[Note: In cases where it is possible to purge the solvent from the tube while quantitatively retaining the analytes, a 5-10 μL injection should be made as this can usually be introduced more accurately than smaller volumes. However, if the solvent is to be retained in the tube, the injection volume should be as small as possible (0.5 - 1.0 μL) to minimize solvent interference in the subsequent chromatogram.]

9.3.3.3 This method of introducing liquid standards onto sorbent tubes via a GC injector is considered the optimum approach to liquid standard introduction as components reach the sorbent bed in the vapor phase (i.e., in a way which most closely parallels the normal air sample collection process). Alternatively, liquid standards may be introduced directly onto the sorbent bed via the non-sampling end of the tube using a conventional GC syringe.

[Note: This approach is convenient and works well in most cases, but it may not be used for multi-bed tubes or for wide boiling range sets of analytes and does not allow solvent to be purged to vent.]

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9.4 Gas Phase Internal Standards

9.4.1 The ideal internal standard components are:

- chemically similar to the target analytes
- extremely unlikely to occur naturally in the atmosphere under test
- readily resolved and distinguished analytically from the compounds of interest
- stable in the vapor phase at ambient temperature
- compatible with metal and glass surfaces under dry and humid conditions
- certified stable in a pressurized form for a long time period (i.e., up to 1 year).

9.4.2 Deuterated or fluorinated hydrocarbons usually meet all these criteria and make perfect internal standards for MS based systems. Typical compounds include deuterated toluene, perfluorobenzene and perfluorotoluene. Multiple internal standards should be used if the target analytes cover a very wide volatility range or several different classes of compound.

9.4.3 Obtain a pressurized cylinder containing accurate (±5%) concentrations of the internal standard components selected. Typically a 0.5 to 5.0 mL volume of this standard is automatically introduced onto the back of the sorbent tube or focusing trap after the tube has passed preliminary leak tests and before it is thermally desorbed. The concentration of the gas should be such that the mass of internal standard introduced from the GSV loop is approximately equivalent to the mass of analytes which will be sampled onto the tube during sample collection. For example, a 1 L air sample with average analyte concentrations in the order of 5 ppb, would require a 10 ppm internal standard, if only 0.5 mL of the standard is introduced in each case.

9.5 Commercial, Preloaded Standard Tubes

9.5.1 Certified, preloaded commercial standard tubes are available and should be used for auditing purposes wherever possible to establish analytical quality control (see Section 14). They may also be used for routine calibration. Suitable preloaded standards should be accurate within ±5% for each analyte at the microgram level and ±10% at the nanogram level.

9.5.2 The following information should be supplied with each preloaded standard tube:

- A chromatogram of the blank tube before the standard was loaded with associated analytical conditions and date.
- Date of standard loading
- List of standard components, approximate masses and associated confidence levels
- Example analysis of an identical standard with associated analytical conditions (these should be the same as for the blank tube)
- A brief description of the method used for standard preparation
- Expiration date

9.6 Carrier Gases

Inert, 99.999% or higher purity helium should be used as carrier gas. Oxygen and organic filters should be installed on the carrier gas lines supplying the analytical system. These filters should be replaced regularly according to the manufacturer's instructions.

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10. Guidance on Sampling and Related Procedures

10.1 Packing Sorbent Tubes

10.1.1 Commercial Tubes

10.1.1.1 Sorbent tubes are commercially available either prepacked and preconditioned or empty.

10.1.1.2 When electing to purchase empty tubes and pack/condition them as required, careful attention must be paid to the appropriate manufacturer's instructions.

10.1.2 Tube Parameters

10.1.2.1 Key parameters to consider include:

- **Sorbent bed positioning within the tube**. The sampling surface of the sorbent bed is usually positioned at least 15 mm from the sampling end of the tube to minimize sampling errors due to diffusive ingress. The position of the sorbent bed must also be entirely within that section of the tube which is surrounded by the thermal desorption oven during tube desorption.
- **Sorbent bed length**. The sorbent bed must not extend outside that portion of the tube which is directly heated by the thermal desorption oven.
- **Sorbent mesh size**. 20 to 80 mesh size sorbent is recommended to prevent excessive pressure drop across the tube which may cause pump failure. It is always recommended that sorbents be sieved to remove ?fines" (undersized particles) before use.
- **Use of appropriate sorbent bed retaining hardware inside the tube**. Usually 100 mesh stainless steel gauzes and retaining springs are used in stainless steel tubes and unsilanized, preconditioned glass or quartz wool in glass tubes.
- **Correct conditioning procedures**. See Table 2 and Section 10.2.
- **Bed separation**. If a single tube is to be packed with two or three different sorbents, these must be kept in discreet beds separated by ~3 mm length plugs of unsilanized, preconditioned glass or quartz wool or glass fiber disks and arranged in order of increasing sorbent strength from the sampling end of the tube. Do not use sorbents of widely different maximum temperatures in one tube or it will be difficult to condition the more stable sorbents without exceeding the maximum recommended temperature of the less stable sorbents.

[Note: Silanized glass or quartz wool may be used for labile species such as sulfur or nitrogen containing compounds but should not be taken to temperatures above 250°C.]

- **Compression of bed**. The sorbent bed must not be compressed while packing the tube. Compression of the sorbent can lead to excessive tube impedance and may produce ?fines".

10.1.2.2 Tubes packed with porous polymer sorbents (Chromosorbs®, Porapaks® and Tenax®) should be repacked after 100 thermal cycles or if the performance criteria cannot be met. Tubes packed with carbonaceous sorbents such as Spherocarb®, Carbotrap™, Carbopack™, Carbosieve™ SIII and Carboxens® should be repacked every 200 thermal cycles or if the safe sampling volume validation procedure fails.

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10.2 Conditioning and Storage of Blank Sorbent Tubes

10.2.1 Sorbent Tube Conditioning.

10.2.1.1 The success of sorbent tube sampling for ppb and sub-ppb level air monitoring is largely dependent on artifact levels being at significantly lower levels (<10%) than the masses of analytes collected during air monitoring. A summary of recommended conditioning parameters for various individual sorbents and multibed tubes is given in Table 2. 1/4 inch O.D. sorbent tubes may be adequately conditioned using elevated temperatures and a flow of ultra-pure inert gas. Washing or any other preconditioning of the bulk sorbent is not usually necessary. Appropriate, dedicated tube conditioning hardware should be used for tube conditioning unless the thermal desorption system offers a separate tube conditioning mode.

10.2.1.2 The tube conditioning temperatures and gas flows recommended in Table 2 should be applied for at least 2 hours when a tube is packed with fresh adsorbent or when its history is unknown.

Sorbent tubes which are:

- desorbed to completion during routine analysis (as is normally the case)
- stored correctly (see Section 10.2.2)
- re-issued for air sampling within 1 month (1 week for Chromosorb®, Tenax® and Porapak® porous polymers)
- and are to be used for atmospheres with analytes at the 10 ppb level or above

do not usually require any reconditioning at all before use. However, tubes to be used for monitoring at lower levels should be both reconditioned for 10-15 minutes using the appropriate recommended conditioning parameters and put through a ?dummy" analysis using the appropriate analytical conditions to obtain blank profiles of each tube before they are issued for sampling.

10.2.1.3 Analytical system conditioning procedures are supplied by system manufacturers. Generally speaking, both system and sorbent tube conditioning processes must be carried out using more stringent conditions of temperature, gas flow and time than those required for sample analysis - within the maximum temperature constraints of all the materials and equipment involved.

10.2.2 Capping and Storage of Blank Tubes.

10.2.2.1 Blank tubes should be capped with ungreased, Swagelok®-type, metal screw-caps and combined PTFE ferrules. The screw caps should be tightened by hand and then an extra 1/4 turn with a wrench. If uncoated aluminum foil is required, tubes should be wrapped individually.

10.2.2.2 Batches of blank, sealed tubes should be stored and transported inside a suitable multi-tube container.

10.3 Record Keeping Procedures for Sorbent Tubes

Sample tubes should be indelibly labeled with a unique identification number as described in Section 8.1.2. Details of the masses and/or bed lengths of sorbent(s) contained in each tube, the maximum allowable temperature for that tube and the date each tube was packed should be permanently recorded. A record should also be made each time a tube is used and each time the safe sampling volume of that tube is retested so that its history can be monitored. If a tube is repacked at any stage, the records should be amended accordingly.

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10.4 Pump Calibration and Tube Connection

10.4.1 Tube Deployment

10.4.1.1 Once at ambient temperature, remove the tubes from the storage container, uncap and connect them to the monitoring pumps as quickly as possible using clean, non-outgassing flexible tubing. Multi-bed sorbent tubes must be orientated so that the air sample passes through the series of sorbents in order of increasing sorbent strength (i.e., weaker sorbent first). This prevents contamination of the stronger adsorbent with less volatile components.

10.4.1.2 In all cases the sampling end of the tube must be clearly identified and recorded.

10.4.1.3 A typical sampling configuration for a distributed volume pair of sampling tubes is shown in Figure 4.

10.4.2 Pump Calibration

10.4.2.1 Pumps should be calibrated according to the manufacturer's instructions, preferably at the monitoring location immediately before sampling begins or, alternatively, in a clean environment before the tubes and pumps are transported to the monitoring site. The apparatus required is described in Section 8.1.6. Details of the pump flow rate delivered with a given identified tube and the flow rate, stroke rate or pressure selected on the pump itself should be recorded together with the date.

10.4.2.2 The pump flow rate should be retested at the end of each sampling period to make sure that a constant pump rate was maintained throughout the sample collection period. The flow rate measured at the end of sampling should agree within 10% with that measured at the start of the sampling period for the sample to be considered valid and the average value should be used.

10.5 Locating and Protecting the Sample Tube

The sampling points of individual sorbent tubes or sequential tube samplers should not be unduly influenced by nearby emission sources unless the emission source itself is specifically being monitored. Common sense generally determines the appropriate placement. Field notes on the relative location of known emission sources should be part of the permanent record and identified on the FTDS. Some shelter or protection from high winds (see Section 8.1.7) other extreme weather conditions and high levels of particulates is required for the sample tube if it is to be left unattended during the monitoring period.

10.6 Selection of Pump Flow Rates and Air Sample Volumes

10.6.1 Flow Rate Selection

10.6.1.1 For 1/4 inch O.D. tubes, 50 mL/min is the theoretical optimum flow rate (31). However, negligible variation in retention volume will in fact be observed for pump flow rates varying from 5 to 200 mL/min. Pump flow rates above 10 mL/min are generally used in order to minimize errors due to ingress of VOCs via diffusion. Flow rates in excess of 200 mL/min are not recommended for standard 1/4-inch sample tubes unless for short term (e.g. 10 minute) monitoring (21).

[Note: High sampling flow rates can be used longer term for high boiling materials such as low level, vapor phase polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in air.]

10.6.1.2 One and four liter air sample volumes are recommended for this method if consistent with anticipated safe sampling volumes. Adjustments of the flow rates to accommodate low safe sampling volumes should be made by proportionally reducing both rates with the qualification that the lower flow rate result is no less than 300 mL total volume. The 300 mL sample gives adequate detection limits (<0.5 ppb per analyte) with

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full scan mass spectrometry detection for ambient air applications (see Table 4). Sensitivity is generally enhanced at least ten-fold if conventional GC detectors or selected ion monitoring are applied. However; the pump flow rate, sampling time and consequently air volume selected may be varied to suit the requirements of each individual air monitoring exercise.

10.6.1.3 Typical example pump flow rates include:

- 16 mL/min to collect 1 L air samples in 1 hour
- 67 mL/min to collect 4 L air samples in 1 hour
- 10 mL/min to collect 1800 mL air samples over 3 hours
- 40 mL/min to collect 7200 mL air samples over 3 hours

10.6.2 Pump Flow Rate Selection

10.6.2.1 The pump flow rate used is dependent upon:

- **Safe sampling volume constraints**. The flow rate must be adjusted (within the allowed range) to ensure that, for the chosen sample collection time, SSVs are not exceeded for any target analyte
- **Time weighted average monitoring requirements**. If long-term - 3, 8 or even 24 hour - time weighted average data are required, the pump flow rate must be adjusted to ensure SSVs are not exceeded during the sample collection period.
- **GC detection limits**. Within the constraints of safe sampling volumes and pump flow rate limits, air volumes selected for trace level (ambient) air monitoring, should be maximized such that the largest possible analyte masses are collected.

10.6.2.2 Typical VOC concentrations and the associated analyte masses retained from a range of different air sample volumes in various atmospheres are presented in Table 4.

10.7 Sampling Procedure Verification - Use of Blanks, Distributed Volume Pairs, Back-Up Tubes, and Distributed Volume Sets

10.7.1 Field and Laboratory Blanks

10.7.1.1 Laboratory blanks must be identically packed tubes, from the same batch, with similar history and conditioned at the same time as the tubes used for sample collection. At least two are required per monitoring exercise. They must be stored in the laboratory in clean controlled conditions (<4°C) throughout the monitoring program and analyzed at the same time as the samples-- one at the beginning and one at the end of the sequence of runs.

10.7.1.2 Field blanks are the same as laboratory blanks except that they are transported to and from the monitoring site, are uncapped and immediately resealed at the monitoring site, but do not actually have air pumped through them. One field blank tube is taken for every ten sampled tubes on a monitoring exercise and no less than two field blanks should be collected, however small the monitoring study. The field blanks should be distributed evenly throughout the set of sampled tubes to be analyzed. Guidance on acceptable performance criteria for blanks is given in Section 13.

10.7.2 Distributed Volume Pairs

10.7.2.1 When monitoring for specific analytes using a validated sorbent tube but in an uncharacterized atmosphere, it is advisable to collect distributed volume tube pairs - e.g. 1 and 4 L samples - in parallel at every monitoring location as described in Section 6. If single tube sampling is used to reduce analysis costs, a reduction in the quality assurance associated with this method has to be assumed.

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10.7.2.2 Back-up tubes (identical to those used for sample collection) should be used to investigate situations in which distributed volume pairs do not agree within acceptable tolerance. To use back-up tubes, a second identical sampling tube is placed in series with a primary (front) tube. The purpose of the backup tube is to capture compounds that pass through the primary tube because of breakthrough. Analysis of the backup tube may indicate unexpected breakthrough or give evidence of channeling of sample through the tube because of loose packing.

10.7.2.3 A significant volume of literature exists on the use of distributed volume sets to determine the occurrence of nonlinearities when different sample volumes are taken from the same sample air mix. Ideally, the quantity of material collected scales linearly with sample volume. If this is not the case, then one of a number of problems has occurred. The 4-tube distributed volume developed by Walling, Bumgardner, and co-workers (32,33) is a method by which sample collection problems can be investigated.

10.8 Determining and Validating Safe Sampling Volumes (SSV)

10.8.1 Field Test Method for Tube Breakthrough.

10.8.1.1 If SSV information is not readily available for the analytes under test on the sorbent tube selected, or if the safe sampling volumes need validating - the following field experiment may be used. Link at least 12 of the sorbent tubes under test together in series to give 6 pairs of tubes. Use inert, preferably Swagelok®-type 1/4-inch metal unions with PTFE fittings. The sampling end of the back up tube should be connected to the exit end of the front tube in each of the pairs. The tube pairs are then connected to calibrated monitoring pumps and used to simultaneously sample at least 3 different air volumes at pump flow rates between 10 and 200 mL/min with 2 replicates at each air sample volume.

10.8.1.2 The experiment should be carried out in the atmosphere to be monitored and, if possible, under worst-case conditions (i.e., highest natural humidity and highest typical VOC concentrations). The sampling points of all the tube pairs should be placed close together to ensure that, as far as possible, tubes are all sampling the same atmosphere. The sampling location selected should be well ventilated. Both the front and back-up tubes of each tube pair should subsequently be analyzed using thermal desorption - capillary GC.

10.8.1.3 If more than 5% of one or more of the target analytes is observed on any of the back-up tubes, breakthrough is shown to have occurred at that sample volume. For practical purposes, the BV for a given sorbent/analyte combination is usually considered to be the sample volume at which there is 5% breakthrough of that analyte onto the back-up tube. The SSV for that analyte/sorbent combination is then taken as two thirds (~66%) of the BV.

10.8.2 Chromatographic Test of Tube Retention Volume for Individual Analytes

10.8.2.1 Inject 0.5 mg of each analyte into a stoppered ~1L volume glass flask fitted with a septum. Check that all the analyte has evaporated.

10.8.2.2 Connect the sample tube under test to a 1/4 inch injection port inside a GC oven. Use 530 μm, uncoated fused silica capillary tubing, or other appropriate narrow bore tubing, to connect the other end of the sample tube to a FID detector. Use 1/4 inch fittings with graphite ferrules to connect to the sample tube itself.

10.8.2.3 Set a nitrogen carrier gas flow of 50 mL/min through the tube.

10.8.2.4 Inject a 0.1 mL sample of the vapor phase standard onto the tube using a gas syringe. Adjust the GC oven temperature so that the analyte peak elutes on the FID between 1 and 20 minutes.

10.8.2.5 Repeat the experiment 4 or 5 times using different GC oven temperatures. Try to ensure that at each of the GC temperatures selected, the peak elutes within 1-20 minutes.

[Note: Use the time from injection to peak crest as the retention time. This may have to be measured manually, depending on the type of integrator available.]

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10.8.2.6 Inject a sample of methane to measure the delay time of the system and subtract this from the analyte retention times determined.

10.8.2.7 Use the flow of nitrogen carrier gas and corrected retention times to calculate the analyte retention volumes at different sorbent temperatures.

10.8.2.8 A graph of $\log_{10}$ retention volume vs. 1/temp(K) should produce a straight line plot which can be readily extrapolated to ambient temperatures. Use this plot to obtain the retention volume.

A SSV for the analyte on that sorbent tube is then derived by halving the calculated retention volume at ambient temperature. When required, this experiment should be carried out for the least well retained compound(s) of interest.

10.9 Resealing Sorbent Tubes After Sample Collection

Sampled tubes should be recapped with the metal, Swagelok®-type caps and combined PTFE ferrules, rewrapped in the aluminum foil (if appropriate) and replaced in the storage container immediately after sampling. They should not be removed from the sampling container until they are in the laboratory and about to be analyzed.

10.10 Sample Storage

Samples should be refrigerated at <4 °C in a clean environment during storage and analyzed within 30 days of sample collection (within one week for limonene, carene, *bis*-chloromethyl ether and labile sulfur or nitrogen-containing volatiles). Samples taken on tubes containing multiple sorbent beds should be analyzed as soon as possible after sampling unless it is know in advance that storage will not cause significant sample recovery errors (see also Section 7.1.3 concerning artifacts).

11. Analytical Procedure

11.1 Preparation for Sample Analysis

Follow the description given in Compendium Method TO-15 for set up of the GC/MS analytical system including column selection, MS tune requirements, calibration protocols, etc.

11.2 Predesorption System Checks and Procedures

The following sample and system integrity checks and procedures must be carried out manually or automatically before thermal desorption:

- **Dry purge**. Dry purge the batch of sampled, back-up and field blank tubes (do not purge lab blanks).
- **Cap**. Cap tubes with PTFE 'analytical' caps and place on instrument carousel.
- **Leak test the tubes**. Each tube must be stringently leak tested at the GC carrier gas pressure, without heat or gas flow applied, before analysis. Tubes which fail the leak test should not be analyzed, but should be resealed and stored intact. On automated systems, the instrument should continue to leak test and analyze subsequent tubes after a given tube has failed. Automated systems should also store a record of which tubes in a sequence have failed the leak test in battery-protected system memory until the error is acknowledged by an operator. These measures prevent sample losses and help ensure data quality.

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- **Leak test the sample flow path**. All parts of the sample flow path should be stringently leak tested before each analysis without heat or gas flow applied to the sample tube. An automatic sequence of tube desorptions and GC analyses should be halted if any leak is detected in the main sample flow path.
- **Purge air**. Purge air from the tube and sample flow path at ambient temperature using carrier gas immediately before tube desorption. It helps to dry the sample and prevents analyte and sorbent oxidation thus minimizing artifact formation, ensuring data quality and extending tube lifetimes. The focusing trap should be in-line throughout the carrier gas purge to retain any ultra-volatile analytes "desorbed" from the tube prematurely.
- **Check GC/MS analytical system ready status**. The "ready" status of the GC, detector(s), data processor and all parts of the analytical system should be automatically checked by the thermal desorption device before each tube desorption. It should not be possible to desorb a tube into the analytical system if it is not ready to accept and analyze samples.
- **Internal standard**. Introduce a gas phase internal standard onto the sorbent tube or focusing trap before primary (tube) desorption, as an additional check of system integrity (optional).

A series of schematics illustrating these steps is presented in Figure 3, Steps (a) through (f).

11.3 Analytical Procedure

11.3.1 Steps Required for Reliable Thermal Desorption.

11.3.1.1 A stepwise summary of the complete thermal desorption procedure is as follows:

- Predesorption system checks (see Section 11.2).
- Introduction of a fixed volume gas phase internal standard (optional) [see Figure 3, Step (d)].
- Desorption of the sorbent tube (typically 200-300°C for 5-15 minutes with a carrier gas flow of 30-100 mL/min - see Table 2) and refocusing of the target analytes on a focusing trap held at near- ambient or subambient temperatures [see Figure 3, Step (e)].

[Note: Analytes should be desorbed from the tube in "backflush" mode, i.e., with the gas flow in the reverse direction to that of the air flow during sampling].

- Splitting the sample as it is transferred from the tube to the focusing trap (Optional). This is only required to prevent column or detector overload due to excess water accumulation or during the analysis of high concentration/large volume air samples or when using ultra-sensitive detectors such as the ECD [see Figure 3, Step (e)].
- Rapid desorption of the focusing trap (typically 40 deg/sec. to a top temperature of 250-350°C, with a "hold" time of 1-15 mins at the top temperature and an inert/carrier gas flow of 3-100 mL/min) and transfer of the analytes into the analytical column [see Figure 3, Step (f)].

[Note: Components should normally be desorbed from the focusing trap in "backflush" mode, i.e., with the gas flow through the 'cold' trap in the reverse direction to that used during analyte focusing.]

- Splitting the sample as VOCs are transferred from the focusing trap to the analytical column. (Optional). This is only required to prevent column or detector overload due to excess water accumulation or during the analysis of high concentration/large volume air samples or when using ultra-sensitive detectors such as the ECD [See Figure 3, Step (f)].
- Desorbing the focusing trap initiates the GC run. [See Figure 3, Step (f)].

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- All volatiles should be stripped from the sorbent tubes during the thermal desorption process leaving them clean and ready for reuse. The tubes should be resealed to ensure they are kept clean and ready for immediate reuse while the sequence of tube desorptions and analyses is completed.

11.3.2 GC/MS Analytical Procedure

11.3.2.1 Once the GC run has been initiated by desorption of the focusing trap, the chromatographic procedure continues as described in Compendium Method TO-15.

11.3.2.2 The precision of the analytical system should be tested using six standard tubes all loaded with a mid-concentration-range standard. This procedure should be carried out whenever the thermal desorption - GC/MS analytical method is changed and should be repeated once every tenth series of samples run with an analytical method or once every three months, whichever happens first. The report produced from the most recent precision test should be included with the final batch report generated for each series of samples.

12. Calibration of Response

Descriptions of how to load tubes from standard atmospheres, concentrated gas phase standards or liquid standards are given in Sections 9.2 and 9.3. Once the tubes are desorbed to the focusing trap and into the analytical GC/MS system the calibration procedure becomes identical to that presented in Section 3 of Compendium Method TO-15. The guidance given in Section 3 of Compendium Method TO-15 concerning multi-level calibration procedures and calibration frequencies should be followed for this Compendium method. It is also advisable to analyze a single level calibrant (i.e. tubes loaded with analyte masses in the mid-range of those expected to be collected during sampling) approximately every tenth sample during an analytical sequence, as a check on system performance. All samples processed that exceed the calibration range will require data qualifiers to be attached to the analytical results.

13. Quality Assurance

13.1 Validating the Sample Collection Procedure

13.1.1 Blanks.

13.1.1.1 Artifact levels on laboratory and field blanks should be at the low or sub-nanogram level for carbonaceous sorbents and Tenax® and at the double digit ng level for Porapaks®, Chromosorb® Century series sorbents and other porous polymers as described in Section 7.1. If artifact levels are considerably above this, careful attention must be paid to the tube conditioning and storage procedures described in Sections 10.2.1 and 10.2.2. Artifact peaks which are 10% or more of the area of average component peaks should be marked as artifacts in the final data reports. When monitoring unknown atmospheres, special care must be taken to distinguish between sorbent artifacts and analytes, using the MS to identify components which are significant in both blank and sampled tubes.

13.1.1.2 If the same profile/pattern of VOCs is observed on the field blanks as on the sampled tubes and if the level of these components is 5% or more of the sampled volatiles, careful attention must be paid to the method of sealing the tubes and other storage procedures in future studies. If the profile of volatiles on the field blanks matches that of the sampled tubes and if the areas of the peaks on the field blank are 10% or more of sampled tube levels, the sampled tube data are invalidated.

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13.1.2 Routine Checking of Sorbent Tube Safe Sampling Volumes.

13.1.2.1 The SSVs of sorbent tubes should be retested annually or once every 20 uses (whichever happens first) using one of the procedures described in Section 10.8.

13.1.2.2 If the SSV of a tube (i.e., half the RV or two thirds of the BV) falls below the normal air sample collection volume for the analytes in question, the tube should be repacked with fresh adsorbent and reconditioned.

13.2 Performance Criteria for the Monitoring Pump

Records of the pump flow rate delivered against the pump flow rate, stroke rate or pressure selected on a pump should be reviewed at least once per three months. If the performance of any pump has been found to have changed significantly over that time; for example if completely different pump settings are required to deliver the same pump flow rate, the pump should be serviced by the manufacturer or their approved agent.

Sampling pump errors can normally be presumed to be in the order of 5% (8). If the pump sampling flow rate measured at the end of sample collection varies more than 10% from that measured at the beginning of sample collection, then that sample is invalidated.

14. Performance Criteria for the Solid Adsorbent Sampling of Ambient Air

14.1 Introduction

There are four performance criteria which must be met for a system to qualify under Compendium Method TO-17. These criteria closely parallel those of Compendium Method TO-15, *"The Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)"*. These criteria are:

- A method detection limit $\leq$0.5 ppb.
- Duplicate (analytical) precision within 20% on synthetic samples of a given target gas or vapor in a typical target gas or vapor mix in humidified zero air.
- Agreement within 25% for distributed volume pairs of tubes taken in each sampling set.
- Audit accuracy within 30 percent for concentrations normally expected in contaminated ambient air (0.5 to 25 ppb). Either mass spectrometry as emphasized here, or specific detectors can be used for analysis. Details for the determination of each of the criteria follow.

14.2 Method Detection Limit

The procedure chosen to define the method detection limit is that given in the Code of Federal Regulations (40CFR136 Appendix B). The method detection limit is defined for each system by making seven replicate measurements of a concentration of the compound of interest near the expected detection limit (within a factor of five), computing the standard deviation for the seven replicate concentrations, and multiplying this value by 3.14 (the Student's t value for 99 percent confidence for seven values).

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14.3 Analytical Precision of Duplicate Pairs

The measure of analytical precision used for this method is the absolute value of the relative difference between two identical samples (same flow rate over the same time period from with a common inlet to the sample volume). The analytical precision is expressed as a percentage as follows:

$$\text{Analytical Precision} = \left(\frac{[|X1 - X2|]}{X} \right) 100$$

where:

X1 = A measurement value taken from one of the two tubes using in sampling.
X2 = A measurement value taken from the second of two tubes using in sampling.
X = Average of X1 and X2.

The analytical precision is a measure of the precision achievable for the entire sampling and analysis procedure including the sampling and thermal desorption process mentioned above and the analytical procedure that is same as the TO-15 analytical finish, although specific detector systems can also be used.

14.4 Precision for the Distributed Volume Pair

The measure of precision used for this method is the absolute value of the relative difference between the distributed volume pair expressed as a percentage as follows:

$$\text{percent difference} = \left(\frac{[|X1 - X2|]}{X} \right) 100$$

where:

X1 = One measurement value (e.g., for a defined sample volume of 1 L).
X2 = Duplicate measurement value (e.g., for a defined sample volume of 4 L taken over the same time period as the first sample).
X = Average of the two values.

There are several factors that may affect the precision of the measurement as defined above. In fact any factor that is nonlinear with sample volume may be significant enough to violate the constraint placed on distributed volume pair precision. These factors include artifact formation, compound reactions on the sorbent, breakthrough of target compounds, etc.

14.5 Audit Accuracy

A measure of audit accuracy is the degree of agreement with audit standards. Audit accuracy is defined as the relative difference between the measurement result and the nominal concentration of the audit compound:

$$\text{Audit Accuracy, \%} = \left[\frac{(\text{Spiked Value} - \text{Observed Value})}{(\text{Spiked Value})} \right] \text{x } 100$$

The choice of audit standard is left to the analyst.

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TABLE 1. GUIDELINES FOR SORBENT SELECTION

Sample Tube Sorbent	Approx. Analyte Volatility Range	Max. Temp., (°C)	Specific Surface Area, (m^2/g)	Example Analytes
CarbotrapC® CarbopackC® Anasorb® GCB2	n-C_8 to n-C_{20}	>400	12	Alkyl benzenes and aliphatics ranging in volatility from n-C to n-C .
Tenax® TA	bp 100 °C to 400 °C n-C_7 to n-C_{26}	350	35	Aromatics except benzene, Apolar components (bp>100°C) and less volatile polar components (bp>150 °C).
Tenax GR	bp 100 °C to 450 °C n-C_7 to n-C_{30}	350	35	Alkyl benzenes, vapor phase PAHs and PCBs and as above for Tenax TA.
Carbotrap® CarbopackB® Anasorb® GCB1	(n-C_4) n-C_5 to n-C_{14}	>400	100	Wide range of VOCs inc., ketones, alcohols, and aldehydes (bp>75 °C) and all apolar compounds within the volatility range specified. Plus perfluorocarbon tracer gases.
Chromosorb® 102	bp 50 °C - 200 °C	250	350	Suits a wide range of VOCs incl. oxygenated compounds and haloforms less volatile than methylene chloride.
Chromosorb 106	bp 50 °C - 200 °C	250	750	Suits a wide range of VOCs incl. hydrocarbons from n-C to n-C . Also good for volatile oxygenated compounds
Porapak Q	bp 50 °C - 200 °C n-C_5 to n-C_{12}	250	550	Suits a wide range of VOCs including oxygenated compounds.
Porapak N	bp 50 °C - 150 °C n-C_5 to n-C_8	180	300	Specifically selected for volatile nitriles; acrylonitrile, acetonitrile and propionitrile. Also good for pyridine, volatile alcohols from EtOH, MEK, etc.
Spherocarb*	-30 °C - 150 °C C_3 to n-C_8	>400	1,200	Good for very volatile compounds such as VCM, ethylene oxide, CS and CH Cl . Also good for volatile polars e.g. MeOH, EtOH and acetone.
Carbosieve SIII*® Carboxen 1000*® Anasorb® CMS*	-60 °C to 80 °C	400	800	Good for ultra volatile compounds such as C C hydrocarbons, volatile haloforms and freons.
Zeolite Molecular Sieve 13X**	-60 °C to 80 °C	350		Used specifically for 1,3- butadiene and nitrous oxide.
Coconut Charcoal* (Coconut charcoal is rarely used)	-80 °C to 50 °C	>400	>1,000	Rarely used for thermal desorption because metal content may catalyze analyte degradation. Petroleum charcoal and Anasorb® 747 are used with thermal desportion in the EPA's volatile organic sampling train (VOST), Methods 0030 and 0031.

* These sorbents exhibit some water retention. Safe sampling volumes should be reduced by a factor of 10 if sampling a high (>90%) relative humidity.
** Significantly hydrophilic. Do not use in high humidity atmospheres unless silicone membrane caps can be fitted for diffusive monitoring purposes.
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TABLE 2. GUIDELINES FOR SORBENT USE

Sample Tube Sorbent	Maximum Temp., (°C)	Hydro-phobic (?)	Temp. and Gas Flow for Conditioning	Temp. and Min. Gas Flow for Desorption	Recommended Focusing Trap Packing
CarbotrapC® CarbopackC® Anasorb® GCB2	>400	Yes	350°C and 100 mL/min	325°C and 30 mL/min	Tenax® or Carbopack C®
Tenax® TA	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax®
Tenax GR	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax®
Carbotrap® CarbopackB® Anasorb® GCB1	>400	Yes	350°C and 100 mL/min	325°C and 30 mL/min	Tenax or Carbopack B®
Chromosorb® 102	250	Yes	250°C and 100 mL/min	225°C and 30 mL/min	Dual-bed CB plus CMS trap or Chrom. 102
Chromosorb 106	250	Yes	250°C and 100 mL/min	250°C and 30 mL/min	Dual-bed CB plus CMS trap or Chrom. 106
Porapak Q	250	Yes	250°C and 100 mL/min	225°C and 30 mL/min	Dual-bed CB plus CMS trap or Porapak Q
Porapak N	180	Yes	180°C and 100 mL/min	180°C and 30 mL/min	Dual-bed CB plus CMS trap or Porapak N
Spherocarb*	>400	No	400°C and 100 mL/min	390°C and 30 mL/min	Dual-bed CB plus CMS trap or Spherocarb
CMS such as CSIII*® Carboxen 1000*® Anasorb® CMS*	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap or CMS alone
Zeolite Molecular Sieve 13X**	350	No	330°C and 100 mL/min	300°C and 30 mL/min	Dual-bed CB plus CMS trap or CMS alone
Tenax / CB : comb. Tube Type 1 (see Sect. 9.1.3)	350	Yes	330°C and 100 mL/min	300°C and 30 mL/min	Tenax
Carb B / CMS* comb. Tube Type 2 (see Sect. 9.1.3)	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap
Carb. 300 type*, comb. Tube Type 3 (see Sect. 9.1.3)	400	No	350°C and 100 mL/min	325°C and 30 mL/min	Dual-bed CB plus CMS trap

* These sorbents exhibit some water retention. Safe sampling volumes should be reduced by a factor of 10 if sampling a high (>90%) relative humidity.
** Significantly hydrophilic. Do not use in high humidity atmospheres unless silicone membrane caps can be fitted for diffusive monitoring purposes.

CB is short for Carbopack B and CMS is short for carbonized molecular sieve.

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TABLE 3 - LIST OF COMPOUNDS WITH BREAKTHROUGH VOLUMES >5L USING THE AIR TOXICS TUBE STYLE 2 LISTED IN SECTIONS 6.1.2 AND 9.1.3 OF COMPENDIUM METHOD TO-17

*[Note: The following list of compounds was determined to have breakthrough volumes of greater than 5 liters of trace levels in humidified zero air for humidities of 20%, 65% and 90% RH at 25°C. The tests were performed immediately prior to the publication of this document at the Research Triangle Institute, Research Triangle Park, NC as a result of activities leading up to the publication of this document. Compounds with an * were not tested at 90% RH.]*

Halocarbon 114
1,3,5-Trimethylbenzene
Halocarbon 11
1,2,4-Trimethylbenzene
Halocarbon 113
Dichlorobenzenes
1,1-Dichloroethene
1,2,4-Trichlorobenzene
Methylene Chloride
Hexachloro-1,3,-butadiene
1,1 Dichloroethane
*1,3 Butadiene
cis-1,2-Dichloroethene
*Acetonitrile
Chloroform
*Acetone
1,1,1-Trichloroethane
*2-Propanol
Carbon tetrachloride
*Acrylonitrile
Benzene
*Isoprene
1,2-Dichloroethane
*Methyl Acetate
Trichloroethene
*Methyl tert-Butyl Ether
1,2-Dichloropropane
*Methyl Ethyl Ketone
cis-1,3-Dichloropropene
*Ethyl Acrylate
Toluene
*Methyl Acrylate
Trans-1,3-Dichloropropene
*Methyl Isobutyl Ketone
*Furfural
Tetrachloroethene
1,2-Dibromoethane
Chlorobenzene
Ethylbenzene
m-Xylene
p-Xylene
o-Xylene
1,1,2,2-Tetrachloroethane

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TABLE 4. MASS OF AN ANALYTE 'X' COLLECTED FROM 1, 2 OR 10 L AIR SAMPLES AT DIFFERENT ATMOSPHERIC CONCENTRATIONS (ASSUMING 'X' HAS A MOLAR WEIGHT OF 100 g)

Sample type	Typical concentration	Mass collected in 1 L sample volume	Mass collected in 2 L sample volume	Mass collected in 10 L sample volume
Fenceline/severe urban area	10-250 ppb	40-1,000 ng	80 ng-2 μg	0.4-10μg
Indoor air sampling	1-100 ppb	4-400 ng	8-800 ng	40 ng-4μg
Avg. exposure to benzene	~3 ppb	11 ng	22 ng	110 ng
Normal urban area	1-10 ppb	4-40 ng	8-80 ng	40-400 ng
Normal rural area	0.1-1 ppb	0.4-4 ng	0.8-8 ng	4-40 ng
Forested area	0.25-2.5 ppb	1-10 ng	2-20 ng	10-100 ng
Mt. Everest/K2 site	0.025-7.5 ppb	0.1-30 ng	0.2-60 ng	1-300 ng
Arctic on an ultraclean day	15-50 ppt	60-200 pg	0.12-0.4 ng	0.6-2 ng

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COMPENDIUM METHOD TO-17
FIELD TEST DATA SHEET (FTDS)

I. GENERAL INFORMATION

PROJECT:_____ DATE(S) SAMPLED:_____
SITE:_____ TIME PERIOD SAMPLED:_____
LOCATION:_____ OPERATOR:_____
INSTRUMENT MODEL NO.:_____ CALIBRATED BY:_____
PUMP SERIAL NO.:_____ RAIN: ____YES _____NO

ADSORBENT CARTRIDGE INFORMATION:

	Tube 1	Tube 2
Type:	_____	_____
Adsorbent:	_____	_____
Serial No.:	_____	_____
Sample No.:	_____	_____

II. SAMPLING DATA

Tube Identification	Sampling Location	Ambient Temp., °F	Ambient Pressure, in Hg	Flow Rate (Q), mL/min		Sampling Period		Total Sampling Time, min.	Total Sample Volume, L
				Tube 1	Tube 2	Start	Stop		

III. FIELD AUDIT

	Tube 1	Tube 2
Audit Flow Check Within 10% of Set Point (Y/N)?	_	_
	pre-	pre-
	_____	_____
	post-	post-

CHECKED BY:_____
DATE:_____

Figure 1. Compendium Method TO-17 Field Test Data Sheet.

ED_013172_00000137-00042

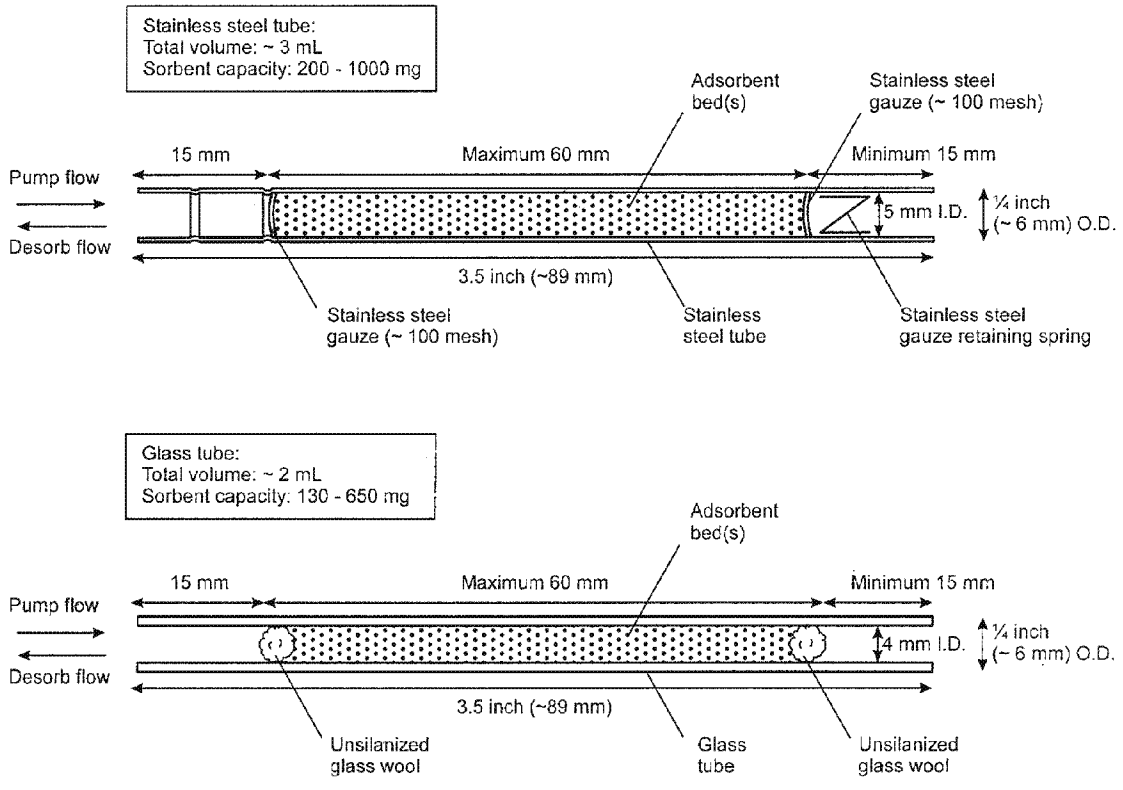
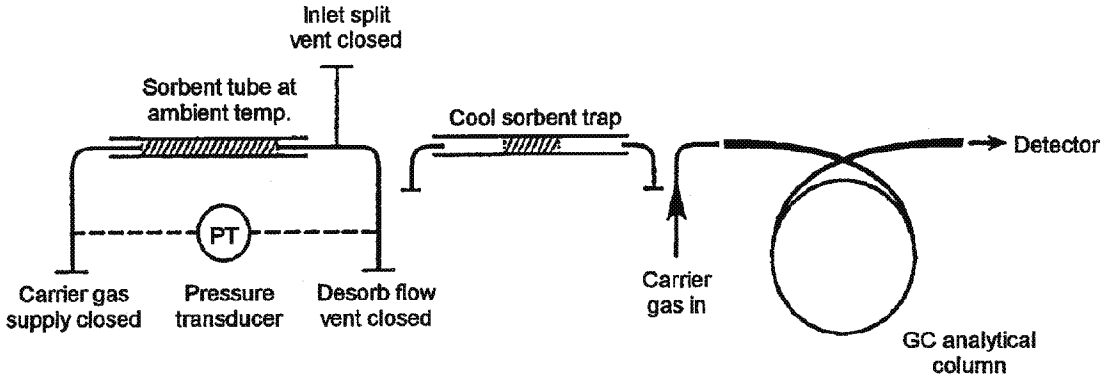
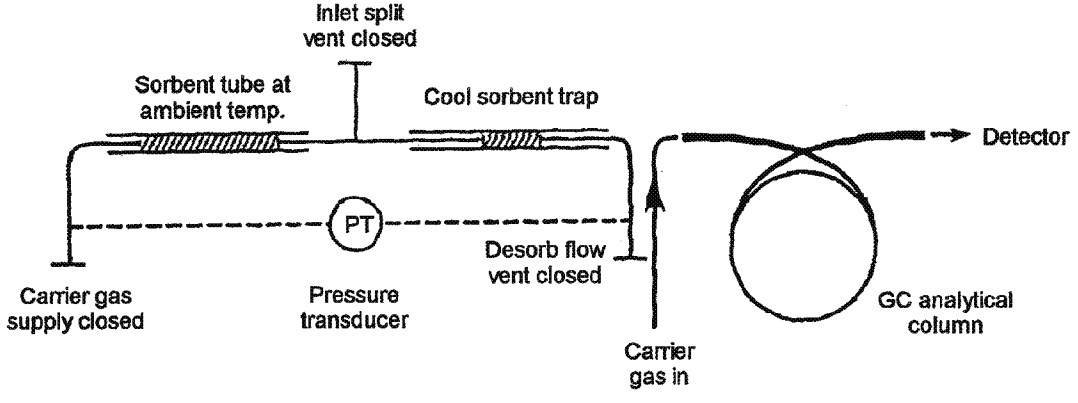


Figure 2. Example of construction of commercially available adsorbent tubes.

ED_013172_00000137-00043



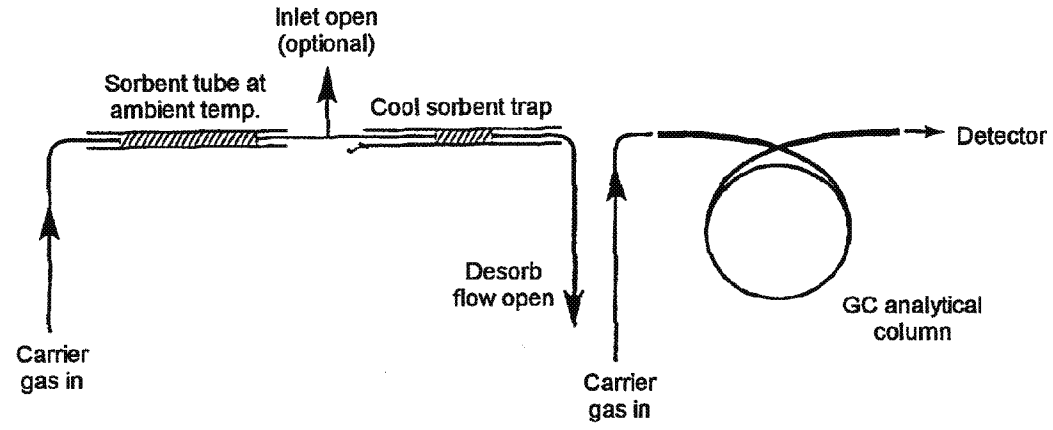
(a) Tube leak check.



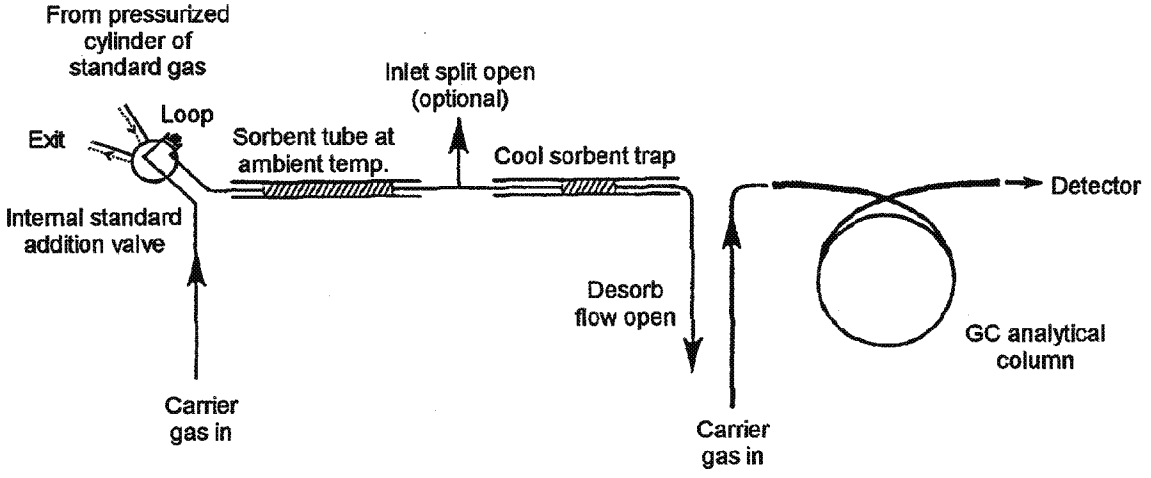
(b) Leak check sample flow path.

Figure 3. Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (a) tube leak test and (b) leak check flow path.

ED_013172_00000137-00044



(c) Purge to remove air.



(d) Gas phase internal standard addition to sample tube.

Figure 3 (cont). Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (c) purge to remove air and (d) gas phase internal standard addition to sample tube.

ED_013172_00000137-00045

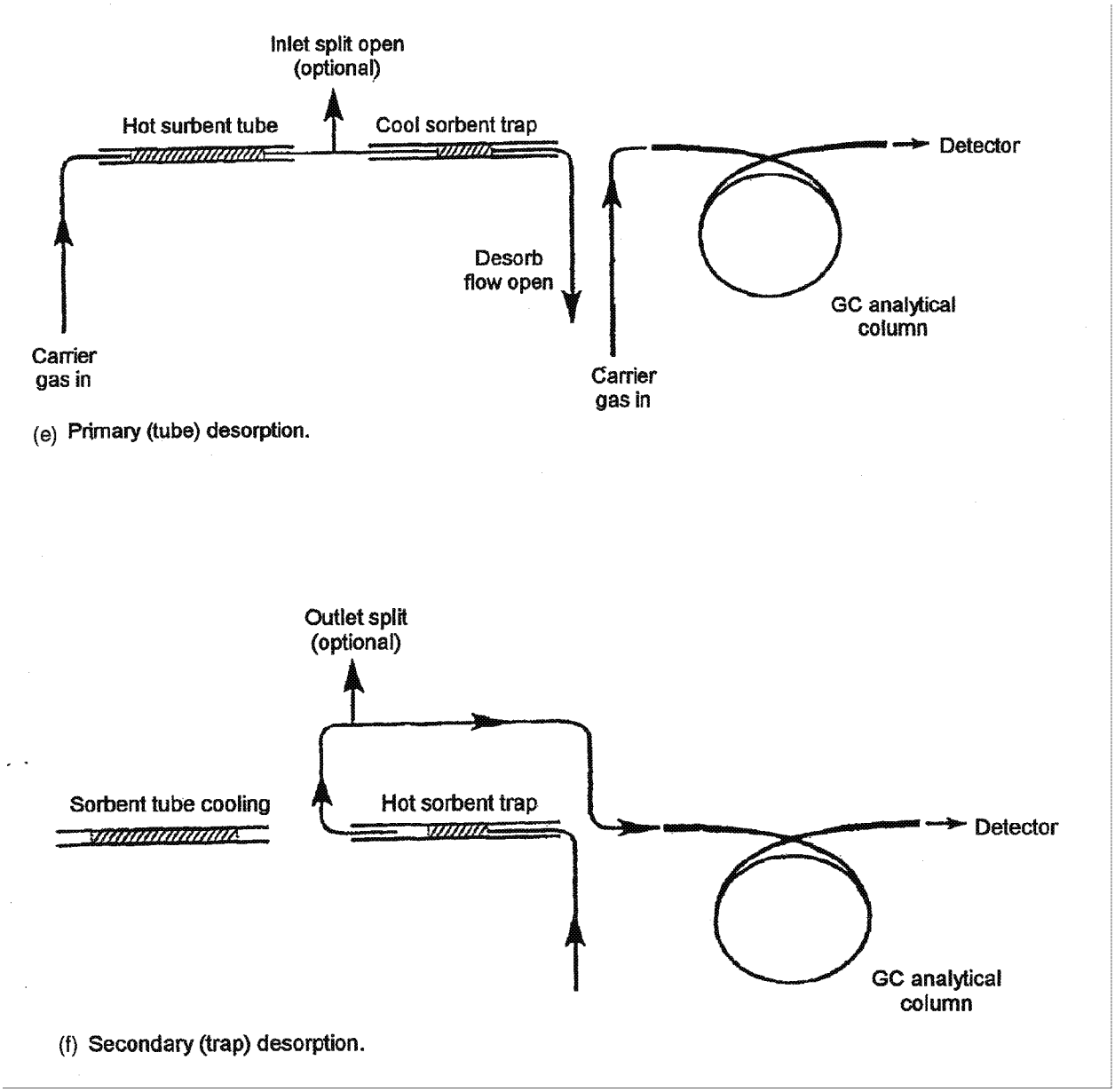


Figure 3 (cont). Sequence of operations to thermally desorb the sample from the sorbent tube and transfer to the gas chromatograph: (e) primary (tube) desorption and (f) secondary (trap) desorption.

ED_013172_00000137-00046

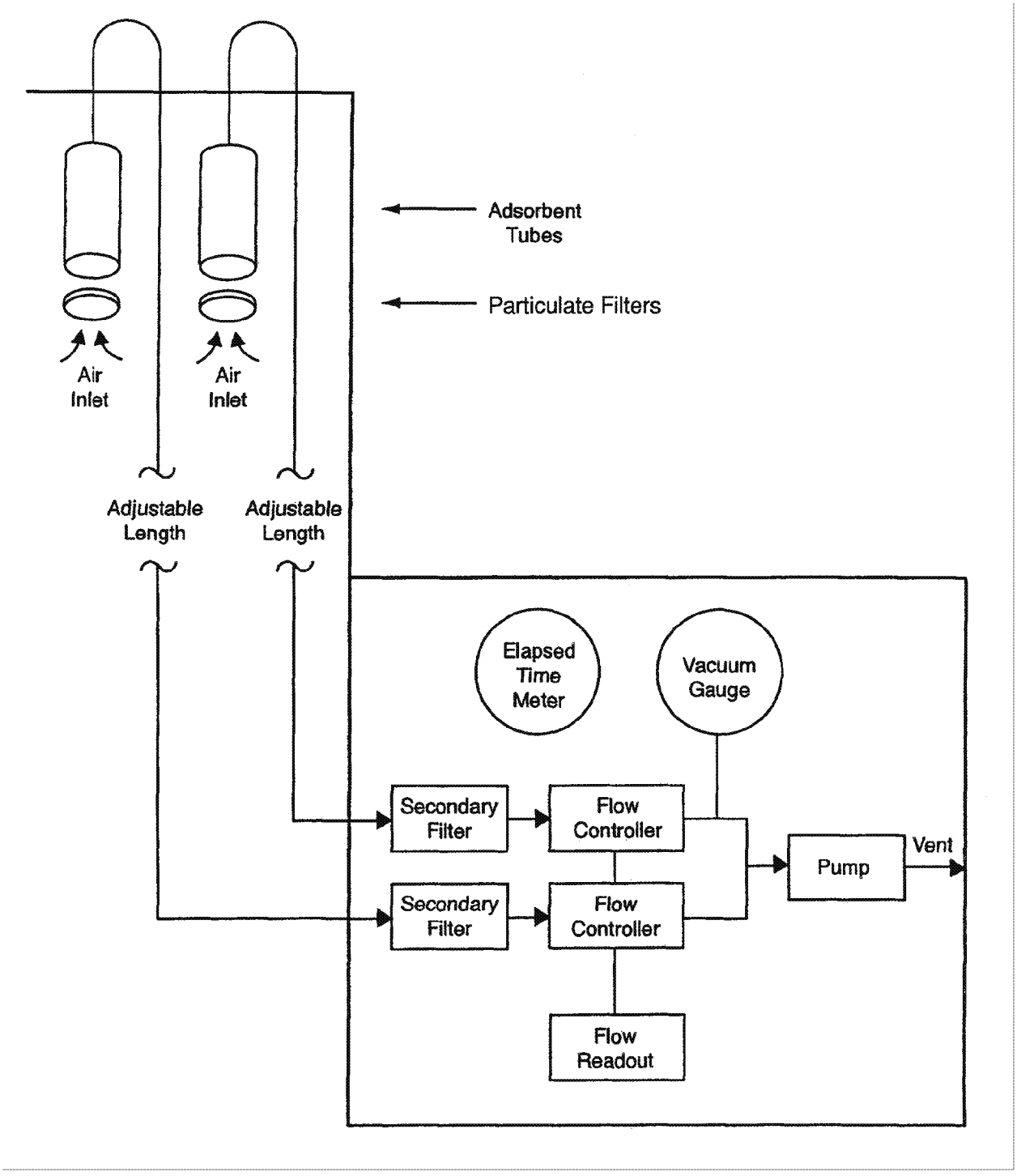


Figure 4. Example of distributive air volume using adsorbent tube technology.

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APPENDIX 1.

The following list includes safe sampling volume data generated by the UK Health and Safety Executive (4) on single sorbent bed 1/4 inch O.D. stainless steel tubes and compatible with a thermal desorption - capillary GC analytical procedure. It is provided as a resource to readers only. The recommendation for Tube Style 2 is based on the specific tube referenced in Section 6.1.2 and Table 3. Where tubes are not listed with safe sample volumes they have not been tested and their inclusion represents a suggestion only. Application to air sampling is subject to criteria listed in Section 14 of Compendium Method TO-17.

[Note: Combination tubes 1, 2, and 3 referenced in this Appendix are those adsorbent tubes described in Section 9.1.3.]

Compound	Suitable sorbents and SSV's where available
	Hydrocarbons
This procedure is suitable for all aliphatic, aromatic and cyclic hydrocarbons less volatile than ethane and more volatile than n-C20. These include:	
n-Butane	CS III, C 1000, Combination Tubes 2 or 3 or Spherocarb (SSV 820L).
n-Pentane	CS III, C 1000, Spherocarb (SSV 30,000L), Combination Tubes 2 or 3 or Chromosorb 106 (SSV 5.5L).
n-Hexane	Carbopack™ B, Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 30L).
Benzene	Carbopack™ B, Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 26L) or Tenax (SSV 6L).
n-Heptane	Carbopack™ B, Tenax (SSV 17L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 160L).
Toluene	Carbopack™ B, Tenax (SSV 38L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 80L).
n-Octane	Carbopack™ B, Tenax (SSV 700L) Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 1000L).
Ethylbenzene	Carbopack™ B, Tenax (SSV 180L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 360L).
all Xylenes	Carbopack™ B, Tenax (SSV 300L), Combination Tubes 1, 2, 3 or Chromosorb 106 (SSV 770L).
n-Nonane	Carbopack™ C/B, Tenax (SSV 700L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 7000L).
Styrene	Carbopack™ C/B, Tenax (SSV 300L) or Combination Tubes 1, 2 or 3.
Isopropylbenzene	Carbopack™ C/B, Tenax (SSV 480L) or Combination Tubes 1, 2 or 3.
n-Propylbenzene	Carbopack™ C/B, Tenax (SSV 850L) or Combination Tubes 1, 2 or 3.
1-Methyl-3-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.
1-Methyl-4-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available
1,3,5-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 2800).
Methylstyrene	Carbopack™ C/B, Tenax (SSV 1200L) or Combination Tubes 1, 2 or 3.
Methyl-2-ethylbenzene	Carbopack™ C/B, Tenax (SSV 1000L) or Combination Tubes 1, 2 or 3.
1,2,4-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L) or Combination Tubes 1, 2 or 3.
n-Decane	Carbopack™ C/B, Tenax (SSV 2100L), Combination Tubes 1, 2 or 3 or Chromosorb 106 (SSV 37,000L).
1,2,3-Trimethylbenzene	Carbopack™ C/B, Tenax (SSV 1800L) or Combination Tubes 1, 2 or 3.
n-Undecane	Carbopack™ C/B, Tenax (SSV 12,000L) or Combination Tubes 1, 2 or 3.
n-Dodecane	Carbopack™ C, Tenax (SSV 63,000L) or Combination Tubes 1 or 3.

Halogenated Hydrocarbons including PCBs

This procedure is suitable for all aliphatic, aromatic and cyclic halogenated hydrocarbons more volatile than n-C20. Examples include:

Dichloromethane	CS III, C 1000, Spherocarb (SSV 200L) or Combination Tubes 2 or 3.
1,2-Dichloroethane	CS III, C 1000, Spherocarb, Chrom. 106 (SSV 17L), Carbopack™ B, Tenax (SSV 5.4L) or Combination Tubes 1, 2 or 3.
1,1,1-Trichloroethane	Spherocarb (SSV 8,000L), Chrom. 106 (SSV 8L), Carbopack™ B, or Combination Tubes 1, 2 or 3.
Carbontetrachloride	Chrom. 106 (SSV 22L), Carbopack™ B, Tenax (SSV 6.2L) or Combination Tubes 1, 2 or 3.
Trichloroethylene	Chrom. 106, Carbopack™ B, Tenax (SSV 5.6L) or Combination Tubes 1, 2 or 3.
1,1,2-Trichloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 34L) or Combination Tubes 1, 2 or 3.
Tetrachloroethylene	Chrom. 106, Carbopack™ B, Tenax (SSV 48L) or Combination Tubes 1, 2 or 3.
Chlorobenzene	Chrom. 106, Carbopack™ B, Tenax (SSV 26L) or Combination Tubes 1, 2 or 3.
1,1,1,2-Tetrachloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 78L) or Combination Tubes 1, 2 or 3.
1,1,2,2-Tetrachloroethane	Chrom. 106, Carbopack™ B, Tenax (SSV 170L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available

Alcohols

This procedure is suitable for alcohols more volatile than n-C20 and sufficiently stable to be analyzed by conventional GC techniques. Examples include:

Methanol	CSIII, C1000, Spherocarb (SSV 130L) or Combination Tubes 2 or 3.
Ethanol	CSIII, C1000, Spherocarb (SSV 3500L) or Combination Tubes 2 or 3.
n-Propanol	Porapak N (SSV 20L), Chrom 106 (SSV 8L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Isopropanol	Chrom 106 (SSV 44L), Carbopack™ B or Combination Tubes 1, 2 or 3.
n-Butanol	Chrom 106 (SSV 50L), Carbopack™ B, Porapak N (SSV 5L), Tenax (SSV 5L) or Combination Tubes 1, 2 or 3.
iso-Butanol	Chrom 106 (SSV 30L), Carbopack™ B, Tenax (SSV 2.8L) or Combination Tubes 1, 2 or 3.
Octanol	Tenax (SSV 1400L), Carbopack™ C or Combination Tubes 1 or 3.

Esters and Gycol Ethers

This procedure is suitable for all esters and glycol ethers more volatile than n-C20 and sufficiently stable to be analyzed by conventional GC techniques. Examples include:

Methylacetate	Chromosorb 106 (SSV 2.6L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Ethylacetate	Chromosorb 106 (SSV 20L), Carbopack™ B, Tenax (SSV 3.6L) or Combination Tubes 1, 2 or 3.
Propylacetate	Chromosorb 106 (SSV 150L), Carbopack™ B, Tenax (SSV 18L) or Combination Tubes 1, 2 or 3.
Isopropylacetate	Chromosorb 106 (SSV 75L), Carbopack™ B, Tenax (SSV 6L) or Combination Tubes 1, 2 or 3.
Butylacetate	Chromosorb 106 (SSV 730L), Carbopack™ B, Tenax (SSV 85L) or Combination Tubes 1, 2 or 3.
Isobutylacetate	Chromosorb 106 (SSV 440L), Carbopack™ B, Tenax (SSV 130L) or Combination Tubes 1, 2 or 3.
Methyl-t-butyl ether	Chromosorb 106 (SSV >6L), Carbopack™ B or Combination Tubes 1, 2 or 3.
t-Butylacetate	Chromosorb 106 (SSV 160L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Methylacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 6.5L) or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available
Ethylacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 60L) or Combination Tubes 1, 2 or 3.
Methylmethacrylate	Chromosorb 106, Carbopack™ B, Tenax (SSV 27L) or Combination Tubes 1, 2 or 3.
Methoxyethanol	Chromosorb 106 (SSV 5L), Carbopack™ B, Tenax (SSV 3L) or Combination Tubes 1, 2 or 3.
Ethoxyethanol	Chromosorb 106 (SSV 75L), Carbopack™ B, Tenax (SSV 5L) or Combination Tubes 1, 2 or 3.
Butoxyethanol	Chromosorb 106, Carbopack™ B, Tenax (SSV 35L) or Combination Tubes 1, 2 or 3.
Methoxypropanol	Chromosorb 106, Carbopack™ B, Tenax (SSV 13L) or Combination Tubes 1, 2 or 3.
Methoxyethylacetate	Chromosorb 106 (SSV 860L), Carbopack™ B, Tenax (SSV 8L) or Combination Tubes 1, 2 or 3.
Ethoxyethylacetate	Chromosorb 106 (SSV 4000L), Carbopack™ B, Tenax (SSV 15L) or Combination Tubes 1, 2 or 3.
Butoxyethylacetate	Chromosorb 106, Carbopack™ B, Tenax (SSV 150L) or Combination Tubes 1, 2 or 3.

Aldehydes and Ketones

This procedure is suitable for all aldehydes and ketones more volatile than n-C20 and sufficiently stable to be analyzed using conventional GC techniques. Examples include:

Acetone	CSIII, C1000, Spherocarb, Chrom 106 (SSV 1.5L) or Combination Tubes 2 or 3.
Methylethylketone (2-butanone)	Chromosorb 106 (SSV 10L), Tenax (SSV 3.2L), Porapak N (SSV 50L) Carbopack™ B or Combination Tubes 1, 2 or 3.
n-Butanal	Chromosorb 106, Carbopack™ B, Porapak N (SSV 50L) or Combination Tubes 1, 2 or 3.
Methylisobutylketone	Chromosorb 106 (SSV 250L), Tenax (SSV 26L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Cyclohexanone	Chromosorb 106, Tenax (SSV 170L), Carbopack™ B or Combination Tubes 1, 2 or 3.
3,5,5-Trimethylcyclohex-2-enone	Tenax (SSV 5600L), Carbopack™ B or Combination Tubes 1 or 3.
Furfural	Tenax (SSV 300L), Carbopack™ B or Combination Tubes 1, 2 or 3.

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Compound	Suitable sorbents and SSV's where available

Miscellaneous VOCs

This procedure is suitable for the analysis of most VOCs in air. It is generally compatible with all organics less volatile than ethane, more volatile than n-C20 and sufficiently stable to be analyzed using conventional GC techniques. Examples include:

Acetonitrile	Porapak N (SSV 3.5L), CSIII, C1000 or Combination Tubes 2 or 3.
Acrylonitrile	Porapak N (SSV 8L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Propionitrile	Porapak N (SSV 11L), Carbopack™ B or Combination Tubes 1, 2 or 3.
Maleic anhydride[a]	Tenax (SSV 88L), Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Pyridine	Tenax (SSV 8L), Porapak N (SSV 200L) Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Aniline	Tenax (SSV 220L), Chrom. 106, Carbopack™ B or Combination Tubes 1, 2 or 3.
Nitrobenzene	Tenax (SSV 14,000L) Carbopack™ C or Combination Tubes 1 or 3.
Acetic acid	Porapak N (SSV 50L), Carbotrap™ B or Combination Tubes 1, 2 or 3.
Phenol	Tenax (SSV 240L) or combination tube 1.

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APPENDIX 2.

LINEARITY TESTING OF ONE SORBENT TUBE/FOCUSING TUBE COMBINATION

Introduction

Automated gas chromatographs such as those used at network monitoring stations for hourly updates of volatile organic compounds (VOCs) have a solid adsorbent concentrator for the VOCs. This unit is comparable to the sorbent tubes being discussed in this document. The table below shows the results of sampling a synthetic mixture of the Compendium Method TO-14 target list in humidified zero air (approximately 70% RH at 25°C). Sampling occurred for 6, 12, and 24 min at a rate of 80 mL/min giving a total sampling volume of 480, 960, and 1920 mL. These results are similar to the determination of safe sampling volume and the amount of material collected should be related linearly to the sample period. The results indicate that breakthrough has not occurred to any appreciable extent at a sampling volume of approximately 2 L for the stated experimental conditions. The response measured is the response of chlorine from an atomic emission detector after chromatographic separation. The sorbent tube mix was Carbotrap™ C/Carbotrap™ B/Carboxen™ 1000 and the focusing tube mix was Tenax-TA/Silica Gel/Ambersorb XE-340/Charcoal. The primary tube was 6 mm O.D. with 4 mm I.D., 110 mm in length. The focusing tube was 6 mm O.D., 0.9 mm I.D., 185 mm in length. The packing lengths for the sorbent tube per sorbent type were: 1.27 cm, 2.86 cm, and 3.18 cm, respectively. The packing lengths for the focusing tube per sorbent type were: 5.08 cm, 2.54 cm, and 1.27 cm.

Linearity test

[Note: Actual sampling volumes were 490, 980, and 1960 instead of 1/2,1, and 2L as listed for convenience in the table below. The response is obtained as chlorine response on an atomic emission detector. Compounds corresponding to the numbered compounds in the table are identified on the following page.]

Cpd.	1/2 L	1 L	2 L	2L/1L	2L/(1/2L)	1L/(1/2L)	% Diff (2L/0.5L) vs. 4
1	1255.4	2402.9	5337.2	2.22	4.25	1.91	-6.28
2	711.82	1802.2	3087	1.71	4.34	2.53	-8.42
3	2079.4	4853	9386	1.93	4.51	2.33	-12.85
4	978.14	2381.3	4680.1	1.97	4.78	2.43	-19.62
6	1155.7	2357.1	4725.2	2.00	4.09	2.04	-2.22
7	3072.8	6764.4	13662	2.02	4.45	2.20	-11.15
8	2337.3	4356.1	8697.2	2.00	3.72	1.86	6.97
9	3041.7	5986.6	11525	1.93	3.79	1.97	5.28
10	1061.7	2183.6	4296.5	1.97	4.05	2.06	-1.17
11	3800.5	7726.7	15182	1.96	3.99	2.03	0.13
12	2386.9	4877.5	9669	1.98	4.05	2.04	-1.27
13	2455.4	5063.5	9986.6	1.97	4.07	2.06	-1.68
14	3972.6	8118.4	15985	1.97	4.02	2.04	-0.60
15	2430.9	4947.9	9756.1	1.97	4.01	2.04	-0.33
16	6155.4	9247.4	16942	1.83	2.75	1.50	31.19

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Cpd.	1/2 L	1 L	2 L	2L/1L	2L/(1/2L)	1L/(1/2L)	% Diff (2L/0.5L) vs. 4
18	4270.4	9233.8	18721	2.03	4.38	2.16	-9.60
19	2494.8	5115.2	10087	1.97	4.04	2.05	-1.08
20	4023.9	8379.4	16672	1.99	4.14	2.08	-3.58
21	1086.8	2295.4	4611.7	2.01	4.24	2.11	-6.08
22	793.33	1670.1	3375.2	2.02	4.25	2.11	-6.36
23	3708.2	7679	15165	1.97	4.09	2.07	-2.24
26	5094	10582	21139	2.00	4.15	2.08	-3.74
27	1265.1	2615.1	5136.9	1.96	4.06	2.07	-1.51
31	4434.9	9176.4	17975	1.96	4.05	2.07	-1.33
36	2320.7	5015.7	9827.3	1.96	4.23	2.16	-5.87
37	441.17	953.09	1894	1.99	4.29	2.16	-7.33
38	1410.7	3015	5895.2	1.96	4.18	2.14	-4.47
39	2338.7	4974.8	9858.8	1.98	4.22	2.13	-5.39
40	2640.9	6269.4	12495	1.99	4.73	2.37	-18.28
41	6796.5	14938	29274	1.96	4.31	2.20	-7.68

There are no values presented in the above table for hydrocarbons and brominated hydrocarbons (compounds numbered 5, 17, 24, 25, 28, 29, 30, 32, 33, 34, and 35) which do not respond to the chlorine detector used to collect this data.

Compendium Method TO-14
Target Compound List (TCL)

1. Dichlorodifluoromethane
2. Methyl Chloride
3. 1,2-dichloro-1,1,2,2-tetrafluoroethane
4. Vinyl Chloride
5. Methyl Bromide
6. Ethyl Chloride
7. Trichlorofluoromethane
8. 1,1-dichloroethene
9. Dichloromethane
10. 3-chloropropene
11. 1,1,2-trichloro-1,2,2-trifluoroethane
12. 1,1-dichloroethane
13. Cis-1,2-dichloroethene
14. Trichloromethane
15. 1,2-dichloroethane
16. 1,1,1-trichloroethane
17. Benzene
18. Carbon Tetrachloride
19. 1,2-dichloropropane
20. Trichloroethene
21. Cis-1,3-dichloropropene
22. Trans-1,3-dichloropropene
23. 1,1,2-trichloroethane
24. Toluene
25. 1,2-dibromoethane
26. Tetrachloroethene
27. Chlorobenzene
28. Ethylbenzene
29. m,p-xylene
30. Styrene
31. 1,1,2,2-tetrachloroethane
32. o-xylene
33. 4-ethyltoluene
34. 1,3,5-trimethylbenzene
35. 1,2,4-trimethylbenzene
36. m-dichlorobenzene
37. Benzyl Chloride
38. p-dichlorobenzene
39. o-dichlorobenzene
40. 1,2,4-trichlorobenzene
41. Hexachlorobutadiene

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APPENDIX C

STANDARD OPERATING PROCEDURES (SOPS)

SOIL GAS SAMPLING

SOP#: 2042
DATE: 06/01/96
REV. #: 0.0

1.0 SCOPE AND APPLICATION

Soil gas monitoring provides a quick means of waste site evaluation. Using this method, underground contamination can be identified, and the source, extent, and movement of the pollutants can be traced.

This standard operating procedure (SOP) outlines the methods used by U.S. EPA/ERT in installing soil gas wells; measuring organic vapor levels in the soil gas using a Photoionization Detector (PID), Flame Ionization Detector (FID) and/or other air monitoring devices; and sampling the soil gas using Tedlar bags, Tenax sorbent tubes, and/or Summa canisters.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

A 3/8" diameter hole is driven into the ground to a depth of four to five feet using a commercially available slam bar. Soil gas can also be sampled at other depths by the use of a longer bar or bar attachments. A 1/4" O.D. stainless steel probe is inserted into the hole. The hole is then sealed around the top of the probe using modeling clay. The gas contained in the interstitial spaces of the soil is sampled by pulling the sample through the probe using an air sampling pump. The sample may be stored in Tedlar bags, drawn through sorbent cartridges, or analyzed directly using a direct reading instrument. The air sampling pump is not used for Summa canister sampling of soil gas. Sampling is achieved by soil gas equilibration with the evacuated Summa canister.

Other field air monitoring devices, such as the combustible gas indicator (MSA CGI/02 Meter, Model 260) and the Organic Vapor Analyzer (Foxboro OVA, Model 128), can also be used dependent on specific site conditions. Measurement of soil temperature using a temperature probe may also be desirable. Bagged samples are usually analyzed in a field laboratory using a portable Photovac GC.

Power driven sampling probes may be utilized when soil conditions make sampling by hand unfeasible (i.e., frozen ground, very dense clays, pavement, etc.). Commercially available soil gas sampling probes (hollow, 1/2 = O.D. steel probes) can be driven to the desired depth using a power hammer (e.g., Bosch Demolition Hammer or Geoprobe™). Samples can be drawn through the probe itself, or through Teflon tubing inserted through the probe and attached to the probe point. Samples are collected and analyzed as described above.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

3.1 Tedlar Bags

Soil gas samples are generally contained in 1.0-L Tedlar bags. Bagged samples are best stored in dark plastic bags placed in coolers to protect the bags from any damage that may occur in the field or in transit. In addition, coolers insure the integrity of the samples by keeping them at a cool temperature and out of direct sunlight. Samples should be analyzed as soon as possible, preferably within 24 - 48 hours.

3.2 Tenax Tubes

Bagged samples can also be drawn onto Tenax or

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other sorbent tubes to undergo lab GC/MS analysis. If Tenax tubes are to be utilized, special care must be taken to avoid contamination. Handling of the tubes should be kept to a minimum and only while wearing nylon or other lint-free gloves. After sampling, each tube should be stored in a clean, sealed culture tube; the ends packed with clean glass wool to protect the sorbent tube from breakage. The culture tubes should be kept cool and wrapped in aluminum foil to prevent any photodegradation of samples (see Section 7.4.).

3.3 Summa Canisters

The Summa canisters used for soil gas sampling have a 6 liter sample capacity and are certified clean by GC/MS analysis before being utilized in the field. After sampling is completed, they are stored and shipped in travel cases.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

4.1 PID Measurements

A number of factors can affect the response of a PID (such as the HNu PI 101). High humidity can cause lamp fogging and decreased sensitivity. This can be significant when soil moisture levels are high, or when a soil gas well is actually in groundwater. High concentrations of methane can cause a downscale deflection of the meter. High and low temperature, electrical fields, FM radio transmission, and naturally occurring compounds, such as terpenes in wooded areas, will also affect instrument response.

Other field screening instruments can be affected by interferences. Consult the manufacturers manuals.

4.2 FID Measurements

A number of factors can affect the response of an FID (such as the OVA model 128). High humidity can cause the FID to flame out or not ignite at all. This can be significant when soil moisture levels are high, or when a soil gas well is actually in groundwater. The FID can only read organic based compounds (they must contain carbon in the molecular structure). The FID also responds poorly to hydrocarbons and halogenated hydrocarbons (such as gasoline, propane fuel). High and low temperature, electrical fields and FM radio transmission will also affect instrument response.

4.3 Factors Affecting Organic Concentrations in Soil Gas

Concentrations in soil gas are affected by dissolution, adsorption, and partitioning. Partitioning refers to the ratio of component found in a saturated vapor above an aqueous solution to the amount in the solution; this can, in theory, be calculated using the Henry's Law constants. Contaminants can also be adsorbed onto inorganic soil components or "dissolved" in organic components. These factors can result in a lowering of the partitioning coefficient.

Soil "tightness" or amount of void space in the soil matrix, will affect the rate of recharging of gas into the soil gas well.

Existence of a high, or perched, water table, or of an impermeable underlying layer (such as a clay lens or layer of buried slag) may interfere with sampling of the soil gas. Knowledge of site geology is useful in such situations, and can prevent inaccurate sampling.

4.4 Soil Probe Clogging

A common problem with this sampling method is soil probe clogging. A clogged probe can be identified by using an in-line vacuum gauge or by listening for the sound of the pump laboring. This problem can usually be eliminated by using a wire cable to clear probe (see Section 7.1.3.).

4.5 Underground Utilities

Prior to selecting sample locations, an underground utility search is recommended. The local utility companies can be contacted and requested to mark the locations of their underground lines. Sampling plans can then be drawn up accordingly. Each sample location should also be screened with a metal detector or magnetometer to verify that no underground pipes or drums exist.

5.0 EQUIPMENT/APPARATUS

5.1 Slam Bar Method

C Slam Bar (1 per sampling team).
C Soil gas probes, stainless steel tubing, 1/4" O.D., 5 ft length.
C Flexible wire or cable used for clearing the

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tubing during insertion into the well.

- C "Quick Connect" fittings to connect sampling probe tubing, monitoring instruments, and Gilian pumps to appropriate fittings on vacuum box.
- C Modeling clay.
- C Vacuum box for drawing a vacuum around Tedlar bag for sample collection (1 per sampling team).
- C Gilian pump Model HFS113A adjusted to approximately 3.0 L/min (1 to 2 per sample team).
- C 1/4" Teflon tubing, 2 ft to 3 ft lengths, for replacement of contaminated sample line.
- C 1/4" Tygon tubing, to connect Teflon tubing to probes and quick connect fittings.
- C Tedlar bags, 1.0 L, at least 1 bag per sample point.
- C Soil Gas Sampling labels, field data sheets, logbook, etc.
- C PID/FID, or other field air monitoring devices, (1 per sampling team).
- C Ice chest, for carrying equipment and for protection of samples (2 per sampling team).
- C Metal detector or magnetometer, for detecting underground utilities/pipes/drums (1 per sampling team).
- C Photovac GC, for field-lab analysis of bagged samples.
- C Summa canisters (plus their shipping cases) for sample, storage and transportation.
- C Large dark plastic garbage bags

5.2 Power Hammer Method

- C Bosch demolition hammer.
- C 1/2" O.D. steel probes, extensions, and points.
- C Dedicated aluminum sampling points.
- C Teflon tubing, 1/4".
- C "Quick Connect" fittings to connect sampling probe tubing, monitoring instruments, and Gilian pumps to appropriate fittings on vacuum box.
- C Modeling clay.
- C Vacuum box for drawing a vacuum around Tedlar bag for sample collection (1 per sampling team).
- C Gilian pump Model HFS113A adjusted to approximately 3.0 L/min (1 to 2 per sample team).
- C 1/4" Teflon tubing, 2 ft to 3 ft lengths, for replacement of contaminated sample line.
- C 1/4" Tygon tubing, to connect Teflon tubing to probes and quick connect fittings.
- C Tedlar bags, 1.0 L, at least 1 bag per sample point.
- C Soil Gas Sampling labels, field data sheets, logbook, etc.
- C HNu Model P1101, or other field air monitoring devices, (1 per sampling team).
- C Ice chest, for carrying equipment and for protection of samples (2 per sampling team).
- C Metal detector or magnetometer, for detecting underground utilities/pipes/drums (1 per sampling team).
- C Photovac GC, for field-lab analysis of bagged samples.
- C Summa canisters (plus their shipping cases) for sample, storage and transportation.
- C Generator w/extension cords.
- C High lift jack assembly for removing probes.

5.3 Geoprobe™ Method

The Geoprobe is a hydraulically-operated sampling device mounted in a customized four-wheel drive vehicle. The sampling device can be deployed from the truck and positioned over a sample location. The base of the sampling device is positioned on the ground. The weight of the vehicle is hydraulically raised on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground. A built-in hammer mechanism allows the probe to be driven past some dense stratigraphic horizons. When the probe reaches the sample depth, up to 50 feet under favorable geologic situations, samples can be collected.

Soil gas can be collected from specific depths in two general ways. One method involves withdrawing a sample directly from the probe rods, after evacuating a sufficient volume of air from the probe rods. The other method involves collecting a sample through tubing attached by an adaptor to the bottom probe rod section. Correctly used, this method provides more reliable results. Manufacturer's instructions and the SOP for the Model 5400 Geoprobe™ Operation should be followed when using this method.

6.0 REAGENTS

- C PID/FID or calibration gases for field air monitoring devices (such as methane and

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isobutylene).

- C Deionized organic-free water, for decontamination.
- C Methanol, HPLC grade, for decontamination.
- C Ultra-zero grade compressed air, for field blanks.
- C Standard gas preparations for Photovac GC calibration and Tedlar bag spikes.
- C Propane Torch (for decontamination of steel probes)

7.0 PROCEDURES

7.1 Soil Gas Well Installation

1. Initially a hole slightly deeper than the desired depth is made. For sampling up to 5 feet, a 5-ft single piston slam bar is used. For deeper depths, a piston slam bar with threaded 4-foot-long extensions can be used. Other techniques can be used, so long as holes are of narrow diameter and no contamination is introduced.

2. After the hole is made, the slam bar is carefully withdrawn to prevent collapse of the walls of the hole. The soil gas probe is then inserted.

3. It is necessary to prevent plugging of the probe, especially for deeper holes. A metal wire or cable, slightly longer than the probe, is placed in the probe prior to inserting into the hole. The probe is inserted to full depth, then pulled up three to six inches, then cleared by moving the cable up and down. The cable is removed before sampling.

4. The top of the sample hole is sealed at the surface against ambient air infiltration by using modeling clay molded around the probe at the surface of the hole.

5. If conditions preclude hand installation of the soil gas wells, the power driven system may be employed. The generator powered demolition hammer is used to drive the probe to the desired depth (up to 12 Ft may be attained with extensions). The probe is pulled up 1-3 inches if the retractable point is used. No clay is needed to seal the hole. After sampling, the probe is retrieved using the high lift jack assembly.

6. If semi-permanent soil gas wells are required, the dedicated aluminum probe points are used. These points are inserted into the bottom of the power driven probe and attached to the Teflon tubing. The probe is inserted as in step 5. When the probe is removed, the point and Teflon tube remain in the hole, which may be sealed by backfilling with clean sand, soil, or bentonite.

7.2 Screening with Field Instruments

1. The well volume must be evacuated prior to sampling. Connect the Gilian pump, adjusted to 3.0 L/min, to the sample probe using a section of Teflon tubing as a connector. The pump is turned on, and a vacuum is pulled through the probe for approximately 15 seconds. Longer time is required for sample wells of greater depths.

2. After evacuation, the monitoring instrument(s) (i.e. HNu or OVA) is connected to the probe using a Teflon connector. When the reading is stable, or peaks, the reading is recorded on soil gas data sheets.

3. Of course, readings may be above or below the range set on the field instruments. The range may be reset, or the response recorded as a greater than or less than figure. Recharge rate of the well with soil gas must be considered when resampling at a different range setting.

7.3 Tedlar Bag Sampling

1. Follow step 7.2.1 to evacuate well volume. If air monitoring instrument screening was performed prior to sample taking, evacuation is not necessary.

2. Use the vacuum box and sampling train (Figure 1) to take the sample. The sampling train is designed to minimize the introduction of contaminants and losses due to adsorption. All wetted parts are either Teflon or stainless steel. The vacuum is drawn indirectly to avoid contamination from sample pumps.

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3. The Tedlar bag is placed inside the vacuum box, and attached to the sampling port. The sample probe is attached to the sampling port via Teflon tubing and a "Quick Connect" fitting.

4. A vacuum is drawn around the outside of the bag, using a Gilian pump connected to the vacuum box evacuation port, via Tygon tubing and a "Quick Connect" fitting. The vacuum causes the bag to inflate, drawing the sample.

5. Break the vacuum by removing the Tygon line from the pump. Remove the bagged sample from the box and close valve. Record data on data sheets or in logbooks. Record the date, time, sample location ID, and the PID/FID instrument reading(s) on sample bag label.

CAUTION: Labels should not be pasted directly onto the bags, nor should bags be labeled directly using a marker or pen. Inks and adhesive may diffuse through the bag material, contaminating the sample. Place labels on the edge of the bags, or tie the labels to the metal eyelets provided on the bags. Markers with inks containing volatile organics (i.e., permanent ink markers) should not be used.

Chain of Custody Sheets must accompany all samples submitted to the field laboratory for analysis.

7.4 Tenax Tube Sampling

Samples collected in Tedlar bags may be adsorbed onto Tenax tubes for further analysis by GC/MS.

7.4.1 Additional Apparatus

A. Syringe with a luer-lock tip capable of drawing a soil gas or air sample from a Tedlar bag onto a Tenax/CMS sorbent tube. The syringe capacity is dependent upon the volume of sample begin drawn onto the sorbent tube.

B. Adapters for fitting the sorbent tube between the Tedlar bag and the sampling syringe. The adapter attaching the Tedlar bag to the sorbent tube consists of a reducing union (1/4" to 1/16" O.D. -- Swagelok cat. # SS-400-6-ILV or equivalent) with a length of 1/4" O.D. Teflon tubing replacing the nut on the 1/6" (Tedlar bag) side. A 1/4" I.D. silicone O-ring replaces the ferrules in the nut on the 1/4" (sorbent tube) side of the union.

The adapter attaching the sampling syringe to the sorbent tube consists of a reducing union (1/4" to 1/16" O.D. -- Swagelok Cat. # SS-400-6-ILV or equivalent) with a 1/4" I.D. silicone O-ring replacing the ferrules in the nut on the 1/4" (sorbent tube) side and the needle of a luer-lock syringe needle inserted into the 1/16" side. (Held in place with a 1/16" ferrule.) The luer-lock end of the needle can be attached to the sampling syringe. It is useful to have a luer-lock on/off valve situated between the syringe and the needle.

C. Two-stage glass sampling cartridge (1/4" O.D. x 1/8" I.D. x 5 1/8") contained in a flame-sealed tube (Manufacturer: Supelco Custom Tenax/Spherocarb Tubes) containing two sorbent sections retained by glass wool:

Front section: 150 mg of Tenax-GC
Back section: 150 mg of CMS (Carbonized Molecular Sieve)

These tubes are prepared and cleaned in accordance with EPA Method EMSL/RTP-SOP-EMD-013 by the vendor. The vendor sends ten tubes per lot made to the REAC GC/MS Laboratory and they are tested for cleanliness, precision, and reproductability.

D. Teflon-capped culture tubes or stainless steel tube containers for sorbent tube storage and shipping. These containers should be conditioned by baking at 120 degrees C for at least two hours. The culture tubes should contain a glass wool plug to prevent sorbent tube breakage during transport. Reconditioning of the containers should occur between uses or after extended periods of disuse (i.e., two weeks or more).

E. Nylon gloves or lint-free cloth. (Hewlett Packard Part # 8650-0030 or equivalent.)

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7.4.2 Sample Collection

Handle sorbent tubes with care, using nylon gloves (or other lint-free material) to avoid contamination.

Immediately before sampling, break one end of the sealed tube and remove the Tenax cartridge.

Connect the valve on the Tedlar bag to the sorbent tube adapter. Connect the sorbent tube to the sorbent tube adapter with the Tenax (white granular) side of the tube facing the Tedlar bag. Connect the sampling syringe assembly to the CMS (black) side of the sorbent tube. Fittings on the adapters should be finer-tight. Open the valve on the Tedlar bag. Open the on/off valve of the sampling syringe. Depending on work plan stipulations, at least 10% of the soil gas samples analyzed by this GC method must be submitted for confirmational GC/MS analysis (according to modified methods TO-1 [Tenax absorbent] and TO-2 [Carbon Molecular Sieve (CMS) absorbent]). Each soil gas sample must be absorbed on replicate Tenax/CMS tubes. The volume absorbed on a Tenax/CMS tube is dependent on the total concentration of the compounds measured by the photovac/GC or other applicable GC:

Total Concentration (ppm)	Sample Volume (mL)
>10	Use Serial Dilution
10	10 - 50
5	20-100
1	100-250

After sampling, remove the tube from the sampling train with gloves or a clean cloth. DO NOT LABEL OR WRITE ON THE TENAX/CMS TUBE.

Place the sorbent tube in a conditioned stainless steel tube holder or culture tube. Culture tube caps should be sealed with Teflon tape.

7.4.3 Sample Labeling

Each sample tube container (not tube) must be labeled with the site name, sample station number, date sampled, and volume sampled.

Chain of custody sheets must accompany all samples to the laboratory.

7.4.4 Quality Assurance (QA)

Before field use, a QA check should be performed on each batch of sorbent tubes by analyzing a tube by thermal desorption/cryogenic trapping GC/MS.

At least one blank sample must be submitted with each set of samples collected at a site. This trip blank must be treated the same as the sample tubes except no sample will be drawn through the tube.

Sample tubes should be stored out of UV light (i.e., sunlight) and kept on ice until analysis. Samples should be taken in duplicate, when possible.

7.5 Summa Canister Sampling

1. Follow step 7.2.1 to evacuate well volume. If PID/FID readings were taken prior to taking a sample, evacuation is not necessary.

2. Attach a certified clean, evacuated 6-liter Summa canister via the 1/4" Teflon tubing.

3. Open valve on Summa canister. The soil gas sample is drawn into the canister by pressure equilibration. The approximate sampling time for a 6 liter canister is 20 minutes.

4. Site name, sample location, number, and date must be recorded on a chain of custody form and on a blank tag attached to the canister.

8.0 CALCULATIONS

8.1 Field Screening Instruments

Instrument readings are usually read directly from the meter. In some cases, the background level at the soil gas station may be subtracted:

Final Reading = Sample Reading - Background

8.2 Photovac GC Analysis

Calculations used to determine concentrations of individual components by Photovac GC analysis are beyond the scope of this SOP and are covered in ERT SOP #2109, *Photovac GC Analysis for Soil Water and Air/Soil Gas.*

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9.0 CALIBRATION

9.1 Field Instruments

It is recommended that the manufacturers' manuals be consulted for correct use and calibration of all instrumentation.

9.2 Gilian Model HFS113A Air Sampling Pumps

Flow should be set at approximately 3.0 L/min; accurate flow adjustment is not necessary. Pumps should be calibrated prior to bringing into the field.

10.0 QUALITY ASSURANCE/ QUALITY CONTROL

10.1 Sample Probe Contamination

Sample probe contamination is checked between each sample by drawing ambient air through the probe via a Gilian pump and checking the response of the FID/PID. If readings are higher than background, replacement or decontamination is necessary.

Sample probes may be decontaminated simply by drawing ambient air through the probe until the HNu reading is at background. More persistent contamination can be washed out using methanol and water, then air drying. For persistent volatile contamination, use of a portable propane torch may be needed. Using a pair of pliers to hold the probe, run the torch up and down the length of the sample probe for approximately 1-2 minutes. Let the probe cool before handling. When using this method, make sure to wear gloves to prevent burns. Having more than one probe per sample team will reduce lag times between sample stations while probes are decontaminated.

10.2 Sample Train Contamination

The Teflon line forming the sample train from the probe to the Tedlar bag should be changed on a daily basis. If visible contamination (soil or water) is drawn into the sampling train, it should be changed immediately. When sampling in highly contaminated areas, the sampling train should be purged with ambient air, via a Gilian pump, for approximately 30 seconds between each sample. After purging, the sampling train can be checked using an FID or PID, or other field monitoring device, to establish the cleanliness of the Teflon line.

10.3 FID/PID Calibration

The FID and PIDs should be calibrated at least once a day using the appropriate calibration gases.

10.4 Field Blanks

Each cooler containing samples should also contain one Tedlar bag of ultra-zero grade air, acting as a field blank. The field blank should accompany the samples in the field (while being collected) and when they are delivered for analysis. A fresh blank must be provided to be placed in the empty cooler pending additional sample collection. One new field blank per cooler of samples is required. A chain of custody sheet must accompany each cooler of samples and should include the blank that is dedicated to that group of samples.

10.5 Trip Standards

Each cooler containing samples should contain a Tedlar bag of standard gas to calibrate the analytical instruments (Photovac GC, etc.). This trip standard will be used to determine any changes in concentrations of the target compounds during the course of the sampling day (e.g., migration through the sample bag, degradation, or adsorption). A fresh trip standard must be provided and placed in each cooler pending additional sample collection. A chain of custody sheet should accompany each cooler of samples and should include the trip standard that is dedicated to that group of samples.

10.6 Tedlar Bag Check

Prior to use, one bag should be removed from each lot (case of 100) of Tedlar bags to be used for sampling and checked for possible contamination as follows: the test bag should be filled with ultra-zero grade air; a sample should be drawn from the bag and analyzed via Photovac GC or whatever method is to be used for sample analysis. This procedure will ensure sample container cleanliness prior to the start of the sampling effort.

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10.7 Summa Canister Check

From each lot of four cleaned Summa canisters, one is to be removed for a GC/MS certification check. If the canister passes certification, then it is re-evacuated and all four canisters from that lot are available for sampling.

If the chosen canister is contaminated, then the entire lot of four Summas must be recleaned, and a single canister is re-analyzed by GC/MS for certification.

10.8 Options

10.8.1 Duplicate Samples

A minimum of 5% of all samples should be collected in duplicate (i.e., if a total of 100 samples are to be collected, five samples should be duplicated.) In choosing which samples to duplicate, the following criteria applies: if, after filling the first Tedlar bag, and, evacuating the well for 15 seconds, the second HN (or other field monitoring device being used) reading matches or is close to (within 50%) the first reading, a duplicate sample may be taken.

10.8.2 Spikes

A Tedlar bag spike and Tenax tube spike may be desirable in situations where high concentrations of contaminants other than the target compounds are found to exist (landfills, etc.). The additional level of QA/QC attained by this practice can be useful in determining the effects of interferences caused by these non-target compounds. Summa canisters containing samples are not spiked.

11.0 DATA VALIDATION

11.1 Blanks (Field and Tedlar Bag Check)

For each target compound, the level of concentration found in the sample must be greater than three times the level (for that compound) found in the field blank which accompanied that sample to be considered valid. The same criteria apply to target compounds detected in the Tedlar bag pre-sampling contamination check.

12.0 HEALTH AND SAFETY CONSIDERATIONS

Due to the remote nature of sampling soil gas, special considerations can be taken with regard to health and safety. Because the sample is being drawn from underground, and no contamination is introduced into the breathing zone, soil gas sampling usually occurs in Level D. Ambient air is constantly monitored using the HNu PI101 to obtain background readings during the sampling procedure. As long as the levels in ambient air do not rise above background, no upgrade of the level of protection is needed.

When conducting soil gas sampling, leather gloves should be worn, and proper slam bar techniques should be implemented (bend knees). Also, an underground utility search should be performed prior to sampling. (See Section 4.5).

13.0 REFERENCES

Gilian Instrument Corp., Instruction Manual for Hi Flow Sampler: HFS113, HFS 113 T, HFS 113U, HFS 113 UT, 1983.

HNu Systems, Inc., Instruction Manual for Model PI 101 Photoionization Analyzer, 1975.

N.J.D.E.P., Field Sampling Procedures Manual, Hazardous Waste Programs, February, 1988.

Roy F. Weston, Inc., Weston Instrumentation Manual, Volume I, 1987.

U.S.E.P.A., Characterization of Hazardous Waste Sites - A Methods Manual: Volume II, Available Sampling Methods, 2nd Edition, EPA-600/4-84-076, December, 1984.

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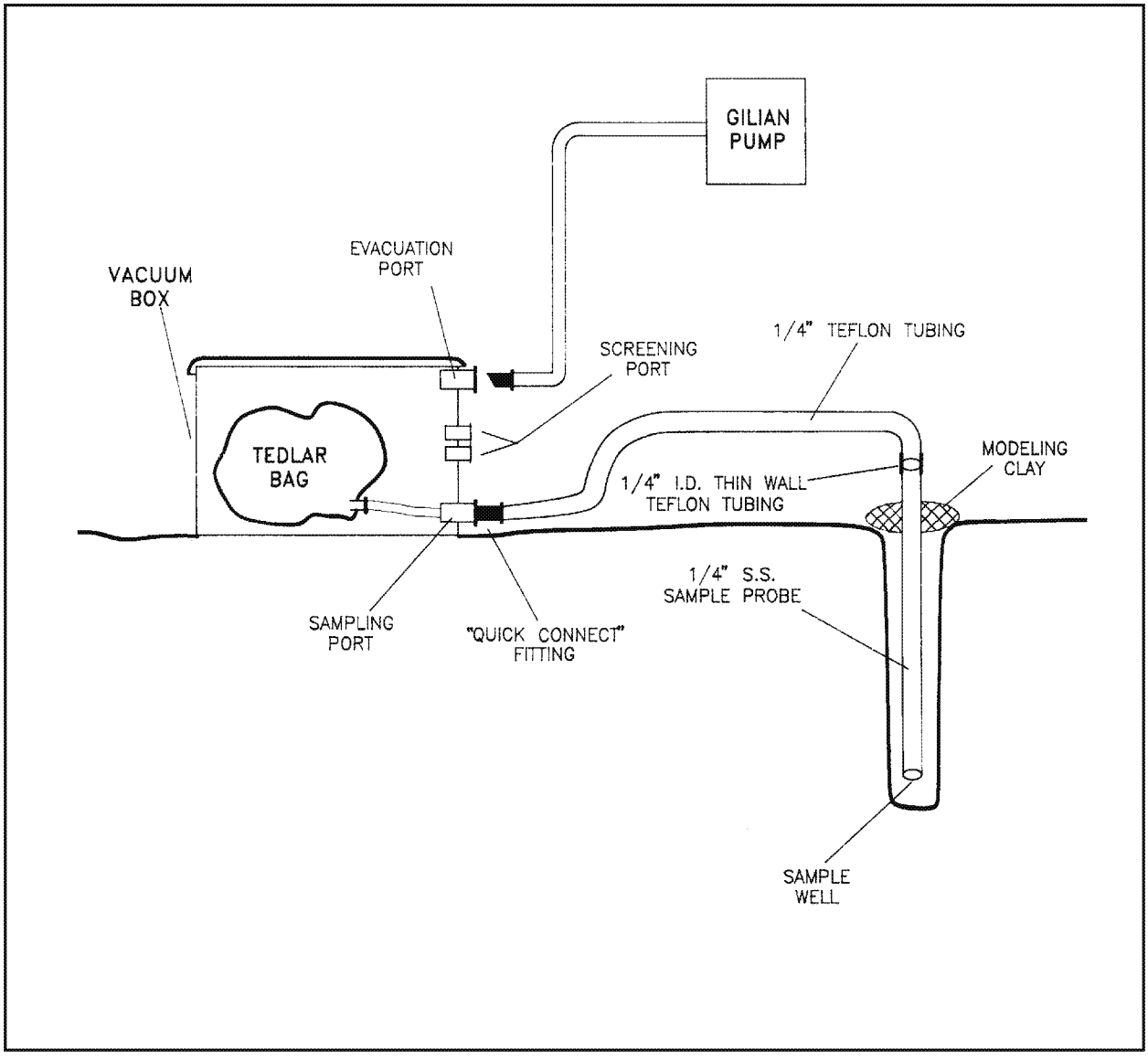
APPENDIX A

Figure

FIGURE 1. Sampling Train Schematic



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APPENDIX B

HNu Field Protocol

Field Procedure

The following sections detail the procedures that are to be followed when using the HNu in the field.

Startup Procedure

a. Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module. Use care in aligning the prongs in the probe cord with the plug in; don't force.

b. Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery are on the scale. If not, recharge the battery. If the red indicator light comes on, the battery needs recharging.

c. Turn the function switch to any range setting. Look into the end of the probe for no more than two to three seconds to see if the lamp is on. If it is on, it will give a purple glow. Do not stare into the probe any longer than three seconds. Long term exposure to UV light can damage eyes. Also, listen for the hum of the fan motor.

d. To ZERO the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.

Operational Check

a. Follow the startup procedure.

b. With the instrument set on the 0-20 range, hold a solvent-based major market near the probe tip. If the meter deflects upscale, the instrument is working.

Field Calibration Procedure

a. Follow the startup procedure and the operational check.

b. Set the function switch to the range setting for the concentration of the calibration gas.

c. Attach a regulator (HNu 101-351) to a disposable cylinder of isobutylene gas (HNu 101-351). Connect the regulator to the probe of the HNu with a piece of clean Tygon tubing. Turn on the value on the regulator.

d. After fifteen seconds, adjust the span dial until the meter reading equals the concentration of the calibration gas used. Be careful to unlock the span dial before adjusting it. If the span has to be set below 3.0, calibration internally or return to equipment maintenance for repair.

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e. Record in the field logbook: the instrument ID no. (EPA decal or serial number if the instrument is a rental); the initial and final span settings; the date and time; concentration and type of calibration has used; and the name of the person who calibrated the instrument.

Operation

a. Follow the startup procedure, operational check, and calibration check.

b. Set the function switch to the appropriate range. If the concentration of gases or vapors is unknown, set the function switch to the 0-20 ppm range. Adjust it if necessary.

c. While taking care not to permit the HNu to be exposed to excessive moisture, dirt, or contamination, monitor the work activity as specified in the Site Health and Safety Plan.

d. When the activity is completed or at the end of the day, carefully clean the outside of the HNu with a damp disposable towel to remove any visible dirt. Return the HNu to a secure area and place on charge.

e. With the exception of the probe's inlet and exhaust, the HNu can be wrapped in clear plastic to prevent it form becoming contaminated and to prevent water from getting inside in the event of precipitation.

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GENERAL AIR SAMPLING GUIDELINES

SOP#: 2008
DATE: 11/16/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) provides guidance in developing and implementing sampling plans to assess the impact of hazardous waste sites on ambient air. It presents the United States Environmental Protection Agency/Environmental Response Team's (U.S. EPA/ERT's) approach to air sampling and monitoring and identifies equipment requirements. It is not within the scope of this SOP to provide a generic air sampling plan. Experience, objectives, site characteristics, and chemical characteristics will dictate sampling strategy. This SOP does not address indoor air sampling.

Two basic approaches can be used to assess ambient air (also referred to as air pathway assessments): modeling and measurements. The modeling approach initially estimates or measures the overall site emission rate(s) and pattern(s). These data are input into an appropriate air dispersion model, which predicts either the maximum or average air concentrations at selected locations or distances during the time period of concern. This overall modeling strategy is presented in the first three volumes of the Air Superfund National Technical Guidance Series on Air Pathway Assessments[1,2,3]. Specific applications of this strategy are presented in several additional Air Superfund Technical Guidance documents[4].

The measurement approach involves actually measuring the air impact at selected locations during specific time periods. These measurements can be used to document actual air impacts during specific time intervals (i.e., during cleanup operations) or to extrapolate the probable "worst case" concentrations at that and similar locations over a longer time period than was sampled.

This SOP addresses issues associated with this second assessment strategy. This SOP also discusses the U.S. EPA/ERT's monitoring instruments, air sampling kits, and approach to air sampling and monitoring at hazardous waste sites.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, depending on site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Air monitoring is defined as the use of direct-reading instruments and other screening or monitoring equipment and techniques that provide instantaneous (real-time) data on the levels of airborne contaminants. The U.S. EPA/ERT maintains numerous monitors for real-time measurements. Examples of air monitoring equipment are hand-held photoionization detectors (PID), flame ionization detectors (FID), oxygen/combustible gas detectors, and remote optical sensors.

Air sampling is defined as those sampling and analytical techniques that require either off- or on-site laboratory analysis and therefore do not provide immediate results. Typically, air sampling occurs after use of real-time air monitoring equipment has narrowed the number of possible contaminants and has provided some qualitative measurement of contaminant concentration. Air sampling techniques are used to more accurately detect, identify and quantify specific chemical compounds relative to the majority of air monitoring technologies.

In the Superfund Removal Program, On-Scene Coordinators (OSCs) may request the U.S. EPA/ERT to conduct air monitoring and sampling during the

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following situations: emergency responses, site assessments, and removal activities. Each of these activities has a related air monitoring/sampling objective that is used to determine the potential hazards to workers and/or the community.

C Emergency Response

Emergency responses are immediate responses to a release or threatened release of hazardous substances presenting an imminent danger to public health, welfare, or the environment (i.e., chemical spills, fires, or chemical process failures resulting in a controlled release of hazardous substances). Generally these situations require rapid on-site investigation and response. A major part of this investigation consists of assessing the air impact of these releases.

C Removal Site Assessment

Removal site assessments (referred to as site assessments) are defined as any of several activities undertaken to determine the extent of contamination at a site and which help to formulate the appropriate response to a release or threatened release of hazardous substances. These activities may include a site inspection, multimedia sampling, and other data collection.

C Removal Actions

Removal actions clean up or remove hazardous substances released into the environment. Removal actions include any activity conducted to abate, prevent, minimize, stabilize, or eliminate a threat to public health or welfare, or to the environment.

Personal risk from airborne contaminants can be determined by comparing the results of on-site monitoring and sampling to health-based action levels such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs). Residential risk can be determined by comparing the results of off-site monitoring or sampling to health-based action levels such as those developed by the Agency for Toxic Substance and Disease Registry (ATSDR).

The extent to which valid inferences can be drawn from air monitoring/sampling depends on the degree to which the monitoring/sampling effort conforms to the objectives of the event. Meeting the project's objectives requires thorough planning of the monitoring/sampling activities, and implementation of the most appropriate monitoring/sampling and analytical procedures. These issues will be discussed in this SOP.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Preservation, containers, handling and storage for air samples are discussed in the specific SOPs for the technique selected. In addition, the analytical method (i.e., U.S. EPA, National Institute for Occupational Safety and Health [NIOSH], and OSHA Methods) may be consulted for storage temperature, holding times and packaging requirements. After sample collection, the sampling media (i.e., cassettes or tubes) are immediately sealed. The samples are then placed into suitable containers (i.e., whirl bags, resealable bagsor culture tubes) which are then placed into a shipping container.

Use bubble wrap or styrofoam peanuts when packing air samples for shipment. DO NOT USE VERMICULITE.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Upwind sources can contribute to sample concentration. Natural sources, such as biological waste, can produce hydrogen sulfide and methane which may contribute to the overall contaminant level. Extraneous anthropogenic contaminants (i.e., burning of fossil fuels; emissions from vehicular traffic, especially diesel; volatile compounds from petrochemical facilities; and effluvium from smoke stacks) may also contribute. Air sampling stations should be strategically placed to identify contributing sources.

Photoreactivity or reaction of the parameters of concern may occur with nonrelated compounds [i.e., nitrogen compounds and polyaromatic hydrocarbons

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(PAHs)]. Some sorbent media/samples should not be exposed to light during or after sampling due to photochemical effects (i.e., PAHs).

Various environmental factors, including humidity, temperature and pressure, also impact the air sampling methodology, collection efficiency and detection limit. Since the determination of air contaminants is specifically dependent on the collection parameters and efficiencies, the collection procedure is an integral part of the analytical method.

Detection limits depend on the contaminants being investigated and the particular site situation. It is important to know why the data are needed and how the data will be used. Care should be taken to ensure the detection limits are adequate for the intended use of the final results.

Some equipment may be sensitive to humidity and temperature extremes.

5.0 EQUIPMENT/APPARATUS

5.1 Direct Reading Instruments (Air Monitoring Instruments)

There are two general types of direct reading instruments: portable screening devices and specialized analytical instruments. Generally all these techniques involve acquiring, for a specific location or area, continuous or sequential direct air concentrations in either a real-time or semi-real-time mode. None of these instruments acquires true time-weighted average concentrations. In addition, these instruments are not capable of acquiring simultaneous concentration readings at multiple locations, although several are able to sequentially analyze samples taken remotely from different locations. The document, "Guide to Portable Instruments for Assessing Airborne Pollutants Arising from Hazardous Waste Sites[5]," provides additional information about air sampling and monitoring. The hazard levels for airborne contaminants vary. See the ACGIH TLVs and the OSHA PELs for safe working levels. Common screening devices and analytical instruments are described in Appendix A.

5.2 Air Sampling Equipment and Media/Devices

The U.S. EPA/ERT uses the following analytical methods for sampling: *NIOSH Manual of Analytical Methods*[6], *American Society for Testing and Materials (ASTM) Methods*[7], *U.S. EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*[8,9], and *OSHA Methods*[10]. Additional air sampling references include *Industrial Hygiene and Toxicology* (3rd Ed.)[11] and *Air Sampling Instruments for Evaluation of Atmospheric Contaminants*[12]. These methods typically specify equipment requirements for sampling. Since air sampling is such a diverse technology, no single method or reference is best for all applications. Common sampling equipment and media/devices are described in Appendix B.

5.3 Tools/Material and Equipment List

In addition to equipment and materials identified in Appendices A and B, the following equipment and materials may be required to conduct air sampling and monitoring at hazardous waste sites:

- C Camera
- C Site logbook
- C Clipboard
- C Chain of custody records
- C Custody seals
- C Air sampling worksheets
- C Sample labels
- C Small screwdriver set
- C Aluminum foil
- C Extension cords
- C Glass cracker
- C Multiple plug outlet
- C Whirl bags or culture tubes
- C Teflon tape
- C Calibration devices
- C Tygon and/or Teflon^{R} tubing
- C Surgical gloves
- C Lint-free gloves
- C Ice
- C Sample container

Use the following additional equipment when decontaminating glassware on site:

- C Protective equipment (i.e., gloves, splash goggles, etc.)
- C Appropriate solvent(s)
- C Spray bottles
- C Liquinox (soap)
- C Paper towels

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C Distilled/deionized water
C Five-gallon buckets
C Scrub brushes and bottle brushes

6.0 REAGENTS

Impinger sampling involves using reagents contained in a glass vial to absorb contaminants of concern (for example, NIOSH Method 3500 for formaldehyde uses 1% sodium bisulfite solution). Impinger solutions vary and are method-dependent.

Reagents such as acetone and hexane are required to decontaminate glassware and some air sampling equipment. Decontamination solutions are specified in the Sampling Equipment Decontamination SOP.

7.0 PROCEDURES

7.1 Air Monitoring Design

7.1.1 Initial Surveys

In general, the initial survey is considered to be a relatively rapid screening process for collecting preliminary data at hazardous waste sites. However, initial surveys may require many hours to complete and may consist of more than one entry.

Some information is generally known about the site; therefore, real-time instrumentation for specific compounds (i.e., detector tubes and electrochemical sensors) can be used to identify hot spots. Sufficient data should be obtained with real-time instruments during the initial entry to screen the site for various contaminants. When warranted, intrinsically safe or explosion-proof instruments should be used. An organic vapor analyzer (OVA) is typically used during this survey. These gross measurements may be used on a preliminary basis to (1) determine levels of personal protection, (2) establish site work zones, and (3) map candidate areas for more thorough qualitative and quantitative studies involving air sampling.

In some situations, the information obtained may be sufficient to preclude additional monitoring. Materials detected during the initial survey may call for a more comprehensive evaluation of hazards and analyses for specific compounds. Since site activities and weather conditions change, a continuous program to monitor the ambient atmosphere must be established.

7.1.2 Off-Site Monitoring

Typically, perimeter monitoring with the same instruments employed for on-site monitoring is utilized to determine site boundaries. Because air is a dynamic matrix, physical boundaries like property lines and fences do not necessarily delineate the site boundary or area influenced by a release. Whenever possible, atmospheric hazards in the areas adjacent to the on-site zone should be monitored with direct-reading instruments. Monitoring at the fenceline or at varying locations off site provides useful information regarding pollutant migration. Three to four locations downwind of the source (i.e., plume) at breathing-zone height, provide a basic fingerprint of the plume. Negative instrument readings off site should not be interpreted as the complete absence of airborne toxic substances; rather, they should be considered another piece of information to assist in the preliminary evaluation. The interpretation of negative readings is instrument-dependent. The lack of instrument readings off site should not be interpreted as the complete absence of all airborne toxic substances; rather, it is possible that the particular compound or class of compounds to which the monitoring instrument responds is not present or that the concentration of the compound(s) is below the instrument's detection limit.

7.2 Air Sampling Design

7.2.1 Sampling Plan Design

The goal of air sampling is to accurately assess the impact of a contaminant source(s) on ambient air quality. This impact is expressed in terms of overall average and/or maximum air concentrations for the time period of concern and may be affected by the transport and release of pollutants from both on- and off-site sources. The location of these sources must be taken into account as they impact the selection of sampling locations. Unlike soil and groundwater concentrations, air concentrations at points of interest can easily vary by orders of magnitude over the period of concern. This variability plays a major role in designing an air sampling plan.

Downwind air concentration is determined by the amount of material being released from the site into the air (the emission rate) and by the degree that the contamination is diluted as it is transported. Local

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meteorology and topography govern downwind dilution. Contaminant emission rates can also be heavily influenced by on-site meteorology and on-site activities. All of these concerns must be incorporated into an air sampling plan.

A sampling strategy can be simple or complex, depending on the sampling program objectives. Programs involving characterization of the pollutant contribution from a single point source tend to be simple, whereas sampling programs investigating fate and transport characteristics of components from diverse sources require a more complex sampling strategy. In addition, resource constraints may affect the complexity of the sampling design.

An optimal sampling strategy accounts for the following site parameters:

- Location of stationary as well as mobile sources
- Analytes of concern
- Analytical detection limit to be achieved
- Rate of release and transport of pollutants from sources
- Availability of space and utilities for operating sampling equipment
- Meteorological monitoring data
- Meteorological conditions in which sampling is to be conducted

The sampling strategy typically requires that the concentration of contaminants at the source or area of concern as well as background contributions be quantified. It is important to establish background levels of contaminants in order to develop a reference point from which to evaluate the source data. Field blanks and lot blanks, as well as various other types of QA/QC samples, can be utilized to determine other sources. The impact of extraneous sources on sampling results can frequently be accounted for by placing samplers upwind, downwind and crosswind from the subject source. The analytical data from these different sampling locations may be compared to determine statistical differences.

7.2.2 Sampling Objectives

The objectives of the sampling must be determined prior to developing the sampling plan. Does the sampling plan verify adequate levels of protection for on-site personnel, or address potential off-site impacts associated with the site or with site activities? In addition, the assumptions associated with the sampling program must be defined. These assumptions include whether the sampling is to take place under "typical," "worst case," or "one-time" conditions. If the conditions present at the time of sampling are different from those assumed during the development of the sampling plan, then quality of the data collected may be affected. The following definitions have been established:

- Typical: routine daily sampling or routine scheduled sampling at pre-established locations.

- Worst case: sampling conducted under the worst meteorological and/or site conditions which would result in elevated ambient concentrations.

- One-time: only one chance is given to collect a sample without regard to time or conditions.

Qualitative data acquired under these conditions are usually applicable only to the time period during which the data were collected and may not provide accurate information to be used in estimating the magnitude of an air impact during other periods or over a long time interval.

The sampling objectives also dictate the detection limits. Sampling methods for airborne contaminants will depend upon the nature and state (solid, liquid or gas) of the contaminant. Gases and vapors may be collected in aqueous media or adsorbents, in molecular sieves, or in suitable containers. Particulates are collected by filters or impactors. The volume of sample to be collected is dependent upon an estimate of the contaminant concentration in the air, the sensitivity of the analytical method, and the standard or desired detection limit. A sufficient amount of sample must be collected to achieve the desired detection limit without interference from other contaminants. In addition, the selected method must be able to detect the target compound(s).

7.2.3 Location and Number of Individual Sampling Points

Choose the number and location of sampling points according to the variability, or sensitivity, of the

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sampling and analytical methods being utilized, the variability of contaminant concentration over time at the site, the level of precision required and costlimitations. In addition, determine the number of locations and placement of samplers by considering the nature of the response, local terrain, meteorological conditions, location of the site (with respect to other conflicting background sources), size of the site, and the number, size, and relative proximity of separate on-site emission sources and upwind sources. The following are several considerations for sampler placement:

C Location of potential on-site emission sources, as identified from the review of site background information or from preliminary on-site inspections.

C Location of potential off-site emission sources upwind of the sampling location(s). Review local wind patterns to determine the location of off-site sources relative to wind direction.

C Topographic features that affect the dispersion and transport of airborne toxic constituents.

Avoid natural obstructions when choosing air sampling station locations, and account for channelization around those obstructions.

C Large water bodies, which affect atmospheric stability and the dispersion of air contaminants.

C Roadways (dirt or paved), which may generate dust that could mask site contaminants.

C Vegetation, such as trees and shrubs, which stabilizes soil and retards subsurface contaminants from becoming airborne. It also affects air flow and scrubs some contaminants from the air. Sometimes thick vegetation can make an otherwise ideal air monitoring location inaccessible.

Consider the duration of sampling activities when choosing the location and number of samples to be collected. For example, if the sampling period is limited to a few hours, one or two upwind and several downwind samples would typically be adequate, especially around major emission sources.

A short-term monitoring program ranges from several days to a few weeks and generally includes gathering data for site assessments, removal actions, and source determination data (for further modeling). Activities involved in a short-term sampling strategy must make the most of the limited possibilities for data collection. Consider moving upwind/downwind locations daily based on National Oceanic and Atmospheric Administration (NOAA) weather forecasts. Weather monitoring becomes critical where complex terrain and local meteorological effects frequently change wind direction. Often, a number of alternatives can fulfill the same objective.

Prevailing winds running the length of a valley usually require a minimum number of sampler locations; however, a complex valley may require more sampler locations to account for the wide variety of winds. Ocean/lake effects may require a radical plan to collect enough samples to reach a low detection limit. Two sets of samplers may be placed next to each other: one set would be activated during the sea breeze while the other set is turned off, and vice versa when there is no sea breeze. After the sampling event, the respective upwind and downwind samples would be combined. Another alternative for sampling near a large body of water may be to use automatic, wind-vector-operated samplers, which turn the sampler on only when the wind comes from a specified vector. At sites located on hillsides, wind will move down a valley and produce an upward fetch at the same time. Sampling locations may have to ring the site to measure the wind's impact.

Off-site sources may affect on-site monitoring. In this case, on-site meteorological data, concurrent with sampling data, is essential to interpreting the acquired data. Also, additional upwind sampling sites may be needed to fully characterize ambient background contaminant levels. Multiple off-site sources may require several monitoring locations, but if the sources are at a sufficient distance, only one monitoring location is needed.

Topography and weather are not the only factors in sampler location; the sampling sites must be secure from vandals and mishap. Secure all sampling locations to maintain chain of custody, and to prevent tampering with samples or loss of sampling units. High-volume sampling methods often require the use of 110 VAC electric power. When portable

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generators are used, the power quality may affect sampler operation. Also, be aware that the generators themselves could be a potential pollution source if their placement is not carefully considered.

Air quality dispersion models can be used to place samplers. The models incorporate source information, surrounding topography, and meteorological data to predict the general distance and directions of maximum ambient concentrations. Modeling results should be used to select sampling locations in areas of maximum pollutant concentrations.

7.2.4 Time, Duration and Frequency of Sampling Events

After choosing appropriate sampling or monitoring locations, determine the sampling frequency and the number of samples to be collected. The time of day, duration and frequency of sampling events is governed by:

- The effects of site activities and meteorology on emission rates
- The diurnal effect of the meteorology on downwind dispersion
- The time period(s) of concern as defined by the objective
- The variability in the impact from other non-site-related sources
- If defined, the degree of confidence needed for either the mean or maximum downwind concentrations observed
- The precision requirements for single measurements
- Cost and other logistical considerations

The duration of the removal action and the number of hours per day that site work is conducted determine the time, duration, and frequency of samples. Short-term sampling programs may require daily sampling, while long-term programs may require 24-hour sampling every sixth or twelfth day. If the site will be undergoing removal activities 24 hours a day, continuous air sampling may be warranted. However, if the site activities will be conducted for only eight hours a day, and there are no emissions likely to occur during the remaining 16 hours, then sampling would be appropriate prior to the start of daily activities, would continue during operations, and end at the conclusion of the daily activities. An off-peak sample collection can ensure that emissions are not persisting after the conclusion of daily cleanup activities. For some sites, emissions are still a factor several hours after daily site activities have been completed. Because of the typically decreased downwind dispersion in the evening, higher downwind concentrations than were present during daytime site activities may be detected. For sites where this is possible, the sampling duration needs to be lengthened accordingly.

Sampling duration and flow rate dictate the volume of air collected, and to a major degree, the detection limit. The analytical method selected will provide a reference to flow rate and volume. Flow rates are limited to the capacity of the pumps being employed and the contact time required by the collection media.

The duration or period of air sampling is commonly divided into two categories (1) samples collected over a brief time period are referred to as "instantaneous" or "grab" samples and are usually collected in less than five minutes and (2) average or integrated samples are collected over a significantly longer period of time. Integrated samples provide an average concentration over the entire sampling period. Integrated samples are not suited to determining cyclical releases of contaminants because periodic or cyclical events are averaged out by the proportionally long sampling duration.

Air quality dispersion models can predict the maximum air contaminant concentration expected from a source. The meteorological and site conditions expected to cause the highest concentration are known as worst-case conditions and can be identified by analyzing the modeling results. Depending upon the objective, one may sample when the model predicts worst-case conditions will exist.

7.2.5 Meteorological and Physical/Chemical Considerations

A meteorological monitoring program is an integral part of site monitoring activities. Meteorological data, which define local terrain impacts on air flow paths, are needed to interpret air concentration data. Meteorological data may be available from an existing station located near the site (i.e., at a local airport), otherwise a station should be set up at the site. This data will document the degree that samples actually were downwind and verify whether other worst-case assumptions were met. Meteorological parameters to

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be monitored are, at a minimum, wind speed, wind direction, and sigma theta (which is the horizontal wind direction standard deviation and an indicator of atmospheric stability). The remaining parameters primarily affect the amount of a contaminant available in the air.

C Wind Speed

When the contaminant of concern is a particulate, wind speed is critical in determining whether the particulate will become airborne, the quantity of the particulate that becomes airborne, and the distance the particulate will travel from the source. Wind speed also contributes to the volatilization of contaminants from liquid sources.

C Wind Direction

Wind direction highly influences the path of airborne contaminants. In addition, variations in wind direction increase the dispersion of pollutants from a given source.

C Atmospheric Stability

Atmospheric stability refers to the degree to which the atmosphere tends to dampen vertical and horizontal motion. Stable atmospheric conditions (i.e., evenings) result in low dispersion, and unstable atmospheric conditions (i.e., hot sunny days) result in higher dispersion.

C Temperature

Higher temperatures increase the rate of volatilization of organic and some inorganic compounds and affect the initial rise of gaseous or vapor contaminants. Therefore, worst-case emission of volatiles and semivolatiles occurs at the hottest time of day, or on the hottest day.

C Humidity

High humidity affects water-soluble chemicals and particulates. Humid conditions may dictate the sampling media used to collect the air sample, or limit the volume of air sampled and thereby increase the detection limit.

C Atmospheric Pressure

Migration of landfill gases through the landfill surface and through surrounding soils are governed by changes in atmospheric pressure. Atmospheric pressure will influence upward migration of gaseous contaminants from shallow aquifers into the basements of overlying structures.

In many cases, the transport and dispersion of air pollutants is complicated by local meteorology. Normal diurnal variations (i.e., temperature inversions) affect dispersion of airborne contaminants. Terrain features can enhance or create air inversions and can also influence the path and speed of air flow, complicating transport and dispersion patterns.

The chemical characteristics of a contaminant (i.e., molecular weight, physical state, vapor pressure, aerodynamic size, temperature, reactive compounds, and photodegradation) affects its behavior and can influence the method used to sample and analyze it.

8.0 CALCULATIONS

Volume is obtained by multiplying the sample time in minutes by the flow rate. Sample volume should be indicated on the chain of custody record. Adjustments for temperature and pressure differences may be required.

Results are usually provided in parts per million (ppm), parts per billion (ppb), milligrams per cubic meter (mg/m^3) or micrograms per cubic meter ($\mu g/m^3$).

Refer to the analytical method or regulatory guidelines for other applicable calculations.

9.0 QUALITYASSURANCE/ QUALITY CONTROL

The manufacturer's instructions should be reviewed prior to instrument use. Instruments must be utilized in accordance with manufacturer's instructions. Equipment checkout and calibration activities must

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occur prior to and after monitoring and sampling and must be documented.

9.1 QA/QC Samples

QA/QC samples provide information on the variability and usability of environmental sample results. Various QA/QC samples may be collected to detect error. QA/QC samples are submitted with the field samples for analysis to aid in identifying the origin of analytical discrepancies; then a determination can be made as to how the analytical results should be used. Collocated samples, background samples, field blanks, and lot blanks are the most commonly collected QA/QC field samples. Performance evaluation (PE) samples and matrix spikes provide additional measures of data QA/QC control. QA/QC results may suggest the need for modifying sample collection, preparation, handling, or analytical procedures if the resultant data do not meet site-specific QA or data quality objectives.

9.2 Sample Documentation

All sample and monitoring activities should be documented legibly, in ink. Any corrections or revisions should be made by lining through the incorrect entry and by initialing the error. All samples must be recorded on an Air Sampling Worksheet. A chain of custody record must be maintained from the time a sample is taken to the final deposition of the sample. Custody seals demonstrate that a sample container has not been opened or tampered with during transport or storage of samples.

10.0 DATA VALIDATION

Results for QA/QC samples should be evaluated for contamination. This information should be utilized to qualify the environmental sample results accordingly with data quality objectives.

11.0 HEALTH AND SAFETY

Personal protection equipment (PPE) requirements identified in federal and/or state regulations and 29 Code of Federal Regulations (CFR) 1910.120 for hazardous waste site work must be followed.

The majority of physical precautions involved in air sampling are related to the contaminant sampled. Attention should be given when sampling in potentially explosive, flammable or acidic atmospheres. On rare occasions, the collection media may be hazardous; for example, in the instance where an acidic or basic solution is utilized in an impinger.

When working with potentially hazardous materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

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APPENDIX A

Portable Screening Devices and Specialized Analytical Instruments

PORTABLE SCREENING DEVICES

Where possible, a datalogger should be used to minimize the length of time required for site personnel to be in a potentially contaminated area. Datalogger cable is available from manufacturers for linear output instruments and some nonlinear output instruments. U.S. EPA ERT/REAC has output cables for organic vapor analyzers (i.e., HNU and OVA), toxic gas analyzers (i.e., monitox) and real-time aerosol monitors (i.e., RAM and miniram).

C Total Hydrocarbon Analyzers

Total hydrocarbon analyzers used to detect a variety of volatile organic compounds (VOCs) at hazardous waste sites principally employ either a photoionization detector (PID) or a flame ionization detector (FID). Compounds are ionized by a flame or an ultraviolet lamp. PIDs depend on the ionization potential of the compounds. PIDs are sensitive to aromatic and olefinic (unsaturated) compounds such as benzene, toluene, styrene, xylenes, and acetylene. Greater selectivity is possible by using low-voltage lamps. The ionization potential of individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. These instruments are not compound-specific and are typically used as screening instruments. FIDs are sensitive to volatile organic vapor compounds such as methane, propanol, benzene and toluene. They respond poorly to organic compounds lacking hydrocarbon characteristics.

C Oxygen and Combustible Gas Indicators

Combustible Gas Indicators (CGIs) provide efficient and reliable methods to test for potentially explosive atmospheres. CGI meters measure the concentration of a flammable vapor or gas in air and present these measurements as a percentage of the lower explosive limit (LEL).

The measurements are temperature-dependent. The property of the calibration gas determines sensitivity. LELs for individual compounds can be found in the NIOSH Pocket Guide to Chemical Hazards. If readings approach or exceed 10% of the LEL, extreme caution should be exercised in continuing the investigation. If readings approach or exceed 25% LEL, personnel should be withdrawn immediately.

CGIs typically house an electrochemical sensor to determine the oxygen concentration in ambient air. Normally, air contains approximately 20.9% oxygen by volume. Oxygen measurements are of particular importance for work in enclosed spaces, low-lying areas, or in the vicinity of accidents that have produced heavier-than-air vapors which could displace ambient air. The meters are calibrated for sea level and may indicate a false negative (i.e, O_2 content) at higher altitudes. Since the air has been displaced by other substances, these oxygen-deficient areas are also prime locations for taking additional organic vapor and combustible gas measurements. Oxygen-enriched atmospheres increase the potential for fires by their ability to contribute to combustion or to chemically react with flammable compounds and promote auto-ignition.

C Toxic Atmosphere Analyzers

The toxic atmosphere analyzer is a compound-specific instrument, designed and calibrated to identify and quantify a specific compound or class of compounds in either gaseous or vapor form. Cross-sensitivity to air pollutants not of interest may be lead to erroneous results.

U.S. EPA/ERT has the following toxic atmosphere analyzers: carbon monoxide, phosgene, nitrous oxide, hydrogen cyanide, sulfur dioxide, hydrogen sulfide, and chlorine gas.

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C Aerosol/Particulate Monitors

A Real-Time Aerosol/Particulate Monitor (RAM) displays readings for total particulates. The instrument employs a pulse light emitting diode which generates a narrow band emission in conjunction with a photovoltaic cell to detect light scattered from particulates.

The U.S. EPA/ERT uses the RAM when the contaminant of concern is associated with particulates, and when responding to fires involving hazardous materials, to identify plume levels. The instrument is very useful in determining the presence of a plume when it is not visible. The U.S. EPA/ERT typically uses RAMs on tripods to obtain particulate concentrations at the breathing zone level. Personal dataloggers are used with the RAMs to document minimum, average and maximum concentrations. This provides real-time data without requiring those in personal protective equipment to be constantly present in the plume.

C Chemical Detector Tubes (Colorimetric Tubes)

A chemical detector tube is a hollow, tube-shaped, glass body containing one or more layers of chemically impregnated inert material. To use, the fused ends are broken off and a manufacturer-specified volume of air is drawn through the tube with a pump to achieve a given detection limit. The chemicals contained within the packing material undergo a chemical reaction with the airborne pollutant present, producing a color change during the intake of each pump stroke. The concentration of a pollutant is indicated by the length of discoloration on a calibrated scale printed on the detector tube.

C Radiation Meters

Radiation meters determine the presence and level of radiation. The meters use a gas or solid ion detection media which becomes ionized when radiation is present. The meters are normally calibrated to one probe. Meters that detect alpha, beta, and gamma radiation are available.

C Gold Film (Hydrogen Sulfide and Mercury Vapor) Monitors

Hydrogen sulfide (H_2S) and Mercury (Hg) monitors operate on the principle that electric resistivity increases across a gold film as a function of H_2S and Hg concentration. The monitors provide rapid and relatively low detection limits for H_2S and Hg in air. After extensive sampling periods or high concentrations of H_2S and Hg, the gold film must be heated to remove contamination and return the monitor to its original sensitivity.

C Infrared Detectors

Infrared detectors such as the Miniature Infrared Analyzer (MIRAN) use infrared (IR) absorption as a function of specific compounds. MIRAN instruments apply to situations where the contaminants are identified but concentrations are not. MIRAN instruments generally require AC power.

SPECIALIZED ANALYTICAL INSTRUMENTS

The continuous monitors described above provide qualitative measurement of air contaminants. Quantitative measurements in the field can be obtained using more sophisticated instruments, such as portable Gas Chromatographs, to analyze grab samples.

C Direct Air Sampling Portable Gas Chromatographs (GCs)

Portable GCs use gas chromatography to identify and quantify compounds. The time it takes for a compound to move through a chromatographic column is a function of that specific compound or group of compounds. A trained technician with knowledge of the range of expected concentrations of compounds can utilize a portable GC in the field to analyze grab samples. GCs generally require AC power and shelter to operate. This method is limited by its reliance on a short-term grab sample to be representative of the air quality at a site.

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C Remote Optical Sensing

This technique, also referred to as long-path or open-path monitoring, involves transmitting either an infrared or ultraviolet light beam across a long open path and measuring the absorbance at specific wavelengths. The technique is capable of analyzing any preselected organic or inorganic volatile compound that can be resolved from compounds naturally occurring in ambient air. Current projected removal applications include perimeter monitoring during site cleanups and measurement of emission source strengths during site assessments.

C TAGA Direct Air Sampling Mass Spectrometer/Mass Spectrometer

The Trace Atmospheric Gas Analyzer (TAGA), which is operated by the U.S. EPA/ERT, is capable of real-time detection of preselected organic compounds at low parts-per-billion concentrations. The instrument has been successfully used by the U.S. EPA/ERT for isolating individual emission plumes and tracking those plumes back to their sources.

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APPENDIX B

Air Sampling Equipment and Media/Devices

AIR SAMPLING EQUIPMENT

C High-Volume, Total Suspended Particulate (TSP) Samplers

High-volume TSP samplers collect all suspended particles by drawing air across an 8- by 10-inch glass-quartz filter. The sample rate is adjusted to 40 cubic feet per minute (CFM), or 1134 liters per minute (L/min), and it is held constant by a flow controller over the sample period. The mass of TSPs can be determined by weighing the filter before and after sampling. The composition of the filter varies according to the analytical method and the detection limit required.

C PM-10 Samplers

PM-10 samplers collect particulates with a diameter of 10 microns or less from ambient air. Particulates of this size represent the respirable fraction, and thus are of special significance. PM-10 samplers can be high-volume or low-volume. The high-volume sampler operates in the same manner as the TSP sampler at a constant flow rate of 40 CFM; it draws the sample through a special impactor head which collects particulates of 10 microns or less. The particulate is collected on an 8- by 10-inch filter. The low-volume sampler operates at a rate of approximately 17 L/min. The flow must remain constant through the impactor head to maintain the 10-micron cut-off point. The low-volume PM-10 collects the sample on 37-mm Teflon filters.

C High-Volume PS-1 Samplers

High-volume PS-1 samplers draw a sample through polyurethane foam (PUF) or a combination foam and XAD-2 resin plug, and a glass quartz filter at a rate of 5-10 CFM (144 to 282 L/min). This system is excellent for measuring low concentrations of semivolatiles, PCBs, pesticides, or chlorinated dioxins in ambient air.

C Area Sampling Pumps

These pumps provide flow-rate ranges of 2-20 L/min and have a telescopic sampling mast with the sampling train. Because of the higher volume, this pump is suitable for sampling low concentrations of airborne contaminants (i.e., asbestos sampling). These pumps are also used for metals, pesticides and PAH sampling which require large sample volumes.

C Personal Sampling Pumps

Personal sampling pumps are reliable portable sampling devices that draw air samples through a number of sampling media including resin tubes, impingers, and filters. Flow rates are usually adjustable from 0.1 to 4 L/min (or 0.01 to .75 L/min with a restrictive orifice) and can remain constant for up to 8 hours on one battery charge or continuously with an AC charger/converter.

C Canister Samplers

Evacuated canister sampling systems use the pressure differential between the evacuated canister and ambient pressure to bleed air into the canister. The sample is bled into the canister at a constant rate over the sampling period using a critical orifice, a mechanically compensated regulator, or a mass flow control
device until the canister is near atmospheric pressure.

Pressure canister sampling systems use a pump to push air into the canister. To maintain a higher, more controlled flow, the pump typically controls the pressure differential across a critical orifice at the

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inlet of the canister, resulting in a pressurized canister at the completion of sampling.

AIR SAMPLING MEDIA/DEVICES

If possible, before employing a specific sampling method, consult the laboratory that will conduct the analyses. Many of the methods can be modified to provide better results or a wider range of results.

C Summa[R] Canisters

Summa canisters are highly polished passivated stainless steel cylinders. The Summa polishing process brings chrome and nickel to the surface of the canisters, which results in an inert surface. This surface restricts adsorption or reactions that occur on the canister's inner surface after collection. At the site, the canister is either placed in a sampler to control sample collection rate, or opened to collect a grab sample. Samples can be collected by allowing air to bleed into or be pumped into the canister. U.S. EPA/ERT uses 6-liter Summa canisters for VOC and permanent gas analysis.

C Passive Dosimeters

Passive dosimeters are clip-on vapor monitors (samplers) in which the diffused contaminants are absorbed on specially prepared active surfaces. Industrial hygienists commonly use dosimeters to obtain time-weighted averages or concentrations of chemical vapors, as they can trap over 130 organic compounds. Selective dosimeters have also been developed for a number of chemicals including formaldehyde, ethylene oxide, hydrogen sulfide, mercury vapor, nitrogen dioxide, sulfur dioxide, and ozone. Dosimeters must be sent to a laboratory for analysis.

C Polyurethane Foam (PUF)

PUF is a sorbent used with a glass filter for the collection of semivolatile organic compounds such as pesticides, PCBs, chlorinated dioxins and furans, and PAHs. Fewer artifacts (chemical changes that occur to collected compounds) are produced than with some other solid sorbents. PUF is used with the PS-1 sampler and U.S. EPA Method TO13. PUF can also be used with personal sampling pumps when sampling for PAHs using the Lewis/McCloud method. Breakthrough of the more volatile PCBs and PAHs may occur when using PUF.

C Sampling Bags (Tedlar[R])

Sampling bags, like canisters, transport air samples to the laboratory for analysis. Samples are generally pumped into the bags, but sometimes a lung system is used, in which a pump creates a vacuum around the bag in a vacuum box. Then the sample flows from a source into the bag. This method is used for VOCs, fixed gases (CO_2, O_2, and N_2) and methane.

C Impingers

An impinger allows an air sample to be bubbled through a solution, which collects a specific contaminant by either chemical reaction or absorption. For long sampling periods, the impinger may need to be kept in an ice bath to prevent the solution from evaporating during sampling. The sample is drawn through the impinger by using a sampling pump or more elaborate sampling trains with multiple impingers.

C Sorbent Tubes/Cartridges

A variety of sampling media are available in sorbent tubes, which are used primarily for industrial hygiene. A few examples are carbon cartridges, carbon molecular sieves, Tenax tubes and tube containing the XAD-2 polymer. Depending upon the sorbent material, tubes can be analyzed using either a solvent extraction or thermal desorption. The former technique uses standard laboratory equipment and allows for multiple analyses of the same sample. The latter technique requires special, but readily available, laboratory equipment and allows only one analysis per sample. In addition, thermal desorption typically allows for lower detection limits by two or more orders of magnitude. Whenever sorbent tubes are

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being used for thermal desorption, they should be certified as "clean" by the laboratory doing the analysis.

Thermally Desorbed Media

During thermal desorption, high-temperature gas streams are used to remove the compounds collected on a sorbent medium. The gas stream is injected and often cryofocused into an analytical instrument, such as a GC, for compound analysis:

C Tenax Tubes

Tenax tubes are made from commercially available polymer (p-phenylene oxide) packed in glass or stainless steel tubes through which air samples are drawn or sometimes pumped. These tubes are used in U.S. EPA Method TO1 and VOST for volatile nonpolar organic, some polar organic, and some of the more volatile semivolatile organics. Tenax is not appropriate for many of the highly volatile organics (with vapor pressure greater than approximately 200 mm Hg).

C Carbonized Polymers

The carbonized molecular sieve (CMS), a carbonized polymer, is a commercially available, carbon sorbent packed in stainless-steel sampling tubes through which air samples are drawn or sometimes pumped. These are used in U.S. EPA Method TO2 for highly volatile nonpolar compounds which have low-breakthrough volumes on other sorbents. When high-thermal desorption temperatures are used with CMS, more variability in analysis may occur than with other sorbents.

C Mixed Sorbent Tubes

Sorbent tubes can contain two type of sorbents. Combining the advantages of each sorbent into one tube increases the possible types of compounds to be sampled. The combination of two sorbents can also reduce the chance that highly volatile compounds will break through the sorbent media. An example of a mixed sorbent tube is the combination of Tenax and charcoal with a carbonized molecular sieve. A potential problem with mixed sorbent tubes is the breakthrough of a compound from an earlier sorbent to a later sorbent from which it cannot be desorbed.

Solvent-Extracted Media

Solvent-extracted media use the principle of chemical extraction to remove compounds collected on a sorbent media. The chemical solvent is injected into an instrument, such as a GC, for analysis of compounds. Examples of solvent-extracted media follow:

C Chemically Treated Silica Gel

Silica gel is a sorbent which can be treated with various chemicals. The chemically treated silica gel can then be used to sample for specific compounds in air. Examples include the DNPH-coated silica gel cartridge used with U.S. EPA Method TO11.

C XAD-2 Polymers

XAD-2 polymers usually are placed in tubes, custom-packed sandwich-style with polyurethane foam, and prepared for use with U.S. EPA Method TO13 or the semi-VOST method. The polymers are used for the collection of semivolatile polar and nonpolar organic compounds. The compounds collected on the XAD-2 polymer are chemically extracted for analysis.

C Charcoal Cartridges

Charcoal cartridges, consisting of primary and backup sections, trap compounds by adsorption. Ambient air is drawn through them so that the backup section verifies that breakthrough of the analytes on the first section did not occur, and the sample collection was therefore quantitative. Quantitative sample collection is evident by the presence of target chemicals on the first charcoal section and the absence on the second section. Next, the adsorbed compounds must be eluted, usually with a solvent extraction, and analyzed by GC with a detector, such as a Mass Spectrometer (MS).

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C Tenax Tubes

Cartridges are used in OSHA and NIOSH methods in a manner similar to charcoal cartridges but typically for less volatile compounds.

Particulate Filters

Particulate filters are used by having a sampling pump pass air through them. The filter collects the particulates present in the air and is then analyzed for particulate mass or chemical or radiological composition. Particulate filters are made from different materials which are described below.

C Mixed Cellulose Ester (MCE)

MCE is manufactured from mixed esters of cellulose which are a blend of nitro-cellulose and cellulose acetate. MCE filters are used often for particulate sampling.

C Glass Fiber

Glass fiber is manufactured from glass fibers without a binder. Particulate filters with glass fiber provide high flow rates, wet strength, and high, solid holding capacity. Generally, the filters are used for gravimetric analysis of particulates.

C Polyvinyl Chloride

Particulate filters with polyvinyl chloride are resistant to concentrated acids and alkalis. Their low moisture pickup and light tare weight make them ideal for gravimetric analysis.

C Teflon

Teflon is manufactured from polytetrafluorethylene (PTFE). Particulate filters with Teflon are easy to handle and exceptionally durable. Teflon filters are used for metal collection.

C Silver

Particulate filters manufactured from pure silver have high collection efficiency and uniform pore size. These filters are used for mercury collection and analysis.

C Cellulose

Particulate filters with cellulose contain less than 0.01% ash. These filters are used to collect particulates.

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SOP	**1101.01**				
GROUP	Sampling Handling				
SUB-GROUP	Sample Custody				
TITLE	Sample Custody in the Field				
DATE	**11/19/2001**	**FILE**	1101-01.DOC	**PAGE**	1 of 4

INTRODUCTION

The following Standard Operating Procedure (SOP) presents procedures for maintaining sample chain of custody (COC) during activities where samples are collected.

PROCEDURE

Sample custody is defined as being under a person's custody if any of the following conditions exist:

- it is in their possession,
- it is in their view, after being in their possession,
- it was in their possession and they locked it up, or
- it is in a designated secure area.

A designated field sampler will be personally responsible for the care and custody of collected samples until they are transferred to another person or properly dispatched to the laboratory. To the extent practicable, as few people as possible will handle the samples.

Sample tags or labels will be completed and applied to the container of each sample. When the tags or labels are being completed, waterproof ink will be used. If waterproof ink is not used, the tags or labels will be covered by transparent waterproof tape. Sample containers may also be placed in Ziploc-type storage bags to help keep them clean in the cooler. Information typically included on the sample tags or labels will include the following:

- Project Code
- Station Number and Location
- Sample Identification Number
- Date and Time of Sample Collection
- Type of Laboratory Analysis Required
- Preservation Required, if applicable
- Collector's Signature
- Priority (optional)
- Other Remarks

Additonal information may include:

- Anticipated Range of Results (Low, Medium, or High)
- Sample Analysis Priority

A COC form will be completed each time a sample or group of samples is prepared for transfer to the laboratory. The form will repeat the information on each of the sample labels and will serve as documentation of handling during shipment. The minimum information requirements of the COC form are listed in Table 1101.01-A. An example COC form is shown in Figure 1101.01-A. The completed COC must be reviewed by the Field Team Leader or Site Manager prior to sample shipment. The COC form will remain each sample shipping container at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples or in a project file.

TABLE 1101.01-A CHAIN OF CUSTODY FORM

INFORMATION	COMPLETED BY	DESCRIPTION
COC	Laboratory	enter a unique number for each chain of custody form
SHIP TO	Field Team	enter the laboratory name and address
CARRIER	Field Team	enter the name of the transporter (e.g., FedEx) or handcarried
AIRBILL	Field Team	enter the airbill number or transporter tracking number (if applicable)
PROJECT NAME	Field Team	enter the project name
SAMPLER NAME	Field Team	enter the name of the person collecting the samples
SAMPLER SIGNATURE	Field Team	signature of the person collecting the samples
SEND RESULTS TO	Field Team	enter the name and address of the prime contractor
FIELD SAMPLE ID	Field Team	enter the unique identifying number given to the field sample (includes MS, MSD, field duplicate and field blanks)
DATE	Field Team	enter the year and date the sample was collected in the format M/D (e.g., 6/3)
TIME	Field Team	enter the time the sample was collected in 24 hour format (e.g., 0900)
MATRIX	Field Team	enter the sample matrix (e.g., water, soil)
PRESERVATIVE	Field Team	enter the preservative used (e.g., HNO3) or "none"
FILTERED/ UNFILTERED	Field Team	enter "F" if the sample was filtered or "U" if the sample was not filtered
CONTAINERS	Field Team	enter the number of containers associated with the sample
MS/MSD	Field Team or Laboratory	enter "X" if the sample is designated for the MS/MSD
ANALYSES REQUESTED	Field Team	enter the method name of the analysis requested (e.g., SW6010A)
COMMENTS	Field Team	enter comments
SAMPLE CONDITION UPON RECEIPT AT LABORATORY	Laboratory	enter any problems with the condition of any sample(s)
COOLER TEMPERATURE	Laboratory	enter the internal temperature of the cooler, in degrees C, upon opening
SPECIAL INSTRUCTIONS/COMMENTS	Laboratory	enter any special instructions or comments
RELEASED BY (SIG)	Field Team and Laboratory	enter the signature of the person releasing custody of the samples
COMPANY NAME	Field Team and Laboratory	enter the company name employing the person releasing/receiving custody
RECEIVED BY (SIG)	Field Team and Laboratory	enter the signature of the person receiving custody of the samples
DATE	Field Team and Laboratory	enter the date in the format M/D/YY (e.g., 6/3/96) when the samples were released/received
TIME	Field Team and Laboratory	enter the date in 24 hour format (e.g., 0900) when the samples were released/received

FIGURE 1101.01-A CHAIN OF CUSTODY FORM

SOP	**1102.01**				
GROUP	Sample Handling				
SUB-GROUP	Sample Shipping				
TITLE	Sample Shipping				
DATE	11/19/2001	**FILE**	1102-01.DOC	**PAGE**	1 of 1

INTRODUCTION

The following Standard Operating Procedure (SOP) presents the procedures for sample shipping that will be implemented during field work involving sampling activities.

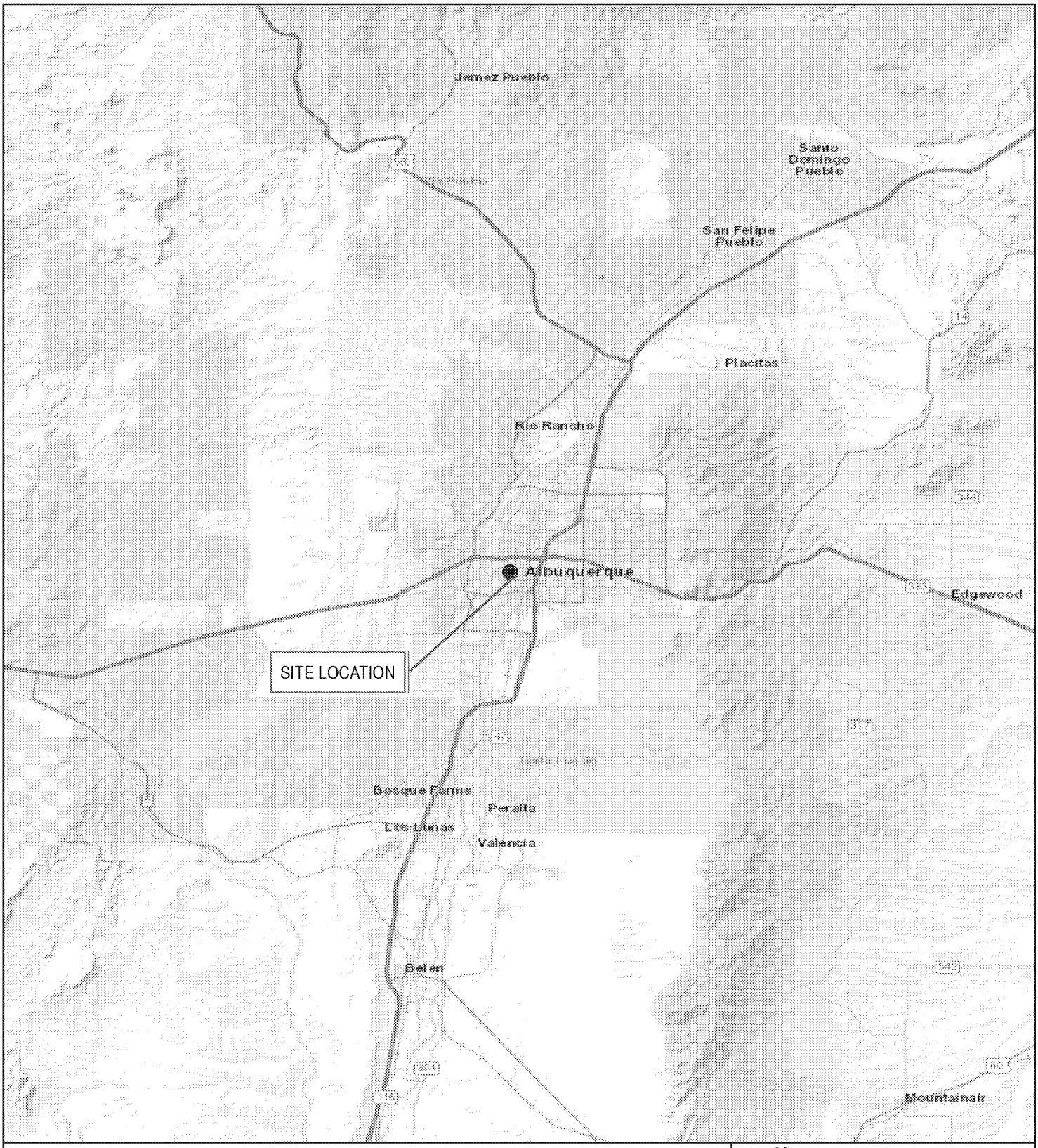
TERMS

COC - Chain-of-Custody

PROCEDURE

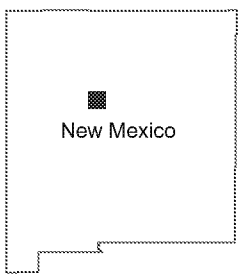
Prior to shipping or transferring custody of samples, they will be packed according to D.O.T. requirements with sufficient ice to maintain an internal temperature of 4°C ± 2°C during transport to the laboratory. Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

1. Samples will be accompanied by a COC record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. If sent by common carrier, a bill of lading or airbill should be used. Bill of lading and airbill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory. The designated laboratory will accept custody in the field upon sample pick-up or at the laboratory if the samples are delivered via field personnel or a courier service.
2. Samples will be properly packed in approved shipping containers for laboratory pick-up by the appropriate laboratory for analysis, with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be padlocked or custody-sealed for transfer to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to itself so that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape. The seal will then be signed. The designated laboratory will accept custody of the samples upon receipt.
3. Whenever samples are split with state representatives or other parties, the COC record will be marked to indicate with whom the samples were split.
4. The field sampler will call the designated laboratory to inform them of sample shipment and verify sample receipt as necessary.



LEGEND

● SITE LOCATION



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SOURCE: WORLD STREETMAP, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 1-1

SITE LOCATION MAP

WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 1-1 - Site Location Map.mxd 10:33:59 PM 5/13/2020 dequenlm

LEGEND

● SITE LOCATION

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0 4,000 8,000

FEET

SOURCE: NATIONAL GEOGRAPHIC, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

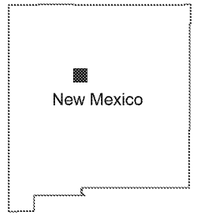
USEPA REGION 6

FIGURE 2-1

SITE AREA MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 2-1 - Site Area Map.mxd 10:35:40 PM 5/13/2020 deguenlm



LEGEND

- BELL TRADING POST PROPERTY
- GROUNDWATER MONITORING WELLS
- CITY PROPERTY
- APPROXIMATE RIGHT-OF-WAY AREAS
- PARCEL BOUNDARY
- NON-RESIDENTIAL PROPERTY
- RESIDENTIAL PROPERTY

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SOURCE: BING AERIAL, ESRI

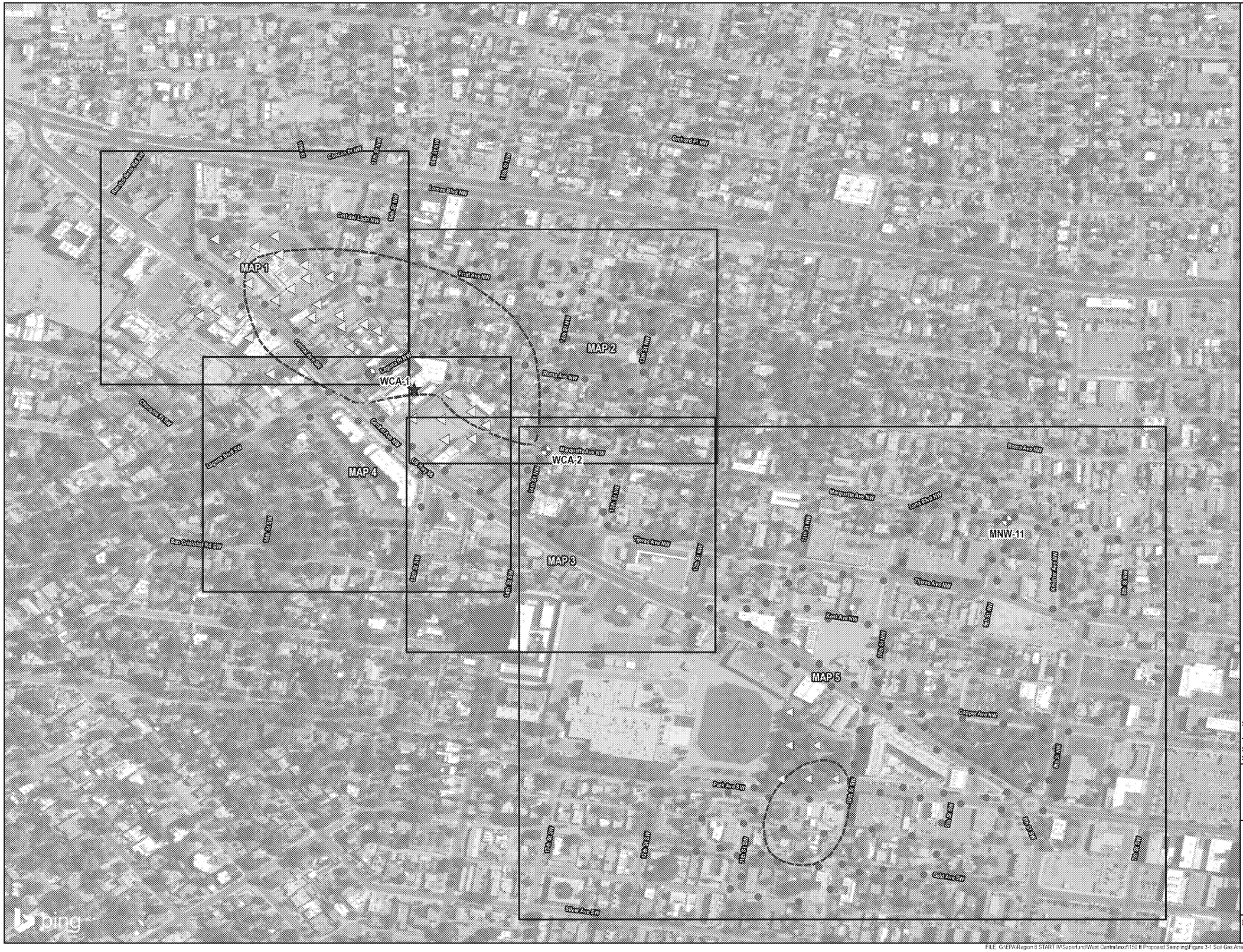
TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 2-2
SITE AND STUDY AREA LAYOUT MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure 2-2 Site and Study Area Layout Map.mxd 3:25:39 PM 5/27/2020 dequentin



New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 35)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 206)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m³ EXTENT
- PCE SOIL GAS 2 ug/m³ EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: BING AERIAL, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-1

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-1 Soil Gas Analytical and Field Sample Location Overview Map.mxd 3:07:39 PM 5/27/2020 dequentin

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 22)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 19)
- GROUNDWATER MONITORING WELLS
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

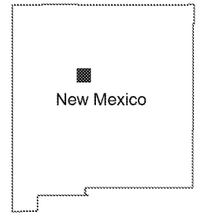
USEPA REGION 6

FIGURE 3-2

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

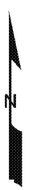
FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-2 Soil Gas Analytical and Field Sample Location Map 1.mxd 3:13:26 PM 5/27/2020 dsguenth



LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 7)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 51)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene



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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-3

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-3 Soil Gas Analytical and Field Sample Location Map 2.mxd 3:32:09 PM 5/27/2020 dequentin

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 5)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 23)
- GROUNDWATER MONITORING WELLS
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-4

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 3
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-4 Soil Gas Analytical and Field Sample Location Map 3.mxd 3:38:34 PM 5/27/2020 dsguenfin

New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 8)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 21)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: © NEARMAP, 2019

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-5

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 4
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-5 Soil Gas Analytical and Field Sample Location Map 4.mxd 3:44:23 PM 5/27/2020 dequentin

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New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 6)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 115)
- GROUNDWATER MONITORING WELL
- TCE SOIL GAS 0.4 ug/m^3 EXTENT
- PCE SOIL GAS 2 ug/m^3 EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

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SOURCE: BING AERIAL, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-6

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION MAP 5
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
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FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-6 Soil Gas Analytical and Field Sample Location Map 5.mxd 3:53:59 PM 5/27/2020 duguenin

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QUALITY ASSURANCE SAMPLING PLAN

FOR

WEST CENTRAL AVENUE ASSESSMENT
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

Prepared For

U.S. Environmental Protection Agency Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270-2102

Contract No. EP-S5-17-02
Technical Direction Document No. 0001/20-324
WESTON Work Order No. 20600.012.001.1324
NRC No. N/A
SEMS ID NMN000607372
FPN N/A
SSID A6JT
EPA OSC Gary Moore

Prepared by

Weston Solutions, Inc.
2600 Dallas Parkway, Suite 280
Frisco, Texas 75034

May 2020

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Appendix C Standard Operating Procedures

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LIST OF TABLES

[TOC \h \z \c "Table"]

ED_013172_00000148-00004

1. [SEQ CHAPTER \H \R 1]INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) contractor, was tasked by the U.S. Environmental Protection Agency Region 6 (EPA Region 6) under Contract Number EP-S5-17-02, Technical Direction Document (TDD) Number 0001/20-324, to conduct passive soil gas (PSG) assessment activities at West Central Avenue Assessment Site (Site) located along Central Avenue NW and surrounding areas located in Albuquerque, Bernalillo County, New Mexico. A Site Location Map is provided as Figure 1-1. The Superfund Enterprise Management System (SEMS) Identification (ID) assigned to the Site is NMN000607372. START prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed at the Site as part of the assessment sampling activities.

1.1 PROJECT OBJECTIVES

START is providing technical assistance to EPA Region 6 to support EPA's determination that the Site presents or does not present, by presence of trichloroethylene (TCE) and/or tetrachloroethylene (PCE), a threat to public health or welfare of the United States or the environment in accordance with *40 Code of Federal Regulations (CFR) 300.415.*

[SEQ CHAPTER \h \r 1]The Project Team will consist of Jeff Criner as the START Assessment/Inspection Manager and Derrick Cobb as the START Project Team Leader (PTL) and Field Safety Officer (FSO). The PTL will be responsible for the technical quality of work performed in the field and will serve as the START liaison to EPA Region 6 during field activities. The PTL, with the concurrence of the EPA On-scene Coordinator (OSC), will determine the locations for PSG samples in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The PTL will be responsible for accurate chain-of-custody documentation for the samples collected during field activities. The PTL will oversee the packaging and shipping of samples to the designated laboratory, and enter daily sample collection into SCRIBE and observational data into Response Manager. The FSO will be responsible for providing overall Site health and safety support.

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1.2 QASP FORMAT

[SEQ CHAPTER \h \r 1]This QASP has been organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methodology and Data Validation
- Section 5 – Quality Assurance

[SEQ CHAPTER \h \r 1]All figures are provided as portable document format (pdf) files. Appendices are provided with the following information:

- Appendix A Site-Specific Data Quality Objective
- Appendix B Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (Second Edition) – Compendium Method TO-17
- Appendix C Standard Operating Procedures

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2. [SEQ CHAPTER \H \R 1]SITE BACKGROUND

[SEQ CHAPTER \h \r 2]Information regarding the Site location, description, and history is included in the following subsections.

2.1 SITE LOCATION AND DESCRIPTION

The West Central Avenue (WCA) Site is located within the city limits of Albuquerque, Bernalillo County, New Mexico. Geographically, it is located east of the Rio Grande River, south and east of Old Town Albuquerque, and west of the downtown Albuquerque area. The Site's suspected point source of contamination is located at 1503 Central Avenue NW, geographic coordinates are Latitude 35.090077° North and Longitude 106.664567° West, in Township 10N, Range 3E, Section 17. The West Central Avenue Site is bordered to the north by Lomas Boulevard NW, to the east by 10th Street, to the south by Park Avenue, and to the west by Rancho Seco Road NW. The elevation of the Site is approximately 4,951 feet above mean sea level (amsl). The Site Area Map and the Site and Study Area Layout Map are presented as Figure 2-1 and Figure 2-2, respectively.

The WCA Site is situated within a commercial and residential area. In addition to urban parks, there are eight schools within a 1 mile radius of the Site. The primary contaminants of concern are tetrachloroethylene (PCE) and trichloroethylene (TCE) chlorinated solvents. The New Mexico Environment Department (NMED) and EPA suspect the source of contamination to originate from the Bell Trading Post (BTP), the location of a former Indian jewelry manufacturing business that operated between 1947 and 1975. The business moved to the Sun Bell site located just 0.3 miles northwest from the BTP at the intersection of Central Avenue NW and Lomas Boulevard NW. The business currently operates as Rio Grande Trading (formerly the Bell Group) and distributes jewelry and supplies under the Rio Grande brand name. The exact date of release is unknown, however, it is suspected that TCE was used to degrease and clean their products and that releases occurred sometime during its operation at the Site.

The Site is located in the central portion of the Albuquerque Basin, a geologic feature filled with unconsolidated to loosely consolidated gravel, sand, silt, and clay. The ground surface near the

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Site slopes east to west toward the Rio Grande located just over 1 mile west-southwest of the Site.

The river deposits identified as the axial Rio Grande facies that underlie the Site consist of well-sorted coarse sand to gravel separated by silty and clayey fine sands. These strata have been divided into seven aquifer zones, differentiated based on geologic and hydraulic characteristics. The uppermost water-bearing zone (shallow aquifer zone) is approximately 40 feet below ground surface (bgs) beneath the western portion of the EPA Fruit Avenue Plume (FAP) Superfund (EPA ID NMD986668911) site that stretches to the west of the railroad tracks. Depth to the shallow aquifer zone west of the Site, at the former BTP property, is approximately 20 to 21 feet bgs.

The groundwater within the Albuquerque Basin at the Site can be divided into three aquifer zones: shallow, intermediate, and deep, and are defined as follows:

- Shallow (S) – wells with screen midpoint elevations at 4,894 feet amsl or higher. These S wells are typically completed across the water table at about 40 feet bgs.
- Intermediate (I) – wells with screen midpoint elevations between 4,894 and 4,834 feet amsl (roughly 60 to 120 feet bgs). This zone has been subdivided into I1 (approximately 60 to 85 feet bgs or 4,893 to 4,868 feet amsl) and I2 (86 to 120 feet bgs or 4,868 to 4,834 feet amsl).
- Deep (D) – wells having screen midpoint elevations at or below 4,834 feet amsl (generally completed below 120 feet bgs). The D zone has been further subdivided into four zones: D1 (generally 120 to 150 feet bgs or 4,834 to 4,804 feet amsl); D2 (generally 150 to 250 feet bgs or 4,804 to 4,704 feet amsl); D3 (approximately 250 to 350 feet bgs or 4,704 to 4,604 feet amsl; and D4 (350 feet and deeper or less than 4,604 feet amsl).

2.2 [SEQ CHAPTER \H \R 2]SITE HISTORY AND PREVIOUS INVESTIGATIONS

The WCA Site was identified by the NMED when chlorinated solvents were detected in background ground water samples collected in 2005. The samples were taken from upgradient monitoring wells of the FAP located just east of the Site, including MNW-11. The FAP site is currently in the Long Term Remedial Action (LTRA) phase of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. Suspected sources of the FAP TCE are the former Sunshine Laundry, Elite Cleaners, and American Linen

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Corporation dry-cleaning facilities. In April 1989, the City of Albuquerque discovered chlorinated solvent contamination in groundwater near the FAP site during a routine inspection of the Coca-Cola bottling plant water supply well, located at 205 Marquette Avenue NE. Undocumented releases from unknown sources are suspected to have formed the WCA groundwater contaminant plume containing PCE and its breakdown products TCE, *cis*-1,2-Dichloroethylene (cis-1,2-DCE), *trans*-1,2-Dichloroethylene (trans-1,2-DCE), and vinyl chloride (VC). The primary contaminants of concern (COCs) for this assessment are PCE and TCE. The full extent of the Site groundwater plume is not well-defined at this time.

MNW-11 is located closest to the Site. The BTP is located at 1503 Central Avenue NW, approximately 2,375 feet west-northwest of monitoring well MNW-11. Groundwater samples collected during a 2001 NMED Voluntary Remediation Program (VRP) Phase II environmental site assessment (ESA) also exhibited a TCE detection of 1.5 micrograms per liter (µg/L). During the same ESA, twelve soil gas samples were collected between 2 to 4 feet bgs. Six of twelve soil gas samples yielded TCE concentrations ranging from 0.2 µg/L (or 200 micrograms per cubic meter [µg/m^3]) to 3.4 µg/L (or 3,400 µg/m^3). In 2005, the Voluntary Remediation Completion report for BTP noted that there may have been a historical release but that the samples were inconclusive and did not exceed state water quality standards. In 2014, a VRP Limited Phase II Expanded Site Assessment was conducted to gather soil vapor and indoor air samples. Two of the three soil gas samples collected from the exterior of the BTP building contained TCE; the highest detection being 1,800 µg/m^3 from a sample collected 3 feet bgs near the intersection of Roma Avenue NW and Laguna Boulevard NW. One of two soil borings for soil vapor sampling and one of two "source" air samples collected from the interior of the building reported TCE concentrations of 14 µg/m^3 and 3.1 µg/m^3 TCE, respectively. It was concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, occurred at the BTP or within the immediate vicinity of the Site.

A former dry cleaner property, Park Avenue Cleaners, was also investigated by NMED VRP in 2000. The property is located at 1004 Park Avenue, approximately 0.45 mile southeast from the former BTP. Soil gas data from two boreholes indicated up to 76,000 µg/m^3 of PCE and 900 µg/m^3 of TCE. A monitoring well, MW-1, was also installed during the investigation; samples yielded detections up to 14 µg/L of PCE.

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In addition to the VRP ESAs, NMED Superfund Oversight Section performed a 2014 site inspection (SI), a 2016 expanded site inspection (ESI), and a 2017 site reassessment (SR) in coordination with EPA. The 2014 SI groundwater analytical results, from samples taken from six wells located approximately 3,000 feet northwest to southwest of 9th Street and Marquette Avenue NW (FAP site address) and upgradient from the BTP, did not indicate detection of any volatile organic compounds (VOCs) nor TCE. In addition to the 2014 SI, NMED VRP also tasked Intera Inc. with conducting a Limited Phase II Environmental Site Investigation (ESA) which focused on indoor air impacts. Sub-slab soil vapor samples from both the indoor and the exterior of the BTP building yielded detections of TCE above EPA Vapor Intrusion Screening Levels (VISLs).

Only soil vapor samples were collected during the 2016 ESI. The ESI data indicated three TCE hotspots and two PCE hotspots from the 1800 block to the 1400 block of Central Avenue NW; the plume appeared to stretch in an eastward direction, southeast down Central Avenue NW then breaking east along Marquette Avenue NW toward the FAP site-associated MNW-11 well. The highest TCE soil gas laboratory sample result (8,530 $\mu g/m^3$) from the ESI were collected from the former BTP property. Additional locations, like the Wash Tub Laundry were identified as an additional possible source of contamination. The former Park Avenue Cleaners property was also investigated as part of the ESI; field gas chromatograph samples yielded up to 1,727 $\mu g/m^3$ PCE and up to 104 $\mu g/m^3$ TCE.

The 2016 NMED ESI report also included FAP sample data from monitoring well samples collected from wells located over the western portion of the FAP plume. Subsequent quarterly sampling of the FAP, between 2003 and 2015, has indicated merging of its western edge with the upgradient WCA TCE plume, thus further complicating FAP remediation efforts. Two sets of data were compiled from samples taken from upgradient-located FAP site monitoring wells (NMED ESI, 2016). From that data, TCE was detected in the following wells as provided in the table below.

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Table [STYLEREF 1 \s]-[SEQ Table * ARABIC \s 1]
TCE in Groundwater Sampled from Western FAP Site Wells
NMED ESI, 2016
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Well	Aquifer subzone	2012 (µg/L)	2015 (µg/L)
MNW-11	D1 (121 - 150 ft. bgs)	46	22
SFMW-14	D1 (121 - 150 ft. bgs)	17	14.9
MNW-9	D1 (121 - 150 ft. bgs)	4.6	1.9
MNW-1	I2 (86 - 120 ft. bgs)	17	19.8
SFMW-13	I2 (86 - 120 ft. bgs)	1	0.9
WB-01	I1/I2 (61 - 120 ft. bgs)	0.9	2.6
WB-02	I1/I2 (61 - 120 ft. bgs)	0.77	0.1

Notes:
ft. bgs – feet below ground surface
µg/L – micrograms per liter

The 2017 SR activities included more air and soil vapor sample collection, and the installation of two monitoring wells. WESTON mobilized in March 2017 to conduct oversight on the installation of two monitoring wells. NMED sampled these wells the following week and released a Site Reassessment Report in September 2017. NMED reported no water samples yielded detections above regulatory limits. The soil vapor and indoor air samples were collected for analysis from public, commercial, and residential properties to generate soil gas plume maps. In lieu of groundwater data, NMED decided to use actively-pumped screening detections to generate the plume maps that further confirmed the plume map generated for the 2016 ESI. The highest TCE soil gas laboratory sample results were detected at 340 µg/m^3 and 35 µg/m^3, located at the 1433 Central Avenue NW property that borders the former BTP on the east side. The highest PCE soil gas sample results, with concentrations up to 1,700 µg/m^3, were collected at the former Park Avenue Cleaners.

In March 2020, START mobilized to the Site for a preliminary Site visit to identify suitable sample locations. During the visit, NMED provided START with additional locations of suspected sources of contaminants, namely Custom Cleaners and Silver Moon Lodge.

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3. [SEQ CHAPTER \H \R 3]SAMPLING APPROACH AND PROCEDURES

[SEQ CHAPTER \h \r 2]The specific sampling approach and procedures are presented in the following subsections.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The EPA OSC and START PTL have pre-determined the sample locations of PSG samplers within the study area. Figures 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 detail the proposed PSG sample locations. The EPA OSC and START PTL may modify, add, or delete PSG sample locations as necessary. Site access to the sample locations, located within private properties and the City of Albuquerque right-of-way areas, will be obtained prior to the initiation of field activities. The START PTL will also contact New Mexico 811 at least 48 hours prior to the sampling event to notify local utility companies (e.g., power, phone, gas, cable, sanitation, etc.) to have underground cables, lines, and pipes flagged and marked. The START PTL will also work closely with the City of Albuquerque regarding any potential utilities that may be located in the right-of-way areas where the PSG samples will be placed. The START PTL will also contact private property owners at least 48 hours prior to entry.

3.1.1 Data Quality Objective

The objective of sampling activities is to determine if PCE and TCE are present within Site soil vapor and whether those concentrations may pose a threat to human health and the environment. To accomplish this, a Data Quality Objective (DQO) has been established and is included in Appendix A:

- Confirm the presence and concentration of PCE, TCE, and other chlorinated solvent degradation products in soil vapor using PSG technology.

The DQO was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

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3.1.2 Health and Safety Plan Implementation

Field activities will be conducted in accordance with the site-specific health and safety plan (HASP). The FSO will be responsible for implementation of the HASP during all field investigation activities. In accordance with WESTON's general health and safety operating procedures, the START field team will drive the route to the hospital specified in the HASP prior to initiating sampling activities.

3.1.3 Community Relations

Community relations may require additional EPA involvement due to the general nature of the Site. It is anticipated that the EPA OSC will be on-site at all times, and community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the START PTL, under the guidance of the START Inspection/Assessment Manager, will manage community relations in the field as directed by the EPA OSC.

3.1.4 Field Activities Review Meeting

The PTL will conduct a meeting with the START field team to familiarize them with the project scope of work, discuss the planned field activities, roles and responsibilities, and review the project HASP and other relevant standard operating procedures (SOPs). This meeting will be conducted prior to beginning any Site activities.

3.1.5 Mobilization

The START team is currently scheduled to mobilize for this sampling event sometime between June and August 2020, pending the evolving response to the COVID-19 pandemic. It is anticipated that placement and retrieval of the PSG sampler will each require approximately 7 days to complete, including mobilization and demobilization.

3.2 FIELD ACTIVITIES

START will use passive soil gas samplers to collect soil vapor from the WCA Site. A total of 278 PSG samples consisting of 241 normal, 25 duplicate, 6 trip blanks, and 6 rinsate blanks will be collected as part of the field activities. The proposed sample locations are shown in Figure 3-

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1. A total of 206 PSG samplers will be installed within the City of Albuquerque right-of-ways. See Figures 3-1 through 3-6. Thirty-five PSG samplers will be installed on private properties along Central Avenue. See Figures 3-1 through 3-6.

Passive gas samplers will be installed [SEQ CHAPTER \h \r 1]in accordance with SOPs. WESTON SOPs and supporting SOPs are included in Appendix C. The specific sampling, decontamination, and sample handling procedures, including disposition of investigation-derived waste (IDW), are described in the following subsections.

3.2.1 PSG Installation/Retrieval

The PSG samplers will be installed in 3-foot-depth holes using a hammer drill with a ¾-inch or 1 inch-diameter drill bit according to the manufacturer's guidelines. Should the proposed sample location be covered with concrete, START will use a concrete drill bit to develop the boring hole. After the PSG samplers are installed, the holes will be sealed with the provided plug to protect the samplers and prevent potential surface vapor intrusion. START will obtain global positioning coordinates (GPS) for each sample location. The PSG samplers will remain in the subsurface for up to 21 days, then retrieved and shipped to a WESTON subcontracted laboratory for analysis. Excess soil from boreholes will be contained on-site and used to backfill the holes after the samplers are removed. For those boring holes drilled through concrete, the boring holes will be patched with concrete according to City of Albuquerque specifications.

3.2.2 Sample Handling Procedures

The PSG [SEQ CHAPTER \h \r 1]samplers will be installed according to the manufacturer specifications. Following PSG sample retrieval, the samplers will be stored in the appropriate containers and preserved in a manner that is appropriate for the analyses to be performed.

Any sampling equipment used for the PSG sampling effort (i.e., drill bit) will be decontaminated prior to and in between each sample location. PSG samples will remain in containers in a clean, segregated area. Sampling personnel will change gloves between each sample collection/handling to reduce the possibility of cross-contamination.

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3.2.3 Quality Assurance/Quality Control Samples

A field quality control (QC) program will be implemented to ensure conformance with data quality protocols established by the EPA. The field QC program is generally comprised of additional collected field QC "duplicate" samples, including those samples described in the following paragraphs. Refer to Table 3-1 for QA/QC sample collection requirements. A summary of field QC samples anticipated to be collected during the assessment is summarized below:

- **Field Duplicate Samples**. Field duplicate PSG samples will be collected during the field sampling effort. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Blind PSG field duplicate samples will be collected at the rate of one duplicate for every ten samples collected. Twenty-five blind field duplicate samples are planned for this sampling effort.
- **Equipment Rinsate Samples**. Equipment rinsate blanks will be prepared by pouring laboratory-grade de-ionized water over non-disposable sampling equipment (i.e., drill bit) after it has been decontaminated, and by collecting the rinse water in sample containers for analyses. The samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. The equipment rinsate blanks will be prepared each day that non-disposable sampling equipment is used. START will collect one rinsate sample from the drill bit used to confirm that it had been properly decontaminated.
- **Trip Blank Samples.** PSG trip blank samples are collected when analyzing soil gas samples for VOCs. PSG trip blank samples are a critical requirement for all absorptive sampling programs and are used to quantify any potential blank contamination from sample transport, handling, and storage. PSG trip blank samples are samples that travel to and from the field sampling site without being opened. One trip blank sample will be placed in the shipping cooler that contains PSG samplers to be analyzed for VOCs.
- **Temperature Blank.** One temperature blank will be prepared in the field and will consist of one 40-milliliter glass sample container with a Teflon®-lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of this sample within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.

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3.3 SAMPLE MANAGEMENT

[SEQ CHAPTER \h \r 1]Specific nomenclature that will be used by START will provide a consistent means of facilitating the sampling and overall data management for the project as defined in the WESTON SOPs provided in Appendix B. Any deviations from the sample nomenclature proposed below must be approved by the START PTL. [SEQ CHAPTER \h \r 1]Sample locations will be identified in the field as each location is sampled, independent of the physical location of the sample.

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, the PSG samplers will be maintained at 4 °C until they are submitted for laboratory analysis. No preservation of the samples is necessary. The samples will be sent to the subcontracted laboratory by overnight carrier.

The hold time is initiated when the samples are collected in the field and continues until the analysis is begun. The turnaround time is initiated when the samples are received by the laboratory and continues until the analytical results are made available to WESTON verbally or electronically for review. Samples that have been analyzed will be disposed by the designated laboratory in accordance with standard laboratory procedures.

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Table [STYLEREF 1 \s]-[SEQ Table * ARABIC \s 1]
Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Sample Matrix	Analytical Parameter	Analytical Method	Container Info	Preservation Requirements	Minimum Volume or Weight	Maximum Holding Time
Passive Soil Gas	VOCs	Modified TO-17	1 sampler per sample location	4 °C	N/A	30 days to analysis
Field Blank Samples (also Passive Soil Gas)	VOCs	Modified TO-17	1 sampler per day of sampling activity	4 °C	N/A	30 days to analysis

Notes:
°C - Degrees Celsius
N/A - Not Applicable
VOCs - Volatile Organic Compounds

3.5 INVESTIGATION-DERIVED WASTE

It is anticipated that minimal Investigation-Derived Waste (IDW) will be generated during the field sampling effort. Any excess soil and/or concrete generated during the passive gas sampler installation activities will be placed in plastic bags and disposed by START off-site within municipal trash dumpsters.

3.6 DECONTAMINATION

Non-disposable sampling equipment (i.e., drill bit) used during the PSG sampler installation process will be decontaminated before initial use, between use, and at the end of the field effort. Equipment decontamination will be completed in the following steps:

1. Non-phosphate detergent and potable water wash to clean the equipment.
2. Final potable water rinse.
3. Equipment air-dried.

Although highly unlikely, should any excess waste be generated because of equipment decontamination, it will be placed in a drum and disposed of appropriately at the end of the sampling activities. The drum will be labeled on the side with the name of the site, the contents,

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sampling location, and date. The drum will remain at the EPA soil vapor extraction facility until arrangements can be made for its disposal.

[SEQ CHAPTER \h \r 1]

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4. ANALYTICAL METHODOLOGY AND DATA VALIDATION

Passive soil gas samples will be analyzed by a WESTON-contracted laboratory using gas chromatography/mass spectrometry (GC/MS) instrumentation, following modified EPA TO-17 procedures. The laboratory's reported quantitation levels (RQLs) for each of the VOCs associated with the modified EPA TO-17 methodology, in mass and mass per volume, will be used. Mass will be reported according the laboratory RQLs; RQLs for mass and mass per volume will be used as a screening tool to determine the presence or absence of VOCs in the passive soil gas samples. The rinsate, trip blank and field blank samples will be analyzed for VOCs by SW-846 Method 8260.

Following analysis, the laboratory will provide a preliminary data deliverable via email in PDF format. The final data deliverable will include a full Contract Laboratory Program (CLP)-like data package (Level IV data package with QC and raw data) in PDF format and a final Electronic Data Deliverable (EDD) in Microsoft Excel format. Initial data deliverables (preliminary results) will be based on a standard, 10-business-day Turn-around Time (TAT) starting when the laboratory receives the samples, unless otherwise directed by the EPA OSC. The TAT criteria will be initiated when the sample group is received by the laboratory and continues until the data deliverable is submitted to START. The final Level IV data deliverable will be submitted by the laboratory based on a 10-business-day TAT.

START-contracted laboratory data packages will be verified and validated using Stage 2B validation, as described in the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (January 2009) unless otherwise specified by the EPA OSC. Data validation qualifiers will be applied based on method-specific analytical quality control guidelines as well as Superfund CLP National Functional Guidelines for Superfund Organic Methods Data Review (January, 2017). A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. START will evaluate the following (if applicable) to verify that the analytical data is within acceptable QA/QC tolerances:

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- The completeness of the laboratory report, verifying that all required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

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5. [SEQ CHAPTER \H \R 5]QUALITY ASSURANCE

[SEQ CHAPTER \h \r 1]Quality Assurance (QA) will be conducted in accordance with the WESTON Corporate Quality Management Manual; the WESTON START Quality Management Plan; and EPA Quality Assurance/Quality Control Guidance for Removal Activities. The START PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory used during the investigation will be responsible for QA/QC related to the analytical work. START will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

5.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under the chain-of-custody procedures.

START personnel will complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to the subcontracted laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.

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- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each shipping container. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and attached to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

5.2 PROJECT DOCUMENTATION

[SEQ CHAPTER \h \r 1]All documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, and SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure Web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data

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entered into EPA SCRIBE software and make it available for multiple users to access on one site. START personnel will use SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

5.3 FIELD DOCUMENTATION

The following field documentation will be maintained.

5.3.1 [SEQ CHAPTER \h \r 1]Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number
- Names of personnel on-site
- Dates and times of all entries
- Description of all site activities, including site entry and exit times
- Noteworthy events and discussions
- Weather conditions
- Site observations
- Identification and description of samples and locations
- Dates and times of sample collections and chain-of-custody information
- Records of photographs
- Site sketches

5.3.2 Sample Labels

[SEQ CHAPTER \h \r 1]Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number
- Date and time the sample was collected
- Sample preservation method
- Analysis requested

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- Sampling location

5.3.3 Chain-of-Custody Record

[SEQ CHAPTER \h \r 1]A chain-of-custody record will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it. The chain-of-custody is discussed in Subsection 5.1 Sample Custody Procedures.

5.3.4 Custody Seal

[SEQ CHAPTER \h \r 1]Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

5.3.5 Photographic Documentation

[SEQ CHAPTER \h \r 1]START will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appeared at completion of the work.

[SEQ CHAPTER \h \r 1]All photographs should be taken with a digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

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5.3.6 Report Preparation

At the completion of the project, START will review and validate all laboratory data and prepare a draft trip report of field activities and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.

5.4 RESPONSE MANAGER

START will use the Response Manager module located on the EPA Web Hub, [HYPERLINK "https://solutions.westonproject.net/epawebhub/"], to collect and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – Site specific data including location and type of site. It also includes an area for all key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Timeline Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for targeted reconnaissance efforts. Typically, the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any an all reconnaissance activities.
- Facility Assessment Module - provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for assessments of structures. Typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle to grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifest and manifest line items, and upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for the tracking of which containers are bulked.

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- Properties Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property with regard to the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.
- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the OSC in a Pollution Report (POLREP) or Situation Report (SITREP).
- HHW Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta data associated with that data file can be filled in using the photo-log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At anytime deemed necessary, POLREP and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and is backed up regularly.

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APPENDIX A

SITE-SPECIFIC DATA QUALITY OBJECTIVE (DQOS)

APPENDIX A

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

STEP 1. STATE THE PROBLEM	
Determine the presence and concentration of chlorinated solvent soil vapor north, east, south, and west of the West Central Avenue Assessment Site.	
STEP 2. IDENTIFY THE DECISION	
If areas are affected by chlorinated solvents, the contaminants of concern (COCs), (specifically PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride [VC]) in soil gas, additional assessment may be warranted.	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	▪ If Site COCs exceeds the EPA RSLs for soil gas vapor, the vapor represented by that sampled will be considered contaminated and will require additional attention. ▪ If Site COCs do not exceed the EPA RSLs for soil gas vapor, the vapor represented by that sample will not require additional attention.
STEP 3. IDENTIFY INPUTS TO THE DECISION	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	▪ Contaminant concentrations in soil gas vapor samples collected during sampling.
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	▪ Passive soil gas sample locations as shown on Figures 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 of the QASP. ▪ Analytical results from VOC analysis (EPA TO-17, modified).
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	Analytical data collected from the passive soil gas samplers will be used for information purposes to determine if additional assessment activities will be required.
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	Sampling techniques and analytical methods are discussed in Sections 3.0 and 4.0 and illustrated on Table 3-1 of the QASP.
STEP 4. DEFINE THE BOUNDARIES OF THE STUDY	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	Area defined as above the ground water plume identified by EPA and NMED with past sampling events.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Soil gas vapor in subsurface soils and groundwater contamination.
DEFINE THE SCALE OF DECISION MAKING.	Results of soil gas vapors will be used to establish whether vapor intrusion has occurred as a result of the contaminated ground water plume.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The data will apply until the soil vapors represented by the samples receive appropriate response actions.
DETERMINE WHEN TO COLLECT DATA.	Passive soil gas samples will be deployed sometime between June and August 2020 and retrieved approximately 3-weeks later and shipped to the laboratory for analysis.

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APPENDIX A (CONTINUED)

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	▪ Inclement weather. ▪ Access not attainable (most sample locations in right-of-ways). ▪ Possible utility lines in proposed sample locations.
STEP 5. DEVELOP A DECISION RULE	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	The sample concentrations at each sample location will be used to determine if additional assessment activities are warranted by EPA at a later date.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	The action level will be that VOCs are detected in a mass concentration (micrograms [µg]) or mass per volume (ppbV) concentration that exceeds the corresponding EPA RSLs and laboratory reporting limit, indicating that further assessment may be required.
DEVELOP A DECISION RULE.	If the COCs identified in the air samples are above the EPA RSLs, those samples and the source ground water plume will require additional investigation. If no COCs are identified in the air samples then vapor intrusion from the ground water plume has not been established and the air represented by the samples will not require additional attention.
STEP 6. SPECIFY LIMITS ON DECISION ERRORS	
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from 0.0 µg or 0.0 ppbV, to an undetermined mass and mass per volume concentration.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type I Error: Deciding that the specified area represented by the passive soil gas sample does not exceed the specified screening level when, in truth, the passive soil gas concentration of the contaminant exceeds its screening level. The consequence of this decision error is that contaminated soil vapor will remain in the source area possibly endangering human health and the environment. There may also be potential future liability associated with remedial cleanup costs of leaving contaminated soil vapor in the source area. This decision error is more severe. Type II Error: Deciding that the specified area represented by the passive soil gas sample does exceed the screening level when, in truth, it does not. The consequences of this decision error are that additional assessment activities may be warranted and unnecessary costs will be incurred.

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APPENDIX A (CONTINUED)

DATA QUALITY OBJECTIVE NO. 1 – PASSIVE SOIL GAS SAMPLING

ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	The true state of nature when the soil gas vapor is decided to be below the screening levels when in fact, it is not below the screening levels, is that the area may need additional assessment. The true state of nature when the soil gas vapor is decided to be above the screening levels when in fact, it is not above the screening levels, is that the area may not need additional assessment.
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS (H_o) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS (H_a).	H_o: The soil gas represented by the passive soil gas sample of the specified area is above the screening level. H_a: The soil gas represented by the passive soil gas sample of the specified area is below the screening level.
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	▪ False Positive Error = Type I ▪ False Negative Error = Type II
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	To be assigned based on discussions with EPA COR.
STEP 7. OPTIMIZE THE DESIGN	
REVIEW THE DQOs	Due to insufficient historical PSG data, determination of the standard deviation was not possible. Therefore, sample size calculation using traditional statistical formula may not be the optimal design. In order to select the optimal sampling program that satisfies the DQOs and is the most resource effective, other elements were considered.
DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN. A total of 278 PSG samples consisting of 241 normal, 25 duplicate, 6 trip blank and 6 rinstae blank will be collected during as part of the field activities. The PSG samples be installed along the right-of-ways in the area near the Bell Trading Post, the area of former Park Avenue Cleaners, the area near the intersection of Marquette Avenue NW and 9th Street NW, and along Central Avenue NW to determine the presence of chlorinated solvent soil gas. The samplers will be installed and allowed to equilibrate to the surrounding site conditions for up to 21 days to allow for optimal sample collection. Samples will be analyzed for volatile organic compounds (VOCs), specifically targeting PCE, TCE and degradation products by analytical method EPA TO-17, modified.	

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Message

From: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Sent: 2/25/2022 5:51:28 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]; Ogden, Sarah, NMENV [sarah.ogden@state.nm.us]; McGlown, Anthony, NMENV [anthony.mcglown@state.nm.us]; Mark Garman [mark.garman@state.nm.us]; Cobb, Derrick [derrick.cobb@westonsolutions.com]
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure
Attachments: Bell Phase II_FINAL_06_30_14 rev 1.pdf

Gary, Michelle, and LaDonna,

Attached is the Limited Phase II Environmental Site Assessment that was performed at the Bell Trading Post Property, June 30, 2014 for the NMED-GWQB- VRP.
Soil gas, crawl space air, indoor air, and ambient air samples were the focus at that time.

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
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From: Kieling, Martyne, NMENV
Sent: Friday, February 25, 2022 10:36 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV <Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure

Gary, Michelle, and LaDonna,

Attached is the Voluntary Remediation Completion Report Former Bell Trading Post Facility at 1503 Central Ave. Albuquerque, NM - September 28, 2005. I did have the dates wrong in my previous email some work was performed in the 1990's however the Phase I and Phase II work and reports and the VR Completion Report was performed in the early 2000's. This should provide a comprehensive look at what was performed at 1503 at that time.

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From: Kieling, Martyne, NMENV
Sent: Friday, February 25, 2022 10:07 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV <Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure

Gary, Michelle & LaDonna,

NMED -GWQB Superfund Oversight Section (SOS) would like to request a Teams meeting with you early next week to discuss the EPA's planned path forward with the Soil vapor/ Indoor air West Central Avenue study.
There have been requests to the GWQB-VRP section from the owner (G&L Investment Company, Inc.) of the Properties in Blue on the map below. Please see the attached letter for details of that request. The Superfund Section will be participating in a conference call with GWQB -VRP and the property representatives on Thursday morning 3/3/3022 and would like to be prepared to speak as to SOS's roll in the planned EPA-CERCLA process at this location an how that may affect the request for VRP involvement. NMED's staff schedule for a Teams meeting is clear Monday 9am MST, Tuesday morning. And Wednesday after 2pm MST.

To answer your question regarding sampling and mitigation at the Former Bell Trading Post. The Bell Trading Post (BTP) property now condominiums/lofts. Went through the VRP process in the 1990s and did a soil lead and asbestos removal. The Bell VRP investigation also performed soil testing for volatile organics and metals and collected 3 ground water grab samples at temporary bore holes. At that time there were no NMWQCC exceedances for TCE in the groundwater grab samples. I have been told that BTP condo management performed some limited follow-up indoor air sampling on their own after the ESI results were provided to them. I can provide a copy of the BTP –VRP reports to you if you wish. I do not have data or reports from the BTB condo management to confirm what I have been told regarding their own contracted indoor air sampling.

Please let us know your available times for a Teams Conference call.
Sincerely,

Martyne Kieling
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, February 24, 2022 12:54 PM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV <Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: [EXTERNAL] Re: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Martyne,

I am out of office till Monday. We do have a map which I believe that I sent to you. We are confirming the property addresses that we need to perform interior sampling based upon the map.
I assume that the Bell Trading Tower building has already performed sampling and mitigation. Please confirm.

Thanks
Gary

Sent from my iPhone

On Feb 23, 2022, at 11:10 AM, Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us> wrote:

Gary,

Please let me know if you have any further updates as to when to expect a final report on the soil vapor study performed in 2021. NMED continues to have inquiries from property owners in the 1400 block W Central Ave.

Please call if you have anything to add and wish to discuss.
Sincerely,

Martyne Kieling
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, December 15, 2021 8:21 AM
To: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXTERNAL] FW: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Limited Phase II Environmental Site Assessment

Bell Trading Post Property
Albuquerque, Bernalillo County, New Mexico
NMED Organization Code: ENV00189
Activity Code: 51573103

Prepared for:

The New Mexico Environment Department
Ground Water Quality Bureau
Voluntary Remediation Program
1190 St. Francis Drive
Santa Fe, New Mexico 87504

Prepared by:

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

6000 Uptown Boulevard NE, Suite 220
Albuquerque, New Mexico 87110

June 30, 2014

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Acronyms and Abbreviations

ACBM	asbestos-containing building materials
bgs	below ground surface
CGI	combustible gas indicator
City	City of Albuquerque
COC	certificate of completion
COPC	contaminant of potential concern
CRWQCB	California Department of Toxic Substances Control/Regional Water Quality Control Board
DE&S	Duke Engineering & Services
EDB	1,2-dibromoethane
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
ESC	ESC Lab Sciences
ESL	environmental screening level
FD	field duplicate
FHDC	Family Housing Development Corporation
ft	feet or foot
GCMS	gas chromatograph/mass spectrometer
GWQB	Ground Water Quality Bureau
HEAL	Hall Environmental Analysis Laboratory, Inc.
ID	identification number
IDW	investigation-derived waste
INTERA	INTERA Incorporated
Keers	Keers Environmental Services, Inc.
LBP	lead-based paint
µg/m^3	microgram per cubic meter
µg/L	microgram per liter
mg/kg	milligram per kilogram
mL/minute	milliliter per minute
MDL	method detection limit
NMED	New Mexico Environment Department
NM-GS	New Mexico Ground Water Standard as defined by the State of New Mexico Water Quality Control Commission

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Acronyms and Abbreviations (concluded)

NMWQCC	New Mexico Water Quality Control Commission
PID	photoionization detector
PPE	personal protective equipment
PRT	Post-Run Tubing
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
REIS	Rhoades Environmental Inspection Services, Inc.
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
SAP	sampling and analysis plan
Site	Bell Trading Post Property, Albuquerque, New Mexico
SIM	Select Ion Monitoring
SSL	soil screening level
TCE	trichloroethene or trichloroethylene
TCLP	toxicity characteristic leaching procedure
TD	total depth
UST	underground storage tank
VISL	vapor intrusion screening level
VISTA	Vista Geoscience LLC of Golden, Colorado
VOC	volatile organic compound
VRP	Voluntary Remediation Program

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1.0 INTRODUCTION

This report presents the results of Limited Phase II Environmental Site Assessment (ESA) activities completed at the Bell Trading Post Property located at 1503 Central Avenue NW in Albuquerque, New Mexico (Site). The following Limited Phase II ESA field activities: (1) active soil vapor sampling and (2) indoor air sampling were performed at the Site by INTERA Incorporated (INTERA) in June 2014 at the request of the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) (INTERA, 2014b). The intent of these additional characterization sampling activities is to further assess potential soil vapor and indoor air impacts associated with former industrial operations at the Site (NMED, 2013). The GWQB conducted a recent review of soil gas data from samples collected as part of a 2001 environmental investigation of the Site that indicated a possible historical release of solvents, specifically trichloroethene (TCE) (DE&S, 2001). All activities were completed using funds garnered from NMED's Community-wide Hazardous Assessment grant.

The Limited Phase II ESA field activities completed at the Site followed the guidance and requirements set forth in the approved site-specific Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) (INTERA, 2014a). The Limited Phase II ESA SAP/QAPP was approved by NMED and the United States Environmental Protection Agency (EPA) on May 8 and May 12, 2014, respectively (INTERA, 2014a).

The remainder of this section (**Section 1**) presents general information regarding project background including, a history of Site operations and land use, physical setting and Site conditions, and a list of potential or known Site contaminants of concern. **Section 2** summarizes the environmental investigation history for the Site. Details regarding the latest Site investigation sampling activities, sample collection methodology, and any deviations from the project-specific SAP/QAPP that occurred during execution of the Limited Phase II ESA are presented in **Section 3**. A discussion of the corresponding analytical results is presented in **Section 4**. **Section 5** provides conclusions and recommendations and references are provided in **Section 6**. All associated figures, tables, and appendices are attached and follow the text.

1.1 Project Overview

Located at 1503 Central Avenue Northwest in Albuquerque, New Mexico, the Site occurs within a mixed use commercial residential area of the City of Albuquerque (City) and is bounded to the southwest by Central Ave SW, northwest by Laguna Blvd NW, north by Roma Ave NW, and east by the termination of 15th St NW to the south (Figure 1 and 2).

A warehouse building of approximately 30,000 square feet (ft^2), the Site was the former location of both a jewelry manufacturing (1947 until circa 1975) and later, a commercial film development facility (1982 until 1984) (INTERA, 2005). In 2001, the City decided to acquire the Site for

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redevelopment as future residential housing. Due to its former operations, the Site qualified as a Brownfields property, defined by the EPA as "real property, the expansion, redevelopment, or re-use of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." As a result, the City completed Site acquisition through participation in the NMED Voluntary Remediation Program (VRP), receiving a certificate of completion (COC) for the Site in November 2005. The building has subsequently been renovated by the Family Housing Development Corporation (FHDC) into residential housing units with supplemental street side commercial/retail space.

Recent review of 2001 Site data indicate a possible historical release of chlorinated solvent(s), specifically TCE, may have occurred at the Site (DE&S, 2001). Although NMED provided the City a COC for the Site in 2005, the lack of formal state and federal guidelines and standards as well as general understanding regarding vapor intrusion issues did not allow for the effective assessment and regulation of this contaminant pathway. In recent years, however, soil vapor intrusion concerns, especially related to the redevelopment of former industrial/commercial sites, have become a priority in both state and federal sectors and significant advances have been made in the field of estimating reasonable exposure levels of contaminants in soil vapor. In December 2013, the California Department of Toxic Substances Control/Regional Water Quality Control Board (CRWQCB), considered one of the experts in the field of assessing environmental concerns relating to contaminated soil vapor, updated their 2008 interim report summarizing Tier 1 and Tier 2 environmental screening levels (ESLs) for shallow soil gas vapor intrusion (CRWQCB, 2008 and 2013). At the same time, the EPA released draft soil vapor guidelines that allow the calculation of recommended vapor intrusion screening levels (VISLs) for use in evaluating the soil vapor intrusion pathways at sites/facilities (EPA, 2014b).

TCE was reported in 2001 Site soil vapor samples at concentrations ranging from 0.2 micrograms per liter (µg/L) (or 200 micrograms per cubic meter [µg/m^3]) to 3.4 µg/L (or 3,400 µg/m^3) (DE&S, 2001). These levels exceed both the recommended residential use EPA VISL and CRWQCB ESL for TCE. The recommended target sub-slab and exterior soil gas EPA VISL calculated for TCE based on a default residential land use scenario and a total target risk for carcinogens of 10^{-5} is 21 µg/m^3; the CRWQCB ESL calculated for a residential site user based on a default residential land use scenario and a total target risk for carcinogens of 10^{-5} is 1,000 µg/m^3 (EPA, 2014b; CRWQCB, 2013).

1.2 Site Description and Land Use

The renovated building occupies most of the Site and is a single-story building currently developed as multiple residential housing units with the primary entrance facing Central Avenue (Figure 2). A large well-lit crawlspace is present beneath the front portion of the building (west-end). Three storage/garage units are present on the southeast side of the building and are joined

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to outdoor terraces of the main building by shared walls. Low concrete walls or metal fencing surrounds the entire property. Separate metal fencing encloses the storage units and partially separates the Site from the vacant lot to the east-southeast. A line of small evergreen trees/shrubs are also planted along the eastern border, just east of the wire fence. Secure parking for residents of the Site is available west of the building. Residential houses also immediately surround the property with the exception of a vacant lot to the southeast-east beyond which is occupied by retail/commercial space.

Prior to 1947, historical use of the Site was primarily residential. After 1947, historical use transitioned to commercial. From 1947 until 1975, Bell Trading Post occupied the Site building and conducted commercial jewelry manufacturing. The Site building was vacant from 1976 until 1982. From approximately 1982 until 1984, Albuquerque Photo Lab occupied the Site building and performed commercial film development. Finally, from 1985 until 1992, Michelson Metals occupied the Site building, using the property as an office for commodity trading only (office use, nonindustrial) (INTERA, 2005).

1.3 Physical Setting

The following general hydrogeologic description of the Site is excerpted from the 2001 Phase II ESA report (DE&S, 2001).

The Site is located in the south-central portion of the Albuquerque Basin. This basin is one of the largest of the south-trending series of grabens that form the Rio Grande Drainage Basin, which was formed in response to the Rio Grande Rift (Thorn et al., 1993). The Rio Grande Rift is a north- to south-trending, downdropped area extending for more than 600 miles. The rift is an area of crustal extension originating in central Colorado and extending south through New Mexico to south of the Mexico/Texas border.

The Albuquerque Basin is filled with up to 10,000 ft of clastic sediments. These sedimentary deposits are of two types: 1) sediment that has filled the subsiding trough, and 2) floodplain deposits, terraces, dunes, alluvial fans and cones, spring deposits, caliche blankets, landslides, and some pediments. The latter group of deposits represents processes of erosion and deposition which may have prevailed throughout subsidence and filling of the basin (Kelley, 1977). The Santa Fe Formation sediments fill the majority of the basin.

The Tertiary and Quaternary Santa Fe Formation is composed of unconsolidated to loosely consolidated gravels, sands, silts, and clays. The thickness of this unit ranges from 2,400 ft on the basin margins to 14,000 ft along the axis of the basin. In the vicinity of the Site, the thickness of this formation is on the order of 4,700 ft. The Santa Fe Group is overlain by Quaternary sediments, which have a similar facies distribution. These post-Santa Fe deposits are alluvial fan and floodplain deposits that are up to 200 ft thick (Thorn et al., 1993).

The Santa Fe Group and post-Santa Fe deposits are the principal water bearing units in the vicinity of the Site and are hydraulically connected (U.S. Army Corps of Engineers, 1979; Thorn et al., 1993). However, the Albuquerque Basin aquifer is anisotropic laterally and vertically due to spatial variations in the lithology of these two water-bearing units (Chamberlin et al., 1992). Clay layers 12 to 15 ft thick are commonly observed in the alluvium of the Albuquerque Basin; these clay layers restrict vertical movement of water and may locally limit hydraulic interconnection between the shallow Quaternary aquifer and the Santa Fe Group aquifer (Thorn et al., 1993). As a result of spatial variations in lithology, the hydraulic transmissivity of the Albuquerque aquifer varies tremendously, from less than 10 ft^2/day to 80,000 ft^2/day (Thorn et al., 1993). The hydraulic conductivity of the upper part of the Santa Fe Group varies also but is estimated to be approximately 20 ft per day, average in the vicinity of the Site (Thorn et al., 1993).

The water table configuration in the Albuquerque area has changed considerably over time due to population growth and the resulting increases in water pumping and use. Ground water flow in the vicinity of the Site before large-scale ground water development is thought to have been to the southwest and this condition existed at least into the mid- to late-1930s (Thorn et al., 1993). Ground water elevation contours representing 1960–1961 conditions in the Albuquerque area show a continued general southwesterly flow direction on the east side of the Rio Grande; however, a cone of depression is evident in the general area of the Site (Bjorklund and Maxwell, 1961). The cone of depression was primarily the result of pumping the Main Plant well field, previously located in the downtown Albuquerque area. The Main Plant wells were drilled between 1920 and 1948, and consisted of more than 23 wells; this well field is now completely abandoned.

Ground water beneath the Site is believed to flow in an easterly direction. City-wide ground-water contours from 1992, and simulated 1994 hydraulic-head levels, reflect a large cone of depression had developed on the east side of Albuquerque as a result of ground-water withdrawal (Kernodle et al., 1995); this cone of depression appears to have influenced the ground water flow direction beneath the Site and throughout downtown Albuquerque. During implementation of the Phase II ESA (DE&S, 2001), groundwater was encountered at the Site at approximately 20 ft below ground surface (bgs).

1.4 Site Contaminants of Potential Concern

Contaminants of potential concern (COPCs) identified for the Site include:

- volatile organic compounds (VOCs), specifically TCE

VOCs have previously been reported in Site soil vapor collected from within the crawlspace of the current Site Building at levels in excess of the current recommended vapor instruction

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guidelines. These reported levels may impact indoor air quality within and around the immediate vicinity of the Site building thus may pose an unacceptable exposure risk to current residents.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS

The following environmental investigations have been previously completed at the Site:

- 1994: Limited subsurface soil investigation by Keers Environmental Services, Inc. (Keers)
- 2000: Phase I ESA by Keers
- 2001: Phase II Site Investigation by Duke Engineering & Services (now known as INTERA)
- 2003: Asbestos and lead-based paint (LBP) Inspection by Rhoades Environmental Inspection Services, Inc. (REIS)

Brief summaries of these Site environmental investigations are provided in the following sections.

Based on results obtained as part of these investigations, the following voluntary remediation activities were completed for the Site by INTERA and their subcontractors in 2005:

- Removal of pigeon-droppings from the Site building.
- Removal of asbestos-containing building materials (ACBM)
- Removal of LBP
- Excavation and removal of lead-containing soils from within the building crawlspace

These voluntary remediation activities are fully documented in INTERA's Final Voluntary Remediation Completion Report for the Site (INTERA, 2005).

2.1 1994 Subsurface Soil Investigation

During the 1994 Site subsurface soil investigation, Keers collected 10 surficial soil samples (surficial soil samples SS-01 through SS-10) from within the building crawl space (Keers, 1994). The surficial soil samples were collected from areas with high potential for contamination (e.g., from under drains, sumps, and piping) and analyzed for VOCs, total cyanide, and Resource Conservation and Recovery Act (RCRA) metals. Silver was identified at a concentration of 134 milligrams per kilogram (mg/kg) in surficial soil sample SS-07 and chromium and lead concentrations of 174 mg/kg and 1,670 mg/kg, respectively, in surficial soil sample SS-09. No other constituents were detected.

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Based on these results, two additional subsurface soil samples (SS-07, depth 5 ft and SS-09, depth 5 ft) were collected from surficial sampling locations SS-07 and SS-09 and analyzed for the detected constituents via toxicity characteristic leaching procedure (TCLP). These samples reported <0.010 mg/kg for silver at SS 07 and 0.047 mg/kg for chromium and 0.890 mg/kg for lead at SS-09. Keers concluded that TCLP results "indicated that contaminants are well below current EPA regulatory limits" (Keers, 1994).

With the exception of lead in surficial soil sample SS-09, the analytical results for the RCRA metals reported by Keers are below current NMED soil screening levels (SSLs) for residential land use (NMED, 2012). The soil sample concentration of lead (1,670 mg/kg) identified by Keers in surficial soil sample SS-09 was the impetus for the lead-containing soil removal activities conducted in as part of the 2005 voluntary remediation activities at the Site.

2.2 Phase I Environmental Site Assessment

A Phase I ESA was completed for the Site by Keers in December 2000 (Keers, 2000). The Phase I ESA reported the following environmental Site concerns:

- An active Underground Storage Tank (UST) site was identified approximately one-eighth of a mile northwest of the Site. The UST site is identified as The World Motel at 1721 Central Avenue NW. The NMED Underground Storage Tank Bureau indicated that a release of gasoline has impacted groundwater hydraulically ugradient of the Site. Keers recommended a periodic review of the most current leaking UST information to determine and assess the extent of soil or groundwater contamination, if any, that may be caused by the up-gradient active leaking UST site and possibly impact the Site.
- The age of the structure located on this Site indicates the potential for construction materials containing either ACBM or LBP or both.
- The Site location in a designated flood zone indicates the potential for environmental impact during a major flood event.

2.3 Phase II Site Investigation – DE&S/INTERA

Duke Engineering & Services (DE&S) (now known as INTERA) completed a Phase II Site Characterization for the Site in November 2001 (DE&S, 2001). Among the Phase II objectives was to investigate impacts to Site soils and ground water from previous site activities (i.e., impact from solvents, cyanide, or heavy metals used in the jewelry manufacturing or commercial film development activities). INTERA advanced 12 Geoprobe® soil borings and submitted 13 soil samples, 13 soil gas samples, and four ground water samples for laboratory analysis. The soil samples were analyzed for the presence of cyanide and heavy metals. Although two soil samples were identified to contain arsenic and iron (naturally occurring metals) at levels above NMED SSLs, the levels were determined to be well within natural variance levels for soils in the

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southwestern United States and no further investigation was initiated. The 2001 soil gas and groundwater sampling locations are depicted on Figure 3.

Soil gas samples were analyzed for VOCs. The ground water samples were analyzed for cations and anions, pH, VOCs, cyanide, and heavy metals. The results of the soil gas sampling indicate that a chlorinated solvent release may have occurred at the Site some time ago. TCE was reported in 2001 Site soil vapor samples at concentrations ranging from 0.2 µg/L (200 µg/m^3) to 3.4 µg/L (3,400 µg/m^3) (DE&S, 2001). These levels exceed both the recommended residential use EPA VISL and CRWQCB ESL for TCE (EPA, 2014b; CRWQCB, 2013).

The results of the ground water sampling identified volatile organic compounds in ground water samples at concentrations below New Mexico Water Quality Control Commission (NMWQCC) standards. TCE was the only VOC compound identified reported above laboratory method detection limits. TCE was reported from the two samples (primary and field duplicate [FD]) collected from soil boring SB-12, at a concentration of 1.5 µg/L, well below the TCE New Mexico Ground Water Standard (NM-GS), defined by NMWQCC as 100 µg/L (NMED, 2004).

2.4 REIS Limited Asbestos and LBP Survey

On behalf of INTERA, Mr. Ronald K. Rhoades of REIS, performed a limited asbestos and LBP inspection survey at the Bell Trading Post Facility building in July 2003. The purpose of this limited asbestos survey was to sample readily accessible ACBM and LBP-containing building materials that may have been used in the construction or any subsequent renovation of the building. ACBM and LBP-containing building materials were identified at the Bell Trading Post Facility. LBP was not detected by REIS in samples collected from exterior painted surfaces.

3.0 2014 LIMITED PHASE II SITE INVESTIGATION ACTIVITIES

From May 28 to June 2, 2014, INTERA and their subcontractors completed the following activities in support of additional soil vapor characterization for the Site:

- Exterior to the Site Building:
  - advanced a total of three (3) soil borings to an approximate total depth (TD) of 3 ft bgs and extracted soil vapor from each borehole for laboratory analysis; and,
  - collected a time-integrated outdoor air sample representative of "ambient" conditions over an 8-hour period for VOC analysis.
- Within the Site Building:
  - advanced a total of two (2) soil borings within the warehouse crawlspace to an approximate TD of 2 ft bgs and extracted soil vapor from each borehole for laboratory analysis; and,

  - collected four air samples (2 "source" air samples within the warehouse crawlspace; 2 "ambient" air samples within occupied/communal areas) over an 8-hour period for VOC analysis.

- Submitted all air samples to the analytical contract laboratory, Hall Environmental Analysis Laboratory, Inc. (HEAL), of Albuquerque, New Mexico, for analysis of VOCs via EPA Method TO-15 Select Ion Monitoring (SIM).
- Submitted all soil gas samples to the contract laboratory, Vista Geoscience LLC (VISTA) of Golden, Colorado, for analysis of VOCs via EPA Method 8260 using a ATD-gas chromatograph /mass spectrometer (GCMS).
- Managed investigation-derived waste (IDW).
- Compared analytical results for soil gas/air samples to applicable regulatory or technical standards/guidance to determine the level of impact at the Site (**Section 4**).

Details regarding completed Phase II ESA activities and sample collection methodology are presented in the **Sections 3.1 to 3.3** below. Field quality assurance (QA)/Quality Control (QC) procedures implemented during the Limited Phase II Activities are summarized in **Section 3.4**. Any deviations from the project-specific SAP/QAPP that occurred during the Limited Phase II ESA field execution are discussed in **Section 3.5**. A discussion of the corresponding Limited Phase II ESA analytical results are presented in **Section 4**.

3.1 Pre-Mobilization Activities

Prior to initiating any field investigation, the following planning and initial field mobilization activities are typically required:

- Obtain Site access agreement(s) from Site current land owners/representative(s);
- Complete all necessary permits and applications as required through applicable regulatory agencies;
- Identify, mark, and assess the degree to which any utilities may be impacted; and,
- Identify and establish all necessary and proper health and safety procedures for safe and effective implementation of the proposed activities.

For this investigation, full Site access was granted to NMED and/or its designees by the current Site owner, FHDC, as documented by the access agreement, a copy of which is included in Appendix A. On May 23, 2014, INTERA contacted New Mexico One Call to identify the locations of underground utilities at the Site. Health and safety procedures for safe and effective implementation of the soil gas/air sampling were established in the approved SAP/QAPP and accompanying site-specific health and safety plan [HASP] (INTERA, 2014, Appendix C) but Site sampling conditions were also verified prior to project initiation. On May 28, 2014,

INTERA performed a Site visit to (1) confirm all utility locates and all proposed sampling locations had been properly marked (2) meet/debrief the current Site owner/representative regarding the upcoming activities and (3) establish the current condition of the building crawlspace and determine the need for any additional equipment prior to proceeding with sampling.

No permits or applications were needed to conduct the soil gas/air sampling at the Site.

3.2 Characterization Sampling of Soil/Gas and Air

On June 2, 2014, ambient air and soil gas samples were collected from the locations depicted on Figure 3. All locations were recorded in the field post-sample collection.

Soil gas samples were collected in sorption tubes via vacuum using a system comprised of coring/drill rod; a Post-Run Tubing (PRT) adapter tool; clean, dedicated Teflon-lined polyethylene tubing (for sample collection); and a peristaltic pump equipped with a flow regulator and bi-way valve. First, core/drill rod equipped with an expendable drive-point was manually driven to the target soil gas sampling depths of 2 or 3 ft bgs using a heavy slide hammer. The rod was then retracted approximately 4 to 6 inches to drop the drive point and create a void at the end of the rod from which to collect a soil gas sample. A Teflon® lined (¼-in or ⅜-in) tube and threaded adaptor was then inserted into the rod and threaded into the PRT tool at the bottom of the sample hole. The tubing was connected to both a portable peristaltic pump, which provided the vacuum for sample extraction, as well as a photoionization detector (PID)/combustible gas indicator (CGI) to monitor VOCs and CO_2 and O_2 levels, respectively, during sample purging and collection. The system was then purged and upon stabilization, a soil vapor grab sample was collected into a loaded sorbent tube using dedicated sample tubing and a pump equipped with a flow meter. Flow was monitored to help ensure that the rate at which the soil gas sample was extracted stayed within the recommended extraction rate of 200 mL/minute.

At each soil gas sample location, two (2) sorbent tubes were collected. This duplication effort in sampling was performed to ensure that a duplicate sample from each location was available for laboratory analysis, if a second run on any sample was required (e.g., laboratory instrument failure, operator error, etc.).

Air samples were collected in clean, dedicated, 6L SUMMA canisters equipped with 8-hour regulators. The SUMMA canisters were provided to INTERA by HEAL. The SUMMA canisters were deployed in the morning and the regulator valve opened to initiate air sample collection. The canisters were then retrieved after a period of 8 hours. Initial and final canister pressures were recorded upon deployment and retrieval, respectively.

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Per the SAP/QAPP, all samples were labeled with the appropriate sample identification number (ID) and any other parameter as specified by the analytical laboratory with indelible ink and properly stored on-Site until sample custody could be transferred to the selected offsite laboratory for analysis. On-Site storage and handling of each soil vapor sample included placement in dark plastic bags within a cooler containing ice.

Upon sample collection, all samples were either shipped via Federal Express (sorption tubes to the VISTA Geoscience laboratory in Golden, Colorado) or physically transferred (SUMMA canisters to HEAL in Albuquerque, New Mexico) the same day they were collected at the Site. Sample transfer was documented on the appropriate sample chain-of-custody form(s).

All reusable sampling equipment such as the PRT and drive rod was decontaminated prior to each use. Decontamination was conducted by scrubbing the outside of the equipment with a brush in a solution of water and nonphosphate detergent (Alconox or Liquinox) and double rinsing equipment with distilled water. Excess decontamination water was then wiped off tools exteriors and the inside allowed to air dry prior to re-use. No decontamination was required of the soil gas sample tubing as disposable dedicated sample tubing was utilized at each sample location.

A photo log documenting the Limited Phase II ESA characterization sampling activities is provided in Appendix B. Specifics regarding the characterization sampling conducted as part of the Limited Phase II efforts at the Site are provided in the following subsections.

3.2.1 Soil Vapor Sampling Outside the Site Building

Six (6) soil gas vapor grab samples (sample IDs: SG-01-249471, SG-01-249472, SG-02-249479, SG-02-249480, SG-03-249473, SG-03-247803) were collected from three locations (SG-01 through SG-03) exterior to the Site Building (Figure 3). The soil gas vapor samples were collected from the Site shallow subsurface at approximately one foot below the base of 1.5-in diameter soil borings, approximately 1.5 to 2 ft bgs. These soil borings were advanced using an concrete coring bit on the morning of June 2, 2014, by INTERA's subcontractor, Concrete Coring Services, to clear each soil vapor sample location of concrete/asphalt surface layer and expose the native substrate soils for soil gas sampling.

Prior to collecting a sample at each location, the sample system was purged a minimum of three volumes or until CO_2 and O_2 levels stabilized to ensure that any residual air remaining in the system had been removed. VOCs levels were also monitored during purging using a PID. All screening/flow parameters were recorded on the appropriate sample collection log and/or the field log book, copies of which are provided in Appendix C.

Once purging was complete, two (2) soil vapor grab samples were collected at each location into sorbent tubes using the pump equipped with a flow meter. During extraction of the first soil gas

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sample at SG-01 (SG-01-2490471), flow was inconsistent and the team had difficulty keeping the flow under the target extraction rate. To resolve this for subsequent soil gas samples, a valve was placed between the pump and the flow meter which reduced system air flow and enabled sampling efforts to continue with consistent extraction of soil gas at a rate at or just below 200 mL/minute.

After 1 liter of soil gas flowed through the sorbent tube, flow was shut off and the sorbent tube was removed, resealed, tagged with the sample ID, and placed in a labeled bag. Specifics regarding each sample were recorded on the corresponding chain-of-custody form (s), copies of which are provided in Appendix D. Samples were then prepared for shipment to VISTA for analysis of VOCs via EPA Method 8260B.

Upon completion of soil gas sample collection, the borings were backfilled to the surface with sand and an asphalt (SG-01 and SG-02) or cement (SG-03) patch put in-place, as appropriate. Any cuttings derived from the coring efforts (minimal amount of material) were placed back in the soil boring prior to backfilling. Surface completions were mounded slightly above the surrounding pavement (1/4-in) at the request of the current Site owner/representative.

3.2.2 Soil Vapor Sampling Within the Site Building Crawlspace

A total of four (4) soil gas vapor grab samples (sample IDs: SG-04-249477, SG-04-249478, SG-05-247808, SG-05-249476) were collected from two locations (SG-04 and SG-05) within the crawlspace of the Site Building (Figure 3). The two soil borings were advanced below the dirt floor of the crawlspace to a TD of approximately 2 ft bgs. Although, the original target TD for these samples was approximately 1 ft bgs, a decision was made to advance an extra foot due to the relatively loose soils within the Site building crawlspace to try and ensure extraction of subsurface soil vapor only. The crawlspace dehumidifier was also turned off prior to and during the crawlspace sample collection efforts to help ensure minimal draw and prevent possible dilution of the soil vapor samples.

At each location, two samples were collected into sorbent tubes after the sampling system had been purged a minimum of three volumes and/or until CO_2 and O_2 levels stabilized. VOCs levels were also monitored during purging using a PID. All flow parameters/screening results recorded on the appropriate sample collection log and/or the field log book (Appendix C).

All four samples were then prepared for shipment to VISTA for analysis of VOCs via EPA Method 8260B.

Upon completion of soil gas sample collection, no backfill of the borings was required as the boreholes collapsed immediately after the drill pipe was removed due to soft unconsolidated soils at the near surface.

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3.2.3 Air Sampling

A total of five (5) time-integrated air samples were collected in SUMMA canisters at locations: C-01 and C-02; I-01 an I-02; and O-01 (Figure 3) as follows:

- two (2) "source" air samples within the Site building crawlspace (sample IDs: Air-C-01 and Air-C-02);
- two (2) "ambient" air samples within common/occupied areas of the Site Building (sample IDs: Air-I-01 and Air-I-02); and,
- one (1) "ambient" air sample exterior to the Site Building (sample ID: Air-O-01).

After the 8-hr sampling period elapsed, all SUMMA canisters were closed, collected, and packaged for shipment. A HEAL representative mobilized to the Site and collected the SUMMA canister package from INTERA and shipped the package via Fedex overnight delivery to ESC Lab Sciences of Mt. Juliet, Tennessee. ESC analyzed each SUMMA canister for the presence of VOCs via EPA Method TO-15 SIM. Sample custody transfer was documented on appropriate sample chain-of-custody form(s), copies of which are provided in Appendix D.

3.3 Investigation-Derived Waste Management

Implementation of the Limited Phase II ESA field activities generated limited amounts of the following IDW:

Used personal protective equipment (PPE) (e.g. gloves),

Used disposable sampling tubing and sampling equipment,

Equipment decontamination water, and

Miscellaneous waste (paper towels used for decontamination etc.).

Due to the low level of contamination expected to be present on these waste streams, these IDW waste steams were managed as nonhazardous solid waste. Non liquid waste (e.g. used PPE, wipes, sample tubing etc.) was containerized in plastic bags, sealed, and disposed of in a general refuse dumpster. Any liquid waste generated during equipment decontamination procedures was disposed of by distributing across an impermeable surface at the Site and allowed to evaporate.

3.4 Field Quality Assurance/Quality Control

During execution of the Limited Phase II ESA, the following samples were collected to measure precision and accuracy in accordance with the specified QA/QC requirements outlined in the SAP/QAPP: field trip blank and FDs. The SAP/QAPP identified a soil gas field trip blank to be submitted along with the samples to ensure no contamination was introduced during sorbent tube storage and transport. This QA sample was not formally collected because an extra sorbent tube was not sent by VISTA. A single field trip blank for the project was collected and analyzed for VOCs by EPA Method 8260B (see discussion below). No field equipment rinsate sample(s) were

collected during this field investigation as air and soil gas vapor samples were collected using dedicated, disposable sampling equipment.

Though duplicate samples were collected at all soil gas sampling locations as described in **Section 3.2**, only the duplicate from Location SG-03 (SG-03DUP) was initially submitted to VISTA laboratory as an FD and analyzed for the same set of parameters as the primary sample. Analysis of one FD represents approximately 10% of the total number of samples collected for analysis as part of this investigation and fulfills the minimum amount of sample duplication efforts recommended for a valid field QA program (INTERA, 2014a). The association of the FD with the primary sample was recorded on appropriate sample forms and on the chain-of-custody (Appendix D).

The intent was to compare results between the primary investigation sample collected from Location SG-03 with the results obtained from the FD via a relative percent difference (RPD) analysis to aid in the evaluation of laboratory precision and sample collection method consistency. However, upon receipt and analysis of the sorbent tube SG-03DUP, it was observed that the tube was clean (no response on the GCMS) and was alternatively, in effect, a field trip blank: No constituents were detected in the sample above reporting limits (RLs).

At the request of INTERA, VISTA analyzed all remaining sorbent tube duplicates and reported the soil gas vapor sample results at Location SG-02 for the purposes of the RPD analysis. Results of the duplicate RPD analysis for samples collected at Location SG-02 are presented on Table 1.

3.5 Deviations

The following deviations from the SAP/QAPP occurred during performance of the 2014 Limited Phase II ESA field activities:

Soil gas sample collection - For soil gas samples collected within the crawlspace of the Site Building the target TD for sample collection was defined in the approved SAP/QAPP at 1 ft bgs. This was based on an assumption that crawlspace conditions were confined with poor air circulation and that the soil at the near surface was relatively hard and consolidated. However, a Site inspection performed by INTERA on May 28, 2014, prior to field mobilization, found that crawlspace conditions had changed since Site redevelopment. Air flow was assisted throughout the entire air space by dehumidifiers and fans, the crawlspace was well lit, and the near soil at the surface was relatively loose. Based on these observations, a decision was made to advance an extra foot below the floor of the crawlspace to minimize the inadvertent draw of ambient crawlspace air into the sample during soil gas extraction.

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Field QA Program - the approved SAP/QAPP identified the need for a field trip blank to be assigned for the soil gas sampling efforts. A designated field trip blank was not identified for use during sample collection, storage, and transport of the sorbent tubes; however, as discussed in **Section 3.4** above, Sample SG-03DUP inadvertently became a field trip blank for the investigation.

4.0 LIMITED PHASE II CHARACTERIZATION SAMPLING RESULTS

Site VOC data collected from both soil gas and air were evaluated to further assess potential soil vapor and indoor air impacts associated with former industrial operations at the Site. In this section, INTERA presents the results of these data collection and assessment activities with respect to applicable regulatory or technical guidelines below as well as discusses these results relative to previous environmental data obtained for the Site.

4.1 Technical or Regulatory Guidelines

As summarized in the approved SAP/QAPP, both EPA and NMED are the primary decision makers regarding this Site (INTERA, 2014a); therefore, the recommended guidelines for assessing soil vapor concerns considered most applicable to this Site are the EPA VISLs for a sub-slab and/or exterior soil gas exposure, updated May 2014 (EPA, 2014b). The recommended guidelines for assessing air quality at the Site considered most applicable are the EPA regional screening levels (RSLs) for indoor air, updated May 2014 (EPA, 2014a).

Any Site VOC constituent for which an EPA VISL or RSL was not available, the corresponding CRWQCB Tier 1 ESL, if listed, for shallow soil gas vapor or air was referenced and utilized to assess potential environmental impact.

VOCs in both Site soil gas and air were evaluated using the recommended default parameters and exposure factors reflective of a residential use scenario, the current and foreseeable future land use of the Site. For the evaluation of carcinogenic VOCs, EPA RSLs and VISLs and, if applicable, CRWQCB Tier 1 ESLs, were adjusted to reflect a total target carcinogenic risk of 10^{-5}. Assigning a less conservative total target carcinogenic risk of 10^{-5} is standard practice for assessing carcinogenic risk within the State of New Mexico as described in the NMED document, Risk Assessment Guidance for Site Investigations and Remediation (NMED, 2012). If non-carcinogenic ESL is lower than 10^{-5} carcinogenic screening level, the lower (more conservative) ESL should be used.

4.2 Soil Gas

Six soil gas samples were analyzed by VISTA via EPA Method 8260 on June 12, 2014. All sample locations are depicted on Figure 4. The 2014 soil gas analytical results are summarized in Table 2. The locations of elevated (in excess of EPA VISLs) soil vapor VOC concentrations are

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shown on Figure 4. A copy of the complete analytical report for soil vapor is provided in Appendix D.

In Site soil vapor, 26 out of the 71 VOCs analyzed were found to be present in one or more samples at concentrations above RLs. Of these COPCs, chloroform, naphthalene, and TCE were present in one or more samples at concentrations in excess of EPA VISLs (Table 2, Figure 4). All three of these VOCs were identified in soil vapor collected from locations SG-02 and SG-03 situated along on the north/west perimeter of the building. Chloroform was reported at a concentration of 7.7 $\mu g/m^3$ at SG-02 and 29 $\mu g/m^3$ at SG-03. The corresponding EPA VISL for chloroform in sub-slab/exterior conditions (adjusted for a total target cancer risk of 10^{-5}) is 12 $\mu g/m^3$. Chloroform was not identified in soil vapor above RLs at any other locations.

Naphthalene was present in soil vapor at all locations except SG-04. At locations SG-02 and SG-03 naphthalene was reported at concentrations of 8.7 $\mu g/m^3$ and 5.4 $\mu g/m^3$, respectively: the corresponding EPA VISL for naphthalene in sub-slab/exterior conditions (adjusted for a total target cancer risk of 10^{-5}) is 8.3 $\mu g/m^3$. Naphthalene was also reported at Location SG-01 and SG-05 but at trace concentration (at or below the quantitation limit [RL]).

TCE was reported in soil vapor at SG-02 at a minimum concentration of 1,800 $\mu g/m^3$. Exact quantitation of TCE at this location could not be evaluated due to limitation of the analytical method's maximum quantitation limit/method detection limit (MDL) (Appendix D). This reported concentration far exceeds the recommended EPA VISL for TCE of 21 $\mu g/m^3$. TCE was also reported in soil vapor at locations SG-03 and SG-05 but the reported TCE concentrations at these locations were significantly less (11 $\mu g/m^3$ and 14 $\mu g/m^3$, respectively) and below recommended screening levels.

4.3 Air

Five SUMMA canisters were analyzed by ESC Lab Sciences (a HEAL subcontracted laboratory) via EPA Method TO-15 SIM on June 8, 2014. Analytical results are summarized in Table 3. All SUMMA canister sample locations are shown on Figure 5. The locations of elevated VOC concentrations in air (in excess of EPA RSLs) are depicted on Figure 5. A copy of the complete analytical report for air is provided in Appendix D.

Of the 22 VOCs analyzed, the following were found to be present in one or more air samples at concentrations above RLs: benzene, carbon tetrachloride, chloroethane, chloroform, cloromethane, 1,4-dichlorobenzene, ethylbenzene, PERC, TCE and vinyl acetate. Of these COPCs, only chloroform was definitively present at concentrations in excess of the EPA RSL (Table 3, Figure 5).

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Chloroform was identified in both air samples collected within the Site building crawlspace at the following concentrations: 1.5 $\mu g/m^3$ in sample Air-C-01 and 1.7 $\mu g/m^3$ in sample Air-C-02: the corresponding EPA RSL for chloroform in indoor air (adjusted for a total target cancer risk of 10^{-5}) is 1.2 $\mu g/m^3$.

In addition to chloroform, 1,2-dibromoethane (EDB), was also retained as a Site COPC in air due to an insufficient lower MDL. A known carcinogen, EDB can cause a variety of acute health effects, primarily through inhalation. Although EDB was not present above RLs in any of the air samples collected at the Site, the EPA RSL for EDB in indoor air is very conservative, 0.05 $\mu g/m^3$. The current MDL for EDB via EPA Method TO-15 SIM is 0.15 $\mu g/m^3$. Therefore, current data is not sufficient to accurately assess the potential environmental risk(s) posed by EDB because the MDL is higher than the respective EPA RSL for EDB.

4.4 Evaluation of Site Soil Gas and Air

Previous assessment of soil gas at the Site indicates a possible historic release of chlorinated solvents, specifically TCE, may have occurred at the Site as a result of former Site operations (DE&S, 2001). Elevated levels of TCE (3,400 $\mu g/m^3$) were identified in the 2001 soil gas sample collected at location SB-03 (Figure 3) immediately north of the building along Laguna Blvd.

The 2014 Limited Phase II ESA investigation results confirm the presence of elevated TCE in soil vapor in the northwestern section of the Site. Chloroform, naphthalene, and TCE were all identified in soil vapor collected both north and within the northwest driveway of the building (Locations SG-02 and SG-03).

Air samples collected as part of the 2014 Limited Phase II ESA investigation in the Site building crawlspace also indicate subsurface transport of VOCs is occurring beneath the Site building. Chloroform was identified in air collected from the Site building crawlspace at concentrations above EPA RSLs. However, no VOCs were detected in air at levels of concern within occupied areas of the Site building. This is likely due to the condition of the Site building floor and the ventilation system that operates within the Site building crawlspace. The ventilation system appears to maintain good air flow and air exchange beneath the Site building thus limiting the accumulation of VOCs in air within the crawlspace.

Both chloroform and TCE are known metal degreasing solvents that were extensively used by the jewelry manufacturing industry. Both halogenated aliphanes, these constituents degrade far more slowly than some other VOCs (such as halogenated aromatics) and mainly under anaerobic conditions (EPA, 1993).

5.0 CONCLUSIONS AND RECOMMENDATIONS

Current available data indicate that an acute release of chlorinated solvents, specifically TCE and chloroform, historically occurred at the Site or within the immediate vicinity of the Site most likely during the Site's operation as a jewelry manufacturing facility. Environmental investigation data indicates that TCE and chloroform are present in soil vapor within the northwest corner of the Site, at approximately the Roma Ave and Laguna Blvd intersection (2001 Location SB-03, Figure 3). Concentrations appear to quickly dissipate to the east and west and less so to the south, suggesting a potential south/southwest trending vapor plume that extends underneath the current Site building. The extent of the plume appears to be contained within the Site property to the east, west, and south; however, no data currently exists to assess soil vapor VOC concentrations across Laguna Blvd, immediately north/northwest of the Site.

Based on current documentation regarding Site history and use, the source of the chlorinated solvents was likely a result of the Site's former jewelry manufacturing operations. The Phase I ESA report completed by Keers in 2000 identified no specific impacts to the Site from other facilities within ASTM-specified search distances (Keers, 2000). Both TCE and chloroform are relatively immune to dechlorination under vadose (aerobic) conditions and will continue to slowly diffuse and/or migrate upward through the subsurface as soil vapor.

Current data indicates that the VOC levels do not pose an immediate risk to the current residents of the Site building. The levels of TCE and chloroform measured in air within the living areas of the Building are below EPA RSLs for residential use. The risk associated with EDB, though not identified above the MDL in any of the air samples, could not be evaluated with regard to its respective EPA RSL.

Maintaining the VOC concentrations below levels of concern is likely dependent on continued operation of a well-ventilated Site building crawlspace. The levels of VOCs present in indoor air may also be impacted by changes in the barometric pressure which can have a seasonal fluidity. For example, changes in humidity, the use of heating/cooling systems within the building, and variable water use outside the building can all impact the rate at which soil gas migrates upward within the subsurface.

As such, INTERA recommends the following actions to be completed for the Site:

- Perform additional limited soil vapor sampling north/northwest of the Site to determine northern lateral extent of the chlorinated solvent plume,
- Ensure maintenance and continued operation of the Site building's crawlspace ventilation system, and

- Conduct air sampling within occupied areas of the Site building and the Site building crawlspace quarterly for a period of at least one year to generate a baseline for the evaluation of potential seasonal influences to indoor air quality and to address any future concerns regarding air quality at the Site.

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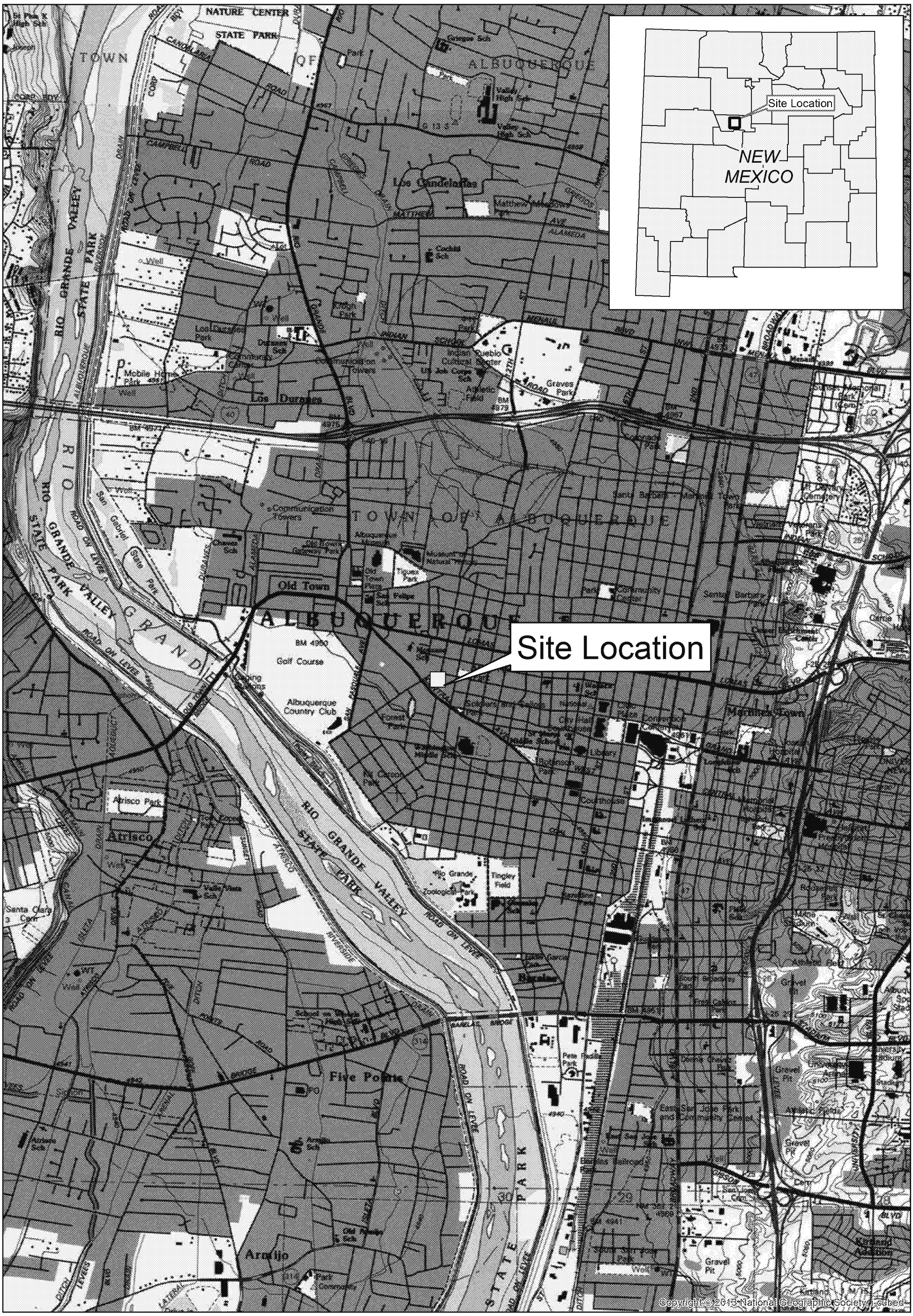
FIGURES



N

0 1,000 2,000 4,000 Feet

Sources:
Topo – ArcGIS online/USGS

INTERA

Figure 1
Site Location Map
Former Bell Trading Post Property,
Albuquerque, New Mexico

S:\Projects\NMENV_M001_GWQB\Bell Trading Post\Graphics\GIS\MapDocs\PhaseII_Jun2014\01_SiteLocation.mxd 6/19/2014

N

0 50 100 Feet

Legend

Previous Soil Sampling Area (basement/crawl space)
Source:

Source(s): Aerial - BERNCO website, dated 2012

INTERA

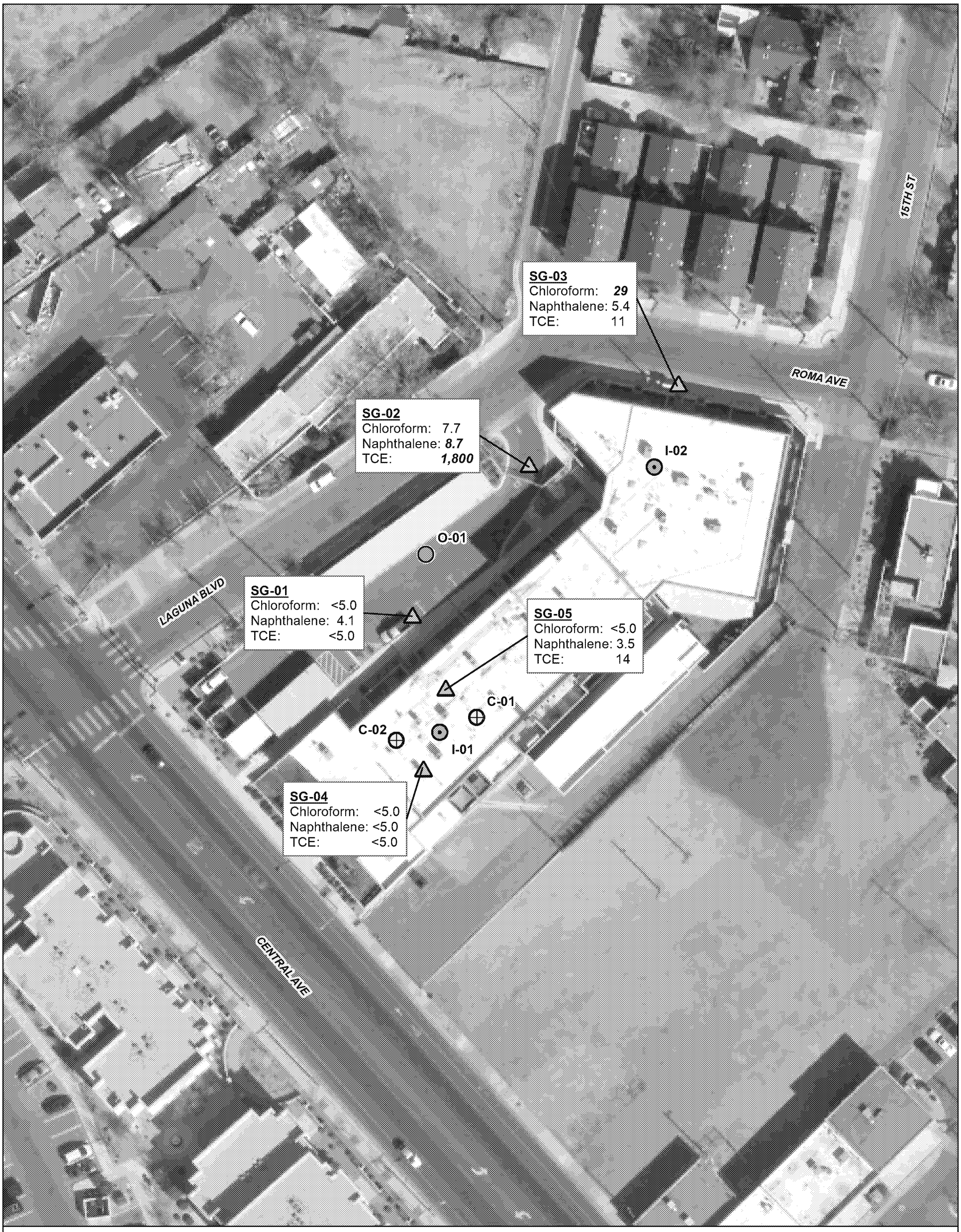
Figure 2
Site Map
Former Bell Trading Post Property,
Albuquerque, New Mexico

FILE: S:\Projects\NMENV_M001_GWQB\Bell Trading Post\Graphics\GIS\MapDocs\PhaseII_Jun2014\02_SitePlan.mxd 6/19/2014

Source(s): Aerial - BERNCO website, dated 2012

Figure 3
Soil Gas and Air Sampling Locations
Former Bell Trading Post Property,
Albuquerque, New Mexico

FILE: S:\Projects\NMENV_M001_GWQB\Bell Trading Post\Graphics\GIS\MapDocs\PhaseII_Jun2014\03_SampleLocs.mxd 6/23/2014



Source(s): Aerial - BERNCO website, dated 2012

INTERA

Figure 4
VOC Concentrations in Soil Gas
Former Bell Trading Post Property,
Albuquerque, New Mexico

FILE: S:\Projects\NMENV_M001_GWQB\Bell Trading Post\Graphics\GIS\MapDocs\PhaseII_Jun2014\04_SoilGasVOC.mxd 6/23/2014

Figure 5
VOC Concentrations in Air
Former Bell Trading Post Property,
Albuquerque, New Mexico

INTERA

Source(s): Aerial - BERNCO website, dated 2012

FILE: S:\Projects\NMENV_M001_GWQB\Bell Trading Post\Graphics\GIS\MapDocs\PhaseII_Jun2014\05_AirVOC.mxd 6/23/2014

TABLES

TABLE 1
Relative Percent Difference Analysis
Bell Trading Post Property
Albuquerque, Bernalillo County, New Mexico

Constituent	Location/Sample ID	Reported Concentration (µg/m3)	Approximate RPD (%)
(cis)-1,2-dichloroethene	SG-02	1.9	18
	SG-02DUP	1.6	
(trans)-1,2-dichloroethene	SG-02	2.1	**200**
	SG-02DUP	<5.0	
1,1,1-Trichloroethane	SG-02	1.6	**23**
	SG-02DUP	1.3	
1,2,4-Trimethylbenzene	SG-02	19	**200**
	SG-02DUP	<5.0	
1,3,5-Trimethylbenzene	SG-02	3.5	**200**
	SG-02DUP	<5.0	
1,3-Dichlorobenzene	SG-02	4.3	**200**
	SG-02DUP	<5.0	
2-Butanone	SG-02	70	**41**
	SG-02DUP	46	
2-Hexanone	SG-02	20	**91**
	SG-02DUP	7.3	
4-Methyl-2-pentanone	SG-02	20	**70**
	SG-02DUP	9.6	
Acetone	SG-02	400	**21**
	SG-02DUP	320	
Benzene	SG-02	11	5
	SG-02DUP	10	
Carbon disulfide	SG-02	8.7	**21**
	SG-02DUP	11	
Chloroform	SG-02	7.7	12
	SG-02DUP	6.8	
Ethylbenzene	SG-02	41	**136**
	SG-02DUP	7.8	
Methylene chloride	SG-02	1.3	1
	SG-02DUP	1.3	
Naphthalene	SG-02	8.7	**200**
	SG-02DUP	<5.0	
n-Butylbenzene	SG-02	1.5	**200**
	SG-02DUP	<5.0	
n-Propylbenzene	SG-02	2.6	**200**
	SG-02DUP	<5.0	
Tetrachloroethene (PERC)	SG-02	12	5
	SG-02DUP	12	
Toluene	SG-02	67	8
	SG-02DUP	62	
Trichloroethene (TCE)	SG-02	1,800	0
	SG-02DUP	1,800	
Trichlorofluoromethane	SG-02	4.7	15
	SG-02DUP	4.1	
m,p-Xylene	SG-02	200	**189**
	SG-02DUP	5.7	
o-Xylene	SG-02	82	**194**
	SG-02DUP	1.3	

Notes:

Includes detected constituents only.

Bolding indicates constituent RPD in excess of the recommended 20% (INTERA, 2014a)

< = constituent not detected above RL. RL is reported.

µg/m^3 = micrograms per cubic meter

RL = reporting limit

TABLE 2
Detected Constituents in Soil Vapor
Bell Trading Post Property
Albuquerque, Bernalillo County, New Mexico

Location/Sample ID	Collection Date	Concentration (µg/m³)																							
		(cis)-1,2-dichloroethene	1,1,1-Trichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	2-Butanone	2-Hexanone	4-Isopropyltoluene	4-Methyl-2-pentanone	Acetone	Benzene	Bromodichloromethane	Carbon disulfide	Chloroform	Dichlorodifluoromethane	Ethylbenzene	Naphthalene	n-Propylbenzene	Styrene	tert-Butylbenzene	Tetrachloroethene (PERC)	Toluene	Trichloroethene (TCE)	Trichlorofluoromethane	Total Xylenes[c]
EPA VISL[a] (µg/m³)		**NaV**	**52,000**	**73**	**NaV**	**NaV**	**52,000**	**310**	**NaV**	**31,000**	**320,000**	**36**	**7.6**	**7,300**	**12**	**1,000**	**110**	**8.3**	**10,000**	**10,000**	**NaV**	**420**	**52,000**	**21**	**7,300**	**1,000**
CRWQCB ESL[b] (µg/m³)		**3,700**	**2,600,000**	**NaV**	**NaV**	**NaV**	**2,600,000**	**NaV**	**NaV**	**210,000**	**15,000,000**	**420**	**330**	**NaV**	**2,300**	**NaV**	**4,900**	**360**	**NaV**	**470,000**	**NaV**	**2,000**	**160,000**	**3,000**	**NaV**	**52,000**
SG-01	6/2/2014	<5.0	<5.0	34	*10*	<5.0	21	<5.0	<5.0	19	170	14	<5.0	25	<5.0	1.7J	51	4.1J	10	<5.0	<5.0	<5.0	140	<5.0	4.5J	180
SG-02	6/2/2014	1.9J	1.6J	19	*3.5J*	*4.3J*	70	20	<5.0	20	400E	11	<5.0	8.7	7.7	<5.0	41	**8.7**	2.6J	<5.0	<5.0	12	67	**1,800E**	<5.0	280
SG-03	6/2/2014	<5.0	<5.0	14	*7.3*	*5.8*	<5.0	<5.0	*33*	9.2	85	7.7	5.4	4.8J	**29**	2.3J	12	5.4	2.1J	2.7J	*1.6J*	1.5J	28	11	4.1J	54
SG-04	6/2/2014	<5.0	<5.0	<5.0	<5.0	*1.9J*	<5.0	<5.0	<5.0	<5.0	57	3.9J	<5.0	12	<5.0	2.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	51	<5.0	3.0J	<10
SG-05	6/2/2014	<5.0	<5.0	5.0J	<5.0	*3.4J*	<5.0	<5.0	<5.0	<5.0	73	4.0J	<5.0	3.4J	<5.0	3.3J	2.7J	3.5J	<5.0	1.3J	<5.0	<5.0	11	14	4.7J	8.7J

Notes:

Bolding indicates constituent detected in excess of the recommended standard/guidance.

Italics indicates constituent detected and no recommended standard/guidance to address vapor intrusion concerns currently exists.

With the exception of total xylenes, the RL for all reported constituents is 5.0 µg/m³; the RL for total xylenes is 10.0 µg/m³.

a =EPA VISL calculated based on a default residential land use scenario and a total target risk for carcinogens of 10^{-5} (EPA, 2014).

b =Tier 1 CRWQCB ESL for soil vapor based on a default residential land use scenario (CRWQCB, 2013). Adjusted for carcinogens to represent a total target cancer risk of 10^{-5}.

c =Total xylenes calculated as the sum of the detected constituents: m,p-Xylene and o-Xylene. If one or more constituents are not detected then half the detection limit is used.

< = constituent not detected above RL. RL is reported.

NaV = not available.

µg/m³ = micrograms per cubic meter

CRWQCB = California Department of Toxic Substances Control/Regional Water Quality Control Board

E = constituent detected above method quantitation range

EPA = U.S. Environmental Protection Agency

ESL = environmental screening level

J = constituent detected below quantitation limit (RL)

VISL = vapor intrusion screening level

RL = reporting limit

TABLE 3
Detected Constituents in Air
Bell Trading Post Property
Albuquerque, Bernalillo County, New Mexico

Location/Sample ID	Collection Date	Concentration (µg/m³) 1,2-Dibromoethane (EDB)	1,4-Dichlorobenzene	Benzene	Carbon tetrachloride	Chloroethane	Chloroform	Chloromethane	Ethylbenzene	Tetrachloroethylene (PERC)	Trichloroethylene (TCE)	Vinyl acetate
EPA RSL[a] (µg/m3)		**0.05**	**2.55**	**3.60**	**4.68**	**10,429**	**1.22**	**93.9**	**11.2**	**41.7**	**2.09**	**209**
CRWQCB ESL[b] (µg/m³)		**0.34**	**2.21**	**0.84**	**0.58**	**31,286**	**4.59**	**93.9**	**9.7**	**4.1**	**5.93**	**NaV**
1406074-001A AIR-O-01	6/2/2014	<0.15	<0.12	0.38	0.50	<0.11	<0.097	0.85	0.31	0.31	0.11	<0.070
1406074-002A AIR-I-01	6/2/2014	<0.15	0.12	0.64	0.50	<0.11	0.58	0.91	0.95	0.19	0.21	<0.070
1406074-003A AIR-I-02	6/2/2014	<0.15	<0.12	0.70	0.47	0.20	0.58	1.1	1.3	0.18	0.64	<0.070
1406074-004A AIR-C-01	6/2/2014	<0.15	<0.12	1.2	0.52	<0.11	**1.5**	1.1	6.1	18	3.1	0.23
1406074-005A AIR-C-02	6/2/2014	<0.15	<0.12	0.57	0.54	<0.11	**1.7**	0.91	1.9	0.41	2.5	<0.070

Notes:

Bolding indicates constituent detected in excess of the recommended standard/guidance.

Shaded cells indicate the RL exceeds the standard/guidance.

a =EPA RSL for indoor air. Calculated based on a default residential land use scenario and a total target risk for carcinogens of 10^{-5} (EPA, 2014).

b =Tier 1 CRWQCB ESL for indoor air based on a default residential land use scenario (CRWQCB, 2013). Adjusted for carcinogens to represent a total target cancer risk of 10-5.

< = constituent not detected above RL. RL is reported.

NaV = not available.

µg/m³ = micrograms per cubic meter

EPA = U.S. Environmental Protection Agency

RSL = regional screening level

RL = reporting limit

Appendix A
Access Agreement

RECEIVED
NOV 8 2013
Ground Water Quality Bureau

Pamela Homer
Acting Program Manager
Remediation Oversight Section
PO Box 5469
Santa Fe, NM 87502-5469

October 31, 2013

Re: Brownfields Assistance for Bell Trading Post Property
1503 Central Avenue NW, Albuquerque, New Mexico 87104

Dear Pamela,
This is a request for assistance through the NMED Brownfields Program for investigation and assessment of property located at 1503 Central Avenue NW in Albuquerque, New Mexico. Based on previous environmental studies of the property, FHDC is hereby requesting assistance through NMED in conducting further site investigation and assessment activities to address potential indoor air impacts.

Thank you for your consideration of this request.

Respectfully submitted,

Rick Davis
President
Family Housing Development Corporation

FHDC a not-for-profit corporation
po box 91525 albuquerque, nm 87199 phone 505-873-9638 mobile 505-238-2892 fax 505-266-5228 email fhdc@earthlink.net

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

Harold Runnels Building
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

RYAN FLYNN
Secretary-Designate

BUTCH TONGATE
Deputy Secretary

CONSENT FOR ACCESS TO PROPERTY

NAME OF PROPERTY OWNER: Rick Davis

DESCRIPTION OF PROPERTY (type of property & address): Residential Condominiums
1503 Central Avenue NW, Albuquerque, NM 87104

I hereby give my consent and authorization to the New Mexico Environment Department (NMED), its contractor and subcontractors, to enter the property described above in order to conduct environmental assessment activities, which may include:

1. Collecting samples of surface and subsurface soil, soil vapor, ground and surface water, air, building materials, waste materials, and solids or liquids stored or disposed of at the property;

2. Documenting scientific and engineering observations, including but not limited to taking notes, making recordings, taking photographs, measuring and surveying;

3. Drilling and finishing boreholes for the purposes of collecting soil, soil vapor, and/or ground water samples; and

4. Other actions at the property as may be necessary to determine the nature, extent and potential threat to human health and the environment of contaminants at the site.

☒ I am the property owner.

☐ I am a representative of the property owner with authorization to sign this access agreement.

Signature: _____ Date: 10/31/2013

Printed Name: Rick Davis Title: President

Address: PO Box 91525 Albuquerque, NM 87199

Telephone Number(s): Home: _____ Work: 873-9638 Cell: 505-259-0735

Email: rick@rdaviscompanies.com

Appendix B
Site Photo Log

Photo 1: View of the Site's northwest entrance from inside gated parking lot, facing north towards Laguna Blvd and Roma Ave intersection.

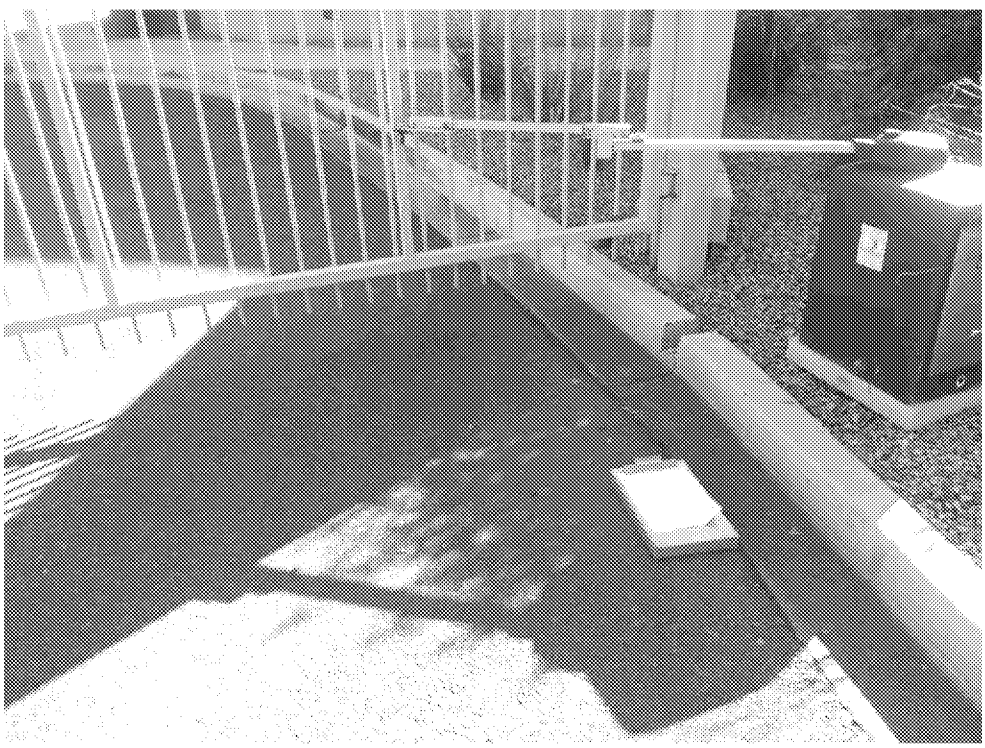


Photo 2: Proposed soil gas sampling location SG-02. Location SG-02 was bored approximately 4 ft from the gate on the opposite side, approximately 1 ft from the curb.

Photo 3: Proposed soil gas sampling location SG-03. The presence of telecommunication lines required Location SG-03 to be adjusted slightly to the east (left in picture).

Photo 4: Proposed soil gas sampling location SG-03, just east of telecommunication lines. Location SG-03 was drilled through the sidewalk, approximately 1 ft from the evergreen tree pictured in the center.

Photo 5: Site Building Crawlspace.

Photo 6: Site Building Crawlspace. Note small excavation area around one of the crawlspace piers, exposing unconsolidated material to approximately 1.5 ft deep.

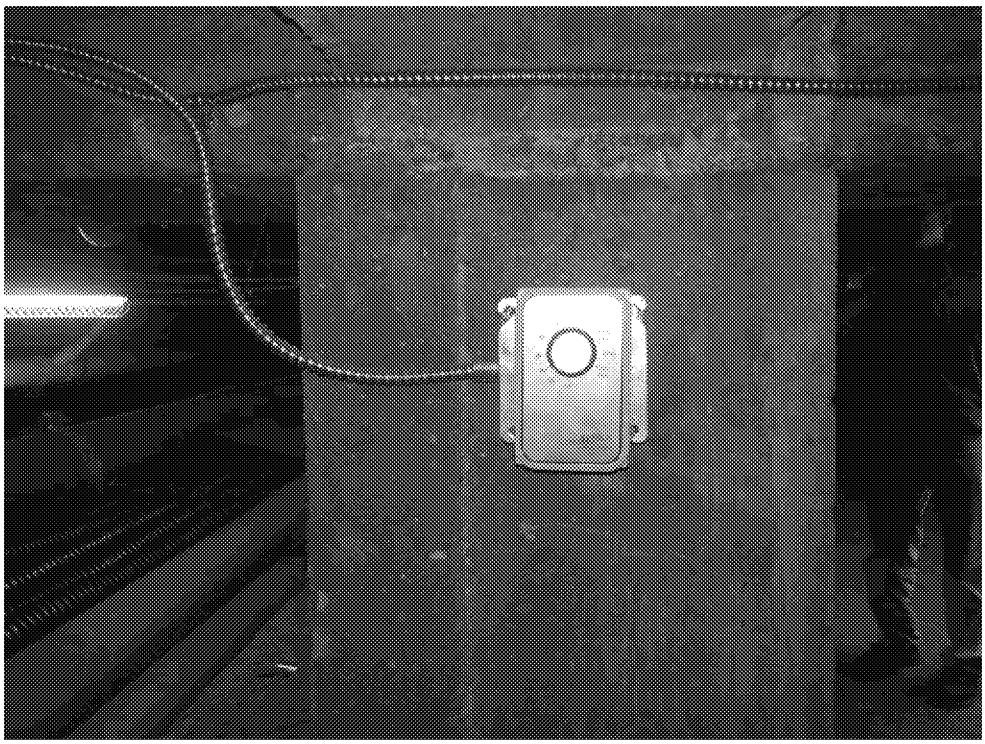


Photo 7: Operational humistat installed to control crawlspace air flow and humidity within the Site Building crawlspace. Typically, humidity levels were set at 45%. Note: System was turned off for the duration execution of air sampling.

Photo 8: Final Soil Vapor Sample Location SG-03.

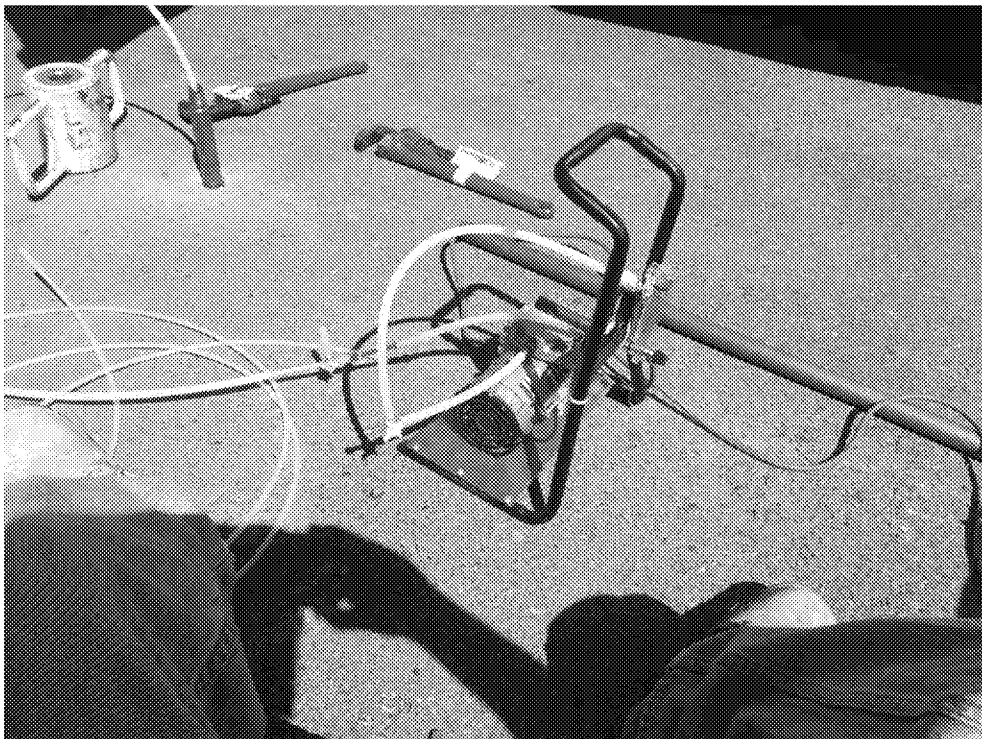


Photo 9: Soil Vapor Sample Equipment.

Photo 10: Soil gas sampling at Location SG-02. Annular space sealed with inflated nitrile gloves to help ensure airtight seal between subsurface and drill pipe was maintained during vapor extraction.

Appendix C
Field Forms and Notes

Vista GeoScience
130 Capital Drive, Suite C
Golden, CO 80401-5654
Phone: 303-277-1694
Fax: 303-278-0104

PAGE:	1 OF 5
DATE / TIME:	6/2/14
PROJECT:	Bell Trading Post
JOB NO. :	
REC / SAMP BY:	C. SHORT

SOIL-VAPOR SAMPLING FORM

WELL/LOC. NO. :	WELL TYPE:	☐ Monitor	☐ Extraction	☐ PRT Sys.	☒ Other
SG-01	WELL MATERIAL:	☐ PVC	☒ Poly / Implant	☐ Teflon	☐ Other

WELL OR PRT PURGING & SAMPLING LOG

PURGE VOLUME
Casing/Tubing Inner Diameter:
☐ 1/4-inch ☐ 1/2-inch ☐ 3/4-inch ☐ 1-inch
☒ Other 3/8"
Total Length of Tubing/Casing: 4'
Number of Well Volumes to be Purged (# Vols): _____

PURGING METHOD
☐ Landtec
☐ Peristaltic pump
☒ Other - Type: PID/CH4
Well Depth: 3'

PURGE VOLUME CALCULATION: (Tubing Volume/ft x length) X (# Purge Volumes) = _____ CC or Liters
(Refer to Tubing / Hole Volume Table)

PURGE TIME
1010 START 1012 STOP 2 ELAPSED

PURGE RATE
Initial _____ L/pm Final _____ L/pm

ACTUAL PURGE VOLUME
_____ Liters

FIELD PARAMETER MEASUREMENT CO H2S LEL O2

Time	Minutes	FLOW	Vacuum	PID	FID	~~CH4~~	~~CO2~~	~~O2~~	~~Bal~~		
00:00		L/min		ppm	ppm	%	%	%	%		
1010	0	0.2		2.2		87	0	0	20.4		
1010:30	1/2			1.3		—	—	—	—		
1011	1			1.3		~~87~~	—	—	—		
1011:30	1.5			—		2	0	0	20.2		
1012	2			—		2	0	0	20.2		
~~H2S~~											

Observations/Note:

SAMPLE COLLECTION

SAMPLE CONTAINER TYPE
☐ Tedlar Bag ☒ Sorption Tubes ☐ Summa Canister ☐ Septum Bottle

SAMPLES Sample Series: _____

Sample/Location ID	Contain ID	Date	Time	Depth	Volume	Q	tf	Comments	
249472	SG-01	6/2	1033	3'	1L	0.2	1038		
249471	trash	6/2	—						

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Golden, CO 80401-5654
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Fax: 303-278-0104

PAGE:	2 OF 5
DATE / TIME:	6/2/14
PROJECT:	
JOB NO. :	
REC / SAMP BY:	C. SHORT

SOIL-VAPOR SAMPLING FORM

WELL/LOC. NO. :	WELL TYPE:	☐ Monitor	☐ Extraction	☐ PRT Sys.	☒ Other
SG-02	WELL MATERIAL:	☐ PVC	☒ Poly / Implant	☐ Teflon	☐ Other

WELL OR PRT PURGING & SAMPLING LOG

PURGE VOLUME
Casing/Tubing Inner Diameter:
☒ 1/4-inch ☐ 1/2-inch ☐ 3/4-inch ☐ 1-inch
☐ Other _____
Total Length of Tubing/Casing: 4'
Number of Well Volumes to be Purged (# Vols): _____

PURGING METHOD
☐ Landtec
☐ Peristaltic pump
☒ Other - Type: PID/GGI
Well Depth: 30"

PURGE VOLUME CALCULATION: (Tubing Volume/ft x length) **X** (# Purge Volumes) = _____ CC or Liters
(Refer to Tubing / Hole Volume Table)

PURGE TIME _____ START _____ STOP _____ ELAPSED

PURGE RATE Initial _____ L/pm Final _____ L/pm

ACTUAL PURGE VOLUME _____ Liters

FIELD PARAMETER MEASUREMENT CO H_2S LEL O_2

Time	Minutes	FLOW	Vacuum	PID	FID	~~CH4~~	~~CO2~~	~~O2~~	~~Bal~~		
00:00		L/min		ppm	ppm	%	%	%	%		
1132	0	0.2		3.2		—	—	—	—		
1133	1	"		1.1		—	—	—	—		
1134	2	"		0.8		—	—	—	—		
1135	3	"		0.6		4	1	0	19.8		
1136	4	"		—		0	2	3	19.8		
1137	5	"		—		7	2	3	19.8		

Observations/Note:

SAMPLE COLLECTION

SAMPLE CONTAINER TYPE
☐ Tedlar Bag ☒ Sorption Tubes ☐ Summa Canister ☐ Septum Bottle

SAMPLES Sample Series: _____

Sample/Location ID		Contain ID	Date	Time	Depth	Volume	Q	tf	Comments
24941	79	SG-02	6/2	1140	30"	1L	0.2	1145	DUP
24941	80	SG-02	6/2	1147	30"	1L	0.2	1147	Use this one

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PAGE:	3 OF 5
DATE / TIME:	~~6/11~~ 6/12/14
PROJECT:	
JOB NO. :	
REC / SAMP BY:	C. SHEET

SOIL-VAPOR SAMPLING FORM

WELL/LOC. NO. :	WELL TYPE:	☐ Monitor	☐ Extraction	☐ PRT Sys.	☒ Other
SG-03	WELL MATERIAL:	☐ PVC	☒ Poly / Implant	☐ Teflon	☐ Other

WELL OR PRT PURGING & SAMPLING LOG

PURGE VOLUME
Casing/Tubing Inner Diameter:
☒ 1/4-inch ☐ 1/2-inch ☐ 3/4-inch ☐ 1-inch
☐ Other _____
Total Length of Tubing/Casing: 41
Number of Well Volumes to be Purged (# Vols): _____

PURGING METHOD
☐ Landtec
☐ Peristaltic pump
☒ Other - Type: PID/EGI
Well Depth: 31

PURGE VOLUME CALCULATION: (Tubing Volume/ft x length) **X** (# Purge Volumes) = _____ CC or Liters
(Refer to Tubing / Hole Volume Table)

PURGE TIME
1235 START 1238 STOP _____ ELAPSED

PURGE RATE
Initial _____ L/pm Final _____ L/pm

ACTUAL PURGE VOLUME
_____ Liters

FIELD PARAMETER MEASUREMENT

CO H2S LEL O2

Time	Minutes	FLOW	Vacuum	PID	FID	~~CH4~~	~~CO2~~	~~O2~~	~~Bal~~		
00:00		L/min		ppm	ppm	%	%	%	%		
1235	0	0.2		1.0		—	—	—	—		
1236	1	↓		0		—	—	—	—		
1237	2	↓		0		4	2	0	20.3		
1238	3	↓		—		3	1	0	20.2		

Observations/Note:

SAMPLE COLLECTION

SAMPLE CONTAINER TYPE
☐ Tedlar Bag ☒ Sorption Tubes ☐ Summa Canister ☐ Septum Bottle

SAMPLES Sample Series: L/min

Sample/Location ID	Contain ID	Date	Time	Depth	Volume	Q	tF	Comments	
249473	SG-03	6/12	1241	3'	1 L	0.2	1246		
247803	SG03	6/12	1249	3'	1 L	0.2	1249		

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Golden, CO 80401-5654
Phone: 303-277-1694
Fax: 303-278-0104

PAGE:	4 OF 5
DATE / TIME:	6/2/14
PROJECT:	
JOB NO. :	
REC / SAMP BY:	ASHORT

SOIL-VAPOR SAMPLING FORM

WELL/LOC. NO. :	WELL TYPE:	☐ Monitor	☐ Extraction	☐ PRT Sys.	☒ Other
SG-04	WELL MATERIAL:	☐ PVC	☒ Poly / Implant	☐ Teflon	☐ Other

WELL OR PRT PURGING & SAMPLING LOG

PURGE VOLUME
Casing/Tubing Inner Diameter:
☒ 1/4-inch ☐ 1/2-inch ☐ 3/4-inch ☐ 1-inch
☐ Other _____
Total Length of Tubing/Casing: _____
Number of Well Volumes to be Purged (# Vols): _____

PURGING METHOD
☐ Landtec
☐ Peristaltic pump
☒ Other - Type: PID/GEM

Well Depth: _____

PURGE VOLUME CALCULATION: (Tubing Volume/ft x length) **X** (# Purge Volumes) = _____ CC or Liters
(Refer to Tubing / Hole Volume Table)

PURGE TIME
_____ START _____ STOP _____ ELAPSED

PURGE RATE
Initial 0.2 L/pm Final 0.2 L/pm

ACTUAL PURGE VOLUME
_____ Liters

FIELD PARAMETER MEASUREMENT

Time	Minutes	FLOW	Vacuum	PID	FID	~~CH4~~ CO	~~CO2~~ H_2S	~~O2~~ LFL	~~Bal~~ O_2		
00:00		L/min		ppm	ppm	%	%	%	%		
1437	0	0.2		0.1		0	0	0	20.9		
1439	2			0.1		0	0	0	20.9		

Observations/Note:

SAMPLE COLLECTION

SAMPLE CONTAINER TYPE
☐ Tedlar Bag ☒ Sorption Tubes ☐ Summa Canister ☐ Septum Bottle

SAMPLES Sample Series: _____

Sample/Location ID		Contain ID		Date	Time	Depth	Volume	Q	tf	Comments	
249	477	SG-04		6/2/14	1445	2.5'	1L	0.2	1448		
249	478	SG-	04	6/2/14	1450	2.5'	1L	0.2	1455		

Vista GeoScience
130 Capital Drive, Suite C
Golden, CO 80401-5654
Phone: 303-277-1694
Fax: 303-278-0104

PAGE:	5 OF 5
DATE / TIME:	6/2/14
PROJECT:	
JOB NO. :	
REC / SAMP BY:	C SHORT

SOIL-VAPOR SAMPLING FORM

WELL/LOC. NO.:	WELL TYPE:	☐ Monitor	☐ Extraction	☐ PRT Sys.	☒ Other
SG-05	WELL MATERIAL:	☐ PVC	☒ Poly / Implant	☐ Teflon	☐ Other

WELL OR PRT PURGING & SAMPLING LOG

PURGE VOLUME
Casing/Tubing Inner Diameter:
☒ 1/4-inch ☐ 1/2-inch ☐ 3/4-inch ☐ 1-inch
☐ Other _____
Total Length of Tubing/Casing: 3'
Number of Well Volumes to be Purged (# Vols): _____

PURGING METHOD
☐ Landtec
☐ Peristaltic pump
☐ Other - Type: FIDRAE (CHS, 6/4/14)
Well Depth: 2.5'

PURGE VOLUME CALCULATION: (Tubing Volume/ft x length) X (# Purge Volumes) = _____ CC or Liters
(Refer to Tubing / Hole Volume Table)

PURGE TIME
_____ START _____ STOP _____ ELAPSED

PURGE RATE
Initial 0.2 L/pm Final 0.2 L/pm

ACTUAL PURGE VOLUME
_____ Liters

FIELD PARAMETER MEASUREMENT CO H2S LEL O2

Time	Minutes	FLOW	Vacuum	PID	~~PID~~	~~CH4~~ CO	~~CO2~~ H2S	~~O2~~ LEL	~~Bal~~ O2		
00:00		L/min		ppm	ppm	%	%	%	%		
1404				0.2		—	—	—	—		
1408				0.1		—	—	—	—		
1410				—		0	0	0	20.9		
1411				—		0	0	0	20.9		

Observations/Note:

SAMPLE COLLECTION

SAMPLE CONTAINER TYPE
☐ Tedlar Bag ☐ Sorption Tubes ☐ Summa Canister ☐ Septum Bottle

SAMPLES Sample Series: _____

Sample/Location ID	Contain ID		Date	Time	Depth	Volume	Q/A TF		Comments	
249809	SG-	05	6/2/14	1414	2.5'	1L	0.2	1419		
249476	SG-	05	6/2/14	1421	2.5'	1L	0.2	1426		

5/28/14 CHS Bell Trading Post (19)

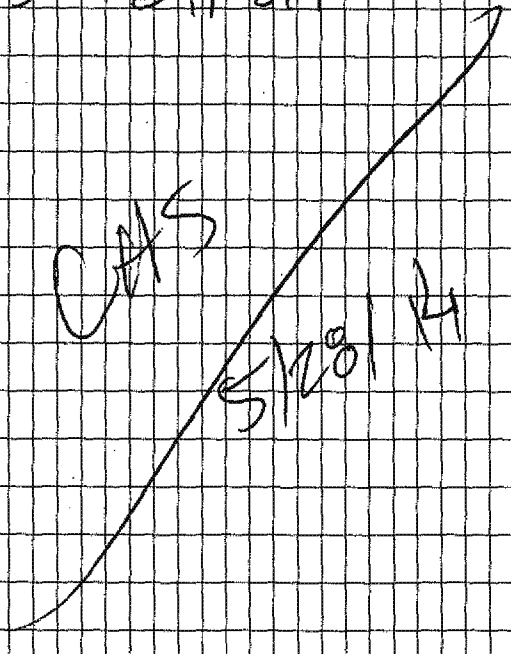
0805 on site.
obj: Measure crawlspace ht,
Confirm utils marked
Mark drill locs
Find pwr in crawlspace

0810 Telecoms (orange), blue, green marked on road + sidewalk on Roma/Laguna

0825 Gas locator on site + gas marked w/ yellow dots in driveway area. Runs from meters on wall towards motorcycle parking.

0835 Met Dallas - confirmed locations. Crawlspace ht shouldn't be an issue + >6' in places

0855 offsite



ED_013172_00000151-00051

(6) Bell Trading Post CHS 6/2/14

0740 C. Short on site. No one in office.
0750 Gained access to driveway through Darcy @ Tanager. Prepare to set air samplers.
6L summas w/ 8 hr regulators.
0758 Set Air-O-Ø1. Regulator #133, tank #925 Im. P_i = 24" Hg.
0800 Precision concrete on site
0814 Begin coring.
0819 set sampler @ Door 101. @ 14 "Hg Air-I-Ø1
0822 Set sampler @ Door 113 @ 9" Hg Air-I-Ø2
0850 Dehumidifier turned off in crawlspace.
0855 Set Air-C-Ø1, ~~west~~ eastern sample, 23" Hg
0900 set Air-C-Ø2, western sample, 25" Hg
0902 Precision crew done, 3 holes, 1.5" diam, 24" deep. Called Lee @ 0840, will prepare to drive at

ED_013172_00000151-00052

Bell Trading Post CHS 6/2/14 ②

1010 Preparing to sample at SG-01

	0s	30s	60s
PID = 2.2		1.3	1.3
CO = 87 ppm		2	2
H_2S = 0		0	0
LEL = 0		0	0
O = 20.4%		20.2	20.2

3' hole stabilizes quickly (430s), 1 set of parameters taken

Samples:	#	D	vol	ID
249472	1037	3'	1L	SG-01
249471	Bad sample. Do NOT Run			

1025 sampling apparatus jumping from 200 → 7500 mL/min. Put Bwat valve between pump & rotameter to ease pressure. Can now confidently gauge 200 mL/min.

1033 Sample SG-01. Q = 0.2 L/min

~~All samples taken w/ 3/8" tubing, 5' for outdoor samples 3' for indoor.~~

See Field Forms for Dimensions

CHS 6/4/14

6/2/14 CHS

Bell Trading Post CHS 6/2/14

1126 Preparing to sample at SG-02
(Near entrance Gate.)

	samples:	t:	d	Vol	Q	ID	t:
Dup	249479	1140	30"	1L	0.2 L/m	SG-02	1145
Use	249480	1147	30"	1L	0.2 L/m	SG-02	1152

1132 Begin purge. 1/4" tube.

t	PID	CO	H_2S	LEL	O_2
1132	3.2	-	-	-	-
1133	1.1	-	-	-	-
1134	0.8	-	-	-	-
1135	0.6	4	1	0	19.8
1136	-	8	2	3	19.8
1137	-	7	2	3	19.9

1140 Begin sampling Dup.
1147 Begin Sampling 249480

CHS

6/2/14

ED_013172_00000151-00054

Bell Trading Post CHS 6/2/14 ES RT

1234 Preparing to sample SG-03

~~Sample~~ CCTS

1235 Begin purge, 1/4" tube

t	PID	CO	H2 S	LEL	O2
1235	1.0	-	-	-	-
1236	0	-	-	-	-
1237	0	[illegible]	[illegible]	[illegible]	[illegible]
1237	-	41	2	0	20.3
1238	-	3	1	0	20.2

Samples	t	D	Vol	Q	ID	tp
249473	1241	3'	1L	0.2	SG-03	1240
247803	1249	3'	1L	0.2	SG-03	1254

CCTS

ED_013172_00000151-00055

(24) Bell Trading Post 6/2/14 CHS

1400: Prepare to sample @ SG-05.

Time	PID	CO	~~LEL~~ H_2S	LEL	O_2
1404	0.2	-	-	-	-
1408	0.1	-	-	-	-
1410	-	0	0	0	20.9
1411	-	0	0	0	20.9

1415: Begin purge ("1/4" Tobe) Sampling continued on field forms.
1430 Pam (NMED) on site
1300 Pam & Joe T offsite.

1443 Sampled SG-04, 249477
1450 Sampled SG-04, 249478
1414 Sampled SG-05, 247809
1421 sampled. SG-05, 249476

1601 Retrieved Air-a-01. 1" Hg
1621 Retrieved Air-I-01 1" Hg
1623 Retrieved Air-I-02 9" Hg.
1700 Retrieved Air-C-01
1702 Retrieved Air-C-02
1710 Handed off samples to Michael From Hall on site.
1715 Looked at asphalt patches w/ Dallas. Asked me to mound them 1/4" above pavement.
1745 offsite

ED_013172_00000151-00056

Bell Trading Post 6/12/14 CHS (25)

1800 Packaged samples, sent to FedEx

CHS

6/12/14

Appendix D
Laboratory Analytical Reports

Friday, June 13, 2014

Joe Tracy
Intera
6000 Uptown Blvd. NE, Suite 220
Albuquerque, NM 87110

RE: 14166: Bell Trading Post

Order No.: 1406001

Dear Joe:

Vista GeoScience received 6 Soil Vapor Samples, collected on Sorbent Tubes on 6/3/2014 for 8260 analysis presented in the following report.

The following report contains data, associated QC and laboratory specifications; exceptions are noted in the Case Narrative.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Roger Bain
Senior Chemist

130 Capital Drive, Suite C
Golden, Colorado 80401-5654
Web Site: www.VistaGeoScience.com

Vista GeoScience

PH: 303.277.1694
FAX: 303.278.0104
E-Mail: info@VistaGeoScience.com

CLIENT: Intera
Project: 14166.01: Bell Trading Post
Lab Order: 1406001

CASE NARRATIVE

Samples were received on 6/3/14 from Intera and were accompanied by a chain of custody form. The samples and their containers appeared to be in good condition and the chain of custody form was complete and accurate.

Samples were analyzed using the methods outlined in the following references: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition and Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-17 (EPA/625/R-96/010b).

Calibration - The laboratory instruments are calibrated using method appropriate standards. On each day project samples are analyzed the instrument calibration is verified using a mid level Continuing Calibration Verification (CCV). Calculations are carried out by the data system to compute the actual concentration of analyte in the original sample.

Method Blanks, Trip Blanks and Instrument Blanks - Blanks are analyzed after each initial calibration, continuing calibration verification, and after samples determined to have high concentrations of analytes to verify system cleanliness. Method blanks are analyzed to verify the cleanliness of procedures requiring sample preparation prior to analysis. Trip blanks are prepared by the laboratory and accompany the samples to verify that there was no contamination during transport.

Batch QC - Prior to analysis, the project samples are associated with a QC batch. This batch is then prepared and analyzed along with QC samples prepared at the same time and using the same reagents and standards. The QC samples associated with a sample batch may include Method Blanks (MB). The results of the batch QC samples are included in the QC section of the report.

Analyst Comments:
Sample SG-3DUP did not duplicate. Two analytes are reported above linear range in sample SG-2 and are flagged with an "E".

Roger Bain
Senior Chemist

ED_013172_00000151-00060

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-01
Lab Order:	1406001	**Tag Number:**	249472
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-001A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	1.7	5.0	J	ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	4.5	5.0	J	ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	170	5.0		ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	25	5.0		ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	21	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	ND	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	14	5.0		ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	19	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	140	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00061

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-01
Lab Order:	1406001	**Tag Number:**	249472
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-001A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	ND	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	51	5.0		ng/L	1	6/12/2014
m,p-Xylene	140	10		ng/L	1	6/12/2014
o-Xylene	38	5.0		ng/L	1	6/12/2014
Styrene	ND	5.0		ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	10	5.0		ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	10	5.0		ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	34	5.0		ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	4.1	5.0	J	ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
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
S	Spike Recovery outside accepted recovery limits		

ED_013172_00000151-00062

Vista GeoScience

Date: *13-Jun-14*

CLIENT: Intera
Lab Order: 1406001
Project: 14166.01: Bell Trading Post
Lab ID: 1406001-002A **Date Received:** 6/3/2014

Client Sample ID: SG-02
Tag Number: 249479
Collection Date: 6/2/2014
Matrix: SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	ND	5.0		ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	400	5.0	E	ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	8.7	5.0		ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	70	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	1.9	5.0	J	ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	7.7	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	1.6	5.0	J	ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	11	5.0		ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	1800	5.0	E	ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	20	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	67	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	12	5.0		ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00063

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-02
Lab Order:	1406001	**Tag Number:**	249479
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-002A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	20	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	41	5.0		ng/L	1	6/12/2014
m,p-Xylene	200	10		ng/L	1	6/12/2014
o-Xylene	82	5.0		ng/L	1	6/12/2014
Styrene	ND	5.0		ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	2.6	5.0	J	ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	3.5	5.0	J	ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	19	5.0		ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	4.3	5.0	J	ng/L	1	6/12/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	8.7	5.0		ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00064

Vista GeoScience

Date: *13-Jun-14*

CLIENT: Intera
Lab Order: 1406001
Project: 14166.01: Bell Trading Post
Lab ID: 1406001-003A **Date Received:** 6/3/2014

Client Sample ID: SG-03
Tag Number: 249473
Collection Date: 6/2/2014
Matrix: SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	2.3	5.0	J	ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	4.1	5.0	J	ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	85	5.0		ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	4.8	5.0	J	ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	ND	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	29	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	7.7	5.0		ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	11	5.0		ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	5.4	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	9.2	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	28	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	1.5	5.0	J	ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00065

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-03
Lab Order:	1406001	**Tag Number:**	249473
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-003A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	ND	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	12	5.0		ng/L	1	6/12/2014
m,p-Xylene	39	10		ng/L	1	6/12/2014
o-Xylene	15	5.0		ng/L	1	6/12/2014
Styrene	2.7	5.0	J	ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	2.1	5.0	J	ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	7.3	5.0		ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	1.6	5.0	J	ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	14	5.0		ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	5.8	5.0		ng/L	1	6/12/2014
4-Isopropyltoluene	33	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	5.4	5.0		ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
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
S	Spike Recovery outside accepted recovery limits		

ED_013172_00000151-00066

Vista GeoScience

Date: *13-Jun-14*

CLIENT: Intera
Lab Order: 1406001
Project: 14166.01: Bell Trading Post
Lab ID: 1406001-004A **Date Received:** 6/3/2014

Client Sample ID: SG-04
Tag Number: 249477
Collection Date: 6/2/2014
Matrix: SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	2.5	5.0	J	ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	3.0	5.0	J	ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	57	5.0		ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	12	5.0		ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	ND	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	ND	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	3.9	5.0	J	ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	ND	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	51	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00067

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-04
Lab Order:	1406001	**Tag Number:**	249477
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-004A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	ND	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	ND	5.0		ng/L	1	6/12/2014
m,p-Xylene	ND	10		ng/L	1	6/12/2014
o-Xylene	ND	5.0		ng/L	1	6/12/2014
Styrene	ND	5.0		ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	ND	5.0		ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	ND	5.0		ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	ND	5.0		ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	1.9	5.0	J	ng/L	1	6/12/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
S	Spike Recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit

ED_013172_00000151-00068

Vista GeoScience

Date: *13-Jun-14*

CLIENT: Intera
Lab Order: 1406001
Project: 14166.01: Bell Trading Post
Lab ID: 1406001-005A **Date Received:** 6/3/2014

Client Sample ID: SG-05
Tag Number: 247809
Collection Date: 6/2/2014
Matrix: SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	3.3	5.0	J	ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	4.7	5.0	J	ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	73	5.0		ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	3.4	5.0	J	ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	ND	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	ND	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	4.0	5.0	J	ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	14	5.0		ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	ND	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	11	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00069

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-05
Lab Order:	1406001	**Tag Number:**	247809
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-005A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	ND	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	2.7	5.0	J	ng/L	1	6/12/2014
m,p-Xylene	6.6	10	J	ng/L	1	6/12/2014
o-Xylene	2.1	5.0	J	ng/L	1	6/12/2014
Styrene	1.3	5.0	J	ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	ND	5.0		ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	ND	5.0		ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	5.0	5.0	J	ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	3.4	5.0	J	ng/L	1	6/12/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	3.5	5.0	J	ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00070

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-03DUP
Lab Order:	1406001	**Tag Number:**	247803
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-006A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	ND	5.0		ng/L	1	6/12/2014
Chloromethane	ND	5.0		ng/L	1	6/12/2014
Vinyl chloride	ND	5.0		ng/L	1	6/12/2014
Bromomethane	ND	5.0		ng/L	1	6/12/2014
Chloroethane	ND	5.0		ng/L	1	6/12/2014
Trichlorofluoromethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Freon-113	ND	5.0		ng/L	1	6/12/2014
Acetone	ND	5.0		ng/L	1	6/12/2014
Iodomethane	ND	5.0		ng/L	1	6/12/2014
Carbon disulfide	ND	5.0		ng/L	1	6/12/2014
Methylene chloride	ND	5.0		ng/L	1	6/12/2014
Acrylonitrile	ND	5.0		ng/L	1	6/12/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/12/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Vinyl acetate	ND	5.0		ng/L	1	6/12/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
2-Butanone	ND	5.0		ng/L	1	6/12/2014
cis-1,2-Dichloroethene	ND	5.0		ng/L	1	6/12/2014
Bromochloromethane	ND	5.0		ng/L	1	6/12/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/12/2014
Chloroform	ND	5.0		ng/L	1	6/12/2014
1,1,1-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/12/2014
Benzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/12/2014
Trichloroethene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/12/2014
Dibromomethane	ND	5.0		ng/L	1	6/12/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/12/2014
4-Methyl-2-pentanone	ND	5.0		ng/L	1	6/12/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/12/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
Toluene	ND	5.0		ng/L	1	6/12/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/12/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/12/2014
Tetrachloroethene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00071

Vista GeoScience

Date: *13-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-03DUP
Lab Order:	1406001	**Tag Number:**	247803
Project:	14166.01: Bell Trading Post	**Collection Date:**	6/2/2014
Lab ID:	1406001-006A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	ND	5.0		ng/L	1	6/12/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/12/2014
Chlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Ethylbenzene	ND	5.0		ng/L	1	6/12/2014
m,p-Xylene	ND	10		ng/L	1	6/12/2014
o-Xylene	ND	5.0		ng/L	1	6/12/2014
Styrene	ND	5.0		ng/L	1	6/12/2014
Bromoform	ND	5.0		ng/L	1	6/12/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/12/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/12/2014
Bromobenzene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/12/2014
n-Propylbenzene	ND	5.0		ng/L	1	6/12/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
1,3,5-Trimethylbenzene	ND	5.0		ng/L	1	6/12/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/12/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trimethylbenzene	ND	5.0		ng/L	1	6/12/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,3-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/12/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/12/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/12/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/12/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/12/2014
Naphthalene	ND	5.0		ng/L	1	6/12/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/12/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00072

Vista GeoScience

24-Jun-14

Lab Order: 1406001

Client: Intera

Project: 14166.01: Bell Trading Post

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
1406001-001A	SG-01	6/2/2014	Soil Gas	Volatile Organics in Soil Gas			6/12/2014
1406001-002A	SG-02			Volatile Organics in Soil Gas			6/12/2014
1406001-003A	SG-03			Volatile Organics in Soil Gas			6/12/2014
1406001-004A	SG-04			Volatile Organics in Soil Gas			6/12/2014
1406001-005A	SG-05			Volatile Organics in Soil Gas			6/12/2014
1406001-006A	SG-03DUP			Volatile Organics in Soil Gas			6/12/2014
1406001-007A	SG-02DUP			Volatile Organics in Soil Gas			6/13/2014

ED_013172_00000151-00073

Vista GeoScience

Date: *13-Jun-14*

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1665**
Client ID: **ZZZZZ** Batch ID: **R1665** TestNo: **SW8260B** Analysis **6/12/2014** SeqNo: **17667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane	ND	5.0									
Chloromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Bromomethane	ND	5.0									
Chloroethane	ND	5.0									
Trichlorofluoromethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
Freon-113	ND	5.0									
Acetone	ND	5.0									
Iodomethane	ND	5.0									
Carbon disulfide	ND	5.0									
Methylene chloride	ND	5.0									
Acrylonitrile	ND	5.0									
Methyl tert-butyl ether	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
1,1-Dichloroethane	ND	5.0									
Vinyl acetate	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Butanone	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
Bromochloromethane	ND	5.0									
Tetrahydrofuran	ND	5.0									
Chloroform	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1-Dichloropropene	ND	5.0									
Carbon tetrachloride	ND	5.0									
Benzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
Trichloroethene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB**	SampTyp **MBLK**	TestCode: **8260_SG**	Units: **ng/L**	Prep Date:		RunNo: **1665**	
Client ID: **ZZZZZ**	Batch ID: **R1665**	TestNo: **SW8260B**		Analysis **6/12/2014**		SeqNo: **17667**	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	5.0									
Dibromomethane	ND	5.0									
Bromodichloromethane	ND	5.0									
4-Methyl-2-pentanone	ND	5.0									
2-Chloroethyl vinyl ether	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Toluene	ND	5.0									
trans-1,3-Dichloropropene	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
Tetrachloroethene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
2-Hexanone	ND	5.0									
Dibromochloromethane	ND	5.0									
1,2-Dibromoethane	ND	5.0									
Chlorobenzene	ND	5.0									
1,1,1,2-Tetrachloroethane	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
o-Xylene	ND	5.0									
Styrene	ND	5.0									
Bromoform	ND	5.0									
Isopropylbenzene	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
Bromobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
n-Propylbenzene	ND	5.0									
2-Chlorotoluene	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
4-Chlorotoluene	ND	5.0									
tert-Butylbenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1665**
Client ID: **ZZZZZ** Batch ID: **R1665** TestNo: **SW8260B** Analysis **6/12/2014** SeqNo: **17667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
n-Butylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Naphthalene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00076

Chain-of-Custody Record

Client: Intera

Mailing Address: on File

Phone #: 505 246 1600

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Bell Trading Post

Project #:

Project Manager: Joe Tracy

Sampler: C Short

On Ice: ☐ Yes ☐ No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
			249471 / SG-01	1L Tedlar		
6/2/14	1033	Air	249472 / SG-01	1L Tedlar		
	1140		249479 / SG-02			
2.	1147		249480 / SG-02			
3.	1241		249473 / SG-03			
4.	1249		247803 / SG-03			
	1443		249477 / SG-04			
5.	1450		249478 / SG-04			
	1414		247809 / SG-05			
6.	1421		249476 / SG-05			

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	8260				Air Bubbles (Y or N)
											X				
											X	CHS			
											X	CHS			
											X				
											X				
											X				
											X	CHS			
											X	CHS			
											X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
6-3-14	0830		ROGER BAN	6-3-14	0830
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks:
249471 → Do not use!
Only 1 sample for SG-01 exists!
Run Duplicate of SG-03

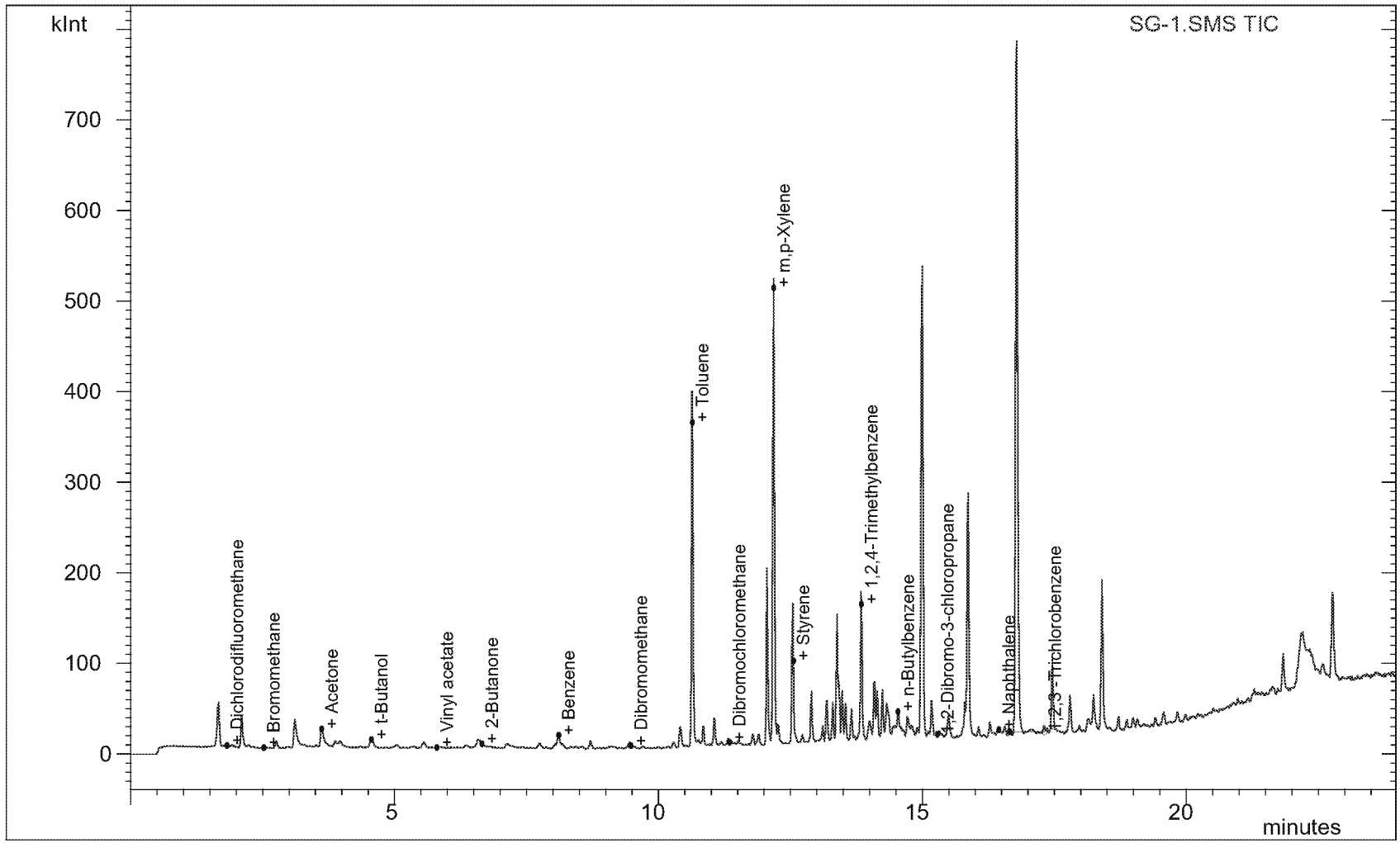
TOTAL TO RUN = 6

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.

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-1.SMS	Calibration File:	C:\VarianWS\Data\11I06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 18:05	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-1	Operator:	RB
Lab Sample ID:	SG-1	Dilution:	1

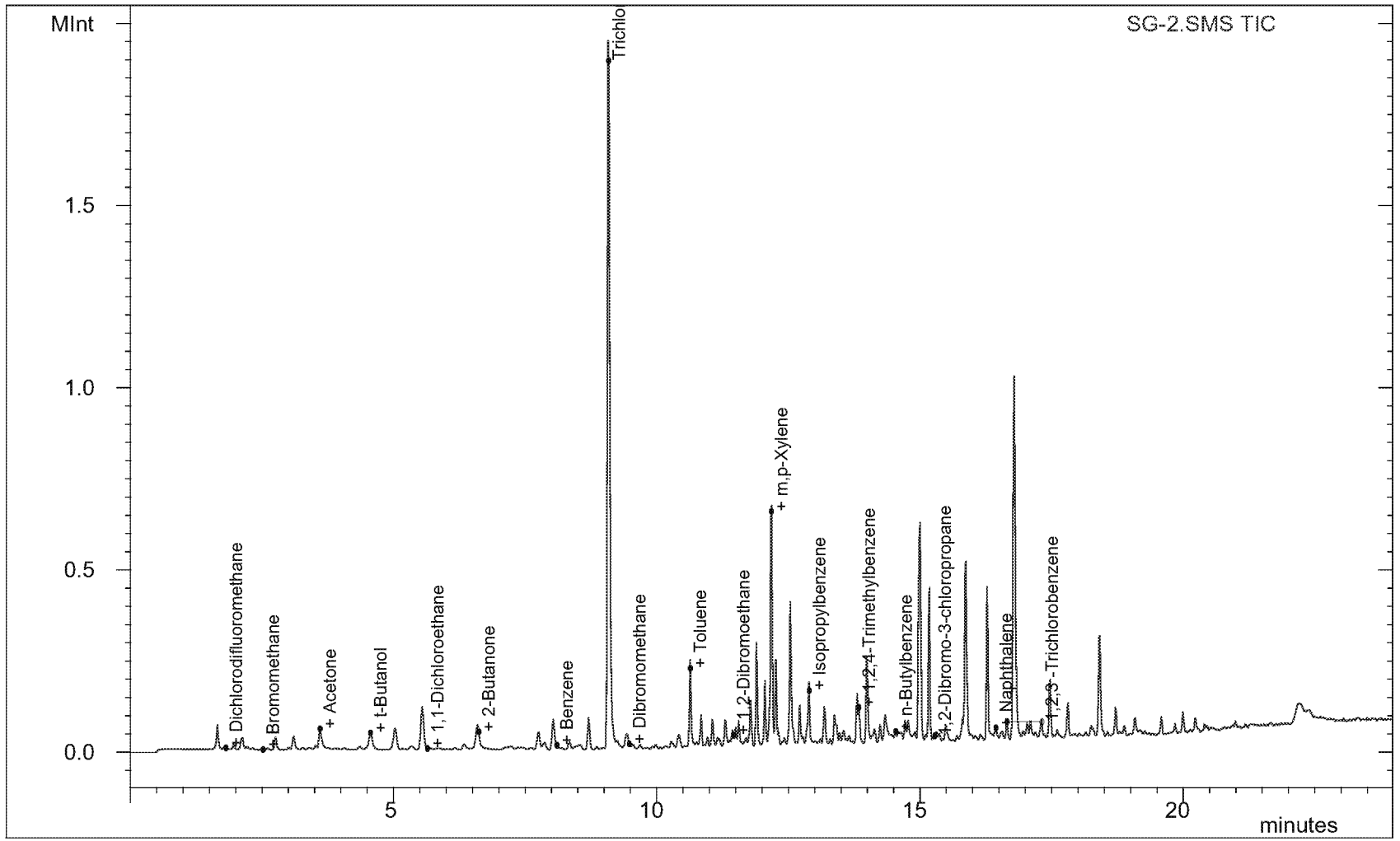


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-2.SMS	Calibration File:	C:\VarianWS\Data\11l06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 18:37	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-2	Operator:	RB
Lab Sample ID:	SG-2	Dilution:	1

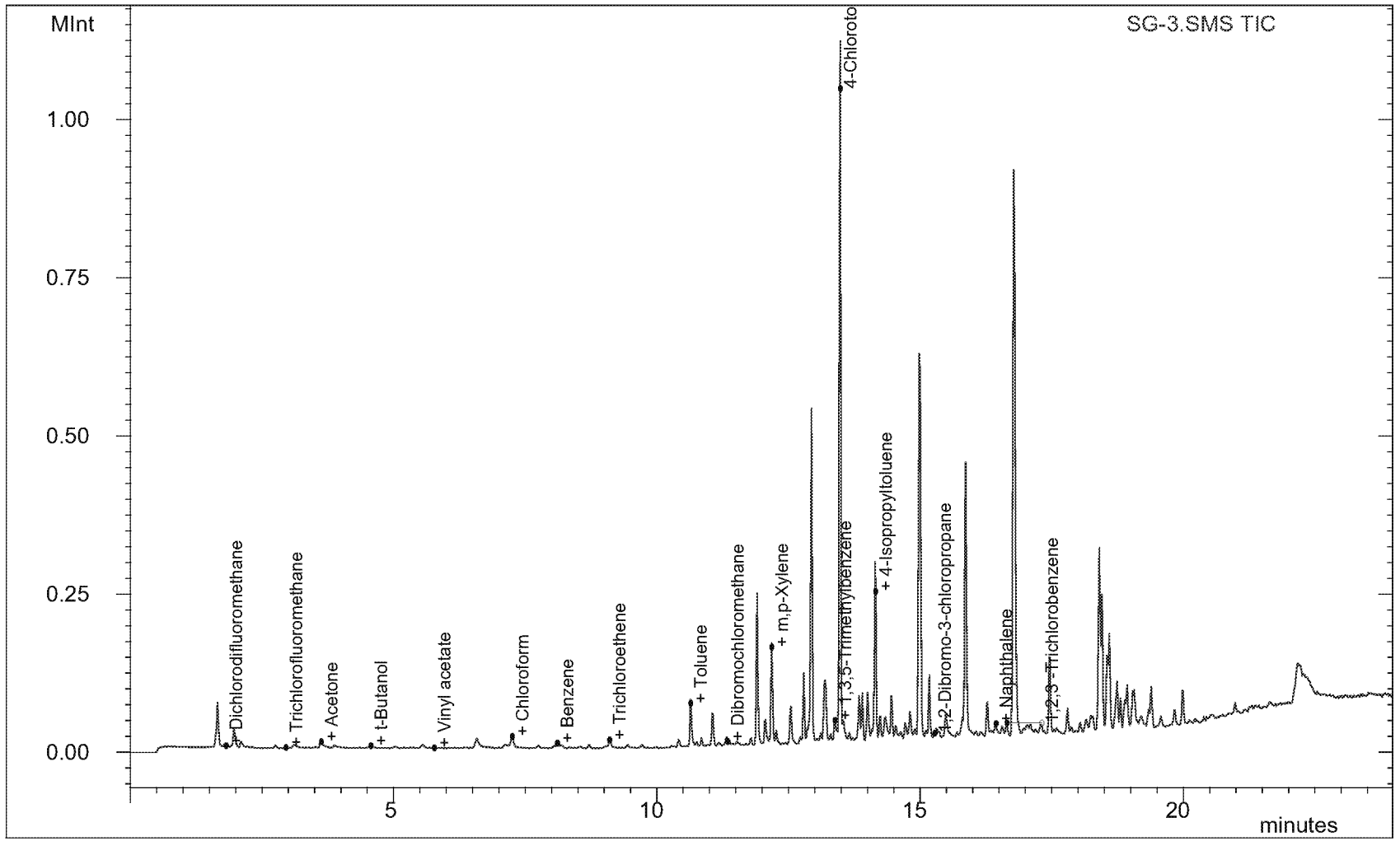


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-3.SMS	Calibration File:	C:\VarianWS\Data\11I06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 19:09	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-3	Operator:	RB
Lab Sample ID:	SG-3	Dilution:	1

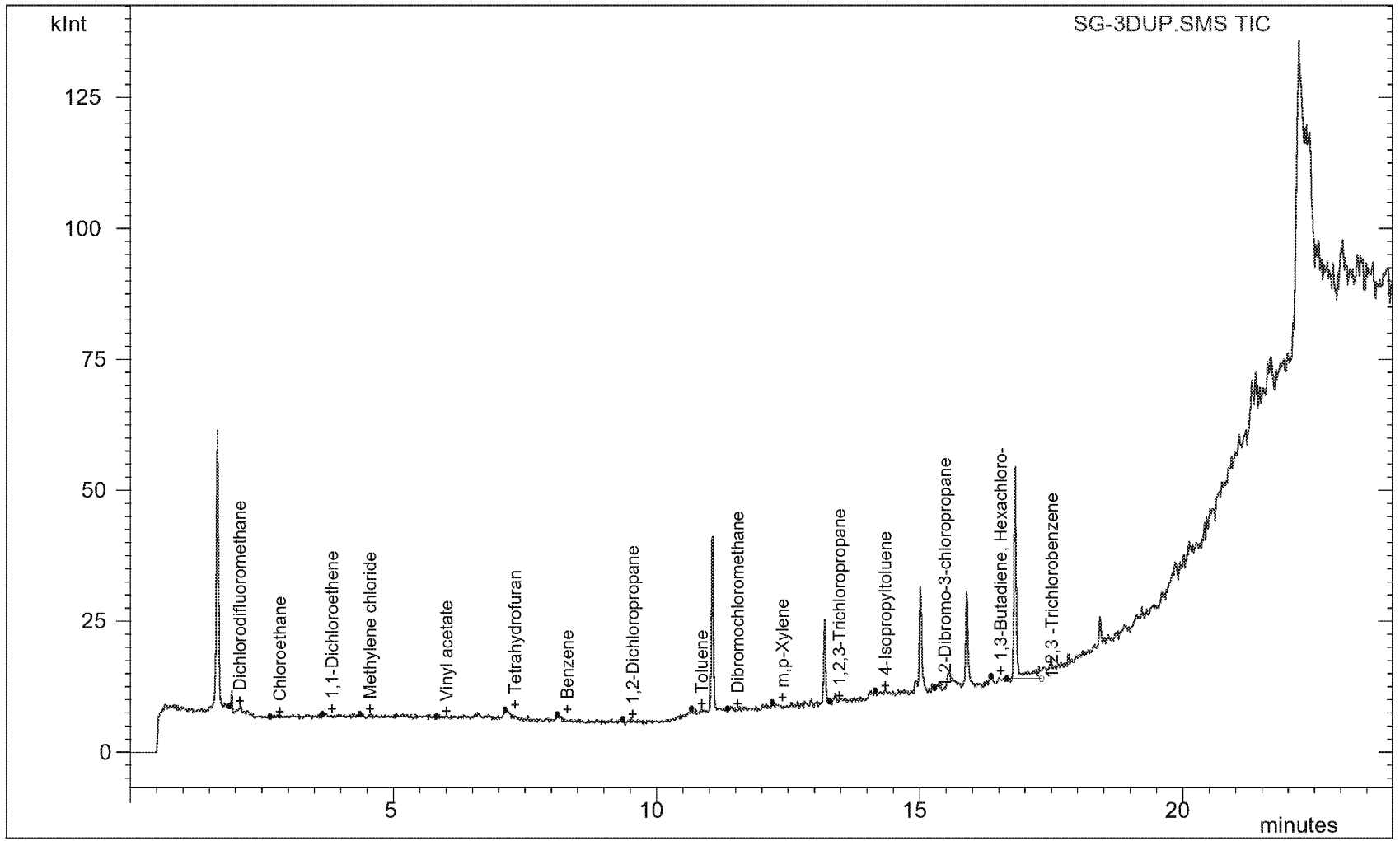


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-3DUP.SMS	Calibration File:	C:\VarianWS\Data\11l06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 20:45	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-3DUP	Operator:	RB
Lab Sample ID:	SG-3DUP	Dilution:	1

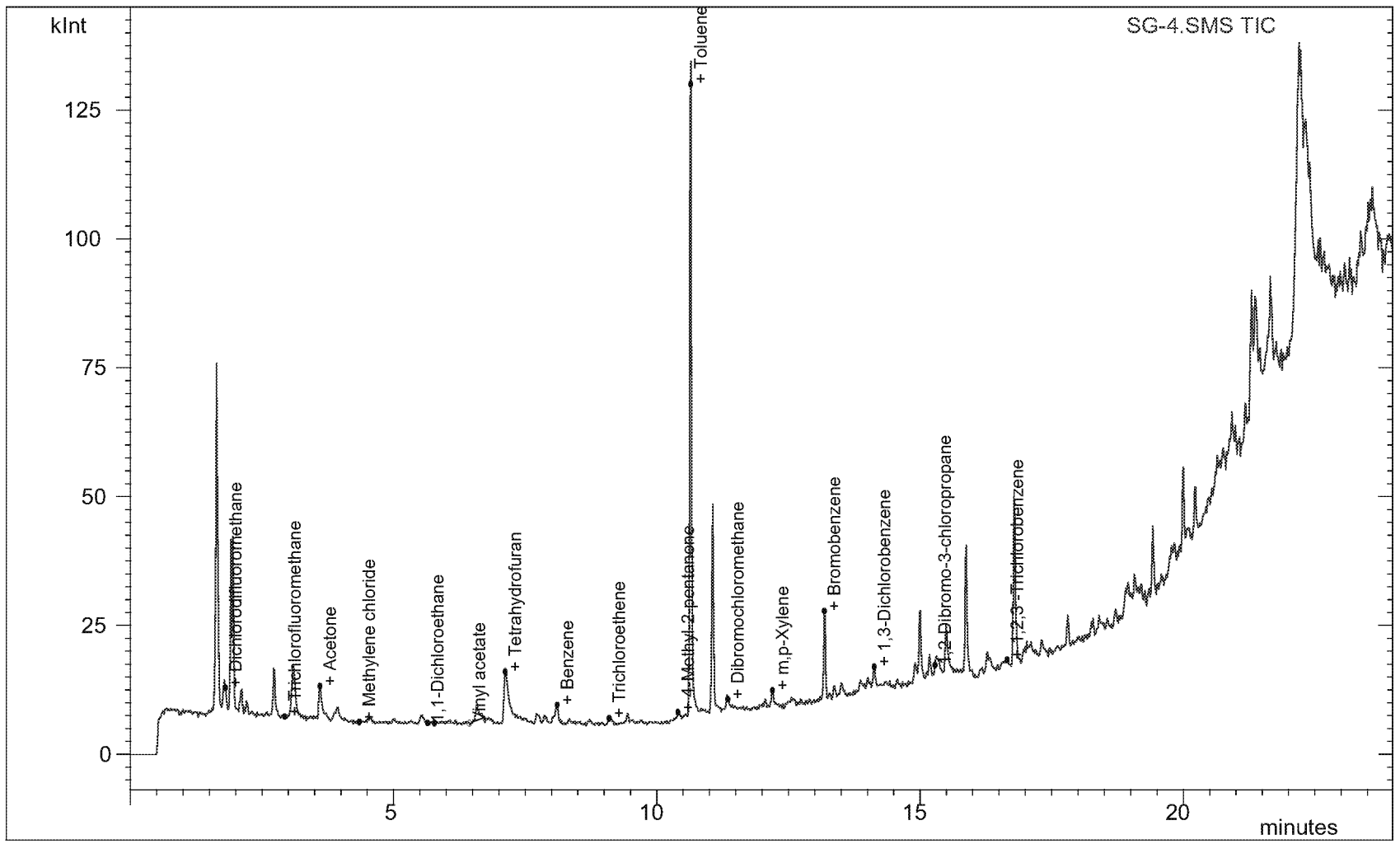


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-4.SMS	Calibration File:	C:\VarianWS\Data\11l06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 19:41	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-4	Operator:	RB
Lab Sample ID:	SG-4	Dilution:	1

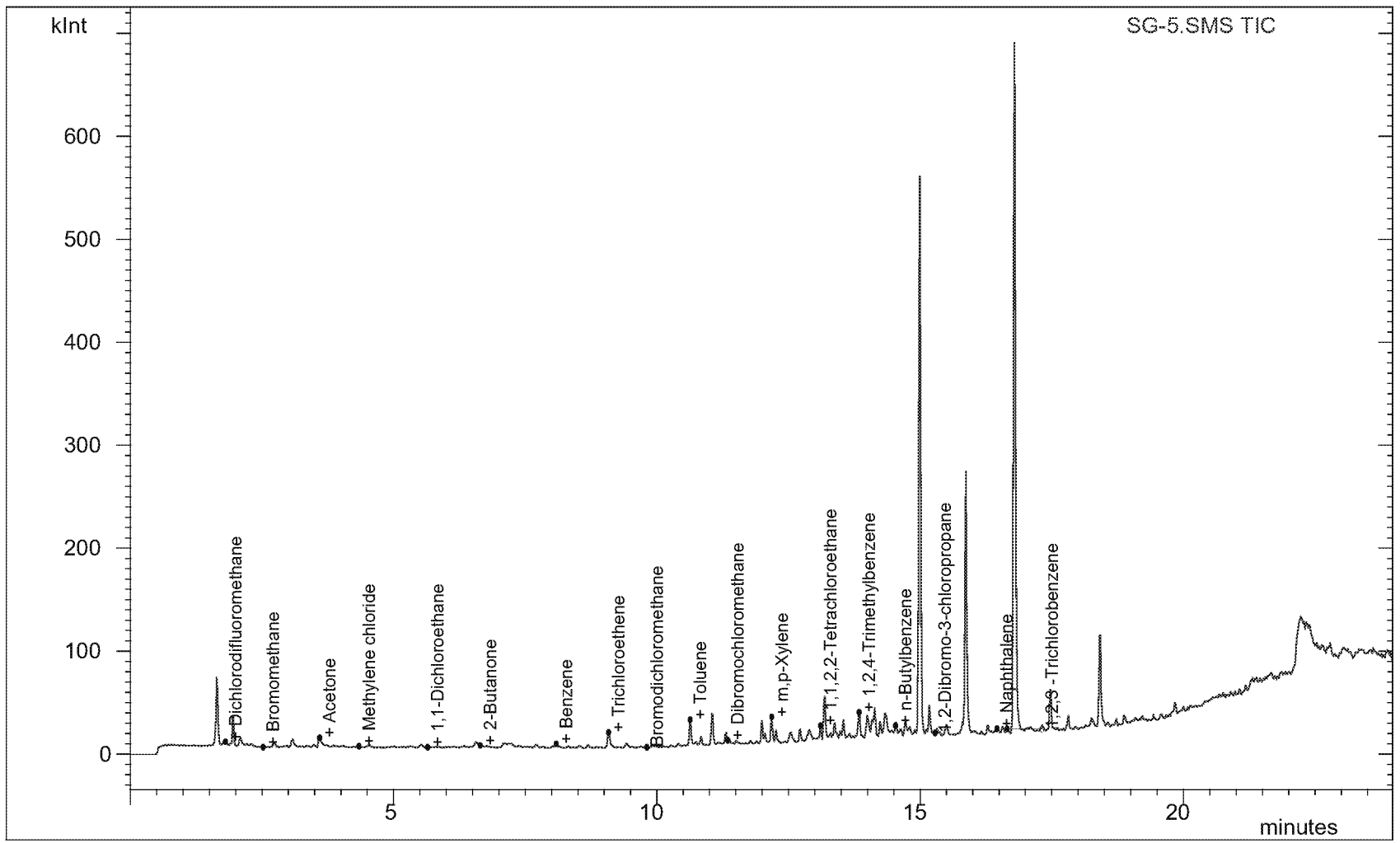


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\SG-5.SMS	Calibration File:	C:\VarianWS\Data\11l06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 20:13	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	SG-5	Operator:	RB
Lab Sample ID:	SG-5	Dilution:	1

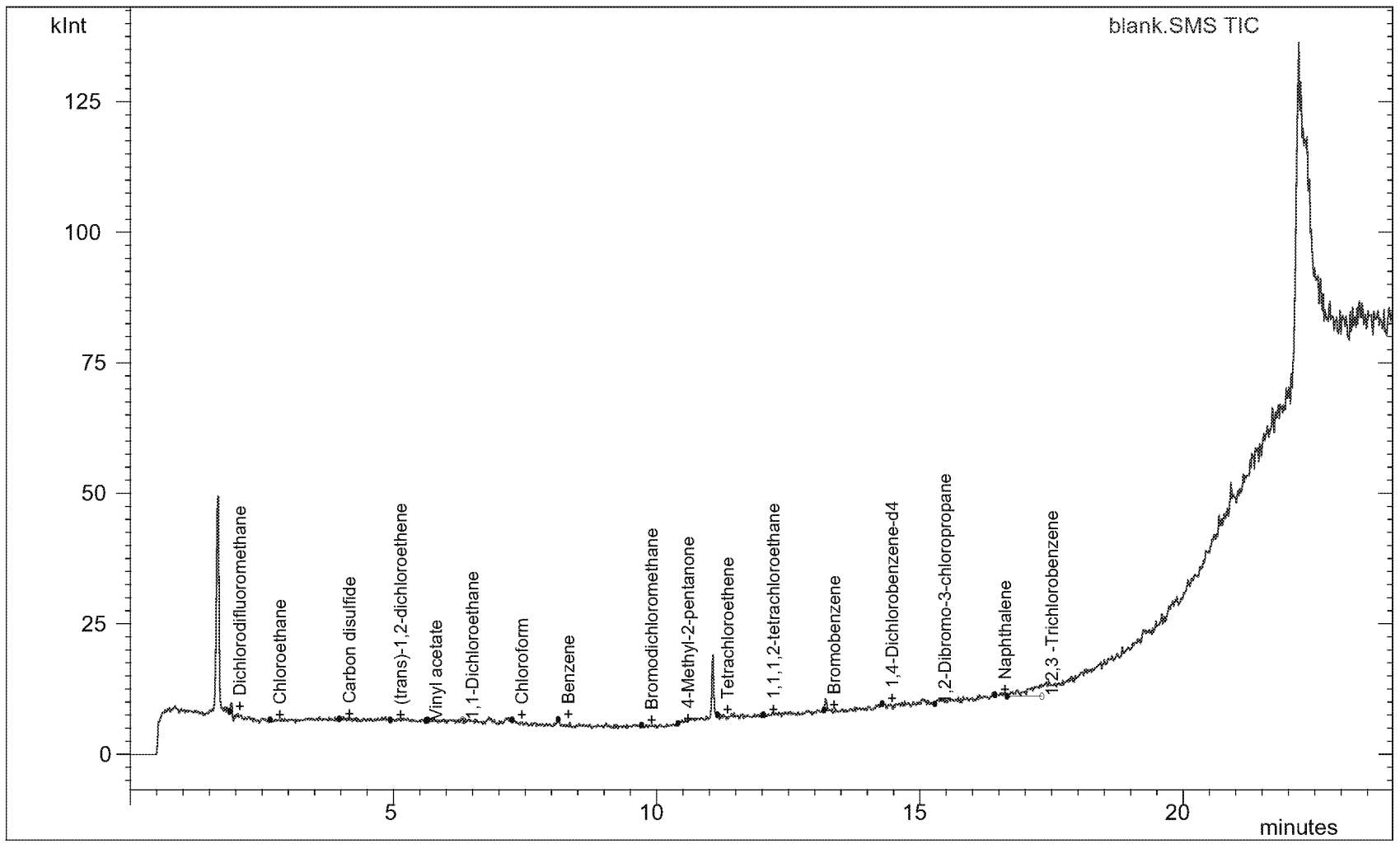


Approved_____ Date_____

CHROMATOGRAM REPORT

EPA Method 8260A

Lab File ID:	c:\varianws\data\14f12\blank.SMS	Calibration File:	C:\VarianWS\Data\11l06\EX-200ng 8260 std.SMS
Acquisition Date:	6/12/2014 17:33	Cal. Sample Date Range:	6/11/2014 16:50 6/11/2014 20:55
EPA Sample No:	blank	Operator:	RB
Lab Sample ID:	blank	Dilution:	1



Approved_____ Date_____

Vista GeoScience

Date: *24-Jun-14*

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1665**
Client ID: **ZZZZZ** Batch ID: **R1665** TestNo: **SW8260B** Analysis **6/12/2014** SeqNo: **17667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane	ND	5.0									
Chloromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Bromomethane	ND	5.0									
Chloroethane	ND	5.0									
Trichlorofluoromethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
Freon-113	ND	5.0									
Acetone	ND	5.0									
Iodomethane	ND	5.0									
Carbon disulfide	ND	5.0									
Methylene chloride	ND	5.0									
Acrylonitrile	ND	5.0									
Methyl tert-butyl ether	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
1,1-Dichloroethane	ND	5.0									
Vinyl acetate	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Butanone	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
Bromochloromethane	ND	5.0									
Tetrahydrofuran	ND	5.0									
Chloroform	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1-Dichloropropene	ND	5.0									
Carbon tetrachloride	ND	5.0									
Benzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
Trichloroethene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1665**
Client ID: **ZZZZZ** Batch ID: **R1665** TestNo: **SW8260B** Analysis **6/12/2014** SeqNo: **17667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	5.0									
Dibromomethane	ND	5.0									
Bromodichloromethane	ND	5.0									
4-Methyl-2-pentanone	ND	5.0									
2-Chloroethyl vinyl ether	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Toluene	ND	5.0									
trans-1,3-Dichloropropene	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
Tetrachloroethene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
2-Hexanone	ND	5.0									
Dibromochloromethane	ND	5.0									
1,2-Dibromoethane	ND	5.0									
Chlorobenzene	ND	5.0									
1,1,1,2-Tetrachloroethane	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
o-Xylene	ND	5.0									
Styrene	ND	5.0									
Bromoform	ND	5.0									
Isopropylbenzene	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
Bromobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
n-Propylbenzene	ND	5.0									
2-Chlorotoluene	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
4-Chlorotoluene	ND	5.0									
tert-Butylbenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MB** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1665**
Client ID: **ZZZZZ** Batch ID: **R1665** TestNo: **SW8260B** Analysis **6/12/2014** SeqNo: **17667**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
n-Butylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Naphthalene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									

Sample **MBLK** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1667**
Client ID: **ZZZZZ** Batch ID: **R1667** TestNo: **SW8260B** Analysis **6/13/2014** SeqNo: **17677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane	ND	5.0									
Chloromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Bromomethane	ND	5.0									
Chloroethane	ND	5.0									
Trichlorofluoromethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
Freon-113	ND	5.0									
Acetone	ND	5.0									
Iodomethane	ND	5.0									
Carbon disulfide	ND	5.0									
Methylene chloride	ND	5.0									
Acrylonitrile	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MBLK** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1667**
Client ID: **ZZZZZ** Batch ID: **R1667** TestNo: **SW8260B** Analysis **6/13/2014** SeqNo: **17677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
1,1-Dichloroethane	ND	5.0									
Vinyl acetate	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Butanone	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
Bromochloromethane	ND	5.0									
Tetrahydrofuran	ND	5.0									
Chloroform	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1-Dichloropropene	ND	5.0									
Carbon tetrachloride	ND	5.0									
Benzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
Trichloroethene	ND	5.0									
1,2-Dichloropropane	ND	5.0									
Dibromomethane	ND	5.0									
Bromodichloromethane	ND	5.0									
4-Methyl-2-pentanone	ND	5.0									
2-Chloroethyl vinyl ether	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Toluene	ND	5.0									
trans-1,3-Dichloropropene	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
Tetrachloroethene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
2-Hexanone	ND	5.0									
Dibromochloromethane	ND	5.0									
1,2-Dibromoethane	ND	5.0									
Chlorobenzene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

CLIENT: Intera
Work Order: 1406001
Project: 14166.01: Bell Trading Post

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_SG

Sample **MBLK** SampTyp **MBLK** TestCode: **8260_SG** Units: **ng/L** Prep Date: RunNo: **1667**
Client ID: **ZZZZZ** Batch ID: **R1667** TestNo: **SW8260B** Analysis **6/13/2014** SeqNo: **17677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
Ethylbenzene	ND	5.0									
m,p-Xylene	ND	10									
o-Xylene	ND	5.0									
Styrene	ND	5.0									
Bromoform	ND	5.0									
Isopropylbenzene	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
Bromobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
n-Propylbenzene	ND	5.0									
2-Chlorotoluene	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
4-Chlorotoluene	ND	5.0									
tert-Butylbenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
sec-Butylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
n-Butylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Naphthalene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

Vista GeoScience

Date: *24-Jun-14*

CLIENT: Intera
Lab Order: 1406001
Project: 14166.01: Bell Trading Post
Lab ID: 1406001-007A **Date Received:** 6/3/2014

Client Sample ID: SG-02DUP
Tag Number:
Collection Date:
Matrix: SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
Dichlorodifluoromethane	ND	5.0		ng/L	1	6/13/2014
Chloromethane	ND	5.0		ng/L	1	6/13/2014
Vinyl chloride	ND	5.0		ng/L	1	6/13/2014
Bromomethane	ND	5.0		ng/L	1	6/13/2014
Chloroethane	ND	5.0		ng/L	1	6/13/2014
Trichlorofluoromethane	4.1	5.0	J	ng/L	1	6/13/2014
1,1-Dichloroethene	ND	5.0		ng/L	1	6/13/2014
Freon-113	ND	5.0		ng/L	1	6/13/2014
Acetone	320	5.0	E	ng/L	1	6/13/2014
Iodomethane	ND	5.0		ng/L	1	6/13/2014
Carbon disulfide	11	5.0		ng/L	1	6/13/2014
Methylene chloride	1.3	5.0	J	ng/L	1	6/13/2014
Acrylonitrile	ND	5.0		ng/L	1	6/13/2014
Methyl tert-butyl ether	ND	5.0		ng/L	1	6/13/2014
trans-1,2-Dichloroethene	ND	5.0		ng/L	1	6/13/2014
1,1-Dichloroethane	ND	5.0		ng/L	1	6/13/2014
Vinyl acetate	ND	5.0		ng/L	1	6/13/2014
2,2-Dichloropropane	ND	5.0		ng/L	1	6/13/2014
2-Butanone	46	5.0		ng/L	1	6/13/2014
cis-1,2-Dichloroethene	1.6	5.0	J	ng/L	1	6/13/2014
Bromochloromethane	ND	5.0		ng/L	1	6/13/2014
Tetrahydrofuran	ND	5.0		ng/L	1	6/13/2014
Chloroform	6.8	5.0		ng/L	1	6/13/2014
1,1,1-Trichloroethane	1.3	5.0	J	ng/L	1	6/13/2014
1,1-Dichloropropene	ND	5.0		ng/L	1	6/13/2014
Carbon tetrachloride	ND	5.0		ng/L	1	6/13/2014
Benzene	10	5.0		ng/L	1	6/13/2014
1,2-Dichloroethane	ND	5.0		ng/L	1	6/13/2014
Trichloroethene	1800	5.0	E	ng/L	1	6/13/2014
1,2-Dichloropropane	ND	5.0		ng/L	1	6/13/2014
Dibromomethane	ND	5.0		ng/L	1	6/13/2014
Bromodichloromethane	ND	5.0		ng/L	1	6/13/2014
4-Methyl-2-pentanone	9.6	5.0		ng/L	1	6/13/2014
2-Chloroethyl vinyl ether	ND	5.0		ng/L	1	6/13/2014
cis-1,3-Dichloropropene	ND	5.0		ng/L	1	6/13/2014
Toluene	62	5.0		ng/L	1	6/13/2014
trans-1,3-Dichloropropene	ND	5.0		ng/L	1	6/13/2014
1,1,2-Trichloroethane	ND	5.0		ng/L	1	6/13/2014
Tetrachloroethene	12	5.0		ng/L	1	6/13/2014
1,3-Dichloropropane	ND	5.0		ng/L	1	6/13/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

Vista GeoScience

Date: *24-Jun-14*

CLIENT:	Intera	**Client Sample ID:**	SG-02DUP
Lab Order:	1406001	**Tag Number:**	
Project:	14166.01: Bell Trading Post	**Collection Date:**	
Lab ID:	1406001-007A **Date Received:** 6/3/2014	**Matrix:**	SOIL GAS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOCS IN SOIL GAS BY ATD/GC/MS		**SW8260B**				Analyst: **RB**
2-Hexanone	7.3	5.0		ng/L	1	6/13/2014
Dibromochloromethane	ND	5.0		ng/L	1	6/13/2014
1,2-Dibromoethane	ND	5.0		ng/L	1	6/13/2014
Chlorobenzene	ND	5.0		ng/L	1	6/13/2014
1,1,1,2-Tetrachloroethane	ND	5.0		ng/L	1	6/13/2014
Ethylbenzene	7.8	5.0		ng/L	1	6/13/2014
m,p-Xylene	5.7	10	J	ng/L	1	6/13/2014
o-Xylene	1.3	5.0	J	ng/L	1	6/13/2014
Styrene	ND	5.0		ng/L	1	6/13/2014
Bromoform	ND	5.0		ng/L	1	6/13/2014
Isopropylbenzene	ND	5.0		ng/L	1	6/13/2014
1,1,2,2-Tetrachloroethane	ND	5.0		ng/L	1	6/13/2014
Bromobenzene	ND	5.0		ng/L	1	6/13/2014
1,2,3-Trichloropropane	ND	5.0		ng/L	1	6/13/2014
n-Propylbenzene	ND	5.0		ng/L	1	6/13/2014
2-Chlorotoluene	ND	5.0		ng/L	1	6/13/2014
1,3,5-Trimethylbenzene	ND	5.0		ng/L	1	6/13/2014
4-Chlorotoluene	ND	5.0		ng/L	1	6/13/2014
tert-Butylbenzene	ND	5.0		ng/L	1	6/13/2014
1,2,4-Trimethylbenzene	ND	5.0		ng/L	1	6/13/2014
sec-Butylbenzene	ND	5.0		ng/L	1	6/13/2014
1,3-Dichlorobenzene	ND	5.0		ng/L	1	6/13/2014
4-Isopropyltoluene	ND	5.0		ng/L	1	6/13/2014
1,4-Dichlorobenzene	ND	5.0		ng/L	1	6/13/2014
1,2-Dichlorobenzene	ND	5.0		ng/L	1	6/13/2014
n-Butylbenzene	ND	5.0		ng/L	1	6/13/2014
1,2-Dibromo-3-chloropropane	ND	5.0		ng/L	1	6/13/2014
1,2,4-Trichlorobenzene	ND	5.0		ng/L	1	6/13/2014
Hexachlorobutadiene	ND	5.0		ng/L	1	6/13/2014
Naphthalene	ND	5.0		ng/L	1	6/13/2014
1,2,3-Trichlorobenzene	ND	5.0		ng/L	1	6/13/2014

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- 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
- S Spike Recovery outside accepted recovery limits

ED_013172_00000151-00091

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 10, 2014

Joseph Tracy
Intera, Inc.
6000 Uptown Boulevard, NE Suite 220
Albuquerque, NM 87110
TEL: (505) 246-1600
FAX (505) 246-2600

RE: Bell Trading Post OrderNo.: 1406074

Dear Joseph Tracy:

Hall Environmental Analysis Laboratory received 5 sample(s) on 6/2/2014 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 qualifers 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 #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

June 09, 2014

Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

ESC Sample # : L702253-01

Date Received : June 03, 2014
Description :

Site ID :

Sample ID : 1406074-001A AIR-O-01

Project # :

Collected By :
Collection Date : 06/02/14 07:58

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics - TO-15 SIM									
Benzene	71-43-2	78.1	0.020	0.064	0.12	0.38	TO-15	06/08/14	1
Carbon tetrachloride	56-23-5	154	0.020	0.13	0.080	0.50	TO-15	06/08/14	1
Chloroethane	75-00-3	64.5	0.040	0.11	< 0.040	< 0.11	TO-15	06/08/14	1
Chloroform	67-66-3	119	0.020	0.097	< 0.020	< 0.097	TO-15	06/08/14	1
Chloromethane	74-87-3	50.5	0.030	0.062	0.41	0.85	TO-15	06/08/14	1
1,2-Dibromoethane	106-93-4	188	0.020	0.15	< 0.020	< 0.15	TO-15	06/08/14	1
1,4-Dichlorobenzene	106-46-7	147	0.020	0.12	< 0.020	< 0.12	TO-15	06/08/14	1
1,1-Dichloroethane	75-34-3	98	0.020	0.080	< 0.020	< 0.080	TO-15	06/08/14	1
1,1-Dichloroethene	75-35-4	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
1,2-Dichloropropane	78-87-5	113	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
cis-1,3-Dichloropropene	10061-01-5	111	0.020	0.091	< 0.020	< 0.091	TO-15	06/08/14	1
trans-1,3-Dichloropropene	10061-02-6	111	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
Ethylbenzene	100-41-4	106	0.030	0.13	0.072	0.31	TO-15	06/08/14	1
1,1,2,2-Tetrachloroethane	79-34-5	168	0.020	0.14	< 0.020	< 0.14	TO-15	06/08/14	1
Tetrachloroethylene	127-18-4	166	0.020	0.14	0.045	0.31	TO-15	06/08/14	1
1,1,1-Trichloroethane	71-55-6	133	0.020	0.11	< 0.020	< 0.11	TO-15	06/08/14	1
1,1,2-Trichloroethane	79-00-5	133	0.030	0.16	< 0.030	< 0.16	TO-15	06/08/14	1
Trichloroethylene	79-01-6	131	0.020	0.11	0.020	0.11	TO-15	06/08/14	1
Vinyl chloride	75-01-4	62.5	0.020	0.051	< 0.020	< 0.051	TO-15	06/08/14	1
Vinyl acetate	108-05-4	86.1	0.020	0.070	< 0.020	< 0.070	TO-15	06/08/14	1
1,4-Bromofluorobenzene	460-00-4				118	% Rec.	TO-15	06/08/14	1

RDL1 = ppbv , RDL2 = ug/m3
Note:
Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 06/09/14 10:31 Printed: 06/09/14 10:32

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REPORT OF ANALYSIS

June 09, 2014

Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

ESC Sample # : L702253-02

Date Received : June 03, 2014
Description :

Site ID :

Sample ID : 1406074-002A AIR-I-01

Project # :

Collected By :
Collection Date : 06/02/14 08:19

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics - TO-15 SIM									
Benzene	71-43-2	78.1	0.020	0.064	0.20	0.64	TO-15	06/08/14	1
Carbon tetrachloride	56-23-5	154	0.020	0.13	0.079	0.50	TO-15	06/08/14	1
Chloroethane	75-00-3	64.5	0.040	0.11	< 0.040	< 0.11	TO-15	06/08/14	1
Chloroform	67-66-3	119	0.020	0.097	0.12	0.58	TO-15	06/08/14	1
Chloromethane	74-87-3	50.5	0.030	0.062	0.44	0.91	TO-15	06/08/14	1
1,2-Dibromoethane	106-93-4	188	0.020	0.15	< 0.020	< 0.15	TO-15	06/08/14	1
1,4-Dichlorobenzene	106-46-7	147	0.020	0.12	0.020	0.12	TO-15	06/08/14	1
1,1-Dichloroethane	75-34-3	98	0.020	0.080	< 0.020	< 0.080	TO-15	06/08/14	1
1,1-Dichloroethene	75-35-4	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
1,2-Dichloropropane	78-87-5	113	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
cis-1,3-Dichloropropene	10061-01-5	111	0.020	0.091	< 0.020	< 0.091	TO-15	06/08/14	1
trans-1,3-Dichloropropene	10061-02-6	111	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
Ethylbenzene	100-41-4	106	0.030	0.13	0.22	0.95	TO-15	06/08/14	1
1,1,2,2-Tetrachloroethane	79-34-5	168	0.020	0.14	< 0.020	< 0.14	TO-15	06/08/14	1
Tetrachloroethylene	127-18-4	166	0.020	0.14	0.028	0.19	TO-15	06/08/14	1
1,1,1-Trichloroethane	71-55-6	133	0.020	0.11	< 0.020	< 0.11	TO-15	06/08/14	1
1,1,2-Trichloroethane	79-00-5	133	0.030	0.16	< 0.030	< 0.16	TO-15	06/08/14	1
Trichloroethylene	79-01-6	131	0.020	0.11	0.040	0.21	TO-15	06/08/14	1
Vinyl chloride	75-01-4	62.5	0.020	0.051	< 0.020	< 0.051	TO-15	06/08/14	1
Vinyl acetate	108-05-4	86.1	0.020	0.070	< 0.020	< 0.070	TO-15	06/08/14	1
1,4-Bromofluorobenzene	460-00-4				117	% Rec.	TO-15	06/08/14	1

RDL1 = ppbv , RDL2 = ug/m3
Note:
Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Reported: 06/09/14 10:31 Printed: 06/09/14 10:32

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REPORT OF ANALYSIS

June 09, 2014

Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

ESC Sample # : L702253-03

Date Received : June 03, 2014
Description :

Site ID :

Sample ID : 1406074-003A AIR-I-02

Project # :

Collected By :
Collection Date : 06/02/14 08:22

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics - TO-15 SIM									
Benzene	71-43-2	78.1	0.020	0.064	0.22	0.70	TO-15	06/08/14	1
Carbon tetrachloride	56-23-5	154	0.020	0.13	0.074	0.47	TO-15	06/08/14	1
Chloroethane	75-00-3	64.5	0.040	0.11	0.077	0.20	TO-15	06/08/14	1
Chloroform	67-66-3	119	0.020	0.097	0.12	0.58	TO-15	06/08/14	1
Chloromethane	74-87-3	50.5	0.030	0.062	0.53	1.1	TO-15	06/08/14	1
1,2-Dibromoethane	106-93-4	188	0.020	0.15	< 0.020	< 0.15	TO-15	06/08/14	1
1,4-Dichlorobenzene	106-46-7	147	0.020	0.12	< 0.020	< 0.12	TO-15	06/08/14	1
1,1-Dichloroethane	75-34-3	98	0.020	0.080	< 0.020	< 0.080	TO-15	06/08/14	1
1,1-Dichloroethene	75-35-4	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
1,2-Dichloropropane	78-87-5	113	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
cis-1,3-Dichloropropene	10061-01-5	111	0.020	0.091	< 0.020	< 0.091	TO-15	06/08/14	1
trans-1,3-Dichloropropene	10061-02-6	111	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
Ethylbenzene	100-41-4	106	0.030	0.13	0.30	1.3	TO-15	06/08/14	1
1,1,2,2-Tetrachloroethane	79-34-5	168	0.020	0.14	< 0.020	< 0.14	TO-15	06/08/14	1
Tetrachloroethylene	127-18-4	166	0.020	0.14	0.027	0.18	TO-15	06/08/14	1
1,1,1-Trichloroethane	71-55-6	133	0.020	0.11	< 0.020	< 0.11	TO-15	06/08/14	1
1,1,2-Trichloroethane	79-00-5	133	0.030	0.16	< 0.030	< 0.16	TO-15	06/08/14	1
Trichloroethylene	79-01-6	131	0.020	0.11	0.12	0.64	TO-15	06/08/14	1
Vinyl chloride	75-01-4	62.5	0.020	0.051	< 0.020	< 0.051	TO-15	06/08/14	1
Vinyl acetate	108-05-4	86.1	0.020	0.070	< 0.020	< 0.070	TO-15	06/08/14	1
1,4-Bromofluorobenzene	460-00-4				124	% Rec.	TO-15	06/08/14	1

RDL1 = ppbv , RDL2 = ug/m3
Note:
Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

June 09, 2014

Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

ESC Sample # : L702253-04

Date Received : June 03, 2014
Description :

Site ID :

Sample ID : 1406074-004A AIR-C-01

Project # :

Collected By :
Collection Date : 06/02/14 08:55

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics - TO-15 SIM									
Benzene	71-43-2	78.1	0.020	0.064	0.39	1.2	TO-15	06/08/14	1
Carbon tetrachloride	56-23-5	154	0.020	0.13	0.082	0.52	TO-15	06/08/14	1
Chloroethane	75-00-3	64.5	0.040	0.11	< 0.040	< 0.11	TO-15	06/08/14	1
Chloroform	67-66-3	119	0.020	0.097	0.30	1.5	TO-15	06/08/14	1
Chloromethane	74-87-3	50.5	0.030	0.062	0.51	1.1	TO-15	06/08/14	1
1,2-Dibromoethane	106-93-4	188	0.020	0.15	< 0.020	< 0.15	TO-15	06/08/14	1
1,4-Dichlorobenzene	106-46-7	147	0.020	0.12	< 0.020	< 0.12	TO-15	06/08/14	1
1,1-Dichloroethane	75-34-3	98	0.020	0.080	< 0.020	< 0.080	TO-15	06/08/14	1
1,1-Dichloroethene	75-35-4	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
1,2-Dichloropropane	78-87-5	113	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
cis-1,3-Dichloropropene	10061-01-5	111	0.020	0.091	< 0.020	< 0.091	TO-15	06/08/14	1
trans-1,3-Dichloropropene	10061-02-6	111	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
Ethylbenzene	100-41-4	106	0.030	0.13	1.4	6.1	TO-15	06/08/14	1
1,1,2,2-Tetrachloroethane	79-34-5	168	0.020	0.14	< 0.020	< 0.14	TO-15	06/08/14	1
Tetrachloroethylene	127-18-4	166	0.080	0.54	2.7	18.	TO-15	06/09/14	4
1,1,1-Trichloroethane	71-55-6	133	0.020	0.11	< 0.020	< 0.11	TO-15	06/08/14	1
1,1,2-Trichloroethane	79-00-5	133	0.030	0.16	< 0.030	< 0.16	TO-15	06/08/14	1
Trichloroethylene	79-01-6	131	0.020	0.11	0.58	3.1	TO-15	06/08/14	1
Vinyl chloride	75-01-4	62.5	0.020	0.051	< 0.020	< 0.051	TO-15	06/08/14	1
Vinyl acetate	108-05-4	86.1	0.020	0.070	0.066	0.23	TO-15	06/08/14	1
1,4-Bromofluorobenzene	460-00-4				119	% Rec.	TO-15	06/08/14	1

RDL1 = ppbv , RDL2 = ug/m3
Note:
Units are based on (STP) - Standard Temperature and Pressure
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REPORT OF ANALYSIS

June 09, 2014

Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

ESC Sample # : L702253-05

Date Received : June 03, 2014
Description :

Site ID :

Sample ID : 1406074-005A AIR-C-02

Project # :

Collected By :
Collection Date : 06/02/14 09:00

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics - TO-15 SIM									
Benzene	71-43-2	78.1	0.020	0.064	0.18	0.57	TO-15	06/08/14	1
Carbon tetrachloride	56-23-5	154	0.020	0.13	0.086	0.54	TO-15	06/08/14	1
Chloroethane	75-00-3	64.5	0.040	0.11	< 0.040	< 0.11	TO-15	06/08/14	1
Chloroform	67-66-3	119	0.020	0.097	0.35	1.7	TO-15	06/08/14	1
Chloromethane	74-87-3	50.5	0.030	0.062	0.44	0.91	TO-15	06/08/14	1
1,2-Dibromoethane	106-93-4	188	0.020	0.15	< 0.020	< 0.15	TO-15	06/08/14	1
1,4-Dichlorobenzene	106-46-7	147	0.020	0.12	< 0.020	< 0.12	TO-15	06/08/14	1
1,1-Dichloroethane	75-34-3	98	0.020	0.080	< 0.020	< 0.080	TO-15	06/08/14	1
1,1-Dichloroethene	75-35-4	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
cis-1,2-Dichloroethene	156-59-2	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
trans-1,2-Dichloroethene	156-60-5	96.9	0.020	0.079	< 0.020	< 0.079	TO-15	06/08/14	1
1,2-Dichloropropane	78-87-5	113	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
cis-1,3-Dichloropropene	10061-01-5	111	0.020	0.091	< 0.020	< 0.091	TO-15	06/08/14	1
trans-1,3-Dichloropropene	10061-02-6	111	0.030	0.14	< 0.030	< 0.14	TO-15	06/08/14	1
Ethylbenzene	100-41-4	106	0.030	0.13	0.43	1.9	TO-15	06/08/14	1
1,1,2,2-Tetrachloroethane	79-34-5	168	0.020	0.14	< 0.020	< 0.14	TO-15	06/08/14	1
Tetrachloroethylene	127-18-4	166	0.020	0.14	0.060	0.41	TO-15	06/08/14	1
1,1,1-Trichloroethane	71-55-6	133	0.020	0.11	< 0.020	< 0.11	TO-15	06/08/14	1
1,1,2-Trichloroethane	79-00-5	133	0.030	0.16	< 0.030	< 0.16	TO-15	06/08/14	1
Trichloroethylene	79-01-6	131	0.020	0.11	0.46	2.5	TO-15	06/08/14	1
Vinyl chloride	75-01-4	62.5	0.020	0.051	< 0.020	< 0.051	TO-15	06/08/14	1
Vinyl acetate	108-05-4	86.1	0.020	0.070	< 0.020	< 0.070	TO-15	06/08/14	1
1,4-Bromofluorobenzene	460-00-4				123	% Rec.	TO-15	06/08/14	1

RDL1 = ppbv , RDL2 = ug/m3
Note:
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Hall Environmental Analysis Laboratory

4901 Hawkins NE

Albuquerque, NM 87109

Quality Assurance Report
Level II

L702253

June 09, 2014

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
1,1,1-Trichloroethane	< .02	ppb			WG725325	06/08/14 17:02
1,1,2,2-Tetrachloroethane	< .02	ppb			WG725325	06/08/14 17:02
1,1,2-Trichloroethane	< .03	ppb			WG725325	06/08/14 17:02
1,1-Dichloroethane	< .02	ppb			WG725325	06/08/14 17:02
1,1-Dichloroethene	< .02	ppb			WG725325	06/08/14 17:02
1,2-Dibromoethane	< .02	ppb			WG725325	06/08/14 17:02
1,2-Dichloropropane	< .03	ppb			WG725325	06/08/14 17:02
1,4-Dichlorobenzene	< .02	ppb			WG725325	06/08/14 17:02
Benzene	< .02	ppb			WG725325	06/08/14 17:02
Carbon tetrachloride	< .02	ppb			WG725325	06/08/14 17:02
Chloroethane	< .04	ppb			WG725325	06/08/14 17:02
Chloroform	< .02	ppb			WG725325	06/08/14 17:02
Chloromethane	< .03	ppb			WG725325	06/08/14 17:02
cis-1,2-Dichloroethene	< .02	ppb			WG725325	06/08/14 17:02
cis-1,3-Dichloropropene	< .02	ppb			WG725325	06/08/14 17:02
Ethylbenzene	< .03	ppb			WG725325	06/08/14 17:02
Tetrachloroethylene	< .02	ppb			WG725325	06/08/14 17:02
trans-1,2-Dichloroethene	< .02	ppb			WG725325	06/08/14 17:02
trans-1,3-Dichloropropene	< .03	ppb			WG725325	06/08/14 17:02
Trichloroethylene	< .02	ppb			WG725325	06/08/14 17:02
Vinyl acetate	< .02	ppb			WG725325	06/08/14 17:02
Vinyl chloride	< .02	ppb			WG725325	06/08/14 17:02
1,4-Bromofluorobenzene		% Rec.	101.0	60-140	WG725325	06/08/14 17:02

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
1,1,1-Trichloroethane	ppb	.5	0.457	91.4	70-130	WG725325
1,1,2,2-Tetrachloroethane	ppb	.5	0.458	91.6	70-130	WG725325
1,1,2-Trichloroethane	ppb	.5	0.481	96.3	70-130	WG725325
1,1-Dichloroethane	ppb	.5	0.419	83.8	70-130	WG725325
1,1-Dichloroethene	ppb	.5	0.382	76.5	70-130	WG725325
1,2-Dibromoethane	ppb	.5	0.506	101.	70-130	WG725325
1,2-Dichloropropane	ppb	.5	0.397	79.4	70-130	WG725325
1,4-Dichlorobenzene	ppb	.5	0.546	109.	70-130	WG725325
Benzene	ppb	.5	0.406	81.2	70-130	WG725325
Carbon tetrachloride	ppb	.5	0.437	87.5	70-130	WG725325
Chloroethane	ppb	.5	0.374	74.8	70-130	WG725325
Chloroform	ppb	.5	0.452	90.4	70-130	WG725325
Chloromethane	ppb	.5	0.354	70.7	70-130	WG725325
cis-1,2-Dichloroethene	ppb	.5	0.404	80.8	70-130	WG725325
cis-1,3-Dichloropropene	ppb	.5	0.430	86.1	70-130	WG725325
Ethylbenzene	ppb	.5	0.499	99.8	70-130	WG725325
Tetrachloroethylene	ppb	.5	0.500	100.	70-130	WG725325
trans-1,2-Dichloroethene	ppb	.5	0.400	80.0	70-130	WG725325
trans-1,3-Dichloropropene	ppb	.5	0.459	91.8	70-130	WG725325
Trichloroethylene	ppb	.5	0.428	85.6	70-130	WG725325
Vinyl acetate	ppb	.5	0.439	87.9	70-130	WG725325
Vinyl chloride	ppb	.5	0.358	71.5	70-130	WG725325
1,4-Bromofluorobenzene				107.0	60-140	WG725325

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
1,1,1-Trichloroethane	ppb	0.478	0.457	96.0	70-130	4.49	25	WG725325
1,1,2,2-Tetrachloroethane	ppb	0.421	0.458	84.0	70-130	8.36	25	WG725325
1,1,2-Trichloroethane	ppb	0.463	0.481	92.0	70-130	3.90	25	WG725325
1,1-Dichloroethane	ppb	0.421	0.419	84.0	70-130	0.580	25	WG725325
1,1-Dichloroethene	ppb	0.420	0.382	84.0	70-130	9.26	25	WG725325

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Hall Environmental Analysis Laboratory

4901 Hawkins NE

Albuquerque, NM 87109

Quality Assurance Report
Level II

L702253

June 09, 2014

Analyte	Units	Laboratory Control Sample Result	Ref	%Rec	Limit	Duplicate RPD	Limit	Batch
1,2-Dibromoethane	ppb	0.467	0.506	93.0	70-130	8.01	25	WG725325
1,2-Dichloropropane	ppb	0.399	0.397	80.0	70-130	0.520	25	WG725325
1,4-Dichlorobenzene	ppb	0.448	0.546	90.0	70-130	19.7	25	WG725325
Benzene	ppb	0.406	0.406	81.0	70-130	0.0400	25	WG725325
Carbon tetrachloride	ppb	0.480	0.437	96.0	70-130	9.31	25	WG725325
Chloroethane	ppb	0.401	0.374	80.0	70-130	6.98	25	WG725325
Chloroform	ppb	0.482	0.452	96.0	70-130	6.39	25	WG725325
Chloromethane	ppb	0.384	0.354	77.0	70-130	8.36	25	WG725325
cis-1,2-Dichloroethene	ppb	0.411	0.404	82.0	70-130	1.71	25	WG725325
cis-1,3-Dichloropropene	ppb	0.417	0.430	83.0	70-130	3.04	25	WG725325
Ethylbenzene	ppb	0.455	0.499	91.0	70-130	9.32	25	WG725325
Tetrachloroethylene	ppb	0.495	0.500	99.0	70-130	1.10	25	WG725325
trans-1,2-Dichloroethene	ppb	0.420	0.400	84.0	70-130	4.88	25	WG725325
trans-1,3-Dichloropropene	ppb	0.423	0.459	85.0	70-130	8.04	25	WG725325
Trichloroethylene	ppb	0.429	0.428	86.0	70-130	0.260	25	WG725325
Vinyl acetate	ppb	0.500	0.439	100.	70-130	12.9	25	WG725325
Vinyl chloride	ppb	0.390	0.358	78.0	70-130	8.54	25	WG725325
1,4-Bromofluorobenzene				107.0	60-140			WG725325

Batch number /Run number / Sample number cross reference

WG725325: R2936966: L702253-01 02 03 04 05

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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: INT | Work Order Number: 1406074 | RcptNo: 1

Received by/date: MG 06/02/14

Logged By: **Michelle Garcia** 6/2/2014 5:31:00 PM Michelle Garcia

Completed By: **Michelle Garcia** 6/2/2014 5:37:01 PM Michelle Garcia

Reviewed By: MG 06/02/14

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. 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: _____

17. Additional remarks:

18. **Cooler Information**

ED_013172_00000151-00100

Chain-of-Custody Record

Client: INTERA

Mailing Address: on file

Phone #:

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) XL

Turn-Around Time:
☐ Standard ☐ Rush

Project Name: Bell Trading Post

Project #:

Project Manager: Joe Tracy

Sampler: C. Short

On Ice: ☐ Yes ☐ No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1406074	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Analysis Request					Air Bubbles (Y or N)
6/2/14	0758	Air	Air-O-01	6L Summa	—	-001												TO-15-Simms					
	0819		Air-I-01		—	-002																	
	0822		Air-I-02		—	-003																	
	0855		Air-C-01		—	-004																	
	0900		Air-C-02		—	-005																	

Date:	Time:	Relinquished by:	Received by:	Date	Time	Remarks:
6/2	1510			6/2/14	1710	
Date:	Time:	Relinquished by:	Received by:	Date	Time	
				06/02/14	1733	

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.

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 6/17/2020 10:03:11 PM
To: 'Kieling, Martyne, NMENV' [Martyne.Kieling@state.nm.us]; Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]
CC: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: West Central Avenue Plume
Attachments: Appendix A - Site-Specific Data Quality Objective.pdf; Appendix B - Compendium of Methods for the Determination of Toxic Compounds in Ambient Air (Second Edition) - Compendium Method TO-17.pdf; Appendix C - Standard Operating Procedures (SOPs).pdf; Figure 1-1 Site Location Map.pdf; Figure 2-1 Site Area Map.pdf; Figure 2-2 Site and Study Area Layout Map.pdf; Figure 3-1 Soil Gas Analytical and Field Sample Location Overview Map.pdf; Figure 3-2 Soil Gas Analytical and Field Sample Location Map 1.pdf; Figure 3-3 Soil Gas Analytical and Field Sample Location Map 2.pdf; Figure 3-4 Soil Gas Analytical and Field Sample Location Map 3.pdf; Figure 3-5 Soil Gas Analytical and Field Sample Location Map 4.pdf; Figure 3-6 Soil Gas Analytical and Field Sample Location Map 5.pdf; West Central Avenue Assessment QASP.pdf

Hello All;

Please see the attached Quality Assurance Sampling Plan. I would like you guys to review the plan and make sure that we are on the same page on the work planned or if you have suggestions please let me know. Additionally, I would like to see if NMED could assist us in getting property access agreements when we are ready to do those.

Thank you,

Gary W. Moore (SEDER)
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QUALITY ASSURANCE SAMPLING PLAN

FOR

WEST CENTRAL AVENUE ASSESSMENT
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

Prepared For

U.S. Environmental Protection Agency Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270-2102

Contract No. EP-S5-17-02
Technical Direction Document No. 0001/20-324
WESTON Work Order No. 20600.012.001.1324
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FPN N/A
SSID A6JT
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May 2020

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1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) contractor, was tasked by the U.S. Environmental Protection Agency Region 6 (EPA Region 6) under Contract Number EP-S5-17-02, Technical Direction Document (TDD) Number 0001/20-324, to conduct passive soil gas (PSG) assessment activities at West Central Avenue Assessment Site (Site) located along Central Avenue NW and surrounding areas located in Albuquerque, Bernalillo County, New Mexico. A Site Location Map is provided as Figure 1-1. The Superfund Enterprise Management System (SEMS) Identification (ID) assigned to the Site is NMN000607372. START prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed at the Site as part of the assessment sampling activities.

1.1 PROJECT OBJECTIVES

START is providing technical assistance to EPA Region 6 to support EPA's determination that the Site presents or does not present, by presence of trichloroethylene (TCE) and/or tetrachloroethylene (PCE), a threat to public health or welfare of the United States or the environment in accordance with *40 Code of Federal Regulations (CFR) 300.415.*

The Project Team will consist of Jeff Criner as the START Assessment/Inspection Manager and Derrick Cobb as the START Project Team Leader (PTL) and Field Safety Officer (FSO). The PTL will be responsible for the technical quality of work performed in the field and will serve as the START liaison to EPA Region 6 during field activities. The PTL, with the concurrence of the EPA On-scene Coordinator (OSC), will determine the locations for PSG samples in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The PTL will be responsible for accurate chain-of-custody documentation for the samples collected during field activities. The PTL will oversee the packaging and shipping of samples to the designated laboratory, and enter daily sample collection into SCRIBE and observational data into Response Manager. The FSO will be responsible for providing overall Site health and safety support.

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1.2 QASP FORMAT

This QASP has been organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methodology and Data Validation
- Section 5 – Quality Assurance

All figures are provided as portable document format (pdf) files. Appendices are provided with the following information:

- Appendix A Site-Specific Data Quality Objective
- Appendix B Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (Second Edition) – Compendium Method TO-17
- Appendix C Standard Operating Procedures

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2. SITE BACKGROUND

Information regarding the Site location, description, and history is included in the following subsections.

2.1 SITE LOCATION AND DESCRIPTION

The West Central Avenue (WCA) Site is located within the city limits of Albuquerque, Bernalillo County, New Mexico. Geographically, it is located east of the Rio Grande River, south and east of Old Town Albuquerque, and west of the downtown Albuquerque area. The Site's suspected point source of contamination is located at 1503 Central Avenue NW, geographic coordinates are Latitude 35.090077° North and Longitude 106.664567° West, in Township 10N, Range 3E, Section 17. The West Central Avenue Site is bordered to the north by Lomas Boulevard NW, to the east by 10th Street, to the south by Park Avenue, and to the west by Rancho Seco Road NW. The elevation of the Site is approximately 4,951 feet above mean sea level (amsl). The Site Area Map and the Site and Study Area Layout Map are presented as Figure 2-1 and Figure 2-2, respectively.

The WCA Site is situated within a commercial and residential area. In addition to urban parks, there are eight schools within a 1 mile radius of the Site. The primary contaminants of concern are tetrachloroethylene (PCE) and trichloroethylene (TCE) chlorinated solvents. The New Mexico Environment Department (NMED) and EPA suspect the source of contamination to originate from the Bell Trading Post (BTP), the location of a former Indian jewelry manufacturing business that operated between 1947 and 1975. The business moved to the Sun Bell site located just 0.3 miles northwest from the BTP at the intersection of Central Avenue NW and Lomas Boulevard NW. The business currently operates as Rio Grande Trading (formerly the Bell Group) and distributes jewelry and supplies under the Rio Grande brand name. The exact date of release is unknown, however, it is suspected that TCE was used to degrease and clean their products and that releases occurred sometime during its operation at the Site.

The Site is located in the central portion of the Albuquerque Basin, a geologic feature filled with unconsolidated to loosely consolidated gravel, sand, silt, and clay. The ground surface near the

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Site slopes east to west toward the Rio Grande located just over 1 mile west-southwest of the Site.

The river deposits identified as the axial Rio Grande facies that underlie the Site consist of well-sorted coarse sand to gravel separated by silty and clayey fine sands. These strata have been divided into seven aquifer zones, differentiated based on geologic and hydraulic characteristics. The uppermost water-bearing zone (shallow aquifer zone) is approximately 40 feet below ground surface (bgs) beneath the western portion of the EPA Fruit Avenue Plume (FAP) Superfund (EPA ID NMD986668911) site that stretches to the west of the railroad tracks. Depth to the shallow aquifer zone west of the Site, at the former BTP property, is approximately 20 to 21 feet bgs.

The groundwater within the Albuquerque Basin at the Site can be divided into three aquifer zones: shallow, intermediate, and deep, and are defined as follows:

- Shallow (S) – wells with screen midpoint elevations at 4,894 feet amsl or higher. These S wells are typically completed across the water table at about 40 feet bgs.
- Intermediate (I) – wells with screen midpoint elevations between 4,894 and 4,834 feet amsl (roughly 60 to 120 feet bgs). This zone has been subdivided into I1 (approximately 60 to 85 feet bgs or 4,893 to 4,868 feet amsl) and I2 (86 to 120 feet bgs or 4,868 to 4,834 feet amsl).
- Deep (D) – wells having screen midpoint elevations at or below 4,834 feet amsl (generally completed below 120 feet bgs). The D zone has been further subdivided into four zones: D1 (generally 120 to 150 feet bgs or 4,834 to 4,804 feet amsl); D2 (generally 150 to 250 feet bgs or 4,804 to 4,704 feet amsl); D3 (approximately 250 to 350 feet bgs or 4,704 to 4,604 feet amsl; and D4 (350 feet and deeper or less than 4,604 feet amsl).

2.2 SITE HISTORY AND PREVIOUS INVESTIGATIONS

The WCA Site was identified by the NMED when chlorinated solvents were detected in background ground water samples collected in 2005. The samples were taken from upgradient monitoring wells of the FAP located just east of the Site, including MNW-11. The FAP site is currently in the Long Term Remedial Action (LTRA) phase of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. Suspected sources of the FAP TCE are the former Sunshine Laundry, Elite Cleaners, and American Linen

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Corporation dry-cleaning facilities. In April 1989, the City of Albuquerque discovered chlorinated solvent contamination in groundwater near the FAP site during a routine inspection of the Coca-Cola bottling plant water supply well, located at 205 Marquette Avenue NE. Undocumented releases from unknown sources are suspected to have formed the WCA groundwater contaminant plume containing PCE and its breakdown products TCE, *cis*-1,2-Dichloroethylene (cis-1,2-DCE), *trans*-1,2-Dichloroethylene (trans-1,2-DCE), and vinyl chloride (VC). The primary contaminants of concern (COCs) for this assessment are PCE and TCE. The full extent of the Site groundwater plume is not well-defined at this time.

MNW-11 is located closest to the Site. The BTP is located at 1503 Central Avenue NW, approximately 2,375 feet west-northwest of monitoring well MNW-11. Groundwater samples collected during a 2001 NMED Voluntary Remediation Program (VRP) Phase II environmental site assessment (ESA) also exhibited a TCE detection of 1.5 micrograms per liter (µg/L). During the same ESA, twelve soil gas samples were collected between 2 to 4 feet bgs. Six of twelve soil gas samples yielded TCE concentrations ranging from 0.2 µg/L (or 200 micrograms per cubic meter [µg/m^3]) to 3.4 µg/L (or 3,400 µg/m^3). In 2005, the Voluntary Remediation Completion report for BTP noted that there may have been a historical release but that the samples were inconclusive and did not exceed state water quality standards. In 2014, a VRP Limited Phase II Expanded Site Assessment was conducted to gather soil vapor and indoor air samples. Two of the three soil gas samples collected from the exterior of the BTP building contained TCE; the highest detection being 1,800 µg/m^3 from a sample collected 3 feet bgs near the intersection of Roma Avenue NW and Laguna Boulevard NW. One of two soil borings for soil vapor sampling and one of two "source" air samples collected from the interior of the building reported TCE concentrations of 14 µg/m^3 and 3.1 µg/m^3 TCE, respectively. It was concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, occurred at the BTP or within the immediate vicinity of the Site.

A former dry cleaner property, Park Avenue Cleaners, was also investigated by NMED VRP in 2000. The property is located at 1004 Park Avenue, approximately 0.45 mile southeast from the former BTP. Soil gas data from two boreholes indicated up to 76,000 µg/m^3 of PCE and 900 µg/m^3 of TCE. A monitoring well, MW-1, was also installed during the investigation; samples yielded detections up to 14 µg/L of PCE.

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In addition to the VRP ESAs, NMED Superfund Oversight Section performed a 2014 site inspection (SI), a 2016 expanded site inspection (ESI), and a 2017 site reassessment (SR) in coordination with EPA. The 2014 SI groundwater analytical results, from samples taken from six wells located approximately 3,000 feet northwest to southwest of 9th Street and Marquette Avenue NW (FAP site address) and upgradient from the BTP, did not indicate detection of any volatile organic compounds (VOCs) nor TCE. In addition to the 2014 SI, NMED VRP also tasked Intera Inc. with conducting a Limited Phase II Environmental Site Investigation (ESA) which focused on indoor air impacts. Sub-slab soil vapor samples from both the indoor and the exterior of the BTP building yielded detections of TCE above EPA Vapor Intrusion Screening Levels (VISLs).

Only soil vapor samples were collected during the 2016 ESI. The ESI data indicated three TCE hotspots and two PCE hotspots from the 1800 block to the 1400 block of Central Avenue NW; the plume appeared to stretch in an eastward direction, southeast down Central Avenue NW then breaking east along Marquette Avenue NW toward the FAP site-associated MNW-11 well. The highest TCE soil gas laboratory sample result (8,530 $\mu g/m^3$) from the ESI were collected from the former BTP property. Additional locations, like the Wash Tub Laundry were identified as an additional possible source of contamination. The former Park Avenue Cleaners property was also investigated as part of the ESI; field gas chromatograph samples yielded up to 1,727 $\mu g/m^3$ PCE and up to 104 $\mu g/m^3$ TCE.

The 2016 NMED ESI report also included FAP sample data from monitoring well samples collected from wells located over the western portion of the FAP plume. Subsequent quarterly sampling of the FAP, between 2003 and 2015, has indicated merging of its western edge with the upgradient WCA TCE plume, thus further complicating FAP remediation efforts. Two sets of data were compiled from samples taken from upgradient-located FAP site monitoring wells (NMED ESI, 2016). From that data, TCE was detected in the following wells as provided in the table below.

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Table 2-1
TCE in Groundwater Sampled from Western FAP Site Wells
NMED ESI, 2016
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Well	Aquifer subzone	2012 (µg/L)	2015 (µg/L)
MNW-11	D1 (121 - 150 ft. bgs)	46	22
SFMW-14	D1 (121 - 150 ft. bgs)	17	14.9
MNW-9	D1 (121 - 150 ft. bgs)	4.6	1.9
MNW-1	I2 (86 - 120 ft. bgs)	17	19.8
SFMW-13	I2 (86 - 120 ft. bgs)	1	0.9
WB-01	I1/I2 (61 - 120 ft. bgs)	0.9	2.6
WB-02	I1/I2 (61 - 120 ft. bgs)	0.77	0.1

Notes:
ft. bgs – feet below ground surface
µg/L – micrograms per liter

The 2017 SR activities included more air and soil vapor sample collection, and the installation of two monitoring wells. WESTON mobilized in March 2017 to conduct oversight on the installation of two monitoring wells. NMED sampled these wells the following week and released a Site Reassessment Report in September 2017. NMED reported no water samples yielded detections above regulatory limits. The soil vapor and indoor air samples were collected for analysis from public, commercial, and residential properties to generate soil gas plume maps. In lieu of groundwater data, NMED decided to use actively-pumped screening detections to generate the plume maps that further confirmed the plume map generated for the 2016 ESI. The highest TCE soil gas laboratory sample results were detected at 340 µg/m^3 and 35 µg/m^3, located at the 1433 Central Avenue NW property that borders the former BTP on the east side. The highest PCE soil gas sample results, with concentrations up to 1,700 µg/m^3, were collected at the former Park Avenue Cleaners.

In March 2020, START mobilized to the Site for a preliminary Site visit to identify suitable sample locations. During the visit, NMED provided START with additional locations of suspected sources of contaminants, namely Custom Cleaners and Silver Moon Lodge.

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3. SAMPLING APPROACH AND PROCEDURES

The specific sampling approach and procedures are presented in the following subsections.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The EPA OSC and START PTL have pre-determined the sample locations of PSG samplers within the study area. Figures 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 detail the proposed PSG sample locations. The EPA OSC and START PTL may modify, add, or delete PSG sample locations as necessary. Site access to the sample locations, located within private properties and the City of Albuquerque right-of-way areas, will be obtained prior to the initiation of field activities. The START PTL will also contact New Mexico 811 at least 48 hours prior to the sampling event to notify local utility companies (e.g., power, phone, gas, cable, sanitation, etc.) to have underground cables, lines, and pipes flagged and marked. The START PTL will also work closely with the City of Albuquerque regarding any potential utilities that may be located in the right-of-way areas where the PSG samples will be placed. The START PTL will also contact private property owners at least 48 hours prior to entry.

3.1.1 Data Quality Objective

The objective of sampling activities is to determine if PCE and TCE are present within Site soil vapor and whether those concentrations may pose a threat to human health and the environment. To accomplish this, a Data Quality Objective (DQO) has been established and is included in Appendix A:

- Confirm the presence and concentration of PCE, TCE, and other chlorinated solvent degradation products in soil vapor using PSG technology.

The DQO was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

3.1.2 Health and Safety Plan Implementation

Field activities will be conducted in accordance with the site-specific health and safety plan (HASP). The FSO will be responsible for implementation of the HASP during all field investigation activities. In accordance with WESTON's general health and safety operating

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procedures, the START field team will drive the route to the hospital specified in the HASP prior to initiating sampling activities.

3.1.3 Community Relations

Community relations may require additional EPA involvement due to the general nature of the Site. It is anticipated that the EPA OSC will be on-site at all times, and community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the START PTL, under the guidance of the START Inspection/Assessment Manager, will manage community relations in the field as directed by the EPA OSC.

3.1.4 Field Activities Review Meeting

The PTL will conduct a meeting with the START field team to familiarize them with the project scope of work, discuss the planned field activities, roles and responsibilities, and review the project HASP and other relevant standard operating procedures (SOPs). This meeting will be conducted prior to beginning any Site activities.

3.1.5 Mobilization

The START team is currently scheduled to mobilize for this sampling event sometime between June and August 2020, pending the evolving response to the COVID-19 pandemic. It is anticipated that placement and retrieval of the PSG sampler will each require approximately 7 days to complete, including mobilization and demobilization.

3.2 FIELD ACTIVITIES

START will use passive soil gas samplers to collect soil vapor from the WCA Site. A total of 278 PSG samples consisting of 241 normal, 25 duplicate, 6 trip blanks, and 6 rinsate blanks will be collected as part of the field activities. The proposed sample locations are shown in Figure 3-1. A total of 206 PSG samplers will be installed within the City of Albuquerque right-of-ways. See Figures 3-1 through 3-6. Thirty-five PSG samplers will be installed on private properties along Central Avenue. See Figures 3-1 through 3-6.

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Passive gas samplers will be installed in accordance with SOPs. WESTON SOPs and supporting SOPs are included in Appendix C. The specific sampling, decontamination, and sample handling procedures, including disposition of investigation-derived waste (IDW), are described in the following subsections.

3.2.1 PSG Installation/Retrieval

The PSG samplers will be installed in 3-foot-depth holes using a hammer drill with a ¾-inch or 1 inch-diameter drill bit according to the manufacturer's guidelines. Should the proposed sample location be covered with concrete, START will use a concrete drill bit to develop the boring hole. After the PSG samplers are installed, the holes will be sealed with the provided plug to protect the samplers and prevent potential surface vapor intrusion. START will obtain global positioning coordinates (GPS) for each sample location. The PSG samplers will remain in the subsurface for up to 21 days, then retrieved and shipped to a WESTON subcontracted laboratory for analysis. Excess soil from boreholes will be contained on-site and used to backfill the holes after the samplers are removed. For those boring holes drilled through concrete, the boring holes will be patched with concrete according to City of Albuquerque specifications.

3.2.2 Sample Handling Procedures

The PSG samplers will be installed according to the manufacturer specifications. Following PSG sample retrieval, the samplers will be stored in the appropriate containers and preserved in a manner that is appropriate for the analyses to be performed.

Any sampling equipment used for the PSG sampling effort (i.e., drill bit) will be decontaminated prior to and in between each sample location. PSG samples will remain in containers in a clean, segregated area. Sampling personnel will change gloves between each sample collection/handling to reduce the possibility of cross-contamination.

3.2.3 Quality Assurance/Quality Control Samples

A field quality control (QC) program will be implemented to ensure conformance with data quality protocols established by the EPA. The field QC program is generally comprised of additional collected field QC "duplicate" samples, including those samples described in the

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following paragraphs. Refer to Table 3-1 for QA/QC sample collection requirements. A summary of field QC samples anticipated to be collected during the assessment is summarized below:

- **Field Duplicate Samples**. Field duplicate PSG samples will be collected during the field sampling effort. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Blind PSG field duplicate samples will be collected at the rate of one duplicate for every ten samples collected. Twenty-five blind field duplicate samples are planned for this sampling effort.
- **Equipment Rinsate Samples**. Equipment rinsate blanks will be prepared by pouring laboratory-grade de-ionized water over non-disposable sampling equipment (i.e., drill bit) after it has been decontaminated, and by collecting the rinse water in sample containers for analyses. The samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. The equipment rinsate blanks will be prepared each day that non-disposable sampling equipment is used. START will collect one rinsate sample from the drill bit used to confirm that it had been properly decontaminated.
- **Trip Blank Samples.** PSG trip blank samples are collected when analyzing soil gas samples for VOCs. PSG trip blank samples are a critical requirement for all absorptive sampling programs and are used to quantify any potential blank contamination from sample transport, handling, and storage. PSG trip blank samples are samples that travel to and from the field sampling site without being opened. One trip blank sample will be placed in the shipping cooler that contains PSG samplers to be analyzed for VOCs.
- **Temperature Blank.** One temperature blank will be prepared in the field and will consist of one 40-milliliter glass sample container with a Teflon®-lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of this sample within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.

3.3 SAMPLE MANAGEMENT

Specific nomenclature that will be used by START will provide a consistent means of facilitating the sampling and overall data management for the project as defined in the WESTON SOPs provided in Appendix B. Any deviations from the sample nomenclature proposed below must be

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approved by the START PTL. Sample locations will be identified in the field as each location is sampled, independent of the physical location of the sample.

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, the PSG samplers will be maintained at 4 °C until they are submitted for laboratory analysis. No preservation of the samples is necessary. The samples will be sent to the subcontracted laboratory by overnight carrier.

The hold time is initiated when the samples are collected in the field and continues until the analysis is begun. The turnaround time is initiated when the samples are received by the laboratory and continues until the analytical results are made available to WESTON verbally or electronically for review. Samples that have been analyzed will be disposed by the designated laboratory in accordance with standard laboratory procedures.

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Table 3-1
Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times
West Central Avenue Assessment
Albuquerque, Bernalillo County, New Mexico

Sample Matrix	Analytical Parameter	Analytical Method	Container Info	Preservation Requirements	Minimum Volume or Weight	Maximum Holding Time
Passive Soil Gas	VOCs	Modified TO-17	1 sampler per sample location	4 °C	N/A	30 days to analysis
Field Blank Samples (also Passive Soil Gas)	VOCs	Modified TO-17	1 sampler per day of sampling activity	4 °C	N/A	30 days to analysis

Notes:
°C - Degrees Celsius
N/A - Not Applicable
VOCs - Volatile Organic Compounds

3.5 INVESTIGATION-DERIVED WASTE

It is anticipated that minimal Investigation-Derived Waste (IDW) will be generated during the field sampling effort. Any excess soil and/or concrete generated during the passive gas sampler installation activities will be placed in plastic bags and disposed by START off-site within municipal trash dumpsters.

3.6 DECONTAMINATION

Non-disposable sampling equipment (i.e., drill bit) used during the PSG sampler installation process will be decontaminated before initial use, between use, and at the end of the field effort. Equipment decontamination will be completed in the following steps:

1. Non-phosphate detergent and potable water wash to clean the equipment.
2. Final potable water rinse.
3. Equipment air-dried.

Although highly unlikely, should any excess waste be generated because of equipment decontamination, it will be placed in a drum and disposed of appropriately at the end of the sampling activities. The drum will be labeled on the side with the name of the site, the contents,

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sampling location, and date. The drum will remain at the EPA soil vapor extraction facility until arrangements can be made for its disposal.

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4. ANALYTICAL METHODOLOGY AND DATA VALIDATION

Passive soil gas samples will be analyzed by a WESTON-contracted laboratory using gas chromatography/mass spectrometry (GC/MS) instrumentation, following modified EPA TO-17 procedures. The laboratory's reported quantitation levels (RQLs) for each of the VOCs associated with the modified EPA TO-17 methodology, in mass and mass per volume, will be used. Mass will be reported according the laboratory RQLs; RQLs for mass and mass per volume will be used as a screening tool to determine the presence or absence of VOCs in the passive soil gas samples. The rinsate, trip blank and field blank samples will be analyzed for VOCs by SW-846 Method 8260.

Following analysis, the laboratory will provide a preliminary data deliverable via email in PDF format. The final data deliverable will include a full Contract Laboratory Program (CLP)-like data package (Level IV data package with QC and raw data) in PDF format and a final Electronic Data Deliverable (EDD) in Microsoft Excel format. Initial data deliverables (preliminary results) will be based on a standard, 10-business-day Turn-around Time (TAT) starting when the laboratory receives the samples, unless otherwise directed by the EPA OSC. The TAT criteria will be initiated when the sample group is received by the laboratory and continues until the data deliverable is submitted to START. The final Level IV data deliverable will be submitted by the laboratory based on a 10-business-day TAT.

START-contracted laboratory data packages will be verified and validated using Stage 2B validation, as described in the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (January 2009) unless otherwise specified by the EPA OSC. Data validation qualifiers will be applied based on method-specific analytical quality control guidelines as well as Superfund CLP National Functional Guidelines for Superfund Organic Methods Data Review (January, 2017). A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. START will evaluate the following (if applicable) to verify that the analytical data is within acceptable QA/QC tolerances:

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- The completeness of the laboratory report, verifying that all required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

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5. QUALITY ASSURANCE

Quality Assurance (QA) will be conducted in accordance with the WESTON Corporate Quality Management Manual; the WESTON START Quality Management Plan; and EPA Quality Assurance/Quality Control Guidance for Removal Activities. The START PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory used during the investigation will be responsible for QA/QC related to the analytical work. START will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

5.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under the chain-of-custody procedures.

START personnel will complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to the subcontracted laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.

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- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each shipping container. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and attached to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

5.2 PROJECT DOCUMENTATION

All documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, and SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure Web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one

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site. START personnel will use SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

5.3 FIELD DOCUMENTATION

The following field documentation will be maintained.

5.3.1 Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number
- Names of personnel on-site
- Dates and times of all entries
- Description of all site activities, including site entry and exit times
- Noteworthy events and discussions
- Weather conditions
- Site observations
- Identification and description of samples and locations
- Dates and times of sample collections and chain-of-custody information
- Records of photographs
- Site sketches

5.3.2 Sample Labels

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number
- Date and time the sample was collected
- Sample preservation method
- Analysis requested
- Sampling location

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5.3.3 Chain-of-Custody Record

A chain-of-custody record will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it. The chain-of-custody is discussed in Subsection 5.1 Sample Custody Procedures.

5.3.4 Custody Seal

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

5.3.5 Photographic Documentation

START will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appeared at completion of the work.

All photographs should be taken with a digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

5.3.6 Report Preparation

At the completion of the project, START will review and validate all laboratory data and prepare a draft trip report of field activities and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.

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5.4 RESPONSE MANAGER

START will use the Response Manager module located on the EPA Web Hub, https://solutions.westonproject.net/epawebhub/, to collect and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – Site specific data including location and type of site. It also includes an area for all key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Timeline Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for targeted reconnaissance efforts. Typically, the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any an all reconnaissance activities.
- Facility Assessment Module - provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for assessments of structures. Typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle to grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifest and manifest line items, and upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for the tracking of which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property with regard to the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.

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- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the OSC in a Pollution Report (POLREP) or Situation Report (SITREP).
- HHW Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta data associated with that data file can be filled in using the photo-log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At anytime deemed necessary, POLREP and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and is backed up regularly.

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New Mexico

LEGEND

PSG Sample Location (n = 2)

Parcel Boundary

N

0 40 80

FEET

SOURCE: © NEARMAP, 2019

USEPA REGION 6

ATTACHMENT 1

PROPOSED SAMPLE LOCATION MAP
WEST CENTRAL AVENUE ASSESSMENT
1429 CENTRAL AVE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
APRIL 2020		AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\attachments\Attachment 1 - Parcel Map_14.mxd 12:48:27 PM 4/28/2020 dsguentm

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 7/15/2020 9:34:49 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: 1615 Central Ave NW, Albuquerque, NM

Derrick,

I received a call from this property owner and I answered his questions. He indicated that he would complete the Access agreement and send in to us. Hopefully, we will get this in a short timeframe.

Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Sent: 2/25/2022 5:36:12 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]; Cook, Brenda [cook.brenda@epa.gov]; Ogden, Sarah, NMENV [sarah.ogden@state.nm.us]; McGlown, Anthony, NMENV [anthony.mcglown@state.nm.us]; Mark Garman [mark.garman@state.nm.us]; Cobb, Derrick [derrick.cobb@westonsolutions.com]
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure
Attachments: COA_BELL_VRCR_Final_09_28_05_final.pdf

Gary, Michelle, and LaDonna,

Attached is the Voluntary Remediation Completion Report Former Bell Trading Post Facility at 1503 Central Ave. Albuquerque, NM - September 28, 2005. I did have the dates wrong in my previous email some work was performed in the 1990's however the Phase I and Phase II work and reports and the VR Completion Report was performed in the early 2000's. This should provide a comprehensive look at what was performed at 1503 at that time.

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Kieling, Martyne, NMENV
Sent: Friday, February 25, 2022 10:07 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV <Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure

Gary, Michelle & LaDonna,

NMED -GWQB Superfund Oversight Section (SOS) would like to request a Teams meeting with you early next week to discuss the EPA's planned path forward with the Soil vapor/ Indoor air West Central Avenue study.
There have been requests to the GWQB-VRP section from the owner (G&L Investment Company, Inc.) of the Properties in Blue on the map below. Please see the attached letter for details of that request. The Superfund Section will be participating in a conference call with GWQB -VRP and the property representatives on Thursday morning 3/3/3022 and would like to be prepared to speak as to SOS's roll in the planned EPA-CERCLA process at this location an how that may affect the request for VRP involvement. NMED's staff schedule for a Teams meeting is clear Monday 9am MST, Tuesday morning. And Wednesday after 2pm MST.

To answer your question regarding sampling and mitigation at the Former Bell Trading Post. The Bell Trading Post (BTP) property now condominiums/lofts. Went through the VRP process in the 1990s and did a soil lead and asbestos removal. The Bell VRP investigation also performed soil testing for volatile organics and metals and collected 3 ground water grab

samples at temporary bore holes. At that time there were no NMWQCC exceedances for TCE in the groundwater grab samples. I have been told that BTP condo management performed some limited follow-up indoor air sampling on their own after the ESI results were provided to them. I can provide a copy of the BTP –VRP reports to you if you wish. I do not have data or reports from the BTB condo management to confirm what I have been told regarding their own contracted indoor air sampling.

Please let us know your available times for a Teams Conference call.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, February 24, 2022 12:54 PM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV

<Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: [EXTERNAL] Re: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Martyne,

I am out of office till Monday. We do have a map which I believe that I sent to you. We are confirming the property addresses that we need to perform interior sampling based upon the map.
I assume that the Bell Trading Tower building has already performed sampling and mitigation. Please confirm.

Thanks
Gary

Sent from my iPhone

On Feb 23, 2022, at 11:10 AM, Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us> wrote:

Gary,

Please let me know if you have any further updates as to when to expect a final report on the soil vapor study performed in 2021. NMED continues to have inquiries from property owners in the 1400 block W Central Ave.

Please call if you have anything to add and wish to discuss.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, December 15, 2021 8:21 AM
To: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXTERNAL] FW: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/8/2021 2:11:26 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: West Central Avenue Access Agreement Spreadsheet
Attachments: Access Agreement Status Update.xlsx

Gary,
Attached is the access agreement spreadsheet for West Central Avenue. Please let me know if you have any questions or need any additional information.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 3/8/2021 10:32:38 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: RE: West Central Avenue Access Agreement Spreadsheet
Attachments: Phone numbers.xlsx

Sorry grabbed the wrong file. Please see attached.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Monday, March 8, 2021 4:27 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: RE: West Central Avenue Access Agreement Spreadsheet

**** External Email ****
Derrick,

The spreadsheet does not have any telephone numbers that you guys have acquired through your research on these properties. Additionally, I wonder if you could get Alex Lara (Long Beach Office) to go to Dana Point and see if he can try to get access from the property owner. It may be worth a try. It looks like the drive is 55 minutes from Long Beach to Dana Point.

Please get me any additional information (phone numbers) that you guys have acquired through research.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Monday, March 8, 2021 8:11 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Access Agreement Spreadsheet

Gary,
Attached is the access agreement spreadsheet for West Central Avenue. Please let me know if you have any questions or need any additional information.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 5/10/2021 11:15:06 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: FW: West Central Ave Plume

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
This is good news! Glad the project is back up and running. Please let me know if I can be of assistance. I will be working in ABQ assisting on Georges Dry Cleaners SI work on 5-18, 5-19 and 5-20. But I would be able to meet with the START Contractor on Site on 5-17 if that would be a benefit. Or I may be able to break away on one of the Georges field days. I will be about 15 min drive away from the WCA plume area.

Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

The EPA Team is in the process of obtaining access agreements in order to perform subsurface vapor monitoring for trichloroethylene and tetrachloroethylene over a wide area along West Central Ave believed to be associated with the Bell Trading Post (Jewelry Manufacturer). The sampling effort is designed to determine the extent of potential contamination previously identified by NMED. The Team has obtained property owner information from the central appraisal district and have sent out many letters requesting access as well as conducting site visits, as well as phone calls to obtain them as well. The team is still short of access agreement by approximately 8 parcels but plans to move forward with plans and attempt to obtain access while onsite. EPA will have START contractor go out the week of 5/17/21 to perform a planning visit prior to anticipated mobilization on 6/7/21 to begin sampling activities.

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 5/14/2021 7:49:30 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: West Central Ave Plume - Status of Property Owners
Attachments: 03.08.21 Access Agreement Status Update.xlsx

Call me if you have questions

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 5/25/2021 5:28:24 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]; Turner, LaDonna [turner.ladonna@epa.gov]
Subject: FW: West Central Avenue Plume
Attachments: 05.25.21 Access Needed.xlsx

FYI

From: Moore, Gary
Sent: Tuesday, May 25, 2021 12:28 PM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: West Central Avenue Plume

Hello Martyne,

I talked with our contractor rep, Derrick Cobb, and he indicated that you may be able to assist us by providing the community relations, historical information, and access assistance associated with the sampling event. If you can do this that would be great as we are still limited on our travel. We have pushed back the mobilization to June 14 to work with your and our contractors schedule. My contractor indicated that it would take up to 2 weeks to complete. Please let me know of any concerns. The contact information for my contractor is:

Derrick Cobb
Weston Solutions
Derrick.cobb@westonsolutions.com
832-347-4180 (cell)

We are still trying to obtain access to several parcels. If you can assist, that would be great. Also, Derrick mentioned that there are several Homeowner Associations that are in that area and that you thought that it would be beneficial to make contact with them prior to the sampling. If you would send me their information that would be great or if you would like to send something out from NMED about the sampling that would be excellent as well.

Thank you so much for your assistance as it will make the work much easier with your knowledge of the area and the history of the site and previous activities.

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 2/14/2020 3:38:25 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]; Steven Cowan [SCowan@css-inc.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]; DeGuenther, Michael [Michael.DeGuenther@WestonSolutions.com]
Subject: RE: West Central Avenue TCE and PCE Iso-Concentration Maps
Attachments: Figure Soil Gas PCE Sample Location Map_2.pdf

Gary,
Attached is a revised PCE map for the area to the southeast of the site. This map is based on a lot of assumptions based on the limited data points for thee area. Please let me know if you have any questions or concerns. Thanks.

From: Cobb, Derrick
Sent: Thursday, February 13, 2020 3:17 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Turner, LaDonna (turner.ladonna@epa.gov) <turner.ladonna@epa.gov>; Steven Cowan <SCowan@css-inc.com>; Jeff.Criner@WestonSolutions.com; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: West Central Avenue TCE and PCE Iso-Concentration Maps

Gary,
Attached are two TCE Iso-Concentration maps and one PCE Iso-Concentration Map for your review. The maps are contoured down the HRS SCDMs for Subsurface Intrusion cancer values which are the most conservative values. I apologize for the delay in getting the maps over to you. Our GIS analysist who was working on the maps caught the flu over the weekend. Please let me know if you have any questions or need any additional data.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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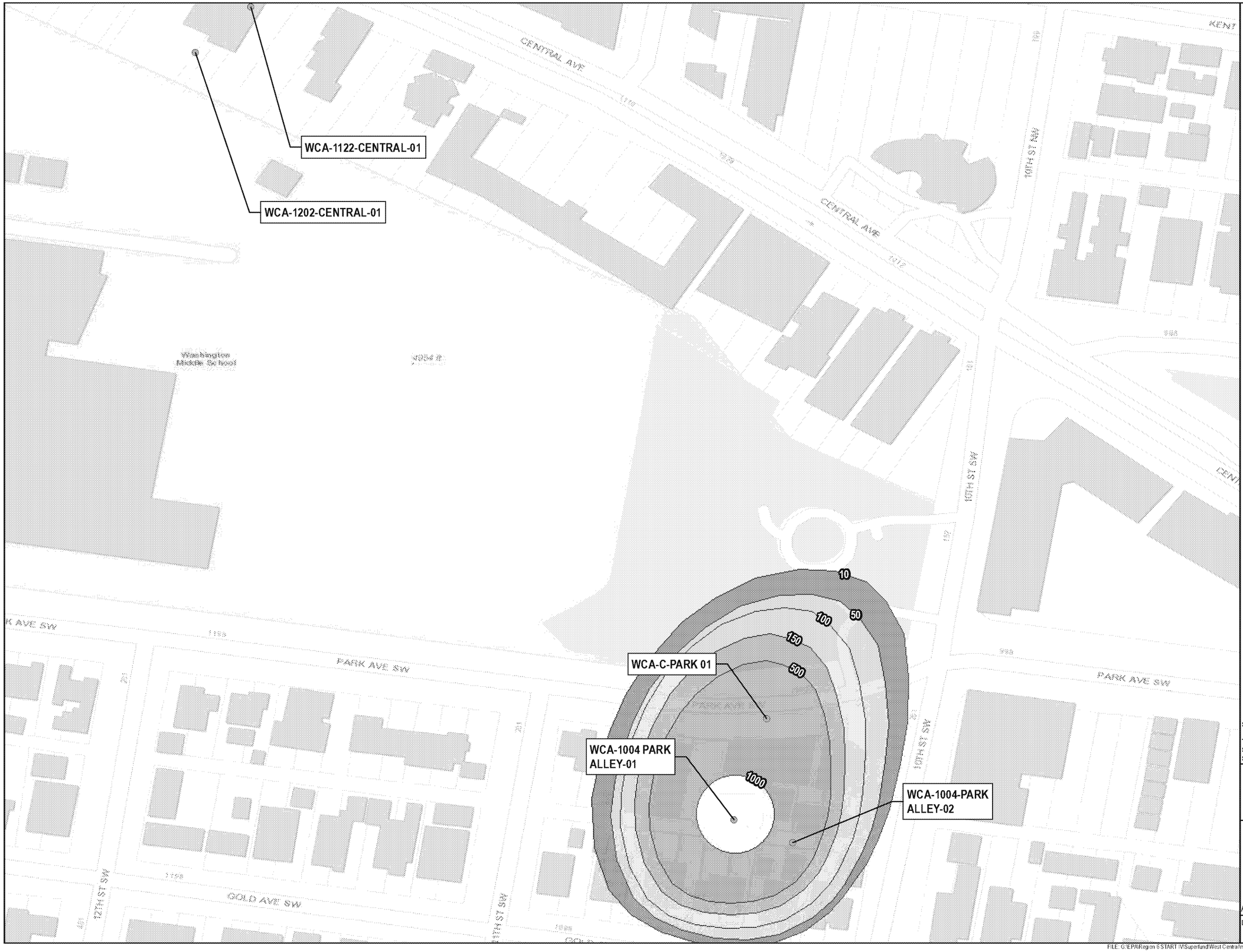

LEGEND

- SOIL GAS SAMPLES
- PCE CONTOUR INTERVAL

PCE Concentration (ug/m^3)

- 10
- 50
- 100
- 150
- 500
- 1000

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS PCE
SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas PCE Sample Location Map_2.mxd 3:37:43 PM 2/13/2020 gardner

Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 2/18/2020 9:14:04 PM
To: Moore, Gary [Moore.Gary@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]
CC: Cowan, Kenneth J. [K.Cowan@WestonSolutions.com]; Criner, Jeffrey J. [Jeff.Criner@WestonSolutions.com]
Subject: West Central Avenue Soil Gas Iso-Concentration Maps
Attachments: Figure Soil Gas PCE Sample Location Map_1.pdf; Figure Soil Gas PCE Sample Location Map_2.pdf; Figure Soil Gas TCE Sample Location Map_1.pdf; Figure Soil Gas TCE Sample Location Map_2.pdf

Gary/LaDonna,
Attached are revised PCE and TCE soil gas Iso-Concentration Maps. The maps have been updated to provide analytical and/or field screening data as well as the plumes superimposed on each other. I believe the next step will be to develop proposed sample locations to further define the soil gas plumes and make sure that we have enough target receptor data points. Please let me know if you have any questions or concerns.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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WCA-1816-LOMAS-01
PCE: NR

WCA-110-R
SECO 01
PCE: NR

WCA-1801-CENTRAL-01
PCE: 0.41

WCA-1801-CENTRAL-02
PCE: 12

WCA-1503-CENTRAL-01
PCE: NR

WCA-1801-CENTRAL-03
PCE: 10.4 / 4.6

WCA-1503-CENTRAL-02
PCE:NR

WCA-1611-CENTRAL-01
PCE: NR

WCA-1503-CENTRAL-03
PCE: NR

WCA-1503-CENTRAL-04
PCE: NR

WCA-1433-CENTRAL-05
PCE: 191

WCA-C-LAGUNA-03
PCE: 27.8

WCA-C-14ST-03
PCE: NR

WCA-C-LAGUNA-02
PCE: 33.4

WCA-1429-CENTRAL-01
PCE: NR

WCA-1503-CENTRAL-08
PCE: 16.3

WCA-C-14ST-02
PCE: NR

WCA-1503-CENTRAL-07
PCE: NR

WCA-C 14ST-01
PCE: 2.11

WCA-1503-CENTRAL-05
PCE: NR

WCA-1445-CENTRAL-01
PCE: NR

WCA-C-14ST-04
PCE: NR

WCA-1611-CENTRAL-03
PCE: 2.2

WCA-1433-CENTRAL-03
PCE: ND

WCA-1433-CENTRAL-02
PCE: 66.7 / 14

WCA-C-MARQUETTE-01
PCE: ND

WCA-1433-CENTRAL-01
PCE: NR

WCA-1404-CENTRAL-02
PCE: ND

WCA-1404-CENTRAL-01
PCE: NR

LEGEND

- SOIL GAS SAMPLES
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

PCE Concentration (ug/m^3)

- 2
- 10
- 50
- 100
- 150

NOTES:
1. All results are in ug/m^3.
2. ND - Not Detected
3. NR - No Result Available
4. TCE - Trichloroethene
5. PCE - Tetrachloroethene

N

0 175 350
FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS PCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas PCE Sample Location Map_1.mxd 12:04:05 PM 2/18/2020 gardnerj

WCA-1122-CENTRAL-01
PCE: NR

WCA-1202-CENTRAL-01
PCE: NR

WCA-C-PARK 01
PCE: 715*

WCA-1004 PARK
ALLEY-01
PCE: 1727 / 1700*

WCA-1004-PARK
ALLEY-02
PCE: 634*

CENTRAL AVE

PARK AVE SW

GOLD AVE SW

10TH ST SW

12TH ST SW

Washington
Middle School

LEGEND

- SOIL GAS SAMPLES
- PCE CONTOUR INTERVAL
- TCE SOIL GAS 0.4 ug/m^3 EXTENT

PCE Concentration (ug/m^3)

- 2
- 10
- 50
- 100
- 150
- 500
- 1000

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

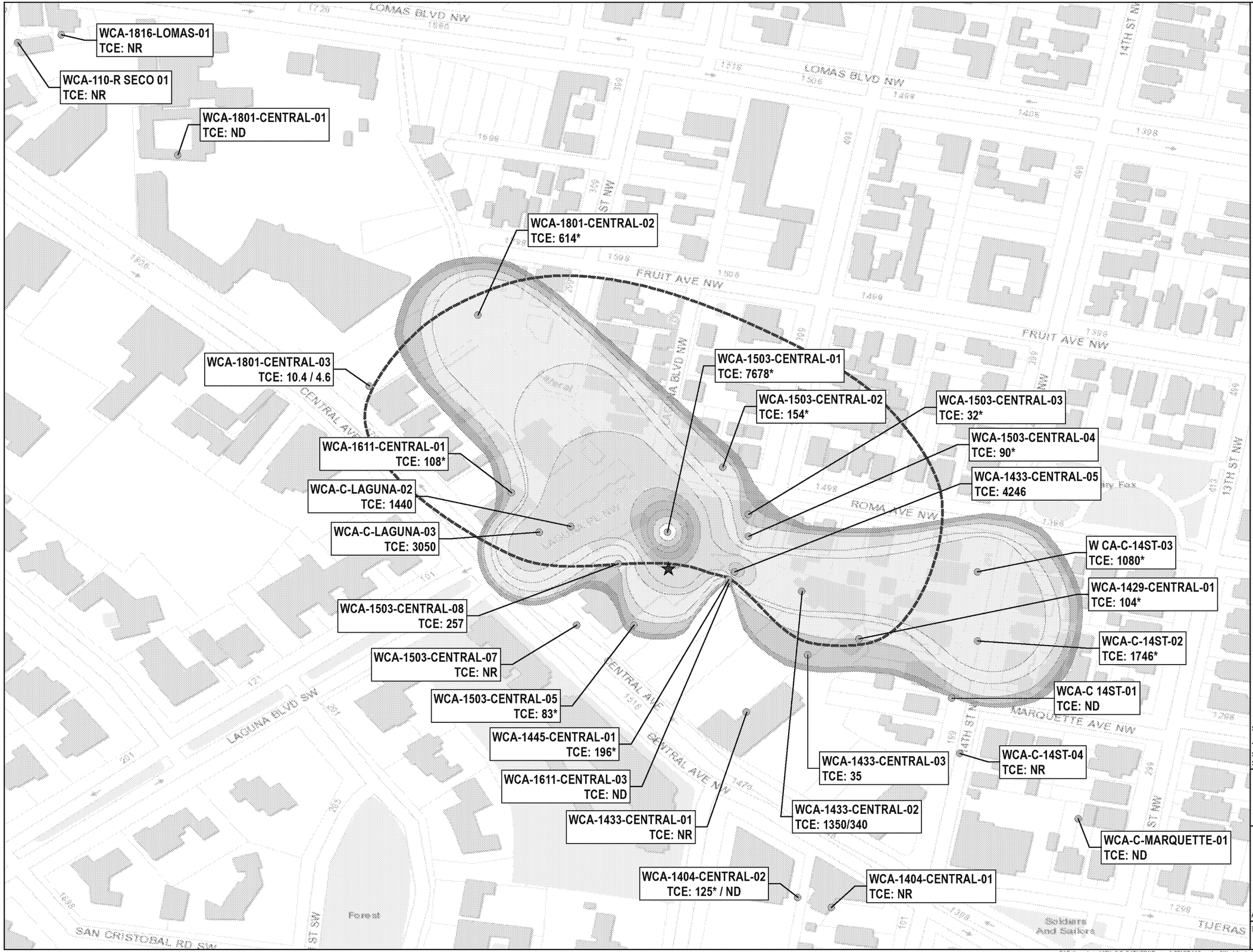
USEPA REGION 6

FIGURE

SOIL GAS PCE
SAMPLE LOCATION MAP 2
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas PCE Sample Location Map_2.mxd 11:44:53 AM 2/18/2020 gardner



LEGEND

- SOIL GAS SAMPLES
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 10 ug/m^3 EXTENT

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100
- 500
- 1000
- 2000
- 3000
- 4000
- 5000
- 6000
- 7000

NOTES:
1. All results are in ug/m³.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 175 350

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: \\nasabgs1\ATX_GIS_DATA\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_1.mxd 2:57:31 PM 2/14/2020 heulitk

WCA-1122-CENTRAL-01
TCE: NR

WCA-1202-CENTRAL-01
TCE: NR

WCA-C-PARK 01
TCE: NR

WCA-1004 PARK
ALLEY-01
TCE: 104* / 2.7

WCA-1004-PARK
ALLEY-02
TCE: 82*

CENTRAL AVE

PARK AVE SW

GOLD AVE SW

10TH ST SW

12TH ST SW

Washington
Middle School

LEGEND

- SOIL GAS SAMPLES
- PCE SOIL GAS 10 ug/m^3 EXTENT

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 100 200

FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE

SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_2.mxd 12:18:29 PM 2/18/2020 gardnerj

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 2/14/2020 1:48:24 PM
To: Jon Rauscher [Rauscher.Jon@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]
Subject: FW: West Central Avenue TCE and PCE Iso-Concentration Maps
Attachments: Figure Soil Gas PCE Sample Location Map_1.pdf; Figure Soil Gas TCE Sample Location Map_1.pdf; Figure Soil Gas TCE Sample Location Map_2.pdf

FYI,

Jon, what are the screening levels and cleanup levels we use for TCE and PCE. Also, do these maps look correct to you?

Do you think we need need to do an overlay of the maps?

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Thursday, February 13, 2020 3:17 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Turner, LaDonna <turner.ladonna@epa.gov>; Steven Cowan <SCowan@css-inc.com>; Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: West Central Avenue TCE and PCE Iso-Concentration Maps

Gary,
Attached are two TCE Iso-Concentration maps and one PCE Iso-Concentration Map for your review. The maps are contoured down the HRS SCDMs for Subsurface Intrusion cancer values which are the most conservative values. I apologize for the delay in getting the maps over to you. Our GIS analysist who was working on the maps caught the flu over the weekend. Please let me know if you have any questions or need any additional data.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 9/23/2021 3:50:18 PM
To: Rauscher, Jon [Rauscher.Jon@epa.gov]; Brenda Cook [Cook.Brenda@epa.gov]; Delgado-Brown, Michelle; Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: West Central Avenue
Attachments: Figure 1 - Trichloroethene Sample Exceedance Map.pdf; Figure 2 - Tetrachloroethene Sample Exceedance Map.pdf; Figure 3 - Naphthalene Sample Exceedance Map.pdf; Figure 4 - Ethylbenzene Sample Exceedance Map.pdf; Figure 5 - Benzene Sample Exceedance Map.pdf; Final Validated Summary Data Table_Gary format.xlsx

Hello All,

Attached are sample locations by compound for exceedances as well as the final validated summary data table. I thought the compound specific exceedance maps would be beneficial for us to help determine which compounds we would like Beacon Environmental to contour for us;. Please give me your recommendations on contour maps we would like Beacon to make for us and how we would like them to be made.

Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 6/23/2021 3:41:24 PM
To: Joshuafernandez8@gmail.com
Subject: West Central Ave Report 3
Attachments: 2014.06.30 Bell Phase II_FINAL_06_30_14 rev 1.pdf

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 9/11/2021 12:49:32 AM
To: Brenda Cook [Cook.Brenda@epa.gov]; Turner, LaDonna; Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle
CC: Derrick Cobb [derrick.cobb@westonsolutions.com]
Subject: FW: [EXT]:West Central Ave Plume
Attachments: ATT00001.txt; Figure 1 - Trichloroethene Sample Exceedance Map.pdf; Figure 4 - Ethylbenzene Sample Exceedance Map.pdf; Figure 2 - Tetrachloroethene Sample Exceedance Map.pdf; Figure 5 - Benzene Sample Exceedance Map.pdf; Figure 3 - Naphthalene Sample Exceedance Map.pdf; WCA_20210831_DV.xlsx

FYI

Any recommendations???

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Thursday, September 9, 2021 4:06 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: RE: [EXT]:West Central Ave Plume

Gary,
Attached are sample locations by compound for exceedances as well as the final validated summary data table. I thought the compound specific exceedance maps would be beneficial for us to help determine which compounds we would like Beacon Environmental to contour for us;. Please let me know if you have any questions. Thanks.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, September 8, 2021 11:53 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: [EXT]:West Central Ave Plume

CAUTION: ***External Message***

Please send me an update.

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 2/25/2020 8:33:23 PM
To: Moore, Gary [Moore.Gary@epa.gov]
CC: Turner, LaDonna [turner.ladonna@epa.gov]; Delgado-Brown, Michelle [DelgadoBrown.Michelle@epa.gov]; Steven Cowan [SCowan@css-inc.com]
Subject: RE: Proposed Sample Location Map
Attachments: Figure Soil Gas TCE Sample Location Map_1 AERIAL.PDF

Gary,
Attached is the high resolution aerial that we were able to download. It currently does not have street names yet but provides more detail.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Tuesday, February 25, 2020 2:12 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Cc: Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Steven Cowan <SCowan@css-inc.com>
Subject: RE: Proposed Sample Location Map

**** External Email ****
At some point we may want to get the property information from the City including property lines. This will show us where the city ROWs are at as well. This would be an overlay on the map(s)

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, February 25, 2020 11:05 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Turner, LaDonna <turner.ladonna@epa.gov>; Steven Cowan <SCowan@css-inc.com>; Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>
Subject: Proposed Sample Location Map

Gary,
We are working on getting the proposed sample location map pulled together, however we are having a difficult time finding a current GIS ;layer showing all the streets in the area. Our GIS Team is currently downloading some high resolution maps to use.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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WCA-1816-LOMAS-01
TCE: NR

WCA-110-R SECO 01
TCE: NR

WCA-1801-CENTRAL-01
TCE: ND

WCA-1801-CENTRAL-02
TCE: 614*

WCA-1801-CENTRAL-03
TCE: 10.4 / 4.6

WCA-1503-CENTRAL-01
TCE: 7678*

WCA-1503-CENTRAL-02
TCE: 154*

WCA-1503-CENTRAL-03
TCE: 32*

WCA-1503-CENTRAL-04
TCE: 90*

WCA-1611-CENTRAL-01
TCE: 108*

WCA-1433-CENTRAL-05
TCE: 4246

WCA-C-LAGUNA-02
TCE: 1440

WCA-C-LAGUNA-03
TCE: 3050

W CA-C-14ST-03
TCE: 1080*

WCA-1429-CENTRAL-01
TCE: 104*

WCA-1503-CENTRAL-08
TCE: 257

WCA-C-14ST-02
TCE: 1746*

WCA-1503-CENTRAL-07
TCE: NR

WCA-1503-CENTRAL-05
TCE: 83*

WCA-C 14ST-01
TCE: ND

WCA-1445-CENTRAL-01
TCE: 196*

WCA-1433-CENTRAL-03
TCE: 35

WCA-C-14ST-04
TCE: NR

WCA-1611-CENTRAL-03
TCE: ND

WCA-1433-CENTRAL-02
TCE: 1350/340

WCA-1433-CENTRAL-01
TCE: NR

WCA-C-MARQUETTE-01
TCE: ND

WCA-1404-CENTRAL-02
TCE: 125* / ND

WCA-1404-CENTRAL-01
TCE: NR

LEGEND

- SOIL GAS SAMPLES
- BELL TRADING POST PROPERTY
- PCE SOIL GAS 2 ug/m^3 EXTENT

TCE Concentrations (ug/m^3)

- 0.4
- 16
- 100
- 500
- 1000
- 2000
- 3000
- 4000
- 5000
- 6000
- 7000

NOTES:
1. All results are in ug/m^3.
2. * indicates result is field screening data.
3. ND - Not Detected
4. NR - No Result Available
5. TCE - Trichloroethene
6. PCE - Tetrachloroethene

N

0 175 350
FEET

SOURCE: WORLD STREETMAP, ESRI

TDD: 0001/19-277
SEMS: NMN000607372
SSID: 06JT

USEPA REGION 6

FIGURE
SOIL GAS TCE
SAMPLE LOCATION MAP 1
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNAILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
FEBRUARY 2020	20600.012.001.1277.01	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\Figure Soil Gas TCE Sample Location Map_1.mxd 11:47:38 AM 2/25/2020 gardnerj

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 11/9/2021 8:21:33 PM
To: Derrick Cobb [derrick.cobb@westonsolutions.com]
CC: Delgado-Brown, Michelle; Turner, LaDonna; Rauscher, Jon [Rauscher.Jon@epa.gov]
Subject: West Central Avenue
Attachments: Beacon Iso-concentration maps - TCE.pdf

Derrick,

We had an EPA Team Meeting and we would like for the following to be done.

1. We would like for you to put a polygon around what we think is the concentration of 16 ug/m3 (attenuation concentration @ 10-6), 70 ug/m3 (attenuation concentration @ THQ=1), 160 ug/m3 (attenuation concentration @ 10-5), and 210 ug/m3 (attenuation concentration @ THQ = 3), on the TCE plume around the Bell Trading Post; The purpose is to visualize the properties that will be contained within these concentration isopleths.
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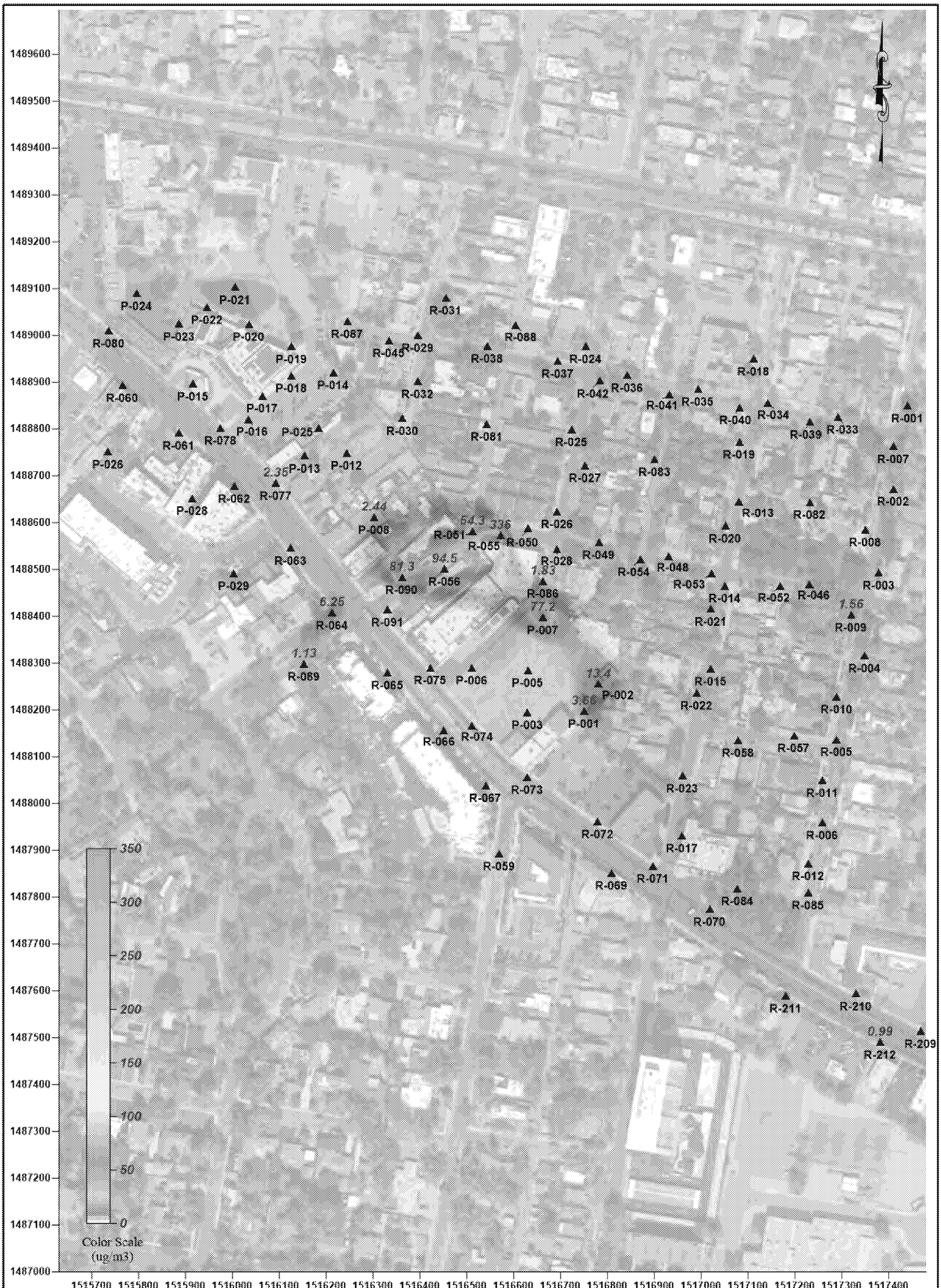
If the EPA team has any other suggestions or I stated something incorrectly, please correct.

Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609



System: State Plane
Zone: New Mexico Central
Datum: NAD 1983
Coordinate Units: Feet

LEGEND

1,000 MICROGRAMS/CUBIC METER

▲ PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 200 400

Figure 3-1
Passive Soil-Gas Survey
Trichloroethene

West Central Avenue Site
Albuquerque, NM

BEACON ENVIRONMENTAL
2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-538-8780
Beacon Project No. 5860, October 2021

ED_013172_00000339-00001

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 3/10/2021 9:36:07 PM
To: brian.matteucci@yahoo.com
Subject: Doc 3
Attachments: 2005.09.28 COA_BELL_VRCR_Final_09_28_05_final.pdf

Gary W. Moore (SEDER)
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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 6/23/2021 3:40:23 PM
To: Joshuafernandez8@gmail.com
Subject: West Central Avenue Reports 2
Attachments: 2005.09.28 COA_BELL_VRCR_Final_09_28_05_final.pdf

Gary W. Moore (SEDER)
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Message

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Sent: 11/22/2021 7:46:00 PM
To: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Subject: RE: [EXT]:West Central Avenue

Derrick,

Can you let me know what the status is of the request below?

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, November 9, 2021 2:27 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>
Subject: RE: [EXT]:West Central Avenue

Gary,
We will get started on preparing the figures with the associated polygons and the associated properties.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Tuesday, November 9, 2021 2:22 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>
Subject: [EXT]:West Central Avenue

CAUTION: ***External Message***

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Sent: 3/10/2021 9:34:01 PM
To: brian.matteucci@yahoo.com
Subject: Doc 2
Attachments: 2005.09.28 COA_BELL_VRCR_Final_09_28_05_final.pdf

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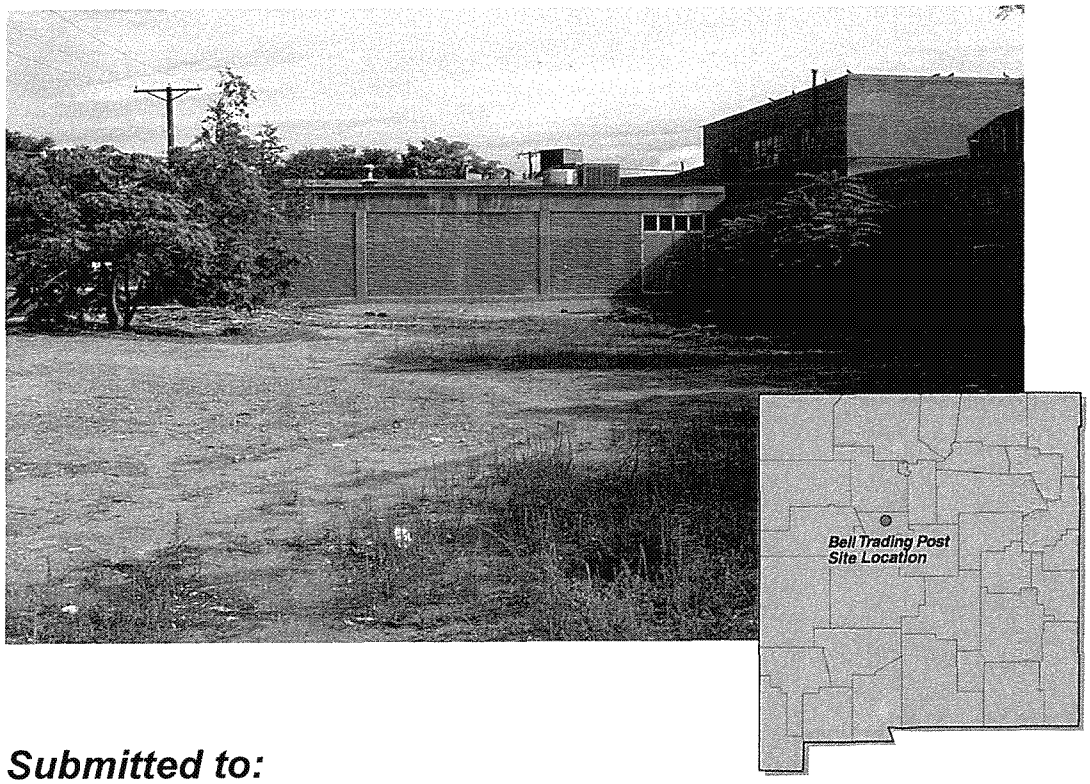
cell: 214.789.1627
office: 214.665.6609

Phase II
Site Characterization Report

Former Bell Trading Post Property
Albuquerque, New Mexico



Submitted to:

New Mexico Environment Department
Voluntary Remediation Program

Submitted by:

Duke Engineering & Services
A Duke Energy Company

Duke Engineering & Services, Inc.
6501 Americas Parkway NE, Suite 810
Albuquerque, New Mexico 87110

November 2001

ED_013172_00000349-00001

PHASE II
SITE CHARACTERIZATION REPORT
FORMER BELL TRADING POST PROPERTY
ALBUQUERQUE, NEW MEXICO

Prepared under Contract No. 99-667-5000-0015
Project No. 00736.00.0004.02.00011 for:

New Mexico Environment Department
Voluntary Remediation Program
1190 St. Francis Drive
Santa Fe, New Mexico 87502

Prepared by:

Duke Engineering & Services SM
A Duke Energy Company

6501 Americas Parkway Northeast, Suite 810
Albuquerque, New Mexico 87110

November 2001

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
COA	City of Albuquerque
COC	chain-of-custody
C/C	Certificate of Completion
CNC	Covenant Not to Sue
DE&S	Duke Engineering and Services
EDTA	ethylene diamine tetraacetic acid
EPA	U.S. Environmental Protection Agency
ESI	Environmental Services, Inc.
ESA	Environmental Site Assessment
eV	electron-Volt
ft^2	square foot/feet
ft^2/day	square feet per day
HEAL	Hall Environmental Analysis Laboratory
Keers	Keers Environmental, Inc.
Kg	Kilogram(s)
LUST	Leaking Underground Storage Tank
MCL	maximum contaminant level
MDL	minimum detection limit
mg/Kg	milligram(s) per Kilogram
mg/L	milligram(s) per Liter
mL	milliliter(s)
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
PAHs	Polynuclear Aromatic Hydrocarbons
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act

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ACRONYMS AND ABBREVIATIONS (Continued)

SB	soil boring
Site	Former Bell Trading Post Property
SSL	NMED VRP Soil Screening Levels
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbon(s)
ug/l	micrograms per liter
UST	Underground Storage Tank
USTB	Underground Storage Tank Bureau
VOCs	Volatile Organic Compounds
VRP	Voluntary Remediation Program
World Motel UST	UST site at the World Motel, 1721 Central Ave. NW

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1.0 INTRODUCTION

Duke Engineering & Services (DE&S) has completed a Phase II Site Characterization at the former Bell Trading Post property (Site) located in Albuquerque, New Mexico. The Phase II Site Characterization was completed at the request of the New Mexico Environment Department (NMED) Voluntary Remediation Program (VRP). The Site is located at 1503 Central Avenue, in the downtown area of Albuquerque, New Mexico (Figure 1). NMED required adherence to the American Society for Testing and Materials (ASTM) Standard 1903-97, "Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process" (ASTM 1997) for the format and content of this report.

1.1 General Project Background

Mr. J. T. Michelson owns the Site property, which currently consists of one large (approximately 30,000 square-foot [ft^2]) vacant building. The City of Albuquerque (COA) is considering acquiring this piece of property and is proposing converting the vacant building on the Site into affordable housing units or demolishing the building prior to new construction. The Site qualifies as a Brownfields property, defined by the U.S. Environmental Protection Agency (EPA) as "a site within the United States once used for industrial and/or commercial purposes that is currently abandoned or under-used." The building has been vacant for more than 5 years. The primary soil and groundwater contaminants of concern to the COA are those associated with the jewelry manufacturing and photographic development commercial activities previously conducted at the Site. To assure potential developers and/or the COA of the Site's readiness, and to alleviate concerns regarding liability related to environmental media contamination, the COA has initiated the process for obtaining a Certificate of Completion (C/C) and a Covenant Not To Sue (CNS) through the NMED VRP. The VRP CNS releases landowners from potential liability for environmental contamination associated with a re-developed Brownfield.

The most recent Phase I Environmental Site Assessment for the Bell Trading Post property, "Phase I Environmental Site Assessment, Bell Trading Post and Adjacent Parcels," was completed by Keers Environmental, Inc., (Keers) in December 2000 (Keers 2000). DE&S reviewed this report and found the following important conclusions:

- An active Underground Storage Tank (UST) site has been identified approximately one-eighth of a mile northwest of the Site. The UST site is identified as The World Motel at 1721 Central Avenue NW (World Motel UST). The NMED Underground Storage Tank Bureau (USTB) has indicated that a release of gasoline has impacted groundwater upgradient of the Site.
- The age of the structure located on this Site indicates the potential for construction materials containing either lead or asbestos or both.
- The Site location in a designated flood zone indicates the potential for environmental impact during a major flood event.

A Phase II ESA, "Limited Subsurface Investigation at 1503 Central Avenue, Albuquerque, New Mexico," was completed by Keers in April 1994 (Keers 1994). DE&S reviewed this report and noted the following findings and conclusions:

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- Ten surficial soil samples were collected in a crawl space beneath the building. The samples were collected at suspected highly contaminated areas under drains, sumps, and piping. The samples were analyzed for volatile organic compounds (VOCs) and halogenated hydrocarbons using EPA laboratory method SW-846 8010, total cyanide using EPA laboratory method SW-846 9010, and Resource Conservation and Recovery Act- (RCRA-) regulated metals using EPA laboratory method SW-846 AA.

- Results from the limited crawl space investigation revealed that silver, chromium, and lead were present in several surficial soil samples collected from within the crawl space under the building. Two of the subsurface soil samples collected contained metals with concentrations exceeding the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit. One subsurface soil sample contained 134 parts per million (ppm) lead, and the other subsurface soil sample contained 174 ppm chromium and 1,670 ppm lead. The elevated concentrations of these compounds prompted further field investigation and the collection of soil samples from a depth of 5 feet below the soil surface at each of the two locations where elevated concentrations were detected in the initial investigation. These deeper subsurface soil samples were analyzed using TCLP methods for the specific metals originally detected. Silver concentrations of <0.010 ppm were reported in samples from below locations where initial samples reported elevated silver concentrations. The sample collected below the location where chromium and lead had been detected contained 0.047 ppm chromium and 0.890 ppm lead. Keers indicated that the results from the 5-foot deep samples were well below the EPA regulatory limits and did not recommend additional testing (Keers 1994).

The recommendations from the Keers Phase II ESA report (Keers 1994) included the following:

- Periodic review of the most current UST information to determine and assess the extent of soil and groundwater contamination, if any, that may be caused by the upgradient active World Motel UST and possibly impact the Site. A site that may be unaffected by contamination at the time an assessment is performed may later become contaminated through a natural phenomenon (such as groundwater flow) or through human intervention.

- Comprehensive Site asbestos and lead-based paint surveys following OSHA and EPA regulations for demolition and renovation practices prior to any planned demolition or renovation activities.

- Determination of Site flood potential through review of the most current Bernalillo County Flood Control District flood information.

- Evaluation of the two rectangular depressions in the asphalt to confirm the presence of abandoned septic tanks and to investigate potential soil contamination.

- Depending upon planned Site use and occupancy, possible further evaluation of the subsurface soil beneath the Site structure.

After reviewing these recommendations, NMED requested that DE&S perform a Phase II Site Characterization at the facility to address some of the issues raised during the Phase I ESA. The Phase II Site Characterization scope of work was developed primarily from the completion of a historical Site use review, a series of interviews with individuals knowledgeable of historical Site

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uses, and from NMED recommendations. The objectives of the Phase II Site Characterization were to:

- Sample groundwater as it enters and exits the Site area to determine if the groundwater meets the definition of "background" contained in the VRP regulations;

- Characterize exposed surface soil at the Site to determine whether it has been impacted by solvents, cyanide, or heavy metals used in the jewelry manufacturing or commercial film development activities that were previously conducted at the Site; and

- Compare laboratory soil results to NMED VRP Soil Screening Levels (SSL) to determine if soils pose a potential risk to human health and to support Site closure for soil within the context of the NMED VRP requirements.

The scope of the Phase II Site Characterization included the advancement of 12 Geoprobe® soil borings, soil gas sampling, groundwater sampling, headspace analysis of soil samples collected, and collection of soil samples for laboratory analysis. Soil, soil gas, and groundwater samples were submitted to Hall Environmental Analysis Laboratory (HEAL) for analysis. Samples were analyzed for cations, anions, laboratory pH, and cyanide using EPA method 335.4, New Mexico Water Quality Control Commission (NMWQCC)-regulated metals using EPA methods 6010 and 7470/7471A, and VOCs using EPA Method 8260B. The Phase II Site Characterization sampling was completed in general accordance with the Phase II Site Characterization Work Plan (provided as Appendix A).

1.1.1 Limitations and Exceptions of Assessment

Although this report is prepared for NMED only and is intended solely for reliance by NMED, it is a public document and can be reviewed by any member of the public who may wish to do so. DE&S prepared this report in a manner consistent with the level of care and expertise exercised in the field of environmental consulting. The conclusions of this Phase II Site Characterization are based on the results of activities performed in accordance with the Work Plan for this project (Appendix A).

1.2 Site History

Prior to 1947, historical uses of the property were primarily residential. After 1947, historical property use was commercial. From 1947 until 1975, Bell Trading Post occupied the Site building and conducted commercial jewelry manufacturing. The Site is identified as vacant from 1976 until 1982. From approximately 1982 until 1984, Albuquerque Photo Lab occupied the Site building and performed commercial film development. Finally, from 1985 until 1992, Michelson Metals occupied the Site building, using the property as an office for commodity trading only (office use, non-industrial). Site property owner Mr. J. T. Michelson has stated that neither metal work nor jewelry production occurred at the Site after 1975 (Interviews with Mr. J. T. Michelson on April 18 and May 3, 2001, see Appendix A for further information).

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1.2.1 Site Description and Features

The Site is located in the COA, Bernalillo County, New Mexico, and consists of approximately 2.5 acres near Old Town. It is bounded to the south by Central Avenue, to the north and northeast by Roma Avenue, to the northwest by Fifteenth Street, to the east by an apartment complex and a vacant business, and to the west by Laguna Boulevard. Currently, one large (approximately 30,000-ft^2) building occupies the Site at 1503 Central Avenue. The Site is legally described as Lots 1 through 7, Block 19, Perea addition, Lot 24, Block 13 of Perea addition, and Lots 3 and 4 of the West End addition. The Site is currently owned by Mr. J. T. Michelson of Sun Country Industries and is currently vacant.

1.2.2 Physical Setting

The Site is located in the southern-central portion of the Albuquerque Basin. This Basin is one of the largest of the southerly trending series of grabens that form the Rio Grande Drainage Basin. The Rio Grande Drainage Basin was formed in response to the Rio Grande Rift (Thorn et al. 1993). The Rio Grande Rift is a northerly to southerly trending, down-dropped crustal extension that originates in Colorado and extends southward for more than 600 miles across New Mexico to south of the Mexico/Texas border.

The Albuquerque Basin is filled with up to 10,000 feet of clastic sediments. These sedimentary deposits are of two types: 1) sediment that has filled the subsiding trough and 2) floodplain deposits, terraces, dunes, alluvial fans and cones, spring deposits, caliche blankets, landslides, and some pediments. The latter group of deposits represent processes of erosion and deposition that may have prevailed throughout subsidence and filling of the basin (Kelley 1977). The Santa Fe Formation sediments fill the majority of the basin.

The Tertiary and Quaternary Santa Fe Formation is composed of unconsolidated to loosely consolidated gravels, sands, silts, and clays. The thickness of this unit ranges from 2,400 feet on the basin margins to 14,000 feet along the axis of the basin. In the vicinity of the Site, the thickness of this formation is approximately 4,700 feet. The Santa Fe Group is overlain by Quaternary sediments, which have a similar facies distribution. These post-Santa Fe deposits are alluvial fan and floodplain deposits and are up to 200 feet thick (Thorn et al. 1993).

The Santa Fe Group and post-Santa Fe deposits are the principal water bearing units in the vicinity of the Site and are hydraulically connected (Thorn et al. 1993). However, the Albuquerque Basin aquifer is anisotropic laterally and vertically due to spatial variations in the lithology of these two water-bearing units (Chamberlin et al. 1992). Clay layers 12 to 15 feet thick are commonly observed in the alluvium of the Albuquerque Basin; these clay layers restrict vertical movement of water and may locally limit hydraulic interconnection between the shallow Quaternary aquifer and the Santa Fe Group aquifer (Thorn et al. 1993). As a result of spatial variations in lithology, variation in the hydraulic transmissivity of the Albuquerque aquifer is extremely large, from less than 10 to 80,000 ft^2/day (Thorn et al. 1993). The hydraulic conductivity of the upper part of the Santa Fe Group varies also, but is estimated to be approximately 20 ft/day, average in the vicinity of the Site (Thorn et al., 1993).

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Over time, population growth and the resulting increased water pumpage and use have considerably changed the water table configuration in the Albuquerque area. Groundwater flow in the vicinity of the Site prior to large-scale groundwater development is thought to have been to the southwest, and this condition existed at least into the mid- to late-1930s (Thorn et al. 1993). Groundwater elevation contours representing 1960 to 1961 conditions in the Albuquerque area show a continued general southwesterly flow direction on the eastern side of the Rio Grande; however, a cone of depression is evident in the general area of the Site (Bjorklund and Maxwell 1961). The cone of depression resulted primarily from pumping of the Main Plant well field, previously located in the downtown Albuquerque area. The Main Plant wells were drilled between 1920 and 1948 and consisted of more than 23 wells; the Main Plant well field is now completely abandoned.

Groundwater beneath the Site currently flows in an easterly direction. City-wide groundwater contours from 1992 and simulated 1994 hydraulic head levels reflect a large cone of depression developing on the eastern side of Albuquerque as a result of groundwater withdrawal (Kernodle et al. 1995). The Kernodle study supports the conclusion that this cone of depression may have influenced the groundwater flow direction beneath the Site.

1.2.3 Site History and Land Use

The Site is currently vacant. Mr. J. T. Michelson of Sun Country Industries currently owns the Site.

Past Site uses were identified through historical records review, reconnaissance, observation, interviews, and client-provided information. These property uses are identified in the Phase II Site Characterization Work Plan (Appendix A) and are summarized hereafter:

- Residential housing;
- Former commercial jewelry manufacturing activities; and
- Former commercial photographic development activities.

1.2.4 Adjacent Property Land Use

The area surrounding the Site is developed with commercial buildings. Roma Avenue and a vacant, paved automobile parking lot located beyond Roma Avenue bound the Site to the north. An apartment building and dentist office bordered by a gravel alley are located east of the Site. Central Avenue acts as the Site's southern boundary; vacant lots line the Site's entire southern perimeter across Central Avenue. An apartment building and an office building are located west of the Site, beyond Laguna Boulevard.

1.3 Contaminants of Concern

The potential contaminants of concern are those associated with the jewelry manufacturing and photographic development businesses previously conducted at the Site. These potential contaminants include but are not limited to solvents, cyanide, and heavy metals. The potential contaminants of concern and their possible origins are discussed further in the following paragraphs.

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- Based on limited background research of the jewelry manufacturing industry and current jewelry industry practices, the following chemicals can be present at a jewelry manufacturing facility: sodium and/or potassium cyanide, hydrogen peroxide, sulfuric and boric acids, ammonia hydroxide, calcium sulfate, sulfurated potash, potassium bifluoride (and potassium tetraborate), and heavy metals such as gold, silver, and copper.

- Chemicals used in the development of black and white photographic films are: silver halide (contained in emulsifiers); hydroquinone, metol, and phenidone (used as developing agents); sodium hydroxide, sodium carbonate, and sodium tetraborate (applied to activate development); sodium sulfite and potassium metabisulfite (used as preservatives), potassium bromide and benztriazole (restrainers); acetic acid; sodium or ammonium thiosulfate (used to fix development); sodium bisulfite and potassium metabisulfite (employed as neutralizers); and potassium aluminum sulfate and potassium chromium sulfate (applied as hardeners). Chemicals used in the color photographic processes are: potassium ferricyanide and potassium bromide, ethylenediamine tetraacetic acid (EDTA), bleach, hexavalent chromium, and organic dyes.

- Although not identified by the site owner, the potential historical use of chlorinated or other solvents at this type of site is a concern based upon NMED's prior experience.

1.4 List of Reports Submitted to the Voluntary Remediation Program

Keers completed a Phase I ESA of the Site in December 2000. A Phase II ESA, "Limited Subsurface Investigation at 1503 Central Avenue, Albuquerque, New Mexico," was completed by Keers in April 1994. DE&S is not aware of any other environmental assessments and/or site investigations conducted at this Site.

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2.0 SUMMARY OF SITE SAMPLING AND ANALYSIS ACTIVITIES

2.1 Purpose of Site Characterization

The primary objective of the Phase II Site Characterization field activities was to collect sufficient environmental data to characterize the Site for evaluation under NMED VRP performance standards. Specific Phase II Site Characterization objectives included:

- Sample groundwater as it enters and exits the Site area to determine if the groundwater would meet the definition of "background" contained in the VRP regulations;
- Characterize soil at the Site to determine whether it has been impacted by solvents, cyanide, or heavy metals; chemicals used in the jewelry manufacturing or commercial film development businesses that occurred at the Site; and
- Compare laboratory soil results to NMED SSL to determine if soils pose a potential risk to human health and to support Site closure for soil within the context of the NMED VRP.

The Work Plan (Appendix A) specifies the sample types, quantities, locations, and analytical methods associated with the Site characterization. The following sections describe the methodologies and standard operating procedures that were used by DE&S personnel to meet the stated objectives of the Phase II Site Characterization field activities at the Site.

2.1.1 Soil Boring Methods and Procedures

Using a Geoprobe® soil investigation unit, 12 soil borings were completed. Drilling was performed by GeoRecovery Systems, Inc. of Arvada, Colorado. Soil boring locations were determined by the DE&S Site geologist and were completed in the proposed locations identified in the Work Plan (see Figure 2 and Appendix A). Two soil borings (SB-01 and SB-02) were located near the northeastern corner of the Site, adjacent to the gravel alley. One soil boring (SB-03) was located near the northwestern corner of the Site, adjacent to the intersection of Roma Avenue and Laguna Boulevard. One soil boring (SB-04) was located near the northern end of the apartment building adjacent to the eastern side of the Site building. Five soil borings (SB-05 to SB-09) were located in the southwestern corner area of the Site, adjacent to the western side of the Site building. Three soil borings (SB-10 to SB-12) were located along the southern side of the Site building, adjacent to the northern side of Central Avenue NW.

Eight soil borings were completed to 4 feet below ground surface (bgs), while four soil borings (SB-01, SB-03, SB-04, and SB-12) were completed to approximately 23 feet bgs. Soil samples were collected continuously from the ground surface to 4 feet bgs in a single 4-foot increment using a transparent acetate liner within a 4-foot macro-sampler. All soil boring equipment used for boring advancement was decontaminated using potable water, washed with Liquinox®, and rinsed with distilled water prior to use in order to remove any potential oils, chemicals, and soil. The soil boring equipment was also cleaned between each boring to minimize any potential cross contamination. Sampling tools (i.e. macro-sampler) were also decontaminated with potable water, washed with Liquinox®, and rinsed with distilled water.

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The DE&S Site geologist visually examined the soil cores from each soil boring for lithology and evidence of staining. Lithology was logged in accordance with the Unified Soil Classification System. Soil field screening was conducted using a Rae Systems, Inc., Mini Rae Model PGM-75 portable photoionization detector (PID). The PID was equipped with a 10.5 electron Volt (eV) lamp. The lamp provides the sensitivity needed to ionize the organic compounds suspected to be present at the Site. Prior to sampling and work activities completed at the Site each day, the PID was calibrated with 100-parts-per-million (ppm) isobutylene span gas.

Soil samples were screened with the PID following the heated headspace method. A portion of each soil sample was placed in a polyethylene bag and placed in direct sunlight to warm to ambient air temperature. The tip of the PID probe was then inserted in a small opening in the bag. The organic compound concentration in the air above the soil sample (or headspace) was then analyzed using the PID. PID screening results were recorded at the corresponding depth interval on the soil-boring log and are presented in Table 2.1. The lithologic descriptions, PID readings, and soil sampling intervals were recorded on the soil boring logs (Appendix B).

2.1.2 Soil Sampling Collection Methods and Procedures

In each of the 12 borings, a soil sample was collected from the 0 to 2-foot bgs interval and the 2- to 4-foot bgs interval. All of the shallow soil samples (the 0 to 2-feet bgs interval) collected from each soil boring were submitted for laboratory analysis.

A steel shovel was used to collect one soil sample, SS-01, from the ground surface after stained soil was observed below an electrical transformer on the northeastern corner of the Site, adjacent to the building and soil boring SB-02. This sample was collected only after DE&S discussed the presence of stained soil with NMED and received the approval to collect and submit the surface soil sample for analytical analysis.

2.1.3 Soil Gas Sampling Collection Methods and Procedures

A soil gas sample was collected at each of the 12 boring locations. After the initial soil samples were collected at each soil boring, the Geoprobe®, using a hollow steel tube equipped with an expendable-drive point, advanced the sample tubing to approximately 12 feet bgs (approximately halfway between the ground surface and the groundwater table contact). Upon reaching 12 feet bgs, the expendable drive point was removed from the tip of the steel Geoprobe® drive tubing. Polyethylene tubing was then placed within the hollow center of the Geoprobe® drive tubing and the drive tubing was removed, leaving the polyethylene tubing in place. The polyethylene tubing was slotted at the top and the bottom 1 to 2 feet of the tubing. Before collecting the soil gas sample, air from within the tubing was evacuated. Then the soil gas sample was collected in tedlar bags using a hand-held air pump. The tedlar bags were stored in a cooler at ambient temperature pending delivery to the laboratory.

Prior to soil gas sample collection, the soil gas was analyzed using a PID (the same PID used to screen soil sample headspace). The polyethylene tubing was attached to the tip of the PID and the PID was allowed to evacuate soil gas from the soil boring for a period of approximately two minutes. The PID soil gas reading was then recorded on each respective soil boring log.

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2.1.4 Groundwater Sampling Collection Methods and Procedures

Four groundwater samples (SB-01, SB-03, SB-04, and SB-12) were collected at the Site. Groundwater samples from soil borings SB-01, SB-03, and SB-04 (upgradient) are representative of groundwater entering the Site, and the groundwater sample collected from boring SB-12 (downgradient) is representative of groundwater exiting the Site.

Groundwater samples were collected through the annular portion of the Geoprobe® piping using polyethylene sample tubing and a peristaltic pump. Dedicated polyethylene was used to collect each groundwater sample; the polyethylene tubing was discarded immediately following groundwater sample collection.

The sampling equipment was decontaminated prior to sample collection. The sampling equipment was cleaned using a solution of Alconox laboratory soap and tap water and rinsed using deionized water. Clean latex gloves were used at all times while collecting and handling the samples. In addition, the polyethylene tubing was discarded after sample collection of each groundwater sample.

2.1.5 Sample Handling and Chain of Custody Documentation

Each subsurface soil sample was containerized in two 4-ounce glass sample containers. Each soil gas sample was collected in one tedlar bag. Each groundwater sample was placed in three 1-liter plastic bottles, one 500 milliliter (mL) plastic bottle, and three 40-mL glass vials. The three 40-mL glass vials were preserved with mercuric chloride. Sample containers were provided by HEAL. Sample containers were labeled with the following information:

- Project name;
- Field sample number;
- Depth interval;
- Initials of collector;
- Date and time of collection;
- Required analysis; and
- Sample preservation.

Upon completion of sample collection and labeling, the samples were wrapped with bubble wrap, placed in a Zip-Lock™ plastic bag, and placed in an ice-filled cooler. The soil gas samples were placed in a cooler without ice in order to keep the soil gas samples out of direct sunlight. All project samples were collected between October 9 and October 10, 2001. DE&S representatives delivered the samples to HEAL in Albuquerque, New Mexico. Proper chain-of-custody (COC) procedures were adhered to during sample collection, transport, and delivery to HEAL.

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Sample field and analytical results are summarized on Tables 2.2 through 2.9 in Section 2.2 of this report. A complete copy of all laboratory analytical results and COCs are included as Appendix D.

2.1.6 Health and Safety Plan

All of the field activities were conducted using Level D personal protection equipment (PPE), including hardhat, gloves, and steel-toed boots. Nitrile gloves were used to handle all samples. Tailgate safety meetings were conducted each morning, and the chemical and physical hazards of the work were reviewed. The breathing air zone was monitored by the on-Site geologist for organic vapors using the PID.

2.1.7 Quality Assurance/Quality Control

Quality assurance (QA) samples were collected to measure precision and accuracy in accordance with the specified QA/quality control (QC) requirements outlined in the Quality Assurance Project Plan for the Site (NMED 2001). For this project, one field blank, one trip blank, two equipment rinsate blanks, one soil sample duplicate, one soil gas sample duplicate, and one groundwater sample duplicate were collected.

The trip blank was analyzed for VOCs by EPA Method 8260B. No VOCs were detected in the trip blank sample analyzed.

Two equipment blanks were collected to determine if sampling equipment and decontamination procedures were contributing contaminants to the soil and water samples. The two equipment blanks were collected by pouring deionized water over the drilling shoe. The equipment blanks were analyzed for cyanide using EPA method 335.4 and metals using EPA methods 6010 and 7470/7471A.

Cyanide was not identified in either of the two equipment rinsate samples. No metals, other than calcium, iron, and sodium, were detected in either of the two equipment rinsate samples. Calcium and iron were detected in the Equipment Rinsate Sample 1 (collected on field day 1) and calcium, sodium, and iron were detected in Equipment Rinsate Sample 2 (collected on field day 2). The concentrations of iron detected in these samples are well below the NMWQCC Standard. There are no NMWQCC Standards for calcium and/or sodium.

The field blank was collected to determine if ambient air contaminants were contributing contaminants to the soil, air, and water samples. The field blank was collected by pouring deionized water through the air and into the sampling vials. The field blank was analyzed for VOCs using EPA method 8260. Field blank analytical results identified only toluene as present in the field blank sample matrix. Toluene was identified at a concentration of 1.2 micrograms per liter (ug/L). The presence of this small concentration of toluene is most likely the result of using a Sharpie® marker to label the sample bottle (these markers contain petroleum compounds).

Duplicates for soil, soil gas, and groundwater were collected to assess field sampling reproducibility. The duplicate soil sample was analyzed for cyanide using EPA method 335.4 and metals using EPA methods 6010 and 7470/7471A. The duplicate for soil gas was analyzed

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using EPA method 8260. The duplicate groundwater sample was analyzed for cations and anions using EPA methods 200.7, 300.0, 340.1, 340.1, 350.2, and 353.2, laboratory pH and VOCs using EPA method 8260, cyanide using EPA method 335.4, and metals using EPA methods 6010 and 7470/7471A.

The duplicate for soil was collected from SB-08 at a depth interval of 0 to 2 feet bgs. Relative percent differences between the primary sample and duplicate results were between 0 and 20%. Variability in samples occurred between the primary and duplicate soil sample for the analytes arsenic, lead, and zinc. This type of sample variability is usually attributable to natural variability within the sample matrix.

The soil gas duplicate sample was collected from SB-12 and the relative percent difference between the results were the same (not detected or less than the laboratory detection limit of 0.1 mg/L) for all of the VOC analytes in the EPA Method 8260 list.

The groundwater duplicate sample was collected from SB-12, and the relative percent differences between analytes varied from 1% (pH analysis) to 112% (barium results). The highest relative percent differences occurred within the metal analyses and were most likely the result of variable amounts of suspended sediments within the sample. The QA/QC duplicate sample results for soil, soil gas, and groundwater duplicate samples are included in Tables 2.2 through 2.8 in Section 2.2 of this report.

2.1.8 Field Documentation

Information pertinent to the work performed was recorded in a field logbook. Items included in the logbook were as follows:

- Field activity/subject;
- Personnel on Site;
- Weather conditions;
- Equipment operations and/or problems; and
- Deviations from the Work Plan, including rationale.

Each entry in the field logbook was signed and dated by the author. All data recorded in the field logbook were written using permanent, waterproof ink. Copies of the field notes are provided as Appendix C. Photographs were taken of the field activities at the subject Site. Photographs are provided in Appendix E.

2.1.9 Waste Management

Acetate liners as well as a minimal amount of PPE, such as gloves, were generated as waste during the Site Characterization activities. These materials were discarded as municipal waste. The trash bags were sealed prior to placement in the waste receptacle. No other investigation derived wastes (soil, groundwater. etc.) were generated during this investigation; therefore no containers were left at the Site.

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2.2 Results of Sampling and Analysis

The soil, soil gas, and groundwater sample Phase II Site Characterization results are presented in the following sections.

2.2.1 Soil

Subsurface soil encountered during installation of soil borings SB-01 to SB-12 is typical of post-Santa Fe Quaternary alluvial fan and floodplain deposits (described in Section 1.2.2). The borings are comprised primarily of fine-grained sands with some thin interbedded clay layers. No odors were detected in any of the soil samples collected from any of the soil borings. PID readings ranged from 1.2 ppm (SB-01 and SB-02) to 6.6 ppm (SB-06). The PID headspace readings are presented in Table 2.1. Soil boring logs are provided in Appendix B.

Table 2.1.
Photoionization Detector Headspace Results

Soil Boring Number	Depth of Soil Material (feet bgs)	PID Reading (ppm)	Comments
SB-01	0 to 2	1.7	Sand
	2 to 4	1.2	Caliche and sand
SB-02	0 to 2	1.7	Sand and silt
	2 to 4	1.2	Silt and clay
SB-03	0 to 2	4.8	Sand
	2 to 4	4.8	Sand, silt, caliche
SB-04	0 to 2	4.0	Fine sand
	2 to 4	1.7	Fine sand
SB-05	0 to 2	2.4	Sand, silt, caliche
	2 to 4	3.2	Sand, silt, caliche
SB-06	0 to 2	2.4	Fine sand, silt
	2 to 4	6.6	Fine sand, silt
SB-07	0 to 2	4.2	Sand, caliche, silt
	2 to 4	3.8	Sand, caliche, silt
SB-08	0 to 2	4.0	Sand and clay
	2 to 4	5.7	Sand and clay
SB-09	0 to 2	3.9	Sand, clay, silt
	2 to 4	4.4	Sand, clay, silt
SB-10	0 to 2	2.6	Sand, clay, silt
	2 to 4	3.0	Sand, clay, silt
SB-11	0 to 2	4.3	Sand, silt
	2 to 4	4.5	Sand, silt
SB-12	0 to 2	3.8	Sand, silt
	2 to 4	1.7	Sand, silt

NOTES:
bgs = below ground surface
PID = Photoionization detector
ppm = part(s) per million

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A total of 13 soil samples were analyzed for cyanide using EPA method 335.4 and metals using EPA methods 6010 and 7470/7471A. The laboratory results and the residential SSLs for the analytes are provided in Table 2.2. Soil sample SB-07(0 to 2 feet) exceeded the SSL concentration for arsenic and soil sample SB-10(0 to 2 feet) exceeded the SSL concentrations for arsenic and iron. These values, although above the residential SSLs for arsenic and iron, are within natural variance levels for soils in the southwestern United States (Welch et al. 1993). Based on this fact, NMED determined that further soil sample analysis (of deeper soil samples collected from the 2- to 4-foot bgs interval from these soil borings) was not necessary.

Table 2.2.
Subsurface Soil Metals and Cyanide Results

Analyte	Residential SSLs (mg/Kg)	SOIL SAMPLE NUMBER/INTERVAL (FEET)												
		SB-01 0 to 2 feet (mg/Kg)	SB-02 0 to 2 feet (mg/Kg)	SB-03 0 to 2 feet (mg/Kg)	SB-04 0 to 2 feet (mg/Kg)	SB-05 0 to 2 feet (mg/Kg)	SB-06 0 to 2 feet (mg/Kg)	SB-07 0 to 2 feet (mg/Kg)	SB-08 0 to 2 feet (mg/Kg)	SB-08D 0 to 2 feet (mg/Kg)	SB-09 0 to 2 feet (mg/Kg)	SB-10 0 to 2 feet (mg/Kg)	SB-11 0 to 2 feet (mg/Kg)	SB-12 0 to 2 feet (mg/Kg)
Arsenic	3.9	3.3	2.8	2.0	4.5	3.7	2.3	**5.7**	2.3	2.9	3.8	**5.2**	2.0	2.2
Barium	5,200	234	115	133	314	130	128	186	115	116	144	103	93.7	124
Cadmium	70	0.3	0.5	0.3	0.4	0.3	<0.2	0.6	<0.2	<0.2	0.3	0.6	<0.2	0.5
Chromium	100,000	7.0	7.7	8.3	13.6	7.6	5.3	10.8	7.2	7.0	8.0	10.2	6.0	11.1
Lead	400	5.2	7.3	7.7	17.8	34.0	3.9	100	62.7	52.2	35.6	38.3	16.3	144
Mercury (Total)	23	<0.033	<0.033	<0.033	<0.033	0.096	<0.033	0.555	0.100	0.112	0.128	0.055	<0.033	0.120
Selenium	380	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	380	2.7	0.4	0.7	1.2	0.9	0.6	1.8	0.8	0.7	1.0	4.3	2.3	9.3
Copper	2,800	10.5	19.1	8.5	15.5	9.0	3.8	27.1	8.1	7.4	13.7	48.1	6.5	13.5
Iron	23,000	8240	9600	9570	12,300	8420	8860	20,500	8180	8270	12,700	**34,900**	7350	9920
Manganese	7,800	709	281	427	259	284	480	319	258	276	311	296	184	245
Zinc	230,000	25.5	30.6	31.0	91.6	61.3	14.9	119	38.5	32.4	51.5	49.6	24.9	89.4
Cyanide	1,200	<0.5	<0.5	2.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
D denotes a duplicate sample
Bold concentrations indicate a concentration identified greater than the New Mexico Soil Screening Level (SSL) for residential soil concentrations.
All results in milligram(s) per Kilogram (mg/Kg)
NA = Not analyzed

DE&S personnel noticed heavy soil staining at the base of a transformer located at the northeastern corner of the Site building. The soil staining appeared black and may be the result of oil leaking from the formerly operating transformer. DE&S collected a surface soil sample from the base of the transformer after discussions with Ms. Christine Bynum, NMED Voluntary Remediation Program Manager. The surface soil sample was analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082. Surface soil sample results did not indicate the presence of PCBs. The PCB results are outlined in Table 2.3.

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Table 2.3.
Surface Soil PCB Results

Analyte	SS-01 (mg/Kg)
Aroclor 1016	<0.5
Aroclor 1221	<2.5*
Aroclor 1232	<0.5
Aroclor 1242	<0.5
Aroclor 1248	<0.5
Aroclor 1254	<0.5
Aroclor 1260	<0.5

NOTES:
Bold concentrations indicate a concentration identified greater than the laboratory detection limit.
All results reported in milligram(s) per Kilogram (mg/Kg).
* - Surface Soil Sample SS-01 had to be diluted due to the presence of oil staining within the soil sample matrix.

2.2.2 Soil Gas

Soil gas samples were screened using a PID prior to soil gas sample collection in tedlar bags. Concentrations of soil gas readings using the PID ranged from 0.1 ppm in soil boring SB-01 to >9,999 ppm in soil borings SB-05 and SB-07. The soil gas PID results are presented in Table 2.4. As discussed further in Section 4.0, the readings for SB-05 and SB-07 are most likely the result of equipment problems.

Table 2.4.
Soil Gas PID Results

	Sample Location											
Soil Gas Screening	SB-01 ppm	SB-02 ppm	SB-03 ppm	SB-04 ppm	SB-05 ppm	SB-06 ppm	SB-07 ppm	SB-08 ppm	SB-09 ppm	SB-10 ppm	SB-11 ppm	SB-12 ppm
Photoionization Detector (PID)	0.1	1.7	30.3	271	>9,999	3,275	>9,999	711	770	572	16.2	59.3

NOTE:
All results are in parts per million (ppm)

Thirteen soil gas samples were analyzed for VOCs using EPA method 8260 (see Table 2.5.). Only trichloroethene (TCE) was identified in any of the soil gas samples. The concentrations of TCE detected ranged from 0.2 mg/L in soil gas sample SB-06/soil gas to 3.4 mg/L in soil gas sample SB-03/soil gas.

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Table 2.5.
Soil Gas VOC Results

Analyte	Sample Location												
	SB-01 mg/L	SB-02 mg/L	SB-03 mg/L	SB-04 mg/L	SB-05 mg/L	SB-06 mg/L	SB-07 mg/L	SB-08 mg/L	SB-09 mg/L	SB-10 mg/L	SB-11 mg/L	SB-12 mg/L	SB-12D mg/L
Trichloroethene (TCE)	<0.1	**0.45**	**3.4**	**0.68**	**0.65**	**0.2**	**1.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

NOTES:
D denotes duplicate sample
Bold concentrations indicate a concentration identified greater than the laboratory detection limit.
All results are in milligram(s) per Liter (mg/L).

2.2.3 Groundwater

Five groundwater samples were analyzed for cations and anions using EPA methods 200.7, 300.0, 340.1, 340.1, 350.2, and 353.2; laboratory pH and VOCs using EPA method 8260; cyanide using EPA method 335.4; and metals using EPA methods 6010 and 7470/7471A. The groundwater sample results are outlined in Tables 2.6, 2.7, 2.8, and 2.9.

Trichloroethene (TCE) was the only VOC compound identified by the laboratory above the method detection limit. TCE was detected at a concentration of 1.5 ug/L in groundwater samples SB-12/water and its duplicate SB-12D/water.

Table 2.6.
Groundwater Sample VOC Results

Analyte	NMWQCC Standard (ug/L)	GROUNDWATER SAMPLE NUMBER				
		SB-01 (ug/L)	SB-03 (ug/L)	SB-04 (ug/L)	SB-12 (ug/L)	SB-12D (ug/L)
Trichloroethene (TCE)	100	<1.0	<1.0	<1.0	**1.5**	**1.5**

NOTES:
D denotes duplicate sample
Bold concentrations indicate a concentration identified greater than the laboratory detection limit.
All results are in microgram(s) per Liter (ug/L)

The groundwater sample metal results are outlined in Table 2.7. Chromium and iron were the only metals identified in groundwater samples above the NMWQCC Standards. Chromium was identified at concentrations of 0.057 mg/L and 0.072 mg/L in groundwater samples SB-03/water and SB-12/water, respectively. Iron was detected at concentrations of 25.1 mg/L, 27.3 mg/L, 12.8 mg/L, 51.3 mg/L, and 8.93 mg/L in groundwater samples SB-01/water, SB-03/water, SB-04/water, SB-12/water, and SB-12D/water, respectively.

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Table 2.7.
Groundwater Metals and Cyanide Results

Analyte	NMWQCC Standards mg/L	GROUNDWATER SAMPLE NUMBER				
		SB-01 mg/L	SB-03 mg/L	SB-04 mg/L	SB-12 mg/L	SB-12D mg/L
Arsenic	0.1	0.02	<0.01	<0.01	<0.01	<0.01
Barium	1.0	0.523	0.583	0.363	0.795	0.222
Cadmium	0.01	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.027	**0.057**	0.019	**0.072**	0.009
Lead	0.05	0.014	0.012	0.006	0.027	<0.005
Mercury (Total)	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	0.05	<0.005	<0.005	<0.005	<0.005	<0.005
Copper*	1.0	0.016	0.013	0.008	0.031	0.005
Iron*	1.0	**25.1**	**27.3**	**12.8**	**51.3**	**8.93**
Magnesium	NA	19.2	24.6	14.9	25.6	19.8
Manganese	0.2	1.30	2.42	1.14	2.31	1.71
Zinc*	10.0	0.059	0.054	0.043	0.122	0.019
Cyanide	0.2	<0.01	<0.01	<0.01	<0.01	<0.01

NOTES:
* - Standards for Copper, Iron, and Zinc are for domestic water supply
D denotes duplicate sample
All results in milligram(s) per Liter (mg/L)
Bold values indicate concentration above the New Mexico Water Quality Control Commission (NMWQCC) Standards.

The groundwater sample results for cations/anions are present in Table 2.8. All cations/anions identified were below their respective NMWQCC Standard (if applicable).

Table 2.8.
Groundwater Cations/Anions Results

Analyte	NMWQCC Standards mg/L	GROUNDWATER SAMPLE NUMBER				
		SB-01 mg/L	SB-03 mg/L	SB-04 mg/L	SB-12 mg/L	SB-12D mg/L
Calcium	NA	104	160	97.9	159	126
Chloride	250	32	41	36	57	54
Fluoride	2.0 (EPA MCL)	0.67	0.70	0.80	0.89	0.80
Nitrate	10.0	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite	NA	<0.10	<0.10	<0.10	<0.10	<0.10
Potassium	NA	22.5	22.5	17.6	23.9	17.9
Phosphorus	NA	<0.50	<0.50	<0.50	<0.50	<0.50
Sodium	NA	57.3	117	75	137	135
Sulfate	600	110	280	100	180	170

NOTES:
D denotes duplicate sample
All results are in milligram(s) per Liter (mg/L)

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The groundwater sample results for ammonia/pH are presented in Table 2.9. The pH readings identified were within the NMWQCC Standard (6.0 9.0). There is no NMWQCC Standard for ammonia.

Table 2.9.
Groundwater Ammonia and pH Results

Analyte	NMWQCC Standards	GROUNDWATER SAMPLE NUMBER				
		SB-01	SB-03	SB-04	SB-12	SB-12D
Ammonia (mg/L)	NA	0.7	<0.5	0.7	0.84	0.8
pH	6.0 - 9.0	7.3	7.5	7.70	7.2	7.13

NOTES:
D denotes duplicate sample
mg/L = milligram(s) per Liter
NA - Not applicable

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4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Subsurface soil encountered during installation of soil borings SB-01 to SB-12 is typical of post-Santa Fe Quaternary alluvial fan and floodplain deposits (described in Section 1.2.2). The borings are comprised primarily of fine-grained sands with some thin interbedded clay layers. No odors were observed from soil samples collected from any of the soil borings. PID readings ranged from 1.2 ppm (SB-01 and SB-02) to 6.6 ppm (SB-06).

A total of 13 soil samples were analyzed for cyanide using EPA method 335.4 and metals using EPA methods 6010 and 7470/7471A. The laboratory results were compared to the residential SSLs for the analytes in Table 2.2. Soil sample SB-07/(0 to 2 feet) exceeded the SSL concentration for arsenic and soil sample SB-10/(0 to 2 feet) exceeded the SSL concentrations for arsenic and iron. These exceedance values, although above the residential SSLs for arsenic and iron, are within natural variance levels for soils in the western United States (Welch et al 2000) and are indicative of natural "background" conditions. Based on this fact, NMED determined that further sample analysis (of soil samples collected from the 2- to 4-foot bgs interval collected from these soil borings) was not necessary.

DE&S personnel noticed heavy soil staining at the based of a transformer located at the northeastern corner of the Bell Trading Post building. The soil staining appeared black and the result of oil leaking from the formerly operating transformer. DE&S collected a surface soil sample from the base of the transformer after discussions with Ms. Christine Bynum of NMED. The surface soil sample was analyzed for PCBs by EPA Method 8082. Surface soil sample results did not indicate the presence of PCBs.

Soil gas samples were screened using a PID prior to soil gas sample collection in tedlar bags. Concentrations of soil gas readings using the PID ranged from 0.1 ppm in soil boring SB-01 to >9,999 ppm in soil borings SB-05 and SB-07. Thirteen soil gas samples were analyzed for VOCs using EPA method 8260. Only TCE was identified in any of the soil gas samples. The concentrations of TCE detected ranged from 0.2 mg/L in soil gas sample SB-06/soil gas to 3.4 mg/L in soil gas sample SB-03/soil gas. It should be noted that the lack of correlation between the PID and laboratory analytical results is most likely a function of the presence of water vapor accumulating on the PID bulb during soil gas screening. The fact that TCE is present in soil gas indicates that most likely a historical release of chlorinated solvents took place at the former Site property, however, the relatively low contamination levels indicate that the release was either small in extent or took place some time ago.

Five groundwater samples were collected at the Site. The groundwater sampling locations were selected in order to demonstrate that past or current land uses at the Site most likely did not contribute and are not currently contributing to the known groundwater contamination in the area. (If environmental conditions at the Site are not contributing to groundwater contamination, groundwater exiting the Site will be of the same or higher quality than groundwater entering the Site.). Groundwater flow in the area is believed to be towards the east (Anderholm 1988).

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Five groundwater samples were analyzed for cations and anions using EPA methods 200.7, 300.0, 340.1, 340.1, 350.2, and 353.2, laboratory pH and VOCs using EPA method 8260, cyanide using EPA method 335.4, and metals using EPA methods 6010 and 7470/7471A.

TCE was the only VOC compound identified by the laboratory above the method detection limit in any of the groundwater samples. TCE was detected at a concentration of 1.5 ug/L in groundwater samples SB-12/water and its duplicate, SB-12D/water. This concentration is not above the NMWQCC Standard for TCE, which is 100.0 ug/L.

Chromium and iron were the only metals identified above the NMWQCC Standards in groundwater samples. Chromium was identified at concentrations of 0.057 mg/L and 0.072 mg/L in groundwater samples SB-03/water and SB-12/water, respectively. Iron was detected at concentrations of 25.1 mg/L, 27.3 mg/L, 12.8 mg/L, 51.3 mg/L, and 8.93 mg/L in groundwater samples SB-01/water, SB-03/water, SB-04/water, SB-12/water, and SB-12D/water, respectively. These levels of chromium and iron, even though they are above the NMWQCC Standards (0.05 mg/L for chromium and 1.0 mg/L for iron) are within variances often observed in groundwater within the Albuquerque alluvial aquifer (USGS 1995) and are believed to represent natural "background" conditions.

Cyanide was not detected in any of the groundwater samples above the laboratory detection limit (0.01 mg/L). The NMWQCC Standard for cyanide is 0.2 mg/L.

All cations/anions identified in groundwater samples were below their respective NMWQCC Standard (if applicable). The pH readings identified in the groundwater samples were within the NMWQCC Standard (6.0 to 9.0). There is no NMWQCC Standard for ammonia. Ammonia concentrations detected ranged from <0.5 mg/L in groundwater sample SB-03/water to 0.84 mg/L in groundwater sample SB-12/water.

4.2 Recommendations

Based on the results of this Phase II ESA, DE&S believes there are sufficient grounds for the VRP Manager to evaluate the Site for closure under VRP regulations.

The fact that TCE has been detected at low levels (below NMWQCC standards) in this area indicates that there was a release of chlorinated solvents at this site in the past. The likely release mechanism was the dissolution of solvents going down the drains within and around the building and being released through cracks in the sumps and drain lines at the site. The fact that heavy metals were detected in the crawlspace further indicates that there were leaks in the drains and/or sumps beneath the Site. Although no evidence was encountered at the site of a release of free phase TCE, the groundwater data are considered inconclusive because chlorinated solvents will tend to sink in the water column and contamination is typically found in deeper groundwater samples. The grab groundwater samples collected with the Geoprobe are representative only of water quality at the water table. Additional groundwater characterization may be warranted for closure of groundwater at this Site under the VRP.

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WARRANTY STATEMENT AND CERTIFICATION

This report was prepared for the New Mexico Environment Department (NMED) only, and is intended for use solely by NMED.

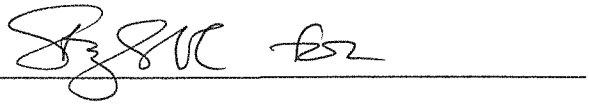
Duke Engineering & Services prepared this report in accordance with generally accepted professional standards used in the field of environmental consulting. These standards were current at the time the work was performed.

Duke Engineering & Services has used professional judgement in collecting and analyzing the information included in this report and in formulating conclusions or recommendations. No other warranty or representation is expressed or implied as to the accuracy of the information, conclusions, or recommendations included or intended in this report. In the case of environmental audits and property assessments, the report relies on information provided to Duke Engineering & Services by the client or the property owner.

Duke Engineering & Services disclaims any liability or responsibility to any person or party for any loss, damage, expenses, fines, or penalties that may arise or result from the use of any information, conclusions, or recommendations contained in this report.

The following person has prepared and/or reviewed this report, is personally familiar with the information submitted in the report, and verifies, to the best of her knowledge, that the contents are true and correct.

Name: Cynthia P. Ardito

Signature: 

Title: General Manager, Environmental Services
New Mexico Certified Scientist No. 072

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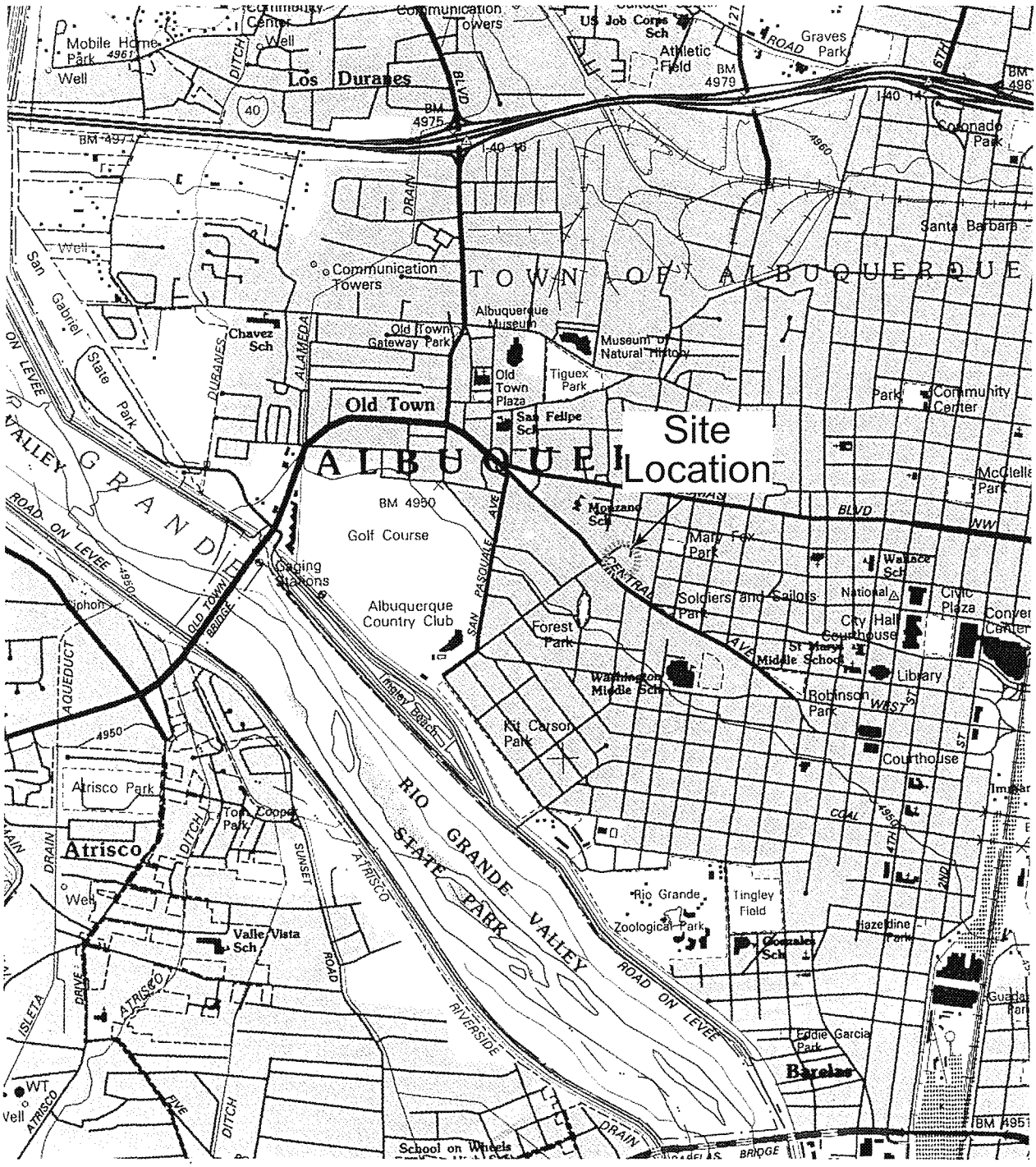
FIGURES



UTM GRID AND 1996 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

File: Bell-sitemap.fh8	**Site Location Map – Bell Trading Post Property**	Figure 1
Duke Engineering & Services, A Duke Energy Company	Albuquerque, New Mexico	

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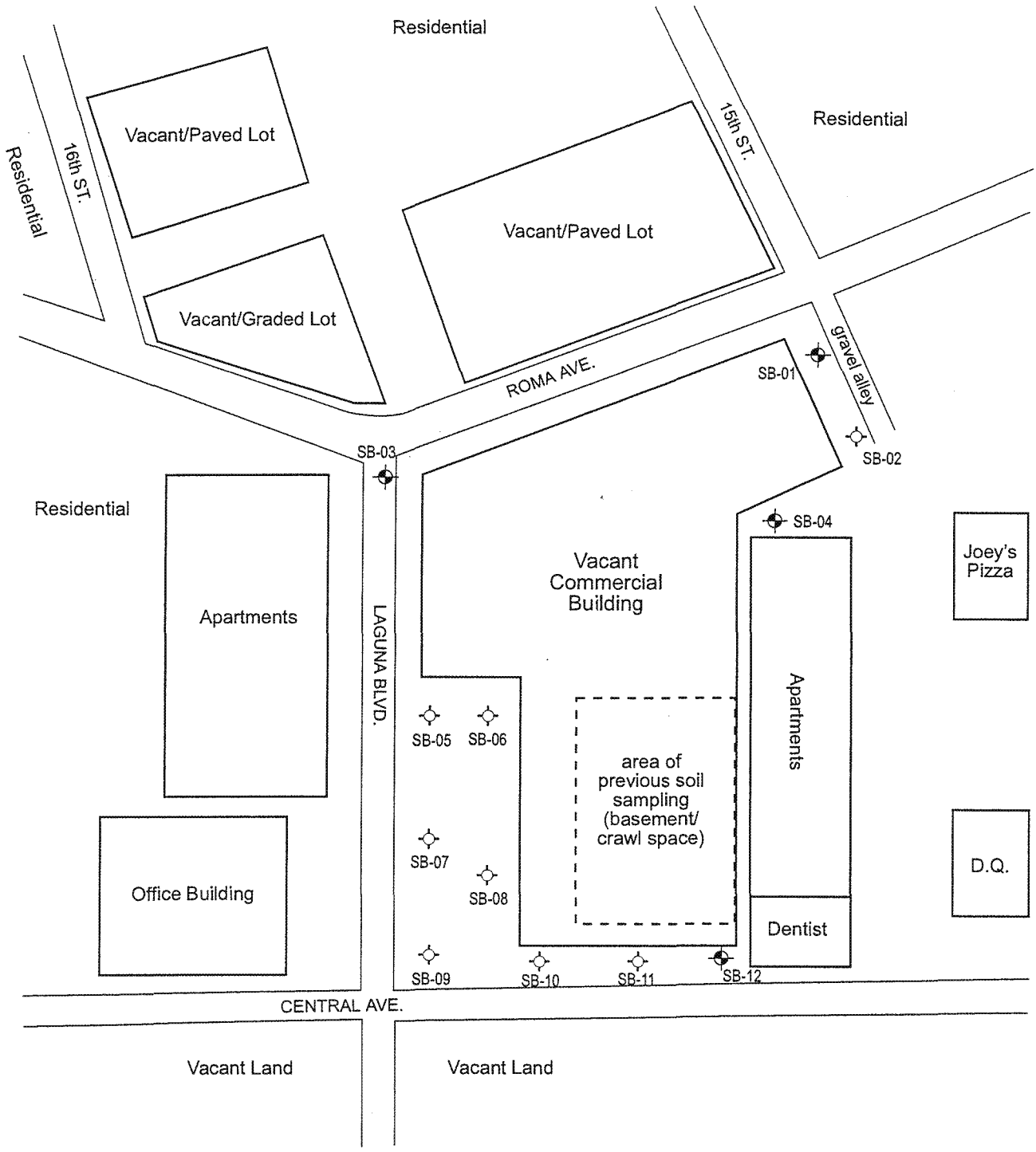

File: Bell-sampling.fh8	**Site Sketch and Sampling Location Map – Bell Trading Post Property**	Figure 2
Duke Engineering & Services, A Duke Energy Company	Albuquerque, New Mexico	

APPENDIX A

Work Plan

PHASE II SITE CHARACTERIZATION WORK PLAN

Former Bell Trading Post Property
Albuquerque, New Mexico

Prepared for:

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Voluntary Remediation Program
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Prepared by:

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October 1, 2001

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EXECUTIVE SUMMARY

This document presents the Phase II Site Characterization Work Plan for soil and ground water sampling and analysis at the Former Bell Trading Post Property (Site) located in Albuquerque, New Mexico. This document was prepared based on letter correspondence and discussions with State of New Mexico Environment Department (NMED) and City of Albuquerque (COA) representatives. This Work Plan was prepared for the NMED Ground Water Quality Bureau's Voluntary Remediation Program (VRP) and follows the Duke Engineering and Services (DE&S) "Scope of Work and Cost Estimate" (SOW) submitted to NMED on March 30, 2001.

The Site consists of approximately 2.5 acres near Old Town Albuquerque and is bounded to the south by Central Avenue, on the north and northeast by Roma Avenue, on the northwest by Fifteenth Street, to the east by an apartment complex and a vacant business, and to the west by Laguna Boulevard. The Site is located in Bernalillo County, New Mexico. Currently, there is one large (approximately 30,000 square feet) vacant building on the Site (1503 Central Avenue NW).

Prior to 1947, historical uses of the property were primarily residential. After 1947, historical property use was commercial. From 1947 until 1975, Bell Trading Post occupied the Site building and conducted commercial jewelry manufacturing. The Site is identified as vacant from 1976 until 1982. From approximately 1982 until 1984, Albuquerque Photo Lab occupied the Site building and performed commercial film development. Finally, from 1985 until 1992, Michelson Metals occupied the Site building, using the property as an office for commodity trading only (office use, non-industrial). Site property owner Mr. J.T. Michelson has stated that neither metal work nor jewelry production occurred at the Site after 1975 (Interviews with Mr. J. T. Michelson on April 18 and May 3, 2001).

Based on limited background research of the jewelry manufacturing industry and current jewelry industry practices, the following chemicals are likely to be present at a jewelry manufacturing facility: sodium and/or potassium cyanide, hydrogen peroxide, sulfuric and boric acids, ammonia hydroxide, calcium sulfate, sulfurated potash, potassium bifluoride (and potassium tetraborate), and heavy metals such as gold, silver, and copper.

Chemicals used in the development of black and white photographic films are: silver halide (contained in emulsifiers); hydroquinone, metol, and phenidone (used as developing agents); sodium hydroxide, sodium carbonate, and sodium tetraborate (applied to activate development); sodium sulfite and potassium metabisulfite (used as preservatives), potassium bromide and benztriazole (restrainers); acetic acid; sodium or ammonium thiosulfate (used to fix development); sodium bisulfite and potassium metabisulfite (employed as neutralizers); and potassium aluminum sulfate and potassium chromium sulfate (applied as hardeners). Chemicals used in the color photographic processes are: potassium ferricyanide and potassium bromide, ethylenediamine tetraacetic acid (EDTA), bleach, hexavalent chromium, and organic dyes.

This Work Plan recommends that soil and ground water samples collected at the Former Bell Trading Post property (using a Geoprobe® or comparable direct-push drilling method) be analyzed for the parameters outlined in Section 4.5.

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1.0 INTRODUCTION

This document presents the Phase II Site Characterization Work Plan (Work Plan) for soil and ground water sampling and analysis at the Former Bell Trading Post Property (Site) located at 1503 Central Avenue, in Albuquerque, New Mexico. This document was prepared based on letter correspondence and discussions with the State of New Mexico Environment Department (NMED) and City of Albuquerque (COA) representatives. This Work Plan was prepared for the NMED Ground Water Quality Bureau's Voluntary Remediation Program (VRP) and follows the Duke Engineering and Services (DE&S) "Scope of Work and Cost Estimate" (SOW) submitted to NMED on March 30, 2001.

This Work Plan is not intended to cover all of the necessary health and safety processes and procedures that should be followed to carry out the activities described in the sections of this Work Plan. A Site-specific Health and Safety Plan (HSP) is included in Appendix A.

1.1 General Project Background

In a letter dated April 12, 2001, Ms. Christine Bynum, Program Manager of the NMED VRP, authorized DE&S to complete Subtasks 1, 2, and 3 of the DE&S proposed SOW dated April 5, 2001. Subtasks 1, 2, and 3 are defined as follows:

Subtask 1: Project coordination/background review, SOW and Cost Estimate preparation.

Subtask 2: Further investigation into past site uses and operating procedures.

Subtask 3: Work Plan and Cost Estimate for Phase II site characterization activities.

DE&S has developed this Work Plan (as outlined in Subtask 3 above) to perform Phase II site characterization based on the following activities:

- Completion of a historical Site use review and a series of interviews with individuals knowledgeable with the historical Site uses; and
- Several telephone conversations with Ms. Christine Bynum of the NMED.

This document is the deliverable associated with Subtask 3.

1.2 Site History

Prior to 1947, historical uses of the property were primarily residential. After 1947, historical property use was commercial/industrial. From 1947 until 1975, Bell Trading Post occupied the Site building and conducted commercial jewelry manufacturing. The Site is identified as vacant from 1976 until approximately 1981 or 1982. From approximately 1982 until 1984, Albuquerque Photo Lab occupied the Site building and performed commercial film development. Finally, from 1985 until 1992, Michelson Metals occupied the Site building, using the property as an office for commodity trading only (office use, non-industrial). Site property owner Mr. J.T. Michelson has stated that neither metal work nor jewelry production occurred at the Site after 1975 (Interviews with Mr. J. T. Michelson on April 18 and May 3, 2001).

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1.3 Potential Contaminants of Concern

The potential contaminants of concern derive from the industrial processes associated with the jewelry manufacturing and photographic development previously conducted at the Site. These potential contaminants include but are not limited to solvents, cyanide, and heavy metals. The potential contaminants of concern and their possible origins are discussed in the following paragraphs.

- Based on limited background research of the jewelry manufacturing industry and current jewelry industry practices, the following chemicals are likely to be present at a jewelry manufacturing facility: sodium and/or potassium cyanide, hydrogen peroxide, sulfuric and boric acids, ammonia hydroxide, calcium sulfate, sulfurated potash, potassium bifluoride (and potassium tetraborate), and heavy metals such as gold, silver, and copper.

- Chemicals used in the development of black and white photographic films are: silver halide (contained in emulsifiers); hydroquinone, metol, and phenidone (used as developing agents); sodium hydroxide, sodium carbonate, and sodium tetraborate (applied to activate development); sodium sulfite and potassium metabisulfite (used as preservatives), potassium bromide and benztriazole (restrainers); acetic acid; sodium or ammonium thiosulfate (used to fix development); sodium bisulfite and potassium metabisulfite (employed as neutralizers); and potassium aluminum sulfate and potassium chromium sulfate (applied as hardeners). Chemicals used in the color photographic processes are: potassium ferricyanide and potassium bromide, ethylenediamine tetraacetic acid (EDTA), bleach, hexavalent chromium, and organic dyes.

1.4 Other Environmental Issues of Concern

Although DE&S did not perform a Phase I Environmental Assessment at the Site, other environmental issues of concern were noted its review of the Phase I ESA by Keers Environmental (Keers 2000). The other environmental issues of concern identified were:

- The potential for the presence of lead-based paint based on the age of the Site improvements and the potential for the presence of lead in the drinking water from pipe dope and solder.

- The possible presence of asbestos-containing materials in the Site structures based on age of Site improvements. The interior materials include Thermal System Insulation (TSI) on an active hot water tank, sheet flooring, floor tile, mastic, and drywall.

- The potential for contaminants to be introduced onto the Site or transported from the Site to adjoining properties by surface water runoff. The Site and vicinity are located in a designated flood zone and could be environmentally impacted during a flood event.

- The possible presence of septic tanks that may have been active while the Site was in use for residential purposes. The possible presence of septic tanks is indicated by two rectangular depressions in the asphalt surface of the 309 15th Street property (as observed on Historic Sanborn Fire Insurance Maps during the development of the Keers Phase I ESA Report). Nitrate contamination of ground water has been extensively documented in the Albuquerque area.

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- An active NMED leaking Underground Storage Tank (UST) site has been identified approximately one-eighth of a mile northwest of the site. The UST site is identified as The World Motel at 1721 Central Avenue NW (World Motel UST). The NMED Underground Storage Tank Bureau (USTB) has indicated that a release of gasoline impacted ground water upgradient of the Site. According to NMED USTB representative Norman Pricer, the ground water impact from this UST has been delineated and identified as limited in extent to the World Motel, and the associated contamination resulting from this leaking UST will not be considered a potential contaminate of concern.

1.5 NMED Requirements for Phase II Investigation

Ms. Christine Bynum, Program Manager of the NMED VRP, submitted a Site Phase II Task Assignment to DE&S in a letter dated March 16, 2001. This Work Plan covers Phase II Site Characterization activities in accordance with the contract between NMED and DE&S, with the NMED Task Assignment, and with the NMED recommendation for Phase II activities at the Site based on the following comments from Christine Bynum in a letter dated March 16, 2001:

- "The City of Albuquerque is contemplating the purchase of this property and potentially converting the building to affordable housing. To NMED knowledge, there is a Phase I that has been done on this property by the current owner and there has been some soil sampling performed. It is my understanding that all of the sampling performed was beneath the building, around drains and in the crawlspace. Additional sampling is necessary in exposed portions of the yard, especially since they are proposing to use the property for housing."

1.6 Work Plan Overview

This Work Plan includes a description of the following activities:

- Soil sample collection using a Geoprobe® and laboratory analysis of the soil samples;
- Ground Water sample collection and laboratory analysis of ground water samples from selected Geoprobe® soil boring locations;
- Final report completion.

DE&S will interact with NMED VRP and COA representatives to coordinate the schedule for any and all of the field work pertaining to this Work Plan.

1.7 Prior Reports Review/Historical Site Uses

The COA is considering this piece of property for condemnation. COA is proposing plans to redevelop the Site into residential multi-family housing. The most recent Phase I Environmental Site Assessment for the Bell Trading Post property, "Phase I Environmental Site Assessment, Bell Trading Post and Adjacent Parcels," was completed by Keers Environmental, Inc. (Keers) in December 2000 (Keers 2000). DE&S has reviewed this report and finds the following important conclusions:

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- An active UST site has been identified approximately one-eighth of a mile northwest of the site. The UST site is identified as The World Motel at 1721 Central Avenue NW (World Motel UST). The NMED USTB has indicated that a release of gasoline has impacted ground water upgradient of the Site.
- Because of the age of the Site structure, the potential for construction materials containing either lead or asbestos or both should be considered.
- The Site is located in a designated flood zone and could be environmentally impacted during a major flood event.

A Phase II ESA, "Limited Subsurface Investigation at 1503 Central Avenue, Albuquerque, New Mexico," was completed by Keers in April 1994 (Keers 1994). DE&S has reviewed this report and notes the following findings and conclusions:

- Ten surficial soil samples were collected in a crawl space beneath the building. The samples were collected at suspected highly contaminated areas under drains, sumps, and piping. The samples were analyzed for volatile organic compounds (VOCs) and halogenated hydrocarbons using laboratory method SW-846 8010, total cyanide using laboratory method SW-846 9010, and RCRA metals using laboratory method SW-846 AA.
- Results from the limited subsurface investigation revealed that silver, chromium, and lead were present in several surficial soil samples collected from within the crawl space under the building. Two of the subsurface soil samples collected contained compounds with concentrations exceeding the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit. One subsurface soil sample contained 134 parts per million (ppm) lead, and the other subsurface soil sample contained 174 ppm chromium and 1,670 ppm lead. The elevated concentrations of these compounds prompted further field investigation and the collection of soil samples from a depth of 5-feet below the soil surface at each of the two locations where elevated concentrations were detected in the initial investigation. These deeper subsurface soil samples were analyzed using TCLP methods for the specific metals originally detected. Silver concentrations of <0.010 ppm were reported in samples from below locations where initial samples reported elevated silver concentrations. The sample collected below the location where chromium and lead had been detected contained 0.047 ppm chromium and 0.890 ppm lead. Keers indicated that the results from the 5-feet deep samples were well below the United States Environmental Protection Agency (EPA) regulatory limits and that additional testing was not recommended at that time (Keers 1994).

1.8 Interviews

DE&S representatives interviewed the following individuals for information pertaining to historic site uses of the Former Bell Trading Post property.

Mr. J.T. Michelson is the current owner of the Site. DE&S representatives contacted Mr. Michelson by telephone on April 18 and May 3, 2001. Mr. Michelson provided the following information:

- Mr. Michelson was involved with the day-to-day operations of the jewelry manufacturing business previously located at the Site.

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- Bell Trading Post used sulfurated potash, also known as "Liver of Sulfur," to oxidize or clean silver and copper metal jewelry. The liver of sulfur was stored in 10 to 20-pound bags within the facility. The liver of sulfur is mixed with water to form a solution to clean copper and silver.
- Bell Trading Post casting operations used gypsum (plaster of Paris) molds. The molds were disposed of at the COA dump after use. Wax castings were not used at Bell Trading Post.
- Bell Trading Post polished silver jewelry with a mild soap solution. Mr. Michelson did not know the type of soap used or the amount stored at the facility.
- Bell Trading Post performed soldering operations. Soldering operations utilize fluxes that contain acids. During soldering operations, acids may become very fluid when heated. Mr. Michelson could not recall the types of fluxes that were used at Bell Trading Post, nor could he specify the types of acids they may have contained. Mr. Michelson did recall that silver solder was the primary solder employed at Bell Trading Post.
- Mr. Michelson stated that the area above the crawl space or sub-basement was used for storage of finished jewelry and a shipment loading dock area.
- Bell Trading Post employed 200 workers. The facility consisted of a tool room, soldering room, parts storage, stamping area, and administrative offices. The second story of the facility was used as a casting area.
- Mr. Michelson stated that Bell Trading Post ceased jewelry manufacturing operations in 1976.
- According to Mr. Michelson, a photographic development shop was located in the facility for five years in the early 1980s. Mr. Michelson could recall neither the name of the business that leased the property nor its owner's name. Mr. Michelson was also unable to say how much of the building and which sections were occupied by the photographic development business.

Mr. Norman Pricer, Field Representative of the NMED USTB was interviewed by telephone on May 10, 2001 to discuss the status of the World Motel UST. The World Motel UST is considered to be hydraulically upgradient relative to the Site (to the west of the Site). According to the most recent information available on the USTB web site, the World Motel UST has impacted ground water and discharged free product. Mr. Pricer stated the following:

- The petroleum compound released at the facility was kerosene/diesel fuel;
- A soil vapor extraction (SVE) remediation system was previously in place at the World Motel UST; however; ground water monitoring is the only activity currently taking place at the World Motel UST;
- The World Motel UST ground water plume has been delineated, with no apparent easterly migration.

A former Albuquerque Photo Lab, Inc., employee, Mr. Steven Donahue, a photographer who worked only in the photo shop at the facility, was interviewed by telephone on May 8, 2001. Mr. Donahue stated the following:

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- Albuquerque Photo Lab, Inc., operated for four to five years in the early 1980s and employed 8 to 10 people.
- Albuquerque Photo Lab, Inc. performed color photo processing, black and white photo processing, off-set printing, and blue print production. Two large printing presses were in use at the Site facility.
- Mr. Donahue was uncertain about all chemicals used by Albuquerque Photo Lab, Inc., at the Site facility building; however, he stated that ammonia, inks, solvents, and silver halide were in use at the facility, and also that the silver (metal) recycling was conducted.
- According to Mr. Donahue, Albuquerque Photo Lab, Inc. went out of business in the mid-1980s.

1.9 Recognized Environmental Conditions

Recommendations from the Keers Report (Keers 1994) include:

- Periodic review of the most current UST information to determine and assess the extent of soil and ground water contamination, if any, that may be caused by the upgradient active World Motel UST and possibly impact the Site. A site that may be unaffected by contamination at the time an assessment is performed may later become contaminated through a natural phenomenon (such as ground water flow) or through human intervention.
- Comprehensive Site asbestos and lead-based paint surveys prior to any planned demolition or renovation activities following OSHA and EPA regulations for demolition and renovation practices.
- Determination of Site flood potential through review of the most current Bernalillo County Flood Control District flood information.
- Evaluation of the two rectangular depressions in the asphalt to confirm the presence of abandoned septic tanks and to investigate potential soil contamination.
- Depending upon planned Site use and occupancy, possible further evaluation of the subsurface soil beneath the Site structure.

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2.0 SITE SETTING

2.1 Geologic and Hydrogeologic Setting

The Site is located in the southern-central portion of the Albuquerque Basin. This Basin is one of the largest of the southerly trending series of grabens that form the Rio Grande Drainage Basin. The Rio Grande Drainage Basin was formed in response to the Rio Grande Rift (Thorn et al. 1993). The Rio Grande Rift is a northerly to southerly trending, downdropped crustal extension that originates in Colorado and extends for more than 600 miles, crossing New Mexico to south of the Mexico/Texas border.

The Albuquerque Basin is filled with up to 10,000-feet of clastic sediments. These sedimentary deposits are of two types: 1) sediment that has filled the subsiding trough, and 2) floodplain deposits, terraces, dunes, alluvial fans and cones, spring deposits, caliche blankets, landslides, and some pediments. The latter group of deposits represent processes of erosion and deposition that may have prevailed throughout subsidence and filling of the basin (Kelley 1977). The Santa Fe Formation sediments fill the majority of the basin.

The Tertiary and Quaternary Santa Fe Formation is composed of unconsolidated to loosely consolidated gravels, sands, silts, and clays. The thickness of this unit ranges from 2,400-feet on the basin margins to 14,000-feet along the axis of the basin. In the vicinity of the Site, the thickness of this formation is approximately 4,700-feet. The Santa Fe Group is overlain by Quaternary sediments, which have a similar facies distribution. These post-Santa Fe deposits are alluvial fan and floodplain deposits and are up to 200-feet thick (Thorn et al. 1993).

The Santa Fe Group and post-Santa Fe deposits are the principal water bearing units in the vicinity of the Site and are hydraulically connected (USACE 1979; Thorn et al. 1993). However, the Albuquerque Basin aquifer is anisotropic laterally and vertically due to spatial variations in the lithology of these two water-bearing units (Chamberlin et al. 1992). Clay layers 12- to 15-feet thick are commonly observed in the alluvium of the Albuquerque Basin; these clay layers restrict vertical movement of water and may locally limit hydraulic interconnection between the shallow Quaternary aquifer and the Santa Fe Group aquifer (Thorn et al. 1993). As a result of spatial variations in lithology, variation in the hydraulic transmissivity of the Albuquerque aquifer is extremely large, from less than 10 square feet (ft^2)/day to 80,000 ft^2/day (Thorn et al. 1993). The hydraulic conductivity of the upper part of the Santa Fe Group varies also, but is estimated to be approximately 20 ft/day, average in the vicinity of the Site (Thorn et al., 1993).

Over time, population growth and the resulting increased water pumpage and use have considerably changed the water table configuration in the Albuquerque area. Ground water flow in the vicinity of the Site prior to large-scale ground water development is thought to have been to the southwest, and this condition existed at least into the mid- to late-1930s (Thorn et al. 1993). Ground water elevation contours representing 1960–1961 conditions in the Albuquerque area show a continued general southwesterly flow direction on the eastern side of the Rio Grande; however, a cone of depression is evident in the general area of the Site (Bjorklund 1961). The cone of depression resulted primarily from pumping of the Main Plant well field, previously located in the downtown Albuquerque area. The Main Plant wells were drilled

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between 1920 and 1948 and consisted of more than 23 wells; the Main Plant well field is now completely abandoned.

Ground water beneath the Site currently flows in an easterly direction. City-wide ground water contours from 1992 and simulated 1994 hydraulic head levels reflect a large cone of depression developing on the eastern side of Albuquerque as a result of ground water withdrawal (Kernodle et al. 1995). Based on the Kernodle study, this cone of depression appears to have influenced the ground water flow direction beneath the Site.

2.2 Adjoining Property Usage and Potential Receptors

The area surrounding the Site is developed with urban commercial buildings. Roma Avenue and a vacant, paved automobile parking lot located beyond the Avenue bound the Site to the north. An apartment building and dentist office bordered by a gravel alley are located east of the Site. Central Avenue acts as the Site's southern boundary; vacant lots line the Site's entire southern perimeter across Central Avenue. An apartment building and an office building are located west of the Site, beyond Laguna Boulevard.

Potential human receptors in the vicinity of the Site include area workers, pedestrians, and trespassers on the Site. On-site workers are not considered potential receptors as the Site building is not currently occupied by any reported employees. Potential exposure of environmental workers (field consultants, field technicians, environmental samplers, remediation contractors, etc.) is addressed in the HSP that accompanies this Work Plan.

2.3 Site Location

The Site consists of approximately 2.5 acres near Old Town Albuquerque and is bounded to the south by Central Avenue, on the north and northeast by Roma Avenue, on the northwest by Fifteenth Street, to the east by an apartment complex and a vacant business, and to the west by Laguna Boulevard. The Site is located in the COA, Bernalillo County, New Mexico. Currently, there is one large (approximately 30,000 square feet) vacant building on the Site (1503 Central Avenue).

A site location map is included as Figure 1.

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3.0 PAST OPERATING PROCEDURES

Subtask 2 of the approved Task assignment work was to determine what processes and chemical uses were employed at the Site commercial building for the manufacturing of jewelry and also in photographic development. The identification of these processes and chemical uses enabled DE&S to prepare a more efficient Site-specific environmental sampling Work Plan.

Subtask 2 included researching chemical usage and disposal techniques employed in the jewelry and photographic industries generally and, if possible, at the Site specifically. DE&S contacted the current owner of the Site, Mr. J. T. Michelson. Mr. Michelson was involved with the day-to-day operations of the jewelry manufacturing business at the Site. Mr. Michelson was contacted and questioned as to what chemicals were used at the facility, what typical maintenance procedures were followed, and what disposal methods were typically used. Mr. Michelson was questioned as to whether or not he could recall any catastrophic chemical releases at the Site. In addition, Mr. Michelson was asked, but he was unable to remember, who had leased the building and operated the photographic development business. Mr. Michelson's comments are included hereafter:

- Bell Trading Post used sulfurated potash, also known as "Liver of Sulfur," to oxidize or clean silver and copper metal jewelry. The liver of sulfur was stored in 10 to 20-pound bags within the facility. The liver of sulfur is mixed with water to form a solution to clean copper and silver.
- Bell Trading Post casting operations used gypsum (plaster of Paris) molds. The molds were disposed of at the COA dump after use. Wax castings were not used at Bell Trading Post.
- Bell Trading Post polished silver jewelry with a mild soap solution. Mr. Michelson did not know the type of soap used or the amount stored at the facility.
- Bell Trading Post performed soldering operations. Soldering operations utilize fluxes that contain acids. During soldering operations, acids may become very fluid when heated. Mr. Michelson could not recall the types of fluxes that were used at Bell Trading Post, nor could he specify the types of acids they may have contained. Mr. Michelson did recall that silver solder was the primary solder employed at Bell Trading Post.
- Mr. Michelson stated that the area above the crawl space or sub-basement was used for storage of finished jewelry and a shipment loading dock area.
- Bell Trading Post employed 200 workers. The facility consisted of a tool room, soldering room, parts storage, stamping area, and administrative offices. The second story of the facility was used as a casting area.
- Mr. Michelson stated that Bell Trading Post ceased jewelry manufacturing operations in 1976.
- According to Mr. Michelson, a photographic development shop was located in the facility for five years in the early 1980s. Mr. Michelson could recall neither the name of the business that leased the property nor its owner's name. Mr. Michelson was also unable to say how

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much of the building and which parts were occupied by the photographic development business.

Additional research into chemical uses at jewelry manufacturing and photographic development operations were accomplished by reviewing relative journals, documents, books, and other printed media. In addition, interviews of industry representatives associated with this property were conducted. Review of documents related to case studies or remediation at these types of industries was undertaken. Sections 3.1 and 3.2 of this SOW detail information collected concerning the jewelry manufacturing and photograph development industries.

3.1 Jewelry Manufacturing

DE&S personnel conducted local library reference material and Internet research to obtain information pertaining to the jewelry manufacturing industry. The general processes employed at a jewelry manufacturing facility are outlined hereafter.

Soldering: The Bell Trading Post employed soldering processes at the facility during its years of operation. A flux is applied to the metal to be soldered. Heating the solder and the metal causes them to form a strong bond. Mr. Michelson stated that the Bell Trading Post used silver solder. No records of the silver solder used by the Bell Trading Post were made available to DE&S; however, DE&S obtained and reviewed material safety data sheets (MSDS) for currently manufactured silver solder and silver solder fluxes. According to these documents, silver solders normally consist of ammonium chloride, antimony, copper, rosin, silver, tin, urea, and zinc chloride. Silver solder fluxes consist of boric acid, potassium bifluoride, and potassium tetraborate. Silver soldering with silver solder flux produces fumes of boron oxide and fluoride. A hydrofluoric acid may be produced if the materials soldered are rinsed with water shortly after soldering. In turn, the acid may cause metals present in the soldered materials to go into solution. If Bell Trading Post silver soldering practices included water rinsing, these acid and metal mixtures may have resulted. Rinsed from the floor of the facility into one of the sumps, the mixture may have threatened or possibly impacted localized ground water either through a sump leak or through a leak in the piping associated with the sump.

Casting: Mr. Michelson stated that castings were created at the Bell Trading Post with gypsum (plaster of Paris). This material was stored as a solid (powder) in 50-pound bags and mixed with tap water when designated for use. Plaster of Paris chemically consists of hemi-hydrated calcium sulfate and is created when the mineral gypsum is heated and then hydrated with water. Further addition of water causes plaster of Paris to become very hard, and this hardened version is used industrially to form several types of casts and molds. Plaster of Paris is environmentally hazardous as a nuisance dust that can be harmful under recurring inhalation exposure. Mr. Michelson has stated that all plaster of Paris materials have been removed from the Site and have been disposed of at the COA dump. Based on these statements, DE&S finds that no current potential exposure exists in the ambient air in the Site facility building. If the plaster of Paris is found to be present, DE&S recommends removal of the plaster of Paris from the building as soon as is feasible. Calcium sulfate is not very soluble in water and can contribute to water hardness. Localized ground water hardness may exist in the area of the Site facility building if aqueous mixtures of plaster of Paris leaked through drains into the underlying ground water table.

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Bombing: It is not known if the practice referred to in the jewelry industry as "bombing" was employed at the Bell Trading Post facility. "Bombing," also called "striping," is a technique used for brightening and removing tarnish from soldered metals. In bombing, a solution of sodium cyanide, heated almost to the boiling point, is poured over a piece of jewelry placed in a container and covered with a hydrogen peroxide solution. The solution formed by the bombing process contains sodium cyanide and a small amount of hydrogen peroxide. Decomposition of the hydrogen peroxide in the solution causes vigorous evolution of oxygen and induces the removal of the oxide layer. The process also causes the formation of metal cyanide complex ions and the dissolution of metal oxides. After use, bombing solutions may contain silver, copper, and other metal ions from the constituents of the jewelry cleaned. These metals can be recovered by electrolysis of the solution. The bombing process and the use of similar cleaning techniques employing sodium cyanide are extremely common in the jewelry manufacturing industry. Although Bell Trading Post is not known to have used the bombing process described here, the likelihood that it employed sodium cyanide in a similar technique is very strong.

Applying Luster - According to Mr. Michelson, jewelry at the Bell Trading Post was oxidized with sulfurated potash (also known as "liver of sulfur"). Liver of sulfur is a very effective oxidizer of sterling of silver but is sometimes difficult to apply. Jewelry to be oxidized is placed in a solution of liver of sulfur and water. The solution is heated and the jewelry is oxidized according to design specifications (normally until the metal has a blue-black appearance). Liver of sulfur as a solid produces a nuisance dust and is a particulate breathing inhalation environmental hazard. Common decomposition products of the liver of sulfur oxidation process are hydrogen sulfide and oxides of sulfur. Based on the Keers Environmental Phase I ESA report and a DE&S representative visit to the Bell Trading Post property building, DE&S believes that all remaining quantities of liver of sulfur have been removed from the Site facility building.

Polishing - Polishing wheels commonly used in the jewelry industry will cause silica dust. It is not known if polishing wheels were in use at the Site facility during jewelry manufacturing operations. Polishing wheels will cause an inhalation environmental hazard when in use. Since the facility ceased operation several years ago, the risk associated with polishing wheels is considered minimal.

3.1.1 Chemical Storage

According to Mr. Michelson, liver of sulfur, plaster of Paris, fluxes, silver solder, and several of the chemicals used in the soldering, casting, bombing, luster, and polishing processes were used and stored at the Site facility building. Mr. Michelson neither knew what quantities were used or stored nor could he identify storage areas within the facility building. Mr. Michelson is able to recall only the materials listed as present at the Site facility. However, research of current jewelry manufacturing practices indicates that, the following chemicals are likely to be present at jewelry manufacturing facilities and therefore may be or have been present at the Site:

Sodium and/or potassium cyanide

Hydrogen peroxide

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Sulfuric and boric acids

Ammonia hydroxide

Calcium sulfate

Sulfurated potash

Potassium bifluoride, and potassium tetraborate

Heavy metals (gold, silver, copper, etc.)

As part of this Work Plan environmental media at the Site (soil and ground water) will be sampled and analyzed for the presence of these common jewelry-manufacturing chemicals. The concentrations of these chemicals identified in soil and ground water will be compared with applicable soil and/or ground water NMED or EPA standards where available.

3.2 Photograph Development

According to Mr. Michelson, a photographic development business operated in the Bell Trading Post building for approximately five years in the early 1980s. The Keers Phase I ESA report (Keers 2000) indicates that the 1982 Albuquerque City Directory lists a business called " Albuquerque Photo Lab" at the Site address. A former Albuquerque Photo Lab employee, Mr. Steven Donahue, was interviewed by telephone on May 8, 2001. According to Mr. Donahue, Albuquerque Photo Lab, Inc. operated for four to five years in the early 1980's. Mr. Donahue stated that the business employed approximately 8 to 10 people. The Albuquerque Photo Lab, Inc. performed color photographic processing, black and white photographic processing, offset printing, and blue print production. Mr. Donahue was a photographer who worked only in the facility's photo shop. He stated knowledge of ammonia, inks, solvents, and silver halide use by Albuquerque Photo Lab, Inc., at the Site facility, and also stated that the business recycled silver and operated two large printing presses on site. However, Mr. Donahue's knowledge of chemical use at the Site by Albuquerque Photo Lab, Inc., was in general limited. According to Mr. Donahue, Albuquerque Photo Lab, Inc. went out of business in the mid-1980s. Mr. Phil Herkenhoff is the former owner of Albuquerque Photo Lab, Inc. and the current owner and operator of Herkenhoff Enterprises, Inc. DE&S has attempted to but as of the writing of this Work Plan, have been unable to contact Mr. Herkenhoff

Specific examples of photographic development processes that took place at the Site facility building are not available. The following sections describe general examples of common photographic processes. Processes undertaken at the Site during its use as a photographic development facility are likely to have been the same as or similar to the processes discussed hereafter.

In general, photographic processing consists of producing a visible black and white or color image by applying a series of chemical solutions and wash waters to a silver halide-sensitized material. Current photographic development practices employ over 20 different processes with

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variations in solution chemistry and treatment sequence. As stated in the preceding paragraph, specific processes used at the Site facility building are not known.

Process wastewater from photographic processing commonly contains large amounts of silver, cyanide, and chromium. Silver results from the processing of silver-halide-sensitized photographic materials. Cyanide and chromium result from bleaches that are commonly used in photographic processing. Cadmium, the result of additional development practices, is also found in photographic processing wastewater. The observed presence of cadmium in photographic wastewater is statistically smaller than that of silver, cyanide, or chromium, but still regarded as a significant quantity.

Ion exchange or reverse osmosis systems are commonly used for recovery of silver for after-fix wash wastewater. Mr. Donahue has stated that silver was recycled at the Site facility building. He also stated that ferrous sulfate treatment was used to reduce the amount of cyanide in photographic process wastewater.

3.2.1. Black and White Photograph Development

Black and white film or paper consists of a base material or substrate that is coated with a light-sensitive emulsion. Silver halide crystals are spread evenly throughout the emulsion. When the emulsion is exposed to light, electrons are ejected from the halide ions. Crystal imperfections or other chemicals trap these "free electrons." The electrons attract positively charged free silver ions in crystal lattice-forming clusters of metallic silver at the trap sites. These clusters of silver form a latent image of the original light exposure pattern. During processing, the developer solution causes additional silver to be attached at the cluster site to the image (chemical amplification). The film image then undergoes further chemical treatment to stabilize the image and to remove excess chemicals. Chemicals and their uses in the development of black and white photographs are:

Chemical	Use
Silver halide	Emulsion
Hydroquinone and metol or phenidone	Developing agent
Sodium hydroxide or sodium carbonate or borax (sodium tetraborate)	Activator
Sodium sulfite or potassium metabisulfite	Preservative
Potassium bromide or benztriazole	Restrainer
Acetic acid	Short Stop
Sodium or ammonium thiosulfate	Fixer

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Sodium bisulfite or potassium metabisulfite	Neutralizer
Potassium aluminum sulfate or potassium chromium sulfate	Hardener

3.2.2 Color Photograph Development

Unmodified silver halide emulsions are sensitive to only a limited range of wavelengths, including the blue-violet region of the visible spectrum, ultraviolet, and shorter wavelengths. However, the inclusion of certain organic dyes in the emulsion can extend sensitivity to longer wavelengths through the visible spectrum into the infrared and can increase emulsion sensitivity to a particular region of the visible spectrum. Color films have three separate light-sensitive emulsion layers. After inclusion of the appropriate dyes, these layers record images of the blue light components, the green light components, and the red light components on first, second, and third layers respectively.

The commonly used color photographic materials are color negative films; color reversal films; color print films; and color print papers. The three basic color development processes are negative, reversal with couplers in the emulsion, and reversal with coupler in the developers.

Chemicals and their uses in the development of color photographs are:

Chemical	Use
Silver halide	Emulsion
Diethylpara-phenylene diamine salt	Developer
Hydroxlamine hydrochloride	Fog restrainer
Acetic acid and/or sodium acetate	Developer removal agent
Ferricyanide bleach	Film bleaching agent
Formalin and sodium carbonate solution	Hardener

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4. 0 SAMPLING AND ANALYSIS ACTIVITIES

4.1 Purpose of Investigation

The purpose of this Phase II investigation is to acquire enough information to characterize the Site for evaluation under NMED VRP performance standards. Soil samples will be collected to assess soil conditions in areas of the Site with exposed soil (or areas now covered with asphalt/concrete believed to have been formerly exposed during building operations). Ground water samples will be collected from selected Geoprobe® soil borings (completed along the Site boundaries) to assess any impacts that the site may have had on local ground water quality.

4.2 Sampling and Analysis

The sampling and analysis section of this Work Plan includes the following activities:

- Soil sample collection and analysis;
- Ground water sample collection and analysis.

4.2.1 Soil Boring Installation and Continuous Soil Sampling

DE&S will advance 12 Geoprobe® soil borings in the following locations at the Bell Trading Post property (Figure 2). These locations were selected from a sampling grid of all open areas (not covered by the Site building):

- Two (2) near the northeastern corner of the Site (adjacent to the gravel alley);
- One (1) near the northwestern corner of the Site (adjacent to the intersection of Roma Avenue and Laguna Boulevard);
- One (1) near the northern end of the adjacent apartment building (adjacent to the eastern side of the Site building);
- Five (5) in the southwestern corner area of the Site (adjacent to the western side of the Site building); and
- Three (3) along the southern side of the Site building (adjacent to the north side of Central Avenue NW).

Prior to initiating soil boring, DE&S will contact New Mexico One-Call Systems, Inc., and all local utility companies to determine the locations of underground utilities.

In order to minimize the cost for disposal and decontamination of soil cuttings, DE&S recommends that direct-push methods (i.e. Geoprobe®) be used for the soil borings completed as part of this assessment. A subcontractor will be utilized to conduct the exploratory boring advancement and sampling program. The subcontractor will be under the direct supervision of

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the DE&S representative and will conduct the subsurface sampling program using a truck-mounted Geoprobe® soil investigation unit. The Geoprobe® utilizes a rotary hammer mounted on a hydraulic ram that, in conjunction with the weight of the vehicle, advances a 2-inch, threaded, hollow-probed steel tube into the subsurface. Soil and ground water samples can be extracted at discrete intervals using various down-hole tools in conjunction with the Geoprobe®.

If the Geoprobe® is not capable of penetrating the subsurface materials, then a drilling rig utilizing a hollow-stem auger drilling and sampling method will be used to complete the project. Use of a hollow-stem auger drilling rig would indicate a change in the Scope of Work and associated costs. NMED will be notified immediately if hollow-stem auger drilling is required to discuss project options and to determine how to proceed. It should be noted that Geoprobe® drilling practices have previously been successful in close proximity of the Bell Trading Post property.

The DE&S Standard Operating Procedures (SOP) for the direct-push soil boring advancement and subsurface soil sampling are included in Appendix B of this SOW.

Soil samples will be collected continuously from the ground surface to the terminal depth of each boring (ranging from approximately 4- to 25-feet). All soil borings will be completed to an approximate depth of 4-feet below ground surface (bgs), with the exception of soil borings SB-01, SB-03, SB-04, and SB-12, which will be completed to depths of approximately 25-feet bgs (suspected local ground water contact). The DE&S geologist will produce a lithologic log of each soil boring. The soil cuttings will be described in accordance with Unified Soil Classification System (USCS). Descriptions of the soil cuttings will include lithologic type, minerals present, color, particle size range, particle angularity, density, plasticity, particle sorting, moisture content, and structure.

Each soil boring will be abandoned by pouring bentonite pellets or chips into the vacant soil boring, then hydrating the bentonite using potable water.

Each soil sample collected will be screened in the field for VOCs using a photoionization detector (PID) via heated headspace technique. The NMED USTB SOP for heated headspace reading collection is included in Appendix C of this Work Plan. The PID will be equipped with an 11.7 ionization potential electron volt lamp that provides the sensitivity necessary to identify VOCs suspected to be present in site soils. The PID provides screening of ionizable organic compound concentrations in air and gives a direct readout in ppm. The PID determines the concentration of total ionizable VOCs, but does not differentiate between specific compounds. The operational range of the PID is 0 to 2,000 ppm, with a minimum instrument detection of 0.1 ppm. Soil samples collected for PID headspace screening will be placed in a laboratory pre-cleaned glass jars, and the jar openings will be sealed with aluminum foil. The soil samples will be allowed to reach ambient temperature either by placement in the sun and/or a warm-water bath. After the soil sample has been at ambient air temperature for approximately 10 minutes, the tip of the PID will be inserted into the jar by piercing the aluminum foil, and the reading returned will be recorded in the field notebook or appropriate field form.

In each of the 4-feet deep soil borings, a soil sample will be collected from the 0 to 2-feet bgs interval and the 2- to 4-feet bgs interval. All of the shallow soil samples (the 0 to 2-feet bgs

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interval) collected from each soil boring will be submitted for laboratory analysis. If metals are detected in any of these soil samples (0 to 2-feet bgs intervals) above normal background levels, then the associated deeper soil sample (the 2- to 4-feet interval) from the same soil boring will be analyzed by the laboratory in order to assess the potential for leaching at the Site.

Each of the deeper soil borings (SB-01, SB-03, SB-04, and SB-12) may also be sampled at the 0 to 2-feet bgs and 2- to 4-feet bgs intervals (if the soil boring is located in an area where additional coverage of surface soils is needed; in areas where the results may be useful for comparison as background soil samples; and/or if the soil borings are located in areas of exposed soil where potential releases might have occurred). In addition, any soil samples exhibiting a significant PID reading, soil staining, and/or odor will be considered for laboratory analysis.

In addition, a maximum of three of the soil samples will be submitted for analysis of soil geotechnical properties (parameters to be used in a potential site-specific risk analysis). These samples will be selected based upon lithology type. The geotechnical soil samples will only be analyzed if Site soil samples submitted for analytical analysis indicate the presence of metals or other contaminants of concern. Each of the three selected geotechnical soil samples will be submitted for the following soil geotechnical parameters: dry bulk density (ASTM Method D2937-94), porosity (ASTM Method D854), volumetric water content/moisture content (ASTM Method D2216-92), fractional organic carbon content in soil (ASTM Method 2974), and sieve analysis (or soil gradation analysis).

Each soil sample selected for laboratory analysis will be placed in glass jar with a Teflon™-lined lid, labeled with the location, time, and date of collection, sampler's name, and required analyses. The soil samples selected for laboratory analysis will be immediately placed in a cooler filled with ice for delivery to the contract laboratory. Standard chain-of-custody procedures will be adhered to throughout the investigation.

All drilling equipment used for boring advancement will be steam-cleaned prior to drilling to remove oils, chemicals, and soil. All soil boring equipment will also be steam cleaned between locations to eliminate the possibility of cross contamination between two borings. Sampling tools will be decontaminated between each use, using established protocols. Equipment decontamination procedures are outlined in Appendix D of this Work Plan.

4.2.2 Ground Water Sample Collection

Four of the Geoprobe® soil borings (SB-01, SB-03, SB-04, and SB-12) will be completed to a depth of approximately 25-feet bgs (suspected local ground water contact). Ground water samples will be collected at these locations. Two of these ground water samples will be collected near the northeastern corner of the Site, one ground water sample will be collected from the southeastern corner of the Site, and one ground water sample will be collected from near the northwestern corner of the Site.

The locations of the proposed ground water sample collection points are shown in Figure 2. These locations were chosen based on their proximity to the Site property corners and current local ground water flow direction (to the east, southeast).

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Each ground water sample will be collected from each Geoprobe® soil boring by constructing a mini-well. The mini-well will be constructed of 1.0 inch-diameter schedule 40 PVC casing. The lower 5-feet of the casing will be slotted (0.01 inch). Polyethylene tubing will then be placed inside the casing and ground water will be removed from the Geoprobe® soil boring using a peristaltic pump. The mini-well casing and polyethylene tubing will be discarded after use by the drilling subcontractor.

All ground water samples collected for laboratory analysis will be analyzed for those parameters outlined in Section 4.5 of this Work Plan.

4.3 Quality Assurance

QA/QC samples for the soil samples will consist of field duplicates and decontaminated equipment blanks. A duplicate is obtained by collecting two samples at one sampling location and labeling one sample as the primary sample name and the other as a field duplicate. The time of collection should be left off the sample container label and chain-of-custody (COC) so that the analytical laboratory does not have an indication of which sample is the field duplicate. In addition, one equipment blank per day will be collected. The equipment blanks will be analyzed in the same manner as the primary samples.

QA/QC ground water samples will be collected at a minimum frequency of 5 % (or 1 for every 20 samples) and will include duplicate samples, field blanks, and equipment rinsate blanks. There will be one trip blank per cooler shipment, if samples are collected for VOA analyses. The field blank sample will be collected by pouring deionized water through the air into a sample container at the Site. The rinsate sample will be collected after decontamination of the equipment by pumping deionized water through the sampling pump or sampling device. Trip blanks will be provided in the sample cooler and accompany the samples from the Site to the contract laboratory. Trip blank samples will only be analyzed if unusual or unexpected laboratory results are identified in the primary samples.

The selected laboratory's QA/QC Plan will be followed, which should require matrix spike and method blank samples to be run at frequencies dictated by laboratory certification requirements. The analytical laboratory will have State- and EPA-certifications for conducting the specific analytical methods.

4.4 Data Evaluation

DE&S will complete a final report describing the work completed at the Site, including the following:

- Any additional information concerning Site conditions discovered during completion of the Phase II Investigation;
- A summary of the historical background of the Site;
- A complete description of the technical approach and field methods used during field activities;

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- A complete description of the results of the field investigation tasks;
- All field forms and field notes taken during the investigation;
- A risk assessment for potential exposures to contaminated soil and ground water at the Site, using the Tier I approach specified in the "Technical Background Document for Development of Soil Screening Guidelines" (NMED 2000). This is equivalent to a Method 2 assessment specified in 20 New Mexico Administrative Code (NMAC) 6.3 Subpart I Section 110 of the VRP Regulations;
- DE&S conclusions and recommendations.

4.5 Laboratory Analysis

Table 1 outlines the laboratory analysis for the soil samples and ground water samples collected from the Geoprobe® soil borings. All soil and ground water samples will be analyzed for these parameters.

Table 1. Soil and Ground Water Sample Analysis
Bell Trading Post Property Work Plan

Chemicals Potentially Used at the Site	Sample Matrix	Analysis	Number of Samples*	EPA Method Number(s)
Sodium cyanide, sodium carbonate	Ground Water	Sodium	5	200.7
Sodium cyanide, potassium cyanide, potassium ferricyanide	Soil/Ground Water	Cyanide	13 soil/5 gw	335.4
Potassium cyanide, potassium tetraborate, potassium bromide, potassium aluminum sulfate, potassium chromium sulfate, potassium ferrycyanide	Ground Water	Potassium	5	200.7
Calcium sulfate	Ground Water	Calcium	5	200.7
Potassium bifluoride	Ground Water	Fluoride	5	340.1
Sodium carbonate	Ground Water	Carbonate	5	300.0
Sulfuric acid, calcium sulfate, potassium aluminum sulfate, potassium chromium sulfate	Ground Water	Sulfate	5	300.0
Ammonia hydroxide	Ground Water	Ammonia	5	350.2
Metals	Soil/Ground Water	NWQCC Metals**	13 soil/5 gw	6010
Zinc	Soil/Ground Water	Zinc	13 soil/5 gw	6010
Mercury	Soil/Ground Water	Mercury	13 soil/5 gw	7470/7471A
Sulfuric Acid	Soil/Ground Water	Acid/Base (pH)	13 soil/5gw	150.1 gw 9045 soil
Nitrates	Ground Water	Nitrate - Nitrite	5	353.2
Hydrogen peroxide	Ground Water	Dissolved Oxygen	5	Field Meter

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Table 1. Soil and Ground Water Sample Analysis (Continued)
Bell Trading Post Property Work Plan

Chemicals Potentially Used at the Site	Sample Matrix	Analysis	Number of Samples*	EPA Method Number(s)
N/A	soil	Fractional Organic Carbon	4	2974
N/A	soil	Sieve Analysis	4	D422-63
N/A	soil	Specific Gravity	4	D2932-94
N/A	soil	Moisture Content	4	D2216-92
N/A	soil	Bulk Density	4	D2937-94
N/A	soil	Dry Sieve Analysis	4	D422-63

Notes:

* - This is a minimum number of samples for analyses. Additional samples may be collected based upon field screening criteria.

** - NMWQCC Metal analyte list includes: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury (total), Selenium, Silver, Copper, Iron, Manganese, and Zinc.

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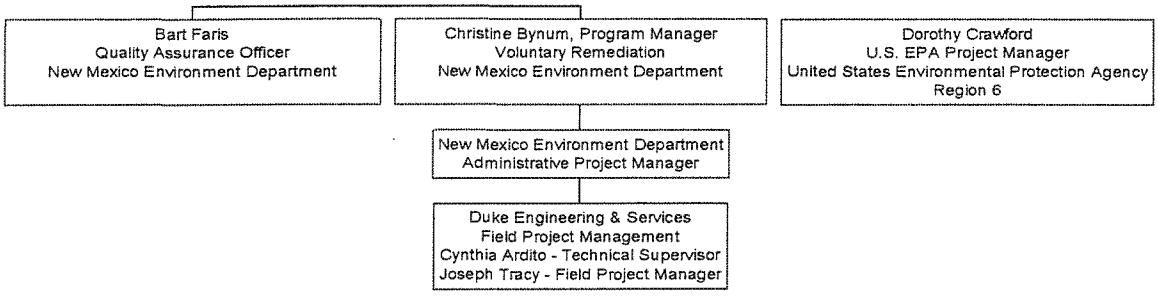
4.6 Investigation Derived Waste

A plan to address the issue of investigation derived waste (IDW) produced during the implementation of this Work Plan is included in Appendix E.

4.7 Project Organizational Chart

The project organizational chart for the Site is outlined below.



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5.0 DELIVERABLES AND SCHEDULE FOR COMPLETION OF WORK

The only deliverable for this project is a final report describing the technical approach, the field sampling/investigation, and results of sample analytical analysis. Included with the final report will be conclusions and recommendations for additional work (if determined warranted).

- **Approval and Finalization of Work Plan** **Week 0 - Week 2**
- NMED Development of QAPP Week 2 - Week 4
- Complete Field Work Week 4 - Week 6
- Draft Final Report Week 6 - Week 8
- NMED Review and Comment Period Week 8 - Week 10
- **Submittal of Final Report** **Week 10 - Week 12**

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6.0 DISCUSSION OF HOW PROPOSED ACTIVITES COMPLY WITH THE VOLUNTARY REMEDIATION PERFORMANCE STANDARD

The VRP allows for the completion of a risk assessment to address potential risks associated with site contaminants and to determine when compliance with VRP Performance standard is met (20 NMAC 6.3, Subpart I, Section 110B) (NMED, 1999a). A risk assessment will address human exposures to Site contaminants in soil and ground water resulting from previous Site use. The risk assessment will be conducted by comparing historical and current soil and ground water concentrations as an initial step. When background concentrations are exceeded, the average soil and individual ground water concentrations shall be compared to New Mexico Soil Screening Guidance (NMSSG) and New Mexico Water Quality Control Commission (WQCC) standards, respectively (where applicable). If comparison results indicate noncompliance with the NMSSG and WQCC standards, then a site-specific risk assessment and targeted removal actions may be undertaken as a later stage of work, as approved by NMED.

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FIGURES

APPENDIX A

HEALTH AND SAFETY PLAN

Health and Safety Plan for Phase II Investigation Activities at the Bell Trading Post Property, Albuquerque, New Mexico

Prepared for:

New Mexico Environment Department
Voluntary Remediation Program
1190 St. Francis Drive, Santa Fe, NM 87502-1190

Prepared by:

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October 2001

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1.0 INTRODUCTION

This Health and Safety Plan (HSP) establishes guidelines and requirements for the safety of personnel during the performance of the field activities associated with this project. The specific activities addressed by this plan are defined in Section 4.0. All employees of Duke Engineering & Services (DE&S) and its subcontractors involved in this project are required to abide by the provisions of this plan.

The health and safety guidelines and requirements presented are based on a review of available information and an evaluation of potential hazards. This HSP outlines the health and safety procedures and equipment required for activities at this site. This is a dynamic document. In the event that the contents of this HSP need to be changed, site personnel shall be informed of the change or changes and shall then be responsible for abiding by the protocol of those revisions. The Project Manager, the Project Health and Safety Officer, or the Site Safety Officer (SSO) may modify this plan in response to additional information obtained regarding the potential hazards to personnel and conditions at the site. Consultation between the Project Manager and a Health and Safety Officer is recommended before establishing HSP modifications.

2.0 POLICY

DE&S considers the prevention of illness, injury, and accidents in the workplace to have greater importance than any other facet of the work. Safety shall always take precedence over expediency or shortcuts, and every attempt shall be made to reduce the possibility of injury, illness, or accident occurrence. All site activities assigned under a subcontract or purchase order issued shall be conducted in accordance with the established safety regulations of the Occupational Safety and Health Administration (OSHA), and other applicable Federal, State, County, and City regulations. All personnel, including DE&S subcontractors, lower tier subcontractors, consultants, and service personnel, who perform any task in relation to site activities or are visitors to the drilling site(s) shall adhere to the provisions of these requirements.

3.0 KEY PERSONNEL

Program Manager: Cindy Ardito, (505) 246-1600 ext. 206

For this project, the Program Manager has the following responsibilities:

- supervise the preparation and implementation of an approved HSP for this program;
- ensure that the project is performed in a manner consistent with the HSP; and
- ensure compliance with the HSP by DE&S and subcontractor personnel.

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Project Manager: Joseph Tracy, (505) 246-1600 ext. 219

The Project Manager has the authority to take the following actions:

- suspend field activities if the health and safety of personnel are endangered, pending further consideration by the Project Health and Safety Officer or the SSO; and
- suspend an individual from field activities for infractions of the HSP, pending further consideration by the Project Health and Safety Officer or the SSO.

Project Health and Safety Officer: Patricia Johnson (505) 246-1600 ext. 220

The Project Health and Safety Officer has the following responsibilities:

- interface with the Project Manager as required in matters of health and safety;
- develop an HSP for the project and to submit it to the Project Manager for approval;
- appoint or approve a SSO to assist in implementing the HSP;
- monitor compliance with the approved HSP;
- assist the Project Manager in seeing that proper health and safety equipment is available for the project; and
- approve personnel to work on this site according to appropriate medical monitoring and health and safety training.

The Project Health and Safety Officer has the authority to take the following actions:

- suspend work or otherwise limit exposure to personnel if the HSP appears to be unsuitable or inadequate;
- direct personnel to change work practices if they are deemed to be hazardous to health and safety of personnel; and
- remove personnel from the project if their actions or condition endangers their health and safety or the health and safety of co-workers.

Site Safety Officer: Joseph Tracy (505) 246-1600 ext. 219

The SSO has the following responsibilities:

- direct health and safety activities on site;

- report safety-related incidents or accidents to the Project Manager and the Project Health and Safety Officer;
- assist the Project Manager in all aspects of implementing the HSP; and
- maintain health and safety equipment on site, as specified in the HSP.

The SSO has the authority to take the following actions:

- suspend field activities if the health and safety of personnel are endangered, pending further consideration by the Project Manager and the Project Health and Safety Officer; and
- suspend an individual from field activities for infractions of the HSP, pending further consideration by the Project Manager and the Project Health and Safety Officer.

4.0 SITE ACTIVITIES

DE&S has been contracted by the New Mexico Environment Department (NMED), Voluntary Remediation Program (VRP) to complete a Phase II environmental site investigation at the Bell Trading Post Property in Albuquerque, New Mexico. The Site consists of approximately 2.5 acres near Old Town Albuquerque and is bounded to the south by Central Avenue, on the north and northeast by Roma Avenue, on the northwest by Fifteenth Street, to the east by an apartment complex and a vacant business, and to the west by Laguna Boulevard. This Health and Safety Plan relates to using direct push technologies (Geoprobe®, etc.), to advancing 19 soil borings, to continuously collecting soil samples, and to collecting ground water samples. The project has the following objectives:

- Vertically delineate of site soils by collection of soil samples continuously at each soil boring location;
- Characterize site ground water quality;
- Continuously sample all soil borings for lithologic characterization; and
- Identify possible contaminant sources previously not known.

Potential activities that are likely to involve direct contact with wastes or potentially contaminated materials include:

- field screening of soil samples;
- handling of cuttings from soil borings;

- transporting contaminated soil;
- decontaminating equipment;
- collecting soil samples;
- collecting ground water samples through tubing; and
- preparing soil and ground water samples for shipment.

5.0 HAZARD ASSESSMENT

An assessment of the hazards has been made for each of the activities specified in Section 4.0.

The following hazards have been identified:

- physical hazards associated with equipment used by the drilling contractor(s) including augers, drill rig, steam cleaner, shovels, and hand tools;
- physical hazard associated with heat stress;
- physical hazards associated with lifting heavy items;
- physical hazards associated with electrical connections;
- physical hazards associated with above or below ground utility lines;
- biological hazards related to insect and reptile bites;
- biological hazards related to Hantavirus from contact with rodent excrement;
- chemical hazard associated with inhalation of organic vapors and/or inorganic contaminants and dust during drilling, well installation, and soil and ground water sampling activities;
- chemical hazard associated with skin and eye contact with organic and/or inorganic contaminants; and
- chemical hazard associated with ingestion of organic and/or inorganic contaminants.

All on-site personnel and site visitors shall be made aware of and protected against the potential hazards listed above.

5.1 Physical Hazards

There is a potential on site of physical injury resulting from contact with direct push technology soil boring advancement equipment including operating push rods, tools, winches, and mechanical equipment operating at eye level. Field personnel shall be aware of these hazards and take steps to avoid them. Use of steel-toed boots and safety glasses shall be required when on the site. Hard hats shall be worn at all times when on site. Personnel shall be cognizant of the fact that when protective equipment such as respirators, gloves, and protective clothing are worn, visibility, hearing, and manual dexterity are impaired.

In addition to the physical hazards listed above, the protective equipment required for some activities (respirators) places a physical strain on the wearer. Heat exhaustion and/or stroke are possible, especially during warm weather. The Heat Stress Casualty Prevention Plan specified in Appendix A shall be implemented to deal with this serious health hazard. The plan outlines heat stress identification, treatment, prevention, and monitoring. Fluids shall be provided on site to maintain the body fluid levels of field personnel.

Many activities associated with direct push soil boring advancement involve lifting or moving of heavy equipment or items including steel drill rods, soil, drums, etc. Site personnel should employ safe lifting practices and should avoid moving heavy items without assistance of mechanical equipment and/or fellow teammates.

Use of electronic equipment and rechargeable meters present exposure to potential electrical shock. Electrical shock may be avoided by maintaining safe work practices around electrical equipment and connections.

During fieldwork activities underground utilities may be encountered. Local utility companies shall be notified prior to fieldwork and shall be requested to mark any line locations on the ground.

The drilling contractor shall perform drilling activities tasks in accordance with the established safety regulations of the Occupational Safety and Health Administration (OSHA) and all other Federal, State, County, and City regulations. Contractors shall follow their own written health and safety plan for drilling activities, specific to the site or general. The DE&S SSO or Project Safety Officer shall approve the contractor's HSP prior to the initiation of excavation activities.

5.2 Biological Hazards

Numerous types of pest organisms may be present at the site. Bees, spiders, wasps, rodents and/or poisonous reptiles may be present at the site. Field personnel are encouraged to avoid exposing hands or other body parts to cool dark areas where these pests are known to dwell. Additionally, exposure to the Hantavirus from contact with rodents and rodent excrement should be avoided at all times. Areas where visible

evidence of rodent activity exist are to be strictly avoided. Agitating dried rodent urine or droppings greatly increases the potential for exposure to the Hantavirus.

5.3 Chemical Hazards

Personnel and site visitors may be exposed to chemical hazards through four routes of exposure: inhalation, ingestion, skin contact, and eye contact.

There may be several potential chemical hazards at this site, primarily hydrocarbons, chlorinated solvents, and related waste products. Exposure to significant concentrations of contaminants could occur during field activities at this site. The inhalation pathway shall be monitored, as necessary, using a photoionization detector (PID) or flame ionization detector (FID). Air monitoring shall provide the information necessary to determine the appropriate level of PPE and appropriate times for establishing or maintaining exclusion zones and contaminant reduction zones. Refer to Section 7.0 for additional details on the air monitoring protocol.

Ingestion of chemical hazards shall be controlled on this site by prohibiting eating, smoking, and drinking in the Exclusion Zone (refer to Section 6.2 for definitions of work zones), and by requiring all field personnel to decontaminate themselves upon leaving the Exclusion Zone.

Skin and eye contact with chemical hazards can cause serious burns, rashes, or irritations. All field personnel shall report any skin or eye contact symptoms to the SSO so a physician can treat personnel and steps can be taken to eliminate similar exposures.

The best assurance of protection against hazardous chemicals is avoidance. Whenever possible, site personnel shall avoid contact with contaminated (or potentially contaminated) surfaces and walk around suspect liquids and discolored soils or substances. Workers shall not kneel or place equipment on potentially contaminated ground, and shall stay away from known waste whenever possible.

If contact is unavoidable in order to perform a required task, potential hazards are minimized by using appropriate PPE to protect against exposure to toxic materials. PPE to protect the body against contact with known or anticipated chemical hazards has been divided into four levels by the EPA (Levels A, B, C, and D) according to the degree of protection afforded.

At this site, the levels of protection selected for activities specified in Section 4.0 are:

Level D – for site workers not expected to come in direct contact with contaminated soil (screening soil, operating drilling equipment, logging of soil borings, preparing samples for shipment, etc.) or

Modified Level D – for site workers who shall come in direct contact with contaminated soil (handling of soil cuttings or well development fluids, equipment decontamination, and sample collection).

These levels of protection were selected because respiratory hazards are not expected. Air monitoring shall be conducted during the drilling activities, and the level of PPE shall be upgraded to Level C if levels of organic vapors exceed the action levels established (Section 7.0). Requirements for Level D, Modified Level D, and Level C are provided below.

The following PPE is required for Level D Protection:

- coveralls or appropriate work clothes;
- steel-toe boots;
- safety glasses or chemical splash goggles;
- hard hat.

Workers who come in direct contact with contaminated soil and/or ground water shall use Modified Level D PPE. Modified Level D PPE shall be used if there is a danger of chemical hazard from skin contact but no respiratory hazard (as determined by air monitoring). The following PPE is required for Modified Level D Protection:

- Nitrile gloves (outer);
- steel-toe boots;
- safety glasses or chemical splash goggles to be worn at all times at this site;
- hard hat.

It is anticipated that all tasks shall be conducted using level D PPE. The following description is provided in the event that the site conditions require that the PPE be upgraded to Level C. Respirators are required when air monitoring indicates a total organic vapor concentration in excess of 10 ppm (see Section 7.0 for discussion of air monitoring). The following PPE is required for Level C protection:

- MSHA/NIOSH approved full-face air-purifying respirator with organic vapor/particulate cartridges;
- Nitrile outer gloves;
- steel-toe boots;
- hard hat.

6.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

Safety equipment and PPE are discussed in this section so protection of the head, eyes, skin, feet, and respiratory system can be better understood. The SSO has the authority to make PPE exceptions for site personnel if he/she deems it in the best interest of the field personnel's well being. Such a PPE exception (i.e., modification to the HSP) shall be based on site specific information such as air monitoring data, visual observation, and weather data/observation. One example of such a modification to the HSP would be to decrease the use of respirators, hard hats, or inadequately ventilated clothing if heat stress is a primary concern during site activities and the use of the PPE was intended for a low-risk precaution. Under no circumstances shall the SSO make a PPE exception/modification if personnel shall be without the protection needed to be safe or to properly protect their health. If it appears that proposed PPE is inadequate site work shall be suspended until new PPE or planning allow personnel to work safely.

6.1 Safety Equipment

In addition to the PPE listed below, the following general safety equipment shall be available: OSHA-approved first-aid kit, fire extinguishers, eye wash, insect repellent/treatment, rinse water, and decontamination water. Table 1 provides a checklist for the health and safety equipment.

6.2 Head Protection

Hard hats shall be worn whenever overhead objects are present or if otherwise required.

6.2.1 Eye Protection

All personnel working on site shall wear safety glasses. Additionally, when personnel are performing activities where the potential exists for increased exposure due to splash, dust, or vapor, etc., safety goggles, face shields, or full-face masks shall be worn.

6.2.2 Skin Protection

Site personnel shall be required to wear disposable, chemically resistant clothing if highly contaminated soil (as defined by the New Mexico Environment Department – Underground Storage Tank Bureau) or phase-separated petroleum hydrocarbons are encountered during soil boring activities and/or soil and ground water sampling. This PPE shall be disposed of at the decontamination station after each use or when they become worn or punctured. The suit materials selected shall be resistant to all known or anticipated chemicals at the site. If the disposable protective suits appear to be

deteriorating under chemical action, the SSO shall be notified. The seams between the sleeves and gloves and the pant legs and boots shall be taped to prevent exposure in these areas.

6.2.3 Footwear

Personnel engaged in field activities at the site shall wear steel-toed boots at all times. The site-specific HSP or the SSO may also require footwear to be chemical resistant.

6.2.4 Respiratory Protection

Inhalation hazards may be present due to excessive organic vapor concentrations or dust generated, during fieldwork tasks. Inhalation hazards may occur during activities associated with handling contaminated soil, and drilling. To protect against known or possible inhalation hazards field personnel shall use respiratory protection when deemed necessary by the SSO or when air monitoring indicates vapor concentrations exceed action levels set forth in Section 7. The Respiratory Protection Program is included in Appendix B.

Many inhalation hazards can be overcome by the use of an appropriate respirator. A full-face respirator with organic/inorganic vapor and particulate air-purifying cartridges is usually sufficient to protect against inhalation hazards associated with site investigations or remedial activities. Personnel shall have current medical clearance, fit testing specific to their respirator, and respiratory training to qualify for respirator use at the site. The SSO shall have proof of a successful fit test for each anticipated respirator user. To ensure a proper fit, no facial hair shall be allowed that interferes with mask operation. The SSO shall determine whether facial hair represents such interference. Respirators shall be inspected and positive and negative pressure fit checks shall be made before use to verify fit and proper operation. Proper cleaning, inspection, and storage are very important to proper respirator use.

6.3 Work Zones

To minimize the movement of contaminants from the site to uncontaminated areas, three work zone areas are established as needed at sites where investigation and/or remediation activities are performed. The work zone areas may be revised as contaminant data is collected at the site. The three work zones include the following:

Zone 1: Exclusion Zone

Zone 2: Contamination Reduction Zone

Zone 3: Clean Zone

Exclusion Zone – The Exclusion Zone is the zone where contamination does or could occur. All persons entering this zone shall wear the level of protection set forth in Section 5.0, *Hazard Assessment.* These level-of-protection guidelines are based on the different types of field activities.

Contamination Reduction Zone – Between the Exclusion Zone and the Clean Zone is the personal Contamination Reduction Zone, which provides a transition zone between the contaminated and clean areas of the site. This zone shall be located directly outside the Exclusion Zone. All personnel shall decontaminate in the Reduction Zone when leaving the Exclusion Zone. The following steps, some of which are not applicable to Level D PPE, shall be taken for personnel decontamination:

- deposit equipment that needs to be decontaminated on plastic drop cloths;
- wash boots and outer gloves with long-handled brushes in a plastic wash tub containing detergent water;
- rinse boots and outer gloves with long-handled brushes in a plastic wash tub containing clear water, or use a sprayer to rinse off boots and gloves if one is available;
- remove tape and place in drum for disposal;
- remove disposable outer gloves and place in drum for proper disposal;
- remove suit and, if disposable, place in drum for disposal;
- remove respirator and place in plastic for subsequent decontamination;
- remove inner gloves and place in drum for disposal; and
- wash hands and face.

Contaminated liquids and clothing from the decontamination area shall be contained in drums and stored at the drum storage area at the site.

Cleaning equipment and supplies shall be provided and used to decontaminate reusable equipment. Equipment decontamination procedures are addressed in the Work Plan.

Clean Zone – The Clean Zone shall be an uncontaminated area from which operations shall be directed. It is essential that contamination from the site be kept out of this area.

6.4 Medical Examination/OSHA Training

Before commencing any of the field activities defined in Section 4.0, all DE&S personnel shall have proof of their current participation in the DE&S monitoring program. Subcontractors involved in hazardous field activities shall provide for medical examinations for their employees. Records of proof of medical examination shall be provided to DE&S by subcontractors and maintained in the project files.

All personnel on site shall be 40-hour OSHA HAZWOPER trained. Proof of certification shall be available on site. A copy of employees' certificates shall be kept in a file on site during work activities and in the project file in the office after the field activities are completed.

6.5 Site Manager Notification

All field personnel shall inform the Site Manager or his/her designated representative before entering the site. If any previously unidentified potential hazards are discovered during any fieldwork, personnel shall notify the Site Manager and SSO for further instructions.

6.6 Project Safety Meetings/Compliance Agreement

A safety meeting shall be conducted by the SSO at the start of each field effort, and thereafter, at the beginning of each day, as appropriate, due to changing field conditions or the start of new tasks. Safety concerns associated with that day's activities shall be discussed. An attendance record (refer to Appendix C for health and safety forms) shall be kept for all safety meetings.

During the first safety meeting or prior to commencement of fieldwork, all personnel shall be provided with a copy of this HSP. Personnel shall be given the opportunity to review the plan and ask any questions. All personnel working on site shall sign a Compliance Agreement stating that they have read and understood the HSP requirements. Signed Compliance Agreement Forms (Appendix C) shall be collected by the SSO and placed in the project file. Individuals refusing to sign the form shall not be allowed to work on the site.

Project safety information shall be recorded in a field logbook. As appropriate, safety information shall include the following:

- names of all DE&S, subcontractor, and visitor personnel;
- dates and times for entry and exit of all personnel at the site;
- lists of all accidents, injuries, illnesses, and incidences of safety infractions;

- air quality and personal exposure monitoring data; and
- other information related to safety matters.

All accidents, illnesses, and/or other incidents shall be reported immediately to the Site Manager, the SSO, and/or the Project Health and Safety Officer.

6.7 Prohibitions

The following activities are prohibited at the site:

- smoking, eating, drinking, chewing gum or tobacco, and storing food or food containers in the Exclusion or Contamination Reduction Zones;
- approach or entry into areas or spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment available to enable safe entry; and
- unauthorized entry into confined spaces.

Field personnel shall practice good personal hygiene to avoid ingesting contaminants or spreading contaminated materials.

6.8 Site Visitors

Visits involving entry to the site by persons not directly involved in tasks identified in the Work Plan are discouraged. Persons designated as Site Visitors shall be briefed by the DE&S SSO as to on-site procedures, conditions, and hazards and shall be required to sign the project safety log before entering the site. Site Visitors shall be accompanied by authorized DE&S personnel at all times while on site and shall be expected to follow all directives from the SSO. Site Visitors shall provide their own PPE required for the area that they are visiting and shall be expected to follow all applicable procedures and protocols.

7.0 AIR QUALITY MONITORING

Due to the potential presence of volatile organic compounds at the site, air monitoring shall be conducted for organic vapors during the field investigations. Monitoring with a PID shall be conducted, as needed, during soil and ground-water sampling. The PID shall be used to establish background levels at the site prior to initiation of waste handling activities. The PID readings shall be used in conjunction with information about known or suspected contaminants at the site to determine what level of protection is required. All PID readings shall be recorded on an Air Monitoring Log form located in Appendix C or in the field logbook.

A PID shall be used to detect trace concentrations of volatile organic vapors in the breathing zone. PIDs are most sensitive to aromatic hydrocarbons, aliphatic amines, and chlorinated hydrocarbons. Carbonyl and unsaturated hydrocarbons, ammonia, and the heavier parrafins (C_5-C_7) can also be detected, but with a lesser degree of sensitivity.

An action level of 10 ppm shall be used to determine when Level C protection shall be employed. The time-weighted average for petroleum (crude oil) is 500 ppm. Ten (10) ppm shall be employed as a conservative action level to prevent unnecessary inhalation of potentially harmful vapors. The following guidelines shall be used:

PID breathing zone readings for Total Organic Vapors:

8-hour TWA* (time-weighted average)..... 10 ppm
Maximum Acceptable Ceiling..... 50ppm

*Do not exceed the 8-hour TWA limit without notifying Program Manager.

PID Reading	Action
0 to 10 ppm	remain in Level D or Modified Level D as appropriate
> 10 ppm	stand down and prepare to go to Level C
> 25 ppm	discontinue work; notify Project Manager and Health & Safety Officer

When organic vapors are being released at a site, personnel shall position themselves upwind, whenever practical. If any personnel experience difficulty in breathing (a possible signal of high vapor concentrations or an oxygen deficient atmosphere), the area shall be immediately evacuated and the SSO shall be notified.

8.0 LABORATORY CONSIDERATIONS

The laboratory directors or contacts shall be informed of any contaminant levels in the samples that would require special handling procedures to prevent risks to the health and safety of laboratory personnel.

9.0 CONFINED SPACE ENTRY

A confined space is a space that by design has limited openings for entry and exit, unfavorable natural ventilation that could contain or produce dangerous air contaminants, and is not intended for employee occupancy without the proper training and procedures. If any confined spaces are encountered, they are not to be entered and shall be reported to the SSO.

10.0 SHIPPING OF SAMPLES

Any shipping of samples from the site shall be done in accordance with the DE&S Standard Operating Procedures (SOP) for the Shipment of Hazardous Materials. A member of the DE&S Shipping Steering Committee shall be contacted if questions arise concerning the specific shipping procedure applicable.

11.0 EMERGENCIES/ACCIDENTS

11.1 On-Site Personnel and Visitors

Illnesses, injuries, and accidents occurring on site shall be attended to immediately in the following manner:

- check the accident scene to determine if you or anyone else is in danger;
- call the emergency phone number (911) if the emergency or accident appears serious). Emergency numbers are listed in Table 2;
- begin care for the injured or exposed person(s) by removing them from immediate danger if a neck or back injury is not suspected;
- render minor first aid as necessary; decontaminate affected personnel as necessary;
- evacuate other personnel on site to a safe place until the SSO determines that it is safe for work to resume;
- report the accident to the Site Manager, the Project Health and Safety Officer, and the SSO immediately;
- complete an Incident Investigation Report for all near misses and all injuries requiring medical attention;
- collaborate with the Project Health and Safety Officer, the SSO, and the Project Manager to develop procedures to prevent a recurrence.

Should an emergency site evacuation become necessary for any reason, the SSO shall alert all personnel to leave the site. The offsite assembly point shall be designated as the eastern gate to the Patrol Yard. Personnel shall not return to the site until an all-clear notification has been received from the SSO.

11.2 Surrounding Community

In the highly unlikely event that a site emergency has the potential to affect the community surrounding the site, the SSO shall be responsible for notifying the police and the fire departments using the telephone numbers listed in Table 2. The SSO shall provide whatever technical assistance is needed by these agencies.

12.0 REFERENCES

U.S. Code of Federal Regulations, 1995, Title 29, as cited.

TABLES

Duke Engineering & Services
A Duke Energy Company

Table 1
Site Health and Safety Equipment Inventory Checklist

EMERGENCY RESPONSE
☐ OSHA-APPROVED INDUSTRIAL FIRST AID KIT ☐ FIRE EXTINGUISHER (1 per field vehicle) ☐ EYE WASH
PERSONNEL PROTECTION
☐ INSECT REPELLENT ☐ SAFETY GLASSES ☐ NITRILE GLOVES (Outer) ☐ LATEX DISPOSABLE GLOVES (Inner) ☐ CHEMICAL-RESISTANT COVERALLS (TYVEK™)/POLYCOATED TYVEK™ (SYRANAX™) ☐ IGLOO™ WATER COOLER/CUPS ☐ GATORADE™ ☐ RESPIRATORS (half-face and/or full face) ☐ DUCT TAPE ☐ STEEL-TOED RUBBER BOOTS ☐ HARD HAT
PERSONNEL DECONTAMINATION
☐ 4-MIL PLASTIC DROP CLOTHS ☐ PLASTIC WASHTUBS ☐ SPRAYER ☐ BRUSHES ☐ TRASH BAGS ☐ DETERGENT ☐ POTABLE OR DISTILLED WATER

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Table 2
Emergency Phone Numbers

EMERGENCY SERVICE	LOCATION OR NOTE	TELEPHONE NO.
Fire Department	Call Emergency No.	911
Sheriff Department	Call Emergency No.	911 or (505) 242-COPS
Ambulance	Call Emergency No.	911
Hospital	Call Emergency No.	911
Poison Control Center	Call Emergency No.	911 or (505) 272-2222

ROUTE TO HOSPITAL:

HOSPITAL: Name: St. Joseph Medical Center (24-hour emergency available)

Address: 601 Dr. Martin Luther King Jr. Ave NE

Hospital Phone Number: (505) 727-8000 (non-emergency)

Emergency Room Phone Number: (505) 727-8142

ROUTE: East on Central Avenue to Broadway Boulevard.

North (left) on Broadway to Dr. Martin Luther King Jr. Avenue NE.

East (right) on Dr. Martin Luther King Jr. Avenue NE to St. Joseph's Hospital (601 Dr. Martin Luther King Jr. Avenue NE). Entrance is on north (left) side of street.

Total distance to hospital: 2.0 miles

Total driving time: 5 minutes

ROUTE MAP: Included as Health and Safety Plan Appendix D.

Duke Engineering & Services
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Health and Safetey Plan

Appendix A

Heat Stress Casualty Prevention Plan

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HEALTH AND SAFETEY PLAN

APPENDIX A

HEAT STRESS CASUALTY PREVENTION PLAN

The increase in ambient air temperature and decreased body ventilation caused by protective outerwear creates an increased potential for injury, specifically, heat casualties. Site personnel shall be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and the prevention of heat stress casualties.

A. IDENTIFICATION AND TREATMENT

1. Heat Exhaustion

a. Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, has clammy skin, and may perspire profusely. The pulse is weak and fast, and breathing is shallow. Victim may faint unless lies down. This may pass, but sometimes it remains and death could occur.

b. First Aid: Immediately remove the victim to Zone 2, Contamination Reduction Zone, in a shady or cool area with good air circulation. Remove all protective outerwear. Call the facility emergency number. Treat the victim for shock (lie victim down, raise victim's feet 6-12 inches and keep victim warm, but loosen all clothing). If the victim is conscious, it may be helpful to give sips of a salt-water solution (one teaspoon of salt to one glass of water). Transport victim to a medical facility as soon as possible.

2. Heat Stroke

a. Symptoms: This is the most serious of heat casualties due to the fact that the body overheats excessively. Body temperatures often are between 107 and 110° F. First, there is often pain in the head, dizziness, nausea, and the skin is dry, red, and hot. Unconsciousness follows quickly and death is imminent if exposure continues. The attack shall usually occur suddenly.

b. First Aid: Immediately evacuate the victim to a cool and shady area in the Contamination Reduction Zone. Lay the victim on back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be done by applying cold wet towels or ice bags to the head. Sponge off the bare skin with cool water or rubbing

alcohol, if available, or even place victim in a tub of cool water. The main objective is to cool the victim without chilling. Give no stimulants. Transport the victim to a medical facility as soon as possible.

B. PREVENTION OF HEAT STRESS

1. One of the major causes of heat casualties is the depletion of body fluids. Personnel shall replace water and salt loss from sweating. Salts can be replaced by either a 0.1% salt solution, more heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes are advised for personnel on low sodium diets.

2. A work schedule shall be established so that the majority of the work shall be performed during the hours of the day when ambient air temperature levels are not at their highest levels.

3. A work/rest guideline shall be implemented for personnel required to wear Level C protection. The maximum wearing time guidelines are as follows:

Ambient Temperatures	Maximum Wearing Time
Above 90° F	½ hour
80 - 90° F	1 hour
70 - 80° F	2 hours
60 - 70° F	3 hours
50 - 60° F	4 hours
40 - 50° F	5 hours
30 - 40° F	6 hours
Below 30° F	8 hours

A sufficient period shall be allowed for personnel to "cool down." This may require shifts of workers during operations.

C. HEAT STRESS MONITORING

For monitoring the body's recuperative ability under excess heat, one or more of the following techniques shall be used as a screening mechanism.

Heart rate (HR) shall be measured by monitoring the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period shall be shortened by 10 minutes (or 33%), while the length of the

rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle shall be shortened by 33%.

Body temperature shall be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99° F. If it does, the next work period shall be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the OT exceeds 99.7° F at the beginning of the next period, the following work cycle shall be further shortened by 33%. OT shall be measured again at the end of the rest period to make sure it has dropped below 99° F.

Monitoring of personnel wearing protective clothing shall commence when the ambient temperature is 70° F or above. Frequency of monitoring shall increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80° F, workers shall be monitored for heat stress after every work period.

Ideally, body fluids shall be maintained at a constant level during the workday. This requires replacement of salt lost in sweat as well.

Good hygienic standards shall be maintained by frequent changes of clothing and daily showering. Clothing shall be permitted to dry during rest periods. Persons who notice skin problems shall immediately consult medical personnel.

Health and Safety Plan

Appendix B

Respiratory Protection Plan

Duke Engineering & Services
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HEALTH AND SAFETY PLAN

APPENDIX B

RESPIRATORY PROTECTION PLAN

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HEALTH AND SAFETY PLAN

APPENDIX B

RESPIRATORY PROTECTION PLAN

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1.0 INTRODUCTION

1.1 Purpose

The purpose of these guidelines is to establish the basic requirements for a Duke Engineering & Services Respiratory Protection Program. This program will serve to protect employees from respiratory hazards, and comply with regulatory requirements.

1.2 Scope

To minimize/eliminate occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished, when feasible, by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used according to this program.

This program applies to all workers who use respirators.

1.3 Duties And Responsibilities

The Program **Manager** has the following duties and responsibilities:

- Manage the process.
- Designate a program administrator.
- Communicate expectations.
- Support implementation of the program.
- Correct any program deficiencies identified.

The Program Administrator has the following duties and responsibilities:

- Integrate program components.
- Ensure ongoing program review.
- Evaluate overall program effectiveness.
- Keep abreast of current issues.
- Keep management informed of program status.

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The **Respirator User** has the following duties and responsibilities:

- Properly use respirators.
- Prevent damage to respirators.
- Maintain training, medical, and fit-test requirements.
- Notify supervision of medical conditions or physical changes that affect medical clearance or respirator fit.
- Exit the contaminated work area and remove respirator if breathing difficulty or respirator malfunction occurs.
- Perform positive and negative pressure fit-check each time the respirator is donned.

2.0 SELECTING RESPIRATORS

2.1 Approval

The National Institute for Occupational Safety and Health (NIOSH) Department of Health and Human Services (DHHS) administers a testing, approval, and certification program for respirators. The program's purpose is to ensure the availability of safe, effective respiratory protection. When selecting respirators:

- Use only NIOSH/DHHS-approved respirators. Approved respirators can be recognized by the NIOSH/DHHS approval label and identification number (TC-XXX-XXX).
- Verify approval by using the NIOSH Certified Equipment List and the approval label.

Note: Any unauthorized modifications to the respirator or use of unapproved parts voids the existing respirator approval.

2.2 Respirator Types and Classes

Respirators can be divided into 2 broad categories.

- **Air Purifying Respirators**

  These respirators use filters or cartridges to remove the contaminant(s) from the surrounding air.

  The filters and cartridges have limited capabilities to remove contaminants and must be replaced periodically. Air-purifying respirators should not be used for protection against vapors or gases with poor warning properties, and cannot be used in oxygen-deficient atmospheres.

- **Atmosphere-Supplying Respirators**

  These respirators provide breathing air from a source independent of the surrounding atmosphere. The air may be supplied from a compressor and an air line or from a compressed-air cylinder. Atmosphere-supplying respirators typically provide a higher protection factor for personnel, but are bulkier and limit activities.

NIOSH certifies a range of classes and types of respirators. The selection of the appropriate respirator for a specific activity is based on:

- Type and properties of respiratory hazard
- Worker activities

- Location and nature of the hazardous area/process
- Respirator use conditions
- Physical characteristics and limitations of respirators
- Assigned protection factors

2.3 Defining Hazards

1. Identify potential contaminant(s).
2. Assess existing or anticipated exposure level and properties of the contaminants(s).

   Acceptable methods include:

   - exposure monitoring
   - direct reading instruments
   - calculations
3. Determine whether the contaminant(s):
   - Can be absorbed through the skin
   - Is an eye or skin irritant
   - Has adequate warning properties (gases and vapors)
4. Determine whether an oxygen deficiency exists.

2.4 Minimum Respiratory Protection for IDLH Atmospheres

An atmosphere is **immediately dangerous to life and health** (IDLH) when it poses an immediate threat to life, causes irreversible health effects, or impairs an individual's ability to escape. The table below lists minimum respiratory protection for situations classified as IDLH.

Hazard	Respirator
IDLH	Self-contained breathing apparatus (SCBA) or combination supplied air with auxiliary SCBA **Note:** When employees enter an IDLH atmosphere, a standby person (s) with pressure-demand SCBA and other needed rescue and communication equipment must be available.
Oxygen deficiency	SCBA or combination supplied air with auxiliary SCBA
Emergency Situations	SCBA or combination supplied air with auxiliary SCBA
Fire-fighting	▪ Interior fires—SCBA ▪ Exterior fires—Determined by fire brigade captain **Note:** For interior firefighting, at least two employees in constant visual or voice contact and at least two employees located outside the IDLH area are required.

2.5 Selecting Respirator for Toxic Contaminants

Note: For a further definition of the selection process, see "Minimum Respirator Protection IDLH Atmospheres" in Section 2.4.

1. After identifying the toxic contaminant(s) in the area, determine whether exposure limits have been published by OSHA, ACGIH, or NIOSH.

2. Is the contaminant concentration less than the applicable exposure limits?

   a. If **no**, proceed to step 3.

   b. If **yes**, respiratory protection is not required.

3. Divide the measured or estimated concentrated by the exposure limit to obtain a hazard ratio: if multiple contaminants are present, determine whether:

   a. Contaminants' effects are additive.

   b. Concentrations should be combined for determining the hazard ratio.

4. Select a respirator with an assigned protection factor greater than the hazard ratio.

   Notes:

   See "Assigned Protection Factors" in Section 2.6.

   For OSHA substance-specific standards, use the regulation-defined protection factor.

5. Use an air-supplied respirator for protection from gases or vapors with inadequate warning properties.

6. When an air-purifying respirator is used for protection from gases and vapors, use a cartridge/canister end-of-service-life indicator (ESLI) or filter change-out schedule.

   Useful information in determining change-out schedules:

   - Physical state of the contaminant(s)
   - Airborne concentration of contaminant(s)

- Manufacturer's data on absorption of the specific contaminant or mixture of contaminants
- Length of time the work task is expected to last

Note: The concentration must be below the canister/cartridge's maximum-use concentration. If the contaminant concentration is above the IDLH level, follow the table in " Minimum Respiratory Protection for IDLH Atmospheres" in section 2.4 of this respiratory protection plan.

7. Select filters/cartridges as follows:

Contaminants	Filter
Fumes, asbestos, lead, inorganic arsenic, etc	High-efficiency particulate filters/P-100 filters
Dusts	▪ P-95/99/100 ▪ N-95/99/100 ▪ R-95-99/100
Paints	Combination organic vapor and P-100 filters
Pesticides	Combination organic vapor and P-100 filters
Organic vapor, ammonia, and acid gases	Organic vapor or chemical filters
Radionuclides	▪ High efficiency filers/P-100 filters ▪ Radionuclies canister

While the chart above focuses on the use of high-efficiency particulate P-100 filters, this does not prevent the use of other NIOSH-approved filters where they have been determined to provide adequate protection from the contaminant

2.6 Assigned Protection Factors

Caution: Use regulator-based protection factors for substance-specific standards such as arsenic, asbestos, cadmium, and lead.

Type of Respirator	Half Mask	Full Face	Helmet Hood	Loose Fitting
Air purifying	10	100		
Powered air purifying	50	1,000	1,000	25
Air line continuous flow	50	1,000	1,000	25
Air line pressure demand	50	1,000		
SCBA		10,000		

2.7 Selection Process

The table below lists respiratory selection criteria for IDLH atmospheres.

Situation	Respirator
Firefighting (interior)	SCBA
Oxygen deficiency, emergencies, IDLH	SCBA or combination or supplied air with auxiliary SCBA

3.0 APPROVING, ISSUING, AND RETURNING RESPIRATORS

1. Issue respirators only to workers with current medical clearance, fit testing, and respiratory training.

2. Issue only the respirator with which a worker has been successfully fit-tested.

3. Do not approve or issue respirators with face pieces to individuals with facial hair that may interfere with the face-to-facepiece seal or valve function.

4. Respirators should be inspected before use.

5. Positive and negative pressure fit-checks should be made before use to verify fit and proper operation.

6. Do not leave respirators unprotected in contaminated work areas during breaks or intermittent use.

7. Return issued respirators to the designated collection point after each use for proper cleaning, inspection, and storage.

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4.0 INSPECTING RESPIRATORS

1. Before and after each use, inspect routinely used respirators to detect physical damage and functional problems.

2. For respirators **not** routinely used (emergency escape and rescue devices), inspect before putting into service, after each use, at least monthly.

3. For emergency-use respirators, document the inspection with a recording including.

   - Date
   - Inspector's name
   - Findings
   - Remedial action
   - Means of identifying the respirator (e.g., serial number)

4. Include the following checks in the respirator inspection:

Component	Inspection Required
Respirator connections	Check tightness of the connections
▪ Facepiece ▪ Valves ▪ Head straps ▪ Filter, cartridge, or canisters ▪ Connecting tubes ▪ Harness assemblies ▪ Electrical components ▪ Air line and fittings	Examine to detect: ▪ Dirt ▪ Cracks ▪ Tears ▪ Loss of elasticity ▪ Missing clamps and gaskets ▪ Incorrect assembly

5. For SCBAs, inspect the components listed in the table above and ensure:

   a. Regulator and warning devices function properly.

   b. Cylinder is fully charged.

6. Follow any additional inspections required by the manufacturer.

Note: For more information on inspections, see "Appendix C. Detailed Inspection Checklist" of this respiratory protection plan.

5.0 MAINTAINING RESPIRATORS

1. Ensure only trained and experienced personnel maintain and repair respirators.
2. Ensure all replacement parts are supplied by the manufacturer or designed specifically for the respirator being repaired.
3. Ensure only the manufacturer or manufacturer-trained technicians adjust and repair reducing or admission valves, regulators, and alarms.
4. If minor defects are identified, repair the respirator on the spot, and return it to service.
5. Remove from service any equipment with major defects, and replace it until repairs can be made.
6. **Never use defective equipment under ANY circumstances.**

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6.0 CLEANING AND DISINFECTING RESPIRATORS

1. To protect respirator users, **clean and disinfect respirators after each use** (including unassigned respirators and respirators used for fit-testing).

   Exception: For respirators assigned exclusively to one person, clean and disinfect as often as necessary to maintain in a sanitary condition. The respirator must be clearly identified for that individual's exclusive use.

2. To clean the respirator:

   a. Remove these components:

      1) Filters, cartridges, canisters

      2) Motors and valve assemblies

      3) Components recommended by the manufacturer

   b. Disassemble the facepiece according to manufacturer's instructions.

   c. Use a commercial washer, or manually clean respirators with detergent.

   d. To prevent damage to the respirators, keep the water temperature for cleaning and rinsing at or below 110°F.

   e. Disinfect the respirator in a commercial disinfectant approved by the respirator manufacturer, following manufacturer's instructions, or by immersing for 2 minutes in a 50 ppm bleach solution (1 milliliter bleach per liter water) or a 50 ppm iodine solution (.8 milliliter tincture of iodine per liter water).

      Notes:

      If tuberculocidal-level (TB-level) disinfection is desired, use 500 ppm bleach solution or commercially available TB-level disinfectant.

      Wet-wiping the respirator surface is not disinfection; respirators must be immersed in the disinfection solution or commercial washers must be used to apply the disinfection solution.

   f. Thoroughly rinse the respirator.

g. To prevent damage, carefully air-dry or use a commercial unit to dry the parts

h. If commercial dryers are used, keep the air temperature below 110°F.

i. Inspect parts and re-assemble respirator.

j. Test the respirator.

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7.0 STORING RESPIRATORS

1. Store cleaned and sanitized respirators in sealed plastic bags.
2. Store respirators where they will not be subject to damage from:
   a. Dust
   b. Heat
   c. Cold
   d. Sunlight
   e. Excessive moisture
   f. Chemicals
3. Do not store respirators on their facial-sealing surfaces.
4. Store full-face respirators with straps either inside the face pieces or so that the facial-sealing surface is not distorted.
5. Periodically rotate respirator stock to ensure all respirators are being used.
6. Ensure the canister shelf life has not expired.
7. Store emergency-use respirators in compartments or covers clearly marked for emergency use.

8.0 MEDICAL EVALUATIONS

1. Before employees use respirators, ensure that they are medically cleared by a physician or licensed health-care professional (PLHCP), such as a nurse under a physician's direction.

2. For employees using respiratory protective equipment, perform repeat medical evaluations at 1-, 2-, or 3-year intervals as determined by a physician.

3. Perform **additional** medical evaluations if:

   - An employee reports a sign or symptom related to ability to use a respirator.
   - The PLHCP, supervisor, or respirator program administrator determines an employee needs reevaluation.
   - It is a programmatic requirement, or as a result of an observation during fit-testing, or identified program deficiency.
   - A change in workplace conditions results in a substantial increase in the physiological burden on an employee.

4. Include any of the following in a medical determination:

   - Any limitations, including whether or not an employee is medically able to wear a respirator
   - The need, if any, for follow-up evaluations
   - A statement that the PLHCP has provided the employee with the PHLCP's written recommendation
   - When a Powered Air Purifying Respirator (PAPR) is medically acceptable in lieu of a negative-pressure respirator

5. Ensure the medical examination includes physiological and psychological factors that could impact the respirator user.

6. Ensure the physical evaluation considers:

   - Facial deformities
   - Hearing impairment
   - Pulmonary function

- Evidence of uncontrolled neurological or cardiovascular disease

7. Before respirator clearance is granted, ensure a PLHCP has reviewed and certified all respiratory medical evaluations.

8. Before respiratory clearance is granted, ensure a PLHCP has:

   - Type and weight of respirators to be used
   - Duration and frequency of respirator use (including rescue and escape)
   - Expected physical work effort
   - Additional protective clothing and equipment to be worn
   - Temperature and humidity extremes that may be encountered
   - Copy of the Respiratory Protection Program and OSHA Respiratory Protection Standard

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9.0 TRAINING

9.1 Requirements

9.1.1 Respirator Users

1. Annual training shall ensure an employee can demonstrate understanding of the following:

   a. Why respirator protection is required

   b. Nature, extent, and effects of the hazards

   c. Respirator operation, capabilities, and limitations

   d. Donning/doffing techniques

   e. Hazard-specific respirators

   f. Inspection, general maintenance, and storage of respirators

   g. Respirator-user responsibilities

   h. Effect of poor engineering controls

   i. Regulations on respirator use

   j. Emergency situations

   k. Who to contact for questions

Note: If using SCBAs, train users on the above plus basic operating principles and pre-operated checks.

2. During training, ensure users:

   a. Handle the respirator.

   b. Have the respirator properly fitted.

   c. Ensure a proper face-to-face piece seal by performing a positive and negative pressure fit- check.

d. Wear respirators in normal air for a suitable familiarity period (5 minutes).

e. Wear respirators in a test atmosphere.

Note: Respirators used during fit testing must be disinfected according to the guidelines in "Cleaning and Disinfecting Respirators" in Section 6.0.

9.1.2 Instructor

1. Instructor qualifications shall be evaluated, usually through the training quality control process for instructors.

2. An instructor must understand every facet of the Respiratory Protection Program.

3. An instructor must have both theoretical knowledge and hands-on experience with respirators.

Note: Technical knowledge/experience can be obtained via a NIOSH-equivalent respiratory protection class or on-the-job experience with the respirator program.

10.0 FIT-TESTING

10.1 General Requirements

1. To ensure respirators adequately fit their users, test all users of tight-fitting respirators, using qualitative or quantitative fit-tests as follows:

   Qualitative Fit tests. Use and agent (banana oil, saccharin, irritant smoke, Bitrex) detected by odor or taste. The results of a qualitative fit-testing are pass or fail.

   Quantitative Fit tests. Measure the concentration of the challenge agent both inside and outside the respiratory. To determine a fit factor, use the ratio of the concentration outside to inside mask.

2. Perform fit testing before initial use and at least annually.

3. If the respirator user, supervisor, medical, or program administrator notices any of the following before the next scheduled fit-test, immediately inform supervision and repeat the fit-testing:

   a. Obvious weight change

   b. Significant facial scarring in the area of the face piece seal

   c. Significant dental changes

   d. Reconstructive or cosmetic surgery

   e. Any condition interfering with a face piece sealing

10.2 Testing procedure

The basic steps for fit-testing are similar for qualitative and quantitative fit-tests. For detailed fit-Protocol. See the OSHA Respiratory Protection Standard.

1. Use sufficient number of models and sizes to ensure proper fit. (One model or size of respirator may not accommodate all facial structures.)

2. If facial hair interferes with the face-to-face respirator seal, do not fit-test.

3. If contact lenses or spectacle inserts are to be used with full-face respirators, the user shall wear the lenses or inserts with the respirator during fit-testing.

4. Select a comfortable respirator; respirator comfort is critical to user acceptance.

5. Perform positive and negative pressure fit-checks.

6. If the respirator fails, re-adjust fit; if it still does not pass, select another respirator.

7. Perform the test exercises (see "Appendix D. Respiratory Fit-Test Exercises" of this respiratory protection plan.

8. If respirator fails:

   a. Terminate the test.

   b. Repeat steps 4-7 with a different model or size of the respirator.

9. Maintain records of the test including:

   a. Names of test subject and test conductor

   b. Testing date

   c. Specific respirator selected (model, manufacturer, and size)

   d. Test method

   e. Test results

11.0 BREATHING-AIR SYSTEMS

1. Ensure breathing air meets the grade D requirements of Compressed Gas Association's Commodity specifications G-7.1-1989.

2. Periodically (e.g. quarterly) sample breathing-air systems using direct reading instruments, calorimetric tubes, or laboratory analysis to verify at least Grade D air quality.

Note: See the ANSI/CGA commodity specification for air

3. Supply breathing air from cylinders or air compressors.

4. Test and maintain cylinders according to 49 CFR 173&178.

5. Situate compressor intakes so as to prevent entrance of contaminated air.

6. Provide suitable in-line sorbent beds and filters, and tag the compressor with most recent change date and signature.

7. Equip breathing-air systems with alarms that indicate low pressure, overheating, and elevated carbon-monoxide levels.

8. Monitor carbon-monoxide concentrations.

9. Ensure breathing-air couplings are incompatible with other gas systems.

10. If breathing-air cylinders are purchased from vendors:

    a. Evaluate the vendor quality-control program.

    b. Obtain a certificate of analysis verifying air of every cylinder has been tested.

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12.0 DISPOSABLE RESPIRATORS

1. Where respiratory protection is required, disposable respirators (e.g., dust masks) are subject to all of the requirements of the Respiratory Protection Program.

2. Where respirator use is not required, disposable may be used voluntarily by an employee. For the voluntary use of dust masks, the following conditions must be met:

   - An exposure evaluation determines that no respiratory hazard exists and therefore no respiratory protection is needed.
   - Use of the dust mask will not in itself create a hazard.
   - The information package titled "Information for Employees Using Respirators" (OSHA standard 29CFR 1910.134, Appendix D) is read.

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13.0 SITE-SPECIFIC INFORMATION

1. With the program, include site-specific information and procedures that include detailed information on selecting, issuing, using (including activity/area), returning, and caring for respirators.

2. Ensure specific location contacts are identified.

3. Ensure exposure evaluation data is complete and current.

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14.0 EVALUATING THE PROGRAM

14.1 Ongoing Evaluation

The program administrator monitors the effectiveness of the Respiratory Protection Program on an ongoing basis to ensure that the program components are properly integrated and implemented.

14.2 Periodic Evaluation

1. Periodically (e.g., annually) perform a detailed evaluation of the overall respirator program effectiveness.

2. Ensure the evaluation:

   a. Focuses on regulatory requirements (e.g., training), consultation with employees, process design, and component implementation

   b. Ensures the program is up to date and responsive to current risks

   c. Determines whether significant facility condition changes affect respirator usage

RESPIRATORY PROTECTION PLAN

APPENDIX A. SITE-SPECIFIC INFORMATION

Program Administrator/Site Contact:

_____

Procedure for selecting and issuing respirators:

_____
_____
_____
_____
_____
_____
_____

Caring for respirators:

_____
_____
_____
_____
_____
_____
_____
_____

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Work tasks requiring respiratory protection:

Task/Area	Respirator Type/Cartridge (if applicable)

Exposure Assessment Information:

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RESPIRATORY PROTECTION PLAN

APPENDIX B. SELECTING TASK-SPECIFIC RESPIRATORS

The types of respirators indicated below must be worn for each of the identified contaminants unless a safety and health evaluation has determined that other personal protective equipment or respiratory protection is acceptable. Although selected based on experience, respirators must be periodically evaluated to ensure that conditions have not changed and that the respirator selected is still appropriate.

Contaminant/Task	Respirator
▪ Diatomaceous earth ▪ Caustic Soda	Full-face air purifying with type P-100 filters
Brush painting with paints *Exception: Isocynates, methylene chloride, glycol ethers*	Air purifying with organic vapor filters
Chlorine cylinder changeout	SCBA
Concrete grinding	Air purifying with type P-100 filters
Dusty coal handling operations	Air purifying with type P-100 filters
Formaldehyde	Air purifying with formaldehyde filters
▪ Grass cutting/mowing ▪ Sweeping inert dusts	Voluntary use of disposable dust mask is acceptable
Insulation work/asbestos	Air purifying with type P-100 filters task-dependent, ; contact Safety/IH
Insulation work/nonasbestos	Air purifying with type P-100 filters
Lead processes generating dust and fumes	Air purifying with type P-100
Mercury	Half-face air purifying with mersorb filters, belt-mounted

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Contaminant/Task	Respirator
Organic solvents *Exceptions: methylene chloride and glycol ethers (Except spraying penolene)*	Air purifying with organic vapor filters
Oxygen-deficient atmospheres (<19.5%)	SCBA air line with auxiliary SCBA
Radiological hazards	Contact Radiation Safety Officer
Sandblasting	Type C supplied air with blasting helmet
Spray painting with pigments	Air purifying with combination organic vapor and type P-100 filters
Spray painting with pigments	Air purifying with organic vapor with type N/R95 prefilter and cover to prevent rapid clogging of paint aerosols
Welding or grinding galvanized metal	Air purifying with type P-100 filters
Welding, grinding, or plasma and air arcing in unventilated area	Air purifying with type P-100 filters *Note: Select spark-resistant filters.*

Note: While the chart above focuses on the use of high-efficiency particulate P-100 filters, this does not prevent the use of other NISOH-approved filters where they have been determined to provide adequate protection from the contaminant.

RESPIRATORY PROTECTION PLAN

APPENDIX C. DETAILED INSPECTION CHECKLIST

Air-Purifying Respirators

Examine the following:

Facepiece:

- Excessive dirt
- Cracks, tears, holes, or distortion from improper storage
- Inflexibility
- Cracked or badly scratched lenses in full-facepieces
- Incorrectly mounted facepiece lens
- Broken or missing mounting clips
- Cracked or broken air-purifying element holder, worn threads or missing gaskets

Head straps or head harness:

- Breaks
- Loss of elasticity
- Broken or malfunctioning buckles and attachments
- Excessively worn serration on the head harness which might permit slippage

Exhalation valve:

- Foreign material (e.g., detergent residue, dust particles, hair under the valve seat)
- Cracks, tears, or distortion in the valve material
- Improper insertion of the valve body in the facepiece

- Cracks, breaks or chips in the valve body particularly in the sealing surface
- Missing or defective valve cover
- Improper installation of the valve in the valve body

Air-purifying elements:

- Incorrect cartridge, canister, or filter for the hazard
- Incorrect installation, loose connections, missing or worn gaskets, or cross threading in the holder
- Expired shelf-life date on cartridges or canister
- Cracks or dents in outside case of filter, cartridge, or canister
- Evidence of prior use of sorbent cartridge or canister, indicated by absence of sealing material, tape, foil over inlet

Corrugated breathing tube (if applicable):

- Broken or missing end connectors, gaskets, or o-rings
- Missing or loose hose clamps
- Deterioration, determined by stretching the tube and looking for cracks

Harness/gas mask (if applicable):

- Damage to the canister holder which may prevent its being held securely in place
- Broken harness straps or fastening

Atmosphere-Supplying Respirators

Tight-Fitting Face pieces

Examine the following:

Face piece:

- Excessive dirt
- Cracks, tears, holes, or distortion from improper storage
- Inflexibility
- Cracked or badly scratched lenses in full-facepieces
- Incorrectly mounted facepiece lens
- Broken or missing mounting clips
- Cracked or broken air-purifying element holder, worn threads or missing gaskets

Headstraps or head harness:

- Breaks
- Loss of elasticity
- Broken or malfunctioning buckles and attachments
- Excessively worn serration on the head harness which might permit slippage

Exhalation valve:

- Foreign material (e.g., detergent residue, dust particles, hair under the valve seat)
- Cracks, tears, or distortion in the valve material
- Improper insertion of the valve body in the facepiece
- Cracks, breaks or chips in the valve body particularly in the sealing surface
- Missing or defective valve cover
- Improper installation of the valve in the valve body

Corrugated breathing tube (if applicable):

- Broken or missing end connectors, gaskets, or o-rings
- Missing or loose hose clamps
- Deterioration, determined by stretching the tube and looking for cracks

Harness/gas mask (if applicable):

- Damage to the canister holder which may prevent its being held securely in place
- Broken harness straps or fastening

Hood, Blouse, or Full Suit

Examine the following:

- Hood, blouse, or full suit for rips, tears, and seam integrity
- Protective headgear for general condition
- Protective face shield for cracks, breaks, or impaired vision
- Abrasive blasting hoods to ensure the protective screen is intact and secured correctly

Air Supply System

Examine the following:

- Integrity and good conditions of air-supply lines and hoses
- Correct hose, hose length, and fittings
- Correct operating pressure for respirator
- In-line couplings incompatible with outlets for other gases
- Correct operation and condition of all regulators, valves, and flow regulators
- Air quality that meets Grade D designation
- Compressor intake location
- Compressor alarms indicating compressor failure

SCBAs

Examine the following:

- Fully charged cylinder (90%)
- Properly functioning regulator and warning devices
- High pressure hose connection tight at bottle
- Bottle condition (cuts, dents, scorch marks)
- O-ring condition
- Hydrostatic test in date
- Air quality that meets Grade D designation

RESPIRATORY PROTECTION PLAN

APPENDIX D. RESPIRATORY FIT-TEST EXERCISES

Upon completion of the protocol, the test conductor should question each test subject regarding the comfort of the respirator. If it has become unacceptable, try another model of a respirator. Do not adjust the respirator once the fit exercises begin. Any adjustment voids the test, and the fit-test must be repeated.

At a minimum, the following exercises are required:

1. Normal breathing. In a normal standing position, without talking, the subject should breathe normally for one minute.

2. Deep breathing. In a normal standing position, the subject should breathe slowly and deeply taking caution so as not to hyperventilate, for one minute.

3. Turning head side to side. Standing in place, the subject should slowly turn his/her head from side to side between the extreme positions on each side. The head should be held at each extreme momentarily so the subject can inhale at each side. Test exercise should be performed for one minute.

4. Moving head up and down. Standing in place, the subject should slowly move his/her head up and down for one minute. The subject should be instructed to inhale in the up position (when looking toward the ceiling).

5. Talking. For one minute, the subject should talk out loud slowly and loudly enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

6. Grimace. This test subject should grimace by smiling or frowning for **15 seconds**.(This applies only

   to Quantitative Fit-Test (QNFT) testing; it is not performed for Qualitative Fit-Test (QLFT).)

7. Bending over. The test subject should bend at the waist as if he/she were to touch his/her toes. Jogging in place should be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist. Test exercises should be performed for one minute.

Health and Safety Plan

Appendix C

Health and Safety Field Forms

HEALTH AND SAFETY PLAN
COMPLIANCE AGREEMENT FORM

I have read the _____ Health and Safety Plan and agree to comply with the guidelines and requirements for the safety of personnel.

_____

Name

_____

Company

_____

Signature

_____

Date

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SAFETY MEETING ATTENDANCE FORM

Page _____ of _____

DATE:_____ PROJECT NO.:_____

PROJECT TITLE:_____

PROJECT TASK:_____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment	_____	Emergency Procedures	_____
Chemical Hazards	_____	Hospital	_____
Physical Hazards	_____	Special Equipment	_____
Mobile Phone	_____	Other_____	

ATTENDEES

NAME (PRINTED)	SIGNATURE
_____	_____
_____	_____
_____	_____

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Meeting Conducted by:

Name Printed	Signature

Duke Engineering & Services
A Duke Energy Company

SITE PERSONNEL ACKNOWLEDGMENT

By signing the following I acknowledge that I have read, understood, and agree to comply with the provided site specific Health and Safety Plan.

Printed Name/Affiliation	Signature	Date

SITE VISITOR LOG

Date	Time In/Out	Name	Organization	Purpose of Visit

AIR MONITORING LOG

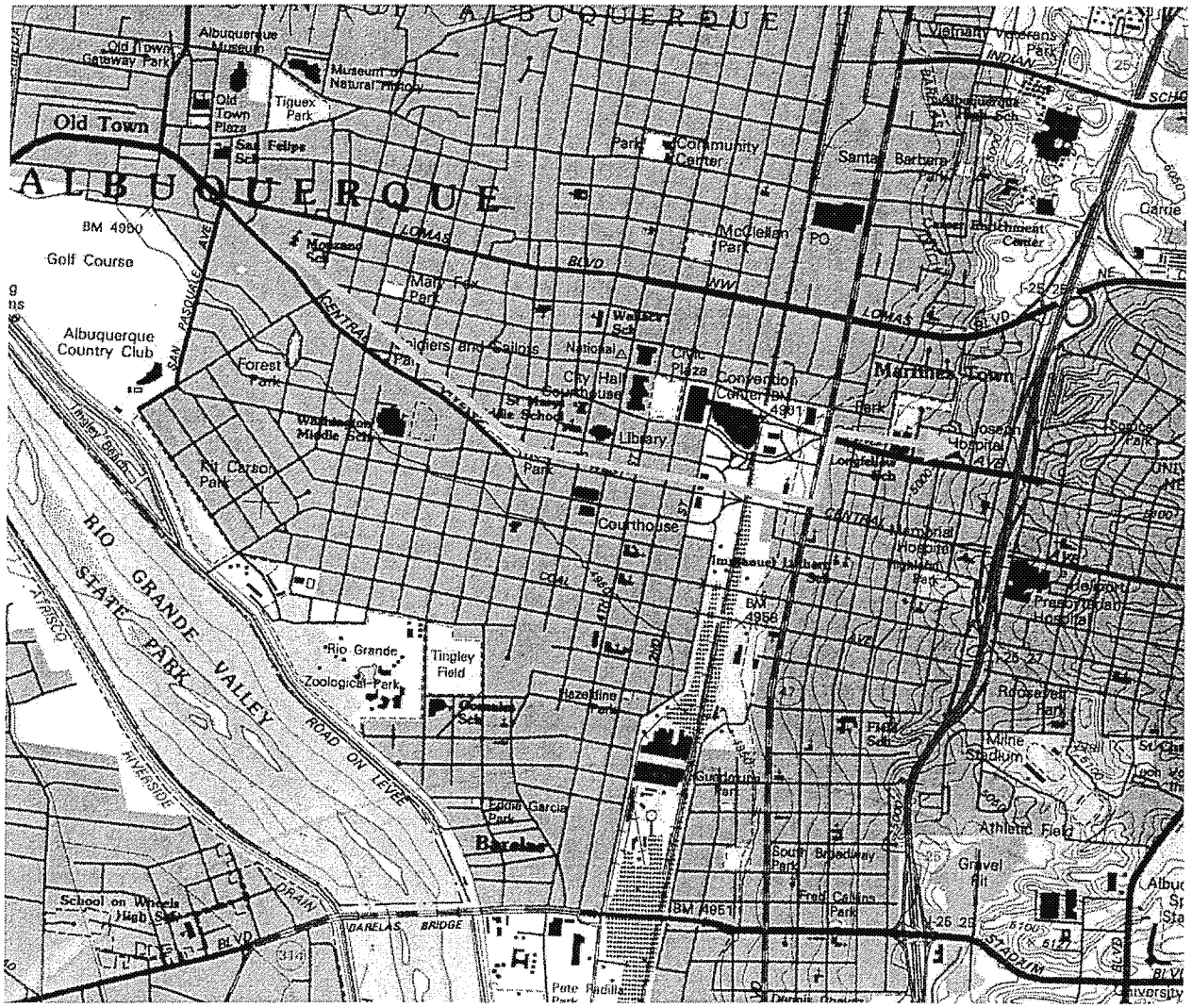
Date	Time	Reading (ppm)	Location and Comments	Calibration Date and Time	Initials

Health and Safetey Plan

Appendix D

Route to Hospital Map

HEALTH AND SAFETY PLAN
FOR THE BELL TRADING
POST PROPERTY



DIRECTIONS:

East on Central Avenue to Broadway Boulevard.

North (left) on Broadway to Dr. Martin Luther King Jr. Avenue NE.

East (right) on Dr. Martin Luther King Jr. Avenue NE to St. Joseph's Hospital (601 Dr. Martin Luther King Jr. Avenue NE). Entrance is on north (left) side of street.

Total distance to hospital: 2.0 miles

Total driving time: 5 minutes

APPENDIX B

DIRECT PUSH TECHNIQUES STANDARD OPERATING PROCEDURES

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Direct Push Techniques

Direct-push drilling is often selected as the drilling method of choice for easy to penetrate unconsolidated materials where wells two inches in diameter or larger will not be installed. Most direct-push drilling systems allow for both continuous sampling and discrete-interval sampling. Direct-push borings can easily be converted to monitor wells typically 1/2- to 1-inch in diameter. Some direct-push drilling systems allow for the installation of 2-inch monitor wells yet may consequently leave insufficient annular space for the placement of sand pack and grout. Prepacked screens should be considered as a means of insuring an adequate filter pack in small diameter borings.

Objectives

Direct-push borings may be drilled in uncontaminated areas for background information, or in areas of known contamination. The objectives of the direct-push borings are:

- determination of the character of the soil and geologic media to a specified total depth;
- collection of soil samples for chemical analyses;
- determination of the vertical extent of contamination where encountered; and
- investigation of locations previously not drilled.

Drilling Equipment

Drilling equipment, such as direct-push probes, tubes, drive shoes, displacement points, shovels, sampling tools, and other necessary equipment, is generally supplied by the driller. Direct-push borings are typically 2 to 4 inches in diameter depending on the equipment used, the type of subsurface encountered, and whether or not small-diameter wells will be installed. Further information on equipment and procedures for monitor-well installation can be found under *Standard Operating Procedures, Monitor-Well Installation.*

Sampling Equipment

Before beginning each soil boring, the following equipment will be assembled:

- sample shuttles;
- chemical sample containers with laboratory-supplied preservatives, if required;
- geotechnical sample containers, if applicable;
- sample labels;
- sampling tools (i.e., sample liners and caps and split-barrel samplers);
- personal protective equipment;
- decontamination equipment;
- waterproof pens;
- stainless steel pocket knife or spatula;
- clean cutting surface;

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- custody seals;
- boring logs;
- sample control logs;
- chain-of-custody forms; and
- field logbook.

Sample-Collection Procedures — Chemical Analyses

Soil borings will be sampled continuously to the specified total depth, unless otherwise instructed. Samples will be collected using stainless-steel tubes, transparent plastic tubes, or a split-barrel sampler. Typically the drive casing and/or sample barrel are 2-feet, 3-feet, 5-feet, or 10-feet in length.

A synthetic sample catcher is affixed to the bottom of the sample barrel when loose sediment may otherwise fall out of the sample barrel.

If refusal of the sampling device is encountered, attempts to advance the boring without the encumbrance of the sampling device can be attempted so as to advance to a depth that permits sampling. Otherwise, it may be advisable to begin a new boring adjacent to the boring of refusal in an attempt to avoid the earlier impediment.

During direct-push drilling, several types of information should be recorded, either on the boring log or in the field logbook. Information that will be recorded includes the following:

- name and/or job number and location of job,
- names of crew,
- type and make of drilling machine,
- weather conditions,
- surface conditions,
- date and time of start and finish of boring,
- boring number and location (station and coordinates, if available and applicable),
- surface elevation (if available),
- method of advancing and cleaning the boring,
- method of keeping the boring open (if any),
- depth to top of ground water and drilling depth at the time of a noted loss of drilling fluid,
- sample depth and percent recovery,
- size of casing, and depth of cased portion of boring,
- equipment and method of driving sampler,
- sampler type and dimensions (note use of liners), and
- remarks (if any).

Once the sample has been collected and brought to the surface, the following procedures should be followed for collection of samples for chemical analyses.

- Samples collected with stainless steel or transparent plastic tubes or with stainless steel split barrel samplers will be field extruded onto a split stainless-steel tube or a split PVC tube for

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screening (if necessary) and description. Depending on the scope of the sampling effort, the sample may receive pass-over field screening or headspace analysis field screening with a PID or FID. Pass-over field screening is performed fairly quickly by making an incision down the length of the sample, passing the PID or FID probe along the incision while partially covering the incision with a hand, and noting the readings. The typical protocol for conducting heated headspace analysis is as follows:

1. Fill a 0.5 liter/16 ounce or larger clean glass jar half full of soil sample. Plastic bags or other non-glass containers are not acceptable.

2. Seal top of jar with clean aluminum foil and lid ring or equivalent.

3. Ensure sample is at 15° to 25°C or approximately 60°F to 80°F. A warm water bath should be used if necessary to raise sample temperature to acceptable range. Samples are to be protected from direct sunlight in order to prevent photodestruction of the volatiles.

4. Aromatic hydrocarbon vapor concentrations should be allowed to develop in the headspace of the sample jar for 5 to 10 minutes. During the initial stages of headspace development, the sample is to be shaken vigorously for one minute.

5. Immediately pierce the foil seal with the probe of either a Photoionization Detector (PID), a Flame Ionization Detector (FID), or colorimetric tube, and record the highest (peak) measurement. The instrument should be able to accurately detect total aromatic hydrocarbons (TAH) between 0 and 1000 parts per million (ppm).

- Soil samples will be split open and the sample will undergo screening and description.

- Soil type will be described according to the Unified Soils Classification System (ASTM D-2488). Appropriate information will be recorded on the boring log.

- Visual inspection, pass-over field screening, and/or PID headspace analysis of samples will serve as the criteria used in the field to screen samples for volatile organic contamination.

- Upon completion of field screening and soil description, part or all of each sample will be placed in a clean, labeled sample container, and capped securely.

- Samples to be analyzed for volatile organics should be disturbed as little as possible, and the interval to be sampled should be containerized first, even before the soil has been described, to prevent loss of volatile components.

If methanol extraction is required for samples to be analyzed for volatile organics, the analytical laboratory should be instructed to supply appropriate sample bottles ready and pre-weighed, containing purge-and-trap grade methanol. Disposable syringes to be used for collecting the soil samples should also be supplied by the laboratory. The following procedure should then be used to collect the soil samples:

1. Fill the syringe with 10 - 15 cm^2 of soil, avoiding pebbles or other large particles.

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2. Unscrew the cap on the sample bottle and quickly push the sample into the bottle with the syringe plunger, being careful not to get soil particles on the rim of the bottle. If the methanol is supplied in a separate vial, pour it into the sample bottle at this point, being careful not to spill any of the methanol. Quickly replace the cap and tighten securely.

3. Gently agitate the sample so the soil is immersed in the methanol. Excessive agitation may cause undo volatilization.

- Field replicates are obtained by splitting the sample interval into two separate samples, which are then containerized and analyzed. Field duplicates are obtained by homogenizing the sample in a stainless-steel or glass container before splitting it into two samples for containerization and analysis.

- Sample labels will include the following information:

  — project name and/or number;
  — field sample number;
  — depth interval, if applicable;
  — initials of collector;
  — date and time of collection; and
  — sample type and preservative (if any).

  — Label information for replicate and duplicate samples requires only project name and/or number, field sample number, and sample type and preservatives (if any).

- Samples are then placed in the sample shuttle and, if required, stored and transported at <4 C (39 F), using frozen ice packs or double-bagged ice.

- Sample information will be recorded in the field logbook and on the sample control log as soon as possible after sample collection, in accordance with procedures set forth in the Quality Assurance Project Plan.

- A chain-of-custody form will be completed and placed in the sample shuttle for shipment to the laboratory.

- A custody seal will be placed across the sample shuttle lid so that the sample shuttle cannot be opened without breaking the custody seal. Custody seals will contain the following information:

  — collector's signature or initials; and
  — date of shipment.

- Samples will be shipped to the laboratory for analysis in a timely manner that facilitates the ability of the laboratory to meet all minimum holding-time requirements for degradable constituents.

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- A decontamination station will be set up near the borehole location, where sampling equipment will be decontaminated between collection of each sample, as described in *Standard Operating Procedure, Decontamination.*

Boring Grouting

Grout is used to backfill the boring at the completion of drilling. Retraction grouting (i.e. grouting as the drive casing is retracted) is preferred in contaminated subsurface conditions since. For grouting shallow borings, cement-bentonite slurry or bentonite pellets are poured into the drive casing as the casing is retracted or directly into the open boring if it is able to stay open and not undergo cave in. In deep borings, retraction grouting is accomplished by pumping grout to the bottom of the boring through tubing placed inside the drive casing.

The grout used should approximate a mixture of Type I Portland cement (95-97%) and powdered bentonite (3-5%). Typically each sack of grout is mixed with 7 gallons of potable water. Grout is used to seal the formation and reduce the potential for vertical migration of surface or subsurface water.

When possible, the grouted borings will be inspected at least 24 hours after the grout has been allowed to shrink and settle. If settling has occurred, additional bentonite-cement grout will be added to bring the grout level to ground surface. All cuttings, fluids, and other unused material generated from the drilling and monitor-well development process will be segregated and placed immediately in 55-gallon drums or other appropriate containers, labeled with boring number, date, and project number, and stored on site pending analysis. Equipment used for grouting purposes (tremie pipe, pumps, grout-mixing containers, etc.) will require cleaning with potable water.

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APPENDIX C

NEW MEXICO ENVIRONMENT DEPARTMENT UNDERGROUND STORAGE TANK BUREAU HEATED HEADSPACE STANDARD OPERATING PROCEDURE

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Headspace Analysis

The NMED UST Bureau has issued the following guidance on Headspace analysis.

Equipment needed for soil screening includes clean 0.5 to 1 liter or 16-ounce jars, aluminum foil, and a FID, PID, detector tubes, or other acceptable field instrument. If the temperature is below 60° Fahrenheit or 15° Celsius, a thermometer and water bath will also be needed. The container for the water bath must be large enough to hold the sample jar, heat source, and deionized water. It is also acceptable to warm up the sample using heated air from the interior of a vehicle. The use of a portable gas chromatograph is optional. Use best judgement in choosing a field instrument. Factors to consider include, but are not limited to, age of the UST system, soil characteristics, and extent of contaminant degradation. Instruments for field screening should be calibrated in the field and in good working order. Follow the manufacturer's instructions for calibrating the field instrument.

The steps for the heated headspace method are:

(1) Fill a 0.5 liter/16 ounce or larger clean glass jar half full of soil sample. Plastic bags or other non-glass containers are not acceptable.

(2) Seal top of jar with clean aluminum foil and lid ring or equivalent.

(3) Ensure sample is at 15°C to 25°C or approximately 60°F to 80°F. A warm water bath or heated air from the interior of a vehicle should be used if necessary to raise sample temperature to the acceptable range. Samples are to be protected from direct sunlight in order to prevent photo-destruction of the volatiles.

(4) Aromatic hydrocarbon vapor concentrations should be allowed to develop in the headspace of the sample jar for 5 to 10 minutes. During the initial stages of headspace development, the sample is to be shaken vigorously for one minute.

(5) Immediately pierce the foil seal with the probe of either a Flame Ionization Detector (FID), a Photoionization Detector (PID) or colorimetric tubes, and record the highest (peak) measurement. The instrument should be able to accurately detect total aromatic hydrocarbons (TAH) between 0 and 1000 parts per million (ppm).

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APPENDIX D

EQUIPMENT DECONTAMINATION METHODS STANDARD OPERATING PROCEDURE

Equipment Decontamination

Specific equipment decontamination procedures are described in the following paragraphs. Types of equipment decontamination that may occur at a given site include the following:

- sampling-equipment decontamination between individual sampling locations to ensure that representative samples are collected;
- drilling–equipment decontamination at the completion of each boring to ensure that boreholes are not cross contaminated; and
- tractor, forklift, backhoe and/or other heavy equipment decontamination to ensure that contamination is contained during site activities.

Sampling equipment will be decontaminated before leaving the Contamination Reduction Zone. Some or all of the following steps will be used to decontaminate this equipment:

- hand–held equipment showing surficial–solid contamination will be placed in a wash tub (or other applicable container) and the contaminated material will be physically removed using scrapers, brushes, or etc. Equipment will then be transferred to the designated container for the detergent wash. Contaminated solids will be drummed or otherwise containerized for disposal when necessary;
- the wash procedure will be followed by a double rinse. Equipment will typically be rinsed first in a wash tub with potable water followed by a spray rinse of distilled water;
- all wash and rinse solutions will be drummed for disposal when necessary;
- equipment that may be damaged by water, such as instruments, will be carefully cleaned with a sponge and detergent water when necessary. Care will be taken to prevent equipment damage;
- solvents such as methanol may be used on an as–needed basis to remove tar or other organics from equipment;
- clean equipment will be air dried if possible or wiped dry with a clean material if needed for immediate reuse; and
- clean equipment will be stored and transported such that it is protected until used again for sampling. Plastic bags are commonly used to help protect many clean equipment items.

When practical, a sufficient quantity of clean, decontaminated sampling equipment will typically be available so that each sample can be taken with a separate sampling tool, and decontamination will be performed on all equipment at the end of the sampling effort, rather than between each sample.

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Drilling-equipment decontamination will be conducted in the Contamination Reduction Zone. Drilling auger flights or direct–push probes will be dismantled and transported to the decontamination area between each boring. The following steps will be used to decontaminate the auger flights or direct–push probes:

- gross soil, dirt, or waste contamination on the drilling augers will be removed at the drilling site. Contamination will be removed using blade scrapers or by other physical methods. Material removed from the augers or probes will be placed in drums or other dedicated containers;

- augers or probes will be carried to the decontamination pad. Augers or probes will typically be placed on a rack in the decontamination area to ensure that water from the decontamination process does not reintroduce contamination to the cleaned equipment; and

- a heated, high-pressure wash operating at a temperature of approximately 212° F and discharging 5 gallons per minute will typically be used to remove the contamination from the outside of each flight. Strongly adhered waste may require additional scrubbing using a wire or bristle brush. The inside of each auger or probe will also be cleaned with a pressure washer or steam cleaner and, if needed, scrubbed with a wire or bristle brush.

Any vehicle used to carry the auger flights or push probes will also receive a heated, high–pressure wash in all areas where the auger flights or push probes come into contact with the vehicle. Once the cleaned augers or push probes are placed into the transport vehicle, additional care will be given to ensure that the augers or probes remain clean by wrapping them in plastic when necessary.

All waste generated during decontamination activities will be contained using drums or other appropriate containers. Waste containers will be labeled properly and stored at the site temporarily pending proper disposal.

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APPENDIX E

INVESTIGATIVE DERIVED WASTE PLAN

Management of Investigation Derived Waste Plan

The primary types of wastes that will be produced during the execution of the Work Plan include:

- Potentially contaminated soil (drill cuttings)
- Purge and decontamination wastewater
- Personal protective equipment (PPE) and other wastes

The procedures for handling and disposal of these wastes are detailed below:

Potentially Contaminated Soil

Excess soil will be generated during drilling activities. Soil cuttings generated during the drilling of the soil boring prior to monitoring well installation will be used as back fill around the monitoring well after the gravel pack has been constructed. The remainder of the soil generated during the monitoring well installations will be containerized in 55-gallon drums. The soil will be then dumped in areas designated appropriate by the City of Albuquerque. If PID readings indicate that the soil cuttings are potentially contaminated, then the soil will be adequately characterized. The soil will then be disposed of according to all Federal, State, and Local regulations.

Purge and Decontamination Wastewater

The wastewater derived from decontamination of the sampling and drilling equipment during the soil sampling activities (surface and subsurface), the drilling activities, and personnel decontamination water will be placed in 55-gallon drums. The purge and development water will then be transported to the City of Albuquerque wastewater treatment plant for treatment and then discharge.

PPE and Other Wastes

Used disposable PPE will be placed in double, 10-mil thick plastic bags and sealed with duct tape. The PPE that is classified as hazardous will be properly disposed of at a suitable and permitted off-site nonhazardous disposal facility. Likewise, spent PPE, equipment, and materials that have not been substantially contaminated by contact with water or soils, or that have been tested and determined to be non-hazardous, will be secured in the same fashion as the hazardous materials and properly disposed of at a suitable and NMED-permitted off-site non-hazardous disposal facility. Other wastes generated as part of investigation activities such as miscellaneous metal and plastic debris will be decontaminated and removed from the site. All decontaminated materials will be visually inspected for the presence of soil or dust particulate on the decontaminated objects. Objects which have been decontaminated and visually inspected to document satisfactory decontamination will be removed from the site and disposed of at a suitable and NMED-permitted off-site non-hazardous disposal facility.

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APPENDIX B

Soil Boring Logs

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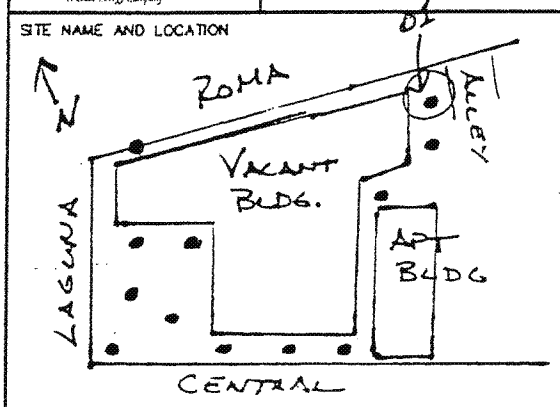
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED					BORING NO. SB-01	
					SHEET 1 OF 1	
SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT					DRILLING START / FINISH	
WATER LEVEL (BLS)	20.0'				TIME 0840	TIME 0830
TIME	0825					
DATE	10/10/01				DATE 10/10/01	DATE 10/10/01
CASING DEPTH (BLS)	N/A					

DRILLER: GeoRecovery

DRILL RIG: GEOPROBE	SURFACE CONDITIONS
ANGLE BEARING	DIRT / GRAVEL SURFACE LAYER
SAMPLE HAMMER TORQUE FT.-LBS.	

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
0	N/A	100	SM		SAND, LT. BRN TO TAN IN COLOR, MOD. MOIST, UNIFORM, SOME CALICHE & SILT. TOTAL DEPTH = 4.0 BGS. COLLECT SOIL GAS @ 12' BGS @ 0810 (0.1 ppm) COLLECT GROUNDWATER SAMPLE HERE @ 0825	0-2	(1)	1.7	0	2	0806
1											
2						2-4	(2)	1.2	2	4	0808
3			SM								
4		-	~								
5											
6											
7											
8											
9											
10											

LOGGED BY: Joseph Tracy

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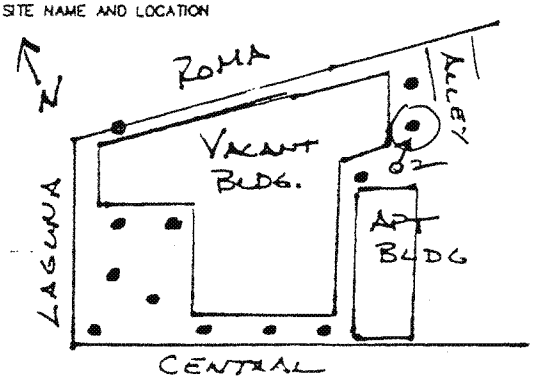
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER, EXPENDABLE DRIVE POINT

BORING NO. SB-02

SHEET 1 OF 1

DRILLING

		START	FINISH
WATER LEVEL (BLS)	N/A		
TIME	↓	TIME 1415	TIME 1435
DATE	↓	DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓		

DRILLER: GEORECOVERY

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS: GRAVEL / DIRT SURFACE LAYER

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
0	N/A	100	SM		SAND, SILTY, BECOMES MORE CLAYEY W/ DEPTH, BWN TO LT. BWN IN COLOR, MOD. MOIST, RELATIVELY UNIFORM, GRAY STAINED AREA @ 3.5' BGS. TOTAL DEPTH = 4.0' BGS. COLLECT SOIL GAS SAMPLE @ 12.0' BGS (@1425). ONLY 1.7 PPM	0-2	(1)	1.7	0	2	1422
1											
2						2-4	(2)	1.2	2	4	1422
3											
4			SM								
5											
6											
7											
8											
9											
10											

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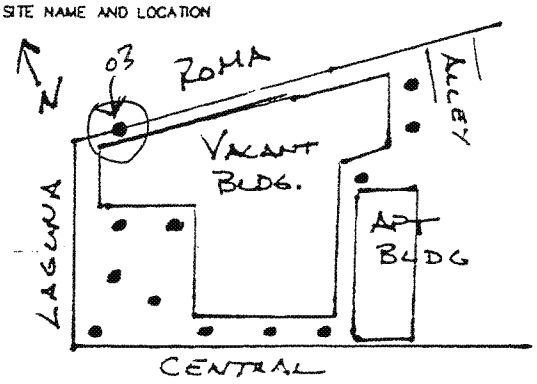
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER, EXPENDABLE DRIVE POINT

BORING NO. SB-03

SHEET 1 OF 1

DRILLING

					START TIME	FINISH TIME
WATER LEVEL (BLS)	≈20.0'					
TIME	0950				0914	1006
DATE	10/10/01				DATE 10/10/01	DATE 10/10/01
CASING DEPTH (BLS)	N/A					

DRILLER: GEORECOVERY

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS CONCRETE SURFACE LAYER (SIDEWALK)

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	N/A 1	100	SM		SAND, LT. BRN TO BRN IN COLOR, SLIGHTLY SILTY, SOME CALICHE, MOD. MOIST. TOTAL DEPTH = 4.0' BGS. COLLECT SOIL GAS SAMPLE @ 12.0' BGS @0928 (30.3 PPM). COLLECT GWATER SAMPLE @ 23.5' BGS @0945	0-2	(1)	4.8	0	2	.0920
2											
3			SM			2-4	(2)	4.8	2	4	0922
4			~								
5											
6											
7											
8											
9											
10											

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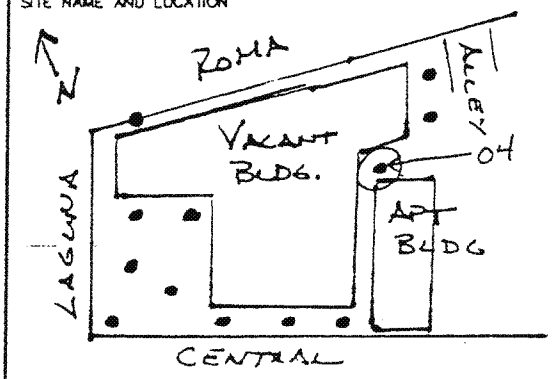
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED					BORING NO. SB-04	
					SHEET 1 OF 1	
SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT					DRILLING START / FINISH	
WATER LEVEL (BLS)	20.0'				TIME 1440	TIME 1506
TIME	1455					
DATE	10/9/01				DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	N/A					

DRILLER: GEORECOVERY

DRILL RIG GEOPROBE	SURFACE CONDITIONS CONCRETE SIDEWALK
ANGLE BEARING	
SAMPLE HAMMER TORQUE FT.-LBS.	

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	NA	100	SM		CONCRETE SURFACE LAYER	0-2	(1)	4.0	0	2	1455
2					SAND, VERY FINE-GRAINED, SLIGHTLY SILTY, LT. BWN TO REDDISH BWN IN COLOR, MOIST, RELATIVELY UNIFORM, NO ODOR DETECTED.	2-4	(2)	1.7	2	4	1500
3			SM		TOTAL DEPTH = 4.0' BGS						
4					COLLECT SOIL GAS @ 12.0' BGS (1506) 271 ppm						
5					COLLECT WATER SAMPLE @ 23.0' BGS						
6											
7											
8											
9											
10											

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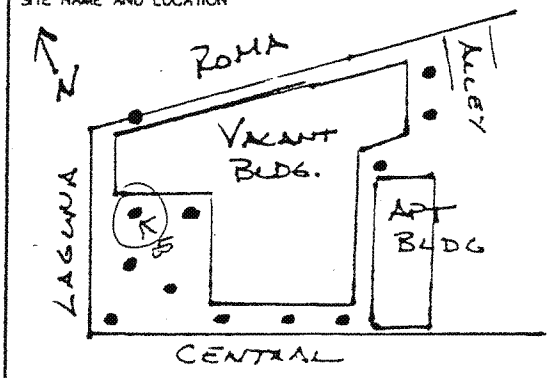
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT

BORING NO. SB-05

SHEET 1 OF 1

DRILLING

		START	FINISH
WATER LEVEL (BLS)	N/A		
TIME		TIME 0902	TIME 0930
DATE		DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓		

DRILLER: GEORECOVERY

DRILL RIG GEOPROBE

SURFACE CONDITIONS BARE GROUND SURFACE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	NA	100 %	SM		SAND, LT. BWN TO TAN W CALICHE VEINS, SLIGHTLY SILTY, DRY, UNIFORM.	0-2	(1)	2.4	0	2	0908
2			SM		TOTAL DEPTH = 4.0' BGS, SOIL GAS @ 12.0' BGS, 9999 PPM	2-4	(2)	3.2	2	4	0910
3											
4											
5											
6											
7											
8											
9											
10											

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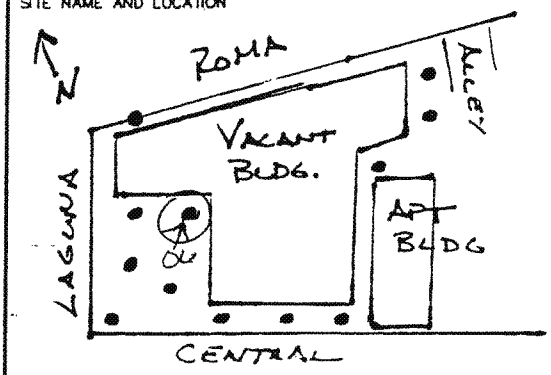
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER, EXPENDABLE DRIVE POINT

BORING NO. SB-06

SHEET 1 OF 1

DRILLING

					START	FINISH
WATER LEVEL (BLS)	N/A				TIME	TIME
TIME					0923	0900
DATE					DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓					

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS BARE GROUND (SAND & GRAVEL)

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	NA	100	SM		SAND, LT. BRN TO TAN IN COLOR, VERY FINE, UNIFORM, LT, W SOME SILT. NO STAINING OR ODOR OBSERVED. TOTAL DEPTH = 4.0' BGS. TAKE SOIL VAPOR SAMPLE @ 12.0' BGS. SOIL GAS = 3275 PPM	0-2	(1)	2.4	0	2	SAMPLE @ 0832
2											SAMPLE @ 0834
3			SM			2-4	(2)	6.6	2	4	
4											
5											
6											
7											
8											
9											
10											

DRILLER: GEORECOVERY, INC.

LOGGED BY: J. TRACY

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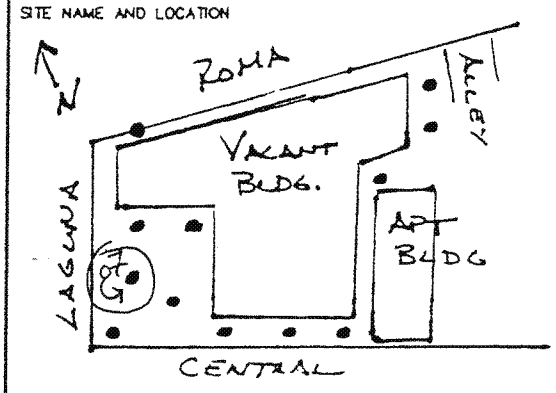
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED					BORING NO. SB-7	
					SHEET 1 OF 1	
SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT FOR GAS					DRILLING START	DRILLING FINISH
WATER LEVEL (BLS)	N/A				TIME 0931	TIME 0947
TIME						
DATE					DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓					

DRILLER: GeoRecovery

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS

BARE GROUND SURFACE

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	N/A	100	~~SM~~		SAND, LT. BRN TO TAN IN COLOR, DRY, UNIFORM, SOME CALICHE, SLIGHTLY SILTY, DRY, WELL PACKED. TOTAL DEPTH = 4.0' BGS. COLLECT SOIL SAMPLES & SOIL GAS SAMPLE. SOIL GAS = 9,999 PPM	0-2	(1)	4.2	0	2	0937
2											
3			SM			2-4	(2)	3.9	2	4	0939
4			~~SM~~								
5											
6											
7											
8											
9											
10											

LOGGED BY: JOSEPH TRACY

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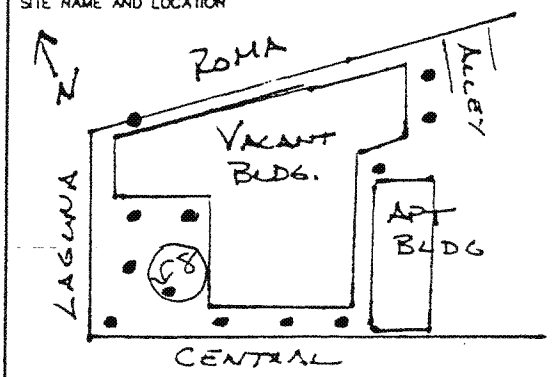
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT

BORING NO. SB-8

SHEET 1 OF 1

DRILLING START FINISH

					START TIME	FINISH TIME
WATER LEVEL (BLS)	N/A					
TIME					0957	1016
DATE					DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓					

DRILLER: GEO RECOVERY

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS

GRASS-COVERED SURFACE LAYER

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	N/A	100	SM		SAND, FINE GRAINED, SLIGHTLY CLAYEY, LT. BWN TO BWN IN COLOR, SLIGHTLY MOIST.	0-2	(1)	4.0	0	2	1002
2					TOTAL DEPTH = 4.0' BGS	2-4	(2)	5.7	2	4	1004
3			SM		COLLECT SOIL GAS SAMPLE @ 12.0' BGS (1007) PID = 711						
4											
5											
6											
7											
8											
9											
10											

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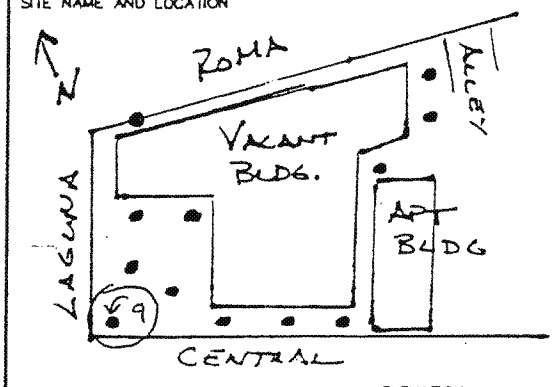
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT

BORING NO. SB-9

SHEET 1 OF 1

DRILLING START / FINISH

WATER LEVEL (BLS)	N/A				TIME 1030	TIME
TIME	↓					
DATE	↓				DATE 10/9/01	DATE 10/10/01
CASING DEPTH (BLS)	↓					

DRILLER: GeoRecovery

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS

GRASS-COVERED GROUND SURFACE

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	NA	100	SC		SAND, CLAYEY, BECOMES SILTY W/ DEPTH, BWN TO LT BWN TO TAN IN COLOR, SLIGHTLY MOIST, SOME CALICHE VEINS. TOTAL DEPTH = 4.0' BGS. TAKE A SOIL GAS SAMPLE @ 12.0' BGS @ 1041 (770 PPM)	0-2	(1)	3.9	0	2	1036
2						2-4	(2)	4.4	2	4	1038
3			SM								
4			~								
5											
6											
7											
8											
9											
10											

LOGGED BY: JOSEPH TRACY

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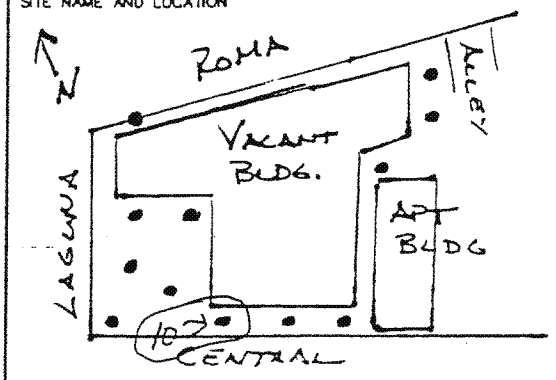
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT

BORING NO. SB-10

SHEET 1 OF 1

DRILLING

		START	FINISH
WATER LEVEL (BLS)	N/A		
TIME		TIME 1101	TIME 1122
DATE		DATE 10/9/01	DATE 10/9/01
CASING DEPTH (BLS)	↓		

DRILLER: GEORECOVERY

DRILL RIG GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS SAND/GRAVEL SURFACE LAYER

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	N/A	100%	SM		SAND, SLIGHTLY CLAYEY, BECOMES SILTY W/ DEPTH & VERY FINE GRAINED, LT. BRN TO BRN IN COLOR, MOIST. TD=4.0'	0-2	(1)	2.6	0	2	1108
2						2-4	(2)	3.0	2	4	1110
3			SM		COLLECT SOIL GAS @ 12.0' BGS @1112 PID = 572 PPM SOIL GAS						
4											
5											
6											
7											
8											
9											
10											

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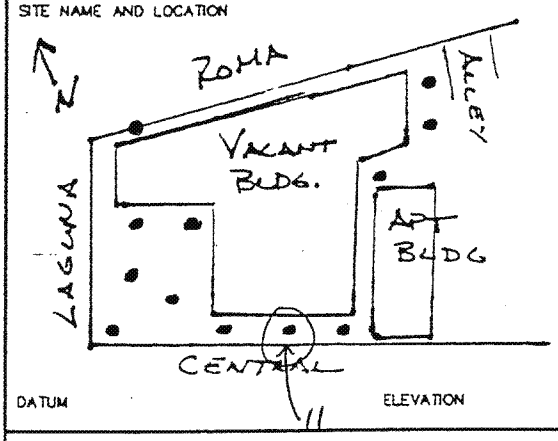
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER, EXPENDABLE DRIVE POINT FOR GAS

BORING NO. SB-11

SHEET 1 OF 1

DRILLING START: TIME 1130 DATE 10/9/01

DRILLING FINISH: TIME 1151 DATE 10/9/01

WATER LEVEL (BLS)	N/A				
TIME					
DATE					
CASING DEPTH (BLS)	↓				

DRILLER: GEORGE AVERY

DRILL RIG: GEOPROBE

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

SURFACE CONDITIONS: DIRT / GRAVEL GROUND SURFACE

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
0	N/A	100%	SM		SAND, LT. BWN TO BWN, SLIGHTLY SILTY, MODERATELY MOIST, UNIFORM, NO ODOR OBSERVED. TOTAL DEPTH = 4.0'. COLLECT SOIL GAS SAMPLE @ 12.0' BGS @ 1143 (16.2 ppm)	0-2	(1)	4.3	0	2	1138
1											
2						2-4	(2)	4.5	2	4	1140
3											
4			SM								
5											
6											
7											
8											
9											
10											

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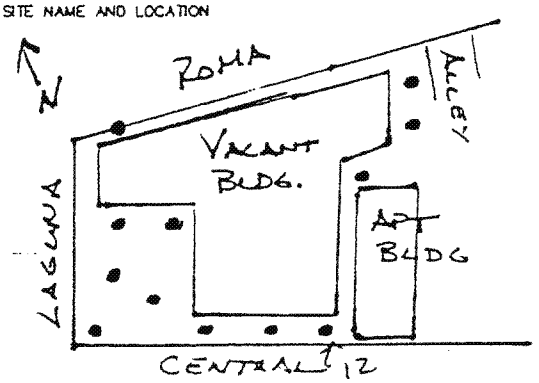
SOIL BORING LOG

SITE NAME AND LOCATION



DATUM ELEVATION

DRILLING METHOD: GEOPROBE SOIL BORING UNIT - VAN MOUNTED

SAMPLING METHOD: 4' MACRO SAMPLER EXPENDABLE DRIVE POINT

WATER LEVEL (BLS)	∇ 21.0'				
TIME	1240				
DATE	10/9/01				
CASING DEPTH (BLS)	N/A				

BORING NO. SB-12

SHEET 1 OF 1

DRILLING

START	FINISH
TIME 1202	TIME 1240
DATE 10/9/01	DATE 10/9/01

DRILLER: GEOPROBE CREW

DRILL RIG GEOPROBE

SURFACE CONDITIONS SAND / GRAVEL SURFACE LAYER

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS.

DEPTH IN FEET (BLS)	BLOWS / 6 IN. ON SAMPLER	% RECOVERY	SOIL GRAPH	MATERIAL CHANGE DEPTH (BLS)(FT)	DESCRIPTION OF MATERIAL	SAMPLED INTERVAL	SAMPLE No.	FIELD SCREENING OR HEAD SPACE ANALYSIS OVM/HNU (ppm)	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
1	N/A	75	SM		SAND, SLIGHTLY SILTY, VERY FINE-GRAINED, UNIFORM, DRY, SOME ZONES (1") OF CLAY @ 3.0' & 3.5' BGS. TOTAL DEPTH = 4.0' BGS. COLLECT SOIL GAS @ 12.0' BGS (59.3 ppm) @1217 WILL ATTEMPT TO COLLECT GROUND WATER SAMPLE HERE	0-2	(1)	3.8	0	2	1210
2											
3			SM			2-4	(2)	1.7	2	4	1212
4			~								
5											
6											
7											
8											
9											
10											

LOGGED BY: JOSEPH TRACY

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APPENDIX C

Field Forms and Field Notes

10/9/01

0740 – Arrive onsite & Beg ICE Check Soil Boring Locations & Make Sure Utilities Are Marked

0810 – Georecovery onsite. Kevin Taylor & Jim Grimaud – Conduct Health & Safety Meeting

0825 – Begin Soil Boring SB-06

0837 – Meg Randall w/ COA onsite, 0910 Meg Randall offsite

0841 – Take Soil Gas Sample @ SB-06

Soil Gas = 3275 PPM. Collect w/ Hand Pump

0912 – Take Soil Gas Sample @ SB-05

Soil Gas = 9999 PPM (OVER)

0941 – Collect Soil Gas Sample @ SB-07

Soil Gas = 9999 PPM (OVER)

0957 – Move to & Begin SB-08

1007 – Collect Soil Gas Sample @ SB-08 Soil Gas = 711 PPM

– Collect Soil Duplicate - 1 of SB-08/0'-2' @ SB-08/2'-4'

1016 – Complete SB-08

1030 – Move To & Begin SB-09

1041 – Collect Soil Gas Sample SB-09 (770 PPM)

1049 – Andy From Hall Env. Onsite To Drop off Bottles For Equipment Rinsates

1101 – Move To & Begin SB-10

1107 – Meg Randall w/ COA Back Onsite

10/9/01 (CON'T)

1110 – BART FERRIS & MIKE MORENO W/ NMED ONSITE TO OBSERVE

1112 – COLLECT SOIL GAS SAMPLE

1130 – MOBE TO & BEGIN SB-11

MEG W/ MIKE & BART WALKING AROUND SITE

1143 – COLLECT SOIL GAS @ SB-11 – (16.2 PPM)

1202 – MOBE TO & BEGIN SB-12

1217 – COLLECT SOIL GAS SAMPLE @ SB-12

COLLECT DUPLICATE HERE TOO.

1240 – BEGIN TO TAM TO COLLECT WATER SAMPLE @ SB-12.

COLLECT SAMPLE & DUPLICATE HERE. BART FERRIS & MIKE MONCADO OF NMED ALSO COLLECT SPLIT SAMPLE (2 VOA VILES) FOR VOC ANALYSIS

1360 – BART & MIKE OF NMED OFFSITE. MEG REMAINS OF CDA OFFSITE. BEGIN TO DECON, I COLLECT SOIL SAMPLES FROM SB-11 & SB-12

1330 – 1400 – LUNCH

1415 – MOBE TO & BEGIN SB-02

1428 – COLLECT SOIL GAS SAMPLE FROM SB-02 (1.7 PPM)

1435 – COMPLETE SOIL BORING SB-02

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10/9/01 (CON'T)

1440 - MOVE TO & BEGIN SB-04. THIS IS A SOIL BORING BELOW CONCRETE SO WE HAVE TO FIRST CORE THE CONCRETE

1453 - CONTINUE TO CORE CONCRETE

1458 - BREAK THROUGH CONCRETE - COLLECT SOIL SAMPLE @ SB-04

1506 - COLLECT SOIL GAS SAMPLE @ SB-04 (271 PPM) @ 12.0' BGS

1520 - MEG RANDALL W/ COA RETURNS ONSITE

- BART & MIKE W/ NMED RETURN TO SITE

1525 - COLLECT GROUND WATER SAMPLE SB-04/WATER. NMED (BART) COLLECTS 2 VOA ~~SAMPLES~~ VIALS (SPLIT SAMPLES)

1600 - MEG RANDALL OFFSITE

BART & MIKE OFFSITE

1600 - COLLECT EQ. RINSE 1 (RINSATE OF SHOE)

1620 - KT (GEO RECOVERY) OFFSITE

1630 - LEAVE SITE & GO TO LABORATORY (HALL). DROP OFF ALL SAMPLES (SOIL GAS, SOILS, GW).

ED_013172_00000349-00163

10/16/01

0800 - Arrive onsite (after getting ice)

- Georecovery (Kevin Taylor & Jim Grimand onsite)

- Begin SB-01

0810 - Collect Soil Gas Sample @ SB-01. PID = 0.1 ppm

- Continue to depth to collect groundwater

0825 - Collect GW Sample SB-01/water

- Abandone Soil Boring SB-01

0835 - Meg Randall onsite. Asks that a sample of soil for PCBs be taken from under & around transformer

I will take sample & submit for PCBs

0900 - Meg Randall offsite

0914 - Mobe to & Begin SB-03

0928 - Collect Soil Gas Sample @ SB-03 (30.3 ppm)

- Continue to depth to attempt to collect GW sample

0945 - Collect SB-03/water

1008 - Complete & Abandone Soil Boring SB-03

0950 - Collect Field Blnk

1000 - Chris Bynum w/ NMED onsite

- Walk site w/ Chris. Will discuss later transformer issue. She says to review Keeas report

1025 - Chris Bynum w/ NMED offsite

1030 - Collect Equipment Rinsate

1038 - Georecovery offsite

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10/10/01 (CON'T)

1046 - PACK GEOTECHNICAL SAMPLES

GEOTECH DUP - 1 = SB-10/0-2' (10/9/01 @ 1105)

1130 - LEAVE SITE AFTER TAKING PHOTOS OF SOIL BORING LOCATIONS

1200 - DROP OFF SAMPLES @ HALL ENVIRONMENTAL

1230 - RETURN TO OFFICE

- UNLOAD EQUIPMENT

1300 - RETURN TO OFFICE.

APPENDIX D

Analytical Results

Hall Environmental Analysis Laboratory

COVER LETTER

November 06, 2001

Joe Tracy
Duke Engineering & Services
One Park Center
6501 Americas Pkwy., NE Ste. 810
Albuquerque, NM 87110
TEL: (505) 246-1600
FAX (505) 246-2600

RE: Bell Trading Post Order No.: 0110066

Dear Joe Tracy:

Hall Environmental Analysis Laboratory received 15 samples on 10/10/01 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

ED_013172_00000349-00167

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-01/Soil Gas
Lab Order: 0110066
Collection Date: 10/10/01 8:10:00 AM
Project: Bell Trading Post
Lab ID: 0110066-01
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/11/01
Trichloroethene	ND	0.10		µg/L	1	10/11/01
Benzene	ND	0.10		µg/L	1	10/11/01
Toluene	ND	0.10		µg/L	1	10/11/01
Ethylbenzene	ND	0.10		µg/L	1	10/11/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/11/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/11/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/11/01
Naphthalene	ND	0.20		µg/L	1	10/11/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
Bromobenzene	ND	0.10		µg/L	1	10/11/01
Bromochloromethane	ND	0.10		µg/L	1	10/11/01
Bromodichloromethane	ND	0.10		µg/L	1	10/11/01
Bromoform	ND	0.10		µg/L	1	10/11/01
Bromomethane	ND	0.10		µg/L	1	10/11/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/11/01
Chlorobenzene	ND	0.10		µg/L	1	10/11/01
Chloroethane	ND	0.20		µg/L	1	10/11/01
Chloroform	ND	0.10		µg/L	1	10/11/01
Chloromethane	ND	0.10		µg/L	1	10/11/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Dibromochloromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/11/01
Dibromomethane	ND	0.20		µg/L	1	10/11/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/11/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00168

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-01/Soil Gas
Lab Order: 0110066
Collection Date: 10/10/01 8:10:00 AM
Project: Bell Trading Post
Lab ID: 0110066-01
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/11/01
Methylene chloride	ND	0.30		µg/L	1	10/11/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/11/01
n-Butylbenzene	ND	0.10		µg/L	1	10/11/01
n-Propylbenzene	ND	0.10		µg/L	1	10/11/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/11/01
Styrene	ND	0.10		µg/L	1	10/11/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/11/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/11/01
Vinyl chloride	ND	0.20		µg/L	1	10/11/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/11/01
Xylenes, Total	ND	0.10		µg/L	1	10/11/01
Surr: 4-Bromofluorobenzene	106	87.2-119		%REC	1	10/11/01
Surr: Dibromofluoromethane	93.9	75.7-113		%REC	1	10/11/01
Surr: Toluene-d8	102	88.8-113		%REC	1	10/11/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00169

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-03/Soil Gas
Lab Order: 0110066
Collection Date: 10/10/01 9:28:00 AM
Project: Bell Trading Post
Lab ID: 0110066-02
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/11/01
Trichloroethene	3.4	0.10		µg/L	1	10/11/01
Benzene	ND	0.10		µg/L	1	10/11/01
Toluene	ND	0.10		µg/L	1	10/11/01
Ethylbenzene	ND	0.10		µg/L	1	10/11/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/11/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/11/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/11/01
Naphthalene	ND	0.20		µg/L	1	10/11/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
Bromobenzene	ND	0.10		µg/L	1	10/11/01
Bromochloromethane	ND	0.10		µg/L	1	10/11/01
Bromodichloromethane	ND	0.10		µg/L	1	10/11/01
Bromoform	ND	0.10		µg/L	1	10/11/01
Bromomethane	ND	0.10		µg/L	1	10/11/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/11/01
Chlorobenzene	ND	0.10		µg/L	1	10/11/01
Chloroethane	ND	0.20		µg/L	1	10/11/01
Chloroform	ND	0.10		µg/L	1	10/11/01
Chloromethane	ND	0.10		µg/L	1	10/11/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Dibromochloromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/11/01
Dibromomethane	ND	0.20		µg/L	1	10/11/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/11/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00170

CLIENT: Duke Engineering & Services
Lab Order: 0110066
Project: Bell Trading Post
Lab ID: 0110066-02

Client Sample ID: SB-03/Soil Gas
Collection Date: 10/10/01 9:28:00 AM
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/11/01
Methylene chloride	ND	0.30		µg/L	1	10/11/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/11/01
n-Butylbenzene	ND	0.10		µg/L	1	10/11/01
n-Propylbenzene	ND	0.10		µg/L	1	10/11/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/11/01
Styrene	ND	0.10		µg/L	1	10/11/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/11/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/11/01
Vinyl chloride	ND	0.20		µg/L	1	10/11/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/11/01
Xylenes, Total	ND	0.10		µg/L	1	10/11/01
Surr: 4-Bromofluorobenzene	103	87.2-119		%REC	1	10/11/01
Surr: Dibromofluoromethane	95.4	75.7-113		%REC	1	10/11/01
Surr: Toluene-d8	101	88.8-113		%REC	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00171

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Lab Order: 0110066
Project: Bell Trading Post
Lab ID: 0110066-07

Client Sample ID: SB-01/Water
Collection Date: 10/10/01 8:25:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY 300.0		**E300**				Analyst: **DJB**
Fluoride	0.67	0.10		mg/L	1	10/10/01
Chloride	32	0.10		mg/L	1	10/10/01
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	10/10/01
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	10/10/01
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	10/10/01
Sulfate	110	2.5		mg/L	5	10/26/01
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00172

CLIENT: Duke Engineering & Services
Lab Order: 0110066
Project: Bell Trading Post
Lab ID: 0110066-07

Client Sample ID: SB-01/Water
Collection Date: 10/10/01 8:25:00 AM
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	95.5	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	98.3	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	95.3	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	101	84.2-115		%REC	1	10/12/01
AMMONIA AS N		**E350.2**				Analyst: **HVA**
Nitrogen, Ammonia	0.70	0.050		mg/L	1	10/30/01
PH BY 150.1		**E150.1**				Analyst: **HVA**
pH	7.30	0.010		pH units	1	10/30/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00173

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-03/Water
Lab Order: 0110066
Collection Date: 10/10/01 9:45:00 AM
Project: Bell Trading Post
Lab ID: 0110066-10
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY 300.0		**E300**				Analyst: **DJB**
Fluoride	0.70	0.10		mg/L	1	10/10/01
Chloride	41	0.50		mg/L	5	10/26/01
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	10/10/01
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	10/10/01
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	10/10/01
Sulfate	280	2.5		mg/L	5	10/26/01
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00174

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-03/Water
Lab Order: 0110066
Collection Date: 10/10/01 9:45:00 AM
Project: Bell Trading Post
Lab ID: 0110066-10
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	87.2	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	98.6	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	94.5	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	97.2	84.2-115		%REC	1	10/12/01
AMMONIA AS N		**E350.2**				Analyst: **HVA**
Nitrogen, Ammonia	ND	0.050		mg/L	1	10/30/01
PH BY 150.1		**E150.1**				Analyst: **HVA**
pH	7.50	0.010		pH units	1	10/30/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00175

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Field Blank
Lab Order: 0110066
Collection Date: 10/10/01 9:50:00 AM
Project: Bell Trading Post
Lab ID: 0110066-11
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/15/01
Toluene	1.2	1.0		µg/L	1	10/15/01
Ethylbenzene	ND	1.0		µg/L	1	10/15/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/15/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/15/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/15/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/15/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/15/01
Naphthalene	ND	2.0		µg/L	1	10/15/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/15/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/15/01
Bromobenzene	ND	1.0		µg/L	1	10/15/01
Bromochloromethane	ND	1.0		µg/L	1	10/15/01
Bromodichloromethane	ND	1.0		µg/L	1	10/15/01
Bromoform	ND	1.0		µg/L	1	10/15/01
Bromomethane	ND	1.0		µg/L	1	10/15/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/15/01
Chlorobenzene	ND	1.0		µg/L	1	10/15/01
Chloroethane	ND	2.0		µg/L	1	10/15/01
Chloroform	ND	1.0		µg/L	1	10/15/01
Chloromethane	ND	1.0		µg/L	1	10/15/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/15/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/15/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/15/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/15/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/15/01
Dibromochloromethane	ND	1.0		µg/L	1	10/15/01
Dibromomethane	ND	2.0		µg/L	1	10/15/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/15/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/15/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/15/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/15/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/15/01
1,1-Dichloroethene	ND	1.0		µg/L	1	10/15/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/15/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/15/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/15/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/15/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/15/01
Isopropylbenzene	ND	1.0		µg/L	1	10/15/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00176

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Field Blank
Lab Order: 0110066
Collection Date: 10/10/01 9:50:00 AM
Project: Bell Trading Post
Lab ID: 0110066-11
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Methylene Chloride	ND	3.0		µg/L	1	10/15/01
n-Butylbenzene	ND	1.0		µg/L	1	10/15/01
n-Propylbenzene	ND	1.0		µg/L	1	10/15/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/15/01
Styrene	ND	1.0		µg/L	1	10/15/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/15/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/15/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/15/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/15/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/15/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/15/01
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/15/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/15/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/15/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/15/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/15/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/15/01
Vinyl chloride	ND	2.0		µg/L	1	10/15/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/15/01
Xylenes, Total	ND	1.0		µg/L	1	10/15/01
Surr: 1,2-Dichloroethane-d4	91.6	74.6-123		%REC	1	10/15/01
Surr: 4-Bromofluorobenzene	101	85.6-117		%REC	1	10/15/01
Surr: Dibromofluoromethane	93.2	78.6-115		%REC	1	10/15/01
Surr: Toluene-d8	101	84.2-115		%REC	1	10/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00177

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT:	Duke Engineering & Services	**Client Sample ID:**	SS-01/Surface
Lab Order:	0110066	**Collection Date:**	10/10/01 8:45:00 AM
Project:	Bell Trading Post		
Lab ID:	0110066-15	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
PCBS BY 8082		**SW8080A**				Analyst: **IC**
Aroclor 1016	ND	0.50		mg/Kg	5	11/2/01
Aroclor 1221	ND	2.5		mg/Kg	5	11/2/01
Aroclor 1232	ND	0.50		mg/Kg	5	11/2/01
Aroclor 1242	ND	0.50		mg/Kg	5	11/2/01
Aroclor 1248	ND	0.50		mg/Kg	5	11/2/01
Aroclor 1254	ND	0.50		mg/Kg	5	11/2/01
Aroclor 1260	ND	0.50		mg/Kg	5	11/2/01
Surr: Decachlorobiphenyl	150	70-130	S	%REC	5	11/2/01
Surr: Tetrachloro-m-xylene	150	70-130	S	%REC	5	11/2/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

ED_013172_00000349-00178

SVL ANALYTICAL, INC.
he Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-01/WATER
Sample Collected: 10/10/01 8:25
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99597
SAMPLE: 279933
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	104	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/19/01
Potassium	22.5	mg/L		200.7	10/17/01
Magnesium	18.2	mg/L		200.7	10/17/01
Sodium	67.3	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	0.02	mg/L		200.7	10/17/01
Barium	0.523	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	0.027	mg/L		200.7	10/17/01
Copper	0.016	mg/L		200.7	10/17/01
Iron	25.1	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	1.30	mg/L		200.7	10/17/01
Lead	0.014	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	0.059	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:35

SVL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-03/WATER
Sample Collected: 10/10/01 9:45
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99597
SAMPLE: 279934
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	160	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/19/01
Potassium	22.5	mg/L		200.7	10/17/01
Magnesium	24.6	mg/L		200.7	10/17/01
Sodium	117	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	0.583	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	0.057	mg/L		200.7	10/17/01
Copper	0.013	mg/L		200.7	10/17/01
Iron	27.3	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	2.42	mg/L		200.7	10/17/01
Lead	0.012	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	0.054	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:35

VL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: EQUIPMENT RINSE-2
Sample Collected: 10/10/01 10:30
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99597
SAMPLE: 279935
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	0.05	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/19/01
Potassium	<1.0	mg/L		200.7	10/17/01
Magnesium	<0.04	mg/L		200.7	10/17/01
Sodium	0.1	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	<0.002	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	<0.006	mg/L		200.7	10/17/01
Copper	<0.003	mg/L		200.7	10/17/01
Iron	0.03	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	<0.002	mg/L		200.7	10/17/01
Lead	<0.005	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	<0.005	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:35

SVL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-01/0'-2'
Sample Collected: 10/10/01 8:06
Sample Receipt : 10/11/01
Date of Report : 10/25/01 As Received Basis

SVL JOB: 99596
SAMPLE: 279929
% Solids: 93.2%
Matrix: SOIL

Determination	Result	Units	Dilution	Method	Analyzed
Cyanide	<0.5	mg/kg		9012A	10/19/01
Silver	2.7	mg/kg		6010B	10/25/01
Arsenic	3.3	mg/kg		6010B	10/25/01
Barium	234	mg/kg		6010B	10/25/01
Cadmium	0.3	mg/kg		6010B	10/25/01
Chromium	7.0	mg/kg		6010B	10/25/01
Copper	10.5	mg/kg		6010B	10/25/01
Iron	8240	mg/kg		6010B	10/25/01
Mercury	<0.033	mg/kg		7471	10/22/01
Manganese	709	mg/kg		6010B	10/25/01
Lead	5.2	mg/kg		6010B	10/25/01
Selenium	<1.0	mg/kg		6010B	10/25/01
Zinc	25.5	mg/kg		6010B	10/25/01

Reviewed By: Blake Johnson Date 10/25/01
10/25/01 14:30

SVL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-03/0'-2'
Sample Collected: 10/10/01 9:20
Sample Receipt : 10/11/01
Date of Report : 10/25/01 As Received Basis

SVL JOB: 99596
SAMPLE: 279930
% Solids: 92.8%
Matrix: SOIL

Determination	Result	Units	Dilution	Method	Analyzed
Cyanide	2.05	mg/kg		9012A	10/19/01
Silver	0.7	mg/kg		6010B	10/25/01
Arsenic	2.0	mg/kg		6010B	10/25/01
Barium	133	mg/kg		6010B	10/25/01
Cadmium	0.3	mg/kg		6010B	10/25/01
Chromium	8.3	mg/kg		6010B	10/25/01
Copper	8.5	mg/kg		6010B	10/25/01
Iron	9570	mg/kg		6010B	10/25/01
Mercury	<0.033	mg/kg		7471	10/22/01
Manganese	427	mg/kg		6010B	10/25/01
Lead	7.7	mg/kg		6010B	10/25/01
Selenium	<1.0	mg/kg		6010B	10/25/01
Zinc	31.0	mg/kg		6010B	10/25/01

Reviewed By: Blake Johnson Date 10/25/01
10/25/01 14:30

Part I Prep Blank and Laboratory Control Sample

Client :Hall Environmental SVL JOB No. :99597

Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found		LCS %R	Analysis Date
Silver	200.7	WATER	mg/L	<0.005	1.00	1.03	103.0	10/17/01
Arsenic	200.7	WATER	mg/L	<0.01	1.00	1.03	103.0	10/17/01
Barium	200.7	WATER	mg/L	<0.002	1.00	1.02	102.0	10/17/01
Calcium	200.7	WATER	mg/L	<0.04	20.0	20.6	103.0	10/17/01
Cadmium	200.7	WATER	mg/L	<0.002	1.00	1.00	100.0	10/17/01
Chromium	200.7	WATER	mg/L	<0.006	1.00	1.03	103.0	10/17/01
Copper	200.7	WATER	mg/L	<0.003	1.00	1.01	101.0	10/17/01
Iron	200.7	WATER	mg/L	<0.02	10.0	10.2	102.0	10/17/01
Potassium	200.7	WATER	mg/L	<1.0	30.0	30.5	101.7	10/17/01
Magnesium	200.7	WATER	mg/L	<0.04	20.0	20.7	103.5	10/17/01
Manganese	200.7	WATER	mg/L	<0.002	1.00	1.01	101.0	10/17/01
Sodium	200.7	WATER	mg/L	<0.1	20.0	20.2	101.0	10/17/01
Lead	200.7	WATER	mg/L	<0.005	1.00	1.00	100.0	10/17/01
Selenium	200.7	WATER	mg/L	<0.01	1.00	1.01	101.0	10/17/01
Zinc	200.7	WATER	mg/L	<0.005	1.00	1.00	100.0	10/17/01
Mercury	245.1	WATER	mg/L	<0.0002	0.0050	0.0049	98.0	10/23/01
Cyanide-TOT	335.4	WATER	mg/L	<0.01	0.15	0.15	100.0	10/19/01

EGEND:

LCS = Laboratory Control Sample LCS %R = LCS Percent Recovery N/A = Not Applicable

ED_013172_00000349-00184

Part I Prep Blank and Laboratory Control Sample

Client :Hall Environmental SVL JOB No. :99596

Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found		LCS %R	Analysis Date
Silver	6010B	SOIL	mg/kg	<0.5	184	195	106.0	10/25/01
Arsenic	6010B	SOIL	mg/kg	<1.0	170	169	99.4	10/25/01
Barium	6010B	SOIL	mg/kg	<0.2	151	159	105.3	10/25/01
Cadmium	6010B	SOIL	mg/kg	<0.2	184	187	101.6	10/25/01
Chromium	6010B	SOIL	mg/kg	<0.6	111	114	102.7	10/25/01
Copper	6010B	SOIL	mg/kg	<0.3	86.0	86.0	100.0	10/25/01
Iron	6010B	SOIL	mg/kg	<2.0	11100	12200	109.9	10/25/01
Manganese	6010B	SOIL	mg/kg	<0.2	359	359	100.0	10/25/01
Lead	6010B	SOIL	mg/kg	<0.5	106	103	97.2	10/25/01
Selenium	6010B	SOIL	mg/kg	<1.0	85.7	78.1	91.1	10/25/01
Zinc	6010B	SOIL	mg/kg	<0.5	371	388	104.6	10/25/01
Mercury	7471	SOIL	mg/kg	<0.033	29.6	37.6	127.0	10/22/01
Cyanide	9012A	SOIL	mg/kg	<0.5	5.60	6.10	108.9	10/19/01

EGEND:

LCS = Laboratory Control Sample LCS %R = LCS Percent Recovery N/A = Not Applicable

ED_013172_00000349-00185

'L ANALYTICAL, INC.

Quality Control Report

Part II Duplicate and Spike Analysis

lient :Hall Environmental

SVL JOB No :99597

est Method	Matrix	QC SAMPLE ID Units	QC SAMPLE ID Result	Duplicate or MSD Found	Duplicate or MSD RPD%	Matrix Spike Result	Matrix Spike SPK ADD	Matrix Spike %R	Analysis Date
200.7	WATER	1 mg/L	<0.005	<0.005	UDL	1.04	1.00	104.0	10/17/01
200.7	WATER	1 mg/L	0.02	0.02	0.0	1.08	1.00	106.0	10/17/01
200.7	WATER	1 mg/L	0.523	0.526	0.6	1.56	1.00	103.7	10/17/01
200.7	WATER	1 mg/L	104	105	1.0	128	20.0	120.0	10/17/01
200.7	WATER	1 mg/L	<0.002	<0.002	UDL	1.02	1.00	102.0	10/17/01
200.7	WATER	1 mg/L	0.027	0.027	0.0	1.05	1.00	102.3	10/17/01
200.7	WATER	1 mg/L	0.016	0.016	0.0	1.04	1.00	102.4	10/17/01
200.7	WATER	1 mg/L	25.1	24.3	3.2	34.5	10.0	94.0	10/17/01
200.7	WATER	1 mg/L	22.5	22.7	0.9	55.4	30.0	109.7	10/17/01
200.7	WATER	1 mg/L	18.2	18.2	0.0	39.7	20.0	107.5	10/17/01
200.7	WATER	1 mg/L	1.30	1.31	0.8	2.36	1.00	106.0	10/17/01
200.7	WATER	1 mg/L	67.3	67.8	0.7	89.5	20.0	111.0	10/17/01
200.7	WATER	1 mg/L	0.014	0.013	7.4	0.998	1.00	98.4	10/17/01
200.7	WATER	1 mg/L	<0.01	<0.01	UDL	1.03	1.00	103.0	10/17/01
200.7	WATER	1 mg/L	0.059	0.058	1.7	1.09	1.00	103.1	10/17/01
245.1	WATER	1 mg/L	<0.0002	<0.0002	UDL	0.0012	0.0010	120.0	10/23/01
335.4	WATER	1 mg/L	<0.01	<0.01	UDL	0.11	0.104	105.8	10/19/01

EGEND:

D% = (|SAM - DUP|/((SAM + DUP)/2) * 100) UDL = Both SAM & DUP not detected. *Result or *Found: Interference reqired dilution.

D% = (|SPK - MSD|/((SPK + MSD)/2) * 100) M in Duplicate/MSD column indicates MSD.

IKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

C Sample 1: SVL SAM No.: 279933 Client Sample ID: SB-01/WATER

ED_013172_00000349-00186

/L ANALYTICAL, INC.

Quality Control Report

Part II Duplicate and Spike Analysis

lient :Hall Environmental

SVL JOB No :99596

est Method	Matrix	QC SAMPLE ID Units	Result	Duplicate or MSD Found		RPD%	Matrix Spike Result	SPK ADD		%R	Analysis Date
6010B	SOIL	1 mg/kg	2.7	114	M	0.9	115	100		112.3	10/25/01
6010B	SOIL	1 mg/kg	3.3	99.0	M	2.5	96.6	100		93.3	10/25/01
6010B	SOIL	1 mg/kg	234	312	M	2.3	305	100		71.0	10/25/01
6010B	SOIL	1 mg/kg	234	N/A		N/A	325	100	A	91.0	10/25/01
6010B	SOIL	1 mg/kg	0.3	92.0	M	2.4	89.8	100		89.5	10/25/01
6010B	SOIL	1 mg/kg	7.0	106	M	2.9	103	100		96.0	10/25/01
6010B	SOIL	1 mg/kg	10.5	108	M	1.9	106	100		95.5	10/25/01
6010B	SOIL	1 mg/kg	8240	10100	M	5.0	9610	1000		R >4S	10/25/01
6010B	SOIL	1 mg/kg	709	540	M	6.7	505	100		R >4S	10/25/01
6010B	SOIL	1 mg/kg	5.2	94.7	M	1.7	93.1	100		87.9	10/25/01
6010B	SOIL	1 mg/kg	<1.0	93.9	M	1.9	92.1	100		92.1	10/25/01
6010B	SOIL	1 mg/kg	25.5	120	M	3.4	116	100		90.5	10/25/01
7471	SOIL	1 mg/kg	<0.033	<0.033		UDL	0.179	0.167		107.2	10/22/01
9012A	SOIL	1 mg/kg	<0.5	<0.5		UDL	5.00	5.00		100.0	10/19/01
Sol. 999	SOIL	1 %	93.2	93.1		0.1	N/A	N/A		N/A	10/23/01

.EGEND:

D% = (|SAM - DUP|/((SAM + DUP)/2) * 100) UDL = Both SAM & DUP not detected. *Result or *Found: Interference reqired dilution.

D% = (|SPK - MSD|/((SPK + MSD)/2) * 100) M in Duplicate/MSD column indicates MSD.

?IKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

)C Sample 1: SVL SAM No.: 279929 Client Sample ID: SB-01/0'-2'

ED_013172_00000349-00187

ED_013172_00000349-00188

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLK** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50776**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.10									
Chloride	ND	0.10									
Nitrogen, Nitrite (As N)	ND	0.10									
Nitrogen, Nitrate (As N)	ND	0.10									
Phosphorus, Orthophosphate (As P)	ND	0.50									
Sulfate	ND	0.50									

Sample ID: **MBLK** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53647**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.10									
Chloride	ND	0.10									
Nitrogen, Nitrite (As N)	ND	0.10									
Nitrogen, Nitrate (As N)	ND	0.10									
Phosphorus, Orthophosphate (As P)	ND	0.50									
Sulfate	ND	0.50									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00189

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-1090** Batch ID: **1090** Test Code: **SW8080A** Units: **mg/Kg** Analysis Date: **11/3/01** Prep Date: **10/22/01**
Client ID: Run ID: **ECD(17A)_011102A** SeqNo: **55092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.010									
Aroclor 1221	ND	0.050									
Aroclor 1232	ND	0.010									
Aroclor 1242	ND	0.010									
Aroclor 1248	ND	0.010									
Aroclor 1254	ND	0.010									
Aroclor 1260	ND	0.010									
Surr: Decachlorobiphenyl	90.44	0	100	0	90.4	70	130	0			
Surr: Tetrachloro-m-xylene	83.23	0	100	0	83.2	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00190

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **5ml rb-b** Batch ID: **R2391** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/11/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011010B** SeqNo: **50979**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%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									
Bromobenzene	ND	1.0									
Bromochloromethane	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	1.0									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	1.0									
2-Chlorotoluene	ND	1.0									
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	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00191

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

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	1.0	
1,1-Dichloropropene	ND	1.0	
Hexachlorobutadiene	ND	1.0	
Isopropylbenzene	ND	1.0	
4-Isopropyltoluene	ND	1.0	
Methylene Chloride	0.278	3.0	J
n-Butylbenzene	ND	1.0	
n-Propylbenzene	ND	1.0	
sec-Butylbenzene	ND	1.0	
Styrene	ND	1.0	
tert-Butylbenzene	ND	1.0	
Tetrachloroethene (PCE)	ND	1.0	
1,1,1,2-Tetrachloroethane	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
trans-1,2-DCE	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Trichloroethene (TCE)	ND	1.0	
Trichlorofluoromethane	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	
Vinyl chloride	ND	2.0	
1,2,3-Trichloropropane	ND	2.0	
Xylenes, Total	ND	1.0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00192

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Surr: 1,2-Dichloroethane-d4	9.078	0	10	0	90.8	74.6	123	0
Surr: 4-Bromofluorobenzene	10.19	0	10	0	102	85.6	117	0
Surr: Dibromofluoromethane	9.606	0	10	0	96.1	78.6	115	0
Surr: Toluene-d8	10.36	0	10	0	104	84.2	115	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00193

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **5ml rb-a** Batch ID: **R2406** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/12/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011012A** SeqNo: **51255**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%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									
Bromobenzene	ND	1.0									
Bromochloromethane	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	1.0									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	1.0									
2-Chlorotoluene	ND	1.0									
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	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00194

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

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	1.0
1,1-Dichloropropene	ND	1.0
Hexachlorobutadiene	ND	1.0
Isopropylbenzene	ND	1.0
4-Isopropyltoluene	ND	1.0
Methylene Chloride	ND	3.0
n-Butylbenzene	ND	1.0
n-Propylbenzene	ND	1.0
sec-Butylbenzene	ND	1.0
Styrene	ND	1.0
tert-Butylbenzene	ND	1.0
Tetrachloroethene (PCE)	ND	1.0
1,1,1,2-Tetrachloroethane	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
trans-1,2-DCE	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Trichloroethene (TCE)	ND	1.0
Trichlorofluoromethane	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
Vinyl chloride	ND	2.0
1,2,3-Trichloropropane	ND	2.0
Xylenes, Total	ND	1.0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00195

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Surr: 1,2-Dichloroethane-d4	8.902	0	10	0	89.0	74.6	123	0
Surr: 4-Bromofluorobenzene	10.11	0	10	0	101	85.6	117	0
Surr: Dibromofluoromethane	9.236	0	10	0	92.4	78.6	115	0
Surr: Toluene-d8	9.884	0	10	0	98.8	84.2	115	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00196

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **5ml rb** Batch ID: **R2412** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/15/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011015A** SeqNo: **51474**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%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									
Bromobenzene	ND	1.0									
Bromochloromethane	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	1.0									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	1.0									
2-Chlorotoluene	ND	1.0									
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	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00197

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

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	1.0
1,1-Dichloropropene	ND	1.0
Hexachlorobutadiene	ND	1.0
Isopropylbenzene	ND	1.0
4-Isopropyltoluene	ND	1.0
Methylene Chloride	ND	3.0
n-Butylbenzene	ND	1.0
n-Propylbenzene	ND	1.0
sec-Butylbenzene	ND	1.0
Styrene	ND	1.0
tert-Butylbenzene	ND	1.0
Tetrachloroethene (PCE)	ND	1.0
1,1,1,2-Tetrachloroethane	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
trans-1,2-DCE	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Trichloroethene (TCE)	ND	1.0
Trichlorofluoromethane	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
Vinyl chloride	ND	2.0
1,2,3-Trichloropropane	ND	2.0
Xylenes, Total	ND	1.0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00198

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Surr: 1,2-Dichloroethane-d4	9.328	0	10	0	93.3	74.6	123	0
Surr: 4-Bromofluorobenzene	10.48	0	10	0	105	85.6	117	0
Surr: Dibromofluoromethane	9.742	0	10	0	97.4	78.6	115	0
Surr: Toluene-d8	10.49	0	10	0	105	84.2	115	0

Sample ID: **MBLK** Batch ID: **R2528** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/30/01** Prep Date:

Client ID: Run ID: **WC_011030E** SeqNo: **54082**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.050									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00199

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110064-15B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50778**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.868	0.10	0	0	0	0	0	0.886	2.05	15	
Nitrogen, Nitrite (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Nitrogen, Nitrate (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Phosphorus, Orthophosphate (As P)	ND	0.50	0	0	0	0	0	0	0	15	

Sample ID: **0109136-01B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50782**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	128.4	5.0	0	0	0	0	0	128	0.349	15	

Sample ID: **0109136-11B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	72.44	2.5	0	0	0	0	0	72.85	0.564	15	

Sample ID: **0109136-21B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50807**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	315.6	10	0	0	0	0	0	314.4	0.363	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00200

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110066-07B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: **SB-01/Water** Run ID: **WC_011010D** SeqNo: **51122**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.641	0.10	0	0	0	0	0	0.665	3.68	15	
Chloride	31.93	0.10	0	0	0	0	0	31.75	0.540	15	
Nitrogen, Nitrite (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Nitrogen, Nitrate (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Phosphorus, Orthophosphate (As P)	ND	0.50	0	0	0	0	0	0	0	15	

Sample ID: **0110116-01A** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53651**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.176	0.10	0	0	0	0	0	0.178	1.13	15	
Chloride	1.234	0.10	0	0	0	0	0	1.246	0.968	15	
Sulfate	23.76	0.50	0	0	0	0	0	23.42	1.44	15	

Sample ID: **0110117-01B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53654**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.261	0.10	0	0	0	0	0	0.268	2.65	15	
Chloride	3.697	0.10	0	0	0	0	0	3.724	0.728	15	
Sulfate	19.73	0.50	0	0	0	0	0	19.66	0.381	15	

Sample ID: **0110042-01C** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53661**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.674	1.0	0	0	0	0	0	1.737	3.69	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00201

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110108-04B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53690**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	939.8	25	0	0	0	0	0	942.4	0.280	15	

Sample ID: **0110086-10B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53969**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	175.1	5.0	0	0	0	0	0	175.7	0.380	15	

Sample ID: **0110151-01B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53990**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	959.6	25	0	0	0	0	0	953.8	0.604	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00202

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110066-02a dup** Batch ID: **R2391** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/11/01** Prep Date:
Client ID: **SB-03/Soil Gas** Run ID: **NEPTUNE_011010B** SeqNo: **51018**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.10	0	0	0	0	0	0	0	20	
Trichloroethene	3.283	0.10	0	0	0	0	0	3.378	2.85	20	E
Benzene	ND	0.10	0	0	0	0	0	0	0	20	
Toluene	0.0254	0.10	0	0	0	0	0	0.0262	0	20	J
Ethylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Methyl tert-butyl ether (MTBE)	ND	0.10	0	0	0	0	0	0	0	20	
1,2,4-Trimethylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,3,5-Trimethylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dichloroethane (EDC)	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dibromoethane (EDB)	ND	0.10	0	0	0	0	0	0	0	20	
Naphthalene	ND	0.20	0	0	0	0	0	0	0	20	
1-Methylnaphthalene	ND	0.40	0	0	0	0	0	0	0	20	
2-Methylnaphthalene	ND	0.40	0	0	0	0	0	0	0	20	
Bromobenzene	ND	0.10	0	0	0	0	0	0	0	20	
Bromochloromethane	ND	0.10	0	0	0	0	0	0	0	20	
Bromodichloromethane	ND	0.10	0	0	0	0	0	0	0	20	
Bromoform	ND	0.10	0	0	0	0	0	0	0	20	
Bromomethane	ND	0.10	0	0	0	0	0	0	0	20	
Carbon tetrachloride	ND	0.10	0	0	0	0	0	0	0	20	
Chlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
Chloroethane	ND	0.20	0	0	0	0	0	0	0	20	
Chloroform	ND	0.10	0	0	0	0	0	0	0	20	
Chloromethane	ND	0.10	0	0	0	0	0	0	0	20	
cis-1,2-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
2-Chlorotoluene	ND	0.10	0	0	0	0	0	0	0	20	
4-Chlorotoluene	ND	0.10	0	0	0	0	0	0	0	20	
cis-1,3-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	
Dibromochloromethane	ND	0.10	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00203

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

1,2-Dibromo-3-chloropropane	ND	0.20	0	0	0	0	0	0	0	20	
Dibromomethane	ND	0.20	0	0	0	0	0	0	0	20	
Dichlorodifluoromethane	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,3-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,4-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
1,3-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
2,2-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	
Hexachlorobutadiene	ND	0.10	0	0	0	0	0	0	0	20	
Isopropylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Methylene chloride	0.0518	0.30	0	0	0	0	0	0.0392	0	20	J
4-Isopropyltoluene	ND	0.10	0	0	0	0	0	0	0	20	
n-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
n-Propylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
sec-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Styrene	ND	0.10	0	0	0	0	0	0	0	20	
tert-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,1,2-Tetrachloroethane	ND	0.10	0	0	0	0	0	0	0	20	
trans-1,2-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.10	0	0	0	0	0	0	0	20	
trans-1,3-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	
Trichlorofluoromethane	ND	0.10	0	0	0	0	0	0	0	20	
Vinyl chloride	ND	0.20	0	0	0	0	0	0	0	20	
1,2,3-Trichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,2,4-Trichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,1-Trichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,1,2-Trichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,2,3-Trichloropropane	ND	0.20	0	0	0	0	0	0	0	20	
Xylenes, Total	ND	0.10	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00204

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

Surr: 4-Bromofluorobenzene	1.028	0	1	0	103	87.2	119	1.027	0.0973	20
Surr: Dibromofluoromethane	0.9372	0	1	0	93.7	75.7	113	0.954	1.78	20
Surr: Toluene-d8	1.006	0	1	0	101	88.8	113	1.01	0.476	20

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

ED_013172_00000349-00205

Hall Environmental Analysis Laboratory

Date: *06-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0109136-01B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50783**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	137.3	5.0	10	128	92.9	30	150	0			

Sample ID: **0109136-11B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50795**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	82.76	2.5	10	72.85	99.1	30	150	0			

Sample ID: **0110066-07B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: **SB-01/Water** Run ID: **WC_011010D** SeqNo: **51123**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	2.078	0.10	2	0.665	70.7	30	150	0			
Chloride	35.66	0.10	4	31.75	97.7	30	150	0			
Nitrogen, Nitrite (As N)	1.755	0.10	2	0	87.8	30	150	0			
Nitrogen, Nitrate (As N)	5.676	0.10	6	0	94.6	30	150	0			
Phosphorus, Orthophosphate (As P)	3.807	0.50	4	0	95.2	30	150	0			

Sample ID: **0110116-01A** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53652**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.627	0.10	1.5	0.178	96.6	30	150	0			
Chloride	5.801	0.10	6	1.246	75.9	30	150	0			
Sulfate	32.82	0.50	10	23.42	94.1	30	150	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00206

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0110117-01B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53655**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.771	0.10	1.5	0.268	100	30	150	0			
Chloride	7.95	0.10	6	3.724	70.4	30	150	0			
Sulfate	29.67	0.50	10	19.66	100	30	150	0			

Sample ID: **0110042-01C** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53662**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	3.071	1.0	1.5	1.737	88.9	30	150	0			

Sample ID: **0110108-04B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53691**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	952.7	25	10	942.4	103	30	150	0			

Sample ID: **0110066-07B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: **SB-01/Water** Run ID: **WC_011026C** SeqNo: **53700**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	121.7	2.5	10	0	1220	30	150	0			S

Sample ID: **0110086-10B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53970**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	186.8	5.0	10	175.7	111	30	150	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00207

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0110151-01B** Batch ID: **R2503** Test Code: **E300** Units: **mg/L** Analysis Date: **10/26/01** Prep Date:
Client ID: Run ID: **WC_011026C** SeqNo: **53991**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	965.1	25	10	953.8	113	30	150	0			

Sample ID: **0110073-01a ms** Batch ID: **R2391** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/11/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011010B** SeqNo: **50981**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	22.09	1.0	20	1.164	105	85.3	120	0			
Toluene	21.55	1.0	20	0	108	73	123	0			
Chlorobenzene	21.42	1.0	20	0	107	84.7	119	0			
1,1-Dichloroethene	18.84	1.0	20	0	94.2	83.4	122	0			
Trichloroethene (TCE)	21.59	1.0	20	0.8	104	76.1	126	0			
Surr: 1,2-Dichloroethane-d4	32.3	0	30	0	108	81.5	125	0			
Surr: 4-Bromofluorobenzene	34.55	0	30	0	115	85.6	117	0			
Surr: Dibromofluoromethane	31.9	0	30	0	106	84.2	117	0			
Surr: Toluene-d8	33.34	0	30	0	111	89.4	116	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00208

CLIENT: Duke Engineering & Services
Work Order: 0110066
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0110069-01a ms** Batch ID: **R2406** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/13/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011012A** SeqNo: **51257**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	21.4	1.0	20	0	107	85.3	120	0			
Toluene	20.45	1.0	20	0	102	73	123	0			
Chlorobenzene	20.28	1.0	20	0	101	84.7	119	0			
1,1-Dichloroethene	19.57	1.0	20	0	97.9	83.4	122	0			
Trichloroethene (TCE)	20.69	1.0	20	0	103	76.1	126	0			
Surr: 1,2-Dichloroethane-d4	28.75	0	30	0	95.8	81.5	125	0			
Surr: 4-Bromofluorobenzene	31.68	0	30	0	106	85.6	117	0			
Surr: Dibromofluoromethane	29.61	0	30	0	98.7	84.2	117	0			
Surr: Toluene-d8	30.25	0	30	0	101	89.4	116	0			

Sample ID: **0110066-10B** Batch ID: **R2528** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/30/01** Prep Date:
Client ID: **SB-03/Water** Run ID: **WC_011030E** SeqNo: **54085**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	10.92	0.050	10	0	109	80	120	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00209

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENGINEERING & SERVICES

Address: 6501 AMERICA'S PARKWAY NE #810 ALBUQUERQUE, NM 87110

Phone #: (505) 246-1600 EXT. 219

Fax #: (505) 246-2600

Project Name: BELL TRADING POST

Project #: 00736.00.00004.02.00011

Project Manager: JOE TRACY

Sampler: JOE TRACY

Samples Cold?: ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: ¼	HEAL No.
10/10/01	0810	Soil Gas	SB-01/Soil Gas	1			X	01100066-1
1	0928	Soil Gas	SB-03/Soil Gas	1			X	-2

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)			Air Bubbles or Headspace (Y or N)
												X				
												X				

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
10/10/01	1207		
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
			10/10/01 1200

Remarks:

ED_013172_00000349-00210

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG. & SERVICES

Project Name: BELL TRADING POST

Address: 6501 AMERICAS PARKWAY NE #810 ALBUQUERQUE NM 87110

Project #: 00736.00.0004.02.00011

Project Manager: JOE TRACY

Phone #: (505) 246-1600 EXT. 219

Sampler: JOE TRACY

Fax #: (505) 246-2600

Samples Cold?: ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HCl	Preservative N/A	HEAL No.
10/9/01	0939	SOIL	SB-07/2'-4'	3/4oz			X	01100166-3
	1500		SD-04/2'-4'				X	-4
	1108		SB-10/0-2'				X	-5
↓	~	↓	GEOTECH DUP-1	↓			X	-6

HOLD

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	GEOTECHNICAL PROP.: BULK DENSITY, POROSITY, VOL. WATER CONTENT, MOISTURE CONTENT, FRACTIONAL ORGANIC	Air Bubbles or Headspace (Y or N)
														X	
														X	
														X	
														X	

Bad Sieve Analysis

Date: 10/10/01 Time: 1208 Relinquished By: (Signature)

Received By: (Signature) 10-10-01 1208

Date: Time: Relinquished By: (Signature)

Received By: (Signature)

Remarks: HOLD ALL SAMPLES

ED_013172_00000349-00211

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG & SERVICES

Address: 6501 AMERICAS PARKWAY NE #810 ALBUQUERQUE, NM 87110

Phone #: (505) 246-1600 EXT. 219

Fax #: (505) 246-2600

Project Name: BELL TRADING POST

Project #: 00736.00.0004.02.00011

Project Manager: JOE TRACY

Sampler: JOE TRACY

Samples Cold?: ☐ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: N/A	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg) + pH, NH_3	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	CYANIDE 335.4	NMWQCC METALS 6010/7471*	Air Bubbles or Headspace (Y or N)
10/10/01	0825	WATER	SB-01/WATER	7	3	0	1	01100006-7										X	X		X		X	X	
	0806	SOIL	SB-01/0-2'	2			2	-8															X	X	
	0808	SOIL	SB-01/2'-4'	2			2	-9															X	X	
	0945	WATER	SB-03/WATER	7	3	0	1	-10										X	X		X		X	X	
	0950	WATER	FIELD BLANK	3	3			-11													X				
	1030	WATER	EQ. RINSE-2	2			#	-12															X	X	
	0920	SOIL	SB-03/0-2'	2			2	-13															X	X	
	0922	SOIL	SB-03/2'-4'	2			2	-14															X	X	
10/10/01	0845	SOIL	SS-01/SURFACE	2			2	-15												X					

Date: 10/10/01 Time: 1206 Relinquished By: (Signature)

Received By: (Signature) 10-10-01 1200

Date: Time: Relinquished By: (Signature)

Received By: (Signature)

Remarks: *NMWQCC METALS - AL, BA, HG, SE, AG, CD, CR, PB, CU, FE, MN, ZN

PLEASE HOLD SAMPLES SB-01/2'-4' & SB-03/2'-4' & SS-01

Hall Environmental Analysis Laboratory

COVER LETTER

November 02, 2001

Joe Tracy
Duke Engineering & Services
One Park Center
6501 Americas Pkwy., NE Ste. 810
Albuquerque, NM 87110
TEL: (505) 246-1600
FAX (505) 246-2600

RE: Bell Trading Post Order No.: 0110064

Dear Joe Tracy:

Hall Environmental Analysis Laboratory received 38 samples on 10/9/01 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

ED_013172_00000349-00212

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-12 Water
Lab Order: 0110064
Collection Date: 10/9/01 12:40:00 PM
Project: Bell Trading Post
Lab ID: 0110064-15
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY 300.0		**E300**				Analyst: **DJB**
Fluoride	0.89	0.10		mg/L	1	10/10/01
Chloride	57	1.0		mg/L	10	10/11/01
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	10/10/01
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	10/10/01
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	10/10/01
Sulfate	180	5.0		mg/L	10	10/11/01
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00213

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-12 Water
Lab Order: 0110064
Collection Date: 10/9/01 12:40:00 PM
Project: Bell Trading Post
Lab ID: 0110064-15
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	1.5	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	86.9	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	103	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	96.5	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	101	84.2-115		%REC	1	10/12/01
AMMONIA AS N		**E350.2**				Analyst: **HVA**
Nitrogen, Ammonia	0.84	0.050		mg/L	1	10/18/01
PH BY 150.1		**E150.1**				Analyst: **HVA**
pH	7.20	0.010		pH units	1	10/16/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00214

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Water Dup 1
Lab Order: 0110064
Collection Date: 10/9/01
Project: Bell Trading Post
Lab ID: 0110064-16
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY 300.0		**E300**				Analyst: **DJB**
Fluoride	0.80	0.10		mg/L	1	10/10/01
Chloride	54	1.0		mg/L	10	10/11/01
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	10/10/01
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	10/10/01
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	10/10/01
Sulfate	170	5.0		mg/L	10	10/11/01
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00215

CLIENT: Duke Engineering & Services
Lab Order: 0110064
Project: Bell Trading Post
Lab ID: 0110064-16

Client Sample ID: Water Dup 1
Collection Date: 10/9/01
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	1.5	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	90.6	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	104	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	97.2	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	101	84.2-115		%REC	1	10/12/01
AMMONIA AS N		**E350.2**				Analyst: **HVA**
Nitrogen, Ammonia	0.80	0.050		mg/L	1	10/18/01
PH BY 150.1		**E150.1**				Analyst: **HVA**
pH	7.13	0.010		pH units	1	10/16/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00216

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-04/Water
Lab Order: 0110064
Collection Date: 10/9/01 3:25:00 PM
Project: Bell Trading Post
Lab ID: 0110064-25
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY 300.0		**E300**				Analyst: **DJB**
Fluoride	0.80	0.10		mg/L	1	10/10/01
Chloride	36	0.10		mg/L	1	10/10/01
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	10/10/01
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	10/10/01
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	10/10/01
Sulfate	100	2.5		mg/L	5	10/11/01
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00217

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-04/Water
Lab Order: 0110064
Collection Date: 10/9/01 3:25:00 PM
Project: Bell Trading Post
Lab ID: 0110064-25
Matrix: AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	83.6	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	102	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	95.7	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	102	84.2-115		%REC	1	10/12/01
AMMONIA AS N		**E350.2**				Analyst: **HVA**
Nitrogen, Ammonia	0.70	0.050		mg/L	1	10/18/01
PH BY 150.1		**E150.1**				Analyst: **HVA**
pH	7.70	0.010		pH units	1	10/16/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00218

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-06/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 8:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-27
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	0.20	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00219

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-06/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 8:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-27
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	105	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	98.2	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	104	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00220

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-05/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 9:12:00 AM
Project: Bell Trading Post
Lab ID: 0110064-28
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	0.65	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00221

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-05/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 9:12:00 AM
Project: Bell Trading Post
Lab ID: 0110064-28
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	102	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	94.8	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	101	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00222

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-07/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 9:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-29
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	1.7	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00223

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-07/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 9:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-29
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	101	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	93.0	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	99.3	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00224

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-08/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 10:07:00 AM
Project: Bell Trading Post
Lab ID: 0110064-30
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00225

CLIENT: Duke Engineering & Services
Client Sample ID: SB-08/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 10:07:00 AM
Project: Bell Trading Post
Lab ID: 0110064-30
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	100	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	92.2	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	98.8	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00226

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-09/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 10:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-31
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00227

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-09/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 10:41:00 AM
Project: Bell Trading Post
Lab ID: 0110064-31
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	102	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	93.1	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	99.7	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00228

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-10/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 11:12:00 AM
Project: Bell Trading Post
Lab ID: 0110064-32
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00229

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-10/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 11:12:00 AM
Project: Bell Trading Post
Lab ID: 0110064-32
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	101	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	95.3	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	99.6	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00230

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-11/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 11:43:00 AM
Project: Bell Trading Post
Lab ID: 0110064-33
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00231

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-11/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 11:43:00 AM
Project: Bell Trading Post
Lab ID: 0110064-33
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	103	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	98.9	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	102	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00232

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-12/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 12:17:00 PM
Project: Bell Trading Post
Lab ID: 0110064-34
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00233

CLIENT: Duke Engineering & Services
Client Sample ID: SB-12/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 12:17:00 PM
Project: Bell Trading Post
Lab ID: 0110064-34
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	102	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	90.4	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	98.3	88.8-113		%REC	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00234

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Soil Gas Dup-1
Lab Order: 0110064
Collection Date: 10/9/01
Project: Bell Trading Post
Lab ID: 0110064-35
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/10/01
Trichloroethene	ND	0.10		µg/L	1	10/10/01
Benzene	ND	0.10		µg/L	1	10/10/01
Toluene	ND	0.10		µg/L	1	10/10/01
Ethylbenzene	ND	0.10		µg/L	1	10/10/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/10/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/10/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/10/01
Naphthalene	ND	0.20		µg/L	1	10/10/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/10/01
Bromobenzene	ND	0.10		µg/L	1	10/10/01
Bromochloromethane	ND	0.10		µg/L	1	10/10/01
Bromodichloromethane	ND	0.10		µg/L	1	10/10/01
Bromoform	ND	0.10		µg/L	1	10/10/01
Bromomethane	ND	0.10		µg/L	1	10/10/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/10/01
Chlorobenzene	ND	0.10		µg/L	1	10/10/01
Chloroethane	ND	0.20		µg/L	1	10/10/01
Chloroform	ND	0.10		µg/L	1	10/10/01
Chloromethane	ND	0.10		µg/L	1	10/10/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/10/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Dibromochloromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/10/01
Dibromomethane	ND	0.20		µg/L	1	10/10/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/10/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/10/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/10/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/10/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00235

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Soil Gas Dup-1
Lab Order: 0110064
Collection Date: 10/9/01
Project: Bell Trading Post
Lab ID: 0110064-35
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/10/01
Methylene chloride	ND	0.30		µg/L	1	10/10/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/10/01
n-Butylbenzene	ND	0.10		µg/L	1	10/10/01
n-Propylbenzene	ND	0.10		µg/L	1	10/10/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/10/01
Styrene	ND	0.10		µg/L	1	10/10/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/10/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/10/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/10/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/10/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/10/01
Vinyl chloride	ND	0.20		µg/L	1	10/10/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/10/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/10/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/10/01
Xylenes, Total	ND	0.10		µg/L	1	10/10/01
Surr: 4-Bromofluorobenzene	100	87.2-119		%REC	1	10/10/01
Surr: Dibromofluoromethane	93.5	75.7-113		%REC	1	10/10/01
Surr: Toluene-d8	98.4	88.8-113		%REC	1	10/10/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00236

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-02/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 2:28:00 PM
Project: Bell Trading Post
Lab ID: 0110064-36
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/11/01
Trichloroethene	0.45	0.10		µg/L	1	10/11/01
Benzene	ND	0.10		µg/L	1	10/11/01
Toluene	ND	0.10		µg/L	1	10/11/01
Ethylbenzene	ND	0.10		µg/L	1	10/11/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/11/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/11/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/11/01
Naphthalene	ND	0.20		µg/L	1	10/11/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
Bromobenzene	ND	0.10		µg/L	1	10/11/01
Bromochloromethane	ND	0.10		µg/L	1	10/11/01
Bromodichloromethane	ND	0.10		µg/L	1	10/11/01
Bromoform	ND	0.10		µg/L	1	10/11/01
Bromomethane	ND	0.10		µg/L	1	10/11/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/11/01
Chlorobenzene	ND	0.10		µg/L	1	10/11/01
Chloroethane	ND	0.20		µg/L	1	10/11/01
Chloroform	ND	0.10		µg/L	1	10/11/01
Chloromethane	ND	0.10		µg/L	1	10/11/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Dibromochloromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/11/01
Dibromomethane	ND	0.20		µg/L	1	10/11/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/11/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00237

CLIENT: Duke Engineering & Services
Client Sample ID: SB-02/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 2:28:00 PM
Project: Bell Trading Post
Lab ID: 0110064-36
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/11/01
Methylene chloride	ND	0.30		µg/L	1	10/11/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/11/01
n-Butylbenzene	ND	0.10		µg/L	1	10/11/01
n-Propylbenzene	ND	0.10		µg/L	1	10/11/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/11/01
Styrene	ND	0.10		µg/L	1	10/11/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/11/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/11/01
Vinyl chloride	ND	0.20		µg/L	1	10/11/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/11/01
Xylenes, Total	ND	0.10		µg/L	1	10/11/01
Surr: 4-Bromofluorobenzene	104	87.2-119		%REC	1	10/11/01
Surr: Dibromofluoromethane	93.5	75.7-113		%REC	1	10/11/01
Surr: Toluene-d8	102	88.8-113		%REC	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00238

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT:	Duke Engineering & Services	**Client Sample ID:**	SB-04/Soil Gas
Lab Order:	0110064	**Collection Date:**	10/9/01 3:06:00 PM
Project:	Bell Trading Post		
Lab ID:	0110064-37	**Matrix:**	AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Tetrachloroethene	ND	0.10		µg/L	1	10/11/01
Trichloroethene	0.68	0.10		µg/L	1	10/11/01
Benzene	ND	0.10		µg/L	1	10/11/01
Toluene	ND	0.10		µg/L	1	10/11/01
Ethylbenzene	ND	0.10		µg/L	1	10/11/01
Methyl tert-butyl ether (MTBE)	ND	0.10		µg/L	1	10/11/01
1,2,4-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,3,5-Trimethylbenzene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloroethane (EDC)	ND	0.10		µg/L	1	10/11/01
1,2-Dibromoethane (EDB)	ND	0.10		µg/L	1	10/11/01
Naphthalene	ND	0.20		µg/L	1	10/11/01
1-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
2-Methylnaphthalene	ND	0.40		µg/L	1	10/11/01
Bromobenzene	ND	0.10		µg/L	1	10/11/01
Bromochloromethane	ND	0.10		µg/L	1	10/11/01
Bromodichloromethane	ND	0.10		µg/L	1	10/11/01
Bromoform	ND	0.10		µg/L	1	10/11/01
Bromomethane	ND	0.10		µg/L	1	10/11/01
Carbon tetrachloride	ND	0.10		µg/L	1	10/11/01
Chlorobenzene	ND	0.10		µg/L	1	10/11/01
Chloroethane	ND	0.20		µg/L	1	10/11/01
Chloroform	ND	0.10		µg/L	1	10/11/01
Chloromethane	ND	0.10		µg/L	1	10/11/01
cis-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
2-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
4-Chlorotoluene	ND	0.10		µg/L	1	10/11/01
cis-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Dibromochloromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dibromo-3-chloropropane	ND	0.20		µg/L	1	10/11/01
Dibromomethane	ND	0.20		µg/L	1	10/11/01
Dichlorodifluoromethane	ND	0.10		µg/L	1	10/11/01
1,2-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,3-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,4-Dichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,3-Dichloropropane	ND	0.10		µg/L	1	10/11/01
2,2-Dichloropropane	ND	0.10		µg/L	1	10/11/01
1,1-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Hexachlorobutadiene	ND	0.10		µg/L	1	10/11/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quanititation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

ED_013172_00000349-00239

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: SB-04/Soil Gas
Lab Order: 0110064
Collection Date: 10/9/01 3:06:00 PM
Project: Bell Trading Post
Lab ID: 0110064-37
Matrix: AIR

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Isopropylbenzene	ND	0.10		µg/L	1	10/11/01
Methylene chloride	ND	0.30		µg/L	1	10/11/01
4-Isopropyltoluene	ND	0.10		µg/L	1	10/11/01
n-Butylbenzene	ND	0.10		µg/L	1	10/11/01
n-Propylbenzene	ND	0.10		µg/L	1	10/11/01
sec-Butylbenzene	ND	0.10		µg/L	1	10/11/01
Styrene	ND	0.10		µg/L	1	10/11/01
tert-Butylbenzene	ND	0.10		µg/L	1	10/11/01
1,1,1,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,2-Dichloroethene	ND	0.10		µg/L	1	10/11/01
1,1,2,2-Tetrachloroethane	ND	0.10		µg/L	1	10/11/01
trans-1,3-Dichloropropene	ND	0.10		µg/L	1	10/11/01
Trichlorofluoromethane	ND	0.10		µg/L	1	10/11/01
Vinyl chloride	ND	0.20		µg/L	1	10/11/01
1,2,3-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,2,4-Trichlorobenzene	ND	0.10		µg/L	1	10/11/01
1,1,1-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,1,2-Trichloroethane	ND	0.10		µg/L	1	10/11/01
1,2,3-Trichloropropane	ND	0.20		µg/L	1	10/11/01
Xylenes, Total	ND	0.10		µg/L	1	10/11/01
Surr: 4-Bromofluorobenzene	107	87.2-119		%REC	1	10/11/01
Surr: Dibromofluoromethane	92.5	75.7-113		%REC	1	10/11/01
Surr: Toluene-d8	98.1	88.8-113		%REC	1	10/11/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00240

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Trip Blank
Lab Order: 0110064
Collection Date:
Project: Bell Trading Post
Lab ID: 0110064-38
Matrix: TRIP BLANK

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY 8260B		**SW8260B**				Analyst: **JDC**
Benzene	ND	1.0		µg/L	1	10/12/01
Toluene	ND	1.0		µg/L	1	10/12/01
Ethylbenzene	ND	1.0		µg/L	1	10/12/01
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/12/01
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/12/01
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/12/01
Naphthalene	ND	2.0		µg/L	1	10/12/01
1-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
2-Methylnaphthalene	ND	4.0		µg/L	1	10/12/01
Bromobenzene	ND	1.0		µg/L	1	10/12/01
Bromochloromethane	ND	1.0		µg/L	1	10/12/01
Bromodichloromethane	ND	1.0		µg/L	1	10/12/01
Bromoform	ND	1.0		µg/L	1	10/12/01
Bromomethane	ND	1.0		µg/L	1	10/12/01
Carbon Tetrachloride	ND	1.0		µg/L	1	10/12/01
Chlorobenzene	ND	1.0		µg/L	1	10/12/01
Chloroethane	ND	2.0		µg/L	1	10/12/01
Chloroform	ND	1.0		µg/L	1	10/12/01
Chloromethane	ND	1.0		µg/L	1	10/12/01
2-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
4-Chlorotoluene	ND	1.0		µg/L	1	10/12/01
cis-1,2-DCE	ND	1.0		µg/L	1	10/12/01
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/12/01
Dibromochloromethane	ND	1.0		µg/L	1	10/12/01
Dibromomethane	ND	2.0		µg/L	1	10/12/01
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/12/01
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloroethene	ND	1.0		µg/L	1	10/12/01
1,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,3-Dichloropropane	ND	1.0		µg/L	1	10/12/01
2,2-Dichloropropane	ND	1.0		µg/L	1	10/12/01
1,1-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Hexachlorobutadiene	ND	1.0		µg/L	1	10/12/01
Isopropylbenzene	ND	1.0		µg/L	1	10/12/01
4-Isopropyltoluene	ND	1.0		µg/L	1	10/12/01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00241

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Client Sample ID: Trip Blank
Lab Order: 0110064
Collection Date:
Project: Bell Trading Post
Lab ID: 0110064-38
Matrix: TRIP BLANK

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Methylene Chloride	ND	3.0		µg/L	1	10/12/01
n-Butylbenzene	ND	1.0		µg/L	1	10/12/01
n-Propylbenzene	ND	1.0		µg/L	1	10/12/01
sec-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Styrene	ND	1.0		µg/L	1	10/12/01
tert-Butylbenzene	ND	1.0		µg/L	1	10/12/01
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/12/01
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	1	10/12/01
trans-1,2-DCE	ND	1.0		µg/L	1	10/12/01
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/12/01
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/12/01
Trichlorofluoromethane	ND	1.0		µg/L	1	10/12/01
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/12/01
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/12/01
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/12/01
Vinyl chloride	ND	2.0		µg/L	1	10/12/01
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/12/01
Xylenes, Total	ND	1.0		µg/L	1	10/12/01
Surr: 1,2-Dichloroethane-d4	89.6	74.6-123		%REC	1	10/12/01
Surr: 4-Bromofluorobenzene	102	85.6-117		%REC	1	10/12/01
Surr: Dibromofluoromethane	85.8	78.6-115		%REC	1	10/12/01
Surr: Toluene-d8	100	84.2-115		%REC	1	10/12/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ED_013172_00000349-00242

ED_013172_00000349-00243

SVL ANALYTICAL, INC.
One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT : Hall Environmental
PROJECT: BELL TRADING

Sample Receipt: 10/11/01
Report Date: 10/25/01

SVL JOB: 99594

SVL ID	CLIENT SAMPLE ID		Ag 6010B	As 6010B	Ba 6010B	Cd 6010B	Cr 6010B	Cu 6010B	Fe 6010B	Mn 6010B
S279910	SB-06/0'-2'	10/09/01	0.6mg/kg	2.3mg/kg	128mg/kg	<0.2mg/kg	5.3mg/kg	3.8mg/kg	8860mg/kg	480mg/kg
S279911	SB-05/0'-2'	10/09/01	0.9mg/kg	3.7mg/kg	130mg/kg	0.3mg/kg	7.6mg/kg	9.0mg/kg	8420mg/kg	284mg/kg
S279912	SB-07/0'-2'	10/09/01	1.8mg/kg	5.7mg/kg	186mg/kg	0.6mg/kg	10.8mg/kg	27.1mg/kg	20500mg/kg	319mg/kg
S279913	SB-08/0'-2'	10/09/01	0.8mg/kg	2.3mg/kg	115mg/kg	<0.2mg/kg	7.2mg/kg	8.1mg/kg	8180mg/kg	258mg/kg
S279914	SOIL DUP 1/0'-2'	10/09/01	0.7mg/kg	2.9mg/kg	116mg/kg	<0.2mg/kg	7.0mg/kg	7.4mg/kg	8270mg/kg	276mg/kg
S279915	SB-09/0'-2'	10/09/01	1.0mg/kg	3.8mg/kg	144mg/kg	0.3mg/kg	8.0mg/kg	13.7mg/kg	12700mg/kg	311mg/kg
S279916	SB-10/0'-2'	10/09/01	4.3mg/kg	5.2mg/kg	103mg/kg	0.6mg/kg	10.2mg/kg	48.1mg/kg	34900mg/kg	296mg/kg
S279917	SB-11/0'-2'	10/09/01	2.3mg/kg	2.0mg/kg	93.7mg/kg	<0.2mg/kg	6.0mg/kg	6.5mg/kg	7350mg/kg	184mg/kg
S279918	SB-12/0'-2'	10/09/01	9.3mg/kg	2.2mg/kg	124mg/kg	0.5mg/kg	11.1mg/kg	13.5mg/kg	9920mg/kg	245mg/kg
S279919	SB-02/0'-2'	10/09/01	4.4mg/kg	2.8mg/kg	115mg/kg	0.5mg/kg	7.7mg/kg	19.1mg/kg	9600mg/kg	281mg/kg
S279920	SB-04/0'-2'	10/09/01	1.2mg/kg	4.5mg/kg	314mg/kg	0.4mg/kg	13.6mg/kg	15.5mg/kg	12300mg/kg	259mg/kg

Soil Samples: As Received Basis

Reviewed By: Blake Johnson Date: 10/25/01

ED_013172_00000349-00244

SVL ANALYTICAL, INC.
One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT : Hall Environmental
PROJECT: BELL TRADING

Sample Receipt: 10/11/01
Report Date: 10/25/01

SVL JOB: 99594

SVL ID	CLIENT SAMPLE ID		Pb 6010B	Se 6010B	Zn 6010B	Hg 7471	CN 9012A	% Sol. 999
S279910	SB-06/0'-2'	10/09/01	3.9mg/kg	<1.0mg/kg	14.9mg/kg	<0.033mg/kg	<0.5mg/kg	96.8%
S279911	SB-05/0'-2'	10/09/01	34.0mg/kg	<1.0mg/kg	61.3mg/kg	0.096mg/kg	<0.5mg/kg	96.0%
S279912	SB-07/0'-2'	10/09/01	100mg/kg	<1.0mg/kg	119mg/kg	0.555mg/kg	<0.5mg/kg	95.5%
S279913	SB-08/0'-2'	10/09/01	62.7mg/kg	<1.0mg/kg	38.5mg/kg	0.100mg/kg	<0.5mg/kg	94.4%
S279914	SOIL DUP 1/0'-2'	10/09/01	52.2mg/kg	<1.0mg/kg	32.4mg/kg	0.112mg/kg	<0.5mg/kg	94.8%
S279915	SB-09/0'-2'	10/09/01	35.6mg/kg	<1.0mg/kg	51.5mg/kg	0.128mg/kg	<0.5mg/kg	91.1%
S279916	SB-10/0'-2'	10/09/01	38.3mg/kg	<1.0mg/kg	49.6mg/kg	0.055mg/kg	<0.5mg/kg	97.0%
S279917	SB-11/0'-2'	10/09/01	16.3mg/kg	<1.0mg/kg	24.9mg/kg	<0.033mg/kg	<0.5mg/kg	97.8%
S279918	SB-12/0'-2'	10/09/01	144mg/kg	<1.0mg/kg	89.4mg/kg	0.120mg/kg	<0.5mg/kg	97.3%
S279919	SB-02/0'-2'	10/09/01	7.3mg/kg	<1.0mg/kg	30.6mg/kg	<0.033mg/kg	<0.5mg/kg	91.7%
S279920	SB-04/0'-2'	10/09/01	17.8mg/kg	<1.0mg/kg	91.6mg/kg	<0.033mg/kg	<0.5mg/kg	91.6%

Soil Samples: As Received Basis

Reviewed By: Blaine Johnson Date: 10/25/01

SVL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-12 WATER
Sample Collected: 10/09/01 12:40
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99595
SAMPLE: 279923
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	159	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/17/01
Potassium	23.9	mg/L		200.7	10/17/01
Magnesium	25.6	mg/L		200.7	10/17/01
Sodium	137	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	0.795	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	0.072	mg/L		200.7	10/17/01
Copper	0.031	mg/L		200.7	10/17/01
Iron	51.3	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	2.31	mg/L		200.7	10/17/01
Lead	0.027	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	0.122	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:32

VL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: WATER DUP 1
Sample Collected: 10/09/01 12:40
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99595
SAMPLE: 279924
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	126	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/17/01
Potassium	17.9	mg/L		200.7	10/17/01
Magnesium	19.8	mg/L		200.7	10/17/01
Sodium	135	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	0.222	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	0.009	mg/L		200.7	10/17/01
Copper	0.005	mg/L		200.7	10/17/01
Iron	8.93	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	1.71	mg/L		200.7	10/17/01
Lead	<0.005	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	0.019	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:32

VL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: SB-04/WATER
Sample Collected: 10/09/01 15:25
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99595
SAMPLE: 279925
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	97.9	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/17/01
Potassium	17.6	mg/L		200.7	10/17/01
Magnesium	14.9	mg/L		200.7	10/17/01
Sodium	75.0	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	0.363	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	0.019	mg/L		200.7	10/17/01
Copper	0.008	mg/L		200.7	10/17/01
Iron	12.8	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	1.14	mg/L		200.7	10/17/01
Lead	0.006	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	0.043	mg/L		200.7	10/17/01

Reviewed By: Bluhe Johnson Date 10/24/01
10/24/01 12:32

VL ANALYTICAL, INC.
ne Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

CLIENT : Hall Environmental
PROJECT: BELL TRADING
CLIENT SAMPLE ID: EQUIPMENT RINSE
Sample Collected: 10/09/01 16:00
Sample Receipt : 10/11/01
Date of Report : 10/24/01

SVL JOB: 99595
SAMPLE: 279926
Matrix: WATER

Determination	Result	Units	Dilution	Method	Analyzed
Calcium	0.05	mg/L		200.7	10/17/01
Cyanide-TOT	<0.01	mg/L		335.4	10/17/01
Potassium	<1.0	mg/L		200.7	10/17/01
Magnesium	<0.04	mg/L		200.7	10/17/01
Sodium	<0.1	mg/L		200.7	10/17/01
Silver	<0.005	mg/L		200.7	10/17/01
Arsenic	<0.01	mg/L		200.7	10/17/01
Barium	<0.002	mg/L		200.7	10/17/01
Cadmium	<0.002	mg/L		200.7	10/17/01
Chromium	<0.006	mg/L		200.7	10/17/01
Copper	<0.003	mg/L		200.7	10/17/01
Iron	0.02	mg/L		200.7	10/17/01
Mercury	<0.0002	mg/L		245.1	10/23/01
Manganese	<0.002	mg/L		200.7	10/17/01
Lead	<0.005	mg/L		200.7	10/17/01
Selenium	<0.01	mg/L		200.7	10/17/01
Zinc	<0.005	mg/L		200.7	10/17/01

Reviewed By: Blake Johnson Date 10/24/01
10/24/01 12:32

Part I Prep Blank and Laboratory Control Sample

Client :Hall Environmental SVL JOB No. :99594

Analyte	Method	Matrix	Units	Prep Blank	True	LCS	Found	LCS %R	Analysis Date
Silver	6010B	SOIL	mg/kg	<0.5	184		195	106.0	10/25/01
Arsenic	6010B	SOIL	mg/kg	<1.0	170		169	99.4	10/25/01
Barium	6010B	SOIL	mg/kg	<0.2	151		158	104.6	10/25/01
Cadmium	6010B	SOIL	mg/kg	<0.2	184		187	101.6	10/25/01
Chromium	6010B	SOIL	mg/kg	<0.6	111		114	102.7	10/25/01
Copper	6010B	SOIL	mg/kg	<0.3	86.0		85.5	99.4	10/25/01
Iron	6010B	SOIL	mg/kg	<2.0	11100		12200	109.9	10/25/01
Manganese	6010B	SOIL	mg/kg	<0.2	359		359	100.0	10/25/01
Lead	6010B	SOIL	mg/kg	<0.5	106		103	97.2	10/25/01
Selenium	6010B	SOIL	mg/kg	<1.0	85.7		79.7	93.0	10/25/01
Zinc	6010B	SOIL	mg/kg	<0.5	371		389	104.9	10/25/01
Mercury	7471	SOIL	mg/kg	<0.033	29.6		37.6	127.0	10/22/01
Cyanide	9012A	SOIL	mg/kg	<0.5	5.60		6.10	108.9	10/17/01

EGEND:

LCS = Laboratory Control Sample LCS %R = LCS Percent Recovery N/A = Not Applicable

Part II Duplicate and Spike Analysis

lient :Hall Environmental SVL JOB No :99594

est Method	Matrix	QC SAMPLE ID Units	Result	Duplicate or MSD Found		RPD%	Matrix Spike Result	SPK ADD		%R	Analysis Date
6010B	SOIL	1 mg/kg	0.6	111	M	0.0	111	100		110.4	10/25/01
6010B	SOIL	2 mg/kg	1.2	N/A		N/A	110	100		108.8	10/25/01
6010B	SOIL	1 mg/kg	2.3	96.4	M	0.2	96.2	100		93.9	10/25/01
6010B	SOIL	2 mg/kg	4.5	N/A		N/A	93.9	100		89.4	10/25/01
6010B	SOIL	1 mg/kg	128	220	M	2.3	215	100		87.0	10/25/01
6010B	SOIL	2 mg/kg	314	N/A		N/A	358	100		44.0	10/25/01
6010B	SOIL	2 mg/kg	314	N/A		N/A	395	100	A	81.0	10/25/01
6010B	SOIL	1 mg/kg	<0.2	95.3	M	0.2	95.5	100		95.5	10/25/01
6010B	SOIL	2 mg/kg	0.4	N/A		N/A	88.3	100		87.9	10/25/01
6010B	SOIL	1 mg/kg	5.3	107	M	0.0	107	100		101.7	10/25/01
6010B	SOIL	2 mg/kg	13.6	N/A		N/A	112	100		98.4	10/25/01
6010B	SOIL	1 mg/kg	3.8	101	M	0.0	101	100		97.2	10/25/01
6010B	SOIL	2 mg/kg	15.5	N/A		N/A	103	100		87.5	10/25/01
6010B	SOIL	1 mg/kg	8860	11000	M	0.9	11100	1000		R >4S	10/25/01
6010B	SOIL	2 mg/kg	12300	N/A		N/A	13100	1000		80.0	10/25/01
6010B	SOIL	1 mg/kg	480	484	M	4.4	463	100		R >4S	10/25/01
6010B	SOIL	2 mg/kg	259	N/A		N/A	315	100		56.0	10/25/01
6010B	SOIL	2 mg/kg	259	N/A		N/A	342	100	A	83.0	10/25/01
6010B	SOIL	1 mg/kg	3.9	96.4	M	0.7	95.7	100		91.8	10/25/01
6010B	SOIL	2 mg/kg	17.8	N/A		N/A	99.5	100		81.7	10/25/01
6010B	SOIL	1 mg/kg	<1.0	91.8	M	0.7	91.2	100		91.2	10/25/01
6010B	SOIL	2 mg/kg	<1.0	N/A		N/A	88.9	100		88.9	10/25/01
6010B	SOIL	1 mg/kg	14.9	115	M	3.4	119	100		104.1	10/25/01
6010B	SOIL	2 mg/kg	91.6	N/A		N/A	154	100		62.4	10/25/01
6010B	SOIL	2 mg/kg	91.6	N/A		N/A	183	100	A	91.4	10/25/01
7471	SOIL	1 mg/kg	<0.033	<0.033		UDL	0.170	0.167		101.8	10/22/01
9012A	SOIL	1 mg/kg	<0.5	<0.5		UDL	4.85	5.00		97.0	10/17/01
Sol. 999	SOIL	1 %	96.8	96.7		0.1	N/A	N/A		N/A	10/23/01

EGEND:

D% = (|SAM - DUP|/((SAM + DUP)/2) * 100) UDL = Both SAM & DUP not detected. *Result or *Found: Interference reqired dilution.

D% = (|SPK - MSD|/((SPK + MSD)/2) * 100) M in Duplicate/MSD column indicates MSD.

IKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

C Sample 1: SVL SAM No.: 279910 Client Sample ID: SB-06/0'-2'

C Sample 2: SVL SAM No.: 279920 Client Sample ID: SB-04/0'-2'

ED_013172_00000349-00250

Part I Prep Blank and Laboratory Control Sample

Client :Hall Environmental SVL JOB No. :99595

Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found		LCS %R	Analysis Date
Silver	200.7	WATER	mg/L	<0.005	1.00	1.03	103.0	10/17/01
Arsenic	200.7	WATER	mg/L	<0.01	1.00	1.03	103.0	10/17/01
Barium	200.7	WATER	mg/L	<0.002	1.00	1.02	102.0	10/17/01
Calcium	200.7	WATER	mg/L	<0.04	20.0	20.6	103.0	10/17/01
Cadmium	200.7	WATER	mg/L	<0.002	1.00	1.00	100.0	10/17/01
Chromium	200.7	WATER	mg/L	<0.006	1.00	1.03	103.0	10/17/01
Copper	200.7	WATER	mg/L	<0.003	1.00	1.01	101.0	10/17/01
Iron	200.7	WATER	mg/L	<0.02	10.0	10.2	102.0	10/17/01
Potassium	200.7	WATER	mg/L	<1.0	30.0	30.5	101.7	10/17/01
Magnesium	200.7	WATER	mg/L	<0.04	20.0	20.7	103.5	10/17/01
Manganese	200.7	WATER	mg/L	<0.002	1.00	1.01	101.0	10/17/01
Sodium	200.7	WATER	mg/L	<0.1	20.0	20.2	101.0	10/17/01
Lead	200.7	WATER	mg/L	<0.005	1.00	1.00	100.0	10/17/01
Selenium	200.7	WATER	mg/L	<0.01	1.00	1.01	101.0	10/17/01
Zinc	200.7	WATER	mg/L	<0.005	1.00	1.00	100.0	10/17/01
Mercury	245.1	WATER	mg/L	<0.0002	0.0050	0.0049	98.0	10/23/01
Cyanide-TOT	335.4	WATER	mg/L	<0.01	0.15	0.16	106.7	10/17/01

EGEND:

LCS = Laboratory Control Sample LCS %R = LCS Percent Recovery N/A = Not Applicable

ED_013172_00000349-00251

Part II Duplicate and Spike Analysis

Client :Hall Environmental SVL JOB No :99595

Test	Method	Matrix	QC SAMPLE ID Units	QC SAMPLE ID Result	Duplicate or MSD Found	Duplicate or MSD RPD%	Matrix Spike Result	Matrix Spike SPK ADD	Matrix Spike %R	Analysis Date
	200.7	WATER	1 mg/L	<0.005	<0.005	UDL	1.08	1.00	108.0	10/17/01
	200.7	WATER	1 mg/L	<0.01	<0.01	UDL	1.13	1.00	113.0	10/17/01
	200.7	WATER	1 mg/L	0.795	0.751	5.7	1.85	1.00	105.5	10/17/01
	200.7	WATER	1 mg/L	159	177	10.7	194	20.0	R >4S	10/17/01
	200.7	WATER	1 mg/L	<0.002	<0.002	UDL	1.04	1.00	104.0	10/17/01
	200.7	WATER	1 mg/L	0.072	0.070	2.8	1.12	1.00	104.8	10/17/01
	200.7	WATER	1 mg/L	0.031	0.027	13.8	1.08	1.00	104.9	10/17/01
	200.7	WATER	1 mg/L	51.3	50.6	1.4	61.6	10.0	103.0	10/17/01
	200.7	WATER	1 mg/L	23.9	23.3	2.5	58.0	30.0	113.7	10/17/01
	200.7	WATER	1 mg/L	25.6	28.4	10.4	50.1	20.0	122.5	10/17/01
	200.7	WATER	1 mg/L	2.31	2.45	5.9	3.50	1.00	119.0	10/17/01
	200.7	WATER	1 mg/L	137	137	0.0	160	20.0	115.0	10/17/01
	200.7	WATER	1 mg/L	0.027	0.030	10.5	1.03	1.00	100.3	10/17/01
	200.7	WATER	1 mg/L	<0.01	<0.01	UDL	1.06	1.00	106.0	10/17/01
	200.7	WATER	1 mg/L	0.122	0.137	11.6	1.19	1.00	106.8	10/17/01
	245.1	WATER	1 mg/L	<0.0002	<0.0002	UDL	0.0012	0.0010	120.0	10/23/01
	335.4	WATER	1 mg/L	<0.01	<0.01	UDL	0.11	0.100	110.0	10/17/01

EGEND:

D% = (|SAM - DUP|/((SAM + DUP)/2) * 100) UDL = Both SAM & DUP not detected. *Result or *Found: Interference reqired dilution.

D% = (|SPK - MSD|/((SPK + MSD)/2) * 100) M in Duplicate/MSD column indicates MSD.

IKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

C Sample 1: SVL SAM No.: 279923 Client Sample ID: SB-12 WATER

ED_013172_00000349-00252

ED_013172_00000349-00253

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLK** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:

Client ID: Run ID: **WC_011010D** SeqNo: **50776**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.10									
Chloride	ND	0.10									
Nitrogen, Nitrite (As N)	ND	0.10									
Nitrogen, Nitrate (As N)	ND	0.10									
Phosphorus, Orthophosphate (As P)	ND	0.50									
Sulfate	ND	0.50									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00254

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **5ml rb** Batch ID: **R2380** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011010A** SeqNo: **50693**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%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									
Bromobenzene	ND	1.0									
Bromochloromethane	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	1.0									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	1.0									
2-Chlorotoluene	ND	1.0									
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	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00255

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

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	1.0
1,1-Dichloropropene	ND	1.0
Hexachlorobutadiene	ND	1.0
Isopropylbenzene	ND	1.0
4-Isopropyltoluene	ND	1.0
Methylene Chloride	ND	3.0
n-Butylbenzene	ND	1.0
n-Propylbenzene	ND	1.0
sec-Butylbenzene	ND	1.0
Styrene	ND	1.0
tert-Butylbenzene	ND	1.0
Tetrachloroethene (PCE)	ND	1.0
1,1,1,2-Tetrachloroethane	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
trans-1,2-DCE	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Trichloroethene (TCE)	ND	1.0
Trichlorofluoromethane	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
Vinyl chloride	ND	2.0
1,2,3-Trichloropropane	ND	2.0
Xylenes, Total	ND	1.0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00256

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Surr: 1,2-Dichloroethane-d4	8.91	0	10	0	89.1	74.6	123	0
Surr: 4-Bromofluorobenzene	10.27	0	10	0	103	85.6	117	0
Surr: Dibromofluoromethane	9.668	0	10	0	96.7	78.6	115	0
Surr: Toluene-d8	9.998	0	10	0	100	84.2	115	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00257

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Sample ID: **5ml rb-b** Batch ID: **R2391** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/11/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011010B** SeqNo: **50979**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%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									
Bromobenzene	ND	1.0									
Bromochloromethane	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	1.0									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	1.0									
2-Chlorotoluene	ND	1.0									
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	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00258

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

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	1.0	
1,1-Dichloropropene	ND	1.0	
Hexachlorobutadiene	ND	1.0	
Isopropylbenzene	ND	1.0	
4-Isopropyltoluene	ND	1.0	
Methylene Chloride	0.278	3.0	J
n-Butylbenzene	ND	1.0	
n-Propylbenzene	ND	1.0	
sec-Butylbenzene	ND	1.0	
Styrene	ND	1.0	
tert-Butylbenzene	ND	1.0	
Tetrachloroethene (PCE)	ND	1.0	
1,1,1,2-Tetrachloroethane	ND	1.0	
1,1,2,2-Tetrachloroethane	ND	1.0	
trans-1,2-DCE	ND	1.0	
trans-1,3-Dichloropropene	ND	1.0	
Trichloroethene (TCE)	ND	1.0	
Trichlorofluoromethane	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	
Vinyl chloride	ND	2.0	
1,2,3-Trichloropropane	ND	2.0	
Xylenes, Total	ND	1.0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00259

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Method Blank

Surr: 1,2-Dichloroethane-d4	9.078	0	10	0	90.8	74.6	123	0
Surr: 4-Bromofluorobenzene	10.19	0	10	0	102	85.6	117	0
Surr: Dibromofluoromethane	9.606	0	10	0	96.1	78.6	115	0
Surr: Toluene-d8	10.36	0	10	0	104	84.2	115	0

Sample ID: **MBLK** Batch ID: **R2462** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/18/01** Prep Date:

Client ID: Run ID: **WC_011018D** SeqNo: **52673**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.050									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00260

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110064-15B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: **SB-12 Water** Run ID: **WC_011010D** SeqNo: **50778**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.868	0.10	0	0	0	0	0	0.886	2.05	15	
Nitrogen, Nitrite (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Nitrogen, Nitrate (As N)	ND	0.10	0	0	0	0	0	0	0	15	
Phosphorus, Orthophosphate (As P)	ND	0.50	0	0	0	0	0	0	0	15	

Sample ID: **0109136-01B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50782**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	128.4	5.0	0	0	0	0	0	128	0.349	15	

Sample ID: **0109136-11B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	72.44	2.5	0	0	0	0	0	72.85	0.564	15	

Sample ID: **0109136-21B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50807**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	315.6	10	0	0	0	0	0	314.4	0.363	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00261

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110064-28a dup** Batch ID: **R2380** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/10/01** Prep Date:

Client ID: **SB-05/Soil Gas** Run ID: **NEPTUNE_011010A** SeqNo: **50722**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.10	0	0	0	0	0	0	0	20	
Trichloroethene	0.6457	0.10	0	0	0	0	0	0.6538	1.25	20	
Benzene	ND	0.10	0	0	0	0	0	0	0	20	
Toluene	0.0328	0.10	0	0	0	0	0	0.0322	0	20	J
Ethylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Methyl tert-butyl ether (MTBE)	ND	0.10	0	0	0	0	0	0	0	20	
1,2,4-Trimethylbenzene	0.025	0.10	0	0	0	0	0	0.0276	0	20	J
1,3,5-Trimethylbenzene	0.02	0.10	0	0	0	0	0	0.0216	0	20	J
1,2-Dichloroethane (EDC)	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dibromoethane (EDB)	ND	0.10	0	0	0	0	0	0	0	20	
Naphthalene	ND	0.20	0	0	0	0	0	0	0	20	
1-Methylnaphthalene	ND	0.40	0	0	0	0	0	0	0	20	
2-Methylnaphthalene	ND	0.40	0	0	0	0	0	0	0	20	
Bromobenzene	ND	0.10	0	0	0	0	0	0	0	20	
Bromochloromethane	ND	0.10	0	0	0	0	0	0	0	20	
Bromodichloromethane	ND	0.10	0	0	0	0	0	0	0	20	
Bromoform	ND	0.10	0	0	0	0	0	0	0	20	
Bromomethane	0.06	0.10	0	0	0	0	0	0	0	20	J
Carbon tetrachloride	ND	0.10	0	0	0	0	0	0	0	20	
Chlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
Chloroethane	ND	0.20	0	0	0	0	0	0	0	20	
Chloroform	ND	0.10	0	0	0	0	0	0	0	20	
Chloromethane	ND	0.10	0	0	0	0	0	0.0704	0	20	
cis-1,2-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
2-Chlorotoluene	ND	0.10	0	0	0	0	0	0	0	20	
4-Chlorotoluene	ND	0.10	0	0	0	0	0	0	0	20	
cis-1,3-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00262

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

Dibromochloromethane	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dibromo-3-chloropropane	ND	0.20	0	0	0	0	0	0	0	20	
Dibromomethane	ND	0.20	0	0	0	0	0	0	0	20	
Dichlorodifluoromethane	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,3-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,4-Dichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
1,2-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
1,3-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
2,2-Dichloropropane	ND	0.10	0	0	0	0	0	0	0	20	
1,1-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	
Hexachlorobutadiene	ND	0.10	0	0	0	0	0	0	0	20	
Isopropylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Methylene chloride	0.0318	0.30	0	0	0	0	0	0.0256	0	20	J
4-Isopropyltoluene	ND	0.10	0	0	0	0	0	0	0	20	
n-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
n-Propylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
sec-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
Styrene	ND	0.10	0	0	0	0	0	0	0	20	
tert-Butylbenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,1,2-Tetrachloroethane	ND	0.10	0	0	0	0	0	0	0	20	
trans-1,2-Dichloroethene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.10	0	0	0	0	0	0	0	20	
trans-1,3-Dichloropropene	ND	0.10	0	0	0	0	0	0	0	20	
Trichlorofluoromethane	ND	0.10	0	0	0	0	0	0	0	20	
Vinyl chloride	ND	0.20	0	0	0	0	0	0	0	20	
1,2,3-Trichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,2,4-Trichlorobenzene	ND	0.10	0	0	0	0	0	0	0	20	
1,1,1-Trichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,1,2-Trichloroethane	ND	0.10	0	0	0	0	0	0	0	20	
1,2,3-Trichloropropane	ND	0.20	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00263

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

Xylenes, Total	ND	0.10	0	0	0	0	0	0	0	20
Surr: 4-Bromofluorobenzene	1.02	0	1	0	102	87.2	119	1.022	0.196	20
Surr: Dibromofluoromethane	0.9382	0	1	0	93.8	75.7	113	0.9482	1.06	20
Surr: Toluene-d8	1.002	0	1	0	100	88.8	113	1.01	0.795	20

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

ED_013172_00000349-00264

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Duplicate

Sample ID: **0110055-03a dup** Batch ID: **R2380** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **NEPTUNE_011010A** SeqNo: **50696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.0	0	0	0	0	0	0	0	20	
Toluene	ND	1.0	0	0	0	0	0	0	0	20	
Ethylbenzene	ND	1.0	0	0	0	0	0	0	0	20	
Methyl tert-butyl ether (MTBE)	ND	1.0	0	0	0	0	0	0	0	20	
1,2,4-Trimethylbenzene	0.26	1.0	0	0	0	0	0	0	0	20	J
1,3,5-Trimethylbenzene	0.206	1.0	0	0	0	0	0	0	0	20	J
1,2-Dichloroethane (EDC)	ND	1.0	0	0	0	0	0	0	0	20	
1,2-Dibromoethane (EDB)	ND	1.0	0	0	0	0	0	0	0	20	
Naphthalene	ND	2.0	0	0	0	0	0	0	0	20	
1-Methylnaphthalene	ND	4.0	0	0	0	0	0	0	0	20	
2-Methylnaphthalene	ND	4.0	0	0	0	0	0	0	0	20	
Bromobenzene	ND	1.0	0	0	0	0	0	0	0	20	
Bromochloromethane	ND	1.0	0	0	0	0	0	0	0	20	
Bromodichloromethane	ND	1.0	0	0	0	0	0	0	0	20	
Bromoform	ND	1.0	0	0	0	0	0	0	0	20	
Bromomethane	ND	1.0	0	0	0	0	0	0	0	20	
Carbon Tetrachloride	ND	1.0	0	0	0	0	0	0	0	20	
Chlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
Chloroethane	ND	2.0	0	0	0	0	0	0	0	20	
Chloroform	ND	1.0	0	0	0	0	0	0	0	20	
Chloromethane	ND	1.0	0	0	0	0	0	0	0	20	
2-Chlorotoluene	ND	1.0	0	0	0	0	0	0	0	20	
4-Chlorotoluene	ND	1.0	0	0	0	0	0	0	0	20	
cis-1,2-DCE	ND	1.0	0	0	0	0	0	0	0	20	
cis-1,3-Dichloropropene	ND	1.0	0	0	0	0	0	0	0	20	
1,2-Dibromo-3-chloropropane	ND	2.0	0	0	0	0	0	0	0	20	
Dibromochloromethane	ND	1.0	0	0	0	0	0	0	0	20	
Dibromomethane	ND	2.0	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00265

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

1,2-Dichlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
1,3-Dichlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
1,4-Dichlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
Dichlorodifluoromethane	ND	1.0	0	0	0	0	0	0	0	20	
1,1-Dichloroethane	ND	1.0	0	0	0	0	0	0	0	20	
1,1-Dichloroethene	ND	1.0	0	0	0	0	0	0	0	20	
1,2-Dichloropropane	ND	1.0	0	0	0	0	0	0	0	20	
1,3-Dichloropropane	ND	1.0	0	0	0	0	0	0	0	20	
2,2-Dichloropropane	ND	1.0	0	0	0	0	0	0	0	20	
1,1-Dichloropropene	ND	1.0	0	0	0	0	0	0	0	20	
Hexachlorobutadiene	ND	1.0	0	0	0	0	0	0	0	20	
Isopropylbenzene	ND	1.0	0	0	0	0	0	0	0	20	
4-Isopropyltoluene	ND	1.0	0	0	0	0	0	0	0	20	
Methylene Chloride	ND	3.0	0	0	0	0	0	0	0	20	
n-Butylbenzene	0.188	1.0	0	0	0	0	0	0	0	20	J
n-Propylbenzene	ND	1.0	0	0	0	0	0	0	0	20	
sec-Butylbenzene	ND	1.0	0	0	0	0	0	0	0	20	
Styrene	ND	1.0	0	0	0	0	0	0	0	20	
tert-Butylbenzene	ND	1.0	0	0	0	0	0	0	0	20	
Tetrachloroethene (PCE)	ND	1.0	0	0	0	0	0	0	0	20	
1,1,1,2-Tetrachloroethane	ND	1.0	0	0	0	0	0	0	0	20	
1,1,2,2-Tetrachloroethane	ND	1.0	0	0	0	0	0	0	0	20	
trans-1,2-DCE	ND	1.0	0	0	0	0	0	0	0	20	
trans-1,3-Dichloropropene	ND	1.0	0	0	0	0	0	0	0	20	
Trichloroethene (TCE)	ND	1.0	0	0	0	0	0	0	0	20	
Trichlorofluoromethane	ND	1.0	0	0	0	0	0	0	0	20	
1,2,3-Trichlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
1,2,4-Trichlorobenzene	ND	1.0	0	0	0	0	0	0	0	20	
1,1,1-Trichloroethane	ND	1.0	0	0	0	0	0	0	0	20	
1,1,2-Trichloroethane	ND	1.0	0	0	0	0	0	0	0	20	
Vinyl chloride	ND	2.0	0	0	0	0	0	0	0	20	
1,2,3-Trichloropropane	ND	2.0	0	0	0	0	0	0	0	20	
Xylenes, Total	ND	1.0	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00266

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Duplicate

Surr: 1,2-Dichloroethane-d4	8.792	0	0	0	0	74.6	123	9.456	7.28	0
Surr: 4-Bromofluorobenzene	9.994	0	0	0	0	85.6	117	10.24	2.43	0
Surr: Dibromofluoromethane	9.486	0	0	0	0	78.6	115	9.476	0.105	0
Surr: Toluene-d8	10.22	0	0	0	0	84.2	115	10.31	0.857	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00267

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0109136-01B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50783**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	137.3	5.0	10	128	92.9	30	150	0			

Sample ID: **0109136-11B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **50795**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	82.76	2.5	10	72.85	99.1	30	150	0			

Sample ID: **0110066-07B** Batch ID: **R2385** Test Code: **E300** Units: **mg/L** Analysis Date: **10/10/01** Prep Date:
Client ID: Run ID: **WC_011010D** SeqNo: **51123**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	2.078	0.10	2	0.665	70.7	30	150	0			
Chloride	35.66	0.10	4	31.75	97.7	30	150	0			
Nitrogen, Nitrite (As N)	1.755	0.10	2	0	87.8	30	150	0			
Nitrogen, Nitrate (As N)	5.676	0.10	6	0	94.6	30	150	0			
Phosphorus, Orthophosphate (As P)	3.807	0.50	4	0	95.2	30	150	0			

Sample ID: **0110082-01B** Batch ID: **R2420** Test Code: **E300** Units: **mg/L** Analysis Date: **10/11/01** Prep Date:
Client ID: Run ID: **WC_011011D** SeqNo: **51561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	5.986	0.10	6	0	99.8	30	150	0			
Sulfate	14.18	0.50	10	4.116	101	30	150	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00268

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0110055-02a ms** Batch ID: **R2380** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/10/01** Prep Date:

Client ID: Run ID: **NEPTUNE_011010A** SeqNo: **50695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	21.3	1.0	20	0	107	85.3	120	0			
Toluene	19.63	1.0	20	0	98.1	73	123	0			
Chlorobenzene	20.6	1.0	20	0	103	84.7	119	0			
1,1-Dichloroethene	19.34	1.0	20	0	96.7	83.4	122	0			
Trichloroethene (TCE)	21.27	1.0	20	0	106	76.1	126	0			
Surr: 1,2-Dichloroethane-d4	29.82	0	30	0	99.4	81.5	125	0			
Surr: 4-Bromofluorobenzene	31.96	0	30	0	107	85.6	117	0			
Surr: Dibromofluoromethane	30.2	0	30	0	101	84.2	117	0			
Surr: Toluene-d8	30.75	0	30	0	103	89.4	116	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

I

ED_013172_00000349-00269

Hall Environmental Analysis Laboratory

Date: *02-Nov-01*

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0110055-02a ms** Batch ID: **R2380** Test Code: **SW8260B** Units: **µg/L** Analysis Date: **10/10/01** Prep Date:

Client ID: Run ID: **NEPTUNE_011010A** SeqNo: **50695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	21.3	1.0	20	0	107	85.3	120	0			
Toluene	19.63	1.0	20	0	98.1	73	123	0			
Chlorobenzene	20.6	1.0	20	0	103	84.7	119	0			
1,1-Dichloroethene	19.34	1.0	20	0	96.7	83.4	122	0			
Trichloroethene (TCE)	21.27	1.0	20	0	106	76.1	126	0			
Surr: 1,2-Dichloroethane-d4	29.82	0	30	0	99.4	81.5	125	0			
Surr: 4-Bromofluorobenzene	31.96	0	30	0	107	85.6	117	0			
Surr: Dibromofluoromethane	30.2	0	30	0	101	84.2	117	0			
Surr: Toluene-d8	30.75	0	30	0	103	89.4	116	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED 013172_00000349-00270

CLIENT: Duke Engineering & Services
Work Order: 0110064
Project: Bell Trading Post

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0110042-01C** Batch ID: **R2462** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/18/01** Prep Date:
Client ID: Run ID: **WC_011018D** SeqNo: **52676**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	11.13	0.10	10	0.98	102	80	120	0			

Sample ID: **0110064-15B** Batch ID: **R2462** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/18/01** Prep Date:
Client ID: **SB-12 Water** Run ID: **WC_011018D** SeqNo: **52679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	11.06	0.050	10	0.84	102	80	120	0			

Sample ID: **0109165-18B** Batch ID: **R2462** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/18/01** Prep Date:
Client ID: Run ID: **WC_011018D** SeqNo: **52684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	10.92	0.050	10	0.7	102	80	120	0			

Sample ID: **0110099-01B** Batch ID: **R2462** Test Code: **E350.2** Units: **mg/L** Analysis Date: **10/18/01** Prep Date:
Client ID: Run ID: **WC_011018D** SeqNo: **52688**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	10.5	0.050	10	0.56	99.4	80	120	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

ED_013172_00000349-00271

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG. & SERVICES, INC.

Address: 6501 AMERICAS PARKWAY NE #510 ALBUQUERQUE NM 87110

Phone #: (505) 246-1600 EXT. 219

Fax #: (505) 246-2600

Project Name: BELL TRADING POST

Project #: 00736.00.0004.02.00011

Project Manager: JOE TRACY

Sampler: JOE TRACY

Samples Cold?: ☐ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: N/A	HEAL No.
10/9/01	0832	SOIL	SB-06/0'-2'	2			X	0110064-1
	0834		SB-06/2'-4'					-2
	0908		SB-05/0-2'					-3
	0910		SB-05/2'-4'					-4
	0937		SB-06/0-2'					-5
	0939		SB-07/2'-4'					-6
	1002		SB-08/0-2'					-7
	1004		SB-08/2'-4'					-8
	—		SOIL 1 DUP./0-2'					-9
	—		SOIL 1 DUP/2'-4'					-10
	1036		SB-09/0-2'					-11
	1038		SB-09/2'-4'					-12

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	CYANIDE 335.4	NMWQCC METALS* 200.8/7470/7471	Air Bubbles or Headspace (Y or N)
														X	X	

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	Date
10/9/01	1652			10/9/01
			1650	
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

Remarks:
* NMWQCC METALS = ARSENIC, BARIUM, CADMIUM, CHROMIUM, LEAD, MERCURY, SELENIUM, SILVER, COPPER, IRON, MANGANESE, ZINC
* — PLEASE HOLD 2'-4' INTERVAL SAMPLES

ED_013172_00000349-00272

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG & SERVICES (DCRS)

Address: 6501 AMERICAS PARKWAY NE #810, ALBUQUERQUE, NM 87110

Phone #: (505) 246-1600 EXT. 219

Fax #: (505) 246-2600

Project Name: BELL TRADING POST

Project #: 00736.00.0004.02-.00011

Project Manager: JOE TRACY

Sampler: JOE TRACY

Samples Cold?: ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HCl	Preservative H/T	HEAL No.
10/9/01	1108	SOIL	SB-10/0'-2'	2			X	0116064-13
	1110	SOIL	SB-10/2'-4'	2				-14
	1240	WATER	SB-12/WATER	7				-15
	—	WATER	WATER DUPLICATE 1	7				-16
	1138	SOIL	SB-11/0-2'	2			X	-17
	1140	SOIL	SB-11/2'-4'	2			X	-18
	1210	SOIL	SB-12/0-2'	2			X	-19
	1212	SOIL	SB-12/2'-4	2			X	-20
	1420	SOIL	SB-02/0-2'	2			X	-21
	1422	SOIL	SB-02/2'-4'	2			X	-22
	1458	SOIL	SB-04/0-2'	2			X	-23
	1500	SOIL	SB-04/2'-4'	2			X	-24

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg) PH/NH3	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	Cyanide 335.4	NMWQCC Metals* 6010 7470	Air Bubbles or Headspace (Y or N)
									X	X		X		X	X	
									X	X		X		X	X	
									X	X		X		X	X	
														X	X	
														X	X	
														X	X	
														X	X	
														X	X	
														X	X	
														X	X	
														X	X	

Date: 10/9/01 Time: 1656 Relinquished By: (Signature)

Received By: (Signature) 10/9/01 1650

Date: Time: Relinquished By: (Signature)

Received By: (Signature)

Remarks: * NMWQCC METALS = ARSENIC, BARIUM, CADMIUM, CHROMIUM, LEAD, MERCURY, SELENIUM, SILVER, COPPER, IRON, MANGANESE, ZINC

X HOLD 2'-4' INTERVAL SOIL SAMPLES RUN WATER AMMONIA & DA

ED_013172_00000349-00273

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG. & SERVICES

Project Name: BELL TRADING POST

Address: 6501 AMERICAS PARKWAY NE #810

Project #: 00736.00.0004.02.00011

ALBUQUERQUE, NM 87110

Project Manager: JOE TRACY

Phone #: (505) 246-1600 EXT. 219

Sampler: JOE TRACY

Fax #: (505) 246-2600

Samples Cold?: ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl/H_2SO_4	Preservative: H/N/A	HEAL No.
10/9/01	1525	H_2O	SB-04/WATER	7	X	X	X	0110069-25
	160	H_2O	EQUIPMENT RINSE-1	2				-26

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg), pH/NH3	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	CYANIDE 335.4	NMWQCC* METALS 6010/7470/71	Air Bubbles or Headspace (Y or N)
									X	X		X	X	X	X	
														X	X	

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
10/9/01	1656			10/9/01	1656
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)		

Remarks: * NMWQCC – AL, BA, AG, AS, CD, CR, PB, CU, FE, MN, ZN

ED_013172_00000349-00274

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite A
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: DUKE ENG. & SERVICES (DE&S)

Address: 6501 AMERICAS PARKWAY NE #810 ALBUQUERQUE, NM 87110

Phone #: (505) 246-1600 EXT. 219

Fax #: (505) 246-2600

Project Name: BELL TRADING POST

Project #: 00736.00.0004.02.00011

Project Manager: JOE TRACY

Sampler: JOE TRACY

Samples Cold?: ☐ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: H/A	HEAL No.
6/9/01	0841	~~SOIL~~ GAS	SB-06 / SOIL GAS	1			X	01101X65-27
	0912		SB-05 / SOIL GAS	1			X	-28
	0941		SB-07 / SOIL GAS	1			X	-29
	1007		SB-08 / SOIL GAS	1			X	-30
	1041		SB-09 / SOIL GAS	1			X	-31
	1112		SB-10 / SOIL GAS	1			X	-32
	1143		SB-11 / SOIL GAS	1			X	-33
	1217		SB-12 / SOIL GAS	1			X	-34
	~		SOIL GAS DUPLICATE - 1	1			X	-35
	1428		SB-02 / SOIL GAS	1			X	-36
	1506		SB-04 / SOIL GAS	1			X	-37
			TRIP BLANK					-38

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	Volatiles Full List (8021)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)			Air Bubbles or Headspace (Y or N)
												X				
												X				
												X				
												X				
												X				
												X				
												X				
												X				
												X				
												X				
												X				

Date: 10/9/01 Time: 1654 Relinquished By: (Signature)

Received By: (Signature) 10/9/01 1656

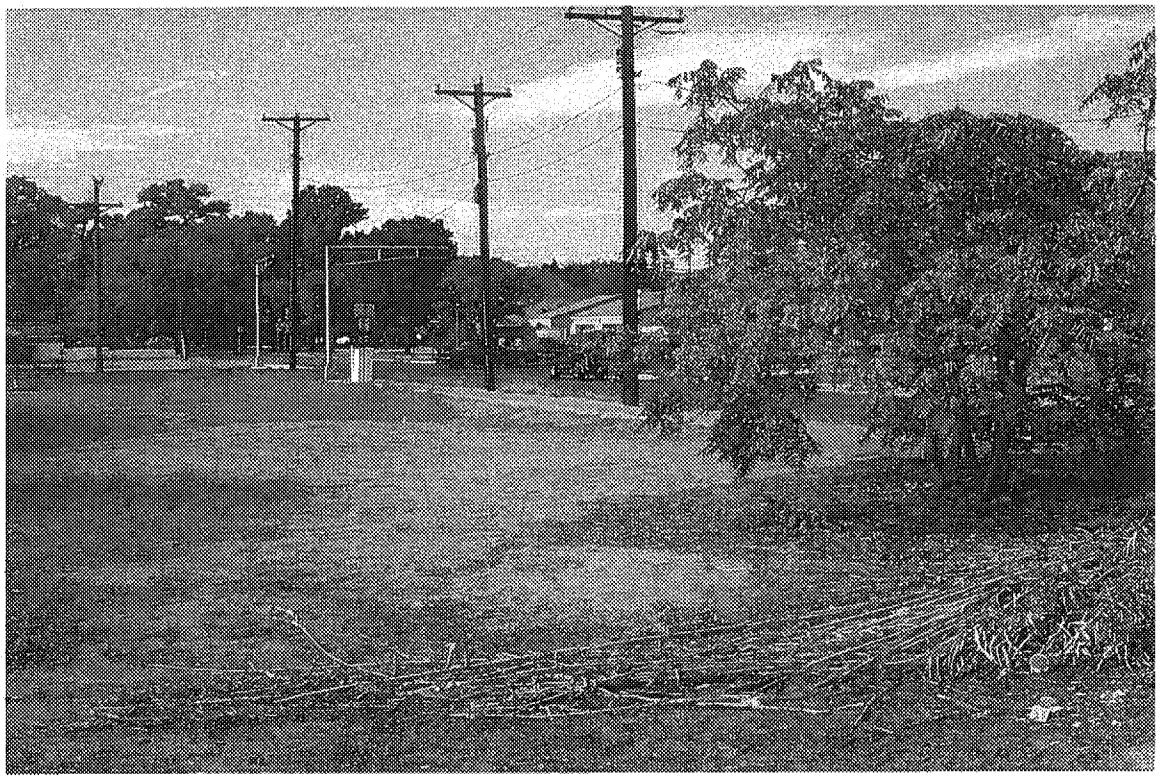
Date: Time: Relinquished By: (Signature)

Received By: (Signature)

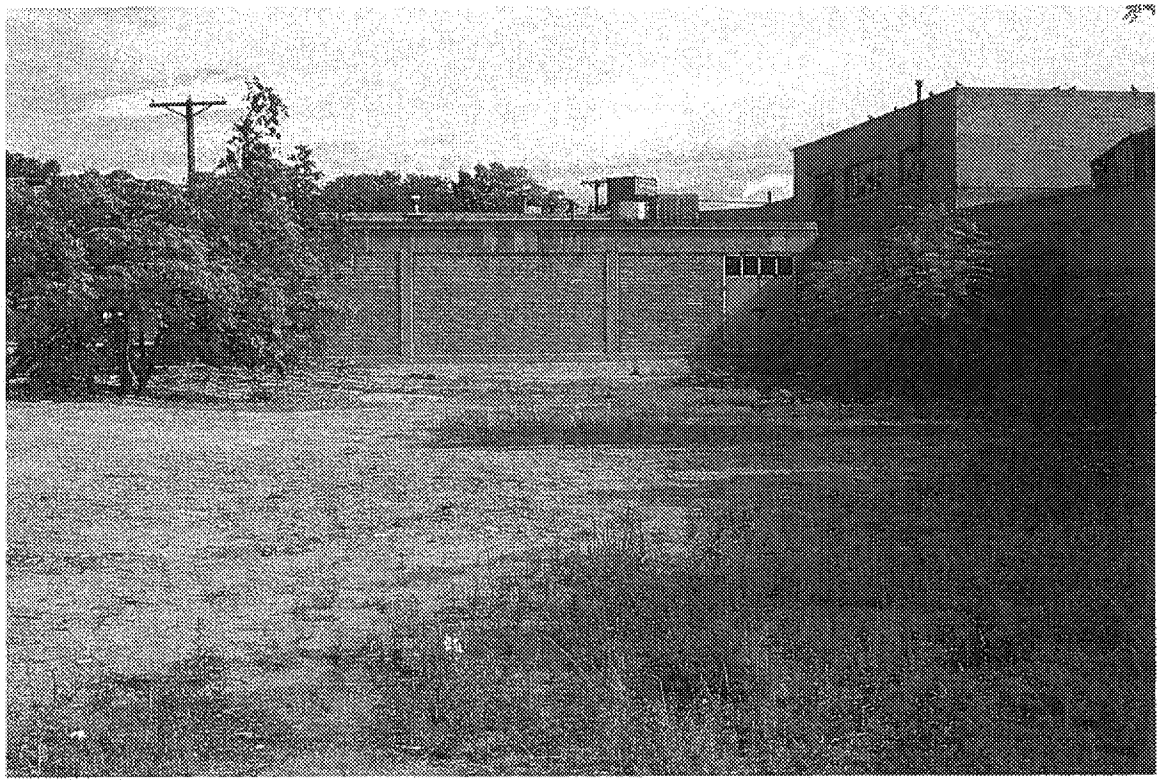
Remarks: HALL PROVIDED ONLY 2 TEDLAR BAGS, DE&S PROVIDED THE REMAINING TEDLAR BAGS. PLEASE CHARGE FOR ONLY 2. THANKS

APPENDIX E

Photographic Log

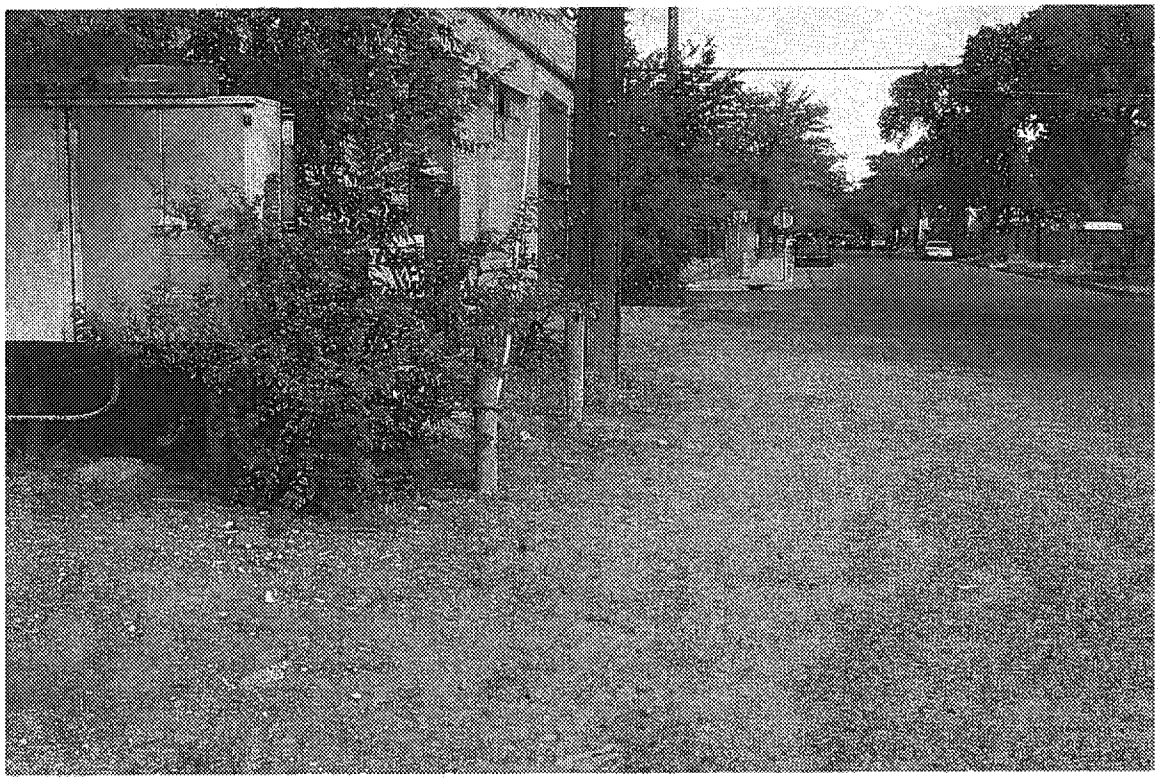


No. 1 – View of the west end of the former Bell Trading Post Property looking south toward Central Avenue (location of soil borings SB-05, SB-06, SB-07, and SB-08).

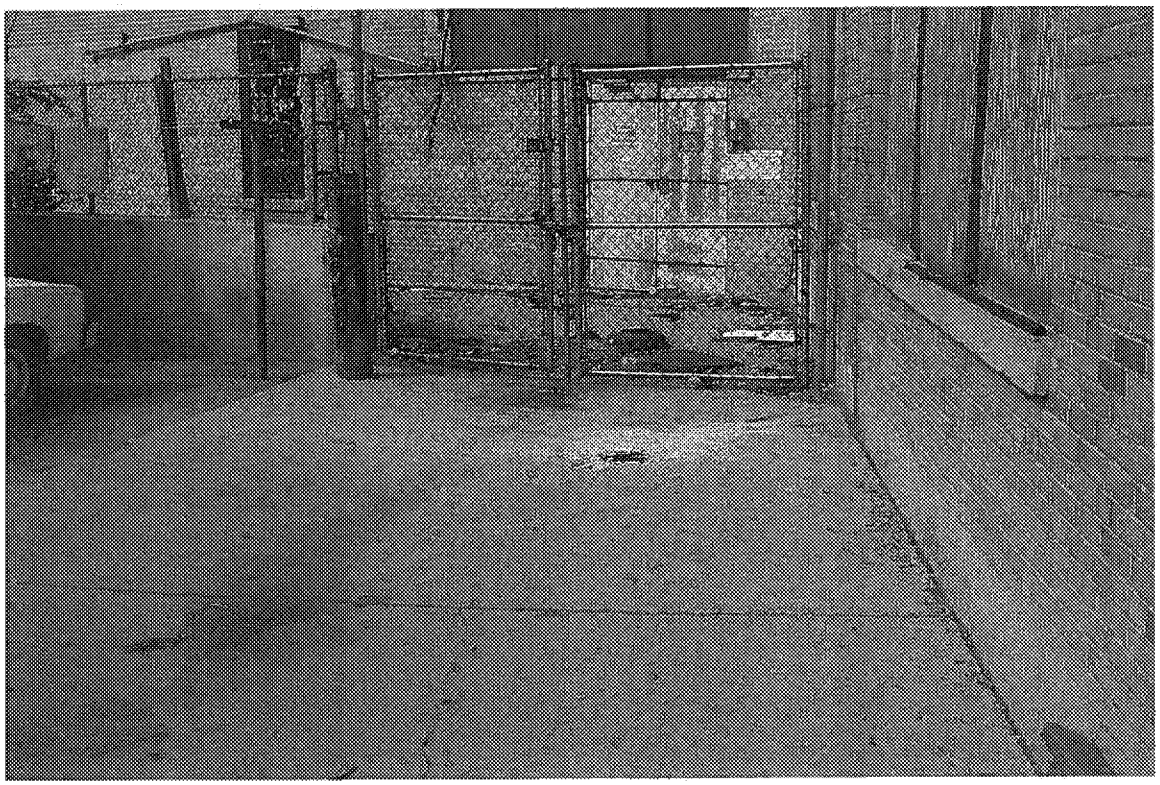


No. 2 – View of the west end of the former Bell Trading Post Property looking north toward the Bell Trading Post Property building (location of soil borings SB-05, SB-06, SB-07, and SB-08).

ED_013172_00000349-00276



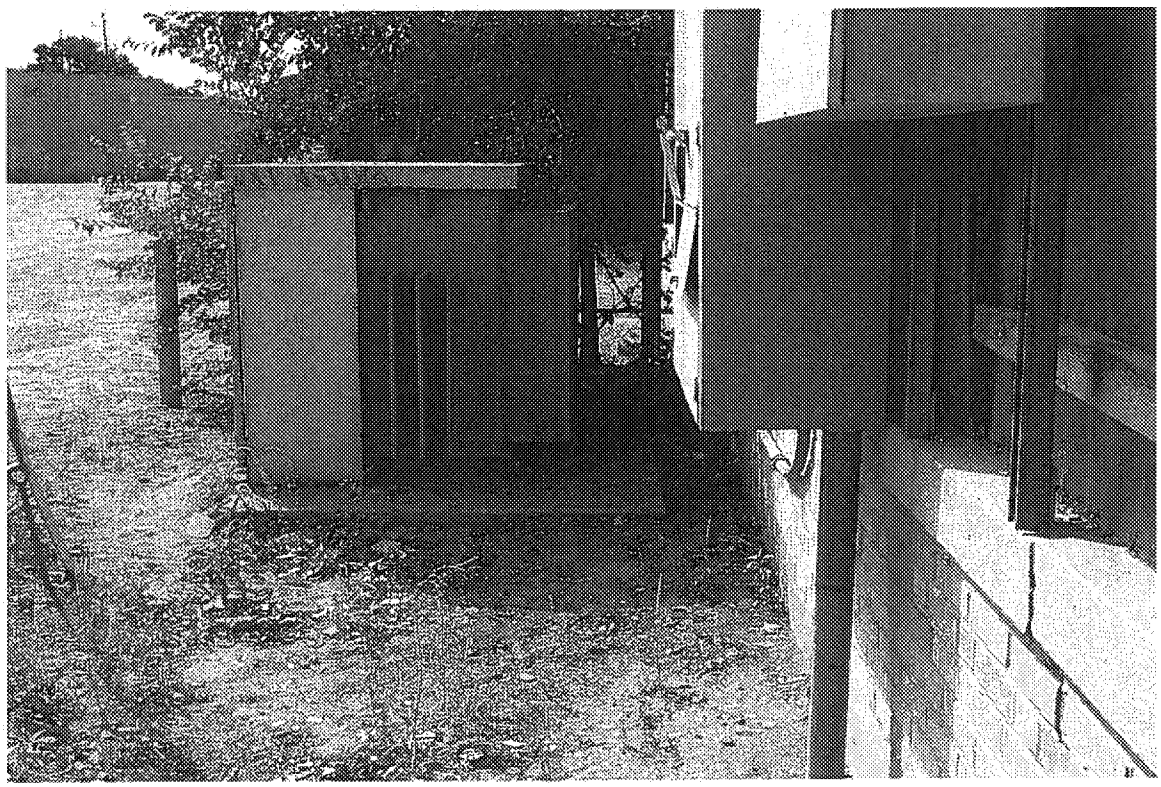
No. 5 – View of the former Bell Trading Post property looking north (location of soil borings SB-01 and SB-02).



No. 6 – View of the former Bell Trading Post property looking west into a concrete alley (location of soil boring SB-04).

ED_013172_00000349-00277

No. 7 – View of the Geoprobe® subcontractor (GeoRecovery Systems, Inc.) as they advance soil boring SB-03, located at the northwest corner of the former Bell Trading Post property.



No. 8 – View of the pad-mounted transformer located near the northeast corner of the former Bell Trading Post property.

ED_013172_00000349-00278

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-8162-1
Client Project/Site: West Central Avenue

For:
New Mexico Environment Department
1190 St. Francis Drive
Rm. N2300
Santa Fe, New Mexico 87502

Attn: Martyne Kieling

Ryan Henry

Authorized for release by:
5/31/2017 10:35:40 AM

Ryan Henry, Project Manager I
(865)291-3000
william.henry@testamericainc.com

LINKS

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Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
CI	The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 140-8162-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-8162-1

Receipt
The samples were received on 5/22/2017 at 9:25am and arrived in good condition.

Air - GC/MS VOA
Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

Method(s) TO-15: The continuing calibration verification (CCV) associated with batch 140-11432 exhibited % difference of > 30% for the following analyte(s) Dichlorodifluoromethane; however, the results were within the LCS acceptance limits. The EPA method requires that all target analytes in the continuing calibration verification standard be within 30% difference from the initial calibration. According to the laboratory standard operating procedure, the continuing calibration is acceptable if it meets the laboratory control sample acceptance criteria.

No additional analytical or quality issues were noted.

Sample Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-8162-1	B-B	Air	05/17/17 09:03	05/22/17 09:25
140-8162-2	B-SS	Air	05/17/17 09:06	05/22/17 09:25
140-8162-3	B-I	Air	05/17/17 09:11	05/22/17 09:25
140-8162-4	A-B-1	Air	05/17/17 09:19	05/22/17 09:25
140-8162-5	A-1-2	Air	05/17/17 09:30	05/22/17 09:25
140-8162-6	A-SS-1	Air	05/17/17 09:23	05/22/17 09:25
140-8162-7	A-SS-2	Air	05/17/17 09:22	05/22/17 09:25
140-8162-8	A-1-1	Air	05/17/17 09:27	05/22/17 09:25
140-8162-9	A-B-2	Air	05/17/17 09:20	05/22/17 09:25
140-8162-10	AA	Air	05/17/17 09:37	05/22/17 09:25
140-8162-11	D-A	Air	05/17/17 11:09	05/22/17 09:25
140-8162-12	D-SS	Air	05/17/17 11:13	05/22/17 09:25
140-8162-13	C-SS	Air	05/17/17 15:40	05/22/17 09:25
140-8162-14	D-I	Air	05/17/17 11:12	05/22/17 09:25
140-8162-15	C-B	Air	05/17/17 14:40	05/22/17 09:25
140-8162-16	C-I	Air	05/17/17 15:42	05/22/17 09:25
140-8162-17	1801-CENTRAL-03	Air	05/17/17 10:39	05/22/17 09:25
140-8162-18	205 14TH-01	Air	05/17/17 12:04	05/22/17 09:25
140-8162-19	1433-CENTRAL-04	Air	05/17/17 15:20	05/22/17 09:25
140-8162-20	1433-CENTRAL-04D	Air	05/17/17 15:20	05/22/17 09:25
140-8162-21	1004-PARKALLEY-01	Air	05/17/17 14:25	05/22/17 09:25
140-8162-22	1433-CENTRAL-03	Air	05/17/17 16:18	05/22/17 09:25
140-8162-23	1404-CENTRAL-02	Air	05/17/17 09:21	05/22/17 09:25
140-8162-24	C-14TH-05	Air	05/17/17 12:24	05/22/17 09:25
140-8162-25	CENTRAL-1433-02	Air	05/17/17 16:35	05/22/17 09:25

Detection Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: B-B — Lab Sample ID: 140-8162-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	J	0.20	0.031	ppb v/v	1.49		TO-15	Total/NA
2-Butanone (MEK)	0.22	J	1.0	0.20	ppb v/v	1.49		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.30	J	0.50	0.20	ppb v/v	1.49		TO-15	Total/NA
Acetone	4.1	J	5.0	1.4	ppb v/v	1.49		TO-15	Total/NA
Benzene	0.090	J	0.20	0.056	ppb v/v	1.49		TO-15	Total/NA
Carbon disulfide	0.051	J	0.50	0.031	ppb v/v	1.49		TO-15	Total/NA
Carbon tetrachloride	0.073	J	0.20	0.038	ppb v/v	1.49		TO-15	Total/NA
Chloromethane	0.70		0.50	0.16	ppb v/v	1.49		TO-15	Total/NA
Dichlorodifluoromethane	0.54		0.50	0.068	ppb v/v	1.49		TO-15	Total/NA
Hexane	0.14	J	0.80	0.032	ppb v/v	1.49		TO-15	Total/NA
Isopropyl alcohol	0.29	J	5.0	0.094	ppb v/v	1.49		TO-15	Total/NA
Methylene Chloride	0.77	B	0.50	0.13	ppb v/v	1.49		TO-15	Total/NA
Tetrahydrofuran	0.14	J	5.0	0.063	ppb v/v	1.49		TO-15	Total/NA
Toluene	0.20		0.20	0.12	ppb v/v	1.49		TO-15	Total/NA
Trichlorofluoromethane	0.27		0.20	0.024	ppb v/v	1.49		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55	J	1.5	0.24	ug/m3	1.49		TO-15	Total/NA
2-Butanone (MEK)	0.66	J	2.9	0.59	ug/m3	1.49		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	1.2	J	2.0	0.80	ug/m3	1.49		TO-15	Total/NA
Acetone	9.7	J	12	3.3	ug/m3	1.49		TO-15	Total/NA
Benzene	0.29	J	0.64	0.18	ug/m3	1.49		TO-15	Total/NA
Carbon disulfide	0.16	J	1.6	0.097	ug/m3	1.49		TO-15	Total/NA
Carbon tetrachloride	0.46	J	1.3	0.24	ug/m3	1.49		TO-15	Total/NA
Chloromethane	1.4		1.0	0.33	ug/m3	1.49		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.49		TO-15	Total/NA
Hexane	0.51	J	2.8	0.11	ug/m3	1.49		TO-15	Total/NA
Isopropyl alcohol	0.70	J	12	0.23	ug/m3	1.49		TO-15	Total/NA
Methylene Chloride	2.7	B	1.7	0.45	ug/m3	1.49		TO-15	Total/NA
Tetrahydrofuran	0.40	J	15	0.19	ug/m3	1.49		TO-15	Total/NA
Toluene	0.77		0.75	0.45	ug/m3	1.49		TO-15	Total/NA
Trichlorofluoromethane	1.5		1.1	0.13	ug/m3	1.49		TO-15	Total/NA

Client Sample ID: B-SS — Lab Sample ID: 140-8162-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	J	0.20	0.031	ppb v/v	1.53		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.26		0.20	0.063	ppb v/v	1.53		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.066	J	0.20	0.065	ppb v/v	1.53		TO-15	Total/NA
2-Butanone (MEK)	0.43	J	1.0	0.20	ppb v/v	1.53		TO-15	Total/NA
Acetone	4.7	J	5.0	1.4	ppb v/v	1.53		TO-15	Total/NA
Benzene	0.13	J	0.20	0.056	ppb v/v	1.53		TO-15	Total/NA
Carbon disulfide	0.060	J	0.50	0.031	ppb v/v	1.53		TO-15	Total/NA
Carbon tetrachloride	0.041	J	0.20	0.038	ppb v/v	1.53		TO-15	Total/NA
Cyclohexane	0.17	J	0.50	0.040	ppb v/v	1.53		TO-15	Total/NA
Dichlorodifluoromethane	0.54		0.50	0.068	ppb v/v	1.53		TO-15	Total/NA
Ethylbenzene	0.25		0.20	0.068	ppb v/v	1.53		TO-15	Total/NA
Hexane	0.16	J	0.80	0.032	ppb v/v	1.53		TO-15	Total/NA
Isopropyl alcohol	1.2	J	5.0	0.094	ppb v/v	1.53		TO-15	Total/NA
Methylene Chloride	0.39	J B	0.50	0.13	ppb v/v	1.53		TO-15	Total/NA
m-Xylene & p-Xylene	0.85		0.80	0.12	ppb v/v	1.53		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-SS (Continued) — Lab Sample ID: 140-8162-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	0.32		0.20	0.061	ppb v/v	1.53		TO-15	Total/NA
Tetrachloroethene	0.10	J	0.20	0.040	ppb v/v	1.53		TO-15	Total/NA
Tetrahydrofuran	0.21	J	5.0	0.063	ppb v/v	1.53		TO-15	Total/NA
Toluene	0.85		0.20	0.12	ppb v/v	1.53		TO-15	Total/NA
Trichlorofluoromethane	0.26		0.20	0.024	ppb v/v	1.53		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1.53		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.3		0.98	0.31	ug/m3	1.53		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.33	J	0.98	0.32	ug/m3	1.53		TO-15	Total/NA
2-Butanone (MEK)	1.3	J	2.9	0.59	ug/m3	1.53		TO-15	Total/NA
Acetone	11	J	12	3.3	ug/m3	1.53		TO-15	Total/NA
Benzene	0.41	J	0.64	0.18	ug/m3	1.53		TO-15	Total/NA
Carbon disulfide	0.19	J	1.6	0.097	ug/m3	1.53		TO-15	Total/NA
Carbon tetrachloride	0.26	J	1.3	0.24	ug/m3	1.53		TO-15	Total/NA
Cyclohexane	0.60	J	1.7	0.14	ug/m3	1.53		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.53		TO-15	Total/NA
Ethylbenzene	1.1		0.87	0.30	ug/m3	1.53		TO-15	Total/NA
Hexane	0.55	J	2.8	0.11	ug/m3	1.53		TO-15	Total/NA
Isopropyl alcohol	3.1	J	12	0.23	ug/m3	1.53		TO-15	Total/NA
Methylene Chloride	1.4	J B	1.7	0.45	ug/m3	1.53		TO-15	Total/NA
m-Xylene & p-Xylene	3.7		3.5	0.52	ug/m3	1.53		TO-15	Total/NA
o-Xylene	1.4		0.87	0.26	ug/m3	1.53		TO-15	Total/NA
Tetrachloroethene	0.70	J	1.4	0.27	ug/m3	1.53		TO-15	Total/NA
Tetrahydrofuran	0.62	J	15	0.19	ug/m3	1.53		TO-15	Total/NA
Toluene	3.2		0.75	0.45	ug/m3	1.53		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1.53		TO-15	Total/NA

Client Sample ID: B-I — Lab Sample ID: 140-8162-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.073	J	0.20	0.031	ppb v/v	1.41		TO-15	Total/NA
2-Butanone (MEK)	1.0		1.0	0.20	ppb v/v	1.41		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.25	J	0.50	0.20	ppb v/v	1.41		TO-15	Total/NA
Acetone	12	CI	5.0	1.4	ppb v/v	1.41		TO-15	Total/NA
Benzene	0.076	J	0.20	0.056	ppb v/v	1.41		TO-15	Total/NA
Carbon disulfide	0.073	J	0.50	0.031	ppb v/v	1.41		TO-15	Total/NA
Carbon tetrachloride	0.068	J	0.20	0.038	ppb v/v	1.41		TO-15	Total/NA
Chloromethane	0.77		0.50	0.16	ppb v/v	1.41		TO-15	Total/NA
Cyclohexane	0.055	J	0.50	0.040	ppb v/v	1.41		TO-15	Total/NA
Dichlorodifluoromethane	0.57		0.50	0.068	ppb v/v	1.41		TO-15	Total/NA
Hexane	0.12	J	0.80	0.032	ppb v/v	1.41		TO-15	Total/NA
Isopropyl alcohol	0.68	J	5.0	0.094	ppb v/v	1.41		TO-15	Total/NA
Methylene Chloride	0.47	J B	0.50	0.13	ppb v/v	1.41		TO-15	Total/NA
Tetrahydrofuran	0.12	J	5.0	0.063	ppb v/v	1.41		TO-15	Total/NA
Toluene	0.19	J	0.20	0.12	ppb v/v	1.41		TO-15	Total/NA
Trichloroethene	1.2		0.20	0.036	ppb v/v	1.41		TO-15	Total/NA
Trichlorofluoromethane	0.24		0.20	0.024	ppb v/v	1.41		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.56	J	1.5	0.24	ug/m3	1.41		TO-15	Total/NA
2-Butanone (MEK)	3.0		2.9	0.59	ug/m3	1.41		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-I (Continued) — Lab Sample ID: 140-8162-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4-Methyl-2-pentanone (MIBK)	1.0	J	2.0	0.80	ug/m3	1.41		TO-15	Total/NA
Acetone	30	CI	12	3.3	ug/m3	1.41		TO-15	Total/NA
Benzene	0.24	J	0.64	0.18	ug/m3	1.41		TO-15	Total/NA
Carbon disulfide	0.23	J	1.6	0.097	ug/m3	1.41		TO-15	Total/NA
Carbon tetrachloride	0.43	J	1.3	0.24	ug/m3	1.41		TO-15	Total/NA
Chloromethane	1.6		1.0	0.33	ug/m3	1.41		TO-15	Total/NA
Cyclohexane	0.19	J	1.7	0.14	ug/m3	1.41		TO-15	Total/NA
Dichlorodifluoromethane	2.8		2.5	0.34	ug/m3	1.41		TO-15	Total/NA
Hexane	0.41	J	2.8	0.11	ug/m3	1.41		TO-15	Total/NA
Isopropyl alcohol	1.7	J	12	0.23	ug/m3	1.41		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1.41		TO-15	Total/NA
Tetrahydrofuran	0.36	J	15	0.19	ug/m3	1.41		TO-15	Total/NA
Toluene	0.71	J	0.75	0.45	ug/m3	1.41		TO-15	Total/NA
Trichloroethene	6.2		1.1	0.19	ug/m3	1.41		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1.41		TO-15	Total/NA

Client Sample ID: A-B-1 — Lab Sample ID: 140-8162-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	4.9	J	5.0	1.4	ppb v/v	1.46		TO-15	Total/NA
Carbon disulfide	0.051	J	0.50	0.031	ppb v/v	1.46		TO-15	Total/NA
Chloromethane	0.68		0.50	0.16	ppb v/v	1.46		TO-15	Total/NA
Dichlorodifluoromethane	0.56		0.50	0.068	ppb v/v	1.46		TO-15	Total/NA
Isopropyl alcohol	0.13	J	5.0	0.094	ppb v/v	1.46		TO-15	Total/NA
Methylene Chloride	0.44	J B	0.50	0.13	ppb v/v	1.46		TO-15	Total/NA
Tetrahydrofuran	0.17	J	5.0	0.063	ppb v/v	1.46		TO-15	Total/NA
Trichlorofluoromethane	0.16	J	0.20	0.024	ppb v/v	1.46		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	12	J	12	3.3	ug/m3	1.46		TO-15	Total/NA
Carbon disulfide	0.16	J	1.6	0.097	ug/m3	1.46		TO-15	Total/NA
Chloromethane	1.4		1.0	0.33	ug/m3	1.46		TO-15	Total/NA
Dichlorodifluoromethane	2.8		2.5	0.34	ug/m3	1.46		TO-15	Total/NA
Isopropyl alcohol	0.33	J	12	0.23	ug/m3	1.46		TO-15	Total/NA
Methylene Chloride	1.5	J B	1.7	0.45	ug/m3	1.46		TO-15	Total/NA
Tetrahydrofuran	0.50	J	15	0.19	ug/m3	1.46		TO-15	Total/NA
Trichlorofluoromethane	0.89	J	1.1	0.13	ug/m3	1.46		TO-15	Total/NA

Client Sample ID: A-1-2 — Lab Sample ID: 140-8162-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	J	0.20	0.031	ppb v/v	1.61		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.15	J	0.20	0.063	ppb v/v	1.61		TO-15	Total/NA
2-Butanone (MEK)	1.0		1.0	0.20	ppb v/v	1.61		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.22	J	0.50	0.20	ppb v/v	1.61		TO-15	Total/NA
Acetone	16	CI	5.0	1.4	ppb v/v	1.61		TO-15	Total/NA
Benzene	0.32		0.20	0.056	ppb v/v	1.61		TO-15	Total/NA
Carbon disulfide	0.10	J	0.50	0.031	ppb v/v	1.61		TO-15	Total/NA
Carbon tetrachloride	0.069	J	0.20	0.038	ppb v/v	1.61		TO-15	Total/NA
Chloroform	0.14	J	0.20	0.038	ppb v/v	1.61		TO-15	Total/NA
Chloromethane	0.83		0.50	0.16	ppb v/v	1.61		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: A-1-2 (Continued)

Lab Sample ID: 140-8162-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cyclohexane	0.35	J	0.50	0.040	ppb v/v	1.61		TO-15	Total/NA
Dichlorodifluoromethane	0.54		0.50	0.068	ppb v/v	1.61		TO-15	Total/NA
Ethylbenzene	0.30		0.20	0.068	ppb v/v	1.61		TO-15	Total/NA
Hexane	1.1		0.80	0.032	ppb v/v	1.61		TO-15	Total/NA
Isopropyl alcohol	3.2	J	5.0	0.094	ppb v/v	1.61		TO-15	Total/NA
Methylene Chloride	0.46	J B	0.50	0.13	ppb v/v	1.61		TO-15	Total/NA
m-Xylene & p-Xylene	0.75	J	0.80	0.12	ppb v/v	1.61		TO-15	Total/NA
o-Xylene	0.24		0.20	0.061	ppb v/v	1.61		TO-15	Total/NA
Styrene	0.080	J	0.20	0.058	ppb v/v	1.61		TO-15	Total/NA
Tetrachloroethene	0.12	J	0.20	0.040	ppb v/v	1.61		TO-15	Total/NA
Tetrahydrofuran	1.3	J	5.0	0.063	ppb v/v	1.61		TO-15	Total/NA
Toluene	2.3		0.20	0.12	ppb v/v	1.61		TO-15	Total/NA
Trichlorofluoromethane	0.29		0.20	0.024	ppb v/v	1.61		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	J	1.5	0.24	ug/m3	1.61		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.72	J	0.98	0.31	ug/m3	1.61		TO-15	Total/NA
2-Butanone (MEK)	3.0		2.9	0.59	ug/m3	1.61		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.91	J	2.0	0.80	ug/m3	1.61		TO-15	Total/NA
Acetone	37	CI	12	3.3	ug/m3	1.61		TO-15	Total/NA
Benzene	1.0		0.64	0.18	ug/m3	1.61		TO-15	Total/NA
Carbon disulfide	0.32	J	1.6	0.097	ug/m3	1.61		TO-15	Total/NA
Carbon tetrachloride	0.43	J	1.3	0.24	ug/m3	1.61		TO-15	Total/NA
Chloroform	0.68	J	0.98	0.19	ug/m3	1.61		TO-15	Total/NA
Chloromethane	1.7		1.0	0.33	ug/m3	1.61		TO-15	Total/NA
Cyclohexane	1.2	J	1.7	0.14	ug/m3	1.61		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.61		TO-15	Total/NA
Ethylbenzene	1.3		0.87	0.30	ug/m3	1.61		TO-15	Total/NA
Hexane	3.8		2.8	0.11	ug/m3	1.61		TO-15	Total/NA
Isopropyl alcohol	7.7	J	12	0.23	ug/m3	1.61		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1.61		TO-15	Total/NA
m-Xylene & p-Xylene	3.3	J	3.5	0.52	ug/m3	1.61		TO-15	Total/NA
o-Xylene	1.0		0.87	0.26	ug/m3	1.61		TO-15	Total/NA
Styrene	0.34	J	0.85	0.25	ug/m3	1.61		TO-15	Total/NA
Tetrachloroethene	0.81	J	1.4	0.27	ug/m3	1.61		TO-15	Total/NA
Tetrahydrofuran	3.9	J	15	0.19	ug/m3	1.61		TO-15	Total/NA
Toluene	8.6		0.75	0.45	ug/m3	1.61		TO-15	Total/NA
Trichlorofluoromethane	1.6		1.1	0.13	ug/m3	1.61		TO-15	Total/NA

Client Sample ID: A-SS-1

Lab Sample ID: 140-8162-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	J	0.20	0.031	ppb v/v	1.5		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.36		0.20	0.063	ppb v/v	1.5		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.088	J	0.20	0.065	ppb v/v	1.5		TO-15	Total/NA
2-Butanone (MEK)	0.79	J	1.0	0.20	ppb v/v	1.5		TO-15	Total/NA
Acetone	11		5.0	1.4	ppb v/v	1.5		TO-15	Total/NA
Benzene	1.1		0.20	0.056	ppb v/v	1.5		TO-15	Total/NA
Bromodichloromethane	0.045	J	0.20	0.044	ppb v/v	1.5		TO-15	Total/NA
Carbon disulfide	0.33	J	0.50	0.031	ppb v/v	1.5		TO-15	Total/NA
Carbon tetrachloride	0.041	J	0.20	0.038	ppb v/v	1.5		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: A-SS-1 (Continued) — Lab Sample ID: 140-8162-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	0.10	J	0.20	0.038	ppb v/v	1.5		TO-15	Total/NA
Chloromethane	0.19	J	0.50	0.16	ppb v/v	1.5		TO-15	Total/NA
Cyclohexane	0.98		0.50	0.040	ppb v/v	1.5		TO-15	Total/NA
Dichlorodifluoromethane	0.51		0.50	0.068	ppb v/v	1.5		TO-15	Total/NA
Ethylbenzene	0.59		0.20	0.068	ppb v/v	1.5		TO-15	Total/NA
Hexane	3.0		0.80	0.032	ppb v/v	1.5		TO-15	Total/NA
Isopropyl alcohol	0.47	J	5.0	0.094	ppb v/v	1.5		TO-15	Total/NA
Methylene Chloride	0.41	J B	0.50	0.13	ppb v/v	1.5		TO-15	Total/NA
m-Xylene & p-Xylene	1.9		0.80	0.12	ppb v/v	1.5		TO-15	Total/NA
o-Xylene	0.65		0.20	0.061	ppb v/v	1.5		TO-15	Total/NA
Styrene	0.11	J	0.20	0.058	ppb v/v	1.5		TO-15	Total/NA
Tetrahydrofuran	1.2	J	5.0	0.063	ppb v/v	1.5		TO-15	Total/NA
Toluene	3.2		0.20	0.12	ppb v/v	1.5		TO-15	Total/NA
Trichlorofluoromethane	0.25		0.20	0.024	ppb v/v	1.5		TO-15	Total/NA
Vinyl chloride	0.097	J	0.20	0.071	ppb v/v	1.5		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	J	1.5	0.24	ug/m3	1.5		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.7		0.98	0.31	ug/m3	1.5		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.43	J	0.98	0.32	ug/m3	1.5		TO-15	Total/NA
2-Butanone (MEK)	2.3	J	2.9	0.59	ug/m3	1.5		TO-15	Total/NA
Acetone	25		12	3.3	ug/m3	1.5		TO-15	Total/NA
Benzene	3.4		0.64	0.18	ug/m3	1.5		TO-15	Total/NA
Bromodichloromethane	0.30	J	1.3	0.29	ug/m3	1.5		TO-15	Total/NA
Carbon disulfide	1.0	J	1.6	0.097	ug/m3	1.5		TO-15	Total/NA
Carbon tetrachloride	0.26	J	1.3	0.24	ug/m3	1.5		TO-15	Total/NA
Chloroform	0.49	J	0.98	0.19	ug/m3	1.5		TO-15	Total/NA
Chloromethane	0.38	J	1.0	0.33	ug/m3	1.5		TO-15	Total/NA
Cyclohexane	3.4		1.7	0.14	ug/m3	1.5		TO-15	Total/NA
Dichlorodifluoromethane	2.5		2.5	0.34	ug/m3	1.5		TO-15	Total/NA
Ethylbenzene	2.6		0.87	0.30	ug/m3	1.5		TO-15	Total/NA
Hexane	11		2.8	0.11	ug/m3	1.5		TO-15	Total/NA
Isopropyl alcohol	1.2	J	12	0.23	ug/m3	1.5		TO-15	Total/NA
Methylene Chloride	1.4	J B	1.7	0.45	ug/m3	1.5		TO-15	Total/NA
m-Xylene & p-Xylene	8.1		3.5	0.52	ug/m3	1.5		TO-15	Total/NA
o-Xylene	2.8		0.87	0.26	ug/m3	1.5		TO-15	Total/NA
Styrene	0.45	J	0.85	0.25	ug/m3	1.5		TO-15	Total/NA
Tetrahydrofuran	3.6	J	15	0.19	ug/m3	1.5		TO-15	Total/NA
Toluene	12		0.75	0.45	ug/m3	1.5		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1.5		TO-15	Total/NA
Vinyl chloride	0.25	J	0.51	0.18	ug/m3	1.5		TO-15	Total/NA

Client Sample ID: A-SS-2 — Lab Sample ID: 140-8162-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.078	J	0.20	0.031	ppb v/v	1.62		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.40		0.20	0.063	ppb v/v	1.62		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.095	J	0.20	0.065	ppb v/v	1.62		TO-15	Total/NA
2-Butanone (MEK)	1.2		1.0	0.20	ppb v/v	1.62		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.41	J	0.50	0.20	ppb v/v	1.62		TO-15	Total/NA
Acetone	14	CI	5.0	1.4	ppb v/v	1.62		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: A-SS-2 (Continued)

Lab Sample ID: 140-8162-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	1.3		0.20	0.056	ppb v/v	1.62		TO-15	Total/NA
Bromodichloromethane	0.051	J	0.20	0.044	ppb v/v	1.62		TO-15	Total/NA
Carbon disulfide	0.57		0.50	0.031	ppb v/v	1.62		TO-15	Total/NA
Carbon tetrachloride	0.051	J	0.20	0.038	ppb v/v	1.62		TO-15	Total/NA
Chloroethane	0.038	J	0.80	0.035	ppb v/v	1.62		TO-15	Total/NA
Chloroform	0.11	J	0.20	0.038	ppb v/v	1.62		TO-15	Total/NA
Chloromethane	0.36	J	0.50	0.16	ppb v/v	1.62		TO-15	Total/NA
Cyclohexane	1.3		0.50	0.040	ppb v/v	1.62		TO-15	Total/NA
Dichlorodifluoromethane	0.56		0.50	0.068	ppb v/v	1.62		TO-15	Total/NA
Ethylbenzene	0.64		0.20	0.068	ppb v/v	1.62		TO-15	Total/NA
Hexane	3.4		0.80	0.032	ppb v/v	1.62		TO-15	Total/NA
Isopropyl alcohol	0.80	J	5.0	0.094	ppb v/v	1.62		TO-15	Total/NA
Methylene Chloride	0.54	B	0.50	0.13	ppb v/v	1.62		TO-15	Total/NA
m-Xylene & p-Xylene	2.1		0.80	0.12	ppb v/v	1.62		TO-15	Total/NA
o-Xylene	0.69		0.20	0.061	ppb v/v	1.62		TO-15	Total/NA
Styrene	0.12	J	0.20	0.058	ppb v/v	1.62		TO-15	Total/NA
Toluene	3.6		0.20	0.12	ppb v/v	1.62		TO-15	Total/NA
Trichlorofluoromethane	0.29		0.20	0.024	ppb v/v	1.62		TO-15	Total/NA
Vinyl chloride	0.10	J	0.20	0.071	ppb v/v	1.62		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.59	J	1.5	0.24	ug/m3	1.62		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.0		0.98	0.31	ug/m3	1.62		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.47	J	0.98	0.32	ug/m3	1.62		TO-15	Total/NA
2-Butanone (MEK)	3.5		2.9	0.59	ug/m3	1.62		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	1.7	J	2.0	0.80	ug/m3	1.62		TO-15	Total/NA
Acetone	33	CI	12	3.3	ug/m3	1.62		TO-15	Total/NA
Benzene	4.2		0.64	0.18	ug/m3	1.62		TO-15	Total/NA
Bromodichloromethane	0.34	J	1.3	0.29	ug/m3	1.62		TO-15	Total/NA
Carbon disulfide	1.8		1.6	0.097	ug/m3	1.62		TO-15	Total/NA
Carbon tetrachloride	0.32	J	1.3	0.24	ug/m3	1.62		TO-15	Total/NA
Chloroethane	0.10	J	2.1	0.092	ug/m3	1.62		TO-15	Total/NA
Chloroform	0.54	J	0.98	0.19	ug/m3	1.62		TO-15	Total/NA
Chloromethane	0.74	J	1.0	0.33	ug/m3	1.62		TO-15	Total/NA
Cyclohexane	4.3		1.7	0.14	ug/m3	1.62		TO-15	Total/NA
Dichlorodifluoromethane	2.8		2.5	0.34	ug/m3	1.62		TO-15	Total/NA
Ethylbenzene	2.8		0.87	0.30	ug/m3	1.62		TO-15	Total/NA
Hexane	12		2.8	0.11	ug/m3	1.62		TO-15	Total/NA
Isopropyl alcohol	2.0	J	12	0.23	ug/m3	1.62		TO-15	Total/NA
Methylene Chloride	1.9	B	1.7	0.45	ug/m3	1.62		TO-15	Total/NA
m-Xylene & p-Xylene	9.0		3.5	0.52	ug/m3	1.62		TO-15	Total/NA
o-Xylene	3.0		0.87	0.26	ug/m3	1.62		TO-15	Total/NA
Styrene	0.49	J	0.85	0.25	ug/m3	1.62		TO-15	Total/NA
Toluene	14		0.75	0.45	ug/m3	1.62		TO-15	Total/NA
Trichlorofluoromethane	1.6		1.1	0.13	ug/m3	1.62		TO-15	Total/NA
Vinyl chloride	0.26	J	0.51	0.18	ug/m3	1.62		TO-15	Total/NA

Client Sample ID: A-1-1

Lab Sample ID: 140-8162-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.071	J	0.20	0.031	ppb v/v	1.57		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: A-1-1 (Continued)

Lab Sample ID: 140-8162-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2,4-Trimethylbenzene	0.15	J	0.20	0.063	ppb v/v	1.57		TO-15	Total/NA
2-Butanone (MEK)	0.93	J	1.0	0.20	ppb v/v	1.57		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.96		0.50	0.20	ppb v/v	1.57		TO-15	Total/NA
Acetone	14		5.0	1.4	ppb v/v	1.57		TO-15	Total/NA
Benzene	0.32		0.20	0.056	ppb v/v	1.57		TO-15	Total/NA
Carbon disulfide	0.086	J	0.50	0.031	ppb v/v	1.57		TO-15	Total/NA
Carbon tetrachloride	0.075	J	0.20	0.038	ppb v/v	1.57		TO-15	Total/NA
Chloroform	0.14	J	0.20	0.038	ppb v/v	1.57		TO-15	Total/NA
Chloromethane	0.75		0.50	0.16	ppb v/v	1.57		TO-15	Total/NA
Cyclohexane	0.40	J	0.50	0.040	ppb v/v	1.57		TO-15	Total/NA
Dichlorodifluoromethane	0.57		0.50	0.068	ppb v/v	1.57		TO-15	Total/NA
Ethylbenzene	0.31		0.20	0.068	ppb v/v	1.57		TO-15	Total/NA
Hexane	1.1		0.80	0.032	ppb v/v	1.57		TO-15	Total/NA
Isopropyl alcohol	3.2	J	5.0	0.094	ppb v/v	1.57		TO-15	Total/NA
Methylene Chloride	0.52	B	0.50	0.13	ppb v/v	1.57		TO-15	Total/NA
m-Xylene & p-Xylene	0.77	J	0.80	0.12	ppb v/v	1.57		TO-15	Total/NA
o-Xylene	0.24		0.20	0.061	ppb v/v	1.57		TO-15	Total/NA
Styrene	0.086	J	0.20	0.058	ppb v/v	1.57		TO-15	Total/NA
Tetrachloroethene	0.14	J	0.20	0.040	ppb v/v	1.57		TO-15	Total/NA
Tetrahydrofuran	1.3	J	5.0	0.063	ppb v/v	1.57		TO-15	Total/NA
Toluene	2.4		0.20	0.12	ppb v/v	1.57		TO-15	Total/NA
Trichlorofluoromethane	0.29		0.20	0.024	ppb v/v	1.57		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55	J	1.5	0.24	ug/m3	1.57		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.72	J	0.98	0.31	ug/m3	1.57		TO-15	Total/NA
2-Butanone (MEK)	2.7	J	2.9	0.59	ug/m3	1.57		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	3.9		2.0	0.80	ug/m3	1.57		TO-15	Total/NA
Acetone	34		12	3.3	ug/m3	1.57		TO-15	Total/NA
Benzene	1.0		0.64	0.18	ug/m3	1.57		TO-15	Total/NA
Carbon disulfide	0.27	J	1.6	0.097	ug/m3	1.57		TO-15	Total/NA
Carbon tetrachloride	0.47	J	1.3	0.24	ug/m3	1.57		TO-15	Total/NA
Chloroform	0.69	J	0.98	0.19	ug/m3	1.57		TO-15	Total/NA
Chloromethane	1.6		1.0	0.33	ug/m3	1.57		TO-15	Total/NA
Cyclohexane	1.4	J	1.7	0.14	ug/m3	1.57		TO-15	Total/NA
Dichlorodifluoromethane	2.8		2.5	0.34	ug/m3	1.57		TO-15	Total/NA
Ethylbenzene	1.3		0.87	0.30	ug/m3	1.57		TO-15	Total/NA
Hexane	4.0		2.8	0.11	ug/m3	1.57		TO-15	Total/NA
Isopropyl alcohol	8.0	J	12	0.23	ug/m3	1.57		TO-15	Total/NA
Methylene Chloride	1.8	B	1.7	0.45	ug/m3	1.57		TO-15	Total/NA
m-Xylene & p-Xylene	3.4	J	3.5	0.52	ug/m3	1.57		TO-15	Total/NA
o-Xylene	1.1		0.87	0.26	ug/m3	1.57		TO-15	Total/NA
Styrene	0.37	J	0.85	0.25	ug/m3	1.57		TO-15	Total/NA
Tetrachloroethene	0.92	J	1.4	0.27	ug/m3	1.57		TO-15	Total/NA
Tetrahydrofuran	3.7	J	15	0.19	ug/m3	1.57		TO-15	Total/NA
Toluene	9.0		0.75	0.45	ug/m3	1.57		TO-15	Total/NA
Trichlorofluoromethane	1.7		1.1	0.13	ug/m3	1.57		TO-15	Total/NA

Client Sample ID: A-B-2

Lab Sample ID: 140-8162-9

This Detection Summary does not include radiochemical test results.

Client Sample ID: A-B-2 (Continued)

Lab Sample ID: 140-8162-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	J	0.20	0.031	ppb v/v	1.4		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.17	J	0.20	0.063	ppb v/v	1.4		TO-15	Total/NA
2-Butanone (MEK)	1.5		1.0	0.20	ppb v/v	1.4		TO-15	Total/NA
Acetone	15	CI	5.0	1.4	ppb v/v	1.4		TO-15	Total/NA
Benzene	0.37		0.20	0.056	ppb v/v	1.4		TO-15	Total/NA
Carbon disulfide	0.11	J	0.50	0.031	ppb v/v	1.4		TO-15	Total/NA
Carbon tetrachloride	0.072	J	0.20	0.038	ppb v/v	1.4		TO-15	Total/NA
Chloroethane	0.060	J	0.80	0.035	ppb v/v	1.4		TO-15	Total/NA
Chloroform	0.072	J	0.20	0.038	ppb v/v	1.4		TO-15	Total/NA
Chloromethane	1.0		0.50	0.16	ppb v/v	1.4		TO-15	Total/NA
Cyclohexane	0.43	J	0.50	0.040	ppb v/v	1.4		TO-15	Total/NA
Dichlorodifluoromethane	0.53		0.50	0.068	ppb v/v	1.4		TO-15	Total/NA
Ethylbenzene	0.38		0.20	0.068	ppb v/v	1.4		TO-15	Total/NA
Hexane	1.4		0.80	0.032	ppb v/v	1.4		TO-15	Total/NA
Isopropyl alcohol	1.2	J	5.0	0.094	ppb v/v	1.4		TO-15	Total/NA
Methylene Chloride	0.47	J B	0.50	0.13	ppb v/v	1.4		TO-15	Total/NA
m-Xylene & p-Xylene	0.90		0.80	0.12	ppb v/v	1.4		TO-15	Total/NA
o-Xylene	0.27		0.20	0.061	ppb v/v	1.4		TO-15	Total/NA
Tetrahydrofuran	1.4	J	5.0	0.063	ppb v/v	1.4		TO-15	Total/NA
Toluene	2.9		0.20	0.12	ppb v/v	1.4		TO-15	Total/NA
Trichlorofluoromethane	0.25		0.20	0.024	ppb v/v	1.4		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55	J	1.5	0.24	ug/m3	1.4		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.82	J	0.98	0.31	ug/m3	1.4		TO-15	Total/NA
2-Butanone (MEK)	4.3		2.9	0.59	ug/m3	1.4		TO-15	Total/NA
Acetone	37	CI	12	3.3	ug/m3	1.4		TO-15	Total/NA
Benzene	1.2		0.64	0.18	ug/m3	1.4		TO-15	Total/NA
Carbon disulfide	0.35	J	1.6	0.097	ug/m3	1.4		TO-15	Total/NA
Carbon tetrachloride	0.45	J	1.3	0.24	ug/m3	1.4		TO-15	Total/NA
Chloroethane	0.16	J	2.1	0.092	ug/m3	1.4		TO-15	Total/NA
Chloroform	0.35	J	0.98	0.19	ug/m3	1.4		TO-15	Total/NA
Chloromethane	2.2		1.0	0.33	ug/m3	1.4		TO-15	Total/NA
Cyclohexane	1.5	J	1.7	0.14	ug/m3	1.4		TO-15	Total/NA
Dichlorodifluoromethane	2.6		2.5	0.34	ug/m3	1.4		TO-15	Total/NA
Ethylbenzene	1.6		0.87	0.30	ug/m3	1.4		TO-15	Total/NA
Hexane	4.8		2.8	0.11	ug/m3	1.4		TO-15	Total/NA
Isopropyl alcohol	2.9	J	12	0.23	ug/m3	1.4		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1.4		TO-15	Total/NA
m-Xylene & p-Xylene	3.9		3.5	0.52	ug/m3	1.4		TO-15	Total/NA
o-Xylene	1.2		0.87	0.26	ug/m3	1.4		TO-15	Total/NA
Tetrahydrofuran	4.1	J	15	0.19	ug/m3	1.4		TO-15	Total/NA
Toluene	11		0.75	0.45	ug/m3	1.4		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1.4		TO-15	Total/NA

Client Sample ID: AA

Lab Sample ID: 140-8162-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	J	0.20	0.031	ppb v/v	1.38		TO-15	Total/NA
2-Butanone (MEK)	0.30	J	1.0	0.20	ppb v/v	1.38		TO-15	Total/NA
Acetone	4.1	J	5.0	1.4	ppb v/v	1.38		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: AA (Continued) — Lab Sample ID: 140-8162-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.085	J	0.20	0.056	ppb v/v	1.38		TO-15	Total/NA
Carbon disulfide	0.20	J	0.50	0.031	ppb v/v	1.38		TO-15	Total/NA
Carbon tetrachloride	0.069	J	0.20	0.038	ppb v/v	1.38		TO-15	Total/NA
Chloromethane	0.60		0.50	0.16	ppb v/v	1.38		TO-15	Total/NA
Cyclohexane	0.047	J	0.50	0.040	ppb v/v	1.38		TO-15	Total/NA
Dichlorodifluoromethane	0.55		0.50	0.068	ppb v/v	1.38		TO-15	Total/NA
Hexane	0.11	J	0.80	0.032	ppb v/v	1.38		TO-15	Total/NA
Isopropyl alcohol	0.36	J	5.0	0.094	ppb v/v	1.38		TO-15	Total/NA
Methylene Chloride	0.49	J B	0.50	0.13	ppb v/v	1.38		TO-15	Total/NA
Tetrahydrofuran	0.077	J	5.0	0.063	ppb v/v	1.38		TO-15	Total/NA
Toluene	0.17	J	0.20	0.12	ppb v/v	1.38		TO-15	Total/NA
Trichlorofluoromethane	0.25		0.20	0.024	ppb v/v	1.38		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.57	J	1.5	0.24	ug/m3	1.38		TO-15	Total/NA
2-Butanone (MEK)	0.89	J	2.9	0.59	ug/m3	1.38		TO-15	Total/NA
Acetone	9.7	J	12	3.3	ug/m3	1.38		TO-15	Total/NA
Benzene	0.27	J	0.64	0.18	ug/m3	1.38		TO-15	Total/NA
Carbon disulfide	0.63	J	1.6	0.097	ug/m3	1.38		TO-15	Total/NA
Carbon tetrachloride	0.43	J	1.3	0.24	ug/m3	1.38		TO-15	Total/NA
Chloromethane	1.2		1.0	0.33	ug/m3	1.38		TO-15	Total/NA
Cyclohexane	0.16	J	1.7	0.14	ug/m3	1.38		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.38		TO-15	Total/NA
Hexane	0.40	J	2.8	0.11	ug/m3	1.38		TO-15	Total/NA
Isopropyl alcohol	0.88	J	12	0.23	ug/m3	1.38		TO-15	Total/NA
Methylene Chloride	1.7	J B	1.7	0.45	ug/m3	1.38		TO-15	Total/NA
Tetrahydrofuran	0.23	J	15	0.19	ug/m3	1.38		TO-15	Total/NA
Toluene	0.65	J	0.75	0.45	ug/m3	1.38		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1.38		TO-15	Total/NA

Client Sample ID: D-A — Lab Sample ID: 140-8162-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.066	J	0.20	0.031	ppb v/v	1.3		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.12	J	0.20	0.063	ppb v/v	1.3		TO-15	Total/NA
2-Butanone (MEK)	1.5		1.0	0.20	ppb v/v	1.3		TO-15	Total/NA
Acetone	14	CI	5.0	1.4	ppb v/v	1.3		TO-15	Total/NA
Benzene	0.18	J	0.20	0.056	ppb v/v	1.3		TO-15	Total/NA
Carbon disulfide	0.076	J	0.50	0.031	ppb v/v	1.3		TO-15	Total/NA
Carbon tetrachloride	0.065	J	0.20	0.038	ppb v/v	1.3		TO-15	Total/NA
Chloromethane	0.65		0.50	0.16	ppb v/v	1.3		TO-15	Total/NA
Cyclohexane	0.13	J	0.50	0.040	ppb v/v	1.3		TO-15	Total/NA
Dichlorodifluoromethane	0.52		0.50	0.068	ppb v/v	1.3		TO-15	Total/NA
Ethylbenzene	0.17	J	0.20	0.068	ppb v/v	1.3		TO-15	Total/NA
Hexane	0.18	J	0.80	0.032	ppb v/v	1.3		TO-15	Total/NA
Isopropyl alcohol	0.57	J	5.0	0.094	ppb v/v	1.3		TO-15	Total/NA
Methylene Chloride	0.43	J B	0.50	0.13	ppb v/v	1.3		TO-15	Total/NA
m-Xylene & p-Xylene	0.41	J	0.80	0.12	ppb v/v	1.3		TO-15	Total/NA
o-Xylene	0.16	J	0.20	0.061	ppb v/v	1.3		TO-15	Total/NA
Toluene	0.77		0.20	0.12	ppb v/v	1.3		TO-15	Total/NA
Trichlorofluoromethane	0.23		0.20	0.024	ppb v/v	1.3		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: D-A (Continued) — Lab Sample ID: 140-8162-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	J	1.5	0.24	ug/m3	1.3		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.59	J	0.98	0.31	ug/m3	1.3		TO-15	Total/NA
2-Butanone (MEK)	4.5		2.9	0.59	ug/m3	1.3		TO-15	Total/NA
Acetone	34	CI	12	3.3	ug/m3	1.3		TO-15	Total/NA
Benzene	0.58	J	0.64	0.18	ug/m3	1.3		TO-15	Total/NA
Carbon disulfide	0.24	J	1.6	0.097	ug/m3	1.3		TO-15	Total/NA
Carbon tetrachloride	0.41	J	1.3	0.24	ug/m3	1.3		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1.3		TO-15	Total/NA
Cyclohexane	0.44	J	1.7	0.14	ug/m3	1.3		TO-15	Total/NA
Dichlorodifluoromethane	2.6		2.5	0.34	ug/m3	1.3		TO-15	Total/NA
Ethylbenzene	0.76	J	0.87	0.30	ug/m3	1.3		TO-15	Total/NA
Hexane	0.65	J	2.8	0.11	ug/m3	1.3		TO-15	Total/NA
Isopropyl alcohol	1.4	J	12	0.23	ug/m3	1.3		TO-15	Total/NA
Methylene Chloride	1.5	J B	1.7	0.45	ug/m3	1.3		TO-15	Total/NA
m-Xylene & p-Xylene	1.8	J	3.5	0.52	ug/m3	1.3		TO-15	Total/NA
o-Xylene	0.70	J	0.87	0.26	ug/m3	1.3		TO-15	Total/NA
Toluene	2.9		0.75	0.45	ug/m3	1.3		TO-15	Total/NA
Trichlorofluoromethane	1.3		1.1	0.13	ug/m3	1.3		TO-15	Total/NA

Client Sample ID: D-SS — Lab Sample ID: 140-8162-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	1.4	J	13	0.81	ppb v/v	1.43		TO-15	Total/NA
Hexane	1.0	J	21	0.83	ppb v/v	1.43		TO-15	Total/NA
Isopropyl alcohol	13	J	130	2.4	ppb v/v	1.43		TO-15	Total/NA
Methylene Chloride	7.4	J B	13	3.4	ppb v/v	1.43		TO-15	Total/NA
Tetrachloroethene	3.6	J	5.2	1.0	ppb v/v	1.43		TO-15	Total/NA
Trichloroethene	990		5.2	0.94	ppb v/v	1.43		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	4.3	J	40	2.5	ug/m3	1.43		TO-15	Total/NA
Hexane	3.6	J	73	2.9	ug/m3	1.43		TO-15	Total/NA
Isopropyl alcohol	31	J	320	6.0	ug/m3	1.43		TO-15	Total/NA
Methylene Chloride	26	J B	45	12	ug/m3	1.43		TO-15	Total/NA
Tetrachloroethene	24	J	35	7.1	ug/m3	1.43		TO-15	Total/NA
Trichloroethene	5300		28	5.0	ug/m3	1.43		TO-15	Total/NA

Client Sample ID: C-SS — Lab Sample ID: 140-8162-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	J	0.20	0.031	ppb v/v	1.42		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.20		0.20	0.063	ppb v/v	1.42		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.071	J	0.20	0.065	ppb v/v	1.42		TO-15	Total/NA
2-Butanone (MEK)	0.45	J	1.0	0.20	ppb v/v	1.42		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.51		0.50	0.20	ppb v/v	1.42		TO-15	Total/NA
Acetone	3.9	J	5.0	1.4	ppb v/v	1.42		TO-15	Total/NA
Benzene	0.15	J	0.20	0.056	ppb v/v	1.42		TO-15	Total/NA
Carbon disulfide	0.18	J	0.50	0.031	ppb v/v	1.42		TO-15	Total/NA
Carbon tetrachloride	0.057	J	0.20	0.038	ppb v/v	1.42		TO-15	Total/NA
Chloroform	0.28		0.20	0.038	ppb v/v	1.42		TO-15	Total/NA
Chloromethane	0.32	J	0.50	0.16	ppb v/v	1.42		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: C-SS (Continued) — Lab Sample ID: 140-8162-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cyclohexane	0.24	J	0.50	0.040	ppb v/v	1.42		TO-15	Total/NA
Dichlorodifluoromethane	0.58		0.50	0.068	ppb v/v	1.42		TO-15	Total/NA
Ethylbenzene	0.22		0.20	0.068	ppb v/v	1.42		TO-15	Total/NA
Hexane	0.29	J	0.80	0.032	ppb v/v	1.42		TO-15	Total/NA
Methylene Chloride	0.40	J B	0.50	0.13	ppb v/v	1.42		TO-15	Total/NA
m-Xylene & p-Xylene	0.63	J	0.80	0.12	ppb v/v	1.42		TO-15	Total/NA
o-Xylene	0.25		0.20	0.061	ppb v/v	1.42		TO-15	Total/NA
Tetrachloroethene	0.26		0.20	0.040	ppb v/v	1.42		TO-15	Total/NA
Tetrahydrofuran	0.39	J	5.0	0.063	ppb v/v	1.42		TO-15	Total/NA
Toluene	0.65		0.20	0.12	ppb v/v	1.42		TO-15	Total/NA
Trichloroethene	0.13	J	0.20	0.036	ppb v/v	1.42		TO-15	Total/NA
Trichlorofluoromethane	0.30		0.20	0.024	ppb v/v	1.42		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1.42		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.97		0.98	0.31	ug/m3	1.42		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.35	J	0.98	0.32	ug/m3	1.42		TO-15	Total/NA
2-Butanone (MEK)	1.3	J	2.9	0.59	ug/m3	1.42		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	2.1		2.0	0.80	ug/m3	1.42		TO-15	Total/NA
Acetone	9.2	J	12	3.3	ug/m3	1.42		TO-15	Total/NA
Benzene	0.49	J	0.64	0.18	ug/m3	1.42		TO-15	Total/NA
Carbon disulfide	0.55	J	1.6	0.097	ug/m3	1.42		TO-15	Total/NA
Carbon tetrachloride	0.36	J	1.3	0.24	ug/m3	1.42		TO-15	Total/NA
Chloroform	1.4		0.98	0.19	ug/m3	1.42		TO-15	Total/NA
Chloromethane	0.67	J	1.0	0.33	ug/m3	1.42		TO-15	Total/NA
Cyclohexane	0.81	J	1.7	0.14	ug/m3	1.42		TO-15	Total/NA
Dichlorodifluoromethane	2.9		2.5	0.34	ug/m3	1.42		TO-15	Total/NA
Ethylbenzene	0.94		0.87	0.30	ug/m3	1.42		TO-15	Total/NA
Hexane	1.0	J	2.8	0.11	ug/m3	1.42		TO-15	Total/NA
Methylene Chloride	1.4	J B	1.7	0.45	ug/m3	1.42		TO-15	Total/NA
m-Xylene & p-Xylene	2.7	J	3.5	0.52	ug/m3	1.42		TO-15	Total/NA
o-Xylene	1.1		0.87	0.26	ug/m3	1.42		TO-15	Total/NA
Tetrachloroethene	1.7		1.4	0.27	ug/m3	1.42		TO-15	Total/NA
Tetrahydrofuran	1.2	J	15	0.19	ug/m3	1.42		TO-15	Total/NA
Toluene	2.5		0.75	0.45	ug/m3	1.42		TO-15	Total/NA
Trichloroethene	0.71	J	1.1	0.19	ug/m3	1.42		TO-15	Total/NA
Trichlorofluoromethane	1.7		1.1	0.13	ug/m3	1.42		TO-15	Total/NA

Client Sample ID: D-I — Lab Sample ID: 140-8162-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	J	0.20	0.031	ppb v/v	1.35		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.16	J	0.20	0.063	ppb v/v	1.35		TO-15	Total/NA
1,2-Dichloroethane	0.048	J	0.20	0.047	ppb v/v	1.35		TO-15	Total/NA
2-Butanone (MEK)	1.7		1.0	0.20	ppb v/v	1.35		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.22	J	0.50	0.20	ppb v/v	1.35		TO-15	Total/NA
Acetone	19		5.0	1.4	ppb v/v	1.35		TO-15	Total/NA
Benzene	0.10	J	0.20	0.056	ppb v/v	1.35		TO-15	Total/NA
Carbon disulfide	0.092	J	0.50	0.031	ppb v/v	1.35		TO-15	Total/NA
Carbon tetrachloride	0.077	J	0.20	0.038	ppb v/v	1.35		TO-15	Total/NA
Chloroform	0.099	J	0.20	0.038	ppb v/v	1.35		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: D-I (Continued)

Lab Sample ID: 140-8162-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	0.64		0.50	0.16	ppb v/v	1.35		TO-15	Total/NA
Cyclohexane	0.077	J	0.50	0.040	ppb v/v	1.35		TO-15	Total/NA
Dichlorodifluoromethane	0.47	J	0.50	0.068	ppb v/v	1.35		TO-15	Total/NA
Ethylbenzene	0.12	J	0.20	0.068	ppb v/v	1.35		TO-15	Total/NA
Hexane	0.16	J	0.80	0.032	ppb v/v	1.35		TO-15	Total/NA
Isopropyl alcohol	17		5.0	0.094	ppb v/v	1.35		TO-15	Total/NA
Methylene Chloride	0.52	B	0.50	0.13	ppb v/v	1.35		TO-15	Total/NA
m-Xylene & p-Xylene	0.25	J	0.80	0.12	ppb v/v	1.35		TO-15	Total/NA
o-Xylene	0.089	J	0.20	0.061	ppb v/v	1.35		TO-15	Total/NA
Styrene	0.21		0.20	0.058	ppb v/v	1.35		TO-15	Total/NA
Tetrahydrofuran	1.1	J	5.0	0.063	ppb v/v	1.35		TO-15	Total/NA
Toluene	0.75		0.20	0.12	ppb v/v	1.35		TO-15	Total/NA
Trichloroethene	1.7		0.20	0.036	ppb v/v	1.35		TO-15	Total/NA
Trichlorofluoromethane	0.23		0.20	0.024	ppb v/v	1.35		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.52	J	1.5	0.24	ug/m3	1.35		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.80	J	0.98	0.31	ug/m3	1.35		TO-15	Total/NA
1,2-Dichloroethane	0.19	J	0.81	0.19	ug/m3	1.35		TO-15	Total/NA
2-Butanone (MEK)	5.0		2.9	0.59	ug/m3	1.35		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.89	J	2.0	0.80	ug/m3	1.35		TO-15	Total/NA
Acetone	45		12	3.3	ug/m3	1.35		TO-15	Total/NA
Benzene	0.32	J	0.64	0.18	ug/m3	1.35		TO-15	Total/NA
Carbon disulfide	0.29	J	1.6	0.097	ug/m3	1.35		TO-15	Total/NA
Carbon tetrachloride	0.48	J	1.3	0.24	ug/m3	1.35		TO-15	Total/NA
Chloroform	0.49	J	0.98	0.19	ug/m3	1.35		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1.35		TO-15	Total/NA
Cyclohexane	0.27	J	1.7	0.14	ug/m3	1.35		TO-15	Total/NA
Dichlorodifluoromethane	2.3	J	2.5	0.34	ug/m3	1.35		TO-15	Total/NA
Ethylbenzene	0.50	J	0.87	0.30	ug/m3	1.35		TO-15	Total/NA
Hexane	0.55	J	2.8	0.11	ug/m3	1.35		TO-15	Total/NA
Isopropyl alcohol	41		12	0.23	ug/m3	1.35		TO-15	Total/NA
Methylene Chloride	1.8	B	1.7	0.45	ug/m3	1.35		TO-15	Total/NA
m-Xylene & p-Xylene	1.1	J	3.5	0.52	ug/m3	1.35		TO-15	Total/NA
o-Xylene	0.39	J	0.87	0.26	ug/m3	1.35		TO-15	Total/NA
Styrene	0.88		0.85	0.25	ug/m3	1.35		TO-15	Total/NA
Tetrahydrofuran	3.4	J	15	0.19	ug/m3	1.35		TO-15	Total/NA
Toluene	2.8		0.75	0.45	ug/m3	1.35		TO-15	Total/NA
Trichloroethene	9.2		1.1	0.19	ug/m3	1.35		TO-15	Total/NA
Trichlorofluoromethane	1.3		1.1	0.13	ug/m3	1.35		TO-15	Total/NA

Client Sample ID: C-B

Lab Sample ID: 140-8162-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.071	J	0.20	0.031	ppb v/v	1.59		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.071	J	0.20	0.063	ppb v/v	1.59		TO-15	Total/NA
2-Butanone (MEK)	1.6		1.0	0.20	ppb v/v	1.59		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.26	J	0.50	0.20	ppb v/v	1.59		TO-15	Total/NA
Acetone	16		5.0	1.4	ppb v/v	1.59		TO-15	Total/NA
Benzene	0.46		0.20	0.056	ppb v/v	1.59		TO-15	Total/NA
Carbon disulfide	0.061	J	0.50	0.031	ppb v/v	1.59		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: C-B (Continued) — Lab Sample ID: 140-8162-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.072	J	0.20	0.038	ppb v/v	1.59		TO-15	Total/NA
Chloroform	0.090	J	0.20	0.038	ppb v/v	1.59		TO-15	Total/NA
Chloromethane	0.70		0.50	0.16	ppb v/v	1.59		TO-15	Total/NA
Cyclohexane	1.1		0.50	0.040	ppb v/v	1.59		TO-15	Total/NA
Dichlorodifluoromethane	0.56		0.50	0.068	ppb v/v	1.59		TO-15	Total/NA
Ethylbenzene	0.17	J	0.20	0.068	ppb v/v	1.59		TO-15	Total/NA
Hexane	1.9		0.80	0.032	ppb v/v	1.59		TO-15	Total/NA
Isopropyl alcohol	1.5	J	5.0	0.094	ppb v/v	1.59		TO-15	Total/NA
Methylene Chloride	0.57	B	0.50	0.13	ppb v/v	1.59		TO-15	Total/NA
m-Xylene & p-Xylene	0.58	J	0.80	0.12	ppb v/v	1.59		TO-15	Total/NA
o-Xylene	0.15	J	0.20	0.061	ppb v/v	1.59		TO-15	Total/NA
Tetrahydrofuran	1.4	J	5.0	0.063	ppb v/v	1.59		TO-15	Total/NA
Toluene	4.2		0.20	0.12	ppb v/v	1.59		TO-15	Total/NA
Trichlorofluoromethane	0.29		0.20	0.024	ppb v/v	1.59		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.54	J	1.5	0.24	ug/m3	1.59		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.35	J	0.98	0.31	ug/m3	1.59		TO-15	Total/NA
2-Butanone (MEK)	4.7		2.9	0.59	ug/m3	1.59		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	1.1	J	2.0	0.80	ug/m3	1.59		TO-15	Total/NA
Acetone	38		12	3.3	ug/m3	1.59		TO-15	Total/NA
Benzene	1.5		0.64	0.18	ug/m3	1.59		TO-15	Total/NA
Carbon disulfide	0.19	J	1.6	0.097	ug/m3	1.59		TO-15	Total/NA
Carbon tetrachloride	0.45	J	1.3	0.24	ug/m3	1.59		TO-15	Total/NA
Chloroform	0.44	J	0.98	0.19	ug/m3	1.59		TO-15	Total/NA
Chloromethane	1.4		1.0	0.33	ug/m3	1.59		TO-15	Total/NA
Cyclohexane	3.7		1.7	0.14	ug/m3	1.59		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.59		TO-15	Total/NA
Ethylbenzene	0.72	J	0.87	0.30	ug/m3	1.59		TO-15	Total/NA
Hexane	6.8		2.8	0.11	ug/m3	1.59		TO-15	Total/NA
Isopropyl alcohol	3.6	J	12	0.23	ug/m3	1.59		TO-15	Total/NA
Methylene Chloride	2.0	B	1.7	0.45	ug/m3	1.59		TO-15	Total/NA
m-Xylene & p-Xylene	2.5	J	3.5	0.52	ug/m3	1.59		TO-15	Total/NA
o-Xylene	0.67	J	0.87	0.26	ug/m3	1.59		TO-15	Total/NA
Tetrahydrofuran	4.0	J	15	0.19	ug/m3	1.59		TO-15	Total/NA
Toluene	16		0.75	0.45	ug/m3	1.59		TO-15	Total/NA
Trichlorofluoromethane	1.6		1.1	0.13	ug/m3	1.59		TO-15	Total/NA

Client Sample ID: C-I — Lab Sample ID: 140-8162-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.066	J	0.20	0.031	ppb v/v	1.42		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.064	J	0.20	0.063	ppb v/v	1.42		TO-15	Total/NA
1,2-Dichloroethane	0.096	J	0.20	0.047	ppb v/v	1.42		TO-15	Total/NA
2-Butanone (MEK)	3.1		1.0	0.20	ppb v/v	1.42		TO-15	Total/NA
Acetone	40		5.0	1.4	ppb v/v	1.42		TO-15	Total/NA
Benzene	0.31		0.20	0.056	ppb v/v	1.42		TO-15	Total/NA
Bromodichloromethane	0.080	J	0.20	0.044	ppb v/v	1.42		TO-15	Total/NA
Carbon disulfide	0.12	J	0.50	0.031	ppb v/v	1.42		TO-15	Total/NA
Carbon tetrachloride	0.090	J	0.20	0.038	ppb v/v	1.42		TO-15	Total/NA
Chloroform	0.50		0.20	0.038	ppb v/v	1.42		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: C-I (Continued) — Lab Sample ID: 140-8162-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	0.75		0.50	0.16	ppb v/v	1.42		TO-15	Total/NA
Cyclohexane	0.57		0.50	0.040	ppb v/v	1.42		TO-15	Total/NA
Dichlorodifluoromethane	0.55		0.50	0.068	ppb v/v	1.42		TO-15	Total/NA
Ethylbenzene	0.16	J	0.20	0.068	ppb v/v	1.42		TO-15	Total/NA
Hexane	0.98		0.80	0.032	ppb v/v	1.42		TO-15	Total/NA
Methylene Chloride	0.47	J B	0.50	0.13	ppb v/v	1.42		TO-15	Total/NA
m-Xylene & p-Xylene	0.44	J	0.80	0.12	ppb v/v	1.42		TO-15	Total/NA
o-Xylene	0.14	J	0.20	0.061	ppb v/v	1.42		TO-15	Total/NA
Styrene	0.23		0.20	0.058	ppb v/v	1.42		TO-15	Total/NA
Tetrahydrofuran	4.6	J	5.0	0.063	ppb v/v	1.42		TO-15	Total/NA
Toluene	4.0		0.20	0.12	ppb v/v	1.42		TO-15	Total/NA
Trichlorofluoromethane	0.27		0.20	0.024	ppb v/v	1.42		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.51	J	1.5	0.24	ug/m3	1.42		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.31	J	0.98	0.31	ug/m3	1.42		TO-15	Total/NA
1,2-Dichloroethane	0.39	J	0.81	0.19	ug/m3	1.42		TO-15	Total/NA
2-Butanone (MEK)	9.0		2.9	0.59	ug/m3	1.42		TO-15	Total/NA
Acetone	96		12	3.3	ug/m3	1.42		TO-15	Total/NA
Benzene	0.98		0.64	0.18	ug/m3	1.42		TO-15	Total/NA
Bromodichloromethane	0.54	J	1.3	0.29	ug/m3	1.42		TO-15	Total/NA
Carbon disulfide	0.36	J	1.6	0.097	ug/m3	1.42		TO-15	Total/NA
Carbon tetrachloride	0.57	J	1.3	0.24	ug/m3	1.42		TO-15	Total/NA
Chloroform	2.5		0.98	0.19	ug/m3	1.42		TO-15	Total/NA
Chloromethane	1.6		1.0	0.33	ug/m3	1.42		TO-15	Total/NA
Cyclohexane	2.0		1.7	0.14	ug/m3	1.42		TO-15	Total/NA
Dichlorodifluoromethane	2.7		2.5	0.34	ug/m3	1.42		TO-15	Total/NA
Ethylbenzene	0.67	J	0.87	0.30	ug/m3	1.42		TO-15	Total/NA
Hexane	3.5		2.8	0.11	ug/m3	1.42		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1.42		TO-15	Total/NA
m-Xylene & p-Xylene	1.9	J	3.5	0.52	ug/m3	1.42		TO-15	Total/NA
o-Xylene	0.60	J	0.87	0.26	ug/m3	1.42		TO-15	Total/NA
Styrene	0.97		0.85	0.25	ug/m3	1.42		TO-15	Total/NA
Tetrahydrofuran	14	J	15	0.19	ug/m3	1.42		TO-15	Total/NA
Toluene	15		0.75	0.45	ug/m3	1.42		TO-15	Total/NA
Trichlorofluoromethane	1.5		1.1	0.13	ug/m3	1.42		TO-15	Total/NA

Client Sample ID: 1801-CENTRAL-03 — Lab Sample ID: 140-8162-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	2.3	J	10	2.0	ppb v/v	1.77		TO-15	Total/NA
Acetone	29	J	50	14	ppb v/v	1.77		TO-15	Total/NA
Chloroform	0.95	J	2.0	0.38	ppb v/v	1.77		TO-15	Total/NA
Cyclohexane	0.45	J	5.0	0.40	ppb v/v	1.77		TO-15	Total/NA
Dichlorodifluoromethane	0.70	J	5.0	0.68	ppb v/v	1.77		TO-15	Total/NA
Isopropyl alcohol	5.2	J	50	0.94	ppb v/v	1.77		TO-15	Total/NA
Methylene Chloride	2.7	J B	5.0	1.3	ppb v/v	1.77		TO-15	Total/NA
Tetrachloroethene	0.68	J	2.0	0.40	ppb v/v	1.77		TO-15	Total/NA
Trichlorofluoromethane	0.33	J	2.0	0.24	ppb v/v	1.77		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	6.8	J	29	5.9	ug/m3	1.77		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1801-CENTRAL-03 (Continued) — Lab Sample ID: 140-8162-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	70	J	120	33	ug/m3	1.77		TO-15	Total/NA
Chloroform	4.6	J	9.8	1.9	ug/m3	1.77		TO-15	Total/NA
Cyclohexane	1.5	J	17	1.4	ug/m3	1.77		TO-15	Total/NA
Dichlorodifluoromethane	3.4	J	25	3.4	ug/m3	1.77		TO-15	Total/NA
Isopropyl alcohol	13	J	120	2.3	ug/m3	1.77		TO-15	Total/NA
Methylene Chloride	9.5	J B	17	4.5	ug/m3	1.77		TO-15	Total/NA
Tetrachloroethene	4.6	J	14	2.7	ug/m3	1.77		TO-15	Total/NA
Trichlorofluoromethane	1.9	J	11	1.3	ug/m3	1.77		TO-15	Total/NA

Client Sample ID: 205 14TH-01 — Lab Sample ID: 140-8162-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	3.1	J	10	2.0	ppb v/v	1.63		TO-15	Total/NA
Acetone	42	J	50	14	ppb v/v	1.63		TO-15	Total/NA
Carbon disulfide	0.38	J	5.0	0.31	ppb v/v	1.63		TO-15	Total/NA
Chloroform	1.3	J	2.0	0.38	ppb v/v	1.63		TO-15	Total/NA
Methylene Chloride	2.9	J B	5.0	1.3	ppb v/v	1.63		TO-15	Total/NA
Trichlorofluoromethane	0.33	J	2.0	0.24	ppb v/v	1.63		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	9.1	J	29	5.9	ug/m3	1.63		TO-15	Total/NA
Acetone	99	J	120	33	ug/m3	1.63		TO-15	Total/NA
Carbon disulfide	1.2	J	16	0.97	ug/m3	1.63		TO-15	Total/NA
Chloroform	6.4	J	9.8	1.9	ug/m3	1.63		TO-15	Total/NA
Methylene Chloride	10	J B	17	4.5	ug/m3	1.63		TO-15	Total/NA
Trichlorofluoromethane	1.8	J	11	1.3	ug/m3	1.63		TO-15	Total/NA

Client Sample ID: 1433-CENTRAL-04 — Lab Sample ID: 140-8162-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.44	J	2.0	0.30	ppb v/v	1.55		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.78	J	2.0	0.63	ppb v/v	1.55		TO-15	Total/NA
2-Butanone (MEK)	10		10	2.0	ppb v/v	1.55		TO-15	Total/NA
Acetone	230		50	14	ppb v/v	1.55		TO-15	Total/NA
Benzene	0.85	J	2.0	0.56	ppb v/v	1.55		TO-15	Total/NA
Carbon disulfide	0.34	J	5.0	0.31	ppb v/v	1.55		TO-15	Total/NA
Cyclohexane	0.49	J	5.0	0.40	ppb v/v	1.55		TO-15	Total/NA
Ethylbenzene	0.81	J	2.0	0.68	ppb v/v	1.55		TO-15	Total/NA
Hexane	1.3	J	8.0	0.32	ppb v/v	1.55		TO-15	Total/NA
Isopropyl alcohol	2.6	J	50	0.94	ppb v/v	1.55		TO-15	Total/NA
Methylene Chloride	2.9	J B	5.0	1.3	ppb v/v	1.55		TO-15	Total/NA
m-Xylene & p-Xylene	3.2	J	8.0	1.2	ppb v/v	1.55		TO-15	Total/NA
o-Xylene	0.84	J	2.0	0.61	ppb v/v	1.55		TO-15	Total/NA
Toluene	3.1		2.0	1.2	ppb v/v	1.55		TO-15	Total/NA
Trichloroethene	2.4		2.0	0.36	ppb v/v	1.55		TO-15	Total/NA
Trichlorofluoromethane	0.40	J	2.0	0.24	ppb v/v	1.55		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2.4	J	11	1.6	ug/m3	1.55		TO-15	Total/NA
1,2,4-Trimethylbenzene	3.8	J	9.8	3.1	ug/m3	1.55		TO-15	Total/NA
2-Butanone (MEK)	30		29	5.9	ug/m3	1.55		TO-15	Total/NA
Acetone	530		120	33	ug/m3	1.55		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1433-CENTRAL-04 (Continued) — Lab Sample ID: 140-8162-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	2.7	J	6.4	1.8	ug/m3	1.55		TO-15	Total/NA
Carbon disulfide	1.1	J	16	0.97	ug/m3	1.55		TO-15	Total/NA
Cyclohexane	1.7	J	17	1.4	ug/m3	1.55		TO-15	Total/NA
Ethylbenzene	3.5	J	8.7	3.0	ug/m3	1.55		TO-15	Total/NA
Hexane	4.7	J	28	1.1	ug/m3	1.55		TO-15	Total/NA
Isopropyl alcohol	6.5	J	120	2.3	ug/m3	1.55		TO-15	Total/NA
Methylene Chloride	10	J B	17	4.5	ug/m3	1.55		TO-15	Total/NA
m-Xylene & p-Xylene	14	J	35	5.2	ug/m3	1.55		TO-15	Total/NA
o-Xylene	3.6	J	8.7	2.6	ug/m3	1.55		TO-15	Total/NA
Toluene	12		7.5	4.5	ug/m3	1.55		TO-15	Total/NA
Trichloroethene	13		11	1.9	ug/m3	1.55		TO-15	Total/NA
Trichlorofluoromethane	2.2	J	11	1.3	ug/m3	1.55		TO-15	Total/NA

Client Sample ID: 1433-CENTRAL-04D — Lab Sample ID: 140-8162-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.45	J	2.0	0.30	ppb v/v	1.46		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.69	J	2.0	0.63	ppb v/v	1.46		TO-15	Total/NA
2-Butanone (MEK)	8.2	J	10	2.0	ppb v/v	1.46		TO-15	Total/NA
Acetone	200		50	14	ppb v/v	1.46		TO-15	Total/NA
Benzene	0.71	J	2.0	0.56	ppb v/v	1.46		TO-15	Total/NA
Chloromethane	1.9	J	5.0	1.6	ppb v/v	1.46		TO-15	Total/NA
Ethylbenzene	0.79	J	2.0	0.68	ppb v/v	1.46		TO-15	Total/NA
Hexane	1.6	J	8.0	0.32	ppb v/v	1.46		TO-15	Total/NA
Isopropyl alcohol	1.5	J	50	0.94	ppb v/v	1.46		TO-15	Total/NA
Methylene Chloride	3.2	J B	5.0	1.3	ppb v/v	1.46		TO-15	Total/NA
m-Xylene & p-Xylene	3.3	J	8.0	1.2	ppb v/v	1.46		TO-15	Total/NA
o-Xylene	0.86	J	2.0	0.61	ppb v/v	1.46		TO-15	Total/NA
Toluene	3.4		2.0	1.2	ppb v/v	1.46		TO-15	Total/NA
Trichloroethene	2.4		2.0	0.36	ppb v/v	1.46		TO-15	Total/NA
Trichlorofluoromethane	0.35	J	2.0	0.24	ppb v/v	1.46		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2.4	J	11	1.6	ug/m3	1.46		TO-15	Total/NA
1,2,4-Trimethylbenzene	3.4	J	9.8	3.1	ug/m3	1.46		TO-15	Total/NA
2-Butanone (MEK)	24	J	29	5.9	ug/m3	1.46		TO-15	Total/NA
Acetone	480		120	33	ug/m3	1.46		TO-15	Total/NA
Benzene	2.3	J	6.4	1.8	ug/m3	1.46		TO-15	Total/NA
Chloromethane	4.0	J	10	3.3	ug/m3	1.46		TO-15	Total/NA
Ethylbenzene	3.4	J	8.7	3.0	ug/m3	1.46		TO-15	Total/NA
Hexane	5.5	J	28	1.1	ug/m3	1.46		TO-15	Total/NA
Isopropyl alcohol	3.7	J	120	2.3	ug/m3	1.46		TO-15	Total/NA
Methylene Chloride	11	J B	17	4.5	ug/m3	1.46		TO-15	Total/NA
m-Xylene & p-Xylene	14	J	35	5.2	ug/m3	1.46		TO-15	Total/NA
o-Xylene	3.7	J	8.7	2.6	ug/m3	1.46		TO-15	Total/NA
Toluene	13		7.5	4.5	ug/m3	1.46		TO-15	Total/NA
Trichloroethene	13		11	1.9	ug/m3	1.46		TO-15	Total/NA
Trichlorofluoromethane	1.9	J	11	1.3	ug/m3	1.46		TO-15	Total/NA

Client Sample ID: 1004-PARKALLEY-01 — Lab Sample ID: 140-8162-21

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1004-PARKALLEY-01 (Continued)

Lab Sample ID: 140-8162-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	4.0	J	10	2.0	ppb v/v	1.55		TO-15	Total/NA
Acetone	38	J	50	14	ppb v/v	1.55		TO-15	Total/NA
Carbon disulfide	0.48	J	5.0	0.31	ppb v/v	1.55		TO-15	Total/NA
Chloroform	0.46	J	2.0	0.38	ppb v/v	1.55		TO-15	Total/NA
Hexane	0.94	J	8.0	0.32	ppb v/v	1.55		TO-15	Total/NA
Methylene Chloride	2.8	J B	5.0	1.3	ppb v/v	1.55		TO-15	Total/NA
Tetrachloroethene	240		2.0	0.40	ppb v/v	1.55		TO-15	Total/NA
Trichloroethene	0.50	J	2.0	0.36	ppb v/v	1.55		TO-15	Total/NA
Trichlorofluoromethane	0.40	J	2.0	0.24	ppb v/v	1.55		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	12	J	29	5.9	ug/m3	1.55		TO-15	Total/NA
Acetone	90	J	120	33	ug/m3	1.55		TO-15	Total/NA
Carbon disulfide	1.5	J	16	0.97	ug/m3	1.55		TO-15	Total/NA
Chloroform	2.2	J	9.8	1.9	ug/m3	1.55		TO-15	Total/NA
Hexane	3.3	J	28	1.1	ug/m3	1.55		TO-15	Total/NA
Methylene Chloride	9.8	J B	17	4.5	ug/m3	1.55		TO-15	Total/NA
Tetrachloroethene	1700		14	2.7	ug/m3	1.55		TO-15	Total/NA
Trichloroethene	2.7	J	11	1.9	ug/m3	1.55		TO-15	Total/NA
Trichlorofluoromethane	2.3	J	11	1.3	ug/m3	1.55		TO-15	Total/NA

Client Sample ID: 1433-CENTRAL-03

Lab Sample ID: 140-8162-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.68	J	2.0	0.30	ppb v/v	1.57		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.3	J	2.0	0.63	ppb v/v	1.57		TO-15	Total/NA
Acetone	47	J	50	14	ppb v/v	1.57		TO-15	Total/NA
Benzene	4.4		2.0	0.56	ppb v/v	1.57		TO-15	Total/NA
Carbon disulfide	0.99	J	5.0	0.31	ppb v/v	1.57		TO-15	Total/NA
Chloromethane	2.6	J	5.0	1.6	ppb v/v	1.57		TO-15	Total/NA
Cyclohexane	0.80	J	5.0	0.40	ppb v/v	1.57		TO-15	Total/NA
Ethylbenzene	2.7		2.0	0.68	ppb v/v	1.57		TO-15	Total/NA
Hexane	4.6	J	8.0	0.32	ppb v/v	1.57		TO-15	Total/NA
Methylene Chloride	2.8	J B	5.0	1.3	ppb v/v	1.57		TO-15	Total/NA
m-Xylene & p-Xylene	11		8.0	1.2	ppb v/v	1.57		TO-15	Total/NA
o-Xylene	2.4		2.0	0.61	ppb v/v	1.57		TO-15	Total/NA
Toluene	20		2.0	1.2	ppb v/v	1.57		TO-15	Total/NA
Trichloroethene	6.5		2.0	0.36	ppb v/v	1.57		TO-15	Total/NA
Trichlorofluoromethane	0.33	J	2.0	0.24	ppb v/v	1.57		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	3.7	J	11	1.6	ug/m3	1.57		TO-15	Total/NA
1,2,4-Trimethylbenzene	6.4	J	9.8	3.1	ug/m3	1.57		TO-15	Total/NA
Acetone	110	J	120	33	ug/m3	1.57		TO-15	Total/NA
Benzene	14		6.4	1.8	ug/m3	1.57		TO-15	Total/NA
Carbon disulfide	3.1	J	16	0.97	ug/m3	1.57		TO-15	Total/NA
Chloromethane	5.3	J	10	3.3	ug/m3	1.57		TO-15	Total/NA
Cyclohexane	2.8	J	17	1.4	ug/m3	1.57		TO-15	Total/NA
Ethylbenzene	12		8.7	3.0	ug/m3	1.57		TO-15	Total/NA
Hexane	16	J	28	1.1	ug/m3	1.57		TO-15	Total/NA
Methylene Chloride	9.8	J B	17	4.5	ug/m3	1.57		TO-15	Total/NA
m-Xylene & p-Xylene	46		35	5.2	ug/m3	1.57		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1433-CENTRAL-03 (Continued) — Lab Sample ID: 140-8162-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	10		8.7	2.6	ug/m3	1.57		TO-15	Total/NA
Toluene	76		7.5	4.5	ug/m3	1.57		TO-15	Total/NA
Trichloroethene	35		11	1.9	ug/m3	1.57		TO-15	Total/NA
Trichlorofluoromethane	1.8	J	11	1.3	ug/m3	1.57		TO-15	Total/NA

Client Sample ID: 1404-CENTRAL-02 — Lab Sample ID: 140-8162-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.50	J	2.0	0.30	ppb v/v	1.57		TO-15	Total/NA
2-Butanone (MEK)	5.7	J	10	2.0	ppb v/v	1.57		TO-15	Total/NA
Acetone	38	J	50	14	ppb v/v	1.57		TO-15	Total/NA
Chloroform	0.40	J	2.0	0.38	ppb v/v	1.57		TO-15	Total/NA
Dichlorodifluoromethane	0.90	J	5.0	0.68	ppb v/v	1.57		TO-15	Total/NA
Isopropyl alcohol	5.9	J	50	0.94	ppb v/v	1.57		TO-15	Total/NA
Methylene Chloride	3.0	J B	5.0	1.3	ppb v/v	1.57		TO-15	Total/NA
Trichlorofluoromethane	4.9		2.0	0.24	ppb v/v	1.57		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2.8	J	11	1.6	ug/m3	1.57		TO-15	Total/NA
2-Butanone (MEK)	17	J	29	5.9	ug/m3	1.57		TO-15	Total/NA
Acetone	90	J	120	33	ug/m3	1.57		TO-15	Total/NA
Chloroform	1.9	J	9.8	1.9	ug/m3	1.57		TO-15	Total/NA
Dichlorodifluoromethane	4.4	J	25	3.4	ug/m3	1.57		TO-15	Total/NA
Isopropyl alcohol	14	J	120	2.3	ug/m3	1.57		TO-15	Total/NA
Methylene Chloride	10	J B	17	4.5	ug/m3	1.57		TO-15	Total/NA
Trichlorofluoromethane	27		11	1.3	ug/m3	1.57		TO-15	Total/NA

Client Sample ID: C-14TH-05 — Lab Sample ID: 140-8162-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	2.2	J	10	2.0	ppb v/v	1.6		TO-15	Total/NA
Acetone	46	J	50	14	ppb v/v	1.6		TO-15	Total/NA
Chloroform	0.65	J	2.0	0.38	ppb v/v	1.6		TO-15	Total/NA
Hexane	0.41	J	8.0	0.32	ppb v/v	1.6		TO-15	Total/NA
Methylene Chloride	2.6	J B	5.0	1.3	ppb v/v	1.6		TO-15	Total/NA
m-Xylene & p-Xylene	1.9	J	8.0	1.2	ppb v/v	1.6		TO-15	Total/NA
o-Xylene	0.63	J	2.0	0.61	ppb v/v	1.6		TO-15	Total/NA
Toluene	1.5	J	2.0	1.2	ppb v/v	1.6		TO-15	Total/NA
Trichlorofluoromethane	0.28	J	2.0	0.24	ppb v/v	1.6		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	6.6	J	29	5.9	ug/m3	1.6		TO-15	Total/NA
Acetone	110	J	120	33	ug/m3	1.6		TO-15	Total/NA
Chloroform	3.2	J	9.8	1.9	ug/m3	1.6		TO-15	Total/NA
Hexane	1.4	J	28	1.1	ug/m3	1.6		TO-15	Total/NA
Methylene Chloride	9.1	J B	17	4.5	ug/m3	1.6		TO-15	Total/NA
m-Xylene & p-Xylene	8.4	J	35	5.2	ug/m3	1.6		TO-15	Total/NA
o-Xylene	2.7	J	8.7	2.6	ug/m3	1.6		TO-15	Total/NA
Toluene	5.8	J	7.5	4.5	ug/m3	1.6		TO-15	Total/NA
Trichlorofluoromethane	1.6	J	11	1.3	ug/m3	1.6		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: CENTRAL-1433-02

Lab Sample ID: 140-8162-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.49	J	2.0	0.30	ppb v/v	1.71		TO-15	Total/NA
2-Butanone (MEK)	3.2	J	10	2.0	ppb v/v	1.71		TO-15	Total/NA
Acetone	55	CI	50	14	ppb v/v	1.71		TO-15	Total/NA
Carbon disulfide	0.81	J	5.0	0.31	ppb v/v	1.71		TO-15	Total/NA
Chloroform	1.5	J	2.0	0.38	ppb v/v	1.71		TO-15	Total/NA
Chloromethane	3.5	J	5.0	1.6	ppb v/v	1.71		TO-15	Total/NA
Methylene Chloride	2.6	J B	5.0	1.3	ppb v/v	1.71		TO-15	Total/NA
Tetrachloroethene	2.1		2.0	0.40	ppb v/v	1.71		TO-15	Total/NA
Trichloroethene	64		2.0	0.36	ppb v/v	1.71		TO-15	Total/NA
Trichlorofluoromethane	0.26	J	2.0	0.24	ppb v/v	1.71		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2.7	J	11	1.6	ug/m3	1.71		TO-15	Total/NA
2-Butanone (MEK)	9.6	J	29	5.9	ug/m3	1.71		TO-15	Total/NA
Acetone	130	CI	120	33	ug/m3	1.71		TO-15	Total/NA
Carbon disulfide	2.5	J	16	0.97	ug/m3	1.71		TO-15	Total/NA
Chloroform	7.2	J	9.8	1.9	ug/m3	1.71		TO-15	Total/NA
Chloromethane	7.2	J	10	3.3	ug/m3	1.71		TO-15	Total/NA
Methylene Chloride	9.0	J B	17	4.5	ug/m3	1.71		TO-15	Total/NA
Tetrachloroethene	14		14	2.7	ug/m3	1.71		TO-15	Total/NA
Trichloroethene	340		11	1.9	ug/m3	1.71		TO-15	Total/NA
Trichlorofluoromethane	1.5	J	11	1.3	ug/m3	1.71		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-B
Date Collected: 05/17/17 09:03
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-1
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/23/17 20:46	1.49
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/23/17 20:46	1.49
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.072**	**J**	0.20	0.031	ppb v/v			05/23/17 20:46	1.49
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/23/17 20:46	1.49
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/23/17 20:46	1.49
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/23/17 20:46	1.49
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/23/17 20:46	1.49
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/23/17 20:46	1.49
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/23/17 20:46	1.49
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/23/17 20:46	1.49
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/23/17 20:46	1.49
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/23/17 20:46	1.49
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/23/17 20:46	1.49
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/23/17 20:46	1.49
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/23/17 20:46	1.49
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/23/17 20:46	1.49
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/23/17 20:46	1.49
2-Butanone (MEK)	**0.22**	**J**	1.0	0.20	ppb v/v			05/23/17 20:46	1.49
4-Methyl-2-pentanone (MIBK)	**0.30**	**J**	0.50	0.20	ppb v/v			05/23/17 20:46	1.49
Acetone	**4.1**	**J**	5.0	1.4	ppb v/v			05/23/17 20:46	1.49
Benzene	**0.090**	**J**	0.20	0.056	ppb v/v			05/23/17 20:46	1.49
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/23/17 20:46	1.49
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/23/17 20:46	1.49
Bromoform	ND		0.20	0.048	ppb v/v			05/23/17 20:46	1.49
Bromomethane	ND		0.20	0.032	ppb v/v			05/23/17 20:46	1.49
Carbon disulfide	**0.051**	**J**	0.50	0.031	ppb v/v			05/23/17 20:46	1.49
Carbon tetrachloride	**0.073**	**J**	0.20	0.038	ppb v/v			05/23/17 20:46	1.49
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/23/17 20:46	1.49
Chloroethane	ND		0.80	0.035	ppb v/v			05/23/17 20:46	1.49
Chloroform	ND		0.20	0.038	ppb v/v			05/23/17 20:46	1.49
Chloromethane	**0.70**		0.50	0.16	ppb v/v			05/23/17 20:46	1.49
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/23/17 20:46	1.49
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/23/17 20:46	1.49
Cyclohexane	ND		0.50	0.040	ppb v/v			05/23/17 20:46	1.49
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/23/17 20:46	1.49
Dichlorodifluoromethane	**0.54**		0.50	0.068	ppb v/v			05/23/17 20:46	1.49
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/23/17 20:46	1.49
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/23/17 20:46	1.49
Hexane	**0.14**	**J**	0.80	0.032	ppb v/v			05/23/17 20:46	1.49
Isopropyl alcohol	**0.29**	**J**	5.0	0.094	ppb v/v			05/23/17 20:46	1.49
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/23/17 20:46	1.49
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/23/17 20:46	1.49
Methylene Chloride	**0.77**	**B**	0.50	0.13	ppb v/v			05/23/17 20:46	1.49
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/23/17 20:46	1.49
Naphthalene	ND		0.50	0.090	ppb v/v			05/23/17 20:46	1.49
o-Xylene	ND		0.20	0.061	ppb v/v			05/23/17 20:46	1.49
Styrene	ND		0.20	0.058	ppb v/v			05/23/17 20:46	1.49

Client Sample ID: B-B

Lab Sample ID: 140-8162-1

Date Collected: 05/17/17 09:03
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/23/17 20:46	1.49
Tetrahydrofuran	**0.14**	**J**	5.0	0.063	ppb v/v			05/23/17 20:46	1.49
Toluene	**0.20**		0.20	0.12	ppb v/v			05/23/17 20:46	1.49
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/23/17 20:46	1.49
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/23/17 20:46	1.49
Trichloroethene	ND		0.20	0.036	ppb v/v			05/23/17 20:46	1.49
Trichlorofluoromethane	**0.27**		0.20	0.024	ppb v/v			05/23/17 20:46	1.49
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/23/17 20:46	1.49
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/23/17 20:46	1.49
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/23/17 20:46	1.49

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/23/17 20:46	1.49
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/23/17 20:46	1.49
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.55**	**J**	1.5	0.24	ug/m3			05/23/17 20:46	1.49
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/23/17 20:46	1.49
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/23/17 20:46	1.49
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/23/17 20:46	1.49
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/23/17 20:46	1.49
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/23/17 20:46	1.49
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/23/17 20:46	1.49
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/23/17 20:46	1.49
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/23/17 20:46	1.49
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/23/17 20:46	1.49
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/23/17 20:46	1.49
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/23/17 20:46	1.49
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/23/17 20:46	1.49
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/23/17 20:46	1.49
1,4-Dioxane	ND		18	0.29	ug/m3			05/23/17 20:46	1.49
2-Butanone (MEK)	**0.66**	**J**	2.9	0.59	ug/m3			05/23/17 20:46	1.49
4-Methyl-2-pentanone (MIBK)	**1.2**	**J**	2.0	0.80	ug/m3			05/23/17 20:46	1.49
Acetone	**9.7**	**J**	12	3.3	ug/m3			05/23/17 20:46	1.49
Benzene	**0.29**	**J**	0.64	0.18	ug/m3			05/23/17 20:46	1.49
Benzyl chloride	ND		4.1	0.40	ug/m3			05/23/17 20:46	1.49
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/23/17 20:46	1.49
Bromoform	ND		2.1	0.50	ug/m3			05/23/17 20:46	1.49
Bromomethane	ND		0.78	0.12	ug/m3			05/23/17 20:46	1.49
Carbon disulfide	**0.16**	**J**	1.6	0.097	ug/m3			05/23/17 20:46	1.49
Carbon tetrachloride	**0.46**	**J**	1.3	0.24	ug/m3			05/23/17 20:46	1.49
Chlorobenzene	ND		0.92	0.23	ug/m3			05/23/17 20:46	1.49
Chloroethane	ND		2.1	0.092	ug/m3			05/23/17 20:46	1.49
Chloroform	ND		0.98	0.19	ug/m3			05/23/17 20:46	1.49
Chloromethane	**1.4**		1.0	0.33	ug/m3			05/23/17 20:46	1.49
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/23/17 20:46	1.49
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/23/17 20:46	1.49
Cyclohexane	ND		1.7	0.14	ug/m3			05/23/17 20:46	1.49
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/23/17 20:46	1.49
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/23/17 20:46	1.49

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: B-B
Date Collected: 05/17/17 09:03
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-1
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.87	0.30	ug/m3			05/23/17 20:46	1.49
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/23/17 20:46	1.49
Hexane	**0.51**	**J**	2.8	0.11	ug/m3			05/23/17 20:46	1.49
Isopropyl alcohol	**0.70**	**J**	12	0.23	ug/m3			05/23/17 20:46	1.49
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/23/17 20:46	1.49
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/23/17 20:46	1.49
Methylene Chloride	**2.7**	**B**	1.7	0.45	ug/m3			05/23/17 20:46	1.49
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/23/17 20:46	1.49
Naphthalene	ND		2.6	0.47	ug/m3			05/23/17 20:46	1.49
o-Xylene	ND		0.87	0.26	ug/m3			05/23/17 20:46	1.49
Styrene	ND		0.85	0.25	ug/m3			05/23/17 20:46	1.49
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/23/17 20:46	1.49
Tetrahydrofuran	**0.40**	**J**	15	0.19	ug/m3			05/23/17 20:46	1.49
Toluene	**0.77**		0.75	0.45	ug/m3			05/23/17 20:46	1.49
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/23/17 20:46	1.49
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/23/17 20:46	1.49
Trichloroethene	ND		1.1	0.19	ug/m3			05/23/17 20:46	1.49
Trichlorofluoromethane	**1.5**		1.1	0.13	ug/m3			05/23/17 20:46	1.49
Vinyl acetate	ND		18	0.49	ug/m3			05/23/17 20:46	1.49
Vinyl bromide	ND		0.87	0.15	ug/m3			05/23/17 20:46	1.49
Vinyl chloride	ND		0.51	0.18	ug/m3			05/23/17 20:46	1.49

Client Sample ID: B-SS
Date Collected: 05/17/17 09:06
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-2
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/23/17 21:31	1.53
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/23/17 21:31	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.076**	**J**	0.20	0.031	ppb v/v			05/23/17 21:31	1.53
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/23/17 21:31	1.53
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/23/17 21:31	1.53
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/23/17 21:31	1.53
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/23/17 21:31	1.53
1,2,4-Trimethylbenzene	**0.26**		0.20	0.063	ppb v/v			05/23/17 21:31	1.53
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/23/17 21:31	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/23/17 21:31	1.53
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/23/17 21:31	1.53
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/23/17 21:31	1.53
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/23/17 21:31	1.53
1,3,5-Trimethylbenzene	**0.066**	**J**	0.20	0.065	ppb v/v			05/23/17 21:31	1.53
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/23/17 21:31	1.53
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/23/17 21:31	1.53
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/23/17 21:31	1.53
2-Butanone (MEK)	**0.43**	**J**	1.0	0.20	ppb v/v			05/23/17 21:31	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/23/17 21:31	1.53
Acetone	**4.7**	**J**	5.0	1.4	ppb v/v			05/23/17 21:31	1.53
Benzene	**0.13**	**J**	0.20	0.056	ppb v/v			05/23/17 21:31	1.53
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/23/17 21:31	1.53
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/23/17 21:31	1.53
Bromoform	ND		0.20	0.048	ppb v/v			05/23/17 21:31	1.53
Bromomethane	ND		0.20	0.032	ppb v/v			05/23/17 21:31	1.53
Carbon disulfide	**0.060**	**J**	0.50	0.031	ppb v/v			05/23/17 21:31	1.53
Carbon tetrachloride	**0.041**	**J**	0.20	0.038	ppb v/v			05/23/17 21:31	1.53
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/23/17 21:31	1.53
Chloroethane	ND		0.80	0.035	ppb v/v			05/23/17 21:31	1.53
Chloroform	ND		0.20	0.038	ppb v/v			05/23/17 21:31	1.53
Chloromethane	ND		0.50	0.16	ppb v/v			05/23/17 21:31	1.53
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/23/17 21:31	1.53
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/23/17 21:31	1.53
Cyclohexane	**0.17**	**J**	0.50	0.040	ppb v/v			05/23/17 21:31	1.53
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/23/17 21:31	1.53
Dichlorodifluoromethane	**0.54**		0.50	0.068	ppb v/v			05/23/17 21:31	1.53
Ethylbenzene	**0.25**		0.20	0.068	ppb v/v			05/23/17 21:31	1.53
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/23/17 21:31	1.53
Hexane	**0.16**	**J**	0.80	0.032	ppb v/v			05/23/17 21:31	1.53
Isopropyl alcohol	**1.2**	**J**	5.0	0.094	ppb v/v			05/23/17 21:31	1.53
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/23/17 21:31	1.53
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/23/17 21:31	1.53
Methylene Chloride	**0.39**	**J B**	0.50	0.13	ppb v/v			05/23/17 21:31	1.53
m-Xylene & p-Xylene	**0.85**		0.80	0.12	ppb v/v			05/23/17 21:31	1.53
Naphthalene	ND		0.50	0.090	ppb v/v			05/23/17 21:31	1.53
o-Xylene	**0.32**		0.20	0.061	ppb v/v			05/23/17 21:31	1.53
Styrene	ND		0.20	0.058	ppb v/v			05/23/17 21:31	1.53

Client Sample ID: B-SS

Lab Sample ID: 140-8162-2

Date Collected: 05/17/17 09:06
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**0.10**	**J**	0.20	0.040	ppb v/v			05/23/17 21:31	1.53
Tetrahydrofuran	**0.21**	**J**	5.0	0.063	ppb v/v			05/23/17 21:31	1.53
Toluene	**0.85**		0.20	0.12	ppb v/v			05/23/17 21:31	1.53
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/23/17 21:31	1.53
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/23/17 21:31	1.53
Trichloroethene	ND		0.20	0.036	ppb v/v			05/23/17 21:31	1.53
Trichlorofluoromethane	**0.26**		0.20	0.024	ppb v/v			05/23/17 21:31	1.53
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/23/17 21:31	1.53
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/23/17 21:31	1.53
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/23/17 21:31	1.53

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/23/17 21:31	1.53
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/23/17 21:31	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.58**	**J**	1.5	0.24	ug/m3			05/23/17 21:31	1.53
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/23/17 21:31	1.53
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/23/17 21:31	1.53
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/23/17 21:31	1.53
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/23/17 21:31	1.53
1,2,4-Trimethylbenzene	**1.3**		0.98	0.31	ug/m3			05/23/17 21:31	1.53
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/23/17 21:31	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/23/17 21:31	1.53
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/23/17 21:31	1.53
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/23/17 21:31	1.53
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/23/17 21:31	1.53
1,3,5-Trimethylbenzene	**0.33**	**J**	0.98	0.32	ug/m3			05/23/17 21:31	1.53
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/23/17 21:31	1.53
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/23/17 21:31	1.53
1,4-Dioxane	ND		18	0.29	ug/m3			05/23/17 21:31	1.53
2-Butanone (MEK)	**1.3**	**J**	2.9	0.59	ug/m3			05/23/17 21:31	1.53
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/23/17 21:31	1.53
Acetone	**11**	**J**	12	3.3	ug/m3			05/23/17 21:31	1.53
Benzene	**0.41**	**J**	0.64	0.18	ug/m3			05/23/17 21:31	1.53
Benzyl chloride	ND		4.1	0.40	ug/m3			05/23/17 21:31	1.53
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/23/17 21:31	1.53
Bromoform	ND		2.1	0.50	ug/m3			05/23/17 21:31	1.53
Bromomethane	ND		0.78	0.12	ug/m3			05/23/17 21:31	1.53
Carbon disulfide	**0.19**	**J**	1.6	0.097	ug/m3			05/23/17 21:31	1.53
Carbon tetrachloride	**0.26**	**J**	1.3	0.24	ug/m3			05/23/17 21:31	1.53
Chlorobenzene	ND		0.92	0.23	ug/m3			05/23/17 21:31	1.53
Chloroethane	ND		2.1	0.092	ug/m3			05/23/17 21:31	1.53
Chloroform	ND		0.98	0.19	ug/m3			05/23/17 21:31	1.53
Chloromethane	ND		1.0	0.33	ug/m3			05/23/17 21:31	1.53
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/23/17 21:31	1.53
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/23/17 21:31	1.53
Cyclohexane	**0.60**	**J**	1.7	0.14	ug/m3			05/23/17 21:31	1.53
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/23/17 21:31	1.53
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/23/17 21:31	1.53

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: B-SS
Date Collected: 05/17/17 09:06
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-2
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**1.1**		0.87	0.30	ug/m3			05/23/17 21:31	1.53
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/23/17 21:31	1.53
Hexane	**0.55**	**J**	2.8	0.11	ug/m3			05/23/17 21:31	1.53
Isopropyl alcohol	**3.1**	**J**	12	0.23	ug/m3			05/23/17 21:31	1.53
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/23/17 21:31	1.53
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/23/17 21:31	1.53
Methylene Chloride	**1.4**	**J B**	1.7	0.45	ug/m3			05/23/17 21:31	1.53
m-Xylene & p-Xylene	**3.7**		3.5	0.52	ug/m3			05/23/17 21:31	1.53
Naphthalene	ND		2.6	0.47	ug/m3			05/23/17 21:31	1.53
o-Xylene	**1.4**		0.87	0.26	ug/m3			05/23/17 21:31	1.53
Styrene	ND		0.85	0.25	ug/m3			05/23/17 21:31	1.53
Tetrachloroethene	**0.70**	**J**	1.4	0.27	ug/m3			05/23/17 21:31	1.53
Tetrahydrofuran	**0.62**	**J**	15	0.19	ug/m3			05/23/17 21:31	1.53
Toluene	**3.2**		0.75	0.45	ug/m3			05/23/17 21:31	1.53
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/23/17 21:31	1.53
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/23/17 21:31	1.53
Trichloroethene	ND		1.1	0.19	ug/m3			05/23/17 21:31	1.53
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			05/23/17 21:31	1.53
Vinyl acetate	ND		18	0.49	ug/m3			05/23/17 21:31	1.53
Vinyl bromide	ND		0.87	0.15	ug/m3			05/23/17 21:31	1.53
Vinyl chloride	ND		0.51	0.18	ug/m3			05/23/17 21:31	1.53

Client Sample ID: B-I
Date Collected: 05/17/17 09:11
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-3
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 08:48	1.41
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 08:48	1.41
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.073**	**J**	0.20	0.031	ppb v/v			05/24/17 08:48	1.41
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 08:48	1.41
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 08:48	1.41
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 08:48	1.41
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 08:48	1.41
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/24/17 08:48	1.41
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 08:48	1.41
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 08:48	1.41
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 08:48	1.41
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 08:48	1.41
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 08:48	1.41
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 08:48	1.41
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 08:48	1.41
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 08:48	1.41
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 08:48	1.41
2-Butanone (MEK)	**1.0**		1.0	0.20	ppb v/v			05/24/17 08:48	1.41
4-Methyl-2-pentanone (MIBK)	**0.25**	**J**	0.50	0.20	ppb v/v			05/24/17 08:48	1.41
Acetone	**12**	**CI**	5.0	1.4	ppb v/v			05/24/17 08:48	1.41
Benzene	**0.076**	**J**	0.20	0.056	ppb v/v			05/24/17 08:48	1.41
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 08:48	1.41
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 08:48	1.41
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 08:48	1.41
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 08:48	1.41
Carbon disulfide	**0.073**	**J**	0.50	0.031	ppb v/v			05/24/17 08:48	1.41
Carbon tetrachloride	**0.068**	**J**	0.20	0.038	ppb v/v			05/24/17 08:48	1.41
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 08:48	1.41
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 08:48	1.41
Chloroform	ND		0.20	0.038	ppb v/v			05/24/17 08:48	1.41
Chloromethane	**0.77**		0.50	0.16	ppb v/v			05/24/17 08:48	1.41
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 08:48	1.41
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 08:48	1.41
Cyclohexane	**0.055**	**J**	0.50	0.040	ppb v/v			05/24/17 08:48	1.41
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 08:48	1.41
Dichlorodifluoromethane	**0.57**		0.50	0.068	ppb v/v			05/24/17 08:48	1.41
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/24/17 08:48	1.41
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 08:48	1.41
Hexane	**0.12**	**J**	0.80	0.032	ppb v/v			05/24/17 08:48	1.41
Isopropyl alcohol	**0.68**	**J**	5.0	0.094	ppb v/v			05/24/17 08:48	1.41
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 08:48	1.41
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 08:48	1.41
Methylene Chloride	**0.47**	**J B**	0.50	0.13	ppb v/v			05/24/17 08:48	1.41
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/24/17 08:48	1.41
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 08:48	1.41
o-Xylene	ND		0.20	0.061	ppb v/v			05/24/17 08:48	1.41
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 08:48	1.41

Client Sample ID: B-I

Lab Sample ID: 140-8162-3

Date Collected: 05/17/17 09:11
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 08:48	1.41
Tetrahydrofuran	**0.12**	**J**	5.0	0.063	ppb v/v			05/24/17 08:48	1.41
Toluene	**0.19**	**J**	0.20	0.12	ppb v/v			05/24/17 08:48	1.41
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 08:48	1.41
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 08:48	1.41
Trichloroethene	**1.2**		0.20	0.036	ppb v/v			05/24/17 08:48	1.41
Trichlorofluoromethane	**0.24**		0.20	0.024	ppb v/v			05/24/17 08:48	1.41
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 08:48	1.41
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 08:48	1.41
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 08:48	1.41

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 08:48	1.41
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 08:48	1.41
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.56**	**J**	1.5	0.24	ug/m3			05/24/17 08:48	1.41
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 08:48	1.41
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 08:48	1.41
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 08:48	1.41
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 08:48	1.41
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/24/17 08:48	1.41
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 08:48	1.41
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 08:48	1.41
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 08:48	1.41
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 08:48	1.41
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 08:48	1.41
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 08:48	1.41
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 08:48	1.41
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 08:48	1.41
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 08:48	1.41
2-Butanone (MEK)	**3.0**		2.9	0.59	ug/m3			05/24/17 08:48	1.41
4-Methyl-2-pentanone (MIBK)	**1.0**	**J**	2.0	0.80	ug/m3			05/24/17 08:48	1.41
Acetone	**30**	**CI**	12	3.3	ug/m3			05/24/17 08:48	1.41
Benzene	**0.24**	**J**	0.64	0.18	ug/m3			05/24/17 08:48	1.41
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 08:48	1.41
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 08:48	1.41
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 08:48	1.41
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 08:48	1.41
Carbon disulfide	**0.23**	**J**	1.6	0.097	ug/m3			05/24/17 08:48	1.41
Carbon tetrachloride	**0.43**	**J**	1.3	0.24	ug/m3			05/24/17 08:48	1.41
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 08:48	1.41
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 08:48	1.41
Chloroform	ND		0.98	0.19	ug/m3			05/24/17 08:48	1.41
Chloromethane	**1.6**		1.0	0.33	ug/m3			05/24/17 08:48	1.41
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 08:48	1.41
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 08:48	1.41
Cyclohexane	**0.19**	**J**	1.7	0.14	ug/m3			05/24/17 08:48	1.41
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 08:48	1.41
Dichlorodifluoromethane	**2.8**		2.5	0.34	ug/m3			05/24/17 08:48	1.41

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: B-I
Date Collected: 05/17/17 09:11
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-3
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.87	0.30	ug/m3			05/24/17 08:48	1.41
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 08:48	1.41
Hexane	**0.41**	**J**	2.8	0.11	ug/m3			05/24/17 08:48	1.41
Isopropyl alcohol	**1.7**	**J**	12	0.23	ug/m3			05/24/17 08:48	1.41
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 08:48	1.41
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 08:48	1.41
Methylene Chloride	**1.6**	**J B**	1.7	0.45	ug/m3			05/24/17 08:48	1.41
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/24/17 08:48	1.41
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 08:48	1.41
o-Xylene	ND		0.87	0.26	ug/m3			05/24/17 08:48	1.41
Styrene	ND		0.85	0.25	ug/m3			05/24/17 08:48	1.41
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 08:48	1.41
Tetrahydrofuran	**0.36**	**J**	15	0.19	ug/m3			05/24/17 08:48	1.41
Toluene	**0.71**	**J**	0.75	0.45	ug/m3			05/24/17 08:48	1.41
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 08:48	1.41
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 08:48	1.41
Trichloroethene	**6.2**		1.1	0.19	ug/m3			05/24/17 08:48	1.41
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			05/24/17 08:48	1.41
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 08:48	1.41
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 08:48	1.41
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 08:48	1.41

Client Sample ID: A-B-1
Date Collected: 05/17/17 09:19
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-4
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/23/17 22:58	1.46
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/23/17 22:58	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			05/23/17 22:58	1.46
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/23/17 22:58	1.46
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/23/17 22:58	1.46
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/23/17 22:58	1.46
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/23/17 22:58	1.46
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/23/17 22:58	1.46
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/23/17 22:58	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/23/17 22:58	1.46
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/23/17 22:58	1.46
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/23/17 22:58	1.46
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/23/17 22:58	1.46
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/23/17 22:58	1.46
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/23/17 22:58	1.46
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/23/17 22:58	1.46
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/23/17 22:58	1.46
2-Butanone (MEK)	ND		1.0	0.20	ppb v/v			05/23/17 22:58	1.46
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/23/17 22:58	1.46
Acetone	**4.9**	**J**	5.0	1.4	ppb v/v			05/23/17 22:58	1.46
Benzene	ND		0.20	0.056	ppb v/v			05/23/17 22:58	1.46
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/23/17 22:58	1.46
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/23/17 22:58	1.46
Bromoform	ND		0.20	0.048	ppb v/v			05/23/17 22:58	1.46
Bromomethane	ND		0.20	0.032	ppb v/v			05/23/17 22:58	1.46
Carbon disulfide	**0.051**	**J**	0.50	0.031	ppb v/v			05/23/17 22:58	1.46
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			05/23/17 22:58	1.46
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/23/17 22:58	1.46
Chloroethane	ND		0.80	0.035	ppb v/v			05/23/17 22:58	1.46
Chloroform	ND		0.20	0.038	ppb v/v			05/23/17 22:58	1.46
Chloromethane	**0.68**		0.50	0.16	ppb v/v			05/23/17 22:58	1.46
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/23/17 22:58	1.46
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/23/17 22:58	1.46
Cyclohexane	ND		0.50	0.040	ppb v/v			05/23/17 22:58	1.46
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/23/17 22:58	1.46
Dichlorodifluoromethane	**0.56**		0.50	0.068	ppb v/v			05/23/17 22:58	1.46
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/23/17 22:58	1.46
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/23/17 22:58	1.46
Hexane	ND		0.80	0.032	ppb v/v			05/23/17 22:58	1.46
Isopropyl alcohol	**0.13**	**J**	5.0	0.094	ppb v/v			05/23/17 22:58	1.46
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/23/17 22:58	1.46
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/23/17 22:58	1.46
Methylene Chloride	**0.44**	**J B**	0.50	0.13	ppb v/v			05/23/17 22:58	1.46
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/23/17 22:58	1.46
Naphthalene	ND		0.50	0.090	ppb v/v			05/23/17 22:58	1.46
o-Xylene	ND		0.20	0.061	ppb v/v			05/23/17 22:58	1.46
Styrene	ND		0.20	0.058	ppb v/v			05/23/17 22:58	1.46
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/23/17 22:58	1.46

Client Sample ID: A-B-1

Lab Sample ID: 140-8162-4

Date Collected: 05/17/17 09:19
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	**0.17**	**J**	5.0	0.063	ppb v/v			05/23/17 22:58	1.46
Toluene	ND		0.20	0.12	ppb v/v			05/23/17 22:58	1.46
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/23/17 22:58	1.46
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/23/17 22:58	1.46
Trichloroethene	ND		0.20	0.036	ppb v/v			05/23/17 22:58	1.46
Trichlorofluoromethane	**0.16**	**J**	0.20	0.024	ppb v/v			05/23/17 22:58	1.46
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/23/17 22:58	1.46
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/23/17 22:58	1.46
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/23/17 22:58	1.46

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/23/17 22:58	1.46
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/23/17 22:58	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			05/23/17 22:58	1.46
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/23/17 22:58	1.46
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/23/17 22:58	1.46
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/23/17 22:58	1.46
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/23/17 22:58	1.46
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/23/17 22:58	1.46
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/23/17 22:58	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/23/17 22:58	1.46
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/23/17 22:58	1.46
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/23/17 22:58	1.46
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/23/17 22:58	1.46
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/23/17 22:58	1.46
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/23/17 22:58	1.46
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/23/17 22:58	1.46
1,4-Dioxane	ND		18	0.29	ug/m3			05/23/17 22:58	1.46
2-Butanone (MEK)	ND		2.9	0.59	ug/m3			05/23/17 22:58	1.46
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/23/17 22:58	1.46
Acetone	**12**	**J**	12	3.3	ug/m3			05/23/17 22:58	1.46
Benzene	ND		0.64	0.18	ug/m3			05/23/17 22:58	1.46
Benzyl chloride	ND		4.1	0.40	ug/m3			05/23/17 22:58	1.46
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/23/17 22:58	1.46
Bromoform	ND		2.1	0.50	ug/m3			05/23/17 22:58	1.46
Bromomethane	ND		0.78	0.12	ug/m3			05/23/17 22:58	1.46
Carbon disulfide	**0.16**	**J**	1.6	0.097	ug/m3			05/23/17 22:58	1.46
Carbon tetrachloride	ND		1.3	0.24	ug/m3			05/23/17 22:58	1.46
Chlorobenzene	ND		0.92	0.23	ug/m3			05/23/17 22:58	1.46
Chloroethane	ND		2.1	0.092	ug/m3			05/23/17 22:58	1.46
Chloroform	ND		0.98	0.19	ug/m3			05/23/17 22:58	1.46
Chloromethane	**1.4**		1.0	0.33	ug/m3			05/23/17 22:58	1.46
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/23/17 22:58	1.46
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/23/17 22:58	1.46
Cyclohexane	ND		1.7	0.14	ug/m3			05/23/17 22:58	1.46
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/23/17 22:58	1.46
Dichlorodifluoromethane	**2.8**		2.5	0.34	ug/m3			05/23/17 22:58	1.46
Ethylbenzene	ND		0.87	0.30	ug/m3			05/23/17 22:58	1.46
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/23/17 22:58	1.46

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-B-1
Date Collected: 05/17/17 09:19
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-4
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		2.8	0.11	ug/m3			05/23/17 22:58	1.46
Isopropyl alcohol	**0.33**	**J**	12	0.23	ug/m3			05/23/17 22:58	1.46
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/23/17 22:58	1.46
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/23/17 22:58	1.46
Methylene Chloride	**1.5**	**J B**	1.7	0.45	ug/m3			05/23/17 22:58	1.46
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/23/17 22:58	1.46
Naphthalene	ND		2.6	0.47	ug/m3			05/23/17 22:58	1.46
o-Xylene	ND		0.87	0.26	ug/m3			05/23/17 22:58	1.46
Styrene	ND		0.85	0.25	ug/m3			05/23/17 22:58	1.46
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/23/17 22:58	1.46
Tetrahydrofuran	**0.50**	**J**	15	0.19	ug/m3			05/23/17 22:58	1.46
Toluene	ND		0.75	0.45	ug/m3			05/23/17 22:58	1.46
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/23/17 22:58	1.46
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/23/17 22:58	1.46
Trichloroethene	ND		1.1	0.19	ug/m3			05/23/17 22:58	1.46
Trichlorofluoromethane	**0.89**	**J**	1.1	0.13	ug/m3			05/23/17 22:58	1.46
Vinyl acetate	ND		18	0.49	ug/m3			05/23/17 22:58	1.46
Vinyl bromide	ND		0.87	0.15	ug/m3			05/23/17 22:58	1.46
Vinyl chloride	ND		0.51	0.18	ug/m3			05/23/17 22:58	1.46

Client Sample ID: A-1-2
Date Collected: 05/17/17 09:30
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-5
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/23/17 23:42	1.61
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/23/17 23:42	1.61
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.065**	**J**	0.20	0.031	ppb v/v			05/23/17 23:42	1.61
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/23/17 23:42	1.61
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/23/17 23:42	1.61
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/23/17 23:42	1.61
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/23/17 23:42	1.61
1,2,4-Trimethylbenzene	**0.15**	**J**	0.20	0.063	ppb v/v			05/23/17 23:42	1.61
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/23/17 23:42	1.61
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/23/17 23:42	1.61
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/23/17 23:42	1.61
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/23/17 23:42	1.61
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/23/17 23:42	1.61
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/23/17 23:42	1.61
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/23/17 23:42	1.61
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/23/17 23:42	1.61
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/23/17 23:42	1.61
2-Butanone (MEK)	**1.0**		1.0	0.20	ppb v/v			05/23/17 23:42	1.61
4-Methyl-2-pentanone (MIBK)	**0.22**	**J**	0.50	0.20	ppb v/v			05/23/17 23:42	1.61
Acetone	**16**	**CI**	5.0	1.4	ppb v/v			05/23/17 23:42	1.61
Benzene	**0.32**		0.20	0.056	ppb v/v			05/23/17 23:42	1.61
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/23/17 23:42	1.61
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/23/17 23:42	1.61
Bromoform	ND		0.20	0.048	ppb v/v			05/23/17 23:42	1.61
Bromomethane	ND		0.20	0.032	ppb v/v			05/23/17 23:42	1.61
Carbon disulfide	**0.10**	**J**	0.50	0.031	ppb v/v			05/23/17 23:42	1.61
Carbon tetrachloride	**0.069**	**J**	0.20	0.038	ppb v/v			05/23/17 23:42	1.61
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/23/17 23:42	1.61
Chloroethane	ND		0.80	0.035	ppb v/v			05/23/17 23:42	1.61
Chloroform	**0.14**	**J**	0.20	0.038	ppb v/v			05/23/17 23:42	1.61
Chloromethane	**0.83**		0.50	0.16	ppb v/v			05/23/17 23:42	1.61
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/23/17 23:42	1.61
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/23/17 23:42	1.61
Cyclohexane	**0.35**	**J**	0.50	0.040	ppb v/v			05/23/17 23:42	1.61
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/23/17 23:42	1.61
Dichlorodifluoromethane	**0.54**		0.50	0.068	ppb v/v			05/23/17 23:42	1.61
Ethylbenzene	**0.30**		0.20	0.068	ppb v/v			05/23/17 23:42	1.61
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/23/17 23:42	1.61
Hexane	**1.1**		0.80	0.032	ppb v/v			05/23/17 23:42	1.61
Isopropyl alcohol	**3.2**	**J**	5.0	0.094	ppb v/v			05/23/17 23:42	1.61
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/23/17 23:42	1.61
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/23/17 23:42	1.61
Methylene Chloride	**0.46**	**J B**	0.50	0.13	ppb v/v			05/23/17 23:42	1.61
m-Xylene & p-Xylene	**0.75**	**J**	0.80	0.12	ppb v/v			05/23/17 23:42	1.61
Naphthalene	ND		0.50	0.090	ppb v/v			05/23/17 23:42	1.61
o-Xylene	**0.24**		0.20	0.061	ppb v/v			05/23/17 23:42	1.61
Styrene	**0.080**	**J**	0.20	0.058	ppb v/v			05/23/17 23:42	1.61

Client Sample ID: A-1-2

Date Collected: 05/17/17 09:30
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**0.12**	**J**	0.20	0.040	ppb v/v			05/23/17 23:42	1.61
Tetrahydrofuran	**1.3**	**J**	5.0	0.063	ppb v/v			05/23/17 23:42	1.61
Toluene	**2.3**		0.20	0.12	ppb v/v			05/23/17 23:42	1.61
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/23/17 23:42	1.61
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/23/17 23:42	1.61
Trichloroethene	ND		0.20	0.036	ppb v/v			05/23/17 23:42	1.61
Trichlorofluoromethane	**0.29**		0.20	0.024	ppb v/v			05/23/17 23:42	1.61
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/23/17 23:42	1.61
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/23/17 23:42	1.61
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/23/17 23:42	1.61

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/23/17 23:42	1.61
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/23/17 23:42	1.61
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.50**	**J**	1.5	0.24	ug/m3			05/23/17 23:42	1.61
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/23/17 23:42	1.61
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/23/17 23:42	1.61
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/23/17 23:42	1.61
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/23/17 23:42	1.61
1,2,4-Trimethylbenzene	**0.72**	**J**	0.98	0.31	ug/m3			05/23/17 23:42	1.61
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/23/17 23:42	1.61
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/23/17 23:42	1.61
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/23/17 23:42	1.61
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/23/17 23:42	1.61
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/23/17 23:42	1.61
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/23/17 23:42	1.61
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/23/17 23:42	1.61
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/23/17 23:42	1.61
1,4-Dioxane	ND		18	0.29	ug/m3			05/23/17 23:42	1.61
2-Butanone (MEK)	**3.0**		2.9	0.59	ug/m3			05/23/17 23:42	1.61
4-Methyl-2-pentanone (MIBK)	**0.91**	**J**	2.0	0.80	ug/m3			05/23/17 23:42	1.61
Acetone	**37**	**CI**	12	3.3	ug/m3			05/23/17 23:42	1.61
Benzene	**1.0**		0.64	0.18	ug/m3			05/23/17 23:42	1.61
Benzyl chloride	ND		4.1	0.40	ug/m3			05/23/17 23:42	1.61
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/23/17 23:42	1.61
Bromoform	ND		2.1	0.50	ug/m3			05/23/17 23:42	1.61
Bromomethane	ND		0.78	0.12	ug/m3			05/23/17 23:42	1.61
Carbon disulfide	**0.32**	**J**	1.6	0.097	ug/m3			05/23/17 23:42	1.61
Carbon tetrachloride	**0.43**	**J**	1.3	0.24	ug/m3			05/23/17 23:42	1.61
Chlorobenzene	ND		0.92	0.23	ug/m3			05/23/17 23:42	1.61
Chloroethane	ND		2.1	0.092	ug/m3			05/23/17 23:42	1.61
Chloroform	**0.68**	**J**	0.98	0.19	ug/m3			05/23/17 23:42	1.61
Chloromethane	**1.7**		1.0	0.33	ug/m3			05/23/17 23:42	1.61
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/23/17 23:42	1.61
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/23/17 23:42	1.61
Cyclohexane	**1.2**	**J**	1.7	0.14	ug/m3			05/23/17 23:42	1.61
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/23/17 23:42	1.61
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/23/17 23:42	1.61

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-1-2
Date Collected: 05/17/17 09:30
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-5
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**1.3**		0.87	0.30	ug/m3			05/23/17 23:42	1.61
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/23/17 23:42	1.61
Hexane	**3.8**		2.8	0.11	ug/m3			05/23/17 23:42	1.61
Isopropyl alcohol	**7.7**	J	12	0.23	ug/m3			05/23/17 23:42	1.61
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/23/17 23:42	1.61
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/23/17 23:42	1.61
Methylene Chloride	**1.6**	J B	1.7	0.45	ug/m3			05/23/17 23:42	1.61
m-Xylene & p-Xylene	**3.3**	J	3.5	0.52	ug/m3			05/23/17 23:42	1.61
Naphthalene	ND		2.6	0.47	ug/m3			05/23/17 23:42	1.61
o-Xylene	**1.0**		0.87	0.26	ug/m3			05/23/17 23:42	1.61
Styrene	**0.34**	J	0.85	0.25	ug/m3			05/23/17 23:42	1.61
Tetrachloroethene	**0.81**	J	1.4	0.27	ug/m3			05/23/17 23:42	1.61
Tetrahydrofuran	**3.9**	J	15	0.19	ug/m3			05/23/17 23:42	1.61
Toluene	**8.6**		0.75	0.45	ug/m3			05/23/17 23:42	1.61
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/23/17 23:42	1.61
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/23/17 23:42	1.61
Trichloroethene	ND		1.1	0.19	ug/m3			05/23/17 23:42	1.61
Trichlorofluoromethane	**1.6**		1.1	0.13	ug/m3			05/23/17 23:42	1.61
Vinyl acetate	ND		18	0.49	ug/m3			05/23/17 23:42	1.61
Vinyl bromide	ND		0.87	0.15	ug/m3			05/23/17 23:42	1.61
Vinyl chloride	ND		0.51	0.18	ug/m3			05/23/17 23:42	1.61

Client Sample ID: A-SS-1
Date Collected: 05/17/17 09:23
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-6
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 00:28	1.5
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 00:28	1.5
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.065**	**J**	0.20	0.031	ppb v/v			05/24/17 00:28	1.5
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 00:28	1.5
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 00:28	1.5
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 00:28	1.5
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 00:28	1.5
1,2,4-Trimethylbenzene	**0.36**		0.20	0.063	ppb v/v			05/24/17 00:28	1.5
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 00:28	1.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 00:28	1.5
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 00:28	1.5
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 00:28	1.5
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 00:28	1.5
1,3,5-Trimethylbenzene	**0.088**	**J**	0.20	0.065	ppb v/v			05/24/17 00:28	1.5
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 00:28	1.5
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 00:28	1.5
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 00:28	1.5
2-Butanone (MEK)	**0.79**	**J**	1.0	0.20	ppb v/v			05/24/17 00:28	1.5
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 00:28	1.5
Acetone	**11**		5.0	1.4	ppb v/v			05/24/17 00:28	1.5
Benzene	**1.1**		0.20	0.056	ppb v/v			05/24/17 00:28	1.5
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 00:28	1.5
Bromodichloromethane	**0.045**	**J**	0.20	0.044	ppb v/v			05/24/17 00:28	1.5
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 00:28	1.5
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 00:28	1.5
Carbon disulfide	**0.33**	**J**	0.50	0.031	ppb v/v			05/24/17 00:28	1.5
Carbon tetrachloride	**0.041**	**J**	0.20	0.038	ppb v/v			05/24/17 00:28	1.5
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 00:28	1.5
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 00:28	1.5
Chloroform	**0.10**	**J**	0.20	0.038	ppb v/v			05/24/17 00:28	1.5
Chloromethane	**0.19**	**J**	0.50	0.16	ppb v/v			05/24/17 00:28	1.5
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 00:28	1.5
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 00:28	1.5
Cyclohexane	**0.98**		0.50	0.040	ppb v/v			05/24/17 00:28	1.5
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 00:28	1.5
Dichlorodifluoromethane	**0.51**		0.50	0.068	ppb v/v			05/24/17 00:28	1.5
Ethylbenzene	**0.59**		0.20	0.068	ppb v/v			05/24/17 00:28	1.5
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 00:28	1.5
Hexane	**3.0**		0.80	0.032	ppb v/v			05/24/17 00:28	1.5
Isopropyl alcohol	**0.47**	**J**	5.0	0.094	ppb v/v			05/24/17 00:28	1.5
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 00:28	1.5
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 00:28	1.5
Methylene Chloride	**0.41**	**J B**	0.50	0.13	ppb v/v			05/24/17 00:28	1.5
m-Xylene & p-Xylene	**1.9**		0.80	0.12	ppb v/v			05/24/17 00:28	1.5
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 00:28	1.5
o-Xylene	**0.65**		0.20	0.061	ppb v/v			05/24/17 00:28	1.5
Styrene	**0.11**	**J**	0.20	0.058	ppb v/v			05/24/17 00:28	1.5

Client Sample ID: A-SS-1

Lab Sample ID: 140-8162-6

Date Collected: 05/17/17 09:23
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 00:28	1.5
Tetrahydrofuran	**1.2**	**J**	5.0	0.063	ppb v/v			05/24/17 00:28	1.5
Toluene	**3.2**		0.20	0.12	ppb v/v			05/24/17 00:28	1.5
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 00:28	1.5
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 00:28	1.5
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 00:28	1.5
Trichlorofluoromethane	**0.25**		0.20	0.024	ppb v/v			05/24/17 00:28	1.5
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 00:28	1.5
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 00:28	1.5
Vinyl chloride	**0.097**	**J**	0.20	0.071	ppb v/v			05/24/17 00:28	1.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 00:28	1.5
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 00:28	1.5
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.50**	**J**	1.5	0.24	ug/m3			05/24/17 00:28	1.5
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 00:28	1.5
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 00:28	1.5
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 00:28	1.5
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 00:28	1.5
1,2,4-Trimethylbenzene	**1.7**		0.98	0.31	ug/m3			05/24/17 00:28	1.5
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 00:28	1.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 00:28	1.5
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 00:28	1.5
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 00:28	1.5
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 00:28	1.5
1,3,5-Trimethylbenzene	**0.43**	**J**	0.98	0.32	ug/m3			05/24/17 00:28	1.5
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 00:28	1.5
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 00:28	1.5
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 00:28	1.5
2-Butanone (MEK)	**2.3**	**J**	2.9	0.59	ug/m3			05/24/17 00:28	1.5
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 00:28	1.5
Acetone	**25**		12	3.3	ug/m3			05/24/17 00:28	1.5
Benzene	**3.4**		0.64	0.18	ug/m3			05/24/17 00:28	1.5
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 00:28	1.5
Bromodichloromethane	**0.30**	**J**	1.3	0.29	ug/m3			05/24/17 00:28	1.5
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 00:28	1.5
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 00:28	1.5
Carbon disulfide	**1.0**	**J**	1.6	0.097	ug/m3			05/24/17 00:28	1.5
Carbon tetrachloride	**0.26**	**J**	1.3	0.24	ug/m3			05/24/17 00:28	1.5
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 00:28	1.5
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 00:28	1.5
Chloroform	**0.49**	**J**	0.98	0.19	ug/m3			05/24/17 00:28	1.5
Chloromethane	**0.38**	**J**	1.0	0.33	ug/m3			05/24/17 00:28	1.5
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 00:28	1.5
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 00:28	1.5
Cyclohexane	**3.4**		1.7	0.14	ug/m3			05/24/17 00:28	1.5
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 00:28	1.5
Dichlorodifluoromethane	**2.5**		2.5	0.34	ug/m3			05/24/17 00:28	1.5

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-SS-1
Date Collected: 05/17/17 09:23
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-6
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**2.6**		0.87	0.30	ug/m3			05/24/17 00:28	1.5
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 00:28	1.5
Hexane	**11**		2.8	0.11	ug/m3			05/24/17 00:28	1.5
Isopropyl alcohol	**1.2**	J	12	0.23	ug/m3			05/24/17 00:28	1.5
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 00:28	1.5
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 00:28	1.5
Methylene Chloride	**1.4**	J B	1.7	0.45	ug/m3			05/24/17 00:28	1.5
m-Xylene & p-Xylene	**8.1**		3.5	0.52	ug/m3			05/24/17 00:28	1.5
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 00:28	1.5
o-Xylene	**2.8**		0.87	0.26	ug/m3			05/24/17 00:28	1.5
Styrene	**0.45**	J	0.85	0.25	ug/m3			05/24/17 00:28	1.5
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 00:28	1.5
Tetrahydrofuran	**3.6**	J	15	0.19	ug/m3			05/24/17 00:28	1.5
Toluene	**12**		0.75	0.45	ug/m3			05/24/17 00:28	1.5
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 00:28	1.5
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 00:28	1.5
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 00:28	1.5
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			05/24/17 00:28	1.5
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 00:28	1.5
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 00:28	1.5
Vinyl chloride	**0.25**	J	0.51	0.18	ug/m3			05/24/17 00:28	1.5

Client Sample ID: A-SS-2
Date Collected: 05/17/17 09:22
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-7
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 01:13	1.62
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 01:13	1.62
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.078**	**J**	0.20	0.031	ppb v/v			05/24/17 01:13	1.62
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 01:13	1.62
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 01:13	1.62
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 01:13	1.62
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 01:13	1.62
1,2,4-Trimethylbenzene	**0.40**		0.20	0.063	ppb v/v			05/24/17 01:13	1.62
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 01:13	1.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 01:13	1.62
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 01:13	1.62
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 01:13	1.62
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 01:13	1.62
1,3,5-Trimethylbenzene	**0.095**	**J**	0.20	0.065	ppb v/v			05/24/17 01:13	1.62
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 01:13	1.62
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 01:13	1.62
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 01:13	1.62
2-Butanone (MEK)	**1.2**		1.0	0.20	ppb v/v			05/24/17 01:13	1.62
4-Methyl-2-pentanone (MIBK)	**0.41**	**J**	0.50	0.20	ppb v/v			05/24/17 01:13	1.62
Acetone	**14**	**CI**	5.0	1.4	ppb v/v			05/24/17 01:13	1.62
Benzene	**1.3**		0.20	0.056	ppb v/v			05/24/17 01:13	1.62
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 01:13	1.62
Bromodichloromethane	**0.051**	**J**	0.20	0.044	ppb v/v			05/24/17 01:13	1.62
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 01:13	1.62
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 01:13	1.62
Carbon disulfide	**0.57**		0.50	0.031	ppb v/v			05/24/17 01:13	1.62
Carbon tetrachloride	**0.051**	**J**	0.20	0.038	ppb v/v			05/24/17 01:13	1.62
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 01:13	1.62
Chloroethane	**0.038**	**J**	0.80	0.035	ppb v/v			05/24/17 01:13	1.62
Chloroform	**0.11**	**J**	0.20	0.038	ppb v/v			05/24/17 01:13	1.62
Chloromethane	**0.36**	**J**	0.50	0.16	ppb v/v			05/24/17 01:13	1.62
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 01:13	1.62
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 01:13	1.62
Cyclohexane	**1.3**		0.50	0.040	ppb v/v			05/24/17 01:13	1.62
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 01:13	1.62
Dichlorodifluoromethane	**0.56**		0.50	0.068	ppb v/v			05/24/17 01:13	1.62
Ethylbenzene	**0.64**		0.20	0.068	ppb v/v			05/24/17 01:13	1.62
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 01:13	1.62
Hexane	**3.4**		0.80	0.032	ppb v/v			05/24/17 01:13	1.62
Isopropyl alcohol	**0.80**	**J**	5.0	0.094	ppb v/v			05/24/17 01:13	1.62
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 01:13	1.62
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 01:13	1.62
Methylene Chloride	**0.54**	**B**	0.50	0.13	ppb v/v			05/24/17 01:13	1.62
m-Xylene & p-Xylene	**2.1**		0.80	0.12	ppb v/v			05/24/17 01:13	1.62
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 01:13	1.62
o-Xylene	**0.69**		0.20	0.061	ppb v/v			05/24/17 01:13	1.62
Styrene	**0.12**	**J**	0.20	0.058	ppb v/v			05/24/17 01:13	1.62

Client Sample ID: A-SS-2

Lab Sample ID: 140-8162-7

Date Collected: 05/17/17 09:22
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 01:13	1.62
Tetrahydrofuran	ND		5.0	0.063	ppb v/v			05/24/17 01:13	1.62
Toluene	**3.6**		0.20	0.12	ppb v/v			05/24/17 01:13	1.62
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 01:13	1.62
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 01:13	1.62
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 01:13	1.62
Trichlorofluoromethane	**0.29**		0.20	0.024	ppb v/v			05/24/17 01:13	1.62
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 01:13	1.62
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 01:13	1.62
Vinyl chloride	**0.10**	J	0.20	0.071	ppb v/v			05/24/17 01:13	1.62

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 01:13	1.62
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 01:13	1.62
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.59**	J	1.5	0.24	ug/m3			05/24/17 01:13	1.62
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 01:13	1.62
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 01:13	1.62
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 01:13	1.62
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 01:13	1.62
1,2,4-Trimethylbenzene	**2.0**		0.98	0.31	ug/m3			05/24/17 01:13	1.62
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 01:13	1.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 01:13	1.62
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 01:13	1.62
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 01:13	1.62
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 01:13	1.62
1,3,5-Trimethylbenzene	**0.47**	J	0.98	0.32	ug/m3			05/24/17 01:13	1.62
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 01:13	1.62
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 01:13	1.62
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 01:13	1.62
2-Butanone (MEK)	**3.5**		2.9	0.59	ug/m3			05/24/17 01:13	1.62
4-Methyl-2-pentanone (MIBK)	**1.7**	J	2.0	0.80	ug/m3			05/24/17 01:13	1.62
Acetone	**33**	CI	12	3.3	ug/m3			05/24/17 01:13	1.62
Benzene	**4.2**		0.64	0.18	ug/m3			05/24/17 01:13	1.62
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 01:13	1.62
Bromodichloromethane	**0.34**	J	1.3	0.29	ug/m3			05/24/17 01:13	1.62
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 01:13	1.62
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 01:13	1.62
Carbon disulfide	**1.8**		1.6	0.097	ug/m3			05/24/17 01:13	1.62
Carbon tetrachloride	**0.32**	J	1.3	0.24	ug/m3			05/24/17 01:13	1.62
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 01:13	1.62
Chloroethane	**0.10**	J	2.1	0.092	ug/m3			05/24/17 01:13	1.62
Chloroform	**0.54**	J	0.98	0.19	ug/m3			05/24/17 01:13	1.62
Chloromethane	**0.74**	J	1.0	0.33	ug/m3			05/24/17 01:13	1.62
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 01:13	1.62
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 01:13	1.62
Cyclohexane	**4.3**		1.7	0.14	ug/m3			05/24/17 01:13	1.62
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 01:13	1.62
Dichlorodifluoromethane	**2.8**		2.5	0.34	ug/m3			05/24/17 01:13	1.62

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-SS-2
Date Collected: 05/17/17 09:22
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-7
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**2.8**		0.87	0.30	ug/m3			05/24/17 01:13	1.62
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 01:13	1.62
Hexane	**12**		2.8	0.11	ug/m3			05/24/17 01:13	1.62
Isopropyl alcohol	**2.0**	**J**	12	0.23	ug/m3			05/24/17 01:13	1.62
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 01:13	1.62
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 01:13	1.62
Methylene Chloride	**1.9**	**B**	1.7	0.45	ug/m3			05/24/17 01:13	1.62
m-Xylene & p-Xylene	**9.0**		3.5	0.52	ug/m3			05/24/17 01:13	1.62
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 01:13	1.62
o-Xylene	**3.0**		0.87	0.26	ug/m3			05/24/17 01:13	1.62
Styrene	**0.49**	**J**	0.85	0.25	ug/m3			05/24/17 01:13	1.62
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 01:13	1.62
Tetrahydrofuran	ND		15	0.19	ug/m3			05/24/17 01:13	1.62
Toluene	**14**		0.75	0.45	ug/m3			05/24/17 01:13	1.62
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 01:13	1.62
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 01:13	1.62
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 01:13	1.62
Trichlorofluoromethane	**1.6**		1.1	0.13	ug/m3			05/24/17 01:13	1.62
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 01:13	1.62
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 01:13	1.62
Vinyl chloride	**0.26**	**J**	0.51	0.18	ug/m3			05/24/17 01:13	1.62

Client Sample ID: A-1-1
Date Collected: 05/17/17 09:27
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-8
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 01:58	1.57
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 01:58	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.071**	**J**	0.20	0.031	ppb v/v			05/24/17 01:58	1.57
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 01:58	1.57
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 01:58	1.57
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 01:58	1.57
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 01:58	1.57
1,2,4-Trimethylbenzene	**0.15**	**J**	0.20	0.063	ppb v/v			05/24/17 01:58	1.57
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 01:58	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 01:58	1.57
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 01:58	1.57
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 01:58	1.57
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 01:58	1.57
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 01:58	1.57
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 01:58	1.57
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 01:58	1.57
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 01:58	1.57
2-Butanone (MEK)	**0.93**	**J**	1.0	0.20	ppb v/v			05/24/17 01:58	1.57
4-Methyl-2-pentanone (MIBK)	**0.96**		0.50	0.20	ppb v/v			05/24/17 01:58	1.57
Acetone	**14**		5.0	1.4	ppb v/v			05/24/17 01:58	1.57
Benzene	**0.32**		0.20	0.056	ppb v/v			05/24/17 01:58	1.57
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 01:58	1.57
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 01:58	1.57
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 01:58	1.57
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 01:58	1.57
Carbon disulfide	**0.086**	**J**	0.50	0.031	ppb v/v			05/24/17 01:58	1.57
Carbon tetrachloride	**0.075**	**J**	0.20	0.038	ppb v/v			05/24/17 01:58	1.57
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 01:58	1.57
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 01:58	1.57
Chloroform	**0.14**	**J**	0.20	0.038	ppb v/v			05/24/17 01:58	1.57
Chloromethane	**0.75**		0.50	0.16	ppb v/v			05/24/17 01:58	1.57
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 01:58	1.57
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 01:58	1.57
Cyclohexane	**0.40**	**J**	0.50	0.040	ppb v/v			05/24/17 01:58	1.57
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 01:58	1.57
Dichlorodifluoromethane	**0.57**		0.50	0.068	ppb v/v			05/24/17 01:58	1.57
Ethylbenzene	**0.31**		0.20	0.068	ppb v/v			05/24/17 01:58	1.57
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 01:58	1.57
Hexane	**1.1**		0.80	0.032	ppb v/v			05/24/17 01:58	1.57
Isopropyl alcohol	**3.2**	**J**	5.0	0.094	ppb v/v			05/24/17 01:58	1.57
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 01:58	1.57
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 01:58	1.57
Methylene Chloride	**0.52**	**B**	0.50	0.13	ppb v/v			05/24/17 01:58	1.57
m-Xylene & p-Xylene	**0.77**	**J**	0.80	0.12	ppb v/v			05/24/17 01:58	1.57
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 01:58	1.57
o-Xylene	**0.24**		0.20	0.061	ppb v/v			05/24/17 01:58	1.57
Styrene	**0.086**	**J**	0.20	0.058	ppb v/v			05/24/17 01:58	1.57

Client Sample ID: A-1-1
Date Collected: 05/17/17 09:27
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-8
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**0.14**	**J**	0.20	0.040	ppb v/v			05/24/17 01:58	1.57
Tetrahydrofuran	**1.3**	**J**	5.0	0.063	ppb v/v			05/24/17 01:58	1.57
Toluene	**2.4**		0.20	0.12	ppb v/v			05/24/17 01:58	1.57
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 01:58	1.57
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 01:58	1.57
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 01:58	1.57
Trichlorofluoromethane	**0.29**		0.20	0.024	ppb v/v			05/24/17 01:58	1.57
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 01:58	1.57
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 01:58	1.57
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 01:58	1.57

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 01:58	1.57
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 01:58	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.55**	**J**	1.5	0.24	ug/m3			05/24/17 01:58	1.57
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 01:58	1.57
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 01:58	1.57
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 01:58	1.57
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 01:58	1.57
1,2,4-Trimethylbenzene	**0.72**	**J**	0.98	0.31	ug/m3			05/24/17 01:58	1.57
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 01:58	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 01:58	1.57
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 01:58	1.57
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 01:58	1.57
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 01:58	1.57
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 01:58	1.57
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 01:58	1.57
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 01:58	1.57
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 01:58	1.57
2-Butanone (MEK)	**2.7**	**J**	2.9	0.59	ug/m3			05/24/17 01:58	1.57
4-Methyl-2-pentanone (MIBK)	**3.9**		2.0	0.80	ug/m3			05/24/17 01:58	1.57
Acetone	**34**		12	3.3	ug/m3			05/24/17 01:58	1.57
Benzene	**1.0**		0.64	0.18	ug/m3			05/24/17 01:58	1.57
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 01:58	1.57
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 01:58	1.57
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 01:58	1.57
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 01:58	1.57
Carbon disulfide	**0.27**	**J**	1.6	0.097	ug/m3			05/24/17 01:58	1.57
Carbon tetrachloride	**0.47**	**J**	1.3	0.24	ug/m3			05/24/17 01:58	1.57
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 01:58	1.57
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 01:58	1.57
Chloroform	**0.69**	**J**	0.98	0.19	ug/m3			05/24/17 01:58	1.57
Chloromethane	**1.6**		1.0	0.33	ug/m3			05/24/17 01:58	1.57
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 01:58	1.57
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 01:58	1.57
Cyclohexane	**1.4**	**J**	1.7	0.14	ug/m3			05/24/17 01:58	1.57
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 01:58	1.57
Dichlorodifluoromethane	**2.8**		2.5	0.34	ug/m3			05/24/17 01:58	1.57

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-1-1
Date Collected: 05/17/17 09:27
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-8
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**1.3**		0.87	0.30	ug/m3			05/24/17 01:58	1.57
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 01:58	1.57
Hexane	**4.0**		2.8	0.11	ug/m3			05/24/17 01:58	1.57
Isopropyl alcohol	**8.0**	J	12	0.23	ug/m3			05/24/17 01:58	1.57
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 01:58	1.57
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 01:58	1.57
Methylene Chloride	**1.8**	B	1.7	0.45	ug/m3			05/24/17 01:58	1.57
m-Xylene & p-Xylene	**3.4**	J	3.5	0.52	ug/m3			05/24/17 01:58	1.57
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 01:58	1.57
o-Xylene	**1.1**		0.87	0.26	ug/m3			05/24/17 01:58	1.57
Styrene	**0.37**	J	0.85	0.25	ug/m3			05/24/17 01:58	1.57
Tetrachloroethene	**0.92**	J	1.4	0.27	ug/m3			05/24/17 01:58	1.57
Tetrahydrofuran	**3.7**	J	15	0.19	ug/m3			05/24/17 01:58	1.57
Toluene	**9.0**		0.75	0.45	ug/m3			05/24/17 01:58	1.57
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 01:58	1.57
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 01:58	1.57
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 01:58	1.57
Trichlorofluoromethane	**1.7**		1.1	0.13	ug/m3			05/24/17 01:58	1.57
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 01:58	1.57
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 01:58	1.57
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 01:58	1.57

Client Sample ID: A-B-2
Date Collected: 05/17/17 09:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-9
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 02:42	1.4
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 02:42	1.4
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.072**	**J**	0.20	0.031	ppb v/v			05/24/17 02:42	1.4
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 02:42	1.4
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 02:42	1.4
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 02:42	1.4
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 02:42	1.4
1,2,4-Trimethylbenzene	**0.17**	**J**	0.20	0.063	ppb v/v			05/24/17 02:42	1.4
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 02:42	1.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 02:42	1.4
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 02:42	1.4
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 02:42	1.4
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 02:42	1.4
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 02:42	1.4
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 02:42	1.4
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 02:42	1.4
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 02:42	1.4
2-Butanone (MEK)	**1.5**		1.0	0.20	ppb v/v			05/24/17 02:42	1.4
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 02:42	1.4
Acetone	**15**	**CI**	5.0	1.4	ppb v/v			05/24/17 02:42	1.4
Benzene	**0.37**		0.20	0.056	ppb v/v			05/24/17 02:42	1.4
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 02:42	1.4
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 02:42	1.4
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 02:42	1.4
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 02:42	1.4
Carbon disulfide	**0.11**	**J**	0.50	0.031	ppb v/v			05/24/17 02:42	1.4
Carbon tetrachloride	**0.072**	**J**	0.20	0.038	ppb v/v			05/24/17 02:42	1.4
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 02:42	1.4
Chloroethane	**0.060**	**J**	0.80	0.035	ppb v/v			05/24/17 02:42	1.4
Chloroform	**0.072**	**J**	0.20	0.038	ppb v/v			05/24/17 02:42	1.4
Chloromethane	**1.0**		0.50	0.16	ppb v/v			05/24/17 02:42	1.4
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 02:42	1.4
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 02:42	1.4
Cyclohexane	**0.43**	**J**	0.50	0.040	ppb v/v			05/24/17 02:42	1.4
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 02:42	1.4
Dichlorodifluoromethane	**0.53**		0.50	0.068	ppb v/v			05/24/17 02:42	1.4
Ethylbenzene	**0.38**		0.20	0.068	ppb v/v			05/24/17 02:42	1.4
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 02:42	1.4
Hexane	**1.4**		0.80	0.032	ppb v/v			05/24/17 02:42	1.4
Isopropyl alcohol	**1.2**	**J**	5.0	0.094	ppb v/v			05/24/17 02:42	1.4
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 02:42	1.4
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 02:42	1.4
Methylene Chloride	**0.47**	**J B**	0.50	0.13	ppb v/v			05/24/17 02:42	1.4
m-Xylene & p-Xylene	**0.90**		0.80	0.12	ppb v/v			05/24/17 02:42	1.4
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 02:42	1.4
o-Xylene	**0.27**		0.20	0.061	ppb v/v			05/24/17 02:42	1.4
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 02:42	1.4

Client Sample ID: A-B-2

Lab Sample ID: 140-8162-9

Date Collected: 05/17/17 09:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 02:42	1.4
Tetrahydrofuran	**1.4**	**J**	5.0	0.063	ppb v/v			05/24/17 02:42	1.4
Toluene	**2.9**		0.20	0.12	ppb v/v			05/24/17 02:42	1.4
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 02:42	1.4
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 02:42	1.4
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 02:42	1.4
Trichlorofluoromethane	**0.25**		0.20	0.024	ppb v/v			05/24/17 02:42	1.4
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 02:42	1.4
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 02:42	1.4
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 02:42	1.4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 02:42	1.4
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 02:42	1.4
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.55**	**J**	1.5	0.24	ug/m3			05/24/17 02:42	1.4
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 02:42	1.4
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 02:42	1.4
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 02:42	1.4
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 02:42	1.4
1,2,4-Trimethylbenzene	**0.82**	**J**	0.98	0.31	ug/m3			05/24/17 02:42	1.4
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 02:42	1.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 02:42	1.4
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 02:42	1.4
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 02:42	1.4
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 02:42	1.4
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 02:42	1.4
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 02:42	1.4
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 02:42	1.4
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 02:42	1.4
2-Butanone (MEK)	**4.3**		2.9	0.59	ug/m3			05/24/17 02:42	1.4
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 02:42	1.4
Acetone	**37**	**CI**	12	3.3	ug/m3			05/24/17 02:42	1.4
Benzene	**1.2**		0.64	0.18	ug/m3			05/24/17 02:42	1.4
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 02:42	1.4
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 02:42	1.4
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 02:42	1.4
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 02:42	1.4
Carbon disulfide	**0.35**	**J**	1.6	0.097	ug/m3			05/24/17 02:42	1.4
Carbon tetrachloride	**0.45**	**J**	1.3	0.24	ug/m3			05/24/17 02:42	1.4
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 02:42	1.4
Chloroethane	**0.16**	**J**	2.1	0.092	ug/m3			05/24/17 02:42	1.4
Chloroform	**0.35**	**J**	0.98	0.19	ug/m3			05/24/17 02:42	1.4
Chloromethane	**2.2**		1.0	0.33	ug/m3			05/24/17 02:42	1.4
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 02:42	1.4
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 02:42	1.4
Cyclohexane	**1.5**	**J**	1.7	0.14	ug/m3			05/24/17 02:42	1.4
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 02:42	1.4
Dichlorodifluoromethane	**2.6**		2.5	0.34	ug/m3			05/24/17 02:42	1.4

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-B-2
Date Collected: 05/17/17 09:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-9
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**1.6**		0.87	0.30	ug/m3			05/24/17 02:42	1.4
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 02:42	1.4
Hexane	**4.8**		2.8	0.11	ug/m3			05/24/17 02:42	1.4
Isopropyl alcohol	**2.9**	J	12	0.23	ug/m3			05/24/17 02:42	1.4
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 02:42	1.4
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 02:42	1.4
Methylene Chloride	**1.6**	J B	1.7	0.45	ug/m3			05/24/17 02:42	1.4
m-Xylene & p-Xylene	**3.9**		3.5	0.52	ug/m3			05/24/17 02:42	1.4
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 02:42	1.4
o-Xylene	**1.2**		0.87	0.26	ug/m3			05/24/17 02:42	1.4
Styrene	ND		0.85	0.25	ug/m3			05/24/17 02:42	1.4
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 02:42	1.4
Tetrahydrofuran	**4.1**	J	15	0.19	ug/m3			05/24/17 02:42	1.4
Toluene	**11**		0.75	0.45	ug/m3			05/24/17 02:42	1.4
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 02:42	1.4
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 02:42	1.4
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 02:42	1.4
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			05/24/17 02:42	1.4
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 02:42	1.4
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 02:42	1.4
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 02:42	1.4

Client Sample ID: AA
Date Collected: 05/17/17 09:37
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-10
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 03:26	1.38
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 03:26	1.38
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.075**	**J**	0.20	0.031	ppb v/v			05/24/17 03:26	1.38
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 03:26	1.38
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 03:26	1.38
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 03:26	1.38
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 03:26	1.38
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/24/17 03:26	1.38
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 03:26	1.38
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 03:26	1.38
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 03:26	1.38
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 03:26	1.38
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 03:26	1.38
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 03:26	1.38
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 03:26	1.38
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 03:26	1.38
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 03:26	1.38
2-Butanone (MEK)	**0.30**	**J**	1.0	0.20	ppb v/v			05/24/17 03:26	1.38
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 03:26	1.38
Acetone	**4.1**	**J**	5.0	1.4	ppb v/v			05/24/17 03:26	1.38
Benzene	**0.085**	**J**	0.20	0.056	ppb v/v			05/24/17 03:26	1.38
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 03:26	1.38
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 03:26	1.38
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 03:26	1.38
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 03:26	1.38
Carbon disulfide	**0.20**	**J**	0.50	0.031	ppb v/v			05/24/17 03:26	1.38
Carbon tetrachloride	**0.069**	**J**	0.20	0.038	ppb v/v			05/24/17 03:26	1.38
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 03:26	1.38
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 03:26	1.38
Chloroform	ND		0.20	0.038	ppb v/v			05/24/17 03:26	1.38
Chloromethane	**0.60**		0.50	0.16	ppb v/v			05/24/17 03:26	1.38
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 03:26	1.38
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 03:26	1.38
Cyclohexane	**0.047**	**J**	0.50	0.040	ppb v/v			05/24/17 03:26	1.38
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 03:26	1.38
Dichlorodifluoromethane	**0.55**		0.50	0.068	ppb v/v			05/24/17 03:26	1.38
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/24/17 03:26	1.38
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 03:26	1.38
Hexane	**0.11**	**J**	0.80	0.032	ppb v/v			05/24/17 03:26	1.38
Isopropyl alcohol	**0.36**	**J**	5.0	0.094	ppb v/v			05/24/17 03:26	1.38
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 03:26	1.38
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 03:26	1.38
Methylene Chloride	**0.49**	**J B**	0.50	0.13	ppb v/v			05/24/17 03:26	1.38
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/24/17 03:26	1.38
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 03:26	1.38
o-Xylene	ND		0.20	0.061	ppb v/v			05/24/17 03:26	1.38
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 03:26	1.38

Client Sample ID: AA

Lab Sample ID: 140-8162-10

Date Collected: 05/17/17 09:37
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 03:26	1.38
Tetrahydrofuran	**0.077**	**J**	5.0	0.063	ppb v/v			05/24/17 03:26	1.38
Toluene	**0.17**	**J**	0.20	0.12	ppb v/v			05/24/17 03:26	1.38
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 03:26	1.38
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 03:26	1.38
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 03:26	1.38
Trichlorofluoromethane	**0.25**		0.20	0.024	ppb v/v			05/24/17 03:26	1.38
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 03:26	1.38
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 03:26	1.38
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 03:26	1.38

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 03:26	1.38
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 03:26	1.38
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.57**	**J**	1.5	0.24	ug/m3			05/24/17 03:26	1.38
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 03:26	1.38
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 03:26	1.38
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 03:26	1.38
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 03:26	1.38
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/24/17 03:26	1.38
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 03:26	1.38
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 03:26	1.38
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 03:26	1.38
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 03:26	1.38
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 03:26	1.38
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 03:26	1.38
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 03:26	1.38
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 03:26	1.38
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 03:26	1.38
2-Butanone (MEK)	**0.89**	**J**	2.9	0.59	ug/m3			05/24/17 03:26	1.38
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 03:26	1.38
Acetone	**9.7**	**J**	12	3.3	ug/m3			05/24/17 03:26	1.38
Benzene	**0.27**	**J**	0.64	0.18	ug/m3			05/24/17 03:26	1.38
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 03:26	1.38
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 03:26	1.38
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 03:26	1.38
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 03:26	1.38
Carbon disulfide	**0.63**	**J**	1.6	0.097	ug/m3			05/24/17 03:26	1.38
Carbon tetrachloride	**0.43**	**J**	1.3	0.24	ug/m3			05/24/17 03:26	1.38
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 03:26	1.38
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 03:26	1.38
Chloroform	ND		0.98	0.19	ug/m3			05/24/17 03:26	1.38
Chloromethane	**1.2**		1.0	0.33	ug/m3			05/24/17 03:26	1.38
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 03:26	1.38
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 03:26	1.38
Cyclohexane	**0.16**	**J**	1.7	0.14	ug/m3			05/24/17 03:26	1.38
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 03:26	1.38
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/24/17 03:26	1.38

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: AA
Date Collected: 05/17/17 09:37
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-10
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.87	0.30	ug/m3			05/24/17 03:26	1.38
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 03:26	1.38
Hexane	**0.40**	**J**	2.8	0.11	ug/m3			05/24/17 03:26	1.38
Isopropyl alcohol	**0.88**	**J**	12	0.23	ug/m3			05/24/17 03:26	1.38
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 03:26	1.38
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 03:26	1.38
Methylene Chloride	**1.7**	**J B**	1.7	0.45	ug/m3			05/24/17 03:26	1.38
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/24/17 03:26	1.38
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 03:26	1.38
o-Xylene	ND		0.87	0.26	ug/m3			05/24/17 03:26	1.38
Styrene	ND		0.85	0.25	ug/m3			05/24/17 03:26	1.38
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 03:26	1.38
Tetrahydrofuran	**0.23**	**J**	15	0.19	ug/m3			05/24/17 03:26	1.38
Toluene	**0.65**	**J**	0.75	0.45	ug/m3			05/24/17 03:26	1.38
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 03:26	1.38
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 03:26	1.38
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 03:26	1.38
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			05/24/17 03:26	1.38
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 03:26	1.38
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 03:26	1.38
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 03:26	1.38

Client Sample ID: D-A
Date Collected: 05/17/17 11:09
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-11
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 04:11	1.3
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 04:11	1.3
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.066**	**J**	0.20	0.031	ppb v/v			05/24/17 04:11	1.3
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 04:11	1.3
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 04:11	1.3
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 04:11	1.3
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 04:11	1.3
1,2,4-Trimethylbenzene	**0.12**	**J**	0.20	0.063	ppb v/v			05/24/17 04:11	1.3
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 04:11	1.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 04:11	1.3
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 04:11	1.3
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 04:11	1.3
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 04:11	1.3
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 04:11	1.3
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 04:11	1.3
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 04:11	1.3
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 04:11	1.3
2-Butanone (MEK)	**1.5**		1.0	0.20	ppb v/v			05/24/17 04:11	1.3
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 04:11	1.3
Acetone	**14**	**CI**	5.0	1.4	ppb v/v			05/24/17 04:11	1.3
Benzene	**0.18**	**J**	0.20	0.056	ppb v/v			05/24/17 04:11	1.3
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 04:11	1.3
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 04:11	1.3
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 04:11	1.3
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 04:11	1.3
Carbon disulfide	**0.076**	**J**	0.50	0.031	ppb v/v			05/24/17 04:11	1.3
Carbon tetrachloride	**0.065**	**J**	0.20	0.038	ppb v/v			05/24/17 04:11	1.3
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 04:11	1.3
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 04:11	1.3
Chloroform	ND		0.20	0.038	ppb v/v			05/24/17 04:11	1.3
Chloromethane	**0.65**		0.50	0.16	ppb v/v			05/24/17 04:11	1.3
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 04:11	1.3
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 04:11	1.3
Cyclohexane	**0.13**	**J**	0.50	0.040	ppb v/v			05/24/17 04:11	1.3
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 04:11	1.3
Dichlorodifluoromethane	**0.52**		0.50	0.068	ppb v/v			05/24/17 04:11	1.3
Ethylbenzene	**0.17**	**J**	0.20	0.068	ppb v/v			05/24/17 04:11	1.3
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 04:11	1.3
Hexane	**0.18**	**J**	0.80	0.032	ppb v/v			05/24/17 04:11	1.3
Isopropyl alcohol	**0.57**	**J**	5.0	0.094	ppb v/v			05/24/17 04:11	1.3
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 04:11	1.3
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 04:11	1.3
Methylene Chloride	**0.43**	**J B**	0.50	0.13	ppb v/v			05/24/17 04:11	1.3
m-Xylene & p-Xylene	**0.41**	**J**	0.80	0.12	ppb v/v			05/24/17 04:11	1.3
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 04:11	1.3
o-Xylene	**0.16**	**J**	0.20	0.061	ppb v/v			05/24/17 04:11	1.3
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 04:11	1.3

Client Sample ID: D-A

Lab Sample ID: 140-8162-11

Date Collected: 05/17/17 11:09
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 04:11	1.3
Tetrahydrofuran	ND		5.0	0.063	ppb v/v			05/24/17 04:11	1.3
Toluene	**0.77**		0.20	0.12	ppb v/v			05/24/17 04:11	1.3
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 04:11	1.3
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 04:11	1.3
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 04:11	1.3
Trichlorofluoromethane	**0.23**		0.20	0.024	ppb v/v			05/24/17 04:11	1.3
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 04:11	1.3
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 04:11	1.3
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 04:11	1.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 04:11	1.3
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 04:11	1.3
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.50**	**J**	1.5	0.24	ug/m3			05/24/17 04:11	1.3
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 04:11	1.3
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 04:11	1.3
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 04:11	1.3
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 04:11	1.3
1,2,4-Trimethylbenzene	**0.59**	**J**	0.98	0.31	ug/m3			05/24/17 04:11	1.3
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 04:11	1.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 04:11	1.3
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 04:11	1.3
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 04:11	1.3
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 04:11	1.3
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 04:11	1.3
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 04:11	1.3
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 04:11	1.3
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 04:11	1.3
2-Butanone (MEK)	**4.5**		2.9	0.59	ug/m3			05/24/17 04:11	1.3
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 04:11	1.3
Acetone	**34**	**CI**	12	3.3	ug/m3			05/24/17 04:11	1.3
Benzene	**0.58**	**J**	0.64	0.18	ug/m3			05/24/17 04:11	1.3
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 04:11	1.3
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 04:11	1.3
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 04:11	1.3
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 04:11	1.3
Carbon disulfide	**0.24**	**J**	1.6	0.097	ug/m3			05/24/17 04:11	1.3
Carbon tetrachloride	**0.41**	**J**	1.3	0.24	ug/m3			05/24/17 04:11	1.3
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 04:11	1.3
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 04:11	1.3
Chloroform	ND		0.98	0.19	ug/m3			05/24/17 04:11	1.3
Chloromethane	**1.3**		1.0	0.33	ug/m3			05/24/17 04:11	1.3
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 04:11	1.3
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 04:11	1.3
Cyclohexane	**0.44**	**J**	1.7	0.14	ug/m3			05/24/17 04:11	1.3
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 04:11	1.3
Dichlorodifluoromethane	**2.6**		2.5	0.34	ug/m3			05/24/17 04:11	1.3

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: D-A
Date Collected: 05/17/17 11:09
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-11
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.76**	**J**	0.87	0.30	ug/m3			05/24/17 04:11	1.3
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 04:11	1.3
Hexane	**0.65**	**J**	2.8	0.11	ug/m3			05/24/17 04:11	1.3
Isopropyl alcohol	**1.4**	**J**	12	0.23	ug/m3			05/24/17 04:11	1.3
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 04:11	1.3
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 04:11	1.3
Methylene Chloride	**1.5**	**J B**	1.7	0.45	ug/m3			05/24/17 04:11	1.3
m-Xylene & p-Xylene	**1.8**	**J**	3.5	0.52	ug/m3			05/24/17 04:11	1.3
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 04:11	1.3
o-Xylene	**0.70**	**J**	0.87	0.26	ug/m3			05/24/17 04:11	1.3
Styrene	ND		0.85	0.25	ug/m3			05/24/17 04:11	1.3
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 04:11	1.3
Tetrahydrofuran	ND		15	0.19	ug/m3			05/24/17 04:11	1.3
Toluene	**2.9**		0.75	0.45	ug/m3			05/24/17 04:11	1.3
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 04:11	1.3
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 04:11	1.3
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 04:11	1.3
Trichlorofluoromethane	**1.3**		1.1	0.13	ug/m3			05/24/17 04:11	1.3
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 04:11	1.3
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 04:11	1.3
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 04:11	1.3

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: D-SS
Date Collected: 05/17/17 11:13
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-12
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.2	0.78	ppb v/v			05/24/17 04:53	1.43
1,1,2,2-Tetrachloroethane	ND		5.2	1.6	ppb v/v			05/24/17 04:53	1.43
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.2	0.81	ppb v/v			05/24/17 04:53	1.43
1,1,2-Trichloroethane	ND		5.2	1.4	ppb v/v			05/24/17 04:53	1.43
1,1-Dichloroethane	ND		5.2	0.68	ppb v/v			05/24/17 04:53	1.43
1,1-Dichloroethene	ND		5.2	0.88	ppb v/v			05/24/17 04:53	1.43
1,2,4-Trichlorobenzene	ND		52	2.5	ppb v/v			05/24/17 04:53	1.43
1,2,4-Trimethylbenzene	ND		5.2	1.6	ppb v/v			05/24/17 04:53	1.43
1,2-Dibromoethane (EDB)	ND		5.2	1.1	ppb v/v			05/24/17 04:53	1.43
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.2	0.83	ppb v/v			05/24/17 04:53	1.43
1,2-Dichlorobenzene	ND		5.2	1.8	ppb v/v			05/24/17 04:53	1.43
1,2-Dichloroethane	ND		5.2	1.2	ppb v/v			05/24/17 04:53	1.43
1,2-Dichloropropane	ND		5.2	1.4	ppb v/v			05/24/17 04:53	1.43
1,3,5-Trimethylbenzene	ND		5.2	1.7	ppb v/v			05/24/17 04:53	1.43
1,3-Dichlorobenzene	ND		5.2	1.7	ppb v/v			05/24/17 04:53	1.43
1,4-Dichlorobenzene	ND		5.2	1.7	ppb v/v			05/24/17 04:53	1.43
1,4-Dioxane	ND		130	2.1	ppb v/v			05/24/17 04:53	1.43
2-Butanone (MEK)	ND		26	5.2	ppb v/v			05/24/17 04:53	1.43
4-Methyl-2-pentanone (MIBK)	ND		13	5.1	ppb v/v			05/24/17 04:53	1.43
Acetone	ND		130	36	ppb v/v			05/24/17 04:53	1.43
Benzene	ND		5.2	1.5	ppb v/v			05/24/17 04:53	1.43
Benzyl chloride	ND		21	2.0	ppb v/v			05/24/17 04:53	1.43
Bromodichloromethane	ND		5.2	1.1	ppb v/v			05/24/17 04:53	1.43
Bromoform	ND		5.2	1.2	ppb v/v			05/24/17 04:53	1.43
Bromomethane	ND		5.2	0.83	ppb v/v			05/24/17 04:53	1.43
Carbon disulfide	**1.4**	**J**	13	0.81	ppb v/v			05/24/17 04:53	1.43
Carbon tetrachloride	ND		5.2	0.99	ppb v/v			05/24/17 04:53	1.43
Chlorobenzene	ND		5.2	1.3	ppb v/v			05/24/17 04:53	1.43
Chloroethane	ND		21	0.91	ppb v/v			05/24/17 04:53	1.43
Chloroform	ND		5.2	0.99	ppb v/v			05/24/17 04:53	1.43
Chloromethane	ND		13	4.2	ppb v/v			05/24/17 04:53	1.43
cis-1,2-Dichloroethene	ND		5.2	1.6	ppb v/v			05/24/17 04:53	1.43
cis-1,3-Dichloropropene	ND		5.2	1.9	ppb v/v			05/24/17 04:53	1.43
Cyclohexane	ND		13	1.0	ppb v/v			05/24/17 04:53	1.43
Dibromochloromethane	ND		5.2	1.1	ppb v/v			05/24/17 04:53	1.43
Dichlorodifluoromethane	ND		13	1.8	ppb v/v			05/24/17 04:53	1.43
Ethylbenzene	ND		5.2	1.8	ppb v/v			05/24/17 04:53	1.43
Hexachlorobutadiene	ND		5.2	2.0	ppb v/v			05/24/17 04:53	1.43
Hexane	**1.0**	**J**	21	0.83	ppb v/v			05/24/17 04:53	1.43
Isopropyl alcohol	**13**	**J**	130	2.4	ppb v/v			05/24/17 04:53	1.43
Isopropylbenzene	ND		21	1.6	ppb v/v			05/24/17 04:53	1.43
Methyl tert-butyl ether	ND		26	4.4	ppb v/v			05/24/17 04:53	1.43
Methylene Chloride	**7.4**	**J B**	13	3.4	ppb v/v			05/24/17 04:53	1.43
m-Xylene & p-Xylene	ND		21	3.1	ppb v/v			05/24/17 04:53	1.43
Naphthalene	ND		13	2.3	ppb v/v			05/24/17 04:53	1.43
o-Xylene	ND		5.2	1.6	ppb v/v			05/24/17 04:53	1.43
Styrene	ND		5.2	1.5	ppb v/v			05/24/17 04:53	1.43
Tetrachloroethene	**3.6**	**J**	5.2	1.0	ppb v/v			05/24/17 04:53	1.43

Client Sample ID: D-SS
Date Collected: 05/17/17 11:13
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-12
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		130	1.6	ppb v/v			05/24/17 04:53	1.43
Toluene	ND		5.2	3.1	ppb v/v			05/24/17 04:53	1.43
trans-1,2-Dichloroethene	ND		5.2	1.3	ppb v/v			05/24/17 04:53	1.43
trans-1,3-Dichloropropene	ND		5.2	1.2	ppb v/v			05/24/17 04:53	1.43
Trichloroethene	**990**		5.2	0.94	ppb v/v			05/24/17 04:53	1.43
Trichlorofluoromethane	ND		5.2	0.62	ppb v/v			05/24/17 04:53	1.43
Vinyl acetate	ND		130	3.6	ppb v/v			05/24/17 04:53	1.43
Vinyl bromide	ND		5.2	0.91	ppb v/v			05/24/17 04:53	1.43
Vinyl chloride	ND		5.2	1.8	ppb v/v			05/24/17 04:53	1.43

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		28	4.3	ug/m3			05/24/17 04:53	1.43
1,1,2,2-Tetrachloroethane	ND		36	11	ug/m3			05/24/17 04:53	1.43
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		40	6.2	ug/m3			05/24/17 04:53	1.43
1,1,2-Trichloroethane	ND		28	7.7	ug/m3			05/24/17 04:53	1.43
1,1-Dichloroethane	ND		21	2.7	ug/m3			05/24/17 04:53	1.43
1,1-Dichloroethene	ND		21	3.5	ug/m3			05/24/17 04:53	1.43
1,2,4-Trichlorobenzene	ND		390	19	ug/m3			05/24/17 04:53	1.43
1,2,4-Trimethylbenzene	ND		26	8.1	ug/m3			05/24/17 04:53	1.43
1,2-Dibromoethane (EDB)	ND		40	8.8	ug/m3			05/24/17 04:53	1.43
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		36	5.8	ug/m3			05/24/17 04:53	1.43
1,2-Dichlorobenzene	ND		31	11	ug/m3			05/24/17 04:53	1.43
1,2-Dichloroethane	ND		21	4.9	ug/m3			05/24/17 04:53	1.43
1,2-Dichloropropane	ND		24	6.2	ug/m3			05/24/17 04:53	1.43
1,3,5-Trimethylbenzene	ND		26	8.3	ug/m3			05/24/17 04:53	1.43
1,3-Dichlorobenzene	ND		31	10	ug/m3			05/24/17 04:53	1.43
1,4-Dichlorobenzene	ND		31	10	ug/m3			05/24/17 04:53	1.43
1,4-Dioxane	ND		470	7.5	ug/m3			05/24/17 04:53	1.43
2-Butanone (MEK)	ND		77	15	ug/m3			05/24/17 04:53	1.43
4-Methyl-2-pentanone (MIBK)	ND		53	21	ug/m3			05/24/17 04:53	1.43
Acetone	ND		310	86	ug/m3			05/24/17 04:53	1.43
Benzene	ND		17	4.7	ug/m3			05/24/17 04:53	1.43
Benzyl chloride	ND		110	10	ug/m3			05/24/17 04:53	1.43
Bromodichloromethane	ND		35	7.7	ug/m3			05/24/17 04:53	1.43
Bromoform	ND		54	13	ug/m3			05/24/17 04:53	1.43
Bromomethane	ND		20	3.2	ug/m3			05/24/17 04:53	1.43
Carbon disulfide	**4.3**	**J**	40	2.5	ug/m3			05/24/17 04:53	1.43
Carbon tetrachloride	ND		33	6.2	ug/m3			05/24/17 04:53	1.43
Chlorobenzene	ND		24	5.9	ug/m3			05/24/17 04:53	1.43
Chloroethane	ND		55	2.4	ug/m3			05/24/17 04:53	1.43
Chloroform	ND		25	4.8	ug/m3			05/24/17 04:53	1.43
Chloromethane	ND		27	8.6	ug/m3			05/24/17 04:53	1.43
cis-1,2-Dichloroethene	ND		21	6.2	ug/m3			05/24/17 04:53	1.43
cis-1,3-Dichloropropene	ND		24	8.7	ug/m3			05/24/17 04:53	1.43
Cyclohexane	ND		45	3.6	ug/m3			05/24/17 04:53	1.43
Dibromochloromethane	ND		44	9.3	ug/m3			05/24/17 04:53	1.43
Dichlorodifluoromethane	ND		64	8.7	ug/m3			05/24/17 04:53	1.43
Ethylbenzene	ND		23	7.7	ug/m3			05/24/17 04:53	1.43
Hexachlorobutadiene	ND		55	22	ug/m3			05/24/17 04:53	1.43

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: D-SS
Date Collected: 05/17/17 11:13
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-12
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**3.6**	**J**	73	2.9	ug/m3			05/24/17 04:53	1.43
Isopropyl alcohol	**31**	**J**	320	6.0	ug/m3			05/24/17 04:53	1.43
Isopropylbenzene	ND		100	7.7	ug/m3			05/24/17 04:53	1.43
Methyl tert-butyl ether	ND		94	16	ug/m3			05/24/17 04:53	1.43
Methylene Chloride	**26**	**J B**	45	12	ug/m3			05/24/17 04:53	1.43
m-Xylene & p-Xylene	ND		90	14	ug/m3			05/24/17 04:53	1.43
Naphthalene	ND		68	12	ug/m3			05/24/17 04:53	1.43
o-Xylene	ND		23	6.9	ug/m3			05/24/17 04:53	1.43
Styrene	ND		22	6.4	ug/m3			05/24/17 04:53	1.43
Tetrachloroethene	**24**	**J**	35	7.1	ug/m3			05/24/17 04:53	1.43
Tetrahydrofuran	ND		380	4.8	ug/m3			05/24/17 04:53	1.43
Toluene	ND		20	12	ug/m3			05/24/17 04:53	1.43
trans-1,2-Dichloroethene	ND		21	5.2	ug/m3			05/24/17 04:53	1.43
trans-1,3-Dichloropropene	ND		24	5.7	ug/m3			05/24/17 04:53	1.43
Trichloroethene	**5300**		28	5.0	ug/m3			05/24/17 04:53	1.43
Trichlorofluoromethane	ND		29	3.5	ug/m3			05/24/17 04:53	1.43
Vinyl acetate	ND		460	13	ug/m3			05/24/17 04:53	1.43
Vinyl bromide	ND		23	4.0	ug/m3			05/24/17 04:53	1.43
Vinyl chloride	ND		13	4.7	ug/m3			05/24/17 04:53	1.43

Client Sample ID: C-SS
Date Collected: 05/17/17 15:40
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-13
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 16:14	1.42
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 16:14	1.42
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.076**	**J**	0.20	0.031	ppb v/v			05/24/17 16:14	1.42
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 16:14	1.42
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 16:14	1.42
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 16:14	1.42
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 16:14	1.42
1,2,4-Trimethylbenzene	**0.20**		0.20	0.063	ppb v/v			05/24/17 16:14	1.42
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 16:14	1.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 16:14	1.42
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 16:14	1.42
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 16:14	1.42
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 16:14	1.42
1,3,5-Trimethylbenzene	**0.071**	**J**	0.20	0.065	ppb v/v			05/24/17 16:14	1.42
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 16:14	1.42
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 16:14	1.42
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 16:14	1.42
2-Butanone (MEK)	**0.45**	**J**	1.0	0.20	ppb v/v			05/24/17 16:14	1.42
4-Methyl-2-pentanone (MIBK)	**0.51**		0.50	0.20	ppb v/v			05/24/17 16:14	1.42
Acetone	**3.9**	**J**	5.0	1.4	ppb v/v			05/24/17 16:14	1.42
Benzene	**0.15**	**J**	0.20	0.056	ppb v/v			05/24/17 16:14	1.42
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 16:14	1.42
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 16:14	1.42
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 16:14	1.42
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 16:14	1.42
Carbon disulfide	**0.18**	**J**	0.50	0.031	ppb v/v			05/24/17 16:14	1.42
Carbon tetrachloride	**0.057**	**J**	0.20	0.038	ppb v/v			05/24/17 16:14	1.42
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 16:14	1.42
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 16:14	1.42
Chloroform	**0.28**		0.20	0.038	ppb v/v			05/24/17 16:14	1.42
Chloromethane	**0.32**	**J**	0.50	0.16	ppb v/v			05/24/17 16:14	1.42
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 16:14	1.42
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 16:14	1.42
Cyclohexane	**0.24**	**J**	0.50	0.040	ppb v/v			05/24/17 16:14	1.42
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 16:14	1.42
Dichlorodifluoromethane	**0.58**		0.50	0.068	ppb v/v			05/24/17 16:14	1.42
Ethylbenzene	**0.22**		0.20	0.068	ppb v/v			05/24/17 16:14	1.42
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 16:14	1.42
Hexane	**0.29**	**J**	0.80	0.032	ppb v/v			05/24/17 16:14	1.42
Isopropyl alcohol	ND		5.0	0.094	ppb v/v			05/24/17 16:14	1.42
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 16:14	1.42
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 16:14	1.42
Methylene Chloride	**0.40**	**J B**	0.50	0.13	ppb v/v			05/24/17 16:14	1.42
m-Xylene & p-Xylene	**0.63**	**J**	0.80	0.12	ppb v/v			05/24/17 16:14	1.42
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 16:14	1.42
o-Xylene	**0.25**		0.20	0.061	ppb v/v			05/24/17 16:14	1.42
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 16:14	1.42

Client Sample ID: C-SS
Date Collected: 05/17/17 15:40
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-13
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	**0.26**		0.20	0.040	ppb v/v			05/24/17 16:14	1.42
Tetrahydrofuran	**0.39**	**J**	5.0	0.063	ppb v/v			05/24/17 16:14	1.42
Toluene	**0.65**		0.20	0.12	ppb v/v			05/24/17 16:14	1.42
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 16:14	1.42
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 16:14	1.42
Trichloroethene	**0.13**	**J**	0.20	0.036	ppb v/v			05/24/17 16:14	1.42
Trichlorofluoromethane	**0.30**		0.20	0.024	ppb v/v			05/24/17 16:14	1.42
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 16:14	1.42
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 16:14	1.42
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 16:14	1.42

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 16:14	1.42
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 16:14	1.42
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.58**	**J**	1.5	0.24	ug/m3			05/24/17 16:14	1.42
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 16:14	1.42
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 16:14	1.42
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 16:14	1.42
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 16:14	1.42
1,2,4-Trimethylbenzene	**0.97**		0.98	0.31	ug/m3			05/24/17 16:14	1.42
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 16:14	1.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 16:14	1.42
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 16:14	1.42
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 16:14	1.42
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 16:14	1.42
1,3,5-Trimethylbenzene	**0.35**	**J**	0.98	0.32	ug/m3			05/24/17 16:14	1.42
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 16:14	1.42
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 16:14	1.42
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 16:14	1.42
2-Butanone (MEK)	**1.3**	**J**	2.9	0.59	ug/m3			05/24/17 16:14	1.42
4-Methyl-2-pentanone (MIBK)	**2.1**		2.0	0.80	ug/m3			05/24/17 16:14	1.42
Acetone	**9.2**	**J**	12	3.3	ug/m3			05/24/17 16:14	1.42
Benzene	**0.49**	**J**	0.64	0.18	ug/m3			05/24/17 16:14	1.42
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 16:14	1.42
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 16:14	1.42
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 16:14	1.42
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 16:14	1.42
Carbon disulfide	**0.55**	**J**	1.6	0.097	ug/m3			05/24/17 16:14	1.42
Carbon tetrachloride	**0.36**	**J**	1.3	0.24	ug/m3			05/24/17 16:14	1.42
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 16:14	1.42
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 16:14	1.42
Chloroform	**1.4**		0.98	0.19	ug/m3			05/24/17 16:14	1.42
Chloromethane	**0.67**	**J**	1.0	0.33	ug/m3			05/24/17 16:14	1.42
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 16:14	1.42
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 16:14	1.42
Cyclohexane	**0.81**	**J**	1.7	0.14	ug/m3			05/24/17 16:14	1.42
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 16:14	1.42
Dichlorodifluoromethane	**2.9**		2.5	0.34	ug/m3			05/24/17 16:14	1.42

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: C-SS
Date Collected: 05/17/17 15:40
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-13
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.94**		0.87	0.30	ug/m3			05/24/17 16:14	1.42
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 16:14	1.42
Hexane	**1.0**	**J**	2.8	0.11	ug/m3			05/24/17 16:14	1.42
Isopropyl alcohol	ND		12	0.23	ug/m3			05/24/17 16:14	1.42
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 16:14	1.42
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 16:14	1.42
Methylene Chloride	**1.4**	**J B**	1.7	0.45	ug/m3			05/24/17 16:14	1.42
m-Xylene & p-Xylene	**2.7**	**J**	3.5	0.52	ug/m3			05/24/17 16:14	1.42
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 16:14	1.42
o-Xylene	**1.1**		0.87	0.26	ug/m3			05/24/17 16:14	1.42
Styrene	ND		0.85	0.25	ug/m3			05/24/17 16:14	1.42
Tetrachloroethene	**1.7**		1.4	0.27	ug/m3			05/24/17 16:14	1.42
Tetrahydrofuran	**1.2**	**J**	15	0.19	ug/m3			05/24/17 16:14	1.42
Toluene	**2.5**		0.75	0.45	ug/m3			05/24/17 16:14	1.42
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 16:14	1.42
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 16:14	1.42
Trichloroethene	**0.71**	**J**	1.1	0.19	ug/m3			05/24/17 16:14	1.42
Trichlorofluoromethane	**1.7**		1.1	0.13	ug/m3			05/24/17 16:14	1.42
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 16:14	1.42
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 16:14	1.42
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 16:14	1.42

Client Sample ID: D-I
Date Collected: 05/17/17 11:12
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-14
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 17:00	1.35
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 17:00	1.35
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.067**	**J**	0.20	0.031	ppb v/v			05/24/17 17:00	1.35
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 17:00	1.35
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 17:00	1.35
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 17:00	1.35
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 17:00	1.35
1,2,4-Trimethylbenzene	**0.16**	**J**	0.20	0.063	ppb v/v			05/24/17 17:00	1.35
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 17:00	1.35
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 17:00	1.35
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 17:00	1.35
1,2-Dichloroethane	**0.048**	**J**	0.20	0.047	ppb v/v			05/24/17 17:00	1.35
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 17:00	1.35
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 17:00	1.35
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 17:00	1.35
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 17:00	1.35
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 17:00	1.35
2-Butanone (MEK)	**1.7**		1.0	0.20	ppb v/v			05/24/17 17:00	1.35
4-Methyl-2-pentanone (MIBK)	**0.22**	**J**	0.50	0.20	ppb v/v			05/24/17 17:00	1.35
Acetone	**19**		5.0	1.4	ppb v/v			05/24/17 17:00	1.35
Benzene	**0.10**	**J**	0.20	0.056	ppb v/v			05/24/17 17:00	1.35
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 17:00	1.35
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 17:00	1.35
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 17:00	1.35
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 17:00	1.35
Carbon disulfide	**0.092**	**J**	0.50	0.031	ppb v/v			05/24/17 17:00	1.35
Carbon tetrachloride	**0.077**	**J**	0.20	0.038	ppb v/v			05/24/17 17:00	1.35
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 17:00	1.35
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 17:00	1.35
Chloroform	**0.099**	**J**	0.20	0.038	ppb v/v			05/24/17 17:00	1.35
Chloromethane	**0.64**		0.50	0.16	ppb v/v			05/24/17 17:00	1.35
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 17:00	1.35
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 17:00	1.35
Cyclohexane	**0.077**	**J**	0.50	0.040	ppb v/v			05/24/17 17:00	1.35
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 17:00	1.35
Dichlorodifluoromethane	**0.47**	**J**	0.50	0.068	ppb v/v			05/24/17 17:00	1.35
Ethylbenzene	**0.12**	**J**	0.20	0.068	ppb v/v			05/24/17 17:00	1.35
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 17:00	1.35
Hexane	**0.16**	**J**	0.80	0.032	ppb v/v			05/24/17 17:00	1.35
Isopropyl alcohol	**17**		5.0	0.094	ppb v/v			05/24/17 17:00	1.35
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 17:00	1.35
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 17:00	1.35
Methylene Chloride	**0.52**	**B**	0.50	0.13	ppb v/v			05/24/17 17:00	1.35
m-Xylene & p-Xylene	**0.25**	**J**	0.80	0.12	ppb v/v			05/24/17 17:00	1.35
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 17:00	1.35
o-Xylene	**0.089**	**J**	0.20	0.061	ppb v/v			05/24/17 17:00	1.35
Styrene	**0.21**		0.20	0.058	ppb v/v			05/24/17 17:00	1.35

Client Sample ID: D-I
Date Collected: 05/17/17 11:12
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-14
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 17:00	1.35
Tetrahydrofuran	**1.1**	**J**	5.0	0.063	ppb v/v			05/24/17 17:00	1.35
Toluene	**0.75**		0.20	0.12	ppb v/v			05/24/17 17:00	1.35
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 17:00	1.35
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 17:00	1.35
Trichloroethene	**1.7**		0.20	0.036	ppb v/v			05/24/17 17:00	1.35
Trichlorofluoromethane	**0.23**		0.20	0.024	ppb v/v			05/24/17 17:00	1.35
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 17:00	1.35
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 17:00	1.35
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 17:00	1.35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 17:00	1.35
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 17:00	1.35
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.52**	**J**	1.5	0.24	ug/m3			05/24/17 17:00	1.35
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 17:00	1.35
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 17:00	1.35
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 17:00	1.35
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 17:00	1.35
1,2,4-Trimethylbenzene	**0.80**	**J**	0.98	0.31	ug/m3			05/24/17 17:00	1.35
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 17:00	1.35
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 17:00	1.35
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 17:00	1.35
1,2-Dichloroethane	**0.19**	**J**	0.81	0.19	ug/m3			05/24/17 17:00	1.35
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 17:00	1.35
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 17:00	1.35
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 17:00	1.35
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 17:00	1.35
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 17:00	1.35
2-Butanone (MEK)	**5.0**		2.9	0.59	ug/m3			05/24/17 17:00	1.35
4-Methyl-2-pentanone (MIBK)	**0.89**	**J**	2.0	0.80	ug/m3			05/24/17 17:00	1.35
Acetone	**45**		12	3.3	ug/m3			05/24/17 17:00	1.35
Benzene	**0.32**	**J**	0.64	0.18	ug/m3			05/24/17 17:00	1.35
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 17:00	1.35
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 17:00	1.35
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 17:00	1.35
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 17:00	1.35
Carbon disulfide	**0.29**	**J**	1.6	0.097	ug/m3			05/24/17 17:00	1.35
Carbon tetrachloride	**0.48**	**J**	1.3	0.24	ug/m3			05/24/17 17:00	1.35
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 17:00	1.35
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 17:00	1.35
Chloroform	**0.49**	**J**	0.98	0.19	ug/m3			05/24/17 17:00	1.35
Chloromethane	**1.3**		1.0	0.33	ug/m3			05/24/17 17:00	1.35
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 17:00	1.35
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 17:00	1.35
Cyclohexane	**0.27**	**J**	1.7	0.14	ug/m3			05/24/17 17:00	1.35
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 17:00	1.35
Dichlorodifluoromethane	**2.3**	**J**	2.5	0.34	ug/m3			05/24/17 17:00	1.35

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: D-I
Date Collected: 05/17/17 11:12
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-14
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.50**	**J**	0.87	0.30	ug/m3			05/24/17 17:00	1.35
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 17:00	1.35
Hexane	**0.55**	**J**	2.8	0.11	ug/m3			05/24/17 17:00	1.35
Isopropyl alcohol	**41**		12	0.23	ug/m3			05/24/17 17:00	1.35
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 17:00	1.35
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 17:00	1.35
Methylene Chloride	**1.8**	**B**	1.7	0.45	ug/m3			05/24/17 17:00	1.35
m-Xylene & p-Xylene	**1.1**	**J**	3.5	0.52	ug/m3			05/24/17 17:00	1.35
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 17:00	1.35
o-Xylene	**0.39**	**J**	0.87	0.26	ug/m3			05/24/17 17:00	1.35
Styrene	**0.88**		0.85	0.25	ug/m3			05/24/17 17:00	1.35
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 17:00	1.35
Tetrahydrofuran	**3.4**	**J**	15	0.19	ug/m3			05/24/17 17:00	1.35
Toluene	**2.8**		0.75	0.45	ug/m3			05/24/17 17:00	1.35
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 17:00	1.35
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 17:00	1.35
Trichloroethene	**9.2**		1.1	0.19	ug/m3			05/24/17 17:00	1.35
Trichlorofluoromethane	**1.3**		1.1	0.13	ug/m3			05/24/17 17:00	1.35
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 17:00	1.35
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 17:00	1.35
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 17:00	1.35

Client Sample ID: C-B
Date Collected: 05/17/17 14:40
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-15
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 17:44	1.59
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 17:44	1.59
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.071**	**J**	0.20	0.031	ppb v/v			05/24/17 17:44	1.59
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 17:44	1.59
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 17:44	1.59
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 17:44	1.59
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 17:44	1.59
1,2,4-Trimethylbenzene	**0.071**	**J**	0.20	0.063	ppb v/v			05/24/17 17:44	1.59
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 17:44	1.59
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 17:44	1.59
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 17:44	1.59
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 17:44	1.59
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 17:44	1.59
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 17:44	1.59
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 17:44	1.59
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 17:44	1.59
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 17:44	1.59
2-Butanone (MEK)	**1.6**		1.0	0.20	ppb v/v			05/24/17 17:44	1.59
4-Methyl-2-pentanone (MIBK)	**0.26**	**J**	0.50	0.20	ppb v/v			05/24/17 17:44	1.59
Acetone	**16**		5.0	1.4	ppb v/v			05/24/17 17:44	1.59
Benzene	**0.46**		0.20	0.056	ppb v/v			05/24/17 17:44	1.59
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 17:44	1.59
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 17:44	1.59
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 17:44	1.59
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 17:44	1.59
Carbon disulfide	**0.061**	**J**	0.50	0.031	ppb v/v			05/24/17 17:44	1.59
Carbon tetrachloride	**0.072**	**J**	0.20	0.038	ppb v/v			05/24/17 17:44	1.59
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 17:44	1.59
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 17:44	1.59
Chloroform	**0.090**	**J**	0.20	0.038	ppb v/v			05/24/17 17:44	1.59
Chloromethane	**0.70**		0.50	0.16	ppb v/v			05/24/17 17:44	1.59
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 17:44	1.59
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 17:44	1.59
Cyclohexane	**1.1**		0.50	0.040	ppb v/v			05/24/17 17:44	1.59
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 17:44	1.59
Dichlorodifluoromethane	**0.56**		0.50	0.068	ppb v/v			05/24/17 17:44	1.59
Ethylbenzene	**0.17**	**J**	0.20	0.068	ppb v/v			05/24/17 17:44	1.59
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 17:44	1.59
Hexane	**1.9**		0.80	0.032	ppb v/v			05/24/17 17:44	1.59
Isopropyl alcohol	**1.5**	**J**	5.0	0.094	ppb v/v			05/24/17 17:44	1.59
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 17:44	1.59
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 17:44	1.59
Methylene Chloride	**0.57**	**B**	0.50	0.13	ppb v/v			05/24/17 17:44	1.59
m-Xylene & p-Xylene	**0.58**	**J**	0.80	0.12	ppb v/v			05/24/17 17:44	1.59
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 17:44	1.59
o-Xylene	**0.15**	**J**	0.20	0.061	ppb v/v			05/24/17 17:44	1.59
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 17:44	1.59

Client Sample ID: C-B

Lab Sample ID: 140-8162-15

Date Collected: 05/17/17 14:40
Matrix: Air
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 17:44	1.59
Tetrahydrofuran	**1.4**	**J**	5.0	0.063	ppb v/v			05/24/17 17:44	1.59
Toluene	**4.2**		0.20	0.12	ppb v/v			05/24/17 17:44	1.59
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 17:44	1.59
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 17:44	1.59
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 17:44	1.59
Trichlorofluoromethane	**0.29**		0.20	0.024	ppb v/v			05/24/17 17:44	1.59
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 17:44	1.59
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 17:44	1.59
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 17:44	1.59

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 17:44	1.59
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 17:44	1.59
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.54**	**J**	1.5	0.24	ug/m3			05/24/17 17:44	1.59
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 17:44	1.59
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 17:44	1.59
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 17:44	1.59
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 17:44	1.59
1,2,4-Trimethylbenzene	**0.35**	**J**	0.98	0.31	ug/m3			05/24/17 17:44	1.59
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 17:44	1.59
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 17:44	1.59
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 17:44	1.59
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 17:44	1.59
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 17:44	1.59
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 17:44	1.59
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 17:44	1.59
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 17:44	1.59
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 17:44	1.59
2-Butanone (MEK)	**4.7**		2.9	0.59	ug/m3			05/24/17 17:44	1.59
4-Methyl-2-pentanone (MIBK)	**1.1**	**J**	2.0	0.80	ug/m3			05/24/17 17:44	1.59
Acetone	**38**		12	3.3	ug/m3			05/24/17 17:44	1.59
Benzene	**1.5**		0.64	0.18	ug/m3			05/24/17 17:44	1.59
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 17:44	1.59
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 17:44	1.59
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 17:44	1.59
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 17:44	1.59
Carbon disulfide	**0.19**	**J**	1.6	0.097	ug/m3			05/24/17 17:44	1.59
Carbon tetrachloride	**0.45**	**J**	1.3	0.24	ug/m3			05/24/17 17:44	1.59
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 17:44	1.59
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 17:44	1.59
Chloroform	**0.44**	**J**	0.98	0.19	ug/m3			05/24/17 17:44	1.59
Chloromethane	**1.4**		1.0	0.33	ug/m3			05/24/17 17:44	1.59
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 17:44	1.59
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 17:44	1.59
Cyclohexane	**3.7**		1.7	0.14	ug/m3			05/24/17 17:44	1.59
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 17:44	1.59
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/24/17 17:44	1.59

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: C-B
Date Collected: 05/17/17 14:40
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-15
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.72**	**J**	0.87	0.30	ug/m3			05/24/17 17:44	1.59
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 17:44	1.59
Hexane	**6.8**		2.8	0.11	ug/m3			05/24/17 17:44	1.59
Isopropyl alcohol	**3.6**	**J**	12	0.23	ug/m3			05/24/17 17:44	1.59
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 17:44	1.59
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 17:44	1.59
Methylene Chloride	**2.0**	**B**	1.7	0.45	ug/m3			05/24/17 17:44	1.59
m-Xylene & p-Xylene	**2.5**	**J**	3.5	0.52	ug/m3			05/24/17 17:44	1.59
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 17:44	1.59
o-Xylene	**0.67**	**J**	0.87	0.26	ug/m3			05/24/17 17:44	1.59
Styrene	ND		0.85	0.25	ug/m3			05/24/17 17:44	1.59
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 17:44	1.59
Tetrahydrofuran	**4.0**	**J**	15	0.19	ug/m3			05/24/17 17:44	1.59
Toluene	**16**		0.75	0.45	ug/m3			05/24/17 17:44	1.59
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 17:44	1.59
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 17:44	1.59
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 17:44	1.59
Trichlorofluoromethane	**1.6**		1.1	0.13	ug/m3			05/24/17 17:44	1.59
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 17:44	1.59
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 17:44	1.59
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 17:44	1.59

Client Sample ID: C-I
Date Collected: 05/17/17 15:42
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-16
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 18:28	1.42
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 18:28	1.42
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.066**	**J**	0.20	0.031	ppb v/v			05/24/17 18:28	1.42
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 18:28	1.42
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 18:28	1.42
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 18:28	1.42
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 18:28	1.42
1,2,4-Trimethylbenzene	**0.064**	**J**	0.20	0.063	ppb v/v			05/24/17 18:28	1.42
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 18:28	1.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 18:28	1.42
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 18:28	1.42
1,2-Dichloroethane	**0.096**	**J**	0.20	0.047	ppb v/v			05/24/17 18:28	1.42
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 18:28	1.42
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 18:28	1.42
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 18:28	1.42
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 18:28	1.42
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 18:28	1.42
2-Butanone (MEK)	**3.1**		1.0	0.20	ppb v/v			05/24/17 18:28	1.42
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 18:28	1.42
Acetone	**40**		5.0	1.4	ppb v/v			05/24/17 18:28	1.42
Benzene	**0.31**		0.20	0.056	ppb v/v			05/24/17 18:28	1.42
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 18:28	1.42
Bromodichloromethane	**0.080**	**J**	0.20	0.044	ppb v/v			05/24/17 18:28	1.42
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 18:28	1.42
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 18:28	1.42
Carbon disulfide	**0.12**	**J**	0.50	0.031	ppb v/v			05/24/17 18:28	1.42
Carbon tetrachloride	**0.090**	**J**	0.20	0.038	ppb v/v			05/24/17 18:28	1.42
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 18:28	1.42
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 18:28	1.42
Chloroform	**0.50**		0.20	0.038	ppb v/v			05/24/17 18:28	1.42
Chloromethane	**0.75**		0.50	0.16	ppb v/v			05/24/17 18:28	1.42
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 18:28	1.42
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 18:28	1.42
Cyclohexane	**0.57**		0.50	0.040	ppb v/v			05/24/17 18:28	1.42
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 18:28	1.42
Dichlorodifluoromethane	**0.55**		0.50	0.068	ppb v/v			05/24/17 18:28	1.42
Ethylbenzene	**0.16**	**J**	0.20	0.068	ppb v/v			05/24/17 18:28	1.42
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 18:28	1.42
Hexane	**0.98**		0.80	0.032	ppb v/v			05/24/17 18:28	1.42
Isopropyl alcohol	ND		5.0	0.094	ppb v/v			05/24/17 18:28	1.42
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 18:28	1.42
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 18:28	1.42
Methylene Chloride	**0.47**	**J B**	0.50	0.13	ppb v/v			05/24/17 18:28	1.42
m-Xylene & p-Xylene	**0.44**	**J**	0.80	0.12	ppb v/v			05/24/17 18:28	1.42
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 18:28	1.42
o-Xylene	**0.14**	**J**	0.20	0.061	ppb v/v			05/24/17 18:28	1.42
Styrene	**0.23**		0.20	0.058	ppb v/v			05/24/17 18:28	1.42

Client Sample ID: C-I

Lab Sample ID: 140-8162-16

Date Collected: 05/17/17 15:42
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 18:28	1.42
Tetrahydrofuran	**4.6**	**J**	5.0	0.063	ppb v/v			05/24/17 18:28	1.42
Toluene	**4.0**		0.20	0.12	ppb v/v			05/24/17 18:28	1.42
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 18:28	1.42
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 18:28	1.42
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 18:28	1.42
Trichlorofluoromethane	**0.27**		0.20	0.024	ppb v/v			05/24/17 18:28	1.42
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 18:28	1.42
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 18:28	1.42
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 18:28	1.42

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 18:28	1.42
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 18:28	1.42
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.51**	**J**	1.5	0.24	ug/m3			05/24/17 18:28	1.42
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 18:28	1.42
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 18:28	1.42
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 18:28	1.42
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 18:28	1.42
1,2,4-Trimethylbenzene	**0.31**	**J**	0.98	0.31	ug/m3			05/24/17 18:28	1.42
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 18:28	1.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 18:28	1.42
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 18:28	1.42
1,2-Dichloroethane	**0.39**	**J**	0.81	0.19	ug/m3			05/24/17 18:28	1.42
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 18:28	1.42
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 18:28	1.42
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 18:28	1.42
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 18:28	1.42
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 18:28	1.42
2-Butanone (MEK)	**9.0**		2.9	0.59	ug/m3			05/24/17 18:28	1.42
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 18:28	1.42
Acetone	**96**		12	3.3	ug/m3			05/24/17 18:28	1.42
Benzene	**0.98**		0.64	0.18	ug/m3			05/24/17 18:28	1.42
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 18:28	1.42
Bromodichloromethane	**0.54**	**J**	1.3	0.29	ug/m3			05/24/17 18:28	1.42
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 18:28	1.42
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 18:28	1.42
Carbon disulfide	**0.36**	**J**	1.6	0.097	ug/m3			05/24/17 18:28	1.42
Carbon tetrachloride	**0.57**	**J**	1.3	0.24	ug/m3			05/24/17 18:28	1.42
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 18:28	1.42
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 18:28	1.42
Chloroform	**2.5**		0.98	0.19	ug/m3			05/24/17 18:28	1.42
Chloromethane	**1.6**		1.0	0.33	ug/m3			05/24/17 18:28	1.42
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 18:28	1.42
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 18:28	1.42
Cyclohexane	**2.0**		1.7	0.14	ug/m3			05/24/17 18:28	1.42
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 18:28	1.42
Dichlorodifluoromethane	**2.7**		2.5	0.34	ug/m3			05/24/17 18:28	1.42

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: C-I
Date Collected: 05/17/17 15:42
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 6L

Lab Sample ID: 140-8162-16
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.67**	**J**	0.87	0.30	ug/m3			05/24/17 18:28	1.42
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 18:28	1.42
Hexane	**3.5**		2.8	0.11	ug/m3			05/24/17 18:28	1.42
Isopropyl alcohol	ND		12	0.23	ug/m3			05/24/17 18:28	1.42
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 18:28	1.42
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 18:28	1.42
Methylene Chloride	**1.6**	**J B**	1.7	0.45	ug/m3			05/24/17 18:28	1.42
m-Xylene & p-Xylene	**1.9**	**J**	3.5	0.52	ug/m3			05/24/17 18:28	1.42
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 18:28	1.42
o-Xylene	**0.60**	**J**	0.87	0.26	ug/m3			05/24/17 18:28	1.42
Styrene	**0.97**		0.85	0.25	ug/m3			05/24/17 18:28	1.42
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 18:28	1.42
Tetrahydrofuran	**14**	**J**	15	0.19	ug/m3			05/24/17 18:28	1.42
Toluene	**15**		0.75	0.45	ug/m3			05/24/17 18:28	1.42
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 18:28	1.42
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 18:28	1.42
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 18:28	1.42
Trichlorofluoromethane	**1.5**		1.1	0.13	ug/m3			05/24/17 18:28	1.42
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 18:28	1.42
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 18:28	1.42
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 18:28	1.42

Client Sample ID: 1801-CENTRAL-03
Date Collected: 05/17/17 10:39
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-17
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		2.0	0.30	ppb v/v			05/24/17 19:12	1.77
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 19:12	1.77
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 19:12	1.77
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 19:12	1.77
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 19:12	1.77
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 19:12	1.77
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 19:12	1.77
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/24/17 19:12	1.77
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 19:12	1.77
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 19:12	1.77
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 19:12	1.77
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 19:12	1.77
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 19:12	1.77
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 19:12	1.77
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 19:12	1.77
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 19:12	1.77
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 19:12	1.77
2-Butanone (MEK)	**2.3**	**J**	10	2.0	ppb v/v			05/24/17 19:12	1.77
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 19:12	1.77
Acetone	**29**	**J**	50	14	ppb v/v			05/24/17 19:12	1.77
Benzene	ND		2.0	0.56	ppb v/v			05/24/17 19:12	1.77
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 19:12	1.77
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 19:12	1.77
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 19:12	1.77
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 19:12	1.77
Carbon disulfide	ND		5.0	0.31	ppb v/v			05/24/17 19:12	1.77
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 19:12	1.77
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 19:12	1.77
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 19:12	1.77
Chloroform	**0.95**	**J**	2.0	0.38	ppb v/v			05/24/17 19:12	1.77
Chloromethane	ND		5.0	1.6	ppb v/v			05/24/17 19:12	1.77
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 19:12	1.77
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 19:12	1.77
Cyclohexane	**0.45**	**J**	5.0	0.40	ppb v/v			05/24/17 19:12	1.77
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 19:12	1.77
Dichlorodifluoromethane	**0.70**	**J**	5.0	0.68	ppb v/v			05/24/17 19:12	1.77
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/24/17 19:12	1.77
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 19:12	1.77
Hexane	ND		8.0	0.32	ppb v/v			05/24/17 19:12	1.77
Isopropyl alcohol	**5.2**	**J**	50	0.94	ppb v/v			05/24/17 19:12	1.77
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 19:12	1.77
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 19:12	1.77
Methylene Chloride	**2.7**	**J B**	5.0	1.3	ppb v/v			05/24/17 19:12	1.77
m-Xylene & p-Xylene	ND		8.0	1.2	ppb v/v			05/24/17 19:12	1.77
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 19:12	1.77
o-Xylene	ND		2.0	0.61	ppb v/v			05/24/17 19:12	1.77
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 19:12	1.77
Tetrachloroethene	**0.68**	**J**	2.0	0.40	ppb v/v			05/24/17 19:12	1.77

Client Sample ID: 1801-CENTRAL-03
Date Collected: 05/17/17 10:39
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-17
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 19:12	1.77
Toluene	ND		2.0	1.2	ppb v/v			05/24/17 19:12	1.77
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 19:12	1.77
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 19:12	1.77
Trichloroethene	ND		2.0	0.36	ppb v/v			05/24/17 19:12	1.77
Trichlorofluoromethane	**0.33**	**J**	2.0	0.24	ppb v/v			05/24/17 19:12	1.77
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 19:12	1.77
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 19:12	1.77
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 19:12	1.77

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		11	1.6	ug/m3			05/24/17 19:12	1.77
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 19:12	1.77
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 19:12	1.77
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 19:12	1.77
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 19:12	1.77
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 19:12	1.77
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 19:12	1.77
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/24/17 19:12	1.77
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 19:12	1.77
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 19:12	1.77
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 19:12	1.77
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 19:12	1.77
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 19:12	1.77
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 19:12	1.77
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 19:12	1.77
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 19:12	1.77
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 19:12	1.77
2-Butanone (MEK)	**6.8**	**J**	29	5.9	ug/m3			05/24/17 19:12	1.77
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 19:12	1.77
Acetone	**70**	**J**	120	33	ug/m3			05/24/17 19:12	1.77
Benzene	ND		6.4	1.8	ug/m3			05/24/17 19:12	1.77
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 19:12	1.77
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 19:12	1.77
Bromoform	ND		21	5.0	ug/m3			05/24/17 19:12	1.77
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 19:12	1.77
Carbon disulfide	ND		16	0.97	ug/m3			05/24/17 19:12	1.77
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 19:12	1.77
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 19:12	1.77
Chloroethane	ND		21	0.92	ug/m3			05/24/17 19:12	1.77
Chloroform	**4.6**	**J**	9.8	1.9	ug/m3			05/24/17 19:12	1.77
Chloromethane	ND		10	3.3	ug/m3			05/24/17 19:12	1.77
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 19:12	1.77
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 19:12	1.77
Cyclohexane	**1.5**	**J**	17	1.4	ug/m3			05/24/17 19:12	1.77
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 19:12	1.77
Dichlorodifluoromethane	**3.4**	**J**	25	3.4	ug/m3			05/24/17 19:12	1.77
Ethylbenzene	ND		8.7	3.0	ug/m3			05/24/17 19:12	1.77
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 19:12	1.77

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1801-CENTRAL-03
Date Collected: 05/17/17 10:39
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-17
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		28	1.1	ug/m3			05/24/17 19:12	1.77
Isopropyl alcohol	**13**	**J**	120	2.3	ug/m3			05/24/17 19:12	1.77
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 19:12	1.77
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 19:12	1.77
Methylene Chloride	**9.5**	**J B**	17	4.5	ug/m3			05/24/17 19:12	1.77
m-Xylene & p-Xylene	ND		35	5.2	ug/m3			05/24/17 19:12	1.77
Naphthalene	ND		26	4.7	ug/m3			05/24/17 19:12	1.77
o-Xylene	ND		8.7	2.6	ug/m3			05/24/17 19:12	1.77
Styrene	ND		8.5	2.5	ug/m3			05/24/17 19:12	1.77
Tetrachloroethene	**4.6**	**J**	14	2.7	ug/m3			05/24/17 19:12	1.77
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 19:12	1.77
Toluene	ND		7.5	4.5	ug/m3			05/24/17 19:12	1.77
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 19:12	1.77
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 19:12	1.77
Trichloroethene	ND		11	1.9	ug/m3			05/24/17 19:12	1.77
Trichlorofluoromethane	**1.9**	**J**	11	1.3	ug/m3			05/24/17 19:12	1.77
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 19:12	1.77
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 19:12	1.77
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 19:12	1.77

Client Sample ID: 205 14TH-01
Date Collected: 05/17/17 12:04
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-18
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		2.0	0.30	ppb v/v			05/24/17 19:54	1.63
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 19:54	1.63
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 19:54	1.63
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 19:54	1.63
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 19:54	1.63
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 19:54	1.63
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 19:54	1.63
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/24/17 19:54	1.63
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 19:54	1.63
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 19:54	1.63
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 19:54	1.63
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 19:54	1.63
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 19:54	1.63
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 19:54	1.63
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 19:54	1.63
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 19:54	1.63
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 19:54	1.63
2-Butanone (MEK)	**3.1**	**J**	10	2.0	ppb v/v			05/24/17 19:54	1.63
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 19:54	1.63
Acetone	**42**	**J**	50	14	ppb v/v			05/24/17 19:54	1.63
Benzene	ND		2.0	0.56	ppb v/v			05/24/17 19:54	1.63
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 19:54	1.63
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 19:54	1.63
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 19:54	1.63
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 19:54	1.63
Carbon disulfide	**0.38**	**J**	5.0	0.31	ppb v/v			05/24/17 19:54	1.63
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 19:54	1.63
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 19:54	1.63
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 19:54	1.63
Chloroform	**1.3**	**J**	2.0	0.38	ppb v/v			05/24/17 19:54	1.63
Chloromethane	ND		5.0	1.6	ppb v/v			05/24/17 19:54	1.63
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 19:54	1.63
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 19:54	1.63
Cyclohexane	ND		5.0	0.40	ppb v/v			05/24/17 19:54	1.63
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 19:54	1.63
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/24/17 19:54	1.63
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/24/17 19:54	1.63
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 19:54	1.63
Hexane	ND		8.0	0.32	ppb v/v			05/24/17 19:54	1.63
Isopropyl alcohol	ND		50	0.94	ppb v/v			05/24/17 19:54	1.63
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 19:54	1.63
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 19:54	1.63
Methylene Chloride	**2.9**	**J B**	5.0	1.3	ppb v/v			05/24/17 19:54	1.63
m-Xylene & p-Xylene	ND		8.0	1.2	ppb v/v			05/24/17 19:54	1.63
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 19:54	1.63
o-Xylene	ND		2.0	0.61	ppb v/v			05/24/17 19:54	1.63
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 19:54	1.63
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/24/17 19:54	1.63

Client Sample ID: 205 14TH-01
Date Collected: 05/17/17 12:04
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-18
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 19:54	1.63
Toluene	ND		2.0	1.2	ppb v/v			05/24/17 19:54	1.63
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 19:54	1.63
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 19:54	1.63
Trichloroethene	ND		2.0	0.36	ppb v/v			05/24/17 19:54	1.63
Trichlorofluoromethane	**0.33**	**J**	2.0	0.24	ppb v/v			05/24/17 19:54	1.63
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 19:54	1.63
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 19:54	1.63
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 19:54	1.63

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		11	1.6	ug/m3			05/24/17 19:54	1.63
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 19:54	1.63
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 19:54	1.63
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 19:54	1.63
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 19:54	1.63
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 19:54	1.63
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 19:54	1.63
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/24/17 19:54	1.63
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 19:54	1.63
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 19:54	1.63
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 19:54	1.63
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 19:54	1.63
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 19:54	1.63
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 19:54	1.63
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 19:54	1.63
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 19:54	1.63
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 19:54	1.63
2-Butanone (MEK)	**9.1**	**J**	29	5.9	ug/m3			05/24/17 19:54	1.63
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 19:54	1.63
Acetone	**99**	**J**	120	33	ug/m3			05/24/17 19:54	1.63
Benzene	ND		6.4	1.8	ug/m3			05/24/17 19:54	1.63
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 19:54	1.63
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 19:54	1.63
Bromoform	ND		21	5.0	ug/m3			05/24/17 19:54	1.63
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 19:54	1.63
Carbon disulfide	**1.2**	**J**	16	0.97	ug/m3			05/24/17 19:54	1.63
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 19:54	1.63
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 19:54	1.63
Chloroethane	ND		21	0.92	ug/m3			05/24/17 19:54	1.63
Chloroform	**6.4**	**J**	9.8	1.9	ug/m3			05/24/17 19:54	1.63
Chloromethane	ND		10	3.3	ug/m3			05/24/17 19:54	1.63
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 19:54	1.63
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 19:54	1.63
Cyclohexane	ND		17	1.4	ug/m3			05/24/17 19:54	1.63
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 19:54	1.63
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/24/17 19:54	1.63
Ethylbenzene	ND		8.7	3.0	ug/m3			05/24/17 19:54	1.63
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 19:54	1.63

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 205 14TH-01
Date Collected: 05/17/17 12:04
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-18
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		28	1.1	ug/m3			05/24/17 19:54	1.63
Isopropyl alcohol	ND		120	2.3	ug/m3			05/24/17 19:54	1.63
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 19:54	1.63
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 19:54	1.63
Methylene Chloride	**10**	**J B**	17	4.5	ug/m3			05/24/17 19:54	1.63
m-Xylene & p-Xylene	ND		35	5.2	ug/m3			05/24/17 19:54	1.63
Naphthalene	ND		26	4.7	ug/m3			05/24/17 19:54	1.63
o-Xylene	ND		8.7	2.6	ug/m3			05/24/17 19:54	1.63
Styrene	ND		8.5	2.5	ug/m3			05/24/17 19:54	1.63
Tetrachloroethene	ND		14	2.7	ug/m3			05/24/17 19:54	1.63
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 19:54	1.63
Toluene	ND		7.5	4.5	ug/m3			05/24/17 19:54	1.63
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 19:54	1.63
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 19:54	1.63
Trichloroethene	ND		11	1.9	ug/m3			05/24/17 19:54	1.63
Trichlorofluoromethane	**1.8**	**J**	11	1.3	ug/m3			05/24/17 19:54	1.63
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 19:54	1.63
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 19:54	1.63
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 19:54	1.63

Client Sample ID: 1433-CENTRAL-04
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-19
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.44**	**J**	2.0	0.30	ppb v/v			05/24/17 20:36	1.55
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 20:36	1.55
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 20:36	1.55
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 20:36	1.55
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 20:36	1.55
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 20:36	1.55
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 20:36	1.55
1,2,4-Trimethylbenzene	**0.78**	**J**	2.0	0.63	ppb v/v			05/24/17 20:36	1.55
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 20:36	1.55
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 20:36	1.55
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 20:36	1.55
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 20:36	1.55
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 20:36	1.55
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 20:36	1.55
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 20:36	1.55
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 20:36	1.55
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 20:36	1.55
2-Butanone (MEK)	**10**		10	2.0	ppb v/v			05/24/17 20:36	1.55
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 20:36	1.55
Acetone	**230**		50	14	ppb v/v			05/24/17 20:36	1.55
Benzene	**0.85**	**J**	2.0	0.56	ppb v/v			05/24/17 20:36	1.55
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 20:36	1.55
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 20:36	1.55
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 20:36	1.55
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 20:36	1.55
Carbon disulfide	**0.34**	**J**	5.0	0.31	ppb v/v			05/24/17 20:36	1.55
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 20:36	1.55
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 20:36	1.55
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 20:36	1.55
Chloroform	ND		2.0	0.38	ppb v/v			05/24/17 20:36	1.55
Chloromethane	ND		5.0	1.6	ppb v/v			05/24/17 20:36	1.55
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 20:36	1.55
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 20:36	1.55
Cyclohexane	**0.49**	**J**	5.0	0.40	ppb v/v			05/24/17 20:36	1.55
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 20:36	1.55
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/24/17 20:36	1.55
Ethylbenzene	**0.81**	**J**	2.0	0.68	ppb v/v			05/24/17 20:36	1.55
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 20:36	1.55
Hexane	**1.3**	**J**	8.0	0.32	ppb v/v			05/24/17 20:36	1.55
Isopropyl alcohol	**2.6**	**J**	50	0.94	ppb v/v			05/24/17 20:36	1.55
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 20:36	1.55
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 20:36	1.55
Methylene Chloride	**2.9**	**J B**	5.0	1.3	ppb v/v			05/24/17 20:36	1.55
m-Xylene & p-Xylene	**3.2**	**J**	8.0	1.2	ppb v/v			05/24/17 20:36	1.55
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 20:36	1.55
o-Xylene	**0.84**	**J**	2.0	0.61	ppb v/v			05/24/17 20:36	1.55
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 20:36	1.55
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/24/17 20:36	1.55

Client Sample ID: 1433-CENTRAL-04
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-19
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 20:36	1.55
Toluene	**3.1**		2.0	1.2	ppb v/v			05/24/17 20:36	1.55
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 20:36	1.55
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 20:36	1.55
Trichloroethene	**2.4**		2.0	0.36	ppb v/v			05/24/17 20:36	1.55
Trichlorofluoromethane	**0.40**	**J**	2.0	0.24	ppb v/v			05/24/17 20:36	1.55
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 20:36	1.55
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 20:36	1.55
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 20:36	1.55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**2.4**	**J**	11	1.6	ug/m3			05/24/17 20:36	1.55
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 20:36	1.55
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 20:36	1.55
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 20:36	1.55
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 20:36	1.55
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 20:36	1.55
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 20:36	1.55
1,2,4-Trimethylbenzene	**3.8**	**J**	9.8	3.1	ug/m3			05/24/17 20:36	1.55
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 20:36	1.55
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 20:36	1.55
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 20:36	1.55
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 20:36	1.55
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 20:36	1.55
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 20:36	1.55
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 20:36	1.55
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 20:36	1.55
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 20:36	1.55
2-Butanone (MEK)	**30**		29	5.9	ug/m3			05/24/17 20:36	1.55
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 20:36	1.55
Acetone	**530**		120	33	ug/m3			05/24/17 20:36	1.55
Benzene	**2.7**	**J**	6.4	1.8	ug/m3			05/24/17 20:36	1.55
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 20:36	1.55
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 20:36	1.55
Bromoform	ND		21	5.0	ug/m3			05/24/17 20:36	1.55
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 20:36	1.55
Carbon disulfide	**1.1**	**J**	16	0.97	ug/m3			05/24/17 20:36	1.55
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 20:36	1.55
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 20:36	1.55
Chloroethane	ND		21	0.92	ug/m3			05/24/17 20:36	1.55
Chloroform	ND		9.8	1.9	ug/m3			05/24/17 20:36	1.55
Chloromethane	ND		10	3.3	ug/m3			05/24/17 20:36	1.55
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 20:36	1.55
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 20:36	1.55
Cyclohexane	**1.7**	**J**	17	1.4	ug/m3			05/24/17 20:36	1.55
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 20:36	1.55
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/24/17 20:36	1.55
Ethylbenzene	**3.5**	**J**	8.7	3.0	ug/m3			05/24/17 20:36	1.55
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 20:36	1.55

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1433-CENTRAL-04
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-19
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**4.7**	**J**	28	1.1	ug/m3			05/24/17 20:36	1.55
Isopropyl alcohol	**6.5**	**J**	120	2.3	ug/m3			05/24/17 20:36	1.55
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 20:36	1.55
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 20:36	1.55
Methylene Chloride	**10**	**J B**	17	4.5	ug/m3			05/24/17 20:36	1.55
m-Xylene & p-Xylene	**14**	**J**	35	5.2	ug/m3			05/24/17 20:36	1.55
Naphthalene	ND		26	4.7	ug/m3			05/24/17 20:36	1.55
o-Xylene	**3.6**	**J**	8.7	2.6	ug/m3			05/24/17 20:36	1.55
Styrene	ND		8.5	2.5	ug/m3			05/24/17 20:36	1.55
Tetrachloroethene	ND		14	2.7	ug/m3			05/24/17 20:36	1.55
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 20:36	1.55
Toluene	**12**		7.5	4.5	ug/m3			05/24/17 20:36	1.55
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 20:36	1.55
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 20:36	1.55
Trichloroethene	**13**		11	1.9	ug/m3			05/24/17 20:36	1.55
Trichlorofluoromethane	**2.2**	**J**	11	1.3	ug/m3			05/24/17 20:36	1.55
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 20:36	1.55
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 20:36	1.55
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 20:36	1.55

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1433-CENTRAL-04D
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-20
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.45**	**J**	2.0	0.30	ppb v/v			05/24/17 21:17	1.46
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 21:17	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 21:17	1.46
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 21:17	1.46
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 21:17	1.46
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 21:17	1.46
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 21:17	1.46
1,2,4-Trimethylbenzene	**0.69**	**J**	2.0	0.63	ppb v/v			05/24/17 21:17	1.46
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 21:17	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 21:17	1.46
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 21:17	1.46
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 21:17	1.46
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 21:17	1.46
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 21:17	1.46
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 21:17	1.46
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 21:17	1.46
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 21:17	1.46
2-Butanone (MEK)	**8.2**	**J**	10	2.0	ppb v/v			05/24/17 21:17	1.46
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 21:17	1.46
Acetone	**200**		50	14	ppb v/v			05/24/17 21:17	1.46
Benzene	**0.71**	**J**	2.0	0.56	ppb v/v			05/24/17 21:17	1.46
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 21:17	1.46
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 21:17	1.46
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 21:17	1.46
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 21:17	1.46
Carbon disulfide	ND		5.0	0.31	ppb v/v			05/24/17 21:17	1.46
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 21:17	1.46
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 21:17	1.46
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 21:17	1.46
Chloroform	ND		2.0	0.38	ppb v/v			05/24/17 21:17	1.46
Chloromethane	**1.9**	**J**	5.0	1.6	ppb v/v			05/24/17 21:17	1.46
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 21:17	1.46
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 21:17	1.46
Cyclohexane	ND		5.0	0.40	ppb v/v			05/24/17 21:17	1.46
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 21:17	1.46
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/24/17 21:17	1.46
Ethylbenzene	**0.79**	**J**	2.0	0.68	ppb v/v			05/24/17 21:17	1.46
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 21:17	1.46
Hexane	**1.6**	**J**	8.0	0.32	ppb v/v			05/24/17 21:17	1.46
Isopropyl alcohol	**1.5**	**J**	50	0.94	ppb v/v			05/24/17 21:17	1.46
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 21:17	1.46
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 21:17	1.46
Methylene Chloride	**3.2**	**J B**	5.0	1.3	ppb v/v			05/24/17 21:17	1.46
m-Xylene & p-Xylene	**3.3**	**J**	8.0	1.2	ppb v/v			05/24/17 21:17	1.46
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 21:17	1.46
o-Xylene	**0.86**	**J**	2.0	0.61	ppb v/v			05/24/17 21:17	1.46
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 21:17	1.46
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/24/17 21:17	1.46

Client Sample ID: 1433-CENTRAL-04D
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-20
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 21:17	1.46
Toluene	**3.4**		2.0	1.2	ppb v/v			05/24/17 21:17	1.46
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 21:17	1.46
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 21:17	1.46
Trichloroethene	**2.4**		2.0	0.36	ppb v/v			05/24/17 21:17	1.46
Trichlorofluoromethane	**0.35**	**J**	2.0	0.24	ppb v/v			05/24/17 21:17	1.46
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 21:17	1.46
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 21:17	1.46
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 21:17	1.46

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**2.4**	**J**	11	1.6	ug/m3			05/24/17 21:17	1.46
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 21:17	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 21:17	1.46
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 21:17	1.46
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 21:17	1.46
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 21:17	1.46
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 21:17	1.46
1,2,4-Trimethylbenzene	**3.4**	**J**	9.8	3.1	ug/m3			05/24/17 21:17	1.46
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 21:17	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 21:17	1.46
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 21:17	1.46
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 21:17	1.46
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 21:17	1.46
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 21:17	1.46
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 21:17	1.46
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 21:17	1.46
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 21:17	1.46
2-Butanone (MEK)	**24**	**J**	29	5.9	ug/m3			05/24/17 21:17	1.46
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 21:17	1.46
Acetone	**480**		120	33	ug/m3			05/24/17 21:17	1.46
Benzene	**2.3**	**J**	6.4	1.8	ug/m3			05/24/17 21:17	1.46
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 21:17	1.46
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 21:17	1.46
Bromoform	ND		21	5.0	ug/m3			05/24/17 21:17	1.46
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 21:17	1.46
Carbon disulfide	ND		16	0.97	ug/m3			05/24/17 21:17	1.46
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 21:17	1.46
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 21:17	1.46
Chloroethane	ND		21	0.92	ug/m3			05/24/17 21:17	1.46
Chloroform	ND		9.8	1.9	ug/m3			05/24/17 21:17	1.46
Chloromethane	**4.0**	**J**	10	3.3	ug/m3			05/24/17 21:17	1.46
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 21:17	1.46
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 21:17	1.46
Cyclohexane	ND		17	1.4	ug/m3			05/24/17 21:17	1.46
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 21:17	1.46
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/24/17 21:17	1.46
Ethylbenzene	**3.4**	**J**	8.7	3.0	ug/m3			05/24/17 21:17	1.46
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 21:17	1.46

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1433-CENTRAL-04D
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-20
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**5.5**	**J**	28	1.1	ug/m3			05/24/17 21:17	1.46
Isopropyl alcohol	**3.7**	**J**	120	2.3	ug/m3			05/24/17 21:17	1.46
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 21:17	1.46
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 21:17	1.46
Methylene Chloride	**11**	**J B**	17	4.5	ug/m3			05/24/17 21:17	1.46
m-Xylene & p-Xylene	**14**	**J**	35	5.2	ug/m3			05/24/17 21:17	1.46
Naphthalene	ND		26	4.7	ug/m3			05/24/17 21:17	1.46
o-Xylene	**3.7**	**J**	8.7	2.6	ug/m3			05/24/17 21:17	1.46
Styrene	ND		8.5	2.5	ug/m3			05/24/17 21:17	1.46
Tetrachloroethene	ND		14	2.7	ug/m3			05/24/17 21:17	1.46
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 21:17	1.46
Toluene	**13**		7.5	4.5	ug/m3			05/24/17 21:17	1.46
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 21:17	1.46
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 21:17	1.46
Trichloroethene	**13**		11	1.9	ug/m3			05/24/17 21:17	1.46
Trichlorofluoromethane	**1.9**	**J**	11	1.3	ug/m3			05/24/17 21:17	1.46
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 21:17	1.46
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 21:17	1.46
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 21:17	1.46

Client Sample ID: 1004-PARKALLEY-01
Date Collected: 05/17/17 14:25
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-21
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		2.0	0.30	ppb v/v			05/24/17 21:59	1.55
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 21:59	1.55
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 21:59	1.55
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 21:59	1.55
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 21:59	1.55
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 21:59	1.55
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 21:59	1.55
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/24/17 21:59	1.55
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 21:59	1.55
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 21:59	1.55
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 21:59	1.55
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 21:59	1.55
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 21:59	1.55
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 21:59	1.55
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 21:59	1.55
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 21:59	1.55
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 21:59	1.55
2-Butanone (MEK)	**4.0**	**J**	10	2.0	ppb v/v			05/24/17 21:59	1.55
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 21:59	1.55
Acetone	**38**	**J**	50	14	ppb v/v			05/24/17 21:59	1.55
Benzene	ND		2.0	0.56	ppb v/v			05/24/17 21:59	1.55
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 21:59	1.55
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 21:59	1.55
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 21:59	1.55
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 21:59	1.55
Carbon disulfide	**0.48**	**J**	5.0	0.31	ppb v/v			05/24/17 21:59	1.55
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 21:59	1.55
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 21:59	1.55
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 21:59	1.55
Chloroform	**0.46**	**J**	2.0	0.38	ppb v/v			05/24/17 21:59	1.55
Chloromethane	ND		5.0	1.6	ppb v/v			05/24/17 21:59	1.55
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 21:59	1.55
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 21:59	1.55
Cyclohexane	ND		5.0	0.40	ppb v/v			05/24/17 21:59	1.55
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 21:59	1.55
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/24/17 21:59	1.55
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/24/17 21:59	1.55
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 21:59	1.55
Hexane	**0.94**	**J**	8.0	0.32	ppb v/v			05/24/17 21:59	1.55
Isopropyl alcohol	ND		50	0.94	ppb v/v			05/24/17 21:59	1.55
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 21:59	1.55
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 21:59	1.55
Methylene Chloride	**2.8**	**J B**	5.0	1.3	ppb v/v			05/24/17 21:59	1.55
m-Xylene & p-Xylene	ND		8.0	1.2	ppb v/v			05/24/17 21:59	1.55
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 21:59	1.55
o-Xylene	ND		2.0	0.61	ppb v/v			05/24/17 21:59	1.55
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 21:59	1.55
Tetrachloroethene	**240**		2.0	0.40	ppb v/v			05/24/17 21:59	1.55

Client Sample ID: 1004-PARKALLEY-01
Date Collected: 05/17/17 14:25
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-21
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 21:59	1.55
Toluene	ND		2.0	1.2	ppb v/v			05/24/17 21:59	1.55
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 21:59	1.55
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 21:59	1.55
Trichloroethene	**0.50**	**J**	2.0	0.36	ppb v/v			05/24/17 21:59	1.55
Trichlorofluoromethane	**0.40**	**J**	2.0	0.24	ppb v/v			05/24/17 21:59	1.55
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 21:59	1.55
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 21:59	1.55
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 21:59	1.55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		11	1.6	ug/m3			05/24/17 21:59	1.55
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 21:59	1.55
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 21:59	1.55
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 21:59	1.55
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 21:59	1.55
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 21:59	1.55
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 21:59	1.55
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/24/17 21:59	1.55
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 21:59	1.55
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 21:59	1.55
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 21:59	1.55
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 21:59	1.55
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 21:59	1.55
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 21:59	1.55
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 21:59	1.55
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 21:59	1.55
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 21:59	1.55
2-Butanone (MEK)	**12**	**J**	29	5.9	ug/m3			05/24/17 21:59	1.55
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 21:59	1.55
Acetone	**90**	**J**	120	33	ug/m3			05/24/17 21:59	1.55
Benzene	ND		6.4	1.8	ug/m3			05/24/17 21:59	1.55
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 21:59	1.55
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 21:59	1.55
Bromoform	ND		21	5.0	ug/m3			05/24/17 21:59	1.55
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 21:59	1.55
Carbon disulfide	**1.5**	**J**	16	0.97	ug/m3			05/24/17 21:59	1.55
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 21:59	1.55
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 21:59	1.55
Chloroethane	ND		21	0.92	ug/m3			05/24/17 21:59	1.55
Chloroform	**2.2**	**J**	9.8	1.9	ug/m3			05/24/17 21:59	1.55
Chloromethane	ND		10	3.3	ug/m3			05/24/17 21:59	1.55
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 21:59	1.55
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 21:59	1.55
Cyclohexane	ND		17	1.4	ug/m3			05/24/17 21:59	1.55
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 21:59	1.55
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/24/17 21:59	1.55
Ethylbenzene	ND		8.7	3.0	ug/m3			05/24/17 21:59	1.55
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 21:59	1.55

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1004-PARKALLEY-01
Date Collected: 05/17/17 14:25
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-21
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**3.3**	**J**	28	1.1	ug/m3			05/24/17 21:59	1.55
Isopropyl alcohol	ND		120	2.3	ug/m3			05/24/17 21:59	1.55
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 21:59	1.55
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 21:59	1.55
Methylene Chloride	**9.8**	**J B**	17	4.5	ug/m3			05/24/17 21:59	1.55
m-Xylene & p-Xylene	ND		35	5.2	ug/m3			05/24/17 21:59	1.55
Naphthalene	ND		26	4.7	ug/m3			05/24/17 21:59	1.55
o-Xylene	ND		8.7	2.6	ug/m3			05/24/17 21:59	1.55
Styrene	ND		8.5	2.5	ug/m3			05/24/17 21:59	1.55
Tetrachloroethene	**1700**		14	2.7	ug/m3			05/24/17 21:59	1.55
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 21:59	1.55
Toluene	ND		7.5	4.5	ug/m3			05/24/17 21:59	1.55
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 21:59	1.55
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 21:59	1.55
Trichloroethene	**2.7**	**J**	11	1.9	ug/m3			05/24/17 21:59	1.55
Trichlorofluoromethane	**2.3**	**J**	11	1.3	ug/m3			05/24/17 21:59	1.55
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 21:59	1.55
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 21:59	1.55
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 21:59	1.55

Client Sample ID: 1433-CENTRAL-03
Date Collected: 05/17/17 16:18
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-22
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.68**	**J**	2.0	0.30	ppb v/v			05/24/17 22:41	1.57
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 22:41	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 22:41	1.57
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 22:41	1.57
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 22:41	1.57
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 22:41	1.57
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 22:41	1.57
1,2,4-Trimethylbenzene	**1.3**	**J**	2.0	0.63	ppb v/v			05/24/17 22:41	1.57
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 22:41	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 22:41	1.57
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 22:41	1.57
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 22:41	1.57
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 22:41	1.57
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 22:41	1.57
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 22:41	1.57
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 22:41	1.57
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 22:41	1.57
2-Butanone (MEK)	ND		10	2.0	ppb v/v			05/24/17 22:41	1.57
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 22:41	1.57
Acetone	**47**	**J**	50	14	ppb v/v			05/24/17 22:41	1.57
Benzene	**4.4**		2.0	0.56	ppb v/v			05/24/17 22:41	1.57
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 22:41	1.57
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 22:41	1.57
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 22:41	1.57
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 22:41	1.57
Carbon disulfide	**0.99**	**J**	5.0	0.31	ppb v/v			05/24/17 22:41	1.57
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 22:41	1.57
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 22:41	1.57
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 22:41	1.57
Chloroform	ND		2.0	0.38	ppb v/v			05/24/17 22:41	1.57
Chloromethane	**2.6**	**J**	5.0	1.6	ppb v/v			05/24/17 22:41	1.57
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 22:41	1.57
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 22:41	1.57
Cyclohexane	**0.80**	**J**	5.0	0.40	ppb v/v			05/24/17 22:41	1.57
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 22:41	1.57
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/24/17 22:41	1.57
Ethylbenzene	**2.7**		2.0	0.68	ppb v/v			05/24/17 22:41	1.57
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 22:41	1.57
Hexane	**4.6**	**J**	8.0	0.32	ppb v/v			05/24/17 22:41	1.57
Isopropyl alcohol	ND		50	0.94	ppb v/v			05/24/17 22:41	1.57
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 22:41	1.57
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 22:41	1.57
Methylene Chloride	**2.8**	**J B**	5.0	1.3	ppb v/v			05/24/17 22:41	1.57
m-Xylene & p-Xylene	**11**		8.0	1.2	ppb v/v			05/24/17 22:41	1.57
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 22:41	1.57
o-Xylene	**2.4**		2.0	0.61	ppb v/v			05/24/17 22:41	1.57
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 22:41	1.57
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/24/17 22:41	1.57

Client Sample ID: 1433-CENTRAL-03
Date Collected: 05/17/17 16:18
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-22
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 22:41	1.57
Toluene	**20**		2.0	1.2	ppb v/v			05/24/17 22:41	1.57
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 22:41	1.57
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 22:41	1.57
Trichloroethene	**6.5**		2.0	0.36	ppb v/v			05/24/17 22:41	1.57
Trichlorofluoromethane	**0.33**	**J**	2.0	0.24	ppb v/v			05/24/17 22:41	1.57
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 22:41	1.57
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 22:41	1.57
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 22:41	1.57

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**3.7**	**J**	11	1.6	ug/m3			05/24/17 22:41	1.57
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 22:41	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 22:41	1.57
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 22:41	1.57
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 22:41	1.57
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 22:41	1.57
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 22:41	1.57
1,2,4-Trimethylbenzene	**6.4**	**J**	9.8	3.1	ug/m3			05/24/17 22:41	1.57
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 22:41	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 22:41	1.57
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 22:41	1.57
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 22:41	1.57
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 22:41	1.57
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 22:41	1.57
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 22:41	1.57
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 22:41	1.57
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 22:41	1.57
2-Butanone (MEK)	ND		29	5.9	ug/m3			05/24/17 22:41	1.57
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 22:41	1.57
Acetone	**110**	**J**	120	33	ug/m3			05/24/17 22:41	1.57
Benzene	**14**		6.4	1.8	ug/m3			05/24/17 22:41	1.57
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 22:41	1.57
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 22:41	1.57
Bromoform	ND		21	5.0	ug/m3			05/24/17 22:41	1.57
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 22:41	1.57
Carbon disulfide	**3.1**	**J**	16	0.97	ug/m3			05/24/17 22:41	1.57
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 22:41	1.57
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 22:41	1.57
Chloroethane	ND		21	0.92	ug/m3			05/24/17 22:41	1.57
Chloroform	ND		9.8	1.9	ug/m3			05/24/17 22:41	1.57
Chloromethane	**5.3**	**J**	10	3.3	ug/m3			05/24/17 22:41	1.57
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 22:41	1.57
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 22:41	1.57
Cyclohexane	**2.8**	**J**	17	1.4	ug/m3			05/24/17 22:41	1.57
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 22:41	1.57
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/24/17 22:41	1.57
Ethylbenzene	**12**		8.7	3.0	ug/m3			05/24/17 22:41	1.57
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 22:41	1.57

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1433-CENTRAL-03
Date Collected: 05/17/17 16:18
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-22
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**16**	**J**	28	1.1	ug/m3			05/24/17 22:41	1.57
Isopropyl alcohol	ND		120	2.3	ug/m3			05/24/17 22:41	1.57
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 22:41	1.57
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 22:41	1.57
Methylene Chloride	**9.8**	**J B**	17	4.5	ug/m3			05/24/17 22:41	1.57
m-Xylene & p-Xylene	**46**		35	5.2	ug/m3			05/24/17 22:41	1.57
Naphthalene	ND		26	4.7	ug/m3			05/24/17 22:41	1.57
o-Xylene	**10**		8.7	2.6	ug/m3			05/24/17 22:41	1.57
Styrene	ND		8.5	2.5	ug/m3			05/24/17 22:41	1.57
Tetrachloroethene	ND		14	2.7	ug/m3			05/24/17 22:41	1.57
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 22:41	1.57
Toluene	**76**		7.5	4.5	ug/m3			05/24/17 22:41	1.57
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 22:41	1.57
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 22:41	1.57
Trichloroethene	**35**		11	1.9	ug/m3			05/24/17 22:41	1.57
Trichlorofluoromethane	**1.8**	**J**	11	1.3	ug/m3			05/24/17 22:41	1.57
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 22:41	1.57
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 22:41	1.57
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 22:41	1.57

Client Sample ID: 1404-CENTRAL-02
Date Collected: 05/17/17 09:21
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-23
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.50**	**J**	2.0	0.30	ppb v/v			05/24/17 23:23	1.57
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/24/17 23:23	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/24/17 23:23	1.57
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/24/17 23:23	1.57
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/24/17 23:23	1.57
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/24/17 23:23	1.57
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/24/17 23:23	1.57
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/24/17 23:23	1.57
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/24/17 23:23	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/24/17 23:23	1.57
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/24/17 23:23	1.57
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/24/17 23:23	1.57
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/24/17 23:23	1.57
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/24/17 23:23	1.57
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/24/17 23:23	1.57
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/24/17 23:23	1.57
1,4-Dioxane	ND		50	0.80	ppb v/v			05/24/17 23:23	1.57
2-Butanone (MEK)	**5.7**	**J**	10	2.0	ppb v/v			05/24/17 23:23	1.57
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/24/17 23:23	1.57
Acetone	**38**	**J**	50	14	ppb v/v			05/24/17 23:23	1.57
Benzene	ND		2.0	0.56	ppb v/v			05/24/17 23:23	1.57
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/24/17 23:23	1.57
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/24/17 23:23	1.57
Bromoform	ND		2.0	0.48	ppb v/v			05/24/17 23:23	1.57
Bromomethane	ND		2.0	0.32	ppb v/v			05/24/17 23:23	1.57
Carbon disulfide	ND		5.0	0.31	ppb v/v			05/24/17 23:23	1.57
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/24/17 23:23	1.57
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/24/17 23:23	1.57
Chloroethane	ND		8.0	0.35	ppb v/v			05/24/17 23:23	1.57
Chloroform	**0.40**	**J**	2.0	0.38	ppb v/v			05/24/17 23:23	1.57
Chloromethane	ND		5.0	1.6	ppb v/v			05/24/17 23:23	1.57
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/24/17 23:23	1.57
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/24/17 23:23	1.57
Cyclohexane	ND		5.0	0.40	ppb v/v			05/24/17 23:23	1.57
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/24/17 23:23	1.57
Dichlorodifluoromethane	**0.90**	**J**	5.0	0.68	ppb v/v			05/24/17 23:23	1.57
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/24/17 23:23	1.57
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/24/17 23:23	1.57
Hexane	ND		8.0	0.32	ppb v/v			05/24/17 23:23	1.57
Isopropyl alcohol	**5.9**	**J**	50	0.94	ppb v/v			05/24/17 23:23	1.57
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/24/17 23:23	1.57
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/24/17 23:23	1.57
Methylene Chloride	**3.0**	**J B**	5.0	1.3	ppb v/v			05/24/17 23:23	1.57
m-Xylene & p-Xylene	ND		8.0	1.2	ppb v/v			05/24/17 23:23	1.57
Naphthalene	ND		5.0	0.90	ppb v/v			05/24/17 23:23	1.57
o-Xylene	ND		2.0	0.61	ppb v/v			05/24/17 23:23	1.57
Styrene	ND		2.0	0.58	ppb v/v			05/24/17 23:23	1.57
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/24/17 23:23	1.57

Client Sample ID: 1404-CENTRAL-02
Date Collected: 05/17/17 09:21
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-23
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/24/17 23:23	1.57
Toluene	ND		2.0	1.2	ppb v/v			05/24/17 23:23	1.57
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/24/17 23:23	1.57
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/24/17 23:23	1.57
Trichloroethene	ND		2.0	0.36	ppb v/v			05/24/17 23:23	1.57
Trichlorofluoromethane	**4.9**		2.0	0.24	ppb v/v			05/24/17 23:23	1.57
Vinyl acetate	ND		50	1.4	ppb v/v			05/24/17 23:23	1.57
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/24/17 23:23	1.57
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/24/17 23:23	1.57

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**2.8**	**J**	11	1.6	ug/m3			05/24/17 23:23	1.57
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/24/17 23:23	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/24/17 23:23	1.57
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/24/17 23:23	1.57
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/24/17 23:23	1.57
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/24/17 23:23	1.57
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/24/17 23:23	1.57
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/24/17 23:23	1.57
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/24/17 23:23	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/24/17 23:23	1.57
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/24/17 23:23	1.57
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/24/17 23:23	1.57
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/24/17 23:23	1.57
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/24/17 23:23	1.57
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/24/17 23:23	1.57
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/24/17 23:23	1.57
1,4-Dioxane	ND		180	2.9	ug/m3			05/24/17 23:23	1.57
2-Butanone (MEK)	**17**	**J**	29	5.9	ug/m3			05/24/17 23:23	1.57
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/24/17 23:23	1.57
Acetone	**90**	**J**	120	33	ug/m3			05/24/17 23:23	1.57
Benzene	ND		6.4	1.8	ug/m3			05/24/17 23:23	1.57
Benzyl chloride	ND		41	4.0	ug/m3			05/24/17 23:23	1.57
Bromodichloromethane	ND		13	2.9	ug/m3			05/24/17 23:23	1.57
Bromoform	ND		21	5.0	ug/m3			05/24/17 23:23	1.57
Bromomethane	ND		7.8	1.2	ug/m3			05/24/17 23:23	1.57
Carbon disulfide	ND		16	0.97	ug/m3			05/24/17 23:23	1.57
Carbon tetrachloride	ND		13	2.4	ug/m3			05/24/17 23:23	1.57
Chlorobenzene	ND		9.2	2.3	ug/m3			05/24/17 23:23	1.57
Chloroethane	ND		21	0.92	ug/m3			05/24/17 23:23	1.57
Chloroform	**1.9**	**J**	9.8	1.9	ug/m3			05/24/17 23:23	1.57
Chloromethane	ND		10	3.3	ug/m3			05/24/17 23:23	1.57
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/24/17 23:23	1.57
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/24/17 23:23	1.57
Cyclohexane	ND		17	1.4	ug/m3			05/24/17 23:23	1.57
Dibromochloromethane	ND		17	3.6	ug/m3			05/24/17 23:23	1.57
Dichlorodifluoromethane	**4.4**	**J**	25	3.4	ug/m3			05/24/17 23:23	1.57
Ethylbenzene	ND		8.7	3.0	ug/m3			05/24/17 23:23	1.57
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/24/17 23:23	1.57

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: 1404-CENTRAL-02
Date Collected: 05/17/17 09:21
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-23
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		28	1.1	ug/m3			05/24/17 23:23	1.57
Isopropyl alcohol	**14**	**J**	120	2.3	ug/m3			05/24/17 23:23	1.57
Isopropylbenzene	ND		39	2.9	ug/m3			05/24/17 23:23	1.57
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/24/17 23:23	1.57
Methylene Chloride	**10**	**J B**	17	4.5	ug/m3			05/24/17 23:23	1.57
m-Xylene & p-Xylene	ND		35	5.2	ug/m3			05/24/17 23:23	1.57
Naphthalene	ND		26	4.7	ug/m3			05/24/17 23:23	1.57
o-Xylene	ND		8.7	2.6	ug/m3			05/24/17 23:23	1.57
Styrene	ND		8.5	2.5	ug/m3			05/24/17 23:23	1.57
Tetrachloroethene	ND		14	2.7	ug/m3			05/24/17 23:23	1.57
Tetrahydrofuran	ND		150	1.9	ug/m3			05/24/17 23:23	1.57
Toluene	ND		7.5	4.5	ug/m3			05/24/17 23:23	1.57
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/24/17 23:23	1.57
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/24/17 23:23	1.57
Trichloroethene	ND		11	1.9	ug/m3			05/24/17 23:23	1.57
Trichlorofluoromethane	**27**		11	1.3	ug/m3			05/24/17 23:23	1.57
Vinyl acetate	ND		180	4.9	ug/m3			05/24/17 23:23	1.57
Vinyl bromide	ND		8.7	1.5	ug/m3			05/24/17 23:23	1.57
Vinyl chloride	ND		5.1	1.8	ug/m3			05/24/17 23:23	1.57

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: C-14TH-05
Date Collected: 05/17/17 12:24
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-24
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		2.0	0.30	ppb v/v			05/25/17 00:06	1.6
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/25/17 00:06	1.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/25/17 00:06	1.6
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/25/17 00:06	1.6
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/25/17 00:06	1.6
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/25/17 00:06	1.6
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/25/17 00:06	1.6
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/25/17 00:06	1.6
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/25/17 00:06	1.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/25/17 00:06	1.6
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/25/17 00:06	1.6
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/25/17 00:06	1.6
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/25/17 00:06	1.6
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/25/17 00:06	1.6
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/25/17 00:06	1.6
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/25/17 00:06	1.6
1,4-Dioxane	ND		50	0.80	ppb v/v			05/25/17 00:06	1.6
2-Butanone (MEK)	**2.2**	**J**	10	2.0	ppb v/v			05/25/17 00:06	1.6
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/25/17 00:06	1.6
Acetone	**46**	**J**	50	14	ppb v/v			05/25/17 00:06	1.6
Benzene	ND		2.0	0.56	ppb v/v			05/25/17 00:06	1.6
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/25/17 00:06	1.6
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/25/17 00:06	1.6
Bromoform	ND		2.0	0.48	ppb v/v			05/25/17 00:06	1.6
Bromomethane	ND		2.0	0.32	ppb v/v			05/25/17 00:06	1.6
Carbon disulfide	ND		5.0	0.31	ppb v/v			05/25/17 00:06	1.6
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/25/17 00:06	1.6
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/25/17 00:06	1.6
Chloroethane	ND		8.0	0.35	ppb v/v			05/25/17 00:06	1.6
Chloroform	**0.65**	**J**	2.0	0.38	ppb v/v			05/25/17 00:06	1.6
Chloromethane	ND		5.0	1.6	ppb v/v			05/25/17 00:06	1.6
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/25/17 00:06	1.6
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/25/17 00:06	1.6
Cyclohexane	ND		5.0	0.40	ppb v/v			05/25/17 00:06	1.6
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/25/17 00:06	1.6
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/25/17 00:06	1.6
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/25/17 00:06	1.6
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/25/17 00:06	1.6
Hexane	**0.41**	**J**	8.0	0.32	ppb v/v			05/25/17 00:06	1.6
Isopropyl alcohol	ND		50	0.94	ppb v/v			05/25/17 00:06	1.6
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/25/17 00:06	1.6
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/25/17 00:06	1.6
Methylene Chloride	**2.6**	**J B**	5.0	1.3	ppb v/v			05/25/17 00:06	1.6
m-Xylene & p-Xylene	**1.9**	**J**	8.0	1.2	ppb v/v			05/25/17 00:06	1.6
Naphthalene	ND		5.0	0.90	ppb v/v			05/25/17 00:06	1.6
o-Xylene	**0.63**	**J**	2.0	0.61	ppb v/v			05/25/17 00:06	1.6
Styrene	ND		2.0	0.58	ppb v/v			05/25/17 00:06	1.6
Tetrachloroethene	ND		2.0	0.40	ppb v/v			05/25/17 00:06	1.6

Client Sample ID: C-14TH-05
Date Collected: 05/17/17 12:24
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-24
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/25/17 00:06	1.6
Toluene	**1.5**	**J**	2.0	1.2	ppb v/v			05/25/17 00:06	1.6
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/25/17 00:06	1.6
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/25/17 00:06	1.6
Trichloroethene	ND		2.0	0.36	ppb v/v			05/25/17 00:06	1.6
Trichlorofluoromethane	**0.28**	**J**	2.0	0.24	ppb v/v			05/25/17 00:06	1.6
Vinyl acetate	ND		50	1.4	ppb v/v			05/25/17 00:06	1.6
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/25/17 00:06	1.6
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/25/17 00:06	1.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		11	1.6	ug/m3			05/25/17 00:06	1.6
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/25/17 00:06	1.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/25/17 00:06	1.6
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/25/17 00:06	1.6
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/25/17 00:06	1.6
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/25/17 00:06	1.6
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/25/17 00:06	1.6
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/25/17 00:06	1.6
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/25/17 00:06	1.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/25/17 00:06	1.6
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/25/17 00:06	1.6
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/25/17 00:06	1.6
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/25/17 00:06	1.6
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/25/17 00:06	1.6
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/25/17 00:06	1.6
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/25/17 00:06	1.6
1,4-Dioxane	ND		180	2.9	ug/m3			05/25/17 00:06	1.6
2-Butanone (MEK)	**6.6**	**J**	29	5.9	ug/m3			05/25/17 00:06	1.6
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/25/17 00:06	1.6
Acetone	**110**	**J**	120	33	ug/m3			05/25/17 00:06	1.6
Benzene	ND		6.4	1.8	ug/m3			05/25/17 00:06	1.6
Benzyl chloride	ND		41	4.0	ug/m3			05/25/17 00:06	1.6
Bromodichloromethane	ND		13	2.9	ug/m3			05/25/17 00:06	1.6
Bromoform	ND		21	5.0	ug/m3			05/25/17 00:06	1.6
Bromomethane	ND		7.8	1.2	ug/m3			05/25/17 00:06	1.6
Carbon disulfide	ND		16	0.97	ug/m3			05/25/17 00:06	1.6
Carbon tetrachloride	ND		13	2.4	ug/m3			05/25/17 00:06	1.6
Chlorobenzene	ND		9.2	2.3	ug/m3			05/25/17 00:06	1.6
Chloroethane	ND		21	0.92	ug/m3			05/25/17 00:06	1.6
Chloroform	**3.2**	**J**	9.8	1.9	ug/m3			05/25/17 00:06	1.6
Chloromethane	ND		10	3.3	ug/m3			05/25/17 00:06	1.6
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/25/17 00:06	1.6
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/25/17 00:06	1.6
Cyclohexane	ND		17	1.4	ug/m3			05/25/17 00:06	1.6
Dibromochloromethane	ND		17	3.6	ug/m3			05/25/17 00:06	1.6
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/25/17 00:06	1.6
Ethylbenzene	ND		8.7	3.0	ug/m3			05/25/17 00:06	1.6
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/25/17 00:06	1.6

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: C-14TH-05
Date Collected: 05/17/17 12:24
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-24
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	**1.4**	**J**	28	1.1	ug/m3			05/25/17 00:06	1.6
Isopropyl alcohol	ND		120	2.3	ug/m3			05/25/17 00:06	1.6
Isopropylbenzene	ND		39	2.9	ug/m3			05/25/17 00:06	1.6
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/25/17 00:06	1.6
Methylene Chloride	**9.1**	**J B**	17	4.5	ug/m3			05/25/17 00:06	1.6
m-Xylene & p-Xylene	**8.4**	**J**	35	5.2	ug/m3			05/25/17 00:06	1.6
Naphthalene	ND		26	4.7	ug/m3			05/25/17 00:06	1.6
o-Xylene	**2.7**	**J**	8.7	2.6	ug/m3			05/25/17 00:06	1.6
Styrene	ND		8.5	2.5	ug/m3			05/25/17 00:06	1.6
Tetrachloroethene	ND		14	2.7	ug/m3			05/25/17 00:06	1.6
Tetrahydrofuran	ND		150	1.9	ug/m3			05/25/17 00:06	1.6
Toluene	**5.8**	**J**	7.5	4.5	ug/m3			05/25/17 00:06	1.6
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/25/17 00:06	1.6
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/25/17 00:06	1.6
Trichloroethene	ND		11	1.9	ug/m3			05/25/17 00:06	1.6
Trichlorofluoromethane	**1.6**	**J**	11	1.3	ug/m3			05/25/17 00:06	1.6
Vinyl acetate	ND		180	4.9	ug/m3			05/25/17 00:06	1.6
Vinyl bromide	ND		8.7	1.5	ug/m3			05/25/17 00:06	1.6
Vinyl chloride	ND		5.1	1.8	ug/m3			05/25/17 00:06	1.6

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: CENTRAL-1433-02
Date Collected: 05/17/17 16:35
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-25
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.49**	**J**	2.0	0.30	ppb v/v			05/25/17 00:48	1.71
1,1,2,2-Tetrachloroethane	ND		2.0	0.61	ppb v/v			05/25/17 00:48	1.71
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.0	0.31	ppb v/v			05/25/17 00:48	1.71
1,1,2-Trichloroethane	ND		2.0	0.54	ppb v/v			05/25/17 00:48	1.71
1,1-Dichloroethane	ND		2.0	0.26	ppb v/v			05/25/17 00:48	1.71
1,1-Dichloroethene	ND		2.0	0.34	ppb v/v			05/25/17 00:48	1.71
1,2,4-Trichlorobenzene	ND		20	0.98	ppb v/v			05/25/17 00:48	1.71
1,2,4-Trimethylbenzene	ND		2.0	0.63	ppb v/v			05/25/17 00:48	1.71
1,2-Dibromoethane (EDB)	ND		2.0	0.44	ppb v/v			05/25/17 00:48	1.71
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.32	ppb v/v			05/25/17 00:48	1.71
1,2-Dichlorobenzene	ND		2.0	0.70	ppb v/v			05/25/17 00:48	1.71
1,2-Dichloroethane	ND		2.0	0.47	ppb v/v			05/25/17 00:48	1.71
1,2-Dichloropropane	ND		2.0	0.52	ppb v/v			05/25/17 00:48	1.71
1,3,5-Trimethylbenzene	ND		2.0	0.65	ppb v/v			05/25/17 00:48	1.71
1,3-Dichlorobenzene	ND		2.0	0.65	ppb v/v			05/25/17 00:48	1.71
1,4-Dichlorobenzene	ND		2.0	0.64	ppb v/v			05/25/17 00:48	1.71
1,4-Dioxane	ND		50	0.80	ppb v/v			05/25/17 00:48	1.71
2-Butanone (MEK)	**3.2**	**J**	10	2.0	ppb v/v			05/25/17 00:48	1.71
4-Methyl-2-pentanone (MIBK)	ND		5.0	2.0	ppb v/v			05/25/17 00:48	1.71
Acetone	**55**	**CI**	50	14	ppb v/v			05/25/17 00:48	1.71
Benzene	ND		2.0	0.56	ppb v/v			05/25/17 00:48	1.71
Benzyl chloride	ND		8.0	0.78	ppb v/v			05/25/17 00:48	1.71
Bromodichloromethane	ND		2.0	0.44	ppb v/v			05/25/17 00:48	1.71
Bromoform	ND		2.0	0.48	ppb v/v			05/25/17 00:48	1.71
Bromomethane	ND		2.0	0.32	ppb v/v			05/25/17 00:48	1.71
Carbon disulfide	**0.81**	**J**	5.0	0.31	ppb v/v			05/25/17 00:48	1.71
Carbon tetrachloride	ND		2.0	0.38	ppb v/v			05/25/17 00:48	1.71
Chlorobenzene	ND		2.0	0.49	ppb v/v			05/25/17 00:48	1.71
Chloroethane	ND		8.0	0.35	ppb v/v			05/25/17 00:48	1.71
Chloroform	**1.5**	**J**	2.0	0.38	ppb v/v			05/25/17 00:48	1.71
Chloromethane	**3.5**	**J**	5.0	1.6	ppb v/v			05/25/17 00:48	1.71
cis-1,2-Dichloroethene	ND		2.0	0.60	ppb v/v			05/25/17 00:48	1.71
cis-1,3-Dichloropropene	ND		2.0	0.74	ppb v/v			05/25/17 00:48	1.71
Cyclohexane	ND		5.0	0.40	ppb v/v			05/25/17 00:48	1.71
Dibromochloromethane	ND		2.0	0.42	ppb v/v			05/25/17 00:48	1.71
Dichlorodifluoromethane	ND		5.0	0.68	ppb v/v			05/25/17 00:48	1.71
Ethylbenzene	ND		2.0	0.68	ppb v/v			05/25/17 00:48	1.71
Hexachlorobutadiene	ND		2.0	0.78	ppb v/v			05/25/17 00:48	1.71
Hexane	ND		8.0	0.32	ppb v/v			05/25/17 00:48	1.71
Isopropyl alcohol	ND		50	0.94	ppb v/v			05/25/17 00:48	1.71
Isopropylbenzene	ND		8.0	0.60	ppb v/v			05/25/17 00:48	1.71
Methyl tert-butyl ether	ND		10	1.7	ppb v/v			05/25/17 00:48	1.71
Methylene Chloride	**2.6**	**J B**	5.0	1.3	ppb v/v			05/25/17 00:48	1.71
m-Xylene & p-Xylene	ND		8.0	1.2	ppb v/v			05/25/17 00:48	1.71
Naphthalene	ND		5.0	0.90	ppb v/v			05/25/17 00:48	1.71
o-Xylene	ND		2.0	0.61	ppb v/v			05/25/17 00:48	1.71
Styrene	ND		2.0	0.58	ppb v/v			05/25/17 00:48	1.71
Tetrachloroethene	**2.1**		2.0	0.40	ppb v/v			05/25/17 00:48	1.71

Client Sample ID: CENTRAL-1433-02
Date Collected: 05/17/17 16:35
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-25
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		50	0.63	ppb v/v			05/25/17 00:48	1.71
Toluene	ND		2.0	1.2	ppb v/v			05/25/17 00:48	1.71
trans-1,2-Dichloroethene	ND		2.0	0.50	ppb v/v			05/25/17 00:48	1.71
trans-1,3-Dichloropropene	ND		2.0	0.48	ppb v/v			05/25/17 00:48	1.71
Trichloroethene	**64**		2.0	0.36	ppb v/v			05/25/17 00:48	1.71
Trichlorofluoromethane	**0.26**	**J**	2.0	0.24	ppb v/v			05/25/17 00:48	1.71
Vinyl acetate	ND		50	1.4	ppb v/v			05/25/17 00:48	1.71
Vinyl bromide	ND		2.0	0.35	ppb v/v			05/25/17 00:48	1.71
Vinyl chloride	ND		2.0	0.71	ppb v/v			05/25/17 00:48	1.71

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**2.7**	**J**	11	1.6	ug/m3			05/25/17 00:48	1.71
1,1,2,2-Tetrachloroethane	ND		14	4.2	ug/m3			05/25/17 00:48	1.71
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	2.4	ug/m3			05/25/17 00:48	1.71
1,1,2-Trichloroethane	ND		11	2.9	ug/m3			05/25/17 00:48	1.71
1,1-Dichloroethane	ND		8.1	1.1	ug/m3			05/25/17 00:48	1.71
1,1-Dichloroethene	ND		7.9	1.3	ug/m3			05/25/17 00:48	1.71
1,2,4-Trichlorobenzene	ND		150	7.3	ug/m3			05/25/17 00:48	1.71
1,2,4-Trimethylbenzene	ND		9.8	3.1	ug/m3			05/25/17 00:48	1.71
1,2-Dibromoethane (EDB)	ND		15	3.4	ug/m3			05/25/17 00:48	1.71
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	2.2	ug/m3			05/25/17 00:48	1.71
1,2-Dichlorobenzene	ND		12	4.2	ug/m3			05/25/17 00:48	1.71
1,2-Dichloroethane	ND		8.1	1.9	ug/m3			05/25/17 00:48	1.71
1,2-Dichloropropane	ND		9.2	2.4	ug/m3			05/25/17 00:48	1.71
1,3,5-Trimethylbenzene	ND		9.8	3.2	ug/m3			05/25/17 00:48	1.71
1,3-Dichlorobenzene	ND		12	3.9	ug/m3			05/25/17 00:48	1.71
1,4-Dichlorobenzene	ND		12	3.8	ug/m3			05/25/17 00:48	1.71
1,4-Dioxane	ND		180	2.9	ug/m3			05/25/17 00:48	1.71
2-Butanone (MEK)	**9.6**	**J**	29	5.9	ug/m3			05/25/17 00:48	1.71
4-Methyl-2-pentanone (MIBK)	ND		20	8.0	ug/m3			05/25/17 00:48	1.71
Acetone	**130**	**CI**	120	33	ug/m3			05/25/17 00:48	1.71
Benzene	ND		6.4	1.8	ug/m3			05/25/17 00:48	1.71
Benzyl chloride	ND		41	4.0	ug/m3			05/25/17 00:48	1.71
Bromodichloromethane	ND		13	2.9	ug/m3			05/25/17 00:48	1.71
Bromoform	ND		21	5.0	ug/m3			05/25/17 00:48	1.71
Bromomethane	ND		7.8	1.2	ug/m3			05/25/17 00:48	1.71
Carbon disulfide	**2.5**	**J**	16	0.97	ug/m3			05/25/17 00:48	1.71
Carbon tetrachloride	ND		13	2.4	ug/m3			05/25/17 00:48	1.71
Chlorobenzene	ND		9.2	2.3	ug/m3			05/25/17 00:48	1.71
Chloroethane	ND		21	0.92	ug/m3			05/25/17 00:48	1.71
Chloroform	**7.2**	**J**	9.8	1.9	ug/m3			05/25/17 00:48	1.71
Chloromethane	**7.2**	**J**	10	3.3	ug/m3			05/25/17 00:48	1.71
cis-1,2-Dichloroethene	ND		7.9	2.4	ug/m3			05/25/17 00:48	1.71
cis-1,3-Dichloropropene	ND		9.1	3.4	ug/m3			05/25/17 00:48	1.71
Cyclohexane	ND		17	1.4	ug/m3			05/25/17 00:48	1.71
Dibromochloromethane	ND		17	3.6	ug/m3			05/25/17 00:48	1.71
Dichlorodifluoromethane	ND		25	3.4	ug/m3			05/25/17 00:48	1.71
Ethylbenzene	ND		8.7	3.0	ug/m3			05/25/17 00:48	1.71
Hexachlorobutadiene	ND		21	8.3	ug/m3			05/25/17 00:48	1.71

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: CENTRAL-1433-02
Date Collected: 05/17/17 16:35
Date Received: 05/22/17 09:25
Sample Container: Summa Canister 1L

Lab Sample ID: 140-8162-25
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexane	ND		28	1.1	ug/m3			05/25/17 00:48	1.71
Isopropyl alcohol	ND		120	2.3	ug/m3			05/25/17 00:48	1.71
Isopropylbenzene	ND		39	2.9	ug/m3			05/25/17 00:48	1.71
Methyl tert-butyl ether	ND		36	6.1	ug/m3			05/25/17 00:48	1.71
Methylene Chloride	**9.0**	**J B**	17	4.5	ug/m3			05/25/17 00:48	1.71
m-Xylene & p-Xylene	ND		35	5.2	ug/m3			05/25/17 00:48	1.71
Naphthalene	ND		26	4.7	ug/m3			05/25/17 00:48	1.71
o-Xylene	ND		8.7	2.6	ug/m3			05/25/17 00:48	1.71
Styrene	ND		8.5	2.5	ug/m3			05/25/17 00:48	1.71
Tetrachloroethene	**14**		14	2.7	ug/m3			05/25/17 00:48	1.71
Tetrahydrofuran	ND		150	1.9	ug/m3			05/25/17 00:48	1.71
Toluene	ND		7.5	4.5	ug/m3			05/25/17 00:48	1.71
trans-1,2-Dichloroethene	ND		7.9	2.0	ug/m3			05/25/17 00:48	1.71
trans-1,3-Dichloropropene	ND		9.1	2.2	ug/m3			05/25/17 00:48	1.71
Trichloroethene	**340**		11	1.9	ug/m3			05/25/17 00:48	1.71
Trichlorofluoromethane	**1.5**	**J**	11	1.3	ug/m3			05/25/17 00:48	1.71
Vinyl acetate	ND		180	4.9	ug/m3			05/25/17 00:48	1.71
Vinyl bromide	ND		8.7	1.5	ug/m3			05/25/17 00:48	1.71
Vinyl chloride	ND		5.1	1.8	ug/m3			05/25/17 00:48	1.71

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-11431/8
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/23/17 17:08	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/23/17 17:08	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			05/23/17 17:08	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/23/17 17:08	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/23/17 17:08	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/23/17 17:08	1
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/23/17 17:08	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/23/17 17:08	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/23/17 17:08	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/23/17 17:08	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/23/17 17:08	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/23/17 17:08	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/23/17 17:08	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/23/17 17:08	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/23/17 17:08	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/23/17 17:08	1
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/23/17 17:08	1
2-Butanone (MEK)	ND		1.0	0.20	ppb v/v			05/23/17 17:08	1
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/23/17 17:08	1
Acetone	ND		5.0	1.4	ppb v/v			05/23/17 17:08	1
Benzene	ND		0.20	0.056	ppb v/v			05/23/17 17:08	1
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/23/17 17:08	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/23/17 17:08	1
Bromoform	ND		0.20	0.048	ppb v/v			05/23/17 17:08	1
Bromomethane	ND		0.20	0.032	ppb v/v			05/23/17 17:08	1
Carbon disulfide	ND		0.50	0.031	ppb v/v			05/23/17 17:08	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			05/23/17 17:08	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/23/17 17:08	1
Chloroethane	ND		0.80	0.035	ppb v/v			05/23/17 17:08	1
Chloroform	ND		0.20	0.038	ppb v/v			05/23/17 17:08	1
Chloromethane	ND		0.50	0.16	ppb v/v			05/23/17 17:08	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/23/17 17:08	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/23/17 17:08	1
Cyclohexane	ND		0.50	0.040	ppb v/v			05/23/17 17:08	1
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/23/17 17:08	1
Dichlorodifluoromethane	ND		0.50	0.068	ppb v/v			05/23/17 17:08	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/23/17 17:08	1
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/23/17 17:08	1
Hexane	ND		0.80	0.032	ppb v/v			05/23/17 17:08	1
Isopropyl alcohol	ND		5.0	0.094	ppb v/v			05/23/17 17:08	1
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/23/17 17:08	1
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/23/17 17:08	1
Methylene Chloride	0.263	J	0.50	0.13	ppb v/v			05/23/17 17:08	1
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/23/17 17:08	1
Naphthalene	ND		0.50	0.090	ppb v/v			05/23/17 17:08	1
o-Xylene	ND		0.20	0.061	ppb v/v			05/23/17 17:08	1
Styrene	ND		0.20	0.058	ppb v/v			05/23/17 17:08	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/23/17 17:08	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-11431/8
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrahydrofuran	ND		5.0	0.063	ppb v/v			05/23/17 17:08	1
Toluene	ND		0.20	0.12	ppb v/v			05/23/17 17:08	1
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/23/17 17:08	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/23/17 17:08	1
Trichloroethene	ND		0.20	0.036	ppb v/v			05/23/17 17:08	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			05/23/17 17:08	1
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/23/17 17:08	1
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/23/17 17:08	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/23/17 17:08	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/23/17 17:08	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/23/17 17:08	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			05/23/17 17:08	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/23/17 17:08	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/23/17 17:08	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/23/17 17:08	1
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/23/17 17:08	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/23/17 17:08	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/23/17 17:08	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/23/17 17:08	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/23/17 17:08	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/23/17 17:08	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/23/17 17:08	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/23/17 17:08	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/23/17 17:08	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/23/17 17:08	1
1,4-Dioxane	ND		18	0.29	ug/m3			05/23/17 17:08	1
2-Butanone (MEK)	ND		2.9	0.59	ug/m3			05/23/17 17:08	1
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/23/17 17:08	1
Acetone	ND		12	3.3	ug/m3			05/23/17 17:08	1
Benzene	ND		0.64	0.18	ug/m3			05/23/17 17:08	1
Benzyl chloride	ND		4.1	0.40	ug/m3			05/23/17 17:08	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/23/17 17:08	1
Bromoform	ND		2.1	0.50	ug/m3			05/23/17 17:08	1
Bromomethane	ND		0.78	0.12	ug/m3			05/23/17 17:08	1
Carbon disulfide	ND		1.6	0.097	ug/m3			05/23/17 17:08	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			05/23/17 17:08	1
Chlorobenzene	ND		0.92	0.23	ug/m3			05/23/17 17:08	1
Chloroethane	ND		2.1	0.092	ug/m3			05/23/17 17:08	1
Chloroform	ND		0.98	0.19	ug/m3			05/23/17 17:08	1
Chloromethane	ND		1.0	0.33	ug/m3			05/23/17 17:08	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/23/17 17:08	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/23/17 17:08	1
Cyclohexane	ND		1.7	0.14	ug/m3			05/23/17 17:08	1
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/23/17 17:08	1
Dichlorodifluoromethane	ND		2.5	0.34	ug/m3			05/23/17 17:08	1
Ethylbenzene	ND		0.87	0.30	ug/m3			05/23/17 17:08	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-11431/8
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/23/17 17:08	1
Hexane	ND		2.8	0.11	ug/m3			05/23/17 17:08	1
Isopropyl alcohol	ND		12	0.23	ug/m3			05/23/17 17:08	1
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/23/17 17:08	1
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/23/17 17:08	1
Methylene Chloride	0.914	J	1.7	0.45	ug/m3			05/23/17 17:08	1
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/23/17 17:08	1
Naphthalene	ND		2.6	0.47	ug/m3			05/23/17 17:08	1
o-Xylene	ND		0.87	0.26	ug/m3			05/23/17 17:08	1
Styrene	ND		0.85	0.25	ug/m3			05/23/17 17:08	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/23/17 17:08	1
Tetrahydrofuran	ND		15	0.19	ug/m3			05/23/17 17:08	1
Toluene	ND		0.75	0.45	ug/m3			05/23/17 17:08	1
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/23/17 17:08	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/23/17 17:08	1
Trichloroethene	ND		1.1	0.19	ug/m3			05/23/17 17:08	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			05/23/17 17:08	1
Vinyl acetate	ND		18	0.49	ug/m3			05/23/17 17:08	1
Vinyl bromide	ND		0.87	0.15	ug/m3			05/23/17 17:08	1
Vinyl chloride	ND		0.51	0.18	ug/m3			05/23/17 17:08	1

Lab Sample ID: LCS 140-11431/1006
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	2.00	2.39		ppb v/v		119	70 - 130
1,1,2,2-Tetrachloroethane	2.00	1.81		ppb v/v		90	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	2.00	2.48		ppb v/v		124	70 - 130
1,1,2-Trichloroethane	2.00	1.99		ppb v/v		99	70 - 130
1,1-Dichloroethane	2.00	2.39		ppb v/v		120	70 - 130
1,1-Dichloroethene	2.00	2.37		ppb v/v		119	70 - 130
1,2,4-Trichlorobenzene	2.00	1.53		ppb v/v		77	60 - 140
1,2,4-Trimethylbenzene	2.00	1.85		ppb v/v		92	70 - 130
1,2-Dibromoethane (EDB)	2.00	2.00		ppb v/v		100	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.29		ppb v/v		114	60 - 140
1,2-Dichlorobenzene	2.00	1.81		ppb v/v		90	70 - 130
1,2-Dichloroethane	2.00	2.25		ppb v/v		112	70 - 130
1,2-Dichloropropane	2.00	2.16		ppb v/v		108	70 - 130
1,3,5-Trimethylbenzene	2.00	1.69		ppb v/v		85	70 - 130
1,3-Dichlorobenzene	2.00	1.84		ppb v/v		92	70 - 130
1,4-Dichlorobenzene	2.00	1.87		ppb v/v		93	70 - 130
1,4-Dioxane	2.00	1.61	J	ppb v/v		81	60 - 140
2-Butanone (MEK)	2.00	1.84		ppb v/v		92	60 - 140
4-Methyl-2-pentanone (MIBK)	2.00	1.63		ppb v/v		81	60 - 140
Acetone	6.00	5.59		ppb v/v		93	60 - 140
Benzene	2.00	2.12		ppb v/v		106	70 - 130

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11431/1006
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzyl chloride	2.00	1.92		ppb v/v		96	70 - 130
Bromodichloromethane	2.00	2.24		ppb v/v		112	70 - 130
Bromoform	2.00	1.99		ppb v/v		100	60 - 140
Bromomethane	2.00	2.28		ppb v/v		114	70 - 130
Carbon disulfide	2.00	2.52		ppb v/v		126	70 - 130
Carbon tetrachloride	2.00	2.24		ppb v/v		112	70 - 130
Chlorobenzene	2.00	1.91		ppb v/v		95	70 - 130
Chloroethane	2.00	2.39		ppb v/v		119	70 - 130
Chloroform	2.00	2.41		ppb v/v		121	70 - 130
Chloromethane	2.00	2.24		ppb v/v		112	60 - 140
cis-1,2-Dichloroethene	2.00	2.21		ppb v/v		111	70 - 130
cis-1,3-Dichloropropene	2.00	2.14		ppb v/v		107	70 - 130
Cyclohexane	2.00	2.27		ppb v/v		114	70 - 130
Dibromochloromethane	2.00	2.12		ppb v/v		106	70 - 130
Dichlorodifluoromethane	2.00	2.54		ppb v/v		127	60 - 140
Ethylbenzene	2.00	1.90		ppb v/v		95	70 - 130
Hexachlorobutadiene	2.00	1.70		ppb v/v		85	60 - 140
Hexane	2.00	2.31		ppb v/v		116	70 - 130
Isopropyl alcohol	6.00	5.58		ppb v/v		93	60 - 140
Isopropylbenzene	2.00	1.84		ppb v/v		92	70 - 130
Methyl tert-butyl ether	2.00	1.96		ppb v/v		98	60 - 140
Methylene Chloride	2.00	2.29		ppb v/v		114	70 - 130
m-Xylene & p-Xylene	4.00	3.73		ppb v/v		93	70 - 130
Naphthalene	2.00	1.51		ppb v/v		76	60 - 140
o-Xylene	2.00	1.81		ppb v/v		91	70 - 130
Styrene	2.00	1.94		ppb v/v		97	70 - 130
Tetrachloroethene	2.00	1.99		ppb v/v		100	70 - 130
Tetrahydrofuran	2.00	1.95	J	ppb v/v		97	60 - 140
Toluene	2.00	1.97		ppb v/v		99	70 - 130
trans-1,2-Dichloroethene	2.00	2.22		ppb v/v		111	70 - 130
trans-1,3-Dichloropropene	2.00	2.10		ppb v/v		105	70 - 130
Trichloroethene	2.00	2.07		ppb v/v		103	70 - 130
Trichlorofluoromethane	2.00	2.49		ppb v/v		124	60 - 140
Vinyl acetate	2.00	1.97	J	ppb v/v		98	60 - 140
Vinyl bromide	2.00	2.20		ppb v/v		110	60 - 140
Vinyl chloride	2.00	2.43		ppb v/v		121	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	11	13.0		ug/m3		119	70 - 130
1,1,2,2-Tetrachloroethane	14	12.4		ug/m3		90	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	15	19.0		ug/m3		124	70 - 130
1,1,2-Trichloroethane	11	10.9		ug/m3		99	70 - 130
1,1-Dichloroethane	8.1	9.68		ug/m3		120	70 - 130
1,1-Dichloroethene	7.9	9.41		ug/m3		119	70 - 130
1,2,4-Trichlorobenzene	15	11.4		ug/m3		77	60 - 140
1,2,4-Trimethylbenzene	9.8	9.10		ug/m3		92	70 - 130
1,2-Dibromoethane (EDB)	15	15.4		ug/m3		100	70 - 130

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11431/1006
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	16.0		ug/m3		114	60 - 140
1,2-Dichlorobenzene	12	10.9		ug/m3		90	70 - 130
1,2-Dichloroethane	8.1	9.10		ug/m3		112	70 - 130
1,2-Dichloropropane	9.2	9.97		ug/m3		108	70 - 130
1,3,5-Trimethylbenzene	9.8	8.31		ug/m3		85	70 - 130
1,3-Dichlorobenzene	12	11.1		ug/m3		92	70 - 130
1,4-Dichlorobenzene	12	11.2		ug/m3		93	70 - 130
1,4-Dioxane	7.2	5.81	J	ug/m3		81	60 - 140
2-Butanone (MEK)	5.9	5.41		ug/m3		92	60 - 140
4-Methyl-2-pentanone (MIBK)	8.2	6.67		ug/m3		81	60 - 140
Acetone	14	13.3		ug/m3		93	60 - 140
Benzene	6.4	6.78		ug/m3		106	70 - 130
Benzyl chloride	10	9.94		ug/m3		96	70 - 130
Bromodichloromethane	13	15.0		ug/m3		112	70 - 130
Bromoform	21	20.6		ug/m3		100	60 - 140
Bromomethane	7.8	8.84		ug/m3		114	70 - 130
Carbon disulfide	6.2	7.84		ug/m3		126	70 - 130
Carbon tetrachloride	13	14.1		ug/m3		112	70 - 130
Chlorobenzene	9.2	8.79		ug/m3		95	70 - 130
Chloroethane	5.3	6.30		ug/m3		119	70 - 130
Chloroform	9.8	11.8		ug/m3		121	70 - 130
Chloromethane	4.1	4.62		ug/m3		112	60 - 140
cis-1,2-Dichloroethene	7.9	8.77		ug/m3		111	70 - 130
cis-1,3-Dichloropropene	9.1	9.71		ug/m3		107	70 - 130
Cyclohexane	6.9	7.82		ug/m3		114	70 - 130
Dibromochloromethane	17	18.0		ug/m3		106	70 - 130
Dichlorodifluoromethane	9.9	12.5		ug/m3		127	60 - 140
Ethylbenzene	8.7	8.25		ug/m3		95	70 - 130
Hexachlorobutadiene	21	18.2		ug/m3		85	60 - 140
Hexane	7.1	8.16		ug/m3		116	70 - 130
Isopropyl alcohol	15	13.7		ug/m3		93	60 - 140
Isopropylbenzene	9.8	9.04		ug/m3		92	70 - 130
Methyl tert-butyl ether	7.2	7.08		ug/m3		98	60 - 140
Methylene Chloride	7.0	7.94		ug/m3		114	70 - 130
m-Xylene & p-Xylene	17	16.2		ug/m3		93	70 - 130
Naphthalene	10	7.92		ug/m3		76	60 - 140
o-Xylene	8.7	7.87		ug/m3		91	70 - 130
Styrene	8.5	8.26		ug/m3		97	70 - 130
Tetrachloroethene	14	13.5		ug/m3		100	70 - 130
Tetrahydrofuran	5.9	5.74	J	ug/m3		97	60 - 140
Toluene	7.5	7.44		ug/m3		99	70 - 130
trans-1,2-Dichloroethene	7.9	8.79		ug/m3		111	70 - 130
trans-1,3-Dichloropropene	9.1	9.53		ug/m3		105	70 - 130
Trichloroethene	11	11.1		ug/m3		103	70 - 130
Trichlorofluoromethane	11	14.0		ug/m3		124	60 - 140
Vinyl acetate	7.0	6.94	J	ug/m3		98	60 - 140
Vinyl bromide	8.8	9.61		ug/m3		110	60 - 140

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11431/1006
Matrix: Air
Analysis Batch: 11431

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	5.1	6.20		ug/m3		121	70 - 130

Lab Sample ID: MB 140-11432/4
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			05/24/17 14:06	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			05/24/17 14:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			05/24/17 14:06	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			05/24/17 14:06	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			05/24/17 14:06	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			05/24/17 14:06	1
1,2,4-Trichlorobenzene	ND		2.0	0.098	ppb v/v			05/24/17 14:06	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			05/24/17 14:06	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			05/24/17 14:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			05/24/17 14:06	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			05/24/17 14:06	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			05/24/17 14:06	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			05/24/17 14:06	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			05/24/17 14:06	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			05/24/17 14:06	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			05/24/17 14:06	1
1,4-Dioxane	ND		5.0	0.080	ppb v/v			05/24/17 14:06	1
2-Butanone (MEK)	ND		1.0	0.20	ppb v/v			05/24/17 14:06	1
4-Methyl-2-pentanone (MIBK)	ND		0.50	0.20	ppb v/v			05/24/17 14:06	1
Acetone	ND		5.0	1.4	ppb v/v			05/24/17 14:06	1
Benzene	ND		0.20	0.056	ppb v/v			05/24/17 14:06	1
Benzyl chloride	ND		0.80	0.078	ppb v/v			05/24/17 14:06	1
Bromodichloromethane	ND		0.20	0.044	ppb v/v			05/24/17 14:06	1
Bromoform	ND		0.20	0.048	ppb v/v			05/24/17 14:06	1
Bromomethane	ND		0.20	0.032	ppb v/v			05/24/17 14:06	1
Carbon disulfide	ND		0.50	0.031	ppb v/v			05/24/17 14:06	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			05/24/17 14:06	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			05/24/17 14:06	1
Chloroethane	ND		0.80	0.035	ppb v/v			05/24/17 14:06	1
Chloroform	ND		0.20	0.038	ppb v/v			05/24/17 14:06	1
Chloromethane	ND		0.50	0.16	ppb v/v			05/24/17 14:06	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			05/24/17 14:06	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			05/24/17 14:06	1
Cyclohexane	ND		0.50	0.040	ppb v/v			05/24/17 14:06	1
Dibromochloromethane	ND		0.20	0.042	ppb v/v			05/24/17 14:06	1
Dichlorodifluoromethane	ND		0.50	0.068	ppb v/v			05/24/17 14:06	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			05/24/17 14:06	1
Hexachlorobutadiene	ND		0.20	0.078	ppb v/v			05/24/17 14:06	1
Hexane	ND		0.80	0.032	ppb v/v			05/24/17 14:06	1
Isopropyl alcohol	ND		5.0	0.094	ppb v/v			05/24/17 14:06	1
Isopropylbenzene	ND		0.80	0.060	ppb v/v			05/24/17 14:06	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-11432/4
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methyl tert-butyl ether	ND		1.0	0.17	ppb v/v			05/24/17 14:06	1
Methylene Chloride	0.260	J	0.50	0.13	ppb v/v			05/24/17 14:06	1
m-Xylene & p-Xylene	ND		0.80	0.12	ppb v/v			05/24/17 14:06	1
Naphthalene	ND		0.50	0.090	ppb v/v			05/24/17 14:06	1
o-Xylene	ND		0.20	0.061	ppb v/v			05/24/17 14:06	1
Styrene	ND		0.20	0.058	ppb v/v			05/24/17 14:06	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			05/24/17 14:06	1
Tetrahydrofuran	ND		5.0	0.063	ppb v/v			05/24/17 14:06	1
Toluene	ND		0.20	0.12	ppb v/v			05/24/17 14:06	1
trans-1,2-Dichloroethene	ND		0.20	0.050	ppb v/v			05/24/17 14:06	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			05/24/17 14:06	1
Trichloroethene	ND		0.20	0.036	ppb v/v			05/24/17 14:06	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			05/24/17 14:06	1
Vinyl acetate	ND		5.0	0.14	ppb v/v			05/24/17 14:06	1
Vinyl bromide	ND		0.20	0.035	ppb v/v			05/24/17 14:06	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			05/24/17 14:06	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			05/24/17 14:06	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			05/24/17 14:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			05/24/17 14:06	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			05/24/17 14:06	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			05/24/17 14:06	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			05/24/17 14:06	1
1,2,4-Trichlorobenzene	ND		15	0.73	ug/m3			05/24/17 14:06	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			05/24/17 14:06	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			05/24/17 14:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			05/24/17 14:06	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			05/24/17 14:06	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			05/24/17 14:06	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			05/24/17 14:06	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			05/24/17 14:06	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			05/24/17 14:06	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			05/24/17 14:06	1
1,4-Dioxane	ND		18	0.29	ug/m3			05/24/17 14:06	1
2-Butanone (MEK)	ND		2.9	0.59	ug/m3			05/24/17 14:06	1
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.80	ug/m3			05/24/17 14:06	1
Acetone	ND		12	3.3	ug/m3			05/24/17 14:06	1
Benzene	ND		0.64	0.18	ug/m3			05/24/17 14:06	1
Benzyl chloride	ND		4.1	0.40	ug/m3			05/24/17 14:06	1
Bromodichloromethane	ND		1.3	0.29	ug/m3			05/24/17 14:06	1
Bromoform	ND		2.1	0.50	ug/m3			05/24/17 14:06	1
Bromomethane	ND		0.78	0.12	ug/m3			05/24/17 14:06	1
Carbon disulfide	ND		1.6	0.097	ug/m3			05/24/17 14:06	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			05/24/17 14:06	1
Chlorobenzene	ND		0.92	0.23	ug/m3			05/24/17 14:06	1
Chloroethane	ND		2.1	0.092	ug/m3			05/24/17 14:06	1
Chloroform	ND		0.98	0.19	ug/m3			05/24/17 14:06	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-11432/4
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		1.0	0.33	ug/m3			05/24/17 14:06	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			05/24/17 14:06	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			05/24/17 14:06	1
Cyclohexane	ND		1.7	0.14	ug/m3			05/24/17 14:06	1
Dibromochloromethane	ND		1.7	0.36	ug/m3			05/24/17 14:06	1
Dichlorodifluoromethane	ND		2.5	0.34	ug/m3			05/24/17 14:06	1
Ethylbenzene	ND		0.87	0.30	ug/m3			05/24/17 14:06	1
Hexachlorobutadiene	ND		2.1	0.83	ug/m3			05/24/17 14:06	1
Hexane	ND		2.8	0.11	ug/m3			05/24/17 14:06	1
Isopropyl alcohol	ND		12	0.23	ug/m3			05/24/17 14:06	1
Isopropylbenzene	ND		3.9	0.29	ug/m3			05/24/17 14:06	1
Methyl tert-butyl ether	ND		3.6	0.61	ug/m3			05/24/17 14:06	1
Methylene Chloride	0.903	J	1.7	0.45	ug/m3			05/24/17 14:06	1
m-Xylene & p-Xylene	ND		3.5	0.52	ug/m3			05/24/17 14:06	1
Naphthalene	ND		2.6	0.47	ug/m3			05/24/17 14:06	1
o-Xylene	ND		0.87	0.26	ug/m3			05/24/17 14:06	1
Styrene	ND		0.85	0.25	ug/m3			05/24/17 14:06	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			05/24/17 14:06	1
Tetrahydrofuran	ND		15	0.19	ug/m3			05/24/17 14:06	1
Toluene	ND		0.75	0.45	ug/m3			05/24/17 14:06	1
trans-1,2-Dichloroethene	ND		0.79	0.20	ug/m3			05/24/17 14:06	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			05/24/17 14:06	1
Trichloroethene	ND		1.1	0.19	ug/m3			05/24/17 14:06	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			05/24/17 14:06	1
Vinyl acetate	ND		18	0.49	ug/m3			05/24/17 14:06	1
Vinyl bromide	ND		0.87	0.15	ug/m3			05/24/17 14:06	1
Vinyl chloride	ND		0.51	0.18	ug/m3			05/24/17 14:06	1

Lab Sample ID: LCS 140-11432/1006
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	2.00	2.50		ppb v/v		125	70 - 130
1,1,2,2-Tetrachloroethane	2.00	1.90		ppb v/v		95	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	2.00	2.56		ppb v/v		128	70 - 130
1,1,2-Trichloroethane	2.00	2.08		ppb v/v		104	70 - 130
1,1-Dichloroethane	2.00	2.53		ppb v/v		126	70 - 130
1,1-Dichloroethene	2.00	2.39		ppb v/v		120	70 - 130
1,2,4-Trichlorobenzene	2.00	1.74		ppb v/v		87	60 - 140
1,2,4-Trimethylbenzene	2.00	2.01		ppb v/v		100	70 - 130
1,2-Dibromoethane (EDB)	2.00	2.07		ppb v/v		103	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.35		ppb v/v		117	60 - 140
1,2-Dichlorobenzene	2.00	1.94		ppb v/v		97	70 - 130
1,2-Dichloroethane	2.00	2.43		ppb v/v		121	70 - 130
1,2-Dichloropropane	2.00	2.29		ppb v/v		114	70 - 130
1,3,5-Trimethylbenzene	2.00	1.81		ppb v/v		91	70 - 130

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11432/1006
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,3-Dichlorobenzene	2.00	1.99		ppb v/v		99	70 - 130
1,4-Dichlorobenzene	2.00	1.99		ppb v/v		99	70 - 130
1,4-Dioxane	2.00	1.69	J	ppb v/v		84	60 - 140
2-Butanone (MEK)	2.00	1.90		ppb v/v		95	60 - 140
4-Methyl-2-pentanone (MIBK)	2.00	1.66		ppb v/v		83	60 - 140
Acetone	6.00	5.23		ppb v/v		87	60 - 140
Benzene	2.00	2.23		ppb v/v		112	70 - 130
Benzyl chloride	2.00	2.10		ppb v/v		105	70 - 130
Bromodichloromethane	2.00	2.35		ppb v/v		118	70 - 130
Bromoform	2.00	1.72		ppb v/v		86	60 - 140
Bromomethane	2.00	2.24		ppb v/v		112	70 - 130
Carbon disulfide	2.00	2.53		ppb v/v		126	70 - 130
Carbon tetrachloride	2.00	2.38		ppb v/v		119	70 - 130
Chlorobenzene	2.00	2.03		ppb v/v		102	70 - 130
Chloroethane	2.00	2.48		ppb v/v		124	70 - 130
Chloroform	2.00	2.58		ppb v/v		129	70 - 130
Chloromethane	2.00	2.31		ppb v/v		115	60 - 140
cis-1,2-Dichloroethene	2.00	2.33		ppb v/v		117	70 - 130
cis-1,3-Dichloropropene	2.00	2.29		ppb v/v		115	70 - 130
Cyclohexane	2.00	2.33		ppb v/v		116	70 - 130
Dibromochloromethane	2.00	2.08		ppb v/v		104	70 - 130
Dichlorodifluoromethane	2.00	2.69		ppb v/v		134	60 - 140
Ethylbenzene	2.00	2.03		ppb v/v		102	70 - 130
Hexachlorobutadiene	2.00	1.75		ppb v/v		87	60 - 140
Hexane	2.00	2.42		ppb v/v		121	70 - 130
Isopropyl alcohol	6.00	5.33		ppb v/v		89	60 - 140
Isopropylbenzene	2.00	2.05		ppb v/v		103	70 - 130
Methyl tert-butyl ether	2.00	2.14		ppb v/v		107	60 - 140
Methylene Chloride	2.00	2.33		ppb v/v		116	70 - 130
m-Xylene & p-Xylene	4.00	4.09		ppb v/v		102	70 - 130
Naphthalene	2.00	1.76		ppb v/v		88	60 - 140
o-Xylene	2.00	1.94		ppb v/v		97	70 - 130
Styrene	2.00	2.06		ppb v/v		103	70 - 130
Tetrachloroethene	2.00	2.05		ppb v/v		103	70 - 130
Tetrahydrofuran	2.00	2.20		ppb v/v		110	60 - 140
Toluene	2.00	2.16		ppb v/v		108	70 - 130
trans-1,2-Dichloroethene	2.00	2.24		ppb v/v		112	70 - 130
trans-1,3-Dichloropropene	2.00	2.26		ppb v/v		113	70 - 130
Trichloroethene	2.00	2.09		ppb v/v		105	70 - 130
Trichlorofluoromethane	2.00	2.60		ppb v/v		130	60 - 140
Vinyl acetate	2.00	2.18		ppb v/v		109	60 - 140
Vinyl bromide	2.00	2.32		ppb v/v		116	60 - 140
Vinyl chloride	2.00	2.54		ppb v/v		127	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	11	13.7		ug/m3		125	70 - 130
1,1,2,2-Tetrachloroethane	14	13.1		ug/m3		95	70 - 130

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11432/1006
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloro-1,2,2-trifluoroethane	15	19.6		ug/m3		128	70 - 130
1,1,2-Trichloroethane	11	11.4		ug/m3		104	70 - 130
1,1-Dichloroethane	8.1	10.2		ug/m3		126	70 - 130
1,1-Dichloroethene	7.9	9.49		ug/m3		120	70 - 130
1,2,4-Trichlorobenzene	15	12.9		ug/m3		87	60 - 140
1,2,4-Trimethylbenzene	9.8	9.87		ug/m3		100	70 - 130
1,2-Dibromoethane (EDB)	15	15.9		ug/m3		103	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	16.4		ug/m3		117	60 - 140
1,2-Dichlorobenzene	12	11.7		ug/m3		97	70 - 130
1,2-Dichloroethane	8.1	9.83		ug/m3		121	70 - 130
1,2-Dichloropropane	9.2	10.6		ug/m3		114	70 - 130
1,3,5-Trimethylbenzene	9.8	8.90		ug/m3		91	70 - 130
1,3-Dichlorobenzene	12	12.0		ug/m3		99	70 - 130
1,4-Dichlorobenzene	12	11.9		ug/m3		99	70 - 130
1,4-Dioxane	7.2	6.07	J	ug/m3		84	60 - 140
2-Butanone (MEK)	5.9	5.59		ug/m3		95	60 - 140
4-Methyl-2-pentanone (MIBK)	8.2	6.78		ug/m3		83	60 - 140
Acetone	14	12.4		ug/m3		87	60 - 140
Benzene	6.4	7.14		ug/m3		112	70 - 130
Benzyl chloride	10	10.9		ug/m3		105	70 - 130
Bromodichloromethane	13	15.8		ug/m3		118	70 - 130
Bromoform	21	17.8		ug/m3		86	60 - 140
Bromomethane	7.8	8.71		ug/m3		112	70 - 130
Carbon disulfide	6.2	7.87		ug/m3		126	70 - 130
Carbon tetrachloride	13	15.0		ug/m3		119	70 - 130
Chlorobenzene	9.2	9.36		ug/m3		102	70 - 130
Chloroethane	5.3	6.55		ug/m3		124	70 - 130
Chloroform	9.8	12.6		ug/m3		129	70 - 130
Chloromethane	4.1	4.77		ug/m3		115	60 - 140
cis-1,2-Dichloroethene	7.9	9.26		ug/m3		117	70 - 130
cis-1,3-Dichloropropene	9.1	10.4		ug/m3		115	70 - 130
Cyclohexane	6.9	8.01		ug/m3		116	70 - 130
Dibromochloromethane	17	17.7		ug/m3		104	70 - 130
Dichlorodifluoromethane	9.9	13.3		ug/m3		134	60 - 140
Ethylbenzene	8.7	8.83		ug/m3		102	70 - 130
Hexachlorobutadiene	21	18.7		ug/m3		87	60 - 140
Hexane	7.1	8.52		ug/m3		121	70 - 130
Isopropyl alcohol	15	13.1		ug/m3		89	60 - 140
Isopropylbenzene	9.8	10.1		ug/m3		103	70 - 130
Methyl tert-butyl ether	7.2	7.70		ug/m3		107	60 - 140
Methylene Chloride	7.0	8.09		ug/m3		116	70 - 130
m-Xylene & p-Xylene	17	17.8		ug/m3		102	70 - 130
Naphthalene	10	9.24		ug/m3		88	60 - 140
o-Xylene	8.7	8.42		ug/m3		97	70 - 130
Styrene	8.5	8.78		ug/m3		103	70 - 130
Tetrachloroethene	14	13.9		ug/m3		103	70 - 130
Tetrahydrofuran	5.9	6.48		ug/m3		110	60 - 140

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-11432/1006
Matrix: Air
Analysis Batch: 11432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Toluene	7.5	8.13		ug/m3		108	70 - 130
trans-1,2-Dichloroethene	7.9	8.87		ug/m3		112	70 - 130
trans-1,3-Dichloropropene	9.1	10.3		ug/m3		113	70 - 130
Trichloroethene	11	11.3		ug/m3		105	70 - 130
Trichlorofluoromethane	11	14.6		ug/m3		130	60 - 140
Vinyl acetate	7.0	7.68		ug/m3		109	60 - 140
Vinyl bromide	8.8	10.2		ug/m3		116	60 - 140
Vinyl chloride	5.1	6.50		ug/m3		127	70 - 130

QC Association Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Air - GC/MS VOA

Analysis Batch: 11431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8162-1	B-B	Total/NA	Air	TO-15	
140-8162-2	B-SS	Total/NA	Air	TO-15	
140-8162-3	B-I	Total/NA	Air	TO-15	
140-8162-4	A-B-1	Total/NA	Air	TO-15	
140-8162-5	A-1-2	Total/NA	Air	TO-15	
140-8162-6	A-SS-1	Total/NA	Air	TO-15	
140-8162-7	A-SS-2	Total/NA	Air	TO-15	
140-8162-8	A-1-1	Total/NA	Air	TO-15	
140-8162-9	A-B-2	Total/NA	Air	TO-15	
140-8162-10	AA	Total/NA	Air	TO-15	
140-8162-11	D-A	Total/NA	Air	TO-15	
140-8162-12	D-SS	Total/NA	Air	TO-15	
MB 140-11431/8	Method Blank	Total/NA	Air	TO-15	
LCS 140-11431/1006	Lab Control Sample	Total/NA	Air	TO-15	

Analysis Batch: 11432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8162-13	C-SS	Total/NA	Air	TO-15	
140-8162-14	D-I	Total/NA	Air	TO-15	
140-8162-15	C-B	Total/NA	Air	TO-15	
140-8162-16	C-I	Total/NA	Air	TO-15	
140-8162-17	1801-CENTRAL-03	Total/NA	Air	TO-15	
140-8162-18	205 14TH-01	Total/NA	Air	TO-15	
140-8162-19	1433-CENTRAL-04	Total/NA	Air	TO-15	
140-8162-20	1433-CENTRAL-04D	Total/NA	Air	TO-15	
140-8162-21	1004-PARKALLEY-01	Total/NA	Air	TO-15	
140-8162-22	1433-CENTRAL-03	Total/NA	Air	TO-15	
140-8162-23	1404-CENTRAL-02	Total/NA	Air	TO-15	
140-8162-24	C-14TH-05	Total/NA	Air	TO-15	
140-8162-25	CENTRAL-1433-02	Total/NA	Air	TO-15	
MB 140-11432/4	Method Blank	Total/NA	Air	TO-15	
LCS 140-11432/1006	Lab Control Sample	Total/NA	Air	TO-15	

Lab Chronicle

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: B-B
Date Collected: 05/17/17 09:03
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.49	298 mL	500 mL	11431	05/23/17 20:46	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: B-SS
Date Collected: 05/17/17 09:06
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-2
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.53	306 mL	500 mL	11431	05/23/17 21:31	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: B-I
Date Collected: 05/17/17 09:11
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-3
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.41	282 mL	500 mL	11431	05/24/17 08:48	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: A-B-1
Date Collected: 05/17/17 09:19
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-4
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.46	292 mL	500 mL	11431	05/23/17 22:58	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: A-1-2
Date Collected: 05/17/17 09:30
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.61	322 mL	500 mL	11431	05/23/17 23:42	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: A-SS-1
Date Collected: 05/17/17 09:23
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-6
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.5	300 mL	500 mL	11431	05/24/17 00:28	HMT	TAL KNX
	Instrument ID: MG									

Lab Chronicle

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: A-SS-2

Lab Sample ID: 140-8162-7
Matrix: Air

Date Collected: 05/17/17 09:22
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.62	324 mL	500 mL	11431	05/24/17 01:13	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: A-1-1

Lab Sample ID: 140-8162-8
Matrix: Air

Date Collected: 05/17/17 09:27
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.57	314 mL	500 mL	11431	05/24/17 01:58	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: A-B-2

Lab Sample ID: 140-8162-9
Matrix: Air

Date Collected: 05/17/17 09:20
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.4	280 mL	500 mL	11431	05/24/17 02:42	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: AA

Lab Sample ID: 140-8162-10
Matrix: Air

Date Collected: 05/17/17 09:37
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.38	276 mL	500 mL	11431	05/24/17 03:26	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: D-A

Lab Sample ID: 140-8162-11
Matrix: Air

Date Collected: 05/17/17 11:09
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.3	260 mL	500 mL	11431	05/24/17 04:11	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: D-SS

Lab Sample ID: 140-8162-12
Matrix: Air

Date Collected: 05/17/17 11:13
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.43	11 mL	500 mL	11431	05/24/17 04:53	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: C-SS
Date Collected: 05/17/17 15:40
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-13
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.42	284 mL	500 mL	11432	05/24/17 16:14	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: D-I
Date Collected: 05/17/17 11:12
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-14
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.35	270 mL	500 mL	11432	05/24/17 17:00	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: C-B
Date Collected: 05/17/17 14:40
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-15
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.59	318 mL	500 mL	11432	05/24/17 17:44	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: C-I
Date Collected: 05/17/17 15:42
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-16
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.42	284 mL	500 mL	11432	05/24/17 18:28	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1801-CENTRAL-03
Date Collected: 05/17/17 10:39
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-17
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.77	35.4 mL	500 mL	11432	05/24/17 19:12	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 205 14TH-01
Date Collected: 05/17/17 12:04
Date Received: 05/22/17 09:25

Lab Sample ID: 140-8162-18
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.63	32.6 mL	500 mL	11432	05/24/17 19:54	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1433-CENTRAL-04

Lab Sample ID: 140-8162-19
Matrix: Air
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.55	31 mL	500 mL	11432	05/24/17 20:36	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1433-CENTRAL-04D

Lab Sample ID: 140-8162-20
Matrix: Air
Date Collected: 05/17/17 15:20
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.46	29.2 mL	500 mL	11432	05/24/17 21:17	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1004-PARKALLEY-01

Lab Sample ID: 140-8162-21
Matrix: Air
Date Collected: 05/17/17 14:25
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.55	31 mL	500 mL	11432	05/24/17 21:59	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1433-CENTRAL-03

Lab Sample ID: 140-8162-22
Matrix: Air
Date Collected: 05/17/17 16:18
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.57	31.4 mL	500 mL	11432	05/24/17 22:41	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: 1404-CENTRAL-02

Lab Sample ID: 140-8162-23
Matrix: Air
Date Collected: 05/17/17 09:21
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.57	31.4 mL	500 mL	11432	05/24/17 23:23	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: C-14TH-05

Lab Sample ID: 140-8162-24
Matrix: Air
Date Collected: 05/17/17 12:24
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.6	32 mL	500 mL	11432	05/25/17 00:06	HMT	TAL KNX
	Instrument ID: MG									

Lab Chronicle

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Client Sample ID: CENTRAL-1433-02

Lab Sample ID: 140-8162-25
Matrix: Air

Date Collected: 05/17/17 16:35
Date Received: 05/22/17 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.71	34.2 mL	500 mL	11432	05/25/17 00:48	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11431/8
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	11431	05/23/17 17:08	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11432/4
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	11432	05/24/17 14:06	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-11431/1006
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	11431	05/23/17 14:03	HMT	TAL KNX
	Instrument ID: MG									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-11432/1006
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	11432	05/24/17 12:11	HMT	TAL KNX
	Instrument ID: MG									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-16-17
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-17
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
L-A-B	DoD ELAP		L2311	02-13-19
Louisiana	NELAP	6	83979	06-30-17
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-17 *
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-17
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: New Mexico Environment Department
Project/Site: West Central Avenue

TestAmerica Job ID: 140-8162-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

ED_013172_00000352-00119

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Martyne Kieling	Samples Collected By: Martyne Kieling (NMED)	COC No:
NM Environment Departemnt GWQB superfund	Phone: 505-827-2340		1 of 1 COCs
1190 S. St. Francis Drive, P.O.Box 5469	Email: martyne.kieling@state.nm.us		
Santa Fe, New Mexico 87502-5469			For Lab Use Only:
Phone: 505-827-2340	Site Contact: Martyne Kieling 505-827-2340		Walk-in Client:
FAX:	TA Contact: Ryan Henry		Lab Sampling:
Project Name: West Central Avenue	Anaylsis Turnaround Time		Job / SDG No.:
Site/Location: Albuquerque, NM	Standard (Specific): standard	140-8162 Chain of Custody	(See below for Add'l Items)
P O # 66700-0000028265	Rush (Specifiy):		

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-14/15 (Stand	TO-15 SIM	EPA 3C	EPA 25C	ASTM D-1946	EPA 15/16	Other (Please specify in notes sectio	Sample Type	Indoor Air/Ambient Air	Sub-Slab	Soil Gas	Soil Vapor Extraction (SVE)	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
B-B	5/17/17	09:39	09:03	-25	-3.0	10876	11149		X													
B-SS	5/17/17	09:39	09:06	-28	-4.5	8620	09824		X													Possible Moisture
B-I	5/17/17	09:40	09:11	-27	-4.0	7052	11211		X													
AB-1	5/17/17	10:49	09:19	-25	-4	10658	10015		X								8162					

REC. @ AMBIENT
CUSTODY SEALS INTACT
4 BOXES RH 5-22-17
UPS# 1Z703AY90191248681

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

93630870
91125269
90767854

Special Instructions/QC Requirements & Comments: Two Canisters Un Used & Flow Controllers -

18 GL / 9 IL / 17 FLOWS / 9 KR

Samples Shipped by: Martyne Kieling	Date / Time: 5-19-17 11:30	Samples Received by: Ryan Henry	5/22/17 0925
Samples Relinquished by:	Date / Time:	Received by:	
Relinquished by:	Date / Time:	Received by:	

Lab Use Only: Shipper Name: Opened by: Condition:

Form No. CA-C-WI-003, Rev. 2.2, dated 1/24/2017

5/31/2017

ED_013172_00000352-00120

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Martyne Kieling	Samples Collected By: Martyne Kieling NMED	COC No:
NM Environment Departemnt GWQB superfund	Phone: 505-827-2340		1 of 1 COCs
1190 S. St. Francis Drive, P.O.Box 5469	Email: martyne.kieling@state.nm.us		
Santa Fe, New Mexico 87502-5469			For Lab Use Only:
Phone: 505-827-2340	Site Contact: Martyne Kieling 505-827-2340		Walk-in Client:
FAX:	TA Contact: Ryan Henry		Lab Sampling:
Project Name: West Central Avenue	Anaylsis Turnaround Time		Job / SDG No.:
Site/Location: Albuquerque, NM	Standard (Specific): standard		(See below for Add'l Items)
P O # 66700-0000028265	Rush (Specifiy):		

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-14/15 (Standard / Low Level)	TO-15 SIM	EPA 3C	EPA 25C	ASTM D-1946	EPA 15/16	Other (Please specify in notes sectio	Sample Type	Indoor Air/Ambient Air	Sub-Slab	Soil Gas	Soil Vapor Extraction (SVE)	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
A-1-2	5/17/17	1051	0930	-29.	-6	7596	10167		x													
A-SS-1	5/17/17	1047	0923	-26	-5	10441	09991		X													
A-SS-2	5/17/17	1047	0922	-26	-5	7071	09936		X													
A-1-1	5/17/17	1051	0927	-26	-5	10786	16849		X													
A-B-2	5/17/17	1049	0920	-26	-4	11275	11063		X													
AA	5/17/17	1105	0937	-27	-4.5	09956	10040		X													

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

Special Instructions/QC Requirements & Comments:

Samples Shipped by: Mtg Hf.	Date / Time: 5/18/17 11:30	Samples Received by: Ryan Henry	5/22/17 0925
Samples Relinquished by:	Date / Time:	Received by:	
Relinquished by:	Date / Time:	Received by:	

Lab Use Only: Shipper Name: Opened by: Condition:

Form No. CA-C-WI-003, Rev. 2.2, dated 1/24/2017

ED_013172_00000352-00121

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	**Project Manager: Martyne Kieling**	**Samples Collected By:** Martyne Kieling NMED
NM Environment Departemnt GWQB superfund	**Phone: 505-827-2340**	
1190 S. St. Francis Drive, P.O.Box 5469	**Email: martyne.kieling@state.nm.us**	
Santa Fe, New Mexico 87502-5469		
Phone: 505-827-2340	**Site Contact: Martyne Kieling 505-827-2340**	
FAX:	**TA Contact: Ryan Henry**	
Project Name: West Central Avenue	**Anaylsis Turnaround Time**	
Site/Location: Albuquerque, NM	Standard (Specific): standard	
P O # 66700-0000028265	Rush (Specifiy):	

COC No: ____ of ____ COCs

For Lab Use Only:
Walk-in Client:
Lab Sampling:

Job / SDG No.:
(See below for Add'l Items)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-14/15 (Standard / Low Level)	TO-15 SIM	EPA 3C	EPA 25C	ASTM D-1946	EPA 15/16	Other (Please specify in notes sectio	Sample Type	Indoor Air/Ambient Air	Sub-Slab	Soil Gas	Soil Vapor Extraction (SVE)	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
D-A	5/17/17	1206	1109	-27.5	-3	10853	11173		X													
D-SS	5/17/17	1146	1113	-25	-3	7060	10712		X													
C-SS	5/17/17	1626	1540	-26	-4.5	7407	11143		X													
D-I	5/17/17	11:57	11:18	-25	-3	7418	09729		X													
C-B	5/17/17	16:27	14:40	-29.5	-4	7592	10120		X													
C-I	5/17/17	1630	15:42	-26	-4.5	8640	10413		X													

	Temperature (Fahrenheit)		
	Start	Interior	Ambient
	Stop		

	Temperature (Fahrenheit)		
	Start	Interior	Ambient
	Stop		

Special Instructions/QC Requirements & Comments:

Samples Shipped by: Martyne Kieling	**Date / Time:** 5/18/17 11:30	**Samples Received by:** Ryan Henry 5/22/17 0925
Samples Relinquished by:	**Date / Time:**	**Received by:**
Relinquished by:	**Date / Time:**	**Received by:**

Lab Use Only: **Shipper Name:** **Opened by:** **Condition:**

Form No. CA-C-WI-003, Rev. 2.2, dated 1/24/2017

5/31/2017

ED_013172_00000352-00122

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Martyne Kieling	Samples Collected By: Steve Jetter	COC No:
NM Environment Departemnt GWQB superfund	Phone: 505-827-2340		1 of 1 COCs
1190 S. St. Francis Drive, P.O.Box 5469	Email: martyne.kieling@state.nm.us		
Santa Fe, New Mexico 87502-5469			For Lab Use Only:
Phone: 505-827-2340	Site Contact: Martyne Kieling 505-827-2340		Walk-in Client:
FAX:	TA Contact: Ryan Henry		Lab Sampling:
Project Name: West Central Avenue	Anaylsis Turnaround Time		
Site/Location: Albuquerque, NM	Standard (Specific): standard		Job / SDG No.:
P O # 66700-0000028265	Rush (Specifiy):		(See below for Add'l Items)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)"	Canister Vacuum in Field, "Hg (Stop)"	Flow Controller ID	Canister ID	TO-14/15 (Standard / Low Level)	TO-15 SIM	EPA 3C	EPA 25C	ASTM D-1946	EPA 15/16	Other (Please specify in notes section)	SampleType	Indoor Air/Ambient Air	Sub-Slab	Soil Gas	Soil Vapor Extraction (SVE)	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
1801-Central-03	5/17/17	1024	1039	-26	-7	10672	10961		x													
205 14th-01	5/17/17	1158	1204	-24	-3	10619	11244		X													
1433-Central-04	5/17/17	1513	1520	-24	-3.5	10852	11285		X													
1433-Central-04D	5/17/17	1513	1520	-24	-3	09588	10957		X													
1004-Parkaley-01	5/17/17	1420	1425	-22	-3	10613	09739		X													
1433-Central-03	5/17/17	1612	1618	-25	-3	10246	10334		X													
1404-Central-02	5/17/17	0916	0921	-24	-3	10952	11546		X													
C-14th-05	5/17/17	1218	1224	-23.5	-3	09957	09957		X													
Central-1433-02	5/17/17	1630	1635	-23.5	-4	09883	10839		X													

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

Temperature (Fahrenheit)			
Start	Interior	Ambient	
Stop			

Special Instructions/QC Requirements & Comments:

Samples Shipped by: Steve Jetter	Date / Time: 5/18/17 11:30	Samples Received by: Ryan Henry	5/22/17 0925
Samples Relinquished by:	Date / Time:	Received by:	
Relinquished by:	Date / Time:	Received by:	
Lab Use Only: Shipper Name:	Opened by:	Condition:	

Form No. CA-C-WI-003, Rev. 2.2, dated 1/24/2017

5/31/2017

ED_013172_00000352-00123

Loc: 140
8162

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☑ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	✓			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____			✓	☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)		✓		☑ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	✓			☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, lab will adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

1. CAN ID ON COC IS INCORRECT FOR '1433-CENTRAL-04D' AND 'C-14TH-05'.

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 1400368 PM Instructions: _____

Sample Receiving Associate: Ryan Henry Date: 5/22/17

QA026R30.doc, 080916

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G5
Date: 5/23/2017

Analyst	Sample ID	Asset #	Cleaning Job	Cert	Size (L)	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
HMT	140-8162-a-1	11149	7984	B	6	-7.1	10:54	2.0
HMT	140-8162-a-2	09824	7985	B	6	-8.5	10:55	1.4
HMT	140-8162-a-3	11211	7985	B	6	-7.8	10:56	0.6
HMT	140-8162-a-4	10015	7984	B	6	-8.8	10:57	0.5
HMT	140-8162-a-5	10167	7984	B	6	-9.0	10:58	1.8
HMT	140-8162-a-6	09991	7984	B	6	-8.8	10:59	0.9
HMT	140-8162-a-7	09936	7985	B	6	-8.9	12:21	2.0
HMT	140-8162-a-8	10849	7985	B	6	-8.8	12:22	1.6
HMT	140-8162-a-9	11063	7984	B	6	-8.5	12:23	0.0
HMT	140-8162-a-10	10040	7984	B	6	-8.3	12:24	0.0
HMT	140-8162-a-11	11173	7985	B	6	-6.9	12:25	0.0
HMT	140-8162-a-12	10712	7985	B	6	-9.0	12:26	0.0
HMT	140-8162-a-13	11143	7984	B	6	-8.0	12:40	0.6
HMT	140-8162-a-14	09729	7974	B	6	-7.8	12:41	0.0
HMT	140-8162-a-15	10120	7974	B	6	-8.9	12:42	1.7
HMT	140-8162-a-16	10413	7974	B	6	-8.9	12:43	0.0
HMT	140-8162-a-17	10961	7867	B	1	-9.9	12:44	2.7
HMT	140-8162-a-18	11244	7867	B	1	-8.1	12:45	2.8
HMT	140-8162-a-19	11285	7867	B	1	-8.5	12:46	1.6
HMT	140-8162-a-20	09888	7867	B	1	-8.1	12:47	1.0
HMT	140-8162-a-21	09739	7867	B	1	-9.5	12:48	0.8
HMT	140-8162-a-22	10334	7867	B	1	-8.3	12:49	2.0
HMT	140-8162-a-23	11546	7867	B	1	-7.4	12:50	2.7
HMT	140-8162-a-24	09584	7867	B	1	-8.1	12:51	2.5
HMT	140-8162-a-25	10839	7867	B	1	-9.2	12:52	2.7

ED_013172_00000352-00124

Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 12/1/2021 4:03:05 PM
To: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Subject: RE: [EXT]:West Central Avenue

Derrick,

Status please???

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Wednesday, November 24, 2021 4:20 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: RE: [EXT]:West Central Avenue

Gary,
Sorry for the delay in getting back to you. I am working with Beacon to see if they draw in the lines. I have an email into them but have not heard back. I will give them a call on Monday to check on the status of if this is something we just need to do ourselves. I hope that you and the family have a good Thanksgiving.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Monday, November 22, 2021 1:46 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: RE: [EXT]:West Central Avenue

CAUTION: ***External Message***

Derrick,

Can you let me know what the status is of the request below?

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, November 9, 2021 2:27 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>
Subject: RE: [EXT]:West Central Avenue

Gary,
We will get started on preparing the figures with the associated polygons and the associated properties.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Tuesday, November 9, 2021 2:22 PM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>
Subject: [EXT]:West Central Avenue

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Derrick,

We had an EPA Team Meeting and we would like for the following to be done.

1. We would like for you to put a polygon around what we think is the concentration of 16 ug/m3 (attenuation concentration @ 10-6), 70 ug/m3 (attenuation concentration @ THQ=1), 160 ug/m3 (attenuation concentration @ 10-5), and 210 ug/m3 (attenuation concentration @ THQ = 3), on the TCE plume around the Bell Trading Post; The purpose is to visualize the properties that will be contained within these concentration isopleths.
2. Once we complete this, we will need to identify the addresses, building use (residential/commercial), owner information, and type of foundation for potential indoor air sampling.

If the EPA team has any other suggestions or I stated something incorrectly, please correct.

Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

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Message

From: Cobb, Derrick [Derrick.Cobb@WestonSolutions.com]
Sent: 12/1/2021 4:13:36 PM
To: Moore, Gary [Moore.Gary@epa.gov]
Subject: RE: [EXT]:West Central Avenue
Attachments: ATT00001.txt

I have a call into Beacon. Should hear something back later today and will update you.

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Wednesday, December 1, 2021 10:03 AM
To: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Subject: RE: [EXT]:West Central Avenue

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Status please???

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Thanks

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
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cell: 214.789.1627
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Message

From: Moore, Gary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D9494EB3B37241B09CE3BDEAFF4C557A-MOORE, GARY]
Sent: 12/15/2021 3:21:11 PM
To: Rauscher, Jon [Rauscher.Jon@epa.gov]; Delgado-Brown, Michelle; Turner, LaDonna; Brenda Cook [Cook.Brenda@epa.gov]; Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: FW: West Central Avenue Figure
Attachments: 5860 Beacon PSG Fig 3 Trichloroethene Rev2.pdf

Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Weekly Report - SED

Reporting Period: 11/14/2021(Sunday)-11/20/2021(Saturday)

ASSESSMENT ENFORCEMENT BRANCH

Tronox Navajo Area Uranium Mines - Region 9 Consultation with Navajo Nation- Information: On November 18, Region 9 held hold government to government consultation with the Navajo Nation on the draft Tronox Allocation Strategy. The strategy was developed by EPA to meet the December 31, 2021, commitment to the OIG, and identifies an approach to use the approximately $924 million in the Tronox special account to fund cleanups at the 54 Tronox NAUMs. The remainder of the needed funds would come from private PRPs implementing the remedies and the federal PRPs. EPA estimates it could take up to $2 billion to clean up the mines, including intramural and extramural funds. Representatives of Region 6 participated in the consultation. - *Kevin Shade (214-665-2708)*

Walker Wood Preserving, Livingston, TX - Cost Recovery Decision- Information: On November 19, the SED Director approved the Cost Recovery Decision Document addressing all past costs expended at the Walker Wood site. The Site is a former wood preserving facility at which a removal action was conducted with costs totaling $951,014. All former owners and operator PRPs are no longer in existence. - *Kelvin Spencer (214-665-7382)*

Lane Plating Works Inc. Superfund Site, Dallas TX - Cost Recovery Decision- Information: On November 19, the SED Director approved the Cost Recovery Decision Document addressing all past costs expended at the Lane Plating Works Inc. Site. The Site is a former plating facility at which a removal action was conducted and is now on the NPL. The costs currently total $3,277,029. The former owner/operator, Lane Plating Works, Inc., is bankrupt with no assets. - *Angienell Clarke (214-665-8134)*

EMERGENCY MANAGEMENT BRANCH

Globe Union, Inc Site, Garland, TX - Removal Action- Information: Removal activities continued at the Globe Union site, as 10 of the 11 properties have been excavated and all 10 of those properties backfilled. Five of the 10 properties have sod installed. One of the 11 initial properties did not grant access for removal. To date, EPA has removed a total 3,872 cubic yards of contaminated soil from the site. The removal team is continuing further restoration of cleaned properties this week. - *Krystal Stotts (214-665-3122)*

Gretna Plating and Polishing Site, Gretna, LA - Removal Action- Information: Removal activities continue at the Gretna Plating and Polishing site. Activities involved removing and containing debris, followed by pressure washing the building. Waste profiling has been completed in anticipation of transportation and disposal. Final action will include sampling the building slab prior to building demolition. - *Philip Rouse (214-665-3187) (Cell-469-431-8856)*

West Central Avenue Plume, Albuquerque, NM - Removal Assessment- Information: The removal assessment around the Bell Trading Post-Jewelry Manufacturing Operations was conducted during the summer to evaluate potential historical sources of groundwater contamination. EPA installed 281 vapor intrusion passive samplers and collected 265 total samplers. Sampling results revealed a smaller plume than originally believed. Areas for future indoor sampling will identified by the end of December. - *Gary Moore (214-665-6609) (Cell-214-789-1627)*

Bulldog Environmental Services Site, Anton, TX - Removal Action- Information: Removal activities continue at the Bulldog Environmental Services site. Based on the hazard categorization data, 60 of the remaining 298 containers on-site have contents with one or more hazard classes. Seven of these containers are in poor condition and contain flammable liquids. Due to a history of people entering the site, EPA is determining an appropriate course of action to remove and dispose of the containers containing flammable liquids and secure the site so the potential threat of a fire or explosion and exposure to nearby human populations is mitigated. All other containers will be disposed of during a separate phase of the removal action. - *Nabil Mzee (214-665-7322) (Cell-469-340-9439)*

REMEDIAL BRANCH

Tar Creek Superfund Site, OK - Technical Meeting With Quapaw Nation- Information: On November 30, EPA is hosting a technical meeting with the Quapaw Nation (QN) to discuss potential impacts to the QN's lead role in site cleanup since the Oklahoma State appellate court extended the McGirt ruling to include Quapaw Nation lands. - *Casey Luckett Snyder (214-665-2297)*

San Jacinto River Waste Pits Superfund Site, Channelview, TX - Technical Workgroup Meeting- Information: On November 16, EPA participated in a Technical Workgroup Meeting. Discussion topics included an update on the Northern Impoundment remedial design, excavation approach, and the potential for hydraulic heave in the deeper excavation areas during construction. - *Ashley Howard (214-665-6758)*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND SITE STRATEGY RECOMMENDATION - REGION 06

Site Name: West Central Avenue **CERCLIS ID#:** NMN000607372

Alias Site Name:

Address: West Central Avenue

City/County or Parish/State/Zip: Albuquerque/Bernalillo/New Mexico

Report Type: Site Reassessment **Date:** November 2017 **Author:** NMED

RECOMMENDATION:

☐ 1. No Further Remedial Action Planned Under Superfund (NFRAP)

☒ 2. Further Investigation Needed Under Superfund
- ☐ PA ☐ HRS Priority: ☒ High
- ☐ SI ☐ RI/FS ☐ Low
- ☐ ESI ☐ RA
- ☒ Other: Removal Assessment

To be performed by: EPA Removal

☐ 3. No further assessment (i.e., not a valid CERCLA site)

☐ 4. Action Deferred to: ☐ RCRA ☐ NRC

☐ 5. Site Being Addressed Under the State Voluntary Cleanup Program (VCP): ☐ Yes ☐ No

NOTIFY AUTHORITY:

☒ Removal	☐ RCRA	☐ TSCA	☐ CAA	☐ SMCRA
☐ Remedial	☐ State/Tribe	☐ NPDES	☐ NRC	☐ Resource Trustee:
☐ CERCLA Enforcement	☐ Federal Facility	☐ UIC	☐ SPCC	☐ Other:

SEND SSSR COPIES TO: ☐ 6SF-EC ☐ 6WQ-SP ☐ ATSDR ☒ State Agency ☐ Tribal Agency

DISCUSSION:

The New Mexico Environment Department (NMED), Ground Water Quality Bureau, Superfund Oversight Section, conducted a Site Reassessment (SR) for the West Central Avenue (WCA) site located in Albuquerque, New Mexico. The WCA site is characterized as a ground water plume contaminated with chlorinated solvents including tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichlorethene (Cis-1,2 DCE) and trans-1,2-dichlorethene (Trans-1,2 DCE). WCA was identified when chlorinated solvents were detected in ground water samples collected from upgradient monitoring wells from the Fruite Avenue Plume Superfund site. WCA is in a mixed residential and commercial use area that contains four schools and several small neighborhood parks within a half mile of the site. There are approximately 30 residential properties within 200 feet of the center of the CWA site. The scope of the SR consisted of collecting ground water, indoor air and soil vapor samples from identified areas of highest soil vapor contamination with potential residential indoor air impacts.

Two groundwater monitoring wells were installed and sampled during the SR. Analytical results from these two wells revealed no presence of chlorinated solvents were present in the samples. The subsurface intrusion pathways was evaluated under the SR to further assessed the Vapor Intrusion (VI) component from the soil into occupied structures. The SR VI focued on structueres nearest those areas previously identified as having the highest TCE soil gas results. Eight new soil gas ports were installed and indoor air samples were collectd at four separate structures. Elevated soil gas concentrations of TCE were detected in two laboratory results and elevated levels of PCE for soil gas was found in one sample. Indoor air sampling analytical results indicated one structure with elevated TCE above the EPA target levels for indoor air. Based on

ED_013172_00000503-00001

the additional data from the SR, it appears that a soil gas plume is present in three distinct areas of the site. It is recommended that the EPA Removal Program provide assistance in further evaluating the site for VI under their authority.

APPROVALS:

Report Reviewed by: LaDonna Turner (Site Assessment Manager) **Signature:** LaDonna Turner **Date:** 09/15/2020

Disposition Approved by:

Brenda Cook (Section Chief 6SF-TR) **Signature:** Brenda Cook **Date:** 09/17/2020

ED_013172_00000503-00002

Message

From: Brown, Michelle [Michelle.Brown@WestonSolutions.com]
Sent: 12/4/2019 7:37:16 PM
To: Cook, Brenda [cook.brenda@epa.gov]; Turner, LaDonna [turner.ladonna@epa.gov]
Subject: West Central Avenue Scoring Strategy - soil gas plume scenarios
Attachments: West Centra SESsi_all 15 condo units_L1.docx; West Centra SESsi_one condo unit_L1.docx; West Centra SESsi_3 condo units_L1.docx; Figure 2-2 Soil Gas Plume Boundary Map.pdf

Good afternoon ladies – Attached are an updated figure of the Soil Gas Plume with lab result call-outs, and a few draft scoresheets with different Level I populations. One scoresheet using just one condo unit and the default county census numbers (which doesn't score), one scoresheet which uses 3 condo units (which is the minimum population needed to score), and one scoresheet which uses the default population for 15 condo units which are part of the Bell Trading Post property. The ASC uses the area of all buildings within the Soil Gas Plume, and the AOC uses the approximate residential area of the Bell Trading Post building. Please let me know if you have any questions or would like me to run any additional scenarios for scoring. Thank you! – Michelle

WESTON SOLUTIONS

Michelle Brown, CHMM
Weston Solutions, Inc.
2600 Dallas Parkway, Suite 280
Frisco, Texas 75034
Direct: 469-666-5527
Cell: 972-977-2644
Michelle.Brown@westonsolutions.com

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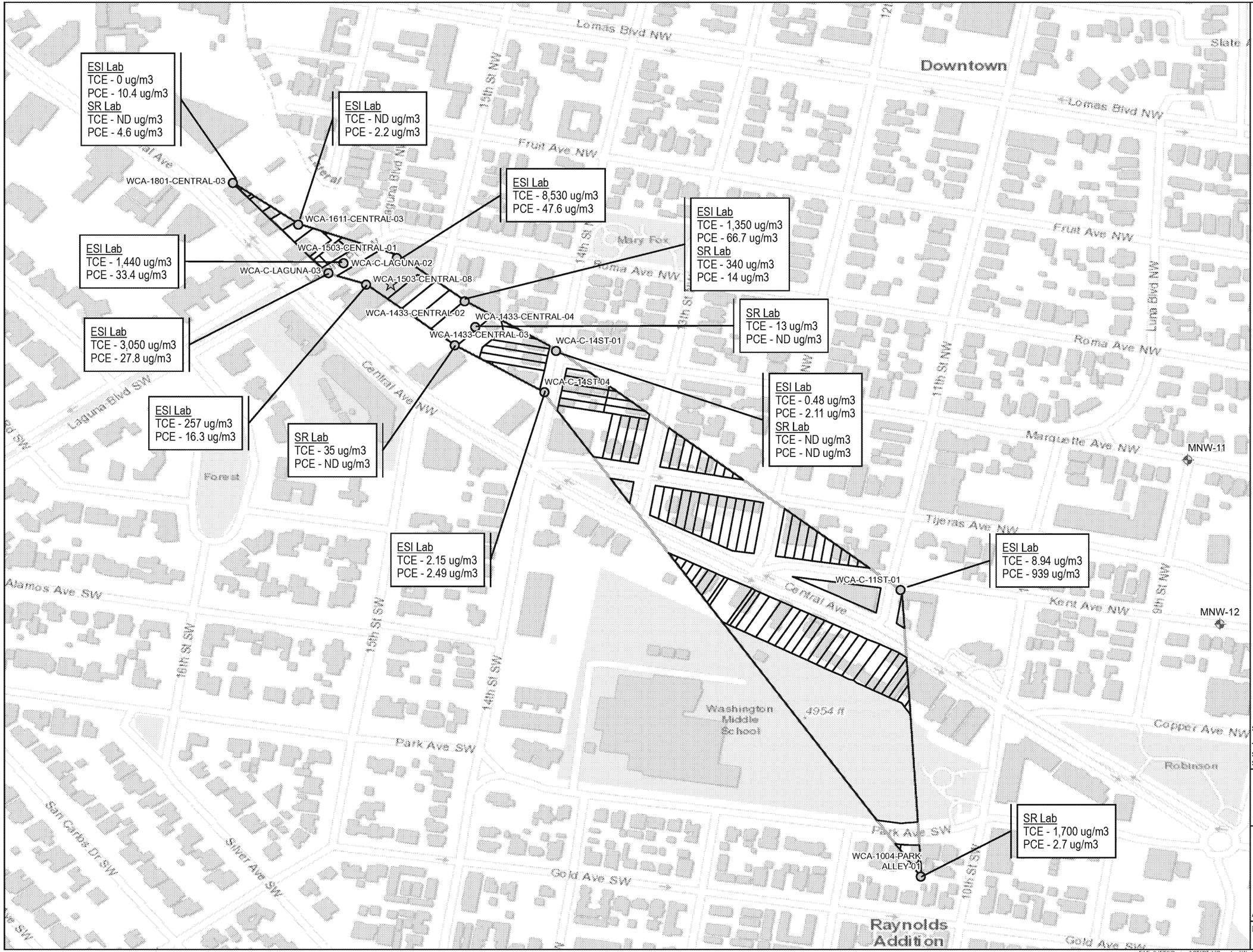
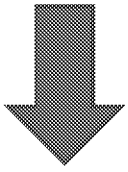


ED_013172_00000511-00001

Questions Regarding West Central Avenue Groundwater Site

in Albuquerque, NM – Meeting June 22, 2020 at 1:00PM

1.) **Please explain what each of you know about the extent of groundwater contamination at the site…**



-Do You know where the highest concentrations of TCE and/or other contaminants are located?

The highest concentration of TCE are located at Bell Trading Post (1503 Central Ave.), the location of a former Indian jewelry manufacturing business that operated between 1947 and 1975.

The highest concentrations of PCE are located at a former dry cleaner property, Park Avenue Cleaners (1004 and 1006 Park Ave.).

-Is the highest concentration of groundwater contamination near a current or previous commercial business that used the COCs?

We are not getting high concentrations of groundwater with this site, but soil gas. See above for associated businesses.

-Does a current and updated groundwater contamination plume map exist for the site?

Soil gas concentration maps attached.

-If it does exist, where can I find a copy of the groundwater plume map?

See above.

-Does any documentation exist currently (invoices/records of business practices/etc.), that proves businesses in the vicinity and/or upgradient of contamination, are using and/or have

previously used TCE and /or other chemicals associated with groundwater contamination at the site?

We currently do not have any of this information. NMED may have?

-How is the Fruit Avenue Plume site, associated with the West Central Avenue Site?

West Central was discovered when an upgradient (background) well associated with Fruit Avenue Plume was discovered to contain chlorinated solvents. NMED then conducted further assessment activities upgradient of FAP.

-What, if anything, has been done to contain contamination at the site and/or ensure the environment and human health is protected from contaminated groundwater at the site?

The Bell Trading Post has a vapor mitigation system associated with it. No other containment activities have been conducted at the site.

-Who (people/animals/etc.) may be at most risk from the COCs at the site?

People. Area is highly populated with several multi-tenant buildings and businesses within the area.

-Has there been an unusual amount of reported cases of disease(s) in (people / animals) near the site of the COCs? What are the symptoms and/or the disease(s)? Can they be scientifically linked and associated within a specific area of the Site?

No known studies on human health have been conducted at this time.

-Do records exist showing previously drilled wells and/or current wells? Where are these records located? Can we get access to those records?

NMED should have well records for wells in area, but plume is soil gas, not groundwater.

-Does anyone (resident and/or commercial) use groundwater wells in the vicinity of the groundwater contamination? What do they use the groundwater for (Drinking / Processing /etc.)?

Groundwater mixed with surface water is used for drinking in the area. In June 2014, four private irrigation wells and two NMED PSTB wells were sampled and no chlorinated solvents were detected. Groundwater contamination was not found where highest soil gas samples were found.

The plume discovered is soil gas, not groundwater. Believe that an old stream bed in the area is trapping soil vapors.

-What are the operational practices of businesses in the vicinity of the groundwater plume that may have used TCE and/or other COCs? Do records exist showing use, disposal, or treatment of COCs?

No records known. Historical operational practices during the timeframe of 1947 to 1975 are known to have poor housekeeping practices.

-Do records exist showing previous spills associated with COCs from the site? Where were the spills located and what specific chemicals were spilled? And how much was spilled? Who was responsible for the spill(s)?

No known data. No reporting requirements during time of operation.

-What do you know about Bell Trading Post and its business practices? Do you know the address of the Original location of Bell Trading Post? Did it use the COCs in question that you are aware of?

Bell Trading Post located 1503 Central Ave. Common practice to use chlorinated solvents for metal cleaning during the manufacturing of jewelry.

-What can you tell me about the "Voluntary Remediation Program Site" described in the in a report titled 2*" Quarter 2005 Ground Water Sampling Event Summary and Well Installation Report Version 1.1?* It, just like the Bell Trading Company, was also identified as an area of concern. Why? What is the address? Who is the owner of this site?

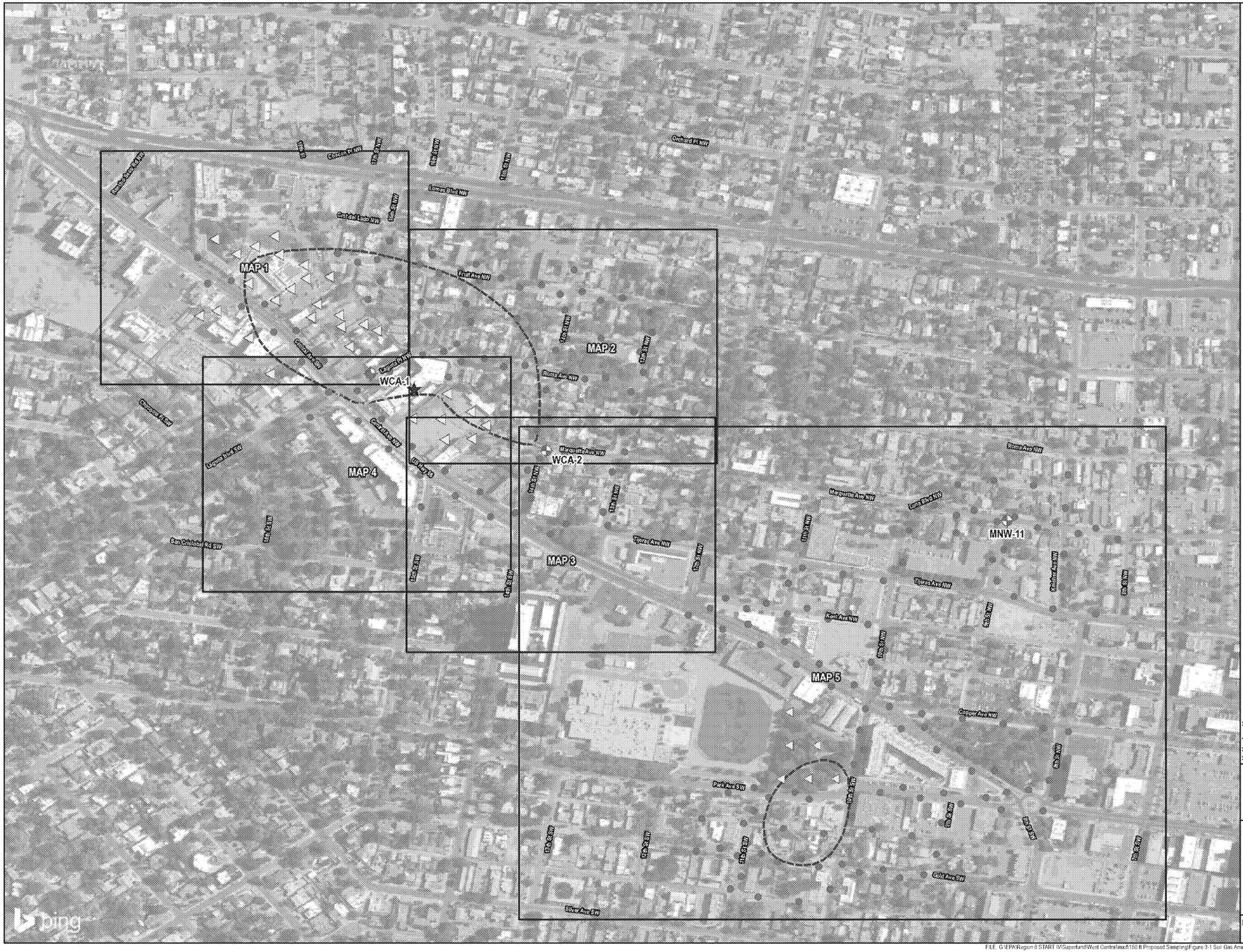
The Voluntary Remediation site is the former Bell Trading Company, also called Sunbell Property located at 1503 Central Avenue. The agreement was entered into by City of Albuquerque Planning Department, who owned the property.

-What can you tell me about Thriftway (abandoned Plateau Service Station), and World Motel (Rural Court) which are both leaking underground storage tank sites that are regulated by the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau? What is the address of these sites and who are the owners?

No information on these sites. These do not appear to be businesses that were investigated as potential sources by NMED.

-What do you know about reports of "Laun-Dry Supply Company, INC" located at: 1503 E 12th St NW, Albuquerque, NM 87104, being potentially responsible for groundwater contamination of TCE and/or PCE? And if it is responsible or reports are true, how is it or might be related to the "West Central Avenue" Ground water Plume?

No information on.



New Mexico

LEGEND

- PROPOSED PRIVATE PROPERTY SAMPLES (n = 35)
- PROPOSED RIGHT-OF-WAY SAMPLES (n = 206)
- GROUNDWATER MONITORING WELLS
- BELL TRADING POST PROPERTY
- TCE SOIL GAS 0.4 ug/m³ EXTENT
- PCE SOIL GAS 2 ug/m³ EXTENT

NOTES:
1. TCE - Trichloroethene
2. PCE - Tetrachloroethene

N

0 400 800

FEET

SOURCE: BING AERIAL, ESRI

TDD No.: 0001/20-324
SEMS ID: NMN000607372
SSID: A6JT

USEPA REGION 6

FIGURE 3-1

SOIL GAS ANALYTICAL AND FIELD SAMPLE LOCATION OVERVIEW MAP
WEST CENTRAL AVENUE
1503 CENTRAL AVENUE NW
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

DATE	PROJECT NO	SCALE
MAY 2020	20600.012.001.1324	AS SHOWN

FILE: G:\EPA\Region 6 START IV\Superfund\West Central\mxd\150 ft Proposed Sampling\Figure 3-1 Soil Gas Analytical and Field Sample Location Overview Map.mxd 3:07:39 PM 5/27/2020 deguentin

Message

From: Steven Cowan [SCowan@css-inc.com]
Sent: 5/7/2021 2:28:10 PM
To: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: Re: [EXTERNAL] FW: West Central Ave Plume
Attachments: ATT00001.txt

Hi LaDonna,

Yes, I'm waiting on Derrick to give me the specific dates for the recon. Once I have the dates, I will make my travel arrangements. Right now, the scheduled sampling date is June 7th, but that could change.

Thanks,

Steve

Sent from my iPhone

On May 7, 2021, at 9:21 AM, Turner, LaDonna <turner.ladonna@epa.gov> wrote:

[CAUTION] This email originated from outside of the CSS organization. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve.

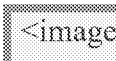
Hope you are well. Thought I would forward you Gary's email. You probably are already aware of this.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

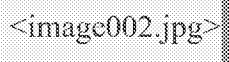
From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 06, 2021 4:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Martyne Kieling <Martyne.Kieling@state.nm.us>
Subject: West Central Ave Plume

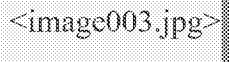
The EPA Team is in the process of obtaining access agreements in order to perform subsurface vapor monitoring for trichloroethylene and tetrachloroethylene over a wide area along West Central Ave believed to be associated with the Bell Trading Post (Jewelry Manufacturer). The sampling effort is designed to determine the extent of potential contamination previously identified by NMED. The Team has obtained property owner information from the central appraisal district and have sent out many letters requesting access as well as conducting site visits, as well as phone calls to obtain them as well. The team is still short of access agreement by approximately 8 parcels but plans to move forward with plans and attempt to obtain access while onsite. EPA will have START contractor go out the week of 5/17/21 to perform a planning visit prior to anticipated mobilization on 6/7/21 to begin sampling activities.



Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609





Message

From: Steven Cowan [SCowan@css-inc.com]
Sent: 5/11/2021 6:44:55 PM
To: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: RE: [EXTERNAL] FW: West Central Ave Plume
Attachments: ATT00001.txt

Hi LaDonna,

Just got out of a Webinar for Passive Soil Gas sampling with the Waterloo Membrane Sampler. Pretty interesting. I'm not sure if Derrick is going to use the WMS or the Beacon sampler. I guess I will find out next week. Thanks for the info; I'm going to forward it to Derrick as well. I will check it out today. I just had a Rapid Covid-19 test last Friday. It was Negative, so too bad I cannot use that documentation next week.

Regards,

Steve Cowan, CSS-START IV
(214)205-6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Tuesday, May 11, 2021 12:26 PM
To: Steven Cowan <SCowan@css-inc.com>
Subject: [EXTERNAL] FW: West Central Ave Plume

[CAUTION] This email originated from outside of the CSS organization. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve.

Martyne sent me a few links regarding NM and COVID. Take a look.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Tuesday, May 11, 2021 11:47 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: West Central Ave Plume

https://cv.nmhealth.org/public-health-orders-and-executive-orders/red-to-green/
https://cv.nmhealth.org/travel-recommendations/

https://www.newmexico.org/covid-19-traveler-information/

LaDonna,
This is what I found but the list of states are from March 23, 2021 they switched to language that says "strongly advise" to self-quarantine and to seek out a covid-19 test upon arrival in or return to NM.

I also found the face covering item below. However, when exercising walking/hiking outside I don't believe we have to wear the mask (this is also a CDC thing as well I heard)…. I always slip one back on when approaching someone on a walk around town or on the trail.
Hope this helps.

NOTICE FOR ALL TRAVELERS: Face coverings are required for all visitors and residents in New Mexico. The only exceptions are when drinking, eating, or under medical instruction. Any individual found in violation may face a $100 fine.

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Tuesday, May 11, 2021 8:58 AM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] RE: West Central Ave Plume

Hi Martyne.

Hope you are doing well – really miss my visits to New Mexico and your good company.

I'm glad this is on schedule to start work. I was wondering if there is any travel restrictions or requirements by the state of New Mexico right now for COVID that you know of. Or if documentation of vaccinations?

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
This is good news! Glad the project is back up and running. Please let me know if I can be of assistance. I will be working in ABQ assisting on Georges Dry Cleaners SI work on 5-18, 5-19 and 5-20. But I would be able to meet with the START Contractor on Site on 5-17 if that would be a benefit. Or I may be able to break away on one of the Georges field days. I will be about 15 min drive away from the WCA plume area.

Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
Innovation | Science | Collaboration | Compliance

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

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Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Steven Cowan [SCowan@css-inc.com]
Sent: 5/13/2021 4:13:14 PM
To: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: RE: [EXTERNAL] FW: West Central Ave Plume
Attachments: ATT00001.txt

Will do. I will get back with later this afternoon.

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 11:12 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

I just got off the phone with Martyne. She said that she would be available on the 18th to meet with yall a few hours. She could be helpful with locations, parking, logistic etc. Talk with Derrick and let me know if this would be helpful or not.

Thanks.

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turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Thursday, May 13, 2021 10:52 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi LaDonna,

We travel to Albuquerque on Monday afternoon (17th). My flight arrives in Albuquerque at 3:15 pm and I think Derrick gets in at 2:00 pm. I think Derrick plans on beginning the recon activities once we both arrive in Albuquerque. Tuesday, the 18th, will be dedicated to the recon efforts. On Wednesday morning (19th), we will both fly back to Dallas and Houston, respectively. I will send this e-mail to Derrick just in case Gary did not forward it to him. Is there anything specific you would like us to discuss with Martyne on Monday afternoon or Tuesday? As always, if you have any questions, just let me know.

Regards,

Steve Cowan
CSS Project Manager: START IV
Cell: 214-205-6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 10:41 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: [EXTERNAL] FW: West Central Ave Plume

[CAUTION] This email originated from outside of the CSS organization. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve.

I am not sure what your travel schedule is for West Central but see Martyne's email below. She will be available on a couple of days if that works out for you guys. Let me know and I will coordinate with her.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

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Sent: Monday, May 10, 2021 5:01 PM
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Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
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Keep me posted- I can be reached by my work number 505-670-0691

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Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Steven Cowan [SCowan@css-inc.com]
Sent: 5/13/2021 9:47:54 PM
To: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: RE: [EXTERNAL] FW: West Central Ave Plume
Attachments: ATT00001.txt

Hi LaDonna,

I have not heard back from Derrick this afternoon. I think he may be in the field today. I will try to touch base with him tomorrow morning about meeting with Martyne on Monday.

Regards,

Steve Cowan
CSS Project Manager: START IV
Cell: 214-205-6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
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To: Steven Cowan <SCowan@css-inc.com>
Subject: [EXTERNAL] FW: West Central Ave Plume

[CAUTION] This email originated from outside of the CSS organization. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve.

I am not sure what your travel schedule is for West Central but see Martyne's email below. She will be available on a couple of days if that works out for you guys. Let me know and I will coordinate with her.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
This is good news! Glad the project is back up and running. Please let me know if I can be of assistance. I will be working in ABQ assisting on Georges Dry Cleaners SI work on 5-18, 5-19 and 5-20. But I would be able to meet with the START Contractor on Site on 5-17 if that would be a benefit. Or I may be able to break away on one of the Georges field days. I will be about 15 min drive away from the WCA plume area.

Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department

Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

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Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Steven Cowan [SCowan@css-inc.com]
Sent: 5/14/2021 2:45:46 PM
To: Turner, LaDonna [turner.ladonna@epa.gov]
Subject: RE: [EXTERNAL] FW: West Central Ave Plume
Attachments: ATT00001.txt

Yes, that will be fine.

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Friday, May 14, 2021 9:44 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi Steve.

Glad that you can meet up with her. It may be best to meet her on Tuesday morning. If I give you her phone number would you be comfortable calling her and setting something up? It may be easier if yall talk.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Friday, May 14, 2021 8:58 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi LaDonna,

I've heard back from Derrick. He would like you to go ahead and set up a time on Monday, possibly Tuesday, to meet with Martyne. I would recommend that a meeting not take place until at least 4:30 pm, since I do not get into Albuquerque until 3:15 pm and we still have to get luggage and a rental car. We can meet her at the site, if that is convenient for her. Isn't there a small restaurant just east of the former jewelry company? If so, we can meet in that parking lot. Any questions, just let me know.

Regards,

Steve Cowan
CSS: Project Manager, START-IV
Cell: 214. 205.6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 11:12 AM

To: Steven Cowan <SCowan@css-inc.com>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

I just got off the phone with Martyne. She said that she would be available on the 18th to meet with yall a few hours. She could be helpful with locations, parking, logistic etc. Talk with Derrick and let me know if this would be helpful or not.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Thursday, May 13, 2021 10:52 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi LaDonna,

We travel to Albuquerque on Monday afternoon (17th). My flight arrives in Albuquerque at 3:15 pm and I think Derrick gets in at 2:00 pm. I think Derrick plans on beginning the recon activities once we both arrive in Albuquerque. Tuesday, the 18th, will be dedicated to the recon efforts. On Wednesday morning (19th), we will both fly back to Dallas and Houston, respectively. I will send this e-mail to Derrick just in case Gary did not forward it to him. Is there anything specific you would like us to discuss with Martyne on Monday afternoon or Tuesday? As always, if you have any questions, just let me know.

Regards,

Steve Cowan
CSS Project Manager: START IV
Cell: 214-205-6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 10:41 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: [EXTERNAL] FW: West Central Ave Plume

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Hi Steve.

I am not sure what your travel schedule is for West Central but see Martyne's email below. She will be available on a couple of days if that works out for you guys. Let me know and I will coordinate with her.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
This is good news! Glad the project is back up and running. Please let me know if I can be of assistance. I will be working in ABQ assisting on Georges Dry Cleaners SI work on 5-18, 5-19 and 5-20. But I would be able to meet with the START Contractor on Site on 5-17 if that would be a benefit. Or I may be able to break away on one of the Georges field days. I will be about 15 min drive away from the WCA plume area.

Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

The EPA Team is in the process of obtaining access agreements in order to perform subsurface vapor monitoring for trichloroethylene and tetrachloroethylene over a wide area along West Central Ave believed to be associated with the Bell Trading Post (Jewelry Manufacturer). The sampling effort is designed to determine the extent of potential contamination previously identified by NMED. The Team has obtained property owner information from the central appraisal district and have sent out many letters requesting access as well as conducting site visits, as well as phone calls to obtain them as well. The team is still short of access agreement by approximately 8 parcels but plans to move

forward with plans and attempt to obtain access while onsite. EPA will have START contractor go out the week of 5/17/21 to perform a planning visit prior to anticipated mobilization on 6/7/21 to begin sampling activities.

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 1/24/2020 5:59:25 PM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: RE: Older WCA Bell Trading Post Reports

Moore.gary@epa.gov

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Friday, January 24, 2020 11:58 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: Older WCA Bell Trading Post Reports

Not sure try it or send me his email and I can just send to him directly

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Friday, January 24, 2020 10:34 AM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] RE: Older WCA Bell Trading Post Reports

Hi Martyne.

I am able to forward you email below to the OSC so he can open them or am I the only one that can open them?

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: martyne.kieling@state.nm.us <martyne.kieling@state.nm.us>
Sent: Thursday, January 23, 2020 3:13 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: Older WCA Bell Trading Post Reports

You have received 3 secure files from martyne.kieling@state.nm.us.

Use the secure links below to download

LaDonna,

The Older WCA Bell Trading Post Reports.

Secure File Downloads:

Available until: **06 February 2020**

Click links to download:

Bell Phase II_FINAL_06_30_14 rev 1.pdf
5.22 MB, Fingerprint: 082b4c1982c336377a78bbbc4b185ff0 (What is this?)

Bell Trading Post Phase II ESA 2001 Report complete file.pdf
6.34 MB, Fingerprint: b15daf2737299875fca4f292560c25bf (What is this?)

COA_BELL_VRCR_Final_09_28_05_final.pdf
28.94 MB, Fingerprint: 27ce4f8a6bf3f8dacc3adda3b277e0d9 (What is this?)

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Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 5/11/2021 2:58:29 PM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: RE: West Central Ave Plume

Hi Martyne.

Hope you are doing well – really miss my visits to New Mexico and your good company.

I'm glad this is on schedule to start work. I was wondering if there is any travel restrictions or requirements by the state of New Mexico right now for COVID that you know of. Or if documentation of vaccinations?

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

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Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5496
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
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Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 1/24/2020 5:33:35 PM
To: martyne.kieling@state.nm.us
Subject: RE: Older WCA Bell Trading Post Reports

Hi Martyne.

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Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: martyne.kieling@state.nm.us <martyne.kieling@state.nm.us>
Sent: Thursday, January 23, 2020 3:13 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: Older WCA Bell Trading Post Reports

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6.34 MB, Fingerprint: b15daf2737299875fca4f292560c25bf (What is this?)

COA_BELL_VRCR_Final_09_28_05_final.pdf
28.94 MB, Fingerprint: 27ce4f8a6bf3f8dacc3adda3b277e0d9 (What is this?)

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Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 5/7/2021 2:21:31 PM
To: Steven Cowan [SCowan@css-inc.com]
Subject: FW: West Central Ave Plume

Hi Steve.

Hope you are well. Thought I would forward you Gary's email. You probably are already aware of this.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 06, 2021 4:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Martyne Kieling <Martyne.Kieling@state.nm.us>
Subject: West Central Ave Plume

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Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 3/3/2022 1:29:06 PM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure

Hi Martyne.

I got your voice mail message yesterday. Sorry I was at a loud place and forgot to call you back.

Based on the discussions with the Site Assessment folks (me, Michelle and Brenda) it doesn't appear to be NPL caliber. The original scoring scenario was based on one large plume, but sampling shows small areas that are not interconnected. Based on current data, it wouldn't score. NMED can use the data to pursue the plume areas individually if you wanted.

I'm not sure what the Removal Program plan is at this point. We haven't had any internal discussions lately.

I am on conference calls all day today, listening mode mostly. So if you want to give me a call you can 214-212-1732.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Friday, February 25, 2022 11:07 AM
To: Moore, Gary <Moore.Gary@epa.gov>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>; McGlown, Anthony, NMENV <anthony.mcglown@state.nm.us>; Mark Garman <mark.garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: RE: [EXTERNAL] Re: West Central Avenue Figure

Gary, Michelle & LaDonna,

NMED -GWQB Superfund Oversight Section (SOS) would like to request a Teams meeting with you early next week to discuss the EPA's planned path forward with the Soil vapor/ Indoor air West Central Avenue study.
There have been requests to the GWQB-VRP section from the owner (G&L Investment Company, Inc.) of the Properties in Blue on the map below. Please see the attached letter for details of that request. The Superfund Section will be participating in a conference call with GWQB -VRP and the property representatives on Thursday morning 3/3/3022 and would like to be prepared to speak as to SOS's roll in the planned EPA-CERCLA process at this location an how that may affect the request for VRP involvement. NMED's staff schedule for a Teams meeting is clear Monday 9am MST, Tuesday morning. And Wednesday after 2pm MST.

To answer your question regarding sampling and mitigation at the Former Bell Trading Post. The Bell Trading Post (BTP) property now condominiums/lofts. Went through the VRP process in the 1990s and did a soil lead and asbestos removal. The Bell VRP investigation also performed soil testing for volatile organics and metals and collected 3 ground water grab

samples at temporary bore holes. At that time there were no NMWQCC exceedances for TCE in the groundwater grab samples. I have been told that BTP condo management performed some limited follow-up indoor air sampling on their own after the ESI results were provided to them. I can provide a copy of the BTP –VRP reports to you if you wish. I do not have data or reports from the BTB condo management to confirm what I have been told regarding their own contracted indoor air sampling.

Please let us know your available times for a Teams Conference call.
Sincerely,

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
1190 S. St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
www.env.nm.gov
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, February 24, 2022 12:54 PM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Cc: Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Ogden, Sarah, NMENV <Sarah.Ogden@state.nm.us>; McGlown, Anthony, NMENV <Anthony.McGlown@state.nm.us>; Garman, Mark, NMENV

<Mark.Garman@state.nm.us>; Cobb, Derrick <derrick.cobb@westonsolutions.com>
Subject: [EXTERNAL] Re: West Central Avenue Figure

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Martyne,

I am out of office till Monday. We do have a map which I believe that I sent to you. We are confirming the property addresses that we need to perform interior sampling based upon the map.
I assume that the Bell Trading Tower building has already performed sampling and mitigation. Please confirm.

Thanks
Gary

Sent from my iPhone

> On Feb 23, 2022, at 11:10 AM, Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us> wrote:
>
> Gary,
>
> Please let me know if you have any further updates as to when to expect a final report on the soil vapor study performed in 2021. NMED continues to have inquiries from property owners in the 1400 block W Central Ave.
>
> Please call if you have anything to add and wish to discuss.
> Sincerely,
>
> Martyne Kieling
> New Mexico Environment Department
> Ground Water Quality Bureau – Superfund Oversight Section
> 1190 S. St. Francis Drive
> P.O. Box 5469
> Santa Fe, NM 87502-5469
> martyne.kieling@state.nm.us
> Mobile # 505-670-0691
> www.env.nm.gov
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>
> **From:** Moore, Gary <Moore.Gary@epa.gov>
> **Sent:** Wednesday, December 15, 2021 8:21 AM
> **To:** Rauscher, Jon <Rauscher.Jon@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
> **Subject:** [EXTERNAL] FW: West Central Avenue Figure
>
> CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.
> Please see the attached figure. This figure represents the attenuation levels that we came up with in our last internal meeting:

10-6: 16 ug/m3
THQ=1: 70 ug/m3
10-5: 160 ug/m3
THQ=3: 210 ug/m3

I currently have Weston determining the properties that fall within the 10-6 attenuation level so that we can pursue access to do indoor sampling. If you have comments, please let me know so that we are moving in the same direction on this site.

Thanks
Gary Moore

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, December 14, 2021 9:48 PM
To: Moore, Gary <Moore.Gary@epa.gov>
Subject: West Central Avenue Figure

Gary,
Attached is the updated figure around Bell Trading Post. We are still working on identifying the land owners. Please let me know if you have any additional questions or requests. Thanks.

Derrick Cobb
Weston Solutions, Inc.
2929 Briarpark Drive, Ste. 175
Houston, Texas 77042
(832) 347-4180 cell
derrick.cobb@westonsolutions.com

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Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 5/11/2021 5:25:40 PM
To: Steven Cowan [SCowan@css-dynamac.com]
Subject: FW: West Central Ave Plume
Attachments: ATT00001.txt

Hi Steve.

Martyne sent me a few links regarding NM and COVID. Take a look.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Tuesday, May 11, 2021 11:47 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: West Central Ave Plume

https://cv.nmhealth.org/public-health-orders-and-executive-orders/red-to-green/
https://cv.nmhealth.org/travel-recommendations/

https://www.newmexico.org/covid-19-traveler-information/

LaDonna,
This is what I found but the list of states are from March 23, 2021 they switched to language that says "strongly advise" to self-quarantine and to seek out a covid-19 test upon arrival in or return to NM.

I also found the face covering item below. However, when exercising walking/hiking outside I don't believe we have to wear the mask (this is also a CDC thing as well I heard).... I always slip one back on when approaching someone on a walk around town or on the trail.
Hope this helps.

NOTICE FOR ALL TRAVELERS: Face coverings are required for all visitors and residents in New Mexico. The only exceptions are when drinking, eating, or under medical instruction. Any individual found in violation may face a $100 fine.

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Tuesday, May 11, 2021 8:58 AM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] RE: West Central Ave Plume

Hi Martyne.

Hope you are doing well – really miss my visits to New Mexico and your good company.

I'm glad this is on schedule to start work. I was wondering if there is any travel restrictions or requirements by the state of New Mexico right now for COVID that you know of. Or if documentation of vaccinations?

Thanks.

LaDonna Turner
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214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

Gary & LaDonna,
This is good news! Glad the project is back up and running. Please let me know if I can be of assistance. I will be working in ABQ assisting on Georges Dry Cleaners SI work on 5-18, 5-19 and 5-20. But I would be able to meet with the START Contractor on Site on 5-17 if that would be a benefit. Or I may be able to break away on one of the Georges field days. I will be about 15 min drive away from the WCA plume area.

Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
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Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
Mobile # 505-670-0691
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

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Bell Trading Post (Jewelry Manufacturer). The sampling effort is designed to determine the extent of potential contamination previously identified by NMED. The Team has obtained property owner information from the central appraisal district and have sent out many letters requesting access as well as conducting site visits, as well as phone calls to obtain them as well. The team is still short of access agreement by approximately 8 parcels but plans to move forward with plans and attempt to obtain access while onsite. EPA will have START contractor go out the week of 5/17/21 to perform a planning visit prior to anticipated mobilization on 6/7/21 to begin sampling activities.

Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
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cell: 214.789.1627
office: 214.665.6609

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 5/13/2021 3:41:28 PM
To: Steven Cowan [SCowan@css-dynamac.com]
Subject: FW: West Central Ave Plume

Hi Steve.

I am not sure what your travel schedule is for West Central but see Martyne's email below. She will be available on a couple of days if that works out for you guys. Let me know and I will coordinate with her.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
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214-665-6666
turner.ladonna@epa.gov

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Sent: Monday, May 10, 2021 5:01 PM
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Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

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Keep me posted- I can be reached by my work number 505-670-0691

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Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
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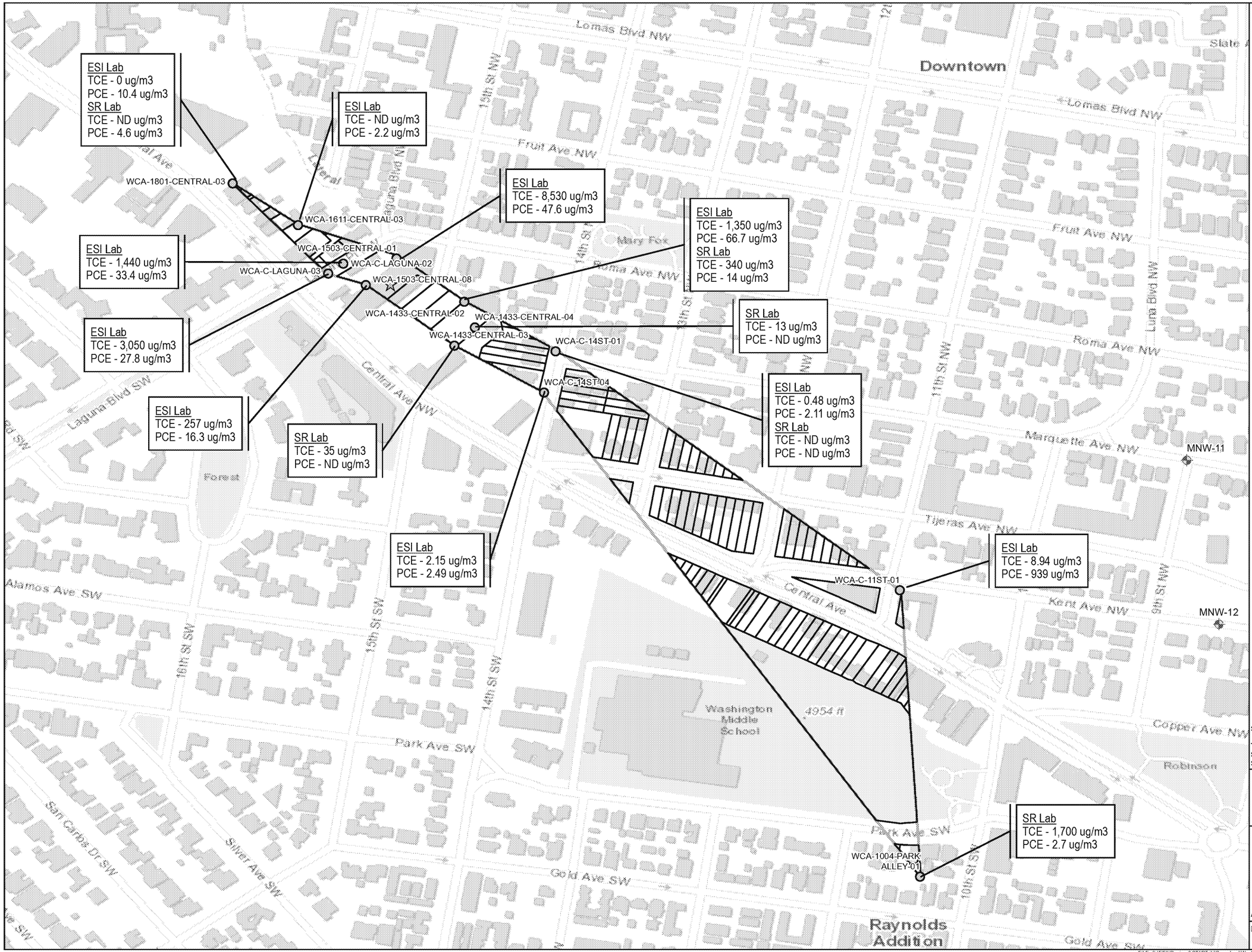
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609



ED_013172_00000631-00001

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 4/23/2020 12:59:08 PM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
CC: Sabino, NMENV Rivera [sabino.rivera@state.nm.us]
Subject: FW: Revised West Central Avenue Proposed Sample Location Maps
Attachments: Figure Soil Gas Sample Location Overview Map_1.pdf; Figure Soil Gas Sample Location Map_1.pdf; Figure Soil Gas Sample Location Map_2.pdf; Figure Soil Gas Sample Location Map_3.pdf; Figure Soil Gas Sample Location Map_4.pdf; Figure Soil Gas TCE Sample Location Map_2.pdf; Figure Soil Gas Sample Location Overview Map_2.pdf

Hi Martyne.

Thought I would forward these revised maps for your review. Let me know if you have any comments.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Tuesday, April 21, 2020 12:13 AM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Cc: Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: Revised West Central Avenue Proposed Sample Location Maps

Gary/LaDonna/Michelle,
Attached are revised proposed sample location maps based on our conference call with NMED last week. We have also created a new overview map that shows relationship and scale between the investigation areas. Please let me know if you have any questions or need any additional information. Thanks.

Derrick Cobb
Weston Solutions, Inc.
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6621 direct
(832) 347-4180 cell
(713) 985-6703 fax
derrick.cobb@westonsolutions.com

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Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 9/9/2019 8:12:59 PM
To: Brown, Michelle [Michelle.Brown@WestonSolutions.com]
Subject: FW: West Central Plume ESI Report
Attachments: Final - ESI Report WCA-ABQ 112016.pdf; Final cover letter WCA ESI Signed.pdf

Hi Michelle.

I didn't know if you saw this message from me. What do you think and what else do you need?

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
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214-665-6666
turner.ladonna@epa.gov

From: Turner, LaDonna
Sent: Friday, August 30, 2019 1:32 PM
To: Brown, Michelle <Michelle.Brown@WestonSolutions.com>
Subject: FW: West Central Plume ESI Report

Looks like no one has the attachments in electronic version. Do you want hard copy to look at?

I know you are out of town so no hurries.

LaDonna Turner
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Superfund & Emergency Management Division
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turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Friday, August 30, 2019 12:41 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: West Central Plume ESI Report

LaDonna,

Attached is the WCA ESI and Cover letter. I don't have the Attachments in electronic format. Only in hard copy. Do you want me to scan or Will Weston Scan the Hard copy that you have.

Doing good here ☺
Martyne

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Friday, August 30, 2019 11:33 AM
To: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Plume ESI Report

Hi Martyne.

Hope you are doing well. I need to forward the ESI report for West Central Plume to Weston but I don't have it electronically. Do you have an electronic copy of the report and attachments electronically that you could forward to me?

Have a good weekend.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 5/14/2021 2:54:03 PM
To: Steven Cowan [SCowan@css-inc.com]
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Martyne's cell number : Mobile # 505-670-0691

LaDonna Turner
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Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Friday, May 14, 2021 9:46 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Yes, that will be fine.

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Friday, May 14, 2021 9:44 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi Steve.

Glad that you can meet up with her. It may be best to meet her on Tuesday morning. If I give you her phone number would you be comfortable calling her and setting something up? It may be easier if yall talk.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Friday, May 14, 2021 8:58 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi LaDonna,

I've heard back from Derrick. He would like you to go ahead and set up a time on Monday, possibly Tuesday, to meet with Martyne. I would recommend that a meeting not take place until at least 4:30 pm, since I do not get into Albuquerque until 3:15 pm and we still have to get luggage and a rental car. We can meet her at the site, if that is convenient for her. Isn't there a small restaurant just east of the former jewelry company? If so, we can meet in that parking lot. Any questions, just let me know.

Regards,

Steve Cowan
CSS: Project Manager, START-IV
Cell: 214. 205.6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 11:12 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

I just got off the phone with Martyne. She said that she would be available on the 18th to meet with yall a few hours. She could be helpful with locations, parking, logistic etc. Talk with Derrick and let me know if this would be helpful or not.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Steven Cowan <SCowan@css-inc.com>
Sent: Thursday, May 13, 2021 10:52 AM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Subject: RE: [EXTERNAL] FW: West Central Ave Plume

Hi LaDonna,

We travel to Albuquerque on Monday afternoon (17th). My flight arrives in Albuquerque at 3:15 pm and I think Derrick gets in at 2:00 pm. I think Derrick plans on beginning the recon activities once we both arrive in Albuquerque. Tuesday, the 18th, will be dedicated to the recon efforts. On Wednesday morning (19th), we will both fly back to Dallas and Houston, respectively. I will send this e-mail to Derrick just in case Gary did not forward it to him. Is there anything specific you would like us to discuss with Martyne on Monday afternoon or Tuesday? As always, if you have any questions, just let me know.

Regards,

Steve Cowan
CSS Project Manager: START IV
Cell: 214-205-6651

From: Turner, LaDonna <turner.ladonna@epa.gov>
Sent: Thursday, May 13, 2021 10:41 AM
To: Steven Cowan <SCowan@css-inc.com>
Subject: [EXTERNAL] FW: West Central Ave Plume

[CAUTION] This email originated from outside of the CSS organization. DO NOT CLICK links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve.

I am not sure what your travel schedule is for West Central but see Martyne's email below. She will be available on a couple of days if that works out for you guys. Let me know and I will coordinate with her.

Thanks.

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US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
214-665-6666
turner.ladonna@epa.gov

From: Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Sent: Monday, May 10, 2021 5:01 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Mark Garman <mark.garman@state.nm.us>; Ogden, Sarah, NMENV <sarah.ogden@state.nm.us>
Subject: RE: West Central Ave Plume

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Keep me posted- I can be reached by my work number 505-670-0691

Martyne Kieling
New Mexico Environment Department
Ground Water Quality Bureau – Superfund Oversight Section
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Santa Fe, NM 87502-5469
martyne.kieling@state.nm.us
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From: Moore, Gary <Moore.Gary@epa.gov>
Sent: Thursday, May 6, 2021 3:57 PM
To: Turner, LaDonna <turner.ladonna@epa.gov>
Cc: Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Cook, Brenda <cook.brenda@epa.gov>; Kieling, Martyne, NMENV <Martyne.Kieling@state.nm.us>
Subject: [EXT] West Central Ave Plume

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Gary W. Moore (SEDER)
Federal On-Scene Coordinator
1201 Elm Street, Ste 500
Dallas, Texas 75270-2102
moore.gary@epa.gov

cell: 214.789.1627
office: 214.665.6609

SITE REASSESSMENT REPORT
WEST CENTRAL AVENUE, ALBUQUERQUE
EPA ID # NMN000607372
BERNALILLO COUNTY, NEW MEXICO

September 2017

New Mexico Environment Department
Ground Water Quality Bureau
Superfund Oversight Section

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Acronyms that may be used in this Document

Acronym	Description
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
amsl	above mean sea level
ATD	Automated Thermal Desorption (GCMS)
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
btoc	below top of casing
BTP	Bell Trading Post
cc	cubic centimeter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CGI	combustible gas indicator
cis-1,2-DCE	cis-1,2-dichloroethene
City	City of Albuquerque
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
CRQL	contract required quantitation limit
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
ESC	ESC Lab Sciences
ESB	Environmental Services Branch
ESL	environmental screening level
ESI	expanded site inspection
F	fahrenheit
FAP	Fruit Avenue Plume Superfund Site
FD	field duplicate
FHDC	Family Housing Development Corporation
FROG	FROG-4000^{tm} GCS
ft	feet or foot
ft2	square feet
ft3	cubic feet
gal	gallons
gal/min	gallons/minutes
GCMS	gas chromatograph/mass spectrometer
GCS	Gas Chromatography System
GPS	global positioning system
GWQB	Ground Water Quality Bureau
HRS	Hazard Ranking System
ID	identification number

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Acronym	Description
IDW	investigation-derived waste
INTERA	INTERA Incorporated
LTRA	Long Term Remedial Action
µg/m3	microgram per cubic meter
µg/L	microgram per liter
mg/kg	milligram per kilogram
ml/minute	milliliter per minute
MDL	method detection limit
MS/MSD	matrix spike and matrix spike duplicate
MSA	Minimum Site Assessment
msl	mean sea level
MTBE	methyl-t-butyl ether
MCL	maximum contaminant level
NOAA	National Oceanic Atmospheric Administration
NMED	New Mexico Environment Department
NMSA	New Mexico Statues Annotated
NMWQCC.	New Mexico Water Quality Control Commission
O&M	Operation and Maintenance
OSE	New Mexico Office of the State Engineer
OWS	oil water separator
PA	Preliminary Assessment
PAH's	poly-aromatic hydrocarbons
P&A	plug and abandoned
PCE	tetrachloroethene
PID	photoionization detector
PPE	personal protective equipment
PRT	Post-Run Tubing
PSG	passive soil gas
PSTB	Petroleum Storage Tank Bureau (New Mexico Environment Department)
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
QMP	quality management plan
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	Remediation Oversight Section
RPD	relative percent difference
RSL	regional screening level
SAP	sampling and analysis plan
SCDM	Superfund Chemical Data Matrix
SI	Sight Investigation

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Acronym	Description
Site	West Central Avenue, Albuquerque, New Mexico
SIM	Select Ion Monitoring
SG	soil gas
SJC	San Juan Chama Drinking Water Project
SOS	Superfund Oversight Section
SOP	standard operating procedure
SR	Site Reassessment
SSL	soil screening level
TCE	trichloroethene
1,1,1-TCA	1,1,1-trichloroethane
trans-1,2-DCE	trans-1,2-dichloroethene
TOC	top of casing
USC	United States Code
UST	underground storage tank
VC	vinyl chloride
VI	vapor intrusion
VISL	vapor intrusion screening level
VOC	Volatile organic compound
VRP	Voluntary Remediation Program
WCA	West Central Avenue

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Environmental Standards Relevant to Analytical Results in this Document

	MCL[1]	NMWQCC[2] Standard	EPA[3] Target Sub-Slab and Exterior Soil Gas Concentration		EPA[4] Target Indoor Air Concentration for Carcinogens		EPA[5] Target Indoor Air Concentration for Non-Carcinogens	
Analyte	Groundwater µg/L	Groundwater µg/L	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3
PCE	5	20	360	1600	11	47	42	180
TCE	5	100	16	100	0.48	3	2.1	8.8
cis-1,2-DCE	70	-	-		-		-	
trans-1,2-DCE	100	-	-	-	-		-	
Vinyl Chloride	2	1	5.6	93	0.17	2.8	100	440
1,1,1-TCA	200	60	1.7E+05	7.3E+05	5200	2.2E+04	1.22	2.2E+04
1,4Dioxane	-	-	19	82	0.56	2.5	31	130

1 Federal Drinking Water Maximum Contaminant Level (Ref. 7)
2 New Mexico Water Quality Control Commission (Ref. 8)
3 Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations -Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)
4 Federal Regional Indoor Air Screening Level version 3.5.1 (May 2016 RSLs) Target Risk for Carcinogens (TCR) @ 1E-06 (Ref. 46)
5 Federal Regional Indoor Air Screening Level version 3.5.1 (May 2016 RSLs) Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)
- No NMWQCC groundwater standards, no inhalation toxicity information (Ref. 8 and Ref. 46)

Target Sub-Slab and Exterior Soil Gas Concentration @ Target Risk for Carcinogens (TCR)=1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)

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1.0 Introduction

Under the authority of the CERCLA, as amended, 42 USC §§ 9601 to 9675 CERCLA, the NMED SOS conducted an SR of the West Central Avenue site (Site) in Albuquerque, Bernalillo County, New Mexico (Figure 1, and Figure 2), CERCLIS ID# NMN000607372. The scope of the SR consisted of collecting groundwater, indoor air and soil vapor samples from identified areas of highest soil vapor contamination with potential residential indoor air impact. Additionally, the samples collected were to confirm or refute correlation of ESI soil vapor results and to evaluate how the areas of highest soil vapor concentrations may or may not correlate with groundwater. The investigation focus is near the potential source areas along West Central Avenue and near known chlorinated solvent impacted groundwater locations (Figure 3). This SR Report summarizes the sampling performed to obtain analytical data for the identification of potential source areas, and for evaluation using the HRS (Ref. 1) and the SCDM (Ref. 2) to determine if a threat to human health and the environment exist such that further action under CERCLA is warranted.

2.0 Site Description

2.1 Location

The WCA Site is located in the City of Albuquerque in a primarily commercial and residential setting (Figure 4). The Site is located west of the downtown area, east of the Rio Grande River and south and east of Old Town Albuquerque. Streets near the Site are paved and there are small neighborhood parks. There are four schools within a half a mile of the Site center point.

The Site was identified when chlorinated solvents were detected in groundwater samples collected from FAP Superfund Site (EPA ID# NMD986668911) up-gradient monitoring wells around the year 2005. The Site is centered near the corner of 9th Street NW and Marquette Avenue NW in Albuquerque, New Mexico (Ref. 3, pp. 12, 24 and 34; Ref. 4; and Ref. 5). The geographical coordinates of the Site are 35°5'19.2" N latitude and 106°39'24.8" W longitude in Township 10N, Range 3E, Section 17 (Ref. 4). The elevation of the Site is approximately 4,954 ft above msl. The Site coordinates and elevation correspond with FAP monitor well MNW-11(D1), in which the Site contaminants were first identified. Monitor well MNW-11(D1) is currently considered the center point location of the WCA groundwater plume (Figure 3 and Figure 4) (Ref. 3, Attachment 3, p. 43). To date, chlorinated solvents attributed to the Site have been detected in FAP monitor wells MNW-11(D1), SFMW-14(D1), MNW-9(D1), MNW-1(I2), SFMW-13(I2), WB-01(I1/I2) and WB-02(I1/I2) (Figure 4) (Ref. 6, pp. 23-68).

2.2 Description

The Site is characterized as a groundwater plume of chlorinated and aromatic hydrocarbon compounds consisting of TCE, cis-1,2-DCE, and trans-1,2-DCE (Ref. 6, pp.

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15, 19, 36, 37, and 42). The full extent of the Site groundwater plume is not known at this time. The current understanding of the extent of the Site groundwater plume is defined by the up-gradient FAP monitoring wells. The NMED oversees the FAP site which is currently in the O&M phase of the CERCLA process (Ref. 6, pp. 16 and 19). The target compound list for FAP includes PCE, TCE, VC, cis-1,2-DCE, and trans-1,2-DCE (Ref. 6, p. 12). The FAP up-gradient wells are approximately 1,600 to 2,000 ft to the west of the FAP source area (Ref. 3, p. 34). FAP data show that the leading edge of the Site plume overlaps the western portion of the FAP site boundary (Ref. 6, p. 16). The Site plume as defined by existing FAP wells is present in the I2 and D1 aquifer zones (Ref. 6, p. 19). It should be noted that the western edge FAP monitor wells are not completed in the S (shallow) zones at MNW-11, MNW-12, MNW-9, WB-02 or WB-01. Figure 4 depicts the locations of these wells. The FAP TCE results and groundwater zone depth descriptions are provided in Table 1 and in Table 2. EPA and NMWQCC maximum contaminant levels are listed in the Table on page vi of this report (Ref. 7 and Ref. 8).

The climate in the Albuquerque area is semiarid. During the weather monitoring recording period from 1914 to 2012, the average annual precipitation in Albuquerque was 8.65 inches; most of the precipitation occurred annually from April through October and the average total snowfall was 9.6 inches with most of the snow falling from November through March (Ref. 9). June, July, and August are the hottest months; the average maximum temperatures for these months for the period of record were between 88.9°F and 91.7°F (Ref. 9). December, January, and February are the coldest months with average minimum temperatures for the period of record between 23.6°F and 27.8°F (Ref. 9). During the summer months, the principal form of precipitation occurs as high-intensity thunderstorms and can result in flooding (Ref. 10, p.1). Annual potential evaporation in the region is substantially greater than annual precipitation with Albuquerque annual potential evapotranspiration calculated at 47.58 inches, resulting in a net annual precipitation of zero inches (Ref. 11, pp. 14 and 16). Groundwater flow direction at this Site is generally west to east (Ref. 6, p. 13).

2.3 Operational History and Previous Investigations

The Site is a groundwater contaminant plume of chlorinated solvents and attribution to a specific source operation(s) has not yet been determined. Business operations in the Site vicinity and up-gradient areas were reviewed during the SI and ESI. The 2014 SI Report for WCA contains details on the businesses near the Site and their spatial proximity to the Site; operational history; ownership; previous environmental investigations under various authorities; and brief discussions on the findings of those investigations (Ref. 12, pp 2-8). Selected business directories from 1947 to 1990 and Sanborn Fire insurance maps for the vicinity were investigated as part of the ESI. Table 3 lists the addresses of properties that are of potential concern, the business type, and years of operation (Ref. 13 and Ref. 14). Sections 2.3.1 through 2.3.5 provide additional information on properties from Table 3 that are the most likely potential sources of chlorinated solvents based on soil vapor sampling results during the ESI and SR. Figure 7 depicts the approximate location of the business that are potential source locations.

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2.3.1 Bell Trading Post Property

The Bell Trading Post property, located at 1503 Central Ave. NW, is approximately 2,375 feet west-northwest of the FAP MNW-11 monitor well (Figure 4 and Figure 5). The property originally housed an Indian jewelry manufacturing business from 1947 to 1975 (Ref. 3, p. 3 and 13). The jewelry business site moved to the Sun Bell site at the intersection of Lomas and Central 0.3 miles northwest of the Site (Ref. 3, p. 13). The business, currently called The Bell Group, distributes jewelry and supplies under the Rio Grande brand name (Ref. 3, p. 13). The Bell Group used TCE for degreasing their products and reportedly did have a release at the Lomas and Central location (Ref. 3, p. 13). The exact date of the release is unknown; however, it would have occurred at some time(s) between the years of 1947 to 1975. The 1503 Central Avenue location was then occupied by the Albuquerque Photo Lab from 1982 until 1984. (Ref. 15, p. 3). Michelson Metals offices occupied the building, from 1985 until 1992 (Ref. 15, p. 3). From 1992 until 2000 the property was vacant.

The Bell Trading Post property was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3) (Ref. 16, pp. 1, 3 and 10). The buildings were developed into "affordable housing" as defined by the U.S Department of Housing and Urban Development (Ref. 17, p. 1) and in 2008 the former Bell Trading Post building was renovated to contain 15 residential units (Ref. 18, p. 1).

The NMED first identified the presence of chlorinated solvents in the soil vapor and groundwater following a sampling event conducted in 2001 for the NMED VRP Phase II Site Characterization of the Former Bell Trading Post property (Ref. 15, pp. 14, 15, 19 and 20).

- Four groundwater samples were collected via Geoprobe® from the groundwater table at about 23 ft bgs. One of these groundwater samples and its field duplicate contained TCE at 1.5 µg/L. (Ref. 15, pp. 15, 28-31).

- Six of twelve soil gas samples contained TCE at concentrations from 0.2 µg/L or 200 µg/m^3 to 3.4 µg/L or 3,400 µg/m^3 (Ref. 15, pp. 15, 27 and 36-40). There is a typographical error in Table 2.5 of the report the units are shown as mg/L whereas in fact they are µg/L (Ref. 15, pp. 31 and 36-40).

- Ten of the twelve soil gas samples had elevated PID field screening results (Ref. 15, pp. 14 and 42-53).

In 2005, the Voluntary Remediation Completion Report for the Bell Trading Post recognized that there had been an indication of a possible historical release of chlorinated solvents (Ref. 17, p. 6). A determination was made that the analytical results for the groundwater samples were inconclusive, and did not exceed the NMWQCC standards (Ref. 17, p. 6). The report concluded that no further environmental remediation at the site was needed (Ref. 17, p. 24). The site was issued an Affidavit of Completion of Voluntary Remediation on November 14, 2005 (Ref. 19, p. 1).

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In October of 2013, a request was made by the Family Housing Development Corporation for assistance through the NMED Brownfields Program for investigation and assessment of the property based on the previous environmental studies (Ref. 20, p. 32). This request resulted in a Limited Phase II ESA with regards to indoor air impacts. In June 2014, The Bell Trading Post property was investigated by INTERA on behalf of the NMED VRP. The investigation included sample collection of soil vapor and indoor air (Ref. 20, p. 1). Details of the June 2014 results are described here and sample locations are shown in Figure 6.

Building Exterior (Figure 6).

- Three (3) soil borings were advanced to approximately 3 ft bgs and soil vapor was extracted from each borehole for VOC laboratory analyses. TCE was identified above the reporting limit in two of the three soil gas samples at a maximum detection of 1,800 $\mu g/m^3$, which is above the recommended EPA VISL for TCE (Ref. 20, pp. 7, 8, 15, 24, 25 and 29).

- An exterior outdoor air sample representative of "ambient" conditions over an 8-hr period was collected for VOC analysis. VOC constituents did not exceed any EPA regional screening levels (Ref. 20, pp. 7, 8, 24, 26 and 30).

Building Interior (Figure 6).

- Two (2) soil borings within the building crawlspace were advanced to approximately 2 ft bgs and soil vapor was extracted from each borehole for laboratory VOC analyses. One sample contained TCE at 14 $\mu g/m^3$ (Ref. 20, pp. 7, 15, 24, 25 and 29).

- Two (2) "source" air samples were collected within the crawlspace over an 8-hour period for VOC analysis. One sample contained PCE at 18 $\mu g/m^3$ (below the EPA regional screening level for indoor air) and TCE at 3.1 $\mu g/m^3$ (above the EPA regional screening level for indoor air). Both samples contained chloroform at concentrations ranging from 1.5 to 1.7 $\mu g/m^3$; both concentrations exceed its regional screening level for indoor air (Ref. 20, pp. 8, 24, 26, and 30).

- Two (2) "ambient" air samples were collected within the occupied/communal areas over an 8-hour period for VOC analysis. The VOC results for both samples were below reporting limits and/or EPA regional screening levels (Ref. 20, pp. 8, 16, 24, 26, and 30).

The Limited Phase II ESA concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, historically occurred at the Bell Trading Post property or within the immediate vicinity of the site. According to the report, the release most likely occurred during the site's operation as a jewelry manufacturing facility (Ref. 20, p. 17).

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The data indicates that TCE and chloroform are present in soil vapor within the northwest corner of the site near the corner of Roma Ave and Laguna Blvd intersection (Ref. 20, pp. 17, 23 and 25).

The Limited Phase II ESA also concluded that the VOC levels do not pose an immediate risk to the current residents of the site building (Ref. 20, p. 17). The report recommended continued operation of a well-ventilated building crawl space and monitoring of factors that may impact the indoor air VOCs (Ref. 20, pp. 17, 23, 37 and 38). Additional soil gas and indoor air monitoring recommendations for the site were proposed but have not been conducted as of the date of this report (Ref. 20, pp. 17, 18, 37 and 38).

In 2016, the ESI soil vapor sampling at the former Bell Trading Post property identified detections of TCE in the soil vapor at an average of depth 6.5 feet bgs. The field gas chromatograph sample results with detections for TCE ranged between 32 $\mu g/m^3$ to 7,678 $\mu g/m^3$. Two laboratory confirmatory soil vapor samples contained TCE at concentrations of 272 $\mu g/m^3$ and 8,530 $\mu g/m^3$ confirming the field detections (Ref. 21, pp. 11, 12, and 13).

2.3.2 Indian Silver Craft Inc.

Business directories reviewed for the ESI identified a jewelry manufacturer, Indian Silver Craft, located at 1701 Central Ave NW from 1965 to 1985 (Ref. 13, p. 15, 22, 27, 30, 35 and 41). However, a sidewalk reconnaissance of 1701 Central Ave NW revealed that this address is a private residence. Online research of the business name yielded several confirmations on the Indian Silver Craft address as 1601 Central Ave NW (Ref. 22, pp 1, 2, 3 and 4). Verbal discussions with neighborhood property owners confirmed a jewelry manufacturer at 1601 Central Ave NW that was in operation for approximately 20 years. A visual survey of the building contents in 2016 confirms that it was a manufacturing operation with equipment still evident inside the building. Indian Silver Craft Inc. appears to no longer be in operation at this location, see Figure 5.

In 2016, the ESI soil vapor sampling around the exterior of the former Indian Silver Craft property identified detections of TCE in the soil vapor at an average of depth of 6.5 feet bgs. The field gas chromatograph sample results with detections for TCE ranged between to 983 $\mu g/m^3$ to 1,682 $\mu g/m^3$. Three laboratory confirmatory soil vapor samples collected at this location contained TCE at 3,050 $\mu g/m^3$ and 1,440 $\mu g/m^3$ with one non-detect result, see Figure 10 (Ref. 21 pp. 11, 12, and 13).

2.3.3 Kelly's Transmission Exchange

From 1985 to 2007, Kelly's Transmission Exchange was located at 1816 Central Ave SW See Figure 7 and Figure 8 (Ref. 13, p. 39 and 47 and Ref. 24). From 1975 to 1980, Aamco Transmission occupied the same location (Ref. 13). 1816 Central Ave SW is located approximately 0.64 miles northwest of the FAP MNW-11(D1) monitor well (Table 3) (Ref. 3, pp. 14 and 32 and Ref. 12, p. 7). In August 2006, an NMED inspection report documented 6 pairs of hydraulic lifts, an oil water separator and an oil saturated garage floor (Ref. 23). In 2007, a corrective action was performed under NMED ROS authority in the investigation and clean-up of Kelly's Transmission. Six pairs of hydraulic lifts were

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removed including the fluids in the fluid reservoirs. An OWS, its oil and sludge contents, and its surrounding subsurface soils were also removed. Confirmation soil sampling for the removal actions detected some TPH and PAH compounds and some metals, but no chlorinated solvents were detected (Ref. 24, pp. 1-7).

One monitor well (MW-1) was installed approximately 11 feet east-southeast of the OWS on September 13, 2006. Groundwater was encountered at 16 feet bgs and the well was completed to 24 feet. The monitor well was sampled on September 14, 2006 for analysis by EPA-Method 8310 and EPA-Method 8260. Analytical results did not indicate PAH's or VOCs (Ref. 25, pp. 2 and 3). It is not known if the well completed on September 14, 2006 is still accessible.

2.3.4 Park Ave Cleaners

The Park Ave Cleaners property at 1004 Park Ave SW (Figure 3) was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3). The February 2000 soil gas data indicated a PCE concentration of 66,000 $\mu g/m^3$ at 12.5 ft bgs in a sampled borehole. Another borehole exhibited detected concentrations of PCE at 76,000 $\mu g/m^3$ and TCE at 900 $\mu g/m^3$ at 10 ft bgs (Ref. 26, pp. 3 and 10).

One monitor well MW-1 was drilled on March 9, 2000 south of the building. Soil samples from the MW-1 borehole exhibited PCE concentrations of 98.3 µg/kg at 8 to 10 ft bgs and 64.7 µg/kg at 17 ft bgs (Ref. 26, pp. 4, 8 and 10). Depth to groundwater in monitor well MW-1 in March 2000 was 16.7 ft bgs (Ref. 26, p. 9). A groundwater sample and duplicate collected from MW-1 on March 10, 2000 detected PCE at 14.0 µg/L and 12.2 µg/L respectively, below the NMWQCC level of 20 µg/L (Ref. 26, pp. 4 and 10). The NMED Voluntary Remediation agreement was signed on November 11, 2000 and the affidavit of completion of the VRP was signed on December 12, 2000 for the neighboring property of 1006 Park Ave SW (Ref. 27 p. 20).

On August 19, 2016, the condition of the well vault and well was checked by NMED SOS personnel. The water level measured 13.4 ft bgs and total depth of the well was recorded at 23.9 ft bgs (Ref. 28, p. 52). Water level has risen at this location 3.3 feet between March 2000 and August 2016.

In 2016, the ESI soil vapor sampling around the exterior of the former Park Ave Cleaners property identified detections of PCE and TCE in the soil vapor at an average depth of 6.5 feet bgs. The three field gas chromatograph sample results for PCE were 1,727 $\mu g/m^3$, 715 $\mu g/m^3$ and 634 $\mu g/m^3$. TCE was detected at 104 $\mu g/m^3$, 82 $\mu g/m^3$ and non-detect (Figure 15 and Table 9). No laboratory confirmatory soil vapor samples were collected at this location in 2016 (Ref. 21, pp. 11 and 13).

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2.3.5 Other Potential Source Properties

Several other properties currently lacking any detailed operational history are also potential chlorinated solvent sources. A list of these properties can be found in Table 3 and Figure 7 (Ref. 13, 14, and 30).

3.0 Waste/Source Sampling

During the PA, SI, ESI and SR for the Site, NMED SOS gathered information pertaining to potential sources, and contaminated media. Potential sources were identified through the review of various environmental investigations, monitoring reports and site reconnaissance (Ref. 3; Ref. 6; Ref. 12, pp. 2-7; Ref. 17; Ref. 20; Ref. 22; Ref. 23; Ref. 24; Ref. 25; Ref. 26; Ref. 27; and Ref. 28). The facilities considered to be likely potential sources were discussed in Sections 2.3.1 through 2.3.5 of this SR report. These sites were identified because of the nature of the business and the potential for using TCE.

TCE is used primarily in vapor degreasing of fabricated metal parts and some textiles. Less commonly, it is used as an intermediate in the production of organic chemicals and pharmaceuticals, as solvents in dry cleaning and extraction, and as a refrigerant/heat exchange liquid. Major environmental releases are from metal degreasing (Ref. 29, p. 1). TCE is also a degradation product of PCE, while cis-1,2-DCE and trans-1,2-DCE are degradation products of TCE (Ref. 30, pp. 1 and 2). Waste source sampling was not conducted for this SR.

4.0 Groundwater Pathway

The groundwater pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to groundwater and whether any receptors (through drinking water wells, wellhead protection areas, resources) are likely to be exposed to hazardous substances as a result of a release. SOS has identified impacts to the groundwater at this Site and has performed a limited investigation on water quality and receptors under the WCA SI performed in 2014 (Ref. 12, pp. 8-17).

The Groundwater Pathway Sections 4.0 through 4.3 of the WCA SI included discussions on the hydrology; municipal, public and domestic supply well use; the historical groundwater sample locations and analytical results (Ref. 12, pp. 8-17). The WCA SI discussed groundwater sampling, results and conclusions of the sampling performed for the SI in 2014 in Sections 4.4 through 4.6. The SI Report documented that the total number of people served by ground water in a four mile radius of the Site is approximately 204,147 (Ref. 12, pp. 12, 17-20).

Limited ground water investigation was conducted during the SR to evaluate how the areas of highest soil vapor concentrations may or may not correlate with groundwater. The SR ground water pathway investigation is discussed in Sections 4.1 and 4.2.

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4.1 2017 SR Groundwater Pathway Sample Locations

Two monitoring wells (WCA-1 and WCA-2) were installed during the SR on March 7, 2017 in locations corresponding with the highest ESI soil vapor detections. Both WCA-1 and WCA-2 were completed in the shallowest water bearing zone to a depth of 29.9 and 30.18 feet btoc, respectively (Ref. 31, pp. 1 and 4). See Figure 5 for the approximate locations of the monitor wells. Static water level on March 8, 2017 (prior to well development) was at 14.60 ft and 16.40 ft btoc, respectively. The TOC elevations have not been surveyed (Ref. 32, pp. 1 and 2).

4.1.1 Groundwater Data Acquisition Strategy

The primary groundwater objective for the SR field event was sampling the two newly installed monitor wells WCA-1 and WCA-2. The wells were installed near the two areas of highest ESI soil vapor concentrations to evaluate potential source release points to the TCE groundwater plume. The drill log and development sheets are included as Ref. 31 and Ref. 32.

Groundwater sampling activities were performed the week of March 15, 2017 (one week following the installation and development of the wells) and again the week of May 15, 2017 (Ref. 33; and Ref. 34). Both low flow and disposable bailer purge methods were performed in the sampling events. Groundwater sample locations are depicted on Figure 3, Figure 4 and Figure 5. A list of businesses that may have used TCE or PCE are included in Table 3 for information purposes. Table 4 contains the groundwater samples collected and the analysis requested. All sampling was conducted in accordance with the NMED GWQB QMP (NMED, March 2017), NMED SOS QAPP (NMED, March 2017), and NMED SOS SOP Manual (NMED, July 1999, Rev 2017) for groundwater sampling. All field activities were performed according to the May 2017 SR Work Plan; and the work was documented in the field sample forms (Ref. 33, Ref. 34 and Ref. 35).

4.1.2 Groundwater Sampling Activities

Groundwater sampling activities were performed on March 15, May 14, and May 15, 2017. Monitor wells WCA-1 and WCA-2 were sampled per the SR work plan. For comparative purposes monitor wells WCA-1 and WCA-2 were sampled by bailing and low flow methods. On May 14, 2017 monitor wells were sampled by baling. On March 15 and May 15, 2017 wells were sampled by low flow sampling. Groundwater samples were collected when field parameters had stabilized (+/- 0.10 standard unit for pH, +/- 10% for specific conductance, temperature is consistent for at least 3 consecutive readings, and turbidity had stabilized or was below 10 NTUs). The March 15 samples were placed on ice and delivered on the same day to the NM Scientific Laboratory Division. The water samples were analyzed for EPA SW846 Mass Spectrometry Method 8260B. May 2017 samples were submitted to the Houston Lab for analysis. See Table 4 for analytical methods. Field Data sheets are included as Ref. 34, pp. 1-2.

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4.2 Groundwater Sample Results

The initial samples collected on March 15, 2017 from well WCA-1 and well WCA-2 did not contain any VOC's above the sample detection limit. The March groundwater data is included in Ref. 36.

Groundwater samples collected on May 14, 2017 and May 15, 2017 from well WCA-1 and well WCA-2 did not exhibit any detections above Federal or New Mexico regulatory limits for the analytical parameters depicted in Table 4 except for manganese (Ref. 8). Dissolved manganese was reported for WCA-2 and its duplicate WCA-22 at 832 µg/l. Total manganese was detected at 1,310 µg/l (WCA-2) and1,380 µg/l (WCA-22) (Ref 37).

5.0 Surface Water Pathway

The surface water pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to surface water; and whether any receptors (intakes supplying drinking water, fisheries, or sensitive environments) are likely to be exposed to a hazardous substance as a result of a release. SOS has identified surface water drainages near the site for future consideration and has performed a limited investigation for water quality and receptors in the 2014 SI (Ref. 12, pp 20-21). No data acquisition was performed during this SR for the evaluation of the surface water exposure pathway.

6.0 Soil Exposure and Sub Surface Intrusion Pathways

The soil exposure pathway assesses the threat to human health and the environment posed by direct contact with hazardous substances and areas of suspected contamination. This pathway addresses any material containing hazardous substances that is on or within 2 feet of the surface and not capped by an impermeable cover. No data acquisition was performed during this SR for the evaluation of the soil exposure pathway.

The subsurface intrusion pathway assesses the vapor intrusion component from the soil into occupied structures and is discussed in this section. The subsurface intrusion pathway was assessed as part of the SR. During the ESI, SOS identified impacts to the soil at the Site. Under the SR, additional soil gas data was collected and a VI survey of 4 structures was performed. The VI survey focused on structures nearest those areas identified during the ESI as having the highest TCE soil gas results.

6.1 Physical Conditions

The majority of the ground surface in the area along Central Ave is capped with asphalt, concrete, homes, apartments, businesses and a school (Figure 3, Figure 4 and Figure 5) (Ref. 12, p. 22). No data acquisition was performed during this SR for the evaluation of the soil exposure pathway. The subsurface intrusion pathway was assessed as part of

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the SR because the contaminants at the Site are VOCs and volatilization from soil or groundwater to soil gas and air, particularly indoor air, may present an exposure pathway.

6.2 Soil Gas / Indoor Air Targets

The Site is in a primarily, residential, commercial and light industrial setting. There are approximately 30 residential properties within 200 ft of the Site groundwater plume center point (MNW-11) with the nearest residence approximately 42 ft away (Figure 3). Proximity of residences, schools and business properties to the soil gas sample locations in this ESI are provided in Table 8. Proximity of the Site to schools is documented in the WCA 2014 SI Report (Ref. 12, p. 22).

6.3 Soil Gas / Indoor Air Sample Locations

6.3.1 Data Acquisition Strategy

The primary objectives of the SR were to collect indoor air for VI assessment as part of the subsurface intrusion pathway, and to collect SG samples to confirm results from the July 2016 ESI sampling effort in order to clarify the soil vapor boundary and thus define the potential extent of the VI concern.

All sampling was conducted in accordance with the NMED GWQB QMP (NMED, March 2017), NMED SOS QAPP (NMED, March 2017), and NMED SOS SOP Manual (NMED, July 1999) for indoor air and soil gas sampling. Sampling procedures were performed according to the May 2017 SR Work Plan (Ref. 35). All field activities were documented on field boring log, field sample forms, and in FROG-4000^{tm} Data Log Book and computer spread sheet (Ref. 38, Ref. 39 and Ref. 40).

6.3.2 Sampling Activities

Soil Gas Sampling

Eight (8) new SG sample ports were installed. The SG sampling utilized a Macho hammer drill to install the new SG wells and dedicated tubing to the planned depth of 6 to 7 feet bgs. The location of each SG well was surveyed with GPS and recorded in the field book and a sketch map of the location was drawn. The SG sampling effort included collecting 11 SG screening samples and eight (8) confirmatory TO-15 laboratory samples with one duplicate. The SG sampling points were focused west of 9th Street and Marquette Avenue and along 14th St NW near Marquette Ave NW (see Figure 7 and Figure 9 through Figure 13). The SG points installed for the combined ESI and SR events are noted in Table 3 according to their proximity to a potential source. Sampling locations are depicted in Figure 8 through Figure 15. Table 4 contains a summary of sample analyses performed.

A SG screening sample was collected from each sample location. Each soil gas screening sample was analyzed directly from the dedicated sample tubing using the FROG-4000^{tm} GCS (FROG). On May 12, 2017, the FROG was calibrated at the Defiant Technologies Laboratory prior to the start of field work (Ref. 40, p.1). The five point chlorinated alkenes calibration enable the FROG with Elvin software to detect and

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measure concentrations of PCE and TCE. Sample collection, analysis, and system purging & cleaning on average took approximately 15 to 20 minutes per sample.

The FROG GCS unit drew the required sample into the unit and a computer with Elvin Software analyzed the results. Each sample analyzed was given a unique date/time stamp and this was recorded along with the sample location information and data result into the FROG Field book (Ref. 40). After the analysis was complete the FROG was put through a purge cycle to clean the unit. The Elvin software allows the user to calculate volumes of the PCE or TCE detected.

Laboratory grab samples were collected using 1 liter mini-Summa air canisters. The Summa canisters supplied by TestAmerica Knoxville were certified clean and under negative pressure (Ref. 39). Sumas canisters were shipped with dedicated regulators set for a 5-minute sample collection time. Field parameters to include tank pre and post pressure readings, collection time, and shut-in pressure test readings were recorded (Ref. 39). Daily local barometric air pressure and temperatures were recorded from the Albuquerque International Airport NOAA site http://w1.weather.gov/obhistory/KABQ.html (Ref. 41). The Summa samples collected by NMED SOS were shipped to Test America Knoxville, TN for VOC analyses using TO-15 method including 1,4-dioxane. Nine (9) samples were collected to confirm the field results.

Indoor Air Sampling

The indoor air samples were collected in 6 liter Summa or similar air sample canisters fitted with flow control regulators set for a 24-hour sample period. Measures were taken to ensure rain would not be able to enter the canisters set for ambient air collection; each canister either had its inlet turned downward or was placed under protective cover. Indoor canisters were placed in locations at approximate breathing zone height. Doors and windows in homes at the indoor canisters survey locations were to remain closed if possible. Owner occupants were given instructions that were to be followed during the sampling event. Sample collection locations were placed if possible in highest use rooms within the residences and the crawl space or sub-slab samples were taken in close vertical proximity to the indoor sample location as feasible. Holes were drilled through the basement or living space slab using the Macho Hammer Drill equipped with concrete bit. Debris was vacuumed out of the hole and a Contractor Vapor Pin Kit was used to install stainless steel sample tips with dedicated sleeves (Ref. 35, pp. 31-34). The hole was leak checked for 5 minutes using the water dam method prior to sample collection. The helium leak detection method was not used as originally planned because the helium meter was not shipped by the rental company. The Summa canisters supplied by TestAmerica Knoxville were certified clean and under negative pressure (approximately -30"Hg) (Ref. 42). Summa canisters were shipped with dedicated certified clean regulators set for a 24 hr sample collection time. Records were kept recording the date, time, beginning and final vacuum of the canister and complete Field Test Data Sheets, Chain of Custody Records, and canister sample tag (Ref. 42).

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6.4 Soil Gas Sample Results

6.4.1 FROG SG Screening Results

Soil vapor field screening confirms the results from the July 2016 ESI sampling effort that identified what appears to be two possible source areas of TCE near the western end of the SR study area (Figure 18) and one PCE source area at 1004 Park Ave SW (Figure 20). All field screening data in ppbv and calculated $\mu g/m^3$ including duplicate analysis performed, and duplicate samples are reported in Table 9. Laboratory results from the 2016 ESI Field work were reported in the November 2016 WCA ESI Report (Ref. 21, pp. 11-14). Data from that event is presented in this WCA SR report in Table 9.

The following sample locations exhibited elevated TCE soil vapor field results and are reported here as the calculated $\mu g/m^3$:

- Samples collected at WCA-1801-Central-02 and WCA-1801-Central-03 are located at 1801 Central Ave NW, on the eastern edge of the Manzano Day School property. These locations exhibited one detection of TCE in the soil gas at 614 $\mu g/m^3$ and non-detect, respectively (Figure 9, Figure 19, and Table 9) (Ref. 40, pp. 62, 67 and 71). Additionally, PCE was detected at 12 $\mu g/m^3$ in sample WCA-1801-Central-02.

- Samples collected at WCA–1611-Central-01, WCA–1611-Central-02 and WCA–1611-Central-04, were collected just west of the former Indian Silver Craft at 1601 Central Ave NW. These three sample locations had detections of TCE at 108 $\mu g/m^3$, 3,364 $\mu g/m^3$ and 763 $\mu g/m^3$, respectively (Ref. 40. p. 69).

- Samples locations WCA-1433-Central-01, WCA-1433-Central-02, WCA-1433-Central-03, WCA-1433-Central-04 and WCA-1433-Central-05 exhibit TCE results of non-detect, 451 $\mu g/m^3$, 6,153 $\mu g/m^3$, 4,872 $\mu g/m^3$, and 4,246 $\mu g/m^3$, respectively (Figure 11, Figure 19, and Table 9) (Ref. 40, pp. 60, 61, and 63-66).

- Samples collected along 14th Street NW between Roma Ave NW and Central Ave NW include WCA-14St-01, WCA-14St-02, WCA-14St-03 and WCA-14St-05. These sample results exhibit TCE detections at 730 $\mu g/m^3$, 1,746 $\mu g/m^3$, 1,080 $\mu g/m^3$, and 7,846 $\mu g/m^3$, respectively (Figure 12, Figure 19, and Table 9) (Ref. 40, pp. 63 and 72).

6.4.2 Laboratory Results

Nine (9) Samples were collected for laboratory analysis from eight (8) soil vapor well locations. The nine (9) samples were collected in 1-liter Summa canisters and sent to

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TestAmerica Knoxville for TO-15 analysis. Summa grab samples were collected with 5-minute flow control regulators. The sample fill time was between 5 and 7 minutes with a final tank pressure recorded at -3 to -7 inches of Hg prior to shipment. Summa grab samples from the ESI, 2016 event were collected without a flow regulator and the sample time averaged 47 seconds to fill the Summa or an average flow rate of one liter every 7.8 seconds, which is significantly faster than the recommended flow rate of +/- 250 ml/min. Data from that 2016 and 2017 events are presented in Table 9.

Five (5) samples collected at locations WCA-1801-Central-03, WCA-1433-Central-02, WCA-C-14St-01, WCA-1404-Central-02 and WCA 1004 Park Alley-02 were drilled and installed in July 2016. Four (4) samples collected at WCA-1433-Central-03, WCA-1433-Central-04, WCA-1433-Central-04D, and WCA-C-14St-05 were from sample locations drilled and installed the week of May 14, 2017. Data results for these nine (9) samples are shown in Table 9 (Ref. 43).

- TCE was detected in the following four (4) of the nine (9) Summa samples collected: WCA-1433-Central-02, -03, -04 and -04D, all located to the east of the former Bell Trading Post property. Detections of TCE ranged from 2.7 $\mu g/m^3$ to 340 $\mu g/m^3$ (Table 9). Additionally, sample WCA-1433-Central-02 exhibited a PCE detection of 14.0 $\mu g/m^3$.

- Laboratory results did not detect any COCs in three (3) samples: WCA-C-14St-01, WCA-C-14St-05, and WCA-1404-Central-02.

- Laboratory results detected PCE at 4.6 $\mu g/m^3$ and 1,700 $\mu g/m^3$ in two (2) samples collected at WCA-1801-Central-03 and WCA-1004-Park-Alley-02, respectively (Ref. 43, pp. 73-75). Sample WCA-1801-Central-03 is about 1 block east of the active dry cleaners, Unique Cleaners, located at 1880 Central NW. Sample WCA-1004-Park-Alley-02 is located at the former Park Avenue Dry Cleaners at 1004-Park Ave SW. Additionally, TCE was detected in WCA-1004-Park-Alley-02 sample at 2.7 $\mu g/m^3$. See Figure 8, Figure 9, Figure 15, and Table 9 for these sample locations and data (Ref. 43, pp. 85-87).

6.5 Indoor Air Sample Results

Indoor air samples were collected at four (4) separate structures. Three (3) were single family dwellings with partial basements that were approximately six (6) feet deep at the bottom of the joists. The basements extended below the living space a third to a quarter of the house living space foot print. The remainder of the basement was dirt crawl space just one or two feet below the wooden floor and joists. The homes were built between mid-1900 to the early 1920s. Two (2) of the three (3) homes are occupied and one is being gutted to begin remodeling. Samples in the single-family homes were collected in the living space, the partial basement and from below the slab. One outdoor ambient sample was taken near the three homes. These homes are identified as A, B, and C.

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The fourth location is a 15-unit condo structure with commercial offices located at one end and is identified as structure D. A portion of structure D is constructed over an actively vented dirt floor crawl space and partly on a concrete slab. All property owners were instructed to limit the use of exhaust fans, air conditioning or evaporation coolers and to keep the windows and doors closed as much as practical for the duration of the 24-hour collection period.

- House A was remodeled approximately one to two years ago. The house is occupied by the homeowners. Air samples with duplicates were collected in the indoor living space, basement, and sub-slab, an ambient outdoor air sample was collected in the back yard. The basement contained limited items and all painting and cleaning supplies had been removed. The basement and sub-slab samples and duplicate results were all below detection limits for the COCs. The floor of the basement was less than two inches thick at the selected Sub-slab sample location. The indoor air sample A-I-1 and its duplicate A-I-2 exhibited a detection of PCE below the RL, but above the MDL. The PCE detection is well below federal residential screening levels. The ambient outdoor sample collected for this neighborhood was non-detect for PCE and TCE. (Table 7) (Ref. 42, pp. 1-7; Ref. 43, pp. 34-54).

- House B is under renovation and contains no internal walls or doors only open studs, all flooring has been removed as well as kitchen, bath, laundry and fireplace, and heating/cooling infrastructure. The owner did not believe any chemicals or solvents had been used thus far in the renovation process. Some equipment and tools may have been on site however, none were present when the samples were collected. There were no chemicals or equipment in the basement. Several porch window panes were broken or missing so the house was not completely closed. No construction workers were in the house and no construction activity took place during the 24-hr collection period. The Indoor air sample B-I was collected in the former laundry area on the back porch directly above the partial basement collection area. Sample B-1 detected TCE at 6.2 $\mu g/m^3$, exceeding the TCE federal screening level for indoor air of 0.48 $\mu g/m^3$. This was the only detection of TCE in House B. The sub-slab sample B-SS detected PCE below the RL but above the MDL. All other results are non-detect, see Table 7 (Ref. 42, pp. 8-10; Ref. 43, pp. 25-33).

- House C has been remodeled over the years. The house is occupied by the homeowners and extended family. Air samples were collected in the indoor living space, basement, and sub-slab. The basement housed a variety of items including paint and cleaning supplies. The indoor air sample C-I and basement sample C-B were below detection limits for PCE and TCE. The sub-slab sample C-SS had a detection of PCE at 1.7 $\mu g/m^3$ and a detection of TCE below the RL but above the MDL. Both detections are well below federal residential sub-slab screening levels for TCE at 16 $\mu g/m^3$ and for PCE at 360 $\mu g/m^3$, see Table 7 (Ref. 42, pp. 11-13; Ref. 43, pp. 59-63 and 67-72).

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- Structure D is currently a multi-unit condo with some office space. The structure originally housed jewelry manufacturing businesses from 1947 to 1975, a photo lab from approximately 1980 to 1985, and then offices for Michelson Metals from 1985 until 1990 (See Table 3, Ref 13,14 and 15). The northern end of the structure is built slab on grade and the southern part of the building is constructed over a deep dirt crawl space that varies from 4 to 6 feet in depth. Indoor air and sub-slab samples were collected in the slab on grade portion of the building. The sample location was inside an unoccupied utility closet space just off a communal hallway. The space was empty of any storage items and only contained the electrical panel and other infrastructure. An ambient outdoor sample was collected near the outdoor parking area entrance on the west side of the building. The indoor air sample D-I and sub-slab sample D-SS detected TCE at 9.2 $\mu g/m^3$ and 5,300 $\mu g/m^3$, respectively. Both detections are above the federal residential and commercial indoor air (0.48 $\mu g/m^3$ and 16 $\mu g/m^3$) and sub-slab (3 $\mu g/m^3$ and 100 $\mu g/m^3$) screening levels for TCE. The sub-slab D-SS sample exhibited a detection of PCE at 24 $\mu g/m^3$ but this was reported as an approximate value because it was less than the RL but greater than the MDL. The ambient sample D-A was non-detect for the COC, see Table 7 (Ref. 42, pp. 14-16; Ref. 43, pp. 55-60 and 64-66).

7.0 Air Pathway

The air pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to the air; and whether any receptors (human population and sensitive environments) are likely to be exposed to hazardous substances as a result of a release. No data acquisition was performed for the evaluation of the air pathway in the ESI or SR.

8.0 Summary and Conclusions

Based on the combined SR and ESI soil gas data, a TCE soil gas plume extends northwest to southeast from the 1800 block of Central Ave NW to the 1400 block of Central Ave NW, where the plume signature then appears to stretch in a more eastward direction along Marquette Avenue toward groundwater monitor well MNW-11 at Marquette Ave NW and 9th Street (Figure 18). Soil gas data collected for the SR confirm the soil gas data in the ESI study. The combined data demonstrate three distinct TCE hot spots indicative of potential source areas in or around the 1800 block westward, the 1500 to 1600 block, and the 1400 block of Central Ave NW (Figure 18 and Figure 19) (Ref. 44 and Ref.45). Soil gas data indicate that there are two PCE hot spots indicative of potential source areas in or around the 1100 block of Central Ave NW and the intersection of Park Ave SW and 10th Street (Ref. 44 and Ref. 45).

The soil gas results from the SR were compared to Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations with a Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46, p. 2). The VISL for TCE

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in target sub-slab and exterior soil gas 16 μg/m^3 in a residential setting and 100 μg/m^3 for a commercial setting (Ref. 46 pp. 2 and 3).

The highest soil gas laboratory sample results for TCE were detected at 340 μg/m^3 and 35 μg/m^3 located at 1433 Central Ave NW. This property borders the east side of the former Bell Trading Post property at 1503 Central Ave NW, where the highest TCE soil gas results from the 2016 ESI study were detected at 8,530 μg/m^3 (Table 7 and Table 9). These results are above the EPA residential target exterior soil gas concentration of 16 μg/m^3 and one is above the TCE commercial target exterior soil gas concentration of 100 μg/m^3.

The highest soil gas sample results for PCE was located near 1004 Park Avenue SW, the former Park Avenue Cleaners, with concentrations of 1,700 μg/m. The result is above the residential and commercial EPA target sub-slab and exterior soil gas concentrations. The VISL for PCE in target sub-slab and exterior soil gas 360 μg/m^3 in a residential setting and 1,600 μg/m^3 for a commercial setting (Ref. 46 pp. 2 and 3).

Vapor intrusion indoor air sampling analytical results for Structure D indicate TCE was detected above the EPA target sub-slab and exterior soil gas level at 5,300 μg/m^3 in the sub-slab below a mixed residential/commercial building at 1503 Central Avenue NW. Additionally, indoor air results from Structure D indicate TCE was detected above the EPA target indoor air concentration at 9.2 μg/m^3 within the residential portion of 1503 Central Avenue NW, the former Bell Trading Post Jewelry manufacturing business.

Vapor intrusion and indoor air results for other residential structures (A, B and C) sampled were all either non-detect or below the EPA target sub-slab and exterior soil gas and indoor air concentrations. One exception was Structure B, a home under the demolition phase of a remodel with missing window panes. Structure B, located at 203 14th Street NW, exhibited a detection of TCE at 6.2 μg/m in the indoor air sample, however, the basement air and sub slab samples were both non-detect for TCE.

Two monitor wells were installed for the SR. Wells WCA-1 and WCA-2 were installed in the shallowest water bearing zone within the area of highest detected soil vapor readings from the ESI. Groundwater sampling analytical results from the SR did not exhibit detectable concentrations of any VOCs, SVOCs, 1,4-dioxane, pesticides, or Aroclor.

NMED SOS recommends HRS evaluation for the Site.

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FIGURES

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Figure 1 Location of Albuquerque and Bernalillo County in New Mexico.

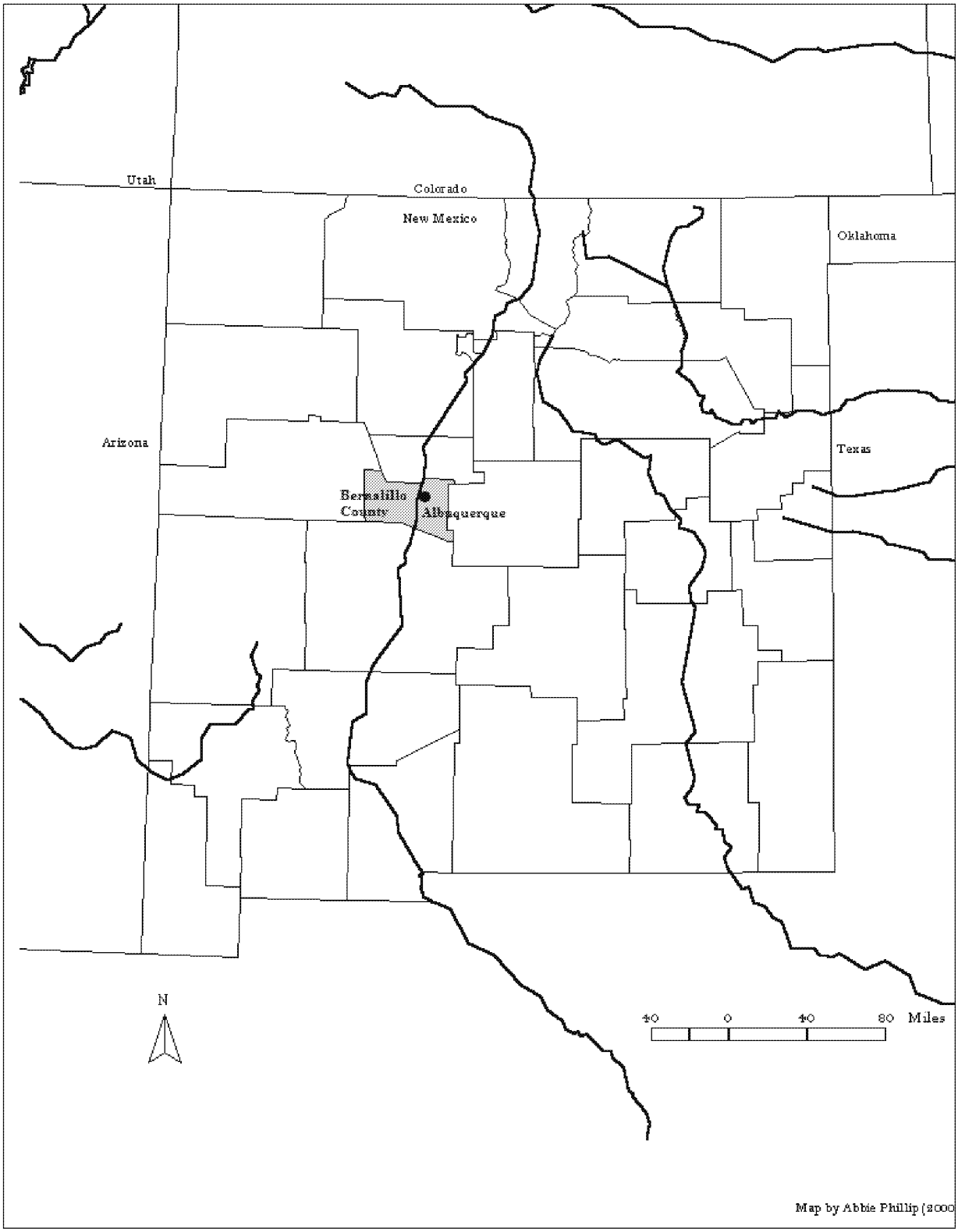

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Figure 2 Albuquerque Area Map, West Central Avenue area outlined in red.

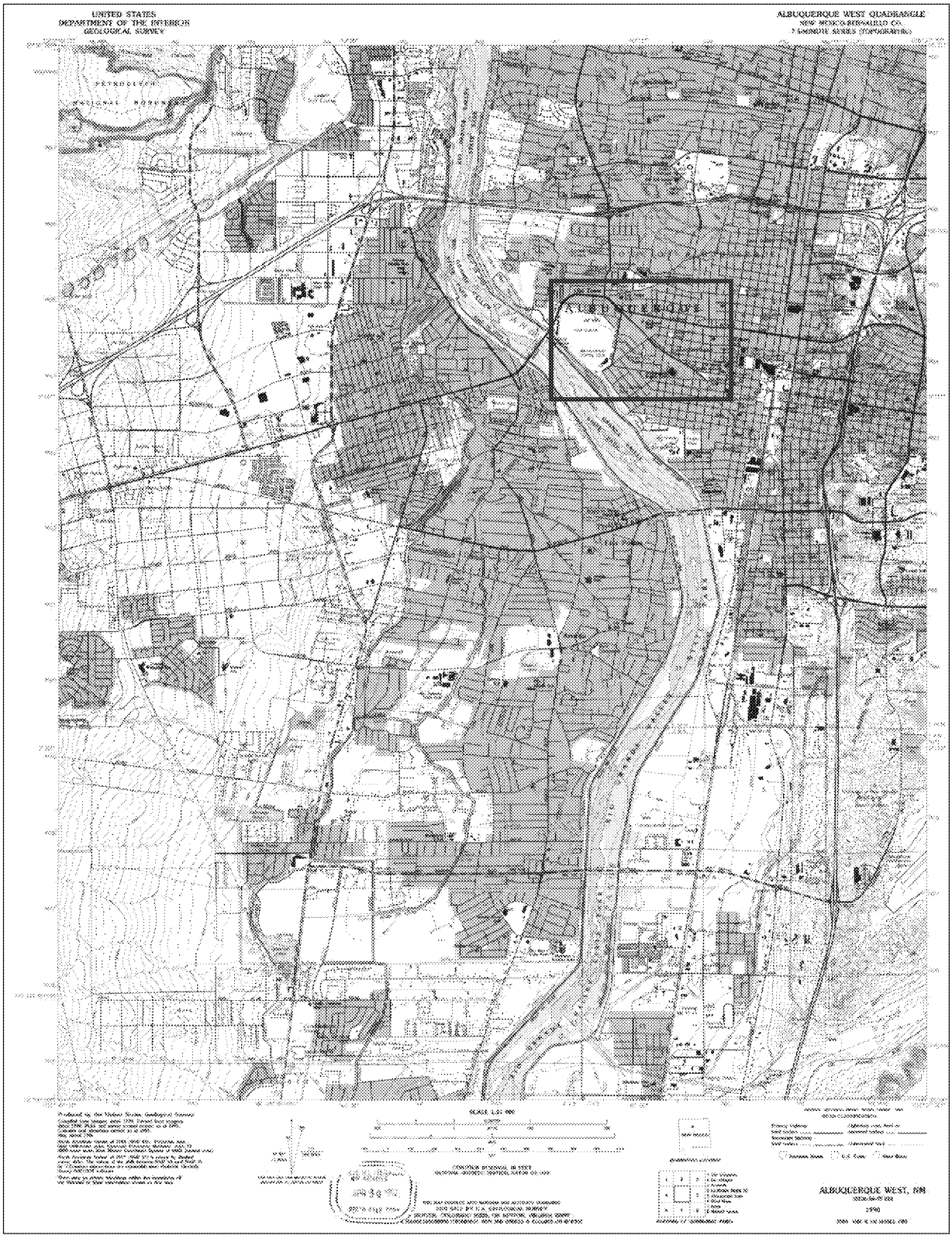

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Figure 3 SR Area of Investigation

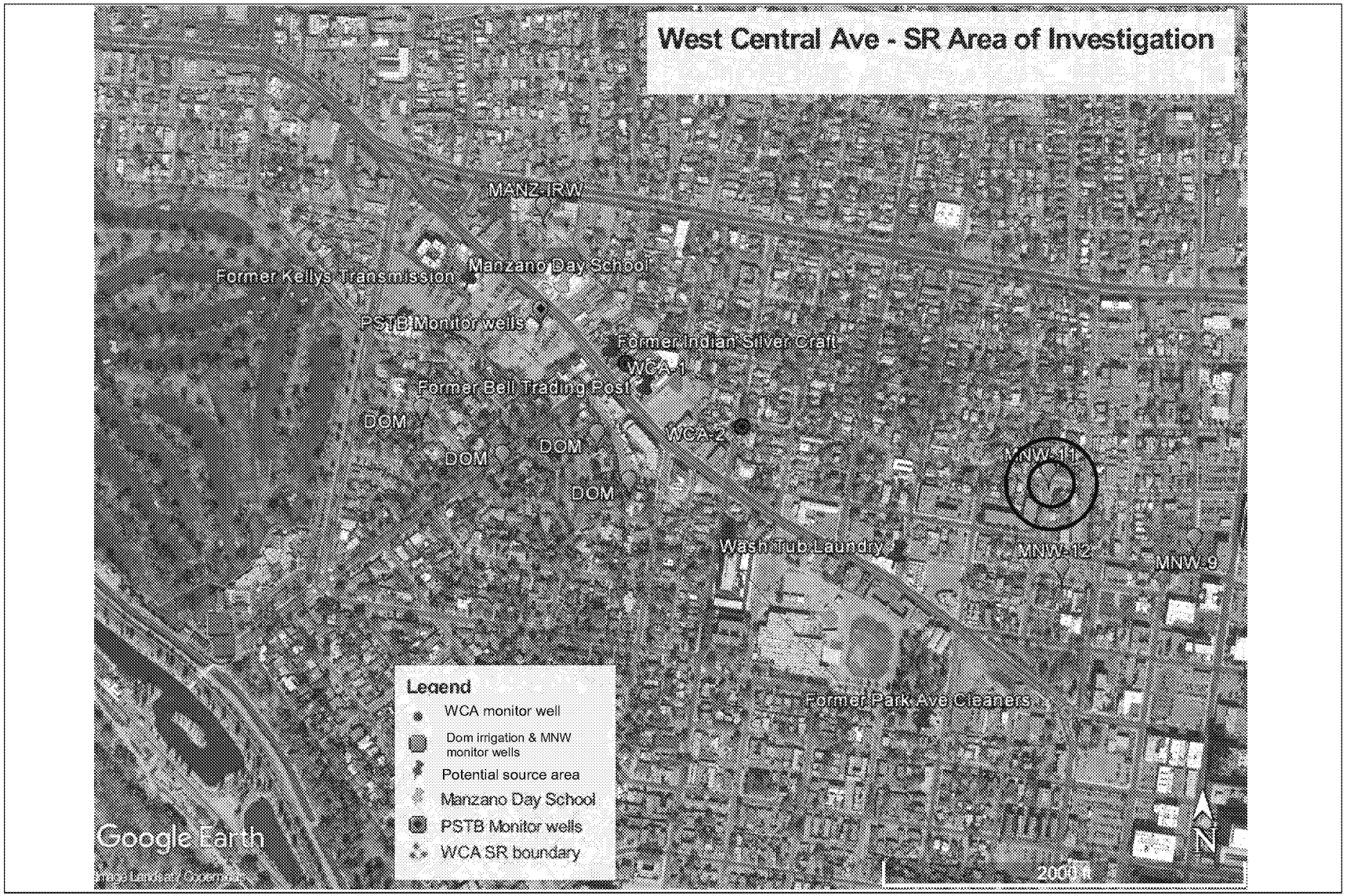

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Figure 4 WCA Base Map with Land Use and Monitor Wells

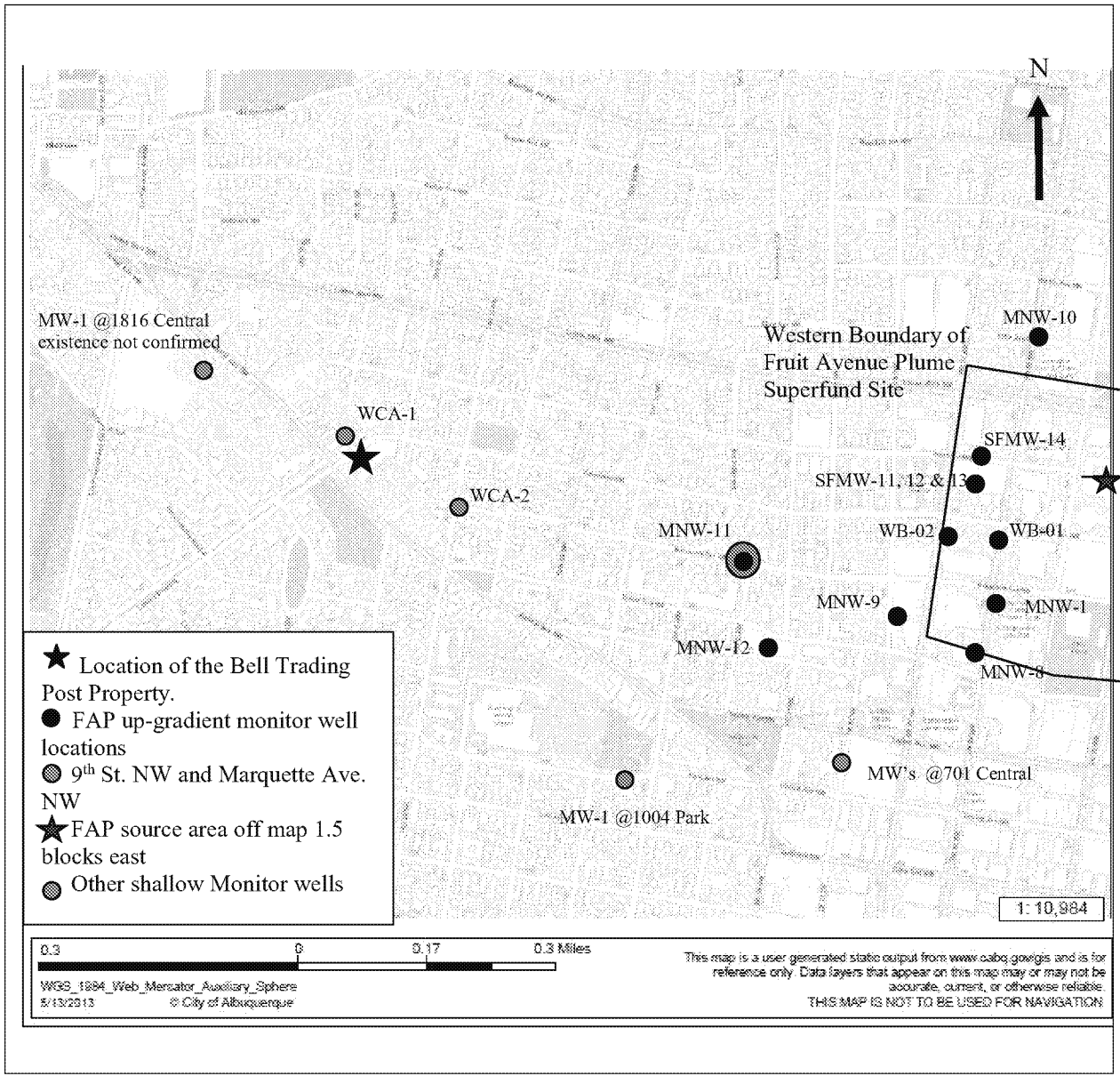

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Figure 5 SR Monitor Wells and Vapor Intrusion Sample Locations

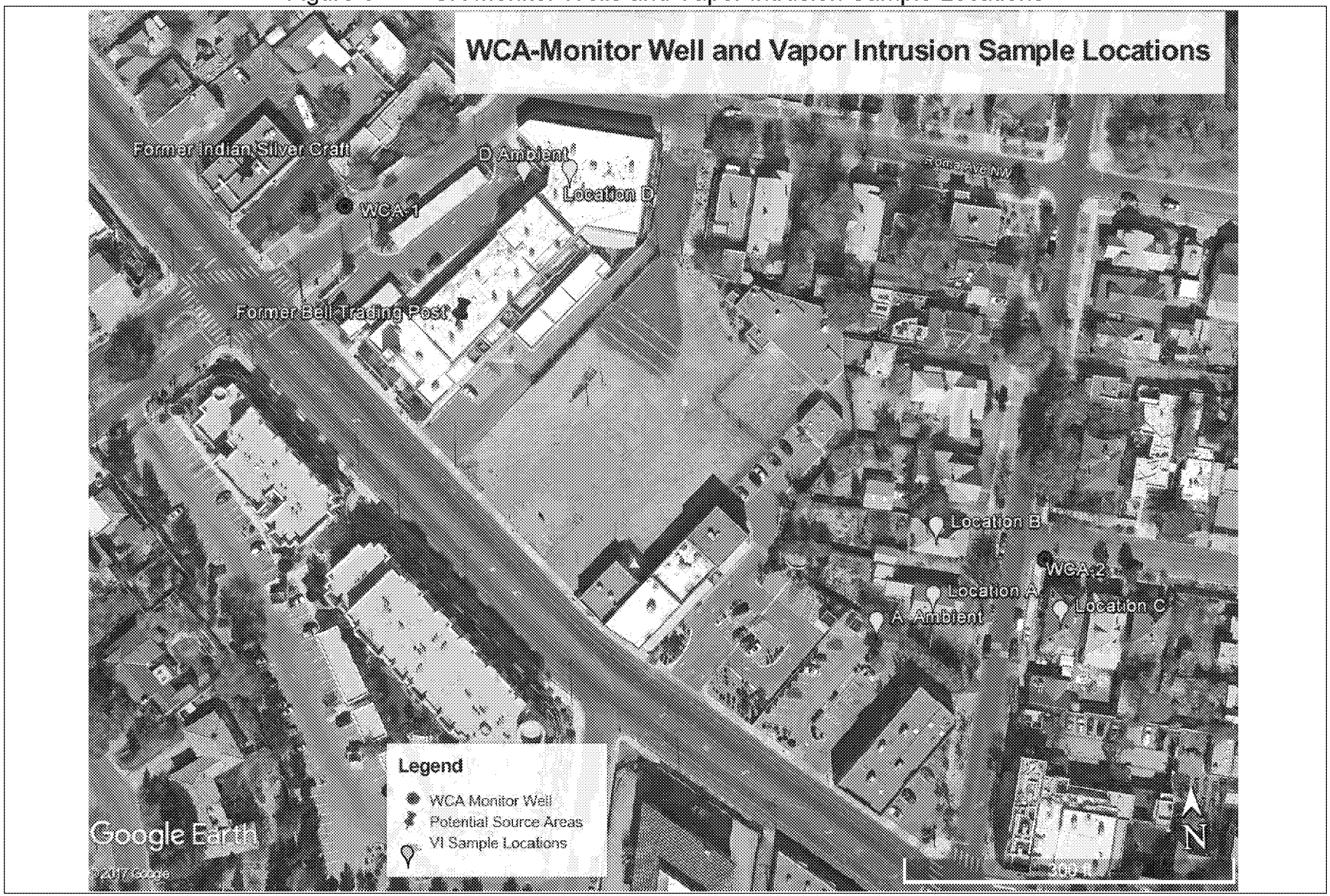

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Figure 6 VRP June 2014 Sample Locations at Bell Trading Post.

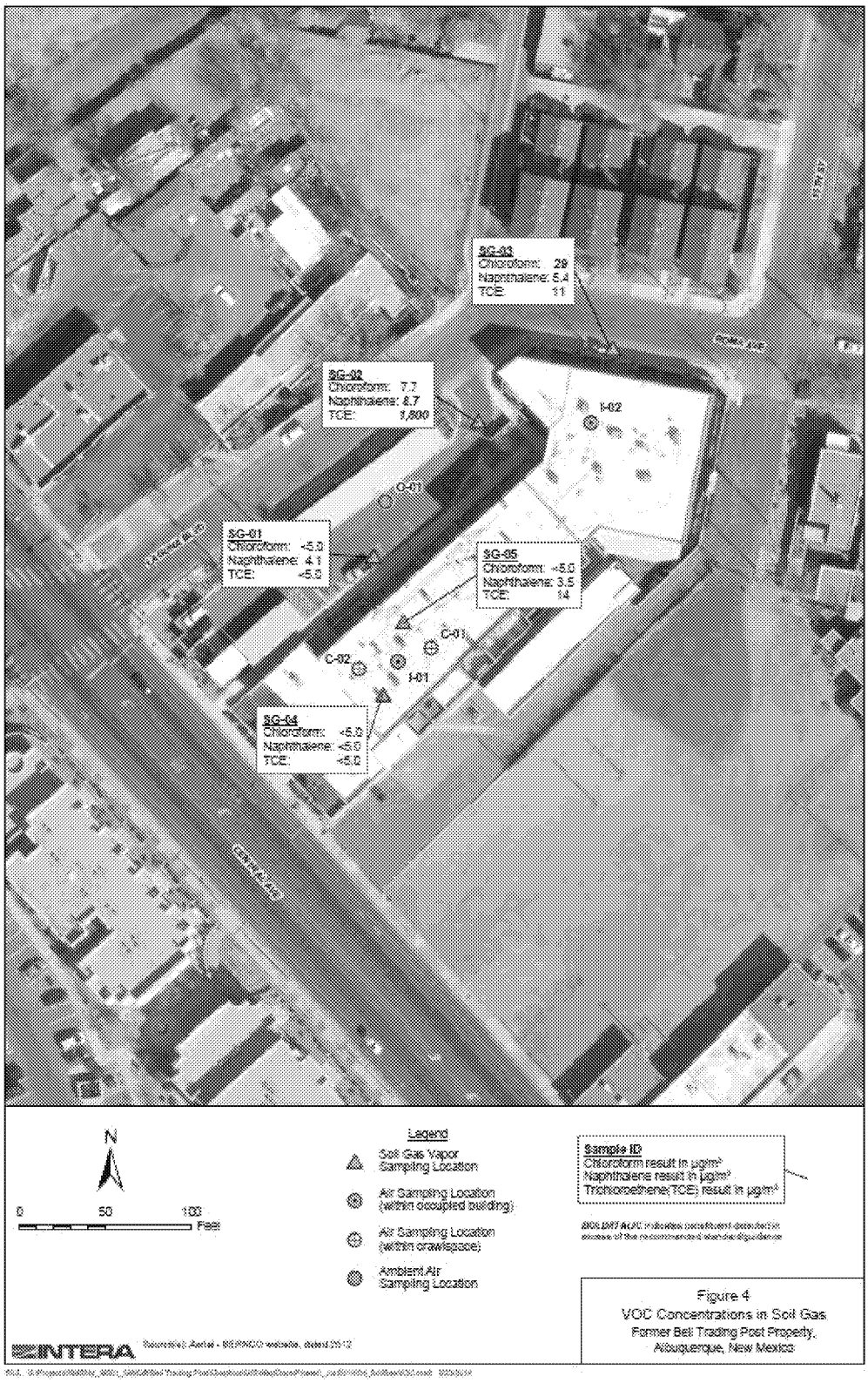

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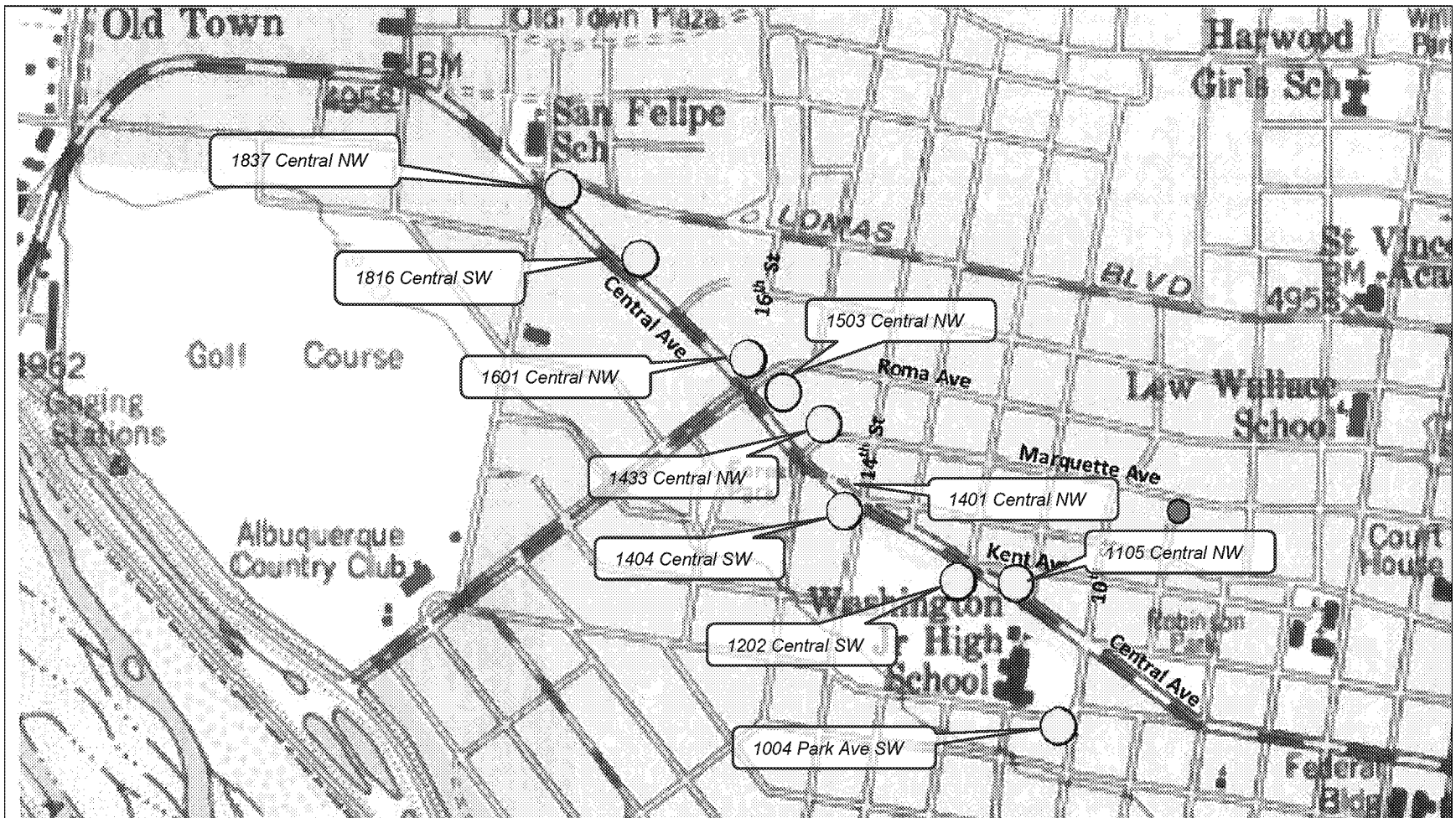
Figure 7 Potential Source Soil Gas Sample areas for West Central Ave.



Note: Blue point is the location MNW-11 monitor well at 9th St. and Marquette Ave.
Yellow points are potential source areas invistigated during the ESI and SR.

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Figure 8 ESI & SR Sample points for 1816 Lomas NW & 110 Rancho Seco.

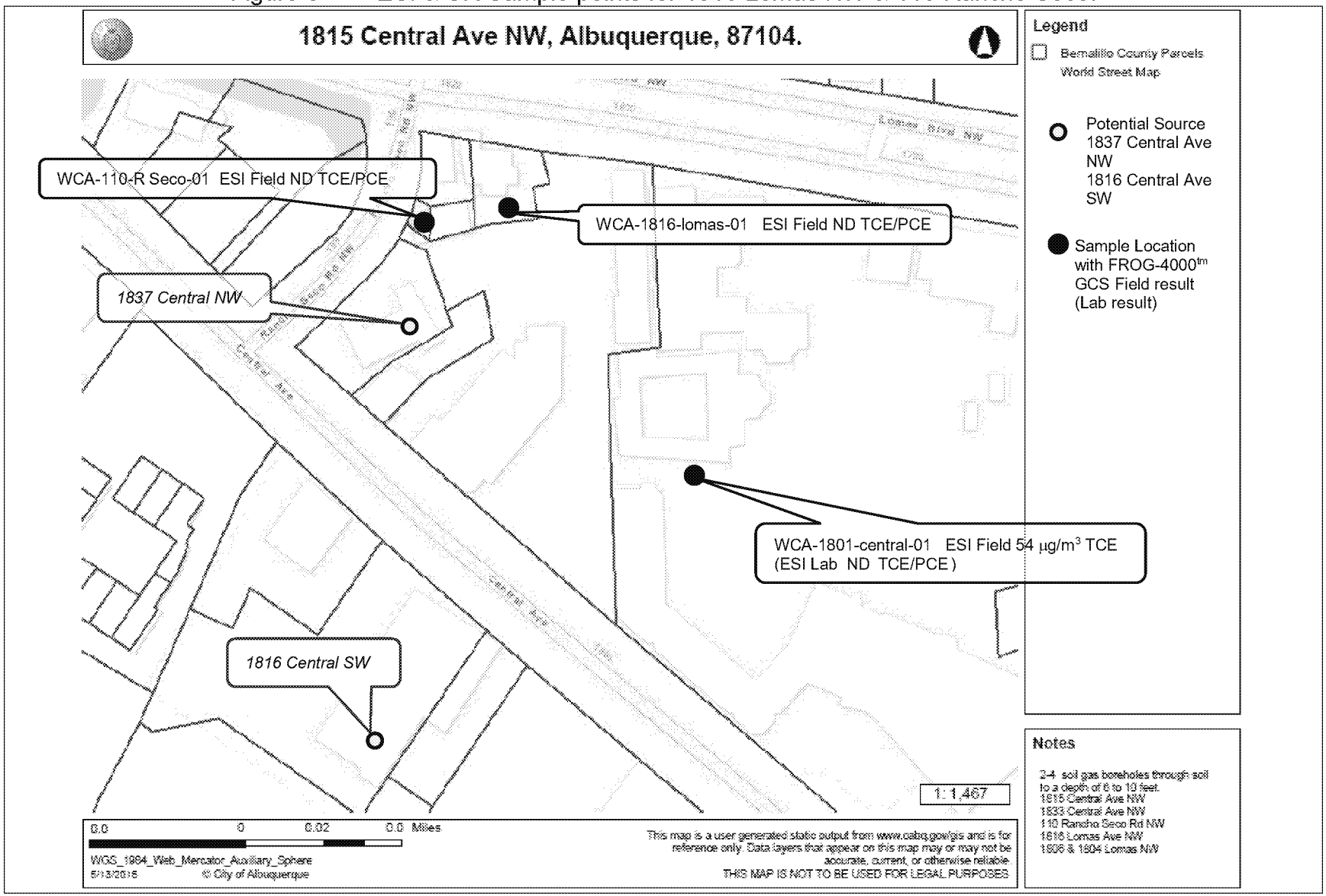

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Figure 9 ESI and SR Sample points for 1801 Central NW.

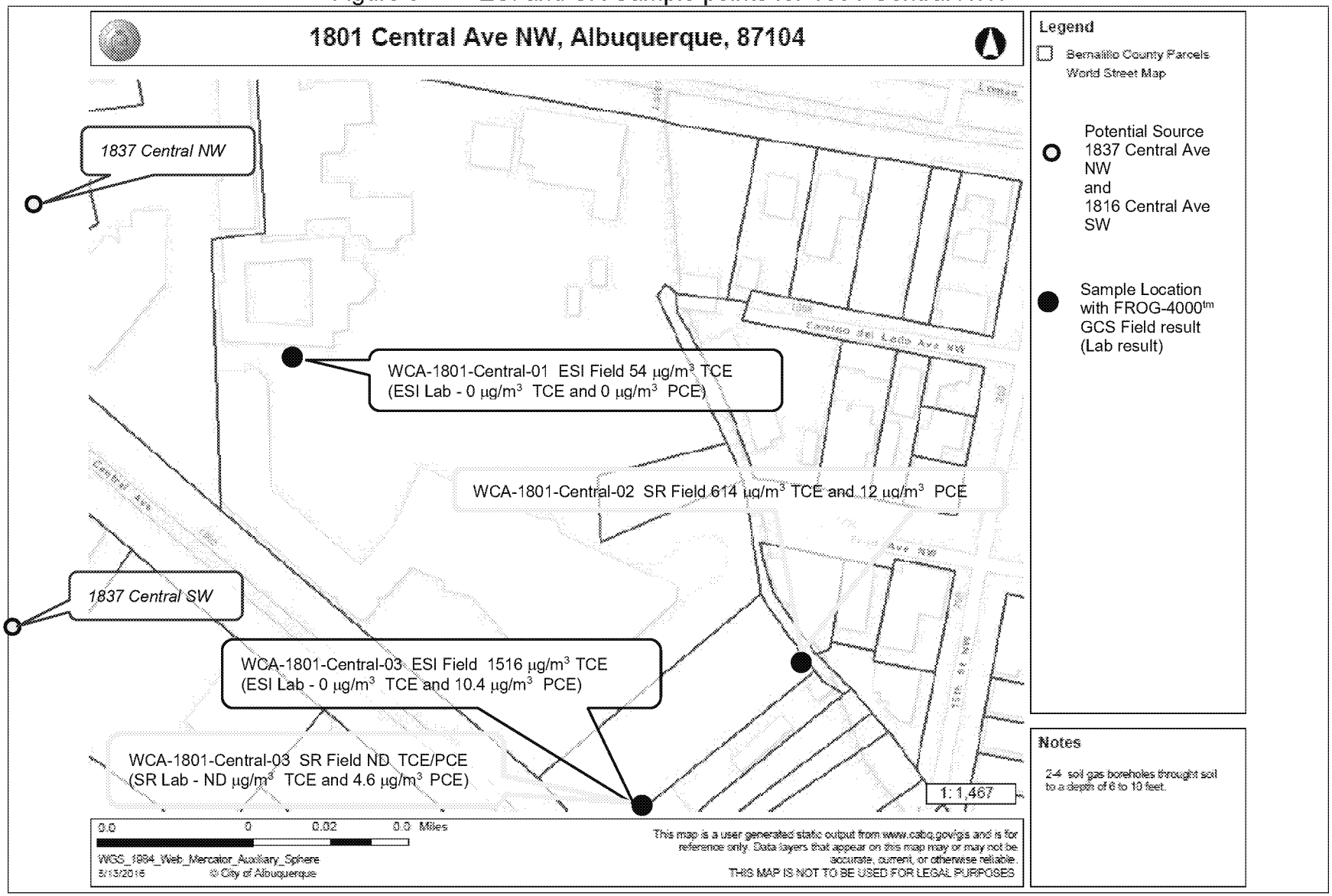

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Figure 10 ESI & SI Sample pts for 1611 and 1503 Central NW & Laguna Pl.

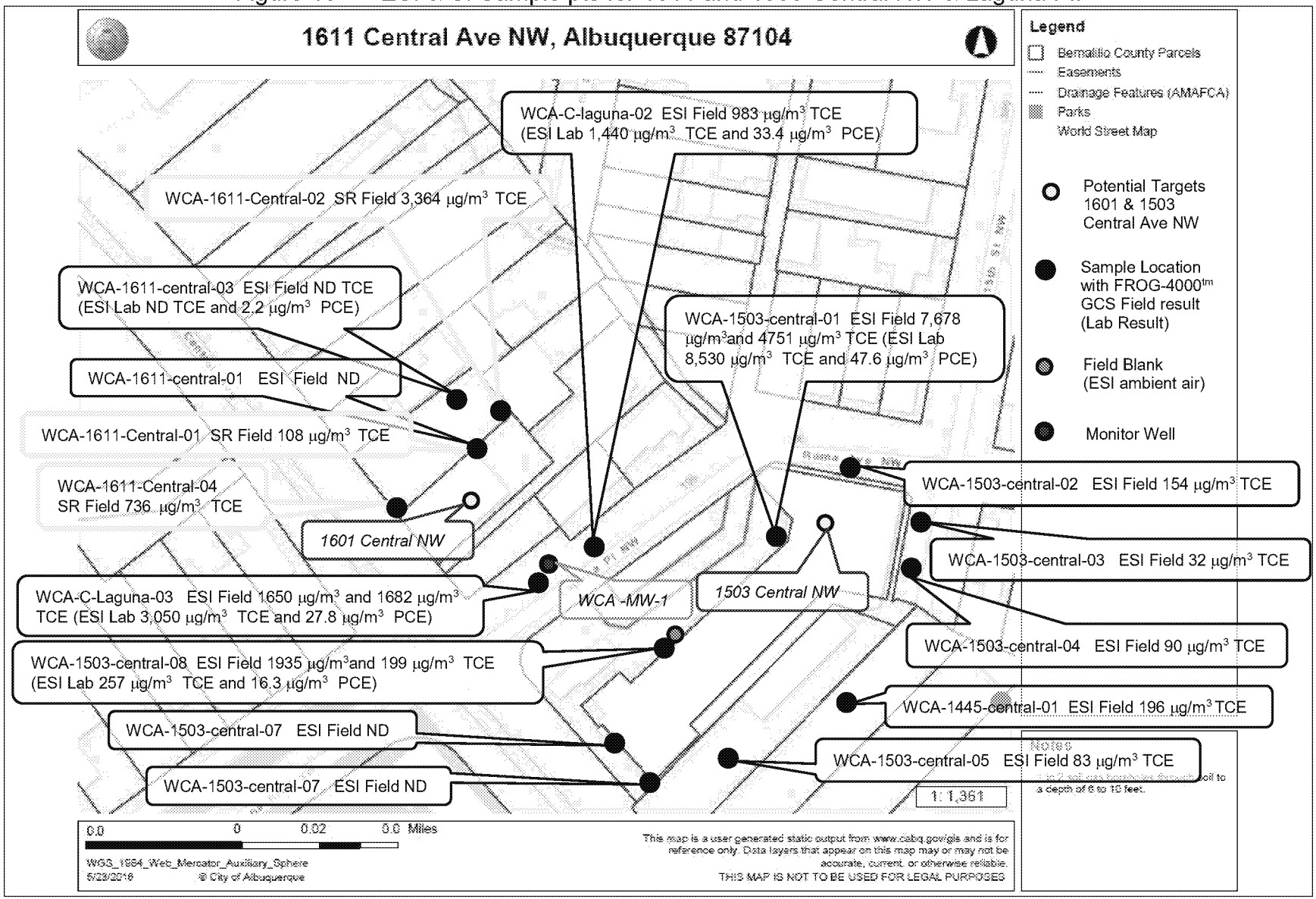

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Figure 11 ESI & SR Sample points at 1445, 1433, & 1429 Central NW

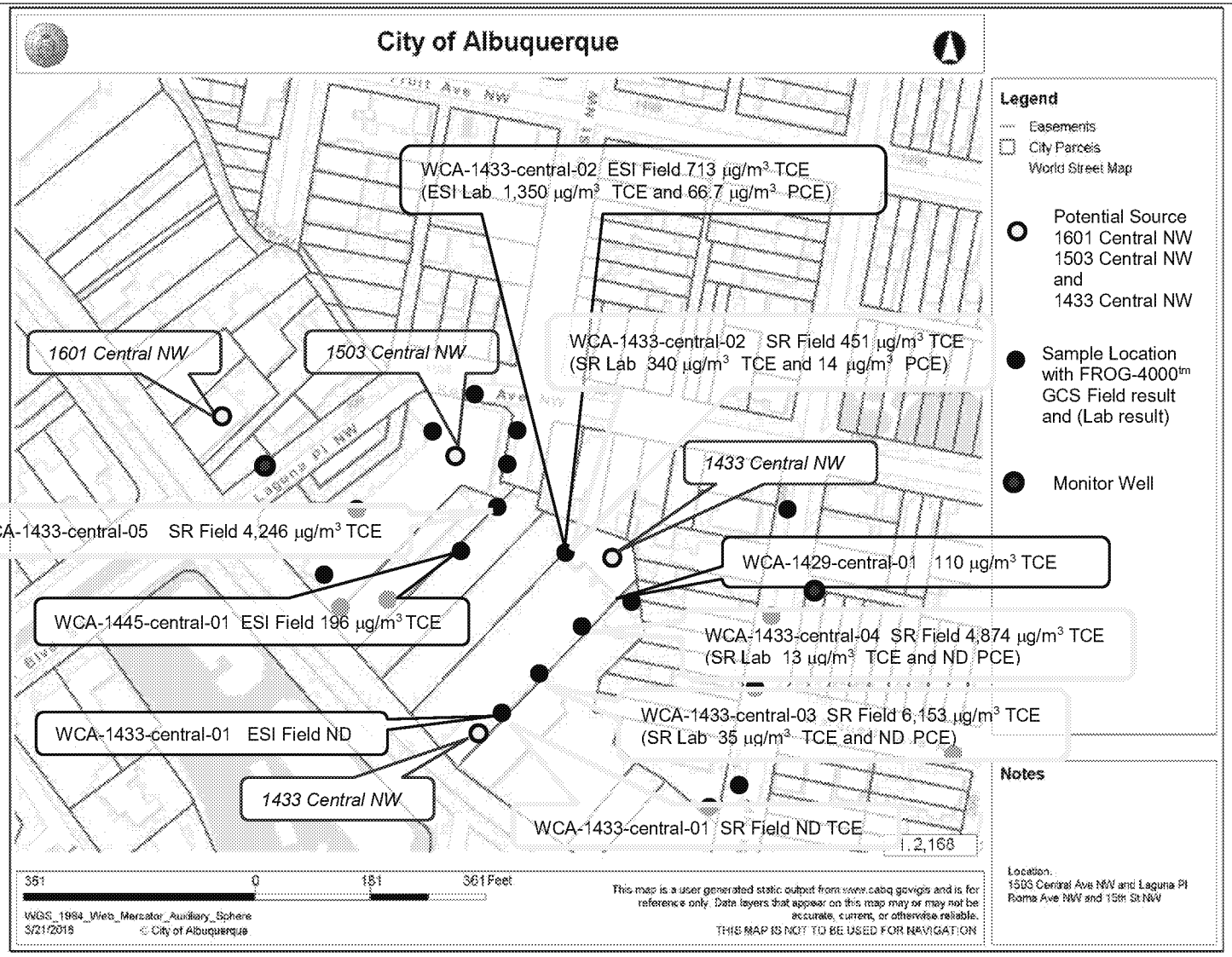

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Figure 12 ESI & SR Sample points for 14th St. & Marquett Ave.

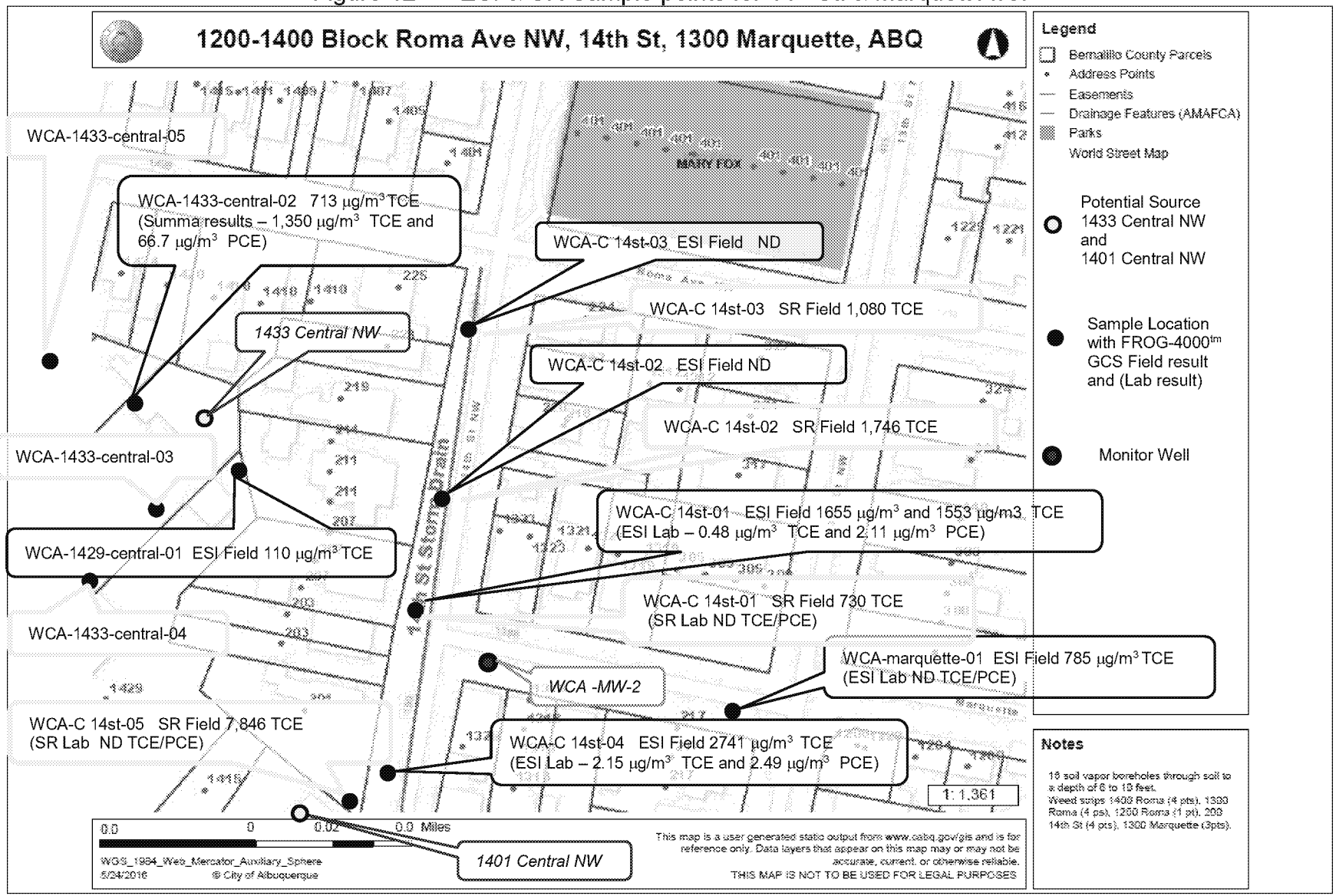

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Figure 13 ESI & SR Sample points 1402-1406 Central Ave SW.

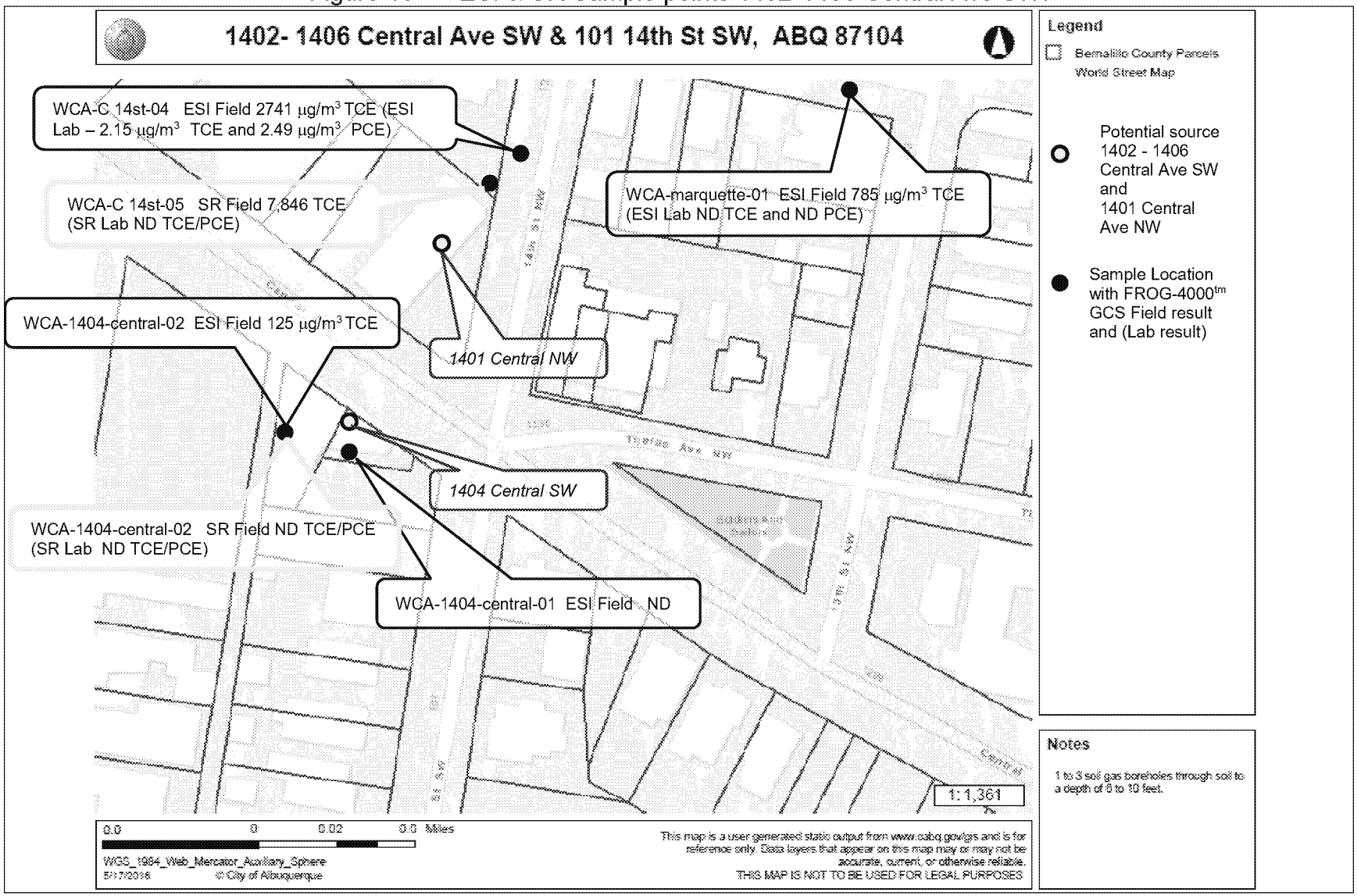

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Figure 14 ESI Sample points for 1202, 1122 & Central & Kent &11th St.

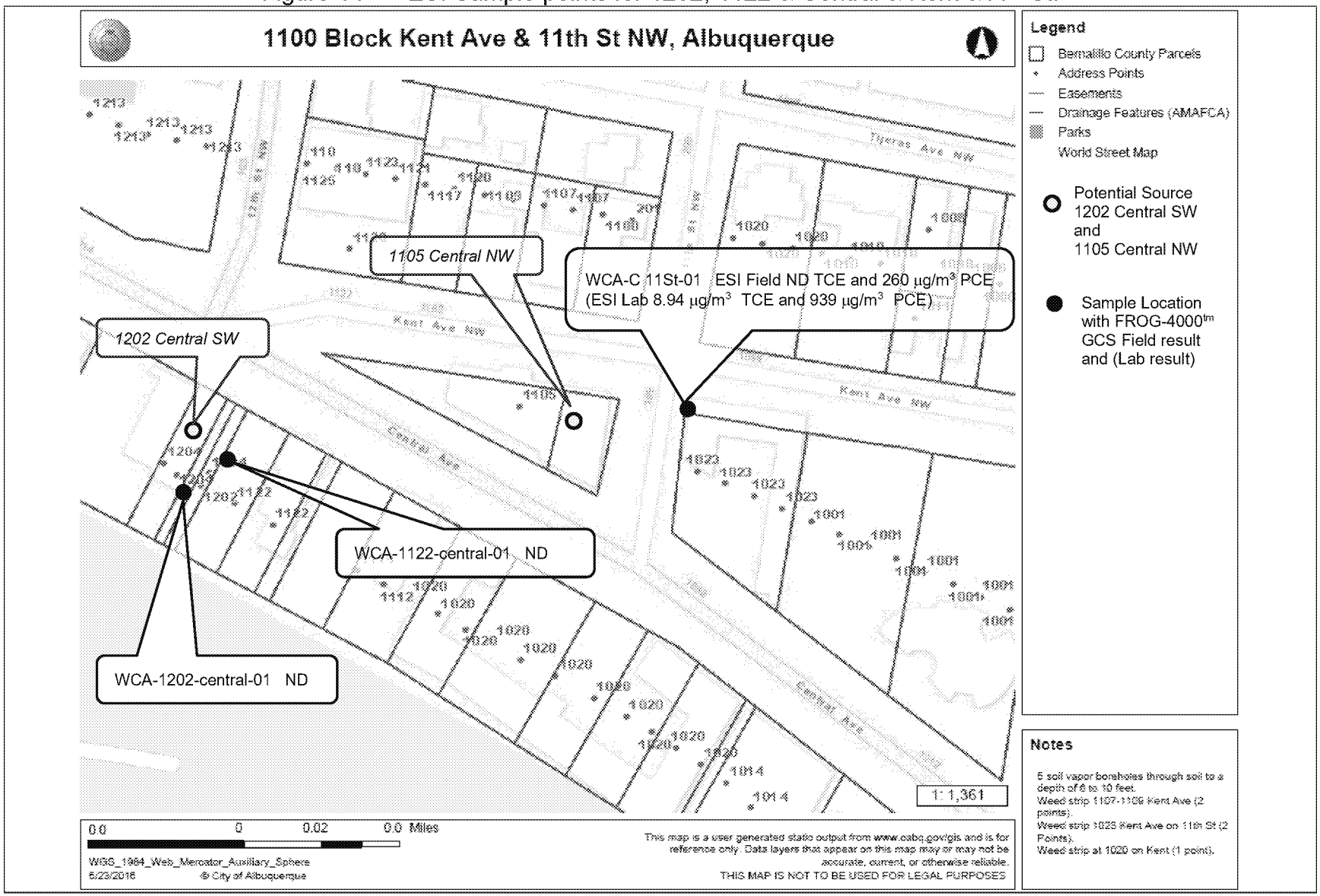

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Figure 15 ESI & SR Sample points for 1004 Park Ave.

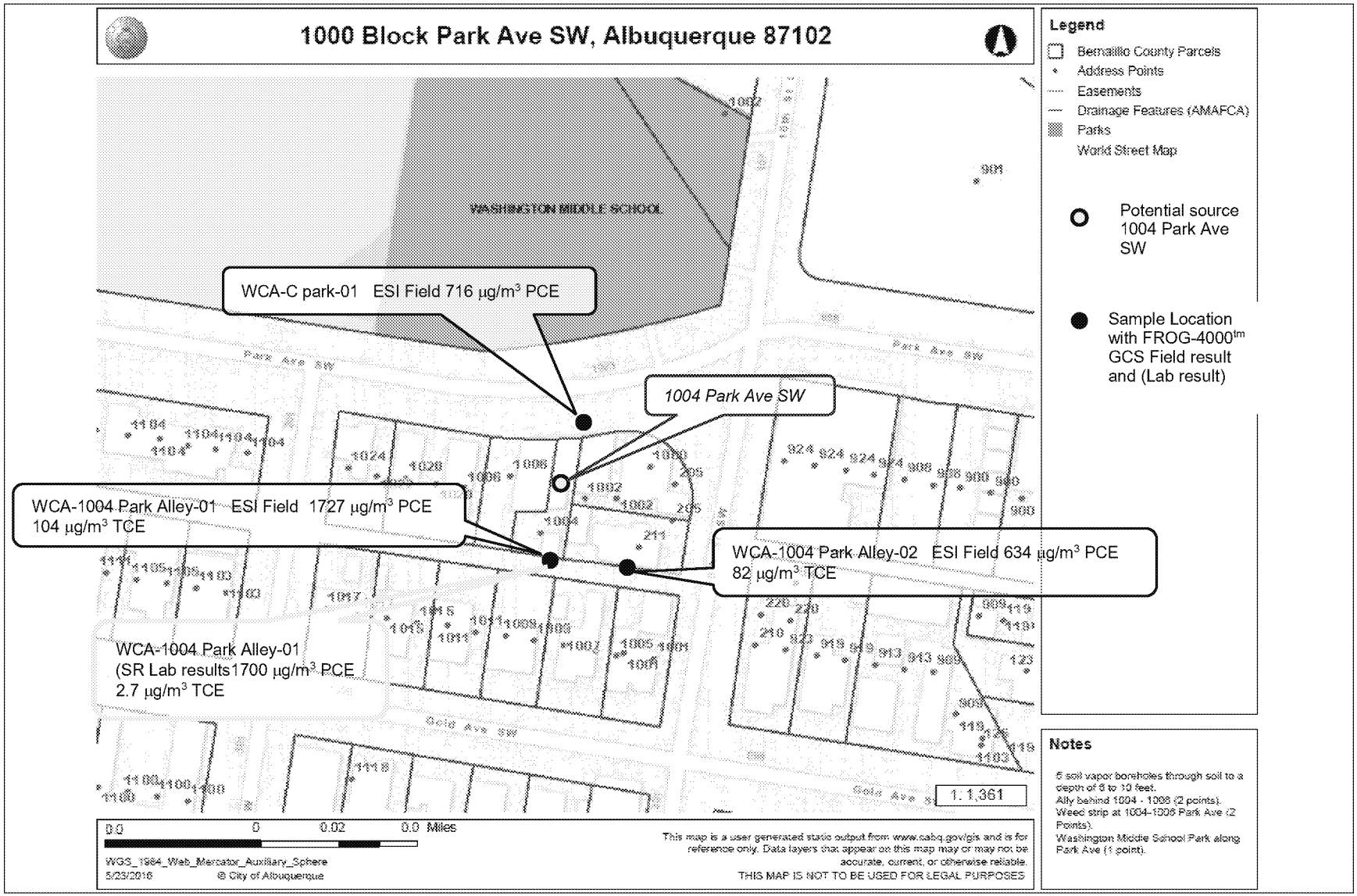

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Figure 16 ESI TCE Field Screen FROG 4000[tm] & Summa Data Comparison

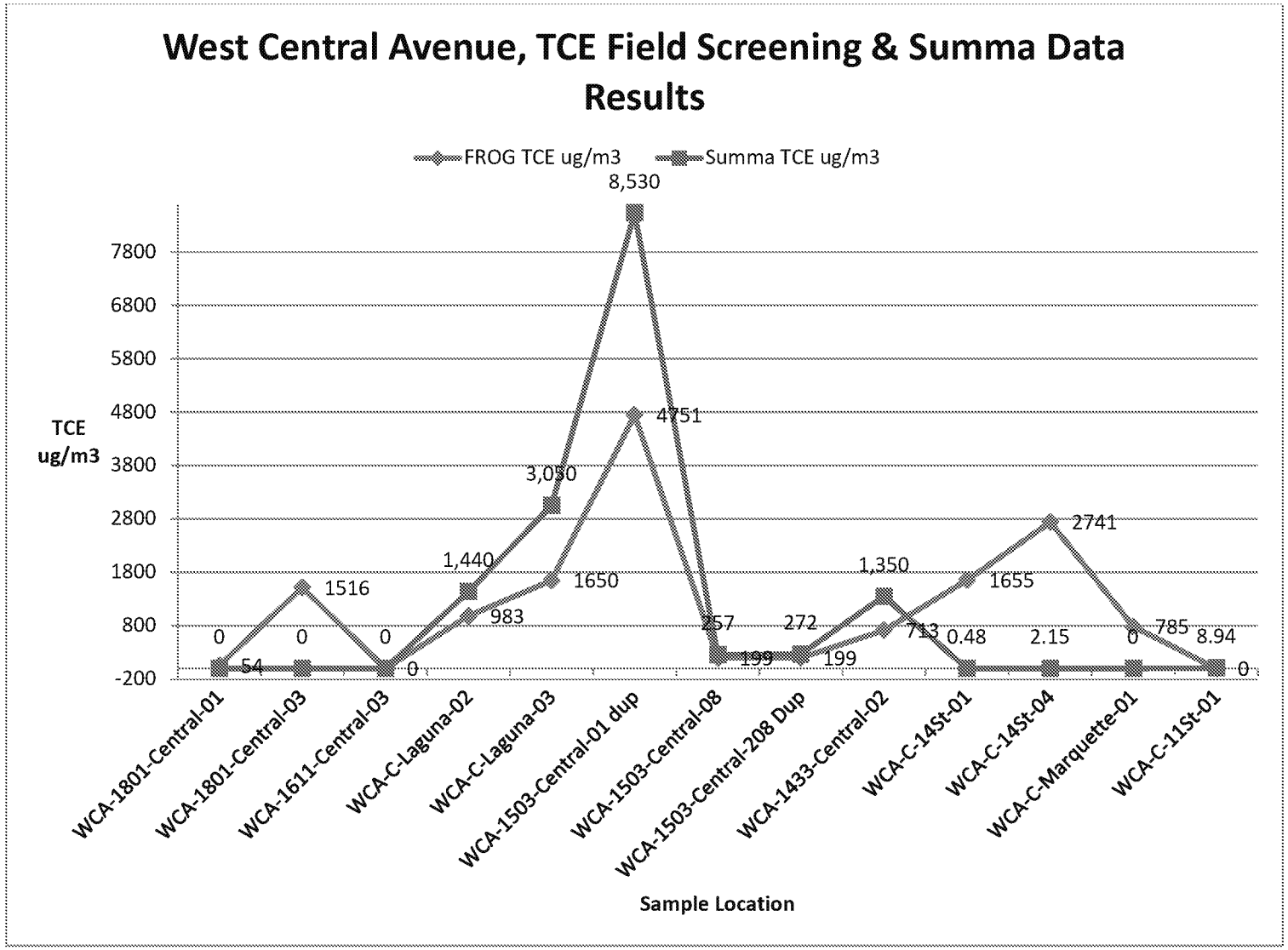

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Figure 17 ESI PCE Field Screen FROG 4000[tm] & Summa Data Comparison

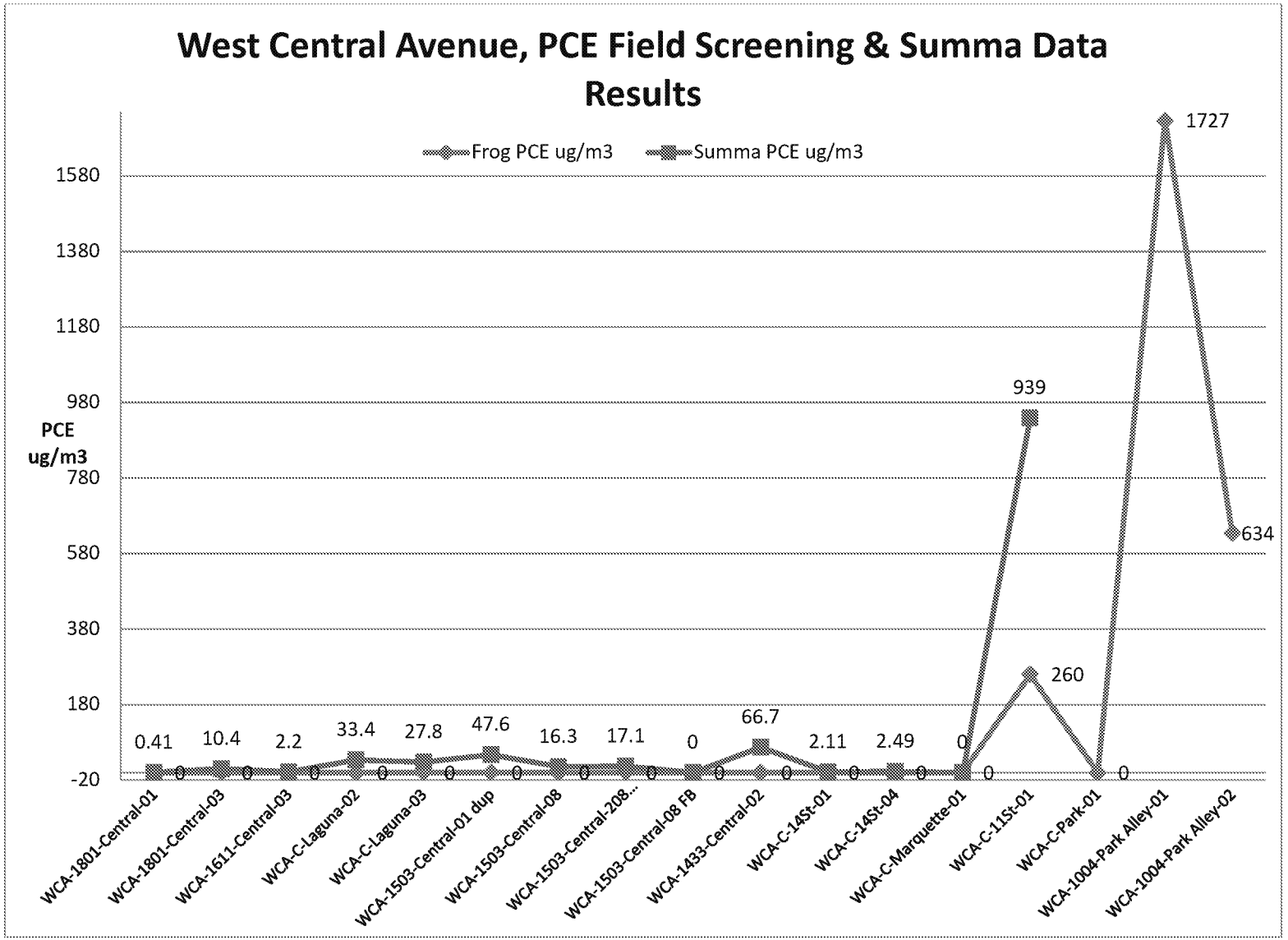

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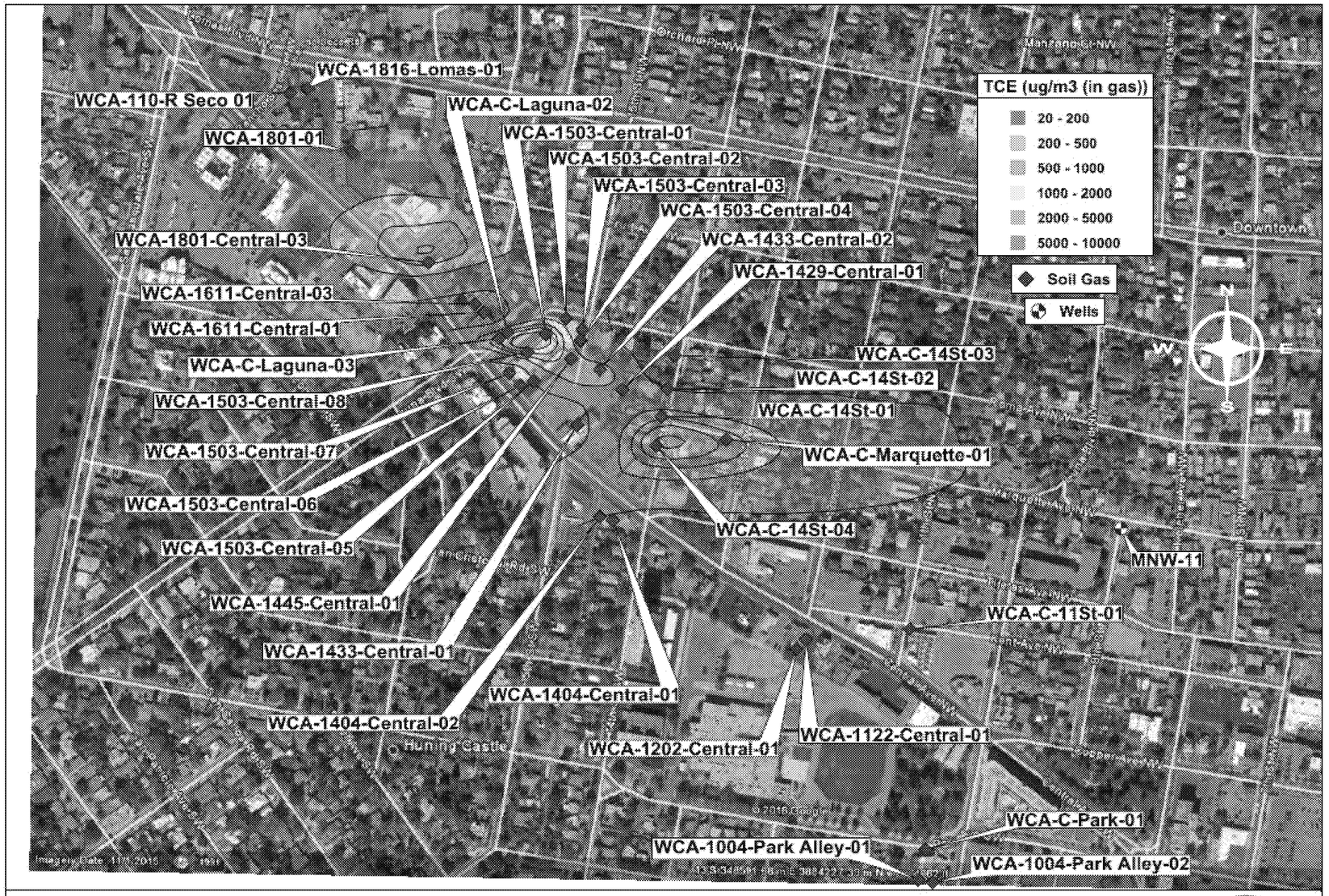
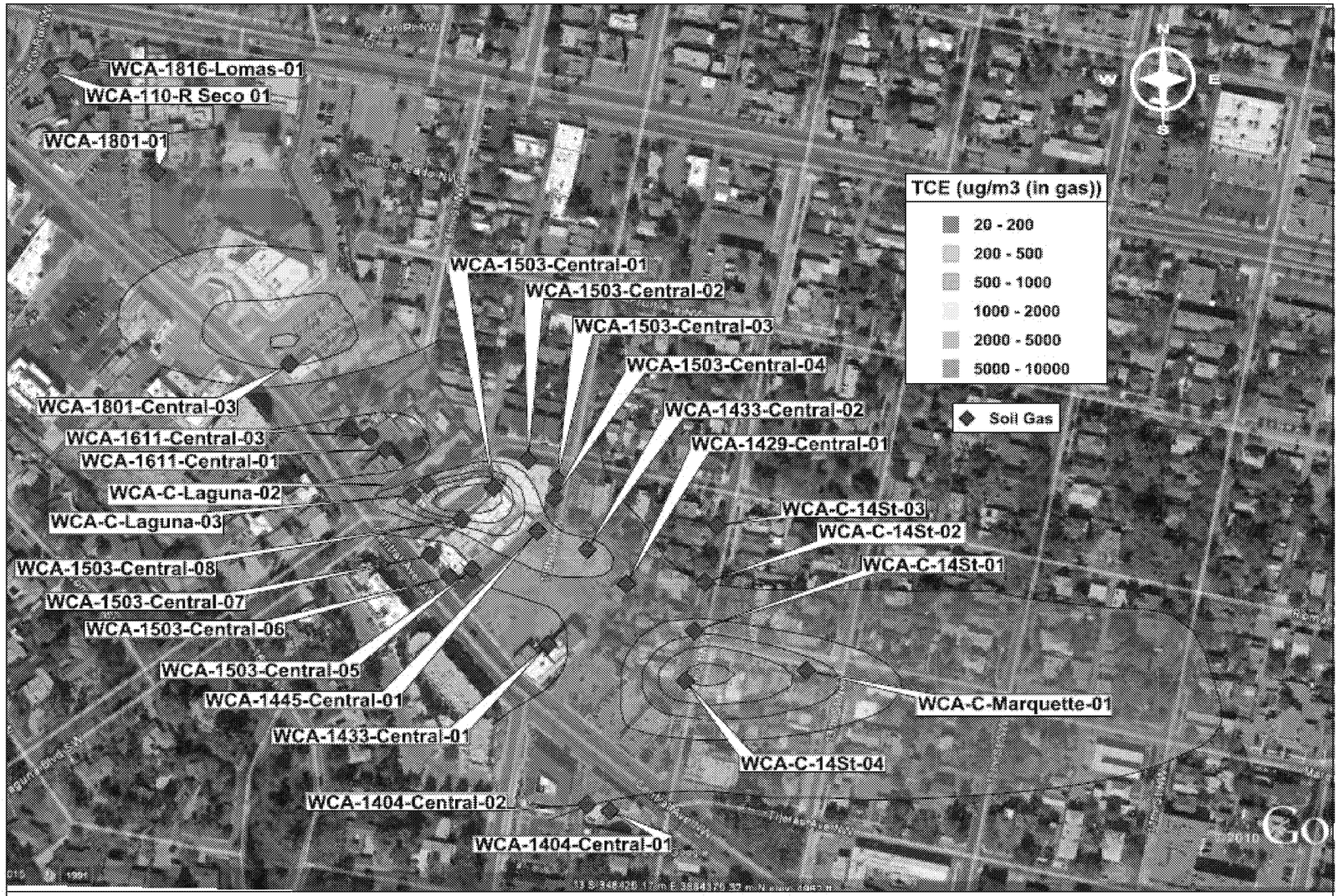
Figure 18 ESI TCE Soil Gas Plume Field Results - West Central Ave



Note: ESI 2016 - TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

Figure 19 ESI TCE Soil Gas Plume Field Results - Central & 1300-1800 Block



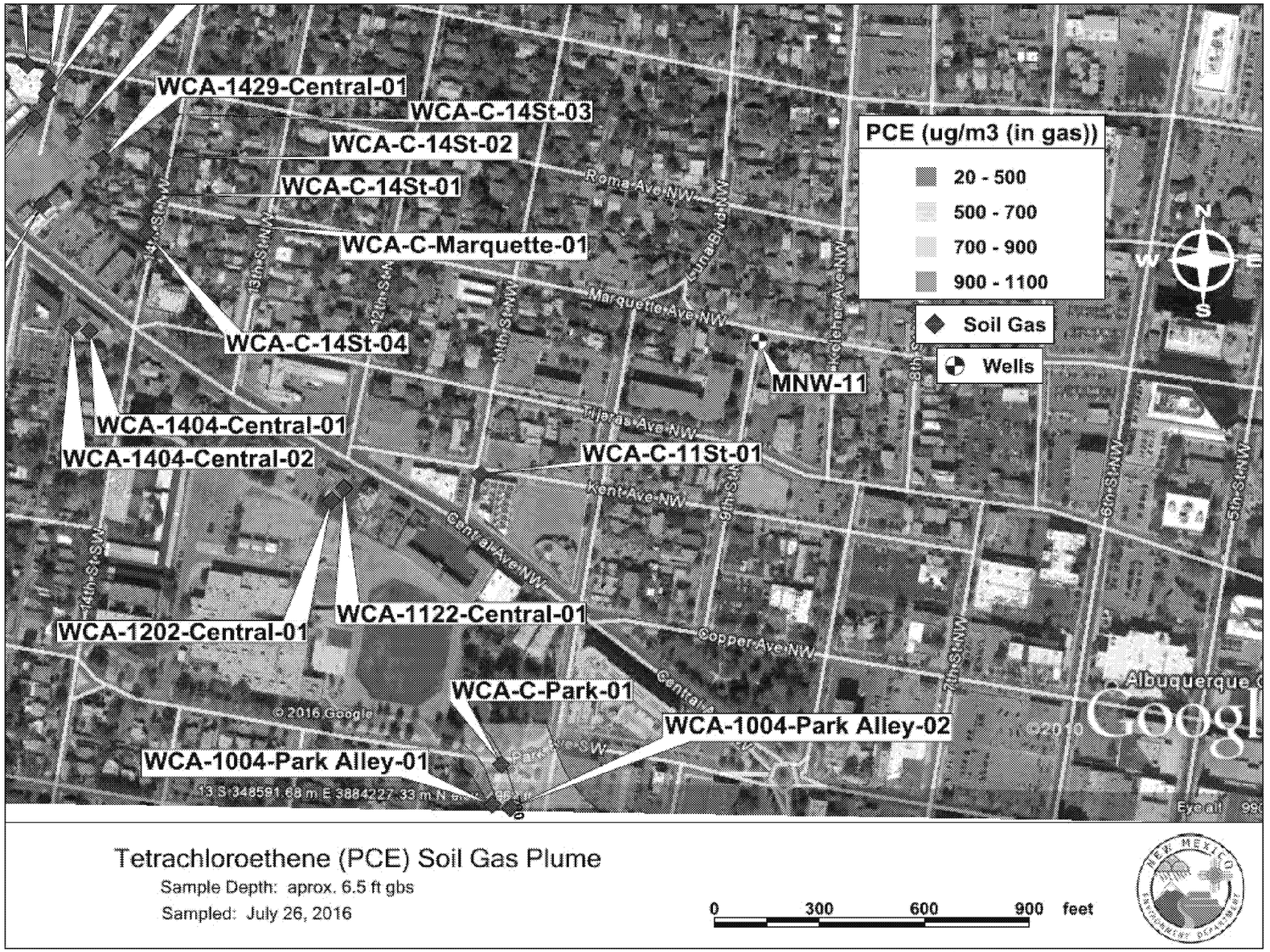
Trichloroethylene Soil Gas Plume

Sample Depth - aprox. 6.5 ft bgs.
Sampled - July 17 - July 21, 2016

0 200 400 600 feet

Note: ESI 2016 - TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

Figure 20 ESI PCE Soil Gas Plume Field Results – 1004 Park Ave



Note: ESI 2016 - PCE Soil Gas Plume –-FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

TABLES

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Table 1 Aquifer Zones at Fruit Avenue Plume Superfund Site.

Zone	Approximate Depth (ft bgs)	Elevation (ft amsl)
Shallow	0 to 60	≥ 4,894
Intermediate 1 (I1)	61 to 85	4,893 to 4,868
Intermediate 2 (I2)	86 to 120	4,867 to 4,834
Deep 1 (D1)	121 to 150	4,833 to 4,804
Deep 2 (D2)	151 to 250	4,803 to 4,704
Deep 3 (D3)	251 to 350	4,703 to 4,604
Deep 4 (D4)	>350	<4,604

bgs - below ground surface

amsl - above mean sea level

(Ref.12, p. 10).

Table 2 Trichloroethene Results in Fruit Avenue Plume Monitor Wells

FAP Well ID	Intermediate wells I1/I2	TCE µg/L	
	61-120 ft bgs	August 2012	February 2015
WB-01(I1/I2)		0.9	2.6
WB-02(I1/I2)		0.77	0.1
	Intermediate wells I-2	TCE µg/L	
	86-120 ft bgs	August 2012	February 2015
MNW-1(I2)		17	19.8
SFMW-13(I2)		1	0.9
	Deep Wells D-1	TCE µg/L	
	121-150 ft bgs	August 2012	February 2015
MNW-11(D1)		46	22
SFMW-14(D1)		17	14.9
MNW-9(D1)		4.6	1.9

FAP Data (Ref. 6, pp. 59, 60, 62, 63, 64, 65, 68 and 69,)
Note: EPA MCL for TCE is 5 µg/L (Ref. 7)

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Table 3 Properties & Sample points WCA

Properties of Concern & Sample Locations West Central Avenue, ESI July 2016 and SR May 2017 (Ref. 13 and 14)			
Address Central Ave West	**Business Type**	**Years In Business.** **Directory dates reviewed 1947, 52, 62, 65, 67, 70, 75, 80, 85 and 90**	**Sample Points near location**
1105	Speed Queen Laundry & Dry Cleaning 70- Extra Quality Coin Laundry 75,80 - X-Tra Quality Coin Laundry Inc. 85-, Washtub Laundromat currently	1970 - 1975- 1980- 1985- /90	**1**
1202	Master Dry Cleaners	1952- 1962- 1965- 1967- 1970- /75	**2**
1401	AAA Ace Auto Supply 62-65- - Ace Auto Supply 67-80 . Neighbors remember that there were auto repair bays at this location.	1962- 1965- 1967- 1980- /85	1
1404	Esco Bio-chemicals Co.	1952- /62	2
1406	Esco Bio-chemicals Co. vitamin production - Esco Bio-chemicals Co. Pharmaceuticals 67- Electronics' TV Laboratory 75 -	1962 - 1965- 1967- 1970- 1975- /80	
1408	Duke's Enterprises Ltd Indian Jewelry Manufacture	1975- 1980- /85	
1433 or 1431	Neighbors Laundromat, The (at 1431 in 65, 67). Property owner interviews has not confirmed this to be accurate.	1962- 1965- 1967- 1970- 1975- /80	6
1503	Bell Indian Trading Post 47 - Bell Indian Trading Post Lmtd Jewelry manufacturers 62, 65 - SunBell Corp. Jewelry Manufactures 70, 75- Albuquerque Photo Laboratory Inc. 80- Michelson Metals 85	1947- 1962- 1965- 1967- 1970- 1975- 1980- 1985- 1990-	**8 +5 along 14th and 1 on Marquette**
1503	Chief Weavers Ltd. - Chief Weavers The Jewelers -	1947- 1952- /	**0**
1701 most likely 1601	Indian Silver Craft	1965- 1967- 1970- 1975- 1980- 1985- /90	**6**
1816	Aamco Transmission, Kellys Transmission Co.	1975-1980, 1985-1990 ROS investigation in 2007	**0**
1911 or 1837	Unique Cleaners - Unique Cleaners (1837 address change 1980) currently Marina Unique Cleaners in operation at this location.	1947- 1952- 1962- 1965- 1967- 1970- 1975- 1980-	**2 + 3 at 1801**
Lomas Ave West	**Business Type**	**Years in business**	**Number of sample points**
1420	Moore Radio Service repair	1947- 1962- 1965- 1967- /70	0
Park Ave West	**Business Type**	**Years in business**	**Number of samples points**
1004	Park Ave Cleaners	1957 – 1993 VRP at 1006 Park Ave in 2000	3

Note: Red Type - Jewelry manufacture
Blue Type - Dry Cleaners
Black Type - Other business types
Pink Highlight - Area with known TCE in subsurface soil, soil gas and groundwater.
Green Highlight – Area with known PCE in subsurface soil gas and groundwater.

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Table 4 VOC Groundwater Sample Analysis for SR May 2017

Sample Type	Analysis	Analytical Method	Number of Samples	Duplicates	MS/ MSD	Field Blank	Trip Blank	Equip Blank
2 monitor wells	Trace VOCs	SOM02.4 Trace, 8260B	4	1	1	1	2	0
1 monitor well	Trace SVOCs	SOM02.4 Trace 8270D	1		1			
1 monitor well	Trace 1,4-dioxane	SOM02.4 Trace 1,4-dioxane	1	1	1			
1 monitor well	Trace pesticides	SOM02.4 Trace Pesticides	1		1			
1 monitor well	Trace Aroclor	SOM02.4 Trace Aroclor	1		1			
1 monitor well	total metals	ISOM2.4 total metals 6010C and 200.7	1	1	1			
1 monitor well	dissolved metals	ISOM2.4 dis metals 6010C and 200.7	1	1	1			

Table 5 Soil Gas Samples collected for SR May 2017

Sampling method	Analysis	Sample Container	Number of Sample locations
Active Soil Gas sampling 6 – 7 feet bgs.	Gas Chromatography FROG 4000[tm] for chlorinated alkenes	None - direct readings	11
Active Soil Gas Sampling 4 min grab 6 – 7 feet bgs.	TO-15 Trace	1 L Summa	9

Table 6 Vapor Intrusion Samples for SR May 2017

Sampling method	Analysis	Sample Container	Number of Sample locations	Total samples collected
VI 24 hour grab	TO-15	6 L Summa	4	16

Note – Sample types (indoor air, sub-slab soil gas, basement air, & ambient air)

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Table 7 Vapor Intrusion Sample Data Summary May 17, 2017

Vapor Intrusion Sample Data Summary – May 17, 2017 - West Central Avenue, Albuquerque								
Location ID		**TO-15 Data(Ref. 37, 41,42, and 46)**						
Spot ID	**sample number**	**Date**	**Time Start**	**Time Stop**	**Canister Serial Number**	**Barometric Pressure "Hg**	**TCE ug/m3**	**PCE ug/m3**
Resident A						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	A-I-1	5/17/2017	10:51	9:27	16849	29.75-29.50	*	0.92 J
Indoor	A-I-2	5/17/2017	10:51	9:30	10167		*	0.81 J
basement	A-B-1	5/17/2017	10:49	9:19	10015		*	*
basement	A-B-2	5/17/2017	10:49	9:20	11063		*	*
sub-slab	A-SS-1	5/17/2017	10:47	9:23	9991		*	*
sub-slab	A-SS-2	5/17/2017	10:47	9:23	9936		*	*
ambient outdoor	AA	5/17/2017	11:05	9:37	10040		*	*
Resident B						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	B-I	5/17/2017	9:40	9:11	11211	29.75-29.50	6.2	*
basement	B-B	5/17/2017	9:39	9:03	11149		*	*
sub-slab	B-SS	5/17/2017	9:39	9:06	9824		*	0.70 J
Resident C						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	C-I	5/17/2017	16:30	15:42	10413	29.57-29.70	*	*
basement	C-B	5/17/2017	16:27	14:40	10120		*	*
sub-slab	C-SS	5/17/2017	16:26	15:40	11143		0.71 J	1.7
Multi Unit D						6-24 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	D-I	5/17/2017	11:57	11:12	9729	29.72-29.50	9.2	*
sub-slab	D-SS	5/17/2017	11:46	11:13	10712		5300	24 J
ambient outdoor	D-A	5/17/2017	12:06	11:09	11173		*	*
							TCE ug/m3	**PCE ug/m3**
						Target Indoor Air Residential	0.48	11
						Target Indoor Air commercial	3	47
						Target Sub Slab Residential	16	360
						Target Sub Slab Commercial	100	1,600

Note: * Non-Detect at reporting limit
J Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations -Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)

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Table 8 Property Type within 200 feet of ESI Sample Location

Table 8 Property Type within 200 feet of ESI Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,- dioxane ug/m3			
Figure 8	WCA-110-R Seco 01						3	6	0
	WCA-1816-Lomas-01						3	6	1
Figure 9	WCA-1801-Central-01	0177	U	0.41	U	U	0	2	1
	WCA-1801-Central-03	283	U	10.4	U	U	6	4	1
Figure 10	WCA-1611-Central-01						-	-	-
	WCA-1611-Central-03	H3440	U	2.2	U	U	-	-	-
	WCA-C-Laguna-02	0190	**1,440**	33.4	U	2.17	27	3	0
	WCA-C-Laguna-03	H3428	**3,050**	27.8	U	U	25	3	0
	WCA-C-Laguna-03 Dup						-	-	-
Figure 10	WCA-1503-Central-01						28	1	0
	WCA-1503-Central-01 dup	0188	**8,530**	47.6	U	U	-	-	-
	WCA-1503-Central-02						28	0	0
	WCA-1503-Central-03						27	1	0
	WCA-1503-Central-04						23	1	0
	WCA-1503-Central-05						20	1	0
	WCA-1503-Central-06								
	WCA-1503-Central-07								
	WCA-1503-Central-08	H3423	**257**	16.3	U	U	21	2	0
	WCA-1503-Central-208 Dup	0281	**272**	17.1	U	U	-	-	-
	WCA-1503-Central-08 FB	H3434	U	U	U	U	-	-	-
Figure 11	WCA-1445-Central-01						18	1	0
	WCA-1433-Central-01								
	WCA-1433-Central-02	0175	**1,350**	66.7	5.03	U	17	2	0
	WCA-1429-Central-01						12	2	0
	WCA-1429-Central-01 Dup						-	-	-

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Table 8 Property Type within 200 feet of ESI Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,- dioxane ug/m3			
Figure 12	WCA-C-Marquette-01	H3424	U	U	U	U	20	0	0
	WCA-C-14St-01	0182	0.48 B	2.11	U	U	14	3	0
	WCA-C-14St-01 DUP						-	-	-
	WCA-C-14St-02								
	WCA-C-14St-02 DUP								
	WCA-C-14St-03								
	WCA-C-14St-04	3439	2.15 B	2.49 B	U	U	10	2	0
Figure 13	WCA-1404-Central-01								
	WCA-1404-Central-02						4	3	0
Figure 14	WCA-1202-Central-01								
	WCA-1122-Central-01								
Figure 14	WCA-C-11St-01	H3445	8.94	**939**	U	U	24	3	0
	WCA-C-11St-01 Dup								
Figure 15	WCA-C-Park-01						12	7	1
	WCA-1004-Park Alley-01						16	8	1
	WCA-1004-Park Alley-02						14	8	1

Ref. 37
U Undetected in Air TO-15 analysis
B "B" flagged because the reported values were less than ten times of the amount found in the blank.
Bold Face Exceeds Residential VISL for TCE and/or PCE

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Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
Figure 8	WCA-110-R Seco 01	N 35.09297 W106.66743	5.6	7/17/2016	4.5-0.0	7/18/2016	8:14	1531_LOG_201.xml	TAL-ND	ND	ND	29.88						
	WCA-1816-Lomas-01	N 35.09301 W106.66721	6.8	7/20/2016	0.9-0.0	7/20/2016	17:10	0938_LOG_264.xml	TAL-ND	ND	ND	29.93						
Figure 9	WCA-1801-Central-01	N 35.0924 W106.66662	6.4	7/19/2016	0.0-0.0	7/19/2016	14:25	1724_LOG_236.xml	TCE 10.1	**54**	ND	29.96	7/20/2016	14:10	29.98	ND	0.41	SN# 0177
	WCA-1801-Central-02	N 35.09159 W 106.66510	6.3	5/15/2017	-	5/22/2017	13:22	1322-LOG-707.xml	**TCE 114 PCE 1.819**	**614**	12	29.86						
	WCA-1801-Central-03	N 35.09123 W106.66565	7.3	7/20/2016	12.4-0.2	7/20/2016	16:10	0839_LOG_260.xml	**TCE 282**	**1516**	ND	29.94	7/21/2016	14:50	29.95	ND	10.4	SN# 283
	WCA-1801-Central-03	N 35.09123 W106.66565	7.3	7/20/2016	-	5/23/2017	11:31	1322-LOG-719.xml	TAL-ND	ND	ND	29.94	5/17/2017	10:39	29.75	ND	4.6	10961
Figure 10	WCA-1611-Central-01	N 35.09069 W106.66493	6.7	7/17/2016	0.3	7/17/2016	10:55	1513_LOG_187.xml	t-DCE 296	ND	ND	29.88						
	WCA-1611-Central-01	N 35.09069 W106.66493	6.7	7/17/2016		5/22/2017	15:05	1505-LOG-713.xml	TCE 20.11	**108**	ND	29.84						
	WCA-1611-Central-02	-	6.5	5/14/2017	-	5/22/2017	14:36	1436-LOG-711.xml	**TCE 626**	**3364**	ND	29.84						
	WCA-1611-Central-03	N 35.09023 W106.66383	6.5	7/20/2016	0.4-0.1	7/20/2016	8:35	1138_LOG_244.xml	t-DCE 195	ND	ND	30.07	7/21/2016	15:36	29.91	ND	2.2	SN# H3440
	WCA-1611-Central-04	-	6.0	5/14/2017	-	5/22/2017	14:09	1409-LOG-709.xml	**TCE 142**	**763**	ND	29.86						
	WCA-C-Laguna-02	N 35.09052 W106.66463	7.3	7/19/2016	0.2-0.1	7/19/2016	11:35	1415_LOG_226.xml	**TCE 183**	**983**	ND	30.03	7/20/2016	14:22	29.98	**1,440**	33.4	SN# 0190
	WCA-C-Laguna-03	N 35.09049 W106.66479	7.0	7/19/2016	0.5-0.4	7/19/2016	10:55	1348_LOG_224.xml	**TCE 307**	**1650**	ND	30.04	7/20/2016	14:33	29.95	**3,050**	27.8	SN# H3428
	WCA-C-Laguna-03 Dup			7/19/2016	0.5-0.4	7/19/2016	15:33	1533-LOG-232.xml	**TCE 313**	**1682**	ND	30.04						

Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
Figure 10	WCA-1503-Central-01	N 35.09049 W106.66414	7.1	7/19/2016	14.9-1.3	7/19/2016	17:10	1037_LOG_240.xml	**TCE 1428.75**	**7678**	ND	29.9						
	WCA-1503-Central-01 dup				4.9-1.2	7/21/2016	13:08	1632_LOG_273.xml	**TCE 884**	**4751**	ND	30.01	7/21/2016	13:08	30.01	**8,530**	47.6	SN# 0188
	WCA-1503-Central-02	N 35.09082 W106.66386	8.0	7/19/2016	3.9-0.1	7/19/2016	15:35		TCE 28.6	**154**	ND	29.91						
	WCA-1503-Central-03	N 35.09058 W106.66373	7.2	7/18/2016	0.2-0.1	7/19/2016	8:55	1440_LOG_228.xml	TCE 5.9	**32**	ND	30.08						
	WCA-1503-Central-04	N 35.09047 W106.66373	7.3	7/18/2016	0.1-0.0	7/19/2016	8:30	1505_LOG_230.xml	TCE 16.8	**90**	ND	30.06						
	WCA-1503-Central-05	N 35.09002 W106.66431	6.9	7/18/2016	0.1	7/18/2016	16:10	1032_LOG_216.xml	TCE 15.4	**83**	ND	29.88						
	WCA-1503-Central-06	35.09000 W106.66449	7.0	7/18/2016	4.8-0.1	7/18/2016	15:45	1056_LOG_218.xml	TAL-ND	ND	ND	29.88						
	WCA-1503-Central-07	N 35.09002 W106.66460	7.8	7/18/2016	0.1-0.0	7/18/2016	15:25	1121_LOG_220.xml	TAL-ND	ND	ND	29.88						
	WCA-1503-Central-08	N 35.09033 W106.66439	6.6	7/19/2016	6.2-0.1	7/18/2016	17:40	1111_LOG_242.xml	**TCE 630, c-DCE > 34,587**	**1935**	ND	29.85	7/21/2016	13:26	29.98	**257**	16.3	SN# H3423
	WCA-1503-Central-208 Dup					7/21/2016	13:26	1245_LOG_278.xml	TCE 37.1	**199**	ND	29.98	7/21/2016	14:36	29.98	**272**	17.1	SN# 0281
	WCA-1503-Central-08 FB											29.98	7/21/2016	13:41	29.98	ND	ND	SN# H3434
Figure 11	WCA-1445-Central-01	N 35.09025 W106.66383	7.1	7/19/2016	5.2-0.0	7/20/2016	10??	0911_LOG_262.xml	TCE 36.4	**196**	ND	30.07						
	WCA-1433-Central-01	N 35.08958 W106.66374	6.5	7/17/2016	1.6	7/17/2016	9:01	1440_LOG_185.xml	TAL-ND	ND	ND	29.88						
	WCA-1433-Central-01	N 35.08958 W106.66374	6.5	7/17/2016	-	5/15/2017	15:51	1551_LOG_681.xml	TAL-ND	ND	ND	29.6						
	WCA-1433-Central-02	N 35.09019 W106.66346	7.2	7/19/2016	1.0-0.2	7/20/2016	9:48	1530_LOG_246.xml	**TCE 132.6**	**713**	ND	30.07	7/21/2016	16:50	29.9	**1,350**	66.7	SN# 0175

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Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION Bold Face Type Exceeds Residential VISL for TCE and/or PCE											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-1433-Central-02	N 35.09019 W106.66346	7.2	7/19/2016	-	5/18/2017	13:21	1321_LOG_703.xml	**TCE 84**	**451**	ND	29.71	5/17/2017	16:35	29.73	**340**	14.0	10839
	WCA-1433-Central-03	N 35.08987 W106.66343	6.2	5/16/2017	-	5/18/2017	12:45	1245_LOG_700.xml	**TCE 1145**	**6153**	ND	29.71	5/17/2017	16:18	29.73	**35**	ND	10334
	WCA-1433-Central-04		6.3	5/15/2017	-	5/16/2017	15:03	1503_LOG_679.xml	**TCE 907**	**4874**	ND	29.62	5/17/2017	15:20	29.61	13	ND	11285
	WCA-1433-Central-04 - D												5/17/2017	15:20	29.81	13	ND	10957
	WCA-1433-Central-05	N 35.09029 W 106.66380	6.5	5/16/2017	-	5/17/2017	16:45	1645_LOG_696.xml	**TCE 790 / PCE 28.4**	**4246**	191	29.55						
	WCA-1429-Central-01	N 35.08995 W106.66317	6.5	7/18/2016	1.3	7/18/2016	8:38	1554_LOG_203.xml	TCE 19.3	**104**	ND	30.03						
	WCA-1429-Central-01 Dup					7/18/2016	8:38	1637_LOG_206.xml	TCE 20.5	**110**	ND	30.03						
Figure 12	WCA-C-Marquette-01	N 35.08904 W106.66206	7.0	7/21/2016	1.8	7/21/2016	15:00	1603_LOG_270.xml	**TCE 146**	**785**	ND	29.95	7/21/2016	15:00	29.95	ND	ND	SN# H3424
	WCA-C-14St-01	N 35.08965 W106.66270	7.0	7/20/2016	0.0-0.0	7/20/2016	13:10	1631_LOG_250.xml	**TCE 308**	**1655**	ND	30.02	7/21/2016	16:15	29.91	0.48 B	2.11	SN# 0182
	WCA-C-14St-01 DUP			7/20/2016		7/20/2016	13:10	1727_LOG_254.xml	**TCE 289**	**1553**	ND	30.02						
	WCA-C-14St-01	N 35.08965 W106.66270	7.0	7/20/2016	-	5/17/2017	15:06	1506-LOG-690.xml	**TCE 136 / PCE 2.59**	**730**	17	29.61	5/17/2017	11:58	29.72	ND	ND	11744
	WCA-C-14St-02	N 35.08994 W106.66257	7.0	7/20/2016	0.0-0.0	7/20/2016	12:40	1602_LOG_248.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-02 DUP			7/20/2016		7/20/2016	12:40	1658_LOG_252.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-02	N 35.08994 W106.66257	7.0	7/20/2016	-	5/23/2017	14:29	_LOG_726.xml	**325**	**1746**	ND	29.85						
	WCA-C-14St-03	N 35.09029 W106.66257	7.2	7/20/2016	0.7-0.1	7/20/2016	14:25	1812_LOG_256.xml	TAL-ND	ND	ND	29.95						

Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-C-14St-03	N 35.09029 W106.66257	7.2	7/20/2016	-	5/23/2017	13:46	_LOG_722.xml	**201**	**1080**	ND	29.89						
	WCA-C-14St-04	N 35.08937 W106.66266	7.2	7/21/2016	20.6-0.0	7/21/2016	14:39	1530_LOG_268.xml	**TCE 510**	**2741**	ND	29.95	7/21/2016	14:39	29.95	2.15 B	2.49 B	SN# 3439
	WCA-C-14St-05	N 35.0 W106.66	6.5	5/14/2017	-	5/17/2017	13:56	1356_LOG_688.xml	**TCE 1460.14**	**7846**	ND	29.65	5/17/2017	12:18	29.72	ND	ND	O9957
Figure 13	WCA-1404-Central-01	N 35.08859 W106.66331	6.3	7/18/2016	0	7/18/2016	10:20	0943_LOG_212.xml	TAL-ND	ND	ND	30.01						
	WCA-1404-Central-02	N 35.08864 W106.66348	6.0	7/18/2016	8.5-0.2	7/18/2016	13:47	1006_LOG_214.xml	TCE 23.3	**125**	ND	29.92						
	WCA-1404-Central-02	N 35.08864 W106.66348	6.0	7/18/2016	-	5/17/2017	10:08	1008_LOG_686.xml	TAL-ND	ND	ND	29.76	5/17/2017	9:21	29.8	ND	ND	11546
Figure 14	WCA-1202-Central-01	N 35.08730 W106.66102	5.8	7/17/2016	0	7/17/2016		1537_LOG_189.xml	TAL-ND	ND	ND							
	WCA-1122-Central-01	N 35.08744 W106.66085	6.8	7/17/2016	not recorded	7/17/2016	14:07	1600_LOG_191.xml	TAL-ND	ND	ND	29.8						
Figure 14	WCA-C-11St-01	N 35.08752 W106.65951	6.2	7/17/2016	0.8	7/17/2016	16:26	1710_LOG_195.xml	PCE 38.4	ND	260	29.82	7/21/2016	14:15	29.98	8.94	939	SN# H3445
	WCA-C-11St-01 Dup					7/17/2016	16:26	1146_LOG_222.xml	TAL-ND	ND	ND	29.82						
Figure 15	WCA-C-Park-01	N 35.08526 W106.65927	6.5	7/21/2016	0	7/26/2016	12:15	1706_LOG_283.xml	**PCE 105.5**	ND	**715**	29.96						
	WCA-1004-Park Alley-01	N 35.08495 W106.65937	6.8	7/21/2016	5.3-1.0	7/26/2016	11:28	1735_LOG_285.xml	**PCE 254.6 / TCE 19.4,**	**104**	**1727**	29.96						
	WCA-1004-Park Alley-01	N 35.08495 W106.65937	6.8	7/21/2016	-			-					5/17/2017	14:25	29.65	2.7	1700	9739
	WCA-1004-Park Alley-02	N 35.08488 W106.65919	7.1	7/21/2016	0.9-0.2	7/26/2016	11:39	1802_LOG_287.xml	**PCE 93.5, TCE 15.2, t-DCE 273.2**	**82**	**634**	29.96						

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SITE REASSESSMENT REPORT
WEST CENTRAL AVENUE, ALBUQUERQUE
EPA ID # NMN000607372
BERNALILLO COUNTY, NEW MEXICO

September 2017

New Mexico Environment Department
Ground Water Quality Bureau
Superfund Oversight Section

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Acronyms that may be used in this Document

Acronym	Description
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
amsl	above mean sea level
ATD	Automated Thermal Desorption (GCMS)
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
btoc	below top of casing
BTP	Bell Trading Post
cc	cubic centimeter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CGI	combustible gas indicator
cis-1,2-DCE	cis-1,2-dichloroethene
City	City of Albuquerque
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
CRQL	contract required quantitation limit
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
ESC	ESC Lab Sciences
ESB	Environmental Services Branch
ESL	environmental screening level
ESI	expanded site inspection
F	fahrenheit
FAP	Fruit Avenue Plume Superfund Site
FD	field duplicate
FHDC	Family Housing Development Corporation
FROG	FROG-4000^{tm} GCS
ft	feet or foot
ft2	square feet
ft3	cubic feet
gal	gallons
gal/min	gallons/minutes
GCMS	gas chromatograph/mass spectrometer
GCS	Gas Chromatography System
GPS	global positioning system
GWQB	Ground Water Quality Bureau
HRS	Hazard Ranking System
ID	identification number

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Acronym	Description
IDW	investigation-derived waste
INTERA	INTERA Incorporated
LTRA	Long Term Remedial Action
µg/m3	microgram per cubic meter
µg/L	microgram per liter
mg/kg	milligram per kilogram
ml/minute	milliliter per minute
MDL	method detection limit
MS/MSD	matrix spike and matrix spike duplicate
MSA	Minimum Site Assessment
msl	mean sea level
MTBE	methyl-t-butyl ether
MCL	maximum contaminant level
NOAA	National Oceanic Atmospheric Administration
NMED	New Mexico Environment Department
NMSA	New Mexico Statues Annotated
NMWQCC.	New Mexico Water Quality Control Commission
O&M	Operation and Maintenance
OSE	New Mexico Office of the State Engineer
OWS	oil water separator
PA	Preliminary Assessment
PAH's	poly-aromatic hydrocarbons
P&A	plug and abandoned
PCE	tetrachloroethene
PID	photoionization detector
PPE	personal protective equipment
PRT	Post-Run Tubing
PSG	passive soil gas
PSTB	Petroleum Storage Tank Bureau (New Mexico Environment Department)
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
QMP	quality management plan
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	Remediation Oversight Section
RPD	relative percent difference
RSL	regional screening level
SAP	sampling and analysis plan
SCDM	Superfund Chemical Data Matrix
SI	Sight Investigation

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Acronym	Description
Site	West Central Avenue, Albuquerque, New Mexico
SIM	Select Ion Monitoring
SG	soil gas
SJC	San Juan Chama Drinking Water Project
SOS	Superfund Oversight Section
SOP	standard operating procedure
SR	Site Reassessment
SSL	soil screening level
TCE	trichloroethene
1,1,1-TCA	1,1,1-trichloroethane
trans-1,2-DCE	trans-1,2-dichloroethene
TOC	top of casing
USC	United States Code
UST	underground storage tank
VC	vinyl chloride
VI	vapor intrusion
VISL	vapor intrusion screening level
VOC	Volatile organic compound
VRP	Voluntary Remediation Program
WCA	West Central Avenue

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Environmental Standards Relevant to Analytical Results in this Document

	MCL[1]	NMWQCC[2] Standard	EPA[3] Target Sub-Slab and Exterior Soil Gas Concentration		EPA[4] Target Indoor Air Concentration for Carcinogens		EPA[5] Target Indoor Air Concentration for Non-Carcinogens	
Analyte	Groundwater µg/L	Groundwater µg/L	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3	Residential µg/m^3	Commercial µg/m^3
PCE	5	20	360	1600	11	47	42	180
TCE	5	100	16	100	0.48	3	2.1	8.8
cis-1,2-DCE	70	-	-		-		-	
trans-1,2-DCE	100	-	-	-	-		-	
Vinyl Chloride	2	1	5.6	93	0.17	2.8	100	440
1,1,1-TCA	200	60	1.7E+05	7.3E+05	5200	2.2E+04	1.22	2.2E+04
1,4Dioxane	-	-	19	82	0.56	2.5	31	130

1 Federal Drinking Water Maximum Contaminant Level (Ref. 7)
2 New Mexico Water Quality Control Commission (Ref. 8)
3 Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations -Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)
4 Federal Regional Indoor Air Screening Level version 3.5.1 (May 2016 RSLs) Target Risk for Carcinogens (TCR) @ 1E-06 (Ref. 46)
5 Federal Regional Indoor Air Screening Level version 3.5.1 (May 2016 RSLs) Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)
- No NMWQCC groundwater standards, no inhalation toxicity information (Ref. 8 and Ref. 46)

Target Sub-Slab and Exterior Soil Gas Concentration @ Target Risk for Carcinogens (TCR)=1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)

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1.0 Introduction

Under the authority of the CERCLA, as amended, 42 USC §§ 9601 to 9675 CERCLA, the NMED SOS conducted an SR of the West Central Avenue site (Site) in Albuquerque, Bernalillo County, New Mexico (Figure 1, and Figure 2), CERCLIS ID# NMN000607372. The scope of the SR consisted of collecting groundwater, indoor air and soil vapor samples from identified areas of highest soil vapor contamination with potential residential indoor air impact. Additionally, the samples collected were to confirm or refute correlation of ESI soil vapor results and to evaluate how the areas of highest soil vapor concentrations may or may not correlate with groundwater. The investigation focus is near the potential source areas along West Central Avenue and near known chlorinated solvent impacted groundwater locations (Figure 3). This SR Report summarizes the sampling performed to obtain analytical data for the identification of potential source areas, and for evaluation using the HRS (Ref. 1) and the SCDM (Ref. 2) to determine if a threat to human health and the environment exist such that further action under CERCLA is warranted.

2.0 Site Description

2.1 Location

The WCA Site is located in the City of Albuquerque in a primarily commercial and residential setting (Figure 4). The Site is located west of the downtown area, east of the Rio Grande River and south and east of Old Town Albuquerque. Streets near the Site are paved and there are small neighborhood parks. There are four schools within a half a mile of the Site center point.

The Site was identified when chlorinated solvents were detected in groundwater samples collected from FAP Superfund Site (EPA ID# NMD986668911) up-gradient monitoring wells around the year 2005. The Site is centered near the corner of 9th Street NW and Marquette Avenue NW in Albuquerque, New Mexico (Ref. 3, pp. 12, 24 and 34; Ref. 4; and Ref. 5). The geographical coordinates of the Site are 35º5'19.2" N latitude and 106º39'24.8" W longitude in Township 10N, Range 3E, Section 17 (Ref. 4). The elevation of the Site is approximately 4,954 ft above msl. The Site coordinates and elevation correspond with FAP monitor well MNW-11(D1), in which the Site contaminants were first identified. Monitor well MNW-11(D1) is currently considered the center point location of the WCA groundwater plume (Figure 3 and Figure 4) (Ref. 3, Attachment 3, p. 43). To date, chlorinated solvents attributed to the Site have been detected in FAP monitor wells MNW-11(D1), SFMW-14(D1), MNW-9(D1), MNW-1(I2), SFMW-13(I2), WB-01(I1/I2) and WB-02(I1/I2) (Figure 4) (Ref. 6, pp. 23-68).

2.2 Description

The Site is characterized as a groundwater plume of chlorinated and aromatic hydrocarbon compounds consisting of TCE, cis-1,2-DCE, and trans-1,2-DCE (Ref. 6, pp.

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15, 19, 36, 37, and 42). The full extent of the Site groundwater plume is not known at this time. The current understanding of the extent of the Site groundwater plume is defined by the up-gradient FAP monitoring wells. The NMED oversees the FAP site which is currently in the O&M phase of the CERCLA process (Ref. 6, pp. 16 and 19). The target compound list for FAP includes PCE, TCE, VC, cis-1,2-DCE, and trans-1,2-DCE (Ref. 6, p. 12). The FAP up-gradient wells are approximately 1,600 to 2,000 ft to the west of the FAP source area (Ref. 3, p. 34). FAP data show that the leading edge of the Site plume overlaps the western portion of the FAP site boundary (Ref. 6, p. 16). The Site plume as defined by existing FAP wells is present in the I2 and D1 aquifer zones (Ref. 6, p. 19). It should be noted that the western edge FAP monitor wells are not completed in the S (shallow) zones at MNW-11, MNW-12, MNW-9, WB-02 or WB-01. Figure 4 depicts the locations of these wells. The FAP TCE results and groundwater zone depth descriptions are provided in Table 1 and in Table 2. EPA and NMWQCC maximum contaminant levels are listed in the Table on page vi of this report (Ref. 7 and Ref. 8).

The climate in the Albuquerque area is semiarid. During the weather monitoring recording period from 1914 to 2012, the average annual precipitation in Albuquerque was 8.65 inches; most of the precipitation occurred annually from April through October and the average total snowfall was 9.6 inches with most of the snow falling from November through March (Ref. 9). June, July, and August are the hottest months; the average maximum temperatures for these months for the period of record were between 88.9°F and 91.7°F (Ref. 9). December, January, and February are the coldest months with average minimum temperatures for the period of record between 23.6°F and 27.8°F (Ref. 9). During the summer months, the principal form of precipitation occurs as high-intensity thunderstorms and can result in flooding (Ref. 10, p.1). Annual potential evaporation in the region is substantially greater than annual precipitation with Albuquerque annual potential evapotranspiration calculated at 47.58 inches, resulting in a net annual precipitation of zero inches (Ref. 11, pp. 14 and 16). Groundwater flow direction at this Site is generally west to east (Ref. 6, p. 13).

2.3 Operational History and Previous Investigations

The Site is a groundwater contaminant plume of chlorinated solvents and attribution to a specific source operation(s) has not yet been determined. Business operations in the Site vicinity and up-gradient areas were reviewed during the SI and ESI. The 2014 SI Report for WCA contains details on the businesses near the Site and their spatial proximity to the Site; operational history; ownership; previous environmental investigations under various authorities; and brief discussions on the findings of those investigations (Ref. 12, pp 2-8). Selected business directories from 1947 to 1990 and Sanborn Fire insurance maps for the vicinity were investigated as part of the ESI. Table 3 lists the addresses of properties that are of potential concern, the business type, and years of operation (Ref. 13 and Ref. 14). Sections 2.3.1 through 2.3.5 provide additional information on properties from Table 3 that are the most likely potential sources of chlorinated solvents based on soil vapor sampling results during the ESI and SR. Figure 7 depicts the approximate location of the business that are potential source locations.

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2.3.1 Bell Trading Post Property

The Bell Trading Post property, located at 1503 Central Ave. NW, is approximately 2,375 feet west-northwest of the FAP MNW-11 monitor well (Figure 4 and Figure 5). The property originally housed an Indian jewelry manufacturing business from 1947 to 1975 (Ref. 3, p. 3 and 13). The jewelry business site moved to the Sun Bell site at the intersection of Lomas and Central 0.3 miles northwest of the Site (Ref. 3, p. 13). The business, currently called The Bell Group, distributes jewelry and supplies under the Rio Grande brand name (Ref. 3, p. 13). The Bell Group used TCE for degreasing their products and reportedly did have a release at the Lomas and Central location (Ref. 3, p. 13). The exact date of the release is unknown; however, it would have occurred at some time(s) between the years of 1947 to 1975. The 1503 Central Avenue location was then occupied by the Albuquerque Photo Lab from 1982 until 1984. (Ref. 15, p. 3). Michelson Metals offices occupied the building, from 1985 until 1992 (Ref. 15, p. 3). From 1992 until 2000 the property was vacant.

The Bell Trading Post property was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3) (Ref. 16, pp. 1, 3 and 10). The buildings were developed into "affordable housing" as defined by the U.S Department of Housing and Urban Development (Ref. 17, p. 1) and in 2008 the former Bell Trading Post building was renovated to contain 15 residential units (Ref. 18, p. 1).

The NMED first identified the presence of chlorinated solvents in the soil vapor and groundwater following a sampling event conducted in 2001 for the NMED VRP Phase II Site Characterization of the Former Bell Trading Post property (Ref. 15, pp. 14, 15, 19 and 20).

- Four groundwater samples were collected via Geoprobe® from the groundwater table at about 23 ft bgs. One of these groundwater samples and its field duplicate contained TCE at 1.5 µg/L. (Ref. 15, pp. 15, 28-31).

- Six of twelve soil gas samples contained TCE at concentrations from 0.2 µg/L or 200 µg/m^3 to 3.4 µg/L or 3,400 µg/m^3 (Ref. 15, pp. 15, 27 and 36-40). There is a typographical error in Table 2.5 of the report the units are shown as mg/L whereas in fact they are µg/L (Ref. 15, pp. 31 and 36-40).

- Ten of the twelve soil gas samples had elevated PID field screening results (Ref. 15, pp. 14 and 42-53).

In 2005, the Voluntary Remediation Completion Report for the Bell Trading Post recognized that there had been an indication of a possible historical release of chlorinated solvents (Ref. 17, p. 6). A determination was made that the analytical results for the groundwater samples were inconclusive, and did not exceed the NMWQCC standards (Ref. 17, p. 6). The report concluded that no further environmental remediation at the site was needed (Ref. 17, p. 24). The site was issued an Affidavit of Completion of Voluntary Remediation on November 14, 2005 (Ref. 19, p. 1).

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In October of 2013, a request was made by the Family Housing Development Corporation for assistance through the NMED Brownfields Program for investigation and assessment of the property based on the previous environmental studies (Ref. 20, p. 32). This request resulted in a Limited Phase II ESA with regards to indoor air impacts. In June 2014, The Bell Trading Post property was investigated by INTERA on behalf of the NMED VRP. The investigation included sample collection of soil vapor and indoor air (Ref. 20, p. 1). Details of the June 2014 results are described here and sample locations are shown in Figure 6.

Building Exterior (Figure 6).

- Three (3) soil borings were advanced to approximately 3 ft bgs and soil vapor was extracted from each borehole for VOC laboratory analyses. TCE was identified above the reporting limit in two of the three soil gas samples at a maximum detection of 1,800 $\mu g/m^3$, which is above the recommended EPA VISL for TCE (Ref. 20, pp. 7, 8, 15, 24, 25 and 29).

- An exterior outdoor air sample representative of "ambient" conditions over an 8-hr period was collected for VOC analysis. VOC constituents did not exceed any EPA regional screening levels (Ref. 20, pp. 7, 8, 24, 26 and 30).

Building Interior (Figure 6).

- Two (2) soil borings within the building crawlspace were advanced to approximately 2 ft bgs and soil vapor was extracted from each borehole for laboratory VOC analyses. One sample contained TCE at 14 $\mu g/m^3$ (Ref. 20, pp. 7, 15, 24, 25 and 29).

- Two (2) "source" air samples were collected within the crawlspace over an 8-hour period for VOC analysis. One sample contained PCE at 18 $\mu g/m^3$ (below the EPA regional screening level for indoor air) and TCE at 3.1 $\mu g/m^3$ (above the EPA regional screening level for indoor air). Both samples contained chloroform at concentrations ranging from 1.5 to 1.7 $\mu g/m^3$; both concentrations exceed its regional screening level for indoor air (Ref. 20, pp. 8, 24, 26, and 30).

- Two (2) "ambient" air samples were collected within the occupied/communal areas over an 8-hour period for VOC analysis. The VOC results for both samples were below reporting limits and/or EPA regional screening levels (Ref. 20, pp. 8, 16, 24, 26, and 30).

The Limited Phase II ESA concluded that an acute release of chlorinated solvents, specifically TCE and chloroform, historically occurred at the Bell Trading Post property or within the immediate vicinity of the site. According to the report, the release most likely occurred during the site's operation as a jewelry manufacturing facility (Ref. 20, p. 17).

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The data indicates that TCE and chloroform are present in soil vapor within the northwest corner of the site near the corner of Roma Ave and Laguna Blvd intersection (Ref. 20, pp. 17, 23 and 25).

The Limited Phase II ESA also concluded that the VOC levels do not pose an immediate risk to the current residents of the site building (Ref. 20, p. 17). The report recommended continued operation of a well-ventilated building crawl space and monitoring of factors that may impact the indoor air VOCs (Ref. 20, pp. 17, 23, 37 and 38). Additional soil gas and indoor air monitoring recommendations for the site were proposed but have not been conducted as of the date of this report (Ref. 20, pp. 17, 18, 37 and 38).

In 2016, the ESI soil vapor sampling at the former Bell Trading Post property identified detections of TCE in the soil vapor at an average of depth 6.5 feet bgs. The field gas chromatograph sample results with detections for TCE ranged between 32 $\mu g/m^3$ to 7,678 $\mu g/m^3$. Two laboratory confirmatory soil vapor samples contained TCE at concentrations of 272 $\mu g/m^3$ and 8,530 $\mu g/m^3$ confirming the field detections (Ref. 21, pp. 11, 12, and 13).

2.3.2 Indian Silver Craft Inc.

Business directories reviewed for the ESI identified a jewelry manufacturer, Indian Silver Craft, located at 1701 Central Ave NW from 1965 to 1985 (Ref. 13, p. 15, 22, 27, 30, 35 and 41). However, a sidewalk reconnaissance of 1701 Central Ave NW revealed that this address is a private residence. Online research of the business name yielded several confirmations on the Indian Silver Craft address as 1601 Central Ave NW (Ref. 22, pp 1, 2, 3 and 4). Verbal discussions with neighborhood property owners confirmed a jewelry manufacturer at 1601 Central Ave NW that was in operation for approximately 20 years. A visual survey of the building contents in 2016 confirms that it was a manufacturing operation with equipment still evident inside the building. Indian Silver Craft Inc. appears to no longer be in operation at this location, see Figure 5.

In 2016, the ESI soil vapor sampling around the exterior of the former Indian Silver Craft property identified detections of TCE in the soil vapor at an average of depth of 6.5 feet bgs. The field gas chromatograph sample results with detections for TCE ranged between to 983 $\mu g/m^3$ to 1,682 $\mu g/m^3$. Three laboratory confirmatory soil vapor samples collected at this location contained TCE at 3,050 $\mu g/m^3$ and 1,440 $\mu g/m^3$ with one non-detect result, see Figure 10 (Ref. 21 pp. 11, 12, and 13).

2.3.3 Kelly's Transmission Exchange

From 1985 to 2007, Kelly's Transmission Exchange was located at 1816 Central Ave SW See Figure 7 and Figure 8 (Ref. 13, p. 39 and 47 and Ref. 24). From 1975 to 1980, Aamco Transmission occupied the same location (Ref. 13). 1816 Central Ave SW is located approximately 0.64 miles northwest of the FAP MNW-11(D1) monitor well (Table 3) (Ref. 3, pp. 14 and 32 and Ref. 12, p. 7). In August 2006, an NMED inspection report documented 6 pairs of hydraulic lifts, an oil water separator and an oil saturated garage floor (Ref. 23). In 2007, a corrective action was performed under NMED ROS authority in the investigation and clean-up of Kelly's Transmission. Six pairs of hydraulic lifts were

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removed including the fluids in the fluid reservoirs. An OWS, its oil and sludge contents, and its surrounding subsurface soils were also removed. Confirmation soil sampling for the removal actions detected some TPH and PAH compounds and some metals, but no chlorinated solvents were detected (Ref. 24, pp. 1-7).

One monitor well (MW-1) was installed approximately 11 feet east-southeast of the OWS on September 13, 2006. Groundwater was encountered at 16 feet bgs and the well was completed to 24 feet. The monitor well was sampled on September 14, 2006 for analysis by EPA-Method 8310 and EPA-Method 8260. Analytical results did not indicate PAH's or VOCs (Ref. 25, pp. 2 and 3). It is not known if the well completed on September 14, 2006 is still accessible.

2.3.4 Park Ave Cleaners

The Park Ave Cleaners property at 1004 Park Ave SW (Figure 3) was investigated in 2000 by the NMED VRP under the authority of Voluntary Remediation Act, Sections 74-4G1 et seq. NMSA 1978 and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3). The February 2000 soil gas data indicated a PCE concentration of 66,000 $\mu g/m^3$ at 12.5 ft bgs in a sampled borehole. Another borehole exhibited detected concentrations of PCE at 76,000 $\mu g/m^3$ and TCE at 900 $\mu g/m^3$ at 10 ft bgs (Ref. 26, pp. 3 and 10).

One monitor well MW-1 was drilled on March 9, 2000 south of the building. Soil samples from the MW-1 borehole exhibited PCE concentrations of 98.3 $\mu g/kg$ at 8 to 10 ft bgs and 64.7 $\mu g/kg$ at 17 ft bgs (Ref. 26, pp. 4, 8 and 10). Depth to groundwater in monitor well MW-1 in March 2000 was 16.7 ft bgs (Ref. 26, p. 9). A groundwater sample and duplicate collected from MW-1 on March 10, 2000 detected PCE at 14.0 $\mu g/L$ and 12.2 $\mu g/L$ respectively, below the NMWQCC level of 20 $\mu g/L$ (Ref. 26, pp. 4 and 10). The NMED Voluntary Remediation agreement was signed on November 11, 2000 and the affidavit of completion of the VRP was signed on December 12, 2000 for the neighboring property of 1006 Park Ave SW (Ref. 27 p. 20).

On August 19, 2016, the condition of the well vault and well was checked by NMED SOS personnel. The water level measured 13.4 ft bgs and total depth of the well was recorded at 23.9 ft bgs (Ref. 28, p. 52). Water level has risen at this location 3.3 feet between March 2000 and August 2016.

In 2016, the ESI soil vapor sampling around the exterior of the former Park Ave Cleaners property identified detections of PCE and TCE in the soil vapor at an average depth of 6.5 feet bgs. The three field gas chromatograph sample results for PCE were 1,727 $\mu g/m^3$, 715 $\mu g/m^3$ and 634 $\mu g/m^3$. TCE was detected at 104 $\mu g/m^3$, 82 $\mu g/m^3$ and non-detect (Figure 15 and Table 9). No laboratory confirmatory soil vapor samples were collected at this location in 2016 (Ref. 21, pp. 11 and 13).

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2.3.5 Other Potential Source Properties

Several other properties currently lacking any detailed operational history are also potential chlorinated solvent sources. A list of these properties can be found in Table 3 and Figure 7 (Ref. 13, 14, and 30).

3.0 Waste/Source Sampling

During the PA, SI, ESI and SR for the Site, NMED SOS gathered information pertaining to potential sources, and contaminated media. Potential sources were identified through the review of various environmental investigations, monitoring reports and site reconnaissance (Ref. 3; Ref. 6; Ref. 12, pp. 2-7; Ref. 17; Ref. 20; Ref. 22; Ref. 23; Ref. 24; Ref. 25; Ref. 26; Ref. 27; and Ref. 28). The facilities considered to be likely potential sources were discussed in Sections 2.3.1 through 2.3.5 of this SR report. These sites were identified because of the nature of the business and the potential for using TCE.

TCE is used primarily in vapor degreasing of fabricated metal parts and some textiles. Less commonly, it is used as an intermediate in the production of organic chemicals and pharmaceuticals, as solvents in dry cleaning and extraction, and as a refrigerant/heat exchange liquid. Major environmental releases are from metal degreasing (Ref. 29, p. 1). TCE is also a degradation product of PCE, while cis-1,2-DCE and trans-1,2-DCE are degradation products of TCE (Ref. 30, pp. 1 and 2). Waste source sampling was not conducted for this SR.

4.0 Groundwater Pathway

The groundwater pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to groundwater and whether any receptors (through drinking water wells, wellhead protection areas, resources) are likely to be exposed to hazardous substances as a result of a release. SOS has identified impacts to the groundwater at this Site and has performed a limited investigation on water quality and receptors under the WCA SI performed in 2014 (Ref. 12, pp. 8-17).

The Groundwater Pathway Sections 4.0 through 4.3 of the WCA SI included discussions on the hydrology; municipal, public and domestic supply well use; the historical groundwater sample locations and analytical results (Ref. 12, pp. 8-17). The WCA SI discussed groundwater sampling, results and conclusions of the sampling performed for the SI in 2014 in Sections 4.4 through 4.6. The SI Report documented that the total number of people served by ground water in a four mile radius of the Site is approximately 204,147 (Ref. 12, pp. 12, 17-20).

Limited ground water investigation was conducted during the SR to evaluate how the areas of highest soil vapor concentrations may or may not correlate with groundwater. The SR ground water pathway investigation is discussed in Sections 4.1 and 4.2.

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4.1 2017 SR Groundwater Pathway Sample Locations

Two monitoring wells (WCA-1 and WCA-2) were installed during the SR on March 7, 2017 in locations corresponding with the highest ESI soil vapor detections. Both WCA-1 and WCA-2 were completed in the shallowest water bearing zone to a depth of 29.9 and 30.18 feet btoc, respectively (Ref. 31, pp. 1 and 4). See Figure 5 for the approximate locations of the monitor wells. Static water level on March 8, 2017 (prior to well development) was at 14.60 ft and 16.40 ft btoc, respectively. The TOC elevations have not been surveyed (Ref. 32, pp. 1 and 2).

4.1.1 Groundwater Data Acquisition Strategy

The primary groundwater objective for the SR field event was sampling the two newly installed monitor wells WCA-1 and WCA-2. The wells were installed near the two areas of highest ESI soil vapor concentrations to evaluate potential source release points to the TCE groundwater plume. The drill log and development sheets are included as Ref. 31 and Ref. 32.

Groundwater sampling activities were performed the week of March 15, 2017 (one week following the installation and development of the wells) and again the week of May 15, 2017 (Ref. 33; and Ref. 34). Both low flow and disposable bailer purge methods were performed in the sampling events. Groundwater sample locations are depicted on Figure 3, Figure 4 and Figure 5. A list of businesses that may have used TCE or PCE are included in Table 3 for information purposes. Table 4 contains the groundwater samples collected and the analysis requested. All sampling was conducted in accordance with the NMED GWQB QMP (NMED, March 2017), NMED SOS QAPP (NMED, March 2017), and NMED SOS SOP Manual (NMED, July 1999, Rev 2017) for groundwater sampling. All field activities were performed according to the May 2017 SR Work Plan; and the work was documented in the field sample forms (Ref. 33, Ref. 34 and Ref. 35).

4.1.2 Groundwater Sampling Activities

Groundwater sampling activities were performed on March 15, May 14, and May 15, 2017. Monitor wells WCA-1 and WCA-2 were sampled per the SR work plan. For comparative purposes monitor wells WCA-1 and WCA-2 were sampled by bailing and low flow methods. On May 14, 2017 monitor wells were sampled by baling. On March 15 and May 15, 2017 wells were sampled by low flow sampling. Groundwater samples were collected when field parameters had stabilized (+/- 0.10 standard unit for pH, +/- 10% for specific conductance, temperature is consistent for at least 3 consecutive readings, and turbidity had stabilized or was below 10 NTUs). The March 15 samples were placed on ice and delivered on the same day to the NM Scientific Laboratory Division. The water samples were analyzed for EPA SW846 Mass Spectrometry Method 8260B. May 2017 samples were submitted to the Houston Lab for analysis. See Table 4 for analytical methods. Field Data sheets are included as Ref. 34, pp. 1-2.

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4.2 Groundwater Sample Results

The initial samples collected on March 15, 2017 from well WCA-1 and well WCA-2 did not contain any VOC's above the sample detection limit. The March groundwater data is included in Ref. 36.

Groundwater samples collected on May 14, 2017 and May 15, 2017 from well WCA-1 and well WCA-2 did not exhibit any detections above Federal or New Mexico regulatory limits for the analytical parameters depicted in Table 4 except for manganese (Ref. 8). Dissolved manganese was reported for WCA-2 and its duplicate WCA-22 at 832 µg/l. Total manganese was detected at 1,310 µg/l (WCA-2) and1,380 µg/l (WCA-22) (Ref 37).

5.0 Surface Water Pathway

The surface water pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to surface water; and whether any receptors (intakes supplying drinking water, fisheries, or sensitive environments) are likely to be exposed to a hazardous substance as a result of a release. SOS has identified surface water drainages near the site for future consideration and has performed a limited investigation for water quality and receptors in the 2014 SI (Ref. 12, pp 20-21). No data acquisition was performed during this SR for the evaluation of the surface water exposure pathway.

6.0 Soil Exposure and Sub Surface Intrusion Pathways

The soil exposure pathway assesses the threat to human health and the environment posed by direct contact with hazardous substances and areas of suspected contamination. This pathway addresses any material containing hazardous substances that is on or within 2 feet of the surface and not capped by an impermeable cover. No data acquisition was performed during this SR for the evaluation of the soil exposure pathway.

The subsurface intrusion pathway assesses the vapor intrusion component from the soil into occupied structures and is discussed in this section. The subsurface intrusion pathway was assessed as part of the SR. During the ESI, SOS identified impacts to the soil at the Site. Under the SR, additional soil gas data was collected and a VI survey of 4 structures was performed. The VI survey focused on structures nearest those areas identified during the ESI as having the highest TCE soil gas results.

6.1 Physical Conditions

The majority of the ground surface in the area along Central Ave is capped with asphalt, concrete, homes, apartments, businesses and a school (Figure 3, Figure 4 and Figure 5) (Ref. 12, p. 22). No data acquisition was performed during this SR for the evaluation of the soil exposure pathway. The subsurface intrusion pathway was assessed as part of

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the SR because the contaminants at the Site are VOCs and volatilization from soil or groundwater to soil gas and air, particularly indoor air, may present an exposure pathway.

6.2 Soil Gas / Indoor Air Targets

The Site is in a primarily, residential, commercial and light industrial setting. There are approximately 30 residential properties within 200 ft of the Site groundwater plume center point (MNW-11) with the nearest residence approximately 42 ft away (Figure 3). Proximity of residences, schools and business properties to the soil gas sample locations in this ESI are provided in Table 8. Proximity of the Site to schools is documented in the WCA 2014 SI Report (Ref. 12, p. 22).

6.3 Soil Gas / Indoor Air Sample Locations

6.3.1 Data Acquisition Strategy

The primary objectives of the SR were to collect indoor air for VI assessment as part of the subsurface intrusion pathway, and to collect SG samples to confirm results from the July 2016 ESI sampling effort in order to clarify the soil vapor boundary and thus define the potential extent of the VI concern.

All sampling was conducted in accordance with the NMED GWQB QMP (NMED, March 2017), NMED SOS QAPP (NMED, March 2017), and NMED SOS SOP Manual (NMED, July 1999) for indoor air and soil gas sampling. Sampling procedures were performed according to the May 2017 SR Work Plan (Ref. 35). All field activities were documented on field boring log, field sample forms, and in FROG-4000^{tm} Data Log Book and computer spread sheet (Ref. 38, Ref. 39 and Ref. 40).

6.3.2 Sampling Activities

Soil Gas Sampling

Eight (8) new SG sample ports were installed. The SG sampling utilized a Macho hammer drill to install the new SG wells and dedicated tubing to the planned depth of 6 to 7 feet bgs. The location of each SG well was surveyed with GPS and recorded in the field book and a sketch map of the location was drawn. The SG sampling effort included collecting 11 SG screening samples and eight (8) confirmatory TO-15 laboratory samples with one duplicate. The SG sampling points were focused west of 9th Street and Marquette Avenue and along 14th St NW near Marquette Ave NW (see Figure 7 and Figure 9 through Figure 13). The SG points installed for the combined ESI and SR events are noted in Table 3 according to their proximity to a potential source. Sampling locations are depicted in Figure 8 through Figure 15. Table 4 contains a summary of sample analyses performed.

A SG screening sample was collected from each sample location. Each soil gas screening sample was analyzed directly from the dedicated sample tubing using the FROG-4000^{tm} GCS (FROG). On May 12, 2017, the FROG was calibrated at the Defiant Technologies Laboratory prior to the start of field work (Ref. 40, p.1). The five point chlorinated alkenes calibration enable the FROG with Elvin software to detect and

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measure concentrations of PCE and TCE. Sample collection, analysis, and system purging & cleaning on average took approximately 15 to 20 minutes per sample.

The FROG GCS unit drew the required sample into the unit and a computer with Elvin Software analyzed the results. Each sample analyzed was given a unique date/time stamp and this was recorded along with the sample location information and data result into the FROG Field book (Ref. 40). After the analysis was complete the FROG was put through a purge cycle to clean the unit. The Elvin software allows the user to calculate volumes of the PCE or TCE detected.

Laboratory grab samples were collected using 1 liter mini-Summa air canisters. The Summa canisters supplied by TestAmerica Knoxville were certified clean and under negative pressure (Ref. 39). Sumas canisters were shipped with dedicated regulators set for a 5-minute sample collection time. Field parameters to include tank pre and post pressure readings, collection time, and shut-in pressure test readings were recorded (Ref. 39). Daily local barometric air pressure and temperatures were recorded from the Albuquerque International Airport NOAA site http://w1.weather.gov/obhistory/KABQ.html (Ref. 41). The Summa samples collected by NMED SOS were shipped to Test America Knoxville, TN for VOC analyses using TO-15 method including 1,4-dioxane. Nine (9) samples were collected to confirm the field results.

Indoor Air Sampling

The indoor air samples were collected in 6 liter Summa or similar air sample canisters fitted with flow control regulators set for a 24-hour sample period. Measures were taken to ensure rain would not be able to enter the canisters set for ambient air collection; each canister either had its inlet turned downward or was placed under protective cover. Indoor canisters were placed in locations at approximate breathing zone height. Doors and windows in homes at the indoor canisters survey locations were to remain closed if possible. Owner occupants were given instructions that were to be followed during the sampling event. Sample collection locations were placed if possible in highest use rooms within the residences and the crawl space or sub-slab samples were taken in close vertical proximity to the indoor sample location as feasible. Holes were drilled through the basement or living space slab using the Macho Hammer Drill equipped with concrete bit. Debris was vacuumed out of the hole and a Contractor Vapor Pin Kit was used to install stainless steel sample tips with dedicated sleeves (Ref. 35, pp. 31-34). The hole was leak checked for 5 minutes using the water dam method prior to sample collection. The helium leak detection method was not used as originally planned because the helium meter was not shipped by the rental company. The Summa canisters supplied by TestAmerica Knoxville were certified clean and under negative pressure (approximately -30"Hg) (Ref. 42). Summa canisters were shipped with dedicated certified clean regulators set for a 24 hr sample collection time. Records were kept recording the date, time, beginning and final vacuum of the canister and complete Field Test Data Sheets, Chain of Custody Records, and canister sample tag (Ref. 42).

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6.4 Soil Gas Sample Results

6.4.1 FROG SG Screening Results

Soil vapor field screening confirms the results from the July 2016 ESI sampling effort that identified what appears to be two possible source areas of TCE near the western end of the SR study area (Figure 18) and one PCE source area at 1004 Park Ave SW (Figure 20). All field screening data in ppbv and calculated $\mu g/m^3$ including duplicate analysis performed, and duplicate samples are reported in Table 9. Laboratory results from the 2016 ESI Field work were reported in the November 2016 WCA ESI Report (Ref. 21, pp. 11-14). Data from that event is presented in this WCA SR report in Table 9.

The following sample locations exhibited elevated TCE soil vapor field results and are reported here as the calculated $\mu g/m^3$:

- Samples collected at WCA-1801-Central-02 and WCA-1801-Central-03 are located at 1801 Central Ave NW, on the eastern edge of the Manzano Day School property. These locations exhibited one detection of TCE in the soil gas at 614 $\mu g/m^3$ and non-detect, respectively (Figure 9, Figure 19, and Table 9) (Ref. 40, pp. 62, 67 and 71). Additionally, PCE was detected at 12 $\mu g/m^3$ in sample WCA-1801-Central-02.

- Samples collected at WCA–1611-Central-01, WCA–1611-Central-02 and WCA–1611-Central-04, were collected just west of the former Indian Silver Craft at 1601 Central Ave NW. These three sample locations had detections of TCE at 108 $\mu g/m^3$, 3,364 $\mu g/m^3$ and 763 $\mu g/m^3$, respectively (Ref. 40. p. 69).

- Samples locations WCA-1433-Central-01, WCA-1433-Central-02, WCA-1433-Central-03, WCA-1433-Central-04 and WCA-1433-Central-05 exhibit TCE results of non-detect, 451 $\mu g/m^3$, 6,153 $\mu g/m^3$, 4,872 $\mu g/m^3$, and 4,246 $\mu g/m^3$, respectively (Figure 11, Figure 19, and Table 9) (Ref. 40, pp. 60, 61, and 63-66).

- Samples collected along 14th Street NW between Roma Ave NW and Central Ave NW include WCA-14St-01, WCA-14St-02, WCA-14St-03 and WCA-14St-05. These sample results exhibit TCE detections at 730 $\mu g/m^3$, 1,746 $\mu g/m^3$, 1,080 $\mu g/m^3$, and 7,846 $\mu g/m^3$, respectively (Figure 12, Figure 19, and Table 9) (Ref. 40, pp. 63 and 72).

6.4.2 Laboratory Results

Nine (9) Samples were collected for laboratory analysis from eight (8) soil vapor well locations. The nine (9) samples were collected in 1-liter Summa canisters and sent to

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TestAmerica Knoxville for TO-15 analysis. Summa grab samples were collected with 5-minute flow control regulators. The sample fill time was between 5 and 7 minutes with a final tank pressure recorded at -3 to -7 inches of Hg prior to shipment. Summa grab samples from the ESI, 2016 event were collected without a flow regulator and the sample time averaged 47 seconds to fill the Summa or an average flow rate of one liter every 7.8 seconds, which is significantly faster than the recommended flow rate of +/- 250 ml/min. Data from that 2016 and 2017 events are presented in Table 9.

Five (5) samples collected at locations WCA-1801-Central-03, WCA-1433-Central-02, WCA-C-14St-01, WCA-1404-Central-02 and WCA 1004 Park Alley-02 were drilled and installed in July 2016. Four (4) samples collected at WCA-1433-Central-03, WCA-1433-Central-04, WCA-1433-Central-04D, and WCA-C-14St-05 were from sample locations drilled and installed the week of May 14, 2017. Data results for these nine (9) samples are shown in Table 9 (Ref. 43).

- TCE was detected in the following four (4) of the nine (9) Summa samples collected: WCA-1433-Central-02, -03, -04 and -04D, all located to the east of the former Bell Trading Post property. Detections of TCE ranged from 2.7 $\mu g/m^3$ to 340 $\mu g/m^3$ (Table 9). Additionally, sample WCA-1433-Central-02 exhibited a PCE detection of 14.0 $\mu g/m^3$.

- Laboratory results did not detect any COCs in three (3) samples: WCA-C-14St-01, WCA-C-14St-05, and WCA-1404-Central-02.

- Laboratory results detected PCE at 4.6 $\mu g/m^3$ and 1,700 $\mu g/m^3$ in two (2) samples collected at WCA-1801-Central-03 and WCA-1004-Park-Alley-02, respectively (Ref. 43, pp. 73-75). Sample WCA-1801-Central-03 is about 1 block east of the active dry cleaners, Unique Cleaners, located at 1880 Central NW. Sample WCA-1004-Park-Alley-02 is located at the former Park Avenue Dry Cleaners at 1004-Park Ave SW. Additionally, TCE was detected in WCA-1004-Park-Alley-02 sample at 2.7 $\mu g/m^3$. See Figure 8, Figure 9, Figure 15, and Table 9 for these sample locations and data (Ref. 43, pp. 85-87).

6.5 Indoor Air Sample Results

Indoor air samples were collected at four (4) separate structures. Three (3) were single family dwellings with partial basements that were approximately six (6) feet deep at the bottom of the joists. The basements extended below the living space a third to a quarter of the house living space foot print. The remainder of the basement was dirt crawl space just one or two feet below the wooden floor and joists. The homes were built between mid-1900 to the early 1920s. Two (2) of the three (3) homes are occupied and one is being gutted to begin remodeling. Samples in the single-family homes were collected in the living space, the partial basement and from below the slab. One outdoor ambient sample was taken near the three homes. These homes are identified as A, B, and C.

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The fourth location is a 15-unit condo structure with commercial offices located at one end and is identified as structure D. A portion of structure D is constructed over an actively vented dirt floor crawl space and partly on a concrete slab. All property owners were instructed to limit the use of exhaust fans, air conditioning or evaporation coolers and to keep the windows and doors closed as much as practical for the duration of the 24-hour collection period.

- House A was remodeled approximately one to two years ago. The house is occupied by the homeowners. Air samples with duplicates were collected in the indoor living space, basement, and sub-slab, an ambient outdoor air sample was collected in the back yard. The basement contained limited items and all painting and cleaning supplies had been removed. The basement and sub-slab samples and duplicate results were all below detection limits for the COCs. The floor of the basement was less than two inches thick at the selected Sub-slab sample location. The indoor air sample A-I-1 and its duplicate A-I-2 exhibited a detection of PCE below the RL, but above the MDL. The PCE detection is well below federal residential screening levels. The ambient outdoor sample collected for this neighborhood was non-detect for PCE and TCE. (Table 7) (Ref. 42, pp. 1-7; Ref. 43, pp. 34-54).

- House B is under renovation and contains no internal walls or doors only open studs, all flooring has been removed as well as kitchen, bath, laundry and fireplace, and heating/cooling infrastructure. The owner did not believe any chemicals or solvents had been used thus far in the renovation process. Some equipment and tools may have been on site however, none were present when the samples were collected. There were no chemicals or equipment in the basement. Several porch window panes were broken or missing so the house was not completely closed. No construction workers were in the house and no construction activity took place during the 24-hr collection period. The Indoor air sample B-I was collected in the former laundry area on the back porch directly above the partial basement collection area. Sample B-1 detected TCE at 6.2 $\mu g/m^3$, exceeding the TCE federal screening level for indoor air of 0.48 $\mu g/m^3$. This was the only detection of TCE in House B. The sub-slab sample B-SS detected PCE below the RL but above the MDL. All other results are non-detect, see Table 7 (Ref. 42, pp. 8-10; Ref. 43, pp. 25-33).

- House C has been remodeled over the years. The house is occupied by the homeowners and extended family. Air samples were collected in the indoor living space, basement, and sub-slab. The basement housed a variety of items including paint and cleaning supplies. The indoor air sample C-I and basement sample C-B were below detection limits for PCE and TCE. The sub-slab sample C-SS had a detection of PCE at 1.7 $\mu g/m^3$ and a detection of TCE below the RL but above the MDL. Both detections are well below federal residential sub-slab screening levels for TCE at 16 $\mu g/m^3$ and for PCE at 360 $\mu g/m^3$, see Table 7 (Ref. 42, pp. 11-13; Ref. 43, pp. 59-63 and 67-72).

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- Structure D is currently a multi-unit condo with some office space. The structure originally housed jewelry manufacturing businesses from 1947 to 1975, a photo lab from approximately 1980 to 1985, and then offices for Michelson Metals from 1985 until 1990 (See Table 3, Ref 13,14 and 15). The northern end of the structure is built slab on grade and the southern part of the building is constructed over a deep dirt crawl space that varies from 4 to 6 feet in depth. Indoor air and sub-slab samples were collected in the slab on grade portion of the building. The sample location was inside an unoccupied utility closet space just off a communal hallway. The space was empty of any storage items and only contained the electrical panel and other infrastructure. An ambient outdoor sample was collected near the outdoor parking area entrance on the west side of the building. The indoor air sample D-I and sub-slab sample D-SS detected TCE at 9.2 $\mu g/m^3$ and 5,300 $\mu g/m^3$, respectively. Both detections are above the federal residential and commercial indoor air (0.48 $\mu g/m^3$ and 16 $\mu g/m^3$) and sub-slab (3 $\mu g/m^3$ and 100 $\mu g/m^3$) screening levels for TCE. The sub-slab D-SS sample exhibited a detection of PCE at 24 $\mu g/m^3$ but this was reported as an approximate value because it was less than the RL but greater than the MDL. The ambient sample D-A was non-detect for the COC, see Table 7 (Ref. 42, pp. 14-16; Ref. 43, pp. 55-60 and 64-66).

7.0 Air Pathway

The air pathway assesses the threat to human health and the environment by determining whether hazardous substances are likely to have been released to the air; and whether any receptors (human population and sensitive environments) are likely to be exposed to hazardous substances as a result of a release. No data acquisition was performed for the evaluation of the air pathway in the ESI or SR.

8.0 Summary and Conclusions

Based on the combined SR and ESI soil gas data, a TCE soil gas plume extends northwest to southeast from the 1800 block of Central Ave NW to the 1400 block of Central Ave NW, where the plume signature then appears to stretch in a more eastward direction along Marquette Avenue toward groundwater monitor well MNW-11 at Marquette Ave NW and 9th Street (Figure 18). Soil gas data collected for the SR confirm the soil gas data in the ESI study. The combined data demonstrate three distinct TCE hot spots indicative of potential source areas in or around the 1800 block westward, the 1500 to 1600 block, and the 1400 block of Central Ave NW (Figure 18 and Figure 19) (Ref. 44 and Ref.45). Soil gas data indicate that there are two PCE hot spots indicative of potential source areas in or around the 1100 block of Central Ave NW and the intersection of Park Ave SW and 10th Street (Ref. 44 and Ref. 45).

The soil gas results from the SR were compared to Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations with a Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46, p. 2). The VISL for TCE

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in target sub-slab and exterior soil gas 16 μg/m^3 in a residential setting and 100 μg/m^3 for a commercial setting (Ref. 46 pp. 2 and 3).

The highest soil gas laboratory sample results for TCE were detected at 340 μg/m^3 and 35 μg/m^3 located at 1433 Central Ave NW. This property borders the east side of the former Bell Trading Post property at 1503 Central Ave NW, where the highest TCE soil gas results from the 2016 ESI study were detected at 8,530 μg/m^3 (Table 7 and Table 9). These results are above the EPA residential target exterior soil gas concentration of 16 μg/m^3 and one is above the TCE commercial target exterior soil gas concentration of 100 μg/m^3.

The highest soil gas sample results for PCE was located near 1004 Park Avenue SW, the former Park Avenue Cleaners, with concentrations of 1,700 μg/m. The result is above the residential and commercial EPA target sub-slab and exterior soil gas concentrations. The VISL for PCE in target sub-slab and exterior soil gas 360 μg/m^3 in a residential setting and 1,600 μg/m^3 for a commercial setting (Ref. 46 pp. 2 and 3).

Vapor intrusion indoor air sampling analytical results for Structure D indicate TCE was detected above the EPA target sub-slab and exterior soil gas level at 5,300 μg/m^3 in the sub-slab below a mixed residential/commercial building at 1503 Central Avenue NW. Additionally, indoor air results from Structure D indicate TCE was detected above the EPA target indoor air concentration at 9.2 μg/m^3 within the residential portion of 1503 Central Avenue NW, the former Bell Trading Post Jewelry manufacturing business.

Vapor intrusion and indoor air results for other residential structures (A, B and C) sampled were all either non-detect or below the EPA target sub-slab and exterior soil gas and indoor air concentrations. One exception was Structure B, a home under the demolition phase of a remodel with missing window panes. Structure B, located at 203 14th Street NW, exhibited a detection of TCE at 6.2 μg/m in the indoor air sample, however, the basement air and sub slab samples were both non-detect for TCE.

Two monitor wells were installed for the SR. Wells WCA-1 and WCA-2 were installed in the shallowest water bearing zone within the area of highest detected soil vapor readings from the ESI. Groundwater sampling analytical results from the SR did not exhibit detectable concentrations of any VOCs, SVOCs, 1,4-dioxane, pesticides, or Aroclor.

NMED SOS recommends HRS evaluation for the Site.

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FIGURES

ED_013172_00000690-00025

Figure 1 Location of Albuquerque and Bernalillo County in New Mexico.

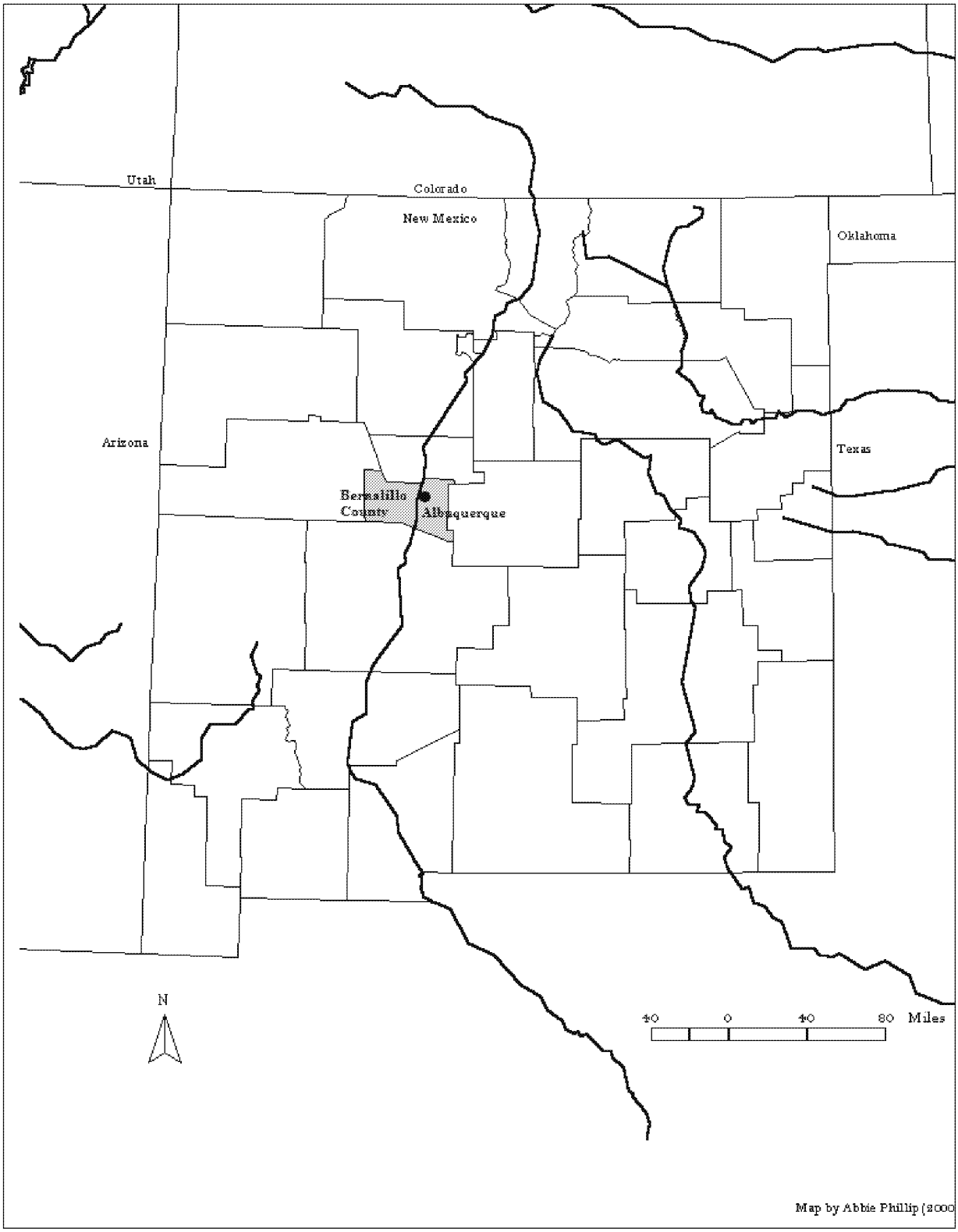

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Figure 2 Albuquerque Area Map, West Central Avenue area outlined in red.

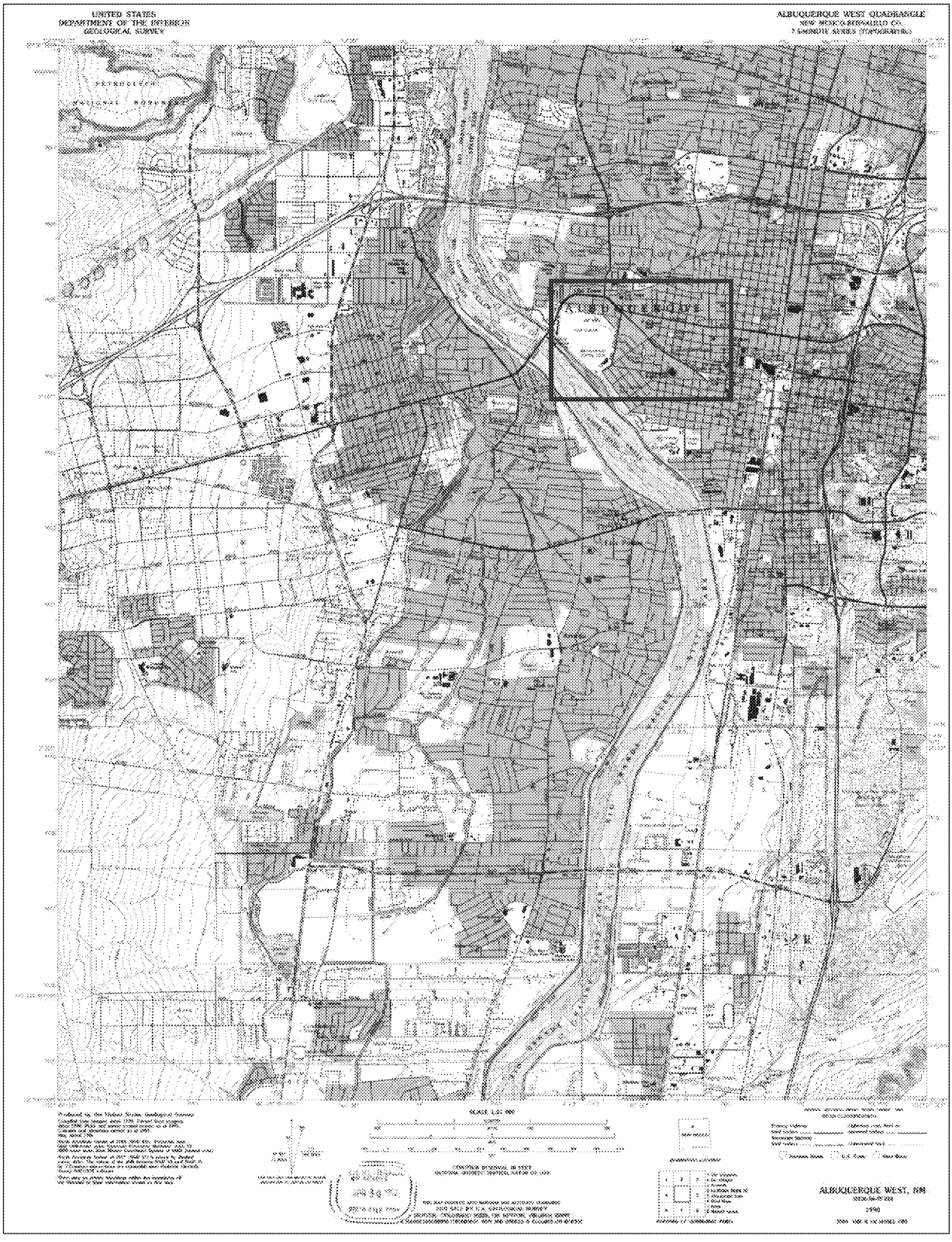

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Figure 3 SR Area of Investigation

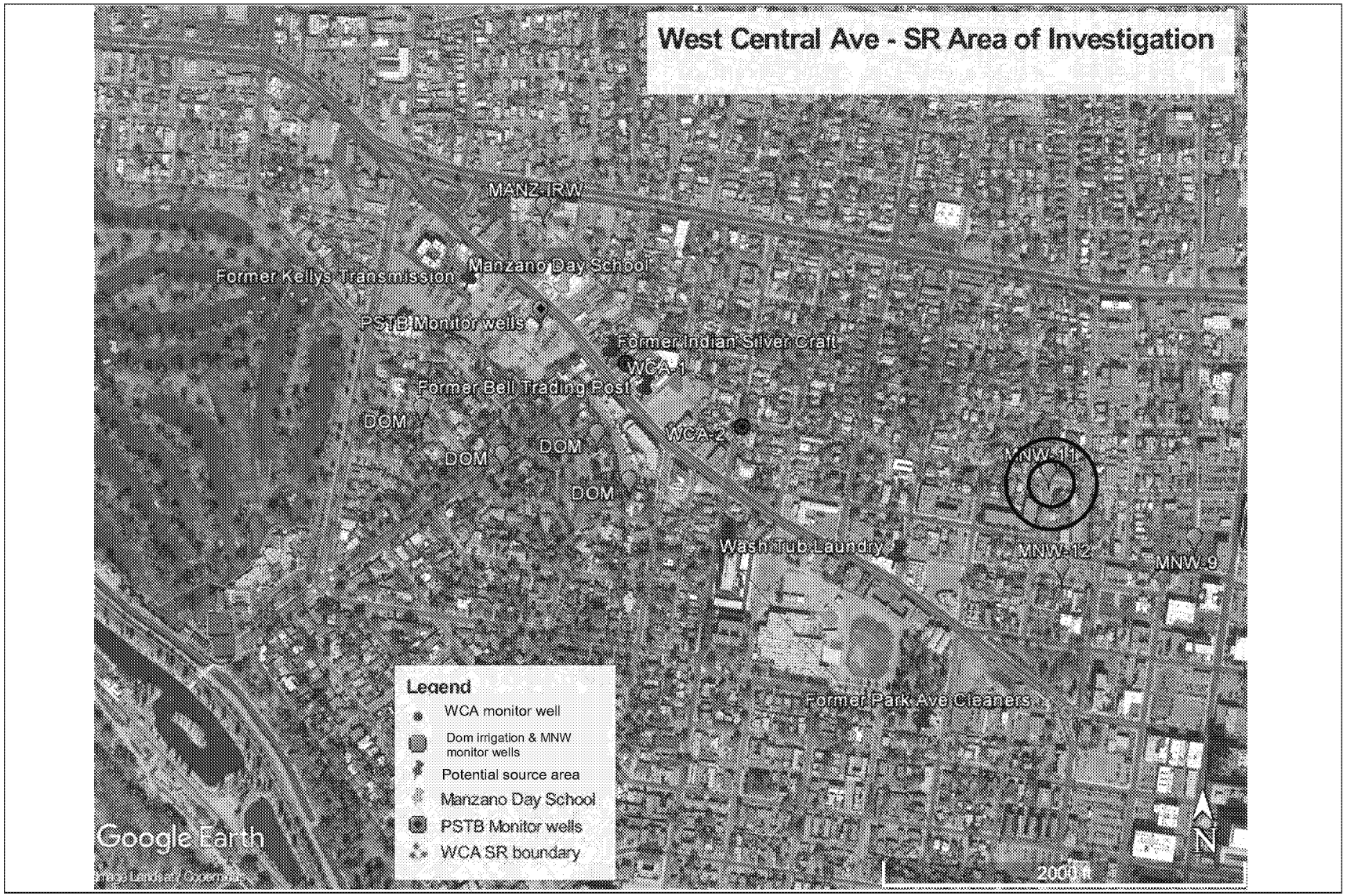

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Figure 4 WCA Base Map with Land Use and Monitor Wells

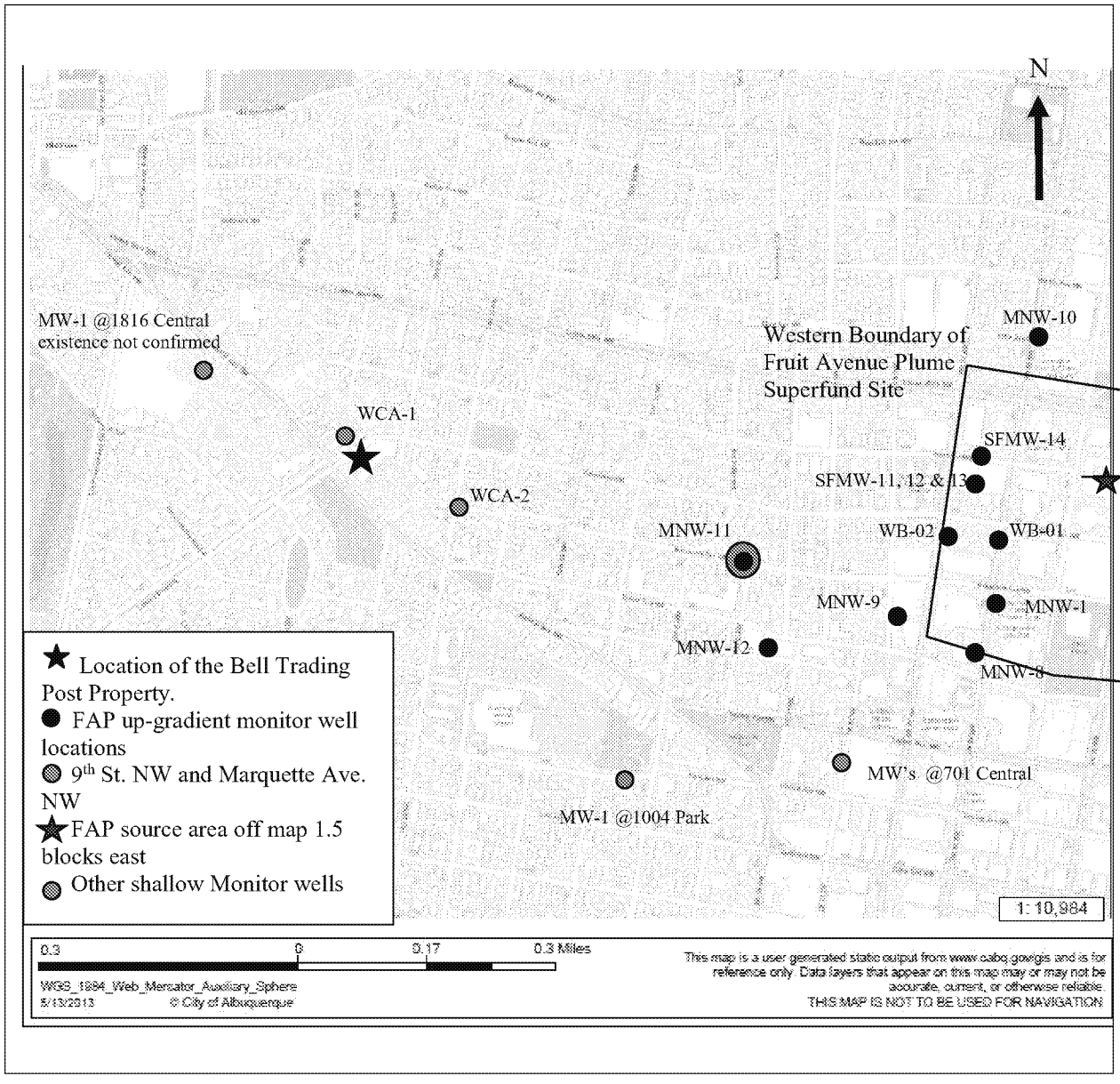

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Figure 5 SR Monitor Wells and Vapor Intrusion Sample Locations

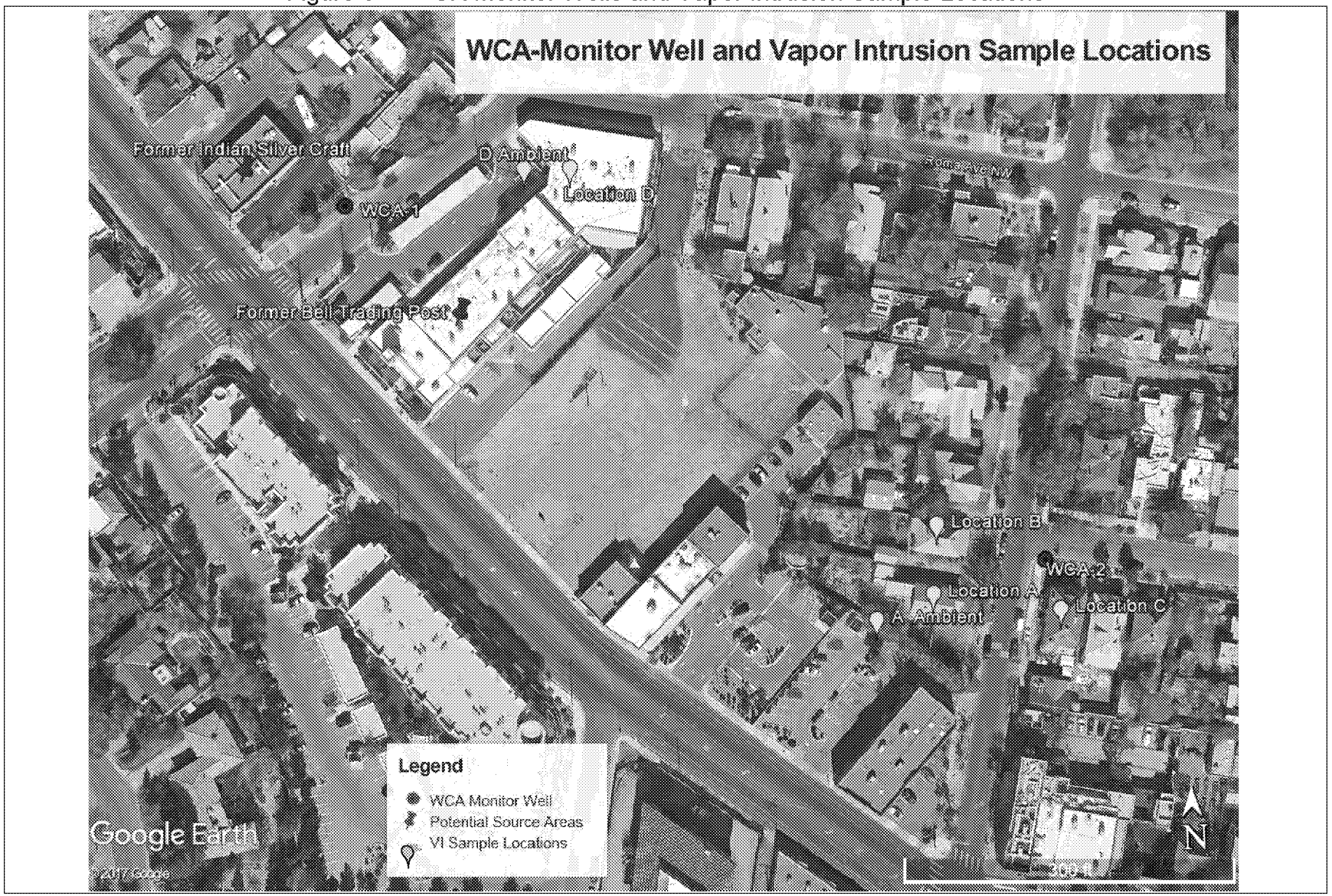

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Figure 6 VRP June 2014 Sample Locations at Bell Trading Post.

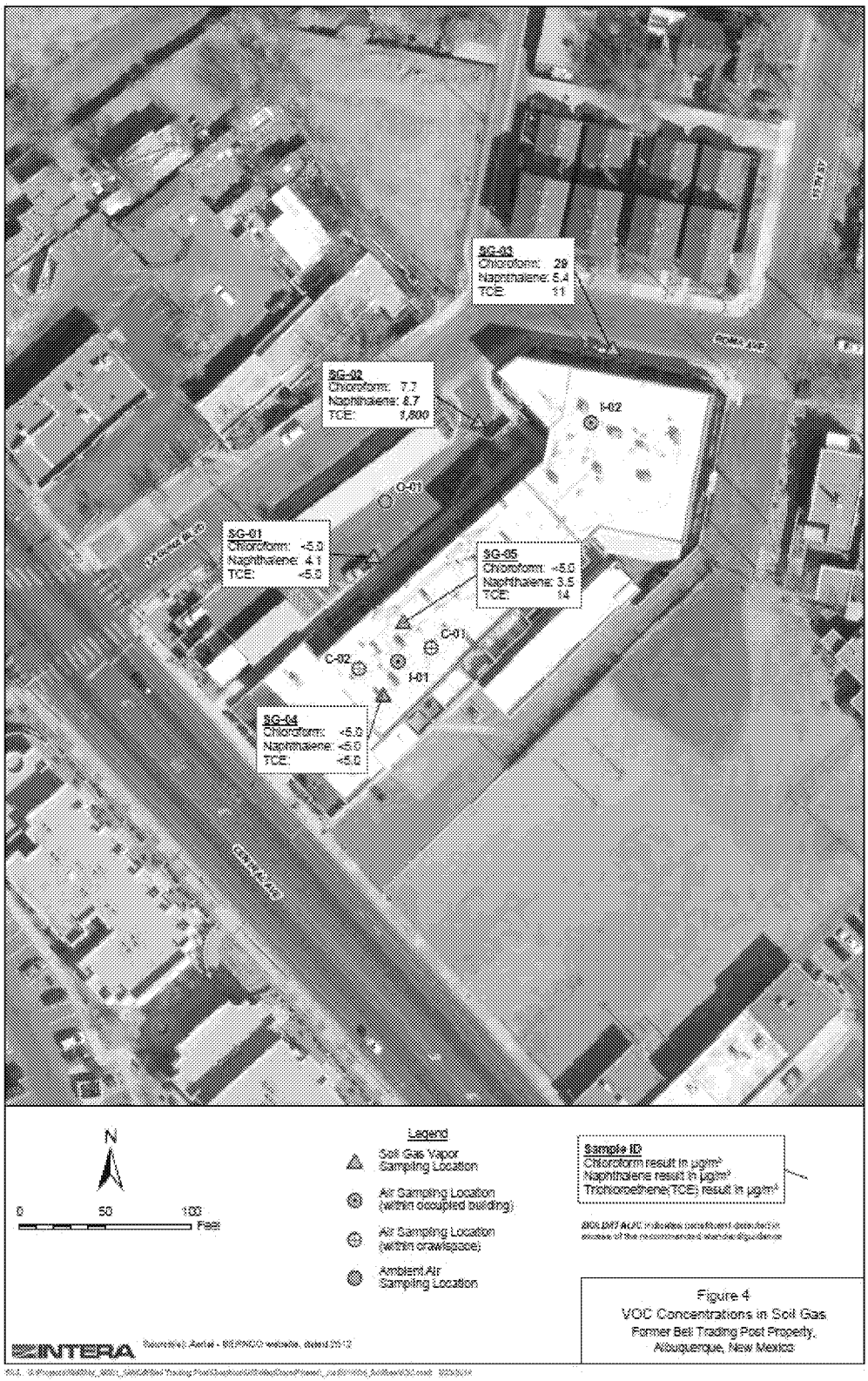

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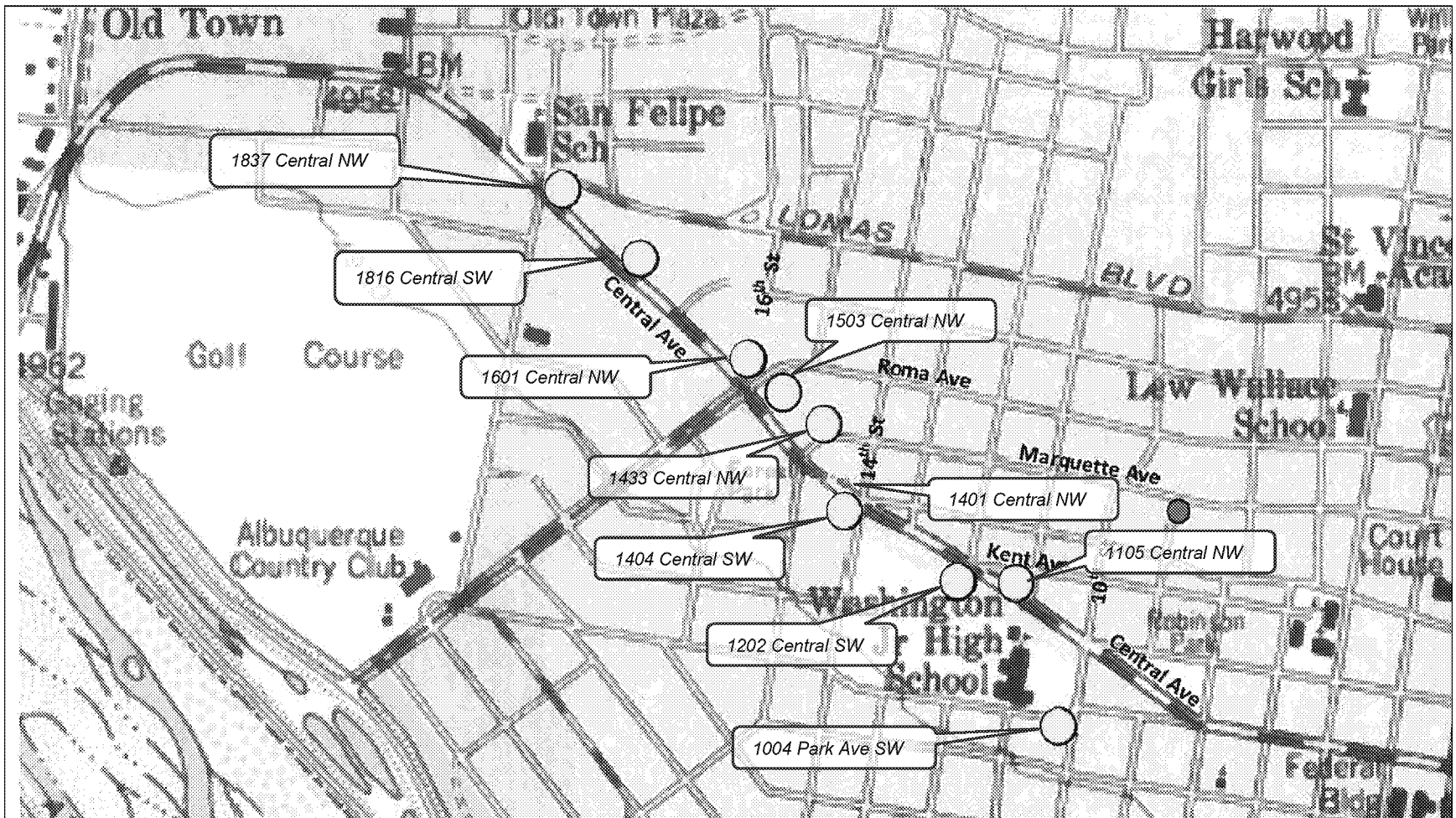
Figure 7 Potential Source Soil Gas Sample areas for West Central Ave.



Note: Blue point is the location MNW-11 monitor well at 9th St. and Marquette Ave.
Yellow points are potential source areas invistigated during the ESI and SR.

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Figure 8 ESI & SR Sample points for 1816 Lomas NW & 110 Rancho Seco.

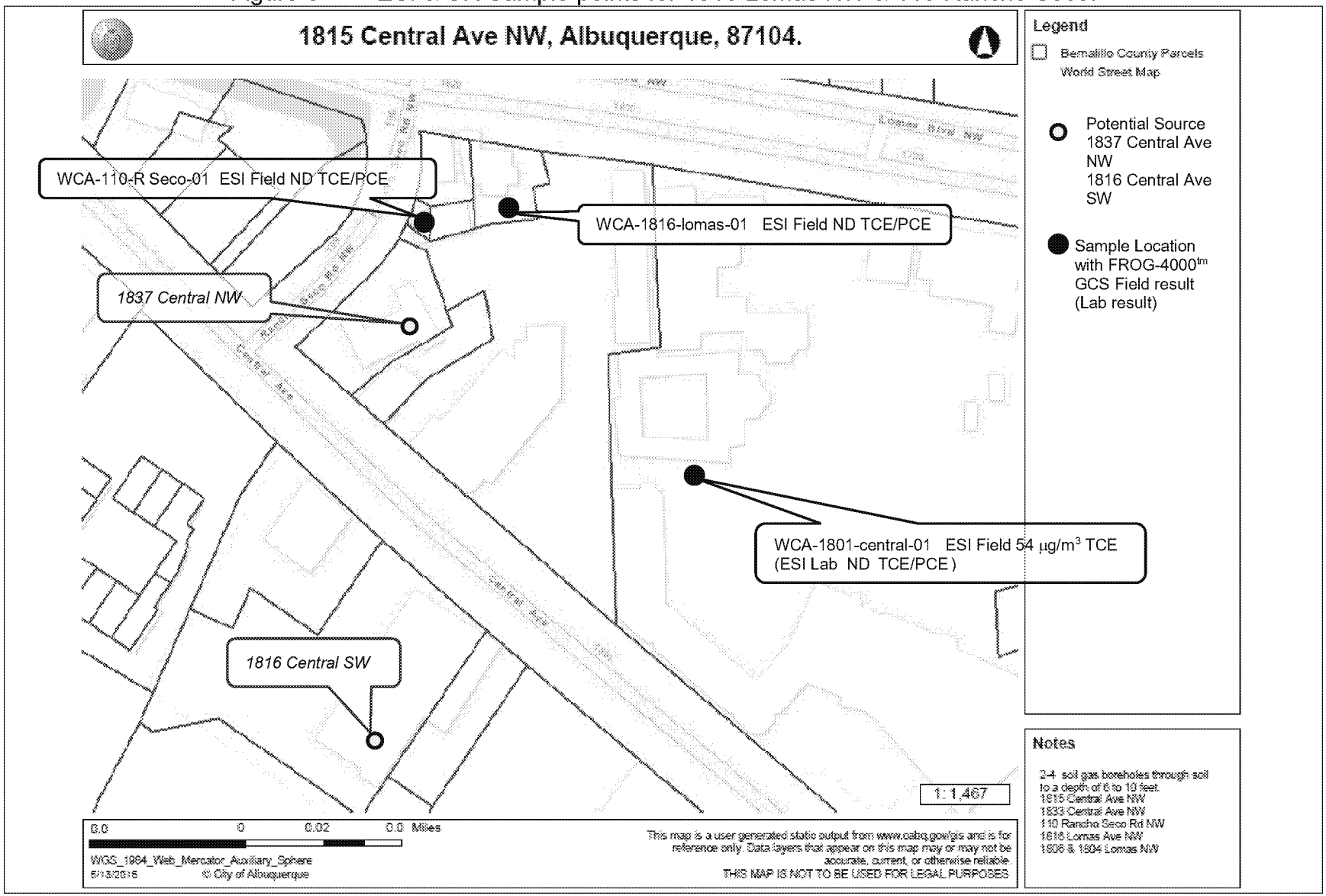

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Figure 9 ESI and SR Sample points for 1801 Central NW.

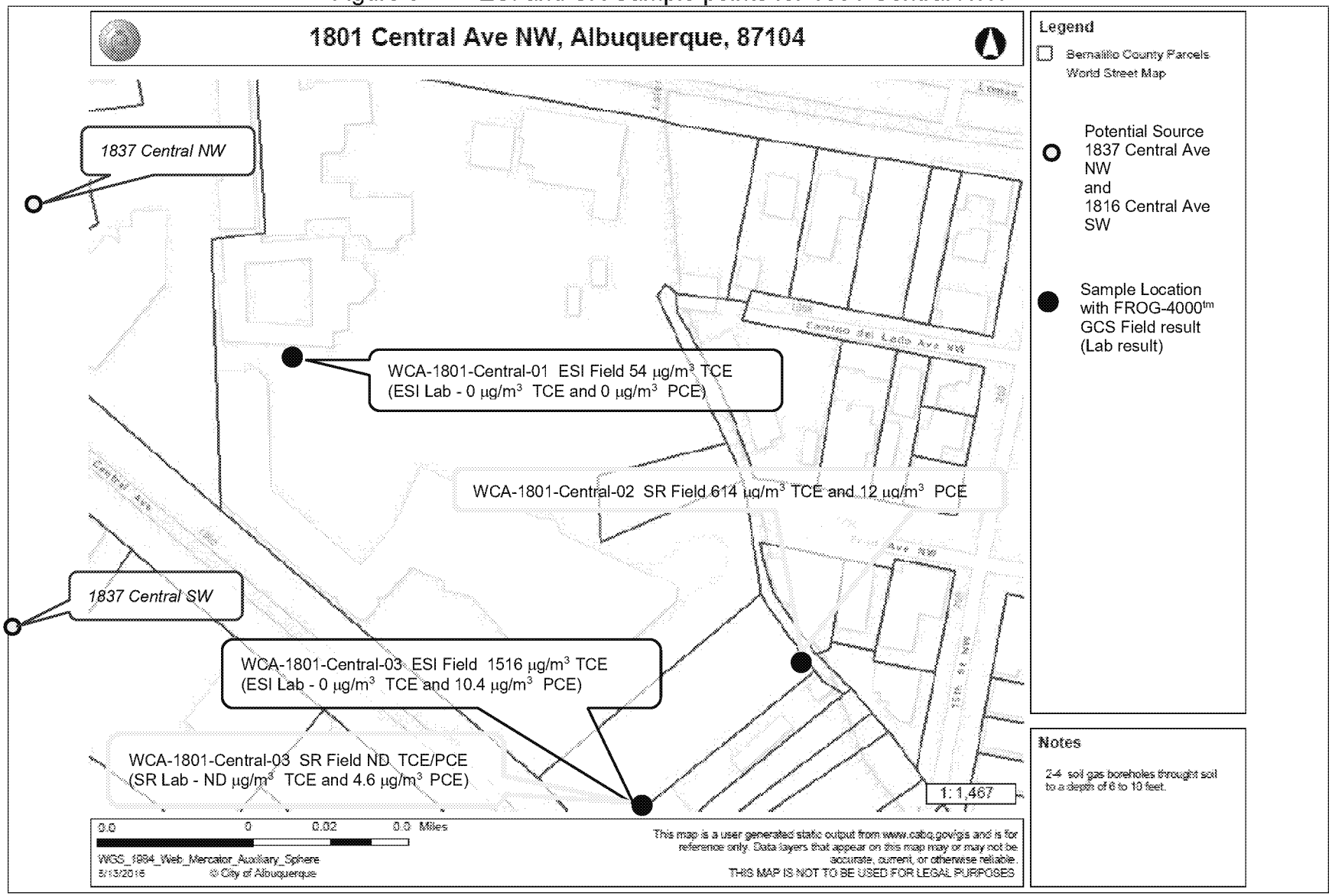

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Figure 10 ESI & SI Sample pts for 1611 and 1503 Central NW & Laguna Pl.

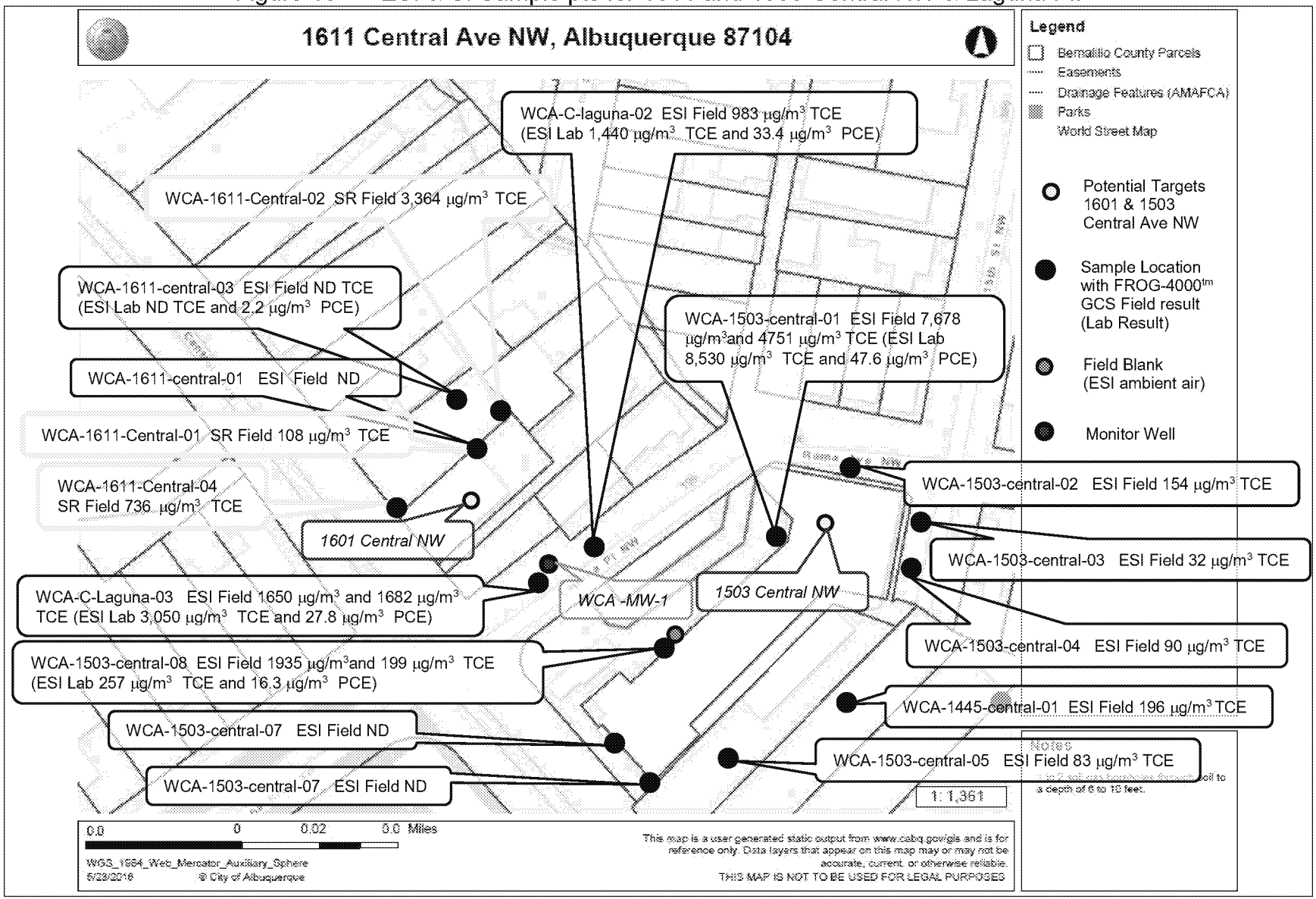

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Figure 11 ESI & SR Sample points at 1445, 1433, & 1429 Central NW

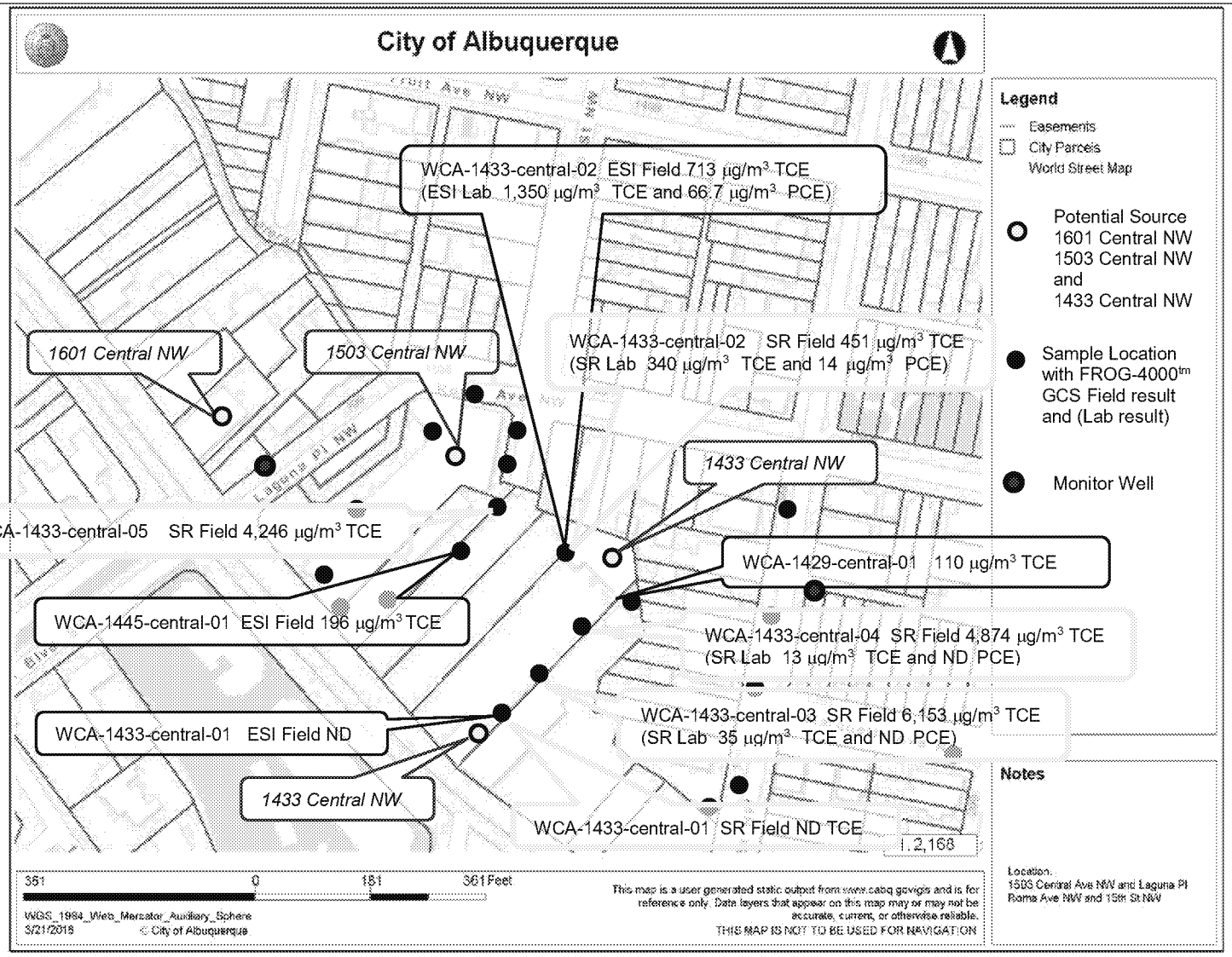

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Figure 12 ESI & SR Sample points for 14th St. & Marquett Ave.

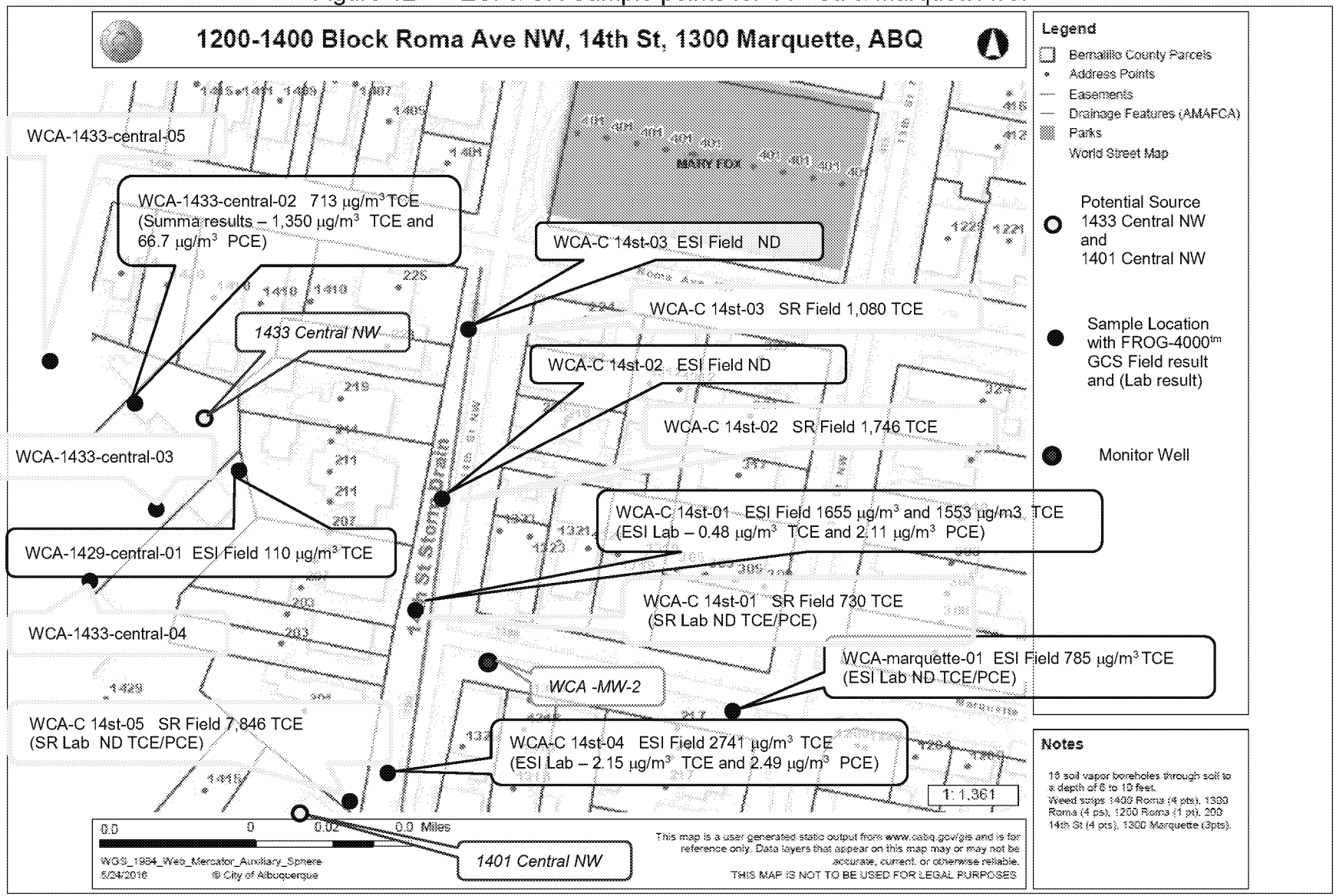

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Figure 13 ESI & SR Sample points 1402-1406 Central Ave SW.

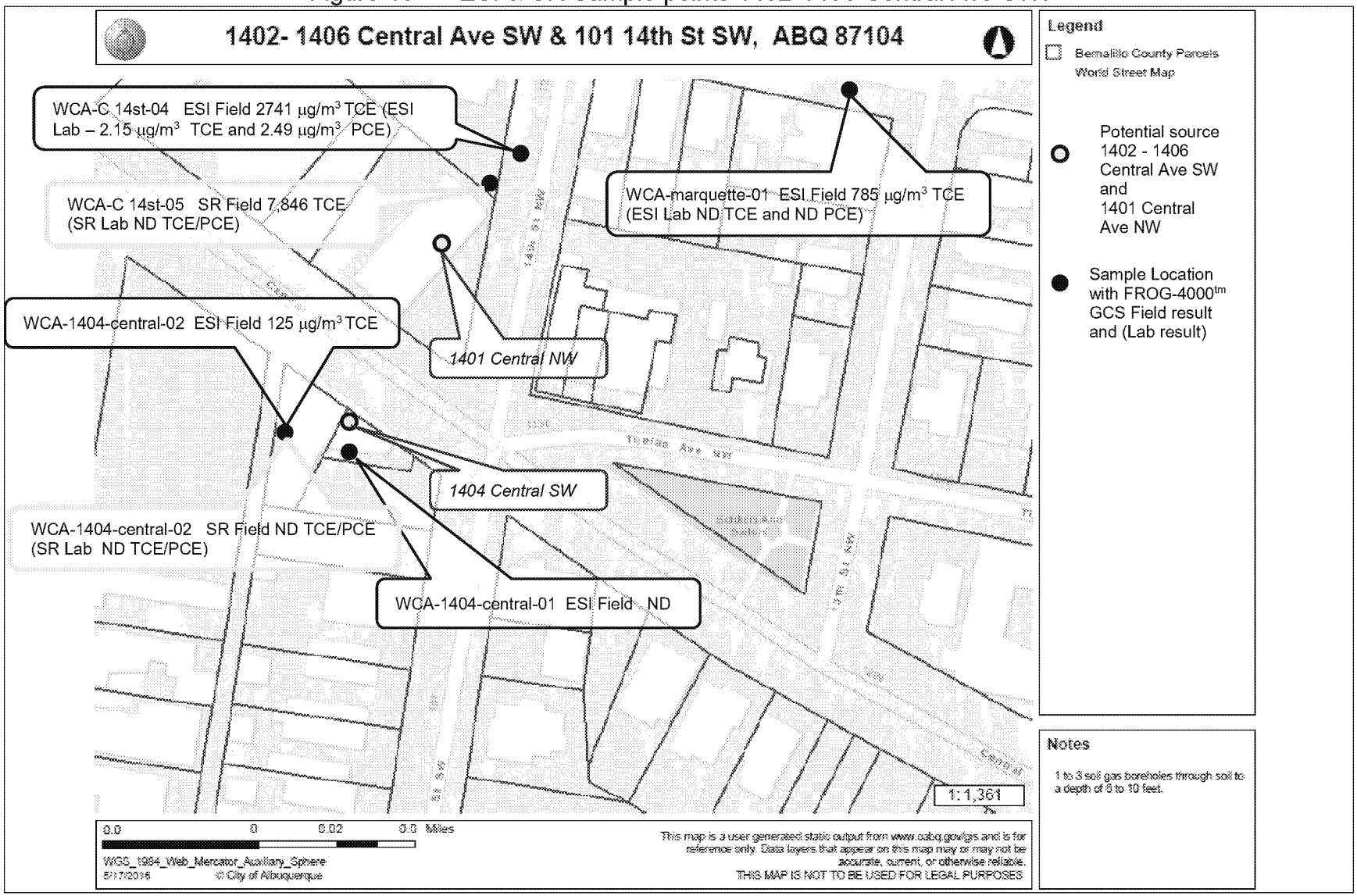

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Figure 14 ESI Sample points for 1202, 1122 & Central & Kent &11th St.

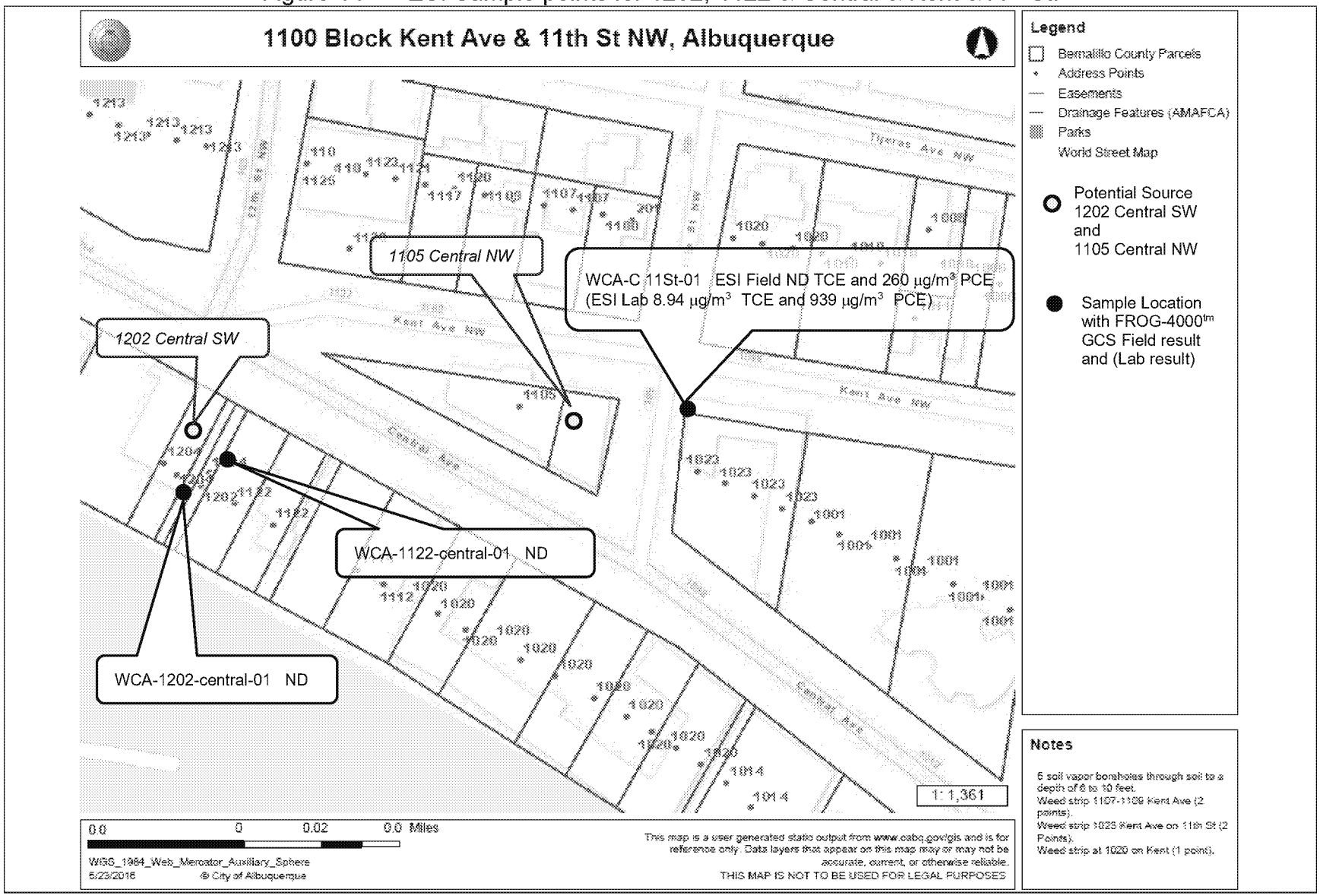

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Figure 15 ESI & SR Sample points for 1004 Park Ave.

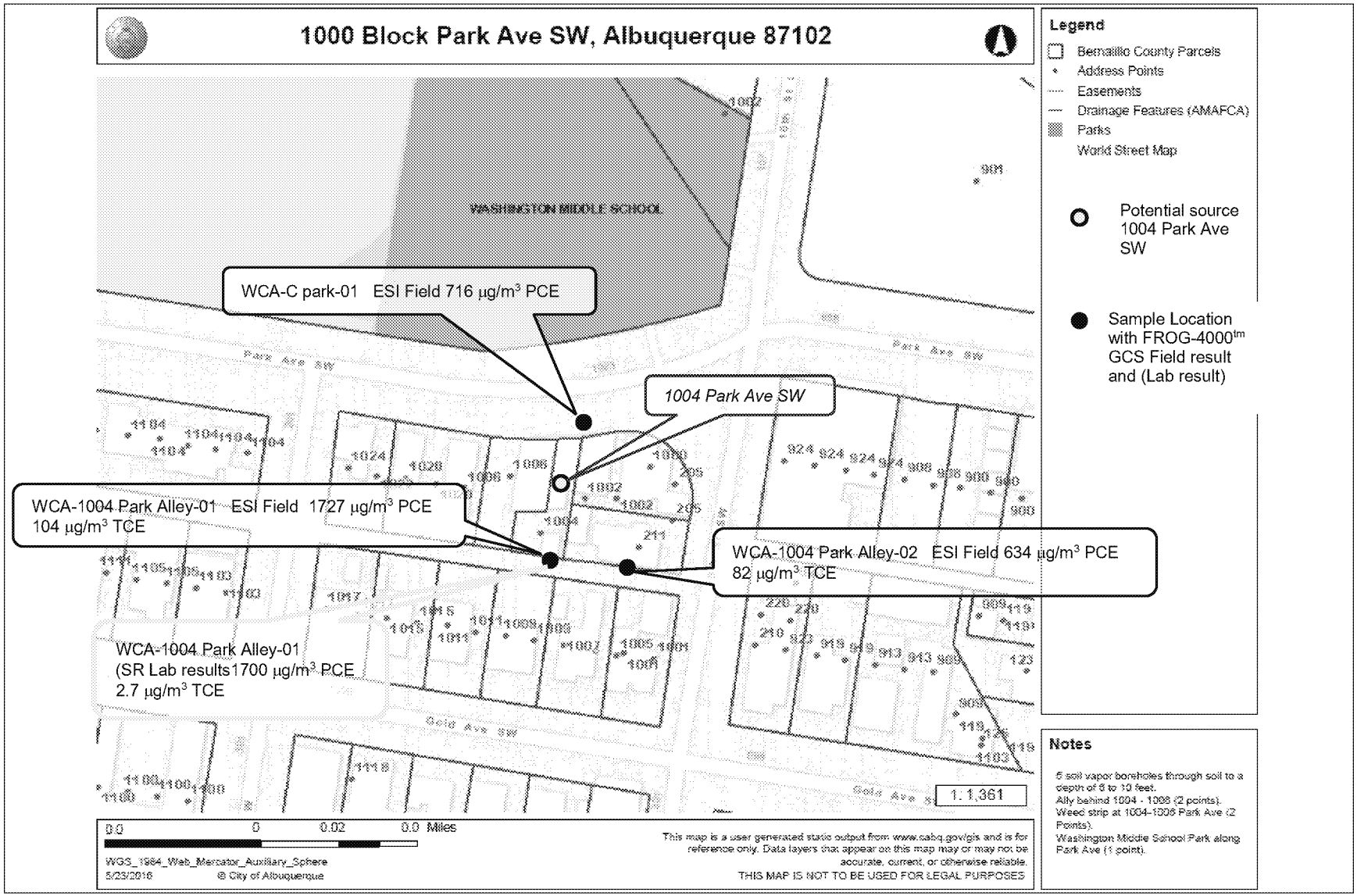

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Figure 16 ESI TCE Field Screen FROG 4000[tm] & Summa Data Comparison

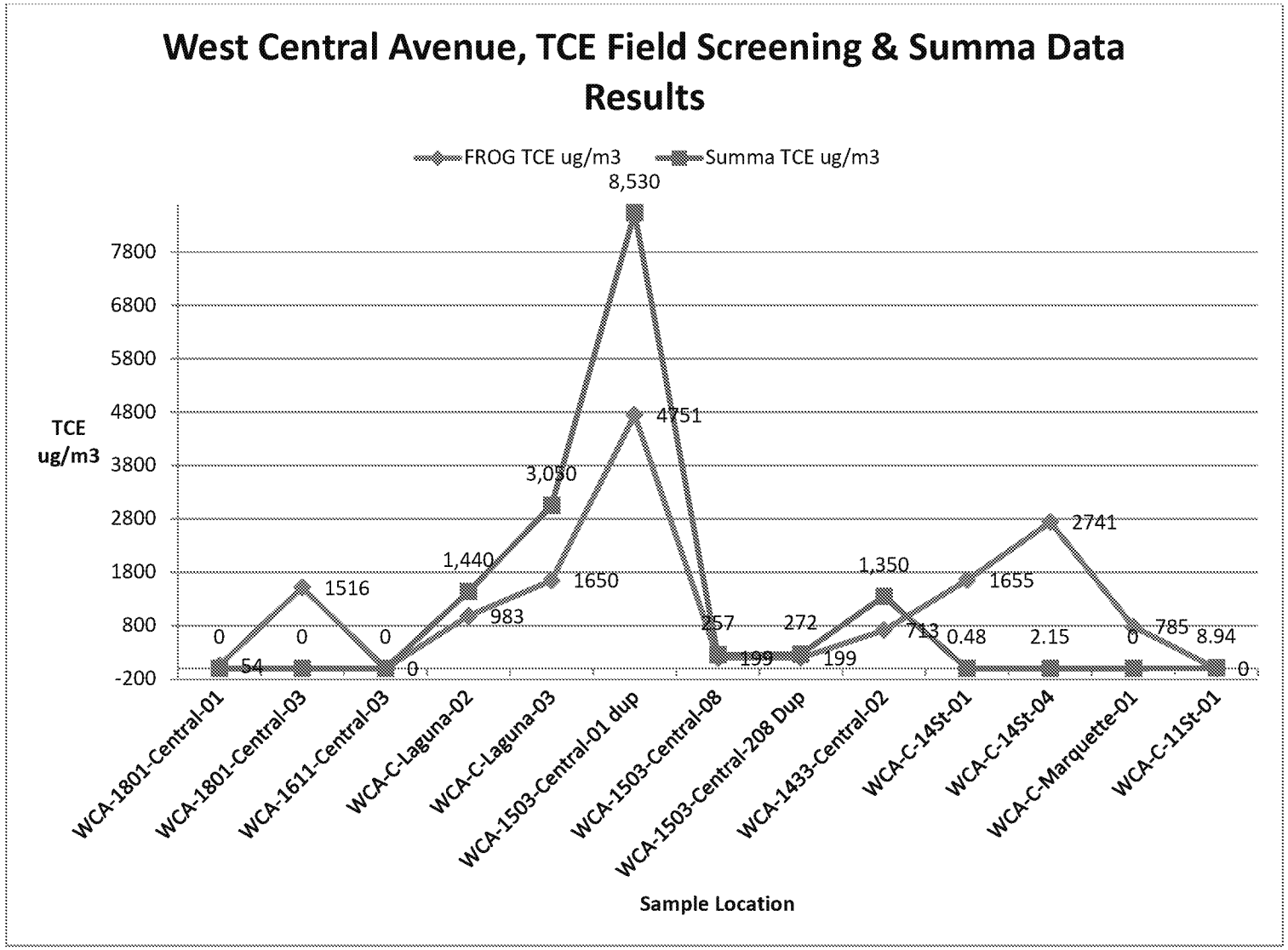

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Figure 17 ESI PCE Field Screen FROG 4000[tm] & Summa Data Comparison

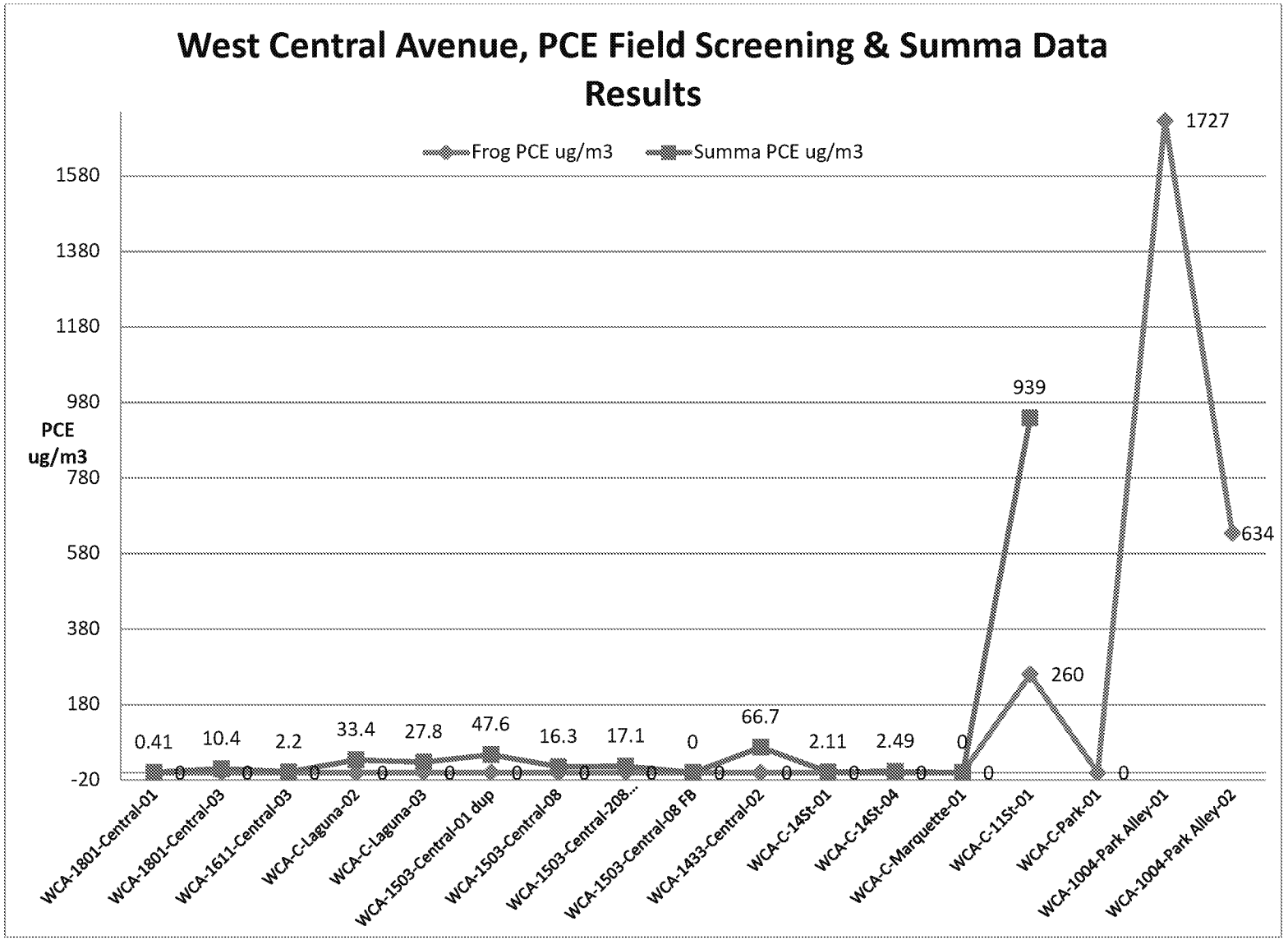

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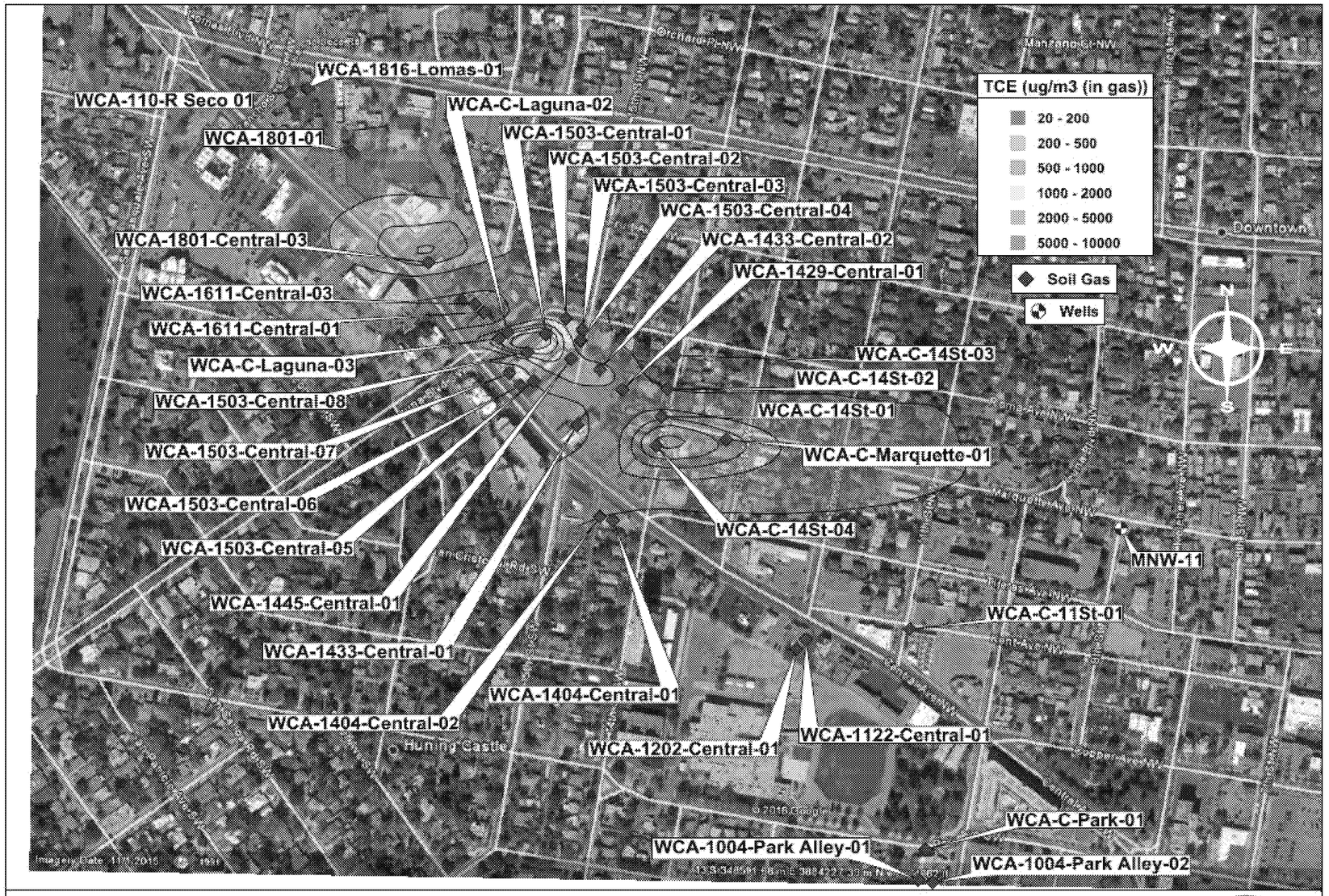
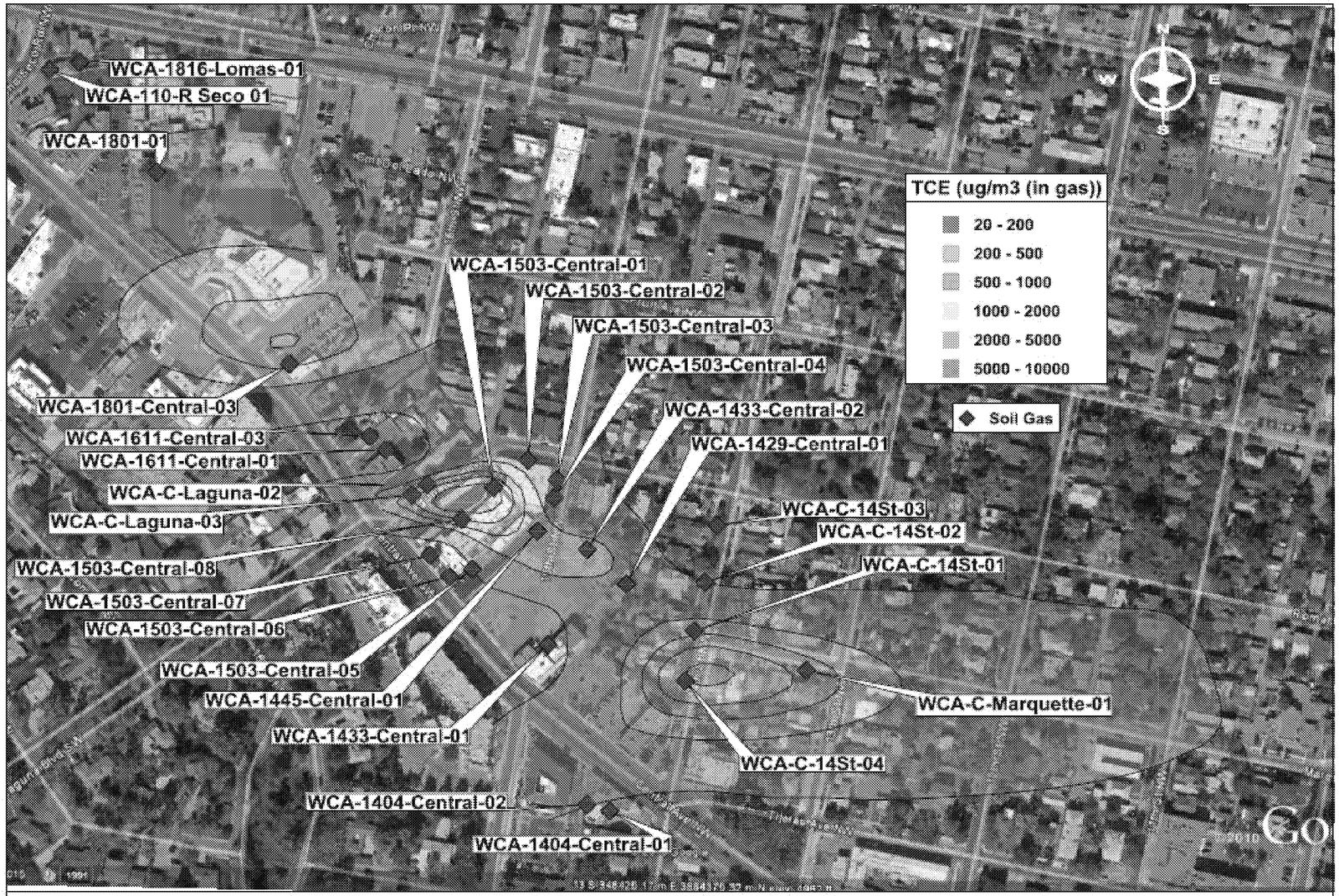
Figure 18 ESI TCE Soil Gas Plume Field Results - West Central Ave



Note: ESI 2016 - TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

Figure 19 ESI TCE Soil Gas Plume Field Results - Central & 1300-1800 Block



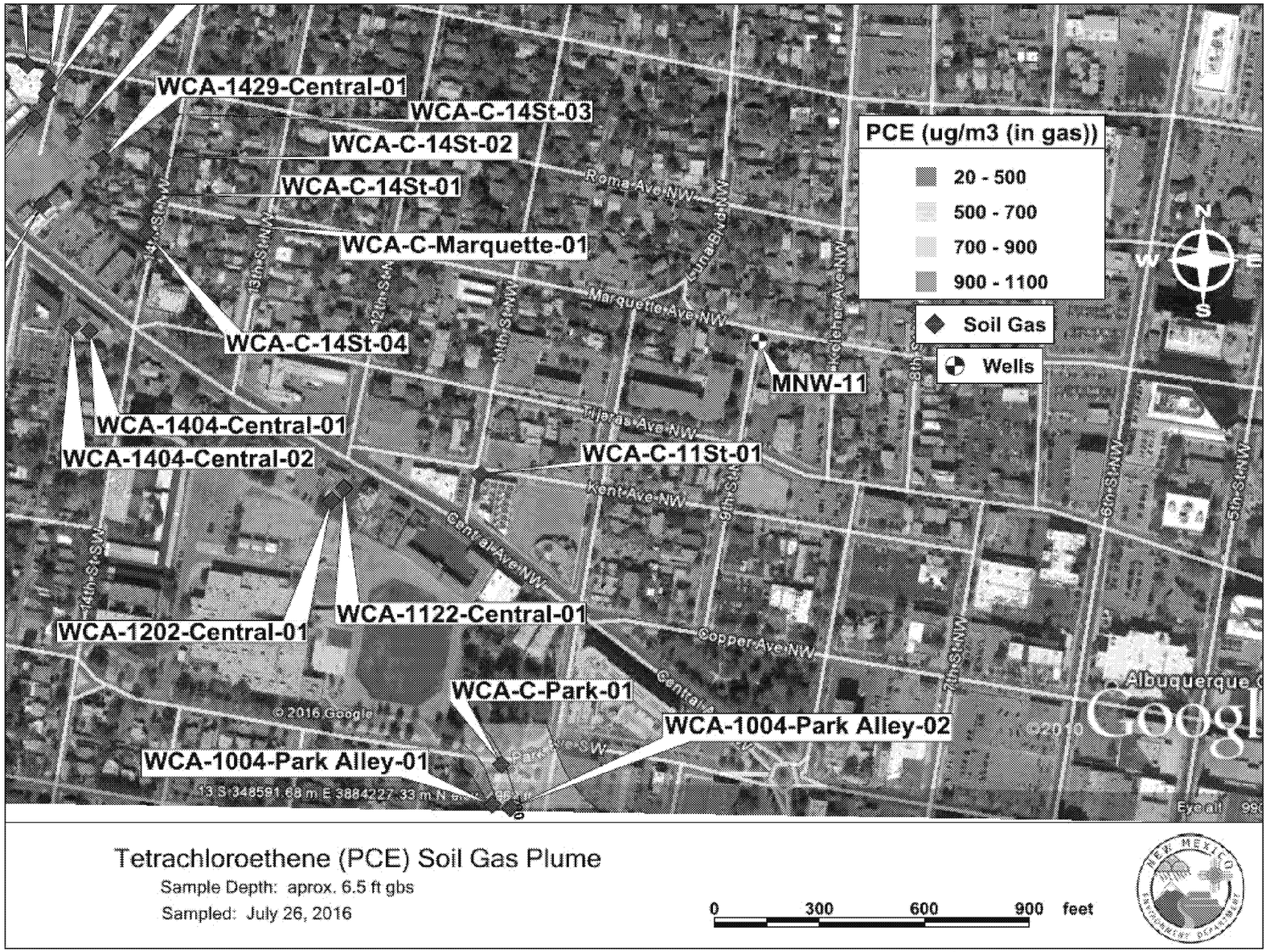
Trichloroethylene Soil Gas Plume

Sample Depth - aprox. 6.5 ft bgs.
Sampled - July 17 - July 21, 2016

0 200 400 600 feet

Note: ESI 2016 - TCE Soil Gas Plume – FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

Figure 20 ESI PCE Soil Gas Plume Field Results – 1004 Park Ave



Note: ESI 2016 - PCE Soil Gas Plume –-FROG-4000^{tm} Analysis in ppbv converted to mq/m^3 (in gas)

TABLES

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Table 1 Aquifer Zones at Fruit Avenue Plume Superfund Site.

Zone	Approximate Depth (ft bgs)	Elevation (ft amsl)
Shallow	0 to 60	≥ 4,894
Intermediate 1 (I1)	61 to 85	4,893 to 4,868
Intermediate 2 (I2)	86 to 120	4,867 to 4,834
Deep 1 (D1)	121 to 150	4,833 to 4,804
Deep 2 (D2)	151 to 250	4,803 to 4,704
Deep 3 (D3)	251 to 350	4,703 to 4,604
Deep 4 (D4)	>350	<4,604

bgs - below ground surface

amsl - above mean sea level

(Ref.12, p. 10).

Table 2 Trichloroethene Results in Fruit Avenue Plume Monitor Wells

FAP Well ID	Intermediate wells I1/I2	TCE µg/L	
	61-120 ft bgs	August 2012	February 2015
WB-01(I1/I2)		0.9	2.6
WB-02(I1/I2)		0.77	0.1
	Intermediate wells I-2	TCE µg/L	
	86-120 ft bgs	August 2012	February 2015
MNW-1(I2)		17	19.8
SFMW-13(I2)		1	0.9
	Deep Wells D-1	TCE µg/L	
	121-150 ft bgs	August 2012	February 2015
MNW-11(D1)		46	22
SFMW-14(D1)		17	14.9
MNW-9(D1)		4.6	1.9

FAP Data (Ref. 6, pp. 59, 60, 62, 63, 64, 65, 68 and 69,)
Note: EPA MCL for TCE is 5 µg/L (Ref. 7)

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Table 3 Properties & Sample points WCA

Properties of Concern & Sample Locations West Central Avenue, ESI July 2016 and SR May 2017 (Ref. 13 and 14)			
Address Central Ave West	**Business Type**	**Years In Business.** **Directory dates reviewed 1947, 52, 62, 65, 67, 70, 75, 80, 85 and 90**	**Sample Points near location**
1105	Speed Queen Laundry & Dry Cleaning 70- Extra Quality Coin Laundry 75,80 - X-Tra Quality Coin Laundry Inc. 85-, Washtub Laundromat currently	1970 - 1975- 1980- 1985- /90	**1**
1202	Master Dry Cleaners	1952- 1962- 1965- 1967- 1970- /75	**2**
1401	AAA Ace Auto Supply 62-65- - Ace Auto Supply 67-80 . Neighbors remember that there were auto repair bays at this location.	1962- 1965- 1967- 1980- /85	1
1404	Esco Bio-chemicals Co.	1952- /62	2
1406	Esco Bio-chemicals Co. vitamin production - Esco Bio-chemicals Co. Pharmaceuticals 67- Electronics' TV Laboratory 75 -	1962 - 1965- 1967- 1970- 1975- /80	
1408	Duke's Enterprises Ltd Indian Jewelry Manufacture	1975- 1980- /85	
1433 or 1431	Neighbors Laundromat, The (at 1431 in 65, 67). Property owner interviews has not confirmed this to be accurate.	1962- 1965- 1967- 1970- 1975- /80	6
1503	Bell Indian Trading Post 47 - Bell Indian Trading Post Lmtd Jewelry manufacturers 62, 65 - SunBell Corp. Jewelry Manufactures 70, 75- Albuquerque Photo Laboratory Inc. 80- Michelson Metals 85	1947- 1962- 1965- 1967- 1970- 1975- 1980- 1985- 1990-	**8 +5 along 14th and 1 on Marquette**
1503	Chief Weavers Ltd. - Chief Weavers The Jewelers -	1947- 1952- /	**0**
1701 most likely 1601	Indian Silver Craft	1965- 1967- 1970- 1975- 1980- 1985- /90	**6**
1816	Aamco Transmission, Kellys Transmission Co.	1975-1980, 1985-1990 ROS investigation in 2007	**0**
1911 or 1837	Unique Cleaners - Unique Cleaners (1837 address change 1980) currently Marina Unique Cleaners in operation at this location.	1947- 1952- 1962- 1965- 1967- 1970- 1975- 1980-	**2 + 3 at 1801**
Lomas Ave West	**Business Type**	**Years in business**	**Number of sample points**
1420	Moore Radio Service repair	1947- 1962- 1965- 1967- /70	0
Park Ave West	**Business Type**	**Years in business**	**Number of samples points**
1004	Park Ave Cleaners	1957 – 1993 VRP at 1006 Park Ave in 2000	3

Note: Red Type - Jewelry manufacture
Blue Type - Dry Cleaners
Black Type - Other business types
Pink Highlight - Area with known TCE in subsurface soil, soil gas and groundwater.
Green Highlight – Area with known PCE in subsurface soil gas and groundwater.

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Table 4 VOC Groundwater Sample Analysis for SR May 2017

Sample Type	Analysis	Analytical Method	Number of Samples	Duplicates	MS/ MSD	Field Blank	Trip Blank	Equip Blank
2 monitor wells	Trace VOCs	SOM02.4 Trace, 8260B	4	1	1	1	2	0
1 monitor well	Trace SVOCs	SOM02.4 Trace 8270D	1		1			
1 monitor well	Trace 1,4-dioxane	SOM02.4 Trace 1,4-dioxane	1	1	1			
1 monitor well	Trace pesticides	SOM02.4 Trace Pesticides	1		1			
1 monitor well	Trace Aroclor	SOM02.4 Trace Aroclor	1		1			
1 monitor well	total metals	ISOM2.4 total metals 6010C and 200.7	1	1	1			
1 monitor well	dissolved metals	ISOM2.4 dis metals 6010C and 200.7	1	1	1			

Table 5 Soil Gas Samples collected for SR May 2017

Sampling method	Analysis	Sample Container	Number of Sample locations
Active Soil Gas sampling 6 – 7 feet bgs.	Gas Chromatography FROG 4000[tm] for chlorinated alkenes	None - direct readings	11
Active Soil Gas Sampling 4 min grab 6 – 7 feet bgs.	TO-15 Trace	1 L Summa	9

Table 6 Vapor Intrusion Samples for SR May 2017

Sampling method	Analysis	Sample Container	Number of Sample locations	Total samples collected
VI 24 hour grab	TO-15	6 L Summa	4	16

Note – Sample types (indoor air, sub-slab soil gas, basement air, & ambient air)

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Table 7 Vapor Intrusion Sample Data Summary May 17, 2017

Vapor Intrusion Sample Data Summary – May 17, 2017 - West Central Avenue, Albuquerque								
Location ID		**TO-15 Data(Ref. 37, 41,42, and 46)**						
Spot ID	**sample number**	**Date**	**Time Start**	**Time Stop**	**Canister Serial Number**	**Barometric Pressure "Hg**	**TCE ug/m3**	**PCE ug/m3**
Resident A						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	A-I-1	5/17/2017	10:51	9:27	16849	29.75-29.50	*	0.92 J
Indoor	A-I-2	5/17/2017	10:51	9:30	10167		*	0.81 J
basement	A-B-1	5/17/2017	10:49	9:19	10015		*	*
basement	A-B-2	5/17/2017	10:49	9:20	11063		*	*
sub-slab	A-SS-1	5/17/2017	10:47	9:23	9991		*	*
sub-slab	A-SS-2	5/17/2017	10:47	9:23	9936		*	*
ambient outdoor	AA	5/17/2017	11:05	9:37	10040		*	*
Resident B						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	B-I	5/17/2017	9:40	9:11	11211	29.75-29.50	6.2	*
basement	B-B	5/17/2017	9:39	9:03	11149		*	*
sub-slab	B-SS	5/17/2017	9:39	9:06	9824		*	0.70 J
Resident C						6-23 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	C-I	5/17/2017	16:30	15:42	10413	29.57-29.70	*	*
basement	C-B	5/17/2017	16:27	14:40	10120		*	*
sub-slab	C-SS	5/17/2017	16:26	15:40	11143		0.71 J	1.7
Multi Unit D						6-24 mph	**TCE ug/m3**	**PCE ug/m3**
Indoor	D-I	5/17/2017	11:57	11:12	9729	29.72-29.50	9.2	*
sub-slab	D-SS	5/17/2017	11:46	11:13	10712		5300	24 J
ambient outdoor	D-A	5/17/2017	12:06	11:09	11173		*	*
							TCE ug/m3	**PCE ug/m3**
						Target Indoor Air Residential	0.48	11
						Target Indoor Air commercial	3	47
						Target Sub Slab Residential	16	360
						Target Sub Slab Commercial	100	1,600

Note: * Non-Detect at reporting limit
J Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

Federal EPA OLEM Vapor Intrusion Assessment VISL Calculator Version 3.5.1 (May 2016 RSLs) for Target Sub Slab and Exterior Soil Gas Concentrations -Target Risk for Carcinogens (TCR) @1E-06 or Target Hazard Quotient for non-carcinogens (THQ)=1 (Ref. 46)

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Table 8 Property Type within 200 feet of ESI Sample Location

Table 8 Property Type within 200 feet of ESI Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,- dioxane ug/m3			
Figure 8	WCA-110-R Seco 01						3	6	0
	WCA-1816-Lomas-01						3	6	1
Figure 9	WCA-1801-Central-01	0177	U	0.41	U	U	0	2	1
	WCA-1801-Central-03	283	U	10.4	U	U	6	4	1
Figure 10	WCA-1611-Central-01						-	-	-
	WCA-1611-Central-03	H3440	U	2.2	U	U	-	-	-
	WCA-C-Laguna-02	0190	**1,440**	33.4	U	2.17	27	3	0
	WCA-C-Laguna-03	H3428	**3,050**	27.8	U	U	25	3	0
	WCA-C-Laguna-03 Dup						-	-	-
Figure 10	WCA-1503-Central-01						28	1	0
	WCA-1503-Central-01 dup	0188	**8,530**	47.6	U	U	-	-	-
	WCA-1503-Central-02						28	0	0
	WCA-1503-Central-03						27	1	0
	WCA-1503-Central-04						23	1	0
	WCA-1503-Central-05						20	1	0
	WCA-1503-Central-06								
	WCA-1503-Central-07								
	WCA-1503-Central-08	H3423	**257**	16.3	U	U	21	2	0
	WCA-1503-Central-208 Dup	0281	**272**	17.1	U	U	-	-	-
	WCA-1503-Central-08 FB	H3434	U	U	U	U	-	-	-
Figure 11	WCA-1445-Central-01						18	1	0
	WCA-1433-Central-01								
	WCA-1433-Central-02	0175	**1,350**	66.7	5.03	U	17	2	0
	WCA-1429-Central-01						12	2	0
	WCA-1429-Central-01 Dup						-	-	-

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Table 8 Property Type within 200 feet of ESI Sample Location (Ref. 37)									
Figure Number	Location ID	Canister Serial Number	Summa TO-15				Estimated Number of Residences within 200 feet of sample location	Estimated Number of Commercial Properties within 200 feet of sample location	Number of schools within 200 feet of sample location
			TCE ug/m3	PCE ug/m3	1,1,1-TCA ug/m3	1, 4,- dioxane ug/m3			
Figure 12	WCA-C-Marquette-01	H3424	U	U	U	U	20	0	0
	WCA-C-14St-01	0182	0.48 B	2.11	U	U	14	3	0
	WCA-C-14St-01 DUP						-	-	-
	WCA-C-14St-02								
	WCA-C-14St-02 DUP								
	WCA-C-14St-03								
	WCA-C-14St-04	3439	2.15 B	2.49 B	U	U	10	2	0
Figure 13	WCA-1404-Central-01								
	WCA-1404-Central-02						4	3	0
Figure 14	WCA-1202-Central-01								
	WCA-1122-Central-01								
Figure 14	WCA-C-11St-01	H3445	8.94	**939**	U	U	24	3	0
	WCA-C-11St-01 Dup								
Figure 15	WCA-C-Park-01						12	7	1
	WCA-1004-Park Alley-01						16	8	1
	WCA-1004-Park Alley-02						14	8	1

Ref. 37
U Undetected in Air TO-15 analysis
B "B" flagged because the reported values were less than ten times of the amount found in the blank.
Bold Face Exceeds Residential VISL for TCE and/or PCE

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Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
Figure 8	WCA-110-R Seco 01	N 35.09297 W106.66743	5.6	7/17/2016	4.5-0.0	7/18/2016	8:14	1531_LOG_201.xml	TAL-ND	ND	ND	29.88						
	WCA-1816-Lomas-01	N 35.09301 W106.66721	6.8	7/20/2016	0.9-0.0	7/20/2016	17:10	0938_LOG_264.xml	TAL-ND	ND	ND	29.93						
Figure 9	WCA-1801-Central-01	N 35.0924 W106.66662	6.4	7/19/2016	0.0-0.0	7/19/2016	14:25	1724_LOG_236.xml	TCE 10.1	**54**	ND	29.96	7/20/2016	14:10	29.98	ND	0.41	SN# 0177
	WCA-1801-Central-02	N 35.09159 W 106.66510	6.3	5/15/2017	-	5/22/2017	13:22	1322-LOG-707.xml	**TCE 114 PCE 1.819**	**614**	12	29.86						
	WCA-1801-Central-03	N 35.09123 W106.66565	7.3	7/20/2016	12.4-0.2	7/20/2016	16:10	0839_LOG_260.xml	**TCE 282**	**1516**	ND	29.94	7/21/2016	14:50	29.95	ND	10.4	SN# 283
	WCA-1801-Central-03	N 35.09123 W106.66565	7.3	7/20/2016	-	5/23/2017	11:31	1322-LOG-719.xml	TAL-ND	ND	ND	29.94	5/17/2017	10:39	29.75	ND	4.6	10961
Figure 10	WCA-1611-Central-01	N 35.09069 W106.66493	6.7	7/17/2016	0.3	7/17/2016	10:55	1513_LOG_187.xml	t-DCE 296	ND	ND	29.88						
	WCA-1611-Central-01	N 35.09069 W106.66493	6.7	7/17/2016		5/22/2017	15:05	1505-LOG-713.xml	TCE 20.11	**108**	ND	29.84						
	WCA-1611-Central-02	-	6.5	5/14/2017	-	5/22/2017	14:36	1436-LOG-711.xml	**TCE 626**	**3364**	ND	29.84						
	WCA-1611-Central-03	N 35.09023 W106.66383	6.5	7/20/2016	0.4-0.1	7/20/2016	8:35	1138_LOG_244.xml	t-DCE 195	ND	ND	30.07	7/21/2016	15:36	29.91	ND	2.2	SN# H3440
	WCA-1611-Central-04	-	6.0	5/14/2017	-	5/22/2017	14:09	1409-LOG-709.xml	**TCE 142**	**763**	ND	29.86						
	WCA-C-Laguna-02	N 35.09052 W106.66463	7.3	7/19/2016	0.2-0.1	7/19/2016	11:35	1415_LOG_226.xml	**TCE 183**	**983**	ND	30.03	7/20/2016	14:22	29.98	**1,440**	33.4	SN# 0190
	WCA-C-Laguna-03	N 35.09049 W106.66479	7.0	7/19/2016	0.5-0.4	7/19/2016	10:55	1348_LOG_224.xml	**TCE 307**	**1650**	ND	30.04	7/20/2016	14:33	29.95	**3,050**	27.8	SN# H3428
	WCA-C-Laguna-03 Dup			7/19/2016	0.5-0.4	7/19/2016	15:33	1533-LOG-232.xml	**TCE 313**	**1682**	ND	30.04						

Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
Figure 10	WCA-1503-Central-01	N 35.09049 W106.66414	7.1	7/19/2016	14.9-1.3	7/19/2016	17:10	1037_LOG_240.xml	**TCE 1428.75**	**7678**	ND	29.9						
	WCA-1503-Central-01 dup				4.9-1.2	7/21/2016	13:08	1632_LOG_273.xml	**TCE 884**	**4751**	ND	30.01	7/21/2016	13:08	30.01	**8,530**	47.6	SN# 0188
	WCA-1503-Central-02	N 35.09082 W106.66386	8.0	7/19/2016	3.9-0.1	7/19/2016	15:35		TCE 28.6	**154**	ND	29.91						
	WCA-1503-Central-03	N 35.09058 W106.66373	7.2	7/18/2016	0.2-0.1	7/19/2016	8:55	1440_LOG_228.xml	TCE 5.9	**32**	ND	30.08						
	WCA-1503-Central-04	N 35.09047 W106.66373	7.3	7/18/2016	0.1-0.0	7/19/2016	8:30	1505_LOG_230.xml	TCE 16.8	**90**	ND	30.06						
	WCA-1503-Central-05	N 35.09002 W106.66431	6.9	7/18/2016	0.1	7/18/2016	16:10	1032_LOG_216.xml	TCE 15.4	**83**	ND	29.88						
	WCA-1503-Central-06	35.09000 W106.66449	7.0	7/18/2016	4.8-0.1	7/18/2016	15:45	1056_LOG_218.xml	TAL-ND	ND	ND	29.88						
	WCA-1503-Central-07	N 35.09002 W106.66460	7.8	7/18/2016	0.1-0.0	7/18/2016	15:25	1121_LOG_220.xml	TAL-ND	ND	ND	29.88						
	WCA-1503-Central-08	N 35.09033 W106.66439	6.6	7/19/2016	6.2-0.1	7/18/2016	17:40	1111_LOG_242.xml	**TCE 630, c-DCE > 34,587**	**1935**	ND	29.85	7/21/2016	13:26	29.98	**257**	16.3	SN# H3423
	WCA-1503-Central-208 Dup					7/21/2016	13:26	1245_LOG_278.xml	TCE 37.1	**199**	ND	29.98	7/21/2016	14:36	29.98	**272**	17.1	SN# 0281
	WCA-1503-Central-08 FB											29.98	7/21/2016	13:41	29.98	ND	ND	SN# H3434
Figure 11	WCA-1445-Central-01	N 35.09025 W106.66383	7.1	7/19/2016	5.2-0.0	7/20/2016	10??	0911_LOG_262.xml	TCE 36.4	**196**	ND	30.07						
	WCA-1433-Central-01	N 35.08958 W106.66374	6.5	7/17/2016	1.6	7/17/2016	9:01	1440_LOG_185.xml	TAL-ND	ND	ND	29.88						
	WCA-1433-Central-01	N 35.08958 W106.66374	6.5	7/17/2016	-	5/15/2017	15:51	1551_LOG_681.xml	TAL-ND	ND	ND	29.6						
	WCA-1433-Central-02	N 35.09019 W106.66346	7.2	7/19/2016	1.0-0.2	7/20/2016	9:48	1530_LOG_246.xml	**TCE 132.6**	**713**	ND	30.07	7/21/2016	16:50	29.9	**1,350**	66.7	SN# 0175

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Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-1433-Central-02	N 35.09019 W106.66346	7.2	7/19/2016	-	5/18/2017	13:21	1321_LOG_703.xml	**TCE 84**	**451**	ND	29.71	5/17/2017	16:35	29.73	**340**	14.0	10839
	WCA-1433-Central-03	N 35.08987 W106.66343	6.2	5/16/2017	-	5/18/2017	12:45	1245_LOG_700.xml	**TCE 1145**	**6153**	ND	29.71	5/17/2017	16:18	29.73	**35**	ND	10334
	WCA-1433-Central-04		6.3	5/15/2017	-	5/16/2017	15:03	1503_LOG_679.xml	**TCE 907**	**4874**	ND	29.62	5/17/2017	15:20	29.61	13	ND	11285
	WCA-1433-Central-04 - D												5/17/2017	15:20	29.81	13	ND	10957
	WCA-1433-Central-05	N 35.09029 W 106.66380	6.5	5/16/2017	-	5/17/2017	16:45	1645_LOG_696.xml	**TCE 790 / PCE 28.4**	**4246**	191	29.55						
	WCA-1429-Central-01	N 35.08995 W106.66317	6.5	7/18/2016	1.3	7/18/2016	8:38	1554_LOG_203.xml	TCE 19.3	**104**	ND	30.03						
	WCA-1429-Central-01 Dup					7/18/2016	8:38	1637_LOG_206.xml	TCE 20.5	**110**	ND	30.03						
Figure 12	WCA-C-Marquette-01	N 35.08904 W106.66206	7.0	7/21/2016	1.8	7/21/2016	15:00	1603_LOG_270.xml	**TCE 146**	**785**	ND	29.95	7/21/2016	15:00	29.95	ND	ND	SN# H3424
	WCA-C-14St-01	N 35.08965 W106.66270	7.0	7/20/2016	0.0-0.0	7/20/2016	13:10	1631_LOG_250.xml	**TCE 308**	**1655**	ND	30.02	7/21/2016	16:15	29.91	0.48 B	2.11	SN# 0182
	WCA-C-14St-01 DUP			7/20/2016		7/20/2016	13:10	1727_LOG_254.xml	**TCE 289**	**1553**	ND	30.02						
	WCA-C-14St-01	N 35.08965 W106.66270	7.0	7/20/2016	-	5/17/2017	15:06	1506-LOG-690.xml	**TCE 136 / PCE 2.59**	**730**	17	29.61	5/17/2017	11:58	29.72	ND	ND	11744
	WCA-C-14St-02	N 35.08994 W106.66257	7.0	7/20/2016	0.0-0.0	7/20/2016	12:40	1602_LOG_248.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-02 DUP			7/20/2016		7/20/2016	12:40	1658_LOG_252.xml	TAL-ND	ND	ND	30.02						
	WCA-C-14St-02	N 35.08994 W106.66257	7.0	7/20/2016	-	5/23/2017	14:29	_LOG_726.xml	**325**	**1746**	ND	29.85						
	WCA-C-14St-03	N 35.09029 W106.66257	7.2	7/20/2016	0.7-0.1	7/20/2016	14:25	1812_LOG_256.xml	TAL-ND	ND	ND	29.95						

Table 9 ESI & SR Field & Laboratory Data Summary Sheet (Ref. 37, 38, 39, 40, 41, 42, 43, 47, and 45)

	FIELD SCREEN DATA COLLECTION (Bold Face Type: Exceeds Residential VISL for TCE and/or PCE)											TO-15 DATA					
MAP	Location ID	UTM	Sample collection depth	Vapor point Drilled and Set	PID Mini Ray ppm	Collection for FROG 4000 GC analysis		Time stamp Frog 4000 GS	FROG 4000 GC Results ppbv	Calculated TCE	Calculated PCE	Barometric Pressure "Hg	Collection of Summa for TO-15 analysis					
Location	Vapor Point	UTM coordinates Garmin	feet bgs	Date	Initial - final readings	Date	Time	time stamp	Target Analite List = PCE, TCE, 1,2-trans-DCE, 1,2-trans-DCE, VC	ug/m3	ug/m3	Albuquerque SunPort to the nearest hour	Date	Time	Barometric Pressure "Hg	TCE ug/m3	PCE ug/m3	Canister Serial Number
	WCA-C-14St-03	N 35.09029 W106.66257	7.2	7/20/2016	-	5/23/2017	13:46	_LOG_722.xml	**201**	**1080**	ND	29.89						
	WCA-C-14St-04	N 35.08937 W106.66266	7.2	7/21/2016	20.6-0.0	7/21/2016	14:39	1530_LOG_268.xml	**TCE 510**	**2741**	ND	29.95	7/21/2016	14:39	29.95	2.15 B	2.49 B	SN# 3439
	WCA-C-14St-05	N 35.0 W106.66	6.5	5/14/2017	-	5/17/2017	13:56	1356_LOG_688.xml	**TCE 1460.14**	**7846**	ND	29.65	5/17/2017	12:18	29.72	ND	ND	O9957
Figure 13	WCA-1404-Central-01	N 35.08859 W106.66331	6.3	7/18/2016	0	7/18/2016	10:20	0943_LOG_212.xml	TAL-ND	ND	ND	30.01						
	WCA-1404-Central-02	N 35.08864 W106.66348	6.0	7/18/2016	8.5-0.2	7/18/2016	13:47	1006_LOG_214.xml	TCE 23.3	**125**	ND	29.92						
	WCA-1404-Central-02	N 35.08864 W106.66348	6.0	7/18/2016	-	5/17/2017	10:08	1008_LOG_686.xml	TAL-ND	ND	ND	29.76	5/17/2017	9:21	29.8	ND	ND	11546
Figure 14	WCA-1202-Central-01	N 35.08730 W106.66102	5.8	7/17/2016	0	7/17/2016		1537_LOG_189.xml	TAL-ND	ND	ND							
	WCA-1122-Central-01	N 35.08744 W106.66085	6.8	7/17/2016	not recorded	7/17/2016	14:07	1600_LOG_191.xml	TAL-ND	ND	ND	29.8						
Figure 14	WCA-C-11St-01	N 35.08752 W106.65951	6.2	7/17/2016	0.8	7/17/2016	16:26	1710_LOG_195.xml	PCE 38.4	ND	260	29.82	7/21/2016	14:15	29.98	8.94	939	SN# H3445
	WCA-C-11St-01 Dup					7/17/2016	16:26	1146_LOG_222.xml	TAL-ND	ND	ND	29.82						
Figure 15	WCA-C-Park-01	N 35.08526 W106.65927	6.5	7/21/2016	0	7/26/2016	12:15	1706_LOG_283.xml	**PCE 105.5**	ND	**715**	29.96						
	WCA-1004-Park Alley-01	N 35.08495 W106.65937	6.8	7/21/2016	5.3-1.0	7/26/2016	11:28	1735_LOG_285.xml	**PCE 254.6 / TCE 19.4,**	**104**	**1727**	29.96						
	WCA-1004-Park Alley-01	N 35.08495 W106.65937	6.8	7/21/2016	-			-					5/17/2017	14:25	29.65	2.7	1700	9739
	WCA-1004-Park Alley-02	N 35.08488 W106.65919	7.1	7/21/2016	0.9-0.2	7/26/2016	11:39	1802_LOG_287.xml	**PCE 93.5, TCE 15.2, t-DCE 273.2**	**82**	**634**	29.96						

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15 Duke Engineering & Services. Phase II Site Characterization Report Former Bell Trading Post Property Albuquerque, New Mexico. November 2001 (53 pages)

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Message

From: Turner, LaDonna [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A7655C153A6248F9AF1C62CDAC717175-TURNER, LADONNA]
Sent: 4/9/2020 1:59:18 PM
To: Kieling, Martyne, NMENV [Martyne.Kieling@state.nm.us]
Subject: FW: Updated West Central Avenue Proposed Sample Location Maps
Attachments: Figure Soil Gas Sample Location Map_1.pdf; Figure Soil Gas Sample Location Map_4.pdf; Figure Soil Gas Sample Location Map_3.pdf; Figure Soil Gas Sample Location Map_2.pdf; Figure Soil Gas Sample Location Overview Map.pdf; Figure Soil Gas TCE Sample Location Map_2.pdf

Good Morning Martyne.

Hope you and your guys are doing well. Thought I would forward you the sample maps for West Central that Weston has been working on with the OSC. Over the past couple of weeks we have been shaving off some sample locations as the number of locations was high. Now that they are getting closer to a workable number I thought I would forward the maps to you and see what you think. Please let me know if you have comments/suggestions, if there are areas that need more focus, etc. Let me know if you have any questions.

Thanks.

LaDonna Turner
US EPA Region 6
Superfund & Emergency Management Division
Risk and Site Assessment Section (SEDAS)
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From: Cobb, Derrick <Derrick.Cobb@WestonSolutions.com>
Sent: Wednesday, April 08, 2020 3:43 PM
To: Moore, Gary <Moore.Gary@epa.gov>; Turner, LaDonna <turner.ladonna@epa.gov>; Delgado-Brown, Michelle <DelgadoBrown.Michelle@epa.gov>
Cc: Criner, Jeffrey J. <Jeff.Criner@WestonSolutions.com>; Steven Cowan <SCowan@css-inc.com>; DeGuenther, Michael <Michael.DeGuenther@WestonSolutions.com>
Subject: Updated West Central Avenue Proposed Sample Location Maps

Gary/LaDonna/Michelle,
Attached are updated proposed sample location maps to include proposed locations on privately properties located northwest and east of the site. Please let me know if you have any questions or concerns. If we are in agreement with the proposed locations we will move forward with wrapping up the QASP for submittal to TeamLink and finish the cost estimate. Please let me know if you have any questions or concerns. Thanks

Derrick Cobb
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