Lockheed Martin
2890 Woodbridge Ave, Building 209
Edison, NJ 00837
Attn: Mr. Jonathan McBurney

Passive Soil Gas Survey – Analytical Report
Date: September 28, 2016

Beacon Project No. 3476

Project Reference:	Wilcox Oil Company Superfund Site, Bristow, OK
Samplers Installed:	August 8 through 11, 2016
Samplers Retrieved:	August 24 and 25, 2016
Samples Received:	August 30, 2016
Analyses Completed:	September 13, 2016
Laboratory Data Issued:	September 14, 2016

EPA Method 8260C
All samples were successfully analyzed using thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) instrumentation to target a custom compound list following EPA Method 8260C. Laboratory results are reported in nanograms (ng) of specific compound per sample.

Laboratory QA/QC procedures included internal standards, surrogates, and blanks based on EPA Method 8260C. Analyses and reporting were in accordance with BEACON's Quality Assurance Project Plan.

Reporting limits
The reporting limit (RL) is 25 nanograms (ng) for each compound. **Table 1** provides survey results in nanograms per sampler by sample-point number and compound name. The RLs represent a baseline above which results exceed laboratory-determined limits of precision and accuracy. Any field sample measurements above the upper calibration standard are estimated; however, these values are reported without qualifiers because all reported measurements are relative to each other and are appropriate to meet the survey objectives of locating source areas and vapor intrusion pathways and defining the lateral extent of contamination.

Calibration Verification
The continuing calibration verification (CCV) values for the calibration check compounds were all within ±20% of the true values as defined by the initial five-point calibration and met the requirements specified in Beacon Environmental's Quality Assurance Project Plan.

Method Blanks/Trip Blanks
Laboratory method blanks are run with each sample batch to identify contamination present in the laboratory. If contamination is detected on a method blank, measurements of identical compounds in that sample batch are flagged in the laboratory report. The laboratory method blanks analyzed in connection with the present samples revealed no contamination.

The trip blank is a sampler prepared, transported, and analyzed with other samples but intentionally not exposed. Any target compounds identified on the trip blanks are reported in the laboratory data. The analyses of the trip blanks (labeled Trip-2 and Trip-3 in **Table 1**) reported none of the targeted compounds.

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Passive Soil-Gas Survey Notes

When sample locations are covered with or near the edge of an artificial surface (*e.g.*, asphalt or concrete), the concentrations of compounds in soil gas are often significantly higher than the concentrations would be if the surfacing were not present. Thus, a reading taken below or near an impermeable surface is much higher than it would be in the absence of such a cap. Therefore, the sample location conditions should be evaluated when comparing results between locations.

Survey findings are exclusive to this project and when the spatial relationships are compared with results of other BEACON Surveys it is necessary to incorporate survey and site information from both investigations (*e.g.*, depth to sources, soil types, porosity, soil moisture, presence of impervious surfacing, sample collection times). BEACON recommends the guidelines stated in **Attachment 1** to establish a relationship between reported soil-gas measurements and actual subsurface contaminant concentrations, which will indicate those measurements representing significant subsurface contamination.

BEACON's passive soil-gas samplers are prepared with two sets of adsorbent cartridges for subsequent duplicate or confirmatory sample analysis. At the client's request, duplicate analysis was performed for eight (8) field samples. The field sample duplicates were designated "D" following the sample number. When comparing quantitative results, a duplicate correspondence should be considered when the relative percent difference (RPD) between the two samples is less than or equal to 100%. For the purpose of calculating correspondences, all non-detections should be assigned, as a baseline value, the RL for the specific contaminant. Based on these assumptions, a 100% correlation was found between the field sample duplicates and their base samples.

Project Details

Samplers were deployed August 8 through 11, 2016, and were retrieved on August 24 and 25, 2016. **Attachment 2** describes standard field procedures. Individual deployment and retrieval times will be found in the Chain of Custody Form (**Attachment 3**).

One-hundred forty-nine (149) field samples, eight (8) field sample duplicates, and two (2) trip blanks were received by BEACON on August 30, 2016. Adsorbent cartridges from the passive samplers were thermally desorbed, then analyzed using gas chromatography/mass spectrometry (GC/MS) equipment, in accordance with EPA Method 8260C, as described in **Attachment 4**. BEACON's laboratory analyzed each sample for the targeted compounds; analyses were completed on September 13, 2016. Following a laboratory review, results were provided on September 14, 2016.

All sample locations are shown on **Figure 1**. The following table lists frequency of detections based on the number of field samples analyzed, the reporting limit, and the maximum value for each mapped compound. The table also includes the transformation and interpolation method for the compound distribution maps provided. Samples were collected in three different areas in this investigation; at the request of the client, each area has been mapped independently of the others. The summary table below considers all field samples from all areas.

Figure Nos.	Compound	Frequency	Reporting Limit (nanograms)	Max Value (nanograms)	Transformation Method	Interpolation Method
2-	Benzene	32	25	37,093	Log	Kriging
3-	Toluene	32	25	12,802	Log	Kriging
4-	Ethylbenzene	20	25	9,429	Log	Kriging
5-	p&m-Xylene	27	25	20,697	Log	Kriging
6-	o-Xylene	21	25	17,670	Log	Kriging
7-	Naphthalene	17	25	7,440	Log	Kriging
8-	2-Methylnaphthalene	18	25	15,846	Log	Kriging

Attachments:

-1- Applying Results From Passive Soil-Gas Surveys
-2- Field Procedures
-3- Chain-of-Custody Form
-4- Laboratory Procedures

ALL DATA MEET REQUIREMENTS AS SPECIFIED IN THE BEACON ENVIRONMENTAL SERVICES, INC. QUALITY ASSURANCE PROJECT PLAN AND THE RESULTS RELATE ONLY TO THE SAMPLES REPORTED. BEACON ENVIRONMENTAL SERVICES IS ACCREDITED TO ISO/IEC 17025:2005, AND THE WORK PERFORMED WAS IN ACCORDANCE WITH ISO/IEC 17025:2005 REQUIREMENTS, WITH THE EXCEPTION THAT SAMPLES WERE ANALYZED WITHIN A 24-HOUR TUNE WINDOW. THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY. RELEASE OF THE DATA CONTAINED IN THIS DATA PACKAGE HAS BEEN AUTHORIZED BY THE LABORATORY DIRECTOR OR HIS SIGNEE, AS VERIFIED BY THE FOLLOWING SIGNATURES:

Steven C. Thornley
Laboratory Director

Patti J. Riggs
Quality Manager

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	Lb160906s	TRIP 2	TRIP 3	ETF-F6	ETF-G4	ETF-G5
Project Number:		3476	3476	3476	3476	3476
Lab File ID:	S16090603	S16090607	S16090608	S16090609	S16090610	S16090611
Received Date:		8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016
Analysis Time:	11:54	13:30	13:56	14:26	14:50	15:13
Matrix:				Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	**39**	<25	<25
2-Methylnaphthalene	<25	<25	<25	**68**	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	ETF-G6	ETF-H4	ETF-H5	ETF-H6	ETF-J4	ETF-J5
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090612	S16090613	S16091309	S16091310	S16090616	S16090617
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/6/2016	9/6/2016	9/13/2016	9/13/2016	9/6/2016	9/6/2016
Analysis Time:	15:36	16:00	12:21	12:44	17:09	17:33
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**8,520**	<25	<25	<25	<25
Toluene	<25	**2,682**	<25	<25	<25	<25
Ethylbenzene	<25	**8,453**	<25	<25	<25	<25
p & m-Xylene	<25	**15,646**	<25	<25	<25	<25
o-Xylene	<25	**6,326**	<25	<25	<25	<25
Naphthalene	<25	**1,034**	<25	<25	<25	<25
2-Methylnaphthalene	<25	**1,708**	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	ETF-J25	ETF-K4	ETF-K25	ETF-L25	ETF-M21	ETF-M22
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090618	S16090619	S16090620	S16090621	S16090622	S16090623
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016
Analysis Time:	17:56	18:19	18:42	19:05	19:28	19:50
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	ETF-M23	ETF-M24	ETF-M24-D	ETF-M25	LPA-C2	LPA-C4
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090624	S16090625	S16090626	S16090627	S16090628	S16090629
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/6/2016
Analysis Time:	20:14	20:38	21:01	21:24	21:47	22:11
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	**37**
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-C5	LPA-C6	LPA-C7	LPA-C8	LPA-C9	LPA-C10
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090630	S16090631	S16090632	S16090633	S16090634	S16090635
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/6/2016	9/6/2016	9/6/2016	9/6/2016	9/7/2016	9/7/2016
Analysis Time:	22:34	22:57	23:21	23:44	0:07	0:31
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
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Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-C11	LPA-C12	LPA-C13	LPA-C14	LPA-C14-D	LPA-C15
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090636	S16090637	S16090638	S16090639	S16090640	S16090641
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	0:54	1:18	1:41	2:04	2:27	2:51
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	**33**	**36**	<25
Toluene	<25	<25	<25	**37**	**41**	<25
Ethylbenzene	<25	<25	<25	**47**	**55**	<25
p & m-Xylene	<25	<25	<25	**184**	**214**	<25
o-Xylene	<25	<25	<25	**203**	**238**	<25
Naphthalene	<25	<25	<25	**307**	**288**	<25
2-Methylnaphthalene	<25	<25	<25	**564**	**567**	**27**

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-C16	LPA-C17	LPA-C18	LPA-D3	LPA-D9	LPA-E2
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090642	S16090643	S16090644	S16090645	S16090646	S16090647
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	3:14	3:37	4:00	4:24	4:47	5:10
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-E4	LPA-E8	LPA-E10	LPA-E12	LPA-F3	LPA-F5
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090648	S16090649	S16090650	S16090651	S16090652	S16090653
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	5:33	5:57	6:20	6:43	7:07	7:30
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-F7	LPA-G2	LPA-G4	LPA-G6	LPA-G8	LPA-G8-D
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090654	S16090655	S16090656	S16090657	S16090658	S16090659
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	7:53	8:17	8:41	9:04	9:27	9:50
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-H1	LPA-H3	Lb160907s	LPA-H5	LPA-H5-D	LPA-H7
Project Number:	3476	3476		3476	3476	3476
Lab File ID:	S16090660	S16090661	S16090703	S16090705	S16090706	S16090707
Received Date:	8/30/2016	8/30/2016		8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	10:14	10:36	15:18	16:04	16:26	16:50
Matrix:	Soil Gas	Soil Gas		Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**111**	<25	<25	<25	<25
Toluene	**1,360**	**101**	<25	**47**	**43**	<25
Ethylbenzene	**61**	**86**	<25	<25	<25	<25
p & m-Xylene	**178**	**189**	<25	<25	<25	<25
o-Xylene	**112**	**143**	<25	<25	<25	<25
Naphthalene	<25	**31**	<25	<25	<25	<25
2-Methylnaphthalene	<25	**77**	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-J2	LPA-J4	LPA-J8	LPA-K1	LPA-K3	LPA-K5
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090805	S16090709	S16090710	S16090711	S16090712	S16090713
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	16:21	17:31	17:54	18:18	18:41	19:04
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**101**	**44**	<25	<25	**30**	<25
Toluene	**350**	**49**	<25	<25	**117**	**3,301**
Ethylbenzene	**29**	<25	<25	<25	<25	<25
p & m-Xylene	**70**	<25	<25	<25	<25	<25
o-Xylene	**51**	<25	<25	<25	<25	<25
Naphthalene	<25	**28**	<25	<25	<25	<25
2-Methylnaphthalene	**39**	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-K7	LPA-L2	LPA-L4	LPA-L6	LPA-L8	LPA-M5
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090714	S16090715	S16090716	S16090717	S16090718	S16090719
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	19:28	19:51	20:15	20:38	21:02	21:25
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	**82**	**103**	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	LPA-M7	LPA-N4	LPA-N6	WPA-H9	WPA-J7	WPA-J8
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090720	S16090721	S16090722	S16090723	S16090724	S16090725
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016	9/7/2016
Analysis Time:	21:48	22:12	22:34	22:57	23:21	23:45
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	**244**	<25	<25
Toluene	**618**	<25	<25	**173**	<25	<25
Ethylbenzene	**32**	<25	<25	**27**	<25	<25
p & m-Xylene	**102**	<25	<25	**56**	<25	<25
o-Xylene	**46**	<25	<25	**25**	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-K6	WPA-K8	WPA-K9	WPA-K9-D	WPA-L7	WPA-L20
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090726	S16090727	S16090728	S16090729	S16090730	S16090731
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	0:09	0:32	0:56	1:19	1:42	2:05
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**40**	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	**28**	<25	<25	<25	<25
2-Methylnaphthalene	<25	**68**	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-L21	WPA-L22	WPA-L23	WPA-L24	WPA-M22	WPA-M23
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090732	S16090733	S16090734	S16090735	S16090736	S16090737
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	2:29	2:52	3:15	3:39	4:03	4:26
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-N23	WPA-P9	WPA-Q2	WPA-Q3	WPA-Q4	WPA-Q6
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090738	S16090739	S16090740	S16090741	S16090742	S16090743
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	4:49	5:13	5:36	5:59	6:22	6:46
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**592**	**108**	**112**	<25	<25
Toluene	<25	**214**	**54**	**27**	<25	<25
Ethylbenzene	<25	<25	**29**	**29**	<25	<25
p & m-Xylene	<25	**72**	**55**	**36**	<25	<25
o-Xylene	<25	**45**	**25**	<25	<25	<25
Naphthalene	<25	**44**	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-Q10	WPA-R3	WPA-R4	WPA-R5	WPA-R7	WPA-R9
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090744	S16090745	S16090746	S16090747	S16091318	S16090749
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/13/2016	9/8/2016
Analysis Time:	7:08	7:32	7:56	8:19	15:54	9:05
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**2,648**	<25	<25	**37,093**	<25	**263**
Toluene	**425**	<25	<25	**8,328**	<25	**28**
Ethylbenzene	**5,146**	<25	<25	**9,402**	<25	**81**
p & m-Xylene	**1,012**	<25	<25	**11,480**	<25	**70**
o-Xylene	**516**	<25	<25	**3,476**	<25	**25**
Naphthalene	**798**	<25	<25	<25	<25	**82**
2-Methylnaphthalene	**342**	<25	<25	<25	<25	**42**

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-R11	WPA-S2	WPA-S3	WPA-S4	WPA-S5	WPA-S6
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090750	S16090751	S16090752	S16090753	S16090754	S16090755
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	9:29	9:52	10:15	10:38	11:01	11:24
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	**96**	**82**
Toluene	<25	<25	<25	<25	**53**	**27**
Ethylbenzene	<25	<25	<25	<25	**30**	<25
p & m-Xylene	<25	<25	<25	<25	**61**	**31**
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	**279**
2-Methylnaphthalene	<25	<25	<25	<25	<25	**524**

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-S8	WPA-S10	WPA-S12	WPA-S12-D	WPA-S25	WPA-S26
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090756	S16090757	S16090758	S16090759	S16091311	S16091312
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/13/2016	9/13/2016
Analysis Time:	11:48	12:11	12:34	12:58	13:07	13:31
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**47**	**545**	**21,205**	**15,404**	<25	<25
Toluene	<25	**577**	**12,802**	**12,806**	<25	<25
Ethylbenzene	<25	**53**	**9,429**	**8,415**	<25	<25
p & m-Xylene	**25**	**307**	**20,697**	**18,655**	<25	<25
o-Xylene	<25	**214**	**17,670**	**16,900**	<25	<25
Naphthalene	<25	**29**	**7,440**	**8,532**	<25	<25
2-Methylnaphthalene	<25	**28**	**15,846**	**15,262**	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-T3	Lb160908s	WPA-T4	WPA-T5	WPA-T7	WPA-T7-D
Project Number:	3476		3476	3476	3476	3476
Lab File ID:	S16091313	S16090803	S16090806	S16090807	S16090808	S16090809
Received Date:	8/30/2016		8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/13/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	13:54	15:33	16:44	17:07	17:30	17:55
Matrix:	Soil Gas		Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**36**	<25	**34**	**52**	**8,826**	**8,652**
Toluene	**46**	<25	**64**	**55**	**1,791**	**1,895**
Ethylbenzene	<25	<25	<25	<25	**532**	**550**
p & m-Xylene	**27**	<25	**72**	**41**	**1,559**	**1,761**
o-Xylene	<25	<25	**27**	<25	**607**	**695**
Naphthalene	<25	<25	<25	<25	**69**	**64**
2-Methylnaphthalene	<25	<25	<25	<25	**100**	**101**

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-T9	WPA-T25	WPA-T26	WPA-T27	WPA-T28	WPA-U2
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090810	S16090811	S16090812	S16090813	S16090814	S16090815
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016
Analysis Time:	18:18	18:41	19:05	19:28	19:52	20:16
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**33**	<25	<25	<25	<25	<25
Toluene	<25	<25	**32**	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-U4	WPA-U5	WPA-U6	WPA-U8	WPA-U25	WPA-U26
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090816	S16091314	S16091315	S16091316	S16091317	S16090821
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/13/2016	9/13/2016	9/13/2016	9/13/2016	9/8/2016
Analysis Time:	20:39	14:17	14:41	15:05	15:29	22:37
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**324**	**364**	<25	<25	<25
Toluene	<25	**437**	**173**	<25	<25	<25
Ethylbenzene	**90**	**99**	**29**	<25	<25	<25
p & m-Xylene	**48**	**318**	**95**	<25	<25	<25
o-Xylene	**31**	**265**	**42**	<25	<25	<25
Naphthalene	**1,056**	<25	<25	<25	<25	<25
2-Methylnaphthalene	**4,083**	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-V3	WPA-V7	WPA-V9	WPA-V23	WPA-V24	WPA-V25
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090822	S16090823	S16090824	S16090825	S16090826	S16090827
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/8/2016	9/8/2016	9/8/2016	9/9/2016	9/9/2016	9/9/2016
Analysis Time:	23:00	23:24	23:47	0:11	0:34	0:58
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**545**	<25	<25	<25	<25	<25
Toluene	**263**	**27**	<25	<25	<25	<25
Ethylbenzene	**29**	<25	<25	<25	<25	<25
p & m-Xylene	**91**	<25	<25	<25	<25	<25
o-Xylene	**57**	<25	<25	<25	<25	<25
Naphthalene	**27**	**48**	<25	<25	<25	<25
2-Methylnaphthalene	**37**	**122**	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-V26	WPA-V27	WPA-V28	WPA-W2	WPA-W4	WPA-W6
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090828	S16090830	S16090831	S16090832	S16090833	S16090834
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016
Analysis Time:	1:21	9:01	9:24	9:48	10:11	10:34
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-W8	WPA-W13	WPA-W14	WPA-W25	WPA-W26	WPA-X3
Project Number:	3476	3476	3476	3476	3476	3476
Lab File ID:	S16090835	S16090836	S16090837	S16090838	S16090839	S16090840
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Analysis Date:	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016
Analysis Time:	10:57	11:21	11:44	12:08	12:31	12:54
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	**28**	**26**	<25	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-X5	WPA-X7	WPA-X13	WPA-X14	Lb160909s	WPA-X15
Project Number:	3476	3476	3476	3476		3476
Lab File ID:	S16090841	S16090842	S16090843	S16090844	S16090903	S16090905
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016		8/30/2016
Analysis Date:	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016
Analysis Time:	13:18	13:40	14:04	14:27	15:54	16:40
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas		Soil Gas
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	<25	<25	<25	<25	**25**
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	**40**
o-Xylene	<25	<25	<25	<25	<25	**47**
Naphthalene	<25	<25	<25	<25	<25	**2,145**
2-Methylnaphthalene	<25	<25	<25	<25	<25	**10,027**

Results in nanograms (ng). B = Detected in method blank.

Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-X16	WPA-X25	WPA-X25-D	WPA-Y4	WPA-Y16	LB160912c
Project Number:	3476	3476	3476	3476	3476	
Lab File ID:	S16091319	S16090908	S16090909	S16090910	S16090912	C16091203
Received Date:	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	
Analysis Date:	9/13/2016	9/9/2016	9/9/2016	9/9/2016	9/9/2016	9/12/2016
Analysis Time:	16:18	17:50	18:13	18:36	19:22	9:30
Matrix:	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas	
Units:	ng	ng	ng	ng	ng	ng
COMPOUNDS						
Benzene	<25	**35**	**33**	<25	<25	<25
Toluene	<25	<25	<25	<25	<25	<25
Ethylbenzene	<25	<25	<25	<25	<25	<25
p & m-Xylene	<25	<25	<25	<25	<25	<25
o-Xylene	<25	<25	<25	<25	<25	<25
Naphthalene	<25	<25	<25	<25	<25	<25
2-Methylnaphthalene	<25	**29**	<25	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.

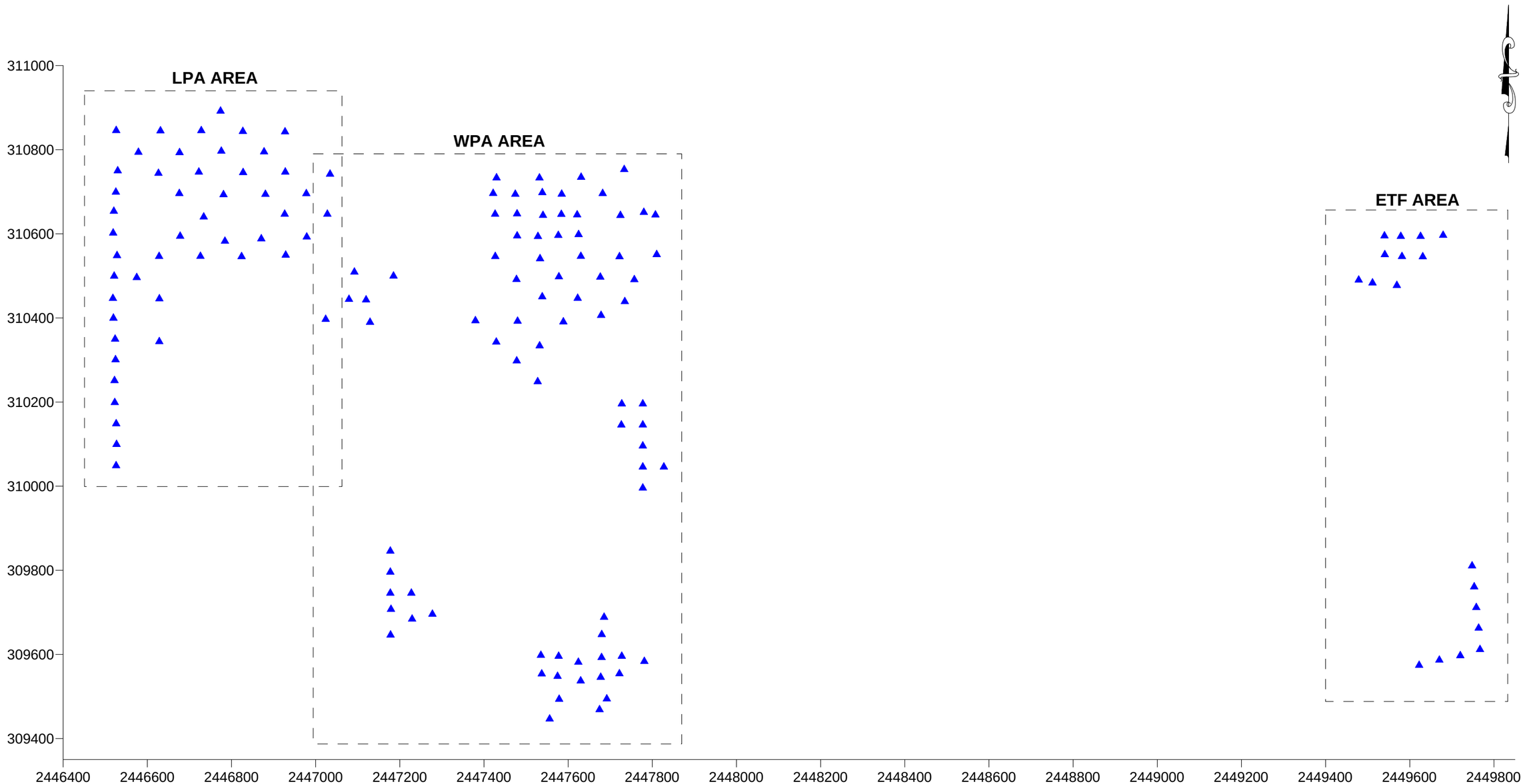
Table 1

Beacon Environmental Services, Inc.
2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA

Analysis by EPA Method 8260C

Client Sample ID:	WPA-X17	WPA-Y6	Lb160913s
Project Number:	3476	3476	
Lab File ID:	C16091209	C16091210	S16091303
Received Date:	8/30/2016	8/30/2016	
Analysis Date:	9/12/2016	9/12/2016	9/13/2016
Analysis Time:	11:40	12:02	10:00
Matrix:	Soil Gas	Soil Gas	
Units:	ng	ng	ng
COMPOUNDS			
Benzene	<25	<25	<25
Toluene	<25	<25	<25
Ethylbenzene	<25	<25	<25
p & m-Xylene	<25	<25	<25
o-Xylene	<25	<25	<25
Naphthalene	<25	<25	<25
2-Methylnaphthalene	<25	<25	<25

Results in nanograms (ng). B = Detected in method blank.



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

▲ PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

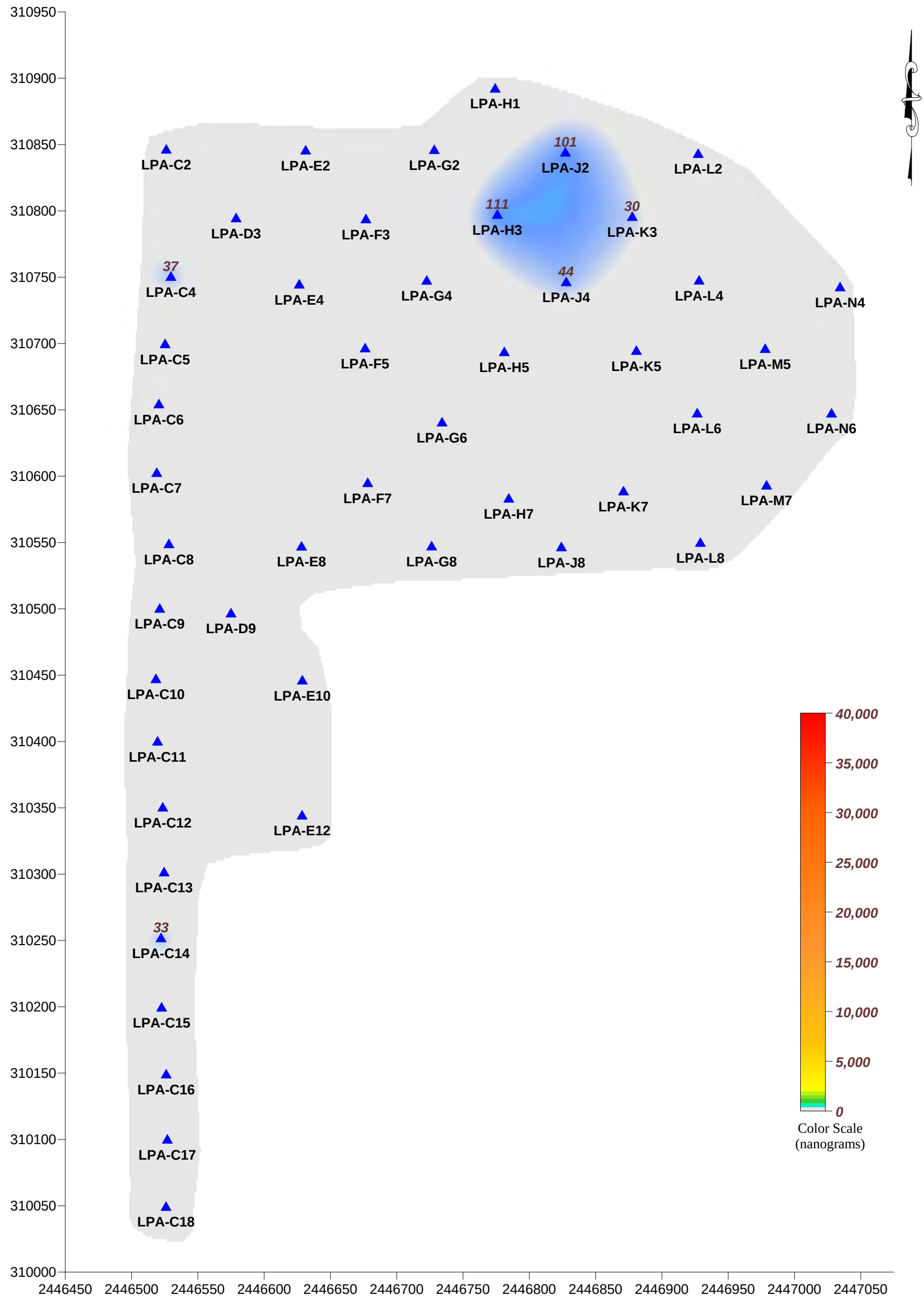
0 240 480

BEACON ENVIRONMENTAL SERVICES, INC.

2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-838-8780
Beacon Project No. 3476, September 2016

Figure 1
Passive Soil-Gas Survey
Sample Locations

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

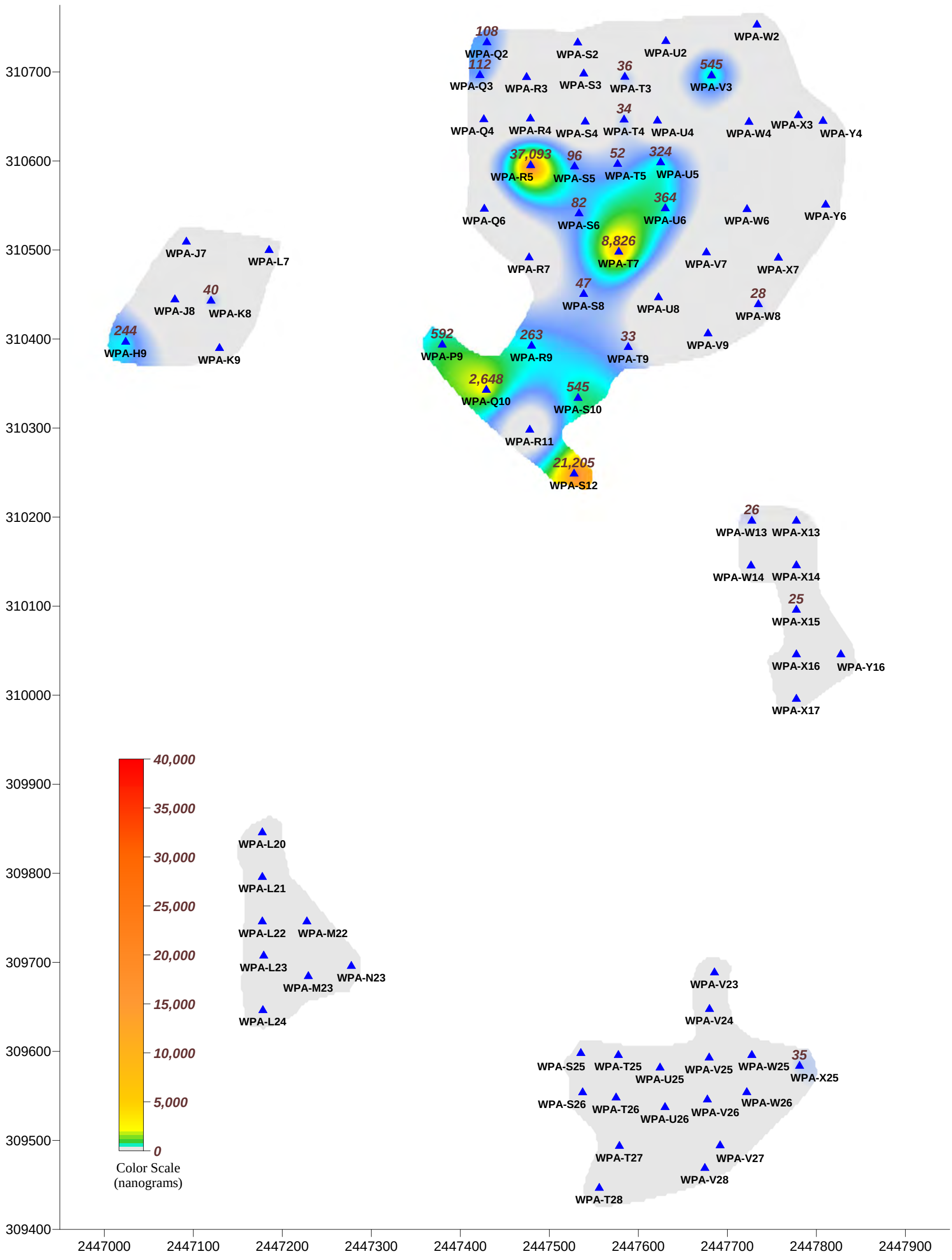
System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

BEACON ENVIRONMENTAL SERVICES, INC.

2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-838-8780
Beacon Project No. 3476, September 2016

Figure 2-1
Passive Soil-Gas Survey
Benzene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

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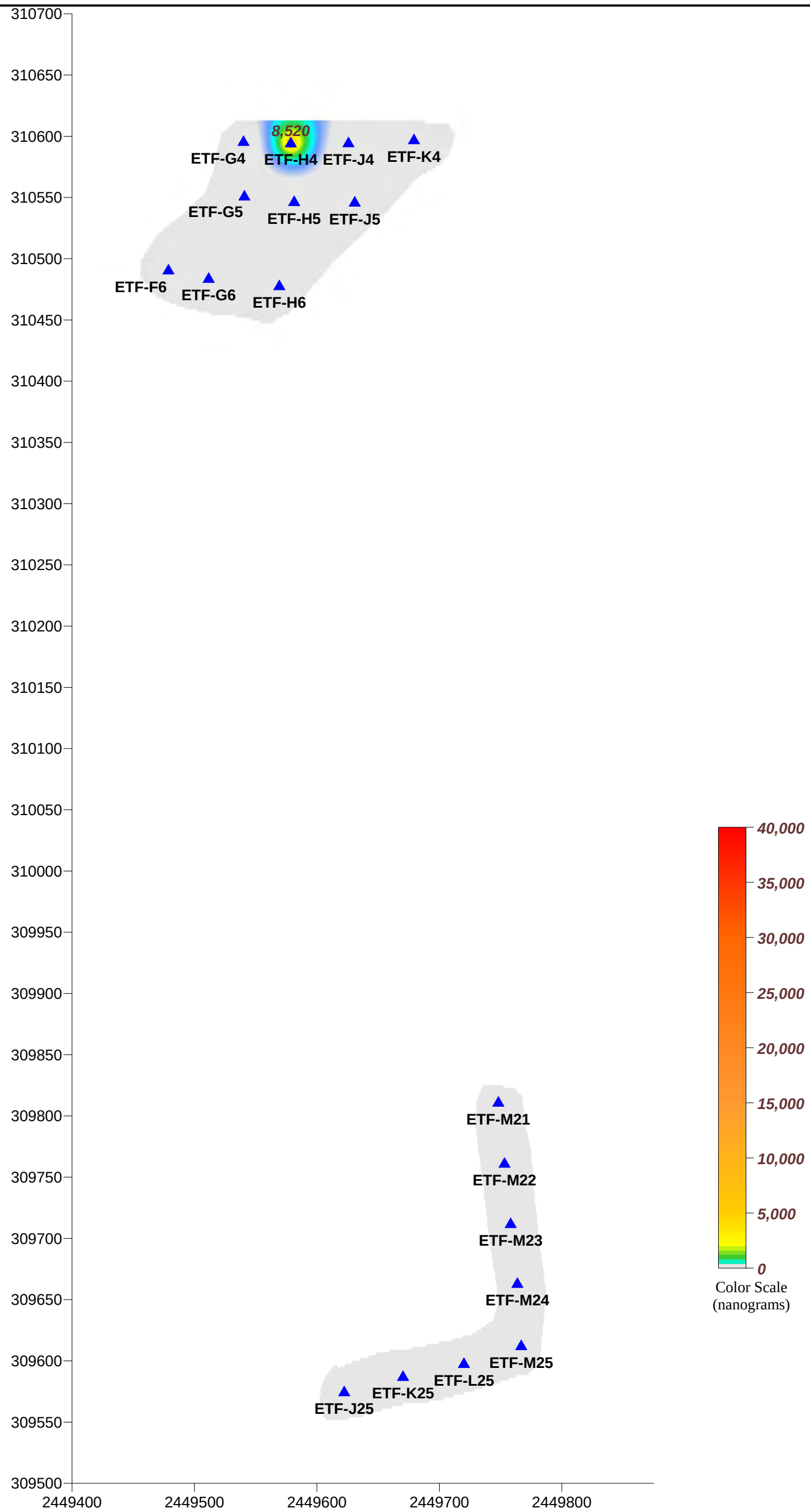
Beacon Project No. 3476, September 2016

Figure 2-2
Passive Soil-Gas Survey
Benzene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

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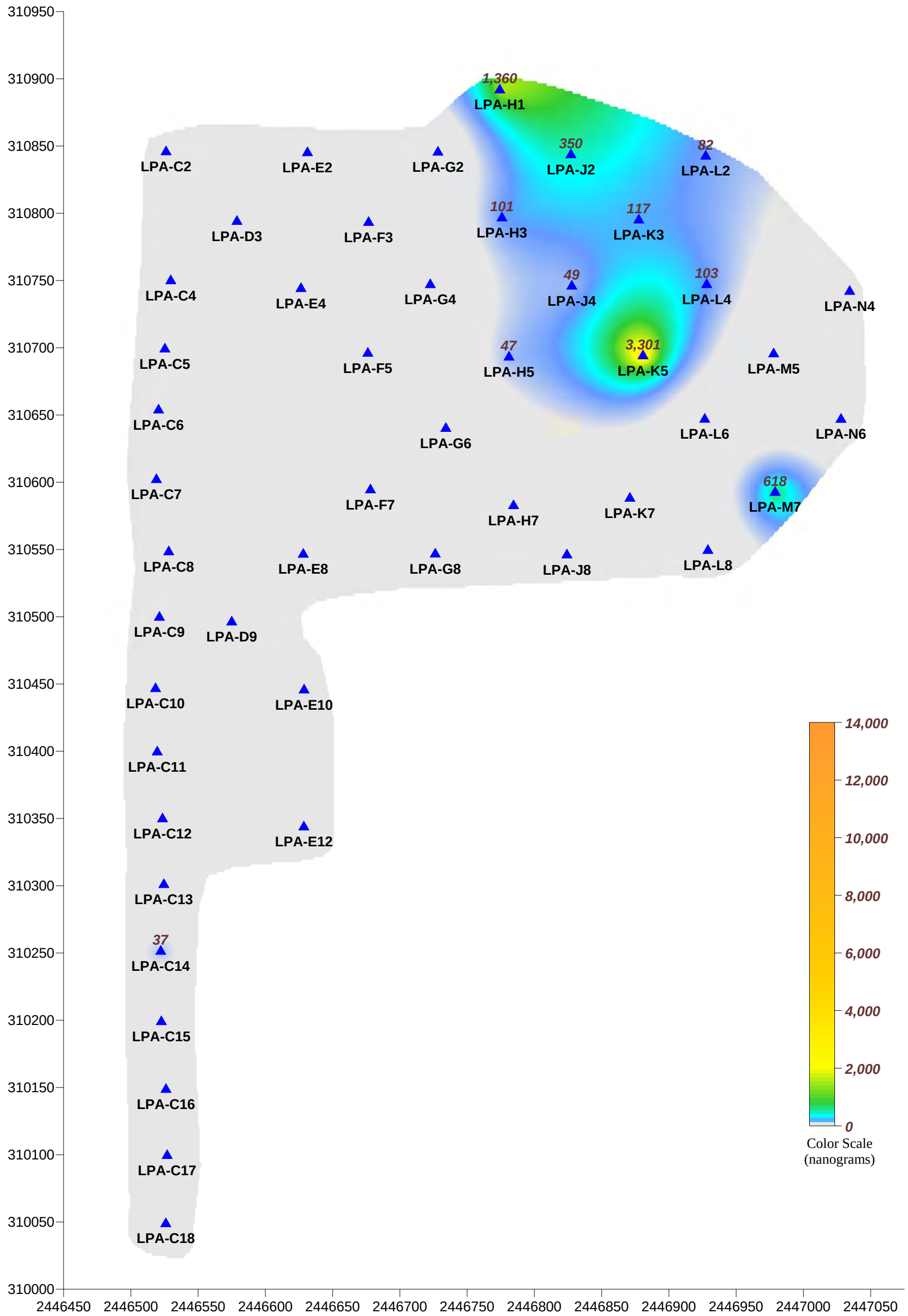
Figure 2-3
Passive Soil-Gas Survey
Benzene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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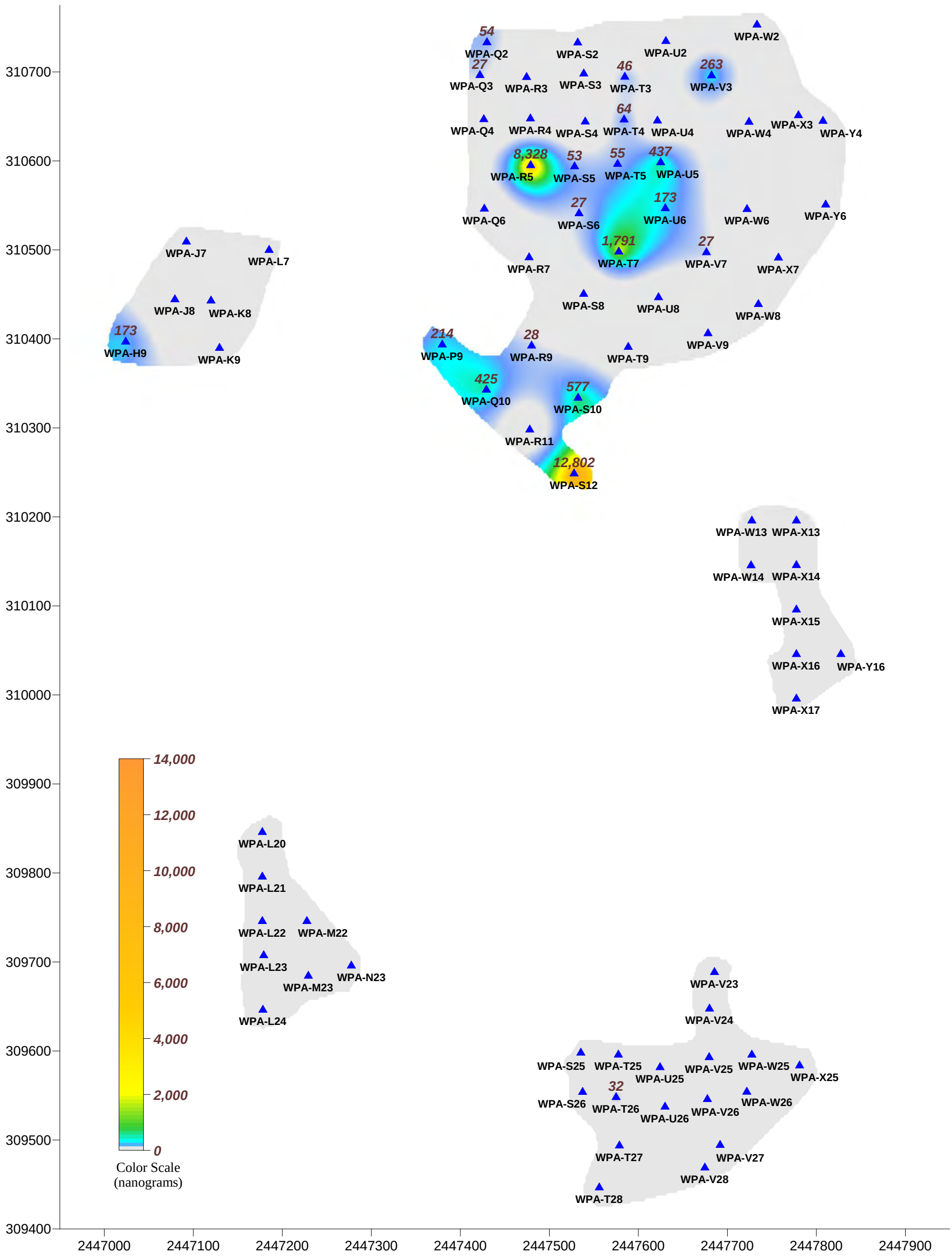
Figure 3-1
Passive Soil-Gas Survey
Toluene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

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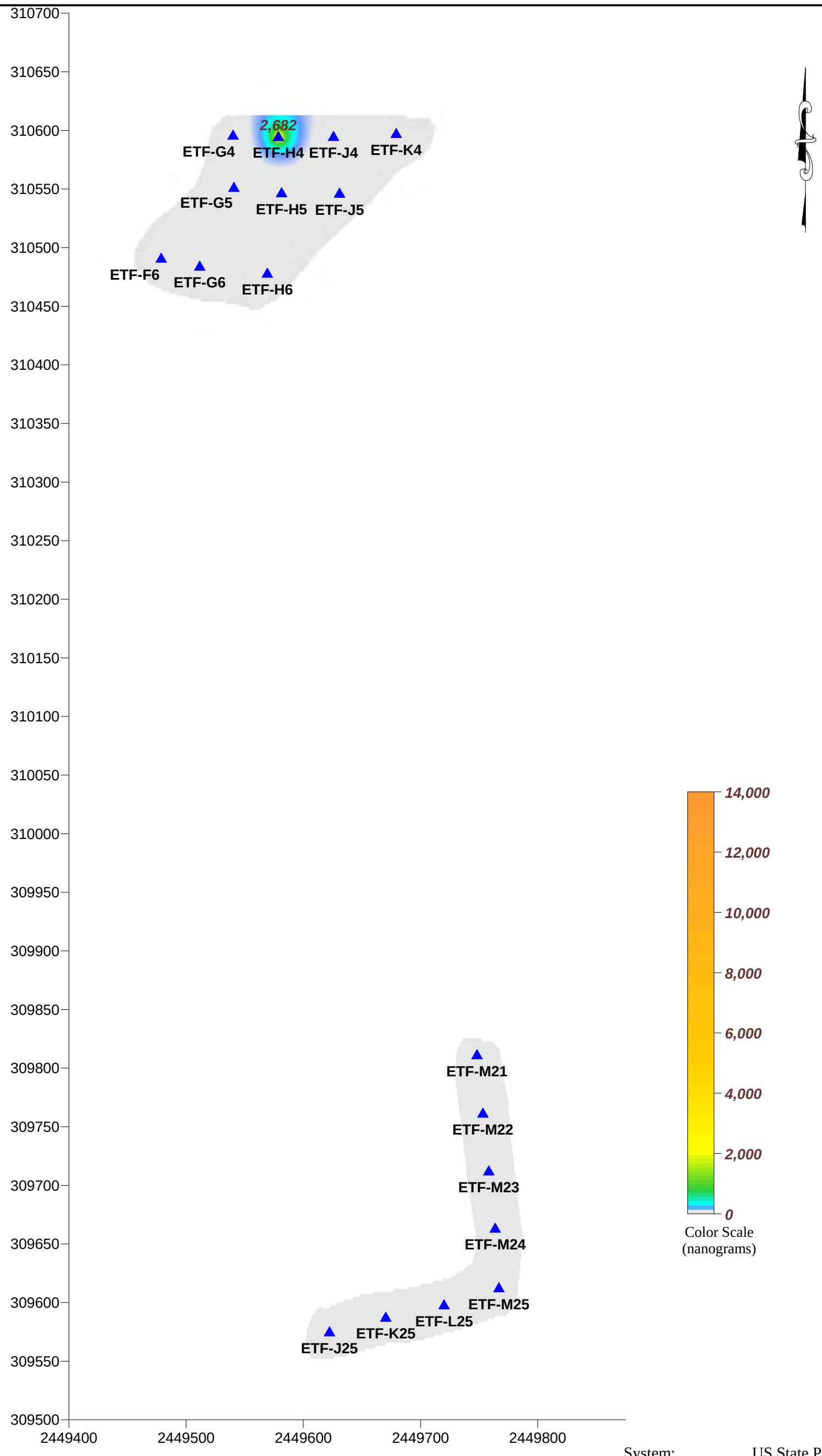
Figure 3-2
Passive Soil-Gas Survey
Toluene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

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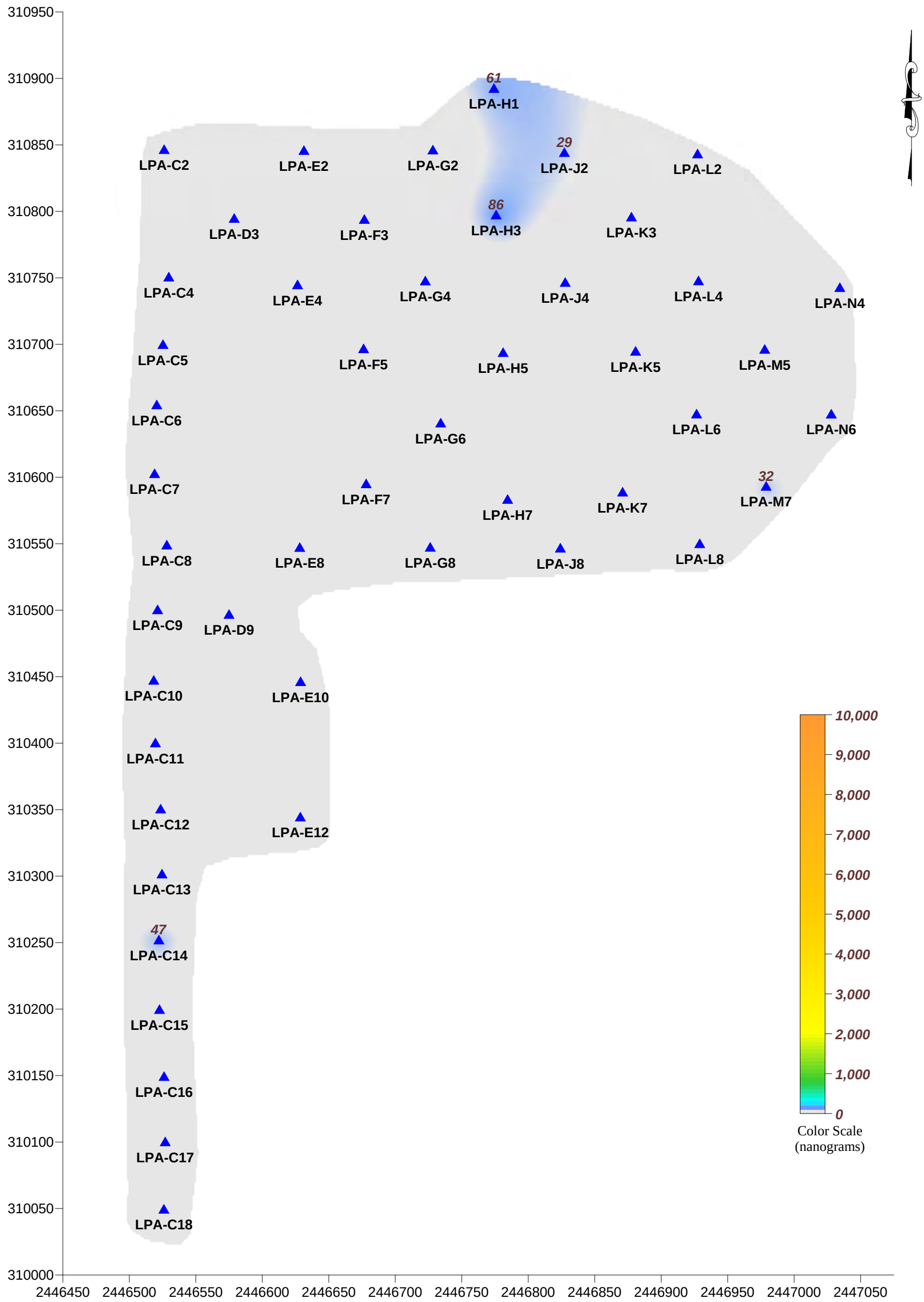
Figure 3-3
Passive Soil-Gas Survey
Toluene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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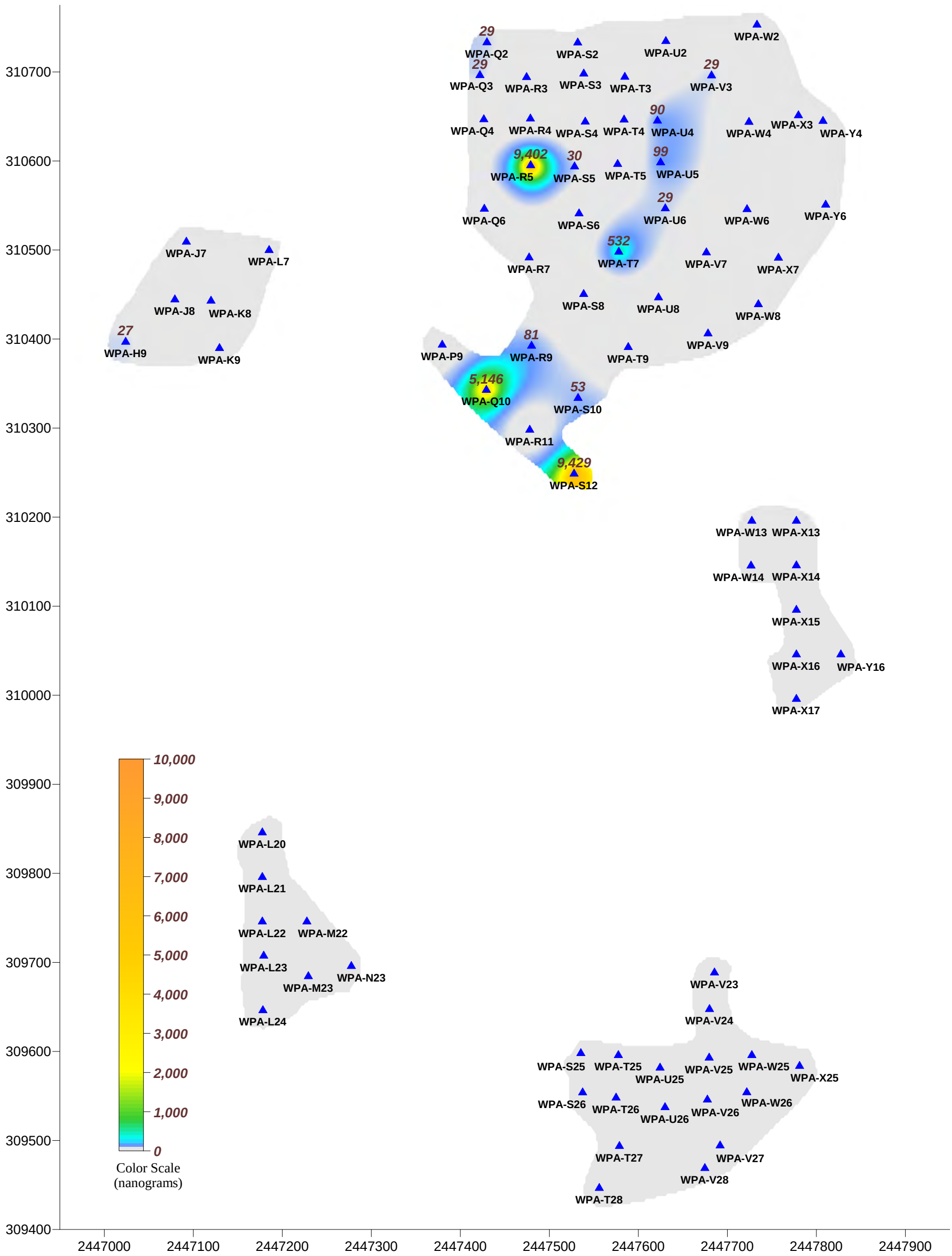
Figure 4-1
Passive Soil-Gas Survey
Ethylbenzene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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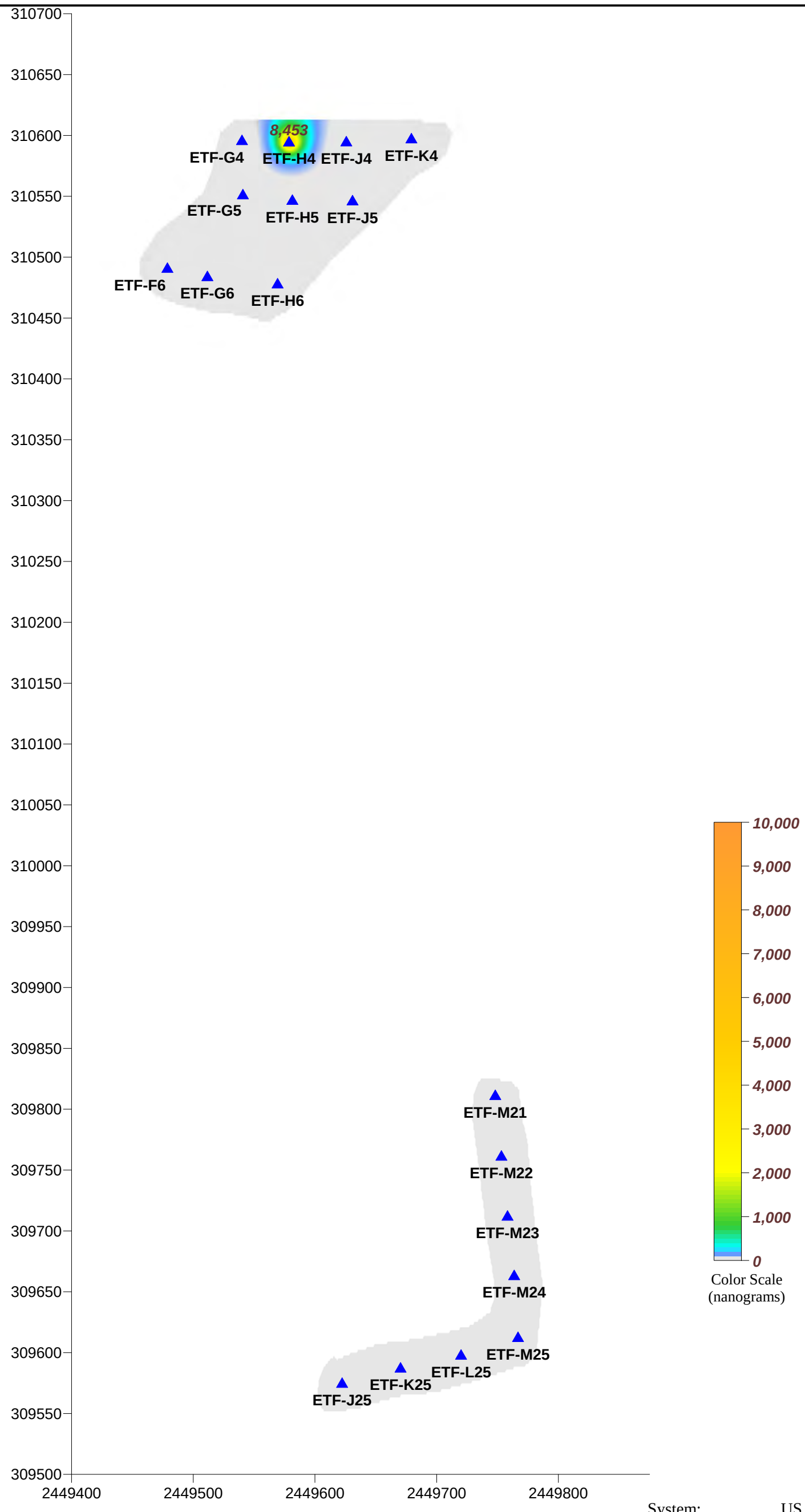
Beacon Project No. 3476, September 2016

Figure 4-2
Passive Soil-Gas Survey
Ethylbenzene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

BEACON ENVIRONMENTAL SERVICES, INC.

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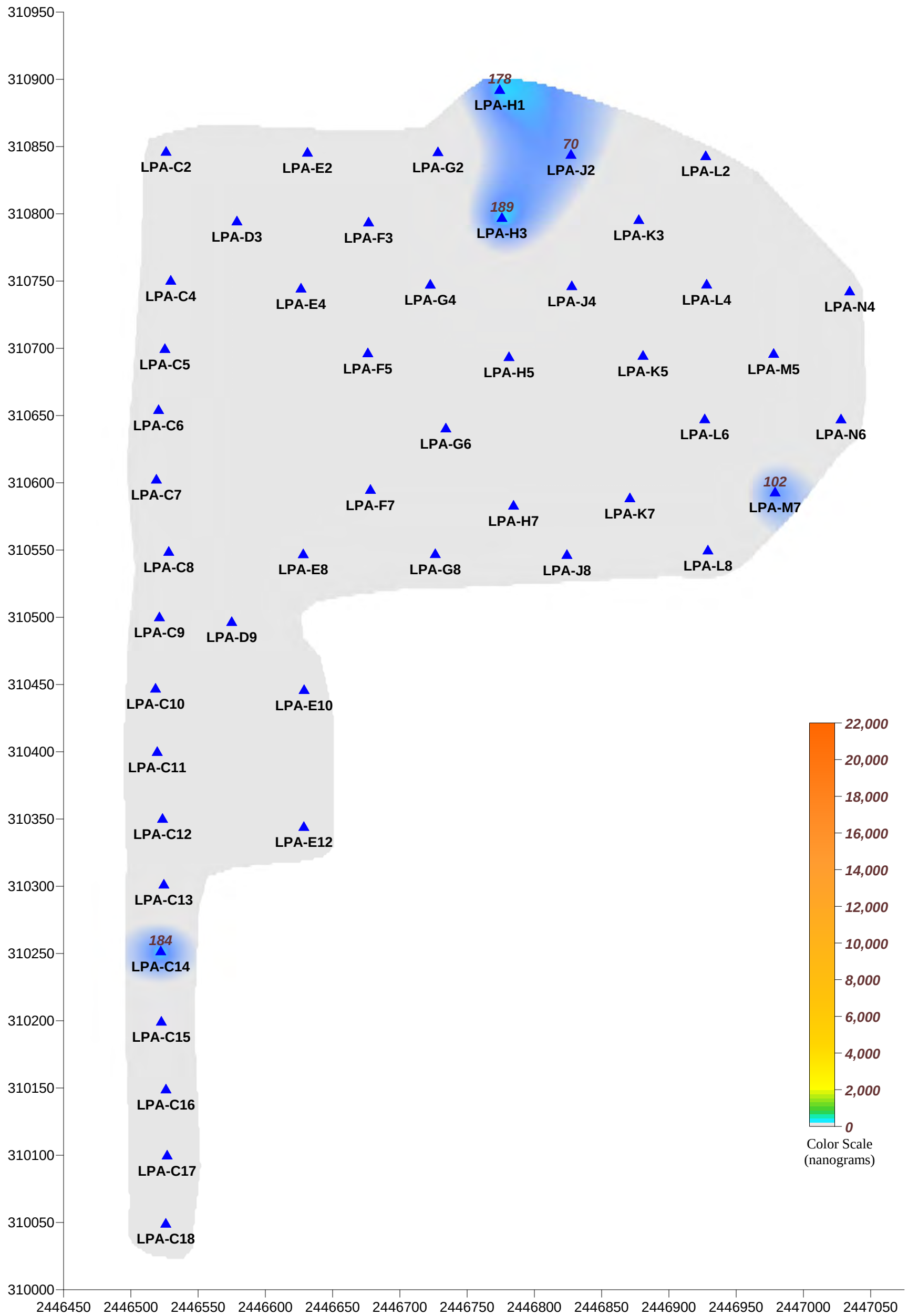
Beacon Project No. 3476, September 2016

Figure 4-3
Passive Soil-Gas Survey
Ethylbenzene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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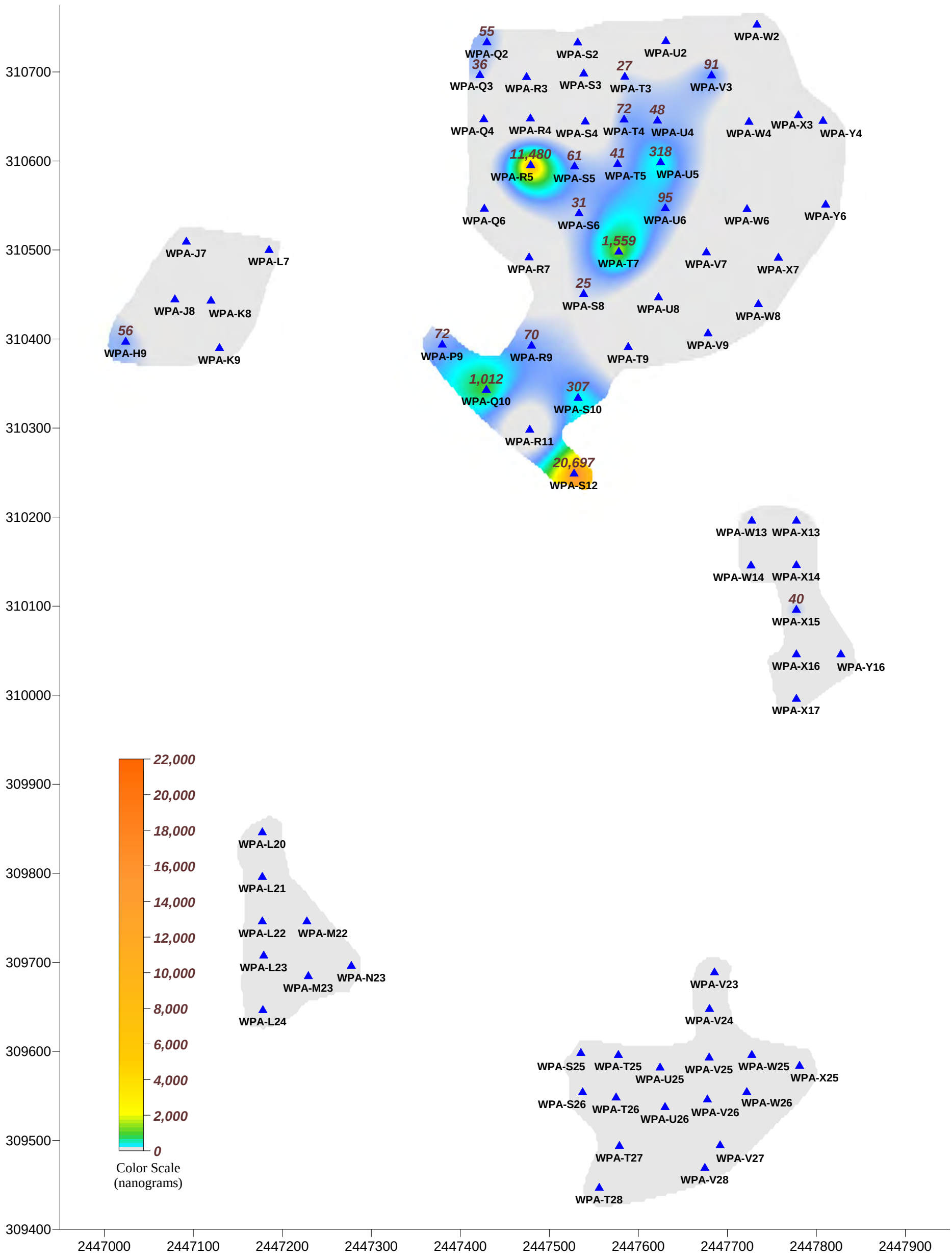
Beacon Project No. 3476, September 2016

Figure 5-1
Passive Soil-Gas Survey
p&m-Xylene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

BEACON ENVIRONMENTAL SERVICES, INC.

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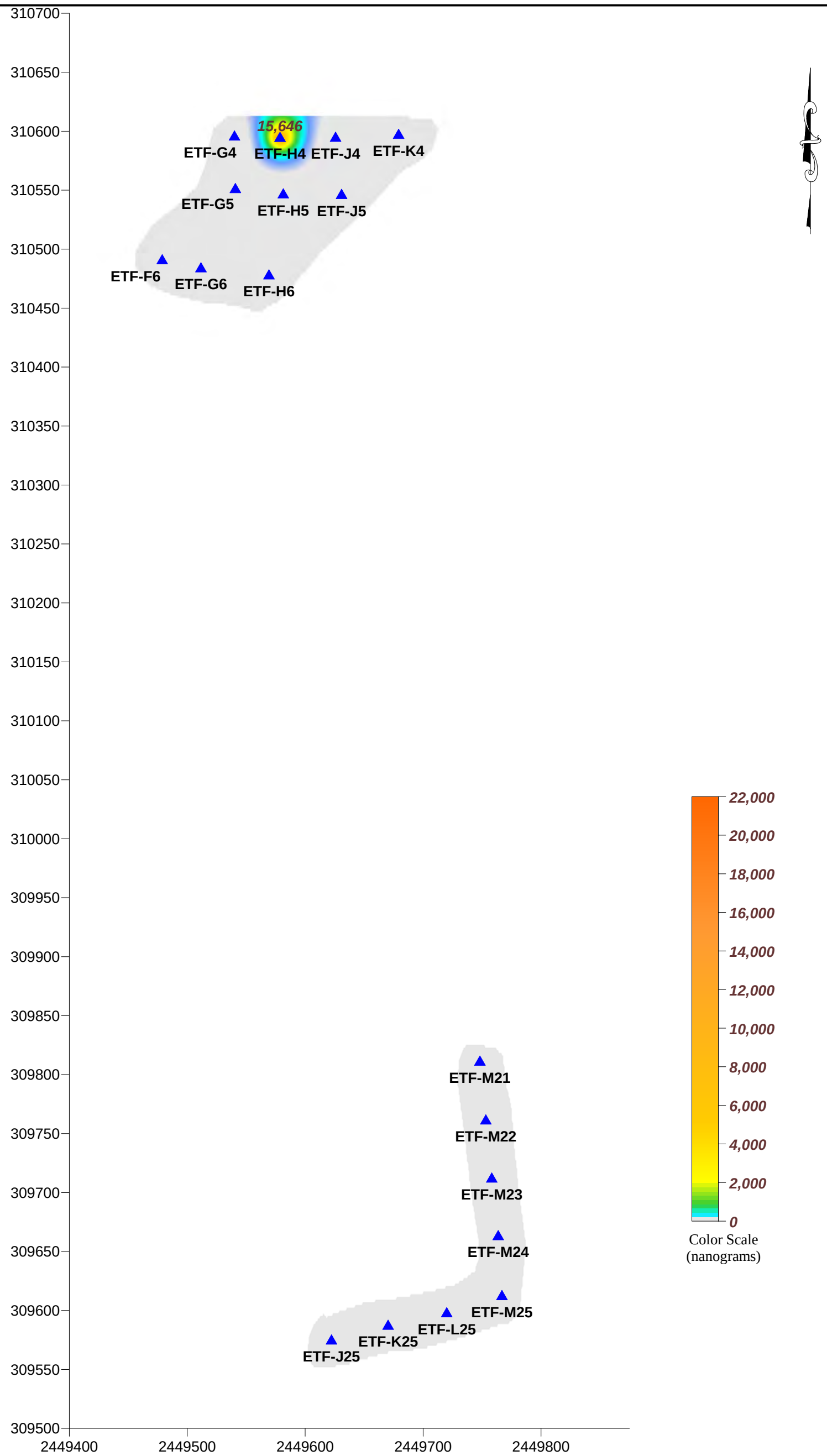
Figure 5-2
Passive Soil-Gas Survey
p&m-Xylene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

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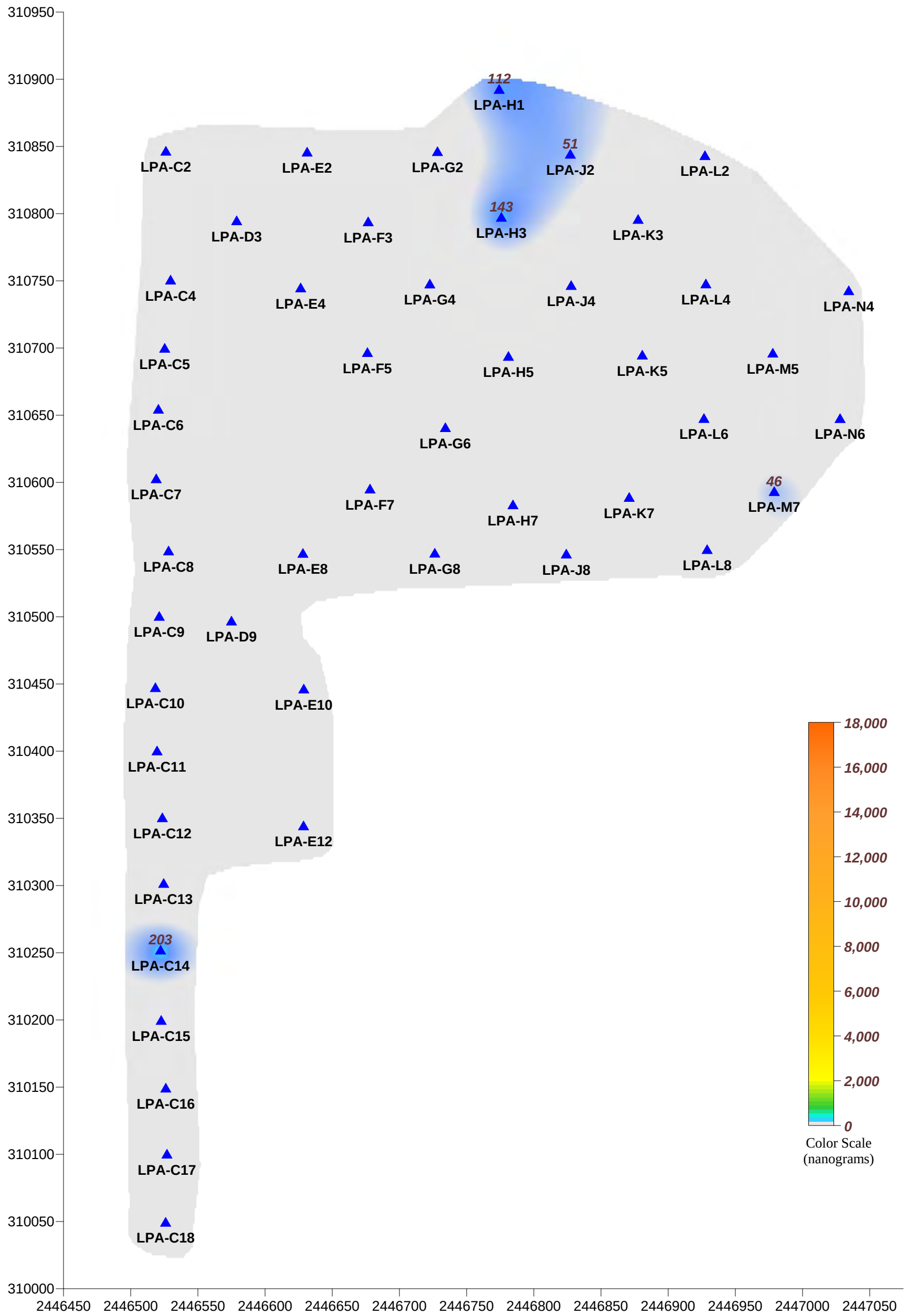
Figure 5-3
Passive Soil-Gas Survey
p&m-Xylene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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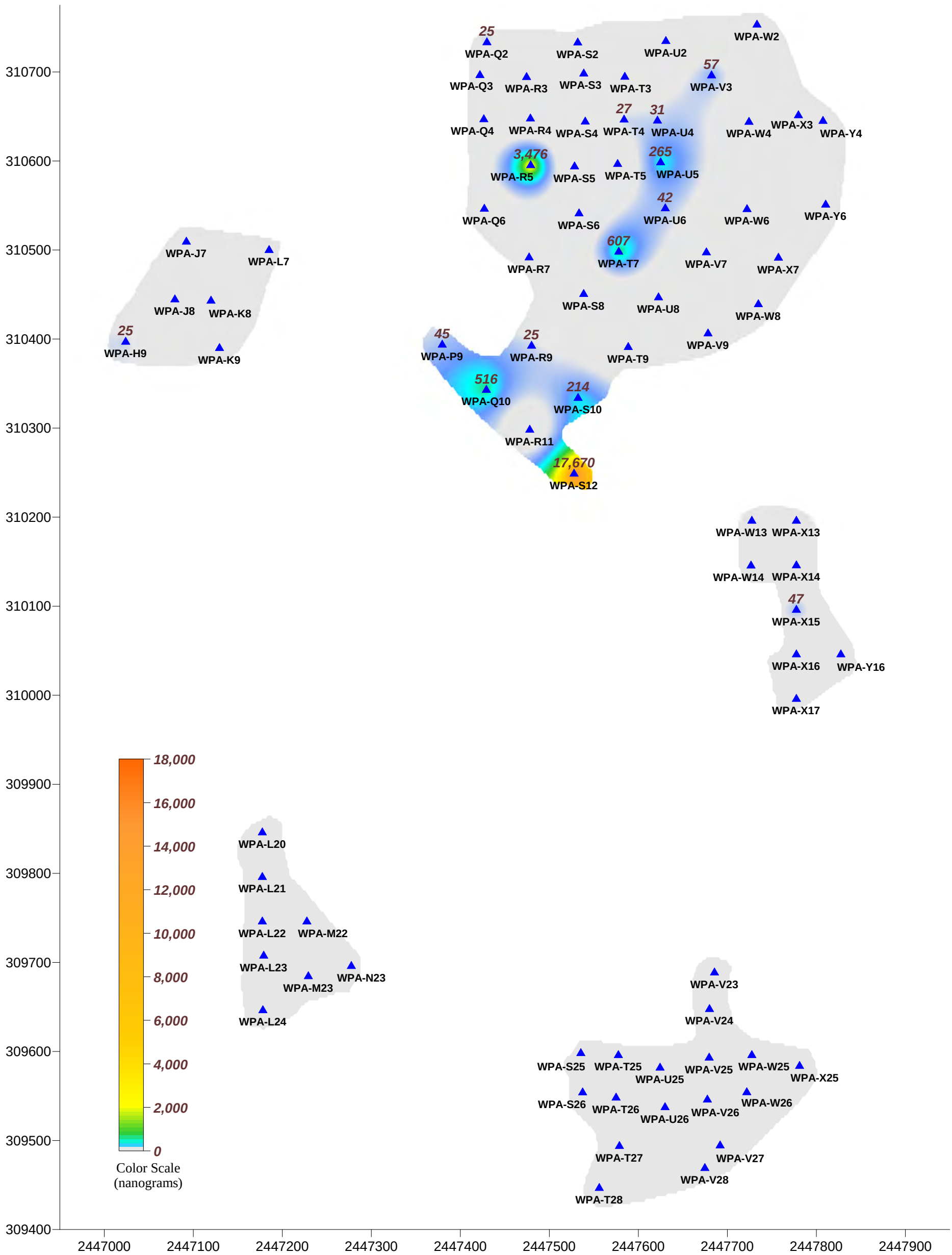
Figure 6-1
Passive Soil-Gas Survey
o-Xylene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

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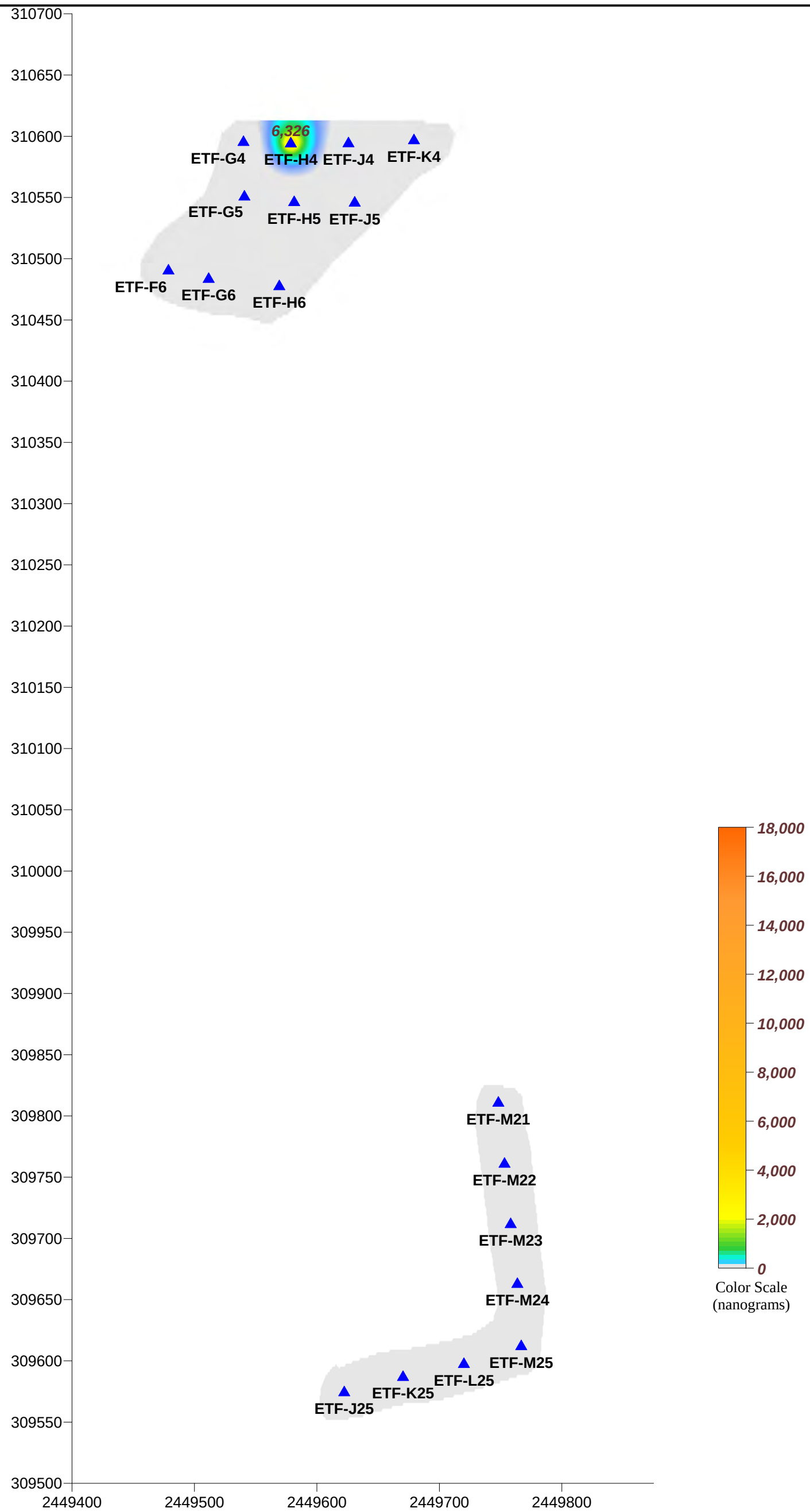
Figure 6-2
Passive Soil-Gas Survey
o-Xylene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

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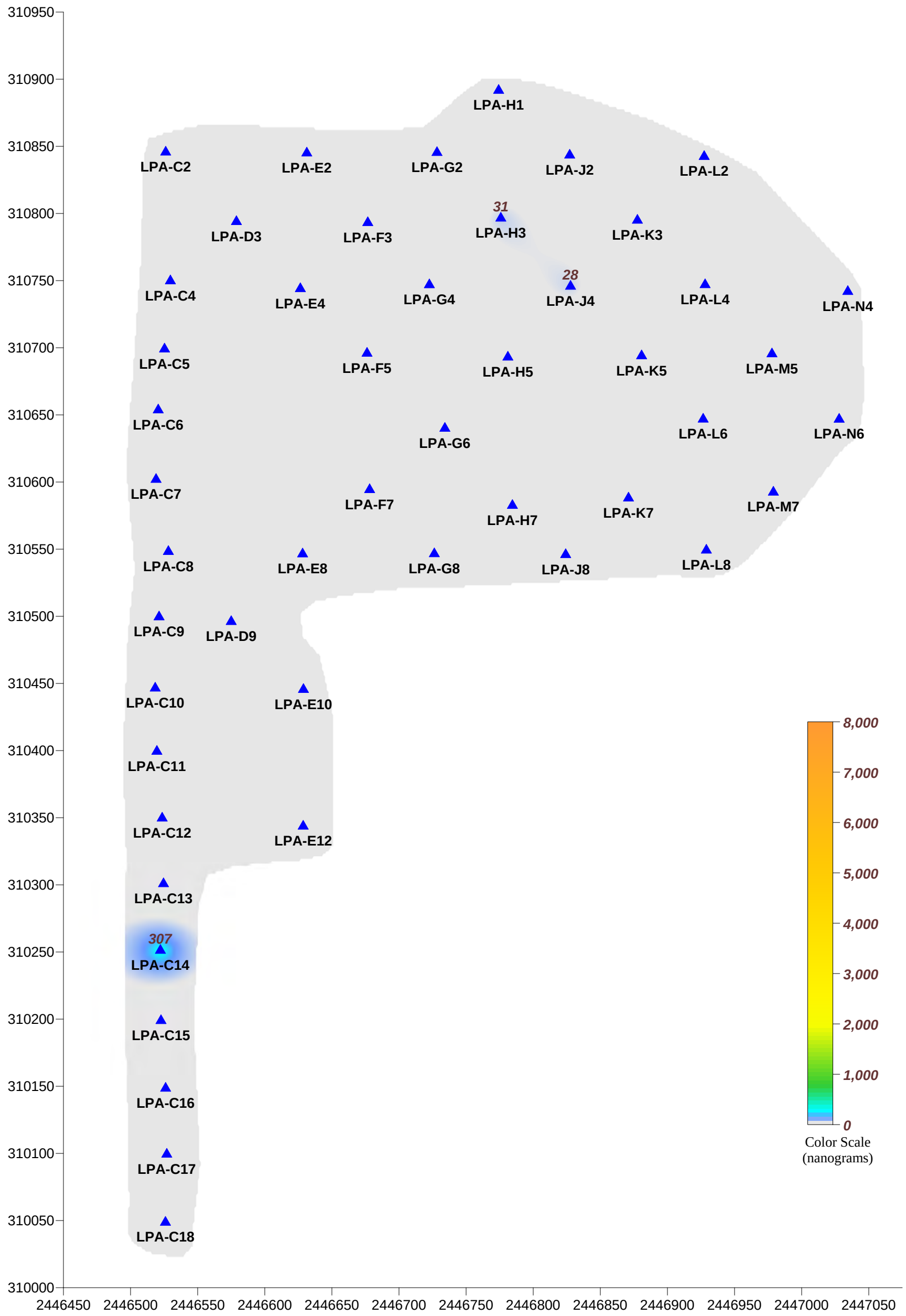
Figure 6-3
Passive Soil-Gas Survey
o-Xylene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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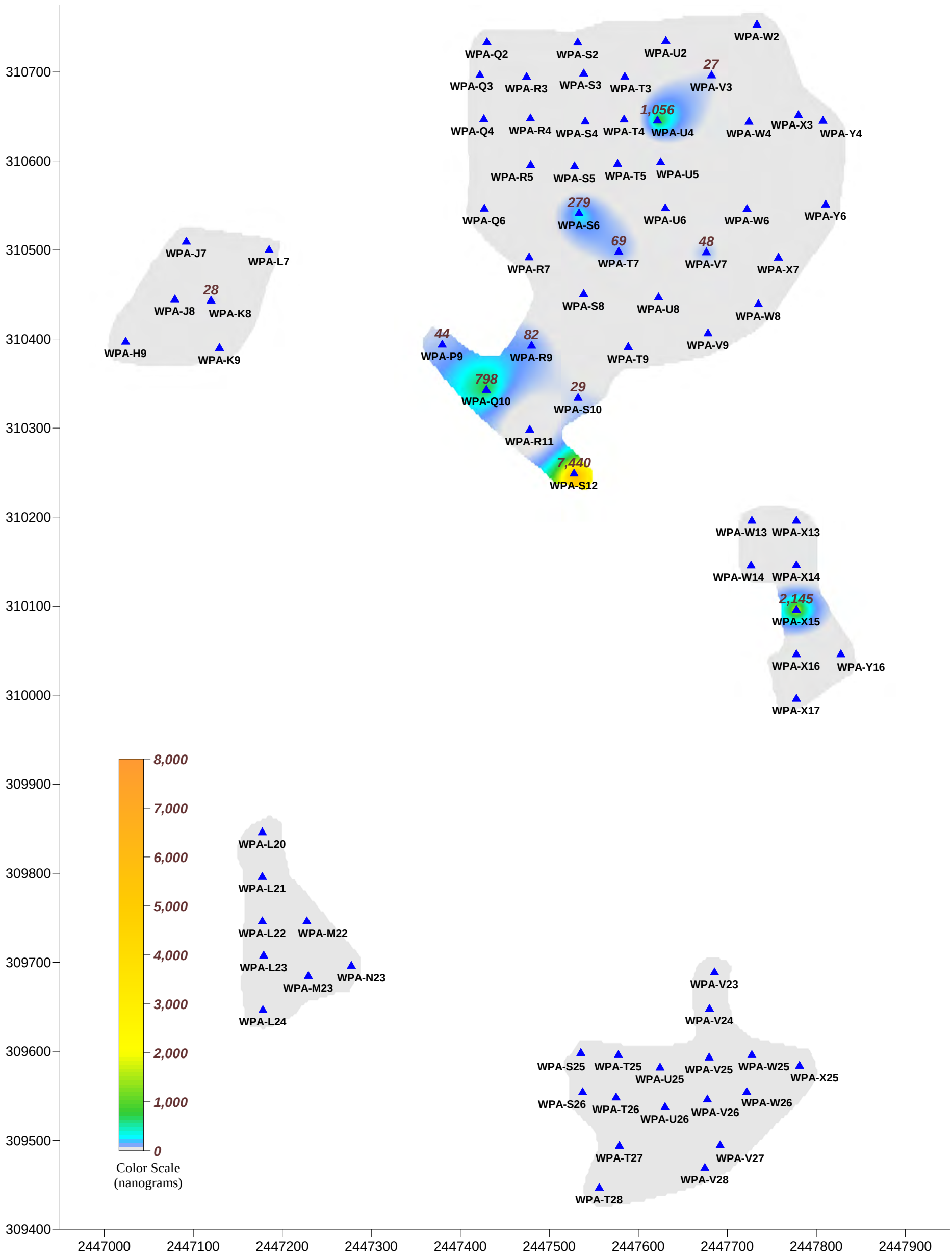
Beacon Project No. 3476, September 2016

Figure 7-1
Passive Soil-Gas Survey
Naphthalene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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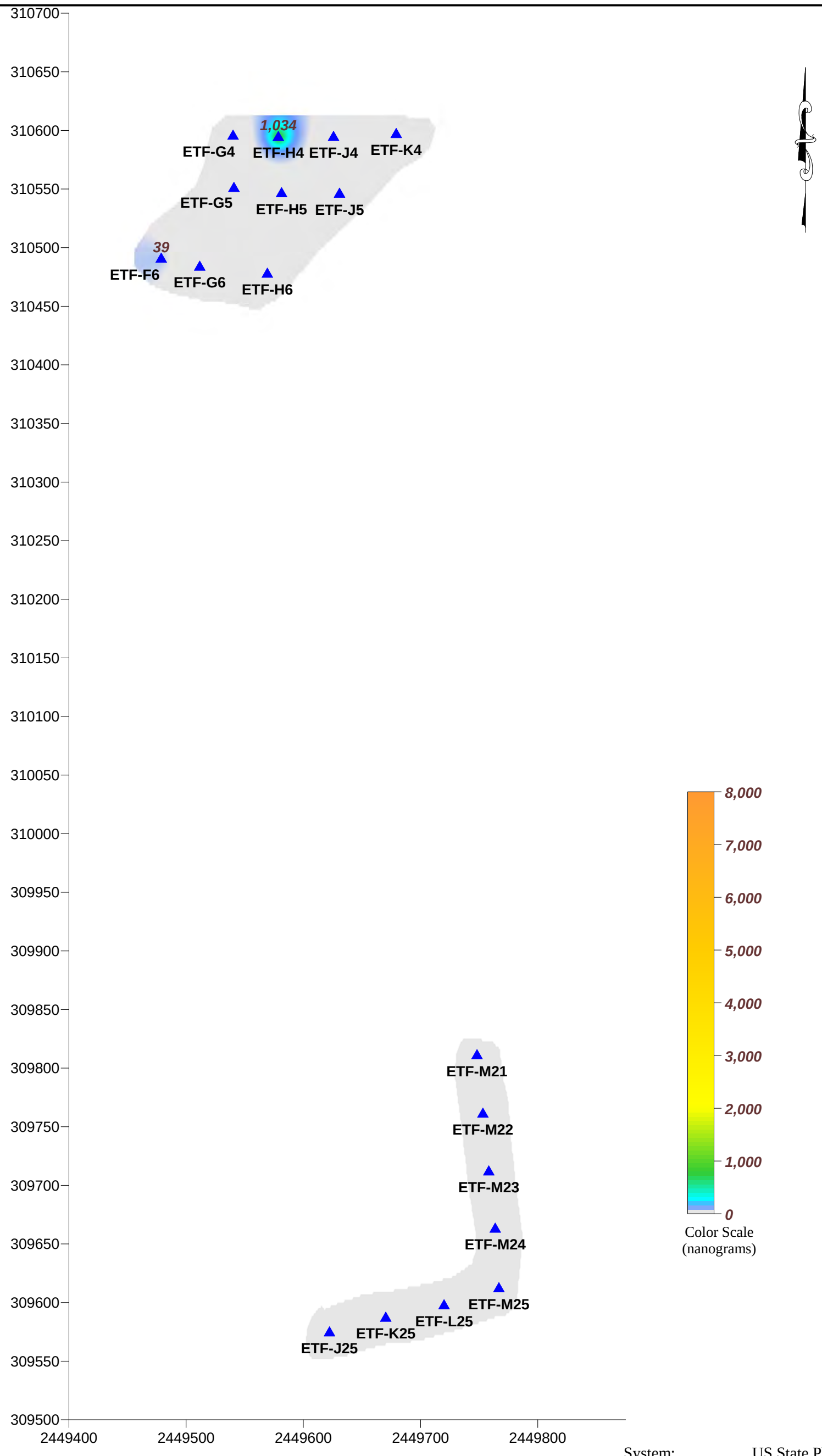
Beacon Project No. 3476, September 2016

Figure 7-2
Passive Soil-Gas Survey
Naphthalene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

BEACON ENVIRONMENTAL SERVICES, INC.

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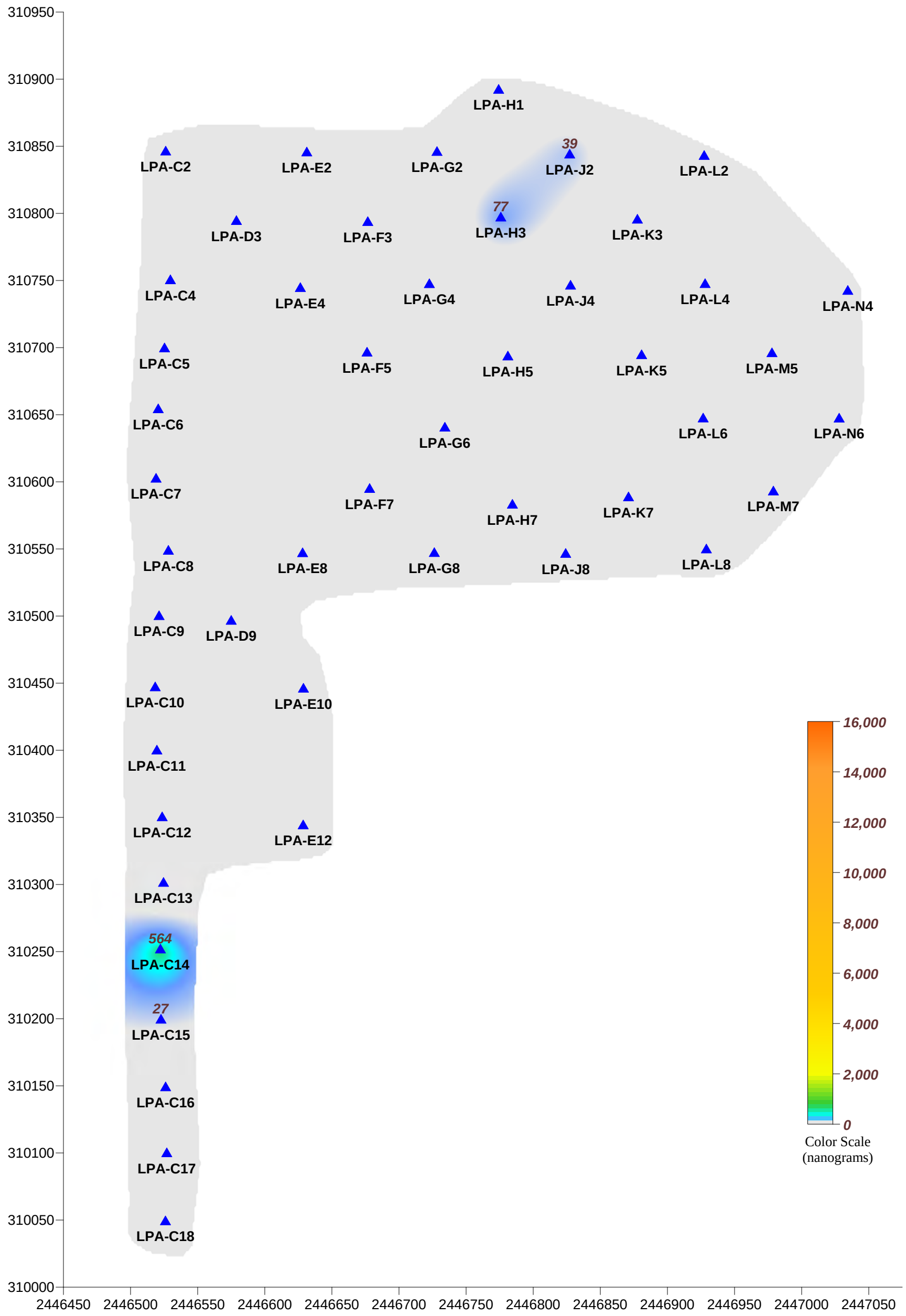
Figure 7-3
Passive Soil-Gas Survey
Naphthalene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK



LEGEND

1,000 NANOGRAMS/SAMPLER

▲ LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 75 150

System:	US State Plane
Zone:	OK N 3501
Datum:	WGS84
Coordinate Units:	Feet

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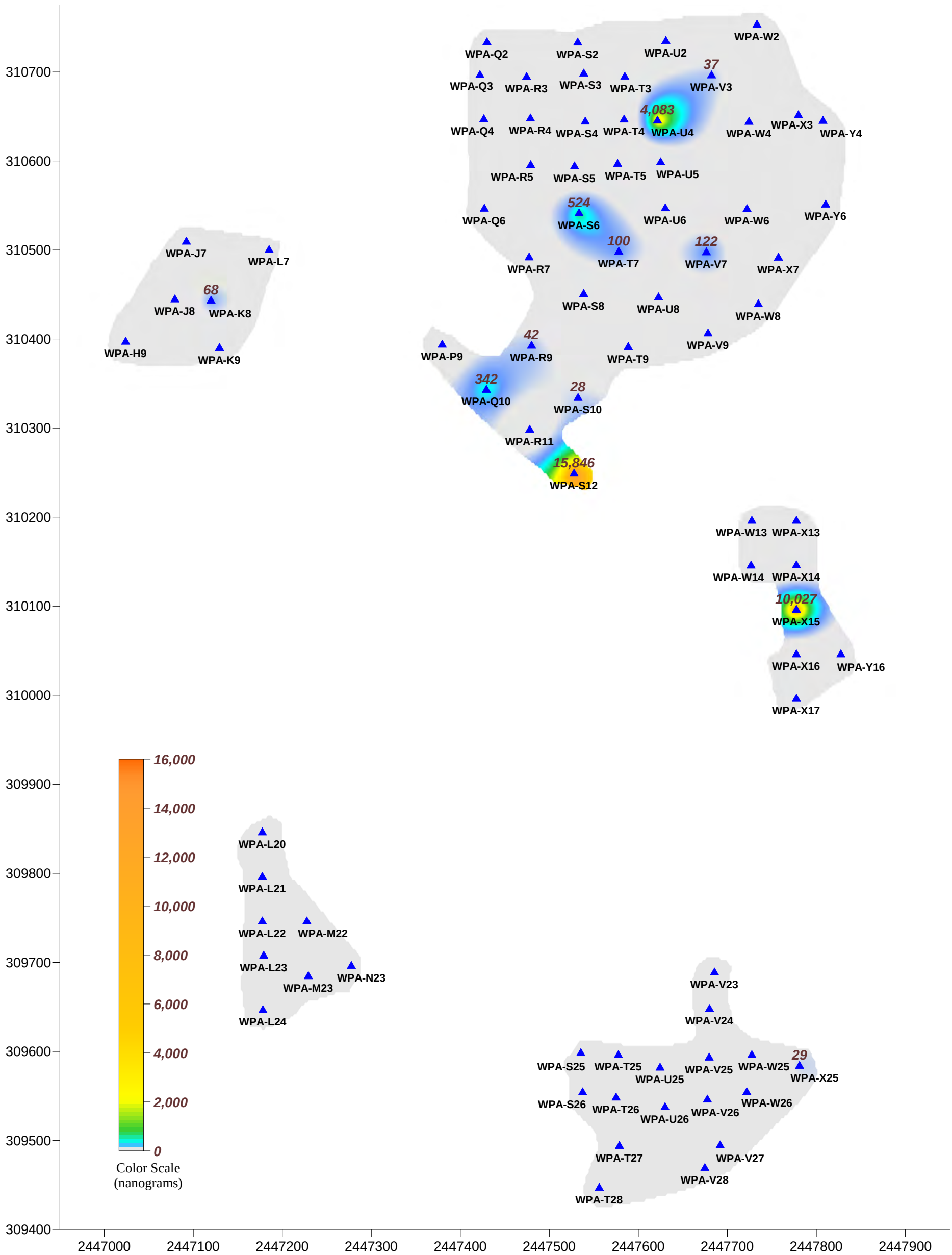
Figure 8-1
Passive Soil-Gas Survey
2-Methylnaphthalene (LPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

WPA-L24 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 110 220

BEACON ENVIRONMENTAL SERVICES, INC.

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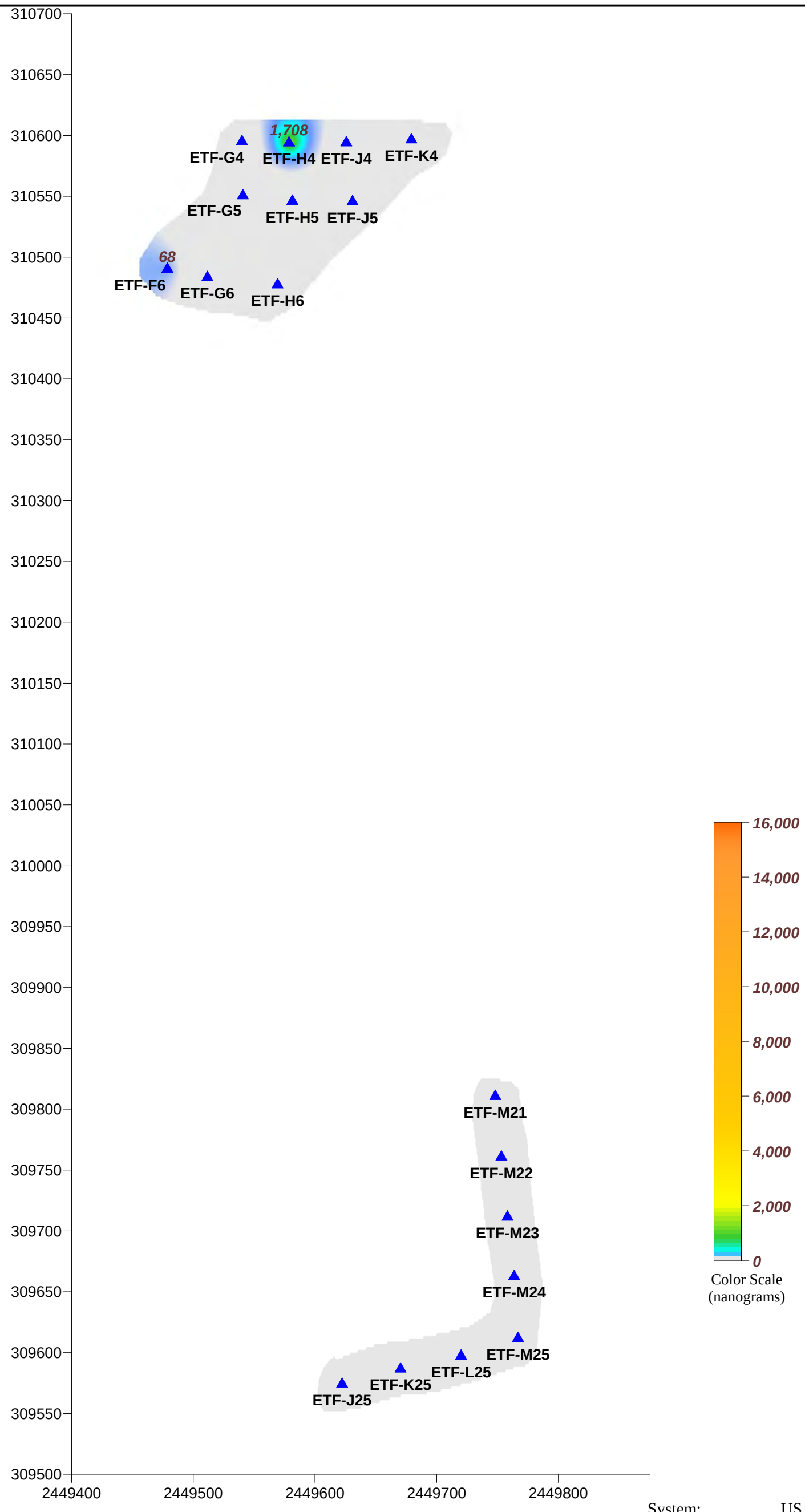
Beacon Project No. 3476, September 2016

Figure 8-2
Passive Soil-Gas Survey
2-Methylnaphthalene (WPA Area)

Wilcox Oil Company Superfund Site
Bristow, OK



System: US State Plane
Zone: OK N 3501
Datum: WGS84
Coordinate Units: Feet

LEGEND

1,000 NANOGRAMS/SAMPLER

LPA-C12 PASSIVE SOIL-GAS SAMPLE LOCATION

Scale in Feet

0 90 180

BEACON ENVIRONMENTAL SERVICES, INC.

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Beacon Project No. 3476, September 2016

Figure 8-3
Passive Soil-Gas Survey
2-Methylnaphthalene (ETF Area)

Wilcox Oil Company Superfund Site
Bristow, OK

Attachments

Attachment 1

APPLYING RESULTS FROM PASSIVE SOIL-GAS SURVEYS

The utility of soil-gas surveys is directly proportional to their accuracy in reflecting and representing changes in the subsurface concentrations of source compounds. Passive soil-gas survey results are the mass collected from the vapor-phase emanating from the source(s). The vapor-phase is merely a fractional trace of the source(s) and, as a matter of convenience, the units used in reporting detection values from passive soil-gas surveys are smaller than those employed for source-compound concentrations.

Passive soil gas data are reported in mass of compounds identified per sample location (e.g., nanograms (ng) or micrograms (µg) per sampler). Results from a passive soil gas survey typically are then used to guide where follow-on intrusive samples should be collected to obtain corresponding concentrations of the contaminants in soil, soil gas, and/or groundwater, as well as eliminate those areas where intrusive samples are not required. It is not practical to report passive soil gas data as concentration because the sampler's uptake rates of the compounds are often greater than the replenishment rates of the compounds around the sampler, which results in low bias measurements, and the replenishment rates will be dependent on several factors that include, at a minimum, soil gas concentrations, soil porosity and permeability, and soil moisture level.

Whatever the relative concentrations of source and associated soil gas, best results are realized when the ratio of soil-gas measurements to actual subsurface concentrations remains as close to constant as the real world permits. It is the reliability and consistency of this ratio, not the particular units of mass (*e.g.*, nanograms) that determine usefulness. Thus, BEACON emphasizes the necessity of conducting — at minimum — follow-on intrusive sampling in areas that show relatively high soil-gas measurements to obtain corresponding concentrations of soil and groundwater contaminants. These correspondent values furnish the basis for approximating a relationship. For extrapolating passive soil gas results to vapor intrusion evaluations, we recommend a minimum of three passive soil gas locations be converted to a shallow vapor well then sampled using an active soil gas method. Once a relationship is established, it can be used in conjunction with the remaining soil-gas measurements to estimate subsurface contaminant concentrations across the survey field. (See www.beacon-usa.com/passivesoilgas.html, Publication 1: *Mass to Concentration Tie-In for PSG Surveys* and Publication 4: *Groundwater and PSG Correlation*.) It is important to keep in mind, however, that specific conditions at individual sample points, including soil porosity and permeability, depth to contamination, and perched ground water, can have an impact on soil-gas measurements at those locations.

When passive soil-gas surveys are utilized as described above, the data provide information that can yield substantial savings in drilling costs and in time. They furnish, among other things, a checklist of compounds expected at each survey location and help to determine how and where drilling budgets can most effectively be spent. Passive soil-gas surveys can also be used as a remediation or general site monitoring tool that can be implemented on a quarterly, semi-annual or annual basis.

Attachment 2

FIELD PROCEDURES FOR PASSIVE SOIL-GAS SURVEYS

The following field procedures are routinely used during a BEACON Passive Soil-Gas Survey. Modifications can be and are incorporated from time to time in response to individual project requirements. In all instances, BEACON adheres to EPA-approved Quality Assurance and Quality Control practices.

A. Field personnel carry a BESURE Sample Collection Kit™ and support equipment to the site and deploy the passive samplers in a prearranged survey pattern. A passive sampler consists of a borosilicate glass vial containing hydrophobic adsorbent cartridges with a length of wire attached to the vial for retrieval. Although samplers require only one person for emplacement and retrieval, the specific number of field personnel required depends upon the scope and schedule of the project. Each Sampler emplacement generally takes less than two minutes.

B. At each survey point a field technician clears vegetation as needed and, using a hammer drill with a 1″- to 1½″-diameter bit, creates a hole 12 to 14 inches deep. [Note: For locations covered with asphalt, concrete, or gravel surfacing, the field technician drills a 1″- to 1½″-diameter hole through the surfacing to the soils beneath]. The technician then, using a hammer drill with a ½″ diameter bit, creates a hole three-feet deep. The hole is then sleeved with a 1″-diameter metal sleeve.

C. The technician then removes the solid plastic cap from a sampler and replaces it with a Sampling Cap (a plastic cap with a hole covered by screen meshing). The technician inserts the sampler, with the Sampling Cap end facing down, into the hole (**see attached figure**). The sampler is then covered with an aluminum foil plug and soils for uncapped locations or, for capped locations, an aluminum foil plug and a concrete patch. The sampler's location, time and date of emplacement, and other relevant information are recorded on the Field Deployment Form.

D. One or more trip blanks are included as part of the quality-control procedures.

E. Once all the samplers have been deployed, field personnel schedule sampler recovery and depart, taking all other equipment and materials with them.

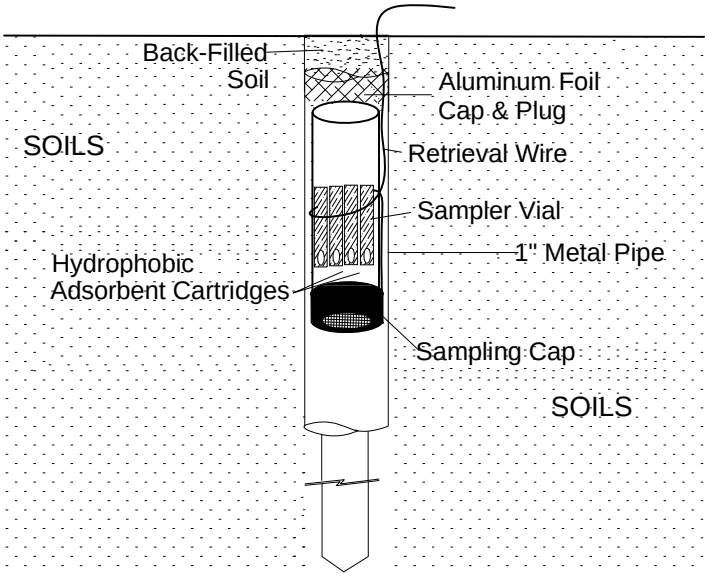
F. Field personnel retrieve the samplers at the end of the exposure period. At each location, a field technician withdraws the sampler from its hole, removes the retrieval wire, and wipes the outside of the vial clean using gauze cloth; following removal of the Sampling Cap, the threads of the vial are also cleaned. A solid plastic cap is screwed onto the vial and the sample location number is written on the label. The technician then records sample-point location, date, time, etc. on the Field Deployment Form.

G. Sampling holes are refilled with soil, sand, or other suitable material. If samplers have been installed through asphalt or concrete, the hole is filled to grade with a plug of cold patch or cement.

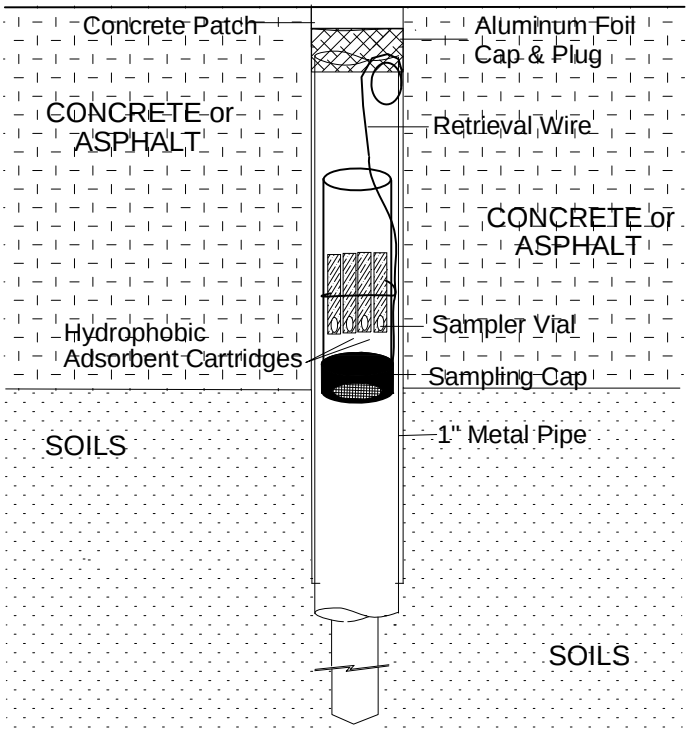
H. Following retrieval, field personnel ship or transport the passive samplers to BEACON's laboratory.

BEACON'S PASSIVE SOIL-GAS SAMPLER

DEPLOYMENT THROUGH SOILS



DEPLOYMENT THROUGH AN ASPHALT/CONCRETE CAP



Attachment 3

Chain of Custody Form

BEACON ENVIRONMENTAL SERVICES, INC.

CHAIN-OF-CUSTODY
PASSIVE SOIL-GAS SAMPLES

2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA
P: 1-410-838-8780 | F: 1-410-838-8740

Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave, Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/8/2016	8-24-2016			
WPA-X17	0930	1045	36	Grassy area/Soil	
WPA-X16	0915	1049	36	Grassy area/Soil	
WPA-X15	0910	1056	36	Grassy area/Soil	Hydrocarbon odor when installed.
WPA-X14	0900	1102	36	Grassy area/Soil	
WPA-X13	0930	1105	36	Grassy area/Soil	
WPA-W13	0935	1109	36	Grassy area/Soil	
WPA-Y16	1000	1120	36	Grassy area/Soil	
WPA-W14	0950	1113	36	Grassy area/Soil	

Special Notes/Instructions:

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CHAIN-OF-CUSTODY
PASSIVE SOIL-GAS SAMPLES

2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA
P: 1-410-838-8780 | F: 1-410-838-8740

Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	W.I.Cox O.I. Company Superfund Site	Office Location:	2890 Woodbridge Ave. Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX; Naphthalene; 2-Methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/8/2016	8-24-2016			
WPA-S25	1010	1135	36	Soil	
WPA-U25	1040	1151	36	Soil	
WPA-U26	1050	1155	36	Soil	
WPA-V26	1105	1200	36	Soil	
WPA-V27	1115	1210	36	Soil	
WPA-W26	1125	1325	36	Soil	
WPA-W25	1135	1311	36	Soil	
WPA-V25	1155	1203	36	Soil	
WPA-V24	1320	1320	36	Soil	
WPA-X25	1410	1315	36	Soil	Hydrocarbon odor when installed.
WPA-V23	1400	1332	36	Soil	
WPA-T26	1415	1139	36	Soil	
WPA-S26	1430	1328	36	Soil	
WPA-T27	1440	1142	36	Soil	
WPA-T28	1450	1145	36	Soil	

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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave., Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Engr)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8-8-2016	8-24-2016			
WPA-V28	1515	1208	36	Soil	
WPA-T25	1030	1132	36	Soil	
WPA-X25-D	1410	1315	36	Soil	Field duplicate.

Special Notes/Instructions:
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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2990 Woodbridge Ave., Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX; Naphthalene; 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/8/2016	8-24-2016			
WPA-N23	1720	1355	36	Grassy area/Soil	
WPA-M22	1730	1402	36	Soil	
WPA-L23	1735	1407	36	Soil	
WPA-L21	1755	1433	36	Soil/Rocky area	
WPA-L22	1800	1417	36	Soil	
WPA-L24	1810	1412	36	Soil	
WPA-M23	1830	1357	36	Soil	
WPA-L20	1815	1438	36	Soil/Rocky area	
Trip 2					

Special Notes/Instructions:
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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave, Edison, NJ.	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, α-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/10/2016	8/24/2016			
WPA-H9	0750	2032	36	Soil	Tar-like clumps on surface/Staining when installed.
WPA-K9	0805	2030	36	Soil	Stained soil when installed.
WPA-K8	0815	2029	36	Road base gravel/ soil	Stained soil when installed
WPA-J8	0845	2027	36	Soil	Stained soil when installed
WPA-J7	0845	2024	36	Soil	
WPA-L7	0910	2019	36	Soil/Concrete	Drilled through a concrete pad
WPA-K6	0900	2023	36	Soil	
WPA-K9-D	0805	2030	36	Soil	Field duplicate

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PASSIVE SOIL-GAS SAMPLES

Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave, Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/9/2016	8-24-2016			
WPA-U8	1640	1642	36	Soil	
WPA-W8	1630	1519	36	Soil	Installed next to concrete tank cradle.
WPA-X7	1625	1515	36	Concrete/Soil	Installed in concrete x 2' thick.
WPA-S12	1020	1714	36	Hard tar-like ground cover / Soil.	Strong gasoline odor when installed.
WPA-S10	1030	1716	36	Soil	Faint hydrocarbon odor.
WPA-R11	1040	1718	36	Soil	
WPA-Q10	1050	1724	36	Asphalt driveway/Soil	Strong gasoline odor when installed.
WPA-R9	1100	1722	36	Asphalt driveway/Soil	Concrete first 10". Gasoline odor when installed.
WPA-Q8	1110	—	36	Soil	unable to locate
WPA-R7	1115	1552	36	Soil	
WPA-Q6	1130	1923	36	Asphalt driveway/Soil	Some hydrocarbon odor when installed.
WPA-P9	1135	1732	36	Asphalt driveway/Soil	Strong gasoline odor when installed.
WPA-S8	1140	1654	36	Soil	
WPA-T9	1150	1650	36	Soil	
WPA-S6	1325	1546	36	Soil	Strong gasoline odor when installed.

Special Notes/Instructions:

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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	W. Cox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave, Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, naphthalene; 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/9/2016	8-24-2016			
WPA-T7	1335	1632	36	Soil	Strong gasoline odor when installed.
WPA-U5	1340	1545	36	Soil	Strong gasoline odor/Stained soil when installed.
WPA-V3	1350	1535	36	Soil	Stained soil when installed.
WPA-W4	1355	1531	36	Soil	
WPA-U6	1405	1638	36	Soil	Gasoline odor when installed/Stained Soil
WPA-V7	1415	1627	36	Soil	Stained soil when installed.
WPA-W6	1425	1507	36	Soil	
WPA-X5	1437	1501	36	Grassy area/Soil	
WPA-X3	1435	1458	36	Soil	Next to concrete tank cradle.
WPA-R5	1456	1932	36	Gravel driveway/Soil	Strong gasoline odor/Stained soil when installed.
WPA-S5	1500	1933	36	Gravel driveway/Soil	Strong oil-like odor/Stained soil when installed.
WPA-T5	1505	1935	36	Grassy area/Soil	
WPA-S4	1515	1944	36	Soil	
WPA-T4	1520	1942	36	Concrete	Drilled in concrete pad ≈9" thick.
WPA-S3	1525	1950	36	Soil	

Special Notes/Instructions:

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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave., Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, naphthalene, 2 methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/19/2016	8/24/2016			
WPA-T3	1530	1948	36	Soil	Stained soil when installed.
WPA-Q2	1535	1955	36	Some gravel / soil	Diesel odor / Stained soil when installed.
WPA-R3	1540	1958	36	Grassy area / Soil	
WPA-Q3	1550	1957	36	Grassy area / Soil	
WPA-Q4	1600	2002	36	Grassy area / Soil	
WPA-R4	1617	1959	36	Grassy area / Soil	
WPA-U4	1620	1540	36	Soil	
WPA-V9	1635	1522	36	Grassy area / Soil	
WPA-S2	1655	1952	36	Grassy area / Soil	
WPA-U2	1705	2044	36	Grassy area / Soil	
WPA-W2	1710	2048	36	Grassy area / Soil	
WPA-Y4	1715	2052	36	Grassy area / Soil	
WPA-Y6	1725	2057	36	Grassy area / Soil	
WPA-S12-D	1020	1714	36	Hard pan-like ground cover / Soil	Field duplicate.
WPA-T7-D	1335	1632	36	Soil	Field duplicate.

Special Notes/Instructions:

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Shipment of Field Kit to Laboratory — Custody Seal # **Intact? Y N**

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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave., Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene.			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/11/2016	8/25/2016			
LPA-E12	1520	0855	36	Grassy area/soil	
LPA-K7	1525	0952	36	Grassy area/soil	
LPA-J8	1535	0950	36	Grassy area/soil	
LPA-L8	1540	0954	36	Grassy area/soil	
LPA-N6	1545	1002	36	Asphalt driveway/ soil	
LPA-N4	1555	1005	36	Asphalt driveway/ soil.	
LPA-H5-D	0830	1012	36	Asphalt parking lot/ soil	Field duplicate
LPA-C14-D	1110	1126	36	Grassy area/soil	Field duplicate.
LPA-G8-D	1435	0947	36	Grassy area/soil	Field duplicate.

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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave; Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth, EA Eng	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene; 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/10/2016	8/25/2016			
ETF-F6	0930	1306	36	Grassy area/soil	
ETF-G6	1045	1308	36	Grassy area/soil	
ETF-H6	1052	1252	36	Grassy area/soil	
ETF-J5	1100	1246	36	Grassy area/soil	
ETF-H5	1115	1257	36	Grassy area/soil	
ETF-J4	1120	1248	36	Grassy area/soil	
ETF-K4	1125	1255	36	Grassy area/soil	
ETF-H4	1130	1256	36	Grassy area/soil	Strong diesel odor/stained soil noticed when installed
ETF-G4	1135	1259	36	Grassy area/soil	Hydrocarbon odor noticed when installed.
ETF-G5	1140	1302	36	Grassy area/soil	

Special Notes/Instructions:
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Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave, Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA crew)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene.			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/10/2016	8/25/2016			
ETF-M25	1500	1229	36	Grassy area/Soil	Strong hydrocarbon odor noticed when installed.
ETF-M24	1510	1230	36	Grassy area/soil	Strong hydrocarbon odor noticed when installed.
ETF-M23	1520	1232	36	Grassy area/soil	Staining noticed when installed.
ETF-M22	1525	1233	36	Grassy area/soil	
ETF-M21	1535	1235	36	Grassy area/soil	
ETF-J25	1540	1221	36	Grassy area/soil	
ETF-K25	1550	1223	36	Grassy area/soil	
ETF-L25	1555	1227	36	Grassy area/soil	
ETF-M24-D	1510	1230	36	Grassy area/soil	Field duplicate.
Trip 3					

Special Notes/Instructions:
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CHAIN-OF-CUSTODY
PASSIVE SOIL-GAS SAMPLES

Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	W. Cox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave., Edison, NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/11/2016	8/25/2016			
LPA-L4	0805	1007	36	Asphalt parking lot / Soil	
LPA-K3	0815	1008	36	Asphalt parking lot / Soil	
LPA-H3	0820	0927	36	Asphalt parking lot / Soil	
LPA-H5	0830	1012	36	Asphalt parking lot / Soil	
LPA-J4	0835	1011	36	Asphalt parking lot / Soil	
LPA-K5	0840	1010	36	Grassy area / Soil	
LPA-L6	0850	0959	36	Concrete sidewalk / Soil	
LPA-M7	0855	0956	36	Grassy area / Soil	
LPA-M5	0910	1001	36	Grassy area / Soil	
LPA-K1	0915	1056	36	Grassy area / Soil	
LPA-L2	0925	1053	36	Grassy area / Soil	Located next to asphalt road. Some staining noticed.
LPA-J2	0930	1058	36	Grassy area / Soil	
LPA-H1	0935	1059	36	Grassy area / Soil	Located next to asphalt road. Staining and strong hydrocarbon odor.
LPA-C2	0945	1154	36	Grassy area / Soil	
~~LPA-C3~~	~~1010~~	—	36	Grassy area / Soil	Unable to locate.

Special Notes/Instructions:

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Shipment of Field Kit to Laboratory — Custody Seal # **Intact? Y N**

Relinquished by:	Date/Time	Courier	Received by:	Date/Time
[signature]	8/26/2016 @ 1100	—	[signature]	8/26/2016 1100 hrs
[signature]	8/29/2016 1600 hrs	FedEx	Augusto Bermudez	8/30/2016 11:25

BEACON ENVIRONMENTAL SERVICES, INC.

CHAIN-OF-CUSTODY
PASSIVE SOIL-GAS SAMPLES

2203A Commerce Road, Suite 1
Forest Hill, MD 21050 USA
P: 1-410-838-8780 | F: 1-410-838-8740

Project Information		Client Information		
Beacon Project No.:	3476	Company Name:	Lockheed Martin	Client PO No.:
Site Name:	Wilcox Oil Company Superfund Site	Office Location:	2890 Woodbridge Ave., Edison NJ	
Site Location:	Bristow, Oklahoma	Samples Submitted By:	Ryan Guth (EA Eng)	Expedited Turnaround Time
Analytical Method:	U.S. EPA Method 8260C	Contact Phone No.:	609-937-9116	☐ Rush (Specify): ____ days
Target Compounds:	BTEX, Naphthalene, 2-methylnaphthalene			

Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/11/2016	8/25/2016			
LPA-C4	1020	1146	36	Grassy area/Soil	
LPA-C5	1025	1143	36	Grassy area/Soil	
LPA-C6	1030	1142	36	Grassy area/Soil	
LPA-C7	1035	1140	36	Grassy area/Soil	
LPA-C8	1040	1138	36	Grassy area/Soil	
LPA-C9	1045	1135	36	Grassy area/Soil	
LPA-C10	1050	1134	36	Grassy area/Soil	
LPA-C11	1055	1132	36	Grassy area/Soil	
LPA-C12	1120	1130	36	Grassy area/Soil	
LPA-C13	1105	1129	36	Grassy area/Soil	
LPA-C14	1110	1126	36	Grassy area/Soil	Strong hydrocarbon odor/staining of soil noticed.
LPA-C15	1120	1124	36	Grassy area/Soil	
LPA-C16	1125	1122	36	Grassy area/Soil	
LPA-C17	1130	1121	36	Grassy area/Soil	
LPA-C18	1145	1119	36	Grassy area/Soil	

Special Notes/Instructions:

Fedex # 7770 8824 9141

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Field Sample ID	Date Emplaced / Time Emplaced	Date Retrieved / Time Retrieved	Sampling Hole Depth (inches)	Type of Surface (Soil/Asphalt/ Concrete/Gravel)	Optional Sample Information (e.g., Description of Sample Location, Sample Condition, PID/FID Readings)
	8/11/2016	8/25/2016			
LPA-D3	1330	0921	36	Grassy area / Soil	
LPA-E4	1335	0918	36	Grassy area / Soil	
LPA-F3	1345	0932	36	Grassy area / Soil	
LPA-E2	1340	0923	36	Grassy area / Soil	
LPA-G2	1350	0925	36	Grassy area / Soil	
LPA-G4	1400	0929	36	Grassy area / Soil	
LPA-F5	1355	0933	36	Asphalt driveway / Soil	
LPA-D5	1410	~~0905~~	36	Grassy area / Soil	unable to locate.
LPA-G6	1445	0937	36	Grassy area / Soil	
LPA-G8	1435	0947	36	Grassy area / Soil	
LPA-H7	1430	0948	36	Grassy area / Soil	
LPA-F7	1500	0902	36	Grassy area / Soil	
LPA-E8	1450	0859	36	Grassy area / Soil	
LPA-D9	1505	1206	36	Grassy area / Soil	
LPA-E10	1510	0858	36	Grassy area / Soil	

Special Notes/Instructions:
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Attachment 4

LABORATORY PROCEDURES FOR PASSIVE SOIL-GAS SAMPLES

Following are laboratory procedures used with BEACON Passive Soil-Gas Surveys, a screening technology for expedited site investigation. After exposure, adsorbent cartridges from the passive samplers are analyzed using U.S. EPA Method 8260C as a guidance document, a capillary gas chromatographic/mass spectrometric method, modified to accommodate high temperature thermal desorption of the adsorbent cartridges and to meet the objectives of reporting semi-quantitative data. This procedure is summarized as follows:

A. The adsorbent cartridges are loaded with internal standards and surrogates prior to loading the autosampler with the cartridges. The loaded cartridges are purged in a helium flow. Then the cartridges are thermally desorbed in a helium flow onto a focusing trap. Any analytes in the helium stream are adsorbed onto a focusing trap.

B. Following trap focusing, the trap is thermally desorbed onto a Rxi-624Sil MS 20m, 0.18 mm ID, 1.00 micron film thickness capillary column.

C. The GC/MS is scanned between 35 and 300 Atomic Mass Units (AMU) at 3.12 scans per second.

D. BFB tuning criteria and the initial five-point calibration procedures are those stated in method SW846-8260C. System performance and calibration check criteria are met prior to analysis of samples. A laboratory method blank is analyzed after the daily standard to determine that the system is contaminant-free.

E. The instrumentation used for these analyses includes:

- Agilent 7890-5975c Gas Chromatograph/Mass Spectrometer;
- Markes Unity2 thermal desorber;
- Markes UltrA2 autosampler; and
- Markes Mass Flow Controller Modules.

and

- Agilent 7890-5975c Gas Chromatograph/Mass Spectrometer; and
- Markes TD100 thermal desorption system.