

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



#5109

FOR OGCC USE ONLY

RECEIVED
3/7/2012

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☒ Site/Facility Closure ☐ Other (describe): _____

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

OGCC Operator Number: 96850

Name of Operator: WPX Energy Rocky Mountain LLC

Address: 1058 County Road 215

City: Parachute State: CO Zip: 81635

Contact Name and Telephone:

Karolina Blaney

No: 970 683 2295

Fax: 970 285 9573

API Number: 05-045-06510

County: Garfield

Facility Name: _____

Facility Number: Arco Deep 1-27 (COGCC # 111608)

Well Name: _____

Well Number: _____

Location: (QtrQtr, Sec, Twp, Rng, Meridian): NESW, S27 T6S R97W 6th PM Latitude: 39.482579 Longitude: -108.207057

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☐ Y ☒ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): non-crop rangeland, non-irrigated

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Soli Series No. 57 - Parachute-Rhone Loams

Potential receptors (water wells within 1/4 mi, surface waters, etc.): There are no permitted water wells within 1/4mi.; an intermitten unnamed tributary of East Fork Conn Creek lies approx 230ft to the south-wouthwest; an unnamed spring lies 3400ft. cross-gradient to the east

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):

- ☒ Soils
☐ Vegetation
☐ Groundwater
☐ Surface Water

Extent of Impact:

Please see attached Notice of Completion Report
for Remediation # 5109

How Determined:

Visual observations, field screening,
analytical testing

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

Please refer to attached Notice of Completion Report for Remediation # 5109

Describe how source is to be removed:

Please refer to attached Notice of Completion Report for Remediation # 5109

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

Please refer to attached Notice of Completion Report for Remediation # 5109

REM # 5109

FORM
27
Rev 6/99State of Colorado
Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801, Denver, Colorado 80203
(303)894-2100 Fax: (303)894-2109Page 2
REMEDATION WORKPLAN (Cont.)Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: WILLIAMS
Well Name & No: ARCO DEEP 1-27
Facility Name & No: PIT Facility # 111608

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Please refer to attached Notice of Completion Report for Remediation # 5109

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

Please refer to attached Notice of Completion Report for Remediation # 5109

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.**Is further site investigation required?** ☐ Y ☐ N If yes, describe:

Please refer to attached Notice of Completion Report for Remediation # 5109

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Please refer to attached Notice of Completion Report for Remediation # 5109

IMPLEMENTATION SCHEDULEDate Site Investigation Began: _____ Date Site Investigation Completed: _____ Date Remediation Plan Submitted: 3/7/2012
Remediation Start Date: _____ Anticipated Completion Date: _____ Actual Completion Date: 3/7/2012

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Karolina Blaney

Signed: _____

Karolina BlaneyTitle: Environmental SpecialistDate: 3/7/2012

OGCC Approved: _____

Chris CanfieldTitle: FOR Chris CanfieldEPS NW Region Date: 03/12/2012



InterTech

February, 2012

NOTICE OF COMPLETION REPORT

ARCO DEEP 1-27 PRODUCTION PIT

T6S R97W Section 27 39.492515, -108.207687

Garfield County, Colorado

Prepared For:



**WPX Energy Rocky Mountain, LLC
P.O. Box 370
Parachute, CO 81635**

Prepared By:



InterTech

**InterTech Environmental & Engineering, LLC
743 Horizon Court, Suite 110
Grand Junction, Colorado 81506**

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1.0 - INTRODUCTION

This document was prepared to describe the procedures and protocol used for the closure of the production pit at the Arco Deep 1-27 well site, Remediation Number 5109. The practices used are as described in the Williams Highlands (Williams) Pit Closure Plan Revision 5.1, COGCC Document Number 01175818. The report provides the documentation necessary to demonstrate a comprehensive and diligent investigation of the pit and adjacent environment which was obtained as described and in accordance with all appropriate county, state, and federal rules and regulations.

1.1 - SITE DESCRIPTION

The Williams Arco Deep 1-27 well site is located in the northwest quarter of the southeast quarter of Section 27 of Township 6 South and Range 97 West in Garfield County, Colorado. The coordinates for the site are:

API/FACILITY ID	LATITUDE	LONGITUDE
05-045-06510	39.492515	-108.207687

The well pad is situated approximately 8,362 feet above sea level on non-crop rangelands and Parachute-Rhone loam soils with moderate to severe erosion potential. Receiving waters include an unnamed ephemeral stream that is a tributary to Baker Gulch. No flow was observed during the pit closure process. The estimated distance to the receiving waters is approximately 315 feet. Vegetation consists of sage brush and grassland communities. See Figure 1 in Appendix A for a Site Vicinity map.

2.0 - PIT CONTENTS REMOVAL AND SAMPLING

The first step of the pit closure process is the submittal and approval from the COGCC Form 27 – Site Investigation and Remediation Plan. This portion of the project is completed by WPX. The second stage of the pit closure process involves removal of the pit contents. If the contents are liquid, a vacuum truck will be used to remove the material. The contents will be managed in accordance with their composition and reuse potential. If the contents are solid or semi-solid, heavy equipment may be used to remove the pit contents. In either instance, if the pit is lined, the utmost care must be exercised to ensure that the liner integrity is not compromised.

2.1 - PIT CONTENTS AND/OR TANK REMOVAL

The pit contents were removed and disposed of prior to EAA or InterTech's involvement in the project.

2.2 - PIT CONTENTS AND/OR TANK SAMPLING PROCEDURES

No samples were collected from the pit contents removed from the Arco Deep 1-27 production pit prior to disposal.

3.0 - PIT LINER MANAGEMENT

WPX has developed a process for removing pit liners from oil and gas production pits that enables the plastic liner material to be recycled. The following describes the procedures established for the liner inspection and removal.

3.1 - LINER INSPECTION

Following the removal of the pit contents, the liner was inspected for rips and/or tears that may have compromised the liner integrity. The locations of all identified rips and/or tears in the liner were documented using a Global Positioning System (GPS) device with sub-foot accuracy. The high water mark on the liner was observed to be approximately two (2) to three (3) feet below the crest of the pit indicating that no overfilling had occurred.

The liner appeared to be in good condition. See Figure 5 in Appendix A for a diagram of the liner inspection results. Three rips and/or tears were observed below the crest of the pit toward the southwest end of the pit.

LOCATION	LATITUDE	LONGITUDE
BTM - W	39.492202	-108.207844
BTM - W	39.492203	-108.207860
WSW	39.492215	-108.207895
NSW	39.492300	-108.207834
NSW	39.492297	-108.207840
NSW	39.492308	-108.207831
NSW	39.492313	-108.207822
NSW	39.492318	-108.207818
ESW	39.492351	-108.207738
ESW	39.492356	-108.207734
ESW	39.492335	-108.207717
SSW	39.492282	-108.207691
WSW	39.492163	-108.207867
WSW	39.492169	-108.207892

3.2 - LINER REMOVAL PROCEDURES

During the liner removal process, the utmost care was taken to ensure that liquid or sludge was not released from the liner system to the surrounding environment. In order to facilitate liner removal, the liner was cut along the circumference of the pit crest. This process allowed the liners to be removed in an efficient and expedited manner.

A track hoe was used to remove the liner. The excavation contractor secured the corners of the liner and then maneuvered in a manner to fold the liner back onto itself within the pit. This allowed any residual liquids or sludge to be extracted prior to the liners' removal and prevented any of the pit's contents from impacting the sub-liner soils. The liner was placed in a lined and bermed secondary containment located west of the production pit.

4.0 - SUB-LINER SOILS INVESTIGATION

After removal of the liner, EAA evaluated the pit for evidence of contamination. The soils were examined visually, PID readings were collected, and PetroFlag field tests were conducted.

4.1 - VISUAL AND OLFACTORY OBSERVATION

Visual observation of the pit showed two (2) areas with discoloration of the soils. The first was on the bottom of the east side sidewall, the second was in the bottom east section of the pit. A slight odor was detected in the soils when they were disturbed during PID screening and sample collection.

4.2 - PID SCREENING

Using a RAE Systems PID, the side walls and pit bottom soils were screened for organic volatile compounds. Using a Trimble Geo XH GPS unit, a grid system was superimposed on the pit and field screening completed on each node. Sample locations and readings are as follows:

LOCATION	LATITUDE	LONGITUDE	PID READING
E	39.492350	-108.207696	18.6
ESW	39.492322	-108.207735	2.3
SSW	39.492293	-108.207703	4
SSW	39.492278	-108.207717	8.3
BTM - E	39.492312	-108.207802	439
BTM - E	39.492297	-108.207784	162
BTM - E	39.492257	-108.207803	56.6
BTM - E	39.492242	-108.207786	130
ESW	39.492313	-108.207677	0
ESW	39.492324	-108.207698	0
ESW	39.492335	-108.207717	0
ESW	39.492351	-108.207738	0
ESW	39.492362	-108.207765	0
ESW	39.492371	-108.207785	0
BTM - E	39.492284	-108.207740	1.6
BTM - E	39.492298	-108.207817	48.2
NSW	39.492306	-108.207831	0
BTM - E	39.492287	-108.207798	4.6
BTM - E	39.492274	-108.207781	61.9
BTM - E	39.492263	-108.207764	46.2
SSW	39.492252	-108.207744	0
BTM - E	39.492299	-108.207726	0
BTM - E	39.492295	-108.207761	11.3
NSW	39.492318	-108.207818	0
BTM - E	39.492313	-108.207747	0
BTM - E	39.492323	-108.207767	0
BTM - E	39.492332	-108.207786	0
NSW	39.492341	-108.207804	0
ESW	39.492301	-108.207690	0
ESW	39.492313	-108.207709	0
ESW	39.492337	-108.207756	0
ESW	39.492347	-108.207775	0
NSW	39.492358	-108.207793	0

LOCATION	LATITUDE	LONGITUDE	PID READING
NSW	39.492272	-108.207858	0
BTM - W	39.492262	-108.207847	0
BTM - W	39.492251	-108.207832	0
BTM - W	39.492240	-108.207816	56.1
BTM - W	39.492228	-108.207800	130
SSW	39.492218	-108.207781	0
SSW	39.492207	-108.207794	0
BTM - W	39.492218	-108.207815	18.3
BTM - W	39.492228	-108.207833	90.7
BTM - W	39.492237	-108.207849	74.4
BTM - W	39.492248	-108.207862	79.5
NSW	39.492257	-108.207875	0
NSW	39.492239	-108.207892	0
BTM - W	39.492231	-108.207878	38.6
BTM - W	39.492221	-108.207861	34.5
BTM - W	39.492213	-108.207843	95.2
BTM - W	39.492203	-108.207826	15.6
SSW	39.492192	-108.207810	0.4
WSW	39.492181	-108.207870	1.4
SSW	39.492178	-108.207824	1.6
BTM - W	39.492189	-108.207844	9.4
BTM - W	39.492203	-108.207860	0
BTM - W	39.492209	-108.207876	0
WSW	39.492215	-108.207895	0
NSW	39.492224	-108.207908	0
WSW	39.492169	-108.207892	0
WSW	39.492163	-108.207867	0
NSW	39.492285	-108.207842	4.5
BTM - E	39.492280	-108.207832	0
BTM - E	39.492292	-108.207788	160
SSW	39.492228	-108.207763	0
ESW	39.492330	-108.207743	0
BTM - W	39.492234	-108.207871	0
NSW	39.492246	-108.207881	0
WSW	39.492163	-108.207849	0
WSW	39.492172	-108.207868	0
WSW	39.492185	-108.207888	0
WSW	39.492201	-108.207908	0
WSW	39.492211	-108.207926	0
NSW	39.492231	-108.207911	0
NSW	39.492222	-108.207894	0
BTM - W	39.492207	-108.207866	0
BTM - W	39.492193	-108.207850	0
SSW	39.492182	-108.207827	0
SSW	39.492192	-108.207805	0
BTM - W	39.492216	-108.207838	0
BTM - W	39.492224	-108.207855	0

In areas where readings were elevated above 100 ppm, additional PID measurements were collected to delineate any potential contamination. See Figure 2 in Appendix A for a location map of the initial PID readings.

4.3 - PETROFLAG INVESTIGATION

Due to the expedited timeframe in place for closure of the production pit, PetroFlag tests were conducted on the initial sample collected from the bottom east section of the pit. The following measurement, also located on Figure 3 in Appendix A, were obtained from the PetroFlag test:

SAMPLE ID	LATITUDE	LONGITUDE	PETROFLAG READING
BTM – E	39.492312	-108.207802	2870

4.4 - SAMPLE COLLECTION

Initial soil samples were collected from the pit on July 15, 2010. Samples were collected from each of the four (4) pit side walls as well as two (2) from the bottom of the pit. Three samples were also collected from undisturbed native topsoil to create a comprehensive database of local soil characteristics.

The sampled material was placed directly into laboratory specified sample containers and labeled in accordance with the relevant COGCC Table 910-1 analytes. The samples were then placed into a cooler with blue ice to cool to 4° C to preserve sample integrity. Samples were submitted to Accutest Laboratories via overnight courier for analysis of contaminants listed in COGCC Table 910-1. The sample names and locations, also located in Appendix A, Figure 4, are as follows:

SAMPLE ID	SAMPLE LOCATION	LATITUDE	LONGITUDE
N-P-AD127	North Sidewall	39.492285	-108.207842
S-P-AD127	South Sidewall	39.492227	-108.207763
E-P-AD127	East Sidewall	39.492330	-108.207744
W-P-AD127	West Side wall	39.492181	-108.207870
B1W-P-AD127	Bottom – East	39.492240	-108.207816
B1E-P-AD127	Bottom – West	39.492292	-108.207788
BG1-P-AD127	Background	39.492716	-108.207700
BG2-P-AD127	Background	39.492271	-108.207213
BG3-P-AD127	Background	39.492034	-108.208035

5.0 - MANAGEMENT OF IMPACTED SOILS

5.1 - EXCAVATION PROCEDURES

Based on visual/olfactory observations and PetroFlag readings, it was surmised that the samples collected would exceed the standards set by COGCC for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), GRO, and/or DRO. Therefore, excavation of the pit began on August 2, 2010. The excavation started on the east side wall and moved downward to the bottom of the east section of the pit. All materials removed from the pit were placed in plastic lined secondary containment on the pad site. The excavation was driven by visual and olfactory observations, PID readings, and PetroFlag measurements.

The following PID readings, also found on Figure 2b of Appendix A, were collected during the excavation process:

LOCATION	LATITUDE	LONGITUDE	PID READING
Excavation Bottom	39.492277	-108.207840	0
Excavation Bottom	39.492271	-108.207827	0
Excavation Bottom	39.492268	-108.207817	0
Excavation Bottom	39.492298	-108.207764	14.2
Excavation Bottom	39.492287	-108.207767	6.7
Excavation Bottom	39.492282	-108.207777	6.8
Excavation Bottom	39.492272	-108.207786	6.3
Excavation Bottom	39.492281	-108.207801	12.7
Excavation Bottom	39.492292	-108.207794	21.6
Excavation Bottom	39.492301	-108.207785	14.9
Excavation Bottom	39.492307	-108.207780	14.7
Excavation Bottom	39.492309	-108.207792	34.8
Excavation Bottom	39.492290	-108.207800	62.8
Excavation Bottom	39.492287	-108.207809	20.6
Excavation Bottom	39.492276	-108.207828	81.3
Excavation Bottom	39.492283	-108.207836	76.6
Excavation Bottom	39.492249	-108.207838	16.1
Excavation Bottom	39.492246	-108.207823	3.5
Excavation Bottom	39.492263	-108.207832	14.2
Excavation Bottom	39.492258	-108.207821	17.6

Excavation Bottom	39.492294	-108.207824	28.8
Excavation Bottom	39.492306	-108.207813	42.9
Excavation Bottom	39.492317	-108.207805	29.9

5.2 - SAMPLING OF EXCAVATION AREA

The excavation was driven by visual and olfactory observations, PID readings, and PetroFlag measurements. During the excavation of the east bottom portion of the pit, a rock shelf was encountered. The track hoe attempted to break through on several occasions; however, was unsuccessful. A soil sample was collected from the bottom of the excavation and submitted for analysis. Analytical results showed GRO and DRO concentrations to exceed the allowable concentrations in Table 910-1. The pit then underwent monitored natural attenuation until a re-sampling of the excavation area was conducted by InterTech on November 21, 2011. See Figure 4b and 4c in Appendix A for the Excavation Sample Location map.

The sampled material was placed directly into laboratory specified sample containers and labeled in accordance with the relevant COGCC Table 910-1 analytes. The samples were then placed into a cooler with blue ice to cool to 4° C to preserve sample integrity. Samples were submitted to Accutest Laboratories via overnight courier for analysis of BTEX, GRO, and DRO.

The sample names and locations are as follows:

SAMPLE ID	SAMPLE DATE	SAMPLE LOCATION	LATITUDE	LONGITUDE
B2EA-P-AD127	08/02/2010	Bottom - East	39.492285	-108.207804
B2EB-P-AD127	11/21/2011	Bottom - East	39.492285	-108.207804

5.3 - SAMPLING OF EXCAVATED SOILS

To complete the pit closure, the excavated material will be thoroughly mixed with native soils, sampled to ensure compliance with COGCC regulations, and placed back into the excavation. The top three (3) feet of the pit will be backfilled with native soils only. The pit will be reclaimed in accordance with COGCC Rules 909 and 1000 Series.

Any contaminated soils unable to be placed back into the pit due to capacity restraints, will undergo on site remediation or be disposed of at an approved disposal facility.

6.0 - ANALYTICAL INTERPRETATION

Analytical results were received from Accutest Laboratories in reports dated July 29, 2010, August 10, 2010 and October 31, 2011.

6.1 - BACKGROUND

A summary of Table 910-1 parameters for the background samples collected on August 17, 2010, are as follows:

PARAMETER	UNITS	STANDARD	BACKGROUND		
			1	2	3
TPH-GRO (C6-C10)	mg/kg	500	ND (1.0)	ND (1.0)	ND (1.1)
TPH-DRO (C10-C28)			34.7	ND (14)	290
Benzene	ug/kg	170	ND (1.6)	ND (1.6)	ND (1.7)
Toluene	ug/kg	85000	ND (5.2)	ND (5.2)	ND (5.6)
Ethylbenzene	ug/kg	100000	ND (2.1)	ND (2.1)	ND (2.2)
Xylene	ug/kg	175000	ND (3.6)	4.0 J	ND (3.9)
Acenaphthene	ug/kg	1000000	ND (6.5)	ND (6.5)	ND (7.0)
Anthracene	ug/kg	1000000	ND (4.5)	ND (4.5)	ND (4.8)
Benzo(a)anthracene	ug/kg	220	ND (6.8)	ND (6.8)	ND (7.3)
Benzo(a)pyrene	ug/kg	22	ND (4.4)	ND (4.4)	ND (4.7)
Benzo(b)fluoranthene	ug/kg	220	ND (5.0)	ND (5.0)	ND (5.4)
Benzo(k)fluoranthene	ug/kg	2200	ND (4.4)	ND (4.4)	ND (4.7)
Chrysene	ug/kg	22000	ND (3.5)	ND (3.5)	ND (3.7)
Dibenzo(a,h)anthracene	ug/kg	22	ND (5.1)	ND (5.1)	ND (5.5)
Fluoranthene	ug/kg	1000000	ND (4.3)	ND (4.3)	ND (4.6)
Fluorene	ug/kg	1000000	ND (6.8)	ND (6.8)	ND (7.3)
Indeno(1,2,3-cd)pyrene	ug/kg	220	ND (4.5)	ND (4.6)	ND (4.9)
Naphthalene	ug/kg	23000	ND (7.7)	ND (7.7)	ND (8.3)
Pyrene	ug/kg	1000000	ND (4.7)	ND (4.7)	ND (5.1)
Arsenic	mg/kg	0.39	6.6	5.1	3.2
Barium	mg/kg	15000	403	262	318
Cadmium	mg/kg	70	<0.25	0.438	<0.25
Chromium, Hexavalent	mg/kg	23	<2.1	<2.1	<2.2
Chromium, Trivalent	mg/kg	120000	50.6	28.8	45.2
Copper	mg/kg	3100	18.2	15.3	14.8
Lead	mg/kg	400	68.2	13.7	13.3
Mercury	mg/kg	23	<0.10	<0.098	<0.11
Nickel	mg/kg	1600	20.4	13.6	20.6
Selenium	mg/kg	390	<4.1	<4.0	<4.6
Silver	mg/kg	390	<2.5	<2.4	<2.7
Zinc	mg/kg	23000	89.2	47.3	52.9
Sodium Adsorption Ratio	ratio	12	0.509	0.218	0.273
Specific Conductivity	umhos/cm	4000	86.8	74.7	125
pH	su	6-9	9.25	8.14	8.41

6.2 - INITIAL SAMPLING

Initial sample analytical results showed all side wall samples and the bottom east sample to exceed Table 910-1 standards for TPH, Sodium Adsorption Ration (SAR), pH, and Electrical Conductivity (EC). A summary of Table 910-1 parameters for the initial sidewall and pit bottom samples collected on August 19, 2010, is as follows:

Parameter	Units	Standard	Sidewalls				Bottom	
			N	S	E	W	W	E
TPH-GRO (C6-C10)	mg/kg	500	ND (4.2)	ND (4.2)	ND (5.0)	ND (4.3)	ND (5.8)	ND
TPH-DRO (C10-C28)			232	26.5	191	350	190	350
Benzene	ug/kg	170	ND (8.0)	ND (8.0)	ND (9.4)	ND (8.2)	ND (11)	ND
Toluene	ug/kg	85000	ND (9.0)	12.4	15.9	ND (9.2)	21.4	ND
Ethylbenzene	ug/kg	100000	ND (10)	ND (10)	ND (12)	ND (10)	ND (14)	ND
Xylene	ug/kg	175000	ND (11)	ND (11)	ND (13)	ND (11)	ND (15)	ND
Acenaphthene	ug/kg	1000000	ND (34)	ND (34)	ND (38)	ND (35)	ND (8.2)	ND
Anthracene	ug/kg	1000000	ND (23)	ND (23)	ND (26)	ND (24)	ND (5.7)	ND
Benzo(a)anthracene	ug/kg	220	ND (36)	ND (35)	ND (40)	ND (37)	ND (8.6)	ND
Benzo(a)pyrene	ug/kg	22	ND (23)	ND (23)	ND (26)	ND (24)	ND (5.5)	ND
Benzo(b)fluoranthene	ug/kg	220	ND (26)	ND (26)	ND (29)	ND (27)	ND (6.4)	ND
Benzo(k)fluoranthene	ug/kg	2200	ND (23)	ND (23)	ND (26)	ND (24)	ND (5.5)	ND
Chrysene	ug/kg	22000	ND (18)	ND (18)	ND (20)	ND (19)	ND (4.4)	ND
Dibenzo(a,h)anthracene	ug/kg	22	ND (27)	ND (27)	ND (30)	ND (28)	ND (6.5)	ND
Fluoranthene	ug/kg	1000000	ND (22)	ND (22)	ND (25)	ND (23)	ND (5.4)	ND
Fluorene	ug/kg	1000000	70.4	ND (35)	ND (40)	ND (37)	ND (8.6)	ND
Indeno(1,2,3-cd)pyrene	ug/kg	220	ND (24)	ND (24)	ND (27)	ND (25)	ND (5.7)	ND
Naphthalene	ug/kg	23000	ND (40)	ND (40)	ND (45)	ND (41)	ND (9.7)	ND
Pyrene	ug/kg	1000000	ND (24)	ND (24)	ND (27)	ND (25)	ND (5.9)	ND
Arsenic	mg/kg	0.39	5.7	5.3	4.6	3.1	5	3.1
Barium	mg/kg	15000	304	388	361	310	276	310
Cadmium	mg/kg	70	<0.99	<1.0	<1.0	<1.1	<1.1	<1.1
Chromium, Hexavalent	mg/kg	23	<2.2	<2.1	<2.4	<2.2	<2.6	<2.2
Chromium, Trivalent	mg/kg	120000	47.9	44.2	46.6	36.4	48.9	36.4
Copper	mg/kg	3100	11.9	13.2	12	15.1	10.5	15.1
Lead	mg/kg	400	12.1	12	12	21.7	12.4	21.7
Mercury	mg/kg	23	<0.11	<0.11	<0.12	<0.11	<0.13	<0.11
Nickel	mg/kg	1600	19.2	19	20.3	18.6	20.4	18.6
Selenium	mg/kg	390	<4.9	<5.2	<5.2	<5.4	<5.5	<5.4
Silver	mg/kg	390	<3.0	<3.1	<3.1	<3.2	<3.3	<3.2
Zinc	mg/kg	23000	43.9	43.2	44.9	48.7	44	48.7
Sodium Adsorption Ratio	ratio	12	2.97	2.92	2.49	1.04	19.1	1.04
Specific Conductivity	umhos/cm	4000	1060	488	261	334	1510	334
pH	su	6-9	9.01	9.41	9.37	8.83	9.55	8.83

6.3 - CONFIRMATION SAMPLES

The excavation was driven by visual and olfactory observations, PID readings, and PetroFlag measurements. Once field screening indicated that the contamination had been removed, confirmation samples were collected again from the four (4) side walls and the east bottom portion of the pit. Due to laboratory analytical confirming an elevated concentration of DRO, the south side wall underwent additional excavation on August 27. A summary of Table 910-1 parameters for the final confirmation sidewall and pit bottom samples collected on August 20, 21, and 27, 2010, are as follows:

Parameter	Units	Standard	Bottom E
TPH-GRO (C6-C10)	mg/kg	500	BDL
TPH-DRO (C10-C28)			10.0

7.0 - REMEDIATION AND RECLAMATION

Remediation of excavated impacted soils can occur through one (1) or a combination of several methods. These methods include, but are not limited to, solarization, microbial treatment, and/or the addition of organics. To complete the pit closure, the excavated material will be thoroughly mixed with native soils, sampled to ensure compliance with COGCC regulations, and placed back into the excavation. The top three (3) feet of the pit will be backfilled with native soils only. The pit will be reclaimed in accordance with COGCC Rules 909 and 1000 Series.

Any contaminated soils unable to be placed back into the pit due to capacity restraints will undergo on site remediation or be disposed of at an approved disposal facility.



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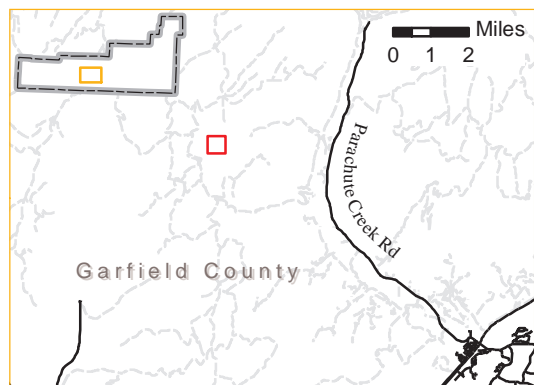


APPENDIX A

FIGURES

TOWNSHIP: 6 S LATITUDE: 39.492508
 SECTION: 27 LONGITUDE: -108.204329
 RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



Site Vicinity Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 1

- USGS Spring / Seep
- USGS Wells
- USGS Streams
- Soils

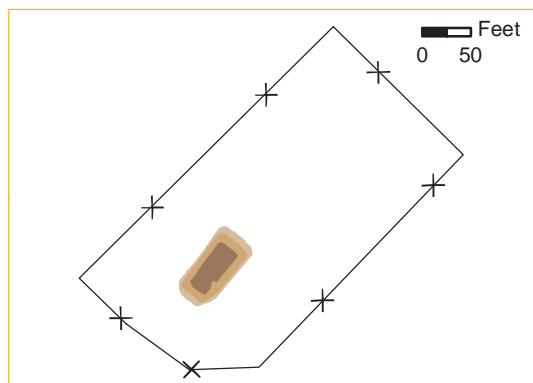
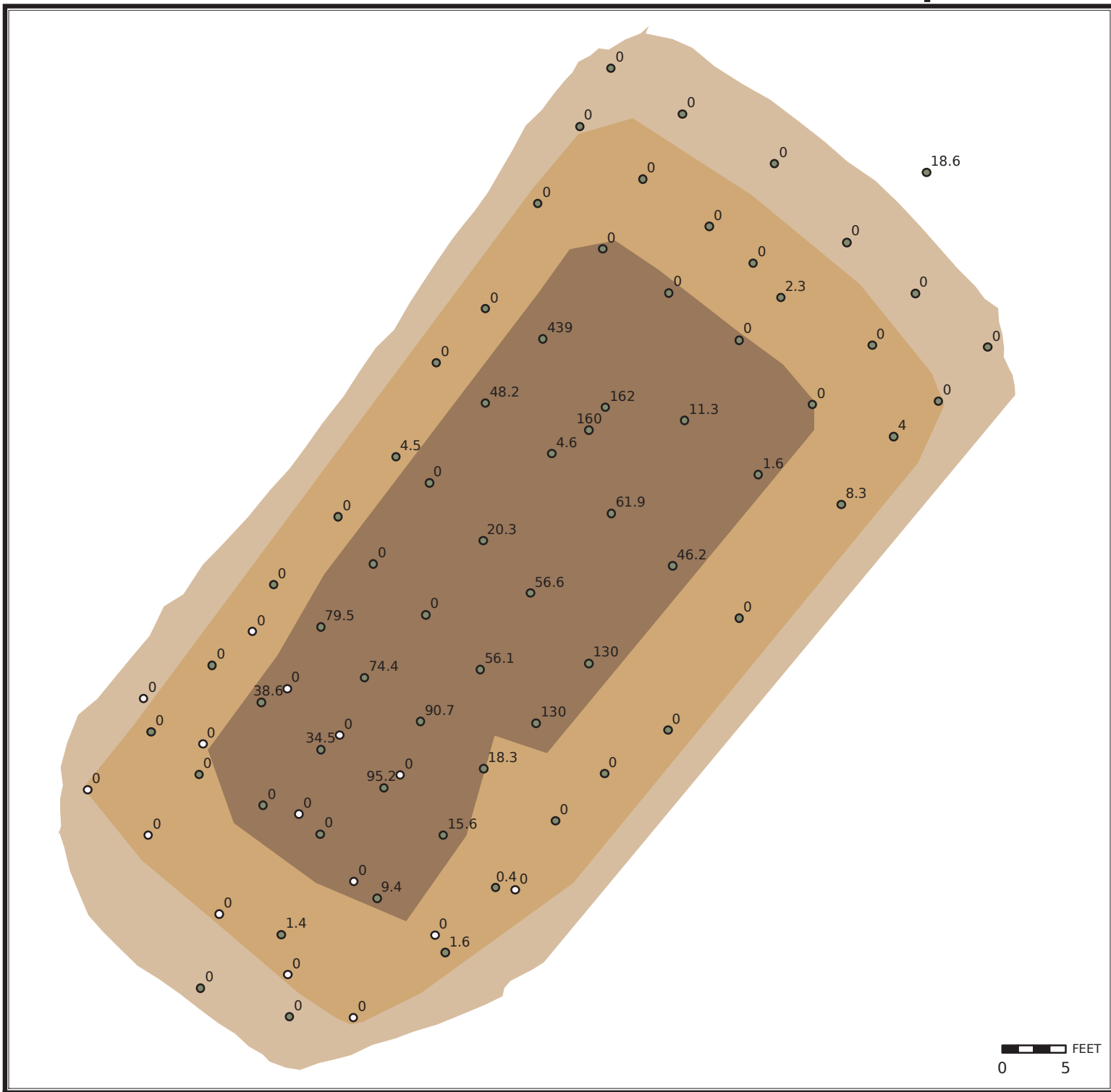
Drawn By:
EKM
 Date:
07/08 2010
 Revised:

Environmental, Audit & Assessment, Inc.
 225 North 5th Street, Suite 8
 Grand Junction, Colorado 81501
 (970) 245-5987 www.eaa-co.com



TOWNSHIP: 6 S LATITUDE: 39.492508
 SECTION: 27 LONGITUDE: -108.204329
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Arco Deep 1-27



**Initial PID Screening
 Location Map
 Williams Production R.M.T.
 Trail Ridge Field
 West Grand Valley
 Figure 2**

PID Readings

- 7/15/2010
- 8/2/2010
- Outer Edge
- Sidewall
- Pit Base
- Well Pad (approx)

Drawn By:
EKM

Date:
07/08 2010
Revised:

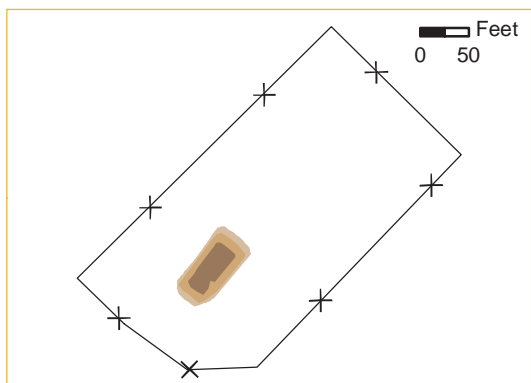
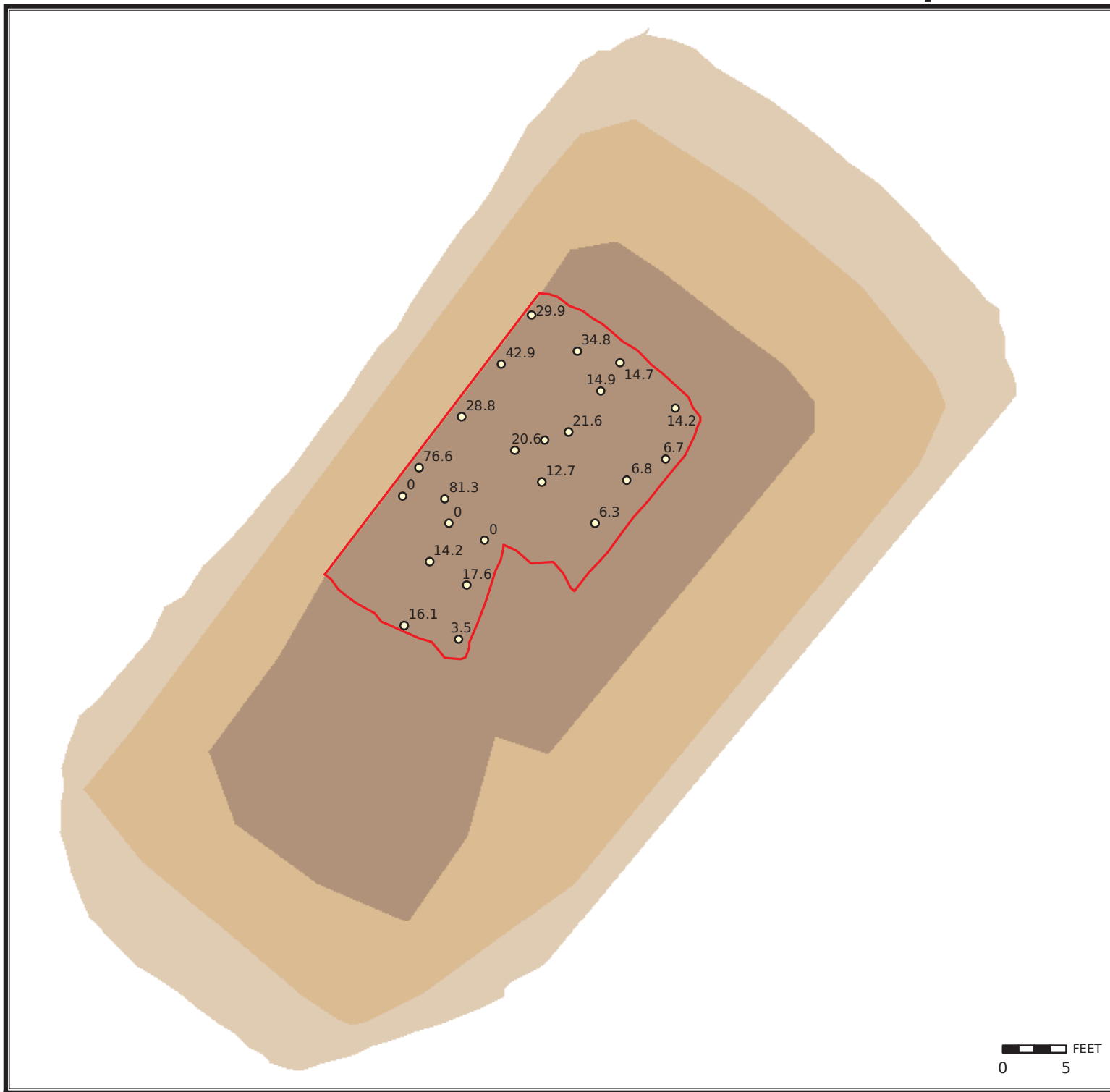
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TOWNSHIP: 6 S LATITUDE: 39.492508
 SECTION: 27 LONGITUDE: -108.204329
 RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



**Excavation PID Screening
 Location Map
 Williams Production R.M.T.
 Trail Ridge Field
 West Grand Valley
 Figure 2b**

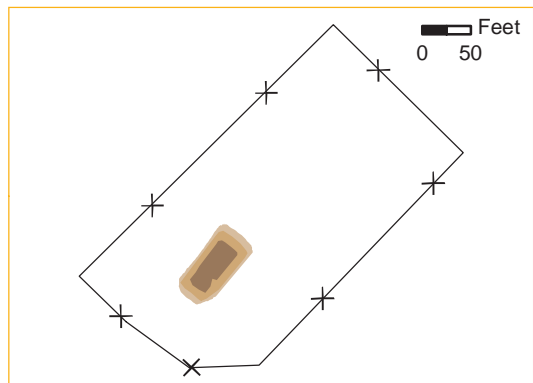
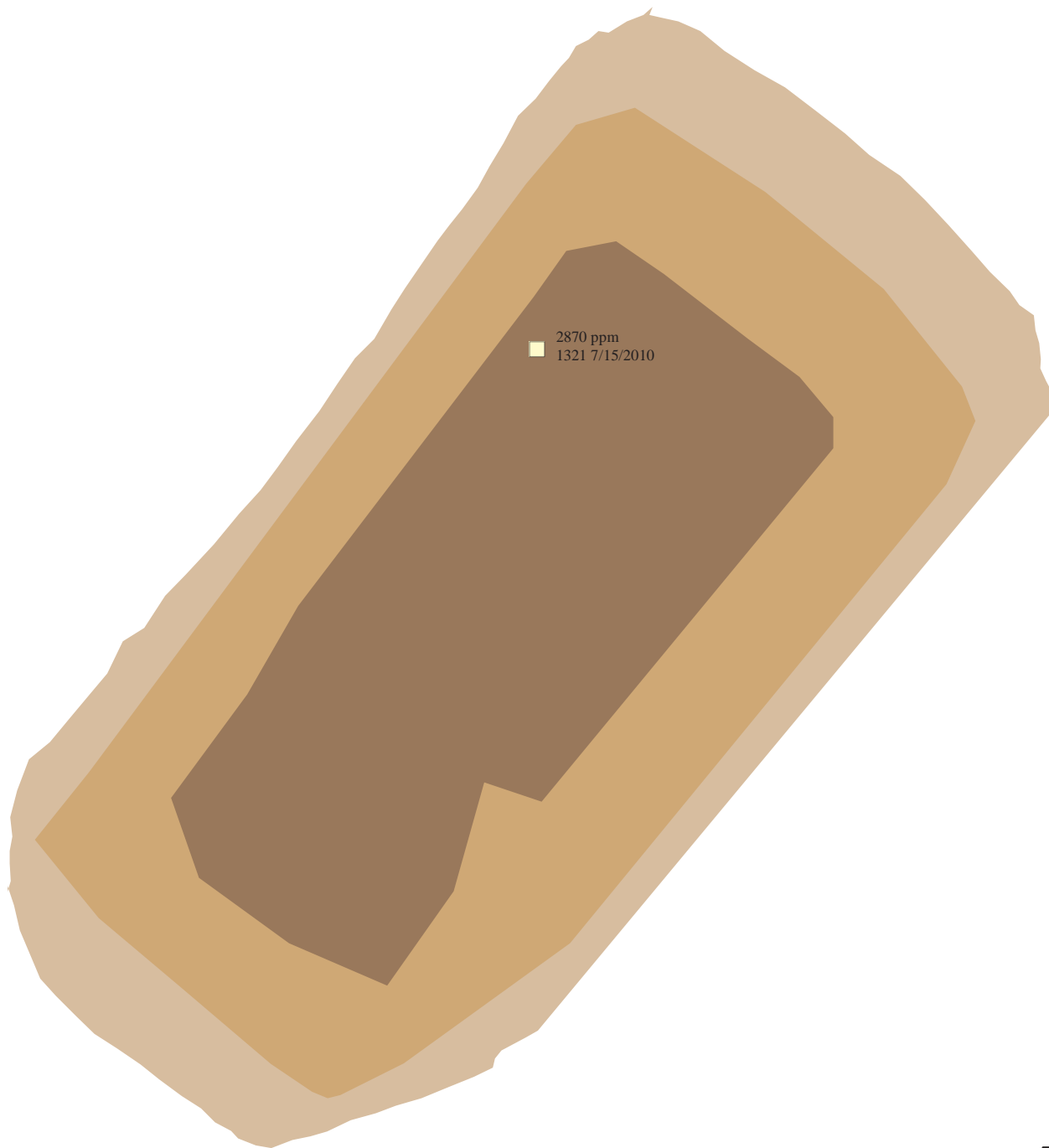
- PID Readings
- Excavation
- Outer Edge
- Sidewall
- Pit Bottom
- ✱ Well Pad (approx)

Drawn By:
EKM
 Date:
07/08 2010
 Revised:

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Arco Deep 1-27



**Initial PetroFlag
 Screening Location Map
 Williams Production R.M.T.
 Trail Ridge Field
 West Grand Valley
 Figure 3**

- PetroFLAG Readings
- Outer Edge
- Sidewall
- Pit Bottom
- X

 Well Pad (approx)

Drawn By:
EKM

Date:
07/08 2010
Revised:

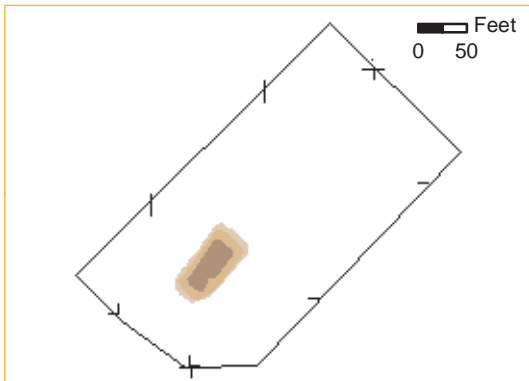
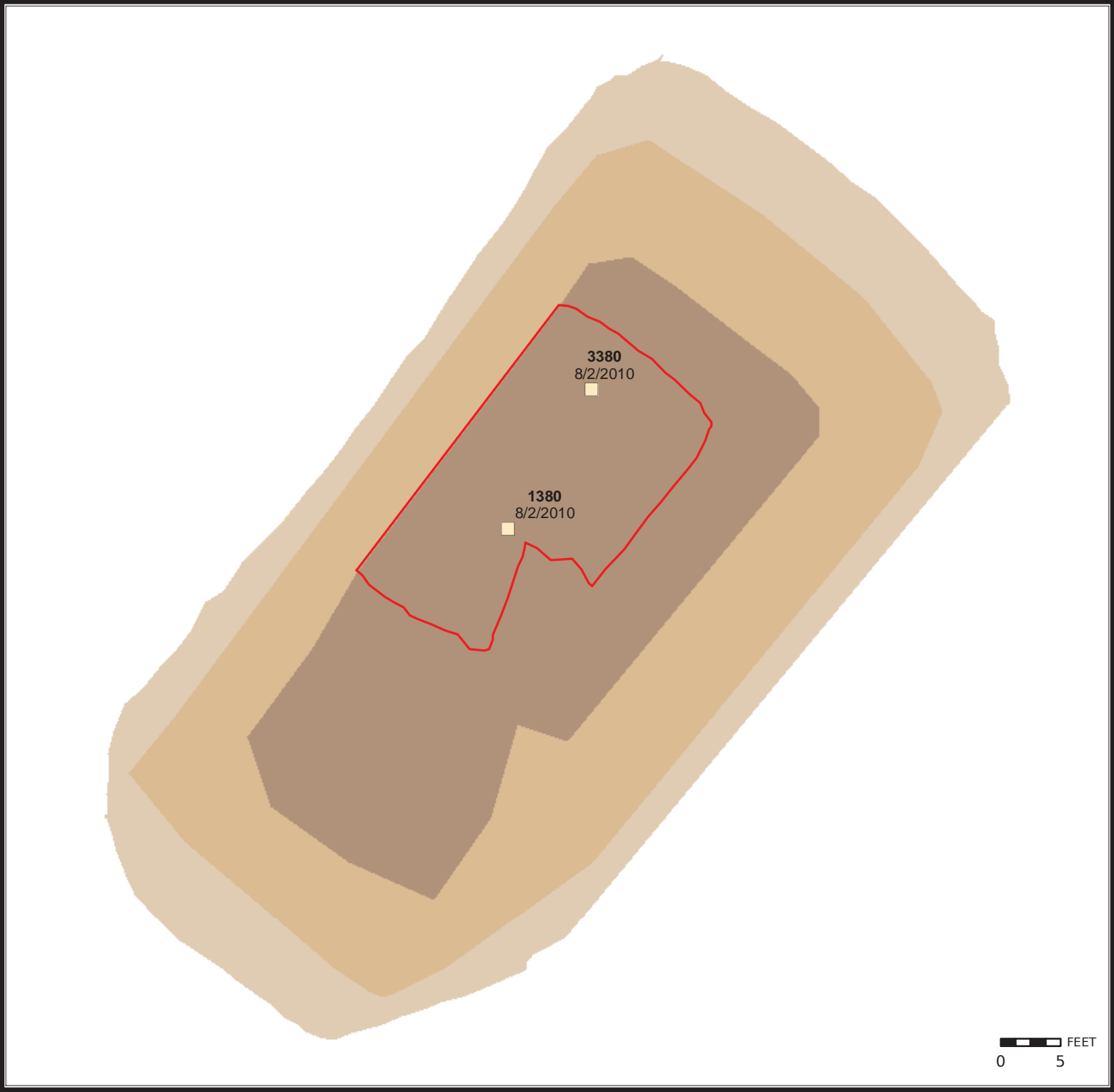
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RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



Excavation PetroFlag
Screening Location Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 3b

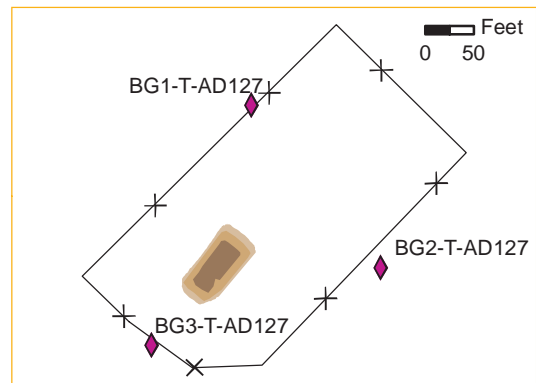
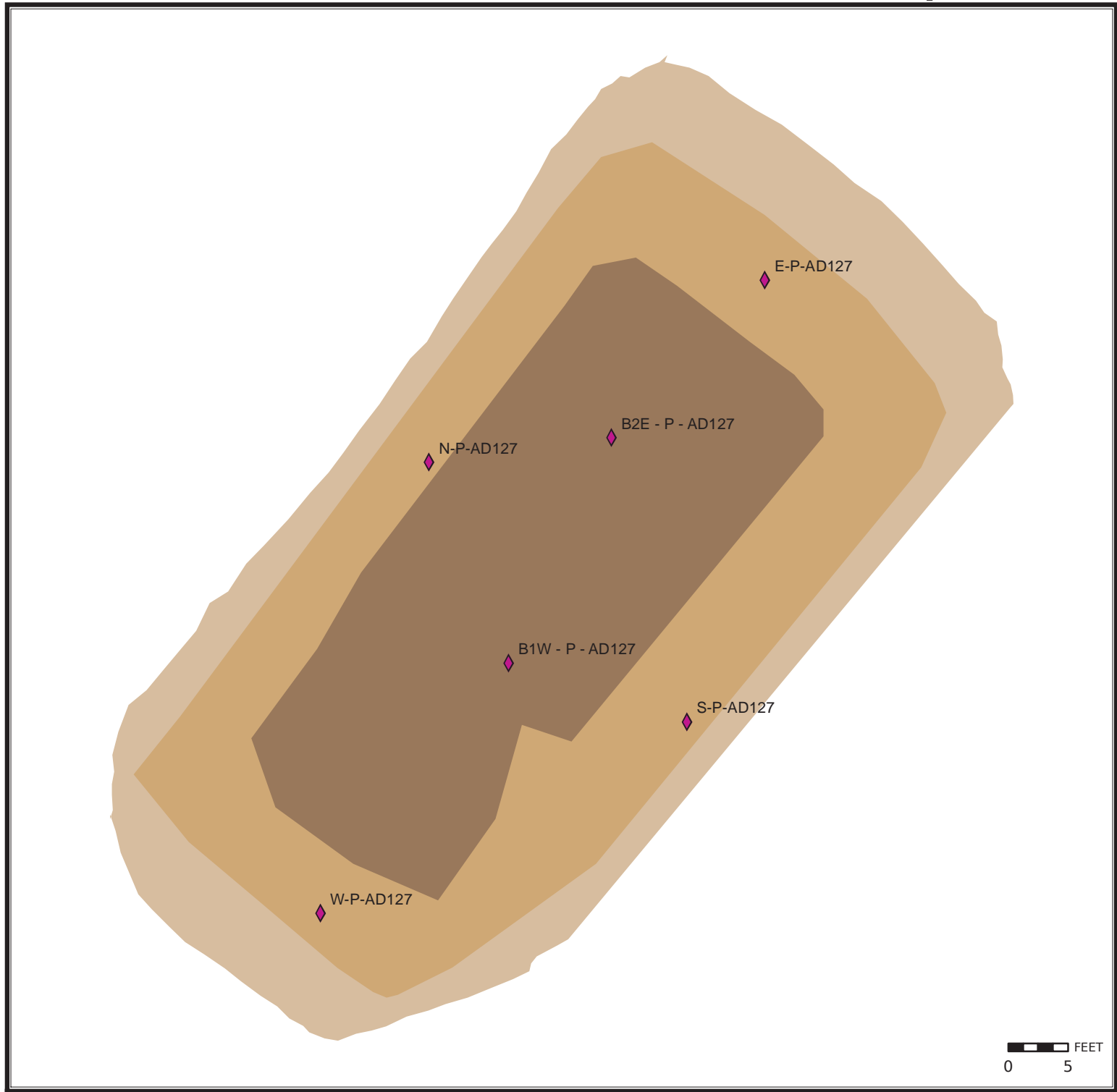
- PetroFLAG Readings
- Excavation
- Outer Edge
- Sidewall
- Pit Bottom
- Well Pad (approx)

Drawn By:
EKM
Date:
07/08 2010
Revised:

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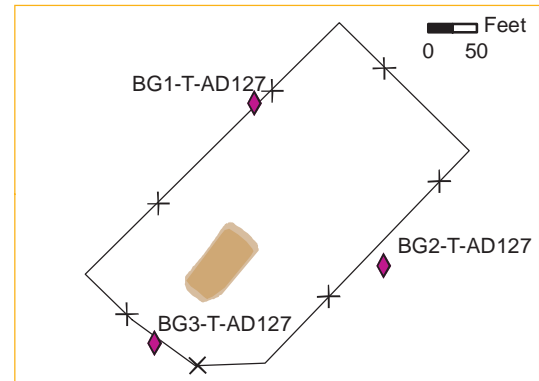
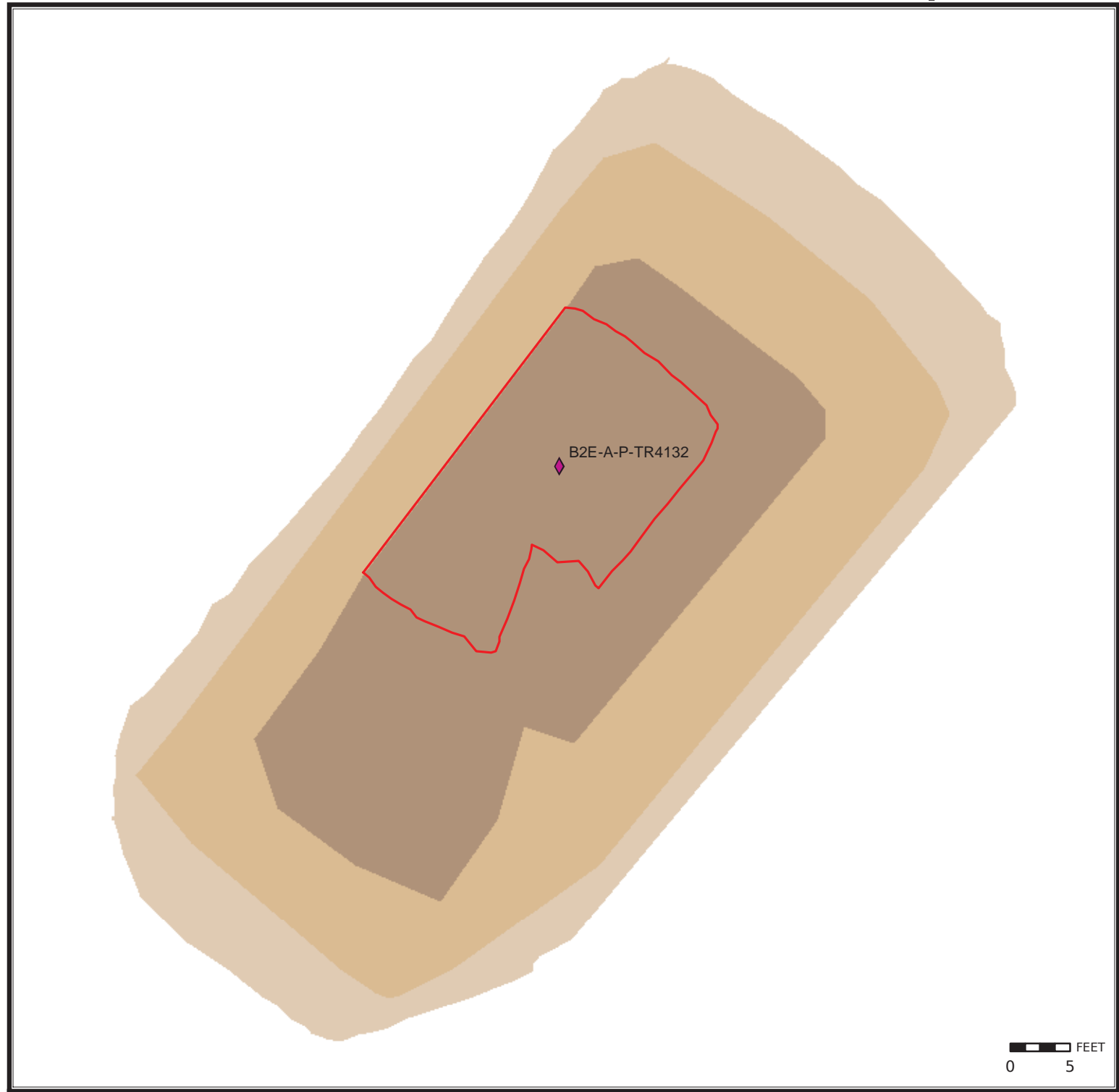
Arco Deep 1-27



Initial Sampling
Location Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 4



Arco Deep 1-27

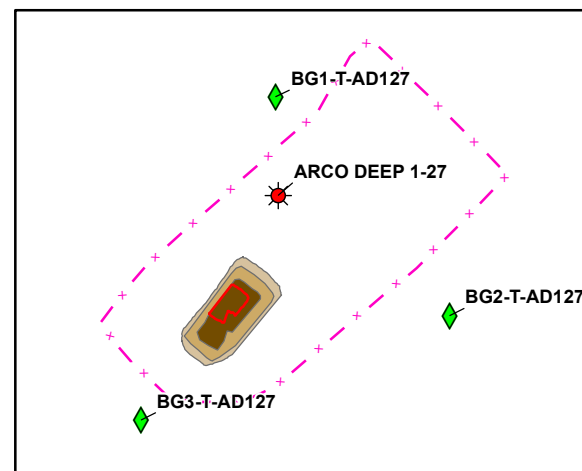
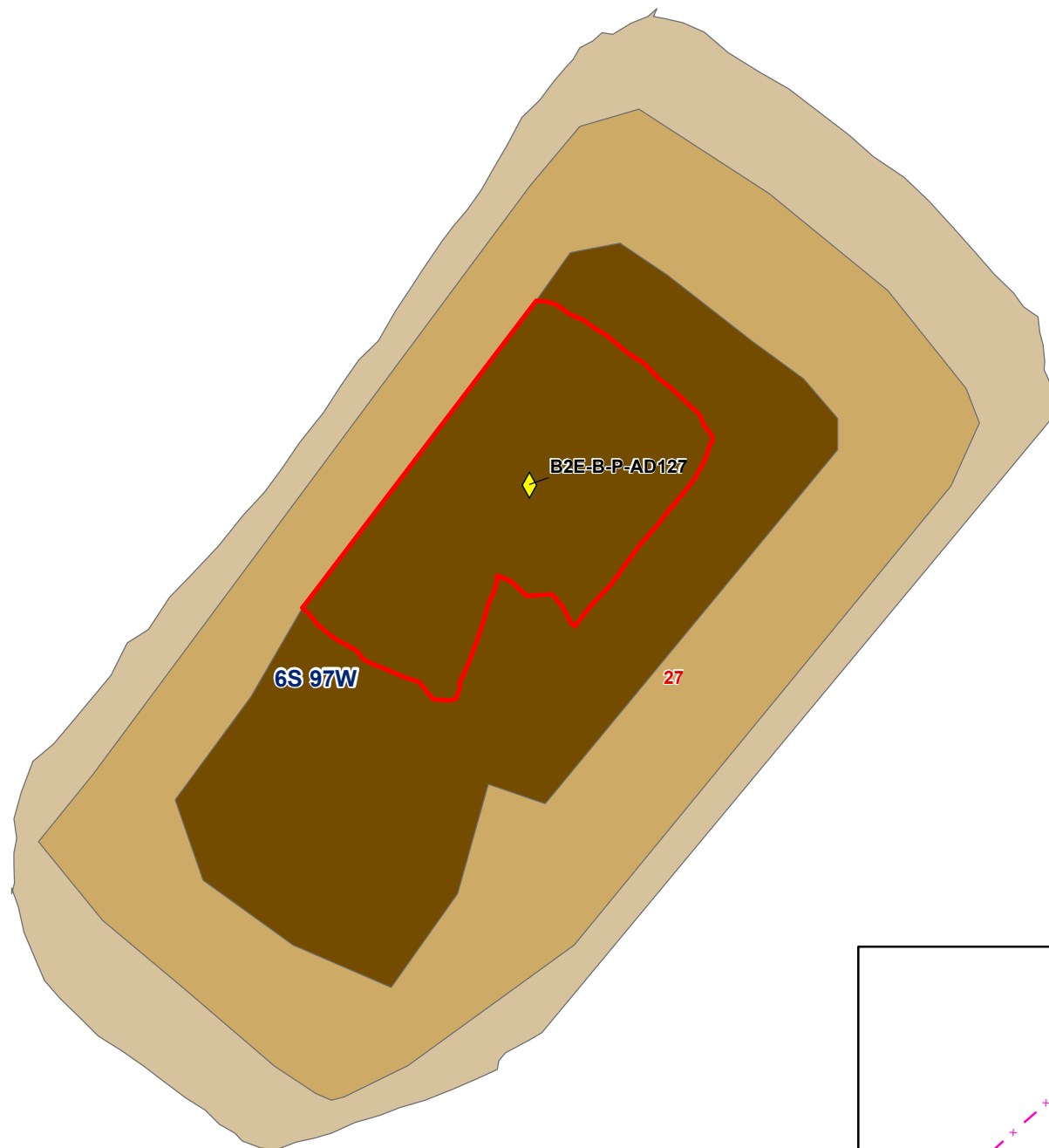


Excavation Sampling
Location Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 4b











Figure 4C
Arco Deep 1-27
Excavation Resampling
Location Map
T6S R97W Section 27

January 23, 2012



Explanation:

-  Gas Well
-  Excavation Sample
-  Background Sample
-  Excavation
-  Pit Bottom
-  Pit Sidewall
-  Pit Outer Edge
-  Well Pad



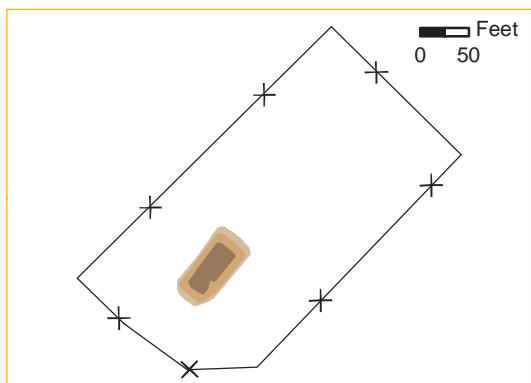
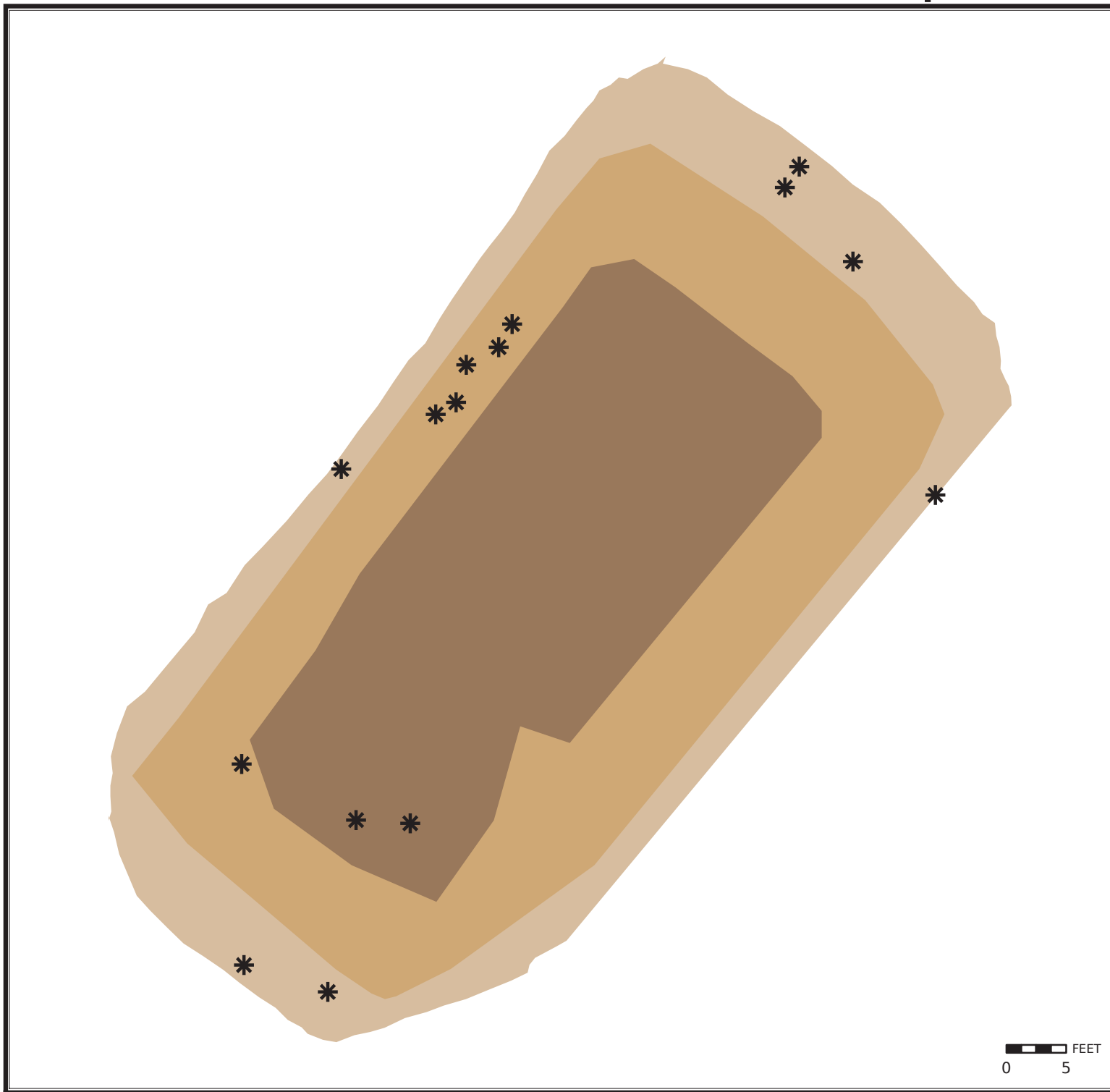
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Feet

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TOWNSHIP: 6 S LATITUDE: 39.492508
 SECTION: 27 LONGITUDE: -108.204329
 RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



Liner Inspection Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 5

- Tear in Liner
- Outer Edge
- Sidewall
- Pit Bottom
- Well Pad (approx)

Drawn By:
EKM

Date:
07/08 2010
Revised:

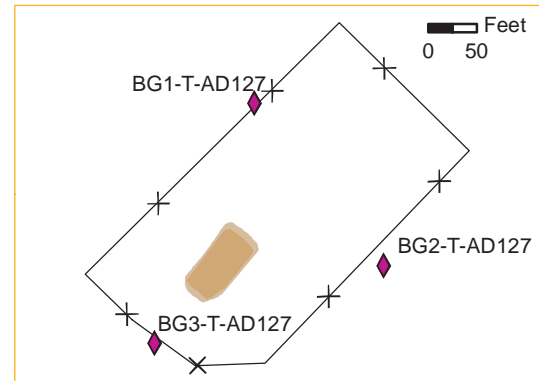
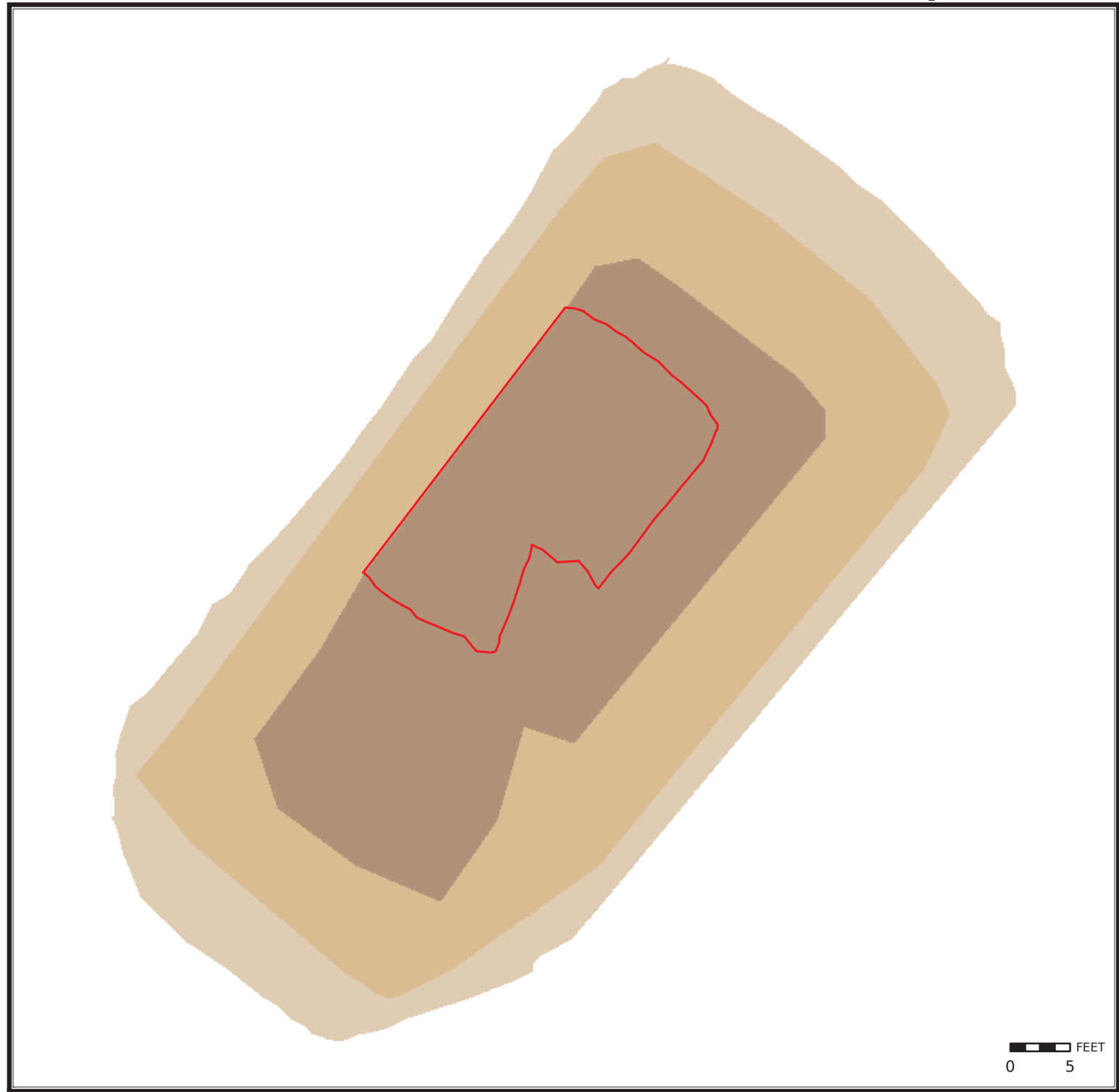
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SECTION: 27 LONGITUDE: -108.204329
RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



Excavation Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 6

Drawn By: EKM
Date: 07/08 2010
Revised:
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225 North 5th Street, Suite 8
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Excavation
Outer Edge
Sidewall
Pit Bottom
Well Pad (approx)





InterTech



APPENDIX B
PHOTOGRAPHS







Williams - Parachute, CO

Prepared by Environmental Science Corp

ARCO DEEP 1-27

Location/ID: BZE-B-P-A0127

Reqd: DBO

21 OCT 11

Time:

9:18

Williams - Parachute, CO

Prepared by Environmental Science Corp

Project: ARCO Deep 1-27

Project #: A1

Sample Location/ID: BZE-B-P-AD127

Analysis Req'd: GRO

Date: 21 OCT 11

Time: 9:29



InterTech



APPENDIX C

OTHER SUPPORTING DOCUMENTATION



Environmental, Audit & Assessment, Inc.

225 North 5th St. Suite #8, Grand Junction, CO 81501, (970) 245-5897, Fax 245-0259, Email info@eaa-co.com
Web Site: www.eaa-co.com

21 September 2010

Colorado Oil and Gas Conservation Commission
Chris Canfield
Environmental Protection Specialist
707 Wapiti Court, Suite 204
Rifle, CO 81650

RE: Form 4 – Arco Deep 1-27

Mr. Canfield:

Please find the attached Sundry Form 4, submitted on behalf of Williams Production RMT Company, requesting that background arsenic concentrations be taken into consideration for the completion of the partially buried tank closure (Remediation #5109, Spill Tracking Number 2521200) at the Arco Deep 1-27 (NWSE, Sec 27, T6S, R97W; API 05-045-06510) well pad. This request is in accordance with and pertaining to footnote 1 to the Table 910-1 of the COGCC 900-series Rule.

Thank you in advance for your time in reviewing the attached document and consideration of approval for the request. If you have any specific questions, would like additional information, or would otherwise like to discuss the matter further, please contact myself or Jason Rauen at 970-623-8993, at your convenience.

Sincerely,

Jana Sanders
Environmental Scientist
Environmental, Audit & Assessment, Inc

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax: (303)894-2109



SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

1. OGCC Operator Number: 96850	4. Contact Name Jason Rauen	Complete the Attachment Checklist OP OGCC
2. Name of Operator: Williams Production R.M.T. Company	Phone: 970-285-9377	
3. Address: 1058 County Road 215 City: Parachute State: CO Zip: 81635	Fax: 970-263-5313	
5. API Number 05-045-06510	OGCC Facility ID Number	Survey Plat
6. Well/Facility Name: Arco Deep 1-27	7. Well/Facility Number	Directional Survey
8. Location (QtrQtr, Sec, Twp, Rng, Meridian): NWSE, 27, T6S, R97W, 6 PM		Surface Eqmpt Diagram
9. County: Garfield	10. Field Name: Grand Valley	Technical Info Page
11. Federal, Indian or State Lease Number: Remediation #5109		Other

General Notice

<input type="checkbox"/> CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qtr is substantive and requires a new permit)	
Change of Surface Footage from Exterior Section Lines:	<input type="checkbox"/> FNU/FSL <input type="checkbox"/> FEL/FWL
Change of Surface Footage to Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/>
Change of Bottomhole Footage from Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/>
Change of Bottomhole Footage to Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/> attach directional survey
Bottomhole location QtrQtr, Sec, Twp, Rng, Mer	
Latitude	Distance to nearest property line
Longitude	Distance to nearest bldg, public rd, utility or RR
Ground Elevation	Distance to nearest lease line
	Is location in a High Density Area (rule 603b)? Yes/No <input type="checkbox"/>
	Distance to nearest well same formation
	Surface owner consultation date:
GPS DATA:	
Date of Measurement	PDOP Reading
	Instrument Operator's Name
<input type="checkbox"/> CHANGE SPACING UNIT	
Formation	Formation Code
Spacing order number	Unit Acreage
	Unit configuration
<input type="checkbox"/> Remove from surface bond	
Signed surface use agreement attached	
<input type="checkbox"/> CHANGE OF OPERATOR (prior to drilling):	
Effective Date:	
Plugging Bond: <input type="checkbox"/> Blanket <input type="checkbox"/> Individual	
<input type="checkbox"/> CHANGE WELL NAME	
From:	NUMBER
To:	
Effective Date:	
<input type="checkbox"/> ABANDONED LOCATION:	
Was location ever built? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is site ready for inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Date Ready for inspection:	
<input type="checkbox"/> NOTICE OF CONTINUED SHUT IN STATUS	
Date well shut in or temporarily abandoned:	
Has Production Equipment been removed from site? <input type="checkbox"/> Yes <input type="checkbox"/> No	
MIT required if shut in longer than two years. Date of last MIT	
<input type="checkbox"/> SPUD DATE:	
<input type="checkbox"/> REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)	
<input type="checkbox"/> SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK	
*submit cbl and cement job summaries	
Method used	Cementing tool setting/perf depth
Cement volume	Cement top
Cement bottom	Date
<input type="checkbox"/> RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.	
Final reclamation will commence on approximately	
<input type="checkbox"/> Final reclamation is completed and site is ready for inspection.	

Technical Engineering/Environmental Notice

<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Report of Work Done
Approximate Start Date:	Date Work Completed:
Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)	
<input type="checkbox"/> Intent to Recomplete (submit form 2)	<input type="checkbox"/> Request to Vent or Flare
<input type="checkbox"/> Change Drilling Plans	<input type="checkbox"/> Repair Well
<input type="checkbox"/> Gross Interval Changed?	<input type="checkbox"/> Rule 502 variance requested
<input type="checkbox"/> Casing/Cementing Program Change	<input checked="" type="checkbox"/> Other: Background
	<input type="checkbox"/> E&P Waste Disposal
	<input type="checkbox"/> Beneficial Reuse of E&P Waste
	<input type="checkbox"/> Status Update/Change of Remediation Plans for Spills and Releases

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: _____ Date: _____ Email: _____
Print Name: _____ Title: _____

COGCC Approved: *Chris Canfield* Title: *for Chris Canfield* Date: *10/19/2010*
CONDITIONS OF APPROVAL, IF ANY

EPS NW Region

TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

1. OGCC Operator Number: 96850	API Number: 05-045-06510
2. Name of Operator: Williams Production R.M.T. Company	OGCC Facility ID #
3. Well/Facility Name: Arco Deep 1-27	Well/Facility Number:
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): NWSE, 27, T6S, R97W, 6PM	

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. DESCRIBE PROPOSED OR COMPLETED OPERATIONS

This COGCC Form 4 is being submitted as a request to meet the background concentration levels for arsenic at Arco Deep 1-27 well pad relative to the partially buried tank closure at the subject facility; in accordance with footnote 1 to the COGCC Table 910-1. Closure activities pertain to the remediation number 5109.

The request is based on the analytical results presented below.

Six (6) grab samples were collected from locations within the tank footprint to ascertain the arsenic concentrations of the facility.

Sample Name	Location	Latitude	Longitude	Depth Below Surface (ft)	Arsenic Concentrations (mg/kg)
N-T-AD127	North Side Wall	39.49241	-108.207633	4	5.3
S-T-AD127	South Side Wall	39.492381	-108.207576	4	4.8
W-T-AD127	West Side Wall	39.492369	-108.207634	4	4.6
E-T-AD127	East Side Wall	39.492415	-108.207583	4	4.6
B1W-T-AD127	Bottom – West	39.492372	-108.207633	6	4.3
B2E-T-AD127	Bottom – East	39.492402	-108.207592	6	5.2

The average concentration was 4.8 mg/kg.

Three (3) grab samples were collected from nearby non-impacted, native soil to establish background arsenic concentrations.

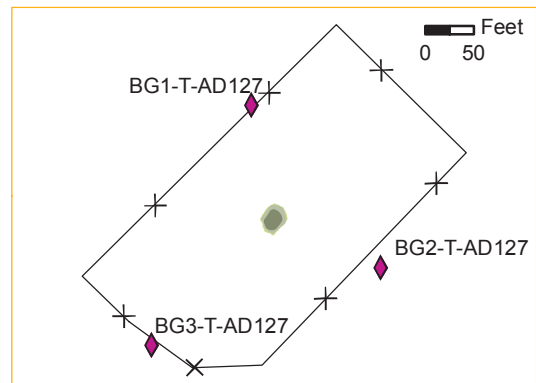
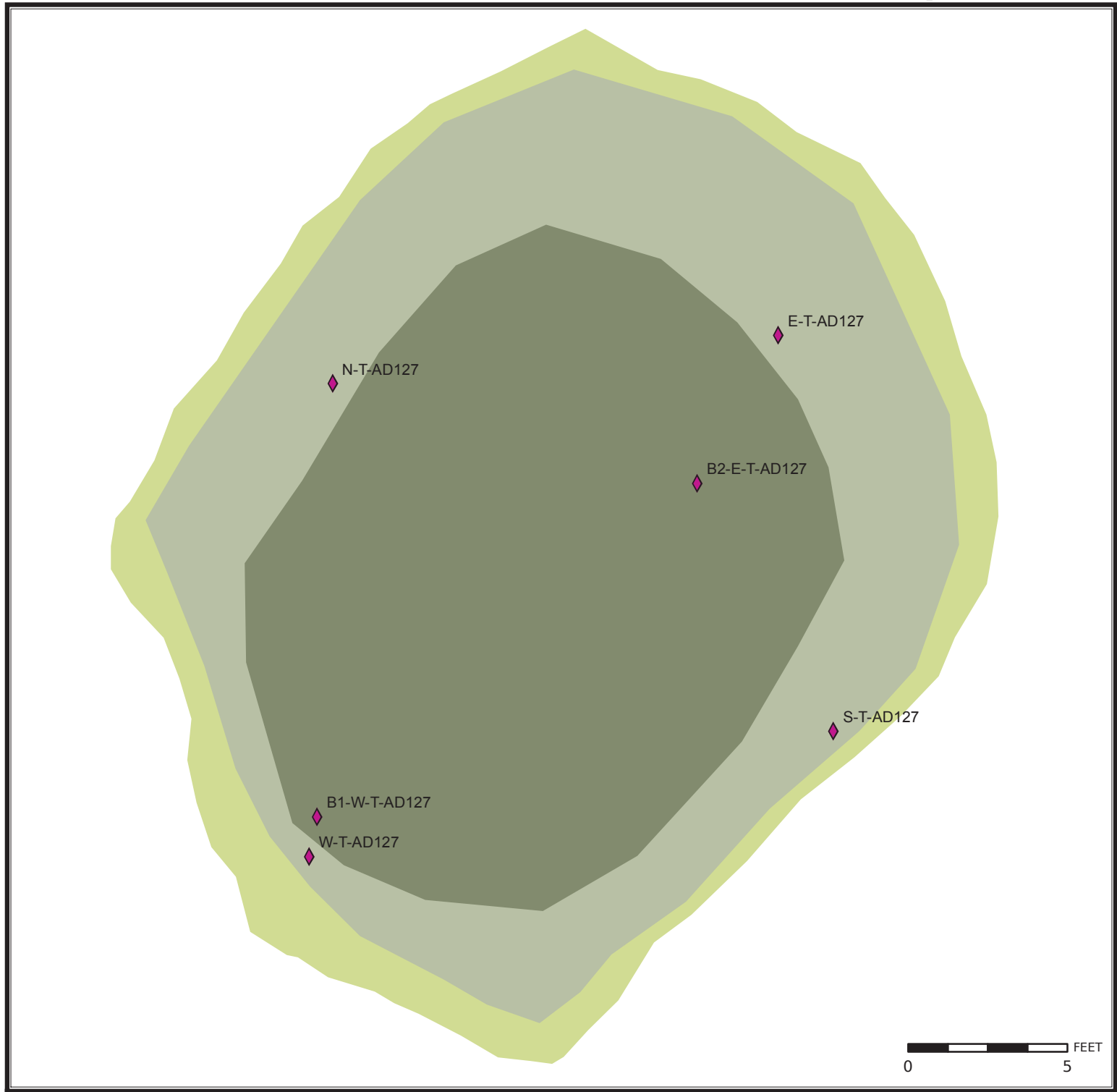
Sample Name	Location	Latitude	Longitude	Depth Below Surface (ft)	Arsenic Concentrations (mg/kg)
BG1-T-AD127	Background	39.492715	-108.207699	0.5	6.6
BG2-T-AD127	Background	39.492271	-108.207213	0.5	5.1
BG3-T-AD127	Background	39.492034	-108.208035	0.5	3.2

The average concentration was 4.9 mg/kg.

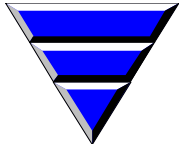
Williams is requesting this approval in order to proceed with closure and reclamation of the partially buried tanks located on the Arco Deep 1-27 well pad.

TOWNSHIP: 6 S LATITUDE: 39.492508
SECTION: 27 LONGITUDE: -108.204329
RANGE: 97 W NAD 1983 HARN - State Plane Colorado Central FIPS 0502

Arco Deep 1-27



Sampling Location Map
Williams Production R.M.T.
Trail Ridge Field
West Grand Valley
Figure 4



Environmental, Audit & Assessment, Inc.

225 North 5th St. Suite #8, Grand Junction, CO 81501, (970) 245-5897, Fax 245-0259, Email info@eaa-co.com
Web Site: www.eaa-co.com

20 October 2010

Colorado Oil and Gas Conservation Commission
Chris Canfield
Environmental Protection Specialist
707 Wapiti Court, Suite 204
Rifle, CO 81650

RE: Form 4 – Arco Deep 1-27

Mr. Canfield:

Please find the attached Sundry Form 4 and supporting documentation, submitted on behalf of Williams Production RMT Company, updating the existing open Form 27 for the closure of the production pit (Remediation #5109, Spill Tracking Number 2521200) at the Arco Deep 1-27 (NWSE, Sec 27, T6S, R97W; API 05-045-06510) well pad. As shown, the horizontal extent of the contamination has been identified; however, the vertical extent remains unknown. During the excavation of the east bottom portion of the pit a rock shelf was encountered. The track hoe attempted to break through on several occasions; however, was unsuccessful. Williams would like the opportunity to discuss options for further investigation of the pit bottom and would welcome an opportunity to meet.

Thank you in advance for your time in reviewing the attached document and consideration of Williams' meeting request. If you have any specific questions, would like additional information, or would otherwise like to discuss the matter further, please contact myself, Jason Rauen at 970-623-8993, or Gretchen Kohler at 303-260-4531, at your convenience.

Sincerely,

Jana Sanders
Environmental Scientist
Environmental, Audit & Assessment, Inc

FORM
4
Rev 12/05State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax: (303)894-2109



SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

1. OGCC Operator Number: 96850	4. Contact Name Jason Rauen	Complete the Attachment Checklist OP OGCC
2. Name of Operator: Williams Production R.M.T. Company	Phone: 970-285-9377	
3. Address: 1058 County Road 215 City: Parachute State: CO Zip: 81635	Fax: 970-263-5313	
5. API Number 05-045-06510	OGCC Facility ID Number 322539	
6. Well/Facility Name: Arco Deep 1-27	7. Well/Facility Number Arco Deep 1-27	Survey Plat
8. Location (Qtr/Tr, Sec, Twp, Rng, Meridian): NWSE, 27, 6S, 97W, 6 PM		Directional Survey
9. County: Garfield	10. Field Name: Grand Valley	Surface Eqpm Diagram
11. Federal, Indian or State Lease Number: Remediation #5190, Spill/Release Tracking # 2521200		Technical Info Page
		Other

General Notice

<input type="checkbox"/> CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qtr is substantive and requires a new permit)																	
Change of Surface Footage from Exterior Section Lines:	<table border="1"> <tr> <td></td> <td>FNL/FSL</td> <td></td> <td>FEL/FWL</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>		FNL/FSL		FEL/FWL												
	FNL/FSL		FEL/FWL														
Change of Surface Footage to Exterior Section Lines:																	
Change of Bottomhole Footage from Exterior Section Lines:																	
Change of Bottomhole Footage to Exterior Section Lines:																	
Bottomhole location Qtr/Tr, Sec, Twp, Rng, Mer																	
Latitude	Distance to nearest property line																
Longitude	Distance to nearest bldg, public rd, utility or RR																
Ground Elevation	Distance to nearest lease line																
	Is location in a High Density Area (rule 603b)? Yes/No																
	Distance to nearest well same formation																
	Surface owner consultation date:																
GPS DATA: Date of Measurement PDOP Reading Instrument Operator's Name																	
<input type="checkbox"/> CHANGE SPACING UNIT Formation Formation Code Spacing order number Unit Acreage Unit configuration	<input type="checkbox"/> Remove from surface bond Signed surface use agreement attached																
<input type="checkbox"/> CHANGE OF OPERATOR (prior to drilling): Effective Date: Plugging Bond: <input type="checkbox"/> Blanket <input type="checkbox"/> Individual	<input type="checkbox"/> CHANGE WELL NAME NUMBER From: To: Effective Date:																
<input type="checkbox"/> ABANDONED LOCATION: Was location ever built? <input type="checkbox"/> Yes <input type="checkbox"/> No Is site ready for inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No Date Ready for Inspection:	<input type="checkbox"/> NOTICE OF CONTINUED SHUT IN STATUS Date well shut in or temporarily abandoned: Has Production Equipment been removed from site? <input type="checkbox"/> Yes <input type="checkbox"/> No MIT required if shut in longer than two years. Date of last MIT																
<input type="checkbox"/> SPUD DATE:	<input type="checkbox"/> REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)																
<input type="checkbox"/> SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK Method used Cementing tool setting/perf depth Cement volume Cement top Cement bottom Date *submit cbl and cement job summaries																	
<input type="checkbox"/> RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004. Final reclamation will commence on approximately Final reclamation is completed and site is ready for inspection.																	

Technical Engineering/Environmental Notice

<input type="checkbox"/> Notice of Intent Approximate Start Date:	<input type="checkbox"/> Report of Work Done Date Work Completed:
Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)	
<input type="checkbox"/> Intent to Recomplete (submit form 2) <input type="checkbox"/> Change Drilling Plans <input type="checkbox"/> Gross Interval Changed? <input type="checkbox"/> Casing/Cementing Program Change	<input type="checkbox"/> Request to Vent or Flare <input type="checkbox"/> Repair Well <input type="checkbox"/> Rule 502 variance requested <input type="checkbox"/> Other:
<input type="checkbox"/> E&P Waste Disposal <input type="checkbox"/> Beneficial Reuse of E&P Waste <input checked="" type="checkbox"/> Status Update/Change of Remediation Plans for Spills and Releases	

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: _____ Date: _____ Email: _____
 Print Name: _____ Title: _____

COGCC Approved: _____ Title: _____ Date: _____

CONDITIONS OF APPROVAL, IF ANY:

TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

1. OGCC Operator Number: 96850 API Number: 05-045-06510
2. Name of Operator: Williams Production R.M.T. Company OGCC Facility ID #
3. Well/Facility Name: Arco Deep 1-27 Well/Facility Number: 322539
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): NWSE, 27, 6S, 97W, 6PM

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

This COGCC Form 4 and attached supporting documentation is being submitted to amend the existing open Form 27 for the Arco Deep 1-27. A COGCC Form 19 was submitted on September 3, 2010, indicating that a release was discovered during routine closure of the Arco Deep 1-27 production pit, Remediation Number 5109 and Spill/Release Tracking Number 2521200. It is not believed that the release was caused due to improper care or operation of the pit. The cause is unknown and occurred unknowingly sometime in the past. This statement is supported by the pre-removal liner inspection which revealed no tears or rips below the high water mark.

As outlined in the approved Form 27, upon removal of the pit liner, soil samples were collected from the four sidewalls and the bottom of the pit. Samples were submitted to Accutest Laboratories for analysis of COGCC Table 910-1 parameters. Once concentrations exceeding 910-1 were confirmed via laboratory analytical, the suspect soils from the bottom east section of the pit were excavated and stockpiled in lined secondary containment. The excavation was driven by visual and olfactory assessment, PID readings, and PetroFlag measurements.

During the excavation of the east bottom portion of the pit a rock shelf was encountered. The track hoe attempted to break through on several occasions; however, was unsuccessful. A soil sample was collected from the bottom of the excavation and submitted for analysis. Analytical results showed DRO concentrations to exceed the allowable concentrations in Table 910-1.

At this time, the horizontal extent of the contamination has been identified; however, vertical extent is unknown. Further investigation is planned to define the extent of the contamination.

Please note, the well pad is situated approximately 8,632 feet above sea level on non-crop rangelands and Parachute-Rhone loams soils with moderate to severe erosion potential. Vegetation consists of sage brush and grassland communities. Receiving waters include an unnamed ephemeral stream that is tributary to Baker Gulch. No flow was observed during the pit closure process. The estimated distance to the receiving waters is approximately 315 feet.



InterTech



APPENDIX D

ANALYTICAL REPORTS



10/21/10

Technical Report for

Williams Production

3.co Deep 1-27

PIT

Accutest Job Number: D15881

Sampling Date: 08/02/10

Report to:

Environmental Audit & Assessment

jsanders@eaa-co.com

ATTN: Jana Sanders

Total number of pages in report: 17



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read 'John Hamilton'.

John Hamilton
Laboratory Director

Client Service contact: Amanda Kissell 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.
Test results relate only to samples analyzed.

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-1-

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Sample Summary

Williams Production

Job No: D15881

3.co Deep 1-27
Project No: PIT

Sample Number	Collected		Time By	Received	Matrix		Client Sample ID
	Date				Code	Type	
D15881-1	08/02/10	11:00	JS	08/04/10	SO	Soil	B2EA-P-AD127

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: Williams Production**Job No** D15881**Site:** 3.co Deep 1-27**Report Dat** 10/21/2010 1:52:15 PM

On 08/04/2010, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 3 °C. The sample was intact and properly preserved, unless noted below. An AMS Job Number of D15881 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Volatiles by GC By Method SW846 8015B

Matrix SO**Batch ID:** GGA474

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15881-1MS and D15881-1MSD were used as the QC samples indicated.
- D15881-1MS and D15881-1MSD for 1,2,4-Trichlorobenzene: Outside control limits due to matrix interference.

Extractables by GC By Method SW846-8015B

Matrix SO**Batch ID:** OP2290

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15878-1MS and D15878-1MSD were used as the QC samples indicated.

Wet Chemistry By Method SM19 2540B M

Matrix SO**Batch ID:** GN5709

- The data for SM19 2540B M meets quality control requirements.

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: B2EA-P-AD127
Lab Sample ID: D15881-1
Matrix: SO - Soil
Method: SW846 8015B
Project: 3.co Deep 1-27

Date Sampled: 08/02/10
Date Received: 08/04/10
Percent Solids: 78.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA8096.D	1	08/06/10	KV	n/a	n/a	GGA474
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	634	28	28	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	135%		60-140%		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: B2EA-P-AD127**Lab Sample ID:** D15881-1**Date Sampled:** 08/02/10**Matrix:** SO - Soil**Date Received:** 08/04/10**Method:** SW846-8015B SW846 3550B**Percent Solids:** 78.4**Project:** 3.co Deep 1-27

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD3227.D	1	08/05/10	CP	08/05/10	OP2290	GFD152
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	918	17	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	112%		63-130%	

ND = Not detected

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

10165 Harwin Dr, Ste 150 Houston, TX 77036
TEL: 713-271-4700 FAX: 713-271-4770
www.acctest.com

Client / Reporting Information				Project Information				Requested Analyses																Matrix Codes	
Company Name Environmental Audit Assessment, Inc.				Project Name Arco Deep 1-23 PIT				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Billing Information (if different from Report to) Company Name Williams Pmt Company PO Box 570 Parachute CO 81635 </div> <div style="width: 65%;"> <div style="display: flex; justify-content: space-between;"> <div> City Parachute </div> <div> State CO </div> <div> Zip 81635 </div> </div> Attention: Jason Raven </div> </div>																	Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank
Street Address 775 N 5th St, Suite 8				Street Arco Deep 1-23 PIT																					
City Grand Junction, CO 81501				City Parachute																					
State CO				State CO																					
Zip 81501				Zip 81635				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Requested Analyses Arsenic, Barium (Lower Total) Cadmium, Chromium (Total) (GFI) Copper, Lead (Inorganic), Mercury Nickel (Soluble salts), Selenium Silver, Zinc EC, PAH, pH </div> <div style="width: 65%;"> Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank </div> </div>																	
Project Contact Jana Sanders				Project # 930-245-5897																					
E-mail jsanders@eaa-co.com				Client Purchase Order # 930-245-5897																					
Phone # 930-245-5897				Phone # 930-245-5897																					
Sampler(s) Name(s) Jana Sanders				Project Manager Jason Raven				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Requested Analyses Arsenic, Barium (Lower Total) Cadmium, Chromium (Total) (GFI) Copper, Lead (Inorganic), Mercury Nickel (Soluble salts), Selenium Silver, Zinc EC, PAH, pH </div> <div style="width: 65%;"> Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank </div> </div>																	
Collection Jason Raven				Number of preserved bottles 2																					
Accust Sample # BZEA-P-AD123				Date 08/02/10																					
Field ID / Point of Collection SP-P-AD123				Time 1200																					
Sampled By JS				Matrix SO				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Requested Analyses Arsenic, Barium (Lower Total) Cadmium, Chromium (Total) (GFI) Copper, Lead (Inorganic), Mercury Nickel (Soluble salts), Selenium Silver, Zinc EC, PAH, pH </div> <div style="width: 65%;"> Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank </div> </div>																	
# of bottles 2				Number of preserved bottles 2																					
HQ1 NAH1				HQ2 NAH2																					
HQ3 NAH3				HQ4 NAH4																					
HQ5 NAH5				HQ6 NAH6				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Requested Analyses Arsenic, Barium (Lower Total) Cadmium, Chromium (Total) (GFI) Copper, Lead (Inorganic), Mercury Nickel (Soluble salts), Selenium Silver, Zinc EC, PAH, pH </div> <div style="width: 65%;"> Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank </div> </div>																	
HQ7 NAH7				HQ8 NAH8																					
HQ9 NAH9				HQ10 NAH10																					
HQ11 NAH11				HQ12 NAH12																					
Turnaround Time (Business days) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 4 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day EMERGENCY Emergency & Rush T/A data available VIA Lablink				Approved By (Accustest PM): Date: 				Comments / Special Instructions TABLE 910-1 - NO BORDO WILLIAMS STD T.A.T. AND DELIVERABLES																	
Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULT1 (Level 3+4) <input type="checkbox"/> REDT1 (Level 3+4) <input type="checkbox"/> Commercial "C"				Commercial "A" = Results Only Commercial "B" = Results + QC Summary Commercial "C" = Results + QC & Surrogate Summary				<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Requested Analyses Arsenic, Barium (Lower Total) Cadmium, Chromium (Total) (GFI) Copper, Lead (Inorganic), Mercury Nickel (Soluble salts), Selenium Silver, Zinc EC, PAH, pH </div> <div style="width: 65%;"> Matrix Codes DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TS - Trip Blank </div> </div>																	
Turnaround Time (Business days) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 4 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day EMERGENCY Emergency & Rush T/A data available VIA Lablink				Approved By (Accustest PM): Date: 																					
Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULT1 (Level 3+4) <input type="checkbox"/> REDT1 (Level 3+4) <input type="checkbox"/> Commercial "C"				Commercial "A" = Results Only Commercial "B" = Results + QC Summary Commercial "C" = Results + QC & Surrogate Summary																					
Turnaround Time (Business days) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 4 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day EMERGENCY Emergency & Rush T/A data available VIA Lablink				Approved By (Accustest PM): Date: 																					

D15881: Chain of Custody

Page 1 of 1

GC Volatiles

5

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA474-MB	GA8094.D	1	08/06/10	KV	n/a	n/a	GGA474

The QC reported here applies to the following samples:

Method: SW846 8015B

D15881-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	20	20	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	100% 60-140%

Blank Spike Summary

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA474-BS	GA8095.D	1	08/06/10	KV	n/a	n/a	GGA474

The QC reported here applies to the following samples: Method: SW846 8015B

D15881-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	220	220	100	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	117%	60-140%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15881-1MS	GA8097.D	1	08/06/10	KV	n/a	n/a	GGA474
D15881-1MSD	GA8098.D	1	08/06/10	KV	n/a	n/a	GGA474
D15881-1	GA8096.D	1	08/06/10	KV	n/a	n/a	GGA474

The QC reported here applies to the following samples: Method: SW846 8015B

D15881-1

CAS No.	Compound	D15881-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	634		311	909	88	903	87	1	62-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15881-1	Limits
120-82-1	1,2,4-Trichlorobenzene	168%* a	153%* a	135%	60-140%

(a) Outside control limits due to matrix interference.

GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2290-MB	FD3215.D	1	08/05/10	CP	08/05/10	OP2290	GFD152

The QC reported here applies to the following samples:

Method: SW846-8015B

D15881-1

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	ND	13	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	114% 63-130%

Blank Spike Summary

Page 1 of 1

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2290-BS	FD3216.D	1	08/05/10	CP	08/05/10	OP2290	GFD152

The QC reported here applies to the following samples:

Method: SW846-8015B

D15881-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	811	122	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	117%	63-130%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D15881
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2290-MS	FD3217.D	1	08/05/10	CP	08/05/10	OP2290	GFD152
OP2290-MSD	FD3218.D	1	08/05/10	CP	08/05/10	OP2290	GFD152
D15878-1	FD3219.D	1	08/05/10	CP	08/05/10	OP2290	GFD152

The QC reported here applies to the following samples:

Method: SW846-8015B

D15881-1

CAS No.	Compound	D15878-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	55.9		687	777	105	935	128	18	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15878-1	Limits
84-15-1	o-Terphenyl	103%	122%	124%	63-130%



10/19/10

Technical Report for

Williams Production

3.co Deep 1-27

ARCO DEEP 1-27 PIT

Accutest Job Number: D15313

Sampling Date: 07/15/10

Report to:

Environmental Audit & Assessment

jsanders@eaa-co.com

ATTN: Jana Sanders

Total number of pages in report: **72**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read 'John Hamilton'.

John Hamilton
Laboratory Director

Client Service contact: Amanda Kissell 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

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Test results relate only to samples analyzed.

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Sample Summary

Williams Production

Job No: D15313

3.co Deep 1-27

Project No: ARCO DEEP 1-27 PIT

Sample Number	Collected			Received	Matrix		Client Sample ID
	Date	Time	By		Code	Type	
D15313-1	07/15/10	14:44	JR	07/17/10	SO	Soil	E-P-AD127
D15313-1A	07/15/10	14:44	JR	07/17/10	SO	Soil	E-P-AD127

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: Williams Production

Job No D15313

Site: 3.co Deep 1-27

Report Dat 10/19/2010 4:43:54 PM

On 07/17/2010, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 5 °C. The sample was intact and properly preserved, unless noted below. An AMS Job Number of D15313 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Extractables by GCMS By Method SW846 8270C BY SIM

Matrix SO

Batch ID: OP2194

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-1MS, D15314-1MSD were used as the QC samples indicated.
- The RPD(s) for the MS and MSD recoveries of Pyrene are outside control limits for sample OP2194-MSD. Probable cause due to sample homogeneity.

Volatiles by GC By Method SW846 8015

Matrix SO

Batch ID: M:GBH744

- The data for SW846 8015 meets quality control requirements.
- D15313-1: Analysis performed at Accutest Laboratories, Marlborough, MA.

Volatiles by GC By Method SW846 8021

Matrix SO

Batch ID: M:GAB3244

- The data for SW846 8021 meets quality control requirements.
- D15313-1: Analysis performed at Accutest Laboratories, Marlborough, MA.

Extractables by GC By Method SW846-8015B

Matrix SO

Batch ID: OP2198

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D15348-1MS, D15348-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Metals By Method SW846 6010B

Matrix AQ

Batch ID: MP2382

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15313-1AMS, D15313-1AMSD were used as the QC samples for the metals analysis.

Matrix SO

Batch ID: MP2375

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15266-1MS, D15266-1MSD, D15266-1SDL were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) for Copper, Nickel, Zinc are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
- The matrix spike duplicate (MSD) recovery(s) of Nickel, Zinc are outside control limits. Probable cause due to matrix interference.
- RPD(s) for Serial Dilution for Selenium, Barium, Cadmium, Chromium, Lead, Nickel, Zinc are outside control limits for sample MP2375-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 6020

Matrix SO

Batch ID: MP2376

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15266-1MS, D15266-1MSD, D15266-1SDL were used as the QC samples for the metals analysis.
- The RPD(s) for the MS and MSD recoveries of Arsenic are outside control limits for sample MP2376-S2. High RPD due to possible sample matrix or nonhomogeneity.
- RPD(s) for Serial Dilution for Arsenic are outside control limits for sample MP2376-SD1. Probable cause due to sample homogeneity.

Metals By Method SW846 7471A

Matrix SO

Batch ID: MP2364

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-1MS, D15314-1MSD were used as the QC samples for the metals analysis.
- The matrix spike and matrix spike duplicate recovery(s) for Mercury are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

Wet Chemistry By Method ASTM E1498-76M

Matrix SO

Batch ID: M:GN32434

- The data for ASTM E1498-76M meets quality control requirements.
- The following sample was run outside of holding time for method ASTM E1498-76M: D15313-1.
- D15313-1 for Redox Potential Vs H2: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method LADNR29B

Matrix SO

Batch ID: R3298

- The data for LADNR29B meets quality control requirements.
- D15313-1A for Sodium Adsorption Ratio: Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

Wet Chemistry By Method SM19 2540B M**Matrix** SO**Batch ID:** GN5426

- The data for SM19 2540B M meets quality control requirements.

Wet Chemistry By Method SW846 3060/7196A M**Matrix** SO**Batch ID:** R3389

- The data for SW846 3060/7196A M meets quality control requirements.
- D15313-1 for Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

Wet Chemistry By Method SW846 3060A/7196A**Matrix** SO**Batch ID:** M:GP11820

- The data for SW846 3060A/7196A meets quality control requirements.
- D15313-1 for Chromium, Hexavalent: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method SW846 9045C**Matrix** SO**Batch ID:** GN5419

- The following sample was run outside of holding time for method SW846 9045C: D15313-1.

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Accutest Mountain States

Job No D15313

Site: WILLCOP: Williams Production, Parachute, CO

Report Date 7/29/2010 4:08:35 PM

2 Sample(s) were collected on 07/15/2010 and were received at Accutest on 07/17/2010 properly preserved, at 1.8, 3.7 Deg. C and intact. These Samples received an Accutest job number of D15313. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GC By Method SW846 8015

Matrix SO	Batch ID: GBH744
------------------	-------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-2MS, D15314-2MSD were used as the QC samples indicated.

Volatiles by GC By Method SW846 8021

Matrix SO	Batch ID: GAB3244
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-1MS, D15314-1MSD were used as the QC samples indicated.

Wet Chemistry By Method ASTM E1498-76M

Matrix SO	Batch ID: GN32434
------------------	--------------------------

- Sample(s) D15340-1DUP were used as the QC samples for Redox Potential Vs H2.

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO	Batch ID: GP11820
------------------	--------------------------

- All samples were distilled within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15090-7DUP, D15090-7MS were used as the QC samples for Chromium, Hexavalent.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety. The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(D15313).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	E-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15313-1	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	89.0
Method:	SW846 8270C BY SIM SW846 3540C		
Project:	3.co Deep 1-27		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01541.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	35	ug/kg	
208-96-8	Acenaphthylene	ND	190	39	ug/kg	
120-12-7	Anthracene	ND	37	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	37	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	24	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	27	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	23	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	24	ug/kg	
218-01-9	Chrysene	ND	37	19	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	28	ug/kg	
206-44-0	Fluoranthene	ND	37	23	ug/kg	
86-73-7	Fluorene	ND	37	37	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	25	ug/kg	
90-12-0	1-Methylnaphthalene	ND	37	33	ug/kg	
91-57-6	2-Methylnaphthalene	ND	190	57	ug/kg	
91-20-3	Naphthalene	ND	190	41	ug/kg	
85-01-8	Phenanthrene	ND	37	30	ug/kg	
129-00-0	Pyrene	ND	37	25	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	52%		10-193%
321-60-8	2-Fluorobiphenyl	58%		20-138%
1718-51-0	Terphenyl-d14	60%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	E-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15313-1	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	89.0
Method:	SW846 8015		
Project:	3.co Deep 1-27		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	BH14472.D	1	07/28/10	AMA	n/a	n/a	M:GBH744
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.5 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	6.0	4.3	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
615-59-8	2,5-Dibromotoluene	109%		36-148%		

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	E-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15313-1	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	89.0
Method:	SW846 8021		
Project:	3.co Deep 1-27		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB58926.D	1	07/28/10	AMA	n/a	n/a	M:GAB3244
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.5 g	10.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	60	8.2	ug/kg	
108-88-3	Toluene	ND	60	9.2	ug/kg	
100-41-4	Ethylbenzene	ND	60	10	ug/kg	
1330-20-7	Xylenes (total)	ND	60	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	89%		70-130%
	2,3,4-Trifluorotoluene	102%		70-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	E-P-AD127		
Lab Sample ID:	D15313-1	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846-8015B SW846 3550B	Percent Solids:	89.0
Project:	3.co Deep 1-27		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2837.D	1	07/21/10	CP	07/21/10	OP2198	GFD140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	350	15	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	105%		63-130%	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: E-P-AD127

Lab Sample ID: D15313-1

Matrix: SO - Soil

Project: 3.co Deep 1-27

Date Sampled: 07/15/10

Date Received: 07/17/10

Percent Solids: 89.0

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	3.1	0.43	mg/kg	5	07/21/10	07/22/10 JM	SW846 6020 ²	SW846 3050B ⁶
Barium	310	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Cadmium	< 1.1	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Chromium	36.4	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Copper	15.1	0.54	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	21.7	5.4	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Mercury	< 0.11	0.11	mg/kg	1	07/20/10	07/20/10 RN	SW846 7471A ¹	SW846 7471A ⁴
Nickel	18.6	3.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Selenium	< 5.4	5.4	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Silver	< 3.2	3.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Zinc	48.7	3.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵

(1) Instrument QC Batch: MA836

(2) Instrument QC Batch: MA843

(3) Instrument QC Batch: MA844

(4) Prep QC Batch: MP2364

(5) Prep QC Batch: MP2375

(6) Prep QC Batch: MP2376

RL = Reporting Limit

Report of Analysis

Client Sample ID: E-P-AD127**Lab Sample ID:** D15313-1**Matrix:** SO - Soil**Project:** 3.co Deep 1-27**Date Sampled:** 07/15/10**Date Received:** 07/17/10**Percent Solids:** 89.0**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 2.2	2.2	mg/kg	1	07/22/10 17:40	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	36.4	3.3	mg/kg	1	07/22/10 19:07	JM	SW846 3060/7196A M
Redox Potential Vs H2 ^a	371		mv	1	07/23/10	AMA	ASTM E1498-76M
Solids, Percent	89		%	1	07/19/10	CJ	SM19 2540B M
Specific Conductivity	334	1.0	umhos/cm	1	07/21/10	CJ	DEPT.OF AG, BOOK N9
pH	8.83		su	1	07/19/10 12:00	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID:	E-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15313-1A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	89.0
Project:	3.co Deep 1-27		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	48.2	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²
Magnesium	7.89	1.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²
Sodium	29.5	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²

(1) Instrument QC Batch: MA839
(2) Prep QC Batch: MP2382

RL = Reporting Limit

Report of Analysis

Client Sample ID:	E-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15313-1A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	89.0
Project:	3.co Deep 1-27		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	1.04		ratio	1	07/22/10 02:33	JM	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

Client / Reporting Information		Project Information		Requested Analyses		Matrix Codes	
Company Name		Project Name		Bottle Order Control #		Accutest Job #	
Street Address		Street		Accutest Quote #		Accutest Job #	
City State Zip		City State		Billing Information (if different from Report to)		Matrix Codes	
Project Contact		E-mail		Company Name		DW - Drinking Water	
Phone #		Fax #		Street Address		GW - Ground Water	
Sampler(s) Name(s)		Phone #		City State Zip		WW - Water	
Project Manager		Client Purchase Order #		Attention:		SW - Surface Water	
Collection		Number of preserved Bottles		City State Zip		SO - Soil	
Field ID / Point of Collection		Date		City State Zip		SL - Sludge	
Time		Sampled By		City State Zip		SED - Sediment	
Matrix		# of bottles		City State Zip		OI - Oil	
HCl		Matrix		City State Zip		SOL - Other Solid	
NaOH		Matrix		City State Zip		WP - Wipe	
ZnAcOH		Matrix		City State Zip		FB - Field Blank	
HNO3		Matrix		City State Zip		RB - Rinse Blank	
H2SO4		Matrix		City State Zip		TB - Trip Blank	
NONE		Matrix		City State Zip			
DI Water		Matrix		City State Zip			
MEDI		Matrix		City State Zip			
TSP		Matrix		City State Zip			
NARCO4		Matrix		City State Zip			
BNCOTE		Matrix		City State Zip			
OTHER		Matrix		City State Zip			
Turnaround Time (Business days)		Data Deliverable Information		Comments / Special Instructions			
<input type="checkbox"/> Standard <input checked="" type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 4 Day RUSH <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day EMERGENCY Emergency & Rush T/A data available VIA Lablink		Approved By (Accutest PM): / Date: <input type="checkbox"/> Commercial "A" (Level 1) <input type="checkbox"/> Commercial "B" (Level 2) <input type="checkbox"/> FULLT1 (Level 3+4) <input type="checkbox"/> REDT1 (Level 3+4) <input type="checkbox"/> Commercial "C" Commercial "A" = Results Only Commercial "B" = Results + QC Summary Commercial "C" = Results + QC & Surrogate Summary		<input type="checkbox"/> TRRP <input type="checkbox"/> EDD Format <input type="checkbox"/> Other		ANALYSIS 7 PCCC TABLE 910-1 WILLIAMS STD DATA DELIVERABLES 5-7 T.A.T.	
Sample Custody must be documented below each time samples change possession, including courier delivery.							
Relinquished by Sampler		Date Time:		Relinquished By:		Date Time:	
1		07/15/10 0850		2		7/17/10 1000	
Relinquished by Sampler		Date Time:		Relinquished By:		Date Time:	
3				4			
Relinquished by:		Date Time:		Relinquished By:		Date Time:	
5				5			
Custody Seal #		Intact		Preserved where applicable		On ice	
		<input type="checkbox"/> Not intact		<input type="checkbox"/>		<input type="checkbox"/>	
						Cooler Temp	
						5.0	

D15313: Chain of Custody

Page 1 of 2



Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D15313

Client: WILLIAMS RMT COMPANY

Immediate Client Services Action Required: No

Date / Time Received: 7/17/2010 10:00:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: ARCO DEEP 1-27-PRR

Airbill #'s: ups

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun | |
| 3. Cooler media: | Ice (bag) | |

Quality Control Preservation

Y or N

N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Sample Integrity - Documentation

Y or N

- | | | |
|----------------------------------------|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|-------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume rec'd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories
V:(303) 425-6021

4036 Youngfield Street
F: (303) 425-6854

Wheat Ridge, CO
www.accutest.com

GC/MS Semi-volatiles

5

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-MB	3G01539.D	2	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15313-1

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	13	12	ug/kg	
208-96-8	Acenaphthylene	ND	67	14	ug/kg	
120-12-7	Anthracene	ND	13	8.6	ug/kg	
56-55-3	Benzo(a)anthracene	ND	13	13	ug/kg	
50-32-8	Benzo(a)pyrene	ND	13	8.4	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	13	9.7	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	13	8.3	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	13	8.4	ug/kg	
218-01-9	Chrysene	ND	13	6.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	13	9.9	ug/kg	
206-44-0	Fluoranthene	ND	13	8.2	ug/kg	
86-73-7	Fluorene	ND	13	13	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	13	8.7	ug/kg	
90-12-0	1-Methylnaphthalene	ND	13	12	ug/kg	
91-57-6	2-Methylnaphthalene	ND	67	20	ug/kg	
91-20-3	Naphthalene	ND	67	15	ug/kg	
85-01-8	Phenanthrene	ND	13	11	ug/kg	
129-00-0	Pyrene	ND	13	9.0	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	53% 10-193%
321-60-8	2-Fluorobiphenyl	53% 20-138%
1718-51-0	Terphenyl-d14	65% 17-174%

Blank Spike Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-BS	3G01540.D	2	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15313-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	41.4	50	40-136
208-96-8	Acenaphthylene	83.3	41.2	49	42-139
120-12-7	Anthracene	83.3	40.5	49	40-141
56-55-3	Benzo(a)anthracene	83.3	41.5	50	38-143
50-32-8	Benzo(a)pyrene	83.3	38.3	46	39-145
205-99-2	Benzo(b)fluoranthene	83.3	36.4	44	38-151
191-24-2	Benzo(g,h,i)perylene	83.3	37.1	45	35-136
207-08-9	Benzo(k)fluoranthene	83.3	42.2	51	38-147
218-01-9	Chrysene	83.3	41.1	49	39-137
53-70-3	Dibenzo(a,h)anthracene	83.3	37.6	45	35-139
206-44-0	Fluoranthene	83.3	41.5	50	34-132
86-73-7	Fluorene	83.3	41.9	50	41-136
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	37.3	45	31-144
90-12-0	1-Methylnaphthalene	83.3	41.0	49	36-130
91-57-6	2-Methylnaphthalene	83.3	41.0	49	40-131
91-20-3	Naphthalene	83.3	43.5	52	36-130
85-01-8	Phenanthrene	83.3	43.2	52	40-135
129-00-0	Pyrene	83.3	40.2	48	29-157

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	53%	10-193%
321-60-8	2-Fluorobiphenyl	52%	20-138%
1718-51-0	Terphenyl-d14	54%	17-174%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-MS	3G01544.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
OP2194-MSD	3G01545.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
D15314-1	3G01543.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15313-1

CAS No.	Compound	D15314-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		90.6	56.8	63	67.2	74	17	20-151/30
208-96-8	Acenaphthylene	ND		90.6	52.5	58	64.9	72	21	23-156/30
120-12-7	Anthracene	ND		90.6	46.2	51	59.3	65	25	25-149/30
56-55-3	Benzo(a)anthracene	ND		90.6	51.1	56	64.2	71	23	22-157/30
50-32-8	Benzo(a)pyrene	ND		90.6	44.5	49	56.1	62	23	23-153/30
205-99-2	Benzo(b)fluoranthene	ND		90.6	48.9	54	62.1	68	24	22-161/30
191-24-2	Benzo(g,h,i)perylene	ND		90.6	40.7	45	51.3	57	23	20-158/30
207-08-9	Benzo(k)fluoranthene	ND		90.6	45.6	50	58.9	65	25	17-161/30
218-01-9	Chrysene	ND		90.6	46.2	51	59.6	66	25	16-159/30
53-70-3	Dibenzo(a,h)anthracene	ND		90.6	41.9	46	53.5	59	24	21-154/30
206-44-0	Fluoranthene	ND		90.6	60.6	67	73.3	81	19	16-140/30
86-73-7	Fluorene	70.4		90.6	104	37	129	65	21	15-153/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		90.6	38.9	43	51.1	56	27	21-159/30
90-12-0	1-Methylnaphthalene	77.2		90.6	107	33	121	48	12	10-148/30
91-57-6	2-Methylnaphthalene	130	J	90.6	152	24	171	45	12	10-181/30
91-20-3	Naphthalene	ND		90.6	58.6	65	64.3	71	9	10-176/30
85-01-8	Phenanthrene	53.8		90.6	85.0	34	105	56	21	22-152/30
129-00-0	Pyrene	ND		90.6	46.2	51	64.5	71	33*	10-200/30

CAS No.	Surrogate Recoveries	MS	MSD	D15314-1	Limits
4165-60-0	Nitrobenzene-d5	54%	60%	71%	10-193%
321-60-8	2-Fluorobiphenyl	59%	70%	76%	20-138%
1718-51-0	Terphenyl-d14	61%	82%	75%	17-174%

GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-MB	FD2830.D	1	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples:

Method: SW846-8015B

D15313-1

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	ND	13	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	102% 63-130%

Blank Spike Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-BS	FD2831.D	1	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples:

Method: SW846-8015B

D15313-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	672	101	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	111%	63-130%

6.2.1

6

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D15313
Account: WILLCOP Williams Production
Project: 3.co Deep 1-27

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-MS	FD2832.D	5	07/21/10	CP	07/21/10	OP2198	GFD140
OP2198-MSD	FD2833.D	5	07/21/10	CP	07/21/10	OP2198	GFD140
D15348-1	FD2834.D	5	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples:

Method: SW846-8015B

D15313-1

CAS No.	Compound	D15348-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	7090		738	7740	88	7530	60 ^a	3	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15348-1	Limits
84-15-1	o-Terphenyl	102%	116%	117%	63-130%

(a) Outside control limits due to high level in sample relative to spike amount.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2364
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 07/20/10

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.10	.0011	.0012	0.0046	<0.10

Associated samples MP2364: D15313-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2364
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 07/20/10

Metal	D15314-1 Original MS	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.028 0.38	0.427	82.5N(a)	85-115

Associated samples MP2364: D15313-1

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2364
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 07/20/10

Metal	D15314-1 Original	MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.028	0.36	0.427	77.8N(a)	5.4	20

Associated samples MP2364: D15313-1

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

7.1.2

7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2364
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 07/20/10

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.34	0.4	85.0	80-120

Associated samples MP2364: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.7	2		
Antimony	3.0	.17	.5		
Arsenic	2.5	.28	.72		
Barium	1.0	.014	.05	0.060	<1.0
Beryllium	1.0	.14	.21		
Boron	5.0	.35	.91		
Cadmium	1.0	.022	.12	0.030	<1.0
Calcium	40	1.7	2.7		
Chromium	1.0	.027	.18	0.050	<1.0
Cobalt	0.50	.048	.058		
Copper	0.50	.16	.38	-0.090	<0.50
Iron	7.0	.77	.91		
Lead	5.0	.13	.24	0.0	<5.0
Lithium	0.20	.076	.09		
Magnesium	20	.58	.93		
Manganese	0.50	.021	.028		
Molybdenum	1.0	.041	.16		
Nickel	3.0	.038	.075	0.0	<3.0
Phosphorus	10	1.5	3.5		
Potassium	200	38	130		
Selenium	5.0	.28	.54	-0.36	<5.0
Silicon	5.0	1.2	.68		
Silver	3.0	.098	.068	0.0	<3.0
Sodium	40	23	6.3		
Strontium	5.0	.0091	.02		
Thallium	1.0	.31	.21		
Tin	5.0	1.4	.56		
Titanium	1.0	.0098	.041		
Uranium	5.0	.22	.53		
Vanadium	1.0	.027	.034		
Zinc	3.0	.076	.49	0.10	<3.0

Associated samples MP2375: D15313-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

7.2.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOB - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2375
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original MS	Spikelot MPICPALL	% Rec	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	90.2	286	225	87.2 75-125
Beryllium	anr			
Boron	anr			
Cadmium	1.2	49.0	56.2	85.1 75-125
Calcium	anr			
Chromium	12.7	56.9	56.2	78.7 75-125
Cobalt				
Copper	30.6	69.4	56.2	69.1N(a) 75-125
Iron	anr			
Lead	13.6	105	112	81.4 75-125
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	32.1	64.9	56.2	58.4N(a) 75-125
Phosphorus				
Potassium	anr			
Selenium	3.8	101	112	86.5 75-125
Silicon				
Silver	0.0	20.0	22.5	89.0 75-125
Sodium	anr			
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	90.6	120	56.2	52.3N(a) 75-125

Associated samples MP2375: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

7.2.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOF - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original MSD		Spikelet MPICPALL % Rec		MSD RPD	QC Limit
Aluminum	anr					
Antimony	anr					
Arsenic	anr					
Barium	90.2	302	207	102.2	5.4	20
Beryllium	anr					
Boron	anr					
Cadmium	1.2	45.1	51.8	84.7	8.3	20
Calcium	anr					
Chromium	12.7	53.5	51.8	78.8	6.2	20
Cobalt						
Copper	30.6	71.2	51.8	78.4	2.6	20
Iron	anr					
Lead	13.6	104	104	87.2	1.0	20
Lithium						
Magnesium	anr					
Manganese	anr					
Molybdenum						
Nickel	32.1	64.4	51.8	62.3N(a)	0.8	20
Phosphorus						
Potassium	anr					
Selenium	3.8	91.3	104	84.4	10.1	20
Silicon						
Silver	0.0	18.5	20.7	89.3	7.8	20
Sodium	anr					
Strontium						
Thallium	anr					
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	90.6	114	51.8	45.2N(a)	5.1	20

Associated samples MP2375: D15313-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2375
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 07/21/10

Metal	BSP Result	Spikelot MPICPAL	% Rec	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	182	200	91.0	80-120
Beryllium	anr			
Boron	anr			
Cadmium	46.5	50	93.0	80-120
Calcium	anr			
Chromium	49.4	50	98.8	80-120
Cobalt				
Copper	49.2	50	98.4	80-120
Iron	anr			
Lead	95.7	100	95.7	80-120
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	47.4	50	94.8	80-120
Phosphorus				
Potassium	anr			
Selenium	92.1	100	92.1	80-120
Silicon				
Silver	19.3	20	96.5	80-120
Sodium	anr			
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	47.1	50	94.2	80-120

Associated samples MP2375: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

7.2.3

Project: 3.co Deep 1-27

Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	D15266-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	931	1110	18.7*(a)	0-10
Beryllium	anr			
Boron	anr			
Cadmium	12.6	14.0	11.1*(a)	0-10
Calcium	anr			
Chromium	131	154	17.2*(a)	0-10
Cobalt				
Copper	316	329	4.0	0-10
Iron	anr			
Lead	141	160	13.3*(a)	0-10
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	331	399	20.6*(a)	0-10
Phosphorus				
Potassium	anr			
Selenium	39.4	43.5	10.4 (b)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium	anr			
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	935	1180	26.2*(a)	0-10

Associated samples MP2375: D15313-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

(a) Serial dilution indicates possible matrix interference.

(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2376
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	.89		
Antimony	0.20	.001	.045		
Arsenic	0.40	.049	.26	0.051	<0.40
Barium	1.0	.0035	.17		
Beryllium	0.10	.0075	.014		
Boron	20	.97	2		
Cadmium	0.050	.023	.048		
Calcium	200	1.8	6.1		
Chromium	1.0	.021	.23		
Cobalt	0.10	.0033	.088		
Copper	1.0	.011	.14		
Iron	20	.81	6.1		
Lead	0.25	.0012	.18		
Magnesium	50	.067	1.3		
Manganese	0.50	.007	.089		
Molybdenum	0.50	.0044	.2		
Nickel	1.0	.0029	.074		
Phosphorus	30	1.8	5.6		
Potassium	100	2	9.1		
Selenium	0.20	.075	.14		
Silver	0.050	.0008	.029		
Sodium	250	.8	1.8		
Strontium	10	.004	.047		
Thallium	0.10	.015	.071		
Tin	5.0	.006	.17		
Titanium	1.0	.035	.071		
Uranium	0.25	.00038	.12		
Vanadium	2.0	.052	.99		
Zinc	5.0	.039	.53		

Associated samples MP2376: D15313-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2376
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	21.3	137	112	103.0	60-119
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2376: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (N) Matrix Spike Rec. outside of QC limits
 (anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2376
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	21.3	102	104	77.9	29.3 (a)	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP2376: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (N) Matrix Spike Rec. outside of QC limits
 (anr) Analyte not requested
 (a) High RPD due to possible sample matrix or nonhomogeneity.

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

Methods: SW846 6020
Units: mg/kg

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	98.8	100	98.8	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2376
 Matrix Type: SOLID

Methods: SW846 6020
 Units: ug/l

Prep Date: 07/21/10

Metal	D15266-1			QC	
	Original	SDL 5:25	%DIF	Limits	
Aluminum					
Antimony					
Arsenic	220	273	24.0*(a)	0-10	
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2376: D15313-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (anr) Analyte not requested
 (a) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	35	250		
Antimony	150	8.5	65		
Arsenic	130	14	33		
Barium	50	.7	12		
Beryllium	50	7	22		
Boron	250	18	93		
Cadmium	50	1.1	6		
Calcium	2000	85	46	2.5	<2000
Chromium	50	1.4	8		
Cobalt	25	2.4	1.5		
Copper	25	8	14		
Iron	350	39	50		
Lead	250	6.5	16		
Lithium	10	3.8	8		
Magnesium	1000	29	62	74.5	<1000
Manganese	25	1.1	3.5		
Molybdenum	50	2.1	6		
Nickel	150	1.9	3		
Phosphorus	500	75	270		
Potassium	5000	1900	2700		
Selenium	250	14	36		
Silicon	250	60	100		
Silver	150	4.9	1.5		
Sodium	2000	1200	110	396	<2000
Strontium	25	.46	17		
Thallium	50	16	11		
Tin	250	70	22		
Titanium	50	.49	3.5		
Uranium	250	11	20		
Vanadium	50	1.4	1.5		
Zinc	150	3.8	8.5		

Associated samples MP2382: D15313-1A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

7.4.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	D15313-1A Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	48200	181000	125000	106.2	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	7890	139000	125000	104.9	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	29500	158000	125000	102.8	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2382: D15313-1A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.4.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
 Account: WILLCOP - Williams Production
 Project: 3.co Deep 1-27

QC Batch ID: MP2382
 Matrix Type: AQUEOUS

Methods: SW846 6010B
 Units: ug/l

Prep Date: 07/21/10

Metal	D15313-1A Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	48200	184000	125000	108.6
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	7890	141000	125000	106.5
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	29500	160000	125000	104.4
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2382: D15313-1A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	136000	125000	108.8	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	131000	125000	104.8	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	130000	125000	104.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2382: D15313-1A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

QC Batch ID: MP2382
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15313
Account: WILLCOP - Williams Production
Project: 3.co Deep 1-27

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP2395/GN5474			umhos/cm	9985	9850	98.6	90-110%
pH	GN5419			su	8.00	8.02	100.3	99.3-100.7%
pH	GN5419			su	8.00	8.02	100.3	99.3-100.7%

Associated Samples:
Batch GN5419: D15313-1
Batch GP2395: D15313-1
(*) Outside of QC limits

8.1
8

Misc. Forms

Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody

4036 Youngfield St., Wheat Ridge, CO 80033
303-425-6021 FAX: 303-425-6854

Accutest Job #: ~~D44343~~ JB

Accutest Quote #: D15313

AMS P.O. #:

Project No.:

Client Information			Subcontract Laboratory Information										Analytical Information									
Name Accutest Mountain States (AMS)			Name Accutest - New England																			
Address 4036 Youngfield St.			Address 495 Technology Center West, BLDG O																			
City Wheat Ridge,	State CO	Zip 80033	City Marlborough		State MA		Zip 01752															
Send Report to: Tiffany Pham			Contact: Sample Management																			
Any questions contact: Amanda Kissell																						
Phone/Fax #: (303) 425-6021; (303) 425-6854			Phone: (508) 481-6200																			
Field ID / Point of Collection			Collection			Matrix	# of bottles	Preservation						Xcra	eh		Comments					
			Date	Time	HCl			NaOH	HNO3	H2SO4	None											
10 D14343 -1			7/15/10	2:44 PM		Soil	1								X	X						
015313 -2				3:00 PM		Soil	1								X	X						
Turnaround Information			Data Deliverable Information										Comments / Remarks									
<input checked="" type="checkbox"/> 10 Business Day Standard <input type="checkbox"/> Other 3-5 days (Days)			Approved By:			<input type="checkbox"/> Commercial "A" <input type="checkbox"/> Commercial "B" <input type="checkbox"/> Commercial "BN" <input type="checkbox"/> Reduced Tier 1 <input type="checkbox"/> Full Tier 1			<input type="checkbox"/> PDF <input type="checkbox"/> Compact Disk Deliverable <input type="checkbox"/> Electronic Delivery: <input type="checkbox"/> State Forms <input type="checkbox"/> Other (Specify)			Please use Colorado regulations and RLs. ac										
10 Day Turnaround Hardcopy, RUSH is FAX Data unless previously approved.																						
Sample Custody must be documented below each time samples change possession, including courier delivery.																						
For Subcontract Laboratory Use Only																						
Relinquished by:			Date & Time:			Received By:			Date & Time:			Seal #:			Headspace:							
1			7/20/10			1 FedEx			1						Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>							
Relinquished by:			Date & Time:			Received By:			Date & Time:			Preserved where applicable:										
2			7/21/10 15:00			2			2 7/21/10 15:00			<input type="checkbox"/>										
Relinquished by:			Date & Time:			Received By:			Date & Time:			Temperature °C			On Ice							
3						3						37			<input checked="" type="checkbox"/>							

9.1

D15313: Chain of Custody

Page 1 of 3

Accutest Labs of New England, Inc.



CHAIN OF CUSTODY

4036 Youngfield St., Wheat Ridge, CO 80033
303-425-6021 FAX: 303-425-6854

Accutest Job #: D15313

Accutest Quote #:

AMS P.O. #:

Project No.:

Client Information			Subcontract Laboratory Information				Analytical Information					
Name Accutest Mountain States (AMS)			Name Accutest - New England				XBTXGRO					
Address 4036 Youngfield St.			Address 495 Technology Center West, BLDG O									
City Wheat Ridge, State CO Zip 80033			City Marlborough State MA Zip 01752									
Send Report to: Any questions contact: Tiffany Pham Amanda Kissell			Contact: Sample Management									
Phone/Fax #: (303) 425-6021; (303) 425-6854			Phone: (508) 481-6200									
Collection			Preservation									
Field ID / Point of Collection	Date	Time	Matrix	# of bottles	HCL	NaOH	HNO3	H2S4	None			
D15313 -1	7/15/10	2:33 PM	Soil	1						X		
		3:00 PM		1								
Turnaround Information			Data Deliverable Information				Comments / Remarks					
<input type="checkbox"/> Approved By: _____			<input type="checkbox"/> Commercial "A" <input type="checkbox"/> PDF				Please use Colorado regulations and RLs. 6FS					
<input checked="" type="checkbox"/> Other _____ (Days) _____			<input type="checkbox"/> Commercial "B" <input type="checkbox"/> Compact Disk Deliverable									
			<input type="checkbox"/> Commercial "BN" <input type="checkbox"/> Electronic Delivery: _____									
			<input type="checkbox"/> Reduced Tier 1 <input type="checkbox"/> State Forms									
10 Day Turnaround Hardcopy, RUSH is FAX Data unless previously approved.			<input type="checkbox"/> Full Tier 1 <input type="checkbox"/> Other (Specify) _____									
Sample Custody must be documented below each time samples change possession, including courier delivery.										For Subcontract Laboratory Use Only		
Relinquished by:	Date & Time:	Received By:	Date & Time:	Seal #:	Headspace:							
1	7/12/10	1 FedEx	1	1	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>							
2	7/15/10 10:20	2 FedEx	2	2 7/15/10 10:20	Preserved where applicable:							
3		3	3	3	<input type="checkbox"/>							
					Temperature °C _____	On Ice <input checked="" type="checkbox"/> 1-8						

D15313: Chain of Custody

Page 2 of 3



Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D15313

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 7/21/2010 3:00:00 PM

No. Coolers: 1

Client Service Action Required at Login: No

Project: N/A

Airbill #'s:

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun | |
| 3. Cooler media: | Ice (bag) | |

Quality Control Preservation

Y or N

N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Sample Integrity - Documentation

Y or N

- | | | |
|----------------------------------------|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|-------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume rec'd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories
V:508.481.6200

495 Technology Center West, Bldg One
F: 508.481.7753

Marlborough, MA
www.accutest.com

9.1
9

D15313: Chain of Custody
Page 3 of 3

GC Volatiles

QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GBH744-MB	BH14468.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15313-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	5.0	3.6	mg/kg	

CAS No.	Surrogate Recoveries	Limits
615-59-8	2,5-Dibromotoluene	90% 36-148%

10.1.1
10

Method Blank Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB3244-MB	AB58912A.D1		07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15313-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	6.9	ug/kg	
100-41-4	Ethylbenzene	ND	50	8.7	ug/kg	
108-88-3	Toluene	ND	50	7.7	ug/kg	
1330-20-7	Xylenes (total)	ND	50	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Limits
615-59-8	2,5-Dibromotoluene	82% 70-130%
	2,3,4-Trifluorotoluene	104% 70-130%

10.1.2
10

Blank Spike Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GBH744-BSP	BH14469.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15313-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (VOA)	20	21.8	109	67-133

CAS No.	Surrogate Recoveries	BSP	Limits
615-59-8	2,5-Dibromotoluene	99%	36-148%

Blank Spike/Blank Spike Duplicate Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB3244-BSP	AB58913A.D1		07/28/10	AP	n/a	n/a	GAB3244
GAB3244-BSD	AB58914A.D1		07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15313-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	2500	2480	99	2460	98	1	70-130/25
100-41-4	Ethylbenzene	2500	2520	101	2500	100	1	70-130/25
108-88-3	Toluene	2500	2510	100	2490	100	1	70-130/25
1330-20-7	Xylenes (total)	7500	7570	101	7510	100	1	70-130/25

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
615-59-8	2,5-Dibromotoluene	87%	88%	70-130%
	2,3,4-Trifluorotoluene	109%	108%	70-130%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15314-2MS	BH14477.D	1	07/28/10	AP	n/a	n/a	GBH744
D15314-2MSD	BH14478.D	1	07/28/10	AP	n/a	n/a	GBH744
D15314-2	BH14476.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15313-1

CAS No.	Compound	D15314-2 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (VOA)	ND		23.2	20.1	87	20.3	88	1	40-154/20

CAS No.	Surrogate Recoveries	MS	MSD	D15314-2	Limits
615-59-8	2,5-Dibromotoluene	106%	106%	106%	36-148%

10.4.1
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Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15313
Account: ALMS Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15314-1MS	AB58931.D	1	07/28/10	AP	n/a	n/a	GAB3244
D15314-1MSD	AB58932.D	1	07/28/10	AP	n/a	n/a	GAB3244
D15314-1	AB58930.D	1	07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15313-1

CAS No.	Compound	D15314-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		2910	2820	97	2840	97	1	70-130/30
100-41-4	Ethylbenzene	ND		2910	2870	98	2890	99	1	70-130/30
108-88-3	Toluene	ND		2910	2870	98	2880	99	0	70-130/30
1330-20-7	Xylenes (total)	ND		8740	8600	98	8650	99	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15314-1	Limits
615-59-8	2,5-Dibromotoluene	92%	94%	96%	70-130%
	2,3,4-Trifluorotoluene	105%	106%	102%	70-130%

General Chemistry

QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15313
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP11820/GN32422	2.0	0.0	mg/kg	40	41.6	104.0	80-120%
Chromium, Hexavalent	GP11820/GN32422			mg/kg	792	851	107.4	80-120%

Associated Samples:
Batch GP11820: D15313-1, D15313-2
(*) Outside of QC limits

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DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15313
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	0.0	0.0	0-20%
Redox Potential Vs H2	GN32434	D15340-1	mv	288	266	4.0	0-20%

Associated Samples:
Batch GN32434: D15313-1, D15313-2
Batch GP11820: D15313-1, D15313-2
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15313
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Williams Production, Parachute, CO

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	40.5	33.3	82.3	75-125%
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	1150	1250	109.0	75-125%

Associated Samples:
Batch GP11820: D15313-1, D15313-2
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits



IT'S ALL IN THE CHEMISTRY

07/29/10

Technical Report for

Williams Production

Arco Deep 1-27 Tank

Accutest Job Number: D15314

Sampling Date: 07/15/10

Report to:

Environmental Audit & Assessment
225 North 5th Street Suite 8
Grand Junction, CO 81501
jsanders@eaa-co.com

ATTN: Jana Sanders

Total number of pages in report: 96



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Jesse L. Smith
Laboratory Director

Client Service contact: Amanda Kissell 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

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Test results relate only to samples analyzed.

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Sample Summary

Williams Production

Job No: D15314

Arco Deep 1-27 Tank

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
D15314-1	07/15/10	15:14 JS	07/17/10	SO	Soil	N-P-AD127
D15314-1A	07/15/10	15:14 JS	07/17/10	SO	Soil	N-P-AD127
D15314-2	07/15/10	14:13 JS	07/17/10	SO	Soil	S-P-AD127
D15314-2A	07/15/10	14:13 JS	07/17/10	SO	Soil	S-P-AD127
D15314-3	07/15/10	15:50 JS	07/17/10	SO	Soil	W-P-AD127
D15314-3A	07/15/10	15:50 JS	07/17/10	SO	Soil	W-P-AD127
D15314-4	07/15/10	15:26 JS	07/17/10	SO	Soil	B1W-P-AD127
D15314-4A	07/15/10	15:26 JS	07/17/10	SO	Soil	B1W-P-AD127

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: Williams Production

Job No D15314

Site: Arco Deep 1-27 Tank

Report Dat 7/29/2010 3:45:49 PM

On 07/17/2010, four (4) samples, 0 Trip Blanks and 0 Field Blanks were received at Accutest Mountain States (AMS) at a temperature of 13.9°C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D15314 was assigned to the project. The lab sample IDs, client sample IDs, and dates of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Extractables by GCMS By Method SW846 8270C BY SIM

Matrix SO	Batch ID: OP2194
------------------	-------------------------

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- Samples D15314-1MS and D15314-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The RPD for the MS and MSD recoveries of Pyrene are outside control limits for sample OP2194-MSD; however, the recoveries are within control limits.

Volatiles by GC By Method SW846 8015

Matrix SO	Batch ID: M:GBH744
------------------	---------------------------

- The data for SW846 8015 meets quality control requirements.
- Analysis performed at Accutest Laboratories, Marlborough, MA.

Volatiles by GC By Method SW846 8021

Matrix SO	Batch ID: M:GAB3244
------------------	----------------------------

- The data for SW846 8021 meets quality control requirements.
- Analysis performed at Accutest Laboratories, Marlborough, MA.

Extractables by GC By Method SW846-8015B

Matrix SO	Batch ID: OP2198
------------------	-------------------------

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15348-1MS and D15348-1MSD were used as the QC samples indicated.

Metals By Method SW846 6010B

Matrix AQ

Batch ID: MP2386

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15314-1AMS and D15314-1AMSD were used as the QC samples for the metals analysis.

Matrix SO

Batch ID: MP2375

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15266-1MS, D15266-1MSD, and D15266-1SDL were used as the QC samples for the metals analysis.
- The matrix spike and matrix spike duplicate (MS/MSD) recoveries of Nickel and Zinc and the MS recovery of Copper are outside control limits. The blank spike (BS) recovery of these analytes are within control limits, proving the analysis is in control.
- The serial dilution RPDs for Barium, Cadmium, Chromium, Lead, Nickel, Selenium, and Zinc are outside control limits for sample MP2375-SD1. The percent difference is acceptable for Selenium due to low initial sample concentration (< 50 times IDL).
- MP2375-SD1 for Barium, Cadmium, Chromium, Lead, Nickel, and Zinc: Serial dilution indicates possible matrix interference.

Metals By Method SW846 6020

Matrix SO

Batch ID: MP2376

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15266-1MS, D15266-1MSD, and D15266-1SDL were used as the QC samples for the metals analysis.
- The RPD for the MS and MSD recovery of Arsenic is outside control limits for sample MP2376-S2; however, the recovery of Arsenic is within control limits.
- The serial dilution RPD for Arsenic is outside control limits for sample MP2376-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 7471A

Matrix SO

Batch ID: MP2364

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D15314-1MSD and D15314-1MS were used as the QC samples for the Mercury analysis.
- The matrix spike and matrix spike duplicate (MS/MSD) recoveries of Mercury are outside control limits. The blank spike (BS) recovery of Mercury is within control limits, proving the analysis is in control.

Wet Chemistry By Method ASTM E1498-76M

Matrix SO

Batch ID: M:GN32434

- The data for ASTM E1498-76M meets quality control requirements.
- The following samples were run outside of holding time for method ASTM E1498-76M: D15314-1, D15314-2, D15314-3, D15314-4
- Redox Potential Vs H2: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method LADNR29B

Matrix SO	Batch ID: R3308
------------------	------------------------

- The data for LADNR29B meets quality control requirements.
- Sodium Adsorption Ratio: Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

Wet Chemistry By Method SM19 2540B M

Matrix SO	Batch ID: GN5426
------------------	-------------------------

- The data for SM19 2540B M meets quality control requirements.

Wet Chemistry By Method SW846 3060/7196A M

Matrix SO	Batch ID: R3382
------------------	------------------------

- The data for SW846 3060/7196A M meets quality control requirements.
- Trivalent Chromium, : Calculated as: (Chromium) - (Hexavalent Chromium)

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO	Batch ID: M:GP11820
------------------	----------------------------

- The data for SW846 3060A/7196A meets quality control requirements.
- Hexavalent Chromium: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method SW846 9045C

Matrix SO	Batch ID: GN5419
------------------	-------------------------

- The following samples were run outside of holding time for method SW846 9045C: D15314-1, D15314-2, D15314-3, D15314-4

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Accutest Mountain States

Job No D15314

Site: WILLCOP: Arco Deep 1-27 Tank

Report Date 7/29/2010 4:12:43 PM

4 Sample(s) were collected on 07/15/2010 and were received at Accutest on 07/17/2010 properly preserved, at 1.8, 3.7 Deg. C and intact. These Samples received an Accutest job number of D15314. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GC By Method SW846 8015

Matrix SO	Batch ID: GBH744
------------------	-------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-2MS, D15314-2MSD were used as the QC samples indicated.

Volatiles by GC By Method SW846 8021

Matrix SO	Batch ID: GAB3244
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15314-1MS, D15314-1MSD were used as the QC samples indicated.

Wet Chemistry By Method ASTM E1498-76M

Matrix SO	Batch ID: GN32434
------------------	--------------------------

- Sample(s) D15340-1DUP were used as the QC samples for Redox Potential Vs H2.

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO	Batch ID: GP11820
------------------	--------------------------

- All samples were distilled within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15090-7DUP, D15090-7MS were used as the QC samples for Chromium, Hexavalent.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety. The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(D15314).



Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	N-P-AD127		
Lab Sample ID:	D15314-1	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8270C BY SIM SW846 3540C	Percent Solids:	91.9
Project:	Arco Deep 1-27 Tank		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01543.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	34	ug/kg	
208-96-8	Acenaphthylene	ND	180	37	ug/kg	
120-12-7	Anthracene	ND	36	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	36	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	23	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	26	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	23	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	23	ug/kg	
218-01-9	Chrysene	ND	36	18	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	27	ug/kg	
206-44-0	Fluoranthene	ND	36	22	ug/kg	
86-73-7	Fluorene	70.4	36	36	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	24	ug/kg	
90-12-0	1-Methylnaphthalene	77.2	36	32	ug/kg	
91-57-6	2-Methylnaphthalene	130	180	55	ug/kg	J
91-20-3	Naphthalene	ND	180	40	ug/kg	
85-01-8	Phenanthrene	53.8	36	29	ug/kg	
129-00-0	Pyrene	ND	36	24	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	71%		10-193%
321-60-8	2-Fluorobiphenyl	76%		20-138%
1718-51-0	Terphenyl-d14	75%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	N-P-AD127						
Lab Sample ID:	D15314-1				Date Sampled:	07/15/10	
Matrix:	SO - Soil				Date Received:	07/17/10	
Method:	SW846 8015				Percent Solids:	91.9	
Project:	Arco Deep 1-27 Tank						

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	BH14473.D	1	07/28/10	AMA	n/a	n/a	M:GBH744
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.1 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	5.8	4.2	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	109%		36-148%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	N-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-1	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	91.9
Method:	SW846 8021		
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB58930.D	1	07/28/10	AMA	n/a	n/a	M:GAB3244
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.1 g	10.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	58	8.0	ug/kg	
108-88-3	Toluene	ND	58	9.0	ug/kg	
100-41-4	Ethylbenzene	ND	58	10	ug/kg	
1330-20-7	Xylenes (total)	ND	58	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	96%		70-130%
	2,3,4-Trifluorotoluene	102%		70-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	N-P-AD127			
Lab Sample ID:	D15314-1		Date Sampled:	07/15/10
Matrix:	SO - Soil		Date Received:	07/17/10
Method:	SW846-8015B SW846 3550B		Percent Solids:	91.9
Project:	Arco Deep 1-27 Tank			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2839.D	1	07/21/10	CP	07/21/10	OP2198	GFD140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	232	15	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	90%		63-130%	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: N-P-AD127

Lab Sample ID: D15314-1

Matrix: SO - Soil

Date Sampled: 07/15/10

Date Received: 07/17/10

Percent Solids: 91.9

Project: Arco Deep 1-27 Tank

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	5.7	0.40	mg/kg	5	07/21/10	07/22/10 JM	SW846 6020 ²	SW846 3050B ⁶
Barium	304	0.99	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Cadmium	< 0.99	0.99	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Chromium	47.9	0.99	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Copper	11.9	0.49	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	12.1	4.9	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Mercury	< 0.11	0.11	mg/kg	1	07/20/10	07/20/10 RN	SW846 7471A ¹	SW846 7471A ⁴
Nickel	19.2	3.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Selenium	< 4.9	4.9	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Silver	< 3.0	3.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Zinc	43.9	3.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵

(1) Instrument QC Batch: MA836

(2) Instrument QC Batch: MA843

(3) Instrument QC Batch: MA844

(4) Prep QC Batch: MP2364

(5) Prep QC Batch: MP2375

(6) Prep QC Batch: MP2376

RL = Reporting Limit

Report of Analysis

Client Sample ID: N-P-AD127**Lab Sample ID:** D15314-1**Matrix:** SO - Soil**Project:** Arco Deep 1-27 Tank**Date Sampled:** 07/15/10**Date Received:** 07/17/10**Percent Solids:** 91.9**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 2.2	2.2	mg/kg	1	07/22/10 17:40	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	47.9	3.2	mg/kg	1	07/22/10 19:18	JM	SW846 3060/7196A M
Redox Potential Vs H2 ^a	289		mv	1	07/23/10	AMA	ASTM E1498-76M
Solids, Percent	91.9		%	1	07/19/10	CJ	SM19 2540B M
Specific Conductivity	1060	1.0	umhos/cm	1	07/21/10	CJ	DEPT.OF AG, BOOK N9
pH	9.01		su	1	07/19/10 12:00	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID:	N-P-AD127		
Lab Sample ID:	D15314-1A	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
		Percent Solids:	91.9
Project:	Arco Deep 1-27 Tank		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	91.3	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²
Magnesium	16.9	1.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²
Sodium	118	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ²

- (1) Instrument QC Batch: MA839
(2) Prep QC Batch: MP2386

RL = Reporting Limit

Report of Analysis

Client Sample ID:	N-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-1A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	91.9
Project:	Arco Deep 1-27 Tank		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	2.97		ratio	1	07/22/10 04:10	JM	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	S-P-AD127		
Lab Sample ID:	D15314-2	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8270C BY SIM SW846 3540C	Percent Solids:	92.5
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01546.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	34	ug/kg	
208-96-8	Acenaphthylene	ND	180	37	ug/kg	
120-12-7	Anthracene	ND	36	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	35	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	23	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	26	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	23	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	23	ug/kg	
218-01-9	Chrysene	ND	36	18	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	27	ug/kg	
206-44-0	Fluoranthene	ND	36	22	ug/kg	
86-73-7	Fluorene	ND	36	35	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	24	ug/kg	
90-12-0	1-Methylnaphthalene	ND	36	32	ug/kg	
91-57-6	2-Methylnaphthalene	ND	180	55	ug/kg	
91-20-3	Naphthalene	ND	180	40	ug/kg	
85-01-8	Phenanthrene	ND	36	29	ug/kg	
129-00-0	Pyrene	ND	36	24	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		10-193%
321-60-8	2-Fluorobiphenyl	65%		20-138%
1718-51-0	Terphenyl-d14	65%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	S-P-AD127						
Lab Sample ID:	D15314-2				Date Sampled:	07/15/10	
Matrix:	SO - Soil				Date Received:	07/17/10	
Method:	SW846 8015				Percent Solids:	92.5	
Project:	Arco Deep 1-27 Tank						

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	BH14476.D	1	07/28/10	AMA	n/a	n/a	M:GBH744
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.0 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	5.8	4.2	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	106%		36-148%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	S-P-AD127		
Lab Sample ID:	D15314-2	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8021	Percent Solids:	92.5
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB58927.D	1	07/28/10	AMA	n/a	n/a	M:GAB3244
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.0 g	10.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	58	8.0	ug/kg	
108-88-3	Toluene	12.4	58	8.9	ug/kg	J
100-41-4	Ethylbenzene	ND	58	10	ug/kg	
1330-20-7	Xylenes (total)	ND	58	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	93%		70-130%
	2,3,4-Trifluorotoluene	103%		70-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	S-P-AD127	
Lab Sample ID:	D15314-2	Date Sampled: 07/15/10
Matrix:	SO - Soil	Date Received: 07/17/10
Method:	SW846-8015B SW846 3550B	Percent Solids: 92.5
Project:	Arco Deep 1-27 Tank	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2841.D	1	07/21/10	CP	07/21/10	OP2198	GFD140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	26.5	14	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	82%		63-130%	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: S-P-AD127

Lab Sample ID: D15314-2

Matrix: SO - Soil

Project: Arco Deep 1-27 Tank

Date Sampled: 07/15/10

Date Received: 07/17/10

Percent Solids: 92.5

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	5.3	0.42	mg/kg	5	07/21/10	07/22/10 JM	SW846 6020 ²	SW846 3050B ⁶
Barium	388	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Cadmium	< 1.0	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Chromium	44.9	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Copper	13.2	0.52	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	12.0	5.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Mercury	< 0.11	0.11	mg/kg	1	07/20/10	07/20/10 RN	SW846 7471A ¹	SW846 7471A ⁴
Nickel	19.0	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Selenium	< 5.2	5.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Silver	< 3.1	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Zinc	43.2	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵

(1) Instrument QC Batch: MA836

(2) Instrument QC Batch: MA843

(3) Instrument QC Batch: MA844

(4) Prep QC Batch: MP2364

(5) Prep QC Batch: MP2375

(6) Prep QC Batch: MP2376

RL = Reporting Limit

Report of Analysis

Client Sample ID: S-P-AD127**Lab Sample ID:** D15314-2**Matrix:** SO - Soil**Project:** Arco Deep 1-27 Tank**Date Sampled:** 07/15/10**Date Received:** 07/17/10**Percent Solids:** 92.5**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 2.1	2.1	mg/kg	1	07/22/10 17:45	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	44.2	3.1	mg/kg	1	07/22/10 19:24	JM	SW846 3060/7196A M
Redox Potential Vs H2 ^a	325		mv	1	07/23/10	AMA	ASTM E1498-76M
Solids, Percent	92.5		%	1	07/19/10	CJ	SM19 2540B M
Specific Conductivity	488	1.0	umhos/cm	1	07/21/10	CJ	DEPT.OF AG, BOOK N9
pH	9.41		su	1	07/19/10 12:00	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID:	S-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-2A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	92.5
Project:	Arco Deep 1-27 Tank		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	41.4	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ²	EPA 200.7 ³
Magnesium	7.66	1.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³
Sodium	77.9	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³

- (1) Instrument QC Batch: MA839
- (2) Instrument QC Batch: MA844
- (3) Prep QC Batch: MP2386

RL = Reporting Limit

Report of Analysis

Client Sample ID:	S-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-2A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	92.5
Project:	Arco Deep 1-27 Tank		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	2.92		ratio	1	07/22/10 15:44	JM	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID: W-P-AD127

Lab Sample ID: D15314-3

Date Sampled: 07/15/10

Matrix: SO - Soil

Date Received: 07/17/10

Method: SW846 8270C BY SIM SW846 3540C

Percent Solids: 82.2

Project: Arco Deep 1-27 Tank

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01547.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	41	38	ug/kg	
208-96-8	Acenaphthylene	ND	200	42	ug/kg	
120-12-7	Anthracene	ND	41	26	ug/kg	
56-55-3	Benzo(a)anthracene	ND	41	40	ug/kg	
50-32-8	Benzo(a)pyrene	ND	41	26	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	41	29	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	41	25	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	41	26	ug/kg	
218-01-9	Chrysene	ND	41	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	30	ug/kg	
206-44-0	Fluoranthene	ND	41	25	ug/kg	
86-73-7	Fluorene	ND	41	40	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	41	27	ug/kg	
90-12-0	1-Methylnaphthalene	ND	41	36	ug/kg	
91-57-6	2-Methylnaphthalene	ND	200	62	ug/kg	
91-20-3	Naphthalene	ND	200	45	ug/kg	
85-01-8	Phenanthrene	ND	41	32	ug/kg	
129-00-0	Pyrene	ND	41	27	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		10-193%
321-60-8	2-Fluorobiphenyl	63%		20-138%
1718-51-0	Terphenyl-d14	59%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	W-P-AD127						
Lab Sample ID:	D15314-3			Date Sampled:	07/15/10		
Matrix:	SO - Soil			Date Received:	07/17/10		
Method:	SW846 8015			Percent Solids:	82.2		
Project:	Arco Deep 1-27 Tank						

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	BH14474.D	1	07/28/10	AMA	n/a	n/a	M:GBH744
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.6 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	6.8	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	112%		36-148%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	W-P-AD127		
Lab Sample ID:	D15314-3	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8021	Percent Solids:	82.2
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB58928.D	1	07/28/10	AMA	n/a	n/a	M:GAB3244
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.6 g	10.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	68	9.4	ug/kg	
108-88-3	Toluene	15.9	68	11	ug/kg	J
100-41-4	Ethylbenzene	ND	68	12	ug/kg	
1330-20-7	Xylenes (total)	ND	68	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	96%		70-130%
	2,3,4-Trifluorotoluene	102%		70-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	W-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-3	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	82.2
Method:	SW846-8015B SW846 3550B		
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2842.D	1	07/21/10	CP	07/21/10	OP2198	GFD140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	191	16	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	92%		63-130%	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: W-P-AD127

Lab Sample ID: D15314-3

Matrix: SO - Soil

Date Sampled: 07/15/10

Date Received: 07/17/10

Percent Solids: 82.2

Project: Arco Deep 1-27 Tank

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	4.6	0.42	mg/kg	5	07/21/10	07/22/10 JM	SW846 6020 ²	SW846 3050B ⁶
Barium	361	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Cadmium	< 1.0	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Chromium	47.0	1.0	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Copper	12.0	0.52	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	12.0	5.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Mercury	< 0.12	0.12	mg/kg	1	07/20/10	07/20/10 RN	SW846 7471A ¹	SW846 7471A ⁴
Nickel	20.3	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Selenium	< 5.2	5.2	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Silver	< 3.1	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Zinc	44.9	3.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵

(1) Instrument QC Batch: MA836

(2) Instrument QC Batch: MA843

(3) Instrument QC Batch: MA844

(4) Prep QC Batch: MP2364

(5) Prep QC Batch: MP2375

(6) Prep QC Batch: MP2376

RL = Reporting Limit

Report of Analysis

Client Sample ID:	W-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-3	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	82.2
Project:	Arco Deep 1-27 Tank		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 2.4	2.4	mg/kg	1	07/22/10 17:45	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	46.6	3.4	mg/kg	1	07/22/10 19:30	JM	SW846 3060/7196A M
Redox Potential Vs H2 ^a	336		mv	1	07/23/10	AMA	ASTM E1498-76M
Solids, Percent	82.2		%	1	07/19/10	CJ	SM19 2540B M
Specific Conductivity	261	1.0	umhos/cm	1	07/21/10	CJ	DEPT.OF AG, BOOK N9
pH	9.37		su	1	07/19/10 12:00	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID:	W-P-AD127		
Lab Sample ID:	D15314-3A	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
		Percent Solids:	82.2
Project:	Arco Deep 1-27 Tank		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	19.4	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ²	EPA 200.7 ³
Magnesium	3.71	1.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³
Sodium	45.8	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³

- (1) Instrument QC Batch: MA839
(2) Instrument QC Batch: MA844
(3) Prep QC Batch: MP2386

RL = Reporting Limit

Report of Analysis

Client Sample ID:	W-P-AD127		
Lab Sample ID:	D15314-3A	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
		Percent Solids:	82.2
Project:	Arco Deep 1-27 Tank		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	2.49		ratio	1	07/22/10 15:50	JM	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	B1W-P-AD127		
Lab Sample ID:	D15314-4	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8270C BY SIM SW846 3540C	Percent Solids:	75.9
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01548.D	1	07/23/10	TMB	07/20/10	OP2194	E3G41
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	8.8	8.2	ug/kg	
208-96-8	Acenaphthylene	ND	44	9.0	ug/kg	
120-12-7	Anthracene	ND	8.8	5.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	8.8	8.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	8.8	5.5	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	8.8	6.4	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	8.8	5.5	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	8.8	5.5	ug/kg	
218-01-9	Chrysene	ND	8.8	4.4	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	8.8	6.5	ug/kg	
206-44-0	Fluoranthene	ND	8.8	5.4	ug/kg	
86-73-7	Fluorene	ND	8.8	8.6	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	8.8	5.7	ug/kg	
90-12-0	1-Methylnaphthalene	ND	8.8	7.8	ug/kg	
91-57-6	2-Methylnaphthalene	ND	44	13	ug/kg	
91-20-3	Naphthalene	ND	44	9.7	ug/kg	
85-01-8	Phenanthrene	ND	8.8	7.0	ug/kg	
129-00-0	Pyrene	ND	8.8	5.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%		10-193%
321-60-8	2-Fluorobiphenyl	64%		20-138%
1718-51-0	Terphenyl-d14	73%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B1W-P-AD127		
Lab Sample ID:	D15314-4	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846 8015	Percent Solids:	75.9
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	BH14475.D	1	07/28/10	AMA	n/a	n/a	M:GBH744
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.4 g	10.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	7.9	5.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	108%		36-148%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B1W-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-4	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	75.9
Method:	SW846 8021		
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB58929.D	1	07/28/10	AMA	n/a	n/a	M:GAB3244
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	10.4 g	10.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	79	11	ug/kg	
108-88-3	Toluene	21.4	79	12	ug/kg	J
100-41-4	Ethylbenzene	ND	79	14	ug/kg	
1330-20-7	Xylenes (total)	ND	79	15	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
615-59-8	2,5-Dibromotoluene	95%		70-130%
	2,3,4-Trifluorotoluene	102%		70-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	B1W-P-AD127		
Lab Sample ID:	D15314-4	Date Sampled:	07/15/10
Matrix:	SO - Soil	Date Received:	07/17/10
Method:	SW846-8015B SW846 3550B	Percent Solids:	75.9
Project:	Arco Deep 1-27 Tank		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2843.D	1	07/21/10	CP	07/21/10	OP2198	GFD140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	190	18	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	80%		63-130%	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: B1W-P-AD127

Lab Sample ID: D15314-4

Matrix: SO - Soil

Project: Arco Deep 1-27 Tank

Date Sampled: 07/15/10

Date Received: 07/17/10

Percent Solids: 75.9

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	5.0	0.44	mg/kg	5	07/21/10	07/22/10 JM	SW846 6020 ²	SW846 3050B ⁶
Barium	276	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Cadmium	< 1.1	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Chromium	48.9	1.1	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Copper	10.5	0.55	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	12.4	5.5	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Mercury	< 0.13	0.13	mg/kg	1	07/20/10	07/20/10 RN	SW846 7471A ¹	SW846 7471A ⁴
Nickel	20.4	3.3	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Selenium	< 5.5	5.5	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Silver	< 3.3	3.3	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵
Zinc	44.0	3.3	mg/kg	1	07/21/10	07/22/10 JM	SW846 6010B ³	SW846 3050B ⁵

(1) Instrument QC Batch: MA836

(2) Instrument QC Batch: MA843

(3) Instrument QC Batch: MA844

(4) Prep QC Batch: MP2364

(5) Prep QC Batch: MP2375

(6) Prep QC Batch: MP2376

RL = Reporting Limit

Report of Analysis

Client Sample ID: B1W-P-AD127**Lab Sample ID:** D15314-4**Matrix:** SO - Soil**Project:** Arco Deep 1-27 Tank**Date Sampled:** 07/15/10**Date Received:** 07/17/10**Percent Solids:** 75.9**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 2.6	2.6	mg/kg	1	07/22/10 17:45	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	48.9	3.7	mg/kg	1	07/22/10 19:35	JM	SW846 3060/7196A M
Redox Potential Vs H2 ^a	300		mv	1	07/23/10	AMA	ASTM E1498-76M
Solids, Percent	75.9		%	1	07/19/10	CJ	SM19 2540B M
Specific Conductivity	1510	1.0	umhos/cm	1	07/21/10	CJ	DEPT.OF AG, BOOK N9
pH	9.55		su	1	07/19/10 12:00	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

Client Sample ID:	B1W-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-4A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	75.9
Project:	Arco Deep 1-27 Tank		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	16.6	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ²	EPA 200.7 ³
Magnesium	2.18	1.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³
Sodium	312	2.0	mg/l	1	07/21/10	07/22/10 JM	SW846 6010B ¹	EPA 200.7 ³

- (1) Instrument QC Batch: MA839
- (2) Instrument QC Batch: MA844
- (3) Prep QC Batch: MP2386

RL = Reporting Limit

Report of Analysis

Client Sample ID:	B1W-P-AD127	Date Sampled:	07/15/10
Lab Sample ID:	D15314-4A	Date Received:	07/17/10
Matrix:	SO - Soil	Percent Solids:	75.9
Project:	Arco Deep 1-27 Tank		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	19.1		ratio	1	07/22/10 15:56	JM	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit



Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

10165 Harwin Dr, Ste 150 Houston, TX 77036
TEL: 713-271-4700 FAX: 713-271-4770
www.accutest.com

[illegible]

D15314: Chain of Custody

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Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D15314

Client: ENIRONMENTAL AUDIT&ASS.

Immediate Client Services Action Required: No

Date / Time Received: 7/17/2010 10:00:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: ARCO DEEP 1-27-PIT

Airbill #'s: ups

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|--------------------------|-------------------------------------|
| 1. Temp criteria achieved: | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun | |
| 3. Cooler media: | Ice (bag) | |

Quality Control Preservation

Y or N

N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Sample Integrity - Documentation

Y or N

- | | | |
|----------------------------------------|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|-------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume rec'd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories
V:(303) 425-6021

4036 Youngfield Street
F: (303) 425-6854

Wheat Ridge, CO
www.accutest.com



GC/MS Semi-volatiles

5

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15314
Account: WILLCOP Williams Production
Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-MB	3G01539.D	2	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	13	12	ug/kg	
208-96-8	Acenaphthylene	ND	67	14	ug/kg	
120-12-7	Anthracene	ND	13	8.6	ug/kg	
56-55-3	Benzo(a)anthracene	ND	13	13	ug/kg	
50-32-8	Benzo(a)pyrene	ND	13	8.4	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	13	9.7	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	13	8.3	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	13	8.4	ug/kg	
218-01-9	Chrysene	ND	13	6.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	13	9.9	ug/kg	
206-44-0	Fluoranthene	ND	13	8.2	ug/kg	
86-73-7	Fluorene	ND	13	13	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	13	8.7	ug/kg	
90-12-0	1-Methylnaphthalene	ND	13	12	ug/kg	
91-57-6	2-Methylnaphthalene	ND	67	20	ug/kg	
91-20-3	Naphthalene	ND	67	15	ug/kg	
85-01-8	Phenanthrene	ND	13	11	ug/kg	
129-00-0	Pyrene	ND	13	9.0	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	53% 10-193%
321-60-8	2-Fluorobiphenyl	53% 20-138%
1718-51-0	Terphenyl-d14	65% 17-174%

Blank Spike Summary

Page 1 of 1

Job Number: D15314

Account: WILLCOP Williams Production

Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-BS	3G01540.D	2	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	41.4	50	40-136
208-96-8	Acenaphthylene	83.3	41.2	49	42-139
120-12-7	Anthracene	83.3	40.5	49	40-141
56-55-3	Benzo(a)anthracene	83.3	41.5	50	38-143
50-32-8	Benzo(a)pyrene	83.3	38.3	46	39-145
205-99-2	Benzo(b)fluoranthene	83.3	36.4	44	38-151
191-24-2	Benzo(g,h,i)perylene	83.3	37.1	45	35-136
207-08-9	Benzo(k)fluoranthene	83.3	42.2	51	38-147
218-01-9	Chrysene	83.3	41.1	49	39-137
53-70-3	Dibenzo(a,h)anthracene	83.3	37.6	45	35-139
206-44-0	Fluoranthene	83.3	41.5	50	34-132
86-73-7	Fluorene	83.3	41.9	50	41-136
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	37.3	45	31-144
90-12-0	1-Methylnaphthalene	83.3	41.0	49	36-130
91-57-6	2-Methylnaphthalene	83.3	41.0	49	40-131
91-20-3	Naphthalene	83.3	43.5	52	36-130
85-01-8	Phenanthrene	83.3	43.2	52	40-135
129-00-0	Pyrene	83.3	40.2	48	29-157

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	53%	10-193%
321-60-8	2-Fluorobiphenyl	52%	20-138%
1718-51-0	Terphenyl-d14	54%	17-174%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D15314
Account: WILLCOP Williams Production
Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2194-MS	3G01544.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
OP2194-MSD	3G01545.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41
D15314-1	3G01543.D	5	07/23/10	TMB	07/20/10	OP2194	E3G41

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	D15314-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		90.6	56.8	63	67.2	74	17	20-151/30
208-96-8	Acenaphthylene	ND		90.6	52.5	58	64.9	72	21	23-156/30
120-12-7	Anthracene	ND		90.6	46.2	51	59.3	65	25	25-149/30
56-55-3	Benzo(a)anthracene	ND		90.6	51.1	56	64.2	71	23	22-157/30
50-32-8	Benzo(a)pyrene	ND		90.6	44.5	49	56.1	62	23	23-153/30
205-99-2	Benzo(b)fluoranthene	ND		90.6	48.9	54	62.1	68	24	22-161/30
191-24-2	Benzo(g,h,i)perylene	ND		90.6	40.7	45	51.3	57	23	20-158/30
207-08-9	Benzo(k)fluoranthene	ND		90.6	45.6	50	58.9	65	25	17-161/30
218-01-9	Chrysene	ND		90.6	46.2	51	59.6	66	25	16-159/30
53-70-3	Dibenzo(a,h)anthracene	ND		90.6	41.9	46	53.5	59	24	21-154/30
206-44-0	Fluoranthene	ND		90.6	60.6	67	73.3	81	19	16-140/30
86-73-7	Fluorene	70.4		90.6	104	37	129	65	21	15-153/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		90.6	38.9	43	51.1	56	27	21-159/30
90-12-0	1-Methylnaphthalene	77.2		90.6	107	33	121	48	12	10-148/30
91-57-6	2-Methylnaphthalene	130	J	90.6	152	24	171	45	12	10-181/30
91-20-3	Naphthalene	ND		90.6	58.6	65	64.3	71	9	10-176/30
85-01-8	Phenanthrene	53.8		90.6	85.0	34	105	56	21	22-152/30
129-00-0	Pyrene	ND		90.6	46.2	51	64.5	71	33*	10-200/30

CAS No.	Surrogate Recoveries	MS	MSD	D15314-1	Limits
4165-60-0	Nitrobenzene-d5	54%	60%	71%	10-193%
321-60-8	2-Fluorobiphenyl	59%	70%	76%	20-138%
1718-51-0	Terphenyl-d14	61%	82%	75%	17-174%



GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D15314

Account: WILLCOP Williams Production

Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-MB	FD2830.D	1	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples:

Method: SW846-8015B

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	ND	13	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	102% 63-130%

Blank Spike Summary

Job Number: D15314
Account: WILLCOP Williams Production
Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-BS	FD2831.D	1	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples: Method: SW846-8015B

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	672	101	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	111%	63-130%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D15314

Account: WILLCOP Williams Production

Project: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2198-MS	FD2832.D	5	07/21/10	CP	07/21/10	OP2198	GFD140
OP2198-MSD	FD2833.D	5	07/21/10	CP	07/21/10	OP2198	GFD140
D15348-1	FD2834.D	5	07/21/10	CP	07/21/10	OP2198	GFD140

The QC reported here applies to the following samples:

Method: SW846-8015B

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	D15348-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	7090		738	7740	88	7530	60 ^a	3	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15348-1	Limits
84-15-1	o-Terphenyl	102%	116%	117%	63-130%

(a) Outside control limits due to high level in sample relative to spike amount.



Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2364
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 07/20/10

Metal	RL	IDL	MDL	MB raw	final
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Mercury	0.10	.0011	.0012	0.0046	<0.10
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Associated samples MP2364: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.1.1
7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2364
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 07/20/10

Metal	D15314-1 Original MS	Spikelot HGWSR1	% Rec	QC Limits
-------	-------------------------	--------------------	-------	--------------

Mercury 0.028 0.38 0.427 82.5N(a) 85-115

Associated samples MP2364: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2364
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 07/20/10

Metal	D15314-1 Original	MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
-------	----------------------	-----	--------------------	-------	------------	-------------

Mercury 0.028 0.36 0.427 77.8N(a) 5.4 20

Associated samples MP2364: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

7.1.2

7

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

Methods: SW846 7471A
Units: mg/kg

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.34	0.4	85.0	80-120

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOF - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.7	2		
Antimony	3.0	.17	.5		
Arsenic	2.5	.28	.72		
Barium	1.0	.014	.05	0.060	<1.0
Beryllium	1.0	.14	.21		
Boron	5.0	.35	.91		
Cadmium	1.0	.022	.12	0.030	<1.0
Calcium	40	1.7	2.7		
Chromium	1.0	.027	.18	0.050	<1.0
Cobalt	0.50	.048	.058		
Copper	0.50	.16	.38	-0.090	<0.50
Iron	7.0	.77	.91		
Lead	5.0	.13	.24	0.0	<5.0
Lithium	0.20	.076	.09		
Magnesium	20	.58	.93		
Manganese	0.50	.021	.028		
Molybdenum	1.0	.041	.16		
Nickel	3.0	.038	.075	0.0	<3.0
Phosphorus	10	1.5	3.5		
Potassium	200	38	130		
Selenium	5.0	.28	.54	-0.36	<5.0
Silicon	5.0	1.2	.68		
Silver	3.0	.098	.068	0.0	<3.0
Sodium	40	23	6.3		
Strontium	5.0	.0091	.02		
Thallium	1.0	.31	.21		
Tin	5.0	1.4	.56		
Titanium	1.0	.0098	.041		
Uranium	5.0	.22	.53		
Vanadium	1.0	.027	.034		
Zinc	3.0	.076	.49	0.10	<3.0

Associated samples MP2375: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original MS	Spikelot MPICPALL % Rec	QC Limits
Aluminum	anr		
Antimony	anr		
Arsenic	anr		
Barium	90.2	286	225
Beryllium	anr		
Boron	anr		
Cadmium	1.2	49.0	56.2
Calcium	anr		
Chromium	12.7	56.9	56.2
Cobalt			
Copper	30.6	69.4	56.2
Iron	anr		
Lead	13.6	105	112
Lithium			
Magnesium	anr		
Manganese	anr		
Molybdenum			
Nickel	32.1	64.9	56.2
Phosphorus			
Potassium	anr		
Selenium	3.8	101	112
Silicon			
Silver	0.0	20.0	22.5
Sodium	anr		
Strontium			
Thallium	anr		
Tin			
Titanium			
Uranium			
Vanadium			
Zinc	90.6	120	56.2

Associated samples MP2375: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original	MSD	Spikelot MPICPALL	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony	anr					
Arsenic	anr					
Barium	90.2	302	207	102.2	5.4	20
Beryllium	anr					
Boron	anr					
Cadmium	1.2	45.1	51.8	84.7	8.3	20
Calcium	anr					
Chromium	12.7	53.5	51.8	78.8	6.2	20
Cobalt						
Copper	30.6	71.2	51.8	78.4	2.6	20
Iron	anr					
Lead	13.6	104	104	87.2	1.0	20
Lithium						
Magnesium	anr					
Manganese	anr					
Molybdenum						
Nickel	32.1	64.4	51.8	62.3N(a)	0.8	20
Phosphorus						
Potassium	anr					
Selenium	3.8	91.3	104	84.4	10.1	20
Silicon						
Silver	0.0	18.5	20.7	89.3	7.8	20
Sodium	anr					
Strontium						
Thallium	anr					
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	90.6	114	51.8	45.2N(a)	5.1	20

Associated samples MP2375: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 07/21/10

Metal	BSP Result	Spikelot MPICPAL	% Rec	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	182	200	91.0	80-120
Beryllium	anr			
Boron	anr			
Cadmium	46.5	50	93.0	80-120
Calcium	anr			
Chromium	49.4	50	98.8	80-120
Cobalt				
Copper	49.2	50	98.4	80-120
Iron	anr			
Lead	95.7	100	95.7	80-120
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	47.4	50	94.8	80-120
Phosphorus				
Potassium	anr			
Selenium	92.1	100	92.1	80-120
Silicon				
Silver	19.3	20	96.5	80-120
Sodium	anr			
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	47.1	50	94.2	80-120

Associated samples MP2375: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	D15266-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	931	1110	18.7*(a)	0-10
Beryllium	anr			
Boron	anr			
Cadmium	12.6	14.0	11.1*(a)	0-10
Calcium	anr			
Chromium	131	154	17.2*(a)	0-10
Cobalt				
Copper	316	329	4.0	0-10
Iron	anr			
Lead	141	160	13.3*(a)	0-10
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	331	399	20.6*(a)	0-10
Phosphorus				
Potassium	anr			
Selenium	39.4	43.5	10.4 (b)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium	anr			
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	935	1180	26.2*(a)	0-10

Associated samples MP2375: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2375
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

(a) Serial dilution indicates possible matrix interference.

(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

7.2.4

7

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2376
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	.89		
Antimony	0.20	.001	.045		
Arsenic	0.40	.049	.26	0.051	<0.40
Barium	1.0	.0035	.17		
Beryllium	0.10	.0075	.014		
Boron	20	.97	2		
Cadmium	0.050	.023	.048		
Calcium	200	1.8	6.1		
Chromium	1.0	.021	.23		
Cobalt	0.10	.0033	.088		
Copper	1.0	.011	.14		
Iron	20	.81	6.1		
Lead	0.25	.0012	.18		
Magnesium	50	.067	1.3		
Manganese	0.50	.007	.089		
Molybdenum	0.50	.0044	.2		
Nickel	1.0	.0029	.074		
Phosphorus	30	1.8	5.6		
Potassium	100	2	9.1		
Selenium	0.20	.075	.14		
Silver	0.050	.0008	.029		
Sodium	250	.8	1.8		
Strontium	10	.004	.047		
Thallium	0.10	.015	.071		
Tin	5.0	.006	.17		
Titanium	1.0	.035	.071		
Uranium	0.25	.00038	.12		
Vanadium	2.0	.052	.99		
Zinc	5.0	.039	.53		

Associated samples MP2376: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2376
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	21.3	137	112	103.0	60-119
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2376: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (N) Matrix Spike Rec. outside of QC limits
 (anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2376
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 07/21/10

Metal	D15266-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	21.3	102	104	77.9	29.3 (a)	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP2376: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) High RPD due to possible sample matrix or nonhomogeneity.

SERIAL DILUTION RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2376
Matrix Type: SOLID

Methods: SW846 6020
Units: ug/l

Prep Date: 07/21/10

Metal	D15266-1			QC	
	Original	SDL 5:25	%DIF	Limits	
Aluminum					
Antimony					
Arsenic	220	273	24.0*(a)	0-10	
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2376: D15314-1, D15314-2, D15314-3, D15314-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	35	250		
Antimony	150	8.5	65		
Arsenic	130	14	33		
Barium	50	.7	12		
Beryllium	50	7	22		
Boron	250	18	93		
Cadmium	50	1.1	6		
Calcium	2000	85	46	-37	<2000
Chromium	50	1.4	8		
Cobalt	25	2.4	1.5		
Copper	25	8	14		
Iron	350	39	50		
Lead	250	6.5	16		
Lithium	10	3.8	8		
Magnesium	1000	29	62	46.0	<1000
Manganese	25	1.1	3.5		
Molybdenum	50	2.1	6		
Nickel	150	1.9	3		
Phosphorus	500	75	270		
Potassium	5000	1900	2700		
Selenium	250	14	36		
Silicon	250	60	100		
Silver	150	4.9	1.5		
Sodium	2000	1200	110	386	<2000
Strontium	25	.46	17		
Thallium	50	16	11		
Tin	250	70	22		
Titanium	50	.49	3.5		
Uranium	250	11	20		
Vanadium	50	1.4	1.5		
Zinc	150	3.8	8.5		

Associated samples MP2386: D15314-1A, D15314-2A, D15314-3A, D15314-4A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
 Matrix Type: AQUEOUS

Methods: SW846 6010B
 Units: ug/l

Prep Date: 07/21/10

Metal	D15314-1A Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	91300	227000	125000	108.6	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	16900	148000	125000	104.9	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	118000	247000	125000	103.2	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2386: D15314-1A, D15314-2A, D15314-3A, D15314-4A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
 Account: WILLCOP - Williams Production
 Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
 Matrix Type: AQUEOUS

Methods: SW846 6010B
 Units: ug/l

Prep Date: 07/21/10

Metal	D15314-1A Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	91300	224000	125000	106.2
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	16900	147000	125000	104.1
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	118000	245000	125000	101.6
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2386: D15314-1A, D15314-2A, D15314-3A, D15314-4A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 07/21/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	137000	125000	109.6	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	132000	125000	105.6	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	131000	125000	104.8	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2386: D15314-1A, D15314-2A, D15314-3A, D15314-4A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

QC Batch ID: MP2386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested



General Chemistry

QC Data Summaries

∞

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15314
Account: WILLCOP - Williams Production
Project: Arco Deep 1-27 Tank

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP2395/GN5474			umhos/cm	9985	9850	98.6	90-110%
pH	GN5419			su	8.00	8.02	100.3	99.3-100.7%
pH	GN5419			su	8.00	8.02	100.3	99.3-100.7%

Associated Samples:
Batch GN5419: D15314-1, D15314-2, D15314-3, D15314-4
Batch GP2395: D15314-1, D15314-2, D15314-3, D15314-4
(*) Outside of QC limits

8.1
8



Misc. Forms

Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody



CHAIN OF CUSTODY

Accutest Job #:	B14314 JB
Accutest Quote #:	D15314
AMS P.O. #:	
Project No.:	

Client Information			Subcontract Laboratory Information								Analytical Information									
Name Accutest Mountain States (AMS)			Name Accutest - New England																	
Address 4036 Youngfield St.			Address 495 Technology Center West, BLDG O																	
City Wheat Ridge,	State CO	Zip 80033	City Marlborough	State MA	Zip 01752															
Send Report to: Tiffany Pham			Contact: Sample Management																	
Any questions contact: Amanda Kissell																				
Phone/Fax #: (303) 425-6021; (303) 425-6854			Phone: (508) 481-6200																	
		Collection				Preservation			Xcra	eh										
Field ID / Point of Collection	Date	Time		Matrix	# of bottles	HCL	NH ₄ OH	HNO ₃							H ₂ O ₂	None				
JB-D14314-1	7/15/10	3:14 PM		Soil	1												X	X		
D15314-2		2:13 PM		Soil	1												X	X		
-3		3:50 PM		Soil	1												X	X		
-4		3:26 PM		Soil	1												X	X		
-																				
-																				
-																				
-																				
Turnaround Information			Data Deliverable Information								Comments / Remarks									
<input checked="" type="checkbox"/> 10 Business Day Standard <input type="checkbox"/> Other _____ (Days) Approved By: _____ 10 Day Turnaround Hardcopy, RUSH is FAX Data unless previously approved.			<input type="checkbox"/> Commercial "A" <input type="checkbox"/> Commercial "B" <input type="checkbox"/> Commercial "BN" <input type="checkbox"/> Reduced Tier 1 <input type="checkbox"/> Full Tier 1 <input type="checkbox"/> PDF <input type="checkbox"/> Compact Disk Deliverable <input type="checkbox"/> Electronic Delivery: <input type="checkbox"/> State Forms <input type="checkbox"/> Other (Specify) _____								Please use Colorado regulations and RLs. <div style="text-align: center;">2C</div>									
Sample Custody must be documented below each time samples change possession, including courier delivery.										For Subcontract Laboratory Use Only										
Relinquished by:		Date & Time:		Received By:		Date & Time:		Seal #:		Headspace:										
1 [Signature]		7/20/10		1 FedEx		1				Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>										
Relinquished by:		Date & Time:		Received By:		Date & Time:		Preserved where applicable:												
2 FedEx		7/21/10 15:00		2 [Signature]		27/21/10 15:00		<input type="checkbox"/>												
Relinquished by:		Date & Time:		Received By:		Date & Time:		Temperature °C		On Ice										
3				3		3		37		[Initials]										

9.1

D15314: Chain of Custody
Page 1 of 3
Accutest Labs of New England, Inc.



4036 Youngfield St., Wheat Ridge, CO 80033
303-425-6021 FAX: 303-425-6854

Accutest Job #:	D15314
-----------------	--------

Accutest Quote #:

AMS P.O. #:

Project No.:

[illegible]

D15314: Chain of Custody

Page 2 of 3



Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D15314

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 7/21/2010 3:00:00 PM

No. Coolers: 1

Client Service Action Required at Login: No

Project: N/A

Airbill #'s:

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun | |
| 3. Cooler media: | Ice (bag) | |

Quality Control Preservation

Y or N

N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Sample Integrity - Documentation

Y or N

- | | | |
|----------------------------------------|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|-------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume rec'd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories
V:508.481.6200

495 Technology Center West, Bldg One
F: 508.481.7753

Marlborough, MA
www.accutest.com

9.1
9

D15314: Chain of Custody

Page 3 of 3



GC Volatiles

QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GBH744-MB	BH14468.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (VOA)	ND	5.0	3.6	mg/kg	

CAS No.	Surrogate Recoveries	Limits
615-59-8	2,5-Dibromotoluene	90% 36-148%

10.1.1
10

Method Blank Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB3244-MB	AB58912A.D1		07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	6.9	ug/kg	
100-41-4	Ethylbenzene	ND	50	8.7	ug/kg	
108-88-3	Toluene	ND	50	7.7	ug/kg	
1330-20-7	Xylenes (total)	ND	50	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Limits
615-59-8	2,5-Dibromotoluene	82% 70-130%
	2,3,4-Trifluorotoluene	104% 70-130%

10.1.2
10

Blank Spike Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GBH744-BSP	BH14469.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (VOA)	20	21.8	109	67-133

CAS No.	Surrogate Recoveries	BSP	Limits
615-59-8	2,5-Dibromotoluene	99%	36-148%

10.2.1
10

Blank Spike/Blank Spike Duplicate Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB3244-BSP	AB58913A.D1		07/28/10	AP	n/a	n/a	GAB3244
GAB3244-BSD	AB58914A.D1		07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	2500	2480	99	2460	98	1	70-130/25
100-41-4	Ethylbenzene	2500	2520	101	2500	100	1	70-130/25
108-88-3	Toluene	2500	2510	100	2490	100	1	70-130/25
1330-20-7	Xylenes (total)	7500	7570	101	7510	100	1	70-130/25

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
615-59-8	2,5-Dibromotoluene	87%	88%	70-130%
	2,3,4-Trifluorotoluene	109%	108%	70-130%

10.3.1
10

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15314-2MS	BH14477.D	1	07/28/10	AP	n/a	n/a	GBH744
D15314-2MSD	BH14478.D	1	07/28/10	AP	n/a	n/a	GBH744
D15314-2	BH14476.D	1	07/28/10	AP	n/a	n/a	GBH744

The QC reported here applies to the following samples: Method: SW846 8015

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	D15314-2 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (VOA)	ND	23.2	20.1	87	20.3	88	1	40-154/20

CAS No.	Surrogate Recoveries	MS	MSD	D15314-2	Limits
615-59-8	2,5-Dibromotoluene	106%	106%	106%	36-148%

10.4.1
10

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15314
Account: ALMS Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15314-1MS	AB58931.D	1	07/28/10	AP	n/a	n/a	GAB3244
D15314-1MSD	AB58932.D	1	07/28/10	AP	n/a	n/a	GAB3244
D15314-1	AB58930.D	1	07/28/10	AP	n/a	n/a	GAB3244

The QC reported here applies to the following samples: Method: SW846 8021

D15314-1, D15314-2, D15314-3, D15314-4

CAS No.	Compound	D15314-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		2910	2820	97	2840	97	1	70-130/30
100-41-4	Ethylbenzene	ND		2910	2870	98	2890	99	1	70-130/30
108-88-3	Toluene	ND		2910	2870	98	2880	99	0	70-130/30
1330-20-7	Xylenes (total)	ND		8740	8600	98	8650	99	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15314-1	Limits
615-59-8	2,5-Dibromotoluene	92%	94%	96%	70-130%
	2,3,4-Trifluorotoluene	105%	106%	102%	70-130%

10.4.2
10



General Chemistry

QC Data Summaries

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries



METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15314
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP11820/GN32422	2.0	0.0	mg/kg	40	41.6	104.0	80-120%
Chromium, Hexavalent	GP11820/GN32422			mg/kg	792	851	107.4	80-120%

Associated Samples:
Batch GP11820: D15314-1, D15314-2, D15314-3, D15314-4
(*) Outside of QC limits

11.1
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DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15314
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	0.0	0.0	0-20%
Redox Potential Vs H2	GN32434	D15340-1	mv	288	266	4.0	0-20%

Associated Samples:

Batch GN32434: D15314-1, D15314-2, D15314-3, D15314-4

Batch GP11820: D15314-1, D15314-2, D15314-3, D15314-4

(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D15314
Account: ALMS - Accutest Mountain States
Project: WILLCOP: Arco Deep 1-27 Tank

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	40.5	33.3	82.3	75-125%
Chromium, Hexavalent	GP11820/GN32422	D15090-7	mg/kg	0.0	1150	1250	109.0	75-125%

Associated Samples:

Batch GP11820: D15314-1, D15314-2, D15314-3, D15314-4

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits



12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Karolina Blaney
Williams
1058 County Road 215
Parachute, CO 81635

Report Summary

Monday October 31, 2011

Report Number: L543084

Samples Received: 10/22/11

Client Project: ARCO DEEP 1-27

Description:

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

T. Alan Harvill , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915, PA - 68-02979

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Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

Karolina Blaney
Williams
1058 County Road 215
Parachute, CO 81635

October 31, 2011

Date Received : October 22, 2011
Description :

Sample ID : B2E-B-P-AD127

Collected By : TC
Collection Date : 10/21/11 09:29

ESC Sample # : L543084-01

Site ID : ARCO DEEP 1-27

Project # : ARCO DEEP 1-27

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015D/GRO	10/25/11	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	91.2		% Rec.	602/8015	10/25/11	5
TPH (GC/FID) High Fraction	10.	4.0	mg/kg	3546/DRO	10/27/11	1
Surrogate recovery(%) o-Terphenyl	75.1		% Rec.	3546/DRO	10/27/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 10/31/11 08:40 Printed: 10/31/11 08:41

Summary of Remarks For Samples Printed
10/31/11 at 08:41:15

TSR Signing Reports: 364
R5 - Desired TAT

use WILPCO-910-1 for 910 list, \$100 min invoice removed per Rodney Mann 9/19/11 TAH

Sample: L543084-01 Account: WILPCO Received: 10/22/11 09:00 Due Date: 10/28/11 00:00 RPT Date: 10/31/11 08:40



YOUR LAB OF CHOICE

Williams
Karolina Blaney
1058 County Road 215
Parachute, CO 81635

Quality Assurance Report
Level II

L543084

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Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

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Est. 1970

October 31, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG562132	10/25/11 04:53
a,a,a-Trifluorotoluene(FID)		% Rec.	92.20	59-128	WG562132	10/25/11 04:53
TPH (GC/FID) High Fraction	< 4	ppm			WG562345	10/27/11 12:24
o-Terphenyl		% Rec.	70.06	50-150	WG562345	10/27/11 12:24

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.34	97.1	67-135	WG562132
a,a,a-Trifluorotoluene(FID)				97.69	59-128	WG562132
TPH (GC/FID) High Fraction	ppm	60	40.6	67.6	50-150	WG562345
o-Terphenyl				68.50	50-150	WG562345

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
TPH (GC/FID) Low Fraction	mg/kg	5.40	5.34	98.0	67-135	1.06	20	WG562132
a,a,a-Trifluorotoluene(FID)				98.31	59-128			WG562132
TPH (GC/FID) High Fraction	ppm	45.8	40.6	76.0	50-150	12.1	20	WG562345
o-Terphenyl				77.51	50-150			WG562345

Analyte	Units	Matrix Spike				Limit	Ref Samp	Batch
		MS Res	Ref Res	TV	% Rec			
TPH (GC/FID) Low Fraction	mg/kg	106.	0	5.5	93.7	55-109	L542640-20	WG562132
a,a,a-Trifluorotoluene(FID)					97.04	59-128		WG562132

Analyte	Units	Matrix Spike Duplicate			Limit	RPD	Limit	Ref Samp	Batch
		MSD	Ref	%Rec					
TPH (GC/FID) Low Fraction	mg/kg	102.	106.	90.8	55-109	3.11	20	L542640-20	WG562132
a,a,a-Trifluorotoluene(FID)				97.05	59-128				WG562132

Batch number /Run number / Sample number cross reference

WG562132: R1908755: L543084-01
WG562345: R1911394: L543084-01

* * 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.'



Williams
Karolina Blaney
1058 County Road 215

Parachute, CO 81635

Quality Assurance Report
Level II

L543084

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October 31, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.