

January 12, 2010

Mr. Daniel Padilla  
OXY USA WTP LP  
760 Horizon Drive STE 101  
Grand Junction, CO 81506

**Subject: 620-1 Pit Soil Characterization Report  
Garfield County, Colorado  
Walsh Project No. 900546.0001.050**

Dear Mr. Padilla:

Walsh Environmental Scientists and Engineers, LLC (WALSH) was contracted by you to provide soil characterization of OXY USA WTP LPs (OXYs) 620-1 storage pit as a follow-up to the first soil characterization of OXYs 620-1 storage pit completed on October 15, 2009 and subsequent report dated November 23, 2009. These actions are in support of OXYs proposal to close the 620-1 soils pit in accordance to the Colorado Oil and Gas Conservation Commission (COGCC) regulations.

During the October 15, 2009 sampling event, WALSH personnel collected three soil samples from within the pit (S1, S3, and S4) and one composite background sample from around the site (S2). OXY provided the 620-1 Pit Soil Characterization Report dated November 23, 2009 and subsequent laboratory analytical data to the COGCC for review and approval. After review, the COGCC requested further characterization of the 620-1 pit. Outlined below are the tasks completed in support of this project:

WALSH personnel collected one soil sample (S-5) and one duplicate soil sample (S-6) beneath the liner in the lowest visible elevation which is located in the west corner of the pit. One composite sample of the existing footprint of the pit was collected (SC-7), consisting of seven composite sampling locations to identify any compromise in the liner material. Also, five individual background samples (B-1 through B-5) were collected from the area surrounding the site. Samples B-1 through B-5 were collected from the same locations as the S2 background composite sample collected on October 15, 2009 to provide an analytical range of background concentrations on site. During the sampling event, all soil samples were collected at a depth ranging from 2" to 8", and no staining or hydrocarbon odors were identified. Sample locations are shown on the attached Figure 1.

Samples S-5, S-6, and SC-7 were analyzed for the entire COGCC Table 910-1 Concentration Levels, while background samples B-1 through B-5 were analyzed for inorganics in soil, arsenic, and boron (hot water soluble).

## **Results**

Laboratory analytical results of the sampling event are summarized in Table 1. Analytical results during the sampling event identified concentrations of arsenic in all samples collected, and pH concentrations in samples S-5, S-6, and SC-7 to be above their respective COGCC regulatory limit.

Although concentrations of arsenic were identified to be above COGCC regulatory limits in all collected samples; samples S-5, S-6, and SC-7 collected from within the pit identified arsenic concentrations to be below background concentrations found in samples B-1, B-2, and B-5.

Samples S-5, S-6, and SC-7 identified concentrations of pH to be above the COGCC regulatory limits as well as the background concentrations found in samples B-1, B-2, B-3, B-4, and B-5.

At the request of OXY, WALSH performed a statistical analysis of the laboratory analytical data to identify concentration averages and ranges between the background samples and the S-5 and S-6 pit soil samples. The statistical analysis identified higher average arsenic concentrations in the pit samples than in the background samples, yet a higher maximum concentration in the background samples was identified. The statistical analysis also identified concentrations of pH to be higher in the pit samples than in the background samples.

### **Recommendations**

Based on the laboratory analytical results and statistical analysis of the sampling event, WALSH recommends the following:

Soil samples S-5, S-6, and SC-7 identified arsenic concentrations to be above the COGCC regulatory limit, yet below the background concentrations identified in samples B-1, B-2, and B-5. Therefore, WALSH recommends no further action needed for arsenic in the S-5, S-6, and SC-7 samples.

Samples S-5, S-6, and SC-7 identified concentrations of pH to be above the COGCC regulatory limit and above the background concentrations identified in samples B-1 through B-5. WALSH recommends obtaining a variance for the soil found below the pit liner to be stabilized by mixing with an appropriate amount of native soil and resampled to verify compliance with the regulatory limit. Once regulatory compliance has been met, WALSH recommends burying and capping the soil on-site.

If you have any questions, please contact me at (970) 241-4636 or by email at [brollins@walshenv.com](mailto:brollins@walshenv.com). Thank you for selecting WALSH for your project.

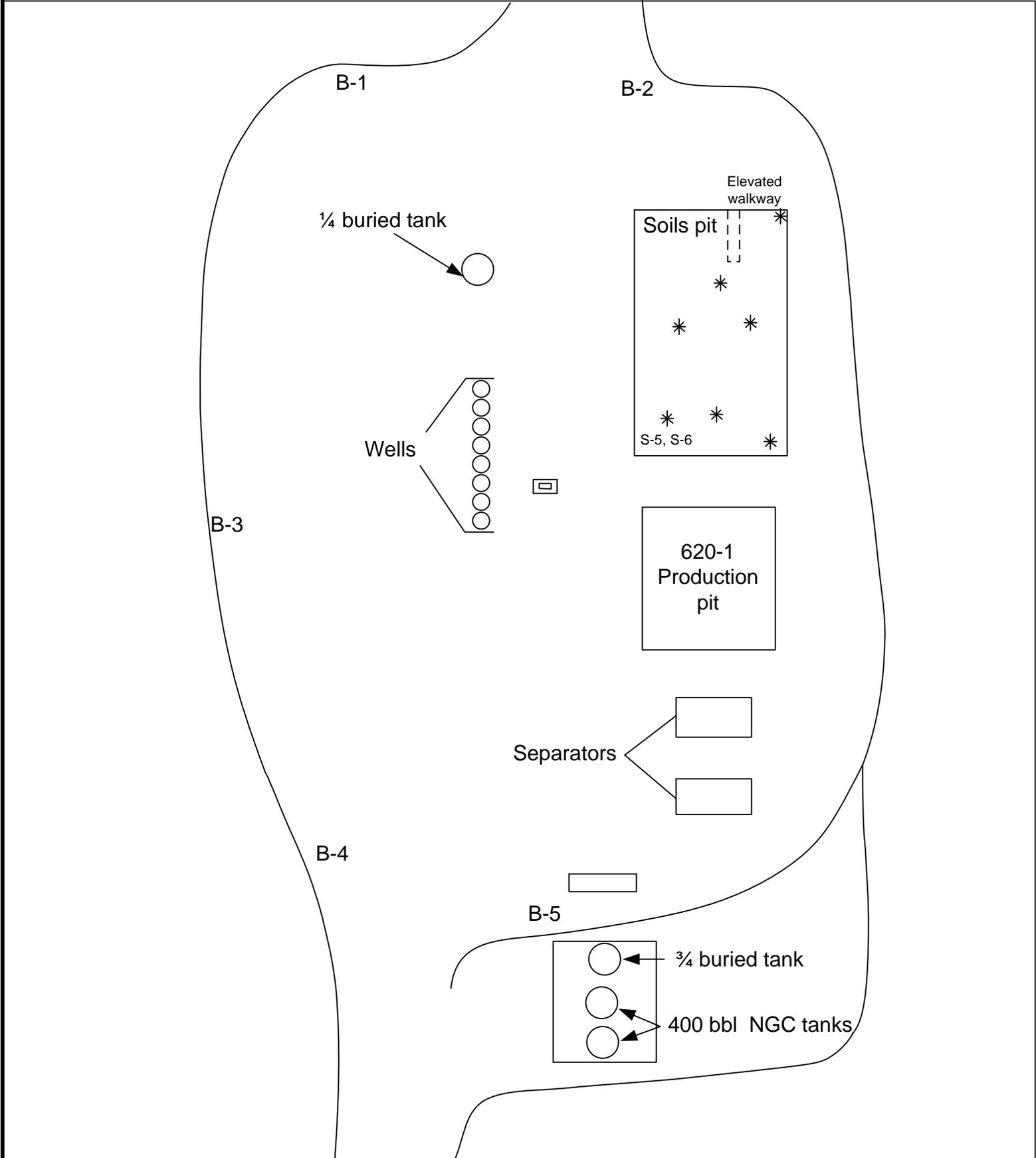
Sincerely,

**Walsh Environmental Scientists and Engineers, LLC**



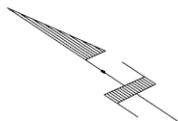
Blair K. Rollins  
Environmental Scientist

Attachments:    Figure 1 – Soil Sample Location Map  
                          Table 1 – Laboratory Analytical Results Summary  
                          Table 2 – Statistical Analysis of samples  
                          Laboratory Analytical Data  
                          Chain-of-Custody Form



**EXPLANATION**

\* = SC-7 (Composite soil sample)



Environmental Scientists and Engineers, LLC

**Figure 1 – Soil Sample Location Map**  
Garfield County, Colorado

900546.0001.050

Date 1/10

Figure 1

Table 1: Laboratory Analytical Results Summary

<b>620-01 Pit Reclaim</b>	
Pad #:	620-01
Sample Date:	12/15/2009
Clearance Achieved Date:	

	MCL (mg/kg)	Sample Identifications (mg/kg)							
		B-1	B-2	B-3	B-4	B-5	S-5	S-6	SC-7
<b>Organics in Soil</b>									
TPH (GRO and DRO)	500						28.8	49.6	54.9
Benzene	0.17						BDL	BDL	BDL
Toluene	85						BDL	BDL	BDL
Ethylbenzene	100						BDL	BDL	BDL
Xylenes	175						BDL	BDL	BDL
<b>Organics in Soil (PAH's)</b>									
Acenaphthene	1000						BDL	BDL	BDL
Anthracene	1000						BDL	BDL	BDL
Benzo(A)anthracene	0.22						BDL	BDL	BDL
Benzo(B)fluoranthene	0.22						BDL	BDL	BDL
Benzo(K)fluoranthene	2.2						BDL	BDL	BDL
Benzo(A)pyrene	0.022						BDL	BDL	BDL
Chrysene	22						BDL	BDL	BDL
Dibenzo(A,H)anthracene	0.022						BDL	BDL	BDL
Fluoranthene	1000						BDL	BDL	BDL
Flourene	1000						BDL	BDL	BDL
Indeno(1,2,3,C,D)pyrene	0.22						BDL	BDL	BDL
Napthalene	23						1.5	3.3	BDL
Pyrene	1000						BDL	BDL	BDL
<b>Inorganics in Soil</b>									
EC	<4 mmhos/cm or 2X background	480.0	297.0	319.0	425.0	2950.0	374.0	622.0	691.0
SAR	<12	0.5	0.9	2.5	3.5	7.6	7.6	10.8	7.6
pH	6-9	8.3	8.7	8.8	8.7	8.3	<b>9.3</b>	<b>9.2</b>	<b>9.1</b>
<b>Metals in Soils</b>									
Arsenic	0.39	<b>23.9</b>	<b>15.7</b>	<b>8.9</b>	<b>6.3</b>	<b>16.7</b>	<b>16.1</b>	<b>21.5</b>	<b>15.4</b>
Barium	15000						391.0	354.0	405.0
Boron (Hot Water Soluble)	2 (mg/L)	2.5	2.3	0.7	0.8	4.2	1.0	1.7	1.0
Cadmium	70						BDL	BDL	BDL
Chromium	12000						19.7	24.6	21.8
Chromium VI	23						BDL	BDL	BDL
Copper	3100						22.2	22.6	19.0
Lead	400						15.5	11.2	14.0
Mercury	23						BDL	BDL	0.0
Nickel	1600						14.8	16.2	16.5
Selenium	390						BDL	0.9	BDL
Silver	390						BDL	BDL	BDL
Zinc	23000						56.2	48.6	52.9

BDL = Below detection limit

**BOLD** = Above COGCC regulatory limit

Table 2: Statistical Analysis of the samples

620-01 Pit Reclaim	
Pad #:	620-01
Sample Date:	12/15/2009
Clearance Achieved Date:	

	MCL (mg/kg)	Background Samples (B-1, B-2, B-3, B-4, B-5)			Northwest Pit Corner Samples (S-5, S-6)			Composite Pit Sample (SC-7)
		Minimum	Maximum	Average	Minimum	Maximum	Average	
Organics in Soil								
TPH (GRO and DRO)	500				28.8	49.6	39.2	54.9
Benzene	0.17				BDL	BDL	BDL	BDL
Toluene	85				BDL	BDL	BDL	BDL
Ethylbenzene	100				BDL	BDL	BDL	BDL
Xylenes	175				BDL	BDL	BDL	BDL
Organics in Soil (PAH's)								
Acenaphthene	1000				BDL	BDL	BDL	BDL
Anthracene	1000				BDL	BDL	BDL	BDL
Benzo(A)anthracene	0.22				BDL	BDL	BDL	BDL
Benzo(B)fluoranthene	0.22				BDL	BDL	BDL	BDL
Benzo(K)fluoranthene	2.2				BDL	BDL	BDL	BDL
Benzo(A)pyrene	0.022				BDL	BDL	BDL	BDL
Chrysene	22				BDL	BDL	BDL	BDL
Dibenzo(A,H)anthracene	0.022				BDL	BDL	BDL	BDL
Fluoranthene	1000				BDL	BDL	BDL	BDL
Flourene	1000				BDL	BDL	BDL	BDL
Indeno(1,2,3,C,D)pyrene	0.22				BDL	BDL	BDL	BDL
Napthalene	23				1.5	3.3	2.4	BDL
Pyrene	1000				BDL	BDL	BDL	BDL
Inorganics in Soil								
EC	<4 mmhos/cm or 2X background	297.0	2950.0	894.2	374.0	622.0	498.0	691.0
SAR	<12	0.5	7.6	3.0	7.6	10.8	9.2	7.6
pH	6-9	8.3	8.8	8.6	<b>9.2</b>	<b>9.3</b>	<b>9.2</b>	<b>9.1</b>
Metals in Soils								
Arsenic	0.39	6.3	23.9	14.3	16.1	21.5	18.8	15.4
Barium	15000				354.0	391.0	372.5	405.0
Boron (Hot Water Soluble)	2 (mg/L)	0.7	4.2	2.1	1.0	1.7	1.4	1.0
Cadmium	70				BDL	BDL	BDL	BDL
Chromium	12000				19.7	24.6	22.2	21.8
Chromium VI	23				BDL	BDL	BDL	BDL
Copper	3100				22.2	22.6	22.4	19.0
Lead	400				11.2	15.5	13.4	14.0
Mercury	23				BDL	BDL	BDL	0.0
Nickel	1600				14.8	16.2	15.5	16.5
Selenium	390				0.9	0.9	0.9	BDL
Silver	390				BDL	BDL	BDL	BDL
Zinc	23000				48.6	56.2	52.4	52.9

BDL = Below detection limit

**BOLD** = Above COGCC regulatory limit