



04/03/12

Technical Report for

Olsson Associates

Oxy CWHF Monitoring Wells

PO# 012-0441

Accutest Job Number: D33084

Sampling Date: 03/26/12

Report to:

**Olsson Associates
826 21 1/2 Road
Grand Junction, CO 81505
shall@oaconsulting.com**

ATTN: Stuart Hall

Total number of pages in report: 43



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.


Brad Madadian
Laboratory Director

Client Service contact: Renea Jackson 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW), UT (NELAP CO00049), TX (T104704511-12-1)

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Test results relate only to samples analyzed.

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Sample Summary

Olsson Associates

Job No: D33084

Oxy CWHF Monitoring Wells
Project No: PO# 012-0441

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
D33084-1	03/26/12	13:45 JV	03/27/12	AQ	Ground Water	MW-1
D33084-1F	03/26/12	13:45 JV	03/27/12	AQ	Groundwater Filtered	MW-1



CASE NARRATIVE / CONFORMANCE SUMMARY

Client: Olsson Associates

Job No D33084

Site: Oxy CWHF Monitoring Wells

Report Date 4/3/2012 12:33:39 PM

On 03/27/2012, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 4 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D33084 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 AQ

Batch ID: GGA881

- All samples were analyzed within the recommended method holding time.
- Sample(s) D33040-1MS, D33040-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Volatiles by GC By Method SW846 8021B

Matrix AQ

Batch ID: GTA881

- All samples were analyzed within the recommended method holding time.
- Sample(s) D33040-1MS, D33040-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Extractables by GC By Method SW846-8015B

Matrix AQ

Batch ID: OP5626

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D32863-15MS, D32863-15MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Metals By Method EPA 200.7

Matrix AQ

Batch ID: MP7162

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D33098-1MS, D33098-1MSD were used as the QC samples for the metals analysis.

Metals By Method EPA 200.8

Matrix AQ

Batch ID: MP7159

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D32868-2MSD, D32868-2MS were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) of Selenium are outside control limits. Spike recovery indicates possible matrix interference.
- The matrix spike duplicate (MSD) recovery(s) of Selenium are outside control limits. Probable cause due to matrix interference.

Wet Chemistry By Method EPA 300/SW846 9056

Matrix AQ

Batch ID: GP6826

- All samples were prepared and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D33084-1MS, D33084-1MSD were used as the QC samples for the Bromide, Chloride, Fluoride, Nitrogen, Nitrate, Nitrogen, Nitrite, Sulfate, Bromide analysis.

Wet Chemistry By Method SM20 2320B

Matrix AQ

Batch ID: GN14328

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D33022-1DUP, D33022-1MS, D33022-1MSD were used as the QC samples for the Alkalinity, Total as CaCO₃ analysis.

Wet Chemistry By Method SM20 2510B

Matrix AQ

Batch ID: GP6856

- Sample(s) D33182-1DUP were used as the QC samples for the Specific Conductivity analysis.

Wet Chemistry By Method SM20 2540C

Matrix AQ

Batch ID: GN14274

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D33016-4DUP were used as the QC samples for the Solids, Total Dissolved analysis.

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:	MW-1	Date Sampled:	03/26/12
Lab Sample ID:	D33084-1	Date Received:	03/27/12
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8015B		
Project:	Oxy CWHF Monitoring Wells		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA15605.D	1	03/30/12	SK	n/a	n/a	GGA881
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	0.20	0.10	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	98%		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:	MW-1	Date Sampled:	03/26/12
Lab Sample ID:	D33084-1	Date Received:	03/27/12
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8021B		
Project:	Oxy CWHF Monitoring Wells		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TA15605.D	1	03/30/12	SK	n/a	n/a	GTA881
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-88-3	Toluene	ND	2.0	1.0	ug/l	
100-41-4	Ethylbenzene	ND	2.0	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	2.0	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	107%		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:	MW-1	
Lab Sample ID:	D33084-1	Date Sampled: 03/26/12
Matrix:	AQ - Ground Water	Date Received: 03/27/12
Method:	SW846-8015B SW846 3510C	Percent Solids: n/a
Project:	Oxy CWHF Monitoring Wells	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH002655.D	1	03/29/12	TR	03/28/12	OP5626	GFH138
Run #2							

	Initial Volume	Final Volume
Run #1	1060 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	0.533	0.38	0.25	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	45%		25-146%		

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: MW-1
 Lab Sample ID: D33084-1
 Matrix: AQ - Ground Water
 Project: Oxy CWHF Monitoring Wells

Date Sampled: 03/26/12
 Date Received: 03/27/12
 Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO ₃	425	5.0	mg/l	1	03/30/12	JD	SM20 2320B
Bromide	< 0.20	0.20	mg/l	1	03/27/12 13:31	GH	EPA 300/SW846 9056
Chloride	38.3	2.5	mg/l	5	03/27/12 17:48	GH	EPA 300/SW846 9056
Fluoride	0.79	0.10	mg/l	1	03/27/12 13:31	GH	EPA 300/SW846 9056
Nitrogen, Nitrate	0.53	0.23	mg/l	5	03/27/12 17:48	GH	EPA 300/SW846 9056
Nitrogen, Nitrite	0.055	0.010	mg/l	1	03/27/12 13:31	GH	EPA 300/SW846 9056
Solids, Total Dissolved	612	10	mg/l	1	03/28/12	CJ	SM20 2540C
Specific Conductivity	839	1.0	umhos/cm	1	03/29/12	JD	SM20 2510B
Sulfate	72.1	2.5	mg/l	5	03/27/12 17:48	GH	EPA 300/SW846 9056
pH	7.56		su	1	03/27/12 16:00	CT	SM20 4500H

RL = Reporting Limit

Report of Analysis

Client Sample ID: MW-1	Date Sampled: 03/26/12
Lab Sample ID: D33084-1F	Date Received: 03/27/12
Matrix: AQ - Groundwater Filtered	Percent Solids: n/a
Project: Oxy CWHF Monitoring Wells	

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	46500	400	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴
Iron	< 70	70	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴
Magnesium	29300	200	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴
Manganese	107	5.0	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴
Potassium	3430	1000	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴
Selenium	2.1	0.80	ug/l	2	03/28/12	03/29/12 GJ	EPA 200.8 ²	EPA 200.8 ³
Sodium	152000	400	ug/l	1	03/28/12	03/28/12 JB	EPA 200.7 ¹	EPA 200.7 ⁴

(1) Instrument QC Batch: MA2290

(2) Instrument QC Batch: MA2292

(3) Prep QC Batch: MP7159

(4) Prep QC Batch: MP7162

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

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

Client / Reporting Information Company Name: Olsson Associates Project Contact: E-Mail: shall@oaconsulting.com Stuart Hall Address: 326 21 1/2 Road City: Grand Junction State: CO Zip: 81505 Phone No.: 970-263-7800 Fax No.: 970-263-7456 Samplers Name: Jess Vann		Project Information Project Name / No.: OXY CWHF Monitoring Well Bill to: Olsson Associates Address: Client Purchase Order #: 012-0441		Requested Analyses BTEX 8021 TPH GRO/DRO 8015 Dissolved Metals - Ca, Fe, Mg, Mn, K, Se, Na Anion-F, Br, Cl, NO3, NO2, SO4 TDS SPON pH Total Alkalinity										Matrix Codes GW - Drinking Water WW - Wastewater SO - Soil SL - Sludge LIQ - Liquid SOL - Other Solid			
Accutest Sample #	Field ID / Point of Collection	Collection		Number of preserved bottles												LAB USE ONLY	
		Date	Time	Matrix	# of bottles	HC	NaOH	PHOS	PHOS4	ENOSRE	Na-SO4	MECH	NONE				
	MW-1	3/26/2012	1345	GW	15									15	x	x	

Dissolved Metals- Please lab filter

Turnaround Time (Business days) <input checked="" type="checkbox"/> 10 Day STANDARD <input type="checkbox"/> 7 Day (per contract) <input type="checkbox"/> 4 Day RUSH <input type="checkbox"/> 3 Day EMERGENCY <input type="checkbox"/> 2 Day EMERGENCY <input type="checkbox"/> 1 Day EMERGENCY <input type="checkbox"/> Other		Approved By/ Date: _____		Data Deliverable Information <input type="checkbox"/> Commercial "A" <input checked="" type="checkbox"/> Commercial "B" <input type="checkbox"/> Reduced Tier 1 <input type="checkbox"/> Full Data Package Commercial "A" = Results Only Commercial "B" = Results & Standard QC		Comments / Remarks AMS FEDEX Account Number - 467721860	
Real time analytical data available via Lablink							
SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY							
Relinquished by: <i>John Vann</i> Date Time: 3/26/12 1630hrs		Received By: <i>John R</i> Date Time: 3/27 1000		Relinquished By: Date Time:		Received By: Date Time:	
Relinquished by: Date Time:		Received By: Date Time:		Relinquished By: Date Time:		Received By: Date Time:	
Relinquished by: Date Time:		Received By: Date Time:		Relinquished By: Date Time:		Received By: Date Time:	
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Relinquished by: Date Time:		Received By: Date Time:		Relinquished By: Date Time:		Received By: Date Time:	

D33084: Chain of Custody

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Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D33084

Client: OLSSON ASS.

Immediate Client Services Action Required: No

Date / Time Received: 3/27/2012 10:00:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: OXY CWHF MONITORING WELL

Airbill #'s: Fedex

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 checked="" type="checkbox"/>		<input type="checkbox"/>	<input 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

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: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA881-MB	GA15591.D	1	03/30/12	SK	n/a	n/a	GGA881

The QC reported here applies to the following samples:

Method: SW846 8015B

D33084-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	0.20	0.10	mg/l	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	94% 60-140%

Method Blank Summary

Page 1 of 1

Job Number: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GTA881-MB	TA15591.D	1	03/30/12	SK	n/a	n/a	GTA881

The QC reported here applies to the following samples:

Method: SW846 8021B

D33084-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
100-41-4	Ethylbenzene	ND	2.0	1.0	ug/l	
108-88-3	Toluene	ND	2.0	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	2.0	2.0	ug/l	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	102% 60-140%

Blank Spike Summary

Page 1 of 1

Job Number: D33084

Account: CORCCOGJ Olsson Associates

Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA881-BS	GA15592.D	1	03/30/12	SK	n/a	n/a	GGA881

The QC reported here applies to the following samples:

Method: SW846 8015B

D33084-1

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
	TPH-GRO (C6-C10)	2.2	2.37	108	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	102%	60-140%

Blank Spike Summary

Page 1 of 1

Job Number: D33084

Account: CORCCOGJ Olsson Associates

Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GTA881-BS	TA15592.D	1	03/30/12	SK	n/a	n/a	GTA881

The QC reported here applies to the following samples:

Method: SW846 8021B

D33084-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	27.2	27.8	102	70-130
100-41-4	Ethylbenzene	45.6	46.5	102	70-130
108-88-3	Toluene	212	206	97	70-130
1330-20-7	Xylenes (total)	216	228	106	68-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	108%	60-140%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D33040-1MS	GA15594.D	5	03/30/12	SK	n/a	n/a	GGA881
D33040-1MSD	GA15595.D	5	03/30/12	SK	n/a	n/a	GGA881
D33040-1	GA15593.D	1	03/30/12	SK	n/a	n/a	GGA881

The QC reported here applies to the following samples:

Method: SW846 8015B

D33084-1

CAS No.	Compound	D33040-1 mg/l	Spike Q	MS mg/l	MS %	MSD mg/l	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	ND	11	11.9	108	11.6	105	3	61-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D33040-1	Limits
120-82-1	1,2,4-Trichlorobenzene	103%	104%	95%	60-140%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D33040-1MS	TA15594.D	5	03/30/12	SK	n/a	n/a	GTA881
D33040-1MSD	TA15595.D	5	03/30/12	SK	n/a	n/a	GTA881
D33040-1	TA15593.D	1	03/30/12	SK	n/a	n/a	GTA881

The QC reported here applies to the following samples:

Method: SW846 8021B

D33084-1

CAS No.	Compound	D33040-1 ug/l	Spike Q ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	136	139	102	137	101	1	67-130/30
100-41-4	Ethylbenzene	ND	228	232	102	229	100	1	62-130/30
108-88-3	Toluene	ND	1060	1030	97	1010	95	2	66-130/30
1330-20-7	Xylenes (total)	ND	1080	1140	106	1120	104	2	61-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D33040-1	Limits
120-82-1	1,2,4-Trichlorobenzene	110%	112%	104%	60-140%

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: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP5626-MB	FH002637.D	1	03/29/12	TR	03/28/12	OP5626	GFH138

The QC reported here applies to the following samples:

Method: SW846-8015B

D33084-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	0.40	0.26	mg/l	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	54% 25-146%

Blank Spike Summary

Page 1 of 1

Job Number: D33084

Account: CORCCOGJ Olsson Associates

Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP5626-BS	FH002639.D	1	03/29/12	TR	03/28/12	OP5626	GFH138

The QC reported here applies to the following samples:

Method: SW846-8015B

D33084-1

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
	TPH-DRO (C10-C28)	20	11.5	58	49-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	62%	25-146%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D33084
Account: CORCCOGJ Olsson Associates
Project: Oxy CWHF Monitoring Wells

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP5626-MS	FH002641.D	1	03/29/12	TR	03/28/12	OP5626	GFH138
OP5626-MSD	FH002643.D	1	03/29/12	TR	03/28/12	OP5626	GFH138
D32863-15	FH002645.D	1	03/29/12	TR	03/28/12	OP5626	GFH138

The QC reported here applies to the following samples:

Method: SW846-8015B

D33084-1

CAS No.	Compound	D32863-15 mg/l	Spike Q	MS mg/l	MS %	MSD mg/l	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	ND	20	9.58	48	10.9	55	20	47-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D32863-15	Limits
84-15-1	o-Terphenyl	59%	64%	79%	25-146%

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: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7159
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 03/28/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	50	.28	4.8		
Antimony	0.40	.002	.022		
Arsenic	0.80	.098	.19		
Barium	2.0	.007	.11		
Beryllium	0.20	.015	.066		
Boron	40	1.9	1.5		
Cadmium	0.10	.045	.054		
Calcium	400	3.6	19		
Chromium	2.0	.041	.11		
Cobalt	0.20	.0065	.011		
Copper	2.0	.021	.2		
Iron	40	1.6	8.2		
Lead	0.50	.0024	.046		
Magnesium	100	.13	3.6		
Manganese	1.0	.014	.14		
Molybdenum	1.0	.0087	.05		
Nickel	2.0	.0057	.11		
Phosphorus	60	3.6			
Potassium	200	4	6.4		
Selenium	0.40	.15	.32	0.14	<0.40
Silver	0.10	.0016	.05		
Sodium	500	1.6	54		
Strontium	20	.0079	.028		
Thallium	0.20	.029	.034		
Thorium	0.20				
Tin	10	.012	.22		
Titanium	2.0	.069	.24		
Uranium	0.20	.00076	.031		
Vanadium	1.0	.1	.54		

Associated samples MP7159: D33084-1F

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: D33084
 Account: CORCCOGJ - Olsson Associates
 Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7159
 Matrix Type: AQUEOUS

Methods: EPA 200.8
 Units: ug/l

Prep Date: 03/28/12

Metal	D32868-2 Original MS	Spikelot MPICPAL % Rec	QC Limits
Aluminum			
Antimony			
Arsenic	anr		
Barium			
Beryllium			
Boron			
Cadmium	anr		
Calcium			
Chromium	anr		
Cobalt			
Copper	anr		
Iron	anr		
Magnesium			
Manganese	anr		
Molybdenum			
Nickel	anr		
Phosphorus			
Potassium			
Selenium	2.8	83.5	200
Silver	anr		
Sodium			
Strontium			
Thallium			
Thorium			
Tin			
Titanium			
Uranium			
Vanadium			

Associated samples MP7159: D33084-1F

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.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D33084
 Account: CORCCOGJ - Olsson Associates
 Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7159
 Matrix Type: AQUEOUS

Methods: EPA 200.8
 Units: ug/l

Prep Date: 03/28/12

Metal	D32868-2 Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic	anr			
Barium				
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron	anr			
Magnesium				
Manganese	anr			
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	2.8	87.2	200	42.0N(a)
Silver	anr			
Sodium				
Strontium				
Thallium				
Thorium				
Tin				
Titanium				
Uranium				
Vanadium				

Associated samples MP7159: D33084-1F

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.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7159
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 03/28/12

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium				
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron	anr			
Lead	anr			
Magnesium				
Manganese	anr			
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	192	200	96.0	85-115
Silver	anr			
Sodium				
Strontium				
Thallium				
Thorium				
Tin				
Titanium				
Uranium				
Vanadium				

Associated samples MP7159: D33084-1F

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: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
Matrix Type: AQUEOUS

Methods: EPA 200.7
Units: ug/l

Prep Date: 03/28/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	100	5.9	7.1		
Antimony	30	3.1	3.1		
Arsenic	25	5.9	5.9		
Barium	10	1.1	1.1		
Beryllium	10	.44	1.8		
Boron	50	4.8	4.8		
Cadmium	10	.27	.62		
Calcium	400	9.6	28	5.0	<400
Chromium	10	.18	.42		
Cobalt	5.0	.35	.4		
Copper	10	.85	1.9		
Iron	70	3.4	5.5	2.4	<70
Lead	50	1.6	1.8		
Lithium	2.0	.28	.46		
Magnesium	200	5.8	12	1.2	<200
Manganese	5.0	.053	.28	-0.10	<5.0
Molybdenum	10	.45	1.1		
Nickel	30	.43	.96		
Phosphorus	100	11	12		
Potassium	1000	55	130	84.7	<1000
Selenium	50	3.8	5.7		
Silicon	50	3.8	3.8		
Silver	30	.18	.56		
Sodium	400	110	110	68.3	<400
Strontium	5.0		.17		
Thallium	10	2.9	2.9		
Tin	50	5.5	15		
Titanium	10	.11	.17		
Uranium	50	1.5	1.9		
Vanadium	10	.16	.18		
Zinc	30	.28	1.4		

Associated samples MP7162: D33084-1F

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
Matrix Type: AQUEOUS

Methods: EPA 200.7
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D33084
 Account: CORCCOGJ - Olsson Associates
 Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
 Matrix Type: AQUEOUS

Methods: EPA 200.7
 Units: ug/l

Prep Date: 03/28/12

Metal	D33098-1 Original MS	Spikelot MPICPAL % Rec	QC Limits
Aluminum	anr		
Antimony			
Arsenic			
Barium			
Beryllium			
Boron	anr		
Cadmium	anr		
Calcium	137000 162000	25000 100.0	70-130
Chromium	anr		
Cobalt			
Copper	anr		
Iron	351 5340	5000 99.8	70-130
Lead	anr		
Lithium			
Magnesium	27700 53400	25000 102.8	70-130
Manganese	972 1440	500 93.6	70-130
Molybdenum			
Nickel	anr		
Phosphorus			
Potassium	4140 32000	25000 111.4	70-130
Selenium			
Silicon			
Silver	anr		
Sodium	291000 313000	25000 88.0	70-130
Strontium	anr		
Thallium			
Tin			
Titanium			
Uranium			
Vanadium			
Zinc	anr		

Associated samples MP7162: D33084-1F

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
Matrix Type: AQUEOUS

Methods: EPA 200.7
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: D33084
 Account: CORCCOGJ - Olsson Associates
 Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
 Matrix Type: AQUEOUS

Methods: EPA 200.7
 Units: ug/l

Prep Date: 03/28/12

Metal	D33098-1 Original	MSD	SpikeLot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony						
Arsenic						
Barium						
Beryllium						
Boron	anr					
Cadmium	anr					
Calcium	137000	159000	25000	88.0	1.9	20
Chromium	anr					
Cobalt						
Copper	anr					
Iron	351	5310	5000	99.2	0.6	20
Lead	anr					
Lithium						
Magnesium	27700	52800	25000	100.4	1.1	20
Manganese	972	1410	500	87.6	2.1	20
Molybdenum						
Nickel	anr					
Phosphorus						
Potassium	4140	31900	25000	111.0	0.3	20
Selenium						
Silicon						
Silver	anr					
Sodium	291000	311000	25000	80.0	0.6	20
Strontium	anr					
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	anr					

Associated samples MP7162: D33084-1F

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
Matrix Type: AQUEOUS

Methods: EPA 200.7
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: D33084
 Account: CORCCOGJ - Olsson Associates
 Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
 Matrix Type: AQUEOUS

Methods: EPA 200.7
 Units: ug/l

Prep Date: 03/28/12

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum	anr			
Antimony				
Arsenic				
Barium				
Beryllium				
Boron	anr			
Cadmium	anr			
Calcium	27000	25000	108.0	85-115
Chromium	anr			
Cobalt				
Copper	anr			
Iron	5140	5000	102.8	85-115
Lead	anr			
Lithium				
Magnesium	26700	25000	106.8	85-115
Manganese	500	500	100.0	85-115
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium	27900	25000	111.6	85-115
Selenium				
Silicon				
Silver	anr			
Sodium	27200	25000	108.8	85-115
Strontium	anr			
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	anr			

Associated samples MP7162: D33084-1F

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

QC Batch ID: MP7162
Matrix Type: AQUEOUS

Methods: EPA 200.7
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: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Alkalinity, Total as CaCO ₃	GN14328	5.0	0.0	mg/l	100	103	102.5	90-110%
Bromide	GP6826/GN14263	0.20	0.0	mg/l	20	20.0	100.0	90-110%
Chloride	GP6826/GN14263	0.50	0.0	mg/l	20	20.0	100.0	90-110%
Fluoride	GP6826/GN14263	0.10	0.0	mg/l	10	9.59	95.9	90-110%
Nitrogen, Nitrate	GP6826/GN14263	0.045	0.0	mg/l	4.52	4.27	94.5	90-110%
Nitrogen, Nitrite	GP6826/GN14263	0.010	0.0	mg/l	6.09	6.06	99.5	90-110%
Phosphate, Ortho	GP6826/GN14263	0.065	0.0	mg/l	9.78	10.5	107.3	90-110%
Solids, Total Dissolved	GN14274	10	0.0	mg/l	400	396	99.0	90-110%
Specific Conductivity	GP6856/GN14310			umhos/cm	99.4	96	96.1	90-110%
Specific Conductivity	GP6856/GN14310			umhos/cm	99.4	96	96.1	90-110%
Sulfate	GP6826/GN14263	0.50	0.0	mg/l	30	29.3	97.7	90-110%
pH	GN14268			su	8.00	7.95	99.4	99.3-100.7%
pH	GN14268			su	8.00	7.95	99.4	99.3-100.7%

Associated Samples:

Batch GN14268: D33084-1

Batch GN14274: D33084-1

Batch GN14328: D33084-1

Batch GP6826: D33084-1

Batch GP6856: D33084-1

(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Alkalinity, Total as CaCO3	GN14328	D33022-1	mg/l	208	205	1.2	0-20%
Solids, Total Dissolved	GN14274	D33016-4	mg/l	502	490	2.4	0-25%
Specific Conductivity	GP6856/GN14310	D33182-1	umhos/cm	1530	1540	0.6	0-20%

Associated Samples:

Batch GN14274: D33084-1

Batch GN14328: D33084-1

Batch GP6856: D33084-1

(*) Outside of QC limits

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MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Alkalinity, Total as CaCO ₃	GN14328	D33022-1	mg/l	208	100	303	95.0	80-120%
Bromide	GP6826/GN14263	D33084-1	mg/l	0.14	2.5	2.6	98.4	80-120%
Chloride	GP6826/GN14263	D33084-1	mg/l	38.3	50	89.0	101.4	80-120%
Fluoride	GP6826/GN14263	D33084-1	mg/l	0.79	2.5	3.1	92.4	80-120%
Nitrogen, Nitrate	GP6826/GN14263	D33084-1	mg/l	0.53	2.83	3.2	94.5	80-120%
Nitrogen, Nitrite	GP6826/GN14263	D33084-1	mg/l	0.055	0.305	0.34	93.6	80-120%
Phosphate, Ortho	GP6826/GN14263	D33084-1	mg/l	0.0	4.08	4.3	105.5	80-120%
Sulfate	GP6826/GN14263	D33084-1	mg/l	72.1	50	120	95.8	80-120%

Associated Samples:

Batch GN14328: D33084-1

Batch GP6826: D33084-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

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MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D33084
Account: CORCCOGJ - Olsson Associates
Project: Oxy CWHF Monitoring Wells

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Alkalinity, Total as CaCO ₃	GN14328	D33022-1	mg/l	208	100	300	0.8	20%
Bromide	GP6826/GN14263	D33084-1	mg/l	0.14	2.5	2.6	0.0	20%
Chloride	GP6826/GN14263	D33084-1	mg/l	38.3	50	89.0	0.0	20%
Fluoride	GP6826/GN14263	D33084-1	mg/l	0.79	2.5	3.1	0.0	20%
Nitrogen, Nitrate	GP6826/GN14263	D33084-1	mg/l	0.53	2.83	3.2	0.0	20%
Nitrogen, Nitrite	GP6826/GN14263	D33084-1	mg/l	0.055	0.305	0.34	0.0	20%
Phosphate, Ortho	GP6826/GN14263	D33084-1	mg/l	0.0	4.08	4.4	2.3	20%
Sulfate	GP6826/GN14263	D33084-1	mg/l	72.1	50	120	0.0	20%

Associated Samples:

Batch GN14328: D33084-1

Batch GP6826: D33084-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

8.4

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