

Technical Report for

Olsson Associates

Delta 12B Cuttings

Accutest Job Number: D24581

Sampling Date: 06/17/11

Report to:

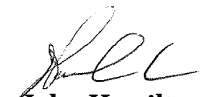
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Total number of pages in report: 73



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.



**John Hamilton
Laboratory Director**

Client Service contact: 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

Olsson Associates

Job No: D24581

Delta 12B Cuttings

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
D24581-1	06/17/11	14:30 BS	06/18/11	SO	Soil	DELTA 12BSS1
D24581-1A	06/17/11	14:30 BS	06/18/11	SO	Soil	DELTA 12BSS1

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

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: Olsson Associates

Job No D24581

Site: Delta 12B Cuttings

Report Dat 7/5/2011 3:41:42 PM

On 06/18/2011, 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 D24581 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 GCMS By Method SW846 8260B

Matrix SO	Batch ID: V5V952
------------------	-------------------------

- All samples were analyzed within the recommended method holding time.
- Sample(s) D24436-1MS, D24436-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Extractables by GCMS By Method SW846 8270C BY SIM

Matrix SO	Batch ID: OP3917
------------------	-------------------------

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24588-1MS, D24588-1MSD were used as the QC samples indicated.
- The matrix spike and matrix spike duplicate (MS/MSD) recovery(s) of multiple analytes are outside control limits. Due to dilution.
- D24581-1: Elevated reporting limits due to matrix interference.
- OP3917-MS and OP3917-MSD: Dilution required due to matrix interference.

Volatiles by GC By Method SW846 8015B

Matrix SO	Batch ID: GGA669
------------------	-------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24557-1MS, D24557-1MSD were used as the QC samples indicated.

Extractables by GC By Method SW846-8015B

Matrix SO	Batch ID: OP3913
------------------	-------------------------

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D24302-1MS, D24302-1MSD 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:** MP5002

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24580-1AMS, D24580-1AMSD were used as the QC samples for the metals analysis.

Matrix SO**Batch ID:** MP4994

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24588-1MS, D24588-1MSD, D24588-1SDL were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) of Nickel are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
- The matrix spike duplicate (MSD) recovery(s) of Chromium, Nickel are outside control limits. Probable cause due to matrix interference.
- The serial dilution RPD(s) for Cadmium, Silver are outside control limits for sample MP4994-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- The serial dilution RPD(s) for Chromium, Nickel, Zinc are outside control limits for sample MP4994-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 6020

Matrix SO**Batch ID:** MP4995

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24588-1MS, D24588-1MSD, D24588-1SDL were used as the QC samples for the metals analysis.

Metals By Method SW846 7471A

Matrix SO**Batch ID:** MP5001

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D24538-1MS, D24538-1MSD were used as the QC samples for the metals analysis.

Wet Chemistry By Method ASTM D1498-76M

Matrix SO**Batch ID:** GN10134

- Sample(s) D24579-1DUP were used as the QC samples for the Redox Potential Vs H2 analysis.

Wet Chemistry By Method SM19 2540B M

Matrix SO**Batch ID:** GN10136

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

Wet Chemistry By Method SW846 3060/7196A M

Matrix SO**Batch ID:** R8105

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

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO	Batch ID: M:GP13153
------------------	----------------------------

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

Wet Chemistry By Method SW846 9045C

Matrix SO	Batch ID: GN10142
------------------	--------------------------

- The following sample was run outside of holding time for method SW846 9045C: D24581-1.

Wet Chemistry By Method USDA HANDBOOK 60

Matrix SO	Batch ID: MP5002
------------------	-------------------------

- Sodium Adsorption Ratio: Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

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 D24581

Site: CORCCOGJ: Delta 2B Cuttings

Report Date 6/29/2011 9:26:39 AM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 06/17/2011 and were received at Accutest on 06/18/2011 properly preserved, at 1.6 Deg. C and intact. These Samples received an Accutest job number of D24581. 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.

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO

Batch ID: GP13153

- 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) D24388-1DUP, D24388-1MS 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(D24581).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: DELTA 12BSS1	
Lab Sample ID: D24581-1	Date Sampled: 06/17/11
Matrix: SO - Soil	Date Received: 06/18/11
Method: SW846 8260B	Percent Solids: 40.1
Project: Delta 12B Cuttings	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V16126.D	1	06/22/11	DC	n/a	n/a	V5V952
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.11 g	5.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	200	87	ug/kg	
108-88-3	Toluene	228	390	200	ug/kg	J
100-41-4	Ethylbenzene	138	390	98	ug/kg	J
1330-20-7	Xylene (total)	1780	790	390	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	87%		70-130%
460-00-4	4-Bromofluorobenzene	95%		70-130%
17060-07-0	1,2-Dichloroethane-D4	109%		70-130%

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: DELTA 12BSS1		
Lab Sample ID: D24581-1		Date Sampled: 06/17/11
Matrix: SO - Soil		Date Received: 06/18/11
Method: SW846 8270C BY SIM SW846 3546		Percent Solids: 40.1
Project: Delta 12B Cuttings		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	3G04646.D	25	06/22/11	TMB	06/21/11	OP3917	E3G172
Run #2							

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

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	420	330	ug/kg	
120-12-7	Anthracene	ND	420	370	ug/kg	
56-55-3	Benzo(a)anthracene	ND	1000	540	ug/kg	
50-32-8	Benzo(a)pyrene	ND	1000	750	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	1000	770	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	1000	460	ug/kg	
218-01-9	Chrysene	ND	1000	460	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	1000	770	ug/kg	
206-44-0	Fluoranthene	ND	420	420	ug/kg	
86-73-7	Fluorene	ND	420	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1200	1100	ug/kg	
91-20-3	Naphthalene	ND	420	390	ug/kg	
129-00-0	Pyrene	ND	420	390	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	43%		10-193%
321-60-8	2-Fluorobiphenyl	51%		20-138%
1718-51-0	Terphenyl-d14	74%		17-174%

(a) Elevated reporting limits due to matrix interference.

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

3.1
3

Client Sample ID: DELTA 12BSS1	Date Sampled: 06/17/11
Lab Sample ID: D24581-1	Date Received: 06/18/11
Matrix: SO - Soil	Percent Solids: 40.1
Method: SW846 8015B	
Project: Delta 12B Cuttings	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA12347.D	1	06/19/11	BR	n/a	n/a	GGA669
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	33.3	39	20	mg/kg	J
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	86%		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

3.1
3

Client Sample ID: DELTA 12BSS1	Date Sampled: 06/17/11
Lab Sample ID: D24581-1	Date Received: 06/18/11
Matrix: SO - Soil	Percent Solids: 40.1
Method: SW846-8015B SW846 3546	
Project: Delta 12B Cuttings	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD07369.D	10	06/24/11	JB	06/21/11	OP3913	GFD321
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.1 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	672	330	220	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	75%		61-142%		

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: DELTA 12BSS1	Date Sampled: 06/17/11
Lab Sample ID: D24581-1	Date Received: 06/18/11
Matrix: SO - Soil	Percent Solids: 40.1
Project: Delta 12B Cuttings	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	1.3	1.0	mg/kg	5	06/20/11	06/21/11 GJ	SW846 6020 ²	SW846 3050B ⁶
Barium	1630	2.6	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Cadmium	< 2.6	2.6	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Chromium	11.7	2.6	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Copper	20.7	2.6	mg/kg	1	06/20/11	06/21/11 JM	SW846 6010B ³	SW846 3050B ⁵
Lead	< 13	13	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Mercury	< 0.23	0.23	mg/kg	1	06/21/11	06/21/11 JM	SW846 7471A ⁴	SW846 7471A ⁷
Nickel	14.9	7.8	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Selenium	< 13	13	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Silver	< 7.8	7.8	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵
Zinc	62.9	7.8	mg/kg	1	06/20/11	06/20/11 JB	SW846 6010B ¹	SW846 3050B ⁵

- (1) Instrument QC Batch: MA1611
- (2) Instrument QC Batch: MA1612
- (3) Instrument QC Batch: MA1615
- (4) Instrument QC Batch: MA1616
- (5) Prep QC Batch: MP4994
- (6) Prep QC Batch: MP4995
- (7) Prep QC Batch: MP5001

RL = Reporting Limit

Report of Analysis

Client Sample ID: DELTA 12BSS1	Date Sampled: 06/17/11
Lab Sample ID: D24581-1	Date Received: 06/18/11
Matrix: SO - Soil	Percent Solids: 40.1
Project: Delta 12B Cuttings	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.99	0.99	mg/kg	1	06/28/11 15:02	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	10.9	3.6	mg/kg	1	06/28/11 15:02	AMA	SW846 3060/7196A M
Redox Potential Vs H2	332		mv	1	06/20/11 14:30	CB	ASTM D1498-76M
Solids, Percent	40.1		%	1	06/21/11	SWT	SM19 2540B M
Specific Conductivity	569	1.0	umhos/cm	1	06/21/11	CJ	DEPT.OF AG, BOOK N9
pH	10.16		su	1	06/20/11 14:30	CB	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: DELTA 12BSS1	Date Sampled: 06/17/11
Lab Sample ID: D24581-1A	Date Received: 06/18/11
Matrix: SO - Soil	Percent Solids: 40.1
Project: Delta 12B Cuttings	

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	12.7	2.0	mg/l	1	06/21/11	06/21/11 JB	SW846 6010B ¹	EPA 200.7 ²
Magnesium	1.25	1.0	mg/l	1	06/21/11	06/21/11 JB	SW846 6010B ¹	EPA 200.7 ²
Sodium	141	2.0	mg/l	1	06/21/11	06/21/11 JB	SW846 6010B ¹	EPA 200.7 ²

(1) Instrument QC Batch: MA1617

(2) Prep QC Batch: MP5002

RL = Reporting Limit

Report of Analysis

Client Sample ID:	DELTA 12BSS1	Date Sampled:	06/17/11
Lab Sample ID:	D24581-1A	Date Received:	06/18/11
Matrix:	SO - Soil	Percent Solids:	40.1
Project:	Delta 12B Cuttings		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	10.1		ratio	1	06/21/11 17:26	JB	USDA HANDBOOK 60

(a) Calculated as: $(Na \text{ meq/L}) / \sqrt{[(Ca \text{ meq/L}) + (Mg \text{ meq/L})/2]}$

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D24581

Client: OLSSON

Immediate Client Services Action Required: No

Date / Time Received: 6/18/2011 11:45:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: DELTA 2B CUTTINGS

Airbill #'s: FEDEX

<u>Cooler Security</u>	<u>Y or N</u>		<u>Y or N</u>	
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"/>

<u>Cooler Temperature</u>	<u>Y or N</u>	
1. Temp criteria achieved:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Cooler temp verification:	Infrared gun	
3. Cooler media:	Ice (bag)	

<u>Quality Control Preservation</u>	<u>Y or N</u>		<u>N/A</u>
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"/>

<u>Sample Integrity - Documentation</u>	<u>Y or N</u>	
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"/>

<u>Sample Integrity - Condition</u>	<u>Y or N</u>	
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	

<u>Sample Integrity - Instructions</u>	<u>Y or N</u>		<u>N/A</u>
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

4.1
4

GC/MS Volatiles

5

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V952-MB	5V16116.D	1	06/22/11	DC	n/a	n/a	V5V952

The QC reported here applies to the following samples:

Method: SW846 8260B

D24581-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	22	ug/kg	
100-41-4	Ethylbenzene	ND	100	25	ug/kg	
108-88-3	Toluene	ND	100	50	ug/kg	
1330-20-7	Xylene (total)	ND	200	100	ug/kg	

CAS No.	Surrogate Recoveries	Limits
2037-26-5	Toluene-D8	99% 70-130%
460-00-4	4-Bromofluorobenzene	95% 70-130%
17060-07-0	1,2-Dichloroethane-D4	100% 70-130%

Blank Spike Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V952-BS	5V16117.D	1	06/22/11	DC	n/a	n/a	V5V952

The QC reported here applies to the following samples:

Method: SW846 8260B

D24581-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	60.4	121	68-130
100-41-4	Ethylbenzene	50	62.6	125	70-130
108-88-3	Toluene	50	61.4	123	70-130
1330-20-7	Xylene (total)	100	115	115	60-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	98%	70-130%
460-00-4	4-Bromofluorobenzene	109%	70-130%
17060-07-0	1,2-Dichloroethane-D4	109%	70-130%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D24436-1MS	5V16120.D	1	06/22/11	DC	n/a	n/a	V5V952
D24436-1MSD	5V16121.D	1	06/22/11	DC	n/a	n/a	V5V952
D24436-1	5V16119.D	1	06/22/11	DC	n/a	n/a	V5V952

The QC reported here applies to the following samples:

Method: SW846 8260B

D24581-1

CAS No.	Compound	D24436-1 ug/kg	Spike Q ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	2610	3460	133	3410	131	1	55-140/30
100-41-4	Ethylbenzene	1220	2610	3290	79	3230	77	2	56-139/30
108-88-3	Toluene	ND	2610	3100	119	3030	116	2	57-144/30
1330-20-7	Xylene (total)	1800	5220	7480	109	7410	108	1	51-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D24436-1	Limits
2037-26-5	Toluene-D8	89%	87%	92%	70-130%
460-00-4	4-Bromofluorobenzene	113%	113%	102%	70-130%
17060-07-0	1,2-Dichloroethane-D4	118%	113%	125%	70-130%

5.3.1
5

GC/MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3917-MB	3G04640.D	1	06/22/11	TMB	06/21/11	OP3917	E3G172

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D24581-1

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	6.7	5.3	ug/kg	
120-12-7	Anthracene	ND	6.7	6.0	ug/kg	
56-55-3	Benzo(a)anthracene	ND	17	8.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	17	12	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	17	12	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	17	7.3	ug/kg	
218-01-9	Chrysene	ND	17	7.3	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	17	12	ug/kg	
206-44-0	Fluoranthene	ND	6.7	6.7	ug/kg	
86-73-7	Fluorene	ND	6.7	5.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	20	18	ug/kg	
91-20-3	Naphthalene	ND	6.7	6.3	ug/kg	
129-00-0	Pyrene	ND	6.7	6.3	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	77% 10-193%
321-60-8	2-Fluorobiphenyl	68% 20-138%
1718-51-0	Terphenyl-d14	86% 17-174%

Blank Spike Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3917-BS	3G04641.D	1	06/22/11	TMB	06/21/11	OP3917	E3G172

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D24581-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	60.5	73	40-136
120-12-7	Anthracene	83.3	70.4	84	40-141
56-55-3	Benzo(a)anthracene	83.3	69.7	84	38-143
50-32-8	Benzo(a)pyrene	83.3	75.8	91	39-145
205-99-2	Benzo(b)fluoranthene	83.3	76.7	92	38-151
207-08-9	Benzo(k)fluoranthene	83.3	70.5	85	38-147
218-01-9	Chrysene	83.3	71.2	85	39-137
53-70-3	Dibenzo(a,h)anthracene	83.3	66.0	79	35-139
206-44-0	Fluoranthene	83.3	77.1	93	34-132
86-73-7	Fluorene	83.3	60.8	73	41-136
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	60.2	72	31-144
91-20-3	Naphthalene	83.3	62.8	75	36-130
129-00-0	Pyrene	83.3	65.6	79	29-157

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	81%	10-193%
321-60-8	2-Fluorobiphenyl	72%	20-138%
1718-51-0	Terphenyl-d14	82%	17-174%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3917-MS ^a	3G04648.D	25	06/22/11	TMB	06/21/11	OP3917	E3G172
OP3917-MSD ^a	3G04649.D	25	06/22/11	TMB	06/21/11	OP3917	E3G172
D24588-1 ^a	3G04647.D	25	06/22/11	TMB	06/21/11	OP3917	E3G172

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D24581-1

CAS No.	Compound	D24588-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		92.5	ND	0* b	ND	0* b	nc	20-151/30
120-12-7	Anthracene	ND		92.5	ND	0* b	ND	0* b	nc	25-149/30
56-55-3	Benzo(a)anthracene	ND		92.5	ND	0* b	ND	0* b	nc	22-157/30
50-32-8	Benzo(a)pyrene	ND		92.5	ND	0* b	ND	0* b	nc	23-153/30
205-99-2	Benzo(b)fluoranthene	ND		92.5	ND	0* b	ND	0* b	nc	22-161/30
207-08-9	Benzo(k)fluoranthene	ND		92.5	ND	0* b	ND	0* b	nc	17-161/30
218-01-9	Chrysene	ND		92.5	ND	0* b	ND	0* b	nc	16-159/30
53-70-3	Dibenzo(a,h)anthracene	ND		92.5	ND	0* b	ND	0* b	nc	21-154/30
206-44-0	Fluoranthene	ND		92.5	ND	0* b	ND	0* b	nc	16-140/30
86-73-7	Fluorene	ND		92.5	ND	0* b	ND	0* b	nc	15-153/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		92.5	ND	0* b	ND	0* b	nc	21-159/30
91-20-3	Naphthalene	ND		92.5	ND	0* b	ND	0* b	nc	10-176/30
129-00-0	Pyrene	ND		92.5	ND	0* b	ND	0* b	nc	10-200/30

CAS No.	Surrogate Recoveries	MS	MSD	D24588-1	Limits
4165-60-0	Nitrobenzene-d5	40%	40%	34%	10-193%
321-60-8	2-Fluorobiphenyl	40%	43%	34%	20-138%
1718-51-0	Terphenyl-d14	78%	75%	74%	17-174%

(a) Dilution required due to matrix interference.

(b) Outside control limits due to dilution.

GC Volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA669-MB	GA12329.D	1	06/19/11	BR	n/a	n/a	GGA669

The QC reported here applies to the following samples:

Method: SW846 8015B

D24581-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	85% 60-140%

Blank Spike Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA669-BS	GA12330.D	1	06/19/11	BR	n/a	n/a	GGA669

The QC reported here applies to the following samples:

Method: SW846 8015B

D24581-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	96.1	87	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	95%	60-140%

7.2.1

7

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D24557-1MS	GA12333.D	1	06/19/11	BR	n/a	n/a	GGA669
D24557-1MSD	GA12334.D	1	06/19/11	BR	n/a	n/a	GGA669
D24557-1	GA12332.D	1	06/19/11	BR	n/a	n/a	GGA669

The QC reported here applies to the following samples:

Method: SW846 8015B

D24581-1

CAS No.	Compound	D24557-1 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	ND	126	122	97	121	96	1	62-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D24557-1	Limits
120-82-1	1,2,4-Trichlorobenzene	96%	97%	85%	60-140%

7.3.1

7

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

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3913-MB	FD07347.D	1	06/23/11	JB	06/21/11	OP3913	GFD321

The QC reported here applies to the following samples:

Method: SW846-8015B

D24581-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	13	8.7	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	94% 61-142%

Blank Spike Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3913-BS	FD07348.D	1	06/23/11	JB	06/21/11	OP3913	GFD321

The QC reported here applies to the following samples:

Method: SW846-8015B

D24581-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	489	73	60-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	92%	61-142%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D24581
Account: CORCCOGJ Olsson Associates
Project: Delta 12B Cuttings

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP3913-MS	FD07349.D	1	06/23/11	JB	06/21/11	OP3913	GFD321
OP3913-MSD	FD07350.D	1	06/24/11	JB	06/21/11	OP3913	GFD321
D24302-1	FD07351.D	1	06/24/11	JB	06/21/11	OP3913	GFD321

The QC reported here applies to the following samples:

Method: SW846-8015B

D24581-1

CAS No.	Compound	D24302-1 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	156	757	719	74	676	69	6	24-157/35

CAS No.	Surrogate Recoveries	MS	MSD	D24302-1	Limits
84-15-1	o-Terphenyl	89%	77%	80%	61-142%

8.3.1
8

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: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 06/20/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.59	.59		
Antimony	3.0	.31	.31		
Arsenic	2.5	.59	.59		
Barium	1.0	.11	.11	0.19	<1.0
Beryllium	1.0	.044	.1		
Boron	5.0	.48	.48		
Cadmium	1.0	.027	.27	0.010	<1.0
Calcium	40	.96	1.1		
Chromium	1.0	.018	.031	0.020	<1.0
Cobalt	0.50	.035	.035		
Copper	1.0	.085	.16	-0.090	<1.0
Iron	7.0	.34	2		
Lead	5.0	.16	.21	-0.13	<5.0
Lithium	0.20	.028	.031		
Magnesium	20	.58	1.4		
Manganese	0.50	.0053	.012		
Molybdenum	1.0	.045	.054		
Nickel	3.0	.043	.099	-0.010	<3.0
Phosphorus	10	1.1	1.2		
Potassium	200	5.5	9.2		
Selenium	5.0	.38	.5	0.25	<5.0
Silicon	5.0	.38	.51		
Silver	3.0	.018	.051	-0.010	<3.0
Sodium	40	11	11		
Strontium	5.0		.017		
Thallium	1.0	.29	.34		
Tin	5.0	.55	1.3		
Titanium	1.0	.011	.1		
Uranium	5.0	.15	.2		
Vanadium	1.0	.016	.025		
Zinc	3.0	.028	.06	0.050	<3.0

Associated samples MP4994: D24581-1

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4994
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 06/20/11

Metal	D24588-1 Original MS		Spike/lot MPICPALL % Rec		QC Limits
Aluminum	anr				
Antimony	anr				
Arsenic	anr				
Barium	1590	1780	222	85.6	75-125
Beryllium	anr				
Boron	anr				
Cadmium	0.16	46.4	55.5	83.3	75-125
Calcium					
Chromium	36.3	78.3	55.5	75.7	75-125
Cobalt					
Copper	20.2	69.2	55.5	88.3	75-125
Iron	anr				
Lead	10.2	108	111	88.1	75-125
Lithium					
Magnesium	anr				
Manganese	anr				
Molybdenum	anr				
Nickel	34.9	73.9	55.5	70.3N(a)	75-125
Phosphorus	anr				
Potassium					
Selenium	0.0	89.4	111	80.5	75-125
Silicon					
Silver	0.15	19.6	22.2	87.6	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Uranium	anr				
Vanadium					
Zinc	36.8	83.6	55.5	84.3	75-125

Associated samples MP4994: D24581-1

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

9.12
9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
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: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4994
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 06/20/11

Metal	D24588-1 Original MSD		SpikeLot MPICPAL % Rec		MSD RPD	QC Limit
Aluminum	anr					
Antimony	anr					
Arsenic	anr					
Barium	1590	2050	222	207.2(a)	14.1	20
Beryllium	anr					
Boron	anr					
Cadmium	0.16	46.9	55.5	84.2	1.1	20
Calcium						
Chromium	36.3	76.5	55.5	72.4N(b)	2.3	20
Cobalt						
Copper	20.2	69.1	55.5	88.1	0.1	20
Iron	anr					
Lead	10.2	99.0	111	80.0	8.7	20
Lithium						
Magnesium	anr					
Manganese	anr					
Molybdenum	anr					
Nickel	34.9	72.6	55.5	67.9N(b)	1.8	20
Phosphorus	anr					
Potassium						
Selenium	0.0	90.6	111	81.6	1.3	20
Silicon						
Silver	0.15	19.8	22.2	88.5	1.0	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Uranium	anr					
Vanadium						
Zinc	36.8	80.8	55.5	79.3	3.4	20

Associated samples MP4994: D24581-1

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

9.1.2
 9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
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 amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- (b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4994
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 06/20/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	191	200	95.5	80-120
Beryllium	anr			
Boron	anr			
Cadmium	47.6	50	95.2	80-120
Calcium				
Chromium	47.9	50	95.8	80-120
Cobalt				
Copper	46.9	50	93.8	80-120
Iron	anr			
Lead	95.0	100	95.0	80-120
Lithium				
Magnesium	anr			
Manganese	anr			
Molybdenum	anr			
Nickel	47.0	50	94.0	80-120
Phosphorus	anr			
Potassium				
Selenium	92.0	100	92.0	80-120
Silicon				
Silver	20.1	20	100.5	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Uranium	anr			
Vanadium				
Zinc	47.1	50	94.2	80-120

Associated samples MP4994: D24581-1

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

9.1.3
 9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4994
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: ug/l

Prep Date: 06/20/11

Metal	D24588-1 Original SDL 1:5		%DIF	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	13700	15000	9.7	0-10
Beryllium	anr			
Boron	anr			
Cadmium	1.40	0.00	100.0(a)	0-10
Calcium	anr			
Chromium	314	351	11.7*(b)	0-10
Cobalt	anr			
Copper	171	175	0.0	0-10
Iron	anr			
Lead	87.9	94.5	7.5	0-10
Lithium	anr			
Magnesium	anr			
Manganese	anr			
Molybdenum	anr			
Nickel	302	351	16.1*(b)	0-10
Phosphorus	anr			
Potassium	anr			
Selenium	0.00	0.00	NC	0-10
Silicon	anr			
Silver	1.30	4.00	207.7(a)	0-10
Sodium	anr			
Strontium	anr			
Thallium	anr			
Tin	anr			
Titanium	anr			
Uranium	anr			
Vanadium	anr			
Zinc	318	379	19.0*(b)	0-10

Associated samples MP4994: D24581-1

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

9.1.4
9

SERIAL DILUTION RESULTS SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4994
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

- (anr) Analyte not requested
- (a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- (b) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP4995
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 06/20/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	1.2		
Antimony	0.20	.001	.0095		
Arsenic	0.40	.049	.22	0.045	<0.40
Barium	1.0	.0035	.1		
Beryllium	0.10	.0075	.014		
Boron	20	.97	1		
Cadmium	0.050	.023	.048		
Calcium	200	1.8	8.2		
Chromium	1.0	.021	.24		
Cobalt	0.10	.0033	.003		
Copper	1.0	.011	.063		
Iron	20	.81	3.7		
Lead	0.25	.0012	.015		
Magnesium	50	.067	2.6		
Manganese	0.50	.007	.029		
Molybdenum	0.50	.0044	.023		
Nickel	1.0	.0029	.031		
Phosphorus	30	1.8	3.5		
Potassium	100	2	3.2		
Selenium	0.20	.075	.19		
Silver	0.050	.0008	.002		
Sodium	250	.8	4.4		
Strontium	10	.004	.04		
Thallium	0.10	.015	.02		
Tin	5.0	.006	.028		
Titanium	1.0	.035	.062		
Uranium	0.25	.00038	.0009		
Vanadium	2.0	.052	.29		
Zinc	5.0	.039	.12		

Associated samples MP4995: D24581-1

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: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4995
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 06/20/11

Metal	D24588-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	2.4	97.4	111	85.6	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 MP4995: D24581-1

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

9.2.2
 9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4995
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 06/20/11

Metal	D24588-1 Original MSD		SpikeLot MPICPALL % Rec	MSD RPD	QC Limit	
Aluminum						
Antimony						
Arsenic	2.4	95.4	111	83.8	2.1	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 MP4995: D24581-1

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

9.2.2
 9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4995
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 06/20/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	103	100	103.0	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				

Associated samples MP4995: D24581-1

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

9.2.3
 9

SERIAL DILUTION RESULTS SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP4995
 Matrix Type: SOLID

Methods: SW846 6020
 Units: ug/l

Prep Date: 06/20/11

Metal	D24588-1			QC
	Original	SDL 5:25	%DIF	Limits

Aluminum				
Antimony				
Arsenic	20.9	19.8	5.4	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 MP4995: D24581-1

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

9.2.4
 9

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5001
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 06/21/11

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.10	.0011	.013	-0.0045	<0.10

Associated samples MP5001: D24581-1

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: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5001
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 06/21/11

Metal	D24538-1 Original MS	Spikelot HGWSR1	% Rec	QC Limits
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Mercury 0.012 0.45 0.384 114.1 85-115

Associated samples MP5001: D24581-1

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: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP5001
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 06/21/11

Metal	D24538-1 Original MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit	
Mercury	0.012	0.48	0.422	111.0	6.5	20

Associated samples MP5001: D24581-1

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5001
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 06/21/11

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.46	0.4	115.0	80-120

Associated samples MP5001: D24581-1

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: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5002
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date: 06/21/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	30	30		
Antimony	150	16	16		
Arsenic	130	30	30		
Barium	50	5.5	5.5		
Beryllium	50	2.2	2.5		
Boron	250	24	24		
Cadmium	50	1.4	1.4		
Calcium	2000	48	75	131	<2000
Chromium	50	.9	4		
Cobalt	25	1.8	1.8		
Copper	50	4.3	14		
Iron	350	17	65		
Lead	250	8	11		
Lithium	10	1.4	6		
Magnesium	1000	29	50	-28	<1000
Manganese	25	.27	1.6		
Molybdenum	50	2.3	4.4		
Nickel	150	2.2	5		
Phosphorus	500	55	100		
Potassium	5000	280	280		
Selenium	250	19	19		
Silicon	250	19	19		
Silver	150	.9	1.6		
Sodium	2000	570	570	-490	<2000
Strontium	25		1.3		
Thallium	50	15	15		
Tin	250	28	50		
Titanium	50	.55	1.6		
Uranium	250	7.5	18		
Vanadium	50	.8	1.1		
Zinc	150	1.4	9		

Associated samples MP5002: D24581-1A

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

9.4.1
9

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5002
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP5002
 Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
 Units: ug/l

Prep Date: 06/21/11

Metal	D24580-1A Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	73500	208000	125000	107.6	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	1430	133000	125000	105.3	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	130000	265000	125000	108.0	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP5002: D24581-1A

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

9.4.2
9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5002
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
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: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP5002
 Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
 Units: ug/l

Prep Date: 06/21/11

Metal	D24580-1A Original MSD		SpikeLot MPICPAL % Rec		MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	73500	207000	125000	106.8	0.5	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	1430	133000	125000	105.3	0.0	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	130000	264000	125000	107.2	0.4	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP5002: D24581-1A

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

9.4.2
9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5002
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
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: D24581
 Account: CORCCOGJ - Olsson Associates
 Project: Delta 12B Cuttings

QC Batch ID: MP5002
 Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
 Units: ug/l

Prep Date: 06/21/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	134000	125000	107.2	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	131000	125000	104.8	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	135000	125000	108.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP5002: D24581-1A

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

9.4.3
 9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

QC Batch ID: MP5002
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
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: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP4720/GN10164			umhos/cm	9961	10100	101.7	90-110%
pH	GN10142			su	8.00	7.98	99.8	99.3-100.7%

Associated Samples:
Batch GN10142: D24581-1
Batch GP4720: D24581-1
(*) Outside of QC limits

10.1
10

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D24581
Account: CORCCOGJ - Olsson Associates
Project: Delta 12B Cuttings

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Redox Potential Vs H2	GN10134	D24579-1	mv	321	325	1.2	0-20%

Associated Samples:
Batch GN10134: D24581-1
(*) Outside of QC limits

10.2
10

Misc. Forms

Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody



Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D24581

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 6/21/2011

Delivery Method:

Client Service Action Required at Login: No

Project:

No. Coolers: 1

Airbill #'s:

<u>Cooler Security</u>	<u>Y or N</u>		<u>Y or N</u>	<u>Y or N</u>	
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"/>

<u>Cooler Temperature</u>	<u>Y or N</u>	
1. Temp criteria achieved:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Cooler temp verification:	Infrared gun	
3. Cooler media:	Ice (bag)	

<u>Quality Control Preservation</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Trip Blank listed on COC:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" 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"/>

<u>Sample Integrity - Documentation</u>	<u>Y</u>	<u>or</u>	<u>N</u>
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"/>

<u>Sample Integrity - Condition</u>	<u>Y</u>	<u>or</u>	<u>N</u>
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		

<u>Sample Integrity - Instructions</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
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 recvd 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

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: D24581
Account: ALMS - Accutest Mountain States
Project: CORCCOGJ: Delta 2B Cuttings

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP13153/GN35315	0.40	0.20	mg/kg	12	11.3	94.2	80-120%
Chromium, Hexavalent	GP13153/GN35315			mg/kg	702	759	108.1	80-120%

Associated Samples:
Batch GP13153: D24581-1
(*) Outside of QC limits

12.1
12

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D24581
Account: ALMS - Accutest Mountain States
Project: CORCCOGJ: Delta 2B Cuttings

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP13153/GN35315	D24388-1	mg/kg	0.25	0.29	14.8	0-20%

Associated Samples:
Batch GP13153: D24581-1
(*) Outside of QC limits

12.2
12

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D24581
Account: ALMS - Accutest Mountain States
Project: CORCCOGJ: Delta 2B Cuttings

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP13153/GN35315	D24388-1	mg/kg	0.25	12.1	12.3	99.9	75-125%
Chromium, Hexavalent	GP13153/GN35315	D24388-1	mg/kg	0.25	662	646	97.6	75-125%

Associated Samples:

Batch GP13153: D24581-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

12.3
12