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STL

**STL Denver**  
4955 Yarrow Street  
Arvada, CO 80002

Tel: 303 736 0100 Fax: 303 431 7171  
[www.stl-inc.com](http://www.stl-inc.com)

## ANALYTICAL REPORT

Project: Sinclair Pits

STL Denver Lot #: D7C120203

John Axelson

Colorado Oil & Gas Conservation Commission  
1120 Lincoln St.  
Suite 801  
Denver, CO 80203

  
for Patrick J. McEntee  
Project Manager

March 23, 2007

# Table Of Contents

## Standard Deliverables

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### Report Contents

### Total Number of Pages

#### **Standard Deliverables**

*The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.*

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- Table of Contents
- Case Narrative
- Executive Summary – Detection Highlights
- Methods Summary
- Method/Analyst Summary
- Lot Sample Summary
- Analytical Results
- QC Data Association Summary
- Chain-of-Custody

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### **Case Narrative**

The results included in this report have been reviewed for compliance with STL's Laboratory Quality Manual. The test results shown in this report meet all requirements of NELAP and any exceptions are noted below.

Dilution factors and footnotes have been provided to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interferences or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

STL utilizes USEPA approved methods in all analytical work. The sample presented in this report was analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of quality control parameters is provided below.

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### **Quality Control Summary for Lot D7C120203**

#### **Sample Receiving**

STL Denver received two soil samples under chain of custody on March 12, 2007.

The sample was received at an elevated temperature of 27.9°C as there was no ice present in the cooler.

All sample containers were received intact.

#### **Holding Times**

All analyses were performed within the prescribed holding time.

#### **Total Metals Analysis, Sodium Absorption Ratio**

No anomalies were observed.

#### **General Chemistry**

The Percent Moisture sample duplicate analysis data associated with QC batch 7074262 exhibited RPD data outside the QC limits. The SOP for this method indicates that the percent moisture in the sample must be greater than 10% for the RPD limits to apply. As the percent moisture of the sample analyzed is less than 1%, the control limits do not apply; therefore, corrective action is deemed unnecessary.

No other anomalies were observed

# EXECUTIVE SUMMARY - Detection Highlights

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<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>ANALYTICAL METHOD</u>
<b>SS-1 03/09/07 10:50 001</b>				
pH	9.0	0.10	No Units	SW846 9045C
Specific Conductance	140	2.0	umhos/cm	SW846 9050A
Percent Moisture	11	0.10	%	MCAWW 160.3 MOD
<b>SS-2 03/09/07 10:55 002</b>				
pH	9.3	0.10	No Units	SW846 9045C
Specific Conductance	280	2.0	umhos/cm	SW846 9050A
Percent Moisture	7.5	0.10	%	MCAWW 160.3 MOD

## METHODS SUMMARY

D7C120203

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<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Sodium Adsorption Ratio (SAR)	S&PG SAR	MCAWW SAR
Soil and Waste pH	SW846 9045C	SW846 DI-LEACHA
Specific Conductance	SW846 9050A	SW846 9050A

### References:

MCAWW "Methods for Chemical Analysis of Water and Wastes",  
EPA-600/4-79-020, March 1983 and subsequent revisions.

S&PG SOILS: AN INTRODUCTION TO SOILS AND PLANT GROWTH, 5FTH ED.,  
DONAHUE, MILLER AND SHICKLUNA, 1983

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical  
Methods", Third Edition, November 1986 and its updates.

## METHOD / ANALYST SUMMARY

D7C120203

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<u>ANALYTICAL METHOD</u>	<u>ANALYST</u>	<u>ANALYST ID</u>
MCAWW 160.3 MOD	David Wells	5099
S&PG SAR	Janel Motichka	002862
SW846 9045C	Danielle M. Fougere	006481
SW846 9050A	Kim Bertha	007985

### References:

MCAWW	"Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.
S&PG	SOILS: AN INTRODUCTION TO SOILS AND PLANT GROWTH, 5FTH ED., DONAHUE, MILLER AND SHICKLUNA, 1983
SW846	"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

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WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
JQWNR	001	SS-1	03/09/07	10:50
JQWNT	002	SS-2	03/09/07	10:55

### NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Colorado Oil&Gas Conservation Commision

Client Sample ID: SS-1

TOTAL Metals

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Lot-Sample #...: D7C120203-001

Matrix.....: SOLID

Date Sampled...: 03/09/07 10:50 Date Received...: 03/12/07

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	7075418					
Na Abs. Ratio	ND	4.3	No Units	S&PG SAR	03/16-03/21/07	JQWNR1AA
		Dilution Factor: 1		Analysis Time...: 15:08		



Colorado Oil&Gas Conservation Commision

Client Sample ID: SS-2

TOTAL Metals

Lot-Sample #...: D7C120203-002

Date Sampled...: 03/09/07 10:55 Date Received...: 03/12/07

Matrix.....: SOLID

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PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	7075418					
Na Abs. Ratio	ND	4.3	No Units	S&PG SAR	03/16-03/21/07	JQWNT1AA
		Dilution Factor: 1		Analysis Time...: 15:12		

Colorado Oil&Gas Conservation Commission

Client Sample ID: SS-1

General Chemistry

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Lot-Sample #...: D7C120203-001 Work Order #...: JQWNR  
Date Sampled...: 03/09/07 10:50 Date Received...: 03/12/07

Matrix.....: SOLID

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	9.0	0.10	No Units	SW846 9045C	03/21/07	7080545
		Dilution Factor: 1		Analysis Time...: 16:00		
Percent Moisture	11	0.10	%	MCAWW 160.3 MOD	03/15/07	7074262
		Dilution Factor: 1		Analysis Time...: 15:00		
Specific Conductance	140	2.0	umhos/cm	SW846 9050A	03/20/07	7079343
		Dilution Factor: 1		Analysis Time...: 13:00		

Colorado Oil&Gas Conservation Commission

Client Sample ID: SS-2

General Chemistry

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Lot-Sample #...: D7C120203-002    Work Order #...: JQWNT    Matrix.....: SOLID  
Date Sampled...: 03/09/07 10:55    Date Received...: 03/12/07

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	9.3	0.10	No Units	SW846 9045C	03/21/07	7080545
		Dilution Factor: 1		Analysis Time...: 16:01		
Percent Moisture	7.5	0.10	%	MCAWW 160.3 MOD	03/15/07	7074262
		Dilution Factor: 1		Analysis Time...: 15:00		
Specific Conductance	280	2.0	umhos/cm	SW846 9050A	03/20/07	7079343
		Dilution Factor: 1		Analysis Time...: 13:00		

# QC DATA ASSOCIATION SUMMARY

D7C120203

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## Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	SW846 9045C		7080545	7082114
	SOLID	S&PG SAR		7075418	
	SOLID	SW846 9050A		7079343	7079220
	SOLID	MCAWW 160.3 MOD		7074262	7074172
002	SOLID	SW846 9045C		7080545	7082114
	SOLID	S&PG SAR		7075418	
	SOLID	SW846 9050A		7079343	7079220
	SOLID	MCAWW 160.3 MOD		7074262	7074172

METHOD BLANK REPORT

TOTAL Metals

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Client Lot #...: D7C120203

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: D7C160000-418 Prep Batch #...: 7075418						
Na Abs. Ratio	ND	4.3	No Units	S&PG SAR	03/16-03/21/07	JQ8KN1AA
		Dilution Factor: 1				
		Analysis Time...: 14:55				

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

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Client Lot #...: D7C120203

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Specific Conductance	ND	Work Order #: JRD431AA	MB Lot-Sample #:	D7C200000-343		
		2.0	umhos/cm	SW846 9050A	03/20/07	7079343
		Dilution Factor: 1				
		Analysis Time...: 13:00				

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

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## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## General Chemistry

Lot-Sample #...: D7C120203

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH		WO#:JRLXT1AA-LCS/JRLXT1AC-LCSD LCS Lot-Sample#: D7C210000-545				
	101	(97 - 103)		SW846 9045C	03/21/07	7080545
	101	(97 - 103)	0.14 (0-5.0)	SW846 9045C	03/21/07	7080545
		Dilution Factor: 1		Analysis Time...: 14:43		
Specific Conductance		WO#:JRD431AC-LCS/JRD431AD-LCSD LCS Lot-Sample#: D7C200000-343				
	99	(90 - 110)		SW846 9050A	03/20/07	7079343
	99	(90 - 110)	0.43 (0-20)	SW846 9050A	03/20/07	7079343
		Dilution Factor: 1		Analysis Time...: 13:00		

**NOTE(S) :**

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Calculations are performed before rounding to avoid round-off errors in calculated results.

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## LABORATORY CONTROL SAMPLE DATA REPORT

## General Chemistry

Lot-Sample #...: D7C120203

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH								
			WO#:JRLXT1AA-LCS/JRLXT1AC-LCSD LCS Lot-Sample#: D7C210000-545					
	7.00	7.04	No Units	101		SW846 9045C	03/21/07	7080545
	7.00	7.05	No Units	101	0.14	SW846 9045C	03/21/07	7080545
			Dilution Factor: 1		Analysis Time...: 14:43			
Specific Conductance								
			WO#:JRD431AC-LCS/JRD431AD-LCSD LCS Lot-Sample#: D7C200000-343					
	1410	1400	umhos/cm	99		SW846 9050A	03/20/07	7079343
	1410	1390	umhos/cm	99	0.43	SW846 9050A	03/20/07	7079343
			Dilution Factor: 1		Analysis Time...: 13:00			

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.



SAMPLE DUPLICATE EVALUATION REPORT

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General Chemistry

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Client Lot #....: D7C120203

Work Order #....: JQPQ0-SMP

Matrix.....: SOLID

JQPQ0-DUP

Date Sampled...: 03/07/07 09:15 Date Received...: 03/08/07

% Moisture.....: 0.79

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	0.79	0.98	%	21	(0-20)	MCAWW 160.3 MOD	03/15/07	7074262
Dilution Factor: 1					Analysis Time...: 15:00			
SD Lot-Sample #: D7C080398-007								

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

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Client Lot #....: D7C120203

Work Order #....: JQ8FN-SMP  
JQ8FN-DUP

Matrix.....: SOLID

Date Sampled....: 03/14/07 14:20 Date Received...: 03/16/07

% Moisture.....: 0.0

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Specific Conductance	95	94	umhos/cm	0.85	(0-20)	SD Lot-Sample #: D7C160320-001 SW846 9050A	03/20/07	7079343
				Dilution Factor: 1	Analysis Time...: 13:00			

**SAMPLE DUPLICATE EVALUATION REPORT**

**General Chemistry**

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Client Lot #...: D7C120203

Work Order #...: JQWNL-SMP  
JQWNL-DUP

Matrix.....: SOLID

Date Sampled...: 03/09/07 11:30 Date Received...: 03/12/07

% Moisture.....: 4.5

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE RESULT</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD LIMIT</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH	9.1	9.2	No Units	0.55	(0-5.0)	SD Lot-Sample #: D7C120200-001 SW846 9045C	03/21/07	7080545
			Dilution Factor: 1		Analysis Time...: 15:58			



# Chain of Custody Record

SEVERN  
TRENT

STL

Severn Trent Laboratories, Inc.

STL Denver  
4955 Yarrow Street  
Arvada, CO 80002

STL-4124 (0901)

Client

COGCC

Project Manager

John Axelsen

Date

3/12/07

Chain of Custody Number

343760

Address

1120 Lincoln St., Ste. 801

Telephone Number (Area Code)/Fax Number

303-637-7178

Lab Number

Page 1 of 1

City

Denver

State

CO

Zip Code

80203

Site Contact

NA

Lab Contact

Pat M. Enick

Analysis (Attach list if more space is needed)

Project Name and Location (State)

Sinclair Pits

Carrier/Waybill Number

NA

Contract/Purchase Order/Quote No.

Matrix

Containers & Preservatives

Special Instructions/  
Conditions of Receipt

Sample I.D. No. and Description  
(Containers for each sample may be combined on one line)

55-1

3/9/07

10:50

Air

Aqueous

Sed.

Soil

Unpres.

H2SO4

HNO3

HCl

NaOH

ZnAc/  
NaOH

X

X

X

55-2

3/9/07

10:55

Possible Hazard Identification

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☒ Return To Client ☐ Disposal By Lab ☐ Archive For \_\_\_\_\_ Months

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Standard

1. Relinquished By

*[Signature]*

Date

3/12/07

Time

14:46

1. Received By

*[Signature]*

Date

3/14/07

Time

14:46

2. Relinquished By

Date

Time

2. Received By

*[Signature]*

Date

Time

3. Relinquished By

Date

Time

3. Received By

*[Signature]*

Date

Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report, CANARY - Stays with the Sample, PINK - Field Copy