

**APPENDIX F.4**

**SOIL CORROSIVITY TESTS**

**NORTH ANNA COL**

**DATA REPORT REV. 0  
JANUARY 23, 2007**

**MACTEC PROJECT NO. 6468-06-1472**



**DOCUMENTATION OF TECHNICAL REVIEW  
SUBCONTRACTOR WORK PRODUCT**

Project Name: North Anna COL

Project Number: 6468-06-1472

Project Manager: Steve Criscenzo

Project Principal: Al Tice

The report described below has been prepared by the named subcontractor retained in accordance with the MACTEC QAPD. The work and report have been reviewed by a MACTEC technically qualified person. Comments on the work or report, if any, have been satisfactorily addressed by the subcontractor. The attached report is approved in accordance with section QS-7 of MACTEC's QAPD

The information and data contained in the attached report are hereby released by MACTEC for project use.

REPORT : Analytical Report Project No. 6468-06-1472, North Anna, Lot #: F6J270353

Revised, December 8, 2006

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SUBCONTRACTOR: Severn Trent Laboratories, Inc. (STL St. Louis)

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DATE OF ACCEPTANCE : December 15, 2006

TECHNICAL REVIEWER: J. Allan Tice

PROJECT PRINCIPAL : J. Allan Tice

DCN NA COL- 177



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# ANALYTICAL REPORT

PROJECT NO. 6468-06-1472

NORTH ANNA

Lot #: P6J270353

J. Allan Tyce

MACTEC Engineering & Consultin  
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SEVERN TRENT LABORATORIES, INC.

  
Terry Romanko  
Project Manager

December 8, 2006

DCN NACOL-176  
TOTAL No. of Pages 31

**Case Narrative**  
**LOT NUMBER: F6J270353**

This report contains the analytical results for the 16 samples received under chain of custody by STL St. Louis on October 27, 2006. These samples are associated with your NORTH ANNA project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

**This report is revised to include chloride data originally missing for three samples.**

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

**Anions (Chloride, Sulfate) (MCAWW 300.0A)**

The MS recovery for Sulfate in 6317431 is outside the established QC limits due to matrix interference. Method performance is demonstrated by acceptable LCS recoveries.

**Affected Samples:**

F6J270353 (1): 909-5  
 F6J270353 (2): 933-5  
 F6J270353 (3): 929-4  
 F6J270353 (4): 928-4  
 F6J270353 (5): 907-3  
 F6J270353 (6): 921-4  
 F6J270353 (7): 927-8  
 F6J270353 (8): 901-4

F6J270353 (9): 927-4  
 F6J270353 (10): 911-5  
 F6J270353 (11): 920-12  
 F6J270353 (12): 920-6  
 F6J270353 (13): 914-9  
 F6J270353 (14): 910-5  
 F6J270353 (15): 920-2  
 F6J270353 (16): 910-9

*911-5 Jaz 12/5/06*

**Percent Moisture (MCAWW 160.3 Mod)**

There were no nonconformances or observations noted with this analysis.

**Soil and Waste pH (SW846 9045C)**

There were no nonconformances or observations noted with this analysis.

*NOTE: FOR EASE OF REFERENCE, TEST  
 REPORTS HAVE BEEN REORDERED  
 BY BORING ORDER.*

*JJ MACTEL 12/5/06*

**METHODS SUMMARY**

F6J270353

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Chloride	MCAWW 300.0A	MCAWW 300.0A
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Soil and Waste pH	SW846 9045C	SW846 DI-LEACHA
Sulfate	MCAWW 300.0A	MCAWW 300.0A

**References:**

- MCAWW "Methods for Chemical Analysis of Water and Wastes",  
EPA-600/4-79-020, March 1983 and subsequent revisions.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical  
Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

F6J270353

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
JHFNE	001	909-5		
JHFNN	002	933-5	10/25/06	
JHFNT	003	929-4	10/25/06	
JHFTJ	004	928-4	10/25/06	
JHFTK	005	907-3	10/25/06	
JHFTM	006	921-4	10/25/06	
JHFTT	007	927-8	10/25/06	
JHFTW	008	901-4	10/25/06	
JHFTX	009	927-4	10/25/06	
JHFT0	010	911-55 <i>911-5 JMS 12/1/06</i>	10/25/06	
JHFT1	011	920-12	10/25/06	
JHFT2	012	920-6	10/25/06	
JHFT4	013	914-9	10/25/06	
JHFT7	014	910-5	10/25/06	
JHFT8	015	920-2	10/25/06	
JHFVF	016	910-9	10/25/06	

**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.

MACTEC Engineering and Consulting Inc

Client Sample ID: 901-4

General Chemistry

Lot-Sample #...: F6J270353-008  
 Date Sampled...: 10/25/06  
 % Moisture.....: 8.9

Work Order #...: JHFTW  
 Date Received...: 10/27/06

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	5.8	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	ND	2.2	mg/kg	MCAWW 300.0A	11/08/06	6317430
				Dilution Factor: 1 Analysis Time...: 08:53		
Percent Moisture	8.9	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	ND	5.5	mg/kg	MCAWW 300.0A	11/08/06	6317431
				Dilution Factor: 1 Analysis Time...: 08:53		

**NOTE(S):**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

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## MACTEC Engineering and Consulting Inc

Client Sample ID: 907-3

## General Chemistry

Lot-Sample #...: F6J270353-005

Work Order #...: JHFTK

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	4.8	0.10	No Units	SW846 9045C	11/01/06	6305181
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	51.1 J	2.3	mg/kg	MCAWW 300.0A	11/08/06	6317430
			Dilution Factor: 1	Analysis Time...: 07:57		
Percent Moisture	14.5	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	ND	5.8	mg/kg	MCAWW 300.0A	11/08/06	6317431
			Dilution Factor: 1	Analysis Time...: 07:57		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 909-5

## General Chemistry

Lot-Sample #...: F6J270353-001    Work Order #...: JHFNE    Matrix.....: SOLID  
 Date Sampled...: 10/25/06    Date Received...: 10/27/06  
 % Moisture.....: 24

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.4	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1    Analysis Time...: 00:00		
Chloride	137 J	26.5	mg/kg	MCAWW 300.0A	11/27/06	6332273
				Dilution Factor: 10    Analysis Time...: 04:20		
Percent Moisture	24.4	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1    Analysis Time...: 00:00		
Sulfate	6.7	6.6	mg/kg	MCAWW 300.0A	11/08/06	6317431
				Dilution Factor: 1    Analysis Time...: 06:06		

**NOTE(S):**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 910-5

## General Chemistry

Lot-Sample #....: F6J270353-014

Work Order #....: JHFT7

Matrix.....: SOLID

Date Sampled....: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 14

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	5.8	0.10	No Units	SW846 9045C	11/01/06	6305182
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	3.6 J	2.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
			Dilution Factor: 1	Analysis Time...: 08:33		
Percent Moisture	14.3	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	5.1 B	5.8	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
			Dilution Factor: 1	Analysis Time...: 08:33		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 910-9

## General Chemistry

Lot-Sample #...: F6J270353-016

Work Order #...: JHFVF

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 6.1

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.7	0.10	No Units	SW846 9045C	11/01/06	6305182
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	5.2 J	2.1	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
				Dilution Factor: 1 Analysis Time...: 09:47		
Percent Moisture	6.1	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	4.2 B	5.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
				Dilution Factor: 1 Analysis Time...: 09:47		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 911-56 *12/12/06*

## General Chemistry

Lot-Sample #...: F6J270353-010

Work Order #...: JHFT0

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 14

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.6	0.10	No Units	SW846 9045C	11/01/06	6305181
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	3.4 J	2.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
			Dilution Factor: 1	Analysis Time...: 07:19		
Percent Moisture	14.5	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	ND	5.8	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
			Dilution Factor: 1	Analysis Time...: 07:19		

**NOTE(S):**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 914-9

## General Chemistry

Lot-Sample #...: F6J270353-013

Work Order #...: JHFT4

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 18

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.8	0.10	No Units	SW846 9045C	11/01/06	6305182
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	8.4 J	2.4	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
				Dilution Factor: 1 Analysis Time...: 08:15		
Percent Moisture	18.3	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	ND	6.1	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
				Dilution Factor: 1 Analysis Time...: 08:15		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 920-2

## General Chemistry

Lot-Sample #...: F6J270353-015

Work Order #...: JHFT8

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 4.9

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.9	0.10	No Units	SW846 9045C	11/01/06	6305182
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	1.5 B,J	2.1	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
				Dilution Factor: 1 Analysis Time...: 09:29		
Percent Moisture	4.9	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	7.5	5.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
				Dilution Factor: 1 Analysis Time...: 09:29		

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 920-6

## General Chemistry

Lot-Sample #...: F6J270353-012

Work Order #...: JHFT2

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 21

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.5	0.10	No Units	SW846 9045C	11/01/06	6305181
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	63.0 J	2.5	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
			Dilution Factor: 1	Analysis Time...: 07:56		
Percent Moisture	20.9	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	7.5	6.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
			Dilution Factor: 1	Analysis Time...: 07:56		

**NOTE (S) :**

RL. Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 920-12

## General Chemistry

Lot-Sample #....: F6J270353-011

Work Order #....: JHFT1

Matrix.....: SOLID

Date Sampled....: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.9	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	1.4 B,J	2.2	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
				Dilution Factor: 1 Analysis Time...: 07:37		
Percent Moisture	10.4	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	2.3 B	5.6	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
				Dilution Factor: 1 Analysis Time...: 07:37		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MACTEC Engineering and Consulting Inc

Client Sample ID: 921-4

General Chemistry

Lot-Sample #...: F6J270353-006    Work Order #...: JHFTM    Matrix.....: SOLID  
 Date Sampled...: 10/25/06    Date Received...: 10/27/06  
 % Moisture.....: 18

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	7.0	0.10	No Units	SW846 9045C	11/01/06	6305181
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	4.4 J	2.4	mg/kg	MCAWW 300.0A	11/08/06	6317430
			Dilution Factor: 1	Analysis Time...: 08:16		
Percent Moisture	18.2	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	10.8	6.1	mg/kg	MCAWW 300.0A	11/08/06	6317431
			Dilution Factor: 1	Analysis Time...: 08:16		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 927-4

## General Chemistry

Lot-Sample #...: F6J270353-009    Work Order #...: JHFTX    Matrix.....: SOLID  
 Date Sampled...: 10/25/06    Date Received...: 10/27/06  
 % Moisture.....: 5.9

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.8	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1    Analysis Time...: 00:00		
Chloride	2.8 J	2.1	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317430
				Dilution Factor: 1    Analysis Time...: 07:00		
Percent Moisture	5.9	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1    Analysis Time...: 00:00		
Sulfate	4.3 B	5.3	mg/kg	MCAWW 300.0A	11/08-11/09/06	6317431
				Dilution Factor: 1    Analysis Time...: 07:00		

**NOTE(S):**

RL Reporting Limit.

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 927-8

## General Chemistry

Lot-Sample #...: F6J270353-007  
 Date Sampled...: 10/25/06  
 % Moisture.....: 13

Work Order #...: JHFTT  
 Date Received...: 10/27/06

Matrix.....: SOLID

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	7.4	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	5.6 J	2.3	mg/kg	MCAWW 300.0A	11/08/06	6317430
				Dilution Factor: 1 Analysis Time...: 08:34		
Percent Moisture	13.0	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	3.4 B	5.7	mg/kg	MCAWW 300.0A	11/08/06	6317431
				Dilution Factor: 1 Analysis Time...: 08:34		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 928-4

## General Chemistry

Lot-Sample #...: F6J270353-004

Work Order #...: JHFTJ

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 17

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.8	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1 Analysis Time...: 00:00		
Chloride	120 J	24.0	mg/kg	MCAWW 300.0A	11/27/06	6332273
				Dilution Factor: 10 Analysis Time...: 04:55		
Percent Moisture	16.5	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1 Analysis Time...: 00:00		
Sulfate	4.9 B	6.0	mg/kg	MCAWW 300.0A	11/08/06	6317431
				Dilution Factor: 1 Analysis Time...: 07:02		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 929-4

## General Chemistry

Lot-Sample #...: F6J270353-003    Work Order #...: JHFNT    Matrix.....: SOLID  
 Date Sampled...: 10/25/06    Date Received...: 10/27/06  
 % Moisture.....: 18

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	5.9	0.10	No Units	SW846 9045C	11/01/06	6305181
			Dilution Factor: 1	Analysis Time...: 00:00		
Chloride	2.8 J	2.4	mg/kg	MCAWW 300.0A	11/08/06	6317430
			Dilution Factor: 1	Analysis Time...: 06:43		
Percent Moisture	17.6	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
			Dilution Factor: 1	Analysis Time...: 00:00		
Sulfate	2.7 B	6.1	mg/kg	MCAWW 300.0A	11/08/06	6317431
			Dilution Factor: 1	Analysis Time...: 06:43		

NOTE (S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

## MACTEC Engineering and Consulting Inc

Client Sample ID: 933-5

## General Chemistry

Lot-Sample #...: F6J270353-002

Work Order #...: JHFNN

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 19

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.4	0.10	No Units	SW846 9045C	11/01/06	6305181
				Dilution Factor: 1	Analysis Time...: 00:00	
Chloride	210 J	24.7	mg/kg	MCAWW 300.0A	11/27/06	6332273
				Dilution Factor: 10	Analysis Time...: 04:37	
Percent Moisture	19.1	0.10	%	MCAWW 160.3 MOD	10/31-11/01/06	6304055
				Dilution Factor: 1	Analysis Time...: 00:00	
Sulfate	3.0 B	6.2	mg/kg	MCAWW 300.0A	11/08/06	6317431
				Dilution Factor: 1	Analysis Time...: 06:25	

**NOTE(S):**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: F6J270353

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride	0.49 B	2.0	mg/kg	Work Order #: JJLC51AA MCAWW 300.0A	MB Lot-Sample #: F6K130000-430 11/08/06	6317430
				Dilution Factor: 1 Analysis Time...: 07:39		
Chloride	0.47 B	2.0	mg/kg	Work Order #: JKEV11AA MCAWW 300.0A	MB Lot-Sample #: F6K280000-273 11/27/06	6332273
				Dilution Factor: 1 Analysis Time...: 12:13		
Sulfate	ND	5.0	mg/kg	Work Order #: JJLC91AA MCAWW 300.0A	MB Lot-Sample #: F6K130000-431 11/08/06	6317431
				Dilution Factor: 1 Analysis Time...: 07:39		

**NOTE (S) :**

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

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #...: F6J270353

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Chloride	97	(90 - 110)			MCAWW 300.0A	11/27/06	6332273
	109	(90 - 110)	11	(0-20)	MCAWW 300.0A	11/27/06	6332273
			Dilution Factor: 1			Analysis Time...: 11:56	
			WO#:JKEV11AC-LCS/JKEV11AD-LCSD LCS Lot-Sample#: F6K280000-273				

**NOTE(S) :**

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

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## General Chemistry

Client Lot #...: F6J270353

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	100	Work Order #: JHN261AA (99 - 101)	LCS Lot-Sample#: F6K010000-181 SW846 9045C	11/01/06	6305181
		Dilution Factor: 1		Analysis Time...: 00:00	
pH (solid)	100	Work Order #: JHN3A1AA (99 - 101)	LCS Lot-Sample#: F6K010000-182 SW846 9045C	11/01/06	6305182
		Dilution Factor: 1		Analysis Time...: 00:00	
Chloride	94	Work Order #: JJLC51AC (90 - 110)	LCS Lot-Sample#: F6K130000-430 MCAWW 300.0A	11/08/06	6317430
		Dilution Factor: 1		Analysis Time...: 07:20	
Sulfate	93	Work Order #: JJLC91AC (90 - 110)	LCS Lot-Sample#: F6K130000-431 MCAWW 300.0A	11/08/06	6317431
		Dilution Factor: 1		Analysis Time...: 07:20	

**NOTE(S):**

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

## MATRIX SPIKE SAMPLE EVALUATION REPORT

## General Chemistry

Client Lot #...: F6J270353

Matrix.....: SOLID

Date Sampled...: 06/24/06

Date Received...: 10/21/06

Percent Moisture: 37

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Chloride	91	Work Order #...: JG2PE1AF (90 - 110)	MCAWW 300.0A	MS Lot-Sample #: F6J220106-008 11/08/06	6317430
		Dilution Factor: 1		Analysis Time...: 04:52	
Sulfate	86 N	Work Order #...: JG2PE1AH (90 - 110)	MCAWW 300.0A	MS Lot-Sample #: F6J220106-008 11/08/06	6317431
		Dilution Factor: 1		Analysis Time...: 04:52	

NOTE (S) :

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

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: F6J270353

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

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 6.1

<u>PARAM 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>
Percent Moisture	6.1	7.9	%	27	(0-30)	SD Lot-Sample #: F6J270353-016 MCAWW 160.3 MOD	10/31-11/01/06 6304055
			Dilution Factor: 1		Analysis Time...: 00.00		

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: F6J270353

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

Matrix.....: SOLID

Date Sampled...: 10/25/06

Date Received...: 10/27/06

% Moisture.....: 24

<u>PARAM 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 (solid)	5.4	No Units	1.1	(0-20)	SD Lot-Sample #: F6J270353-001 SW846 9045C	11/01/06	6305181
		Dilution Factor: 1		Analysis Time...: 00:00			

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SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: F6J270353

Work Order #....: JG2PE-SMP  
JG2PE-DUP

Matrix.....: SOLID

Date Sampled...: 06/24/06

Date Received...: 10/21/06

% Moisture.....: 19

PARAM RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride							
1.9 B,J	2.0 B	mg/kg	0.62	(0-20)	MCAWW 300.0A	11/08/06	6317430
		Dilution Factor: 1			Analysis Time...: 04:52		
Sulfate							
3.0 B	2.8 B	mg/kg	5.2	(0-20)	MCAWW 300.0A	11/08/06	6317431
		Dilution Factor: 1			Analysis Time...: 04:52		

NOTE(S):

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

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

**CHAIN OF CUSTODY RECORD  
NORTH ANNA COL GEOLOGIC/GEOTECHNICAL EXPLORATION  
MACTEC JOB NO. 6468-06-1472**

CR 4783

No. NA-7

10/22

SAMPLE DESIGNATION	SAMPLE TYPE	TAKEN BY	DATE TAKEN	INTENDED USE	REMARKS
909-5	JAR	ZB	10/25	Chemical Test	LAB #5 #1
933-5	JAR				LAB #6. 06-207
929-4					06-207
928-4					06-207
907-3					06-207
921-4					06-202
927-8					06-207
901-4					06-207
927-4					06-202
911-55					06-207
910-12					06-202
920-6					06-207
914-9					06-207
910-5	JAR				06-202

120g  
10/27/06

Relinquished by: <i>[Signature]</i> (signature)	Date/Time 10/26/06 5:00pm	Received by:  (signature)	Relinquished by:  (signature)	Received by:  (signature)	Date/Time
Relinquished by:  (signature)	Date/Time	Received by:  (signature)	Relinquished by:  (signature)	Received at Laboratory  (signature)	Date/Time

Remarks: If relinquishing to a common carrier or Fed Ex - write freight bill or tracking number here. **FEDEX 7928-7305-9827**

Samples taken from SPT JAR samples in accordance with WI #14

Receiving Laboratory: Please return original form after signing for receipt of samples; keep copy for your records. Retain all portions of unused samples in labeled containers.

*Received by: Gil Clarke 10-27-06 0800*

DCN No. NA COL 113

LOT# F6J270353

STL ST. LOUIS

REVISSED

29 OF 31







**DOCUMENTATION OF TECHNICAL REVIEW  
SUBCONTRACTOR WORK PRODUCT**

Project Name: North Anna COL

Project Number: 6468-06-1472

Project Manager: Steve Criscenzo

Project Principal: Al Tice

The report described below has been prepared by the named subcontractor retained in accordance with the MACTEC QAPD. The work and report have been reviewed by a MACTEC technically qualified person. Comments on the work or report, if any, have been satisfactorily addressed by the subcontractor. The attached report is approved in accordance with section QS-7 of MACTEC's QAPD

The information and data contained in the attached report are hereby released by MACTEC for project use.

REPORT : Analytical Report Project No. 6468-06-1472, North Anna, Lot #: F6L140293

Dated January 9, 2007

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SUBCONTRACTOR: Severn Trent Laboratories, Inc. (STL St. Louis)

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DATE OF ACCEPTANCE : January 10, 2007

TECHNICAL REVIEWER: J. Allan Tice *J. Allan Tice 1-10-07*

PROJECT PRINCIPAL : J. Allan Tice

DCN NA COL- 195



STL St. Louis  
13715 Rider Trail North  
Earth City, MO 63045

Tel: 314 298 8566 Fax: 314 298 8757  
www.stl-inc.com

## ANALYTICAL REPORT

PROJECT NO. JOB # 6468-06-1472

NORTH ANNA COL GEOLOGIC

Lot #: F6L140293

J. Allan Tyce

MACTEC Engineering & Consultin  
3301 Atlantic Ave  
Raleigh, NC 27604

SEVERN TRENT LABORATORIES, INC.

A handwritten signature in black ink that reads "Terry Romanko".

Terry Romanko  
Project Manager

January 9, 2007

DCN NACOL 196

Leaders in Environmental Testing

Severn Trent Laboratories, Inc.

**Case Narrative**  
LOT NUMBER: F6L140293

This report contains the analytical results for the four samples received under chain of custody by STL St. Louis on December 13, 2006. These samples are associated with your NORTH ANNA COL GEOLOGIC project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There were no nonconformances or observations noted with any analysis on this lot.

**METHODS SUMMARY**

F6L140293

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Chloride	MCAWW 300.0A	MCAWW 300.0A
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Soil and Waste pH	SW846 9045C	SW846 DI-LEACHA
Sulfate	MCAWW 300.0A	MCAWW 300.0A

**References:**

- MCAWW "Methods for Chemical Analysis of Water and Wastes",  
EPA-600/4-79-020, March 1983 and subsequent revisions.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical  
Methods", Third Edition, November 1986 and its updates.

**SAMPLE SUMMARY**

F6L140293

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>SAMPLED DATE</u>	<u>SAMP TIME</u>
JLG78	001	B-945-5	12/12/06	
JLG8L	002	B-918-3	12/12/06	
JLG8N	003	B-947-7	12/12/06	
JLG8T	004	B-948-3	12/12/06	

**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.

MACTEC Engineering and Consulting Inc

Client Sample ID: B-918-3

General Chemistry

Lot-Sample #...: F6L140293-002    Work Order #...: JLG8L    Matrix.....: SOLID  
 Date Sampled...: 12/12/06    Date Received...: 12/13/06  
 % Moisture.....: 11

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.9	0.10	No Units	SW846 9045C	12/20/06	6354216
				Dilution Factor: 1    Analysis Time...: 00:00		
Chloride	8.0 J	2.2	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005059
				Dilution Factor: 1    Analysis Time...: 02:29		
Percent Moisture	10.9	0.10	%	MCAWW 160.3 MOD	12/19-12/20/06	6353336
				Dilution Factor: 1    Analysis Time...: 00:00		
Sulfate	9.4	5.6	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005060
				Dilution Factor: 1    Analysis Time...: 02:29		

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

*50 mg...*  
 Note PAGES 6 & 7 switched  
 so test results are in boring order  
 JLG MACTEC 1-10-07

MACTEC Engineering and Consulting Inc

Client Sample ID: B-945-5

General Chemistry

Lot-Sample #....: F6L140293-001    Work Order #....: JLG78    Matrix.....: SOLID  
 Date Sampled....: 12/12/06    Date Received...: 12/13/06  
 % Moisture.....: 17

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.4	0.10	No Units	SW846 9045C	12/20/06	6354216
				Dilution Factor: 1    Analysis Time...: 00:00		
Chloride	6.9 J	2.4	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005059
				Dilution Factor: 1    Analysis Time...: 01:52		
Percent Moisture	17.5	0.10	%	MCAWW 160.3 MOD	12/19-12/20/06	6353336
				Dilution Factor: 1    Analysis Time...: 00:00		
Sulfate	3.1 B	6.1	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005060
				Dilution Factor: 1    Analysis Time...: 01:52		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

*Note: Pages 5 & 6 switched  
 so test results are in boring order  
 J. J. Mactec 1-10-07*

MACTEC Engineering and Consulting Inc

Client Sample ID: B-947-7

General Chemistry

Lot-Sample #....: F6L140293-003      Work Order #....: JLG8N      Matrix.....: SOLID  
 Date Sampled....: 12/12/06      Date Received...: 12/13/06  
 % Moisture.....: 19

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	6.4	0.10	No Units	SW846 9045C	12/20/06	6354216
				Dilution Factor: 1      Analysis Time...: 00:00		
Chloride	21.4 J	2.5	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005059
				Dilution Factor: 1      Analysis Time...: 03:44		
Percent Moisture	18.7	0.10	%	MCAWW 160.3 MOD	12/19-12/20/06	6353336
				Dilution Factor: 1      Analysis Time...: 00:00		
Sulfate	6.4	6.1	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005060
				Dilution Factor: 1      Analysis Time...: 03:44		

**NOTE(S) :**

RL Reporting Limit  
 Results and reporting limits have been adjusted for dry weight.  
 J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MACTEC Engineering and Consulting Inc

Client Sample ID: B-948-3

General Chemistry

Lot-Sample #....: F6L140293-004    Work Order #....: JLG8T    Matrix.....: SOLID  
 Date Sampled....: 12/12/06    Date Received...: 12/13/06  
 % Moisture.....: 12

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH (solid)	5.7	0.10	No Units	SW846 9045C	12/20/06	6354216
				Dilution Factor: 1    Analysis Time...: 00:00		
Chloride	3.8 J	2.3	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005059
				Dilution Factor: 1    Analysis Time...: 04:21		
Percent Moisture	12.5	0.10	%	MCAWW 160.3 MOD	12/19-12/20/06	6353336
				Dilution Factor: 1    Analysis Time...: 00:00		
Sulfate	ND	5.7	mg/kg	MCAWW 300.0A	01/04-01/05/07	7005060
				Dilution Factor: 1    Analysis Time...: 04:21		

**NOTE(S) :**

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

## METHOD BLANK REPORT

## General Chemistry

Client Lot #...: F6L140293

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride	0.49 B	2.0	mg/kg	MCAWW 300.0A	01/04/07	7005059
		Work Order #: JMGQ1AA		MB Lot-Sample #: F7A050000-059		
		Dilution Factor: 1		Analysis Time...: 06:32		
Sulfate	ND	5.0	mg/kg	MCAWW 300.0A	01/04/07	7005060
		Work Order #: JMGQQ1AA		MB Lot-Sample #: F7A050000-060		
		Dilution Factor: 1		Analysis Time...: 06:32		

**NOTE(S):**


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

B Estimated result. Result is less than RL.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## General Chemistry

Lot-Sample #...: F6L140293

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Chloride							
		WO#:JMGQNLAC-LCS/JMGQNLAD-LCSD LCS Lot-Sample#: F7A050000-059					
	105	(90 - 110)			MCAWW 300.0A	01/04/07	7005059
	105	(90 - 110)	0.34	(0-20)	MCAWW 300.0A	01/04/07	7005059
		Dilution Factor: 1		Analysis Time...: 06:13			
Sulfate							
		WO#:JMGQQ1AC-LCS/JMGQQ1AD-LCSD LCS Lot-Sample#: F7A050000-060					
	101	(90 - 110)			MCAWW 300.0A	01/04/07	7005060
	100	(90 - 110)	1.2	(0-20)	MCAWW 300.0A	01/04/07	7005060
		Dilution Factor: 1		Analysis Time...: 06:13			

**NOTE(S) :**


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

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

## General Chemistry

Client Lot #...: F6L140293

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	100	(99 - 101)	SW846 9045C	12/20/06	6354216
		Dilution Factor: 1		Analysis Time..: 00:00	

Work Order #: JLVG41AA LCS Lot-Sample#: F6L200000-216

**NOTE(S) :**


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

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: F6L140293

Matrix.....: SOLID

Date Sampled...: 05/15/06

Date Received...: 12/11/06

Percent Moisture: 46

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Chloride	103	Work Order #...: JK8N21AE (90 - 110)	MCAWW 300.0A	MS Lot-Sample #: F6L110212-001 01/04/07	7005059
		Dilution Factor: 1		Analysis Time...: 08:18	
Sulfate	94	Work Order #...: JK8N21AG (90 - 110)	MCAWW 300.0A	MS Lot-Sample #: F6L110212-001 01/04/07	7005060
		Dilution Factor: 1		Analysis Time...: 08:18	

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
Results and reporting limits have been adjusted for dry weight.









