TEST REPORT

In-House Engineering Test

On Five
COAL FIRED UNITS

At The
Four Corners Power Plant

Located near
Fruitland, New Mexico

Prepared For
Arizona Public Service
Four Corners Power Plant
End of County Road 6675
Fruitland, New Mexico 87416

Prepared By
TRC Environmental Corporation
7761 Shaffer Parkway Suite 100
Littleton, Colorado 80127

TRC Report No. 182436.INHE

April-September 2011

TEST REPORT

In-House Engineering Test

On Five

COAL FIRED UNITS

At The

Four Corners Power Plant

Located near

Fruitland, New Mexico

Prepared For

Arizona Public Service

Four Corners Power Plant
End of County Road 6675
Fruitland, New Mexico 87416

Prepared By

TRC Environmental Corporation
7761 Shaffer Parkway Suite 100
Littleton, Colorado 80127

TRC Project No. 182436.0000.0000

April-September 2011

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
1.1 Test Objectives 1
1.2 Process Description 1
2.0 SUMMARY OF RESULTS 5
3.0 PROCEDURES 15
3.3 Percent Moisture Measurement 15
3.2 O_2 Determination 15
3.3 SO_3 Determination 16
4.0 QUALITY ASSURANCE / QUALITY CONTROL 18
4.1 O_2 Continuous Emissions Monitors 18
4.2 Moisture 19
4.3 SO_3 Sampling 19

LIST OF TABLES

Page

Table 1-1. Executive Summary Units 1- 5 (ppmv, lb/hr) 2
Table 1-2. Executive Summary Units 1- 5 (lb/MMBTU, lb/MWH) 3
Table 1-3. General Facility and Testing Information 4
Table 1-4. Test Methods 4
Table 2-1. Summary of Results Unit 1 7
Table 2-2. Summary of Results Unit 2 8
Table 2-3. Summary of Results Unit 3 9
Table 2-4. Summary of Results Unit 4 10
Table 2-5. Summary of Results Unit 5 (April) 11
Table 2-6. Summary of Results Unit 5 APH Inlet 12
Table 2-7. Summary of Results Unit 5 APH Outlet 13
Table 2-8. Summary of Results Unit 5 (September) 14
Table 3-1. List of Instruments 16
Table 4-1. Reference Method CEMS Performance Criteria 19

LIST OF FIGURES

Page

Figure 3-1. CTM-013 Sample System Diagram 17

APPENDICES

Page

APPENDIX A – FIELD DATA SHEETS A1
APPENDIX B – EXAMPLE CALCULATIONS B1
APPENDIX C – QUALITY ASSURANCE ACTIVITIES C1
APPENDIX D – CALIBRATION CERTIFICATIONS D1
APPENDIX E – LOGGED DATA RECORDS E1
APPENDIX F – UNIT OPERATIONAL DATA F1
APPENDIX G – LABORATORY ANALYSES DATA G1

LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
°F	Degrees Fahrenheit
BACT	Best Available Control Technology
CEMS	Continuous Emission Monitor System
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CTM	Conditional Test Method
DSCFH	Dry Standard Cubic Feet per Hour
EPA	Environmental Protection Agency
H_2O_2	Hydrogen Peroxide
H_2SO_4	Sulfuric Acid
Hr	Hour
lb	Pounds
lb/HR	Pounds per Hour
MMBTU	Million British Thermal Units
MSCFH	Thousand Standard Cubic Feet per Hour
MW	Megawatts
MWH	Megawatts per Hour
NO_X	Nitrogen Oxides
O_2	Oxygen
PPMV	Parts Per Million Volume
QA/QC	Quality Assurance/Quality Control
SCF	Standard Cubic Feet
SCFH	Standard Cubic Feet per Hour
SO_2	Sulfur Dioxide
SO_3	Sulfur Trioxide
Vol %	Percentage on Volume Basis
VOC	Volatile Organic Compounds
WSCFH	Wet Standard Cubic Feet per Hour

I certify that to the best of my knowledge:

- *Test data and all corresponding information have been checked for accuracy and completeness.*
- *Analyses have been conducted in accordance with approved protocol, reference methods, and the requirements of NELAC (as applicable).*
- *All deviations, method modifications, or analytical anomalies are summarized in the appropriate report narrative(s).*
- *Test results presented in the report relate only to the samples and test conditions presented in this report.*
- *This report includes a total of 196 pages.*

Jason Grizzle, Operations Manager

Date of Issue: November 29, 2011

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) of Littleton, Colorado was retained by Arizona Public Service (APS) to conduct Sulfur Trioxide (SO_3) testing at the Four Corners Power Plant located on the Navajo Nation near Fruitland, New Mexico. TRC conducted this testing over three mobilizations, spanning from April 2011 through September 2011. This document presents the results for each unit and the time frame it was tested.

Table 1-1 presents an executive summary of the testing results for the units in parts per million by volume (ppmv) and pounds per hour (lb/hr. Table 1-2 presents an executive summary of the testing results for the unit's emission rates in pounds per million British thermal units (lb/MMBTU) and pounds per Megawatt hour (lb/MWH). Table 1-3 presents the general facility and testing information. Section 2.0 of this report includes test result summaries. Section 3.0 of this report describes the test methods used including details specific to this test program. Section 4.0 describes the Quality Assurance/ Quality Control (QA/QC) procedures that were used during the sampling phase of this testing.

1.1 Test Objectives

The testing program for each of the five coal fired units included three runs each of which was at a minimum one hour in duration. During each run samples were collected to determine the SO3 concentrations. The concentrations were then used to calculate the emissions of SO3 using the volumetric flow rates and process parameter supplied by APS personnel. All samples for each measured compound were collected simultaneously during each run. The methods shown in Table 1-2 were used to measure the concentrations and flow rates of the components of interest. Table 1-3 presents a summary of the sample collection strategies used during this testing.

1.2 Process Description

The Four Corners Power Plant, located on the Navajo Nation near Fruitland, New Mexico, is a pulverized coal fired, steam generating electric utility plant serving Arizona and California. Four Corners Power Plant consists of five electrical generating units and auxiliary equipment that provide a generating capacity of approximately 2,060 megawatts (MW).

Table 1-1. Executive Summary Units 1- 5 (ppmv, lb/hr)

Parameter	Location	Unit	Date of testing	Average Test Result
SO_3 (ppmv dry)	Stack	1	6/14/11	0.02
SO_3 (lb/hr)	Stack	1	6/14/11	0.13
SO_3 (ppmv dry)	Stack	2	4/7/2011	0.06
SO_3 (lb/hr)	Stack	2	4/7/2011	0.34
SO_3 (ppmv dry)	Stack	3	4/7/2011	<0.03
SO_3 (lb/hr)	Stack	3	4/7/2011	<0.25
SO_3 (ppmv dry)	Stack	4	4/6/2011	<0.05
SO_3 (lb/hr)	Stack	4	4/6/2011	<0.89
SO_3 (ppmv dry)	Stack	5	4/5/2011	<0.05
SO_3 (lb/hr)	Stack	5	4/5/2011	<0.93
SO_3 (ppmv dry)	APH Inlet	5	9/30/2011	2.07
SO_3 (lb/hr)	APH Inlet	5	9/30/2011	48.48
SO_3 (ppmv dry)	APH Outlet	5	9/30/2011	0.18
SO_3 (lb/hr)	APH Outlet	5	9/30/2011	4.12
SO_3 (ppmv dry)	Stack	5	9/30/2011	0.08
SO_3 (lb/hr)	Stack	5	9/30/2011	1.76

Table 1-2. Executive Summary Units 1- 5 (lb/MMBTU, lb/MWH)

Parameter	Location	Unit	Date of testing	Average Test Result
SO3 (lb/MMBTU)	Stack	1	6/14/11	0.000068
SO3 (lb/MWH)	Stack	1	6/14/11	0.00073
SO3 (lb/MMBTU)	Stack	2	4/7/2011	0.00018
SO3 (lb/MWH)	Stack	2	4/7/2011	0.0020
SO_3 (lb/MMBTU)	Stack	3	4/7/2011	<0.000094
SO_3 (lb/MWH)	Stack	3	4/7/2011	<0.0011
SO_3 (lb/MMBTU)	Stack	4	4/6/2011	<0.00014
SO_3 (lb/MWH)	Stack	4	4/6/2011	<0.00113
SO_3 (lb/MMBTU)	Stack	5	4/5/2011	<0.00014
SO_3 (lb/MWH)	Stack	5	4/5/2011	<0.0013
SO_3 (lb/MMBTU)	APH Inlet	5	9/30/2011	0.0064
SO_3 (lb/MWH)	APH Inlet	5	9/30/2011	0.062
SO_3 (lb/MMBTU)	APH Outlet	5	9/30/2011	0.00055
SO_3 (lb/MWH)	APH Outlet	5	9/30/2011	0.0052
SO_3 (lb/MMBTU)	Stack	5	9/30/2011	0.00023
SO_3 (lb/MWH)	Stack	5	9/30/2011	0.0022

Table 1-3. General Facility and Testing Information

Source Owner	Arizona Public Service
Source Location	Four Corners Power Plant End of County Road 6675 Fruitland, New Mexico 87416
Contact Person	Alan Papp
Contact Telephone Number	(602) 250-5407
Contact Email Address	Alan.Papp@aps.com
Contact Address	End of San Juan County Road 6675 Fruitland, New Mexico 87416
Types of Process Sampled	Exhaust stacks associated with four Coal fired Units
Emission Source	Stacks of Units 1, 2, 3, 4, and 5
Testing Firm Representative	Jason Grizzle
Telephone Number	(303) 395-4056
Email Address	jgrizzle@trcsolutions.com
Company Name	TRC Environmental Corporation
Address	7761 Shaffer Pkwy Suite 100 Littleton, CO 80127
Test Methods Performed	EPA Method 3A – O_2 Concentration EPA Method 4 – Stack Gas Moisture EPA Conditional Test Method 013– SO_3 Concentration
Testing Dates	April 5-7, June 14, and September 30, 2011

Table 1-4. Test Methods

Parameter	Test Method	Measurement Technique	Modifications to Method
Moisture	EPA Method 4	Gravimetrical Analyses of collected moisture in an impingement train	None
O_2	EPA Method 3A	Continuous Analyzer Paramagnetic cell	Sampling conducted using Tedlar Bags for some sources
SO_3	EPC CTM-013	Controlled Condensation	Sample analysis by ion chromatograph

2.0 SUMMARY OF RESULTS

Detailed test results are presented and discussed in this section. Detailed descriptions of the procedures used to perform the compliance test measurements are presented in Section 3.0 of this report.

TRC Environmental Corporation conducted In-House Engineering Testing on five coal-fired boilers to determine the emissions of SO_3. This testing was conducted at the Arizona Public Service's Four Corners Power Plant located near Fruitland, New Mexico. These tests were conducted over three separate mobilizations consisting of the date; April 5 through 7, June 14, and September 30, 2011.

Testing in April consisted of determining the emission of SO_3 for four of the five units, which included 2, 3, 4 and 5. Unit 1 was not tested during this period due to the unit not being operational at the time of the testing. During each test, three runs were conducted on each unit to determine the concentrations of SO_3 and oxygen (O_2). These concentrations were determined using the procedures of United State Environmental Protection Agency (EPA) Methods 3A and Condition Test Method (CTM) 013. Each test run was a minimum of 60-minutes in duration while the units were operating at normal load rates. Samples of SO_3 were collected in the appropriate sample containers and shipped to a NELAC Accredited laboratory where they were analyzed for SO_3 concentrations using ion chromatographic techniques as opposed to the thorin titration techniques. The Tables 2-2 through 2-5 represents the results from these tests on the four units.

Unit 1 located at the Four Corners Power Plant was tested on June 14, 2011 to determine the emission of SO_3. Three test runs of 120 minutes in duration were conducted on the unit while operating at normal load rates. SO_3 and O_2 concentration were collected and analyzed using the EPA Methods 3A and CTM-013. Samples for O_2 were collected in Tedlar bags during the sample runs and transported to the stack testing trailer for analyses by instruments as outlined in the EPA Method 3A. Samples of SO_3 were collected in the appropriate sample containers and shipped to a NELAC Accredited laboratory where they were analyzed for SO_3 concentrations using ion chromatographic techniques as opposed to the thorin titration techniques. The results of this testing can be found in Table 2-1 of this report.

On September 30, 2011 testing was conducted at the APS Four Corners Facility on the Unit 5 located within the facility. Three sampling locations throughout the unit were determined by APS personnel, which consisted of before and after the Air Preheater (APH) and the stack of

the unit. Each location was tested to determine the concentrations of SO_3 and O_2 using the same sampling techniques as employed on Unit 1 during the testing in June. Testing was conducted while the unit was operating at normal load rates. Three test runs were conducted on the APH Inlet and APH Outlet over 60 minutes each, while the testing at the stack of the unit was conducted over three runs of 120 minutes in duration. Samples for O_2 were collected in Tedlar bags during the sample runs and transported to the stack testing trailer for analyses by instruments as outlined in the EPA Method 3A. Samples of SO_3 were collected in the appropriate sample containers and shipped to a NELAC Accredited laboratory where they were analyzed for SO_3 concentrations using ion chromatographic techniques as opposed to the thorin titration techniques. The results of these tests are depicted in Tables 2-6 through 2-8 of this report.

For all the testing conducted on these units the mass emission rates of SO_3 were calculated from the concentrations determined during testing and the volumetric flow rates provided by APS personnel. The volumetric flow rates were either determined from theoretical calculations of fuel combustion or from continuous flow rate monitors installed on the stacks of the units. The mass emissions of SO_3 were calculated from these volumetric flow rates and the corresponding concentration of SO_3. Additionally, APS personnel provide other process parameters to determine the mass emissions in terms of lb/hr, lb/MMBTU and lb/MWH as requested.

All field data sheets utilized in this testing are presented in Appendix A of this report. Example calculations are located in Appendix B. Quality assurance activities are documented in Appendix C. Calibration certifications supporting the results are in Appendix D. Data acquisition records from TRC instrumentation can be found in Appendix E. Operational data is contained in Appendix F. Laboratory analyses data performed by Resolution Analytics can be found in Appendix G.

Table 2-1. Summary of Results Unit 1

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: RS
Project Number: 182436.0000.0000

SOURCE	**Unit 1**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	6/14/11	6/14/11	6/14/11	
Start Time	10:35	12:47	14:56	
Stop Time	12:35	14:47	16:56	
PROCESS DATA				
Electric Power Production (MW)	170.2	170.4	170.5	**170.4**
Fuel Flow (MMBTU/Hr)	1845.1	1840.1	1850.5	**1845.2**
Fuel Flow Rate of Max (%)	55.8	55.3	55.3	**55.5**
CEMS O_2 (%)	7.6	7.6	7.6	**7.6**
APS Calculated Volumetric Flow Rate (SCFH)	31,500,000	31,500,000	31,500,000	**31,500,000**
CEMS SO_2 (ppm)	36.0	35.8	38.8	**36.9**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.62	24.62	24.62	**24.62**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.0	6.1	6.1	**6.0**
Moisture (%)	14.3	16.1	16.7	**15.73**
SO_3 (ppmv, dry)	0.02	0.02	< 0.01	**0.02**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	0.16	0.12	< 0.09	**0.13**
SO_3 (lb/MMBTU)	0.000088	0.000065	< 0.000051	**0.000068**
SO_3 (lb/MWH)	0.00095	0.00070	< 0.00055	**0.00073**

Table 2-2. Summary of Results Unit 2

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: TJS, BJM
Project Number: 182436.0000.0000

SOURCE	**Unit 2**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	4/7/11	4/7/11	4/7/11	
Start Time	19:30	21:00	22:05	
Stop Time	20:30	22:00	23:05	
PROCESS DATA				
Electric Power Production (MW)	170.9	170.7	170.5	**170.7**
Fuel Flow (MMBTU/Hr)	1877.3	1887.8	1894.1	**1886.4**
Fuel Flow Rate of Max (%)	57.6	58.3	59.2	**58.4**
CEMS O_2 (%)	5.5	5.6	5.6	**5.6**
APS Calculated Volumetric Flow Rate (SCFH)	27,734,220	27,734,220	27,734,220	**27,734,220**
CEMS SO_2 (ppm)	53.3	49.7	45.9	**49.6**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.11	24.20	24.20	**24.17**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	8.1	8.6	8.8	**8.5**
Moisture (%)	16.0	14.7	15.2	**15.3**
SO_3 (ppmv, dry)	0.05	0.03	0.09	**0.06**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	0.30	0.20	0.54	**0.34**
SO_3 (lb/MMBTU)	0.00016	0.00011	0.00028	**0.00018**
SO_3 (lb/MWH)	0.0017	0.0012	0.0031	**0.0020**

Table 2-3. Summary of Results Unit 3

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: TJS, BJM
Project Number: 182436.0000.0000

SOURCE	**Unit 3**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	4/7/11	4/7/11	4/7/11	
Start Time	10:10	11:35	13:00	
Stop Time	11:10	12:35	14:00	
PROCESS DATA				
Electric Power Production (MW)	221.0	220.7	220.5	**220.7**
Fuel Flow (MMBTU/Hr)	2633.9	2639.2	2644.4	**2639.2**
Fuel Flow Rate of Max (%)	65.0	64.4	64.1	**64.5**
CEMS O_2 (%)	2.7	2.7	2.7	**2.7**
APS Calculated Volumetric Flow Rate (SCFH)	35,298,000	35,298,000	35,298,000	**35,298,000**
CEMS SO_2 (ppm)	55.7	43.6	39.6	**46.3**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.34	24.31	24.24	**24.30**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.5	6.4	6.3	**6.4**
Moisture (%)	13.0	13.6	7.9	**11.5**
SO_3 (ppmv, dry)	<0.03	<0.03	<0.04	**<0.03**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	<0.21	<0.22	<0.32	**<0.25**
SO_3 (lb/MMBTU)	<0.000079	<0.000082	<0.000121	**<0.000094**
SO_3 (lb/MWH)	<0.0009	<0.0010	<0.0014	**<0.0011**

Table 2-4. Summary of Results Unit 4

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: TJS, BJM
Project Number: 182436.0000.0000

SOURCE	**Unit 4**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	4/6/11	4/6/11	4/6/11	
Start Time	09:05	10:35	12:05	
Stop Time	10:05	11:35	13:05	
PROCESS DATA				
Electric Power Production (MW)	785.8	784.4	786.4	**785.5**
Fuel Flow (MMBTU/Hr)	6405.0	6348.8	6332.1	**6362.0**
Fuel Flow Rate of Max (%)	64.1	64.3	64.5	**64.3**
CEMS O_2 (%)	2.4	2.4	2.5	**2.4**
APS Calculated Volumetric Flow Rate (SCFH)	85,084,020	85,084,020	85,084,020	**85,084,020**
CEMS SO_2 (ppm)	66.1	63.8	59.8	**63.3**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.40	24.41	24.36	**24.39**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	5.1	5.1	5.1	**5.1**
Moisture (%)	12.1	11.0	16.1	**13.1**
SO_3 (ppmv, dry)	0.05	0.06	<0.04	**<0.05**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	0.87	1.08	<0.72	**<0.89**
SO_3 (lb/MMBTU)	0.00014	0.00017	<0.00011	**<0.00014**
SO_3 (lb/MWH)	0.0011	0.0014	<0.00092	**<0.0011**

Table 2-5. Summary of Results Unit 5 (April)

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: TJS, BJM
Project Number: 182436.0000.0000

SOURCE	**Unit 5**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	4/5/11	4/5/11	4/5/11	
Start Time	14:00	16:00	18:00	
Stop Time	15:00	17:00	19:00	
PROCESS DATA				
Electric Power Production (MW)	745.6	745.5	745.3	**745.4**
Fuel Flow (MMBTU/Hr)	6755.3	6720.6	6716.8	**6730.9**
Fuel Flow Rate of Max (%)	63.8	63.8	64.2	**63.9**
CEMS O_2 (%)	2.3	2.3	2.3	**2.3**
APS Calculated Volumetric Flow Rate (SCFH)	90,021,780	90,021,780	90,021,780	**90,021,780**
CEMS SO_2 (ppm)	92.5	81.9	75.0	**83.1**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.39	24.32	24.29	**24.33**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.2	6.2	6.3	**6.2**
Moisture (%)	8.9	10.4	9.2	**9.52**
SO_3 (ppmv, dry)	<0.02	<0.03	0.09	**<0.05**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	<0.45	<0.64	1.71	**<0.93**
SO_3 (lb/MMBTU)	<0.000066	<0.000096	0.00025	**<0.0001389**
SO_3 (lb/MWH)	<0.00060	<0.00086	0.0023	**<0.0012526**

Table 2-6. Summary of Results Unit 5 APH Inlet

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: RS, GH, JH, CM, JE
Project Number: 182436.0000.0000

SOURCE	**Unit 5 APH Inlet**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	9/30/11	9/30/11	9/30/11	
Start Time	10:30	12:03	13:20	
Stop Time	11:30	13:03	14:20	
PROCESS DATA				
Electric Power Production (MW)	787.5	787.0	787.4	**787.3**
Fuel Flow (MMBTU/Hr)	7524	7533	7534	**7530**
Fuel Flow Rate of Max (%)	68.8	68.9	69.1	**68.9**
CEMS O_2 (%)	5.6	5.9	5.7	**5.8**
CEMS Volumetric Flow Rate (SCFH)	112,396,778	112,734,454	113,450,437	**112,860,556**
CEMS SO_2 (ppm)	46.0	48.2	43.6	**45.9**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.87	24.87	24.87	**24.87**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.1	6.1	5.9	**6.0**
SO_3 (ppmv, dry)	2.15	1.78	2.28	**2.07**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	50.10	41.66	53.67	**48.48**
SO_3 (lb/MMBTU)	0.0067	0.0055	0.0071	**0.0064**
SO_3 (lb/MWH)	0.0636	0.0529	0.0682	**0.0616**

Table 2-7. Summary of Results Unit 5 APH Outlet

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: RS, GH, CM, JH, JE
Project Number: 182436.0000.0000

SOURCE	**Unit 5 APH Out**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	9/30/11	9/30/11	9/30/11	
Start Time	10:30	12:00	13:15	
Stop Time	11:30	13:00	14:15	
PROCESS DATA				
Electric Power Production (MW)	787.5	787.0	787.4	**787.3**
Fuel Flow (MMBTU/Hr)	7524	7533	7534	**7530**
Fuel Flow Rate of Max (%)	68.8	68.9	69.1	**68.9**
CEMS O_2 (%)	5.6	5.9	5.7	**5.8**
CEMS Volumetric Flow Rate (SCFH)	112,396,778	112,734,454	113,450,437	**112,860,556**
CEMS SO_2 (ppm)	46.0	48.2	43.6	**45.9**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.84	24.84	24.84	**24.84**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.5	6.4	6.5	**6.5**
SO_3 (ppmv, dry)	0.20	0.19	0.14	**0.18**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	4.59	4.37	3.40	**4.12**
SO_3 (lb/MMBTU)	0.00061	0.00058	0.00045	**0.00055**
SO_3 (lb/MWH)	0.0058	0.0056	0.0043	**0.0052**

Table 2-8. Summary of Results Unit 5 (September)

Client: Arizona Public Service
Facility: Four-Corners Facility Fruitland, NM
Technicians: RS, GH, JH, CM, JE
Project Number: 182436.0000.0000

SOURCE	**Unit 5 Stack**			
TEST RUN	**1**	**2**	**3**	**AVERAGE**
Date	9/30/11	9/30/11	9/30/11	
Start Time	09:15	12:15	14:30	
Stop Time	11:15	14:15	16:30	
PROCESS DATA				
Electric Power Production (MW)	787.3	787.2	787.8	**787.4**
Fuel Flow (MMBTU/Hr)	7527	7534	7539	**7533**
Fuel Flow Rate of Max (%)	68.8	69.0	69.3	**69.0**
CEMS O_2 (%)	5.7	5.8	5.8	**5.8**
CEMS Volumetric Flow Rate (SCFH)	112,396,778	112,734,454	113,450,437	**112,860,556**
CEMS SO_2 (ppm)	47.2	45.6	44.5	**45.8**
AMBIENT CONDITIONS				
Atmospheric Pressure (in. Hg)	24.78	24.78	24.78	**24.78**
STACK CONCENTRATIONS				
O_2 (vol %, dry)	6.1	6.2	6.1	**6.1**
SO_3 (ppmv, dry)	0.10	0.07	0.06	**0.08**
OUTLET EMISSION RATES				
SO_3 (lb/hr)	2.32	1.64	1.31	**1.76**
SO_3 (lb/MMBTU)	0.00031	0.00022	0.00017	**0.00023**
SO_3 (lb/MWH)	0.0029	0.0021	0.0017	**0.0022**

3.0 PROCEDURES

The following section describes the test methods used including details specific to this test program.

3.3 Percent Moisture Measurement

EPA Method 4, Determination of Moisture Content in Stack Gases, was used at the outlets to determine the moisture content of the stack exhaust gases during each sampling run. This testing was only conducted during the April and June testing events. The moisture determination procedure uses a condenser assembly connected between an extraction probe and extraction pump.

A minimum of 21 dry standard cubic feet of stack gas was collected over a period of approximately one hour during each test. Sample gas was drawn from the stack at a flow rate no greater than 0.75 actual cubic feet per minute (dry). The sample gas was then passed through a series of four chilled glass impingers to collect moisture. The impingers were placed into an ice bath to prevent the exit temperature from exceeding 68 ºF. The conditioned sample gas was then passed through a calibrated dry gas meter. The entire sample system was leak checked before and after each test.

After the sample collection is completed, the amount of liquid (condensate) in the impingers was measured gravimetrically and the net gain determined. The total condensate gain of the condenser assembly, incorporated with the calculated volume of gas extracted, determines the total moisture of the gas stream.

3.2 O_2 Determination

For the direct analysis of stack gas, an extractive system was used to obtain gas samples for the analysis of O_2. The sample was extracted using a stainless steel/Teflon® diaphragm pump. Sample gas was continuously pulled through a stainless-steel probe. EPA Method 3A samples were transported to the mobile laboratory through a heated Teflon® sample line (maintained at 250 ± 25 ºF). The sample gas was passed through a minimum contact condenser to remove any moisture. The conditioned sample gas was then directed to a stainless steel (dry) manifold and partitioned to each of the Non-volatile organic compounds (VOC) continuous analyzers through glass and stainless steel rotameters for flow control of the sample.

During the June and September testing events O_2 samples were extracted by one of the following method of a single-point, integrated sampling tedlar bag as used in EPA Method 3.

Table 3-1 provides the list of instruments used during the emission tests. Figure 3-1 presents a reference method sample system diagram.

Table 3-1. List of Instruments

Parameter	Manufacturer	Model	Serial Number
O_2	Servomex	1400	01420C1/2534

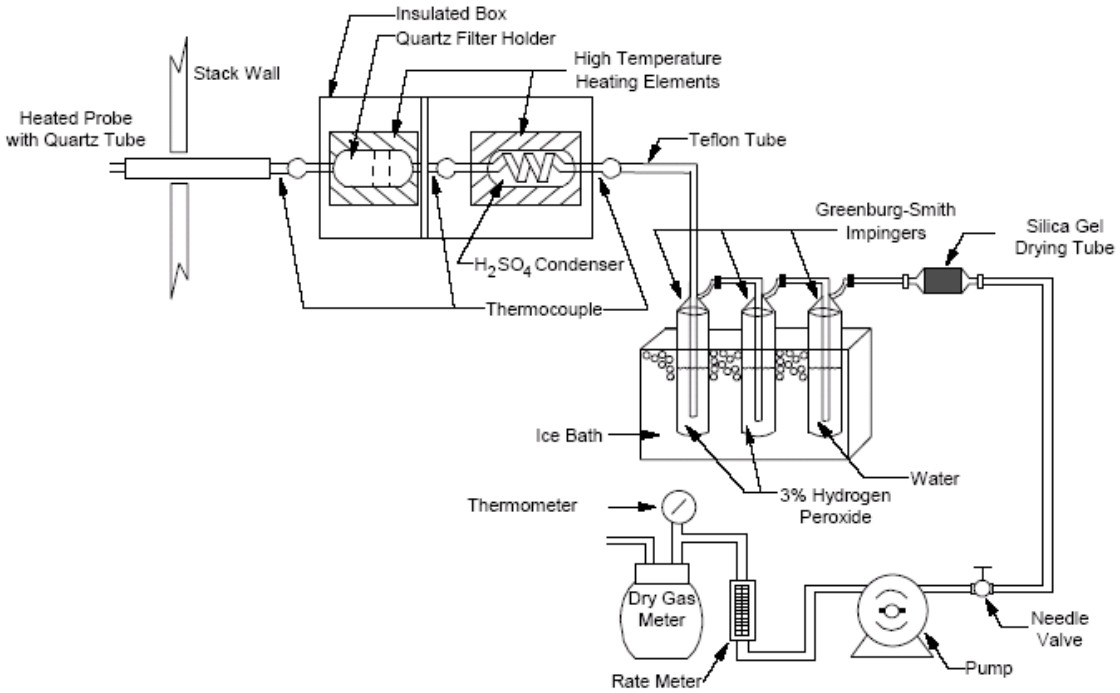
3.3 SO_3 Determination

The determination of stack gas concentrations of Sulfuric Acid (H_2SO_4) Vapor or Mist was performed in accordance with EPA Conditional Test Method 013, which is also referred to as the National Council for Air and Stream Improvement (NCASI) Method 8A. In this method stack gas is extracted at a constant volume rate. The sulfuric acid mist (including SO_3) and the sulfur dioxide (SO_2) are separated using an H_2SO_4 condenser prior to the first impinger. As shown in Figure 3-2, the gaseous sample was extracted using a quartz-lined probe into a high-temperature (>500°F) filter holder. The sample is then pulled through a modified Graham condenser kept at a nominal 180°F. The gas is then pulled through a chilled liquid impingement train. Impingers 1 and 2 contained 100 ml of 3% hydrogen peroxide (H_2O_2). Upon completion of each run a 15-minute purge of ambient air was performed.

Following the sampling purge, the sample train was transported to the sample turn area in the sampling trailer or other secure area for sample collection and sample storage. The condenser was washed a minimum of three times with deionized water into a polyurethane bottle for storage. The liquid level was marked and the sample was logged into the change of custody. Once the testing was completed, the samples were shipped by Federal Express carrier to the analytical laboratory.

TRC elected to use Resolution Analytics, Incorporated (Resolution) of Raleigh, North Carolina for analysis of the sulfuric acid. The samples were prepared for analyses by obtaining the final volume of the contents of the samples. The samples were then analyzed using a Dionex ICS-2100 ion chromatograph that used an IonPac AS18 4x250mm separation column. Each sample was analyzed in duplicate using the same parameters of CTM-013 for acceptability of results. Laboratory reports for each testing event can be found in Appendix G of this report.

Figure 3-1. CTM-013 Sample System Diagram



4.0 QUALITY ASSURANCE / QUALITY CONTROL

To ensure accurate results, strict quality assurance and control measures were followed. All testing was performed following standard EPA protocols as outlined in Code of Federal Regulations Title 40, Part 60, Appendix A. The test data was thoroughly documented and checked for completeness.

4.1 O_2 Continuous Emissions Monitors

The O_2 monitors used by TRC were operated per manufacturer instructions and in accordance with the applicable EPA reference methods. Appendix C documents the results of QA/QC activities.

The continuous analyzers were calibrated prior to testing using gas standards certified by the vendor using EPA Protocol Procedure G1. The gas certification documentation for standards used during this test program is included in Appendix D.

A calibration error test was performed. A low, mid, and high gas was introduced directly to each analyzer. TRC elected to use ambient air as the high level gas (20.9%) for O_2. The calibration error test for each analyzer met the requirements of the reference methods.

After the "direct to the analyzer" calibration error test, the total sampling system which includes the sample line, sample pump, and condenser was tested for system bias. All sample system bias tests met the reference method requirements. After each run, the measured concentrations of O_2 were corrected for bias following the requirements of Method 7E.

During the initial sample system bias tests, the response time of each analyzer was determined. The longest elapsed time was chosen as the system response time. Test runs were started after two times the sample system response time elapsed.

Additionally, sample system drift was determined at the end of each run. System drift is defined in the Method 7E as the value derived by subtracting the pre-run bias test concentration from the post-run bias test concentration, expressed as a percentage of calibration span. All sample system drift tests met the requirements of the test methods.

These checks ensure that the system remains within the tolerance levels defined by the respective EPA reference methods. Calibration results are documented in the final report. Table 4-1 presents the reference method continuous emissions monitoring systems (CEMS) performance criteria.

Table 4-1. Reference Method CEMS Performance Criteria

Criteria	O_2 (M3A)
Calibration Error, %	≤ 2
System Bias, %	≤ 5
Zero Drift, %	≤ 3
Calibration Drift, %	≤ 3
Interference Response, %	≤ 2.5

4.2 Moisture

The dry gas meter used for the moisture tests was calibrated prior to testing in accordance with EPA methodology. A post test calibration check was also conducted on the meter. Calibration certification documentation of the dry gas meters can be found in Appendix C. That documentation shows that the difference between the pre and post test calibrations differed by less than 5% as required. The absence of leaks in the sampling system was also verified by conducting leak checks prior to and following each test.

4.3 SO_3 Sampling

In accordance with EPA CTM-013 as referenced in NCASI Method 8A, the 3% H_2O_2 solution in impingers 1 and 2 of the sampling train was prepared freshly on the date of each test from a stock solution of 30% H_2O_2. Prior to and after each test run, a leak check was performed to verify the absence of leaks within the sample system. All samples were collected and shipped in accordance with method guidelines.

The dry gas meter used for the moisture tests was calibrated prior to testing in accordance with EPA methodology. A post test calibration check was also conducted on the meter. Calibration certification documentation of the dry gas meters can be found in Appendix C. That documentation shows that the difference between the pre and post test calibrations differed by less than 5% as required. The absence of leaks in the sampling system was also verified by conducting leak checks prior to and following each test.

APPENDIX A– FIELD DATA SHEETS

STACK SAMPLING DATA SHEET

1915

Plant Name:	APS 4 corners	Stack Diameter (in):	NA	Dry Gas Meter ID:	90394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 2	Barometric Pres. (Pb, in. Hg):	~~756 HVA~~	Total # of Sample Points:	1
Technicians:	TJS, BJM		24.11 ~~27.32~~	# of Sample Points per Port:	1
Test Run#:	1				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	590.255	Time (Start):	1930
Meter Reading (ft³, Stop):		Time (Stop):	2030

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.002	7
	Post-test	0.005	7

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3479.3	
Final Wt. (g)					3545.7	

point #	Clock time	DGM reading	ΔH "H2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
NA	1930	590.255	0.35	171	120	322	503	67	73	0
	1935	592.180	0.35	~~120~~ 172	~~323~~ 120	323	502	64	74	0
	1940	593.980	0.35	166	120	322	501	62	77	0
	1945	595.720	0.35	167	122	324	500	67	77	0
	1950	597.440	0.35	171	121	323	501	67	78	0
	1955	599.270	0.35	180	121	324	502	68	78	0
	2000	600.920	0.35	175	121	325	503	67	79	0
	2005	602.610	0.35	170	121	325	501	67	79	0
	2010	604.315	0.35	175	121	325	502	67	80	0
	2015	605.950	0.35	175	121	325	500	65	79	0
607.625	2020	[illegible]	0.35	169	121	325	503	62	80	0
	2025	609.380	0.35	184	121	324	500	60	80	0
	2030	610.928	—	—	—	—	—	—	—	0
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

A2

TRC

STACK SAMPLING DATA SHEET

Plant Name:	Four Corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 2	Barometric Pres. (Pb, in. Hg):	754 HVA	Total # of Sample Points:	1
Technicians:	TS, BM		24.20 ~~22.27 HG~~	# of Sample Points per Port:	1
Test Run#:	2				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	618.775	Time (Start):	2100
Meter Reading (ft³, Stop):	640.940	Time (Stop):	2200

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	.005	4
	Post-test	0.007	6

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3516.0	
Final Wt. (g)					3580.1	

point #	Clock time	DGM reading	ΔH "H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
NA	2100	618.775	.35	167	121	326	501	65	79	3
	2105	620.710	.35	168	121	325	500	64	80	3
	2110	622.520	.35	183	121	325	502	62	81	3
	2115	624.320	.35	180	121	326	503	61	82	3
	2120	626.280	.35	176	122	327	503	60	82	3
	2125	628.030	.35	173	122	325	501	59	83	3
	2130	629.980	.35	181	123	325	503	59	82	3
	2135	631.725	.35	176	122	326	502	58	82	3
	2140	633.680	.35	172	121	324	502	59	82	3
	2145	635.435	.35	182	121	325	502	58	82	3
	2150	637.375	.35	178	121	326	502	58	83	3
	2155	639.150	.35	174	121	325	503	58	84	3
	2200	640.940	/	/	/	/	/	/	/	/
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

A3

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 CORNERS	Stack Diameter (in):	—	Dry Gas Meter ID:	4394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 2	Barometric Pres. (Pb, in. Hg):	~~27.44~~ 24.20	Total # of Sample Points:	1
Technicians:	TJS, BJM			# of Sample Points per Port:	1
Test Run#:	3				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	647.886	Time (Start):	1025
Meter Reading (ft³, Stop):	670.120	Time (Stop):	1125

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.005	6
	Post-test	0.005	6

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SiGel		
Initial Wt. (g)					3450.3	
Final Wt. (g)					3517.3	

point #	Clock time	DGM reading	ΔH " H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum " Hg
NA	1025 PM	647.886	0.35	165	121	327	502	65	82	0.1
	1030	649.820	0.35	174	121	325	502	63	82	0.1
	1035	651.450	0.35	173	121	326	502	59	82	0.1
	1040	653.520	0.35	175	121	326	502	57	82	0.1
	1045	655.310	0.35	174	121	325	502	55	83	0.1
	1050	657.120	0.35	175	121	325	502	54	83	0.1
	1055	658.920	0.35	172	121	326	502	53	82	0.1
	1100	660.870	0.35	172	121	326	502	53	82	0.1
	1105	662.640	0.35	174	121	325	504	54	82	0.1
	1110	664.520	0.35	170	121	326	502	54	83	0.1
	1115	666.530	0.35	168	121	327	502	53	85	0.1
	1120	668.250	0.35	170	121	326	502	53	82	0.1
	1125	670.120	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

A4

TRC

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BJM
Facility Four Corners		Ambient Temp. (°F) 58	
Source Unit 2		Barometric Pressure (in. Hg) 24.11 ~~22.37~~	Meter Box ID 09215
Sampling Location Stack			Meter ID 9215
Condition NORMAL	Run No. 1		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	730	0	769.110	NA	68	70	72	10.0
	735	5	771.410		67	70	71	10.0
	740	10	773.640		64	70	73	10.0
	745	15	775.910		62	69	71	10.0
	750	20	778.150		67	67	72	10.0
	755	25	779.825		67	68	72	10.0
	800	30	782.040		67	67	71	10.0
	805	35	784.810		66	68	70	10.0
	810	40	786.120		67	69	70	10.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	= Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=
2	D.I. Water	100 ml	Standard G/S		-	=
3	NA	NA	Modified G/S		-	=
4	Silica Gel	~ 200 g	Modified G/S		-	=
5				3377.9	- 3321.6	=
6					-	=

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	15	15
Leak Rate (cfm)	.01	.01

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: [signature] 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BJM
Facility Four Corners		Ambient Temp. (°F) 55	
Source Unit 2		Barometric Pressure (in. Hg) 24.20	Meter Box ID 09215
Sampling Location Stack		~~22.27 Hg~~	Meter ID 9215
Condition Normal	Run No. 2		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	2100	0	786.520	~~NA~~	64	75	76	11.0
	2105	5	788.625	NA	62	74	75	11.0
	2110	10	790.530		60	73	75	11.0
	2115	15	792.750		60	74	75	11.0
	2120	20	794.480		59	73	74	11.0
	2125	25	796.260		59	73	74	11.0
	2130	30	798.125		59	74	75	11.0
	2135	35	800.010		58	73	74	11.0
	2140	40	801.748		58	74	75	11.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	= Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=
2	D.I. Water	100 ml	Standard G/S		-	=
3	NA	NA	Modified G/S		-	=
4	Silica Gel	~ 200 g	Modified G/S		-	=
5				3414.9	- 3377.9	=
6					-	=

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	19	19
Leak Rate (cfm)	.004	.004

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: [signature] 4/27/11 (Project Manager or QA Manager - sign and date)

TRC

Page of

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BJM / TS
Facility Four Corners		Ambient Temp. (°F) 55	
Source Unit 2		Barometric Pressure (in. Hg) ~~29.77~~ 24.20	Meter Box ID 9215
Sampling Location Stack			Meter ID 9215
Condition Normal	Run No. 3		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1025	0	801.809		65	72	74	11.0
	1030		803.750		63	72	73	11.0
	1035		805.520		59	72	74	11.0
	1040		807.340		57	73	75	11.0
	1045		809.040		55	72	75	11.0
	1050		810.870		54	70	74	11.0
	1055		812.525		53	70	73	11.0
	1100		814.250		53	70	74	11.0
	1105		815.770		54	71	74	11.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	=	Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=	
2	D.I. Water	100 ml	Standard G/S		-	=	
3	NA	NA	Modified G/S		-	=	
4	Silica Gel	~ 200 g	Modified G/S		-	=	
5				3459.9	- 3414.9	=	
6					-	=	

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	17	15
Leak Rate (cfm)	.004	.004

Comments:

A7

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: _____ (Project Manager or QA Manager - sign and date)

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 Corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 3	Barometric Pres. (Pb, in. Hg):	770 hpa	Total # of Sample Points:	1
Technicians:	TJS		24.34 ~~27.74 Hg~~	# of Sample Points per Port:	1
Test Run#:	1				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	503.678	Time (Start):	1010
Meter Reading (ft³, Stop):	524.720	Time (Stop):	1110

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DIH2O	SiGel		
Initial Wt. (g)					3458.1	
Final Wt. (g)					3473.5	

Quality Assurance Leak Checks:

*Meterbox Leak Check: (one-minute leak rate)	leak (cfm)	in. Hg Vacuum
Pre-test	0.004	7
Post-test	0.005	5

point # O2 %	Clock time	DGM reading	ΔH "H2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
6.30	1010	503.678	0.35	167	126	321	499	67	50	0.5
6.31	1015	505.330	0.35	172	127	322	501	51	53	0.5
6.21	1020	507.150	0.35	171	126	324	500	51	50	0.5
6.32	1025	508.360	0.35	180	128	324	504	50	55	0.5
6.39	1030	510.380	0.35	180	129	326	505	50	56	0.5
6.41	1035	512.250	0.35	170	127	324	501	51	57	0.5
5.99	1040	514.025	0.35	170	129	326	503	52	56	0.5
6.15	1045	515.860	0.35	186	129	325	507	51	57	0.5
6.18	1050	517.720	0.35	174	129	327	501	52	56	0.5
5.92	1055	519.540	0.35	167	130	327	503	52	57	0.5
5.80	1100	521.350	0.35	180	129	327	503	52	58	0.5
5.88	1105	523.150	0.35	174	129	326	502	52	58	0.5
5.75	1110	524.720	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

O_2 SPAN
CE 20.95
BIAS 9.94
ZERO

PRE SSB
ZERO 9.97
BIAS -0.03

POST SSB
ZERO -0.03
BIAS 8.88

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 Corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0025
Source:	Unit 3	Barometric Pres. (Pb, in. Hg):	~~26.5 Hg~~ 24.31	Total # of Sample Points:	1
Technicians:	TJS, BJM			# of Sample Points per Port:	1
Test Run#:	2				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	533.978	Time (Start):	1135
Meter Reading (ft³, Stop):	555.360	Time (Stop):	1235

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3571.9	
Final Wt. (g)					3570.3	

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.003	6.5
	Post-test	0.002	7

point #	Clock time	DGM reading	ΔH "H2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
5.89	1135	533.978	0.35	169	128	326	507	60	61	1.0
5.93	1140	535.200	0.35	169	128	327	499	61	65	1.0
5.90	1145	537.650	0.35	167	129	325	505	61	66	1.0
5.93	1150	539.250	0.35	168	128	327	501	59	66	1.0
5.94	1155	541.350	0.35	167	129	326	500	59	65	1.0
5.92	1200	542.850	0.35	166	128	326	501	60	64	1.0
5.95	1205	544.550	0.35	166	128	327	503	60	63	1.0
5.93	1210	546.430	0.35	167	129	327	498	59	62	1.0
5.90	1215	548.250	0.35	166	129	326	505	58	65	1.0
5.92	1220	550.350	0.35	166	129	328	500	59	62	1.0
5.93	1225	551.820	0.35	167	129	327	503	59	65	1.0
6.10	1230	553.750	0.35	166	128	327	505	60	66	1.0
	1235	555.360	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

SSB ZERO -0.03

BIAS 9.62

A9

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/7/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0024
Source:	Unit 3	Barometric Pres. (Pb, in. Hg):	24.24	Total # of Sample Points:	1
Technicians:	TJS, BJM	~~765 mm~~		# of Sample Points per Port:	1
Test Run#:	3				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	561.710	Time (Start):	1300
Meter Reading (ft³, Stop):	582.771	Time (Stop):	1400

Quality Assurance Leak Checks:

*Meterbox Leak Check: (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.01	7
	Post-test	0.015	7

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3467.5	
Final Wt. (g)					3498.4	

point #	Clock time	DGM reading	ΔH "H2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
6.0	1300	561.710	0.35	168	129	329	504	59	65	0.5
6.05	1305	563.850	0.35	169	128	328	501	60	63	0.5
6.10	1310	565.210	0.35	167	129	328	501	60	64	0.5
6.0	1315	566.880	0.35	181	129	328	506	59	68	0.5
6.15	1320	568.620	0.35	198	128	325	500	60	70	0.5
6.20	1325	570.470	0.35	188	129	327	504	61	70	0.5
6.23	1330	572.250	0.35	172	129	327	505	62	71	0.5
6.18	1335	574.150	0.35	170	129	327	507	63	72	0.5
6.20	1340	575.780	0.35	175	130	325	500	63	72	0.5
6.15	1345	577.450	0.35	189	129	327	500	63	73	0.5
6.21	1350	579.215	0.35	178	129	326	502	63	73	0.5
6.20	1355	581.750	0.35	170	129	327	504	62	73	0.5
6.21	1400	582.771	0.35	170	129	327	500	62	73	0.5
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BTM
Facility Four Corners		Ambient Temp. (°F) 43	
Source Unit 3		Barometric ~~74.04~~ Pressure (in. Hg)	Meter Box ID 9215
Sampling Location Stack		24.34	Meter ID 9215
Condition Normal	Run No. 1		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	Δ H (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1010	0	707.845	NA	49	44	45	5.0
	1015	5	711.025		50	43	44	5.0
	1020	10	714.520		50	43	45	5.0
	1025	15	717.420		50	44	48	5.0
	1030	20	720.350		51	45	49	5.0
	1035	25	723.530		51	44	49	5.0
	1040	30	726.420		50	45	49	5.0
	1045	35	729.150		51	51	49	5.0
	1050	40	731.658	—	—	—	—	—
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	= Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=
2	D.I. Water	100 ml	Standard G/S		-	=
3	NA	NA	Modified G/S		-	=
4	Silica Gel	~ 200 g	Modified G/S		-	=
5				3397.7	3333.9	=
6					-	=

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	0.005	15
Leak Rate (cfm)	15	0.018

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 4/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BTM
Facility Four Corners		Ambient Temp. (°F) 48	
Source Unit 3		Barometric Pressure (in. Hg) 24.31	Meter Box ID 9215
Sampling Location Stack			Meter ID ~~9947~~
Condition NORMAL	Run No. 2		DGMCF or Y 9992

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	Δ H (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1135	0	732.780	NA	60	58	59	6.0
	1140	5	734.850		61	57	58	6.0
	1145	10	737.650		60	58	58	6.0
	1150	15	740.140		60	59	58	6.0
	1155	20	742.640		59	58	60	6.0
	1200	25	744.970		59	55	61	6.0
	1205	30	747.210		59	55	62	6.0
	1210	35	749.425		58	56	61	6.0
	1215	40	751.680		59	57	60	6.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	= Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=
2	D.I. Water	100 ml	Standard G/S		-	=
3	NA	NA	Modified G/S		-	=
4	Silica Gel	~ 200 g	Modified G/S		-	=
5				3472.8	- 3397.7	=
6					-	=

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	17	17
Leak Rate (cfm)	.01	17

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: [signature] 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/7/11
Client APS			Operator BFM
Facility Four Corners		Ambient Temp. (°F) 54	
Source Unit 3		Barometric Pressure (in. Hg) 24.24	Meter Box ID 9215
Sampling Location Stack			Meter ID 9215
Condition NORMAL	Run No. 3		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	Δ H (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	100	0	752.250	NA	59	62	61	9.0
	105	5	754.520		60	61	61	9.0
	110	10	756.760		60	59	60	9.0
	115	15	758.610		59	59	61	9.0
	120	20	760.820		60	58	62	9.0
	125	25	762.850		59	59	60	9.0
	130	30	764.650		61	62	61	9.0
	135	35	766.860		61	60	62	9.0
	140	40	768.650		63	60	62	9.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g) - Initial Wt. (g) = Net Gain (g)
1	D.I. Water	100 ml	Modified G/S	- =
2	D.I. Water	100 ml	Standard G/S	- =
3	NA	NA	Modified G/S	- =
4	Silica Gel	~ 200 g	Modified G/S	- =
5				3528.7 3472.8 =
6				- =

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	15.0	17
Leak Rate (cfm)	.01	.015

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 Corners	Stack Diameter (in):	—	Dry Gas Meter ID:	10394
Date:	4/6/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 4	Barometric Pres. (Pb, in. Hg):	~~22.27~~ 24.40	Total # of Sample Points:	1
Technicians:	TJS			# of Sample Points per Port:	1
Test Run#:	1				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	414.875	Time (Start):	0905
Meter Reading (ft³, Stop):	437.936	Time (Stop):	1005

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.002	7
	Post-test	0.002	5

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3423.2	
Final Wt. (g)					3483.7	

point #	Clock time	DGM reading	ΔH "H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
	0905	414.875	0.35	168	125	324	500	66	87	1.0
	0910	417.950	0.35	172	125	326	501	64	89	0.5
	0915	419.760	0.35	167	125	325	501	63	89	0.5
	0920	421.620	0.35	177	125	324	501	62	89	0.5
Point was missed	0925	423.35	0.35	172	125	325	501	60	89	0.5
	0930	427.185	0.35	171	125	325	501	60	91	0.5
	0935	428.935	0.35	169	126	324	501	59	93	0.5
	0940	430.760	0.35	168	126	325	502	59	92	0.5
	0945	432.890	0.35	180	125	325	501	59	93	0.5
	0950	434.350	0.35	177	125	327	501	60	93	0.5
	~~0955~~ 1000	436.140	0.35	174	125	328	501	61	94	0.5
	1000 ~~1005~~	437.936	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 CORNERS	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/6/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 4	Barometric Pres. (Pb, in. Hg):	~~22.24~~ 24.41	Total # of Sample Points:	1
Technicians:	TJS			# of Sample Points per Port:	1
Test Run#:	2				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	445.185	Time (Start):	1035
Meter Reading (ft³, Stop):	466.828	Time (Stop):	1135

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)	leak (cfm)	in. Hg Vacuum
Pre-test	0.004	5
Post-test	0.002	5

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3428.4	
Final Wt. (g)					3486.5	

point #	Clock time	DGM reading	ΔH "H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM in/out Temp °F	Line Vacuum "Hg
	1035	445.185	0.35	168	126	328	498	67	92	1.0
	1040	447.100	0.35	170	125	327	498	64	92	0.5
	1045	448.825	0.35	169	125	327	500	61	93	0.5
	1050	450.620	0.35	180	125	324	503	56	94	0.5
	1055	452.410	0.35	179	125	326	499	55	94	0.5
	1100	454.210	0.35	174	125	326	499	54	96	0.5
	1105	456.005	0.35	175	125	326	499	54	96	0.5
	1110	457.830	0.35	174	125	325	498	54	94	0.5
	1115	459.528	0.35	175	125	326	501	54	95	0.5
	1120	461.310	0.35	174	125	326	499	55	94	0.5
	1125	463.115	0.35	175	126	326	498	54	94	0.5
	1130	464.905	0.35	173	125	326	499	55	94	0.5
	1135	466.828	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 Corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/6/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 4	Barometric Pres. (Pb, in. Hg):	~~22.24~~ 24.36	Total # of Sample Points:	1
Technicians:	TJS			# of Sample Points per Port:	1
Test Run#:	3				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	474.755	Time (Start):	1205
Meter Reading (ft³, Stop):	496.218	Time (Stop):	1305

Quality Assurance Leak Checks:

*Meterbox Leak Check: (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.012	8
	Post-test	0.010	7

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SiGel		
Initial Wt. (g)					3428.6	
Final Wt. (g)					3487.3	

point #	Clock time	DGM reading	ΔH "H_2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
	1205	474.755	0.35	170	125	327	500	63	90	0.5
	1210	476.585	0.35	174	125	325	499	60	90	0.5
	1215	478.398	0.35	178	126	326	497	59	91	0.5
	1220	480.220	0.35	174	125	325	500	59	91	0.5
	1225	482.025	0.35	173	126	324	501	60	89	0.5
	1230	483.865	0.35	175	127	324	500	61	88	0.5
	1235	485.570	0.35	174	126	325	500	60	90	0.5
	1240	487.410	0.35	177	126	324	499	60	91	0.5
	1245	489.280	0.35	173	126	324	502	60	92	0.5
	1250	491.070	0.35	177	126	325	501	62	90	0.5
	1255	492.705	0.35	174	127	325	496	61	87	0.5
	1300	494.460	0.35	175	126	323	502	62	86	0.5
	1305	496.218	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 04/06/2011
Client APS			Operator BTM
Facility Four Corners		Ambient Temp. (°F) 49	
Source Unit 4		Barometric Pressure (in. Hg) 24.40 ~~22.27~~	Meter Box ID 09215
Sampling Location Stack			Meter ID ~~09215~~ 09215
Condition NORMAL	Run No. 1		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	905	0	606.220		62	82	82	6.0
	910	5	609.820		55	76	80	6.0
	915	10	614.140		55	75	80	6.0
	920	15	617.930		56	73	81	6.0
	925	20	620.820		55	71	82	6.0
	930	25	623.740		54	71	80	6.0
	935	30	626.820		55	72	84	6.0
	940	35	629.530		55	71	84	6.0
	945	40	632.440		54	71	84	6.0
0950	~~1000~~	~~945~~	635.310		58	72	81	6.0
0955	~~1005~~	~~950~~	638.220		57	71	83	6.0
	1000	955	641.120		59	70	79	6.0
	1005	1000	644.020		59	70	79	6.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	=	Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=	
2	D.I. Water	100 ml	Standard G/S		-	=	
3	NA	NA	Modified G/S		-	=	
4	Silica Gel	~ 200 g	Modified G/S		-	=	
5				3566.1	- 3477.6	=	
6					-	=	

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	19.0	19.0
Leak Rate (cfm)	.30	.40

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

8841-0046

TRC

Page 1 of 1

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/6/11
Client APS			Operator BJM
Facility Four Corners		Ambient Temp. (°F) 66	
Source Unit 4		Barometric Pressure (in. Hg) 24.41 ~~22.4~~	Meter Box ID 9215
Sampling Location Stack			Meter ID ~~.9922~~ 9215
Condition Normal	Run No. 2		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1035	0	644.250	NA	67	78	81	6.0
	1040	5	647.325		60	75	80	6.0
	1045	10	650.720		53 ~~69~~	~~72~~ 69	76	6.0
	1050	15	653.950		53	69	76	6.0
	1055	20	656.440		52	68	77	6.0
	1100	25	658.930		53	69	76	6.0
	1105	30	662.020		53	70	77	6.0
	1110	35	665.240		52	69	81	6.0
	1115	40	667.920		52	69	80	6.0
	1120	45	671.80		52	70	81	6.0
	1125	50	673.670		54	70	78	6.0
	1130	55	676.540		54	70	78	6.0
	1135	60	679.415		53	69	79	6.0
	Total		Net	Avg.		Avg.	Avg.	

644.250
653.
3.16
.631

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g)	- Initial Wt. (g)	= Net Gain (g)
1	D.I. Water	100 ml	Modified G/S		-	=
2	D.I. Water	100 ml	Standard G/S		-	=
3	NA	NA	Modified G/S		-	=
4	Silica Gel	~ 200 g	Modified G/S		-	=
5				3640.0	- 3566.1	=
6					-	=

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	19	19
Leak Rate (cfm)	.4	1.3

Comments:

6644-18283

NA = Not Applicable
Rev. 3 (10/2007)

32.53
52.00

Checked By: _____ 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 04/06/11
Client APS			Operator BFM
Facility Four Corners		Ambient Temp. (°F) 65	
Source Unit 4		Barometric Pressure (in. Hg) 24.36 ~~22.4~~	Meter Box ID ~~[illegible]~~ 9215
Sampling Location Stack			Meter ID
Condition NORMAL	Run No. 3		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1205	0	682.345	NA	62	74	74	6.0
	1210	5	685.620		61	75	73	6.0
	1215	10	688.630		51	70	74	6.0
	1220	15	691.620		51	71	73	6.0
	1225	20	694.910		50	71	73	6.0
	1230	25	698.030		51	71	73	6.0
	1235	30	701.570		53	67	72	6.0
	1240	35	703.960		53	67	72	6.0
	1245	40	707.600		53	68	72	6.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g) - Initial Wt. (g) = Net Gain (g)
1	D.I. Water	100 ml	Modified G/S	- =
2	D.I. Water	100 ml	Standard G/S	- =
3	NA	NA	Modified G/S	- =
4	Silica Gel	~ 200 g	Modified G/S	- =
5				3645.2 - 3532.6 =
6				- =

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	19	19
Leak Rate (cfm)	.44	.40

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/5/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 5	Barometric Pres. (Pb, in. Hg):	~~22.41~~ 24.39	Total # of Sample Points:	1
Technicians:	TJS			# of Sample Points per Port:	60
Test Run#:	1				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	321.635	Time (Start):	1400
Meter Reading (ft³, Stop):	352.537	Time (Stop):	1500

Quality Assurance Leak Checks:

*Meterbox Leak Check: (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.002	10
	Post-test	0.005	7

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DIH2O	SIGel		
Initial Wt. (g)					3396.6	
Final Wt. (g)					3474.2	

point #	Clock time	DGM reading	ΔH "H2O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F (in)	DGM In/out Temp °F (out)	Line Vacuum "Hg	VA
1	1400	321.635	0.75	170	112	353	501	60	81		81	0
	1405	324.300	0.75	175	116	323	491	57	82		82	1.0
	1410	327.000	0.75	169	118	319	499	56	85		83	1.0
	1415	329.680	0.75	175	121	327	502	57	88		85	1.0
	1420	332.156	0.75	177	125	313	500	59	90		86	1.5
	1425	335.065	0.75	176	125	323	501	61	91		87	1.5
	1430	337.760	0.75	181	126	325	502	62	92		87	1.5
	1435	340.510	0.75	182	127	325	502	61	92		87	2.
	1440	343.185	0.75	184	127	325	501	62	93		88	2.
	1445	345.885	0.75	183	127	325	502	64	94		89	2.
	1450	348.590	0.75	181	127	324	500	65	94		89	2.
	1455	350.575	0.35	179	127	325	521	66	93		90	0
	1500	352.537	—	—	—	—	—	—	—		—	—
Totals or Avgs.												

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

Initial - 3396.6

TRC

STACK SAMPLING DATA SHEET

Plant Name:	APS 4 corners	Stack Diameter (in):	—	Dry Gas Meter ID:	90394
Date:	4/5/11	Total Sample Time (min):	60	Dry Gas Meter Factor (Y):	1.0028
Source:	Unit 5	Barometric Pres. (Pb, in. Hg):	~~22.71~~ 24.32	Total # of Sample Points:	1
Technicians:	TJS			# of Sample Points per Port:	1
Test Run#:	2				
Project #:	182436				

Meterbox Data:

Meter Reading (ft³, Start):	353.967	Time (Start):	1600
Meter Reading (ft³, Stop):	376.575	Time (Stop):	1700

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.007	7
	Post-test	0.005	7

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SIGel		
Initial Wt. (g)					3419.7	
Final Wt. (g)					3476.6	

point #	Clock time	DGM reading	ΔH "H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
	1600	353.967	0.35	167	126	320	494	67	88	0.5
	1605	355.910	0.35	171	127	323	495	63	90	0.5
	1610	357.815	0.35	172	127	324	496	62	91	0.5
	1615	359.710	0.35	183	127	323	499	61	93	0.5
	1620	361.575	0.35	184	127	324	500	61	94	0.5
	1625	363.437	0.35	179	127	326	501	60	95	0.5
	1630	365.300	0.35	172	128	325	500	59	95	0.5
	1635	367.125	0.35	171	128	324	498	61	95	0.5
	1640	368.995	0.35	172	128	325	499	61	96	0.5
	1645	370.925	0.35	169	127	326	500	60	95	0.5
	1650	372.950	0.35	177	127	327	500	61	96	0.5
	1655	374.690	0.35	175	128	324	501	62	96	0.5
	1700	376.575	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

STACK SAMPLING DATA SHEET

Plant Name: AES 4 corners	Stack Diameter (in): —	Dry Gas Meter ID: 90394
Date: 4/5/11	Total Sample Time (min): 60	Dry Gas Meter Factor (Y): 1.0028
Source: Unit 5	Barometric Pres. (Pb, in. Hg): ~~22.14~~ 24.29	Total # of Sample Points: 1
Technicians: TJS		# of Sample Points per Port: 1
Test Run#: 3		
Project #: 182436		

Meterbox Data:

Meter Reading (ft³, Start): 384.288		Time (Start): 1800	
Meter Reading (ft³, Stop): 407.395		Time (Stop): 1900	

Impinger #	1	2	3	4	5	6
Contents	3% H2O2	3% H2O2	DiH2O	SiGel		
Initial Wt. (g)					3424.4	
Final Wt. (g)					3481.9	

Quality Assurance Leak Checks:

*Meterbox Leak Check (one-minute leak rate)		leak (cfm)	in. Hg Vacuum
	Pre-test	0.008	7
	Post-test	0.005	7

point #	Clock time	DGM reading	ΔH "H₂O	Condenser Temp °F	Stack Temp °F	Probe Temp °F	Filter Temp °F	Last Impinger Temp °F	DGM In/out Temp °F	Line Vacuum "Hg
	1800	384.288	0.35	166	124	324	498	67	91	0.5
	1805	386.275	0.35	178	125	324	497	64	92	0.5
	1810	388.160	0.35	179	125	325	498	62	94	0.5
	1815	390.055	0.35	181	125	326	500	62	95	0.5
	1820	391.990	0.35	183	125	326	500	60	97	0.5
	1825	393.930	0.35	180	125	326	502	60	97	0.5
	1830	395.863	0.35	177	125	326	502	60	97	0.5
	1835	397.800	0.35	175	125	326	501	60	97	0.5
	1840	399.717	0.35	173	125	325	501	60	97	0.5
	1845	401.640	0.35	172	125	326	500	61	98	0.5
	1850	403.555	0.35	170	126	325	501	61	97	0.5
	1855	405.510	0.35	180	126	327	500	61	97	0.5
	1900	407.395	—	—	—	—	—	—	—	—
Totals or Avgs.										

* meterbox leak check = less than +/- 4% sampling or +/- 0.020 cfm at a vacuum greater than observed during test.

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182438.0000.0000			Date 4/5/11
Client APS			Operator BJM
Facility Four Corners		Ambient Temp. (°F) 61	
Source Unit 5		Barometric Pressure (in. Hg) ~~22.41~~ 24.39	Meter Box ID 009215
Sampling Location Stack			Meter ID 9215
Condition Normal	Run No. 1		DGMCF or Y 0.9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
1	1400	0	492.193	NA	64	70	64	6.0
	1405	5	495.305		62	68	67	6.0
	1410	10	498.501		59	71	70	6.0
	1415	15	501.765		57	72	73	6.0
	1420	20	504.630		59	73	80	6.0
	1425	25	506.195		58	72	80	6.0
	1430	30	511.001		58	73	81	6.0
	1435	35	514.250		58	72	83	6.0
	1440	40	517.301		59	73	82	6.0
	1445	45	520.030		59	73	82	6.0
	1450	50	523.503		59	73	81	6.0
	1455	55	526.603		59	73	82	6.0
	1460	60	529.704		60	73	83	6.0
	—	—	—	—	—	—	—	—
	Total —		Net —	Avg. —		Avg. —	Avg. —	

22.6

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g) - Initial Wt. (g) = Net Gain (g)
1	D.I. Water	100 ml	Modified G/S	- =
2	D.I. Water	100 ml	Standard G/S	- =
3	NA	NA	Modified G/S	- =
4	Silica Gel	~ 200 g	Modified G/S	- =
5				3347.6 - 3325.6 =
6				- =

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	15"	19
Leak Rate (cfm)	0.004	.004

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/5/11
Client APS			Operator BJM
Facility Four Corners		Ambient Temp. (°F) 72	
Source Unit 5		Barometric Pressure (in. Hg) 24.32	Meter Box ID 09215
Sampling Location Stack			Meter ID 9215
Condition Normal	Run No. 2		DGMCF or Y = .9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	ΔH (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1600	0	533.434	NA	77	82	83	6.0
	1605	5	536.450		56	82	83	6.0
	1610	10	539.400		57	81	83	6.0
	1615	15	542.450		53	80	84	6.0
	1620	20	545.565		54	79	86	6.0
	1625	25	548.555		53	78	86	6.0
	1630	30	551.565		53	77	85	6.0
	1635	35	554.450		53	76	87	6.0
	1640	40	557.575		53	76	86	6.0
	1645	45	560.525		53	75	84	6.0
	1650	50	563.530		53	76	84	6.0
	1655	55	566.550		53	75	84	6.0
	—	60	569.055		54	77	87	6.0
	Total		Net	Avg.		Avg.	Avg.	

533.435
0.

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g) - Initial Wt. (g) = Net Gain (g)
1	D.I. Water	100 ml	Modified G/S	- =
2	D.I. Water	100 ml	Standard G/S	- =
3	NA	NA	Modified G/S	- =
4	Silica Gel	~ 200 g	Modified G/S	- =
5				3416.9 - 3347.6 =
6				- =

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	16.0	16.0
Leak Rate (cfm)	.004	.007

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

40 CFR 60 Method 4 -- MOISTURE CONTENT

Project No. 182436.0000.0000			Date 4/5/11
Client APS			Operator DTM
Facility Four Corners		Ambient Temp. (°F) 68	
Source Unit 5		Barometric Pressure (in. Hg) ~~22.04~~ 24.29	Meter Box ID 9215
Sampling Location Stack			Meter ID 9215
Condition normal	Run No. 3		DGMCF or Y 9972

Moisture Sample Collection Data

Traverse Point	Time: Clock (24-hr)	Time: Elapsed (min)	Volume - DGM Volume (ft^3)	Δ H (in. H_2O)	Temperatures (°F): Impingers Exit	Temperatures (°F): DGM Meter In	Temperatures (°F): DGM Meter Out	Vacuum Gage (in. Hg)
	1800	0	570.302	NA	58	85	87	6.0
	1805	5	573.030		58	81	84	6.0
	1810	10	576.040		54	79	83	6.0
	1815	15	579.650		53	79	85	6.0
	1820	20	582.750		53	79	84	6.0
	1825	25	585.125		53	77	85	6.0
	1830	30	588.150		52	76	84	6.0
	1835	35	591.365		53	76	85	6.0
	1840	40	594.450		53	76	84	6.0
	1845	45	597.250		53	76	83	6.0
	1850	50	600.150		53	74	82	6.0
	1855	55	603.270		53	73	82	6.0
		60	606.050		53	73	82	6.0
	Total		Net	Avg.		Avg.	Avg.	

Moisture Analytical Results

Impinger	Contents	Mass/Volume	Configuration	Final Wt. (g) - Initial Wt. (g) = Net Gain (g)
1	D.I. Water	100 ml	Modified G/S	- =
2	D.I. Water	100 ml	Standard G/S	- =
3	NA	NA	Modified G/S	- =
4	Silica Gel	~ 200 g	Modified G/S	- =
5				3477.6 - 3416.9 =
6				- =

Sample Train Leak Checks	Initial	Final
Vacuum (in. Hg)	19	19
Leak Rate (cfm)	.75	.35

Comments:

NA = Not Applicable
Rev. 3 (10/2007)

Checked By: 11/27/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No. 182346	Test Location Schematic	Date 6-14-11	
Client APS		Operator Name [illegible]	
Facility 4 Corners		Barometer ID B-1	K Factor —
Source Unit 1		Barometric Press. (in. Hg) 24.62	Filter No. —
Sampling Location Stack	Stack Diameter (in) —	Assumed Moisture (%) —	Ambient Temp. (°F) 90
Condition Full	Run No. 1	Static Pressure (in. H_2O) —	Probe Setting (°F) 500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Console No.	ΔH @	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p
—	—	glass	8	610204	1.665	1.0058	—	—

Post-Test Orifice/Meter Positive Leak Check Pass? — Y — N

Pitot Leak Check Post-test: Pass? + — Y — N, − — Y — N

Pitot Leak Check Pre-test: Pass? + — Y — N, − — Y — N

Traverse Point	Time Clock (24 hr)	Time Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH Desired (in. H_2O)	Orifice ΔH Actual (in. H_2O)	Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Cond.		Pump Vacuum (in. Hg)
Begin Pt	1035	0	521.413			0.40		498	497	60	81	81	14	5	2
		10	525.27			0.40		502	510	59	90	82	15	2	2
		20	529.25			0.40		500	515	58	96	83	15	3	2
		30	533.24			0.40		502	502	60	99	84	15	5	2
		40	537.22			0.40		501	503	59	101	85	15	4	2
		50	541.19			0.40		500	504	59	103	86	15	5	2
		60	545.22			0.40		500	502	58	103	87	15	4	2
		70	549.25			0.40		500	500	59	103	87	15	5	2
		80	553.17			0.40		499	500	58	102	87	14	5	2
		90	557.09			0.40		500	499	59	104	88	14	5	2
		100	561.26			0.40		501	506	61	103	88	14	5	2
		110	565.37			0.40		503	506	61	105	89	14	7	2
End	1235	120	569.449												

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	5	0.000
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

	E	I
1	459.6	733.5
2	722.2	706.7
3	617.1	614.2
56	900.5	890.1

CO_2 = 12.70

O_2 = 5.98

Rev.5 (1/10) NA = Not Applicable

FILE: Isokinetics(r5) TAB: Min_pg1L

Checked By: [signature] 11/4/11 (Project Manager or QA Manager) - sign and date

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346	Test Location Schematic	
Client	APS	Date	6-14-11
Facility	4 Corners	Operator Name	[illegible]
Source	Unit 1	Barometer ID	B-1
Sampling Location	Stack	K Factor	—
Stack Diameter (in)	—	Barometric Press. (in. Hg)	24.62
Condition	Full	Filter No.	—
Run No.	2	Assumed Moisture (%)	—
		Ambient Temp. (°F)	90
		Static Pressure (in. H_2O)	—
		Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Console No.	ΔH @	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p
—		glass	8	610204	1.665	1.0058	—	

Post-Test Orifice/Meter Positive Leak Check Pass? ___Y ___N

Pitot Leak Check Post-test. Pass? + ___Y ___N - ___Y ___N

Pitot Leak Check Pre-test. Pass? + ___Y ___N - ___Y ___N

Traverse Point	Time Clock (24 hr)	Time Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH Desired (in. H_2O)	Orifice ΔH Actual (in. H_2O)	Temp. Stack Flue Gas	Temp. Probe	Temp. Filter Box	Temp. Impingers Exit	Temp. DGM Meter In	Temp. DGM Meter Out	Temp. Cond.	Pump Vacuum (in. Hg)
Single Pt.	1347	0	569.615			0.40		502	507	65	93	90	142	2
		10	573.84			0.40		503	502	63	101	89	143	2
		20	577.82			0.40		502	508	62	105	89	145	2
		30	581.94			0.40		502	509	61	106	90	146	2
		40	585.96			0.40		501	507	61	106	90	146	2
		50	589.98			0.40		502	509	61	106	91	148	2
		60	594.00			0.40		502	501	61	107	91	147	2
		70	597.98			0.40		502	502	59	107	91	144	2
		80	602.03			0.40		501	503	59	107	91	146	2
		90	606.05			0.40		502	503	59	109	91	146	2
		100	610.08			0.40		502	504	59	107	92	147	2
		110	614.07			0.40		502	503	58	108	92	147	2
End	1447	120	617.998											

Sample Train Leak Checks (e.g. pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	5	0.000
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

	E	I
1	874.5	742.4
2	721.3	710.3
3	610.6	609.9
5G	958.1	946.9

CO_2 = 12.70

O_2 = 6.1

Checked By: [illegible] 11/4/11 (Project Manager or QA Manager - sign and date)

A27

Rev.5 (1/10) NA = Not Applicable

FILE: Isokinetics(r5) TAB: Min_pg1L

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346	Test Location Schematic	
Client	APS	Date	6-14-11
Facility	4 Corners	Operator Name	[illegible]
Source	Unit 1	Barometer ID	B-1
Sampling Location	Stack	K Factor	—
Stack Diameter (in)	—	Barometric Press. (in. Hg)	24.62
Condition	Full	Filter No.	—
Run No.	3	Assumed Moisture (%)	—
		Ambient Temp. (°F)	90
		Static Pressure (in. H_2O)	—
		Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Console No.	ΔH@	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p
—	—	glass	8	610204	1.665	1.0058	—	—

Post-Test Orifice/Meter Positive Leak Check Pass? — Y — N

Pitot Leak Check Post-test: Pass? + ___ Y ___ N

Pitot Leak Check Pre-test: Pass? + ___ Y ___ N

Traverse Point	Time Clock (24 hr)	Time Elapsed (min)	DGM Volume (ft³)	Pitot ΔP (in. H_2O)	Orifice ΔH Desired (in. H_2O)	Orifice ΔH Actual (in. H_2O)	Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Cond.	Pump Vacuum (in. Hg)
Start	1456	0	618.272			0.40		501	503	66	99	94	142	2
		10	622.28			0.40		501	505	62	109	93	142	2
		20	626.28			0.40		499	502	60	109	93	143	2
		30	630.49			0.40		501	503	59	109	93	145	2
		40	634.35			0.40		501	504	59	109	94	144	2
		50	~~634.35~~	638.41		0.40		500	501	59	109	94	144	2
		60	642.53			0.40		501	504	60	110	94	146	2
		70	646.55			0.40		501	504	60	111	94	147	2
		80	650.39			0.40		500	504	63	110	95	145	2
		90	654.54			0.40		501	505	60	111	95	147	2
		100	658.57			0.40		501	505	62	111	95	147	2
		110	662.60			0.40		500	505	62	111	95	147	2
End	1656	120	666.727											

Sample Train Leak Checks (e.g. pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft³) Start	Volume (ft³) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	5	0.000
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

	F	I
1	865.5	730.6
2	742.1	730.8
3	615.6	613.5
SG	997.7	985.1

CO_2 = 12.60

O_2 = 6.10

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

A28

Rev.5 (1/10) NA = Not Applicable

FILE: Isokinetics(r5) TAB: Min_pg1L

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A 1 2

Project No.	182346
Client	APS
Facility	4 Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	1

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p
N/A		glass	9	N/A	

DGM - Meter Box: Meter Box No.	ΔH@	DGMCF or Y
610204	1.665	1.0058

Impinger Contents (grams)

Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				

Impinger Box Number: Total:

Recovery Date: Recovered by:

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	—
K Factor	N/A
Barometric Pressure (in. Hg)	24.78
Filter No.	N/A
Assumed Moisture (%)	—
Ambient Temp. (°F)	80
Static Pressure (in. H_2O)	N/A
Probe Setting (°F)	500

Pitot Tube Leak Checks

Pitot Leak Check Pre-test: Pass? + ___ Y ___ N / − ___ Y ___ N

Pitot Leak Check Post-test: Pass? + ___ Y ___ N / − ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft³)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser		Pump Vacuum (in. Hg)
Single Pt.	0915	342.069	N/A	0.40	N/A	497	501	64	78	77	173		2
	5	344.10		0.40		497	500	59	87	77	180		2
	10	346.14		0.40		496	500	58	94	80	181		2
	15	348.16		0.40		497	499	58	95	80	181		2
	20	350.18		0.40		496	501	58	98	81	181		2
	25	352.21		0.40		495	500	58	100	83	181		2
	30	354.23		0.40		496	502	58	101	84	181		2
	35	356.25		0.40		494	500	58	103	85	180		2
	40	358.28		0.40		495	501	59	104	87	178		2
	45	360.31		0.40		496	502	58	105	87	178		2
	50	362.34		0.40		499	501	59	106	88	178		2
	55	364.36		0.40		499	501	58	106	88	178		2
	60	366.40		0.40		499	502	59	107	89	179		2
	65	368.43		0.40		499	502	59	108	90	180		2
	70	370.45		0.40		499	501	59	109	91	180		2
	75	372.48		0.40		499	501	59	109	91	178		2
	80	374.50		0.40		499	502	60	110	91	177		2

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft³) Start	Volume (ft³) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	5	0.000
Port: 29	Before					
	After					

Comments: (Test Location Schematic may be drawn here, unless a separate sheet is used.)

CO2 = 12.8

O2 = 6.1

NA = Not Applicable

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346
Client	ADS
Facility	4 Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	1

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p

DGM - Meter Box Meter Box No.	ΔH@	DGMCF or Y

Impinger Contents (grams)

Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				

Impinger Box Number: Total:

Recovery Date: Recovered by:

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	K Factor
Barometric Pressure (in. Hg)	Filter No.
Assumed Moisture (%)	Ambient Temp. (°F)
Static Pressure (in. H_2O)	Probe Setting (°F)

Pitot Tube Leak Checks

Pitot Leak Check Pre-test: Pass?	Pitot Leak Check Post-test: Pass?
+ ___ Y ___ N	+ ___ Y ___ N
- ___ Y ___ N	- ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft³)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser			Pump Vacuum (in. Hg)
Single Pt	85	376.54	N/A	0.40	N/A	499	503	56	111	91	176			2
	90	378.58		0.40		500	503	55	111	92	175			2
	95	380.62		0.40		499	503	53	111	93	175			2
	100	382.66		0.40		499	503	52	111	93	175			2
	105	384.70		0.40		500	504	53	111	93	175			2
	110	386.74		0.40		499	503	53	111	94	175			2
	115	388.76		0.40		499	504	54	112	94	175			2
End	120	390.806												

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft³) Start	Volume (ft³) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before					
	After					
Port: 30	Before					
	After					

Comments: *(Test Location Schematic may be drawn here, unless a separate sheet is used.)*

NA = Not Applicable

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A 1 2

Project No.	
Client	APS
Facility	4 Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	2

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p
N	A	Glass	9	N	A

DGM - Meter Box: Meter Box No.	ΔH @	DGMCF or Y
610204	1.665	1.0058

Impinger Contents (grams)				
Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				
Impinger Box Number:			Total:	
Recovery Date:		Recovered by: RS		

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	—
K Factor	N/A
Barometric Pressure (in. Hg)	24.78
Filter No.	N/A
Assumed Moisture (%)	—
Ambient Temp. (°F)	85
Static Pressure (in. H_2O)	N/A
Probe Setting (°F)	500

Pitot Tube Leak Checks

Pitot Leak Check Pre-test Pass?	Pitot Leak Check Post-test Pass?
N/A	N/A

Traverse Point	Time (24 hr)	DGM Volume (ft³)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser		Pump Vacuum (in. Hg)
Sample Pt.	1215	391.180	N/A	0.40	N/A	500	503	65	100	95	170		2
	5	393.22		0.40		500	504	58	105	95	171		2
	10	395.33		0.40		500	503	57	108	94	175		2
	15	397.35		0.40		499	504	57	109	94	176		2
	20	399.37		0.40		499	502	56	110	94	174		2
	25	401.38		0.40		499	503	57	111	94	175		2
	30	403.39		0.40		499	503	57	111	95	175		2
	35	405.43		0.40		499	502	57	111	95	175		2
	40	407.44		0.40		499	502	57	112	95	175		2
	45	409.45		0.40		500	501	57	112	95	175		2
	50	411.47		0.40		499	502	57	112	95	175		2
	55	413.48		0.40		499	503	58	113	96	175		2
	60	415.50		0.40		499	503	58	112	96	175		2
	65	417.52		0.40		499	502	59	113	96	175		2
	70	419.54		0.40		499	501	57	113	96	175		2
	75	421.56		0.40		499	503	54	113	96	175		2
	80	423.58		0.40		499	502	53	113	96	175		2

Sample Train Leak Checks (e.g. pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft³) Start	Volume (ft³) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	5	0.000
Port:	Before					
	After					

Comments: (Test Location Schematic may be drawn here, unless a separate sheet is used.)

CO_2 = 12.7
O_2 = 6.15

NA = Not Applicable

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346
Client	APS
Facility	4 Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	2

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p

DGM - Meter Box: Meter Box No.	ΔH@	DGMCF or Y

Impinger Contents (grams)

Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				

Impinger Box Number: Total:

Recovery Date: Recovered by:

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	K Factor
Barometric Pressure (in. Hg)	Filter No.
Assumed Moisture (%)	Ambient Temp. (°F)
Static Pressure (in. H_2O)	Probe Setting (°F)

Pitot Tube Leak Checks

Pitot Leak Check Pre-test: Pass?	Pitot Leak Check Post-test: Pass?
+ ___ Y ___ N	+ ___ Y ___ N
- ___ Y ___ N	- ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser			Pump Vacuum (in. Hg)
	85	425.60	N/A	0.40	N/A	499	503	53	113	96	175			2
	90	427.63		0.40		499	503	54	113	97	175			2
	95	429.65		0.40		499	501	53	113	98	175			2
	100	431.67		0.40		499	502	54	113	97	175			2
	105	433.70		0.40		498	502	54	114	97	175			2
	110	435.72		0.40		499	501	55	114	97	175			2
	115	437.75		0.40		498	503	54	114	97	175			2
1415	120	439.763												

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before					
	After					
Port:	Before					
	After					

Comments: *(Test Location Schematic may be drawn here, unless a separate sheet is used.)*

NA = Not Applicable

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Page 1 of 2

Project No.	182346
Client	APS
Facility	4-Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	3

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p
N/A		glass	9	N/A	

DGM - Meter Box: Meter Box No.	ΔH @	DGMCF or Y
610204	1.665	1.0058

Impinger Contents (grams)

Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				

Impinger Box Number: Total:

Recovery Date: Recovered by: RS

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	—
K Factor	N/A
Barometric Pressure (in. Hg)	24.78
Filter No.	N/A
Assumed Moisture (%)	—
Ambient Temp. (°F)	85
Static Pressure (in. H_2O)	N/A
Probe Setting (°F)	500

Pitot Tube Leak Checks

Pitot Leak Check Pre-test: Pass?	Pitot Leak Check Post-test: Pass?
+ ___ Y ___ N	+ ___ Y ___ N
− ___ Y ___ N	− ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft³)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser		Pump Vacuum (in. Hg)
Single Pt.	1430	439.935	N/A	0.40	N/A	504	505	65	102	97	170		2
	5	441.90		0.40		500	502	57	109	97	176		2
	10	444.05		0.40		499	502	57	110	97	175		2
	15	446.10		0.40		497	501	57	111	97	175		2
	20	448.14		0.40		495	500	57	112	97	175		2
	25	450.20		0.40		498	502	57	113	97	175		2
	30	452.22		0.40		499	502	57	113	97	175		2
	35	454.24		0.40		498	501	57	114	97	175		2
	40	456.26		0.40		499	500	57	114	97	175		2
	45	458.28		0.40		498	502	58	114	98	175		2
	50	460.30		0.40		499	501	58	114	98	175		2
	55	462.32		0.40		499	502	58	115	98	175		2
	60	464.35		0.40		500	500	59	115	98	175		2
	65	466.37		0.40		498	501	58	115	98	175		2
	70	468.39		0.40		499	501	58	115	98	175		2
	75	470.41		0.40		499	502	59	115	99	175		2
	80	472.38		0.40		500	501	59	115	99	175		2

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft³) Start	Volume (ft³) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	15	0.000
	After			60	15	0.000
Port:	Before					
	After					

Comments: (Test Location Schematic may be drawn here, unless a separate sheet is used.)

CO_2 = 12.8

O_2 = 6.1

NA = Not Applicable

Rev. 1a (10-1-2008)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346
Client	APS
Facility	4 Corners
Source	Unit 5
Sampling Location	Stack
Condition	Base
Run No.	3

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	Pitot Tube ID No.	Pitot Tube PTCF / C_p

DGM - Meter Box: Meter Box No.	ΔH@	DGMCF or Y

Impinger Contents (grams)

Impinger	Contents	Final	Initial	Net
1				
2				
3				
4				
5				
Silica Gel				

Impinger Box Number: Total:

Recovery Date: Recovered by: RS

Date	9-30-11
Operator	[illegible]
Stack Diameter (in)	K Factor
Barometric Pressure (in. Hg)	Filter No.
Assumed Moisture (%)	Ambient Temp. (°F)
Static Pressure (in. H_2O)	Probe Setting (°F)

Pitot Tube Leak Checks

Pitot Leak Check Pre-test: Pass?	Pitot Leak Check Post-test: Pass?
+ ___ Y ___ N	+ ___ Y ___ N
- ___ Y ___ N	- ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser		Pump Vacuum (in. Hg)
Single Pt.	85	474.42	N/A	0.40	N/A	499	500	59	116	99	175		2
	90	476.45		0.40		498	498	59	116	99	175		2
	95	478.48		0.40		499	499	59	116	99	175		2
	100	480.52		0.40		500	498	59	116	99	175		2
	105	482.55		0.40		498	498	60	116	99	175		2
	110	484.54		0.40		498	500	59	116	99	175		2
	115	486.56		0.40		498	498	60	116	99	175		2
End	120	488.585											
End Time	1630												

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before					
	After					
Port:	Before					
	After					

Comments: *(Test Location Schematic may be drawn here, unless a separate sheet is used.)*

NA = Not Applicable

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

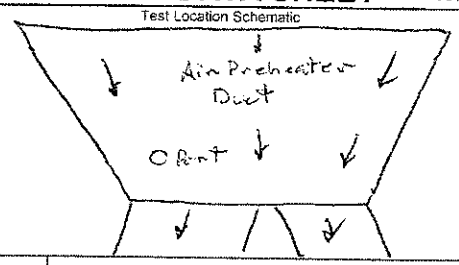
TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346
Client	APS
Facility	Four Corners
Source	Boiler Unit #5
Sampling Location	Air Preheater Duct Outlet
Condition	Normal
Run No.	1

Test Location Schematic



Date	9.30.11		
Operator	JSH		
Stack Diameter (in)	—	K Factor	NA
Barometric Pressure (in. Hg)	24.84	Filter No.	NA
Assumed Moisture (%)	—	Ambient Temp. (°F)	70
Static Pressure (in. H_2O)	NA	Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No	ΔH @	DGMCF	ID No.	PTCF / C_p	Pitot Tube Pitot Leak Check Post-test: Pass?	Pitot Leak Check Pre-test: Pass?
	NA	Q	9	90598	1.726	1.015	NA		NA	NA

Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser Temp		Pump Vacuum (in. Hg)
10:30 *		908.9	NA	1.80A	NA	465	464	68	85	77	165		2.4"
	5	911.83		1.80A		498	461	67	88	78	185		2"
	10	915.839		1.80A		499	465	65	89	80	184		2"
	15	919.739		1.80A		495	464	65	90	81	182		2"
	20	921.679		0.4		495	456	65	89	81	176		2"
	25	923.603		0.4		495	461	65	89	83	174		2"
	30	925.494		0.4		495	466	64	90	83	174		2.5"
	35	927.371		0.4		496	471	65	90	84	173		2.5"
	40			0.4		496	473	65	91	84	173		2.5"
	45	931.175		0.4		495	470	63	91	86	164		2.5"
	50	933.082		0.4		495	465	56	92	86	166		2.5"
	55	935.0		0.4		495	468	54	93	87	167		2.5"
11:30 End		936.917											
Time	60 min			0.4									

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before	908.549	908.852	60	15"	0.007
	After	936.96	936.963	60	6"	0.003
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

Single point

CO_2 = —

O_2 = 6.5

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET Method: 8A

Project No.	182346
Client	APS
Facility	Four Corners
Source	Unit 5
Sampling Location	Air Preheater Duct Outlet
Condition	Normal
Run No	2

Test Location Schematic

Section 1

Date	9.30.11
Operator	JSH
Stack Diameter (in)	—
K Factor	NA
Barometric Pressure (in. Hg)	24.84
Filter No.	NA
Assumed Moisture (%)	NA
Ambient Temp. (°F)	80
Static Pressure (in. H_2O)	NA
Probe Setting (°F)	500°

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No.	ΔH@	DGMCF or Qs	Pitot Tube ID No.	PTCF / C_p	Pitot Leak Check Post-test. Pass?	Pitot Leak Check Pre-test Pass?
	NA	Q	9	90598	1.726	1.015	NA	NA	+ ___ Y ___ N / − ___ Y ___ N	NA + ___ Y ___ N / − ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Conversion Temp °F		Pump Vacuum (in. Hg)
1200 *		937.2	NA	0.4	NA	497	452	60	96	89	168		4"
	5	939.35		0.4		495	461	54	97	90	165		4"
	10	941.3		0.4		496	471	54	98	90	169		4.5"
	15	943.261		0.4		496	475	54	99	92	171		5"
	20	945.198		0.4		495	478	54	101	92	171		5"
	25	947.158		0.4		495	476	54	101	93	172		5"
	30	949.09		0.4		495	470	56	101	94	171		5"
	35	951.095		0.4		495	471	56	101	95	171		5.5"
	40	953.0		0.4		495	467	57	102	95	171		6"
	45	954.941		0.4		495	467	57	102	96	172		6"
	50	956.908		0.4		495	468	57	102	96	171		6"
	55	958.877		0.4		495	464	58	102	97	172		6"
1300 END		960.844											
T-Avg	60 min												

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before	937.212	937.22	60	15"	0.01
	After	960.9	960.905	60	7" ~~15"~~	0.005
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

Single Point

CO_2 = 12.78

O_2 = 6.44

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method: 8A

Project No.	182346
Client	APS
Facility	Four Corners NM
Source	Unit 5 Boiler
Sampling Location	Air Preheater Duct outlet
Condition	Normal
Run No.	3

Test Location Schematic: See Run 1

Date	9.30.11
Operator	JH
Stack Diameter (in)	
K Factor	NA
Barometric Pressure (in. Hg)	24.84
Filter No.	NA
Assumed Moisture (%)	NA
Ambient Temp. (°F)	80
Static Pressure (in. H_2O)	NA
Probe Setting (°F)	500°

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No.	ΔH@	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p	Pitot Leak Check Post-test: Pass?	Pitot Leak Check Pre-test: Pass?
NA	NA	Q	9	90598	1.726	1.015	NA	NA	+ ___ Y ___ N / − ___ Y ___ N NA	+ ___ Y ___ N / − ___ Y ___ N

	Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Condenser Temp °F		Pump Vacuum (in. Hg)
1315	*		961.200	NA	0.4	NA	496	464	66	105	98	165		3.5"
		5	963.140	NA	0.4	NA	495	458	61	105	99	169		4"
		10	964.917	NA	0.4	NA	495	456	61	106	99	170		4
		15	966.751	NA	0.40	NA	495	456	60	106	100	173		4
		20	968.685	NA	0.40	NA	495	458	60	105	100	173		4
		25	970.258	NA	.040	NA	495	458	62	104	101	173		5
		30	972.442	NA	0.40	NA	495	467	61	104	101	174		5
		35	974.396	NA	0.40	NA	495	456	61	105	100	174		5
		40	976.258	NA	0.40	NA	495	458	62	105	100	173		5
		45	978.187	NA	0.40	NA	495	462	63	102	101	173		5
		50	979.997	NA	0.40	NA	495	465	64	102	100	173		5
		55	981.882	NA	0.40	NA	494	465	64	100	99	176		5
1415	END	60	983.692											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before	961.060	961.065	60	15"	0.005
	After					
Port:	Before					
	After					
Port:	Before					
	After	983.750	983.751	60	8	0.001

Comments:

* Single Point

CO_2 = 12.8

O_2 = 6.5

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Page 1 of 1

Project No.	182346
Client	AFS
Facility	4C
Source	Unit 5 APH Inlet
Sampling Location	APH Inlet
Condition	Base Load
Run No.	1

Test Location Schematic

Date	9/30/11		
Operator	RS		
Stack Diameter (in)	—	K Factor	—
Barometric Pressure (in. Hg)	24.87	Filter No.	—
Assumed Moisture (%)	—	Ambient Temp. (°F)	90
Static Pressure (in. H_2O)	—	Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No.	DGM - Meter Box ΔH @	DGM - Meter Box DGMCF or Y	Pitot Tube ID No.	Pitot Tube PTCF / C_p	Pitot Leak Check Post-test: Pass?	Pitot Leak Check Pre-test: Pass?
—	—	QTZ	9	610203	1.595	9887	—	—	N/A + Y N / − Y N	+ Y N / − Y N

	Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	~~Impingers~~ CO_2 Exit	DGM Meter In	DGM Meter Out	Impinger Exit		Pump Vacuum (in. Hg)
1030	1	0	297.625	N/A	0.40	N/A	500	440	179	78	75	64		0
		5	299.99				500	440	178	78	76	66		0
		10	301.80				500	440	179	78	76	67		0
		15	303.7				500	444	180	80	76	62		0
		20	305.74				500	442	178	82	76	56		0
		25	307.64				500	443	179	84	76	55		0
		30	309.7				500	445	176	85	77	54		0
		35	311.65				500	445	178	85	78	55		0
		40	313.6				500	444	178	85	78	57		0 1
		45	315.54				500	442	177	85	79	57		0 1
		50	317.54				500	440	178	85	79	59		1
		55	319.55											
1130		60	321.57											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	20	0
	After			60	20	0
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

O_2 =

CO_2 = 6.06

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No.	182346
Client	APS
Facility	4C
Source	Unit 5 APH Inlet
Sampling Location	APH inlet
Condition	Base Load
Run No.	2
Test Location Schematic	
Date	9/30/11
Operator	RS
Stack Diameter (in)	—
K Factor	—
Barometric Pressure (in. Hg)	24.87
Filter No.	—
Assumed Moisture (%)	—
Ambient Temp. (°F)	90
Static Pressure (in. H_2O)	—
Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No.	ΔH@	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p	Pitot Leak Check Post test: Pass?	Pitot Leak Check Pre-test: Pass?
—	—	QTZ	9	610203	1.595	.9887	—	—	+ ___ Y ___ N / - ___ Y ___ N	+ ___ Y ___ N / - ___ Y ___ N

	Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pilot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	~~Cyclone~~ Exit	DGM Meter In	DGM Meter Out	Impinger Exit		Pump Vacuum (in. Hg)
1203	1	0	324.661	N/A	0.40	N/A	500	440	175	79	76	64		1
		5	326.66				500	440	175	79	77	64		1
		10	328.6				500	441	175	82	75	62		1
		15	330.662				499	441	175	82	75	62		1
		20	332.61				500	439	175	82	75	62		1
		25	334.59				499	440	175	85	76	62		1
		30	336.6				499	442	175	85	76	62		1
		35	338.5				497	444	178	85	76	62		1
		40	340.5				497	446	177	85	75	66		1
		45	342.4				495	441	177	84	75	65		1
		50	344.4				495	442	175	84	75	64		1
		55	346.42				495	441	175	84	75	64		1
1303		60	348.21											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before			60	20	0
	After			60	18	0
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

CEMS = 3.2% O_2 wet

O_2 = 6.06

CO_2 = 13.07

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No.	182346
Client	APS
Facility	4C
Source	Units APH Inlet
Sampling Location	APH Inlet
Condition	Base Load
Run No.	3
Test Location Schematic	
Date	9/30/11
Operator	RS
Stack Diameter (in)	—
K Factor	—
Barometric Pressure (in. Hg)	
Filter No.	—
Assumed Moisture (%)	—
Ambient Temp. (°F)	90
Static Pressure (in. H_2O)	—
Probe Setting (°F)	500

Nozzle ID No.	Nozzle Diameter (in.)	Probe Liner Material	Probe Length (ft)	DGM - Meter Box Meter No.	ΔH@	DGMCF or Y	Pitot Tube ID No.	PTCF / C_p	Pitot Leak Check	Pitot Leak Check
—	—	QTZ	9	610203	1.595	.9887	—	—	+ ___ Y ___ N Post-test. Pass? ___ Y ___ N	+ ___ Y ___ N ~~Pre-test. Pass?~~ ___ Y ___ N

Traverse Point	Time (24 hr)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH (in. H_2O)	Temperature (°F) Stack Flue Gas	Probe	Filter Box	~~Impingers~~ Cond Exit	DGM Meter In	DGM Meter Out	Impinger Exit		Pump Vacuum (in. Hg)
B:201	0	352.37	N/A	0.4	N/A	500	440	185	83	76	64		1
	5	354.4				499	439	184	83	76	65		1
Start 1320	10	356.4				497	441	183	84	76	65		1
	15	358.5				495	439	186	84	76	65		2
	20	360.4				491	437	185	84	75	64		2
	25	362.3				490	440	180	84	75	64		3
	30	364.2				485	437	185	85	75	64		3
	35	366.089				473	436	184	85	77	64		4
	40	368.042				473	432	182	84	76	65		4
	45	370.212				472	430	181	86	77	65		4
	50	372.012				473	429	183	85	77	65		5
	55	373.98				473	436	184	84	72	65		5
14:20	60	375.951											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Pre	Before			60	20	0
	After			60	20	0
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

O_2 = 5.9

CO_2 = 13.25

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 11/4/11 (Project Manager or QA Manager - sign and date)

APPENDIX B– EXAMPLE CALCULATIONS

Example Calculations

SO_3 Emission Rates

Example for Run: **Unit 2 Run 3**

Observed Measurements:		Constants/Conversions/Standards:	
0.1	C_{SO3}, corrected SO_3 concentration (ppm)	385.3	ideal gas constant @ EPA STP (68 OF and 29.92 "Hg); (scf / lb-mol)
8.07	C_{O2}, corrected O2 concentration (%)	80.07	Molecular weight of SO_3 (lb/lb-mol)
2.77E+07	Qd, stack exhaust flow rate (DSCFH)	29.92	EPA STP (" Hg); P_{ref}
170.9	MWHr	454	conversion, grams per pound
1894	MMBTU/Hr		

SO_3 density factor, SO_3

$$= \frac{80.07 \text{ lb/lb-mol}}{385.3 \text{ scf/lb-mol}} \times 10^{-6}$$

$$= 2.08\text{E-}07 \text{ lb/scf}$$

SO_3 mass emission rate (lb/hr), $E_{SO3\ (lb/hr)}$

$$= C_{SO3} \times Qd \times D_{SO3}$$

$$= 0.09 \times 2.77\text{E+}07 \times 2.08\text{E-}07$$

$$= \mathbf{0.54 \text{ lbs/hr}}$$

SO_3 mass emission rate (lb/MMBtu)

$$= \frac{SO_3 \text{ (lb/hr)}}{\text{MMBTU/hr}}$$

$$= \frac{0.5360}{1894.10}$$

$$= \mathbf{0.0002830 \text{ lbs/MMBtu}}$$

SO_3 mass emission rate (lb/MWHr)

$$= \frac{SO_3 \text{ (lb/hr)}}{\text{MW-hr}}$$

$$= \frac{0.54}{170.9}$$

$$= \mathbf{0.0031 \text{ lb/MW-hr}}$$

Values may differ from Summary Tables due to rounding and truncation.

Example Calculations

Corrected Emission Concentrations (Equation 7E-5)

Refers to Test Run: Unit 2 Run 1

C_X	=	raw concentration of component
C_O	=	average of initial and final zero bias checks
C_M	=	average of intial and final span bias checks
C_{MA}	=	actual concentration of upscale calibration gas

(Eq. 7E-1) $$Cx_{Corrected} = C_X - C_O * \frac{C_{MA}}{C_M - C_O}$$

Oxygen

C_{O2}	7.97	%
C_O	0.03	%
C_M	9.86	%
C_{MA}	9.99	%

$$C_{O2} = 7.97 - 0.03 * \frac{9.99}{9.86 - 0.03}$$

$$\mathbf{C_{O2} = 8.07\ \%}$$

EXAMPLE CALCULATIONS

Observed Data

154	=	SO_3 (µg) from analyses
80.07	=	Molecular Weight of SO_3 (gr/gmole)
24.04	=	Volume of Gas per mol (US EPA) (l/gmol)
17.57	=	Volume of Gas collected during run (SCFH)
1000000	=	Conversion from µg to gr
1000000	=	Conversion from µl to l
28.3	=	Conversion from SCF to l

Example Calculations for Unit 2 Run 3

SO_3 (ppmv) Calculation

$$\text{Conc. } SO_3 \text{ (ppmv)} = \frac{\text{Conc } SO_3 \text{ (ug)} \times \text{Volume of Gas per mol (l/gmol)} \times \text{Conversion from µg to g}}{\text{Molecular Weight of } SO_3 \text{ (gr/gmol)} \times \text{Volume of Gas Collected (SCFH)} \times \text{Conversion from l to SCFH} \times \text{Conversion from µl to l}}$$

$$= \frac{154 \times 24.04 \times 1000000}{80.07 \times 17.57 \times 28.3 \times 1000000}$$

$$= \mathbf{0.09301} \text{ (ppmv)}$$

Values may differ from Summary Tabes due to rounding and truncation.

EXAMPLE CALCULATIONS:

Arizona Public Service
Fruitland, New Mexico
Technicians: TJS, BJM
Project Number: 182436.0000.0000
Example calculations for Test Run: Unit 2 Run 3

Stack Gas Moisture

Observed Measurements:

Dry Gas Meter Correction Factor (Kd) =	0.992
Barometric Pressure (Pm) =	24.20
Average Temperature of Dry Gas meter =	72.7

Impinger Weight Gain [IWG]:

	3459.9	Ending Impinger Wt. (g)
	–3414.9	Beginning Impinger Wt. (g)
=	**45.0**	**(g)**

Net Volume Sampled [NVS]:

	815.77	Ending Meter Reading (ft3)
	–801.81	Beginning Meter Reading (ft3)
=	**13.96**	**(ft3)**

Volume Metered [Vm]:

	NVS	x	Kd
	13.96	x	0.9923
=	**13.85**	**(ft3)**	

Average Temperature [Tm]:

	460	+	72.7 (°F)
=	**532.7**	**(°R)**	

Moisture Fraction:

$$\frac{(\text{IWG (g)}) \times \left(1.335 \frac{\text{liters}}{\text{(g) H2O}}\right)}{\left(\text{IWG (g)} \times 1.335 \frac{\text{liters}}{\text{(g) H2O}}\right) + \left(\frac{\text{Vm}}{\text{Tm}}\right) \times \left(\text{Pm}\right) \times \left(499.4 \frac{\text{liters °R}}{\text{ft3 in. Hg}}\right)}$$

$$\frac{(45.0) \times \left(1.335 \frac{\text{liters}}{\text{(g) H2O}}\right)}{\left(45.0 \times 1.335 \frac{\text{liters}}{\text{(g) H2O}}\right) + \left(\frac{13.85}{532.7}\right) \times \left(24.2\right) \times \left(499.4 \frac{\text{liters °R}}{\text{ft3 in. Hg}}\right)}$$

= **0.1605** or **16.05%** **Moisture**

Dry Fraction:

	1 –	Moisture Fraction
	1 –	0.1604601
=	**0.840**	

APPENDIX C – QUALITY ASSURANCE ACTIVITIES

Meter Box: Orifice Full Calibration

Date:	4/13/2011
Prev. Calib. Date:	12/9/2010
Location:	Littleton Lab
Technician:	JDG
Meter Serial No:	90394
TRC Meter Box ID	90394
Atm. Pressure (corr. In Hg):	24.18 uncorrected: 24.30
Critical Vacuum in Hg:	11 in. Hg. (required minimum)
Prev. Calib Factor (Y):	1.0028

Reference Orifice Set		Orifice (#)	K' Factor
Manufacturer:	Apex Instruments	40	0.2336
Model:	CI, VI	48	0.3435
Tested By:	EW	55	0.4575
		63	0.5861
		73	0.8085

Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Initial Temperatures Inlet (deg F)	Initial Temperatures Outlet (deg F)	Final Temperatures Inlet (deg F)	Final Temperatures Outlet (deg F)	Vacuum (in Hg)	Ambient Temperatures Initial (deg F)	Ambient Temperatures Final (deg F)
40	0.2336	0.20	18	687.117	692.597	5.48	70	70	70	70	16	69	70
48	0.3435	0.47	13	692.597	698.419	5.822	70	70	70	71	15	70	70
55	0.4575	0.87	9	698.419	703.800	5.381	71	71	71	71	14	70	70
63	0.5861	1.50	10	703.800	711.461	7.661	71	71	72	72	12	70	70
73	0.8085	2.85	7	711.461	718.785	7.324	72	72	72	72	10	70	70

Meter Box Dry Gas Meter: Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Critical Orifice: Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Dry Gas Meter Calibration Factor (Y): Value (#)	Variation (#)	Orifice Calibration Factor (dH@): Value (in H2O)	Variation (in H2O)
4.41	124.94	0.304	4.42	125.10	1.001	0.001	1.49	-0.18
4.69	132.79	0.448	4.69	132.80	1.000	0.000	1.628	-0.05
4.33	122.71	0.598	4.32	122.45	0.998	-0.002	1.695	0.02
6.18	174.87	0.766	6.16	174.29	0.997	-0.003	1.783	0.11
5.92	167.70	1.046	5.94	168.30	1.004	0.004	1.789	0.11

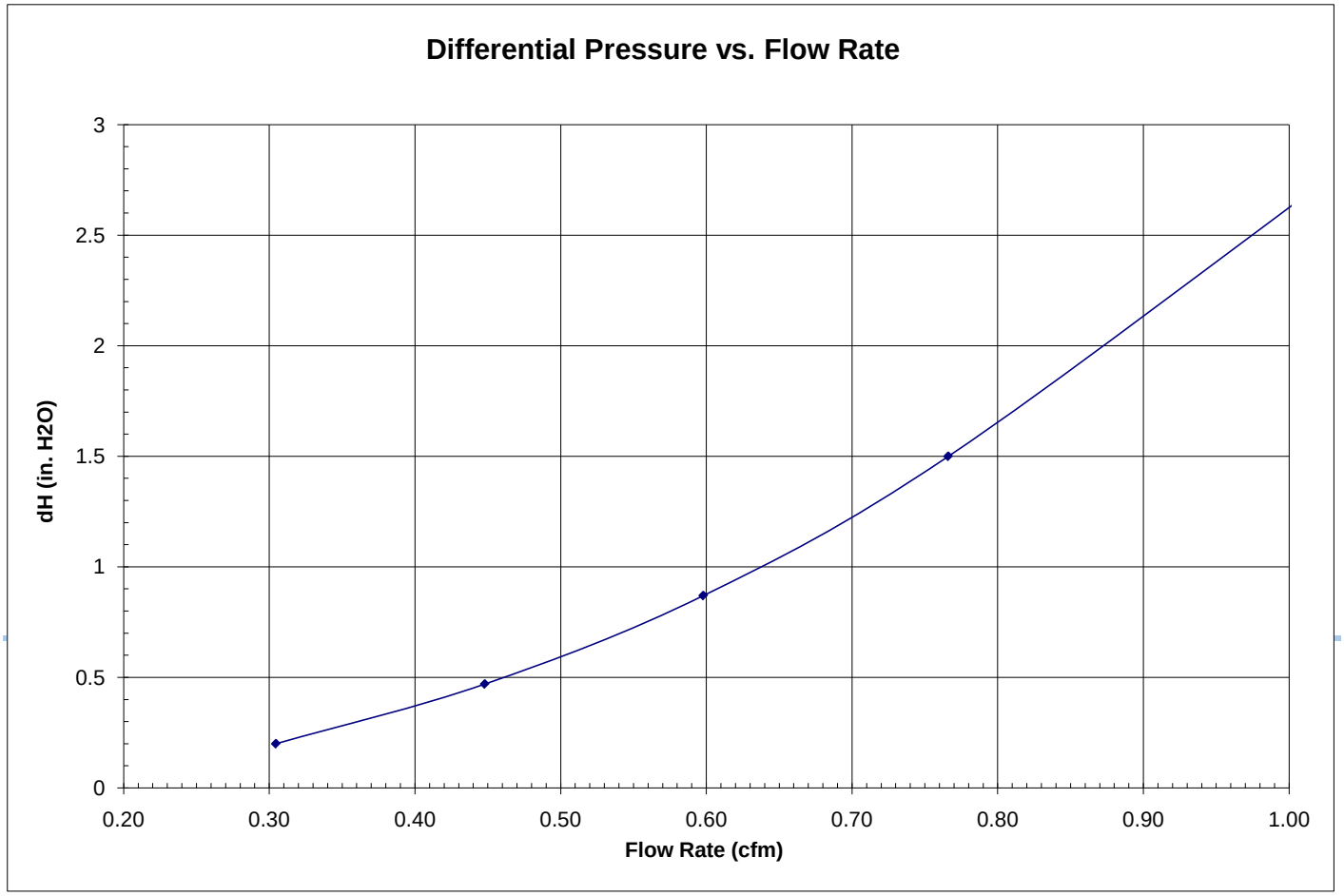
Meter Box

Calibration Test Results		**Pass/Fail**
*** Average Y:**	**0.9999**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.678**	***PASS***

Criteria:

* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.

** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Meter Box: Orifice Full Calibration

Date:	12/9/2010
Prev. Calib. Date:	6/4/10
Location:	Littleton Lab
Technician:	JDG
Meter Serial No:	90394
TRC Meter Box ID	90394
Atm. Pressure (corr. In Hg):	24.14 uncorrected: 24.27
Critical Vacuum in Hg:	11 in. Hg. (required minimum)
Prev. Calib Factor (Y):	0.9953

Reference Orifice Set		Orifice (#)	K' Factor
Manufacturer:	Apex Instruments	40	0.2336
Model:	CI, VI	48	0.3435
Tested By:	EW	55	0.4575
		63	0.5861
		73	0.8085

Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Initial Temperatures Inlet (deg F)	Initial Temperatures Outlet (deg F)	Final Temperatures Inlet (deg F)	Final Temperatures Outlet (deg F)	Vacuum (in Hg)	Ambient Temperatures Initial (deg F)	Ambient Temperatures Final (deg F)
40	0.2336	0.20	25	251.200	258.788	7.588	73	69	71	72	16	71	71
48	0.3435	0.47	14	258.800	265.066	6.266	71	72	72	73	15	71	71
55	0.4575	0.87	10	265.100	271.065	5.965	71	73	72	73	13	71	71
63	0.5861	1.50	7	271.100	276.440	5.34	71	73	72	73	12	71	71
73	0.8085	2.85	5	277.200	282.437	5.237	72	73	72	73	10	71	71

Meter Box Dry Gas Meter: Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Critical Orifice: Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Dry Gas Meter Calibration Factor (Y): Value (#)	Variation (#)	Orifice Calibration Factor (dH@): Value (in H2O)	Variation (in H2O)
6.09	172.37	0.304	6.12	173.28	1.005	0.002	1.50	-0.18
5.02	142.26	0.448	5.04	142.68	1.003	0.000	1.623	-0.06
4.79	135.52	0.596	4.79	135.74	1.002	-0.001	1.695	0.02
4.29	121.56	0.763	4.30	121.73	1.001	-0.001	1.788	0.11
4.23	119.64	1.047	4.24	119.94	1.003	0.000	1.797	0.12

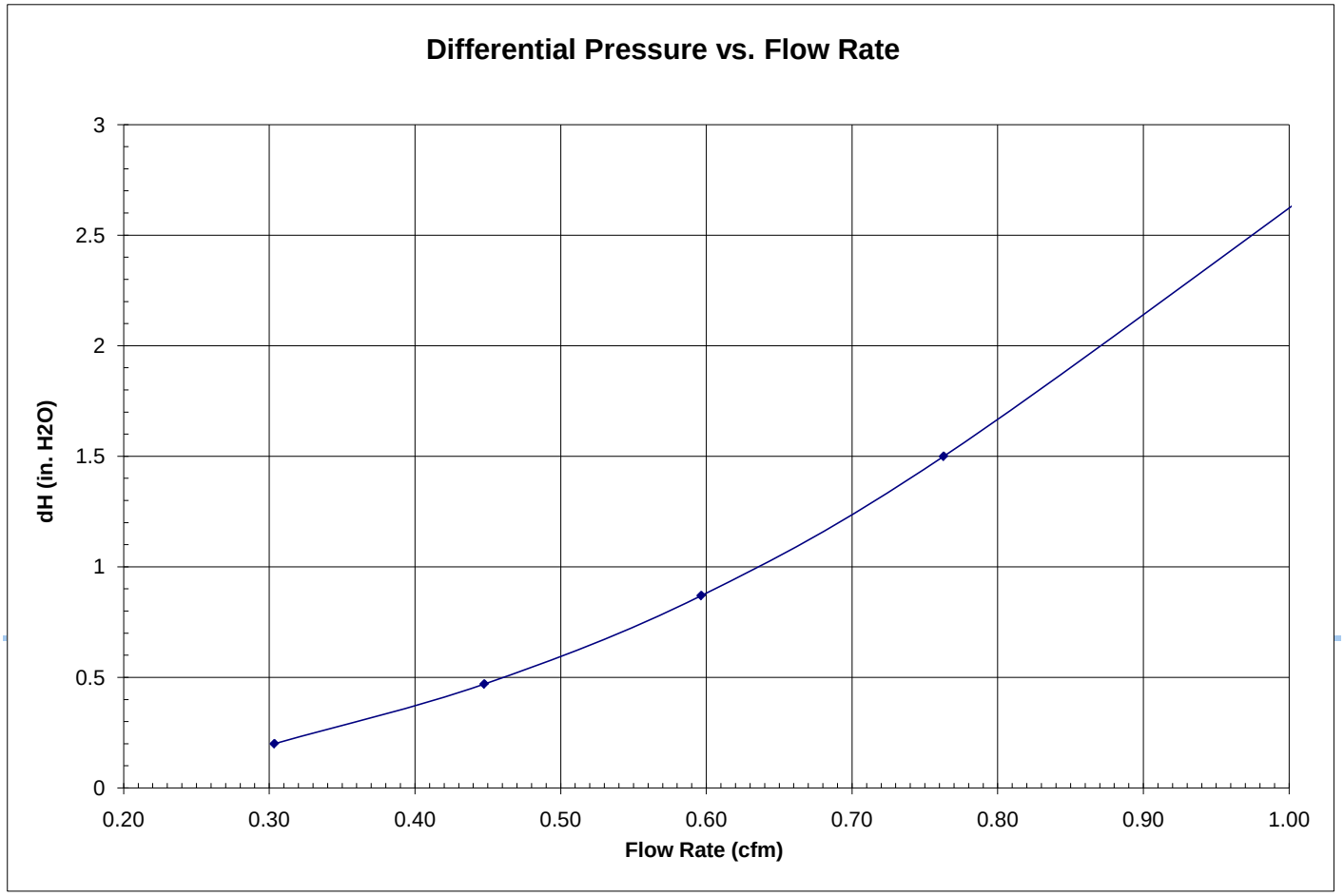
Meter Box

Calibration Test Results		**Pass/Fail**
*** Average Y:**	**1.0028**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.680**	***PASS***

Criteria:

* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.

** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Dry Gas Meter Calibration

WORKING METER

Date:	4/13/2011		
Location:	Littleton Lab		
Technician:	JDG		
Meter Serial No:	9215		
TRC DGM ID	9215		
Prev. Calib Factor (Y):	0.9972		
P bar (in Hg)	**uncorrected:**	24.300	**24.358**

REFERENCE METER

Calibration Date:	11/3/2010
Location:	Austin Texas Lab
Technician:	KRH
Meter Serial No:	56048
TRC DGM ID	56048
Calib. Factor (Y):	0.9650

REFERENCE METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)
1	8	69	70	729.266	732.433	3.056	0.3820	2.443
2	8	70	70	732.433	735.601	3.057	0.3821	2.442
3	10	70	70	735.601	739.529	3.791	0.3791	3.028
4	13	70	70	739.529	744.926	5.208	0.4006	4.160
5	17	70	70	744.926	750.654	5.528	0.3251	4.415

WORKING METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)	**Calculated** DGM Factor (Y)
1	8	69	70	824.486	827.542	3.056	0.382	2.443	1.0001
2	8	70	70	827.542	830.678	3.136	0.392	2.505	0.9748
3	10	70	70	830.628	834.436	3.808	0.381	3.042	0.9954
4	13	70	70	834.436	839.700	5.264	0.405	4.205	0.9894
5	17	70	70	839.700	845.281	5.581	0.328	4.458	0.9904

Dry Gas Meter (DGM Factor) Calibration Test Results

*** Average Y: 0.9900**

Ave. Y between 0.95 and 1.05:	*PASS*
Ind. Y values +/- 0.02 from Ave.:	*PASS*
Ave. Y w/in 5% of previous value:	*YES*

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.

JDG

Dry Gas Meter Calibration

WORKING METER

Date:	12/7/2010		
Location:	Littleton Lab		
Technician:	JAW		
Meter Serial No:	9215		
TRC DGM ID	9215		
Prev. Calib Factor (Y):	1.0160		
P bar (in Hg)	**uncorrected:**	24.510	**24.570**

REFERENCE METER

Calibration Date:	11/3/2010
Location:	Austin Texas Lab
Technician:	KRH
Meter Serial No:	56048
TRC DGM ID	56048
Calib. Factor (Y):	0.9650

REFERENCE METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)
1	8	69	71	437.565	445.109	7.280	0.9100	5.865
2	8	70	71	445.109	452.370	7.007	0.8759	5.640
3	10	70	70	452.370	458.662	6.072	0.6072	4.892
4	13	70	69	458.662	464.359	5.498	0.4229	4.433
5	17	69	72	464.359	469.670	5.125	0.3015	4.125

WORKING METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)	**Calculated** DGM Factor (Y)
1	8	69	72	337.182	344.513	7.331	0.916	5.901	0.9940
2	8	71	74	344.513	351.563	7.050	0.881	5.653	0.9976
3	10	72	74	351.563	357.685	6.122	0.612	4.905	0.9974
4	13	72	75	357.685	363.244	5.559	0.428	4.449	0.9964
5	17	74	75	363.244	368.406	5.162	0.304	4.124	1.0003

Dry Gas Meter (DGM Factor) Calibration Test Results

*** Average Y: 0.9972**

Ave. Y between 0.95 and 1.05:	*PASS*
Ind. Y values +/- 0.02 from Ave.:	*PASS*
Ave. Y w/in 5% of previous value:	*YES*

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.

JAW

Barometer Calibration Check

Date:	4/1/2010
Location:	TRC Littleton Lab
Technician:	JAW
Manufacturer:	VWR
Type:	Digital
Units:	in Hg
Lab Assignment.:	90995419

Lab Standard Barometer

Manufacturer:	Princo
Type:	Fortin Type Mercurial
Units:	in. Hg and mm Hg
ID Number:	NOVA 453x

Laboratory Standard Barometer

Uncorrected (Observed) Lab Barometer Reading	24.46	in. Hg
Temperature of Lab Barometer	69	°F
Temperature Correction (+ or -)	-0.089	unitless
Lattitude Correction (+ or -)	-0.013	unitless
Temperature Corrected Laboratory Barometer Reading	24.371	in. Hg
Temperature & Latitude Corrected Laboratory Barometer Re	**24.358**	in. Hg
Corrected Laboaratory Barometer Reading	619	mm Hg
Corrected Laboaratory Barometer Reading	825	mb
Corrected Laboaratory Barometer Reading	5551	ft

Digital Barometer

Field Barometer Reading (temperature compensated)	**24.38**	in. Hg

Calibration Test Results

*Difference (in Hg)	**-0.022**
Pass/Fail	*PASS*

Acceptance Criteria

Agreement within 0.1 in. Hg or 2.5 mm Hg.

Dry Gas Meter Calibration

WORKING METER

Date:	4/13/11		
Location:	Littleton Lab		
Technician:	JDG		
Meter Serial No:	9215		
TRC DGM ID	9215		
Prev. Calib Factor (Y):	0.9972		
P bar (in Hg)	**uncorrected:**	24.300	**24.358**

REFERENCE METER

Calibration Date:	11/3/10
Location:	Austin Texas Lab
Technician:	KRH
Meter Serial No:	56048
TRC DGM ID	56048
Calib. Factor (Y):	0.9650

REFERENCE METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)
1	8	69	70	729.266	732.433	3.056	0.3820	2.443
2	8	70	70	732.433	735.601	3.057	0.3821	2.442
3	10	70	70	735.601	739.529	3.791	0.3791	3.028
4	13	70	70	739.529	744.926	5.208	0.4006	4.160
5	17	70	70	744.926	750.654	5.528	0.3251	4.415

WORKING METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)	**Calculated** DGM Factor (Y)
1	8	69	70	824.486	827.542	3.056	0.382	2.443	1.0001
2	8	70	70	827.542	830.678	3.136	0.392	2.505	0.9748
3	10	70	70	830.628	834.436	3.808	0.381	3.042	0.9954
4	13	70	70	834.436	839.700	5.264	0.405	4.205	0.9894
5	17	70	70	839.700	845.281	5.581	0.328	4.458	0.9904

Dry Gas Meter (DGM Factor) Calibration Test Results

*** Average Y: 0.9900**

Ave. Y between 0.95 and 1.05:	*PASS*
Ind. Y values +/- 0.02 from Ave.:	*PASS*
Ave. Y w/in 5% of previous value:	*YES*

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.

JDG

Dry Gas Meter Calibration

WORKING METER

Date:	12/7/10		
Location:	Littleton Lab		
Technician:	JAW		
Meter Serial No:	9215		
TRC DGM ID	9215		
Prev. Calib Factor (Y):	1.0160		
P bar (in Hg)	**uncorrected:**	24.510	**24.570**

REFERENCE METER

Calibration Date:	11/3/10
Location:	Austin Texas Lab
Technician:	KRH
Meter Serial No:	56048
TRC DGM ID	56048
Calib. Factor (Y):	0.9650

REFERENCE METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)
1	8	69	71	437.565	445.109	7.280	0.9100	5.865
2	8	70	71	445.109	452.370	7.007	0.8759	5.640
3	10	70	70	452.370	458.662	6.072	0.6072	4.892
4	13	70	69	458.662	464.359	5.498	0.4229	4.433
5	17	69	72	464.359	469.670	5.125	0.3015	4.125

WORKING METER

Calibration Run #	Time (min)	Start Temp (deg F)	Stop Temp (deg F)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Meter Rate (cu•ft /min)	**Corr. Vol @** EPA STP (cu ft)	**Calculated** DGM Factor (Y)
1	8	69	72	337.182	344.513	7.331	0.916	5.901	0.9940
2	8	71	74	344.513	351.563	7.050	0.881	5.653	0.9976
3	10	72	74	351.563	357.685	6.122	0.612	4.905	0.9974
4	13	72	75	357.685	363.244	5.559	0.428	4.449	0.9964
5	17	74	75	363.244	368.406	5.162	0.304	4.124	1.0003

Dry Gas Meter (DGM Factor) Calibration Test Results

*** Average Y: 0.9972**

Ave. Y between 0.95 and 1.05:	*PASS*
Ind. Y values +/- 0.02 from Ave.:	*PASS*
Ave. Y w/in 5% of previous value:	*YES*

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.

JAW

Meter Box: Orifice Full Calibration

Date: 7/7/2011
Prev. Calib. Date: 5/12/2011
Location: TRC Albuquerque
Technician: JCC
Meter Serial No: 997368
Meter Box ID: 610203
Atm. Pressure (corr. In Hg): 24.85
Critical Vacuum + 2 in Hg: 14 in. Hg. (required minimum)
Prev. Calib Factor (Y): 0.9815

Set Used: Brass

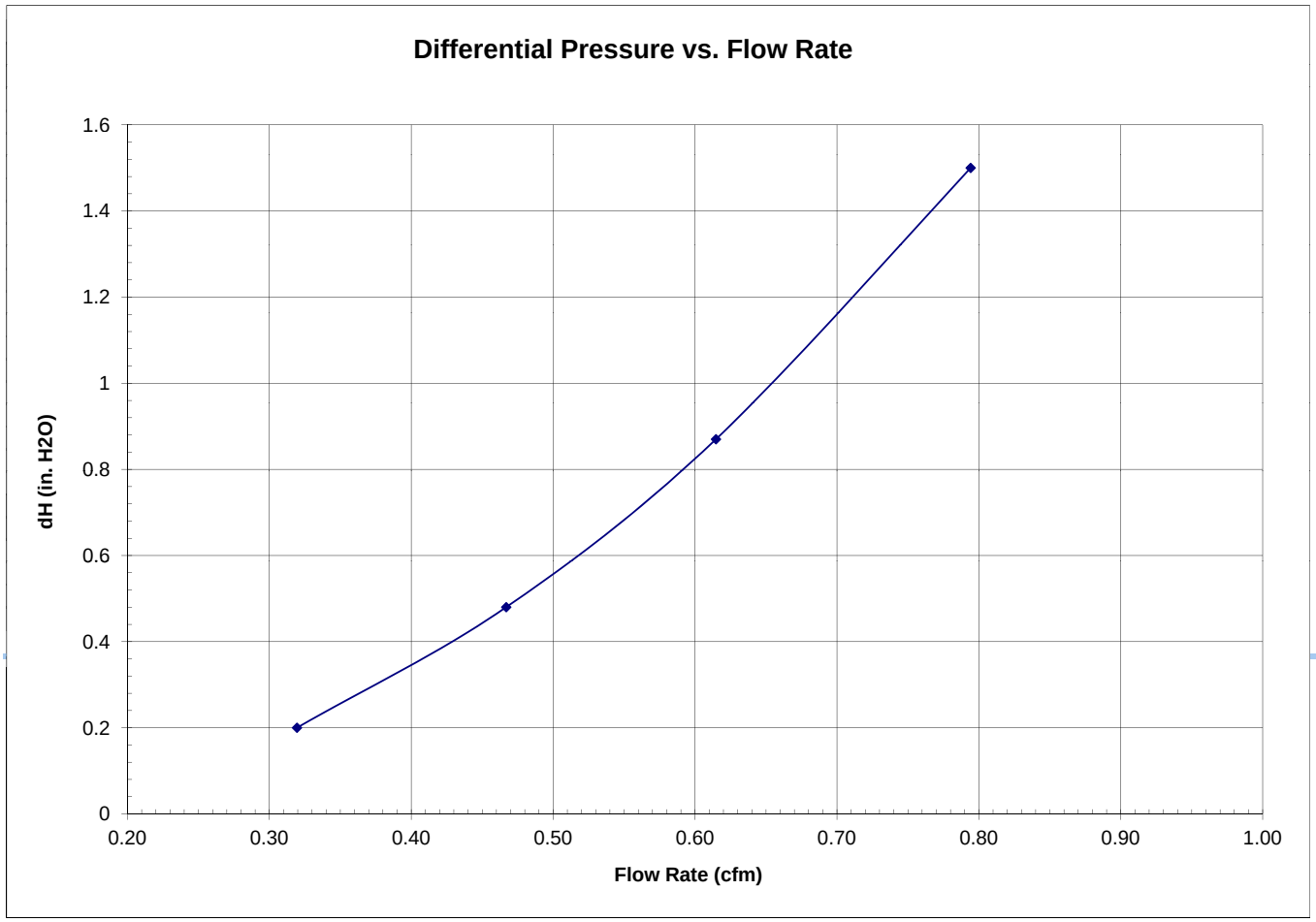
							Initial Temperatures		Final Temperatures			Ambient Temperatures	
Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)
40	0.2388	0.20	20.0	263.918	270.307	6.389	84	84	86	86	21.0	89	91
48	0.3515	0.48	21.0	270.307	280.112	9.805	87	87	89	88	20.0	91	91
55	0.4578	0.87	15.0	280.112	289.333	9.221	90	88	91	89	18.7	91	91
63	0.5940	1.50	10.0	289.333	297.275	7.942	91	90	92	90	17.5	91	91

Meter Box Dry Gas Meter			Critical Orifice		Dry Gas Meter Calibration Factor (Y)		Orifice Calibration Factor (dH@)	
Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Value (#)	Variation (#)	Value (in H2O)	Variation (in H2O)
5.14	145.60	0.319	5.06	143.30	0.984	-0.004	1.433	-0.16
7.86	222.51	0.467	7.81	221.28	0.994	0.006	1.574	-0.02
7.37	208.83	0.615	7.27	205.86	0.986	-0.003	1.670	0.07
6.35	179.79	0.794	6.29	178.07	0.990	0.002	1.705	0.11

Meter Box

Calibration Test Results		Pass/Fail
*** Average Y:**	**0.9887**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.595**	***PASS***

Criteria:
* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.
** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Meter Box: Orifice Full Calibration

Date: 7/8/2011
Prev. Calib. Date: 5/12/2011
Location: TRC Albuquerque
Technician: JCC
Meter Serial No: 978517
Meter Box ID: 610204
Atm. Pressure (corr. In Hg): 24.85
Critical Vacuum + 2 in Hg: 14 in. Hg. (required minimum)
Prev. Calib Factor (Y): 1.0058

Set Used: BRASS

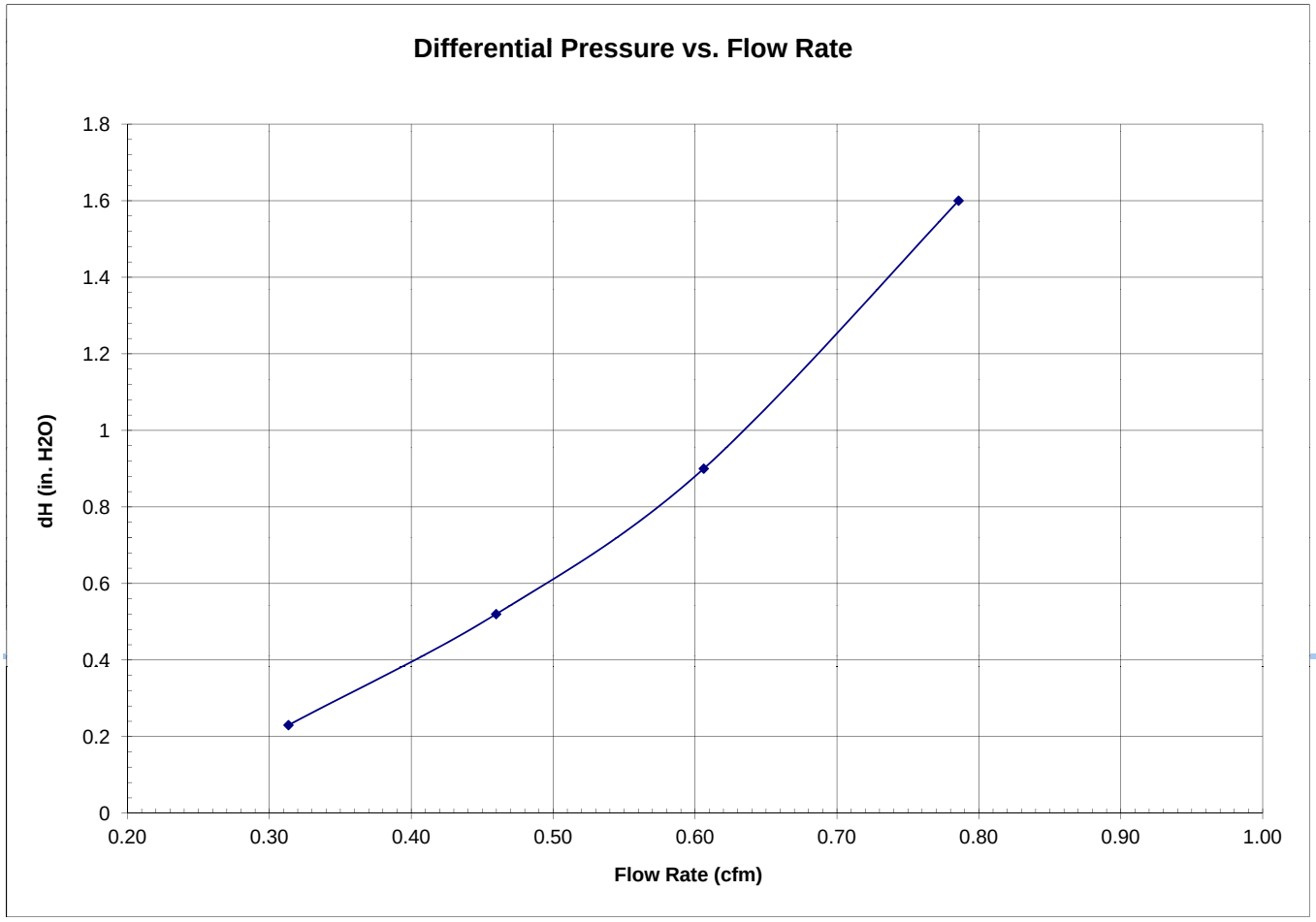
							Initial Temperatures		Final Temperatures			Ambient Temperatures	
Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)
40	0.2388	0.23	20.0	305.478	311.747	6.269	97	96	97	96	21.3	94	94
48	0.3515	0.52	21.0	311.747	321.403	9.656	97	96	98	97	20.0	94	95
55	0.4578	0.9	20.0	321.403	333.525	12.122	98	97	99	98	19.5	95	95
63	0.5940	1.6	10.0	333.525	341.382	7.857	99	98	100	98	18.0	95	96

Meter Box Dry Gas Meter			Critical Orifice		Dry Gas Meter Calibration Factor (Y)		Orifice Calibration Factor (dH@)	
Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Value (#)	Variation (#)	Value (in H2O)	Variation (in H2O)
4.94	139.93	0.313	5.04	142.79	1.020	0.004	1.582	-0.10
7.61	215.52	0.460	7.79	220.58	1.023	0.007	1.653	-0.02
9.55	270.38	0.606	9.66	273.48	1.011	-0.005	1.686	0.01
6.19	175.37	0.786	6.26	177.34	1.011	-0.005	1.786	0.11

Meter Box

Calibration Test Results		Pass/Fail
*** Average Y:**	**1.0167**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.677**	***PASS***

Criteria:
* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.
** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Meter Box: Orifice Full Calibration

Date: 7/8/2011
Prev. Calib. Date: 5/12/2011
Location: TRC Albuquerque
Technician: JCC
Meter Serial No: 978517
Meter Box ID: 610204
Atm. Pressure (corr. In Hg): 24.85
Critical Vacuum + 2 in Hg: 14 in. Hg. (required minimum)
Prev. Calib Factor (Y): 1.0058

Set Used: BRASS

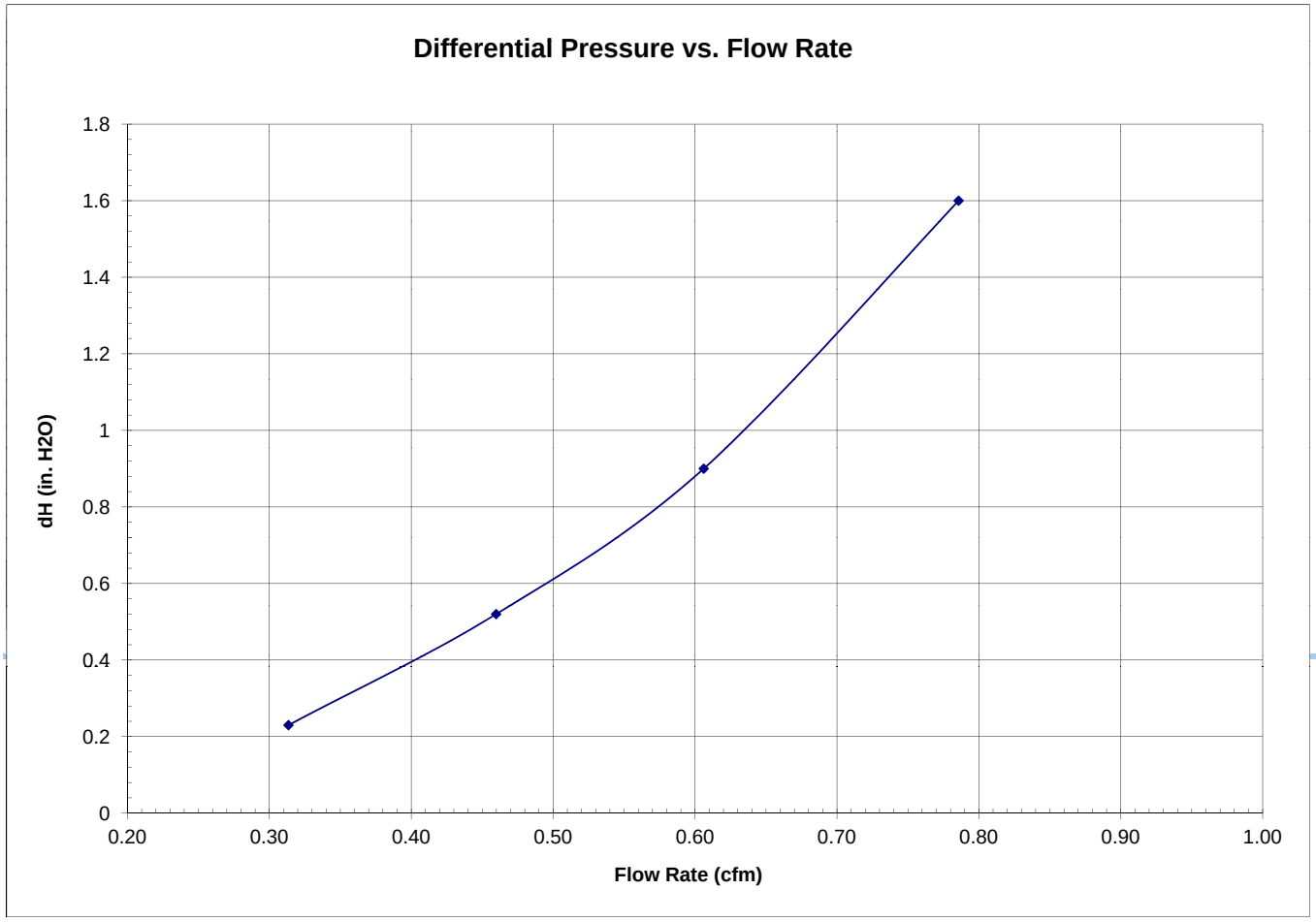
							Initial Temperatures		Final Temperatures			Ambient Temperatures	
Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)
40	0.2388	0.23	20.0	305.478	311.747	6.269	97	96	97	96	21.3	94	94
48	0.3515	0.52	21.0	311.747	321.403	9.656	97	96	98	97	20.0	94	95
55	0.4578	0.9	20.0	321.403	333.525	12.122	98	97	99	98	19.5	95	95
63	0.5940	1.6	10.0	333.525	341.382	7.857	99	98	100	98	18.0	95	96

Meter Box Dry Gas Meter			Critical Orifice		Dry Gas Meter Calibration Factor (Y)		Orifice Calibration Factor (dH@)	
Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Value (#)	Variation (#)	Value (in H2O)	Variation (in H2O)
4.94	139.93	0.313	5.04	142.79	1.020	0.004	1.582	-0.10
7.61	215.52	0.460	7.79	220.58	1.023	0.007	1.653	-0.02
9.55	270.38	0.606	9.66	273.48	1.011	-0.005	1.686	0.01
6.19	175.37	0.786	6.26	177.34	1.011	-0.005	1.786	0.11

Meter Box

Calibration Test Results		Pass/Fail
*** Average Y:**	**1.0167**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.677**	***PASS***

Criteria:
* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.
** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Meter Box: Orifice Full Calibration

Date: 10/13/2011
Prev. Calib. Date: 7/8/2011
Location: TRC Albuquerque
Technician: JCC
Meter Serial No: 978517
Meter Box ID: 610204
Atm. Pressure (corr. In Hg): 25.02
Critical Vacuum + 2 in Hg: 14 in. Hg. (required minimum)
Prev. Calib Factor (Y): 1.0058

Set Used: BRASS

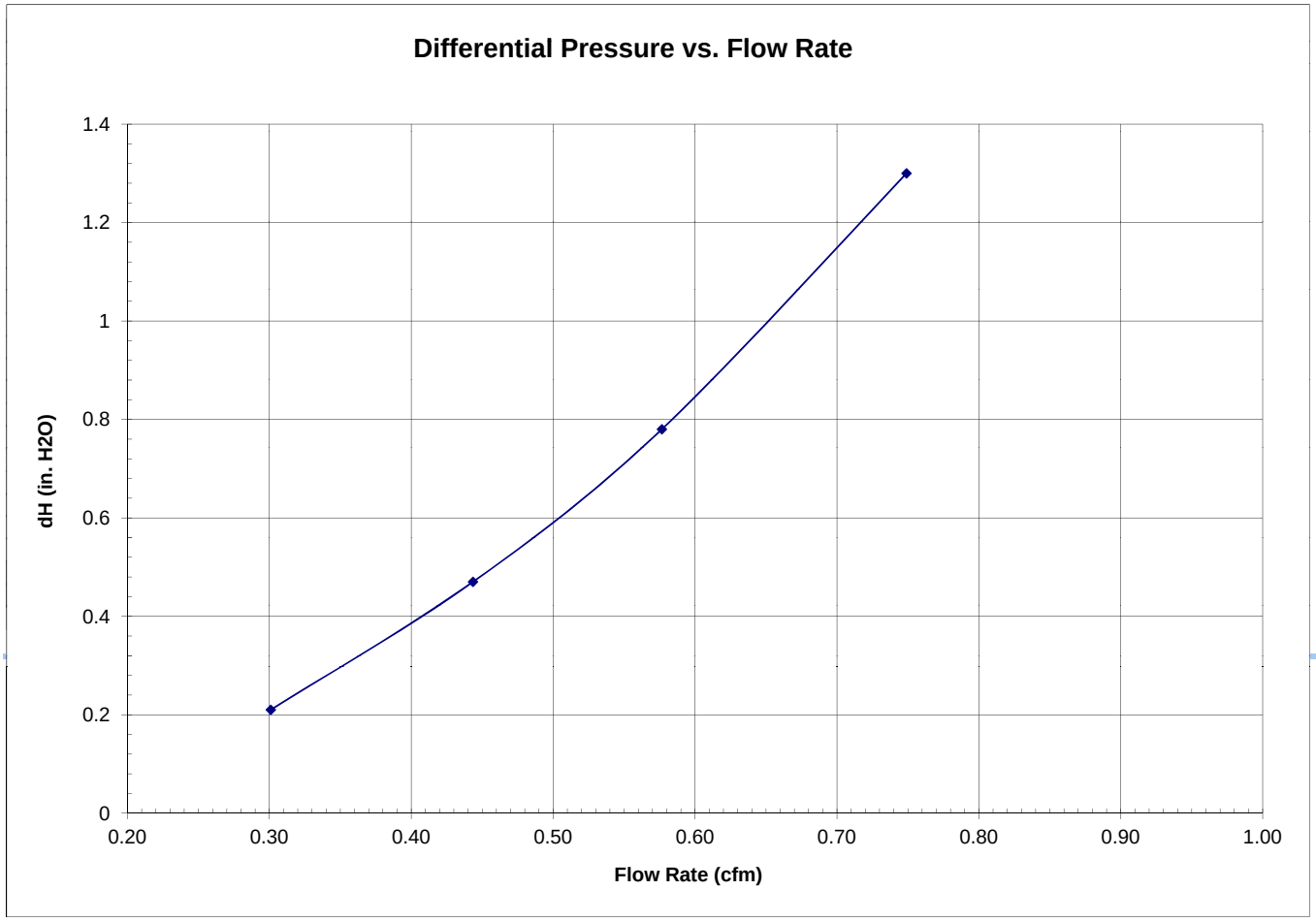
							Initial Temperatures		Final Temperatures			Ambient Temperatures	
Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)
40	0.2388	0.21	20.0	511.612	517.632	6.020	74	73	80	75	10.0	74	75
48	0.3515	0.47	16.0	517.432	524.528	7.096	80	75	86	77	9.0	75	75
55	0.4578	0.78	15.0	524.228	532.877	8.649	85	77	89	78	9.0	75	76
63	0.5940	1.3	18.0	532.228	545.710	13.482	88	77	94	80	7.2	76	76

Meter Box Dry Gas Meter			Critical Orifice		Dry Gas Meter Calibration Factor (Y)		Orifice Calibration Factor (dH@)	
Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Value (#)	Variation (#)	Value (in H2O)	Variation (in H2O)
4.96	140.58	0.301	5.17	146.37	1.041	-0.007	1.445	0.01
5.81	164.61	0.444	6.08	172.25	1.046	-0.002	1.467	0.04
7.06	199.80	0.577	7.43	210.26	1.052	0.004	1.419	-0.01
10.96	310.49	0.749	11.56	327.29	1.054	0.006	1.392	-0.04

Meter Box

Calibration Test Results		Pass/Fail
*** Average Y:**	**1.0485**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.431**	***PASS***

Criteria:
* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.
** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



Meter Box: Orifice Full Calibration

Date: 10/13/2011
Prev. Calib. Date: 8/1/2011
Location: TRC Albuquerque
Technician: JCC
Meter Serial No: 90598
Meter Box ID: 90598
Atm. Pressure (corr. In Hg): 24.98
Critical Vacuum + 2 in Hg: 14 in. Hg. (required minimum)
Prev. Calib Factor (Y): 1.0150

Set Used: Brass

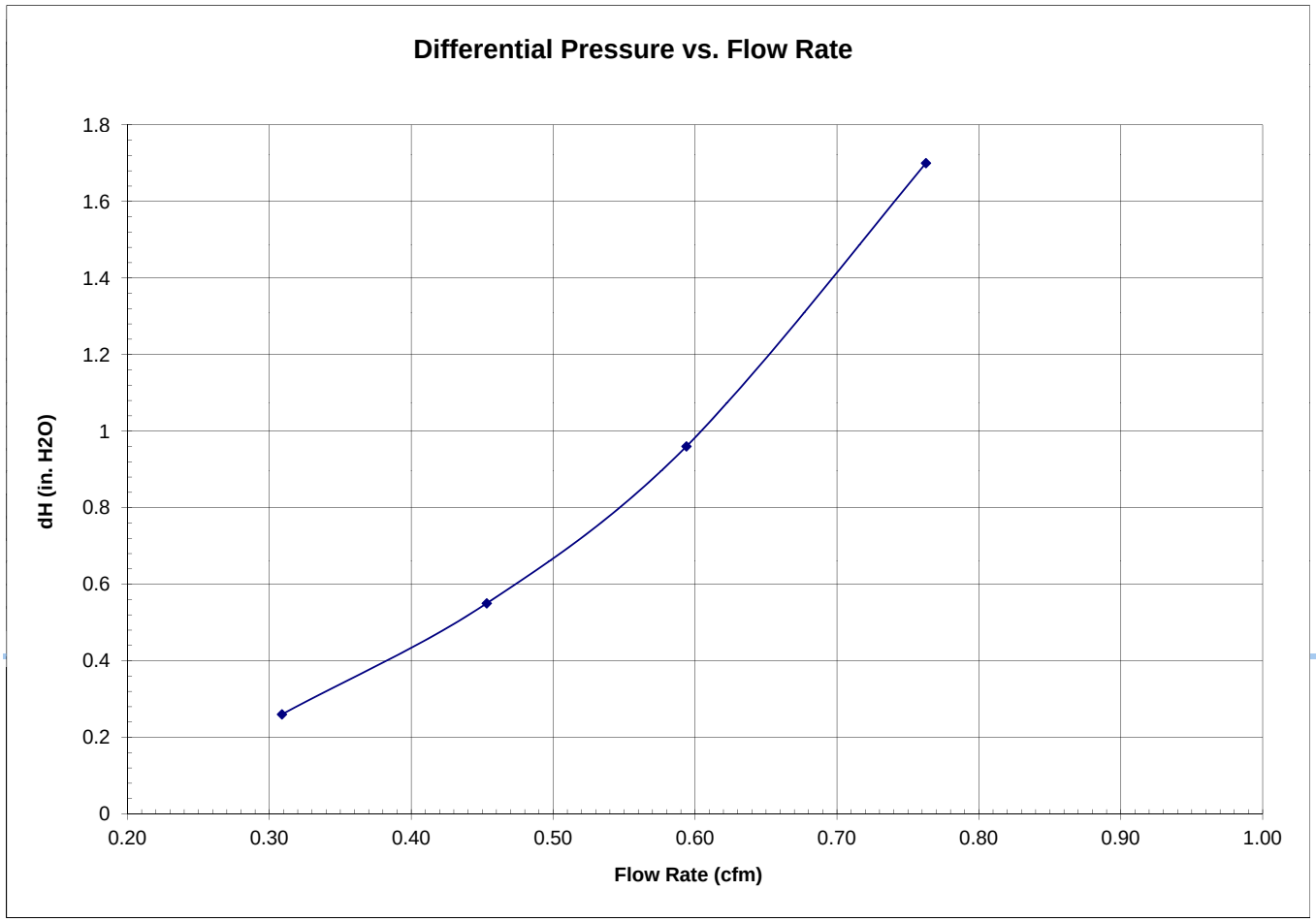
							Initial Temperatures		Final Temperatures			Ambient Temperatures	
Orifice Serial #	K' coefficient (see above)	dH (in. H2O)	Time (min)	Vol (initial) (cu ft)	Vol (final) (cu ft)	Vol. Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)
40	0.2388	0.26	15.0	984.014	988.647	4.633	68	68	69	68	17.0	60	61
48	0.3515	0.55	11.0	988.647	993.632	4.985	69	68	69	68	14.0	62	62
55	0.4578	0.96	11.0	993.632	1,000.165	6.533	69	68	71	69	13.0	62	63
63	0.5940	1.70	10.0	1000.165	1,007.792	7.627	71	68	71	69	11.5	63	64

Meter Box Dry Gas Meter			Critical Orifice		Dry Gas Meter Calibration Factor (Y)		Orifice Calibration Factor (dH@)	
Volume Corrected Vm (std) (cu ft)	Volume Corrected Vm (std) (liters)	Flow Rate (CFM)	Volume Corrected Vcr (std) (cu ft)	Volume Corrected Vm (std) (liters)	Value (#)	Variation (#)	Value (in H2O)	Variation (in H2O)
3.87	109.52	0.309	3.92	111.08	1.014	0.000	1.723	-0.04
4.16	117.89	0.453	4.23	119.68	1.015	0.001	1.702	-0.06
5.45	154.46	0.594	5.50	155.78	1.009	-0.005	1.754	0.00
6.38	180.55	0.763	6.48	183.63	1.017	0.003	1.855	0.10

Meter Box

Calibration Test Results		Pass/Fail
*** Average Y:**	**1.0138**	***PASS***
Ave. Y w/in 5% of previous value:		*YES*
0.95 >= Y <= 1.05:		*PASS*
**** Average dH:**	**1.758**	***PASS***

Criteria:
* Y- ratio of the reading of the calibration meter (critical orifice) to the Meter Box DGM. Acceptable tolerance of individual values from the average is +/- 0.02.
** dH- the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air flow at 68 F and 29.92 in Hg, acceptable tolerance of individual values from the average is +/- 0.2.



APPENDIX D – CALIBRATION CERTIFICATIONS

Airgas

CERTIFICATE OF BATCH ANALYSIS

NITROGEN - ULTRA HIGH PURITY-PURE

ATTN: JEFF

Part Number:	NI UHP15A	Reference Number:	71-104946728-1
Cylinder Analyzed:	TWB074524	Cylinder Volume:	142 Cubic Feet
Laboratory:	IMT - Henderson/Denver Fill Plant - CO	Cylinder Pressure:	2000 PSIG
Analysis Date:	Oct 26, 2009	Valve Outlet:	580
Lot #:	71-104946728-1		

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NitrogenUltraHighPurity	99.999%	99.999%
CO + CO2	< 1 PPM	0.35 PPM
Moisture	< 1 PPM	0.06 PPM
Oxygen	< 1 PPM	0.30 PPM
THC	< 0.5 PPM	0.36 PPM

Cylinders in Batch:

CC320091, CC320109

Notes:

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature On File

Approved for Release

Page 1 of 71-104946728-2

Airgas

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI80E15A0138	Reference Number:	54-124223381-7
Cylinder Number:	CC331472	Cylinder Volume:	151 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jun 16, 2010	Valve Outlet:	590

Expiration Date: Jun 16, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	10.00 %	9.880 %	G1	+/- 1% NIST Traceable
OXYGEN	10.00 %	9.991 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/02	061201	CC195929	9.898% OXYGEN/	Oct 02, 2012
NTRM/CO2	1	CC59142	13.78% CARBON DIOXIDE/	Oct 02, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Jun 03, 2010
(O2-1)HORIBA MPA-510	Paramagnetic	Jun 03, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI58E15A02X7	Reference Number:	54-124218637-5
Cylinder Number:	CC69555	Cylinder Volume:	161 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2014 PSIG
Analysis Date:	May 12, 2010	Valve Outlet:	590

Expiration Date: May 12, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	21.00 %	20.79 %	G2	+/- 1% NIST Traceable
OXYGEN	21.00 %	20.95 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	60608	CC207980	22.51% OXYGEN/NITROGEN	May 01, 2016
NTRM	1	CC214614	6.986% CARBON DIOXIDE/NITROGEN	May 01, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	May 03, 2010
(O2-1)HORIBA MPA-510	Paramagnetic	May 03, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI57E15A3973	Reference Number:	54-124204395-1
Cylinder Number:	CC189787	Cylinder Volume:	161 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jan 18, 2010	Valve Outlet:	590

Expiration Date: Jan 18, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	21.50 %	21.39 %	G1	+/- 1% NIST Traceable
OXYGEN	21.50 %	21.30 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	60808	CC207980	22.51% OXYGEN/NITROGEN	May 01, 2010
NTRM/CO2	80813	CC255428	20.09% CARBON DIOXIDE/NITROGEN	Jul 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA CLA-510	Chemiluminescence	Dec 20, 2009
HORIBA MPA-510	Paramagnetic	Dec 20, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

Airgas Specialty Gases

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI78E15A0225	Reference Number:	48-124187510-1
Cylinder Number:	CC137800	Cylinder Volume:	152 Cu.Ft.
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Aug 10, 2009	Valve Outlet:	660

Expiration Date: Aug 10, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	11.00 %	11.15 %	G1	+/- 1% NIST Traceable
OXYGEN	11.00 %	11.01 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	82745	SG0161076	15.912% CARBON DIOXIDE/NITROGEN	May 01, 2010
NTRM	82658	SG0166290	16.04% OXYGEN/	Jan 01, 2010

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS % CO2	NDIR	Jul 23, 2009
Siemens %O2	PARAMAGNETIC	Jul 23, 2009

Triad Data Available Upon Request

Notes:

QA Approval

APPENDIX E – LOGGED DATA RECORDS

Bottles	9.99	20.9				
CE		**SSB**				
Zero	0	**Zero**	0.02			
Span	20.95	**Bias**	9.83			
Bias	9.98					
Start Run	1930	Stop Run	2030			
Source	Date	Time	Run	O2 %		
Unit 2	4/7/2011	1935	1	7.98		
Unit 2	4/7/2011	1940	1	7.99		
Unit 2	4/7/2011	1945	1	8.01		
Unit 2	4/7/2011	1950	1	8.02		
Unit 2	4/7/2011	1955	1	7.88		
Unit 2	4/7/2011	2000	1	7.98		
Unit 2	4/7/2011	2005	1	8.10		
Unit 2	4/7/2011	2010	1	8.00		
Unit 2	4/7/2011	2015	1	8.01	SSB Zero Avg	
Unit 2	4/7/2011	2020	1	7.88	0.0250000000	
Unit 2	4/7/2011	2025	1	7.89	SSB Bias Avg	
Unit 2	4/7/2011	2030	1	7.87		9.86
			Average	7.9675		
SSB		**Corrected average**		**8.059598**		
Zero	0.03					
Bias	9.89					
Start Run	2100	**Stop Run**	2200			
Source	Date	Time	Run	O2 %		
Unit 2	4/7/2011	2105	2	7.78		
Unit 2	4/7/2011	2110	2	8.06		
Unit 2	4/7/2011	2115	2	8.22		
Unit 2	4/7/2011	2120	2	8.48		
Unit 2	4/7/2011	2125	2	9.00		
Unit 2	4/7/2011	2130	2	8.90		
Unit 2	4/7/2011	2135	2	9.00		
Unit 2	4/7/2011	2140	2	8.78		
Unit 2	4/7/2011	2145	2	8.30	SSB Zero Avg	
Unit 2	4/7/2011	2150	2	8.38	0.0155000000	
Unit 2	4/7/2011	2155	2	8.47	SSB Bias Avg	
Unit 2	4/7/2011	2200	2	8.30		9.82
			Average	8.4725		
SSB		**Corrected average**		**8.60838**		
Zero	0.00					
Bias	9.75					
Start Run	2205	**Stop Run**	2305			
Source	Date	Time	Run	O2 %		
Unit 2	4/7/2011	2210	3	8.22		
Unit 2	4/7/2011	2215	3	8.27		
Unit 2	4/7/2011	2220	3	8.86		

Unit 2	4/7/2011	2225		3	8.76	
Unit 2	4/7/2011	2230		3	8.80	
Unit 2	4/7/2011	2235		3	9.10	
Unit 2	4/7/2011	2240		3	9.18	
Unit 2	4/7/2011	2245		3	8.91	
Unit 2	4/7/2011	2250		3	8.82	SSB Zero Avg
Unit 2	4/7/2011	2255		3	8.97	0.0755000000
Unit 2	4/7/2011	2300		3	9.23	SSB Bias Avg
Unit 2	4/7/2011	2305		3	8.36	9.95
			Average		8.79	
SSB		**Corrected average**			**8.807606**	
Zero	0.15					
Bias	10.15					

Bottles	9.99	20.9				
CE		**SSB**				
Zero	-0.01	**Zero**	-0.03			
Span	20.95	**Bias**	9.97			
Bias	9.98					
Start Run	1010	Stop Run	1110			
Source	Date	Time	Run	O2 %		
Unit 3	4/7/2011	1015	1	6.30		
Unit 3	4/7/2011	1020	1	6.31		
Unit 3	4/7/2011	1025	1	6.21		
Unit 3	4/7/2011	1030	1	6.32		
Unit 3	4/7/2011	1035	1	6.39		
Unit 3	4/7/2011	1040	1	6.41		
Unit 3	4/7/2011	1045	1	5.99		
Unit 3	4/7/2011	1050	1	6.15		
Unit 3	4/7/2011	1055	1	6.18	SSB Zero Avg	
Unit 3	4/7/2011	1060	1	5.92		-0.030
Unit 3	4/7/2011	1065	1	5.80	SSB Bias Avg	
Unit 3	4/7/2011	1110	1	5.88		9.425
			Average	6.155		
SSB		**Corrected average**		**6.528429**		
Zero	-0.03					
Bias	8.88					
Start Run	1135	**Stop Run**	1235			
Source	Date	Time	Run	O2 %		
Unit 3	4/7/2011	1140	2	5.89		
Unit 3	4/7/2011	1145	2	5.93		
Unit 3	4/7/2011	1150	2	5.90		
Unit 3	4/7/2011	1155	2	5.93		
Unit 3	4/7/2011	1160	2	5.94		
Unit 3	4/7/2011	1165	2	5.92		
Unit 3	4/7/2011	1170	2	5.95		
Unit 3	4/7/2011	1175	2	5.93		
Unit 3	4/7/2011	1180	2	5.90	SSB Zero Avg	
Unit 3	4/7/2011	1185	2	5.92		-0.030
Unit 3	4/7/2011	1190	2	5.93	SSB Bias Avg	
Unit 3	4/7/2011	1235	2	6.10		9.25
			Average	5.936667		
SSB		**Corrected average**		**6.416739**		
Zero	-0.03					
Bias	9.62					
Start Run	1300	**Stop Run**	1400			
Source	Date	Time	Run	O2 %		
Unit 3	4/7/2011	1305	3	6.00		
Unit 3	4/7/2011	1310	3	6.05		
Unit 3	4/7/2011	1315	3	6.10		

Unit 3	4/7/2011	1320	3	6.00		
Unit 3	4/7/2011	1325	3	6.15		
Unit 3	4/7/2011	1330	3	6.20		
Unit 3	4/7/2011	1335	3	6.23		
Unit 3	4/7/2011	1340	3	6.18		
Unit 3	4/7/2011	1345	3	6.20	SSB Zero Avg	
Unit 3	4/7/2011	1350	3	6.15		-0.035
Unit 3	4/7/2011	1355	3	6.21	SSB Bias Avg	
Unit 3	4/7/2011	1400	3	6.20		9.74
			Average	6.139167		
SSB		**Corrected average**		**6.306876**		
Zero	-0.04					
Bias	9.85					

Bottles	9.99	20.9			
CE		**SSB**			
Zero	0.05	**Zero**	-0.01		
Span	20.98	**Bias**	9.82		
Bias	10.01				
Start Run	905	Stop Run	1005		
Source	Date	Time	Run	O2 %	
Unit 4	4/6/2011	910	1	4.94	
Unit 4	4/6/2011	915	1	4.93	
Unit 4	4/6/2011	920	1	4.87	
Unit 4	4/6/2011	925	1	4.86	
Unit 4	4/6/2011	930	1	4.88	
Unit 4	4/6/2011	935	1	4.87	
Unit 4	4/6/2011	940	1	4.99	
Unit 4	4/6/2011	945	1	5.00	
Unit 4	4/6/2011	950	1	4.89	SSB Zero Avg
Unit 4	4/6/2011	955	1	4.94	-0.0200000000
Unit 4	4/6/2011	960	1	4.98	SSB Bias Avg
Unit 4	4/6/2011	1005	1	4.96	9.78
			Average	4.925833	
SSB		**Corrected average**		**5.051815**	
Zero	-0.03				
Bias	9.74				
Start Run	1035	**Stop Run**	1135		
Source	Date	Time	Run	O2 %	
Unit 4	4/6/2011	1040	2	4.90	
Unit 4	4/6/2011	1045	2	4.98	
Unit 4	4/6/2011	1050	2	4.89	
Unit 4	4/6/2011	1055	2	4.88	
Unit 4	4/6/2011	1060	2	4.92	
Unit 4	4/6/2011	1065	2	4.95	
Unit 4	4/6/2011	1070	2	4.90	
Unit 4	4/6/2011	1075	2	4.87	
Unit 4	4/6/2011	1080	2	4.97	SSB Zero Avg
Unit 4	4/6/2011	1085	2	5.00	-0.0300000000
Unit 4	4/6/2011	1090	2	4.89	SSB Bias Avg
Unit 4	4/6/2011	1135	2	4.88	9.72
			Average	4.919167	
SSB		**Corrected average**		**5.081144**	
Zero	-0.03				
Bias	9.7				
Start Run	1205	**Stop Run**	1305		
Source	Date	Time	Run	O2 %	
Unit 4	4/6/2011	1210	3	4.85	
Unit 4	4/6/2011	1215	3	4.92	
Unit 4	4/6/2011	1220	3	4.91	

Unit 4	4/6/2011	1225		3	4.92	
Unit 4	4/6/2011	1230		3	5.00	
Unit 4	4/6/2011	1235		3	4.87	
Unit 4	4/6/2011	1240		3	5.00	
Unit 4	4/6/2011	1245		3	4.90	
Unit 4	4/6/2011	1250		3	4.88	SSB Zero Avg
Unit 4	4/6/2011	1255		3	4.84	-0.0350000000
Unit 4	4/6/2011	1260		3	4.93	SSB Bias Avg
Unit 4	4/6/2011	1305		3	5.02	9.76
			Average		4.92	
SSB		**Corrected average**			**5.063762**	
Zero	-0.04					
Bias	9.82					

Bottles	9.99	20.9			
CE		**SSB**			
Zero	0.01	**Zero**	0.02		
Span	20.9	**Bias**	9.94		
Bias	9.97				
Start Run	1400	Stop Run	1500		
Source	Date	Time	Run	O2 %	
Unit 5	4/5/2011	1405	1	6.23	
Unit 5	4/5/2011	1410	1	6.12	
Unit 5	4/5/2011	1415	1	6.15	
Unit 5	4/5/2011	1420	1	6.2	
Unit 5	4/5/2011	1425	1	6.17	
Unit 5	4/5/2011	1430	1	6.32	
Unit 5	4/5/2011	1435	1	6.16	
Unit 5	4/5/2011	1440	1	6.13	
Unit 5	4/5/2011	1445	1	6.08	SSB Zero Avg
Unit 5	4/5/2011	1450	1	6.15	0.0050000000
Unit 5	4/5/2011	1455	1	6.13	SSB Bias Avg
Unit 5	4/5/2011	1500	1	6.15	9.895
			Average	6.165	
SSB		**Corrected average**		**6.209828**	
Zero	-0.01				
Bias	9.85				
Start Run	1600	**Stop Run**	1700		
Source	Date	Time	Run	O2 %	
Unit 5	4/5/2011	1605	2	6.16	
Unit 5	4/5/2011	1610	2	6.13	
Unit 5	4/5/2011	1615	2	6.23	
Unit 5	4/5/2011	1620	2	6.12	
Unit 5	4/5/2011	1625	2	6.08	
Unit 5	4/5/2011	1630	2	6.15	
Unit 5	4/5/2011	1635	2	6.23	
Unit 5	4/5/2011	1640	2	6.11	
Unit 5	4/5/2011	1645	2	6.13	SSB Zero Avg
Unit 5	4/5/2011	1650	2	6.06	-0.0050000000
Unit 5	4/5/2011	1655	2	6.16	SSB Bias Avg
Unit 5	4/5/2011	1700	2	6.11	9.815
			Average	6.139167	
SSB		**Corrected average**		**6.238018**	
Zero	0.00				
Bias	9.78				
Start Run	1800	**Stop Run**	1900		
Source	Date	Time	Run	O2 %	
Unit 5	4/5/2011	1805	3	6.05	
Unit 5	4/5/2011	1810	3	6.03	
Unit 5	4/5/2011	1815	3	6.1	

Unit 5	4/5/2011	1820	3	6.18	
Unit 5	4/5/2011	1825	3	6.09	
Unit 5	4/5/2011	1830	3	6.08	
Unit 5	4/5/2011	1835	3	6.16	
Unit 5	4/5/2011	1840	3	6.14	
Unit 5	4/5/2011	1845	3	6.1	SSB Zero Avg
Unit 5	4/5/2011	1850	3	6.13	0.0050000000
Unit 5	4/5/2011	1855	3	6.09	SSB Bias Avg
Unit 5	4/5/2011	1900	3	6.08	9.78
			Average	6.165	
SSB		**Corrected average**		**6.282885**	
Zero	0.01				
Bias	9.78				

Run averages corrected for bias

Operator: JSH

Plant Name: APS

Location: Unit 5 Air Preheater Inlet

Run	O2 %	CO2 %
1	6.33	13.15
2	4.02	15.32

Calibration Error Test at Run 1 . STRATA Version 3.2

		O2	CO2
		%	%
9/30/11	12:22:55	0.15	-0.02
9/30/11	12:23:55	1.33	1.17
9/30/11	12:24:55	27.29	18.27
9/30/11	12:25:55	20.44	19.93
9/30/11	12:26:55	11.01	11.18

Calibration Error Test at Run 1

Operator: JSH

Plant Name: APS

Location: Unit 5 Air Preheater Outlet

Reference Cylinder Numbers

	Zero	Low-range	Mid-range	High-range
O2	SX48388		CC137800	CC189787
CO2	SX48388		CC137800	CC189787

Date/Time	9/30/11	12:27:16	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Avg	-0.02	-0.02	
Zero Error%	0.1	0.1	
Low Ref Cyl			
Low Avg			
Low Error%			
Mid Ref Cyl	11.01	11.15	
Mid Avg	10.91	11.18	
Mid Error%	0.4	0.1	
High Ref Cyl	21.3	21.39	
High Avg	21.03	21.42	
High Error%	1.1	0.1	

Test Run 1 Begin. STRATA Version 3.2
Operator: JSH
Plant Name: APS
Location: Unit 5 Air Preheater Outlet

		O2	CO2
		%	%
Begin calculating run averages			
9/30/11	12:28:29	10.85	11.13
9/30/11	12:29:29	10.86	11.08
9/30/11	12:30:29	15.82	6.19
9/30/11	12:31:29	8.50	11.73
9/30/11	12:32:29	6.06	13.07
9/30/11	12:33:29	6.44	12.78
Average of Test Run		O2	CO2
		%	%
9/30/11	12:33:48	6.25	12.93

Test Run 1 End

Final System Bias Check for Run 1 . STRATA Version 3.2

	O2	CO2
	%	%

Final System Bias Check for Run 1

Operator:	JSH	
Plant Name:	APS	
Location:	Unit 5 Air Preheater Outlet	
	Reference Cylinder Numbers	
	Zero	Span
O2	SX48388	CC137800
CO2	SX48388	CC137800

Date/Time	9/30/11	12:33:53	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Cal	-0.02	-0.02	
Zero Avg	0.08	0.22	
Zero Bias%	0.0	0.0	
Zero Drift%	0.0	0.0	
Span Ref Cyl	11.01	11.15	
Span Cal	10.91	11.18	
Span Avg	10.89	11.01	
Span Bias%	0.0	0.0	
Span Drift%	0.0	0.0	
Ini Zero Avg	-0.02	-0.02	
Ini Span Avg	10.91	11.18	
Run Avg	6.25	12.93	
Co	0.00	0.00	
Cm	0.00	0.00	
Correct Avg	6.33	13.15	

Test Run 2 Begin. STRATA Version 3.2
Operator: JSH
Plant Name: APS
Location: Unit 5 Air Preheater Inlet

		O2	CO2
		%	%
9/30/11	14:07:04	10.35	10.03
9/30/11	14:08:04	3.73	14.95
Begin calculating run averages			
9/30/11	14:09:26	3.64	15.13
9/30/11	14:10:26	3.92	15.07
Average of Test Run		O2	CO2
		%	%
9/30/11	14:11:14	3.98	14.95

Test Run 2 End

Final System Bias Check for Run 2 . STRATA Version 3.2

		O2	CO2
		%	%
9/30/11	14:13:50	1.51	2.70
9/30/11	14:14:50	5.52	6.53

Final System Bias Check for Run 2

Operator:	JSH	
Plant Name:	APS	
Location:	Unit 5 Air Preheater Inlet	
	Reference Cylinder Numbers	
	Zero	Span
O2	SX48388	CC137800
CO2	SX48388	CC137800

Date/Time	9/30/11	14:15:00	PASSED
Analyte	O2	CO2	
Units	%	%	
Zero Ref Cyl	0	0	
Zero Cal	-0.02	-0.02	
Zero Avg	0.07	0.32	
Zero Bias%	0.4	1.3	
Zero Drift%	0.3	1.3	
Span Ref Cyl	11.01	11.15	
Span Cal	10.91	11.18	
Span Avg	10.87	10.99	
Span Bias%	0.2	0.8	
Span Drift%	0.0	0.0	
Ini Zero Avg	0.08	0.22	
Ini Span Avg	10.89	11.01	
Run Avg	3.98	14.95	
Co	0.04	0.27	
Cm	10.88	11.00	
Correct Avg	4.02	15.32	

APPENDIX F – UNIT OPERATIONAL DATA

5GJ5NETMW	NET MWATTS
5FFXFUELFLOW	FUEL FLOW
5AAVO2NET90AVG	O2 SELECTED TOTAL AVERAGE
5RAVWETO2VAL	UNIT 5 % O2 WET
5RAVAVGFLOW	UNIT 5 % KSCFM
5RAVSO2PPM1MIN	SO2 PPM 1MIN

	5GJ5NETMW	5FFXFUELFLOW	5AAVO2NET90/	5RAVWETO2VAL	5RAVAVGFLOW	5RAVSO2PPM1MIN
05-Apr-11 14:00:00	745.3	63.9	2.31	5.41	1827.53	104.8
05-Apr-11 14:02:00	746.8	63.8	2.32	6.01	1833.54	104.6
05-Apr-11 14:04:00	747.4	63.7	2.29	5.54	1831.58	0.0
05-Apr-11 14:06:00	745.1	63.7	2.34	5.43	1828.22	106.0
05-Apr-11 14:08:00	744.5	63.6	2.34	5.41	1824.85	106.3
05-Apr-11 14:10:00	745.3	63.8	2.37	5.40	1821.49	106.6
05-Apr-11 14:12:00	745.1	63.7	2.38	5.39	1818.13	106.9
05-Apr-11 14:14:00	745.3	64.0	2.35	5.47	1814.77	107.2
05-Apr-11 14:16:00	746.8	64.0	2.25	15.71	1811.40	107.0
05-Apr-11 14:18:00	746.8	63.6	2.17	5.49	1808.04	32.3
05-Apr-11 14:20:00	746.1	63.3	2.25	5.48	1795.68	75.5
05-Apr-11 14:22:00	745.3	63.1	2.28	5.46	1779.46	107.1
05-Apr-11 14:24:00	744.6	63.1	2.30	5.45	1763.23	107.1
05-Apr-11 14:26:00	744.2	63.3	2.28	5.44	1760.63	107.1
05-Apr-11 14:28:00	745.1	63.3	2.26	5.42	1761.26	107.2
05-Apr-11 14:30:00	744.8	63.5	2.33	5.41	1761.88	107.2
05-Apr-11 14:32:00	742.9	63.6	2.46	6.28	1762.51	107.2
05-Apr-11 14:34:00	744.1	64.0	2.36	5.54	1763.13	0.0
05-Apr-11 14:36:00	745.0	63.8	2.39	5.44	1763.76	106.3
05-Apr-11 14:38:00	741.9	64.2	2.43	5.41	1764.38	106.3
05-Apr-11 14:40:00	744.7	64.2	2.33	5.50	1766.02	106.2
05-Apr-11 14:42:00	746.7	64.2	2.29	5.48	1768.08	106.2
05-Apr-11 14:44:00	744.0	64.1	2.36	5.45	1770.14	106.2
05-Apr-11 14:46:00	747.3	64.1	2.25	13.21	1772.21	106.1
05-Apr-11 14:48:00	746.5	63.9	2.31	5.52	1774.27	28.3
05-Apr-11 14:50:00	746.8	63.8	2.39	5.40	1776.33	76.0
05-Apr-11 14:52:00	747.6	63.8	2.27	5.49	1778.39	105.6
05-Apr-11 14:54:00	746.8	63.8	2.27	5.47	1780.45	105.5
05-Apr-11 14:56:00	746.9	63.8	2.47	5.42	1782.51	105.4
05-Apr-11 14:58:00	745.4	63.7	2.27	5.39	1784.57	105.3
05-Apr-11 15:00:00	747.0	63.9	2.27	5.38	1786.63	105.2
05-Apr-11 15:02:00	746.0	63.7	2.37	6.56	1788.70	105.1
05-Apr-11 15:04:00	746.2	63.7	2.37	5.47	1790.76	0.0
05-Apr-11 15:06:00	746.8	63.8	2.26	5.46	1792.70	105.5
05-Apr-11 15:08:00	745.3	63.7	2.39	5.45	1794.53	105.6
05-Apr-11 15:10:00	743.8	63.8	2.29	5.44	1796.37	105.6
05-Apr-11 15:12:00	745.3	63.9	2.28	5.44	1798.20	105.7
05-Apr-11 15:14:00	745.9	63.8	2.48	5.43	1800.04	105.7
05-Apr-11 15:16:00	745.3	64.0	2.37	10.10	1801.87	105.8
05-Apr-11 15:18:00	745.5	63.8	2.28	5.62	1803.71	31.3
05-Apr-11 15:20:00	747.5	63.5	2.32	5.44	1805.55	76.7
05-Apr-11 15:22:00	744.6	63.4	2.31	5.40	1807.38	104.4
05-Apr-11 15:24:00	746.0	63.2	2.19	5.39	1793.62	104.1
05-Apr-11 15:26:00	744.5	63.2	2.42	5.39	1777.69	103.8
05-Apr-11 15:28:00	744.6	63.4	2.26	5.51	1778.56	103.5
05-Apr-11 15:30:00	744.4	63.3	2.29	5.46	1779.44	103.2
05-Apr-11 15:32:00	744.6	63.6	2.33	6.92	1780.32	104.4

05-Apr-11 15:34:00	744.7	63.7	2.44	5.47	1781.20	0.0
05-Apr-11 15:36:00	743.1	63.9	2.25	5.46	1782.08	104.7
05-Apr-11 15:38:00	744.4	64.0	2.46	5.44	1782.96	104.8
05-Apr-11 15:40:00	743.8	64.1	2.47	5.43	1783.84	104.9
05-Apr-11 15:42:00	744.3	64.2	2.28	5.42	1784.72	104.9
05-Apr-11 15:44:00	746.7	64.1	2.30	5.40	1785.59	105.0
05-Apr-11 15:46:00	744.7	63.9	2.35	6.55	1786.47	105.1
05-Apr-11 15:48:00	745.3	63.9	2.30	5.47	1787.35	29.0
05-Apr-11 15:50:00	746.1	63.8	2.35	5.46	1788.23	78.1
05-Apr-11 15:52:00	745.3	63.8	2.30	5.44	1792.44	104.5
05-Apr-11 15:54:00	745.0	63.8	2.31	5.42	1798.37	104.3
05-Apr-11 15:56:00	745.3	63.9	2.36	5.40	1804.31	104.1
05-Apr-11 15:58:00	745.0	63.9	2.35	5.40	1810.24	103.9
05-Apr-11 16:00:00	746.1	63.9	2.32	5.42	1816.17	103.7
05-Apr-11 16:02:00	745.8	63.8	2.33	7.64	1822.11	103.5
05-Apr-11 16:04:00	745.6	63.8	2.22	5.43	1828.04	0.0
05-Apr-11 16:06:00	745.3	63.8	2.17	5.41	1827.27	104.0
05-Apr-11 16:08:00	744.3	63.8	2.23	5.39	1825.15	101.1
05-Apr-11 16:10:00	745.1	64.0	2.31	5.37	1823.03	98.2
05-Apr-11 16:12:00	745.8	63.9	2.32	5.35	1820.91	95.3
05-Apr-11 16:14:00	745.3	64.0	2.18	5.33	1818.79	92.4
05-Apr-11 16:16:00	746.8	63.9	2.32	5.47	1816.67	91.7
05-Apr-11 16:18:00	745.5	63.7	2.24	5.65	1814.55	30.6
05-Apr-11 16:20:00	744.6	63.8	2.23	5.46	1812.44	64.6
05-Apr-11 16:22:00	744.8	63.6	2.40	5.42	1810.32	90.9
05-Apr-11 16:24:00	746.5	63.6	2.19	5.49	1808.20	91.0
05-Apr-11 16:26:00	744.4	63.6	2.23	5.39	1806.08	91.0
05-Apr-11 16:28:00	745.2	63.8	2.33	5.38	1811.85	91.1
05-Apr-11 16:30:00	746.5	63.7	2.22	5.45	1827.62	91.2
05-Apr-11 16:32:00	744.4	63.8	2.24	8.60	1822.40	91.3
05-Apr-11 16:34:00	744.4	64.0	2.45	5.50	1817.18	0.0
05-Apr-11 16:36:00	744.0	64.2	2.33	5.44	1811.96	90.5
05-Apr-11 16:38:00	746.1	64.1	2.11	5.38	1806.74	90.8
05-Apr-11 16:40:00	745.5	64.1	2.37	5.33	1801.52	91.2
05-Apr-11 16:42:00	746.0	63.9	2.21	5.48	1796.30	91.5
05-Apr-11 16:44:00	746.1	63.8	2.24	5.43	1791.08	91.8
05-Apr-11 16:46:00	747.5	63.6	2.25	5.38	1785.86	92.2
05-Apr-11 16:48:00	747.5	63.6	2.10	5.53	1781.85	30.2
05-Apr-11 16:50:00	745.3	63.6	2.27	5.31	1782.04	66.1
05-Apr-11 16:52:00	743.8	63.7	2.29	5.36	1782.23	92.3
05-Apr-11 16:54:00	746.6	63.7	2.14	5.41	1782.42	92.3
05-Apr-11 16:56:00	746.0	63.8	2.18	5.39	1782.61	92.4
05-Apr-11 16:58:00	744.0	63.8	2.31	5.33	1782.80	92.4
05-Apr-11 17:00:00	745.3	63.8	2.19	5.44	1782.98	92.5
05-Apr-11 17:02:00	746.0	63.8	2.23	10.41	1783.17	91.3
05-Apr-11 17:04:00	745.3	63.6	2.36	5.34	1783.36	0.0
05-Apr-11 17:06:00	747.3	63.6	2.24	5.38	1783.55	91.5
05-Apr-11 17:08:00	745.3	63.5	2.27	5.39	1783.74	91.8
05-Apr-11 17:10:00	743.0	63.5	2.34	5.38	1783.92	92.0
05-Apr-11 17:12:00	745.3	63.6	2.29	5.37	1784.11	92.3
05-Apr-11 17:14:00	746.7	63.5	2.27	5.36	1784.30	92.6
05-Apr-11 17:16:00	746.1	63.7	2.18	5.35	1784.49	89.4
05-Apr-11 17:18:00	746.8	63.7	2.22	5.61	1784.68	25.5
05-Apr-11 17:20:00	743.8	63.5	2.22	5.39	1784.87	61.2
05-Apr-11 17:22:00	745.4	63.6	2.42	5.45	1785.05	87.6

05-Apr-11 17:24:00	746.8	63.5	2.17	5.52	1785.24	87.8
05-Apr-11 17:26:00	744.0	63.4	2.22	5.42	1785.43	88.0
05-Apr-11 17:28:00	744.8	63.5	2.23	5.38	1785.62	88.2
05-Apr-11 17:30:00	745.3	63.5	2.33	5.42	1793.11	88.5
05-Apr-11 17:32:00	746.1	63.4	2.31	12.13	1779.16	87.6
05-Apr-11 17:34:00	746.1	63.5	2.39	5.43	1765.22	0.0
05-Apr-11 17:36:00	746.1	63.6	2.22	5.41	1751.52	88.0
05-Apr-11 17:38:00	745.6	63.4	2.06	5.40	1752.60	88.0
05-Apr-11 17:40:00	741.5	63.5	2.24	5.38	1753.68	88.0
05-Apr-11 17:42:00	744.5	63.6	2.34	5.38	1754.77	87.9
05-Apr-11 17:44:00	743.7	64.0	2.31	5.40	1755.85	87.9
05-Apr-11 17:46:00	744.2	64.1	2.27	5.41	1756.93	87.9
05-Apr-11 17:48:00	745.4	64.2	2.33	5.65	1758.01	24.9
05-Apr-11 17:50:00	744.9	64.2	2.30	5.46	1759.10	62.2
05-Apr-11 17:52:00	744.5	64.1	2.27	5.44	1760.18	88.0
05-Apr-11 17:54:00	744.2	64.2	2.32	5.42	1761.26	87.9
05-Apr-11 17:56:00	745.0	64.2	2.20	5.40	1762.35	87.9
05-Apr-11 17:58:00	745.7	64.0	2.29	5.38	1763.43	87.8
05-Apr-11 18:00:00	744.9	64.0	2.30	5.40	1764.51	87.8
05-Apr-11 18:02:00	745.3	64.0	2.22	15.04	1766.79	86.6
05-Apr-11 18:04:00	745.3	64.0	2.20	5.38	1771.08	0.0
05-Apr-11 18:06:00	744.6	64.1	2.28	5.41	1775.36	87.8
05-Apr-11 18:08:00	746.0	64.3	2.17	5.44	1779.65	87.9
05-Apr-11 18:10:00	746.8	64.0	2.26	5.44	1783.94	88.1
05-Apr-11 18:12:00	745.3	64.2	2.32	5.43	1788.22	88.3
05-Apr-11 18:14:00	745.4	64.2	2.31	5.42	1792.51	88.4
05-Apr-11 18:16:00	745.3	64.3	2.22	5.43	1796.79	88.6
05-Apr-11 18:18:00	746.5	64.0	2.12	5.62	1801.08	26.9
05-Apr-11 18:20:00	747.0	63.8	2.22	5.41	1804.30	63.4
05-Apr-11 18:22:00	744.9	63.8	2.20	5.42	1806.19	88.5
05-Apr-11 18:24:00	743.8	63.7	2.34	5.44	1808.08	88.4
05-Apr-11 18:26:00	745.0	63.9	2.25	5.46	1809.97	88.4
05-Apr-11 18:28:00	743.8	63.9	2.35	5.47	1811.86	88.4
05-Apr-11 18:30:00	743.8	64.1	2.25	5.49	1813.75	88.3
05-Apr-11 18:32:00	745.2	64.2	2.26	18.49	1815.64	88.3
05-Apr-11 18:34:00	743.9	64.3	2.24	5.41	1817.53	0.0
05-Apr-11 18:36:00	744.4	64.3	2.31	5.41	1819.42	88.3
05-Apr-11 18:38:00	745.3	64.4	2.33	5.41	1821.31	88.4
05-Apr-11 18:40:00	745.5	64.3	2.23	5.42	1823.20	88.4
05-Apr-11 18:42:00	744.0	64.4	2.35	5.42	1825.09	88.5
05-Apr-11 18:44:00	743.9	64.5	2.27	5.42	1826.98	88.5
05-Apr-11 18:46:00	744.5	64.4	2.21	5.43	1828.87	88.6
05-Apr-11 18:48:00	745.2	64.6	2.30	5.66	1830.76	25.5
05-Apr-11 18:50:00	746.7	64.5	2.23	5.50	1798.74	0.0
05-Apr-11 18:52:00	746.3	64.5	2.18	5.47	1799.16	89.1
05-Apr-11 18:54:00	746.7	64.3	2.24	5.43	1804.61	89.0
05-Apr-11 18:56:00	746.8	63.9	2.34	5.42	1810.99	88.9
05-Apr-11 18:58:00	745.3	63.9	2.28	5.42	1844.59	88.9
05-Apr-11 19:00:00	745.7	64.1	2.26	5.42	1878.18	88.8

	4GJ5NETMW	4FFXFUELFLOW	4AAVO2NET90AVG	4RAVWETO2VAL	4RAVSTACKFLOW	4RAVSO2PPM1MIN
06-Apr-11 09:00:00	787.1	64.0	2.51	4.37	1711.98	75.5
06-Apr-11 09:02:00	785.2	64.0	2.33	5.25	1673.27	75.8
06-Apr-11 09:04:00	784.4	64.0	2.39	4.44	1677.63	31.2
06-Apr-11 09:06:00	784.8	64.1	2.39	4.29	1671.22	47.4
06-Apr-11 09:08:00	784.4	64.1	2.45	4.38	1715.26	75.7
06-Apr-11 09:10:00	785.2	64.1	2.47	4.38	1620.38	75.8
06-Apr-11 09:12:00	786.8	64.0	2.40	4.41	1668.32	75.8
06-Apr-11 09:14:00	787.6	64.0	2.41	4.36	1700.07	75.9
06-Apr-11 09:16:00	787.2	64.0	2.40	4.30	1702.54	76.0
06-Apr-11 09:18:00	784.0	64.0	2.51	17.05	1719.94	76.1
06-Apr-11 09:20:00	787.0	64.1	2.40	4.52	1714.15	0.0
06-Apr-11 09:22:00	786.0	64.2	2.50	4.35	1663.96	75.1
06-Apr-11 09:24:00	783.2	64.6	2.48	4.44	1735.49	75.2
06-Apr-11 09:26:00	785.0	64.6	2.45	4.43	1694.89	75.2
06-Apr-11 09:28:00	784.2	64.7	2.34	4.41	1737.53	75.3
06-Apr-11 09:30:00	785.0	64.7	2.54	4.40	1734.43	75.3
06-Apr-11 09:32:00	788.1	64.7	2.26	7.20	1716.67	75.4
06-Apr-11 09:34:00	787.3	64.2	2.36	4.49	1695.19	31.0
06-Apr-11 09:36:00	785.8	64.1	2.43	4.37	1665.61	47.0
06-Apr-11 09:38:00	786.9	64.0	2.24	4.32	1693.94	75.1
06-Apr-11 09:40:00	787.4	64.0	2.47	4.33	1699.41	75.1
06-Apr-11 09:42:00	784.0	63.9	2.61	4.33	1688.99	75.2
06-Apr-11 09:44:00	786.2	63.9	2.40	4.33	1713.01	75.3
06-Apr-11 09:46:00	785.8	63.9	2.63	4.34	1720.61	75.3
06-Apr-11 09:48:00	786.3	63.9	2.32	18.07	1689.30	75.4
06-Apr-11 09:50:00	785.8	63.9	2.54	4.32	1673.08	0.0
06-Apr-11 09:52:00	785.6	63.9	2.51	4.33	1724.30	45.7
06-Apr-11 09:54:00	785.6	63.9	2.44	4.38	1664.80	75.5
06-Apr-11 09:56:00	784.8	63.9	2.53	4.39	1688.70	75.6
06-Apr-11 09:58:00	787.2	64.0	2.47	4.36	1655.07	75.7
06-Apr-11 10:00:00	786.3	64.0	2.40	4.33	1665.37	75.8
06-Apr-11 10:02:00	784.0	64.0	2.48	4.30	1692.69	76.0
06-Apr-11 10:04:00	785.6	64.0	2.45	4.56	1656.20	76.1
06-Apr-11 10:06:00	786.3	64.1	2.55	4.39	1716.23	0.0
06-Apr-11 10:08:00	784.8	64.1	2.55	4.32	1703.45	74.2
06-Apr-11 10:10:00	786.2	64.1	2.36	4.36	1702.76	74.3
06-Apr-11 10:12:00	785.6	64.1	2.39	4.36	1711.88	74.4
06-Apr-11 10:14:00	786.3	64.2	2.38	4.35	1697.16	74.4
06-Apr-11 10:16:00	784.8	64.2	2.52	4.35	1698.60	74.5
06-Apr-11 10:18:00	784.8	64.2	2.43	20.25	1685.18	74.6
06-Apr-11 10:20:00	785.6	64.2	2.37	4.43	1687.32	28.3
06-Apr-11 10:22:00	784.8	64.3	2.57	4.32	1683.18	46.9
06-Apr-11 10:24:00	783.9	64.3	2.59	4.42	1674.89	74.1
06-Apr-11 10:26:00	782.0	64.2	2.52	4.39	1662.28	74.1
06-Apr-11 10:28:00	787.6	63.9	2.33	4.37	1682.70	74.2
06-Apr-11 10:30:00	783.1	63.9	2.45	4.35	1671.53	74.3
06-Apr-11 10:32:00	781.9	64.2	2.42	5.24	1696.15	74.3
06-Apr-11 10:34:00	783.3	64.2	2.43	4.63	1711.42	74.4
06-Apr-11 10:36:00	785.5	64.2	2.50	4.40	1715.79	0.0
06-Apr-11 10:38:00	785.8	64.1	2.41	4.33	1710.56	74.1
06-Apr-11 10:40:00	783.2	64.0	2.51	4.35	1668.61	74.2
06-Apr-11 10:42:00	784.8	64.1	2.43	4.37	1674.09	74.3
06-Apr-11 10:44:00	781.9	64.1	2.59	4.30	1669.94	74.4
06-Apr-11 10:46:00	785.9	64.2	2.31	4.42	1688.72	74.5
06-Apr-11 10:48:00	786.5	64.2	2.29	20.20	1678.13	74.5
06-Apr-11 10:50:00	785.2	64.2	2.40	4.30	1678.10	28.1
06-Apr-11 10:52:00	783.3	64.2	2.35	4.36	1671.14	45.0

06-Apr-11 10:54:00	783.9	64.2	2.43	4.39	1721.95	73.3
06-Apr-11 10:56:00	784.0	64.2	2.41	4.31	1707.75	73.2
06-Apr-11 10:58:00	784.2	64.2	2.35	4.35	1717.72	73.2
06-Apr-11 11:00:00	785.3	64.2	2.43	4.36	1677.66	73.2
06-Apr-11 11:02:00	784.5	64.2	2.45	4.30	1712.78	73.1
06-Apr-11 11:04:00	784.0	64.2	2.39	4.66	1707.63	73.1
06-Apr-11 11:06:00	784.6	64.2	2.36	4.41	1702.82	0.0
06-Apr-11 11:08:00	787.1	64.2	2.45	4.33	1708.65	73.5
06-Apr-11 11:10:00	783.5	64.2	2.43	4.28	1680.29	73.8
06-Apr-11 11:12:00	783.5	64.3	2.43	4.28	1679.35	74.1
06-Apr-11 11:14:00	782.1	64.8	2.44	4.28	1724.51	74.4
06-Apr-11 11:16:00	784.1	64.8	2.55	4.29	1700.70	74.8
06-Apr-11 11:18:00	784.0	64.7	2.44	19.88	1711.07	75.1
06-Apr-11 11:20:00	784.8	64.5	2.39	4.43	1708.87	27.7
06-Apr-11 11:22:00	785.6	64.4	2.36	4.37	1695.28	46.4
06-Apr-11 11:24:00	784.8	64.3	2.35	4.31	1651.33	72.7
06-Apr-11 11:26:00	784.8	64.2	2.54	4.25	1693.30	72.7
06-Apr-11 11:28:00	780.8	64.3	2.46	4.36	1694.81	72.7
06-Apr-11 11:30:00	783.1	64.8	2.33	4.35	1711.45	72.7
06-Apr-11 11:32:00	786.4	64.7	2.48	4.25	1696.53	72.7
06-Apr-11 11:34:00	784.8	64.6	2.40	4.74	1701.79	72.7
06-Apr-11 11:36:00	786.4	64.5	2.28	4.41	1701.08	0.0
06-Apr-11 11:38:00	787.2	64.4	2.49	4.30	1697.95	74.1
06-Apr-11 11:40:00	786.4	64.3	2.40	4.28	1738.39	74.3
06-Apr-11 11:42:00	786.4	64.3	2.37	4.34	1695.66	74.5
06-Apr-11 11:44:00	782.6	64.4	2.48	4.32	1695.75	74.7
06-Apr-11 11:46:00	786.4	64.4	2.45	4.31	1702.47	74.9
06-Apr-11 11:48:00	785.7	64.4	2.45	19.80	1700.12	75.1
06-Apr-11 11:50:00	786.8	64.5	2.39	4.47	1739.71	28.9
06-Apr-11 11:52:00	785.6	64.5	2.51	4.34	1679.74	45.6
06-Apr-11 11:54:00	787.2	64.5	2.63	4.35	1707.55	74.7
06-Apr-11 11:56:00	787.5	64.4	2.42	4.31	1675.86	74.3
06-Apr-11 11:58:00	786.7	64.3	2.47	4.24	1721.61	73.8
06-Apr-11 12:00:00	784.6	64.3	2.49	4.29	1675.45	73.4
06-Apr-11 12:02:00	785.8	64.3	2.50	4.36	1675.63	72.9
06-Apr-11 12:04:00	786.4	64.3	2.35	4.86	1731.33	72.5
06-Apr-11 12:06:00	787.5	64.3	2.44	4.30	1656.96	0.0
06-Apr-11 12:08:00	786.2	64.3	2.48	4.27	1693.35	73.3
06-Apr-11 12:10:00	785.9	64.7	2.50	4.27	1686.48	73.1
06-Apr-11 12:12:00	786.9	64.6	2.54	4.27	1686.39	72.8
06-Apr-11 12:14:00	788.3	64.2	2.49	4.28	1706.67	72.6
06-Apr-11 12:16:00	786.5	64.2	2.55	4.28	1714.58	72.3
06-Apr-11 12:18:00	786.3	64.2	2.29	19.10	1673.14	72.1
06-Apr-11 12:20:00	784.8	64.3	2.53	4.35	1706.13	29.8
06-Apr-11 12:22:00	784.5	64.3	2.56	4.36	1654.14	47.0
06-Apr-11 12:24:00	788.0	64.3	2.54	4.30	1670.55	72.2
06-Apr-11 12:26:00	788.0	64.4	2.54	4.21	1684.88	72.0
06-Apr-11 12:28:00	786.4	64.6	2.39	4.28	1694.36	71.9
06-Apr-11 12:30:00	784.0	64.8	2.30	4.27	1685.70	71.7
06-Apr-11 12:32:00	785.6	64.9	2.61	5.27	1685.78	71.6
06-Apr-11 12:34:00	786.6	64.8	2.50	4.96	1663.60	71.4
06-Apr-11 12:36:00	789.2	64.4	2.46	4.38	1629.00	0.0
06-Apr-11 12:38:00	786.8	64.5	2.49	4.27	1682.05	69.1
06-Apr-11 12:40:00	785.2	64.5	2.55	4.24	1651.79	69.5
06-Apr-11 12:42:00	787.9	64.5	2.45	4.23	1690.06	69.9
06-Apr-11 12:44:00	788.5	64.5	2.32	4.25	1717.72	70.3
06-Apr-11 12:46:00	787.0	64.4	2.52	4.26	1657.19	70.7
06-Apr-11 12:48:00	785.6	64.3	2.44	17.93	1671.70	71.0
06-Apr-11 12:50:00	787.0	64.4	2.60	4.47	1708.19	27.0
06-Apr-11 12:52:00	787.0	64.4	2.43	4.25	1680.03	43.6

06-Apr-11 12:54:00	785.9	64.5	2.45	4.28	1687.24	70.5
06-Apr-11 12:56:00	786.8	64.5	2.62	4.30	1696.25	70.3
06-Apr-11 12:58:00	784.8	64.6	2.53	4.23	1666.76	70.1
06-Apr-11 13:00:00	785.6	64.6	2.49	4.36	1692.06	69.9
06-Apr-11 13:02:00	785.6	64.7	2.41	4.34	1707.65	69.7
06-Apr-11 13:04:00	786.0	64.7	2.64	5.29	1724.01	69.4
06-Apr-11 13:06:00	785.0	64.7	2.40	4.33	1694.34	0.0
06-Apr-11 13:08:00	786.9	64.7	2.42	4.36	1693.13	69.0
06-Apr-11 13:10:00	786.2	64.6	2.53	4.28	1687.60	69.3
06-Apr-11 13:12:00	788.8	64.5	2.38	4.27	1699.85	69.6
06-Apr-11 13:14:00	783.5	64.4	2.52	4.28	1688.55	69.9
06-Apr-11 13:16:00	785.6	64.4	2.53	4.30	1698.22	70.2
06-Apr-11 13:18:00	786.7	64.4	2.42	15.69	1698.53	70.5
06-Apr-11 13:20:00	787.1	64.4	2.45	4.33	1667.38	27.1
06-Apr-11 13:22:00	786.2	64.5	2.57	4.26	1684.46	41.5
06-Apr-11 13:24:00	785.7	64.5	2.48	4.27	1701.89	69.6
06-Apr-11 13:26:00	788.0	64.5	2.48	4.27	1713.21	69.7
06-Apr-11 13:28:00	788.4	64.6	2.49	4.22	1704.77	69.9
06-Apr-11 13:30:00	785.6	64.7	2.53	4.22	1709.43	70.0

	3GJ5NETMWATT	3FFVTOTLFUELFL	3AAVSELO2	3RAVO2PERCENT	3RAVSTKGASFLOW	3RAVSO2PPM1MIN
07-Apr-11 10:10:00	220.6	65.2	2.72	6.02	2575582	69.23
07-Apr-11 10:12:00	221.3	65.3	2.71	5.89	2568136	68.76
07-Apr-11 10:14:00	222.1	65.6	2.70	5.94	2520963	68.29
07-Apr-11 10:16:00	223.4	64.3	2.74	5.85	2516869	67.83
07-Apr-11 10:18:00	221.6	64.4	2.66	6.17	2535008	67.36
07-Apr-11 10:20:00	219.7	64.0	2.70	17.98	2479595	66.89
07-Apr-11 10:22:00	217.7	64.6	2.55	5.84	2431710	14.93
07-Apr-11 10:24:00	219.5	65.6	2.69	6.12	2499652	47.15
07-Apr-11 10:26:00	220.3	65.6	2.70	5.95	2537378	62.40
07-Apr-11 10:28:00	221.5	65.5	2.66	5.90	2531069	62.64
07-Apr-11 10:30:00	222.3	65.6	2.71	5.98	2528536	62.87
07-Apr-11 10:32:00	223.4	65.5	2.73	5.96	2517881	63.10
07-Apr-11 10:34:00	221.8	64.1	2.79	6.11	2499155	63.34
07-Apr-11 10:36:00	220.1	63.4	2.62	6.02	2450715	63.57
07-Apr-11 10:38:00	219.5	65.1	2.61	5.92	2431554	22.96
07-Apr-11 10:40:00	220.3	65.7	2.67	6.07	2570878	59.62
07-Apr-11 10:42:00	222.1	65.6	2.59	5.80	2546848	60.19
07-Apr-11 10:44:00	222.5	65.6	2.70	5.82	2501305	60.75
07-Apr-11 10:46:00	221.8	64.4	2.87	6.00	2516256	61.32
07-Apr-11 10:48:00	221.5	64.6	2.70	6.03	2475825	61.88
07-Apr-11 10:50:00	221.4	64.4	2.74	19.95	2451708	62.45
07-Apr-11 10:52:00	219.6	64.8	2.58	5.88	2415805	14.65
07-Apr-11 10:54:00	219.8	65.7	2.81	6.03	2483768	50.17
07-Apr-11 10:56:00	220.6	65.3	2.72	6.05	2544523	56.99
07-Apr-11 10:58:00	221.6	65.4	2.64	5.95	2502917	57.21
07-Apr-11 11:00:00	221.9	65.4	2.80	5.92	2504463	57.42
07-Apr-11 11:02:00	222.3	64.2	2.89	5.96	2517161	57.64
07-Apr-11 11:04:00	220.1	64.5	2.72	7.34	2451146	57.85
07-Apr-11 11:06:00	219.5	64.3	2.67	5.98	2430106	58.07
07-Apr-11 11:08:00	220.0	65.1	2.73	5.96	2442563	21.97
07-Apr-11 11:10:00	221.0	65.0	2.69	6.05	2527872	57.31
07-Apr-11 11:12:00	221.6	65.1	2.70	5.99	2521152	56.58
07-Apr-11 11:14:00	220.8	65.1	2.71	5.90	2508303	55.85
07-Apr-11 11:16:00	220.5	65.1	2.75	5.99	2484736	55.12
07-Apr-11 11:18:00	220.6	63.7	2.67	6.08	2494080	54.38
07-Apr-11 11:20:00	220.6	63.5	2.65	19.96	2443459	53.65
07-Apr-11 11:22:00	217.1	64.0	2.50	5.95	2426936	32.97
07-Apr-11 11:24:00	218.9	64.8	2.92	6.14	2510344	42.18
07-Apr-11 11:26:00	219.4	64.5	2.81	6.01	2557839	55.39
07-Apr-11 11:28:00	220.7	64.8	2.70	6.09	2489584	55.49
07-Apr-11 11:30:00	220.0	64.9	2.58	5.86	2473365	55.59
07-Apr-11 11:32:00	220.8	65.0	2.69	5.89	2499042	55.69
07-Apr-11 11:34:00	221.3	63.8	2.77	5.92	2515081	55.79
07-Apr-11 11:36:00	220.3	63.9	2.69	6.17	2508912	55.88
07-Apr-11 11:38:00	217.0	64.3	2.68	5.97	2457744	6.32
07-Apr-11 11:40:00	219.7	65.5	2.77	5.96	2490661	53.91
07-Apr-11 11:42:00	221.0	65.5	2.72	5.92	2537753	53.92
07-Apr-11 11:44:00	221.5	65.8	2.74	5.86	2537563	53.94
07-Apr-11 11:46:00	222.3	65.6	2.77	5.95	2537496	53.96
07-Apr-11 11:48:00	222.4	65.4	2.64	5.94	2510489	53.97
07-Apr-11 11:50:00	221.3	63.9	2.84	19.85	2458033	53.99
07-Apr-11 11:52:00	220.5	64.2	2.57	5.96	2414945	33.58
07-Apr-11 11:54:00	219.5	64.4	2.58	5.85	2448248	41.63
07-Apr-11 11:56:00	219.9	64.7	2.68	5.91	2496594	53.98
07-Apr-11 11:58:00	220.7	65.1	2.56	5.94	2473453	53.61
07-Apr-11 12:00:00	222.2	65.1	2.64	5.79	2492634	53.24
07-Apr-11 12:02:00	222.2	65.0	2.73	5.85	2484222	52.88
07-Apr-11 12:04:00	223.1	64.9	2.80	5.89	2451370	52.51
07-Apr-11 12:06:00	221.6	63.9	2.80	6.20	2477760	52.14

07-Apr-11 12:08:00	219.9	63.3	2.61	5.87	2403789	6.46
07-Apr-11 12:10:00	219.8	64.0	2.69	5.94	2420222	51.86
07-Apr-11 12:12:00	221.1	64.8	2.78	5.88	2511806	51.50
07-Apr-11 12:14:00	221.5	65.0	2.73	5.84	2593482	51.13
07-Apr-11 12:16:00	221.8	65.0	2.77	5.85	2556397	50.76
07-Apr-11 12:18:00	221.6	65.0	2.75	5.89	2480578	50.40
07-Apr-11 12:20:00	221.6	63.0	2.85	19.65	2460953	50.03
07-Apr-11 12:22:00	219.4	63.2	2.57	6.05	2446216	31.12
07-Apr-11 12:24:00	218.5	63.9	2.11	5.82	2401941	37.50
07-Apr-11 12:26:00	218.4	62.5	2.87	5.80	2396254	43.75
07-Apr-11 12:28:00	217.9	63.1	2.94	5.99	2500312	36.61
07-Apr-11 12:30:00	220.9	66.2	2.94	6.02	2618058	29.46
07-Apr-11 12:32:00	220.8	63.9	3.53	6.22	2699428	22.32
07-Apr-11 12:34:00	221.6	63.3	2.83	6.23	2577488	15.18
07-Apr-11 12:36:00	220.6	64.6	2.72	6.23	2431106	8.04
07-Apr-11 12:38:00	219.5	64.9	2.54	5.76	2412432	0.89
07-Apr-11 12:40:00	220.3	65.1	2.69	5.83	2490681	2.11
07-Apr-11 12:42:00	220.0	65.4	2.64	5.94	2506617	4.53
07-Apr-11 12:44:00	223.0	64.9	2.64	5.66	2469085	6.95
07-Apr-11 12:46:00	221.8	65.4	2.70	5.71	2490670	9.37
07-Apr-11 12:48:00	221.6	65.1	2.71	5.88	2523389	11.78
07-Apr-11 12:50:00	222.3	64.1	2.72	19.31	2474492	14.20
07-Apr-11 12:52:00	218.8	63.5	2.51	5.86	2420841	16.62
07-Apr-11 12:54:00	220.3	64.5	2.61	5.77	2399155	19.03
07-Apr-11 12:56:00	220.2	65.1	2.62	5.82	2476994	21.45
07-Apr-11 12:58:00	221.7	64.8	2.62	5.86	2520878	23.87
07-Apr-11 13:00:00	221.8	65.0	2.59	5.64	2497743	26.29
07-Apr-11 13:02:00	221.6	62.8	2.93	5.87	2506912	28.70
07-Apr-11 13:04:00	220.1	63.6	2.65	5.93	2498238	31.12
07-Apr-11 13:06:00	220.0	63.7	2.59	5.95	2442030	33.54
07-Apr-11 13:08:00	219.9	63.9	2.48	5.79	2412659	4.35
07-Apr-11 13:10:00	220.3	64.3	2.69	5.82	2464939	5.67
07-Apr-11 13:12:00	219.6	65.2	2.79	5.86	2505916	12.14
07-Apr-11 13:14:00	221.3	64.6	2.68	5.90	2508544	18.62
07-Apr-11 13:16:00	223.5	64.6	2.57	5.93	2497769	25.09
07-Apr-11 13:18:00	221.9	63.0	2.73	5.97	2477333	31.57
07-Apr-11 13:20:00	219.9	62.8	2.63	19.23	2436846	38.04
07-Apr-11 13:22:00	219.0	63.3	2.57	5.80	2402516	26.82
07-Apr-11 13:24:00	218.7	64.4	2.73	5.90	2511626	30.52
07-Apr-11 13:26:00	219.6	64.7	2.85	6.01	2623251	42.68
07-Apr-11 13:28:00	220.2	64.9	2.64	5.81	2598149	44.94
07-Apr-11 13:30:00	221.5	64.7	2.72	5.90	2510415	47.20
07-Apr-11 13:32:00	222.0	63.8	2.86	5.87	2489860	49.46
07-Apr-11 13:34:00	220.6	63.3	2.92	6.09	2496898	51.72
07-Apr-11 13:36:00	219.8	63.4	2.67	6.17	2420267	53.98
07-Apr-11 13:38:00	218.0	64.0	2.49	5.83	2432203	6.90
07-Apr-11 13:40:00	220.3	64.4	2.75	6.01	2512037	54.71
07-Apr-11 13:42:00	220.3	64.5	2.72	5.88	2498959	56.53
07-Apr-11 13:44:00	220.7	64.7	2.80	5.88	2496979	58.35
07-Apr-11 13:46:00	221.8	64.4	2.81	5.94	2529497	60.18
07-Apr-11 13:48:00	220.3	63.9	2.85	6.01	2534704	62.00
07-Apr-11 13:50:00	220.1	62.7	2.72	18.99	2457740	63.82
07-Apr-11 13:52:00	218.5	63.8	2.50	5.71	2384686	17.11
07-Apr-11 13:54:00	219.4	64.8	2.67	5.93	2456615	49.42
07-Apr-11 13:56:00	219.9	65.1	2.86	6.04	2558640	64.31
07-Apr-11 13:58:00	222.4	65.0	2.72	6.00	2595584	64.98
07-Apr-11 14:00:00	223.6	64.8	2.69	5.76	2551220	65.66

	2GJ5NETMWATT	2FFVTOTLFUELFL	2AAVSELO2	2RAVO2PERCENT	2RAVSTKGASFLOW	2RAVSO2PPM1MIN
07-Apr-11 19:00:00	170.7	57.41	5.45	7.92	2073120	57.3
07-Apr-11 19:02:00	172.7	57.87	5.33	8.02	2075785	57.0
07-Apr-11 19:04:00	172.7	57.17	5.39	7.71	2082304	56.6
07-Apr-11 19:06:00	171.3	56.60	5.79	8.09	2070829	56.2
07-Apr-11 19:08:00	169.7	56.93	5.41	19.66	2053391	52.8
07-Apr-11 19:10:00	169.6	57.35	5.45	8.26	2030544	10.8
07-Apr-11 19:12:00	169.4	58.17	5.58	8.00	2061664	45.4
07-Apr-11 19:14:00	170.2	57.90	5.41	7.78	2088017	56.8
07-Apr-11 19:16:00	171.3	58.08	5.24	7.78	2093920	55.4
07-Apr-11 19:18:00	173.7	57.34	5.27	7.69	2096864	54.0
07-Apr-11 19:20:00	172.1	56.73	5.57	8.00	2082125	52.7
07-Apr-11 19:22:00	171.4	55.87	5.72	8.05	2055186	52.3
07-Apr-11 19:24:00	169.1	56.68	5.69	8.39	2036019	52.7
07-Apr-11 19:26:00	169.4	57.88	5.50	7.94	2034112	0.0
07-Apr-11 19:28:00	169.8	58.30	5.40	7.97	2062400	57.0
07-Apr-11 19:30:00	171.0	57.73	5.40	7.91	2095069	56.4
07-Apr-11 19:32:00	172.0	57.56	5.50	7.88	2101408	55.8
07-Apr-11 19:34:00	172.9	57.38	5.64	8.04	2091141	55.3
07-Apr-11 19:36:00	172.2	57.21	5.61	8.14	2080095	54.7
07-Apr-11 19:38:00	170.9	56.87	5.66	19.34	2074921	53.2
07-Apr-11 19:40:00	168.9	56.73	5.91	8.16	2054752	12.4
07-Apr-11 19:42:00	169.5	57.88	5.44	8.17	2052970	43.9
07-Apr-11 19:44:00	170.2	57.73	5.29	7.82	2078390	57.2
07-Apr-11 19:46:00	171.8	57.58	5.39	8.17	2101069	58.5
07-Apr-11 19:48:00	172.6	57.43	5.39	7.82	2074656	59.8
07-Apr-11 19:50:00	172.2	57.25	5.71	8.21	2076435	61.1
07-Apr-11 19:52:00	170.7	57.49	5.62	8.08	2058058	59.7
07-Apr-11 19:54:00	169.3	57.72	5.61	8.32	2050028	58.8
07-Apr-11 19:56:00	169.6	57.99	5.53	7.95	2054016	0.0
07-Apr-11 19:58:00	171.0	58.21	5.28	7.87	2076944	62.6
07-Apr-11 20:00:00	170.9	58.44	5.55	8.02	2094197	63.2
07-Apr-11 20:02:00	173.1	58.07	5.36	7.94	2095151	63.7
07-Apr-11 20:04:00	171.9	56.67	5.73	8.15	2093792	64.3
07-Apr-11 20:06:00	171.7	56.93	5.63	8.03	2048672	64.8
07-Apr-11 20:08:00	169.3	57.19	5.83	17.10	2027219	63.2
07-Apr-11 20:10:00	169.4	57.43	5.48	7.98	2063673	14.4
07-Apr-11 20:12:00	169.6	57.46	5.67	7.99	2093486	54.8
07-Apr-11 20:14:00	170.1	57.49	5.43	8.05	2096677	68.6
07-Apr-11 20:16:00	172.7	57.51	5.39	7.89	2097165	67.0
07-Apr-11 20:18:00	171.9	57.54	5.61	7.97	2093056	65.5
07-Apr-11 20:20:00	171.4	57.71	5.55	8.15	2089041	63.9
07-Apr-11 20:22:00	171.2	57.89	5.50	8.00	2072622	62.1
07-Apr-11 20:24:00	169.2	58.08	5.55	8.70	2083426	60.9
07-Apr-11 20:26:00	170.2	58.18	5.48	8.02	2092822	0.0
07-Apr-11 20:28:00	170.1	57.98	5.45	8.00	2104248	64.2
07-Apr-11 20:30:00	170.9	57.79	5.45	7.92	2083805	63.8
07-Apr-11 20:32:00	172.5	57.49	5.62	7.74	2090688	63.4
07-Apr-11 20:34:00	172.5	57.05	5.51	8.12	2097896	63.1
07-Apr-11 20:36:00	170.8	57.10	5.64	8.10	2069312	62.7
07-Apr-11 20:38:00	170.1	57.38	5.65	14.67	2031331	57.4
07-Apr-11 20:40:00	169.6	57.92	5.67	8.00	2040361	13.5
07-Apr-11 20:42:00	169.9	58.16	5.44	7.81	2081835	45.1
07-Apr-11 20:44:00	170.4	58.02	5.56	7.93	2112652	58.6
07-Apr-11 20:46:00	170.5	57.88	5.64	7.96	2109957	58.9
07-Apr-11 20:48:00	172.9	57.74	5.50	7.80	2112292	59.2
07-Apr-11 20:50:00	172.8	57.53	5.69	8.01	2105783	59.4
07-Apr-11 20:52:00	171.7	56.91	5.64	7.95	2092251	59.7
07-Apr-11 20:54:00	171.5	57.13	5.47	8.88	2057040	56.8
07-Apr-11 20:56:00	169.6	57.34	5.53	7.96	2041722	0.0

07-Apr-11 20:58:00	169.4	57.77	5.61	8.02	2044436	54.6
07-Apr-11 21:00:00	170.5	58.10	5.53	7.76	2084794	55.0
07-Apr-11 21:02:00	170.6	57.97	5.53	8.04	2098458	55.4
07-Apr-11 21:04:00	172.9	57.85	5.58	8.03	2095562	55.9
07-Apr-11 21:06:00	172.1	57.73	5.72	8.01	2096096	56.3
07-Apr-11 21:08:00	170.9	57.60	5.60	11.14	2080216	54.9
07-Apr-11 21:10:00	170.2	57.76	5.65	8.07	2066081	14.6
07-Apr-11 21:12:00	169.6	57.99	5.77	8.14	2054016	45.2
07-Apr-11 21:14:00	168.9	58.27	5.48	8.01	2056971	57.1
07-Apr-11 21:16:00	169.5	58.61	5.49	8.02	2083104	57.5
07-Apr-11 21:18:00	170.8	58.68	5.58	7.90	2091632	57.9
07-Apr-11 21:20:00	171.4	58.40	5.40	7.79	2095412	58.3
07-Apr-11 21:22:00	172.1	58.06	5.79	7.98	2101134	59.5
07-Apr-11 21:24:00	172.1	57.62	5.43	8.95	2078464	57.5
07-Apr-11 21:26:00	171.4	57.75	5.58	8.03	2066823	0.0
07-Apr-11 21:28:00	170.3	58.01	5.76	8.06	2056253	59.7
07-Apr-11 21:30:00	169.8	58.69	5.57	7.93	2050871	58.5
07-Apr-11 21:32:00	169.0	58.68	5.38	7.85	2089683	57.3
07-Apr-11 21:34:00	170.3	58.53	5.64	8.02	2099059	56.0
07-Apr-11 21:36:00	170.9	58.38	5.40	7.83	2101769	54.8
07-Apr-11 21:38:00	172.9	57.43	5.82	11.04	2089535	56.0
07-Apr-11 21:40:00	172.2	57.67	5.56	8.22	2072202	14.1
07-Apr-11 21:42:00	169.1	57.92	5.71	8.02	2045891	46.7
07-Apr-11 21:44:00	169.6	58.54	5.52	7.85	2046231	59.0
07-Apr-11 21:46:00	170.0	59.32	5.42	7.92	2092692	58.3
07-Apr-11 21:48:00	171.3	59.10	5.41	7.76	2115277	57.6
07-Apr-11 21:50:00	172.7	58.87	5.43	7.77	2102274	56.8
07-Apr-11 21:52:00	172.1	58.73	5.62	7.97	2113134	56.9
07-Apr-11 21:54:00	171.1	58.80	5.63	9.12	2096927	54.3
07-Apr-11 21:56:00	169.7	58.87	5.54	8.16	2063247	0.0
07-Apr-11 21:58:00	169.7	58.94	5.45	7.89	2061796	55.6
07-Apr-11 22:00:00	169.4	59.02	5.75	8.15	2090173	55.0
07-Apr-11 22:02:00	170.1	59.01	5.64	8.02	2102665	54.4
07-Apr-11 22:04:00	172.1	58.78	5.64	8.07	2125888	53.8
07-Apr-11 22:06:00	172.2	58.55	5.68	8.02	2119808	53.2
07-Apr-11 22:08:00	171.3	58.57	5.73	10.60	2104183	52.1
07-Apr-11 22:10:00	170.6	58.74	5.72	8.17	2071616	12.3
07-Apr-11 22:12:00	168.7	58.91	5.57	8.06	2057088	39.6
07-Apr-11 22:14:00	169.1	59.18	5.58	7.99	2053280	51.1
07-Apr-11 22:16:00	170.4	59.65	5.50	7.85	2096548	51.0
07-Apr-11 22:18:00	170.8	59.41	5.43	7.98	2114554	51.0
07-Apr-11 22:20:00	172.3	59.17	5.58	8.02	2124263	50.9
07-Apr-11 22:22:00	171.2	58.82	5.71	8.22	2121173	51.1
07-Apr-11 22:24:00	170.6	58.47	5.52	9.58	2068255	48.7
07-Apr-11 22:26:00	170.2	58.61	5.57	7.92	2054240	0.0
07-Apr-11 22:28:00	168.8	58.79	5.50	8.06	2056199	52.1
07-Apr-11 22:30:00	168.7	58.96	5.48	7.89	2065108	52.3
07-Apr-11 22:32:00	169.2	59.64	5.47	7.95	2099919	52.5
07-Apr-11 22:34:00	171.2	59.41	5.47	7.89	2120414	52.8
07-Apr-11 22:36:00	172.8	59.08	5.40	7.87	2121397	53.0
07-Apr-11 22:38:00	170.8	59.16	5.59	8.11	2105501	51.6
07-Apr-11 22:40:00	170.5	59.25	5.53	8.07	2073578	10.9
07-Apr-11 22:42:00	169.8	59.34	5.72	8.03	2063968	40.0
07-Apr-11 22:44:00	170.1	59.43	5.53	7.99	2073662	52.3
07-Apr-11 22:46:00	168.6	59.57	5.65	8.15	2087828	52.9
07-Apr-11 22:48:00	169.6	59.52	5.42	8.00	2109133	53.5
07-Apr-11 22:50:00	170.5	59.41	5.47	7.98	2121637	54.0
07-Apr-11 22:52:00	172.9	59.31	5.46	7.82	2104503	53.1
07-Apr-11 22:54:00	171.8	59.21	5.47	10.11	2093489	53.5
07-Apr-11 22:56:00	171.6	59.14	5.71	8.12	2107047	0.0

07-Apr-11 22:58:00	170.8	59.28	5.70	8.24	2103697	60.0
07-Apr-11 23:00:00	170.6	59.41	5.62	7.94	2092041	58.5
07-Apr-11 23:02:00	169.4	59.55	5.64	8.20	2094216	57.0
07-Apr-11 23:04:00	169.1	59.69	5.66	8.13	2080124	55.5
07-Apr-11 23:06:00	169.6	60.35	5.63	8.07	2103023	54.0
07-Apr-11 23:08:00	170.9	60.12	5.34	13.70	2118208	55.0
07-Apr-11 23:10:00	173.7	59.82	5.40	7.90	2129552	15.7
07-Apr-11 23:12:00	171.6	58.55	5.73	8.03	2103621	49.0
07-Apr-11 23:14:00	171.1	58.87	5.53	7.98	2060028	61.0
07-Apr-11 23:16:00	169.9	59.20	5.59	8.11	2041098	58.5
07-Apr-11 23:18:00	169.5	59.46	5.66	8.18	2078277	56.1
07-Apr-11 23:20:00	168.5	59.71	5.69	8.13	2080800	53.7
07-Apr-11 23:22:00	170.4	60.32	5.53	7.98	2102753	51.7
07-Apr-11 23:24:00	171.1	60.12	5.53	11.29	2126240	53.8
07-Apr-11 23:26:00	172.0	59.92	5.52	8.00	2133005	0.0
07-Apr-11 23:28:00	172.1	59.55	5.64	8.11	2133027	62.3
07-Apr-11 23:30:00	171.4	59.18	5.71	8.10	2111360	60.7

Unit 1	Unit 1							
		Net MW	Relative Fuel Flow	Boiler Exit % O2	Stack % O2	KSCFH	ppm SO2	net BTU/KWH
Start Time	End Time	1GJ5NETMWATT	1FFVTOTLFUELFL	1aAVSELO2	1RAVO2PERCENT	1RAVSTKGASFLOW	1RAVSO2PPM1MIN	1PA5HRA
14-Jun-11 10:00:00	14-Jun-11 11:00:00	170.2	56.5	2.35	7.62	1,924,691	42.7	10889.9
14-Jun-11 11:00:00	14-Jun-11 12:00:00	170.1	55.6	2.30	7.60	1,911,799	15.5	10816.1
14-Jun-11 12:00:00	14-Jun-11 13:00:00	170.4	55.4	2.31	7.57	1,914,660	49.9	10813.8
14-Jun-11 13:00:00	14-Jun-11 14:00:00	170.4	55.3	2.29	7.60	1,922,327	36.4	10790.7
14-Jun-11 14:00:00	14-Jun-11 15:00:00	170.8	55.1	2.30	7.59	1,930,471	41.4	10760.3
14-Jun-11 15:00:00	14-Jun-11 16:00:00	170.5	55.3	2.32	7.71	1,929,649	38.6	10803.4
14-Jun-11 16:00:00	14-Jun-11 17:00:00	170.4	55.4	2.29	7.63	1,927,279	39.0	10874.7
14-Jun-11 17:00:00	14-Jun-11 18:00:00	170.7	55.1	2.30	7.60	1,920,290	38.0	10878.7

Unit 5	Unit 5							
		Net MW	Relative Fuel Flow	Boiler Exit % O2	Stack % O2	KSCFM	ppm SO2	net BTU/KWH
Start Time	End Time	5GJ5NETMW	5FFXFUELFLOW	5AAVO2NET90AVG	5RAVWETO2VAL	5RAVAVGFLOW	5RAVSO2PPM1MIN	5PA5HRA
30-Sep-11 09:00:00	30-Sep-11 10:00:00	787.4	68.9	2.50	5.25	1,870.42	40.0	9554.1
30-Sep-11 10:00:00	30-Sep-11 11:00:00	787.6	68.6	2.48	5.93	1,874.31	52.1	9553.4
30-Sep-11 11:00:00	30-Sep-11 12:00:00	786.8	68.8	2.52	5.96	1,875.11	49.5	9574.8
30-Sep-11 12:00:00	30-Sep-11 13:00:00	787.2	69.0	2.50	5.91	1,879.14	46.9	9567.8
30-Sep-11 13:00:00	30-Sep-11 14:00:00	787.5	69.2	2.51	5.57	1,882.48	40.4	9568.5
30-Sep-11 14:00:00	30-Sep-11 15:00:00	788.3	69.3	2.49	5.90	1,886.53	46.7	9564.9
30-Sep-11 15:00:00	30-Sep-11 16:00:00	787.5	69.2	2.50	5.91	1,903.52	46.5	9577.8
30-Sep-11 16:00:00	30-Sep-11 17:00:00	787.7	68.8	2.49	5.90	1,908.88	45.5	9569.9

APPENDIX G – LABORATORY ANALYSES DATA

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

ANALYTICAL REPORT

CLIENT: **TRC ENVIRONMENTAL, INC.**

PROJECT: 178050: APS

ANALYTICAL SERVICES PROVIDED:

- SO3
  (EPA METHOD 8A)

Confirmation of Data Review:

To the best of my knowledge this analytical data has been checked thoroughly for completeness and the results presented are accurate, error-free, legible, and have been performed and validated in accordance with the approved method(s).

Date of Review: April 21, 2011

J. Bruce Nemet

Quality Assurance Officer

www.resolutionanalytics.com
2733 Lee Avenue • Sanford, NC 27332 • Phone: 919-774-5557 • Fax: 919-776-6785

Chain of Custody

TRC Environmental Corporation
7761 Shaffer Parkway
Suite 100
Littleton , CO 80127

Project Name:	APS 4 Corners
Project #:	178050.0000.0000
Date(s):	04/05/11 to 04/07/11
Laboratory:	Resolution
P.O.:	
Ship Date:	04/11/11
Shipped By:	T. SMITH

TRC Contact	
Name:	Travis Smith
eMail:	tsmith@trcsolutions.com
Phone:	512-496-9302

Sample Code	Sample Date	Container Size	Container Material	Matrix: Glass Filter	Acetone	Air	Acidic	Basic	Other	Description	Analysis: NJATM-1	EPA Alt-005	HCl	Cl2	TSP	Diox/Fur	SVOCs	VOCs	HCOH	Other	Comments
182436_M8A_UNIT5_R1_CR	04/05/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT5_R2_CR	04/05/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT5_R3_CR	04/05/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT4_R1_CR	04/06/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT4_R2_CR	04/06/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT4_R3_CR	04/06/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT3_R1_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT3_R2_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT3_R3_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT2_R1_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT2_R2_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_M8A_UNIT2_R3_CR	04/07/11	250ml	Nalgene						X	DI H2O										X	IC analysis
182436_field blank	4/8/11	250ml	Nalgene						X	DI H_2O										X	IC analysis

Notes:

Relinquished by:	Date/Time:	Relinquished by:	Date/Time:
Travis Smith	4/11/11 1524		
Received by:	**Date/Time:**	**Received by:**	**Date/Time:**
[illegible]	4/12/11 1130		

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc
RFA #: 178050
Analysis: EPA Method 8A

Report Summary

Sample ID	Analyte(s) (mg) SO_3
H_2O Blank	< 0.089
UNIT 5 RUN 1	< 0.055
UNIT 5 RUN 2	< 0.057
UNIT 5 RUN 3	0.154
UNIT 4 RUN 1	0.080
UNIT 4 RUN 2	0.097
UNIT 4 RUN 3	< 0.065
UNIT 3 RUN 1	< 0.047
UNIT 3 RUN 2	< 0.049
UNIT 3 RUN 3	< 0.070
UNIT 2 RUN 1	0.080
UNIT 2 RUN 2	0.057
UNIT 2 RUN 3	0.074

* EPA Audits are reported in mg/DSCM SO2

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client:	TRC, Inc
RFA #:	178050
Date Received:	4/12/2011
Date Analyzed:	4/20/2011
Analyst:	TCS
Analysis:	EPA Method 8A
Analyte(s):	SO3

Analytical Narrative

Sample Matrix & Components:

DI H2O Impinger contents and rinses.

Summary of Sample Prep:

Samples were final volumed in the laboratory prior to analysis by ion chromatograghy. See data for dilution factors used in analysis.

Summary of Instrumentation:

Dionex ICS-2100 ion chromatogragh
IonPac AS18 4x250mm
Eluent: 32mM KOH
Suppressor current: 85 mA

25µl injection volume
Flow rate: 1.05 mls/min
Temp: 30° C

Limits Of Quantification:

0.887 mg/L SO_3

Summary Of QA Audit Sample Analysis:

See analytical data sheets for results of internal calibration verification standard results. All internal QC results within ±10 % limits.

Summary Sample Spike Analysis:

See Analytical data sheets for results of sample spike analyses. All spike results within 90% - 110% limits.

<u>Miscellaneous Comments Regarding Sample Analysis:</u> (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

None

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc
RFA #: 178050
Analysis: EPA Method 8A

SO_3 Analytical Data Sheet

SO_4 Standard Calibration Curve

Standard Manufacturer: AccuSpec
Lot ID: SC8350362

m_2: -6.49E-05
m_1: 2.43E-01
b: -9.61E-03

R^2: 0.9999827

$SO4^-$ Conc. (mg/L)	Standard Areas Inj. 1	Inj. 2	Average Area	% Diff.	$SO4^-$ (mg/L)	% Difference from Actual
1.00	0.2466	0.2518	0.2492	2.09%	1.06	6.46%
5.00	1.1894	1.1950	1.1922	0.47%	4.95	-1.03%
10.0	2.4012	2.3964	2.3988	0.20%	9.93	-0.70%
20.0	4.8279	4.8615	4.8447	0.69%	20.1	0.35%
40.0	9.5492	9.6726	9.6109	1.28%	40.0	-0.03%

Internal Calibration Verification

Standard Manufacturer: AccuSpec
Lot ID: SC8350362

	Inj. 1	Inj. 2	Average Area	% Diff.	Expected $SO4^-$ (mg/L)	Actual $SO4^-$ (mg/L)	% Diff.
ICV Standard	2.3994	2.4140	2.4067	0.61%	10.0	10.0	-0.37%

Matrix Spike

Sample I.D.	Inj. 1	Inj. 2	Average Area	% Diff.	Spike $SO4^-$ (mg/L)	Sample SO4 (mg/L)	Calc. $SO4^-$ (mg/L)	% Recovery
UNIT 2 RUN 3	1.3619	1.3608	1.3614	0.08%	5.65	1.42	5.71	98.9%

Note: 1.0 mls of the above sample was spiked with
1.0 mls of a 10.0 ppm sulfate standard.

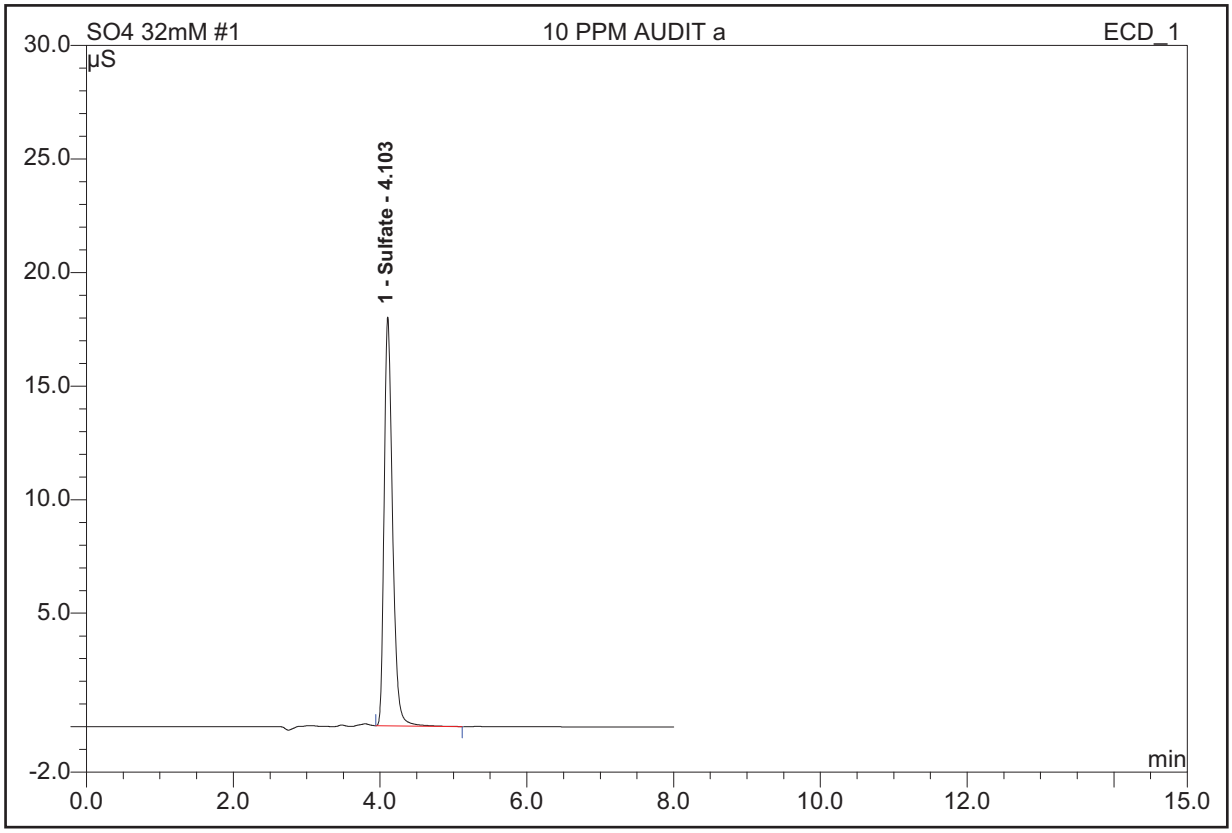
Field Samples

SAMPLE ID	Inj. 1 Area	Inj. 2 Area	ND	Average Area	% Diff.	Dilution Factor	ND	$SO4^-$ (mg/L)	Sample Volume (ml)	ND	**SO_3 Catch (mg)**
H2O Blank	0.0375	0.0373	<	0.2492	NA	1	<	1.065	100	<	**0.089**
UNIT 5 RUN 1	0.1365	0.1440	<	0.2492	NA	1	<	1.065	62	<	**0.055**
UNIT 5 RUN 2	0.2281	0.2501	<	0.2492	NA	1	<	1.065	64	<	**0.057**
UNIT 5 RUN 3	0.7239	0.7084		0.7162	2.16%	1		2.987	62		**0.154**
UNIT 4 RUN 1	0.3551	0.3542		0.3547	0.25%	1		1.498	64		**0.080**
UNIT 4 RUN 2	0.4973	0.4929		0.4951	0.89%	1		2.077	56		**0.097**
UNIT 4 RUN 3	0.2493	0.2455	<	0.2492	NA	1	<	1.065	73	<	**0.065**
UNIT 3 RUN 1	0.1739	0.1756	<	0.2492	NA	1	<	1.065	53	<	**0.047**
UNIT 3 RUN 2	0.1015	0.2351	<	0.2492	NA	1	<	1.065	55	<	**0.049**
UNIT 3 RUN 3	0.1894	0.1908	<	0.2492	NA	1	<	1.065	79	<	**0.070**
UNIT 2 RUN 1	0.3296	0.3300		0.3298	0.12%	1		1.396	69		**0.080**
UNIT 2 RUN 2	0.2752	0.2689		0.2721	2.32%	1		1.159	59		**0.057**
UNIT 2 RUN 3	0.3321	0.3379		0.3350	1.73%	1		1.418	63		**0.074**

1 10 PPM AUDIT a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 15:15**	*Eluent Concentration (mM):*	**32**

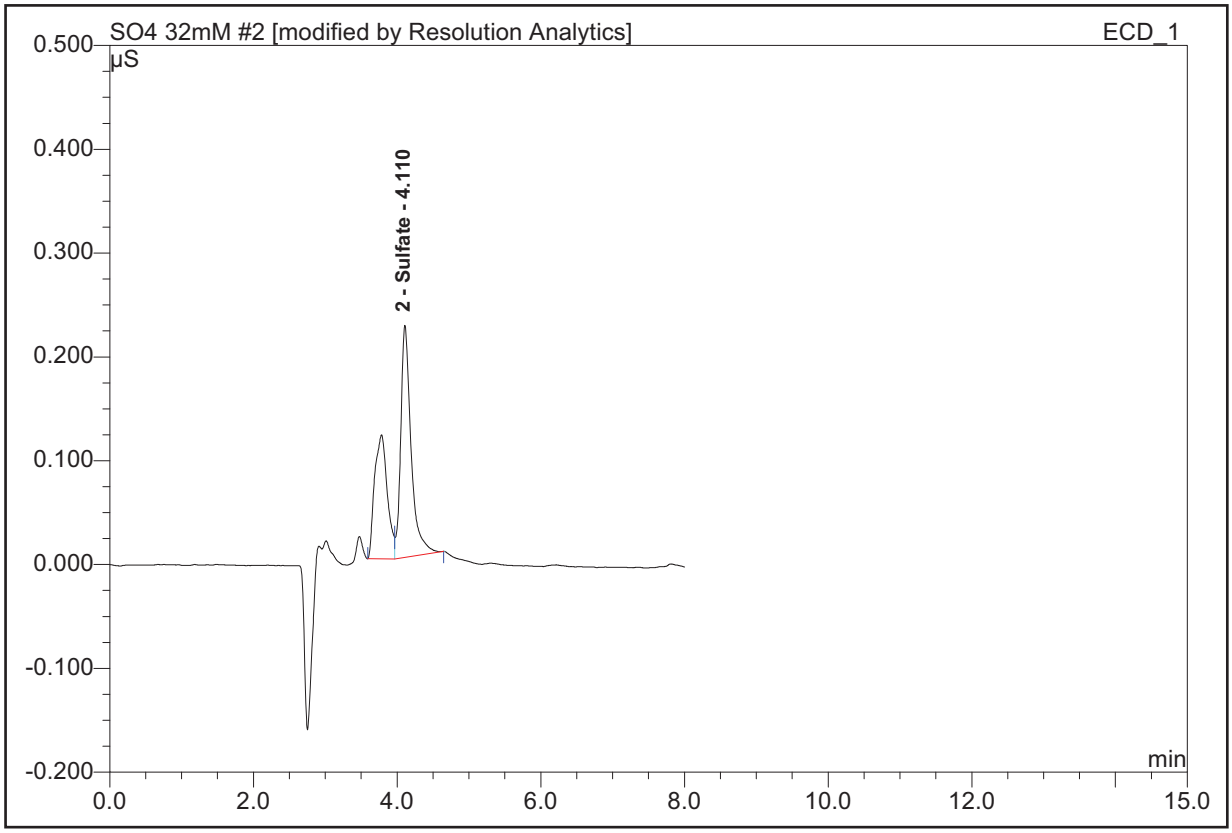


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.10	Sulfate	18.001	2.3994

2 DI H2O a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/21/2011 11:33**	*Eluent Concentration (mM):*	**32**

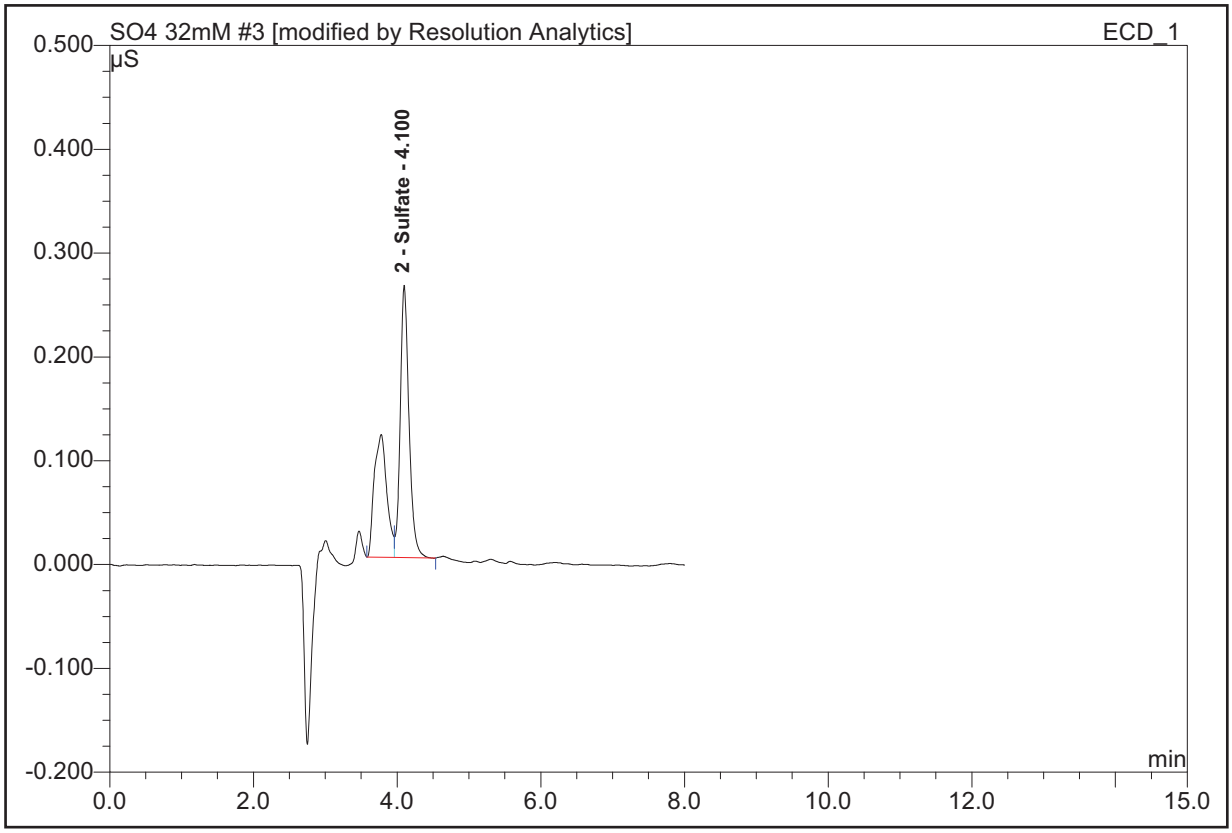


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	0.224	0.0375

3 DI H2O b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/21/2011 11:42**	*Eluent Concentration (mM):*	**32**

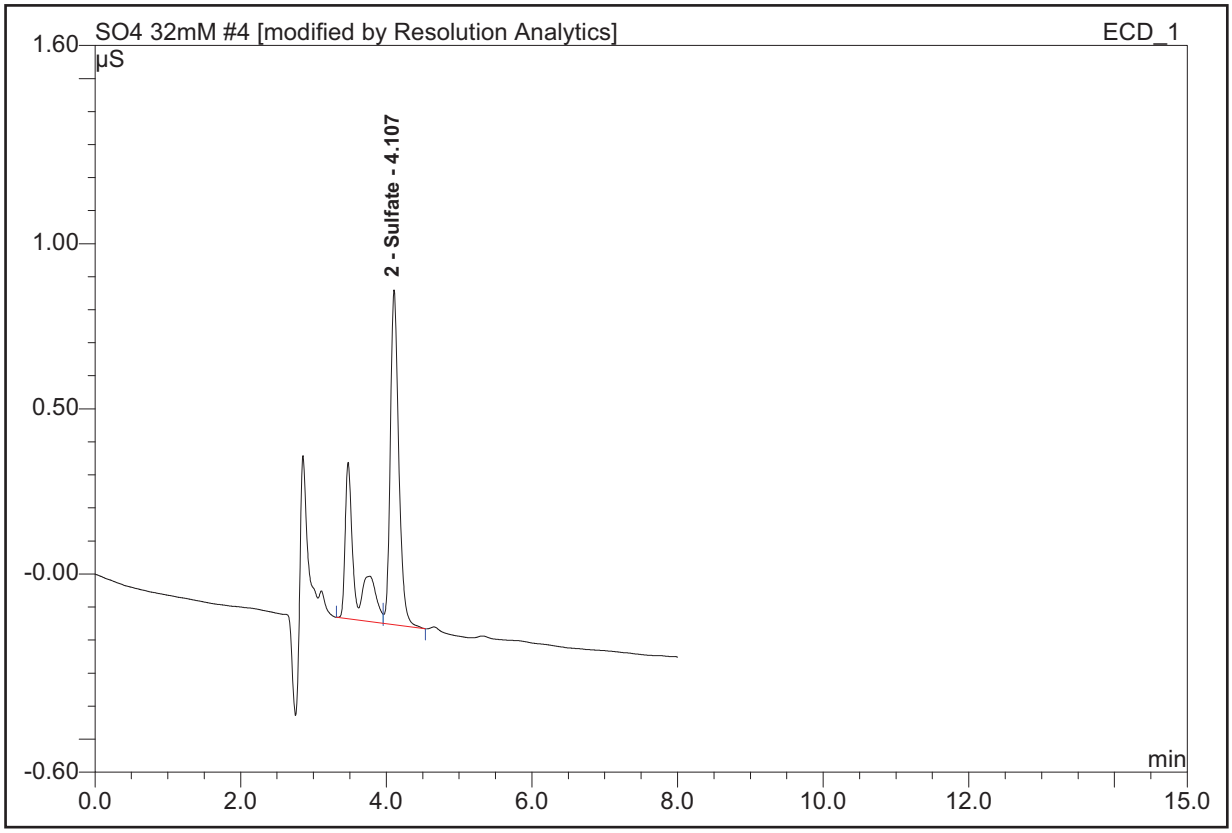


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.10	Sulfate	0.262	0.0373

4 U5-1 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 15:41**	*Eluent Concentration (mM):*	**32**

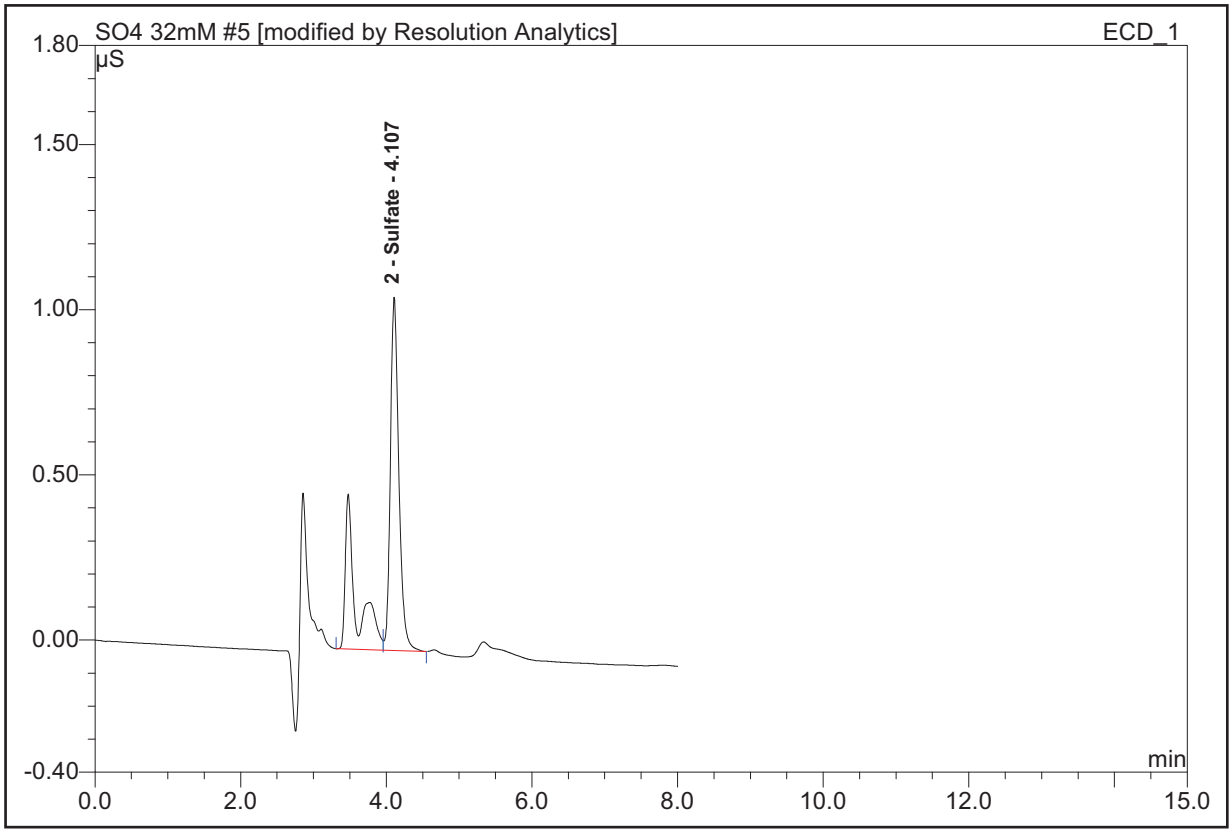


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.013	0.1365

5 U5-1 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 15:51**	*Eluent Concentration (mM):*	**32**

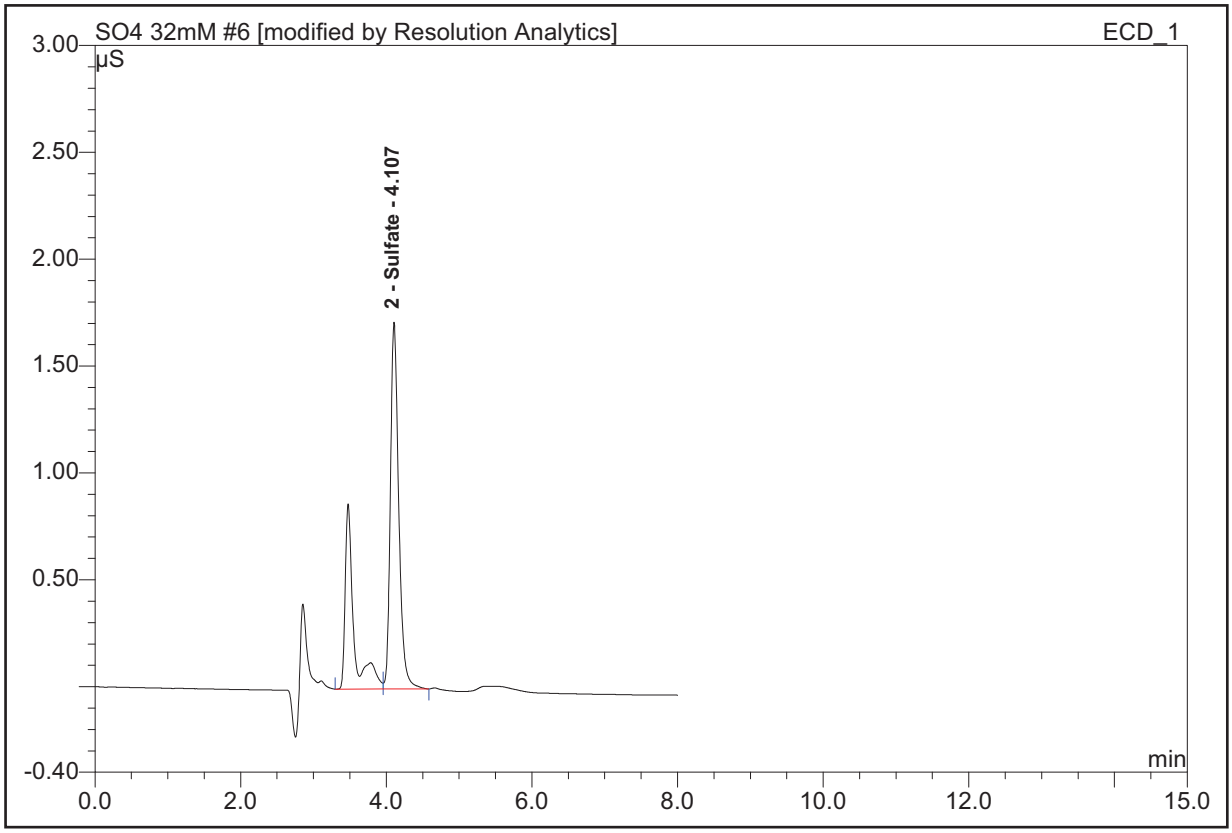


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.069	0.1440

6 U5-2 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:01**	*Eluent Concentration (mM):*	**32**

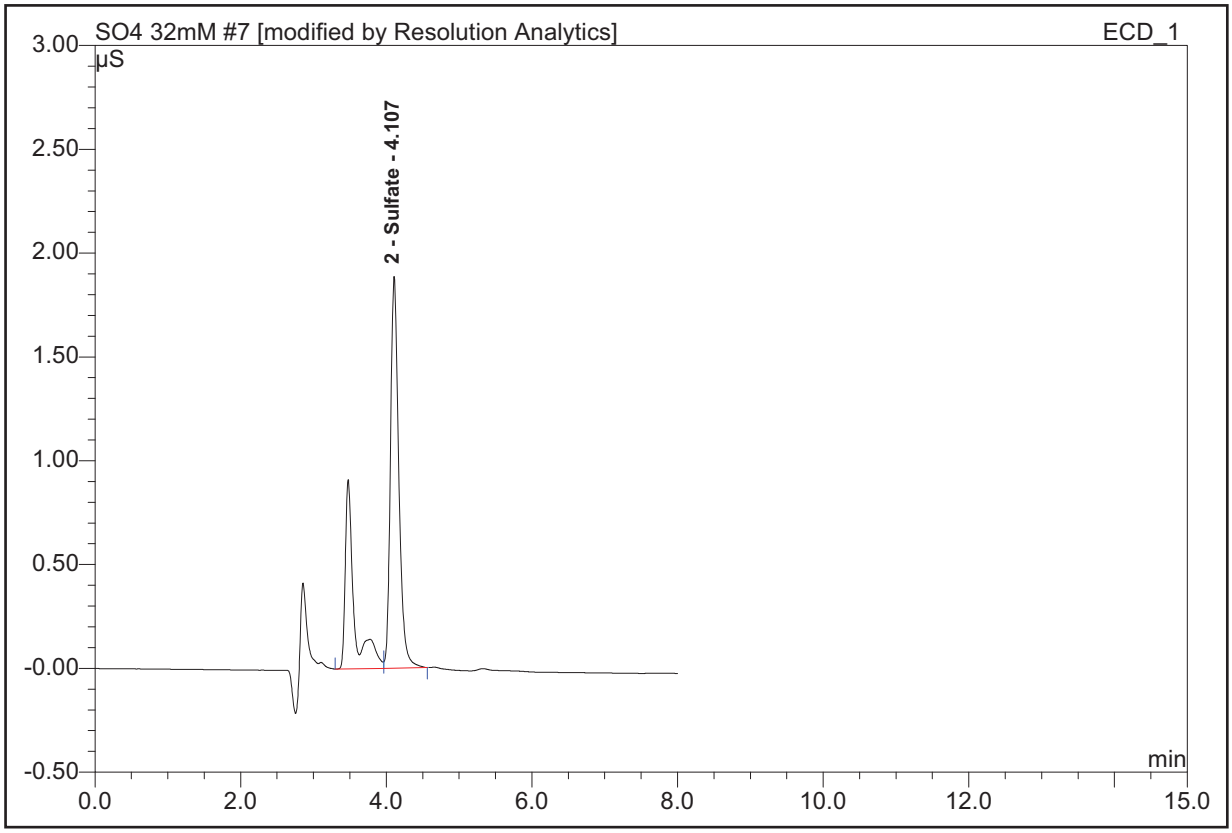


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.716	0.2281

7 U5-2 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:10**	*Eluent Concentration (mM):*	**32**

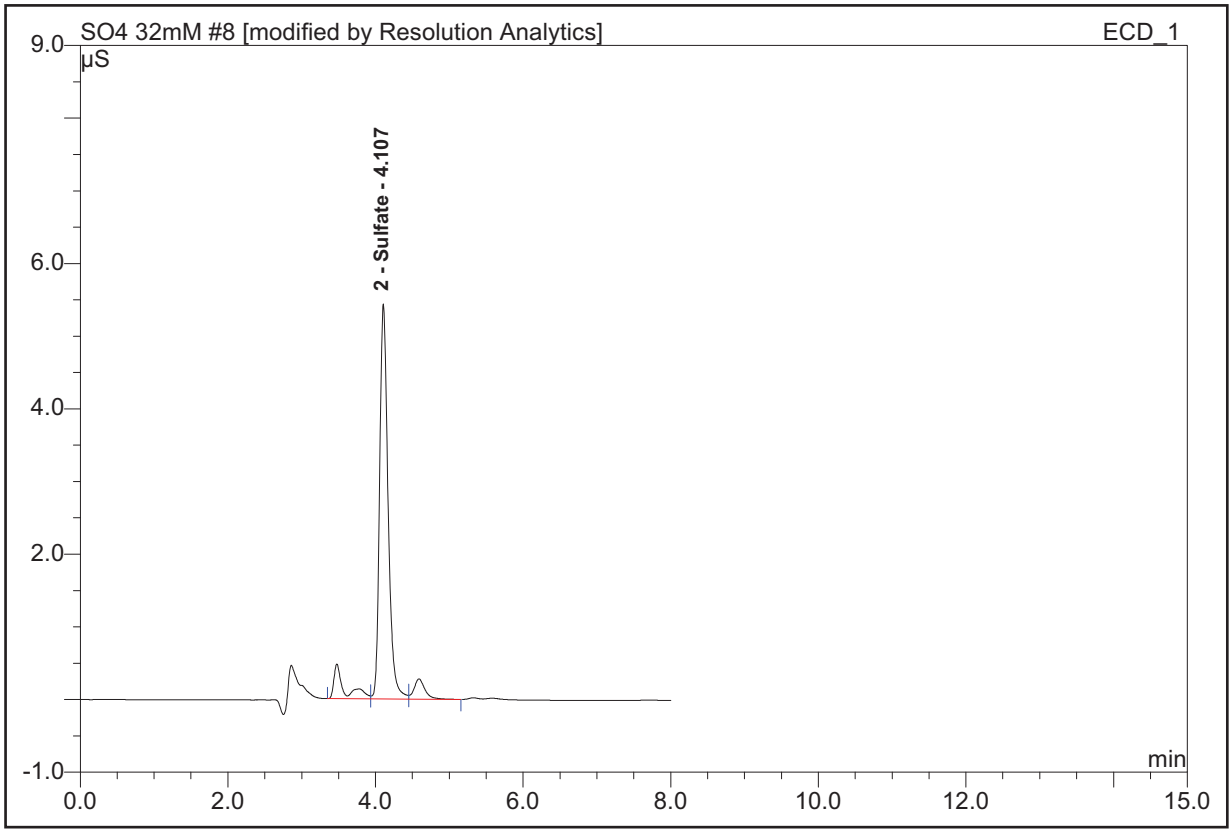


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.886	0.2501

8 U5-3 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:20**	*Eluent Concentration (mM):*	**32**

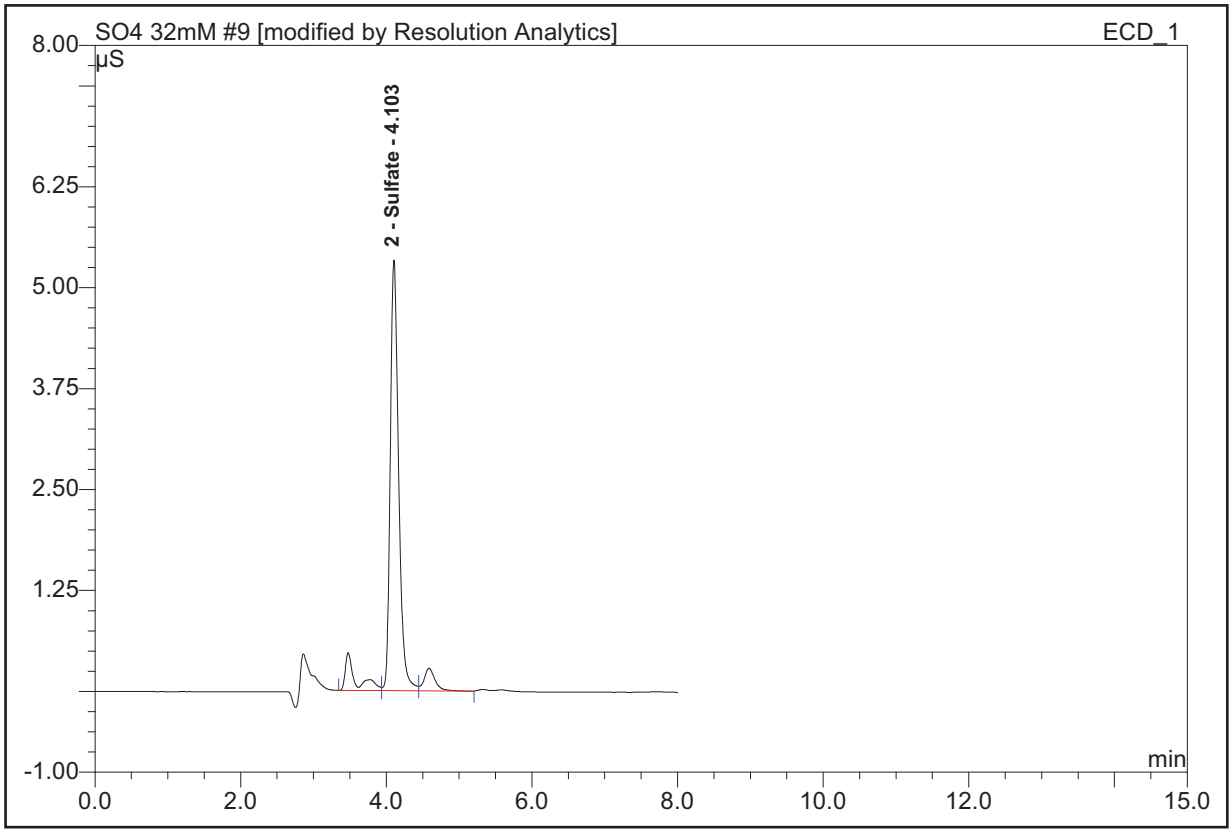


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	5.436	0.7239

9 U5-3 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:30**	*Eluent Concentration (mM):*	**32**

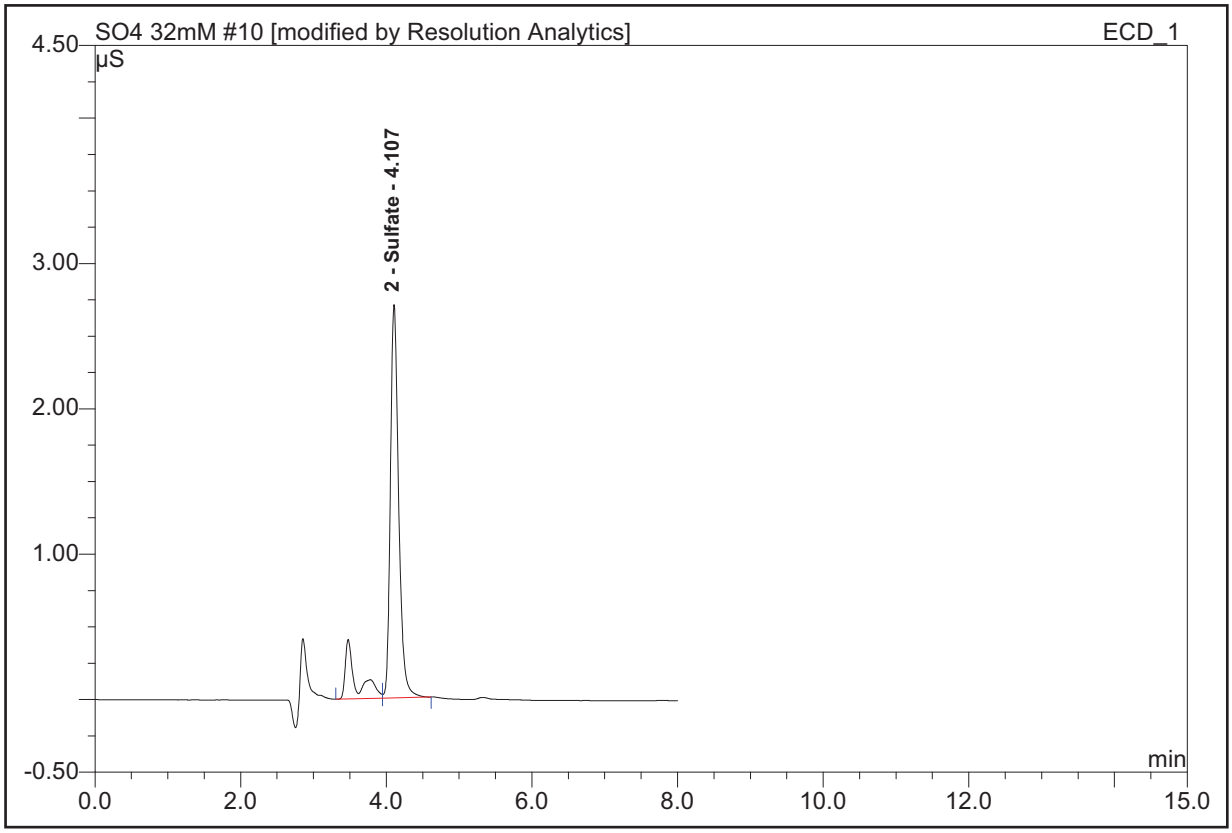


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.10	Sulfate	5.333	0.7084

10 U4-1 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:40**	*Eluent Concentration (mM):*	**32**

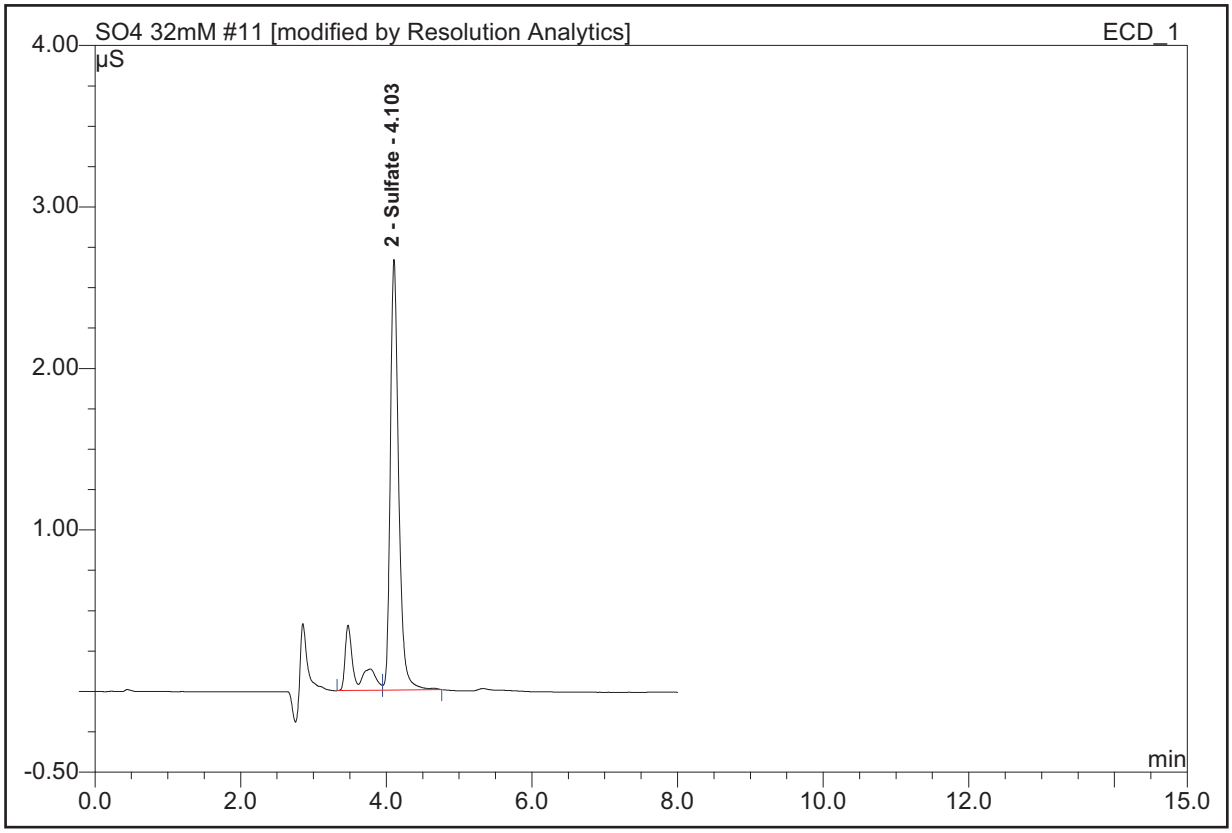


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	2.706	0.3551

11 U4-1 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:49**	*Eluent Concentration (mM):*	**32**

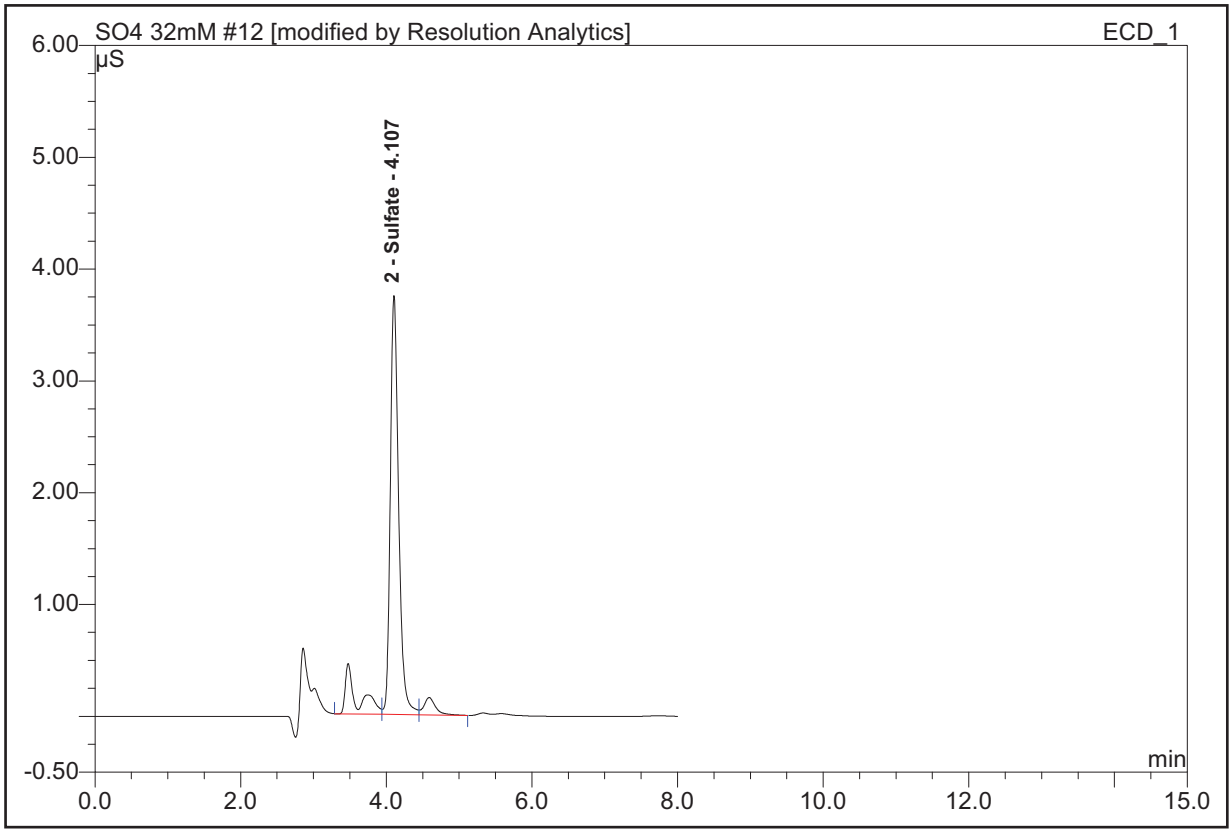


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.10	Sulfate	2.666	0.3542

12 U4-2 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 16:59**	*Eluent Concentration (mM):*	**32**

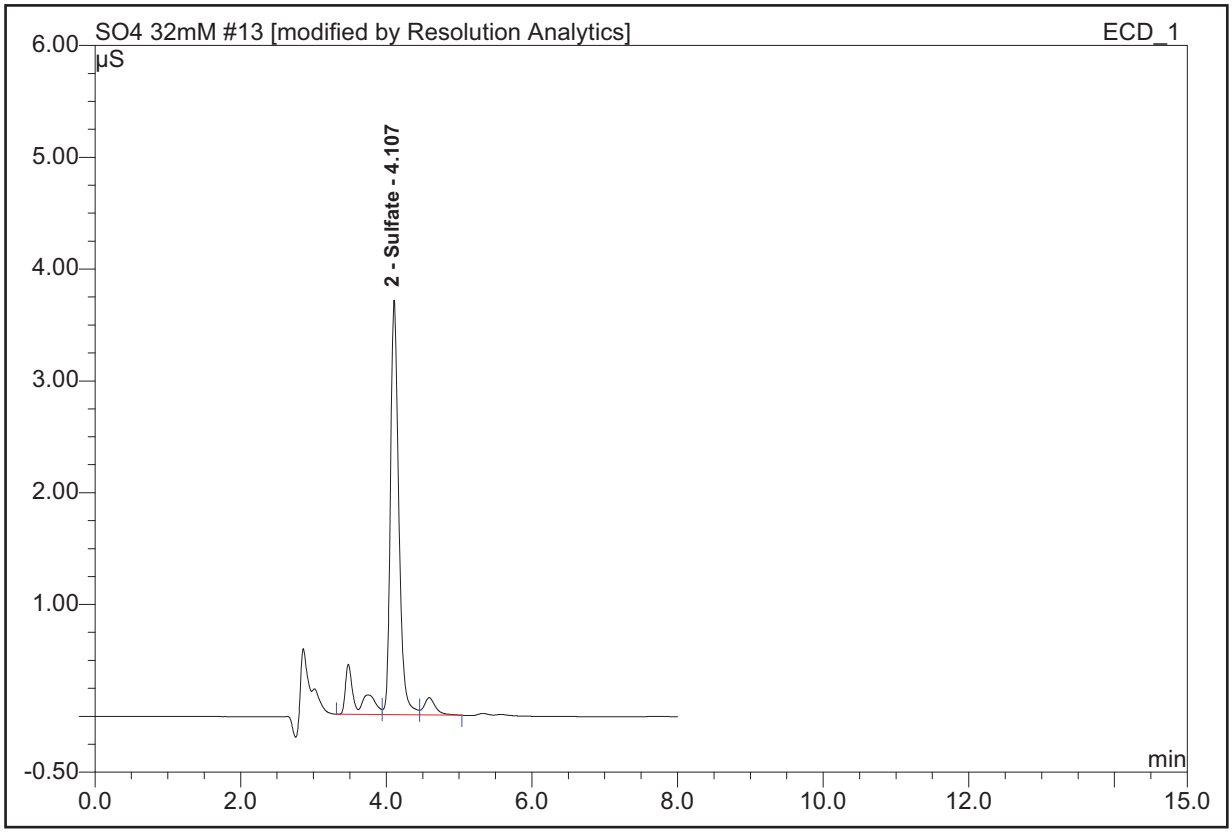


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	3.747	0.4973

13 U4-2 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:09**	*Eluent Concentration (mM):*	**32**

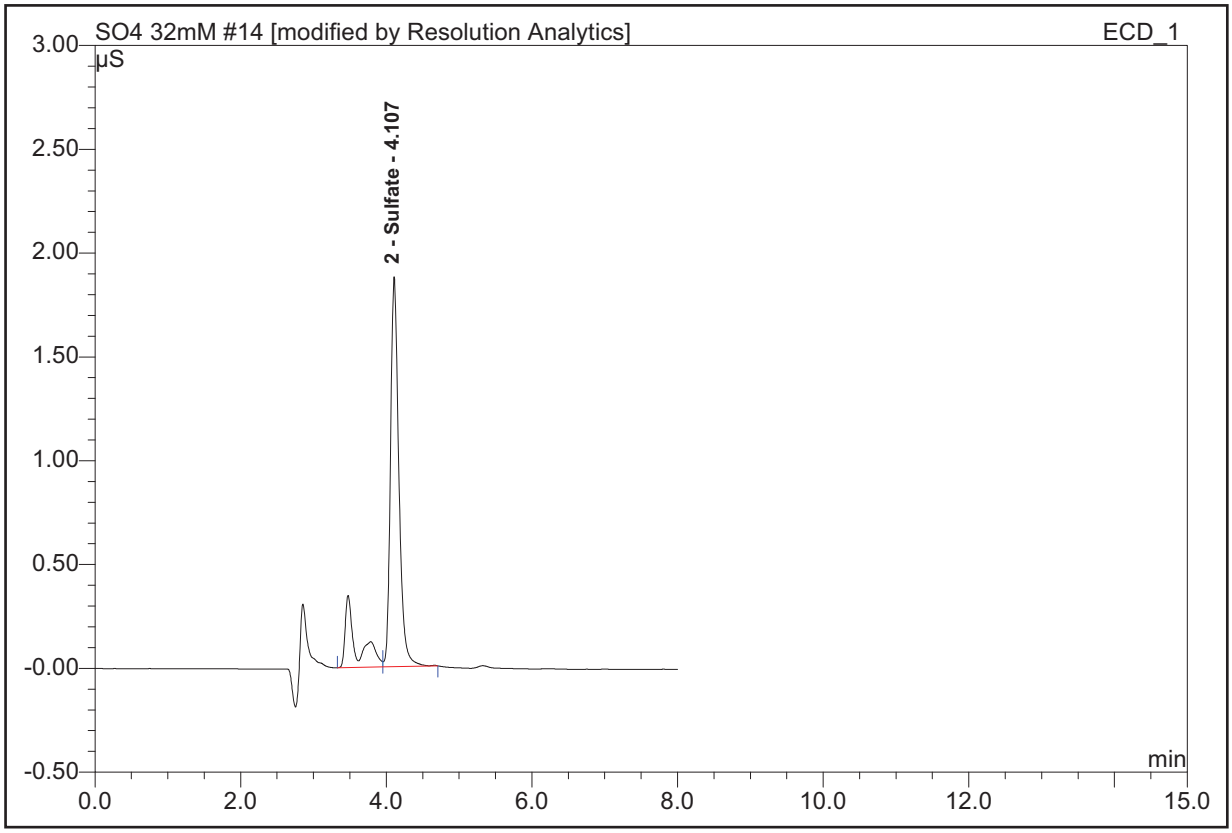


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	3.708	0.4929

14 U4-3 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:19**	*Eluent Concentration (mM):*	**32**

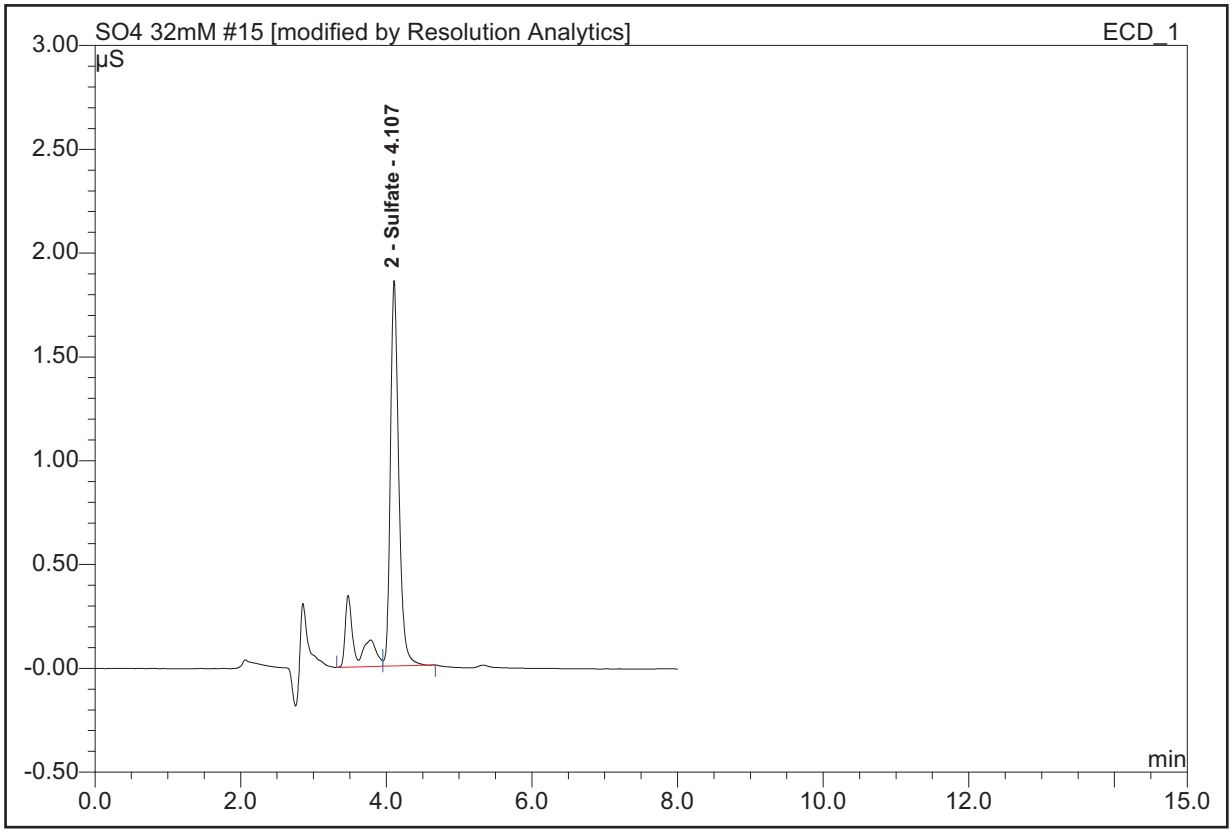


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.877	0.2493

15 U4-3 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:29**	*Eluent Concentration (mM):*	**32**

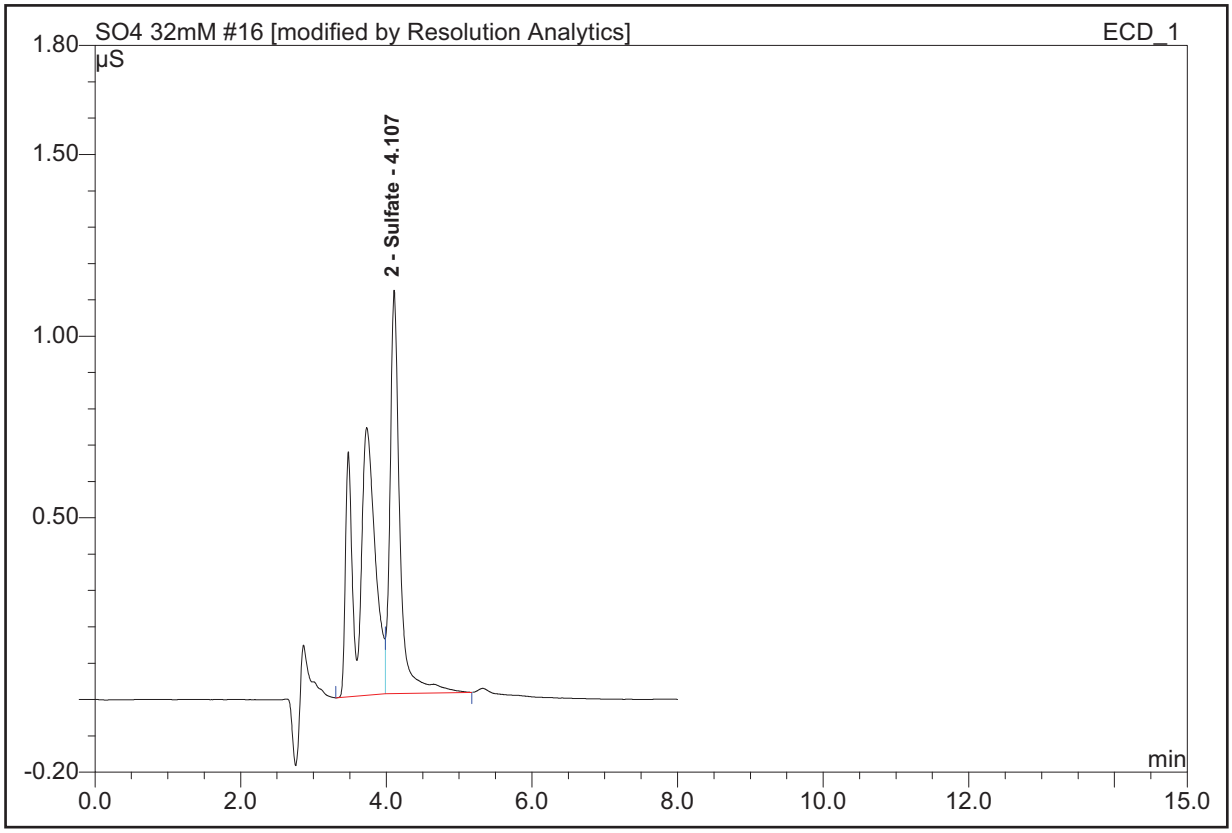


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.855	0.2455

16 U3-1 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:38**	*Eluent Concentration (mM):*	**32**

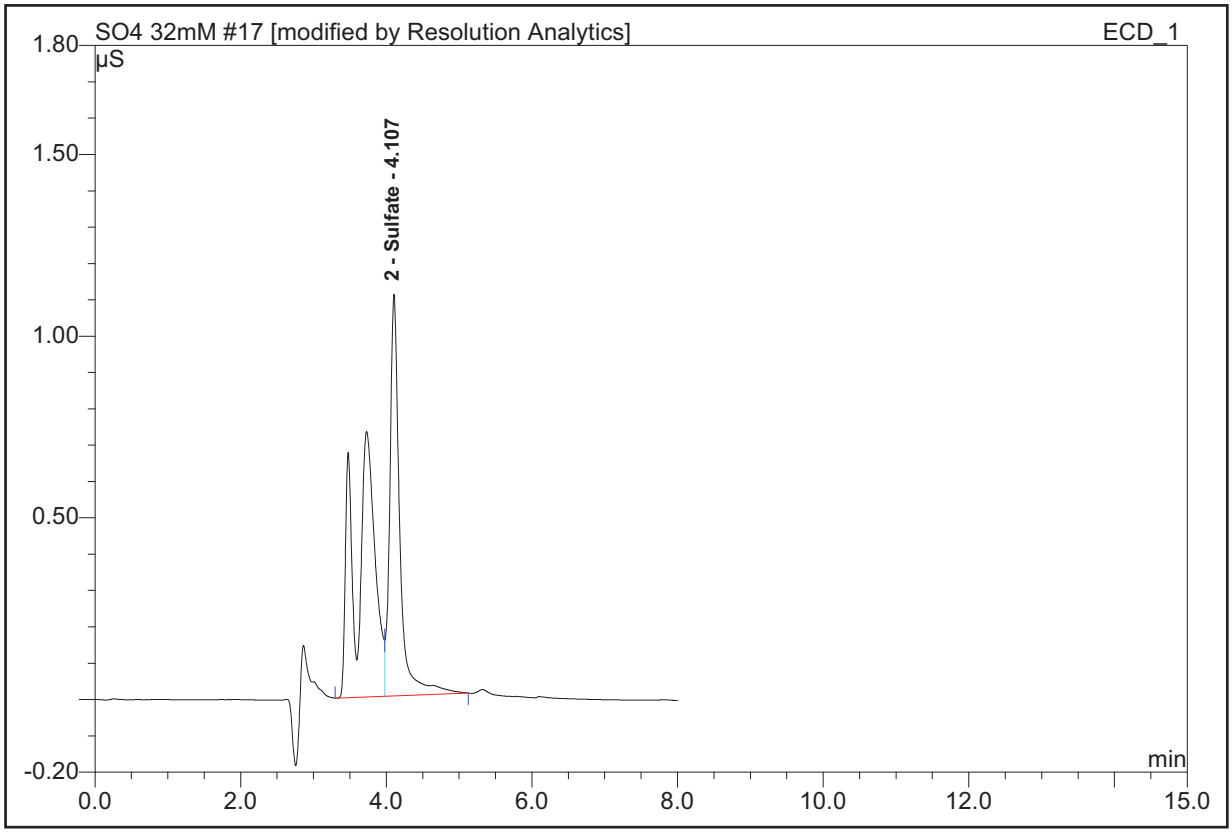


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.109	0.1739

17 U3-1 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:48**	*Eluent Concentration (mM):*	**32**

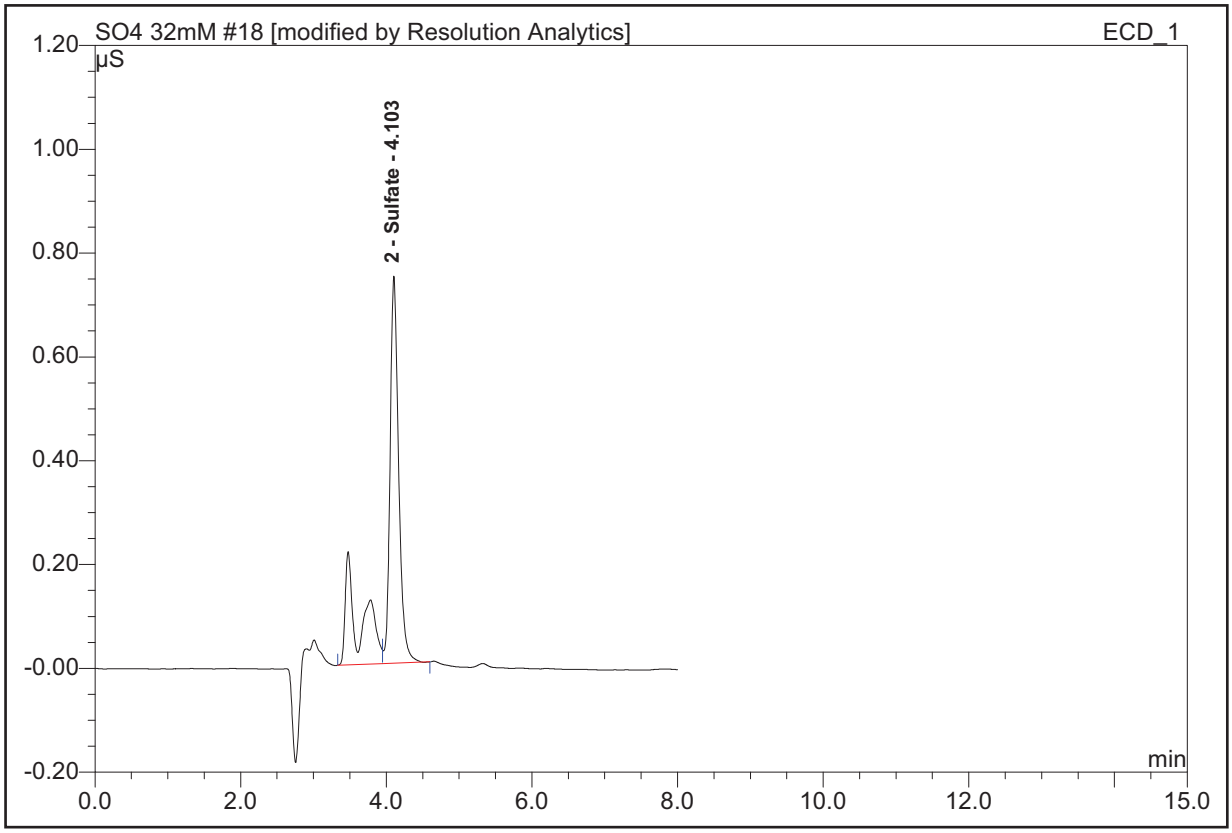


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.106	0.1756

18 U3-2 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 17:58**	*Eluent Concentration (mM):*	**32**

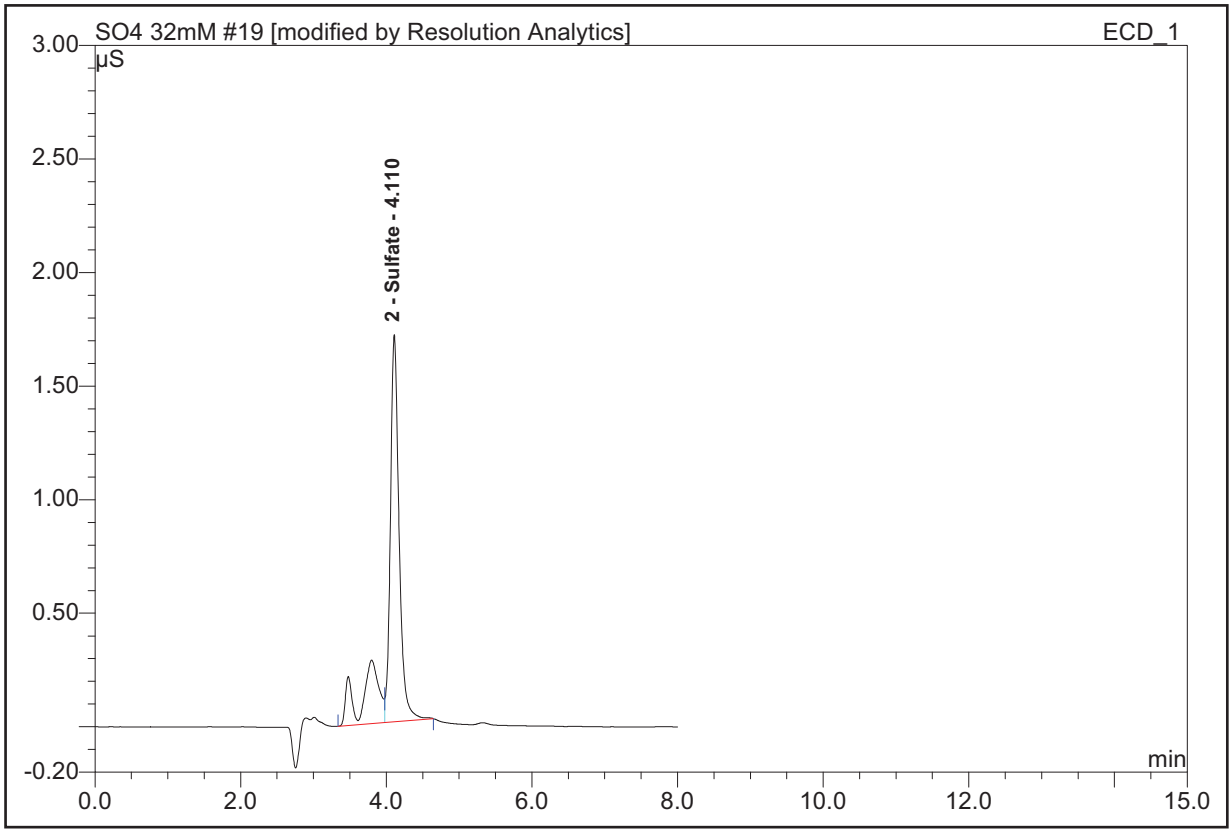


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.10	Sulfate	0.746	0.1015

19 U3-2 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:08**	*Eluent Concentration (mM):*	**32**

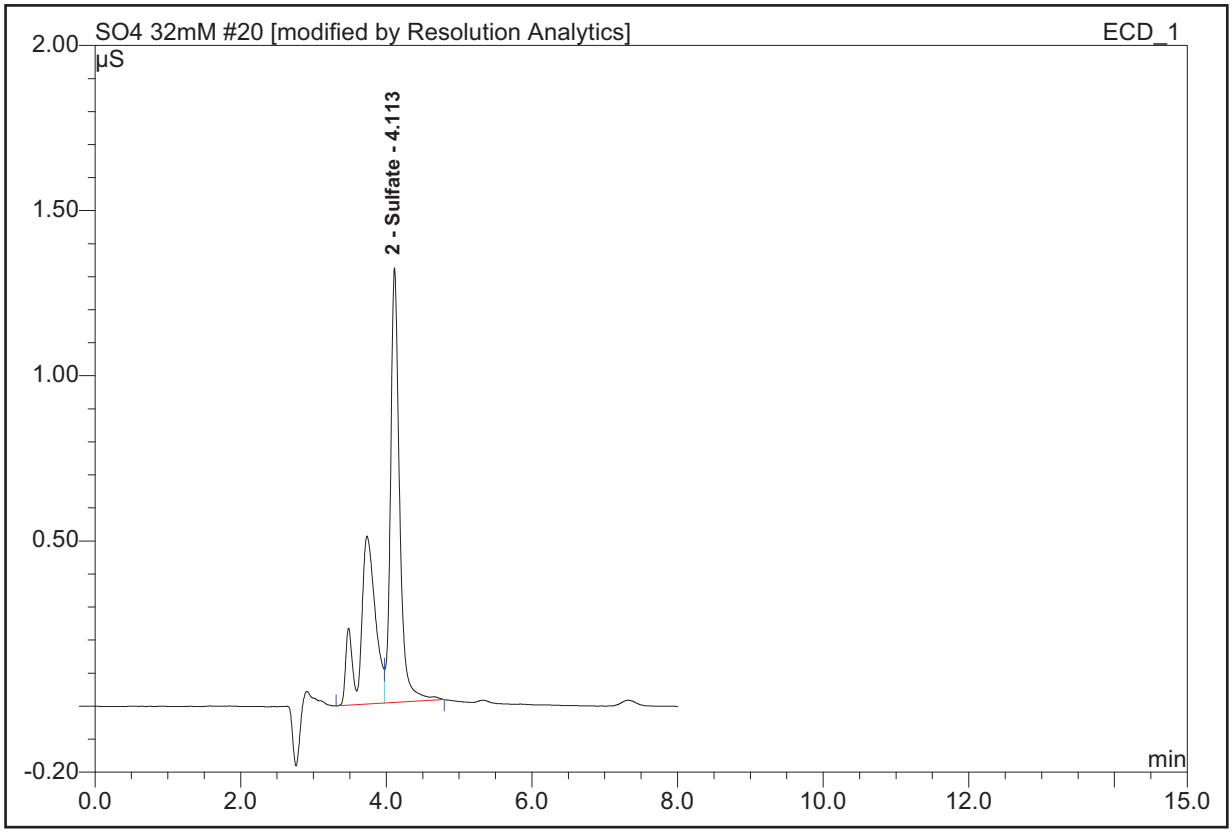


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.704	0.2351

20 U3-3 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:18**	*Eluent Concentration (mM):*	**32**

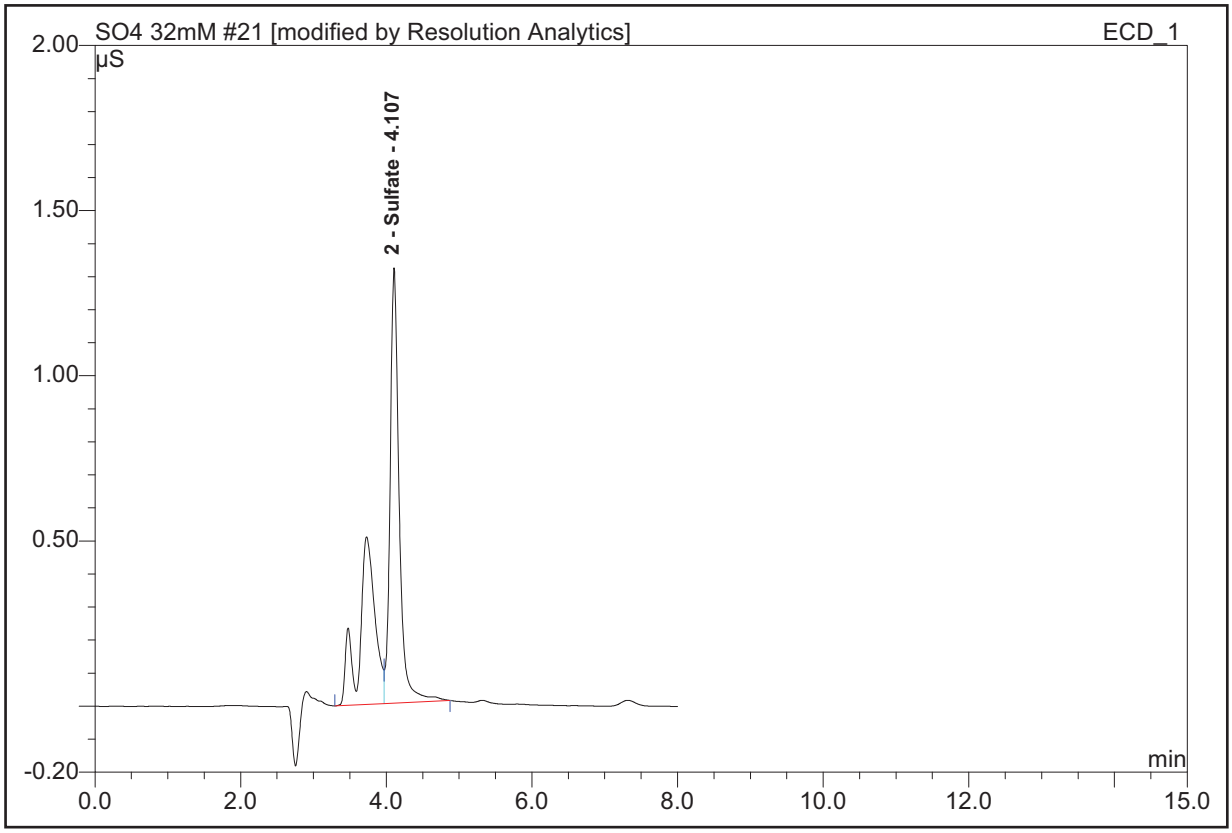


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.316	0.1894

21 U3-3 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:27**	*Eluent Concentration (mM):*	**32**

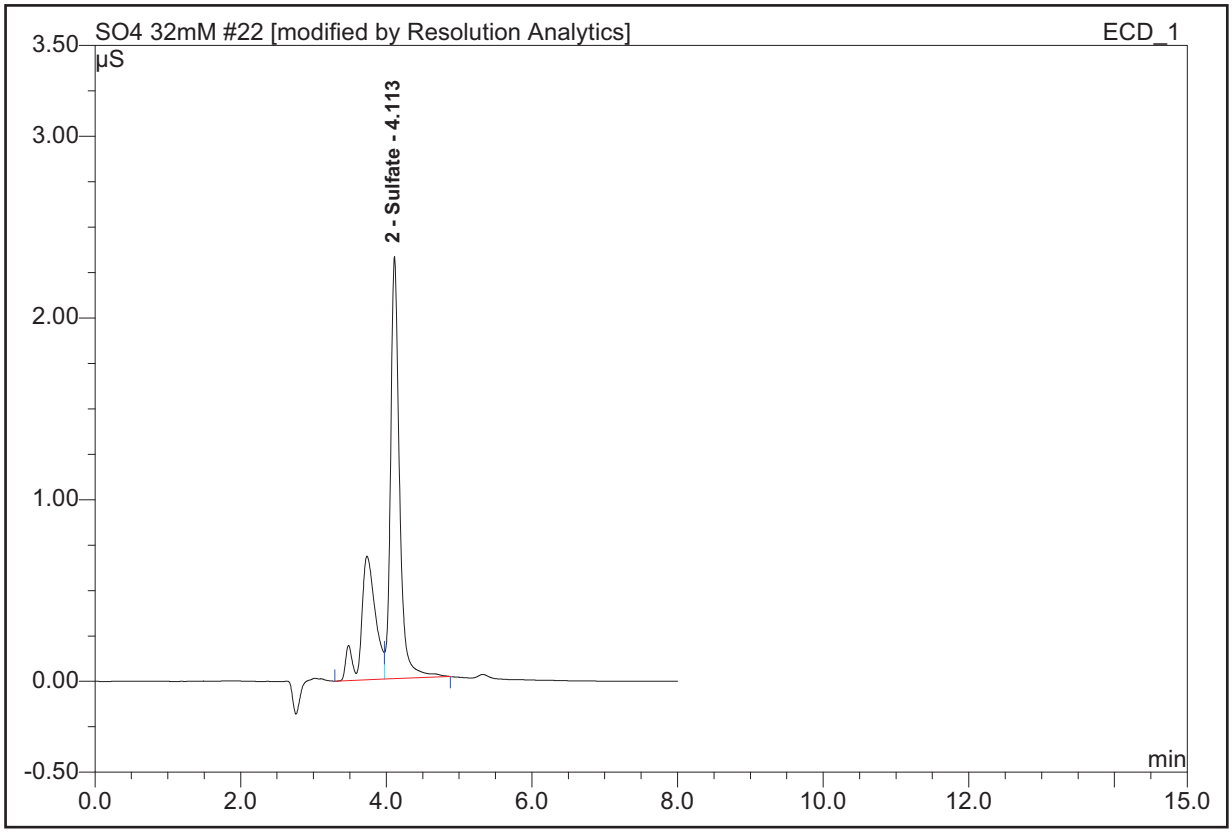


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.318	0.1908

22 U2-1 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:37**	*Eluent Concentration (mM):*	**32**

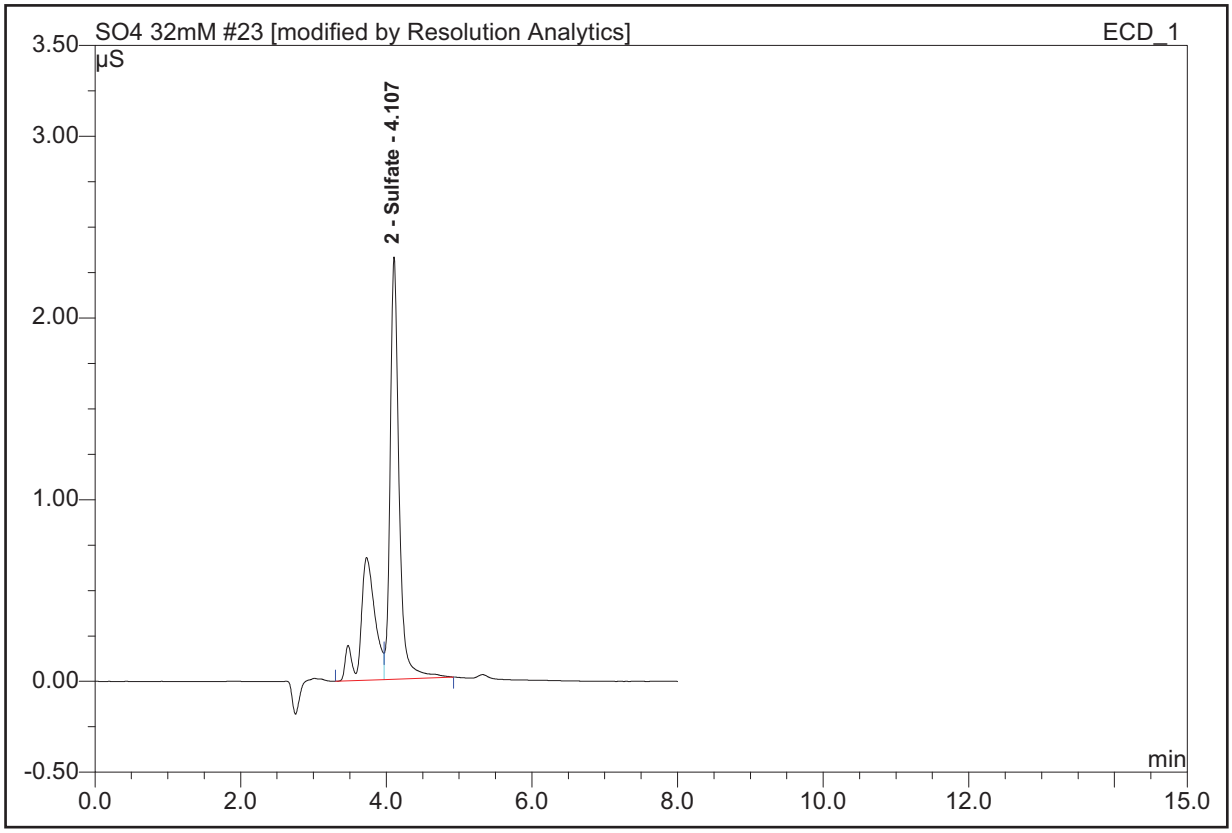


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	2.324	0.3296

23 U2-1 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:47**	*Eluent Concentration (mM):*	**32**

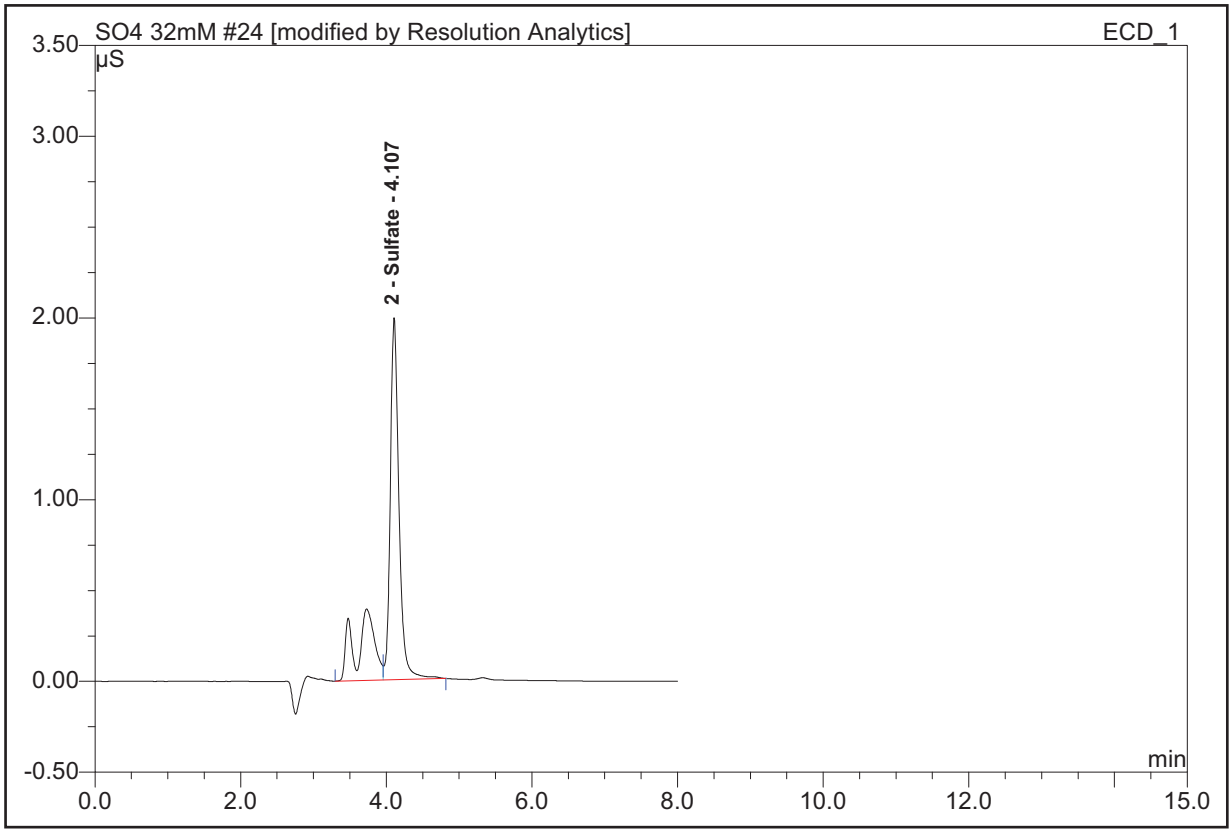


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	2.324	0.3300

24 U2-2 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 18:57**	*Eluent Concentration (mM):*	**32**

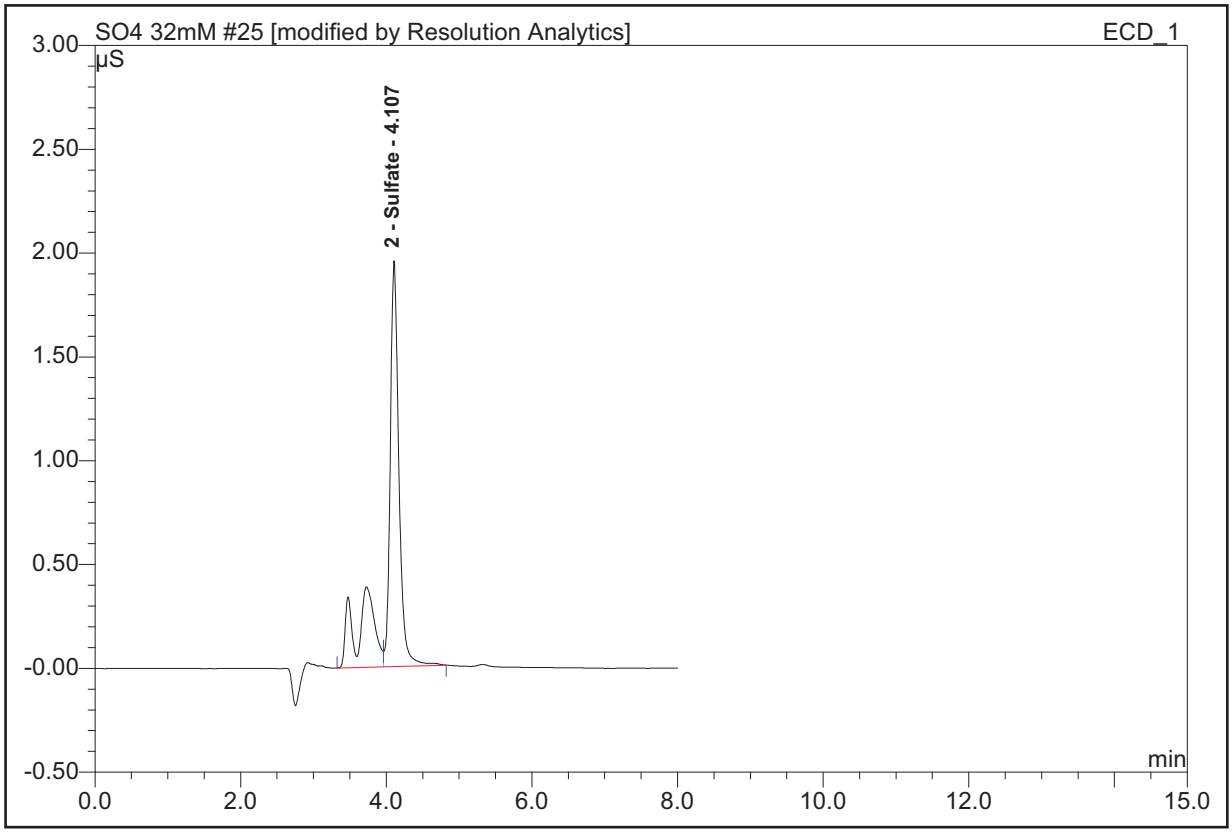


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.992	0.2752

25 U2-2 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 19:06**	*Eluent Concentration (mM):*	**32**

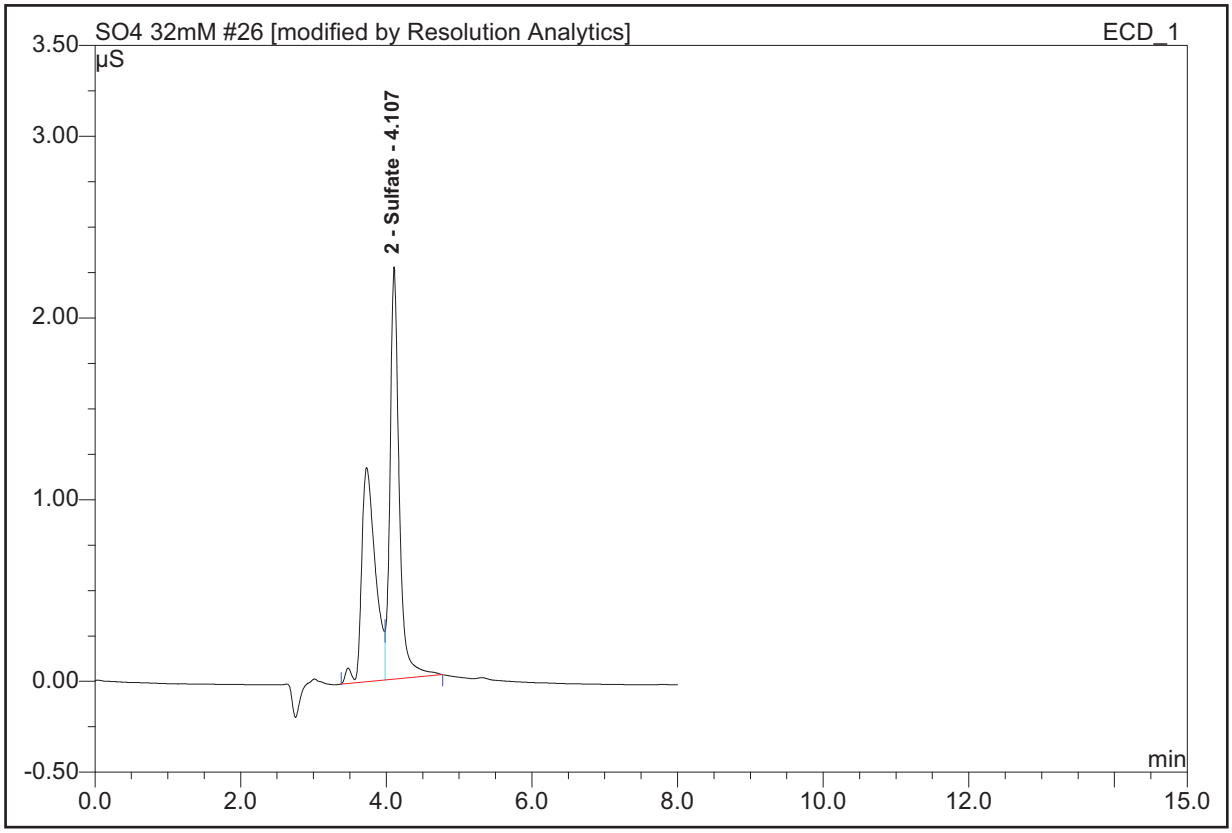


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	1.954	0.2689

26 U2-3 a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 19:16**	*Eluent Concentration (mM):*	**32**

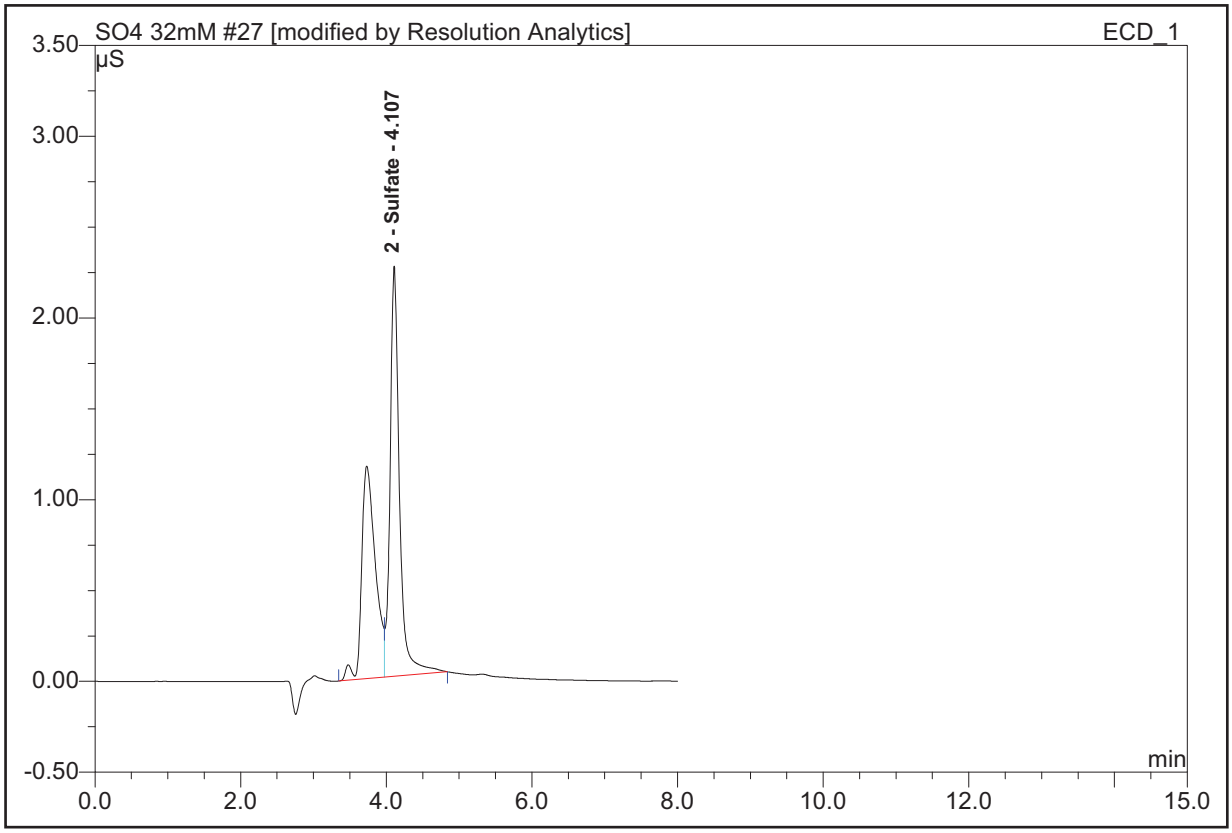


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	2.269	0.3321

27 U2-3 b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 19:26**	*Eluent Concentration (mM):*	**32**

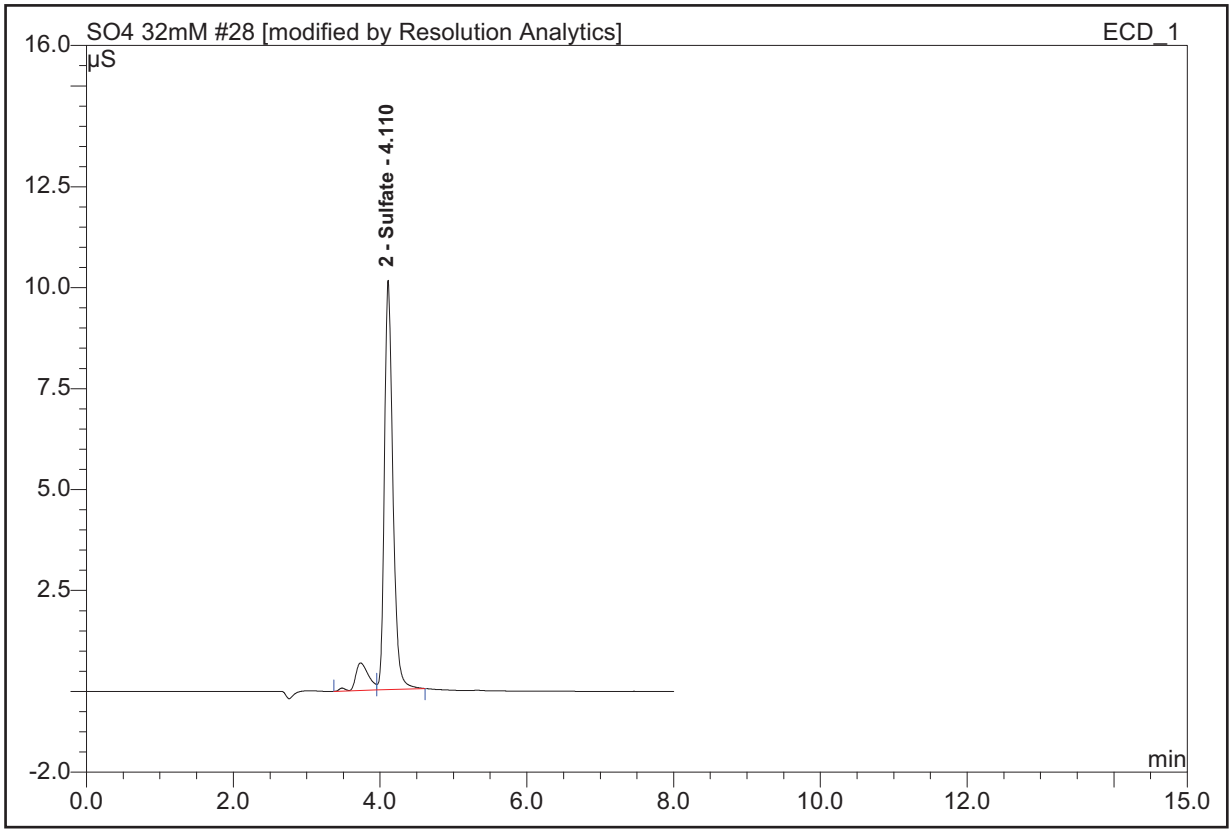


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	2.258	0.3379

28 SO3 MATRIX a

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 19:36**	*Eluent Concentration (mM):*	**32**

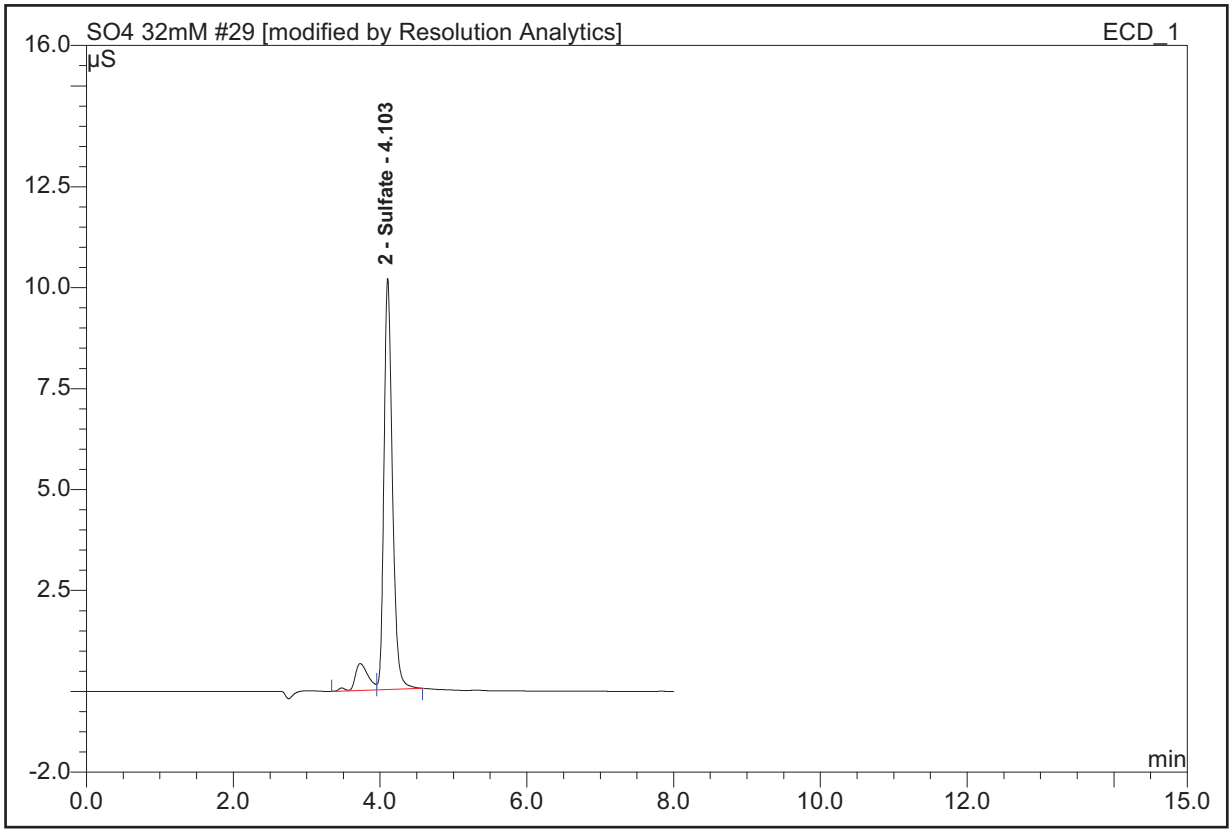


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.11	Sulfate	10.138	1.3619

29 SO3 MATRIX b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/20/2011 19:45**	*Eluent Concentration (mM):*	**32**

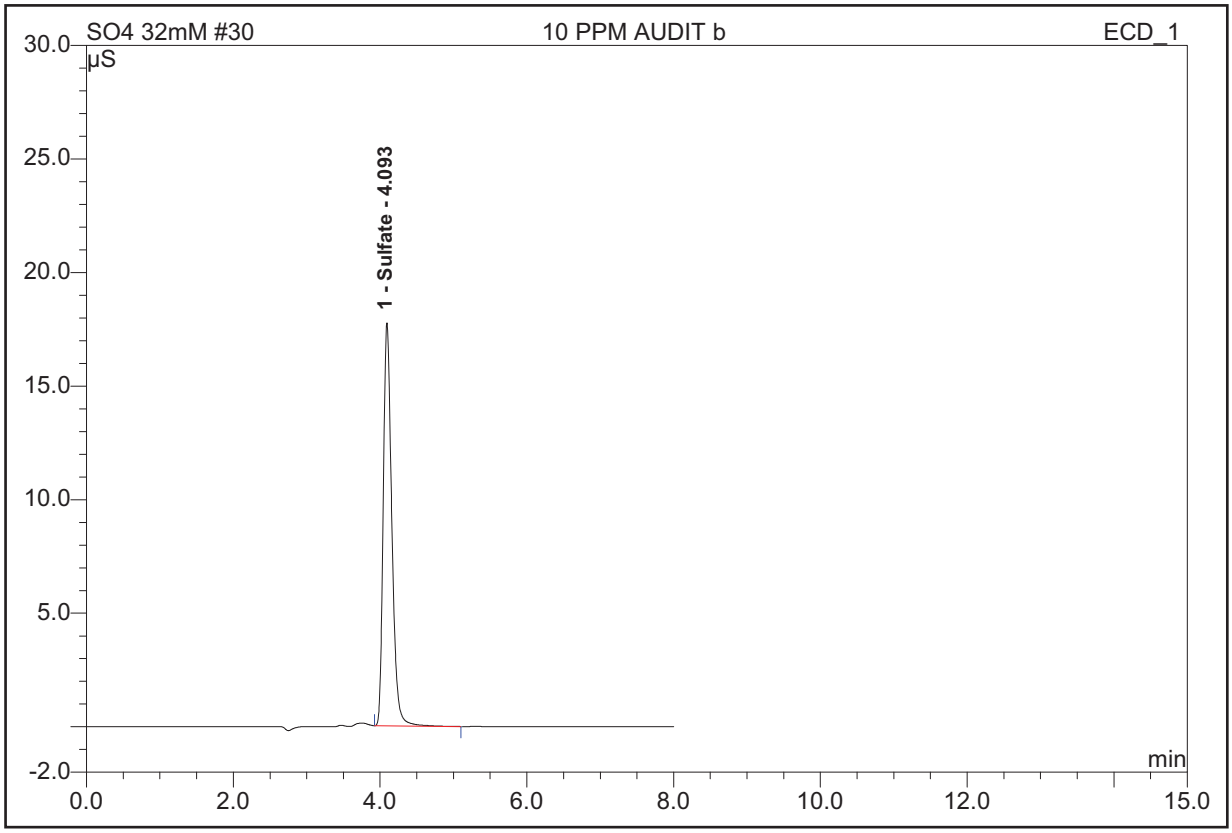


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	4.10	Sulfate	10.188	1.3608

30 10 PPM AUDIT b

Sequence **ICS2000\JOBS\TRC\178050**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**04/21/2011 11:52**	*Eluent Concentration (mM):*	**32**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.09	Sulfate	17.752	2.4140

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

ANALYTICAL REPORT

CLIENT: **TRC ENVIRONMENTAL, INC.**

PROJECT: 182068: APS Four Corners

ANALYTICAL SERVICES PROVIDED:

- SO_3
  (EPA METHOD 8)

Confirmation of Data Review:

To the best of my knowledge this analytical data has been checked thoroughly for completeness and the results presented are accurate, error-free, legible, and have been performed and validated in accordance with the approved method(s).

Date of Review: August 22, 2011

J. Bruce Nemet

Quality Assurance Officer

www.resolutionanalytics.com
2733 Lee Avenue • Sanford, NC 27332 • Phone: 919-774-5557 • Fax: 919-776-6785

CHAIN OF CUSTODY RECORD

Project Name: APS Four Corners

Project No.: 182068.001

Sampling Date(s):

Laboratory: RA

Laboratory P.O.:

Shipping Date(s): 08/18/11

Shipper's Name: TRC

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX	Description	ANALYSIS		Comments
182436.U1.R1	06/01/11	250	G	H2O	Unit 1 Run 1	SO3		0
182346.U1.R2	06/01/11	250	G	H2O	Unit 1 Run 2	SO3		0
182346.U1.R3	06/01/11	250	G	H2O	Unit 1 Run 3	SO3		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0

Relinquished by:	**Date/Time:**	**Relinquished by:**
Received by: Jeffrey S. Coppage	**Date/Time:** 8/19/11 8:40	**Received by:**
Remarks (*):		

G38

TRC

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc.
RFA #: 182068: APS
Analysis: EPA Method 8A

Report Summary

Sample ID	Analyte(s) (mg) SO_3
U1-RUN 1	0.089
U1-RUN 2	0.065
U1-RUN 3	< 0.051

* EPA Audits are reported in mg/DSCM SO2

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client:	TRC, Inc.
RFA #:	182068: APS
Date Received:	8/19/2011
Date Analyzed:	8/19/2011
Analyst:	TCS
Analysis:	EPA Method 8A
Analyte(s):	SO3

Analytical Narrative

Sample Matrix & Components:

H_2O impinger contents and rinses

Summary of Sample Prep:

Samples were final volumed in the laboratory prior to analysis by ion chromatograghy. See data for dilution factors used in analysis.

Summary of Instrumentation:

Dionex ICS-2100 ion chromatogragh
IonPac AS18 4x250mm
Eluent: 32mM KOH
Suppressor current: 85 mA

25µl injection volume
Flow rate: 1.05 mls/min
Temp: 30° C

Limits Of Quantification:

0.887 mg/L SO_3

Summary Of QA Audit Sample Analysis:

See analytical data sheets for results of internal calibration verification standard results. All internal QC results within ±10 % limits.

Summary Sample Spike Analysis:

See Analytical data sheets for results of sample spike analyses. All spike results within 90% - 110% limits.

<u>Miscellaneous Comments Regarding Sample Analysis:</u> (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

None

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc.
RFA #: 182068: APS
Analysis: EPA Method 8A

SO_3 Analytical Data Sheet

SO_4 Standard Calibration Curve

Standard Manufacturer: AccuSpec
Lot ID: SC8350362

m_2: -6.49E-05
m_1: 2.43E-01
b: -9.61E-03

R^2: 0.9999827

$SO4^-$ Conc. (mg/L)	Standard Areas Inj. 1	Inj. 2	Average Area	% Diff.	$SO4^-$ (mg/L)	% Difference from Actual
1.00	0.2466	0.2518	0.2492	2.09%	1.06	6.46%
5.00	1.1894	1.1950	1.1922	0.47%	4.95	-1.03%
10.0	2.4012	2.3964	2.3988	0.20%	9.93	-0.70%
20.0	4.8279	4.8615	4.8447	0.69%	20.1	0.35%
40.0	9.5492	9.6726	9.6109	1.28%	40.0	-0.03%

Internal Calibration Verification

Standard Manufacturer: AccuSpec
Lot ID: SC8350362

	Inj. 1	Inj. 2	Average Area	% Diff.	Expected $SO4^-$ (mg/L)	Actual $SO4^-$ (mg/L)	% Diff.
ICV Standard	2.4715	2.4850	2.4783	0.54%	10.0	10.3	2.59%

Matrix Spike

Sample I.D.	Inj. 1	Inj. 2	Average Area	% Diff.	Spike $SO4^-$ (mg/L)	Sample SO4 (mg/L)	Calc. $SO4^-$ (mg/L)	% Recovery
U1-RUN 3	1.3788	1.3794	1.3791	0.04%	5.7	1.06	5.5	103.4%

Note: 1.0 mls of the above sample was spiked with
1.0 mls of a 10.0 ppm sulfate standard.

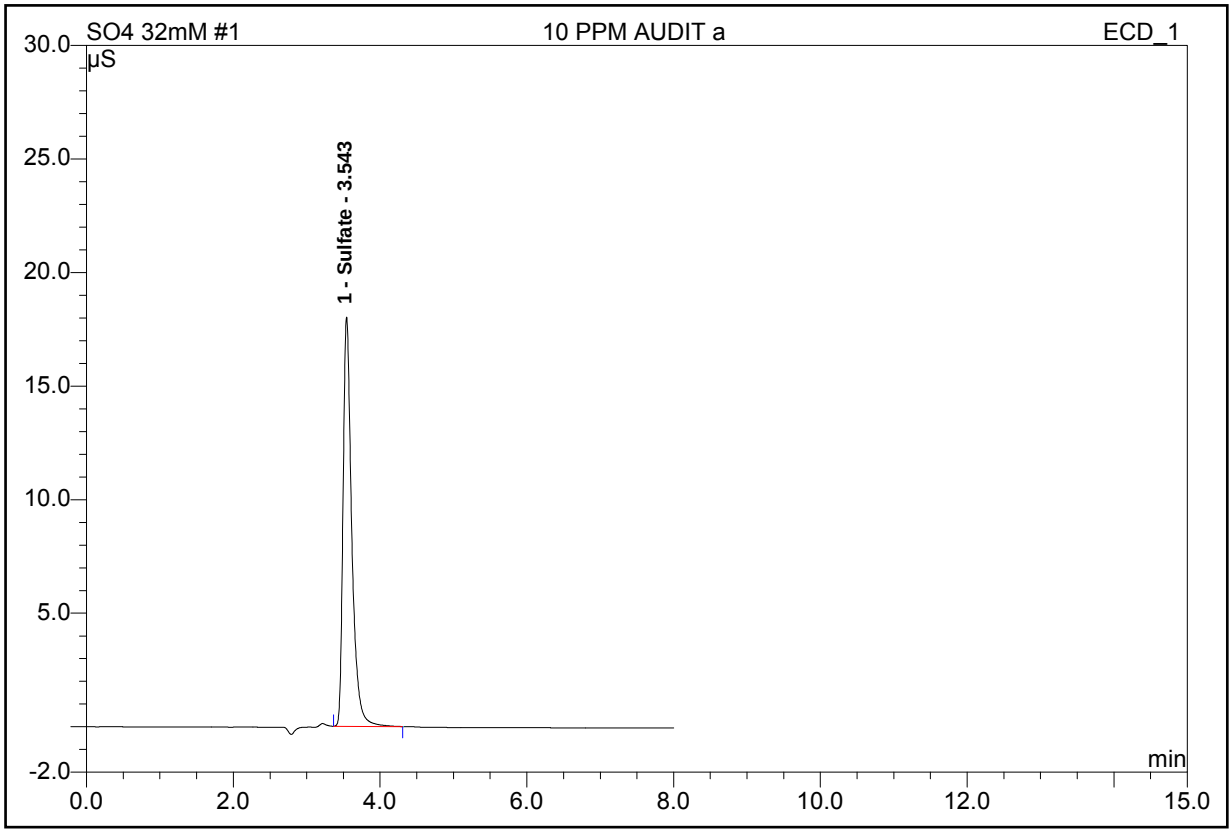
Field Samples

SAMPLE ID	Inj. 1 Area	Inj. 2 Area	ND	Average Area	% Diff.	Dilution Factor	ND	$SO4^-$ (mg/L)	Sample Volume (ml)	ND	**SO_3 Catch (mg)**
U1-RUN 1	0.3634	0.3505		0.3570	3.61%	1		1.508	71		**0.089**
U1-RUN 2	0.2945	0.2888		0.2917	1.95%	1		1.239	63		**0.065**
U1-RUN 3	0.2389	0.2381	<	0.2492	NA	1	<	1.065	58	**<**	**0.051**

1 10 PPM AUDIT a

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:11**	*Eluent Concentration (mM):*	**32**

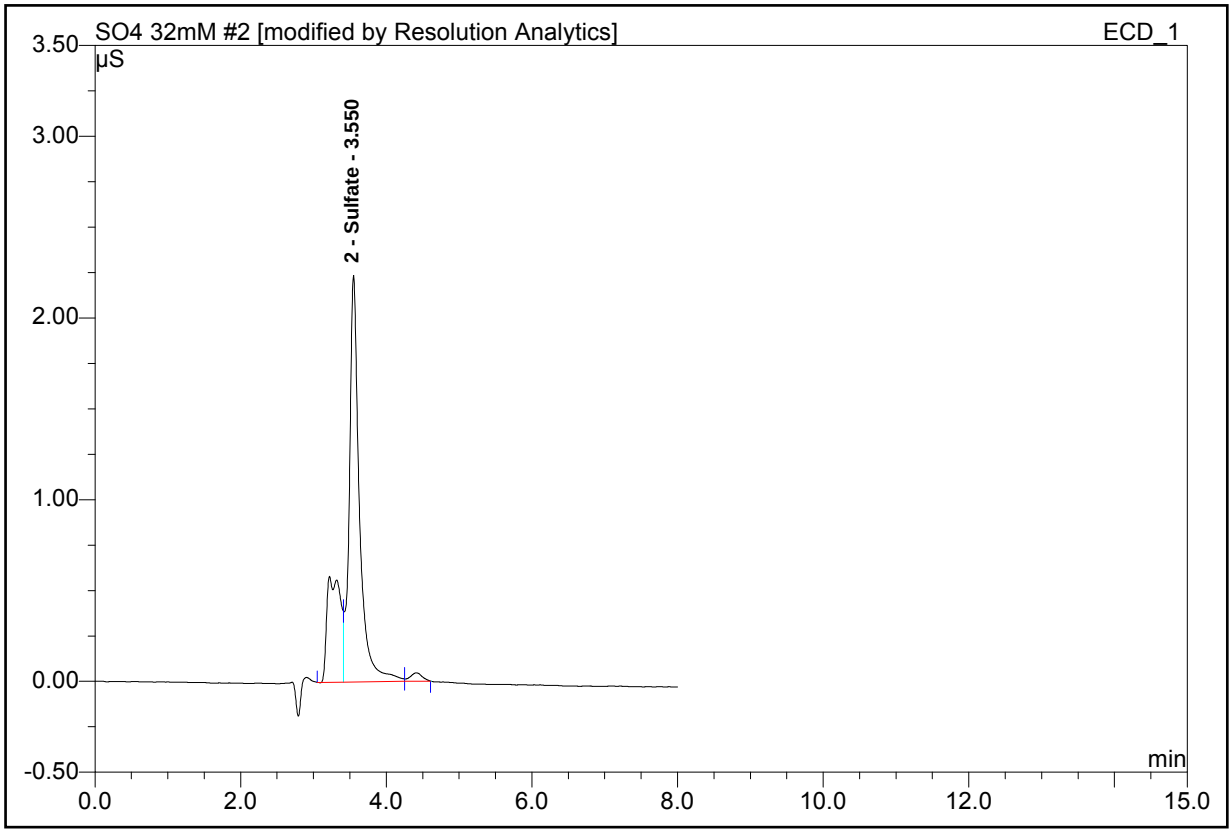


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	3.54	Sulfate	18.017	2.4715

2 RUN 1 a

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:21**	*Eluent Concentration (mM):*	**32**

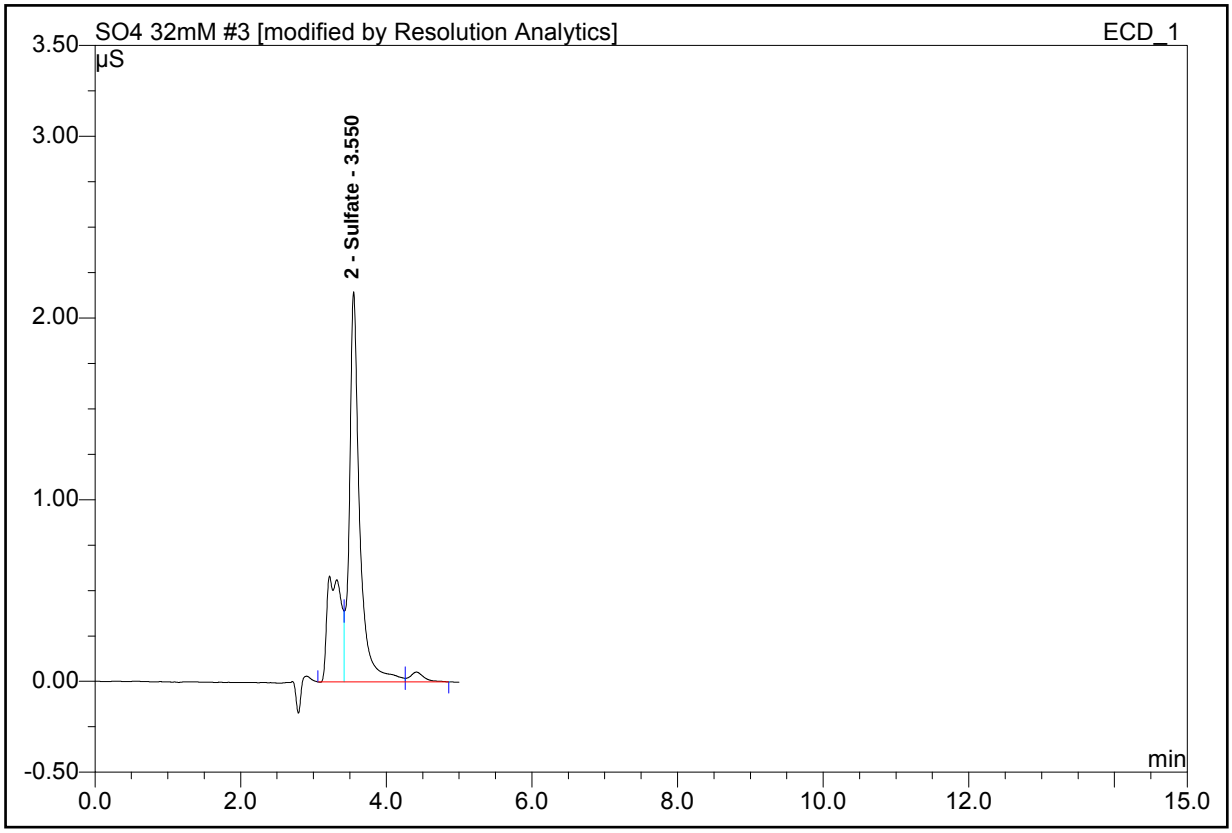


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	2.237	0.3634

3 RUN 1 b

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:31**	*Eluent Concentration (mM):*	**32**

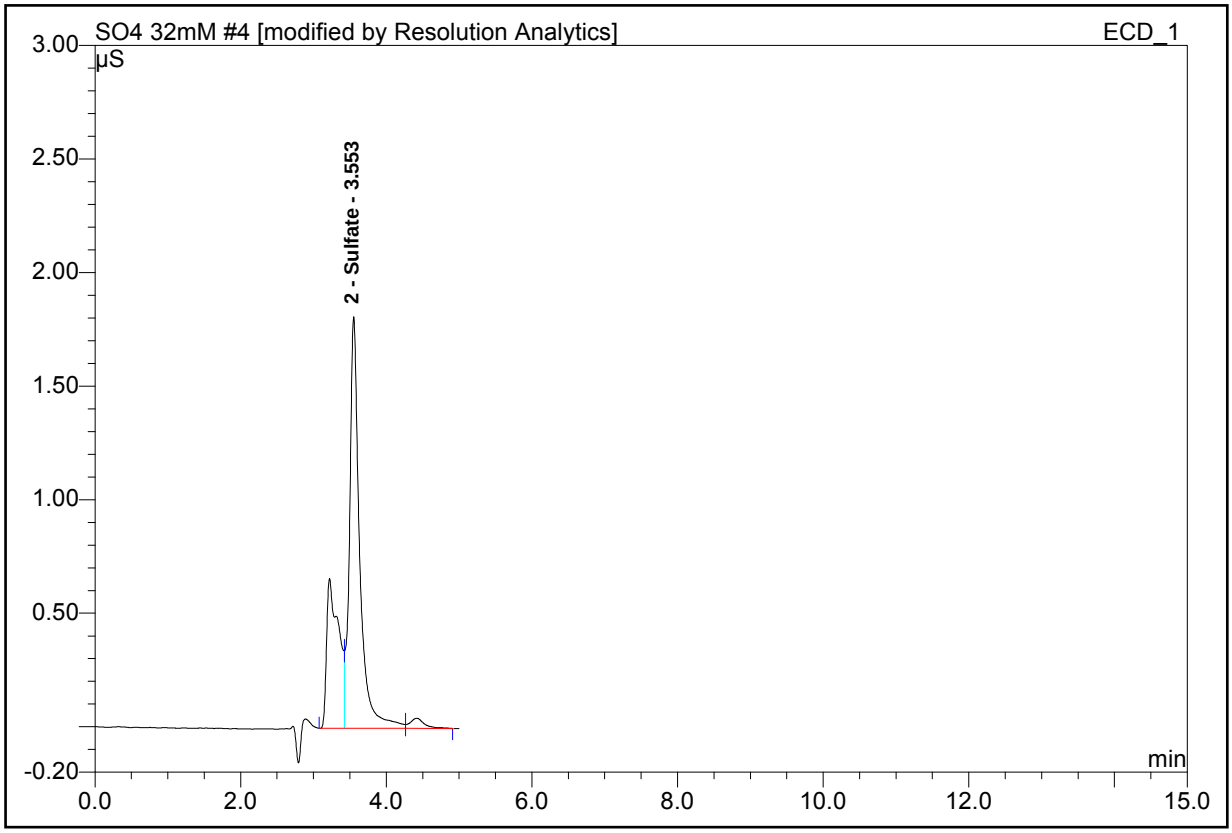


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	2.148	0.3505

4 RUN 2 a

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:37**	*Eluent Concentration (mM):*	**32**

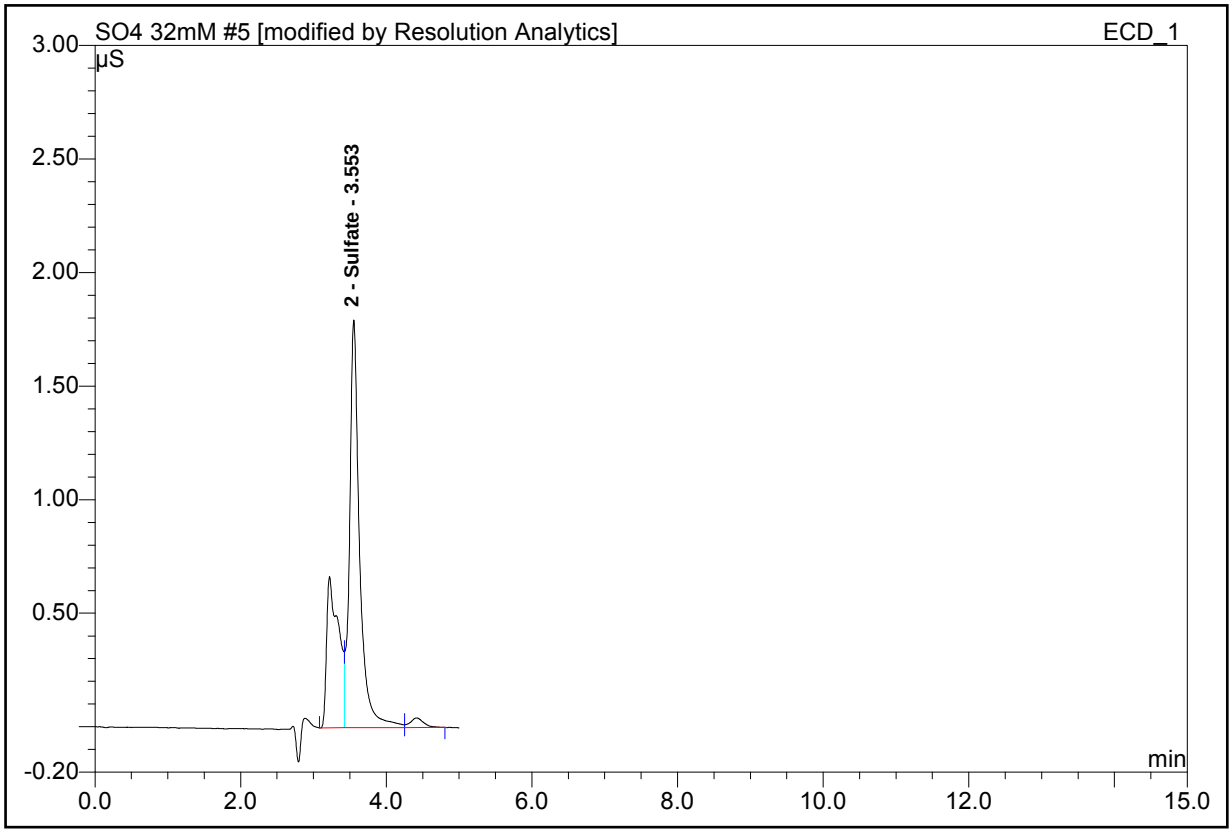


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	1.812	0.2945

5 RUN 2 b

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:44**	*Eluent Concentration (mM):*	**32**

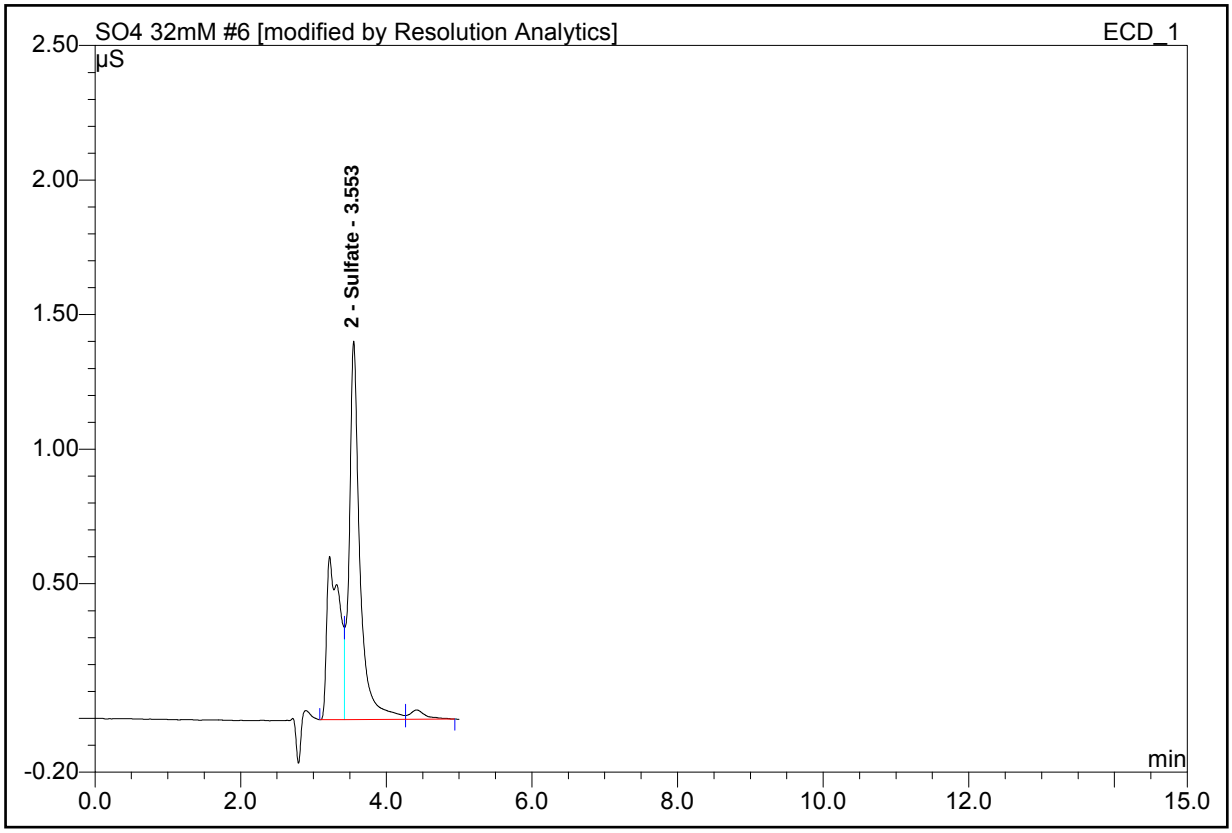


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	1.796	0.2888

6 RUN 3 a

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:51**	*Eluent Concentration (mM):*	**32**

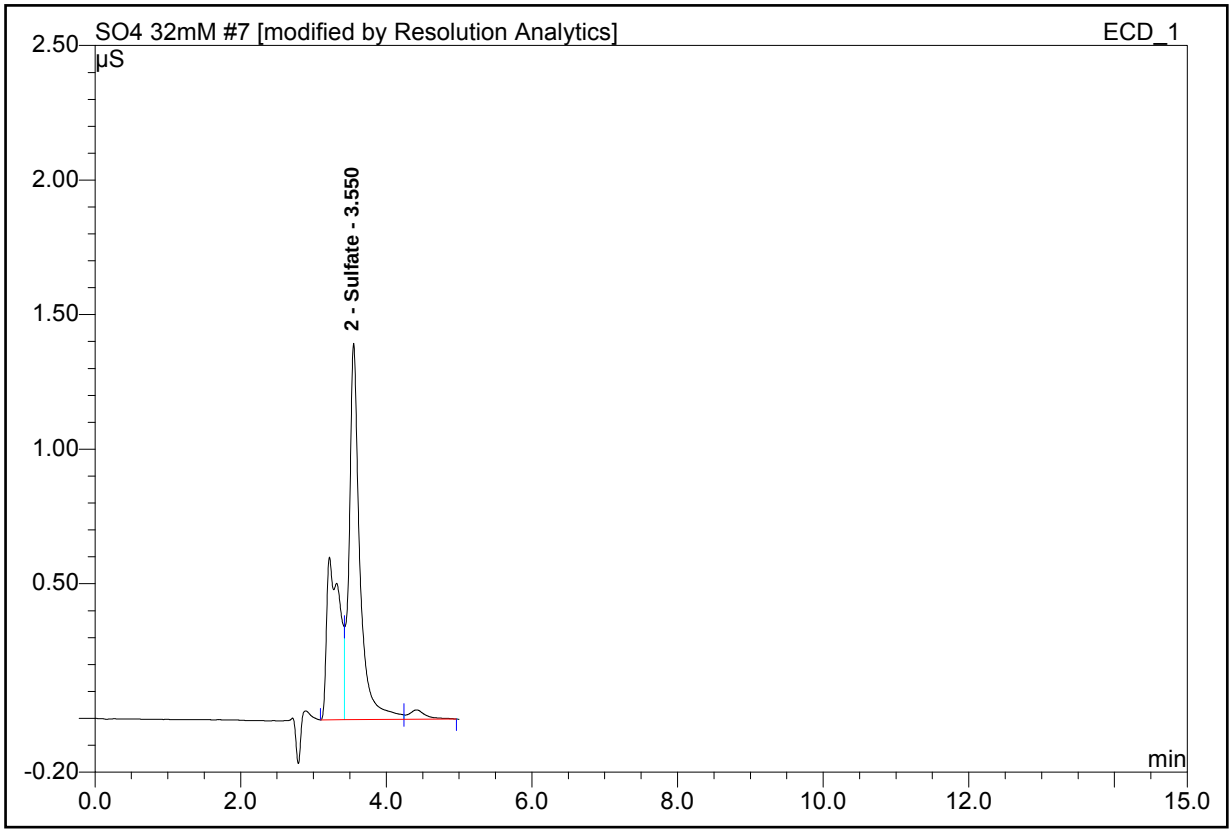


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	1.406	0.2389

7 RUN 3 b

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 10:58**	*Eluent Concentration (mM):*	**32**

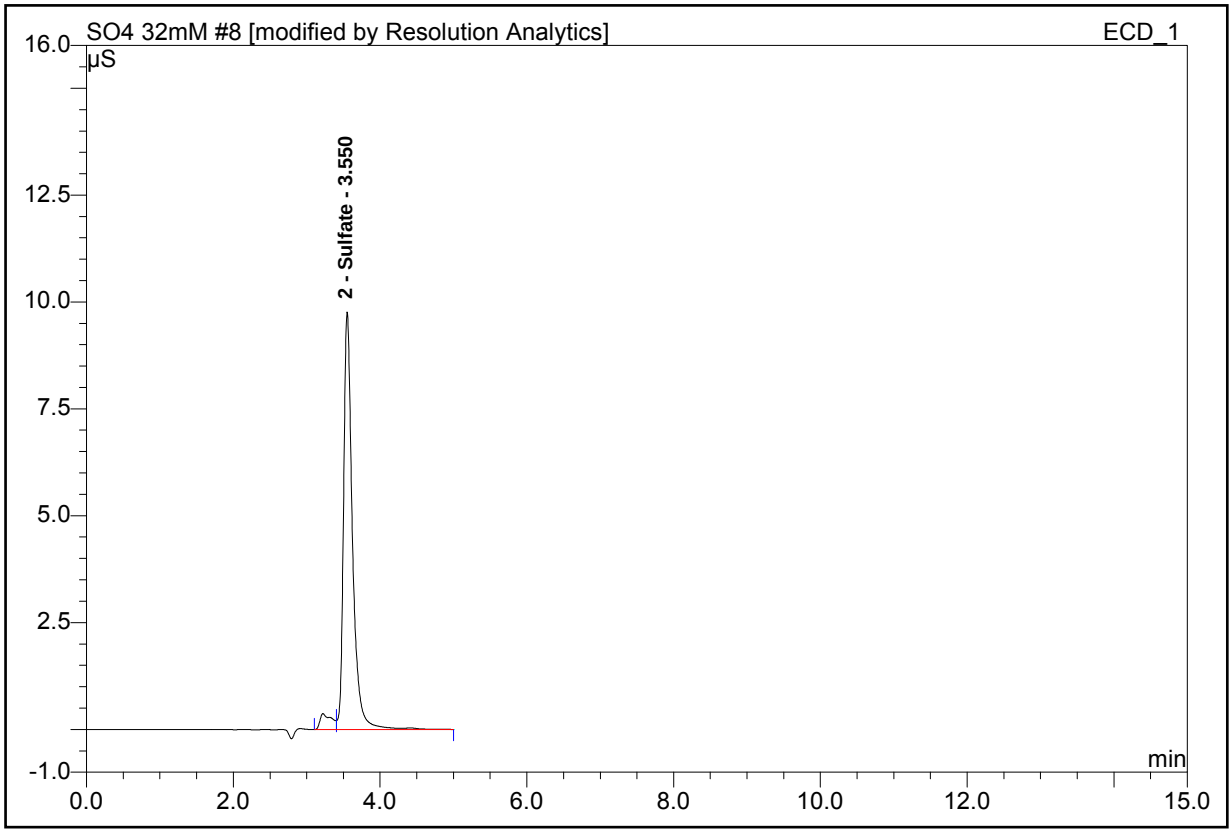


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	1.398	0.2381

8 SO2 MATRIX a

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 11:04**	*Eluent Concentration (mM):*	**32**

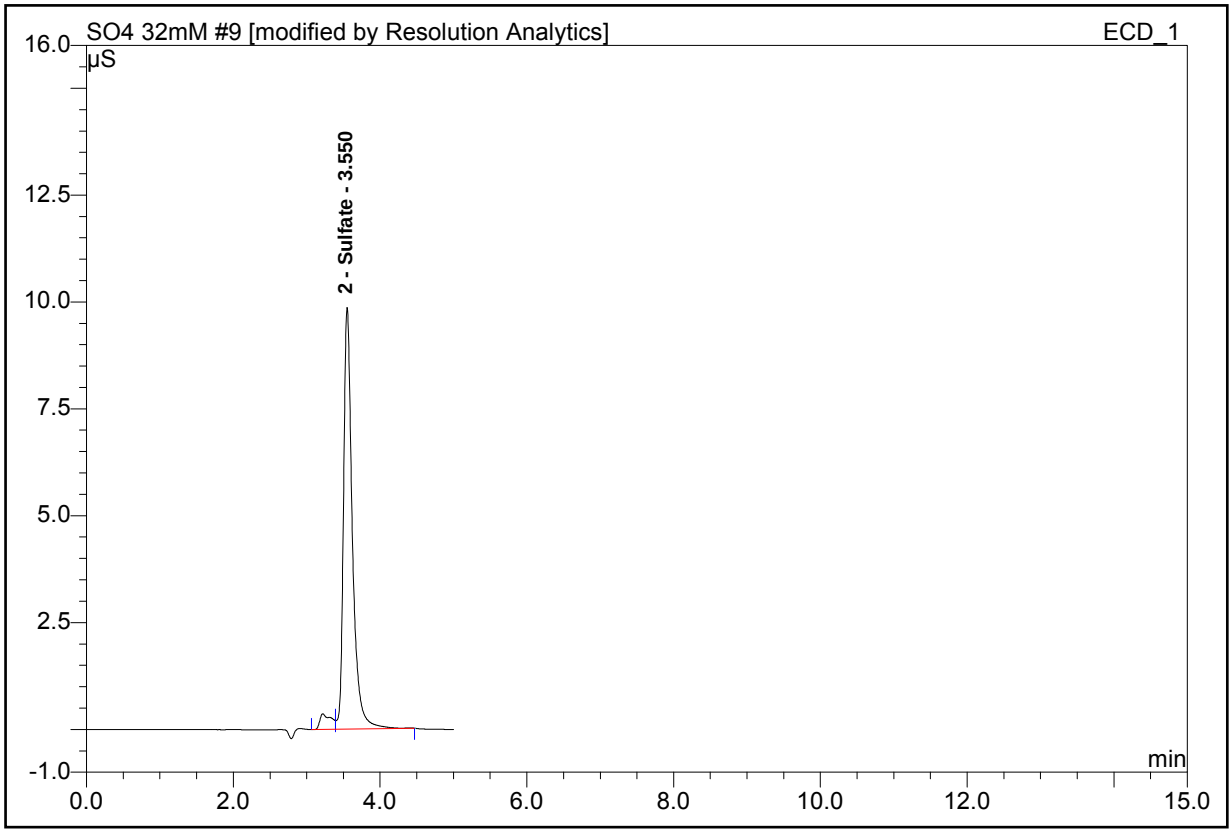


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	9.768	1.3788

9 SO2 MATRIX b

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 11:11**	*Eluent Concentration (mM):*	**32**

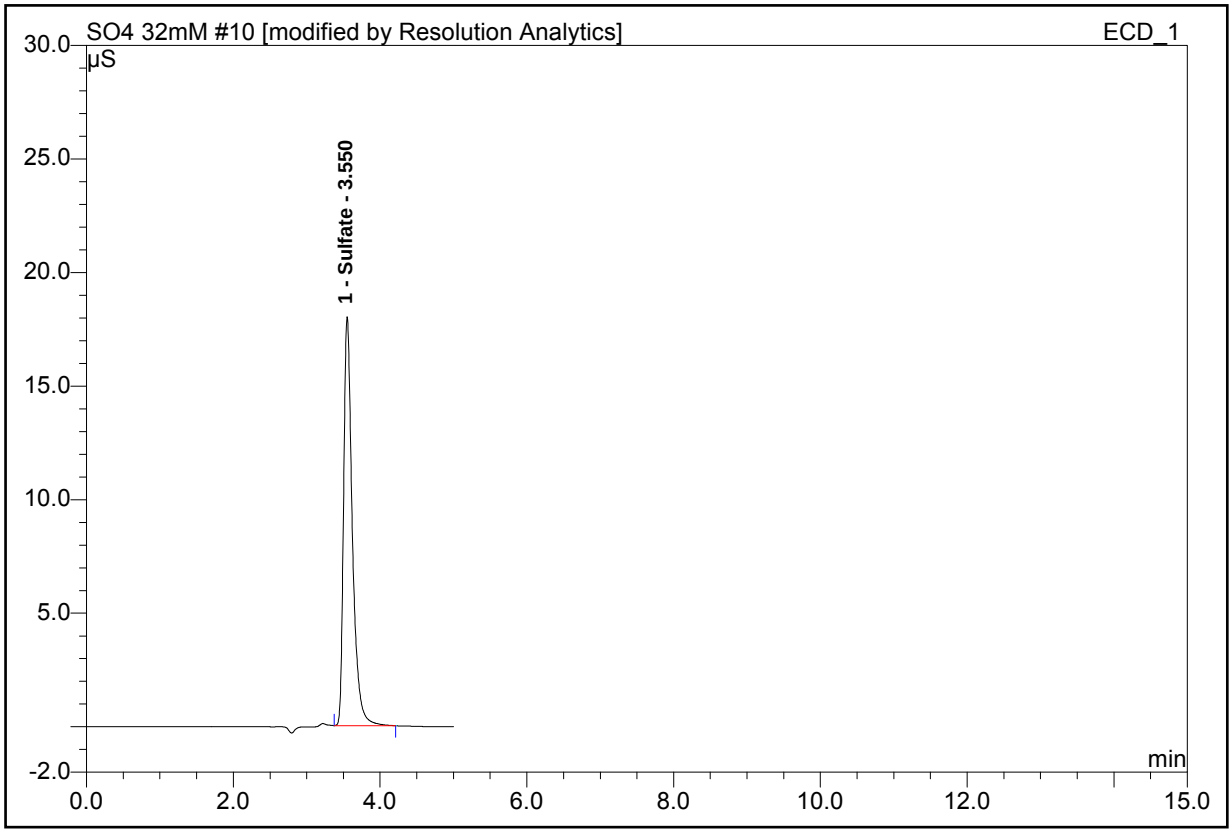


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.55	Sulfate	9.866	1.3794

10 10 PPM AUDIT b

Sequence **ICS2000\Methods\Sulfate**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**08/19/2011 11:18**	*Eluent Concentration (mM):*	**32**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	3.55	Sulfate	18.006	2.4850

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

ANALYTICAL REPORT

CLIENT: **TRC ENVIRONMENTAL, INC.**

PROJECT: 182068: APS Four Corners

ANALYTICAL SERVICES PROVIDED:

- SO_3
  (EPA METHOD 8)

Confirmation of Data Review:

To the best of my knowledge this analytical data has been checked thoroughly for completeness and the results presented are accurate, error-free, legible, and have been performed and validated in accordance with the approved method(s).

Date of Review: October 19, 2011

J. Bruce Nemet
Quality Assurance Officer

www.resolutionanalytics.com
2733 Lee Avenue • Sanford, NC 27332 • Phone: 919-774-5557 • Fax: 919-776-6785

CHAIN OF CUSTODY RECORD

Project Name: APS Four Corners
Project No.: 182068.001
Sampling Date(s):
Laboratory: RA
Laboratory P.O.:
Shipping Date(s): 10/07/11
Shipper's Name: TRC

Email results to Jgrizzle@TRCSolutions

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX	Description	ANALYSIS		Comments
182436.U5.R1.APH IN	09/30/11	250	G	H2O	Unit 5 Run 1 APH Inlet	SO3		0
182436.U5.R2.APH IN	09/30/11	250	G	H2O	Unit 5 Run 2 APH Inlet	SO3		0
182436.U5.R3.APH IN	09/30/11	250	G	H2O	Unit 5 Run 3 APH Inlet	SO3		0
0	01/00/00	0	0	0	0	0		0
182436.U5.R1.APH OUT	09/30/11	250	G	H2O	Unit 5 Run 1 APH Outlet	SO3		0
182436.U5.R2.APH OUT	09/30/11	250	G	H2O	Unit 5 Run 2 APH Outlet	SO3		0
182436.U5.R3APH OUT	09/30/11	250	G	H2O	Unit 5 Run 3 APH Outlet	SO3		0
0	01/00/00	0	0	0	0	0		0
182436.U5.R1.Stack	09/30/11	250	G	H2O	Unit 5 Run 1 Stack	SO3		0
182436.U5.R2.Stack	09/30/11	250	G	H2O	Unit 5 Run23 Stack	SO3		0
182436.U5.R3.Stack	09/30/11	250	G	H2O	Unit 5 Run 3 Stack	SO3		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0
0	01/00/00	0	0	0	0	0		0

Relinquished by: [signature] **Date/Time:** 10/7/11 **Relinquished by:**
Received by: Jeffrey S. Coppola **Date/Time:** 10/11/11 **Received by:**
Remarks (*):

G53

TRC

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc.
RFA #: 182068
Analysis: EPA Method 8A

Report Summary

Sample ID	Analyte(s) (mg) SO_3
U5.R1.APH IN	3.899
U5.R2.APH IN	3.179
U5.R3.APH IN	4.065
U5.R1.APH OUT	0.423
U5.R2.APH OUT	0.330
U5.R3.APH OUT	0.242
U5.R1.Stack	0.362
U5.R2.Stack	0.251
U5.R3.Stack	0.198

* EPA Audits are reported in mg/DSCM SO2

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client:	TRC, Inc.
RFA #:	182068
Date Received:	10/11/2011
Date Analyzed:	10/18/2011
Analyst:	TCS
Analysis:	EPA Method 8A
Analyte(s):	SO3

Analytical Narrative

Sample Matrix & Components:

H_2O impinger contents and rinses

Summary of Sample Prep:

Samples were final volumed in the laboratory prior to analysis by ion chromatograghy. See data for dilution factors used in analysis.

Summary of Instrumentation:

Dionex ICS-2100 ion chromatogragh
IonPac AS18 4x250mm
Eluent: 32mM KOH
Suppressor current: 85 mA

25µl injection volume
Flow rate: 1.05 mls/min
Temp: 30° C

Limits Of Quantification:

0.420 mg/L SO_3

Summary Of QA Audit Sample Analysis:

See analytical data sheets for results of internal calibration verification standard results. All internal QC results within ±10 % limits.

Summary Sample Spike Analysis:

See Analytical data sheets for results of sample spike analyses. All spike results within 90% - 110% limits.

<u>Miscellaneous Comments Regarding Sample Analysis:</u> (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

None

RESOLUTION ANALYTICS, INC.
Specialists in Air Emissions Analysis

Client: TRC, Inc.
RFA #: 182068
Analysis: EPA Method 8A

SO_3 Analytical Data Sheet

SO_4 Standard Calibration Curve

Standard Manufacturer: Ultra
Lot ID: L00282

m_2: 2.07E-04
m_1: 2.39E-01
b: 1.02E-02

R^2: 0.9999931

$SO4^-$ Conc. (mg/L)	Standard Areas Inj. 1	Inj. 2	Average Area	% Diff.	$SO4^-$ (mg/L)	% Difference from Actual
0.500	0.1330	0.1281	0.1306	3.75%	0.504	0.74%
1.00	0.2612	0.2602	0.2607	0.38%	1.05	4.79%
5.00	1.1884	1.1958	1.1921	0.62%	4.93	-1.45%
20.0	4.8745	4.8780	4.8763	0.07%	20.0	0.13%
40.0	9.8562	9.9306	9.8934	0.75%	40.0	-0.01%

Internal Calibration Verification

Standard Manufacturer: AccuStandard
Lot ID: 211055138

	Inj. 1	Inj. 2	Average Area	% Diff.	Expected $SO4^-$ (mg/L)	Actual $SO4^-$ (mg/L)	% Diff.
ICV Standard	2.3058	2.3366	2.3212	1.33%	10.0	9.60	-4.04%

Matrix Spike

Sample I.D.	Inj. 1	Inj. 2	Average Area	% Diff.	Spike $SO4^-$ (mg/L)	Sample SO4 (mg/L)	Calc. $SO4^-$ (mg/L)	% Recovery
U5.R3.Stack	1.4498	1.4620	1.4559	0.84%	6.0	2.43	6.2	96.9%

Note: 1.0 mls of the above sample was spiked with
1.0 mls of a 10.0 ppm sulfate standard.

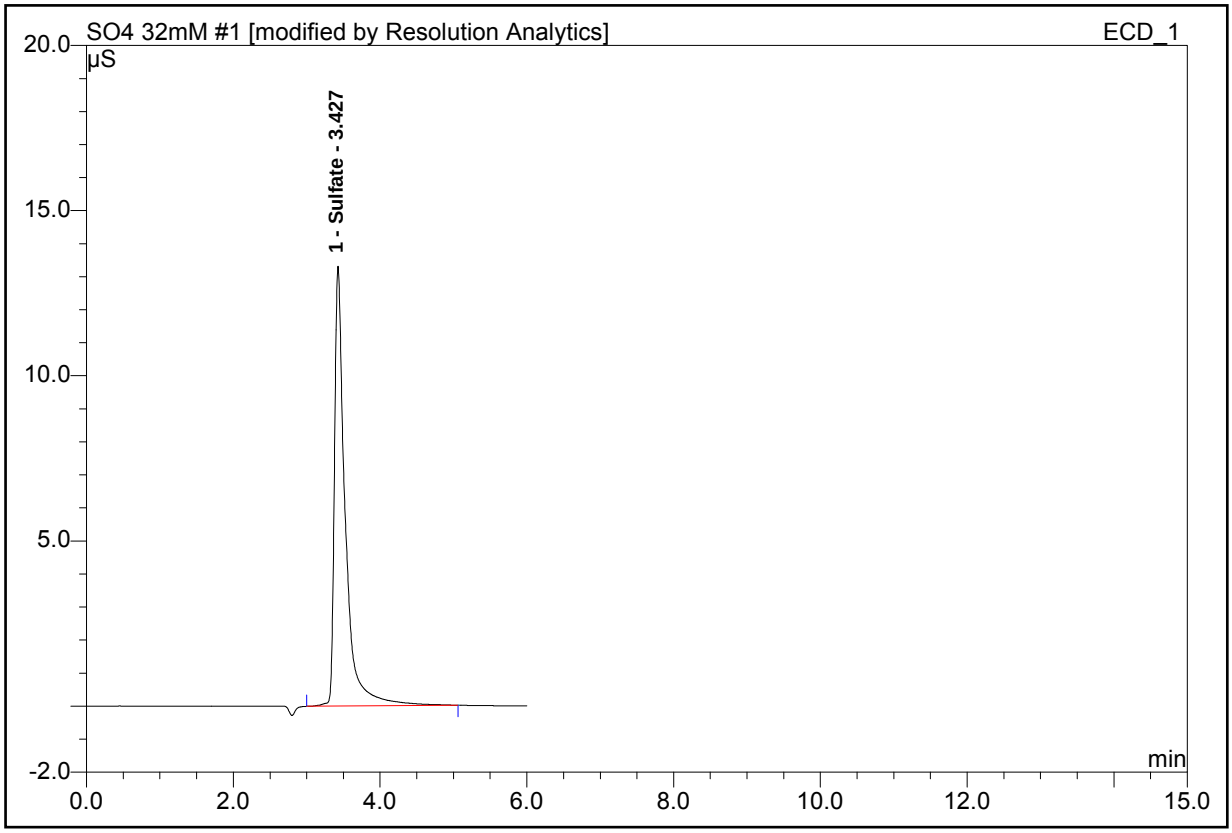
Field Samples

SAMPLE ID	Inj. 1 Area	Inj. 2 Area	ND	Average Area	% Diff.	Dilution Factor	ND	$SO4^-$ (mg/L)	Sample Volume (ml)	ND	**SO_3 Catch (mg)**
U5.R1.APH IN	6.3498	6.5131		6.4315	2.54%	2		26.287	89		**3.90**
U5.R2.APH IN	5.1776	5.1515		5.1646	0.51%	2		21.192	90		**3.18**
U5.R3.APH IN	6.1160	6.0493		6.0827	1.10%	2		24.888	98		**4.07**
U5.R1.APH OUT	1.3143	1.2995		1.3069	1.13%	1		5.404	94		**0.423**
U5.R2.APH OUT	0.9623	0.9535		0.9579	0.92%	1		3.954	100		**0.330**
U5.R3.APH OUT	0.8909	0.9130		0.9020	2.45%	1		3.722	78		**0.242**
U5.R1.Stack	1.2604	1.2734		1.2669	1.03%	1		5.238	83		**0.362**
U5.R2.Stack	0.8584	0.8626		0.8605	0.49%	1		3.549	85		**0.251**
U5.R3.Stack	0.5866	0.5949		0.5908	1.40%	1		2.426	98		**0.198**

1 10 PPM AUDIT a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:00**	*Eluent Concentration (mM):*	**32**

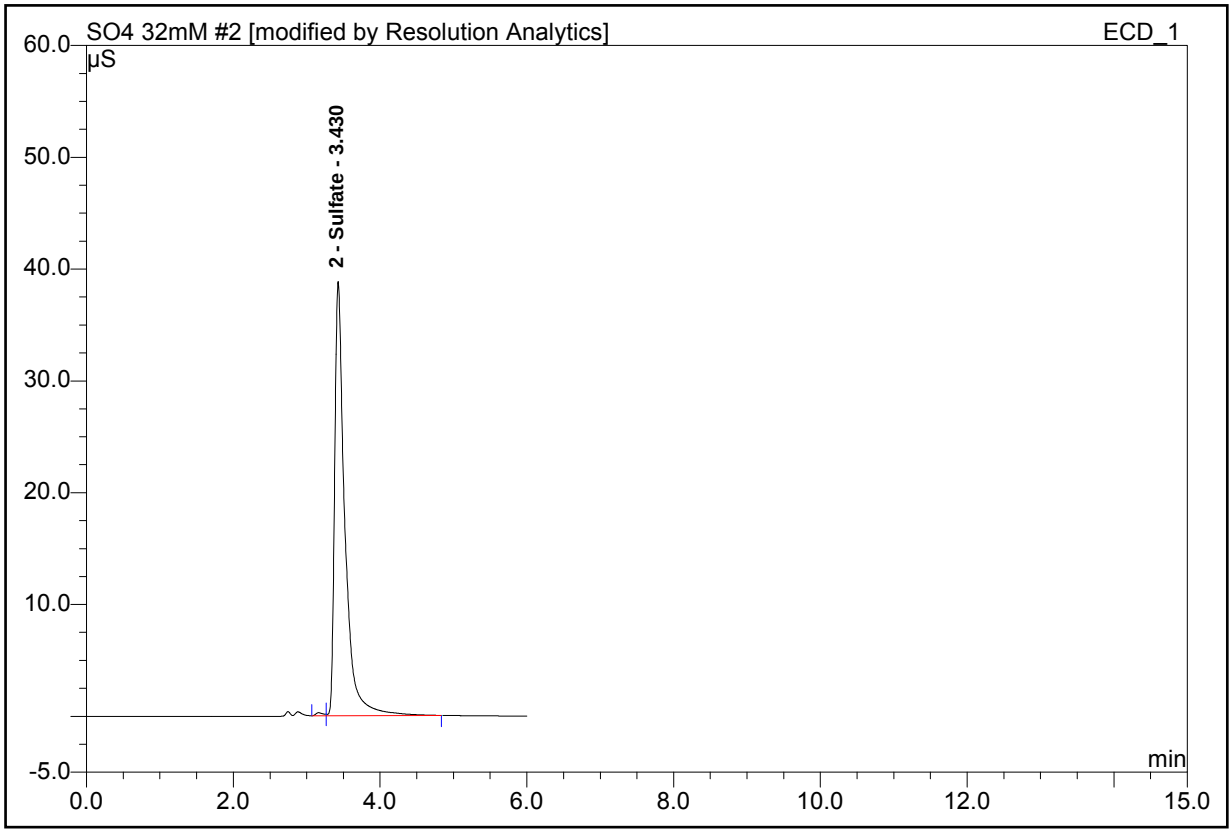


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	3.43	Sulfate	13.315	2.3058

2 APH IN 1 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:22**	*Eluent Concentration (mM):*	**32**

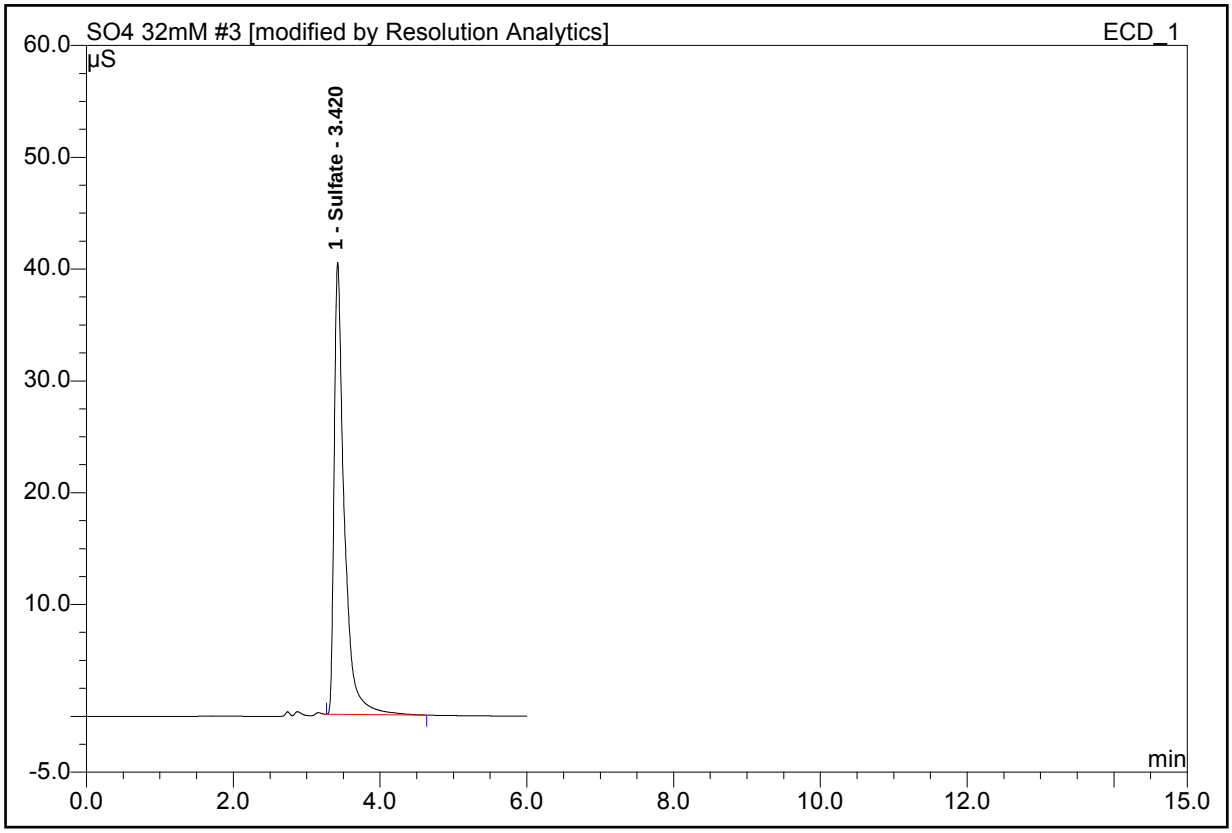


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	38.843	6.3498

3 APH IN 1 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:30**	*Eluent Concentration (mM):*	**32**

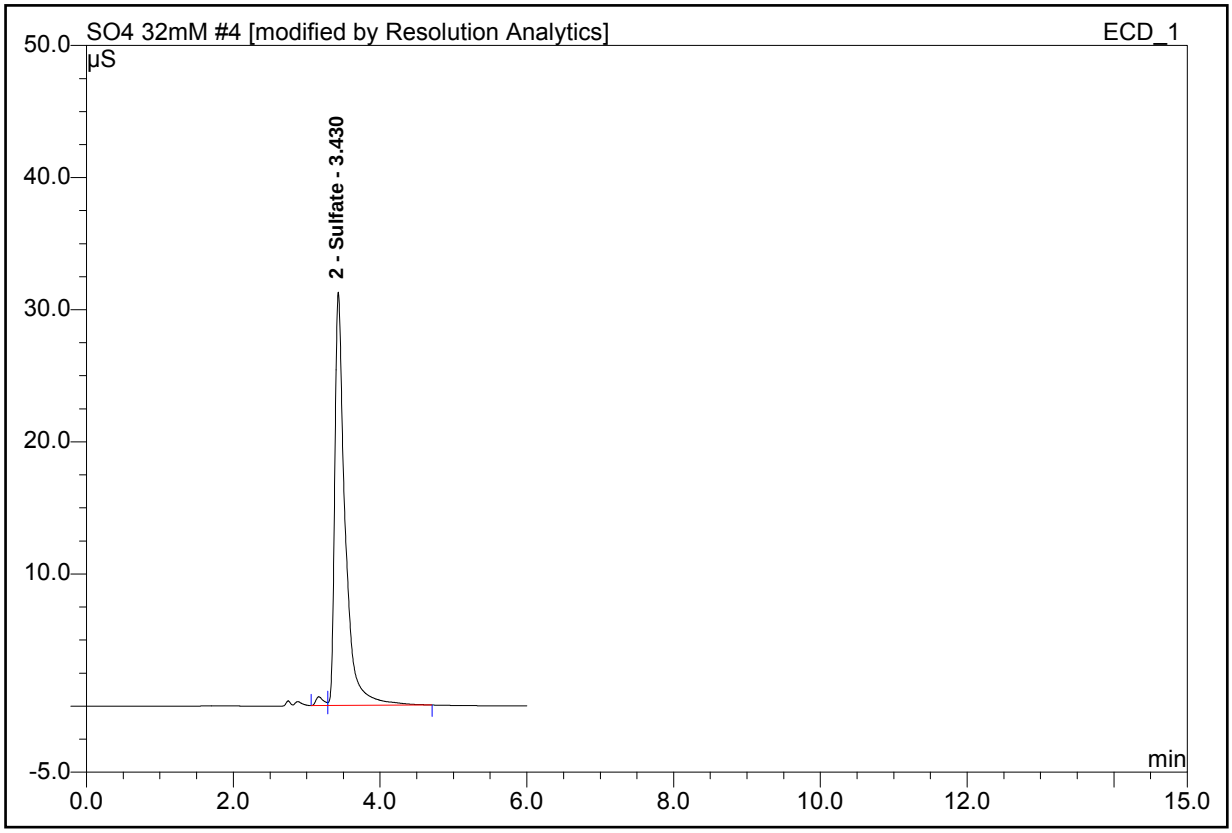


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	3.42	Sulfate	40.422	6.5131

4 APH IN 2 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:38**	*Eluent Concentration (mM):*	**32**

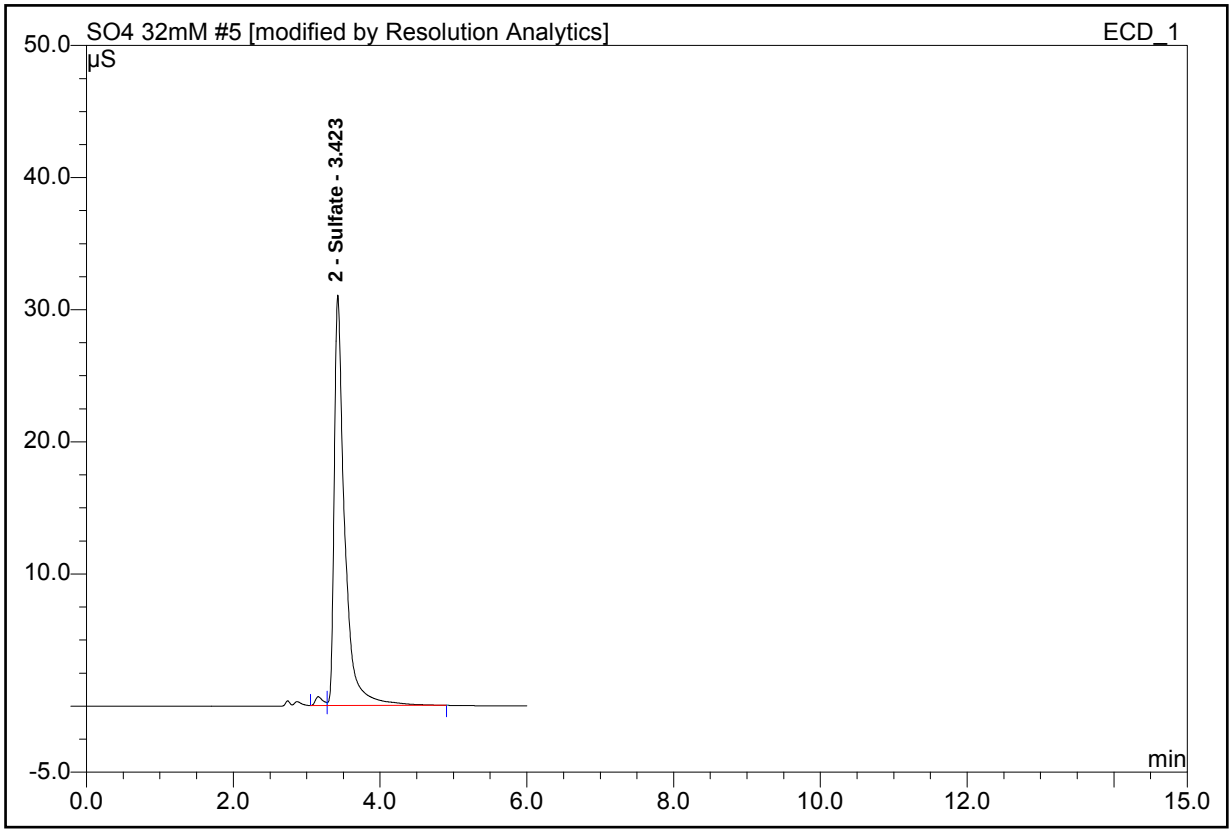


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	31.295	5.1776

5 APH IN 2 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:46**	*Eluent Concentration (mM):*	**32**

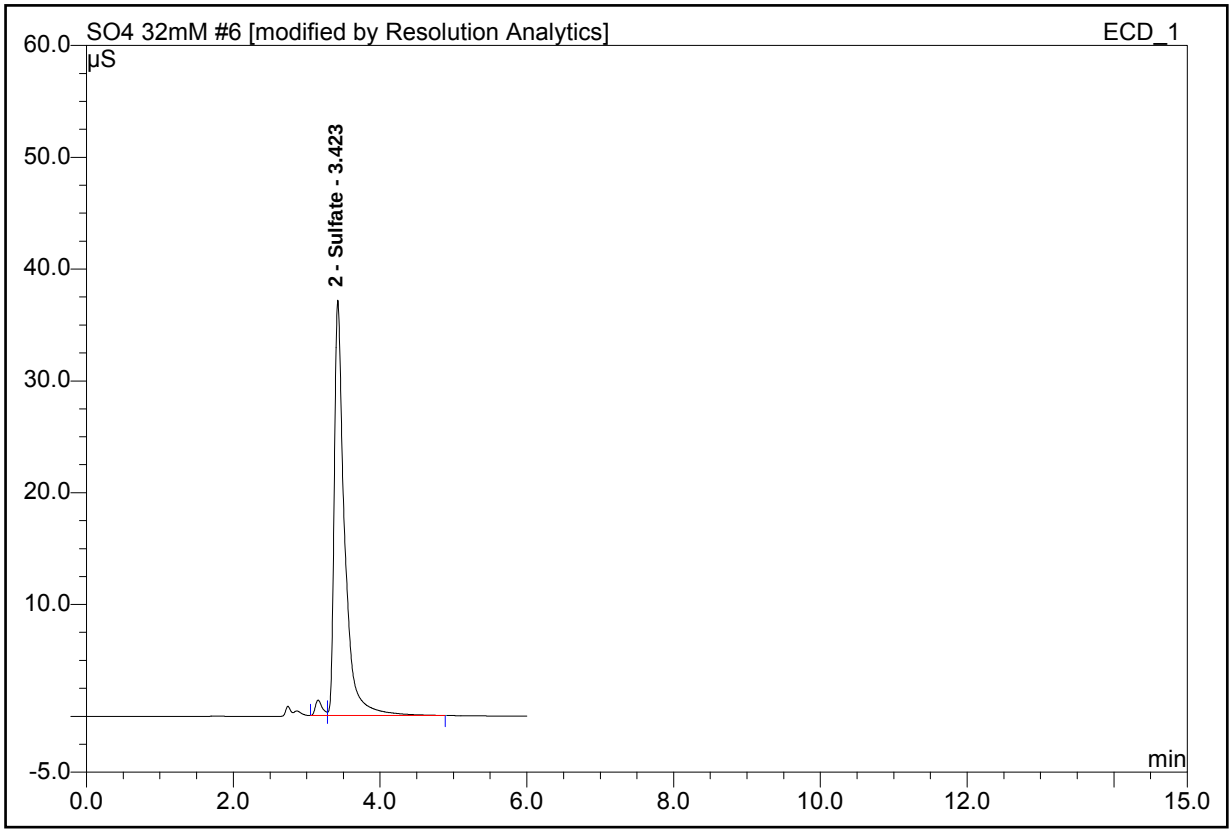


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.42	Sulfate	31.071	5.1515

6 APH IN 3 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 10:53**	*Eluent Concentration (mM):*	**32**

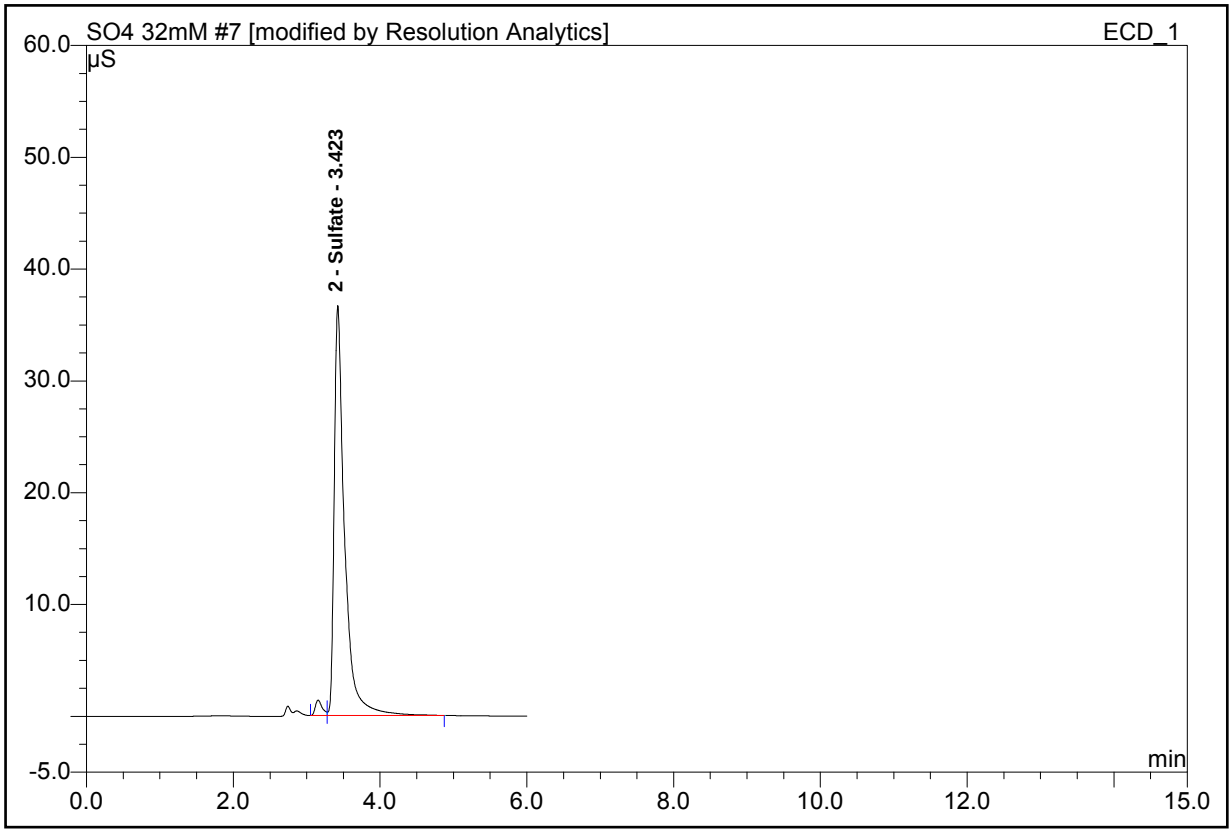


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.42	Sulfate	37.152	6.1160

7 APH IN 3 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:01**	*Eluent Concentration (mM):*	**32**

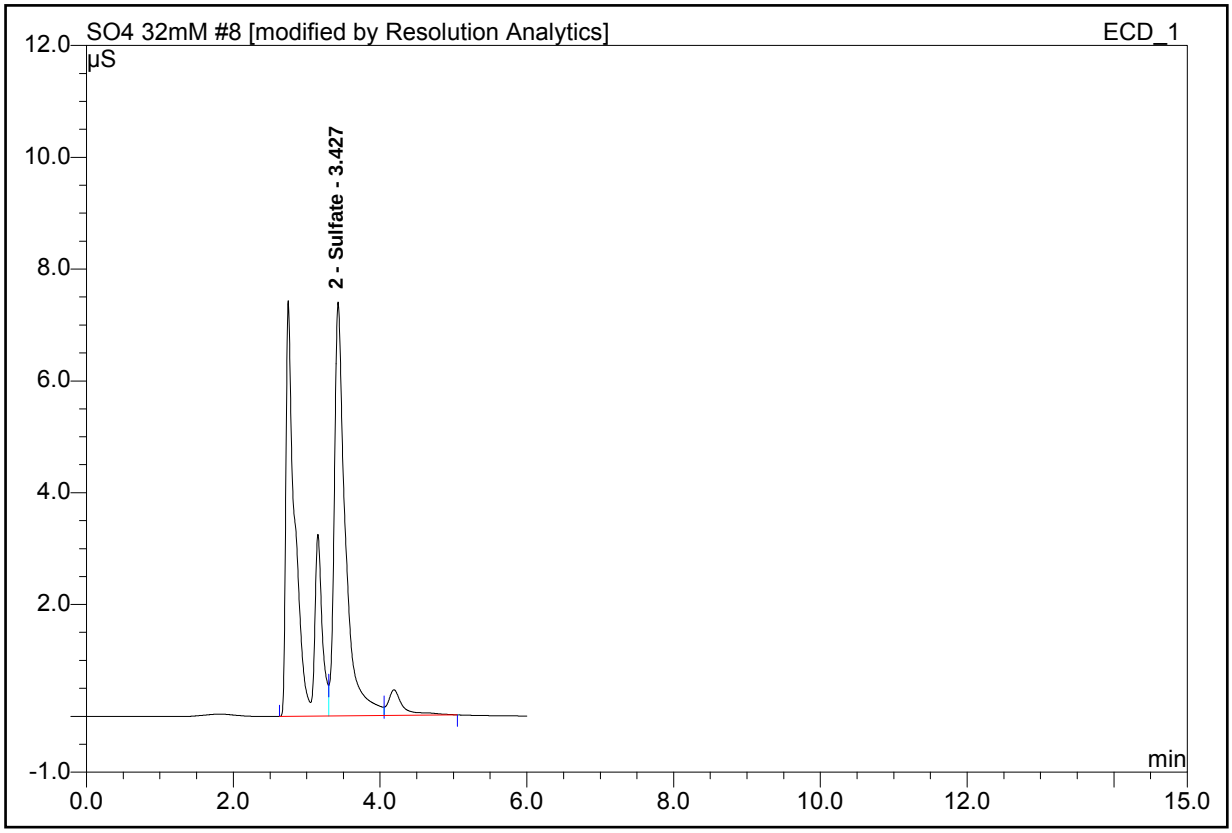


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.42	Sulfate	36.674	6.0493

8 APH OUT 1 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:09**	*Eluent Concentration (mM):*	**32**

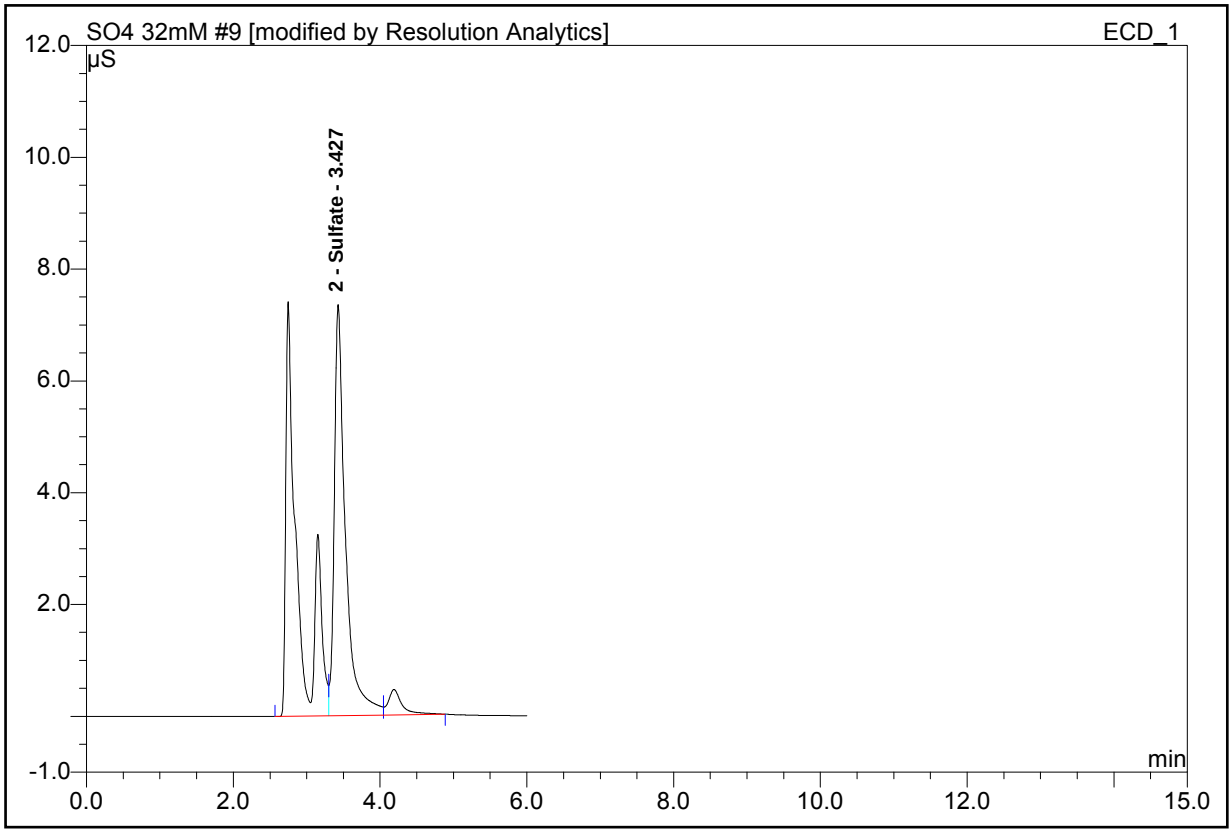


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	7.403	1.3143

9 APH OUT 1 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:17**	*Eluent Concentration (mM):*	**32**

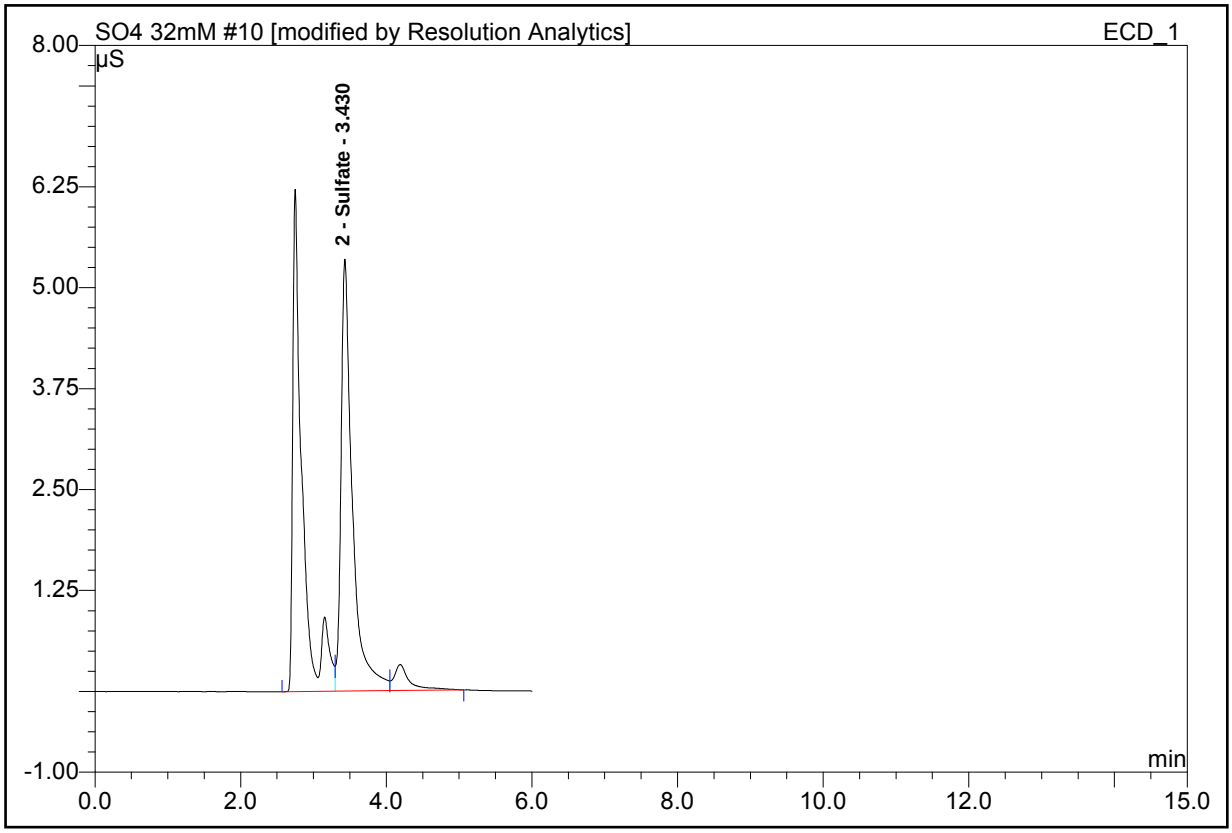


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	7.352	1.2995

10 APH OUT 2 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:24**	*Eluent Concentration (mM):*	**32**

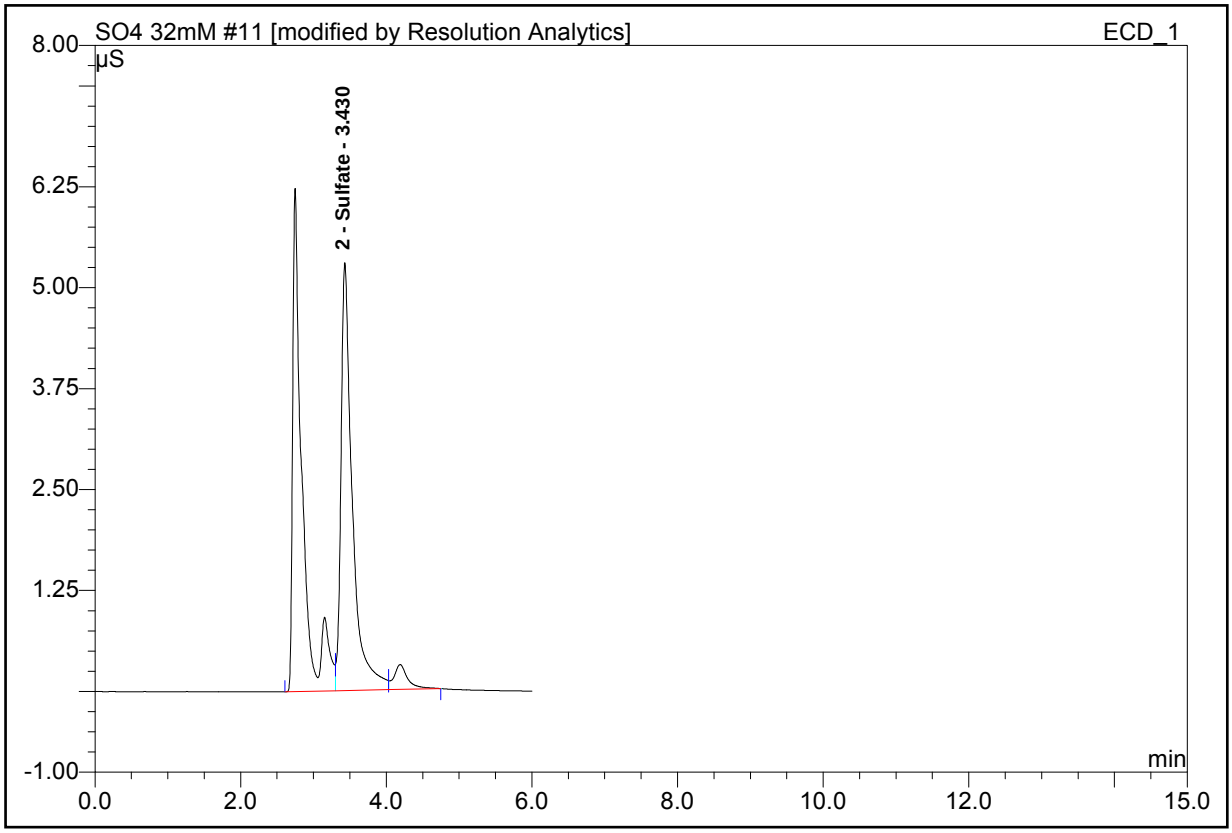


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	5.350	0.9623

11 APH OUT 2 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:32**	*Eluent Concentration (mM):*	**32**

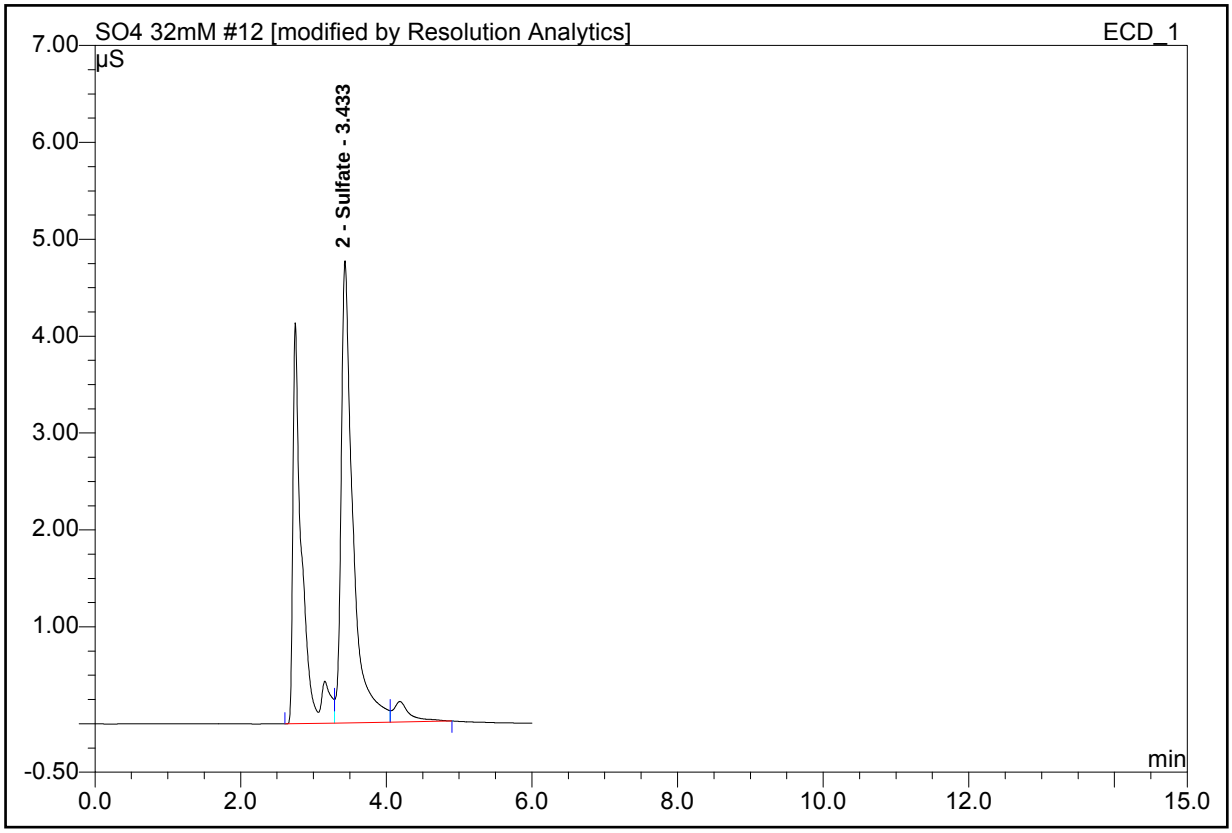


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	5.299	0.9535

12 APH OUT 3 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:40**	*Eluent Concentration (mM):*	**32**

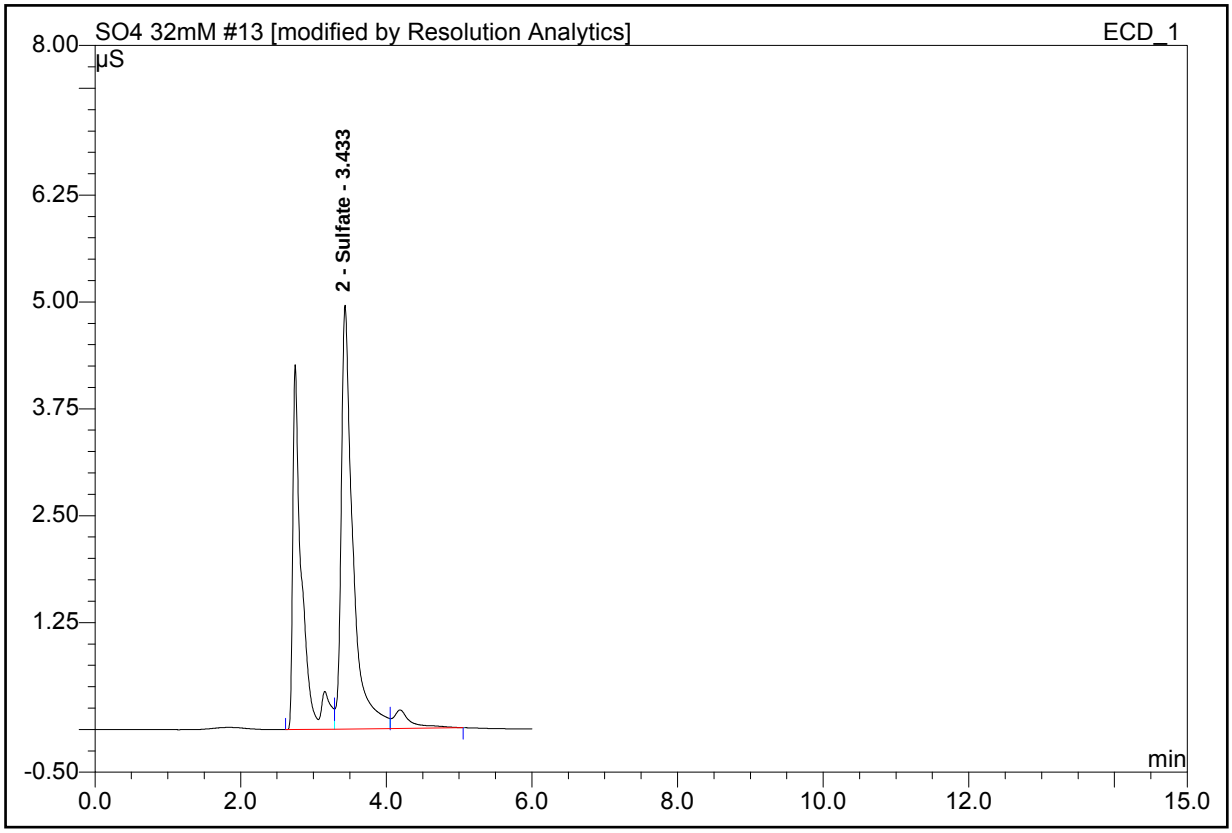


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	4.769	0.8909

13 APH OUT 3 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:48**	*Eluent Concentration (mM):*	**32**

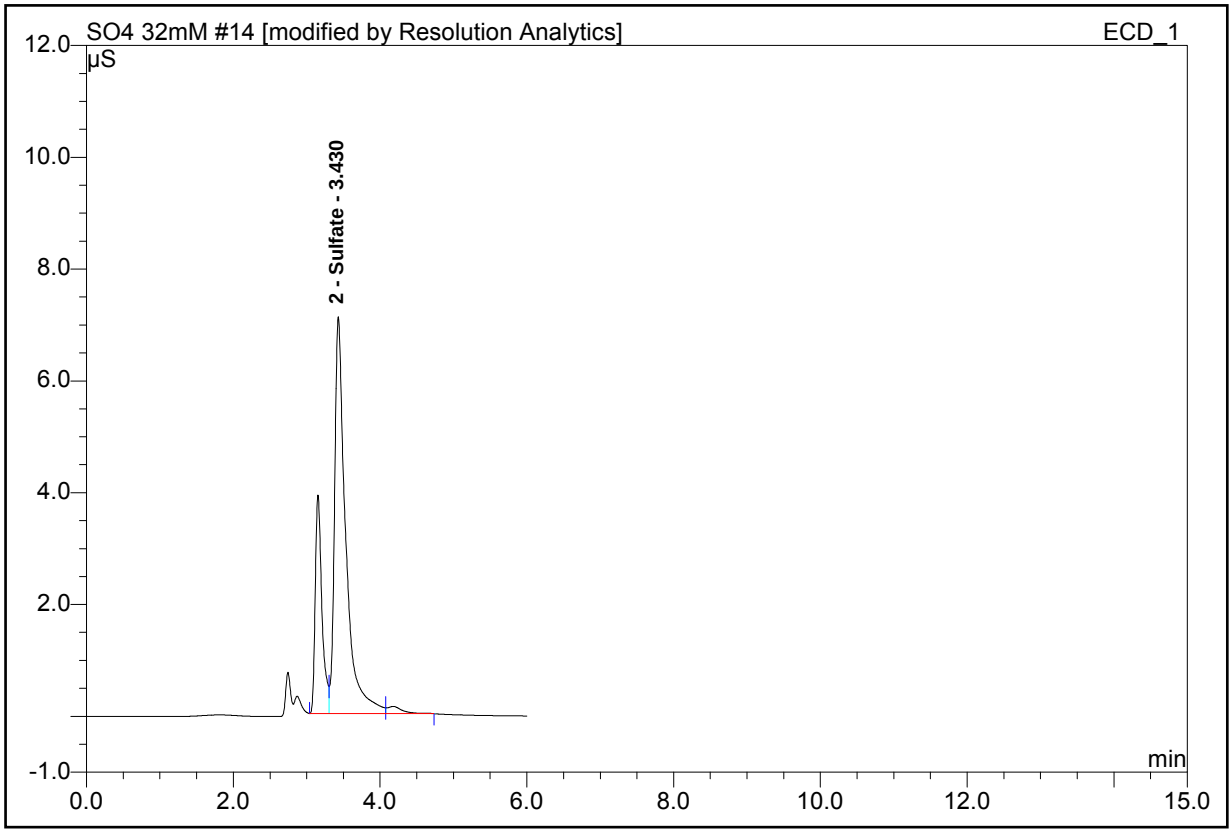


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	4.958	0.9130

14 STACK 1 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 11:55**	*Eluent Concentration (mM):*	**32**

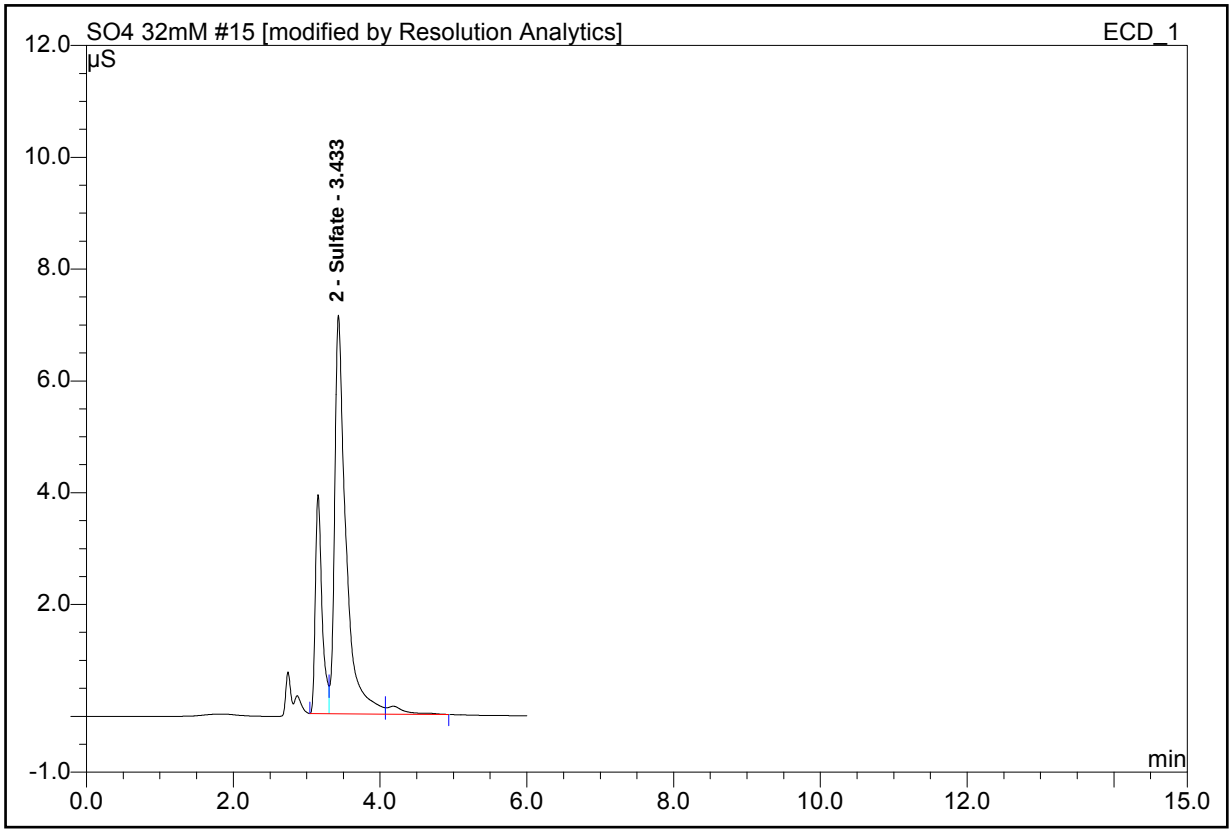


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	7.102	1.2604

15 STACK 1 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:03**	*Eluent Concentration (mM):*	**32**

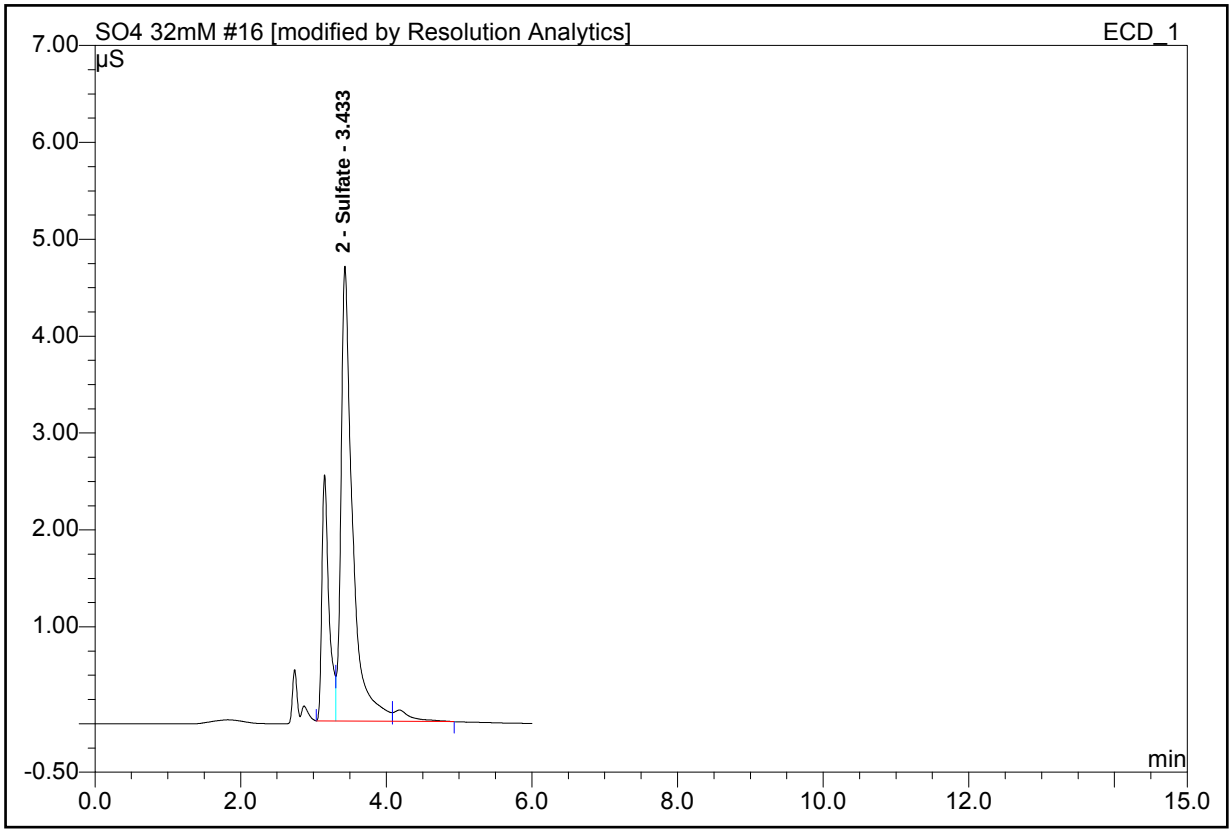


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	7.128	1.2734

16 STACK 2 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:11**	*Eluent Concentration (mM):*	**32**

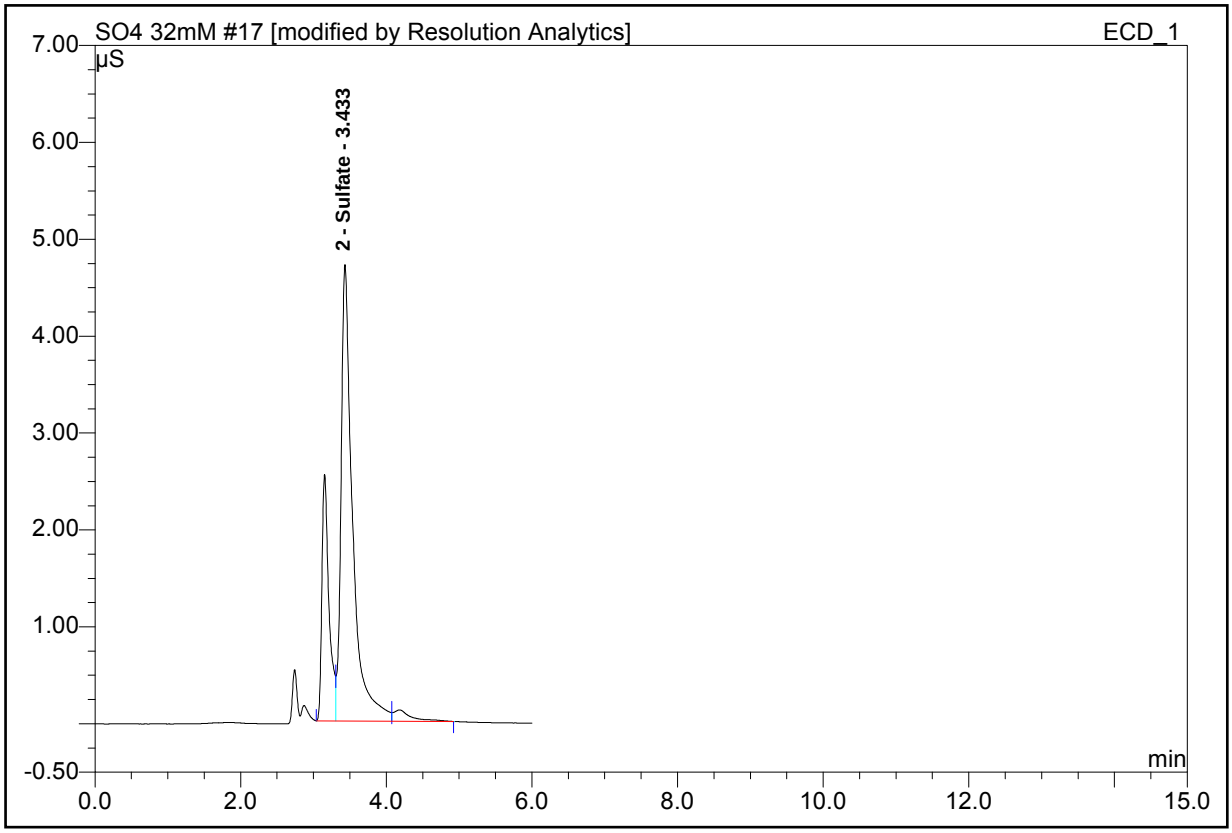


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	4.692	0.8584

17 STACK 2 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:19**	*Eluent Concentration (mM):*	**32**

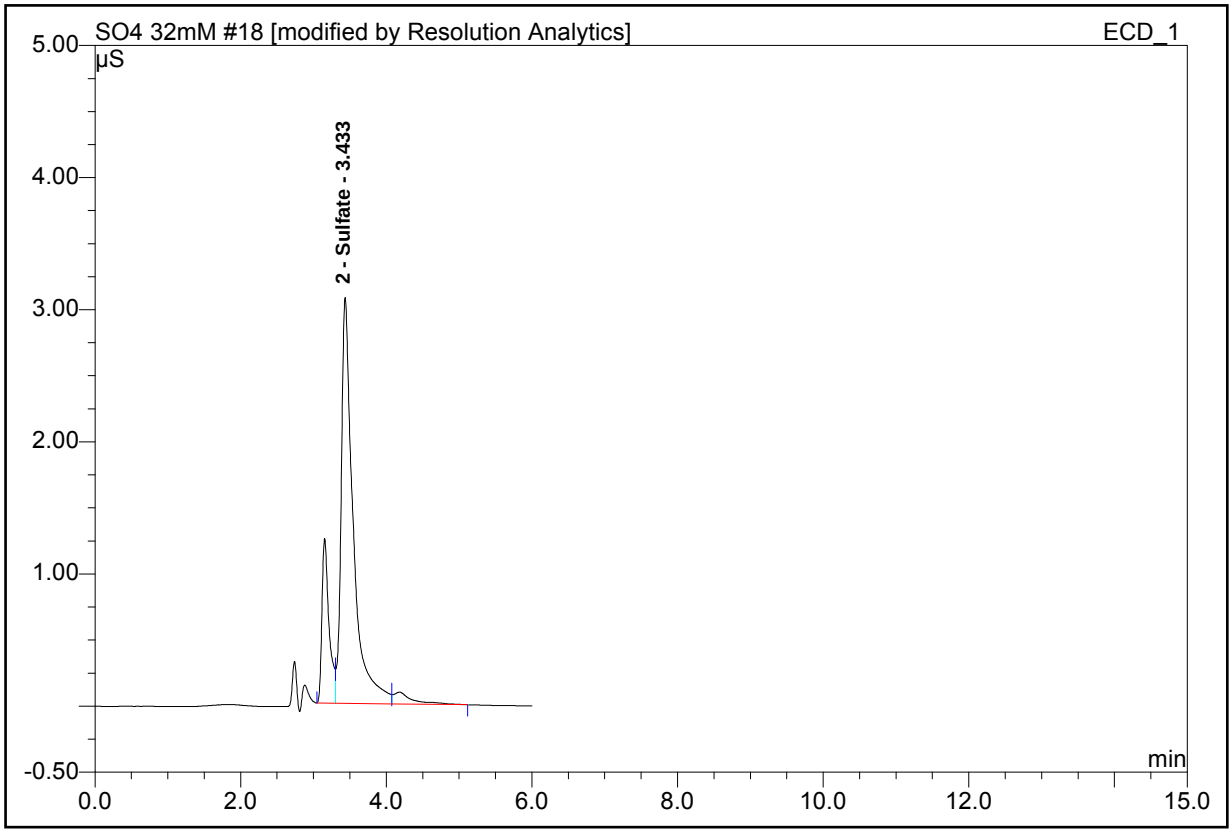


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	4.711	0.8626

18 STACK 3 a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:26**	*Eluent Concentration (mM):*	**32**

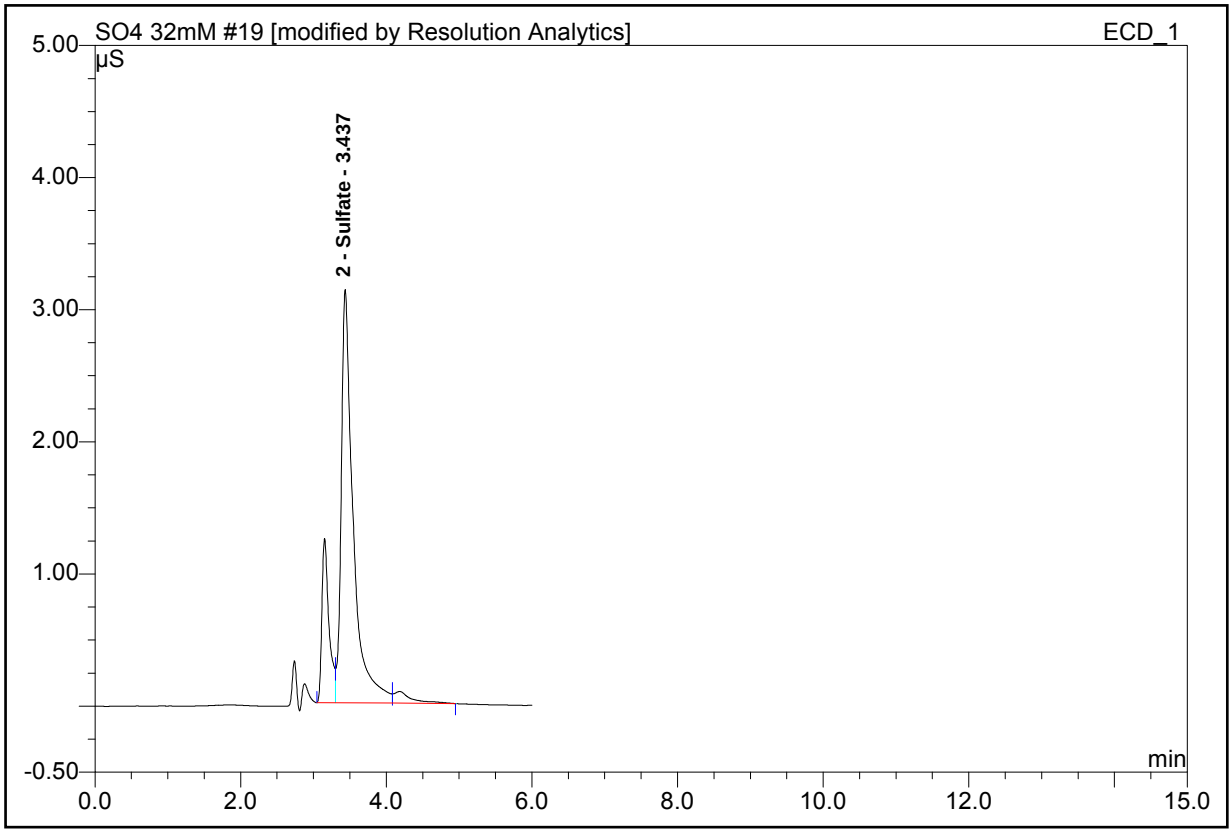


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	3.072	0.5866

19 STACK 3 b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:34**	*Eluent Concentration (mM):*	**32**

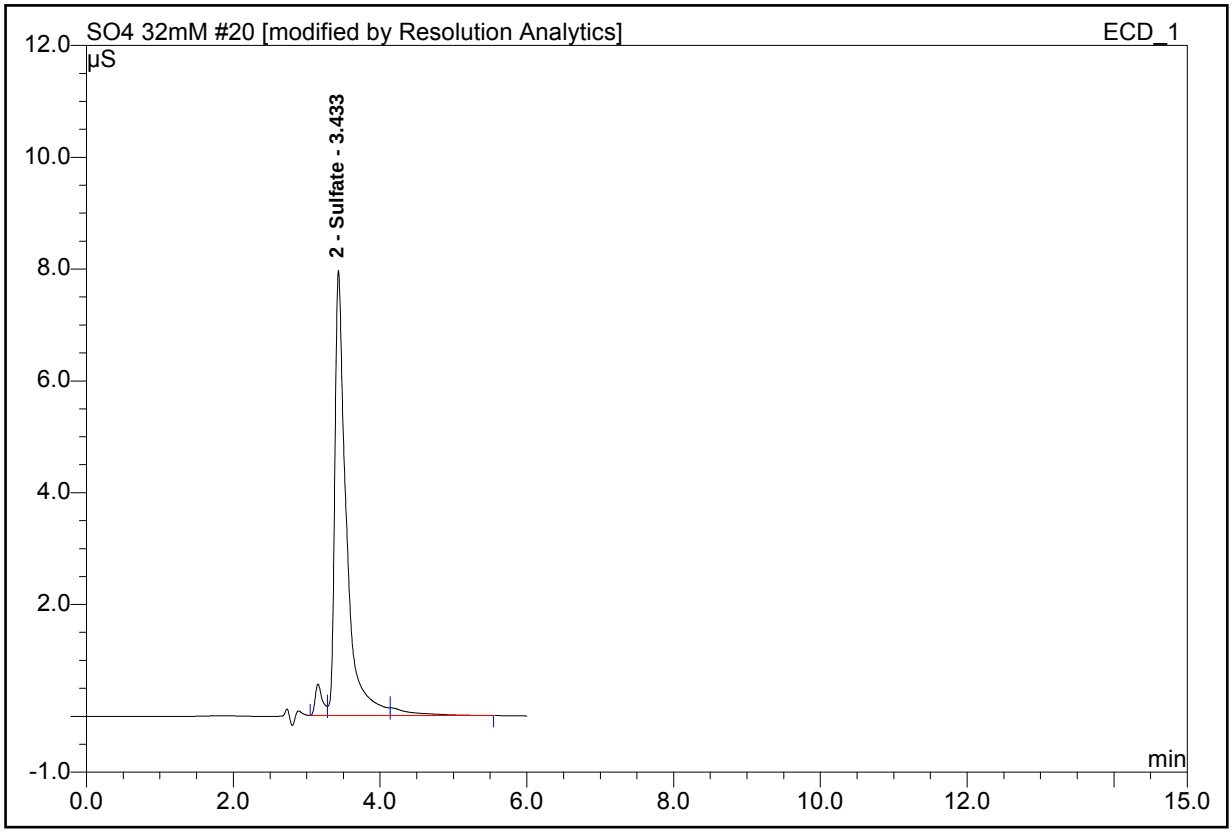


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.44	Sulfate	3.127	0.5949

20 SO3 MATRIX a

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:42**	*Eluent Concentration (mM):*	**32**

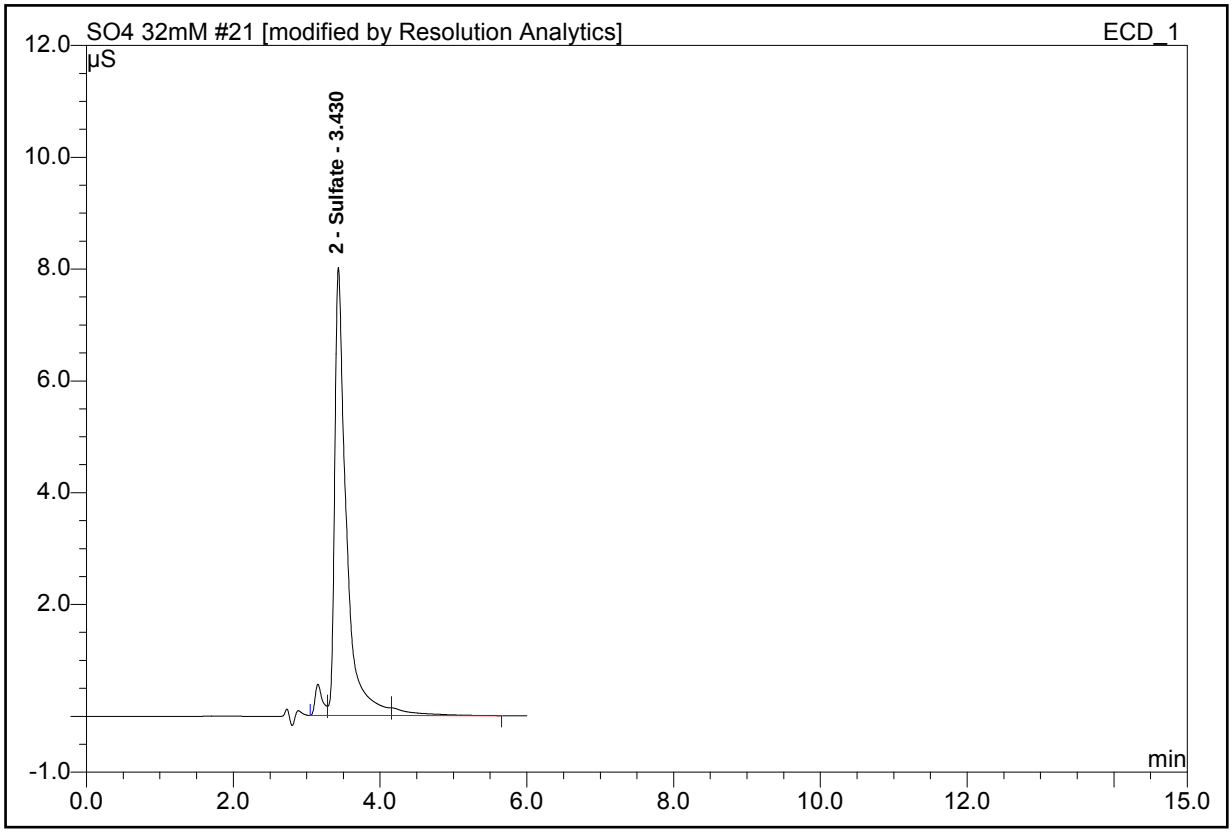


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	7.962	1.4498

21 SO3 MATRIX b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:50**	*Eluent Concentration (mM):*	**32**

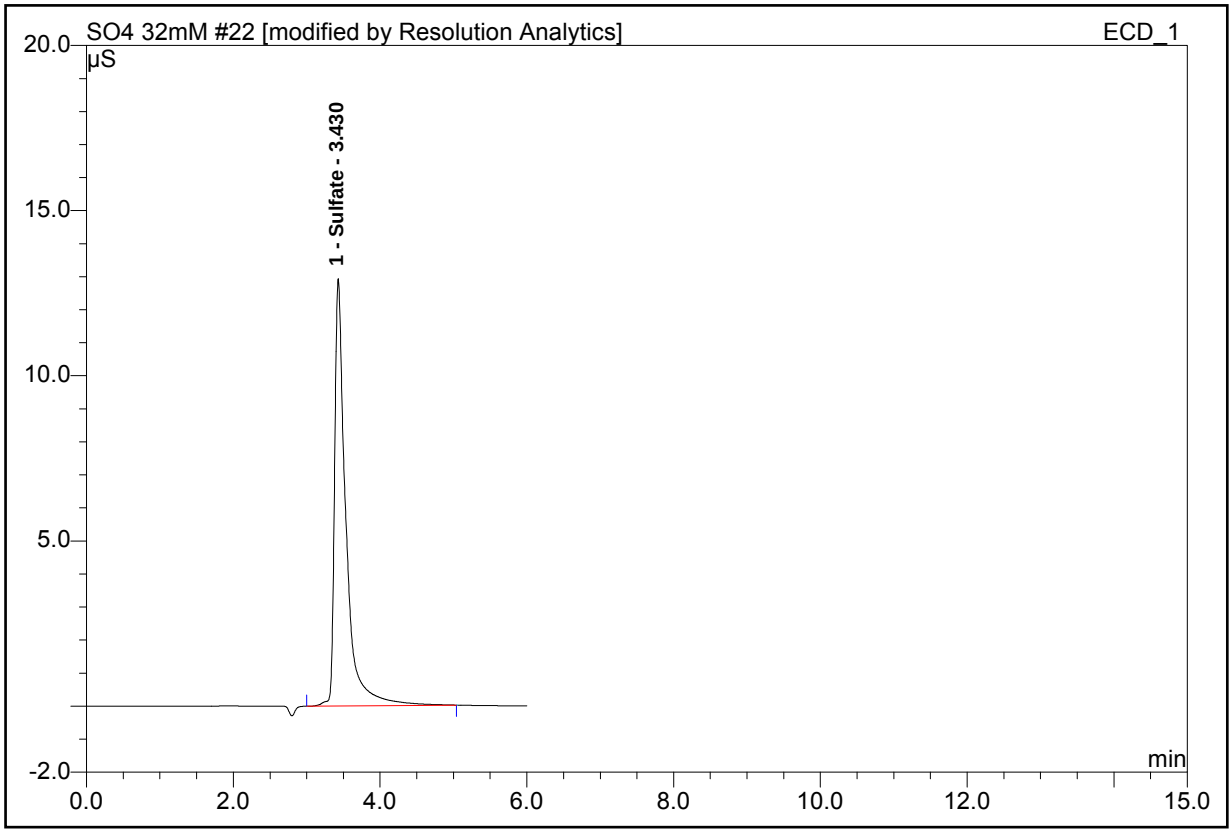


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	3.43	Sulfate	8.015	1.4620

22 10 PPM AUDIT b

Sequence **ICS2000\JOBS\TRC\182068**

Column:	**IonPac AS18 4x250mm**	*Suppressor Type:*	**ASRS_4mm**
Injection Volume:	**25 µl**	*Suppressor Current (mA):*	**85**
Control Program:	**SO4 32mm**		
Quantif. Method:	**32mm so4**	*Eluent Cartridge:*	**EluGen-OH**
Recording Time:	**10/19/2011 12:57**	*Eluent Concentration (mM):*	**32**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	3.43	Sulfate	12.933	2.3366