Non Ref File

MEMORANDUM

TO: GENERAL CHEMICAL COMPANY COMPLIANCE FILE

THROUGH: CHARLES COLLINS, ADMINISTRATOR, AQD
BERNIE DAILEY, ENGINEERING SUPERVISOR, AQD

FROM: DAN OLSON, COMPLIANCE OFFICER, AQD

DATE: DECEMBER 7, 1990

SUBJECT: COMPLIANCE TEST FOR GR-3-A CRUSHER STACK (MD-121)

On October 22,1990, the Division received a copy of the test report for the stack test performed on the GR-3-A emission source located at the General Chemical Trona plant near Green River, Sweetwater County, Wyoming. This test effort was conducted on September 24 and 25, 1990. The test series was a Reference Method 5 series for particulate mass emission rate conducted for General Chemical by The Emission Measurement People (TEMP) of Canon City, Colorado.

Lee Gribovicz, Air Quality District Engineer, was on-site for this test effort and observed the test setup and procedures, which he found to be satisfactory. This source is an NSPS Subpart OOO source which is subject to an emission limit of 0.05 grams/dscm (0.02 gr/dscf), with a maximum of seven (7) percent opacity. Additionally, Air Quality Permit MD-121 places a cap on the mass limit of 2.0 lb/hr. Mr. Gribovicz explained to both General Chemical and TEMP personnel that the Division would require both front and back half analyses on this test. He indicated that the front half would be used for comparison against the NSPS standard and the total catch would be used to compare against the mass emission cap in lb/hr stated in the permit. Throughout the day, Mr. Gribovicz observed the stack with no visible emissions.

The raw test data included with the test report were reviewed for consistency and emission rate calculations were independently performed by the division to compare with those of the testing contractor. No significant differences were noted. The results of this evaluation are summarized below and included as attachments to this memo:

TESTED EMISSION RATES

	AQD	TEMP	ALLOWABLE
FRONT HALF			
gr/dscf	0.0057	0.0058	0.02 (NSPS)
lb/hr	0.7890	0.7970	----
TOTAL CATCH			
gr/dscf	0.0165	0.0167	----
lb/hr	2.243	2.268	2.0 (MD-121)

Based on the results of this analysis, it appears that the GR-3-A stack on the day of this test series was operating within the requirements of NSPS Subpart OOO for emission rate and opacity but was exceeding the mass cap of 2.0 lb/hr set for this source by permit conditions in MD-121.

cc: Lee Gribovicz

STACK TEST CALCULATIONS

SOURCE: General Chemical Company, GR3A Crusher - FRONT HALF

TESTED BY: Ross & Scappaticci
The Emission Measurement People

DATE TESTED: 09/24/90 thru 09/25/90

OBSERVED BY: Lee Gribovicz

EVALUATED BY: Dan Olson

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.391E+01	2.381E+01	2.382E+01
ABS. STACK GAS PRESSURE (in Hg)	2.396E+01	2.386E+01	2.388E+01
ABS. AVE. STACK GAS TEMP (*R)	5.423E+02	5.503E+02	5.429E+02
ABS. AVE. DGM TEMP (*R)	5.432E+02	5.548E+02	5.505E+02
TOT. VOL. H2O COLLECTED (ml)	6.130E+01	6.470E+01	5.960E+01
VOL. THRU DGM (ft3)	6.233E+01	7.068E+01	6.871E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	2.252E+00	2.542E+00	2.400E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	7.680E-01	8.190E-01	8.050E-01
STD VOL. SAMPLED (scf)	4.873E+01	5.393E+01	5.283E+01
H2O VAPOR IN GAS @STP (ft3)	2.885E+00	3.045E+00	2.805E+00
MOL. WT. WET (lb/lb mole)	2.827E+01	2.837E+01	2.829E+01
MOL. WT. DRY (lb/lb mole)	2.888E+01	2.896E+01	2.884E+01
VEL. STACK GAS (fps)	4.934E+01	5.302E+01	5.181E+01
FLOW RATE, DRY @ STP (scfm)	1.540E+04	1.629E+04	1.620E+04
CONCENTRATION (gr/scf)	3.924E-03	2.945E-03	1.035E-02
CONCENTRATION (lb/scf)	5.606E-07	4.207E-07	1.478E-06
EMISSION RATE (lb/hr)	5.181E-01	4.111E-01	1.437E+00
% ISOKINETIC	9.113E+01	9.541E+01	9.397E+01

Average: 0.0057 gr/dscf
0.789 lb/hr

STACK TEST CALCULATIONS

SOURCE: General Chemical Company, GR3A Crusher-- BACK HALF

TESTED BY: Ross & Scappaticci
The Emission Measurement People

DATE TESTED: 09/24/90 thru 09/25/90

OBSERVED BY: Lee Gribovicz

EVALUATED BY: Dan Olson

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.391E+01	2.381E+01	2.382E+01
ABS. STACK GAS PRESSURE (in Hg)	2.396E+01	2.386E+01	2.388E+01
ABS. AVE. STACK GAS TEMP (*R)	5.423E+02	5.503E+02	5.429E+02
ABS. AVE. DGM TEMP (*R)	5.432E+02	5.548E+02	5.505E+02
TOT. VOL. H2O COLLECTED (ml)	6.130E+01	6.470E+01	5.960E+01
VOL. THRU DGM (ft3)	6.233E+01	7.068E+01	6.871E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	2.252E+00	2.542E+00	2.400E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	7.680E-01	8.190E-01	8.050E-01
STD VOL. SAMPLED (scf)	4.873E+01	5.393E+01	5.283E+01
H2O VAPOR IN GAS @STP (ft3)	2.885E+00	3.045E+00	2.805E+00
MOL. WT. WET (lb/lb mole)	2.827E+01	2.837E+01	2.829E+01
MOL. WT. DRY (lb/lb mole)	2.888E+01	2.896E+01	2.884E+01
VEL. STACK GAS (fps)	4.934E+01	5.302E+01	5.181E+01
FLOW RATE, DRY @ STP (scfm)	1.540E+04	1.629E+04	1.620E+04
CONCENTRATION (gr/scf)	1.968E-02	6.090E-03	6.596E-03
CONCENTRATION (lb/scf)	2.812E-06	8.700E-07	9.424E-07
EMISSION RATE (lb/hr)	2.599E+00	8.501E-01	9.158E-01
% ISOKINETIC	9.113E+01	9.541E+01	9.397E+01

Average: 0.0108 gr/dscf
1.455 lb/hr.

STACK TEST CALCULATIONS

SOURCE: General Chemical Company, GR3A Crusher -TOTAL

TESTED BY: Ross & Scappaticci
The Emission Measurement People

DATE TESTED: 09/24/90 thru 09/25/90

OBSERVED BY: Lee Gribovicz

EVALUATED BY: Dan Olson

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.391E+01	2.381E+01	2.382E+01
ABS. STACK GAS PRESSURE (in Hg)	2.396E+01	2.386E+01	2.388E+01
ABS. AVE. STACK GAS TEMP (*R)	5.423E+02	5.503E+02	5.429E+02
ABS. AVE. DGM TEMP (*R)	5.432E+02	5.548E+02	5.505E+02
TOT. VOL. H2O COLLECTED (ml)	6.130E+01	6.470E+01	5.960E+01
VOL. THRU DGM (ft3)	6.233E+01	7.068E+01	6.871E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	2.252E+00	2.542E+00	2.400E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	7.680E-01	8.190E-01	8.050E-01
STD VOL. SAMPLED (scf)	4.873E+01	5.393E+01	5.283E+01
H2O VAPOR IN GAS @STP (ft3)	2.885E+00	3.045E+00	2.805E+00
MOL. WT. WET (lb/lb mole)	2.827E+01	2.837E+01	2.829E+01
MOL. WT. DRY (lb/lb mole)	2.888E+01	2.896E+01	2.884E+01
VEL. STACK GAS (fps)	4.934E+01	5.302E+01	5.181E+01
FLOW RATE, DRY @ STP (scfm)	1.540E+04	1.629E+04	1.620E+04
CONCENTRATION (gr/scf)	2.361E-02	9.035E-03	1.693E-02
CONCENTRATION (lb/scf)	3.373E-06	1.291E-06	2.418E-06
EMISSION RATE (lb/hr)	3.117E+00	1.261E+00	2.350E+00
% ISOKINETIC	9.113E+01	9.541E+01	9.397E+01

Average: 0.0165 gr/dscf

2.243 lb/hr.

General Chemical Company
GR3A Crusher
9/24-25/90

Data Sheet

Emission Measurement People,
Ross & ~~Scappaticci~~
Scappaticci

P_{std} = 29.92 in Hg

T_{std} = 530° R

		Test 1	Test 2	Test 3
P_{bar}	= barometric pressure at site (in Hg)	23.91	23.81	23.82
P_s	= absolute stack gas pressure (in Hg)	23.96	23.86	23.88
T_s	= absolute average stack gas temp. (°R)	542.3	530.3	542.9
T_m	= absolute average dry gas meter temp. (°R)	543.2	554.75	550.5
V_{lc}	= total volume of water collected (ml)	61.3	64.7	54.6
V_m	= volume of gas through dry gas meter (ft^3)	62.326	~~70.68~~ ~~80.080~~	68.71
ΔH	= average pressure drop across orifice (in H_2O)	2.252	2.542	2.40
C_p	= pitot tube coefficient	0.84	0.84	0.84
$(\overline{\sqrt{\Delta p}})_{ave}$	= average velocity head of stack gas (in H_2O)	0.768	0.819	0.805
A_s	= cross-sectional area of stack (ft^2)	7.0686	7.0686	7.0686
M_n	= total amount of particulate collected	Front ~~Back~~ Half 0.0124	0.0103	0.03545
		Total 0.0246	0.0316	0.0580
Θ	= total sampling time (min.)	72	72	72
A_n	= cross-sectional area of nozzle (ft^2)	0.000341	→	→

Orsat Analysis

	Test 1	Test 2	Test 3
% CO_2	1	2	1
% O_2	18	16	17
% CO	0	0	0
% N_2	81	82	82

The Emission Measurement People, Inc.
P.O. Box 935, CAÑON CITY, CO 81215-0935
Nationwide Watts: 1 800 222-4187
Office Phone: 719 275-0046

October 18, 1990

Wyoming Dept. of Environmental Quality
Division of Air Quality
210 Lincoln Street
L A N D E R, WY 82520

ATTN: Mr. Lee Gribovicz, District Engineer

RE: Submittal of Emission Measurement Test Report
For Particulate Emissions
GR3A Crusher, General Chemical Corporation, Green River, WY

Dear Mr. Gribovicz:

On behalf of General Chemical Corporation, **The Emission Measurement People, Inc.** are pleased to submit one copy of the subject compliance test report of the emission measurement project which we recently conducted at their GR3A Crusher near Green River.

Should you have any questions about the project or the report, please give us a call anytime. We have enjoyed working with you and General Chemical Corporation.

Very Truly Yours,

Petra LaChance

Petra LaChance
Administrator

JRF/pl

Enclosure(s): (1)

cc: Mr. Mike Wendorf, Environmental Technician, General Chemical Corporation (2 Report copies)
Mr. Bernard Dailey, Wyoming DEQ, Cheyenne, WY 82002 (1 Report copy)
Mr. John R. Floyd, Principal, **The Emission Measurement People, Inc.**

FLUNKED

EMISSION MEASUREMENT TEST REPORT

of

GR3A Crusher
Compliance Testing
for
Particulate Emission(s)

GR3A
General Chemical Corporation, Green River, Wyoming
Test Date: September 24-25, 1990

Prepared for:

General Chemical Corporation

West of Green River
GREEN RIVER, WY 82935
Mr. Mike D. Wendorf, Environmental Technician
Phone: 307 872-3621

Submitted to:

Wyoming Department of Environmental Quality
Division of Air Quality

210 Lincoln Street
Lander, WY 82520
Mr. Lee Gribovicz, District Engineer
Phone: 307 332-6755

Prepared by:

The Emission Measurement People, Inc.

P.O. Box 935, CAÑON CITY, CO 81215-0935
John R. Floyd, Technical Operations Director
Nationwide Watts: 800-222-4187
Office Phone: 719 275-0046

Report Date: October 16, 1990

EMISSION MEASUREMENT TEST REPORT

of

GR3A Crusher
Compliance Testing
for
Particulate Emission(s)

GR3A
General Chemical Corporation, Green River, Wyoming
Test Date: September 24-25, 1990

Prepared for:

General Chemical Corporation

West of Green River
GREEN RIVER, WY 82935
Mr. Mike D. Wendorf, Environmental Technician
Phone: 307 872-3621

Submitted to:

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210 Lincoln Street
Lander, WY 82520
Mr. Lee Gribovicz, District Engineer
Phone: 307 332-6755

Prepared by:

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P.O. Box 935, CAÑON CITY, CO 81215-0935
John R. Floyd, Technical Operations Director
Nationwide Watts: 800-222-4187
Office Phone: 719 275-0046

Report Date: October 16, 1990

CONTENTS OF EMISSION MEASUREMENT TEST REPORT

GR3A Crusher
for Particulate Emission(s)
General Chemical Corporation, Green River, Wyoming

CERTIFICATION, REVIEW, and ACCEPTANCE of REPORT

*** This Emission Measurement Compliance Test Report was compiled and prepared by the Project Leader for **The Emission Measurement People, Inc.**, using data collected by **The Emission Measurement People, Inc.** under contract to the Operating Company, as well as data supplied by the plant operator(s). ***

CERTIFICATION

*** As on site Project Leader for **The Emission Measurement People, Inc.**, I hereby certify that this report and these data are authentic and correct for the emission testing reported here. ***

Project Leader: Terrell Hobby Date: OCT. 13 1990

REVIEW

*** As Technical Operations Director for **The Emission Measurement People, Inc.**, I have reviewed the report for accuracy and completeness and find it acceptable and technically correct. ***

Technical Director: John R Fogt Date: OCT. 13 1990

ACCEPTANCE

*** As a final document, and from my level of involvement, I have reviewed this report and find it accurate, complete, and a fair presentation of the pertinent facts, process records, and emission levels for the subject facility. On behalf of the Operating Company I approve the report for release for purposes of evaluating the compliance status of the facility with applicable air pollution regulations. ***

Signed: _____ Date: _____

Name: _____ Title: _____

1.0 Introduction and Project Overview

The objective of this Emission Measurement Project was to conduct the specified number of valid test runs for certain parameter(s) of the flue gases coming from the plant's specific stack(s) (described in Table 1-1), such that the DEQ, listed in Table 1-1, can make a determination as to the compliance status of the facility with applicable air pollution regulations, emission limitations, permit conditions, and/or permit requirements, listed in Table 1-2, below. **The Emission Measurement People, Inc.** of Cañon City, Colorado have been retained by General Chemical Corporation to conduct the required air pollution emission tests at the subject plant. This plant may have been tested previously, as given in Table 1-2, in Section 1.1.

Operating Co.:	General Chemical Corporation		
Facility Name:	General Chemical Corporation	Reg. Agency:	DEQ
Test Location:	Green River	Test Date:	9/24-25/90
Parameter(s):	Particulate Front Half, M5	Particulate Front & Back Half, MM5	
No. Runs Valid:	3	3	
Results:	0.797	2.268	
Units/Basis:	lbs./hr.	lbs./hr.	
Pass:	Yes	N/A	

This Emission Measurement Test Report contains the description of the tests conducted, including quality control checks, original copies of all test data and records, and the final test results and production records during the tests. The major points of this report are organized as follows.

A compliance test protocol (plan) was prepared and sent to the DEQ with (or just following) the usual "30-day advance notification to test". The protocol contained critical plant specifications, flue drawing(s), detailed test method descriptions, and the project schedule. It was reviewed, amended (as needed), and approved by the Agency prior to the commencement of testing. There was a short pre-test conference with all key personnel on site just prior to the start of the tests, in order to review the approved test protocol and project plans, and assure concurrence of all parties for testing responsibilities and field schedules, etc. Certain information in the protocol and/or the Records Reference Document (RRD) (described in Section 3.1.1, below) is not repeated in this report, except as it may have changed from the time these documents were issued. Appendix 4.1 contains certain project correspondence and documentation of contents of all related submittals to the DEQ, including:

- Transmittal Letters and Project Activities Log,
- Protocol Submittal and Approval,
- Protocol Title Sheet and Contents, and
- Records Reference Document Title Sheet and Contents

1.1 Tables for Section 1.0

Table 1-1
AGENCY, COMPANY, and PLANT INFORMATION

Air Pollution Control Agency **********		
Agency Name:	Wyoming Department of Environmental Quality	
Department:	Division of Air Quality	
Address/City:	210 Lincoln Street, Lander, WY 82520	
Department Manager:	Mr. Bernard Daily, Technical Specialist	
Observer Contact:	Mr. Lee Gribovicz, District Engineer	
Phone, AC, No., Ext.:	307 332-6755, Ext.: -	
Operating Company, Corporate Offices **********		
Company:	General Chemical Corporation	
Street/City:	West of Green River, GREEN RIVER, WY 82935	
Mailing/City:	P.O. Box 551, GREEN RIVER, WY 82935-0551	
Contact/Title:	Mr. Mike D. Wendorf, Environmental Technician	
Phone, AC, No., Ext.:	307 872-3621, Ext.: -	
Facility and Plant Process **********		
Facility Name:	General Chemical Corporation	
Street/City:	West of Green River, Green River, Wyoming 82935	
Mailing/City:	P.O. Box 551, Green River, Wyoming 82935	
Contact/Title:	Mr. Mike D., Wendorf	
Phone, AC, No., Ext.:	307 872-3445, Ext.: -	
Directions to Plant:	See Protocol, Appendix 4.1.3	
Base Elevation (ft., MSL):	6239	
Process Tested:	**GR3A Crusher**	
Stack/Duct ID:	GR3A	
Unit No(s).:	1	
Equipment Type:	Trona Ore Crusher	
Burner Type/Model:	N/A	
Max. Rated Capacity (MRC):	300	Units: Tons/hr.
Cap. During Tests, % MRC:	>90%	
Design Flow ACFM:	36688	
Hours of Operation/Year:	8059 hrs (= 336 days/yr @ 24 hrs/day)	
Process Variables:	------ (1) ------	------ (2) ------
Feed Type:	Automatic	N/A
Oper. Setpoint:	3/8" - 1/2" grinder (top side)	
Air Pollution Control Equipment **********		
Location:	---- Primary ----	--- Secondary ---
Pollutant Removed:		
Type(s)/Design:	Cyclones	Baghouse/Buhl Norfelt
Model(s)/S.N.:		40-CE-320
Oper. Setpoint:	N/A	N/A

The Emission Measurement People, Inc.

Table 1-2
REGULATIONS, EMISSION LIMITS, and PRIOR TESTS
GR3A Crusher

Permit No(s).:	
Parameter:	Partic.
Emission Limit :	2.0
Units/Basis:	lbs./hr.
Regulation No.:	
Results of Prior Tests:	3.96
Units/Basis:	lbs./hr.
Prior Tests By (Tester):	**The Emission Measurement People, Inc.**
Test Date:	June 15, 1990
Observed By:	WY DEQ, Gerald Blackwell
Production Load:	>90%

2.0 Results Summary and Conclusions

Table 2-1, in Section 2.2, summarizes the plant production and air pollution emission results for this Emission Measurement Project. The results for this test program are of acceptable quality for purposes of the defined objective of this project (1.0 above, and in Section 1.0 of the protocol). All the procedures for advance Agency notification, test protocol, and quality assurance were applied in this project. All results are presented for each test run in detail in Table 3-6. At least two (2) valid test runs are required (minimum on each stack tested) by the regulations and these were conducted. More may have been conducted as needed to obtain representative results. Any test problems or test (or analytical) method variations for this project are discussed in Section 3.5, below.

All process data and production records for these tests were made by plant personnel and/or the plant process instrumentation system (computer). These data for each test run are presented in Table 3-3 in Section 3.7, and discussed in detail in Section 3.3, below. All emission data were collected by **The Emission Measurement People, Inc.** personnel. Copies of all raw project data and records are contained in Appendices 4.3 and 4.4. Plant stack opacity may have been recorded by the DEQ observer of these tests. If a copy of this data was available as this report was prepared it is included in Appendix 4.4, below.

There were no major process or test-related upsets or malfunctions during these tests which would cause the results to be unrepresentative of the air pollution emissions of the plant as operated on the date tested. The data should be accepted by the DEQ for purposes of the stated test objective, and are valid for confirming the compliance status of the facility with all applicable air pollution emission requirements for which tests have been conducted at this time. This Emission Measurement Test Report has been reviewed and certified above (following the contents page) for accuracy and correctness by project personnel, both from **The Emission Measurement People, Inc.**, and General Chemical Corporation.

2.1 Determination of Compliance

This Emission Measurement Test Report demonstrates that compliance has been attained by General Chemical Corporation (described in Table 1-1, in Section 1.1 above) on the specific process(es)/stack(s) tested. This allows the plant to operate in compliance with the applicable air pollution emission limitation(s), regulation(s), and/or permit renewal requirement(s) at a production load up to 111.11% of the average production rate recorded during the tests, and reported in Table 3-3, in Section 3.7. Any outstanding issues or problems with this compliance determination are specified here.

-- None --

2.2 Tables for Section 2.0

Table 2-1
SUMMARY of PROCESS & EMISSION MEASUREMENT RESULTS
GR3A Crusher
General Chemical Corporation

Stack/Duct ID:	GR3A
Test Condition:	>90%[1]

Plant Process and Production Results

Production Ore, TPH:	271.57
Amp., % on Fan:	59-66

Particulate Emission Results (Front Half,M5) [2]

gr./dscf:	0.0058053
gr./acf:	0.0042620
lbs./hr.:	0.7974809
lbs./10^6BTU:	4.639E-06
Tons/Year:	3.2135000

Particulate Emission Results (Front & Back Half, M5) [3]

gr./dscf:	0.016710
gr./acf:	0.012260
lbs./hr.:	2.268200
lbs./10^6BTU:	0.000014
Tons/Year:	9.139900

Parametric (Non-Pollutant) Flue Gas Data

Pressure, Velocity, Delta P, (in. w.g.):	0.63767
Moisture, (%, w/w):	5.38885
CO_2, Orsat, (%, dry, v/v):	1.33
CO_2, Orsat, (%, wet, v/v):	1.26
O_2, Orsat, (%, dry, v/v):	17.0
O_2, Orsat, (%, wet, v/v):	16.13
Temp. of Stack, (^{0}F):	85.16
Velocity, (fps):	51.449
Vol. Flow, (10^3 DSCFM):	15.970
Vol. Flow, (10^3 ACFM):	21.819

1 Average of all valid test runs, see Tables 3-6 and 3-7.
2 Tons per year are based on hours per year, as specified in Table 1-1.
3 Tons per year are based on hours per year, as specified in Table 1-1.

3.0 Technical Discussion

3.1 Quality Assurance (QA) Documentation

General - These Emission Measurement Tests have incorporated the procedures of "The Red Book"--*The U.S. EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III - Stationary Source Specific Methods (# EPA 600/4-77-027b), August, 1977 (as updated).* Appendix 4.2 of this report contains the post-test equipment calibrations, chain-of-custody for data and sample(s) records and any other data involving quality assurance audit checks which may have been made or requested by the Agency observer(s) during (or after) the tests. Tables 3-1(a-d), in Section 3.7, summarize the pre- and post-test equipment calibration(s) and other quality assurance aspects of the tests. The results of all calibrations and audit checks were well within Agency requirements or guidelines. Complete pre-test calibrations of all test equipment and materials were submitted directly to the Agency prior to the test in the Records Reference Document (RRD), discussed below.

3.1.1 Records Reference Document - There are several critical parts of an Emission Measurement Project for verification of data quality. Some of the regulatory specifications, equipment design/schematics and/or calibrations, etc. tend to remain constant for at least a six-month period. These include:

- Qualifications of Emission Test Contractor,
- Pre-test calibrations of test equipment,
- Pre-test tare weights of filter media(e),
- Certification records for calibration gases,
- Forms for recording emission and production data,
- Specifications, schematic(s), and description(s) of test equipment and data reduction software, and
- Agency compliance documentation requirements for the test protocol, emission test report, and quality assurance.

The Emission Measurement People, Inc. update and compile the repetitive records semi-annually into a bound, self-contained Records Reference Document (RRD), and forward a copy directly to each Regulatory Agency overseeing their active projects during that period. See contents of Records Reference Document in Appendix 4.1.3. This action has been received favorably by Agency observers, as it not only supports the Agencies' data requirements for active projects, but also for past projects. As equipment calibrations, etc. are updated in the current Records Reference Document, they are valid for both pre-test records for upcoming projects, and post-test records checks for past projects. This method of transmitting the more repetitious data and information to Agencies and plant operators also helps to minimize bulk in protocol and report files. The current Records Reference Document is:

Volume No./Date:	3.89.1, August 23, 1989
Was forwarded to Agency:	DEQ
c/o Name/on Date:	Mr. Lee Gribovicz on September 6, 1989

A copy of the Records Reference Document was available on site for review by the project coordinator for the Company, listed in Table 3-2, in Section 3.7. Copies of these transmittals are contained in Appendix 4.1.

3.1.2 Manual Methods QA

Moisture and Volumetric Flowrate (M2, M4) - Specific QA Considerations are listed below:

1. Pitot tube coefficient (C_p) of 0.84 with geometric specifications for pitobe per M2; otherwise, the pitobe/nozzle recalibrated in a wind tunnel (or test redone, if required); Delta P values <0.05 in. w.g. measured with Dwyer "microtector" (hook gauge), accurate to 0.001 in. w.g.

2. Leak check of orsat analyzer; performance check with ambient air; calculation of F_0 factor (each repetition). See F_0 results in Table 3-7, in Section 3.7, below. Field check of console dry gas meter calibration factor (Y_0) with observer's QA critical flow orifice, if requested. Pitot system leak-check after each test run. Special pre-test back side leak-check of pump, dry gas meter, T/Cs, orifice, valves, manometer, and orsat bag-fill system, per "Red Book" Section 3.4.2, paragraph 2.1.2 and Method 5, paragraph 5.6.

3. Current equipment calibration data in Records Reference Document on file with DEQ, and on site. All data available anytime for review and/or copying by Agency or plant.

Annual calibration (or 200 hours) of "Standard Dry Gas Meter" directly against a spirometer. Six month calibration of console dry gas meter rate factor (Y_0) and orifice factor (Delta H_a) against the "Standard Dry Gas Meter", both with triplicate runs at five (5) flow (Delta H) rates (M5, 7.1.1 & 7.1.2). Post-test triplicate calibration check of console dry gas meter rate factor (Y_0) at a single flow near the sampling rate during the tests. Full 5-point re-calibration of the console done if post-test check not within the required 5.0% deviation and 3% range (M5, 5.3.2). All data reduced (by flowrate - tabular and graphically) by computer.

4. Use of Field Micro-Computer (FMC) for data reduction as described in Section 3.1.4, below. Equipment schematic(s) and example data sheets contained in Records Reference Document; 3-part sample labels used, as applicable.

Particulate (M5) - Specific QA Considerations are listed below.

1. Records of evaporation beakers and 3" (90 mm) glass fiber filter(s) tare weights in Records Reference Document on file with Agency prior to, and on site during test.

2. Filter and acetone blank (field & lab) to check handling and analytical procedures. One set (selected at random) offered to the Agency Observer with tare weight(s).

3. Probe(s) and nozzle(s) pre-wash (water and acetone) & dynamic blank (acetone only) on site, to assure clean equipment prior to start of tests. Nozzle(s) diameter specifications rechecked prior to, and after tests.

4. Use of agency analytical forms (including density of acetone). Sample analyses may have been observed at **The Emission Measurement People, Inc.** laboratory by advance arrangement with Mr. Terrell Hastings at 303 375-1022.

3.1.3 Instrumental Methods QA - Not Applicable

3.1.4 Data Collection and Reduction QA - Among the issues which affect emission data quality for this project, close attention and efficiency in the data reduction and results calculation stages are areas in which virtually all errors should be consistently preventable. Using automated procedures to handle all project data (after they were once recorded and entered into the system manually) has proven to help accomplish a much higher degree of data quality and reporting accuracy. A documentation package for each software subroutine used in this project, as well as a listing of the manual calculations, is contained in the Records Reference Document. Also, due to the digital-based data system used, a chain-of-custody sheet is established for the data, as well as the samples, see Section 3.1.5, below. Specific QA procedure(s) for the two types of data handling for this project are listed below.

Manual Reference Methods QA - To check the software proficiency and repeatability, a "known" set of data accompanied the project run data sets through the entire process from manual data entry in the field through the generation of the report results table(s). The below procedure for automated handling for manual method emission data was followed to assure high precision and accuracy in the data reduction, calculation, and reporting activities.

1. Manually verify and enter all data constants for the project from Table 3-6 of protocol into Field Micro-Computer (FMC) and obtain printout of registers.

2. Manually enter "known" standard run data from data sheet into FMC and save same on magnetic media.

3. Manually record specific test data & variables on a test run data sheet and enter same into FMC as each test run is progressing.

4. At conclusion of each test run, complete leak check and field analytical work, and enter same into FMC. Obtain average(s)/total(s) for each data column on the test run sheet, and obtain optional printout, using Field Thermal Printer (FTP).

5. Save all data for completed test run on hard disk (up to 3 runs) in FMC prior to start of next test run.

6. Complete data recording and entry of test run data for each project test run as in 3 through 5, above.

7. Save field data for all runs (and "known" run) on magnetic media before departure from site (or after each 4 runs, to clear hard disk).

8. Manually record all post-test laboratory analytical activity and/or calibration(s) data on data sheet(s) and enter same into FMC, and save same on magnetic media.

9. Recall all complete data file(s) from magnetic media into FMC and execute "results" subroutines as required by project for each test run and save results on magnetic media. Interface with instrumental methods digital data on magnetic media (as applicable), to obtain gas emission results in proper final units.

10. Recall all results file(s) for each test run (and "known" run) from magnetic media into FMC (with large printer) and compile and print results file table(s) for project report.

11. Compare printed results of "known" run to expected "known" results as a system operational check of the software.

3.1.5 Chain-of-Custody for Data and Sample(s) - A chain-of-custody record for the data and the sample(s) was made and followed throughout the sampling and analysis process. This record shows the when, where, and who, regarding the handling of the critical project samples and data. A copy of this record is contained in Appendix 4.2.2.

3.2 Project Activity Log and Personnel

Table 3-2 provides a listing of all key personnel involved in this project. The tests were observed by the DEQ personnel, as well as by plant and/or third party personnel, as listed. All parties agreed during the testing that, from a plant operation standpoint, as well as the field aspects of sample collection, these emission measurement data should be valid and acceptable for the stated purpose(s) and for evaluating compliance with applicable air pollution emission regulation(s) and/or permit requirement(s).

These tests were conducted by **The Emission Measurement People, Inc.** personnel of Cañon City/Denver, Colorado, whose qualifications and corporate experience are included in Section 5.0 of the Records Reference Document (see Section 3.1.1 and Appendix 4.1.3). A record of the project activities is contained in the Project Activity Log in Appendix 4.1.4.

3.3 Plant Operation and Production

During the emission tests, the plant process operation and production load were at normal maximum and the plant was operated continuously at greater than 90% MRC (Maximum Rated Capacity), as specified in Table 1-1, in Section 1.1. The average production data for each run is listed in Table 3-3, in Section 3.7. A detailed description of the plant process was contained in Section 3.3 of the test protocol.

These production data were reported to **The Emission Measurement People, Inc.** Project Leader (listed in Table 3-2, in Section 3.7) at the conclusion of all test runs. Copies of the plant operator's recorded production data, taken at the required 20-30 minute intervals (or continuously by plant computerized instrumentation during the tests) are contained in Appendix 4.3, and/or at the plant (if not available for this report).

Specific extraordinary process operational issues (if any) during these tests are discussed here.

-- None --

3.4 Location of Test Port(s) and Sampling Point(s)

Table 3-4 and Figure 3-1, in Section 3.7, describe in detail the flue duct (stack) configuration, the sampling port(s) location(s), and the test point(s) used for this Emission Measurement Project. The test location(s) meet(s) the specifications of EPA Method 1 for straight duct length distance (diameters) before (upstream) and after (downstream) of test ports. No adverse conditions involving the sampling location(s) were present which could artificially affect the magnitude (or representativeness) of the final emission results or the overall quality of the data, except as are noted here.

-- None --

3.5 Sampling and Analytical Procedures and Modifications

Tables 3-5(a-c) (as applicable) summarize(s) the basic test methods and specifications applied during these tests. Any modifications or adjustments in the published EPA Reference Methods applied to these tests are described below.

3.5.1 Description of Sampling Equipment

Flowrate & Moisture (M2, M4) - The sampling equipment used for this project was a system of standard design for M5-type sampling and meets the construction guidelines set out by EPA. The unique features of the equipment are described in Section 3.1 of the Records Reference Document, on file with the Agency. The amount of moisture trapped on the silica gel was calculated based on Dalton's Law, as described fully in the RRD.

Molecular Weight (M3) - The gas sample for molecular weight, % CO_2 and % O_2 was taken from the positive tap of the orifice manometer (after the dry gas meter) at a rate of about 200 ccm, by switching a 3-way solenoid valve. If Method 3A was used for O_2, then this sample was for back-up only, see Table 3-5(a). This was done after reading the orifice pressure (Delta H value) at each sample point, and making the needed adjustments in sampling rate, if applicable. Orsat sample system included tedlar bag(s), filled by DGM pressure through 3-way solenoid valve, regulating valve, and rotameter, as well as Burrell orsat gas analyzer and chemicals for CO_2 and O_2, with aspirator bulb.

Particulate (M5) - The equipment was the same as M2 and M4, above, with the addition of the heater elements for the probe and filter, a sample nozzle, probe wash recovery, and filter media.

3.5.2 Measurement of Pollutant Emissions

Particulate (M5) - Point-by-point isokinetic values were calculated, recorded and adjusted in the field (as each point was being sampled), sufficiently detailed so as to be suitable for point-by-point Agency audit review. Final isokinetic sampling rates (reported in Table 3-7 in Section 3.7, below) were calculated after each test run following final moisture and orsat analyses. Test method speicifications are given in Table 3-5(a) in Section 3.7, below.

3.5.3 Measuring Non-Pollutant Flue Gas Parameters

Moisture (M4) - Moisture sampling specifications using EPA Method 4 are described in Table 3-5(a), below. All requirements of this Method were followed, including a constant sample rate of at least 0.53 cfm (ca. 1.0 Delta H) for at least 21 minutes to obtain at least 7.5 dscf for the moisture tests, which were at the same points, with the same probe and for the same time as the pollutant tests. Should weather or process problems have prevented the full 21 minutes of sampling, the 7.5 dscf may be obtained by using a higher flowrate, above the constant Delta H of at least 1.0. This was done together with Method 5, if applicable (but then at a variable sample rate).

A comparison of the results of moisture collected on the silica gel using Dalton's Law to gravimetric analyses was included in the Records Reference

Document, submitted to the Agency with (or prior to) the test protocol. As specified in EPA Method 4, paragraph 2.1.2, Dalton's Law was used to determine the moisture volume collected on the silica gel. This was discussed in the approved protocol.

Oxygen/Carbon Dioxide/Molecular Weight (M3/M3A) - The back-up gas sample (or main sample if 3A was not conducted) for molecular weight was taken from the positive tap of the orifice manometer (after the dry gas meter) at a rate of about 200 ccm, by switching a 3-way solenoid valve. This was done in the same train as was used for moisture. See Discussion (M4), above. If O_2 was taken using the instrumentation as described above and in Table 3-5(b), the sample was the same as the gaseous pollutant parameters, described in Section 3.5.2, above. CO_2 may have been back-calculated from the F_o combustion factor and fuel type using the digital O_2 value, or from orsat analyses, (see Table 3-5(a) in Section 3.7, below).

Volumetric Flowrate, Velocity, and Temperature (M2) - These tests were conducted for the same time as the moisture and molecular weight tests, above (except at more points, as required by EPA Methods 1 and 2). Point locations are given in Table 3-4.

3.5.4 Laboratory Analyses

Particulate (M5) - The analytical procedures for the acetone evaporations and filter weighings for the front half particulate catches were as provided for in EPA QA Volume III and Method 5. The lab data sheet is included in Appendix 4.6. Specific details of the procedure used are described below. The analyses of the particulate catches were done by **The Emission Measurement People, Inc.** at their laboratory in Canon City, Colorado following the procedures of Method 5, paragraph 4.1.1, 4.2, and 4.3.

A blank filter and a 200-400 ml. field blank acetone sample were collected in the field along with the regular run samples. To obtain tare weights, all numbered filters (and cleaned, numbered beakers) were dried at 68°F in a desiccator for at least 24 hours and weighed at 6 hour intervals to 0.10 mg. to a constant weight, i.e., when two consecutive weighings agree within 0.5 mg. as required by the method. These tare weight data were included in the Records Reference Document, Section 4.5, for all filters and beakers used in the current 6-month period. Beakers were re-tared before and after each use.

The density of the acetone wash and the volume (from the sample jar label) of each probe/filter bell (and blank) wash were recorded on the lab sheet. The weight of each acetone sample was then calculated (using volume and density) and recorded. The washes were then individually evaporated to dryness at less than the boiling point of acetone (56.2°C) in 250 ml. tared beakers using an infra-red heat lamp. The beakers were then cooled, desiccated, and weighed to a constant weight.

The result of the field blank analysis is given in terms of milligram of blank residue per gram of acetone. By applying the milligram weight of blank residue per gram of acetone to the known grams of acetone in each sample (using the acetone volume and density), a blank correction in milligrams for each acetone wash sample was determined.

3.6 Detailed Test Results and Discussion

Detailed Test Results - All project data are presented tabularly in Tables. Table 3-3 contains all the plant performance, process operation, air pollution abatement system data, and production records for this project. Table 3-6 contains all the pertinent emission test results for each test run in this project. Performance data (by run) on the sampling and analytical equipment are contained in Table 3-7.

The minimum number of required valid runs were completed on each stack tested, as given in Table 3-5(a). More runs were likely conducted only to assure an acceptable set of representative data. All runs were reported in Tables 3-6 and 3-7, and non-valid runs are noted along with the reasons.

The results of these emission tests, as summarized in Table 2-1, in Section 2.2, above, demonstrate compliance with all applicable permit and/or local air pollution emission requirements, as well as the applicable regulations listed in Table 1-2, in Section 1.1. This project has met the objective as defined in Section 1.0, above.

3.7 Tables for Section 3.0

Table 3-1(a)
QA DOCUMENTATION - CALIBRATIONS
Methods: 1, 2, 3, 4, 5

	Make/Vendor	I.D./S.N.	Calibrations/Checks Date	Result[1]
Barometer	Ultimeter, Mod.12	7A1520	3-12-90	+\- 0.1" Hg.
Standard Gas Meter	Rockwell/S-275	6843916	3-12-90	1.0026
Main Console	TEMP, Inc.	CC-01	-	-
Pump	-	-	-	-
Temperature Meter	Watlow	LCD-1	7-10-90	+/- 2.0°F
Vac. Gauge	Gen. Instrument	-	7-10-90	+/- 1.0" Hg
Gas Meter	Rockwell/S-275	6841506	7-10-90	0.3
Orifice Meter (ΔH_a)	TDDC	0.201	7-10-90	ca. 1.510" w.g.
Pitot Tip (geom.)	TDD, Inc.		on site[3]	0.84 (C_p)

[1] See actual calibration data in Records Reference Document.

Table 3-1(b)
QA DOCUMENTATION - AUDIT CHECKS
Methods: 1, 2, 3, 4, 5

		Date[1]	Result
M3	- Orsat/CO_2 Ambient[2]	on site	0.0% (+/- 0.2%)
M3	- Orsat/O_2 Ambient[2]	on site	20.9% (+/- 0.2%)
M4	- Critical Flow Device	N/A	-

[1] Not conducted if not available from or requested by Agency observer.
[2] Ambient air, less than 6 passes, same reagent as runs.

Table 3-1(c)
QA DOCUMENTATION - QA CHECKS
Methods: 1, 2, 3, 4, 5

	Date[1]	Result
Sample Vacuum Leak @ Nozzle:	on site	<0.02cfm (or 4.0%)
Sample Pressure Leak @ Meter Outlet:	on site	dead @ 4.0" w.g.
T/C(s), Static System Check:	on site	+/- 5.4°F
Heat Controller(s)	quarterly[2]	+/- 5.4°F
Graduated Cylinder:	on site	+/- 1.0 ml.[3]
Orsat Leak (+):	on site	dead @ >20 ml.
Orsat Leak (-):	on site	dead @ >20 ml.
Orsat, No. of Passes	-	-
O_2	on site	<8
CO_2	on site	<8
F_0 Calculation	on site	Each Repetition
Bag(s) Leak (+):	quarterly[2]	OK, including valves
Pitot Leak (+):	on site	dead @ >3.0" w.c.
Pitot Leak (-):	on site	dead @ >3.0" w.c.
Pitobe Geometric Specifications (all):	quarterly[2]	0.840
Manometer Lever/Zero:	dur. test[4]	OK
Manometer 0.01/0.10" w.g. reading:	on site	Yes[3]
Pressure Drop, Silica Gel (-12 mesh):[5]	quarterly[2]	Screened
Pressure Drop, Filter Frit:	quarterly[2]	Acid-washed
Analytical Balance @ 100.0008 gm.:[6]	with data	+/- 0.10 mg.
Analytical Balance, Class "S":[7]	quarterly[2]	Range

1 Recorded on run data sheet and / or in Records Reference Document.
2 Checked quarterly, see Records Reference Document.
3 Required precision of reading.
4 As needed during run, see data sheet(s).
5 Screened to - 12 mesh to reduce pressure drop.
6 Certified internal balance weight.
7 See Class "S" results quarterly in Records Reference Document.

Table 3-2
PROJECT PERSONNEL

POSITION	NAME/TITLE	COMPANY/Phone
Company **********		
Coordinator	Mr. Mike Wendorf Environmental Technician	GCC 307 872-3621
Observer(s)	Mr. Jerry Justis Environmental Technician	GCC 307 872-3621
	Mr. Ted Kass Senior Engineer	GCC 307 872-3431
	Mr. Gary Merkis Manager, Surface Operations	GCC 307 872-3431
Regulatory Agency **********		
Administrator	Bernard Daily Technical Specialist	DEQ 307 777-7391
Observer(s)	Lee Gribovicz District Engineer	DEQ 307 332-6755
Third Party **********		
	NONE	
Testing Contractor **********		
Project Leader	John R. Floyd Technical Operations Director	The Emission Measurement People, Inc. 719 275-0046
Test Leader	Jess Scappaticci Technician	The Emission Measurement People, Inc. 303 375-1022
Technologist(s)	Tracy Ross	The Emission Measurement People, Inc. 303 375-1022

Table 3-3
PLANT OPERATION and PRODUCTION, by Run
General Chemical Corporation

Plant Name:	General Chemical Corporation			
Plant Location:	Green River, Wyoming			
Stack/Duct ID:	GR3A			
Run Number:	101	102	103	Avg
Date, 1990:	9-25	9-25	9-25	
Time - Start of Clock:	10:50	14:25	17:25	
- End of Clock:	12:10	16:10	19:10	
Test Condition:				
Plant Production Data **********				
Production Ore, TPH:	291.2	238.5	285.0	271.57
Amp., % on Motor:	60-66	59-65	60-63	59-66

Table 3-4
TEST PORT(S) and SAMPLING POINT(S)
Stack/Duct ID: GR3A

Stack Configuration:	Round			
Applicable Figure No. in Report:	3-1			
Stack Height, above Grade, (ft.):	120			
Height of Test Platform, (ft.):	100 top floor process building			
Flow Direction (@ Test Port(s)):	up			
Flue Size(s), Inside Dia., (in.):	36			
Outside Dia., (in.):[1]	36.5 1/4" thickness			
Straight Flue Distance to Test Port:	in.	ft.	Dia(s).	
B, Before:	162	13.5	4.5	
A, After:	>72	>6.0	>2.0	
Sample Ports: Type:	NPT			
Description:	male			
Size, Dia., (in.):	3"			
Nip., Length., (in.):	6" (2)[2]			
Quantity Used:	2			
Orientation:	90°			
Sample Train/ID:	Partic.	MW/H_2O	Flow[3]	
No. of Sample Points				
Total:[4]	24	24	24	
Per Port:	12	12	12	
Required Probe Length, (in. E.L.):	41	41	41	
Pitobe ID No.:	5-1	5-1	5-1	

Point(s)/Location(s):[5]

Point No.:	%:	Distance to Point from (in.) near Wall
1	2.1	(1.00)
2	6.7	(2.41)
3	11.8	(4.25)
4	17.7	(6.37)
5	25.5	(9.00)
6	35.6	(12.82)
7	64.4	(23.18)
8	75.0	(27.00)
9	82.3	(29.60)
10	88.2	(31.75)
11	93.3	(33.60)
12	97.9	(35.00)

1 Including wall thickness and stack wall insulation.
2 Port adapter length in parenthesis to be added.
3 Equivalent to metric rule (0.4m., 1,2m., 2.0m.) or 17%, 50%, 83%.
4 Half of total points to be on each diameter.
5 Distance to point from inside near wall (for each diametric traverse).

Table 3-5(a)
TEST METHOD SPECIFICATIONS
General Chemical Corporation

Method Type	Manual	Manual	Manual
Parameter:	Particulate	MW/H_2O	Flow
Method No.(s):	M5	M3/M4	M2
Number of Runs:[1]	3	3	3
Number of Sample Points:[2]	24	24	24
Sampling Time/Point, (min.):	3.0	3.0	3.0
Sampling Time/Run, (min.):	72.0	72.0	72.0
Sampling Flowrate, (dscfm):	>.75	-	>.75
Sample Volume, (dscf):[3]	>50	-	>50
Clock Time/Run, (min.):	72.0	72.0	72.0
Clock Time/All Runs, (hrs.):[3]	4.0	4.0	4.0

1 Per stack tested.
2 See point location(s) in Table 3-4.
3 See Table 3-6 for constants data for methods run.

Table 3-5(b)
INSTRUMENTAL EQUIPMENT SPECIFICATIONS
Methods 3A, 6C, 7E (or 20), and 10

Not Applicable

Table 3-5(c)
LABORATORY ANALYTICAL SPECIFICATIONS/RESULTS
Methods: 5, 6/8
Stack ID: GR3A

Run No.:	101	102	103
Particulate (Front Half, M5)	**********	**********	**********
Weights, Total, (mg.):	12.4170	10.2833	35.4500
Acetone Washes Weight, (mg.):	275.4500	314.8000	354.1500
Filter Cake Weight, (mg.):	5.3000	4.5000	1.9000
Blank Acetone, (mg./g.):	0.0326	0.0326	0.0326
Particulate (Back Half, MM5)	**********	**********	**********
Weights, Total, (mg.):	62.1750	21.2800	22.5875
Water Washes Weight, (mg):	450.0000	540.0000	525.0000
Blank Water (mg./g.):	0.0005	0.0005	0.0005

Table 3-6(R)
TEST RESULTS, by RUN
Methods 1, 2, 3, 4, 5
GR3A Crusher
General Chemical Corporation

Stack/Duct ID:	GR3A			
Test Condition:	>90%			
Run Number:	101	102	103	Average[1]
Plant Process and Production Data **********				
Production Ore, TPH:[2]	291.2	238.5	285.0	271.51
Amp., % on Motor:	60-66	59-65	60-63	59-66
Particulate Emission Results (Front Half,M5)[3]**********				
gr./dscf:	0.00397	0.00298	0.01047	0.00580
gr./acf:	0.00292	0.00215	0.00771	0.00426
lbs./hr.:	0.52426	0.41674	1.45144	0.79748
lbs./10^6BTU	4.091E-06	1.813E-06	8.013E-06	4.639E-06
Tons/Year:	2.1125	1.6792	5.8487	3.2135
Particulate Emission Results (Front & Back Half, MM5)[4] **********				
gr./dscf:	0.02386	0.009134	0.017136	0.01671
gr./acf:	0.01755	0.006614	0.012620	0.01226
lbs./hr.:	3.1494	1.2791	2.3762	2.2682
lbs./10^6BTU	2.46E-05	5.57E-06	1.31E-05	1.4E-05
Tons/Year:	12.6907	5.1542	9.5750	9.1399
Parametric (Non-Pollutant) Flue Gas Data **********				
Pressure, Velocity, Delta P, (in. w.g.):	0.59	0.6756	0.6474	0.63767
Moisture, (%, w/w):	5.67716	5.38984	5.09836	5.38885
CO_2, Orsat, (%, dry, v/v):	1	2	1	1.33
CO_2, Orsat, (%, wet, v/v):	.94	1.89	.94	1.26
O_2, Orsat, (%, dry, v/v):	18.0	16.0	17.0	17.0
O_2, Orsat, (%, wet, v/v):	16.97	15.13	16.13	16.13
Temp. of Stack, (^{0}F):	82.3	90.3	82.9	85.16
Velocity, (fps):	49.347	53.204	51.795	51.449
Vol. Flow, (10^3 DSCFM):	15.394	16.337	16.178	15.970
Vol. Flow, (10^3 ACFM):	20.928	22.564	21.966	21.819

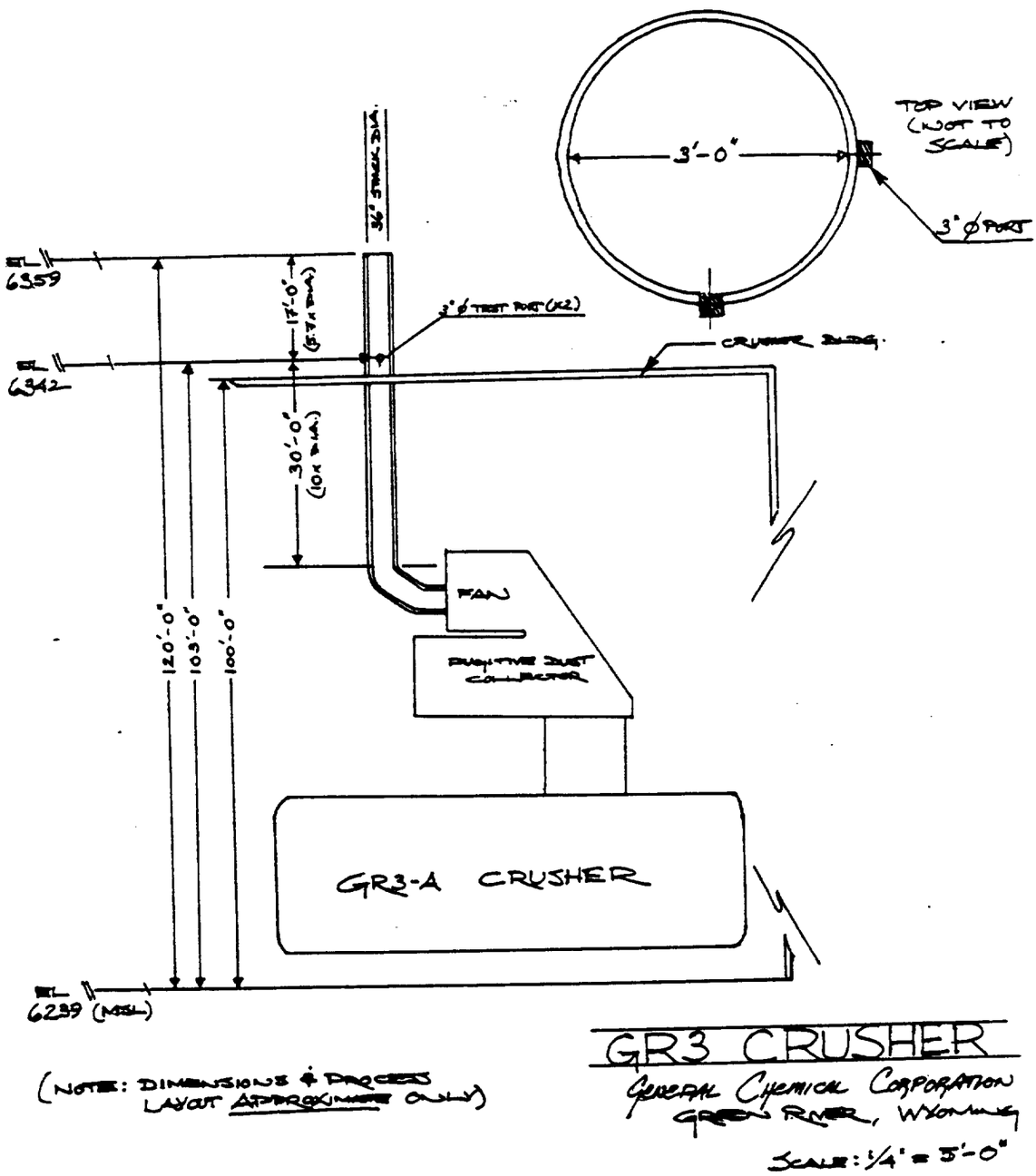
1 Average of all valid test runs, as noted in Table 3-7.
2 Not available to Tester at time of report.
3 Tons per year are based on hours per year, as specified in Table 1-1.
4 Tons per year are based on hours per year, as specified in Table 1-1.

Table 3-7(R)
SAMPLING and ANALYTICAL DATA, by RUN
Methods 1, 2, 3, 4, 5
GR3A Crusher
General Chemical Corporation

Stack/Duct ID:	GR3A		
Test Condition:	>90%		
Run Number:	101	102	103
Date, 1990:	9-25	9-25	9-25
Run Time, (min.):	72	72	72
Time Start:	10:50	14:25	17:25
Field Data			
Volume of Gas Sample, (dscf):[1]	48.227	53.326	52.267
Volume, @ Actual Cond., (acf):[1]	62.326	70.680	68.710
Temp. of Gas Sample(^{0}F):	83.20	94.80	90.50
D H Press. @ Meter, (in. w.g.):	2.21	2.56	2.40
Press. Barom., Abs., (in. Hg.):	23.91	23.81	23.82
Excess Leak, (ACF):	0.000	0.000	0.000
Moisture Determination:[1]			
Press. of H_2O Vapor @ Saturat.:	0.5523	0.5369	0.5369
@ S.G., (in. Hg.):	12.41	14.31	14.62
Temp. @ S.G., (^{0}F):	61.60	60.80	60.80
Vacuum @ S.G., (in. Hg.):	11.50	9.50	9.20
Vol. H_2O @ Silica Gel, (gm.):[2]	61.57	64.43	59.55
Vol. H_2O @ Impingers, (ml.):	0.00	6.00	4.00
Molecular Weight, Wet:[3]	28.27	28.38	28.30
Particulate Data			
Isokinetic Sampling Rate (%):[1]	90.22	94.00	93.04
Point-by-point, (Average):	105.90	96.00	93.60
Point-by-point, (High, %):	332.00	109.72	97.16
Point-by-point, (Low, %):	21.94	92.51	90.51
Nozzle Diameter, (in.):	0.250	0.250	0.250
Rate Factor, (K_3):	1.000	3.750	3.790
Conclusions			
Valid Sample Data?:	yes	yes	yes

1 All sample volumes and results are already corrected for excessive leak.
2 According to Dalton's Law, M4.
3 See CO_2 and O_2 data in Table 3-6, above.

Figure 3-1
STACK CONFIGURATION and PORT LOCATION(S)
GR3A Crusher
General Chemical Corporation



4.0 Appendices

4.1 Project Documentation

- 4.1.1 Project Correspondence
- 4.1.2 Compliance Test Protocol (Title Sheet and Contents)
- 4.1.3 Records Reference Document (Title Sheet and Contents)
- 4.1.4 Project Activities Log

4.2 Quality Assurance Documentation

- 4.2.1 Q.A. Audit Results (if applicable)
- 4.2.2 Chain-of-Custody for Data and Sample(s)
- 4.2.3 Post-test Calibrations (if applicable)

4.3 Plant Operation and Production Data (as available)

4.4 Field Sampling Data Records

- 4.4.1 Data Sheets for Reference Methods
- 4.4.2 Emission Data Printouts from CEM Tests
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- 4.4.4 Opacity Observations (as available)

4.5 Calculations and Computer Printouts

4.6 Laboratory Analytical Results

Appendix 4.1

PROJECT DOCUMENTATION

4.1.1 Project Correspondence

4.1.2 Compliance Test Protocol
(Title Sheet and Contents)

4.1.3 Records Reference Document
(Title Sheet and Contents)

4.1.4 Project Activities Log

OFFICIAL COMPLIANCE TEST PROTOCOL

for

EMISSION MEASUREMENT TEST

of

1. CEMS Relative Accuracy Test Audit (RATA) of "D" Boiler for SO_2, NO_x, and O_2 Emissions
2. CEMS Certification of "C" Boiler for SO_2, NO_x, and O_2 Emissions
3. Compliance Test of GR3 Crusher for Particulate Emissions

at

General Chemical Corporation, Green River, Wyoming

Prepared for:

General Chemical Corporation

P.O. Box 551
GREEN RIVER, WY 82935-0551
Mr. Dale Jensen, Manager, Technical Services
Phone: 307 872-3445

Submitted to:

Wyoming Department of Environmental Quality
Division of Air Quality

210 Lincoln Street
Lander, WY 82520
Mr. Lee Gribovicz, District Engineer
Phone: 307 332-6755

Prepared by:

The Emission Measurement People, Inc.

P.O. Box 935, CAÑON CITY, CO 81215-0935
John R. Floyd, Technical Operations Director
Nationwide Watts: 800-222-4187
Office Phone: 719 275-0046

Date of Protocol: June 4, 1990

Contents of Compliance Test Protocol

for

EMISSION MEASUREMENT TEST

GR3 Crusher and Steam Boilers
for SO_2, NO_x (Boiler), Particulate (GR3 Crusher) Emission(s)
General Chemical Corporation, Green River, Wyoming

RECORDS REFERENCE DOCUMENT

Volume No.: 3.89.1

Part I - Quality Assurance

Date: August 23, 1989

Submitted to:

Wyoming Dept. Environmental Quality
Division of Air Quality
210 Lincoln Street
LANDER, WY 82520
Mr. Lee Gribovicz, District Engineer
Phone: 307 332-9056

Prepared by:

The Emission Measurement People, Inc.
P.O. Box 449, PENROSE, CO 81240-0449
John R. Floyd, Technical Operations Director
Nationwide Watts: 800-222-4187
Office Phone: 719 275-0046

RECORDS REFERENCE DOCUMENT

Volume No.: 3.89.1

Part II - Equipment & Procedures

Date: August 23, 1989

Submitted to:

Wyoming Dept. Environmental Quality
Division of Air Quality
210 Lincoln Street
LANDER, WY 82520
Mr. Lee Gribovicz, District Engineer
Phone: 307 332-9056

Prepared by:

The Emission Measurement People, Inc.
P.O. Box 449, PENROSE, CO 81240-0449
John R. Floyd, Technical Operations Director
Nationwide Watts: 800-222-4187
Office Phone: 719 275-0046

The Emission Measurement People, Inc.
P.O. Box 449, Penrose, CO 81240-0449
Nationwide Watts: 1 800 222-4187
Office Phone: 719 275-0046

September 6, 1989

Wyoming Dept. Environmental Quality
Division of Air Quality
210 Lincoln Street
LANDER, WY 82520

ATTN: Mr. Lee Gribovicz, District Engineer

RE: **The Emission Measurement People, Inc.** Records Reference Document, Volume No.: 3.89.1 (in 2 Parts)

Dear Mr. Gribovicz:

Enclosed for your reference is our current "Records Reference Document". This document meets the requirements of the Colorado Test Manual. If you need additional information of this type for your protocol, please let us know as soon as possible.

The Emission Measurement People, hope that having this data on file with you, Mr. Gribovicz, and your staff will greatly improve both the coordination and the data quality for our projects in your region. We will update the document twice a year with new calibrations, etc. We also ask that you keep our name on file and put us on your list of testers.

We appreciate your support and look forward to working with you on upcoming projects. Should you have any comments or suggestions feel free to call or write us anytime.

Very Truly Yours,

John R. Floyd, Principal
Technical Operations Director

JRF/pl

Enclosure(s) (2)

Activity Log
for
Particulate Test at General Chemical

9-24-90	Left office at 11:00 and arrived at Little America at 19:00.
9-25-90	Left for General Chemical at 05:30 arrived at plant at 06:00. Was setting up equipment by 07:30. Was completely set up at 09:00. Had to fix the probe heater cord. Started running at 10:50. Agency showed up and wanted a backside wash. All runs went fine. We were done running at 18:32. Jess collected impinger water while Tracy loaded Pick-up. And ran averages. Left plant site at 20:30 to go back to Little America.
9-26-90	Drove Back to Denver

The Emission Measurement People, Inc.

PROJECT LOG

Client Name: General Chemical
Plant Location: Green River, WY

Date: 9/25/90
Plant Personnel: _____
Agency Personnel: _____
TEMP Personnel: Tracy Ross / Jesse Sapirstein

Time/Date		Personnel
____/9/24 ____/9/24 ____/____	Activity: Travel to Little America Depart Shop: 1100 Arrive Site: (Little America) 1900 Complete Set-up:	Tracy Jesse
____/9/25	Complete Preliminary Run/Ready to Test	
____/9/25 ____/____	Begin 1st Run Begin first run at 1050 End 1st Run 1102	TR
____/9/25 ____/____	Begin 2nd Run 1425 End 2nd Run 1532	
____/9/25 ____/____	Begin 3rd Run 1725 1832 End 3rd Run	
____/____ ____/____	Begin 4th Run End 4th Run	
____/____	Pick-up Process Data from Plant Operator	

Appendix 4.2

QUALITY ASSURANCE DOCUMENTATION

4.2.1 Q.A. Audit Results
(if applicable)

4.2.2 Chain-of-Custody
for Data and Sample(s)

4.2.3 Post-test Calibrations
(if applicable)

QUALITY ASSURANCE
FORM

QAF S-351
Revision: One
Originator:
Approved: BZ
Effective Date:

SAMPLE CHAIN OF CUSTODY RECORD

Project No.: _____ Client General Chemical Plant: GR3 Crusher Unit: _____

Test Date: 9-25-90

SampleID	Sample Type	Test Location	No. of Samples	Sample Delivered	Date Delivered	Rec'd By	Date	Reason	Rec'd By	Date	Comments
3101	~~Filter~~ Moisture		1	TR	9-26-90	JS					
3102	"		1	"	"	"					
3103	"		1	"	"	"					
2005	Filter		1	"	"	"					
2013	"		1	"	"	"					
2009	"		1	"	"	"					

2.3

Appendix 4.3

PLANT OPERATION AND PRODUCTION DATA

(as available)

GR-3-A IMPACTOR FEED DATA FOR COMPLIANCE TEST OF
25 September 1990

The GR-3-A impactor provides crushed trona ore for the GR-3 process facility. In order to document the load on the impactor during the testing period, pertinent readings from two sources were recorded:

1. The motor load current was recorded to verify steady operation of the impactor.
2. The Ramsey belt scale readings were taken at the start and end of each of the three runs. This provides a tonnage total from the impactor to the GR-3 calciner storage bins. These readings were taken in the GR-3 calciner control room.

Run #1
Ramsey belt scale:
finish @ 1218 hrs.= 3025875
start @ 1052 hrs.= 3025477
86 min.= 398 tons = 291.2 tons/hour

Motor load current:
@ 1124 hrs.= 60-66%
@ 1200 hrs.= 60-66%

Run #2
Ramsey belt scale:
finish @ 1545 hrs.= 3026750
start @ 1427 hrs.= 3026440
78 min.= 310 tons = 238.5 tons/hour

Motor load current:
@ 1430 hrs.= 60-65%
@ 1540 hrs.= 59-64%

Run #3
Ramsey belt scale:
finish @ 1845 hrs.= 3027506
start @ 1725 hrs.= 3027126
80 min.= 380 tons = 285.0 tons/hour

Motor load current:
@ 1735 hrs.= 60-63%
@ 1815 hrs.= 60-63%

Appendix 4.4

FIELD SAMPLING DATA RECORDS

4.4.1 Data Sheets for Reference Methods

4.4.2 Emission Data Printouts from CEM Tests

4.4.3 Drift Records for CEM Tests

4.4.4 Opacity Observations (as available)

Field Data Sheet sept, 25

Run No. 3101 Date: 1990

Plant Benson Chemical City: Green River

Operator(s) Tracy Ross Helper Jess Scaffhua

Final Meter Leak Rate 0.0 cfm @ 24 in. Hg.

Manometer Level ____ Zero ____ Time ____ By: ____

Bag ID:

Filter I.D. # 7005

Nozzle I.D. # 8-1

Ambient Temperature

Probe Heat Setting

Filter Heat Setting 270

Signed: Tracy Ross

CALCULATIONS

Pb 23.91 in.Hg.

ΔH 2.21 in.H_2O

Vm(act) 62.326 F^3

Tm 83.2 °F

Vlc 61.3 ml.H_2O

Ts 82.3 °F

RMSAP in.H_2O

dn .250 in.

Vm(std) 48.984 F^3

H_2O 5.57 %(v/v)

ISO %Final

250 105.9 PBP

Constants

Cp .84 assum. Ts

ΔHa RMSAP

Tm H(des)

%H_2O dn(des)

Pb dn(act) .250

Pst .75 K3(a)

K3(b)

Data Line No.	Location ISO Port I.D.	Point No.	%	Time Clock 24hr.	Elap. min.	Velocity Head, ΔP in. H_2O	Gas Meter Index Rdg. Cu. ft.	ΔH Orifice in. H_2O	Orsat Bag cc/m	System Temperatures (°F) Stack 1	Probe 2	Oven 3	Imp. 4	Gas Meter 5-in	6-out	5-ave.	Vacuums		Gas Meter Index Rdg. Liters	Press. in.H_2O	Rate Lpm
0				1050	0.0		890.034														
1	A	1	8.33		3.0	.05	892.80	2.5	purge	80			65			70	— ORSAT —				10
2		2	8.11		6.0	.10	895.21	2.0		80			63			70	Rep 1 2 3 Avg				10
3		3	14.81		9.0	.13	896.69	.40		80			60			71	CO_2				5
4		4	9.4		12.0	.15	897.97	.50		80			60			73	Total				5
5		5	9.1		15.0	.19	899.37	.60		80			60			73	O_2				5
6		6	5.7		18.0	.25	900.94	.75		81			61			74	Fe				6
7		7	4.72		21.0	.28	902.72	1.0		81			60			74	Trina				6.5
8		8	2.76		24.0	.30	904.57	1.0		82			61			76	* person				6.5
9		9	2.41		27.0	.34	906.69	1.3		82			61			78	Bag ID				7.2
10		10	0.08		30.0	.36	908.69	1.3		82			61			82	By				7.5
11		11	5.92		33.0	.40	910.88	1.5		82			61			82					8.0
12		12	4.87		36.0	.44	913.17	1.6		82			61			84	Moisture Analysis				8.5
13	B	1	9.62		39.0	1.4	915.66	2.0		82			62			83	Imp. Final Time Net				10
14		2	5.60		42.0	1.4	918.20	2.0		82			62			86	1 250 250 0				10
15		3	6.8		45.0	1.5	921.01	2.5		82			62			89	2				12
16		4	9.73		48.0	1.5	924.42	3.7		82			61			89	3				17
17		5	7.46		51.0	1.2	927.91	3.7		82			62			91	4 — 56 DL* 61.3				17
18		6	3.31		54.0	.90	931.41	3.7		84			62			93	Total — — 61.3				17
19		7	6.94		57.0	.90	934.91	3.7		85			62			93	* DL Vlc(a) @ 61 °F .5407				17
20		8	1.94		60.0	.90	938.39	3.7		85			63			93	Vlc(b) @ 62 °F .560				17
21		9	6.21		63.0	1.0	941.90	3.7		85			62			93					17
22		10	1.01		66.0	1.0	945.40	3.7		85			62			93					17
23		11	0.23		69.0	.90	948.87	3.7		85			62			93					17
24		12	5.60		72.0	.90	952.36	3.5		85			62			93					17
	Totals / Averages																				

Field Data Sheet 9/25

Run No. 3102 Date: 1990

Plant General Chemical City: Green River

Operator(s) Tracy Ross Helper: Jesse Scaffner

Final Meter Leak Rate 0.0 cfm @ 18 in. Hg.

Manometer Level ____ Zero ____ Time Ax:

Bag ID:

Filter I.D. # 2013

Nozzle I.D. # 8-1

Ambient Temperature

Probe Heat Setting

Filter Heat Setting

Signed: Tracy Ross

CALCULATIONS

Pb	23.81	in.Hg.	
ΔH	2.558	in.H_2O	
Vm(act)	20.68	F^3	
Tm	94.8	°F	
Vlc	64.7	ml.H_2O	

Ts	90.3	°F	
RMSΔP		in.H_2O	
dn	.250	in.	
Vm(std)	54.213	F^3	
H_2O	5.33	%(v/v)	
ISO	95.63	%Final	

ISO 96 %BP

Constants

Cp	.84 assum.	Ts	
ΔHa		RMSΔP	
Tm		H(des)	
$\%H_2O$		dn(des)	
Pb		dn(act)	.250
Pst		K3(a)	
		K3(b)	—

Data Line No.	Location ISO Port I.D.	Point No.	%	Time Clock 24hr.	Time Elap. min.	Velocity Head, ΔP in. H_2O	Gas Meter Index Rdg. Cu. ft.	Gas Meter ΔH Orifice in. H_2O	Orsat Bag cc/m	System Temperatures (°F) Stack 1	Probe 2	Oven 3	Imp. 4	Gas Meter In	Gas Meter Out	Gas Meter 3-ave.	Vacuums	Gas Meter Index Rdg. Liters	Gas Meter Press. in.H_2O	Gas Meter Rate Lpm
0				14.25	0.0															
1	A	1	3.91		3.0	.90	956.19	2.0	purge	91			63			84				
2		2	9.70		6.0	.90	959.23	3.3		91			61			86				
3		3	14.10		9.0	.90	962.53	3.3		91			60			88				
4		4	16.10		12.0	1.0	965.90	3.3		91			60			88				
5		5	82.51		15.0	.90	969.33	3.5		91			60			90				
6		6	97.10		18.0	.90	972.78	3.5		91			61			91				
7		7	97.67		21.0	.70	976.23	3.3		91			61			92				
8		8	98.09		24.0	.60	979.31	2.6		91			60			93				
9		9	104.99		27.0	.60	982.35	2.6		91			60			93				
10		10	95.72		30.0	.60	985.13	2.2		91			60			94				
11		11	97.24		33.0	.60	987.85	2.2		91			61			94				
12		12	97.44		36.0	.70	990.58	2.2		91			61			95				
13	B	1	95.24		39.0	.70	993.36	2.2		91			62			94				
14		2	0		42.0	.70	996.31	2.6		91			60			96				
15		3	99.42		45.0	.50	999.28	2.6		90			60			98				
16		4	99.72		48.0	.60	1002.21	2.5		90			60			98				
17		5	99.31		51.0	.50	1005.13	2.3		89			61			100				
18		6	101.24		54.0	.50	1007.85	2.0		89			60			100				
19		7	99.01		57.0	.50	1010.51	2.0		89			61			100				
20		8	99.75		60.0	.60	1013.19	2.0		89			61			100				
21		9	92.14		63.0	.60	1015.90	2.2		89			65			100				
22		10	98.18		66.0	.60	1018.67	2.2		89			62			100				
23		11	83.50		69.0	.60	1021.42	2.2		89			62			100				
24		12	99.18		72.0	.60	1024.19	2.2		89			62			100				
	Totals / Averages																			

— ORSAT —

Req	1	2	3	Avg
CO_2				
Total				
O_2				
Fe				
Time				
*pass				
Bag ID				
Ax				

Moisture Analysis

Imp.	Final	Tare	Net	
1	256	250	6	
2				
3				
4	—	SG	DL * 58.7	
Total	—	—	64.7	

* DL Vlc(a) @ 60 °F .5218

Vlc(b) @ 61 °F .5407

Field Data Sheet 9/25

Run No. 3103 Date: 1990

Plant General Chemical City: Green River

Operator(s) Tracy Ross Helper: Jess Sagebiel

Final Meter Leak Rate 0.10 cfm @ 18 in. Hg.

Manometer Level ____ Zero ____ Time By: ____

Bag ID:

Filter I.D. # 7009

Nozzle I.D. # 8-1

Ambient Temperature

Probe Heat Setting

Filter Heat Setting

Signed: Tracy Ross

CALCULATIONS

Pb	23.82 in.Hg.	RMSΔP	in.H_2O
ΔH	2.4 in.H_2O	dn	.250 in.
Vm(act)	68.710 F^3	Vm(std)	53.118 F^3
Tm	90.5 °F	H_2O	5.03 %(v/v)
Vlc	59.6 ml.H_2O	ISO	94.81 %Final
		ISO	93.6 PBP

Ts	82.9 °F		
RMSΔP	in.H_2O		
dn	.250 in.		
Vm(std)	53.118 F^3		
H_2O	5.03 %(v/v)		
ISO	94.81 %Final		
ISO	93.6 PBP		

Constants

Cp	.84 assum.	Ts	
ΔHa		RMSΔP	
Tm		M(des)	
$\%H_2O$		dn(des)	
Pb		dn(act)	
Pst		K3(a)	
		K3(b)	

Data Line No.	Location ISO Port I.D.	Point No.	X	Time Clock 24hr.	Elap. min.	Velocity Head, ΔP in. H_2O	Gas Meter Index Rdg. Cu. ft.	ΔH Orifice in. H_2O	Orsat Bag cc/g	System Temperatures (°F) Stack 1	Probe 2	Oven 3	Imp. 4	Gas Meter 5-in	6-out	5-ave.	Vacuums	Gas Meter Index Rdg. Liters	Press. in.H_2O	Rate Lpm
0				1725	0.0		24.58													
1	A	1			3.0	.60	27.33	2.2	purge	84			61							
2		2			6.0	.60	30.07	2.2		84			60							
3		3			9.0	.60	32.80	2.2		84			59							
4		4			12.0	.65	35.51	2.2		84			59							
5		5			15.0	.65	38.33	2.4		84			60							
6		6			18.0	.70	41.19	2.4		84			60							
7		7			21.0	.70	44.11	2.6		84			60							
8		8			24.0	.70	47.08	2.6		84			60							
9		9			27.0	.70	50.05	2.6		84			61							
10		10			30.0	.65	53.02	2.6		84			61							
11		11			33.0	.65	55.92	2.4		84			61							
12		12			36.0	.65	58.79	2.4		84			61							
13	B	1			39.0	.60	61.69	2.4		84			62							
14		2			42.0	.60	64.46	2.2		82			60							
15		3			45.0	.65	67.33	2.4		81			60							
16		4			48.0	.65	70.22	2.4		81			61							
17		5			51.0	.70	73.20	2.6		81			61							
18		6			54.0	.70	76.18	2.6		81			62							
19		7			57.0	.65	79.19	2.5		82			61							
20		8			60.0	.65	81.98	2.4		82			61							
21		9			63.0	.65	84.85	2.4		82			61							
22		10			66.0	.65	87.72	2.4		82			62							
23		11			69.0	.60	90.54	2.3		82			62							
24		12			72.0	.60	93.29	2.2		82			62							
	Totals / Averages																			

—ORSAT—

Rep	1	2	3	Avg
CO_2				
Total				
O_2				
Fe				
Trims				
*possum				
Bag ID				
By				

Moisture Analysis

Imp.	Final	Tare	Net
1	254	250	4
2			
3			
4	—	56	DL * 55.6
Total	—	—	59.6

* DL V_{lc}(a) @ 60 °F, .5218

V_{lc}(b) @ 61 °F, .5407

FIELD TEST DATA

DATE 9/25/90
RUN NO. 3101
EQUIPMENT VENTED
TYPE ABATEMENT
EQUIPMENT NUMBER

AMB. TEMP.
BAR. PRESSURE 23.91
STACK PRESSURE
NOZZLE SIZE .250
METER RATE FACTOR
F.filter I.D. 7005

start 1050 int. 890.034 → ISO 4%

PT. NO.	SAM. TIME (MIN.)	VEL. HEAD ($\sqrt{\Delta P}$)	DES. SAM. RATE (CFM)	GAS METER RDG FT.^{3}	METER (ΔP_0) IN. H$_2$O	STACK TEMP. °F.	~~GAS~~ TEMP.@ METER °F.	SAM. BOX TEMP. °F.	IMP. IN-LET °F.	IMP. OUT-LET °F
A 1	3.0	.05	2.5	892.80	332.34	80	70		65	10
2	6.0	.10	2.0	895.21	285.11	80	70		63	10
3	9.0	.13	.40	896.69	124.87	80	71		60	5
4	12.0	.15	.50	897.97	94.4	80	73		60	5
5	15.0	.19	.60	899.37	96.1	80	73		60	5
6	18.0	.25	.75	900.94	95.7	81	74		61	6
7	21.0	.28	1.0	902.72	94.72	81	74		60	6.5
8	24.0	.30	1.0	904.57	92.76	82	76		61	6.5
9	27.0	.34	1.3	906.69	102.41	82	78		61	7.2
10	30.0	.36	1.3	908.69	90.08	82	82		61	7.5
11	33.0	.40	1.5	910.88	95.92	82	82		61	8.0
12	36.0	.44	1.6	913.17	94.83	82	84		61	8.5
B 13	39.0	1.9	2.0	915.66	98.62	82	83		62	10
14	42.0	1.4	2.0	918.20	56.00	82	86		62	10
15	45.0	1.5	2.5	921.01	41.8	82	89		62	12
16	48.0	1.5	3.7	924.42	72.73	82	89		61	17
17	51.0	1.2	3.7	927.91	74.16	82	91		62	17
18	54.0	.90	3.7	931.41	83.81	82	93		62	17
19	57.0	.90	3.7	934.91	95.94	82	93		62	17
20	60.0	.90	3.7	938.39	21.94	85	93		63	17
21	63.0	1.0	3.7	941.90	96.21	85	93		62	17
22	66.0	1.0	3.7	945.40	91.01	85	93		62	17
23	69.0	.90	3.7	948.87	90.23	85	93		62	17
24	72.0	.90	3.5	952.36	95.60	85	93		62	17
		Final (CFM)								
	End Time					Moisture				
						Tare	Final			
	Leak Check		0.0 cfm at 24 Hg			250 ml	251			
						net	1			
					Moisture %		61.3			
						Total ml	61.3			
TOTAL										
AVG.										

FIELD TEST DATA

DATE 9/25/90
RUN NO. 3102
EQUIPMENT VENTED
TYPE ABATEMENT
EQUIPMENT NUMBER

AMB. TEMP.
BAR. PRESSURE 23.81
STACK PRESSURE
NOZZLE SIZE .250
METER RATE FACTOR
Filter I.D. 7013

Time Start 1425 Δ H Int. Volume 953.51 % ISO

PT. NO.	SAM. TIME (MIN.)	VEL HEAD ($\sqrt{\Delta P}$)	DES. SAM. RATE (CFM)	GAS METER RDG $FT.^3$	METER (ΔH_o) IN. H_2O	STACK TEMP. ° F.	TEMP.@ METER ° F.	SAM. BOX TEMP. ° F.	IMP. IN-LET ° F	IMP. OUT-LET ° F
A 1	3.0	.90	2.0	956.19	34.20	91	84		63	7.3
2	6.0	.90	3.3	959.23	38.81	91	86		61	12.
3	9.0	.90	3.3	962.53	42.00	91	88		60	12
4	12.0	1.0	3.3	965.90	42.86	91	88		60	12
5	15.0	.90	3.5	969.33	41.3	91	90		60	13.
6	18.0	.90	3.5	972.78	43.6	91	91		61	13.
7	21.0	.70	3.3	976.23	43.56	91	92		61	12.
8	24.0	.60	2.6	979.31	44.0	91	93		60	10.
9	27.0	.60	2.6	982.35	46.8	91	93		60	10
10	30.0	.60	2.2	985.13	42.20	91	93		60	8.
11	33.0	.60	2.2	987.85	41.77	91	94		61	8.
12	36.0	.70	2.2	990.54	41.55	91	95		61	8.
13	39.0	.70	2.2	993.36	39.52	91	94		62	8
14	42.0	.70	2.6	996.31	41.84	91	96		60	9.
15	45.0	.50	2.6	999.28	41.94	90	98		60	9.
16	48.0	.60	2.5	1002.21	48.44	90	98		60	9.2
17	51.0	.50	2.3	1005.13	44.30	89	100		61	9.0
18	54.0	.50	2.0	1007.85	45.16	89	100		61	8.0
19	57.0	.50	2.0	1010.51	47.47	89	100		61	8.0
20	60.0	.60	2.0	1013.19	44.50	89	100		61	8.0
21	63.0	.60	2.2	1015.90	41.10	89	100		61	8.2
22	66.0	.60	2.2	1018.67	42.0	89	100		62	8.2
23	69.0	.60	2.2	1021.42	41.70	87	100		62	8.2
24	72.0	.60	2.2	1024.19	42.01	89	100		63	8.2
TOTAL										
AVG.										

Leak Ck. 0.0 CFM @ 22 Hg

9/25/90

Moisture

Tare	250
Net	256
Silica Gel	~~58.7~~ 64.7
Total	~~58~~

FIELD TEST DATA

DATE 9/25/90
RUN NO. 3103
EQUIPMENT VENTED
TYPE ABATEMENT
EQUIPMENT NUMBER

AMB. TEMP.
BAR. PRESSURE 23.82
STACK PRESSURE
NOZZLE SIZE .250
METER RATE FACTOR
Filter I.D. 7009

Start 1725 Init. Volume 024.58 9/25/90

PT. NO.	SAM. TIME (MIN.)	Δp VEL. HEAD (√Δp)	DES. SAM. RATE (CFM)	GAS METER RDG FT.³	METER (ΔP) IN. H_2O	STACK TEMP. ° F.	~~GAS~~ TEMP.@ METER ° F.	SAM. BOX TEMP. ° F.	IMP. IN-LET ° F.	IMP. OUT-LET ° F.	Vacuum
A 1	3.0	.60	2.2	027.33	95.73	84	78		61	8.5	
2	6.0	.60	2.2	030.07	-9x5.11	84	81		60	8.5	
3	9.0	.60	2.2	032.80	1130.24	84	83		59	8.5	
4	12.0	.65	2.2	035.51	93.30	84	84		59	8.5	
5	15.0	.65	2.4	038.33	93.00	84	86		60	9.0	
6	18.0	.70	2.4	041.19	93.96	84	88		60	9.0	
7	21.0	.70	2.6	044.11	92.17	84	90		60	9.8	
8	24.0	.70	2.6	047.08	93.74	84	90		60	9.8	
9	27.0	.70	2.6	050.05	93.58	84	91		61	9.8	
10	30.0	.65	2.6	053.02	93.24	84	93		61	9.8	
11	33.0	.65	2.4	055.42	94.00	84	95		61	9.5	
12	36.0	.65	2.4	058.79	93.10	84	95		61	9.5	
B 1	39.0	.60	2.4	061.69	95.28	84	88		62	9.5	
2	42.0	.60	2.2	064.46	93.48	82	91		60	8.9	
3	45.0	.65	2.4	067.33	97.16	81	92		60	9.8	
4	48.0	.65	2.4	070.22	93.83	81	93		61	9.2	
5	51.0	.70	2.6	073.20	96.81	81	93		61	9.5	
6	54.0	.70	2.6	076.18	93.29	81	93		62	9.8	
7	57.0	.65	2.5	079.19	94.03	81	94		61	9.5	
8	60.0	.65	2.4	081.98	90.51	82	94		61	9.3	
9	63.0	.65	2.4	084.85	93.10	82	94		61	9.3	
10	66.0	.65	2.4	087.72	92.93	82	95		62	9.3	
11	69.0	.60	2.3	090.54	91.29	82	95		62	9.0	
12	72.0	.60	2.2	093.29	92.63	82	95		62	8.8	
TOTAL											
AVG.											

Moisture

Tare	250 ml
net	254
Silica Gel	55.6
Dbl	59.6

Appendix 4.5

CALCULATIONS AND COMPUTER PRINTOUTS

Run 3101

PORT END
1202
1202

[illegible] TIME=
72 MIN
ACT VOL=
62.326 FT3
LK. RATE (CFM)?
CORR. VOL=
62.326 FT3

AVERAGES
PBAR1?
23.91
PBAR2?
23.91
AVG. PBAR =23.91
DEL-P
~~[illegible]~~ 1.5900
MTR. [illegible]
62.326
RUN TIME
72
DEL-H.
2.210
STK. TEMP
82.3
IMP. TEMP
61.5
MTR. TEMP
83.2
PUMP VAC
11.7
PBT [illegible]
105.[illegible]

Run 3102
Rerun Data
USED for Run Sheet

PORT END
[illegible]
[illegible]

[illegible] TIME=
72 MIN
[illegible] VOL=
[illegible] FT3

AVERAGES
PBAR1?
[illegible]
PBAR2?
[illegible]
AVG. PBAR =[illegible]
DEL-P
[illegible]
MTR. VOL
[illegible]
RUN TIME
72
DEL-H
[illegible]
STK. TEMP
[illegible]
IMP. TEMP
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[redacted]

[illegible]
[illegible]
PBAR2?
[illegible]
AVG. PBAR =[illegible]
DEL-P.
[illegible]
MTR. [illegible]
[illegible]
RUN TIME
[illegible]
DEL-H
[illegible]
STK. TEMP
[illegible]
IMP. TEMP
[illegible]
MTR. TEMP
[illegible]
PUMP VAC
[illegible]
PBT [illegible]
[illegible]

3101

SMPLE RT DH?
2.50
DSRD NOZ =
0.19
ACT. DIA?
0.25
K3 = 3.76

SMPLE RT DH? 3102
2.00
DSRD NOZ =
0.22
ACT. DIA?
0.25
K3 = 3.75

SMPLE RT DH? 3103
[illegible]
DSRD NOZ =
[illegible]
ACT. DIA?
[illegible]
K3 = [illegible]

CONSTANTS		AVERAGES	
Plant Name:	General Chem	Time Start:	1050
Location:	Green River,	Time End:	1210
RUN Number:	3101	Delta P:	0.59
Test Date:	9/25/90	Delta H:	2.21
Stack Id:	GR3 crusher	Meter Volume:	62.326
Console Id.:	nutech-2	Stack Temperature:	82.3
Methods Tested:	5	Imp. Temperature:	61.6
No. of points:	24	Meter Temperature:	83.2
No. of Minutes/Point:	3	Meter Vacuum:	11.5
Mtr. Factor, (Yo):	0.987	% Isokinetic (PBP):	105.9
F-Factor, (Fd):	1	Elapsed Minutes:	72
Pitot, (Cp):	0.84	Press. Static , Stac	0.75
Fuel Type:		Press. , Barometric:	23.91
Fo, low:		Ml. H2O condensed:	0
Fo, high:		Leak Rate: cfm.	0
CO2, %dry:	1	Leak Check in.Hg.	24
O2,%dry	18		
SO2, ppmd	0	**VARIABLES**	
NOx, ppmd	0	Tm	543.20
CO, ppmd	0	Ts	542.30
SO2, %dry	0	Pm	24.0725
CO, %dry	0	Ps	23.96515
Argon, %	0.0078	Tstd	528.00
N2, %	80.9922	Pstd	29.92
		Tstd/Pstd	17.64706
		R	21.85
Orifice Delta-Ha:	1.978	Rho w; density H2O	0.0022
Altitude of Plant:		Rho a;den. acetone	0.787
Press., Barometric:	30. in.Hg.	Kp	85.49
**Temp. of Meter:		Mw; Mole wt H2O	18.00
**Moisture, Stack:		Mn2	28.013
**Temp. of Stack:		Mco	28.013
**Delta-P:		Mo2	31.998
**Sample Rate (Delta-H):		Mco2	44.01
**Desired Nozzle, Dia.:		Mso2	64.07
Actual Nozzle, Dia.:	0.25	Mar	39.948
**K3:	1	Mnox	46.01
Stack Dia., inches	36	Hg. Specific gravity	13.60
Stack Area: sq.ft.	7.068375	Con2:RwRTstd/MwPstd	0.04715
Nozzle Area: sq.ft.	0.000340885		

SO2 LAB	
Blank ml:	0.05
H2SO4 ml:	10
N. H2SO4:	0.02
TTR Std 1:	20
TTR Std 2:	19.95
Ave. Std. TTR:	19.975
Aliq. Factor:	200
VTTR. 1I,ml:	0
VTTR. 1F,ml:	1
VTTR. 1Net:	1
VTTR. 2I, ml:	0
VTTR. 2F, ml:	1
VTTR. 2Net:	1
VTTR Ave:	1
SO2, ppm:	16.82675

SO2 Results(6)	
ppm, dry	16.82675
ppm,wet	15.87147
lb./hr.	2.579122
LMBTU	2.01E-05

O2, %dry orsat
CO2, %dry orsat

Meter Volume, A	62.326
vapor press.	0.552258
Total H2O	61.56556
Vmstd, dscf	48.22749
Vwstd,scf	2.902747
Bws, moisture	0.056772
Molecular wt.dr	28.8912
Molecular wt. w	28.27289
Velocity, fps	49.34751
Flow rate,dscf/	923670.4
DSCFM	15394.51
ACFM	20928.4
Fuel Factor Fo	2.9
O2, %dry	18
O2, %wet	16.97811
CO2, %dry	1

SO2 Results(6C)	
ppm, dry	0
ppm,wet	0
lb./hr.	0
LMBTU	0

NOx Results(7E)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

CO Results(10)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

Particulate Results	
Final Isokineti	90.2212
probe wash, mg.	7.11667
filter, mg. #	5.3
Total mg	12.41667
gr/scf	0.003973
gr/acf	0.002923
lb/hr	0.524266
LMBTU	4.09E-06
Tons/yr	2.11253
Front	12.4167
Back	62.175
Total mg	74.5917

gr/scf	0.023868
gr/acf	0.017557
lb/hr	3.149467
LMBTU	2.46E-05
Tons/year	12.69078

CONSTANTS		AVERAGES	
Plant Name:	General Chem	Time Start:	1425
Location:	Green River,	Time End:	1610
RUN Number:	3102	Delta P:	0.6756
Test Date:	9/25/90	Delta H:	2.558
Stack Id:	GR3 crusher	Meter Volume:	70.68
Console Id.:	nutech-2	Stack Temperature:	90.3
Methods Tested:	5	Imp. Temperature:	60.8
No. of points:	24	Meter Temperature:	94.8
No. of Minutes/Point:	3	Meter Vacuum:	9.5
Mtr. Factor, (Yo):	0.987	% Isokinetic (PBP):	96
F-Factor, (Fd):	1	Elapsed Minutes:	72
Pitot, (Cp):	0.84	Press. Static , Stac	0.75
Fuel Type:		Press. , Barometric:	23.81
Fo, low:		Ml. H2O condensed:	6
Fo, high:		Leak Rate: cfm.	0
CO2, %dry:	2	Leak Check in.Hg.	18
O2,%dry	16		
SO2, ppmd	0	**VARIABLES**	
NOx, ppmd	0	Tm	554.80
CO, ppmd	0	Ts	550.30
SO2, %dry	0	Pm	23.99809
CO, %dry	0	Ps	23.86515
Argon, %	0.0078	Tstd	528.00
N2, %	81.9922	Pstd	29.92
		Tstd/Pstd	17.64706
		R	21.85
Orifice Delta-Ha:	1.978	Rho w; density H2O	0.0022
Altitude of Plant:		Rho a;den. acetone	0.787
Press., Barometric:	30. in.Hg.	Kp	85.49
**Temp. of Meter:		Mw; Mole wt H2O	18.00
**Moisture, Stack:		Mn2	28.013
**Temp. of Stack:		Mco	28.013
**Delta-P:		Mo2	31.998
**Sample Rate (Delta-H):		Mco2	44.01
**Desired Nozzle, Dia.:		Mso2	64.07
Actual Nozzle, Dia.:	0.25	Mar	39.948
**K3:	3.75	Mnox	46.01
Stack Dia., inches	36	Hg. Specific gravity	13.60
Stack Area: sq.ft.	7.068375	Con2:RwRTstd/MwPstd	0.04715
Nozzle Area: sq.ft.	0.000340885		

SO2 LAB	
Blank ml:	0.05
H2SO4 ml:	10
N. H2SO4:	0.02
TTR Std 1:	20
TTR Std 2:	19.95
Ave. Std. TTR:	19.975
Aliq. Factor:	200
VTTR. 1I,ml:	0
VTTR. 1F,ml:	1
VTTR. 1Net:	1
VTTR. 2I, ml:	0
VTTR. 2F, ml:	1
VTTR. 2Net:	1
VTTR Ave:	1
SO2, ppm:	15.21784

SO2 Results(6)	
ppm, dry	15.21784
ppm,wet	14.39763
lb./hr.	2.475451
LMBTU	1.08E-05

O2, %dry orsat	
CO2, %dry orsat	

Meter Volume, A	70.68
vapor press.	0.536866
Total H20	64.43302
Vmstd, dscf	53.32635
Vwstd,scf	3.037944
Bws, moisture	0.053898
Molecular wt.dr	28.97147
Molecular wt. w	28.38013
Velocity, fps	53.2047
Flow rate,dscf/	980272.4
DSCFM	16337.87
ACFM	22564.24
Fuel Factor Fo	2.45
O2, %dry	16
O2, %wet	15.13763
CO2, %dry	2

SO2 Results(6C)	
ppm, dry	0
ppm,wet	0
lb./hr.	0
LMBTU	0

NOx Results(7E)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

CO Results(10)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

Particulate Results	
Final Isokineti	93.99961
probe wash, mg.	5.78333
filter, mg. #	4.5
Total mg	10.28333
gr/scf	0.002976
gr/acf	0.002155
lb/hr	0.416738
LMBTU	1.81E-06
Tons/yr	1.679245

Front	10.2833
Back	21.28
Total mg	31.5633

gr/scf	0.009134
gr/acf	0.006614
lb/hr	1.279121
LMBTU	5.57E-06
Tons/year	5.154216

CONSTANTS		AVERAGES	
Plant Name:	General Chem	Time Start:	1725
Location:	Green River,	Time End:	1910
RUN Number:	3103	Delta P:	0.6474
Test Date:	9/25/90	Delta H:	2.4
Stack Id:	GR3 crusher	Meter Volume:	68.71
Console Id.:	nutech-2	Stack Temperature:	82.9
Methods Tested:	5	Imp. Temperature:	60.8
No. of points:	24	Meter Temperature:	90.5
No. of Minutes/Point:	3	Meter Vacuum:	9.2
Mtr. Factor, (Yo):	0.987	% Isokinetic (PBP):	93.6
F-Factor, (Fd):	1	Elapsed Minutes:	72
Pitot, (Cp):	0.84	Press. Static , Stac	0.75
Fuel Type:		Press. , Barometric:	23.82
Fo, low:		Ml. H20 condensed:	4
Fo, high:		Leak Rate: cfm.	0
CO2, %dry:	1	Leak Check in.Hg.	18
O2,%dry	17		
SO2, ppmd	0	**VARIABLES**	
NOx, ppmd	0	Tm	550.50
CO, ppmd	0	Ts	542.90
SO2, %dry	0	Pm	23.99647
CO, %dry	0	Ps	23.87515
Argon, %	0.0078	Tstd	528.00
N2, %	81.9922	Pstd	29.92
		Tstd/Pstd	17.64706
		R	21.85
Orifice Delta-Ha:	1.978	Rho w; density H20	0.0022
Altitude of Plant:		Rho a;den. acetone	0.787
Press., Barometric:	30. in.Hg.	Kp	85.49
**Temp. of Meter:		Mw; Mole wt H20	18.00
**Moisture, Stack:		Mn2	28.013
**Temp. of Stack:		Mco	28.013
**Delta-P:		Mo2	31.998
**Sample Rate (Delta-H):		Mco2	44.01
**Desired Nozzle, Dia.:		Mso2	64.07
Actual Nozzle, Dia.:	0.25	Mar	39.948
**K3:	3.79	Mnox	46.01
Stack Dia., inches	36	Hg. Specific gravity	13.60
Stack Area: sq.ft.	7.068375	Con2:RwRTstd/MwPstd	0.04715
Nozzle Area: sq.ft.	0.000340885		

SO2 LAB	
Blank ml:	0.05
H2SO4 ml:	10
N. H2SO4:	0.02
TTR Std 1:	20
TTR Std 2:	19.95
Ave. Std. TTR:	19.975
Aliq. Factor:	200
VTTR. 1I,ml:	0
VTTR. 1F,ml:	1
VTTR. 1Net:	1
VTTR. 2I, ml:	0
VTTR. 2F, ml:	1
VTTR. 2Net:	1
VTTR Ave:	1
SO2, ppm:	15.52637

SO2 Results(6)	
ppm, dry	15.52637
ppm,wet	14.73478
lb./hr.	2.500967
LMBTU	1.38E-05

O2, %dry orsat
CO2, %dry orsat

Meter Volume, A	68.71
vapor press.	0.536866
Total H2O	59.55399
Vmstd, dscf	52.2667
Vwstd,scf	2.807903
Bws, moisture	0.050984
Molecular wt.dr	28.85135
Molecular wt. w	28.29811
Velocity, fps	51.79515
Flow rate,dscf/	970696.5
DSCFM	16178.28
ACFM	21966.45
Fuel Factor Fo	3.9
O2, %dry	17
O2, %wet	16.13328
CO2, %dry	1

SO2 Results(6C)	
ppm, dry	0
ppm,wet	0
lb./hr.	0
LMBTU	0

NOx Results(7E)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

CO Results(10)	
ppm, dry	0
ppm, wet	0
lb./hr.	0
LMBTU	0

Particulate Results	
Final Isokineti	93.04062
probe wash, mg.	33.55
filter, mg. #	1.9
Total mg	35.45
gr/scf	0.010467
gr/acf	0.007709
lb/hr	1.451439
LMBTU	8.01E-06
Tons/yr	5.848573
Front	35.45
Back	22.5875
Total mg	58.0375

gr/scf	0.017136
gr/acf	0.012621
lb/hr	2.376245
LMBTU	1.31E-05
Tons/year	9.57508

Appendix 4.6

LABORATORY ANALYTICAL RESULTS

Acetone Density(gm/ml)=	0.787	FRONTE	General Chemical	9/18/90
Acetone Blank			Filter Blank	
Beaker ID.	10		Filter ID:	
Wash Volume:	150.0 ml			
Weight Wash:	118.05 gm			
Tare Weight:			Tare Weight:	
Tare Weight:	101.3513 gm		Tare Weight:	.4 gm
Tare Weight:	101.3514 gm		Tare Weight:	
Average Tare Wt.:	101.35135 gm		Average Tare Wt.:	.4 gm
Final Weight:			Final Weight:	
Final Weight:	101.3553 gm		Final Weight:	.4 gm
Final Weight:	101.3552 gm		Final Weight:	
Average Final Wt.:	101.3552 gm		Average Final Wt.	.4 gm
Net Weight:	3.85 mg		Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.032613299		Correction Factor (mg.)	0

Front Half Run number: 3101

Acetone Sample		Filter Sample	
Beaker ID.	8	Filter ID:	7085
Wash Volume:	350.0 ml		
Weight Wash:	275.45 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	101.122 gm	Tare Weight:	.3685 gm
Tare Weight:	101.1319 gm	Tare Weight:	.3685 gm
Average Tare Wt.:	101.12195 gm	Average Tare Wt.:	.3685 gm
Final Weight:		Final Weight:	
Final Weight:	101.148 gm	Final Weight:	.3658 gm
Final Weight:	101.1481 gm	Final Weight:	.3658 gm
Average Final Wt.:	101.14805 gm	Average Final Wt.	.3658 gm
Net Weight:	16.1 mg	Net Weight:	5.3 mg
Blank Correction:	-8.96333 mg	Blank Correction:	0.0 mg
Correct Net Wt.:	7.11667 mg	Correct Net Wt.:	5.3 mg

Actual Total: 12.4167 mg

Water Density(gm/ml)=	1.00	PROBITE	General Chemical	9/18/96

Acetone Blank		Filter Blank	
Beaker ID.	11	Filter ID:	
Wash Volume:	200.0 ml		
Weight Wash:	200.0 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	104.0549 gm	Tare Weight:	.4 gm
Tare Weight:	104.0549 gm	Tare Weight:	
Average Tare Wt.:	104.0549 gm	Average Tare Wt.:	.4 gm
Final Weight:		Final Weight:	
Final Weight:	104.055 gm	Final Weight:	.4 gm
Final Weight:	104.055 gm	Final Weight:	
Average Final Wt.:	104.055 gm	Average Final Wt.	.4 gm
Net Weight:	0.1 mg	Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.0005	Correction Factor (mg.)	0

Back Half Run number: 3181

Acetone Sample		Filter Sample	
Beaker ID.	4	Filter ID:	
Wash Volume:	450.0 ml		
Weight Wash:	450.0 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	100.5904 gm	Tare Weight:	.0 gm
Tare Weight:	100.5908 gm	Tare Weight:	.0 gm
Average Tare Wt.:	100.59035 gm	Average Tare Wt.:	.0 gm
Final Weight:		Final Weight:	
Final Weight:	100.6328 gm	Final Weight:	.0 gm
Final Weight:	100.6327 gm	Final Weight:	.0 gm
Average Final Wt.:	100.63275 gm	Average Final Wt.	.0 gm
Net Weight:	62.4 mg	Net Weight:	0.0 mg
Blank Correction:	-0.225 mg	Blank Correction:	0.0 mg
Correct Net Wt.:	62.175 mg	Correct Net Wt.:	0.0 mg

Actual Total: 62.1750 mg

Acetone Density(gm/ml)=	0.787	PROBATE	General Chemical	9/18/90

Acetone Blank		Filter Blank	
Beaker ID.	10	Filter ID:	
Wash Volume:	130.0 ml		
Weight Wash:	113.05 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	101.9813 gm	Tare Weight:	.4 gm
Tare Weight:	101.9814 gm	Tare Weight:	
Average Tare Wt.:	101.98135 gm	Average Tare Wt.:	.4 gm
Final Weight:		Final Weight:	
Final Weight:	101.9953 gm	Final Weight:	.4 gm
Final Weight:	101.9951 gm	Final Weight:	
Average Final Wt.:	101.9952 gm	Average Final Wt.	.4 gm
Net Weight:	1.85 mg	Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.032613299	Correction Factor (mg.)	0

Front Half Run number: 3102

Acetone Sample		Filter Sample	
Beaker ID.	1	Filter ID:	7009
Wash Volume:	400.0 ml		
Weight Wash:	314.0 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	100.2236 gm	Tare Weight:	.3397 gm
Tare Weight:	100.2237 gm	Tare Weight:	.3397 gm
Average Tare Wt.:	100.22375 gm	Average Tare Wt.:	.3397 gm
Final Weight:		Final Weight:	
Final Weight:	100.2390 gm	Final Weight:	.3442 gm
Final Weight:	100.2390 gm	Final Weight:	.3442 gm
Average Final Wt.:	100.2390 gm	Average Final Wt.	.3442 gm
Net Weight:	16.05 mg	Net Weight:	4.5 mg
Blank Correction:	-10.26667 mg	Blank Correction:	0.0 mg
Correct Net Wt.:	5.78333 mg	Correct Net Wt.:	4.5 mg

Actual Total: 10.2833 mg

Water Density(gm/ml)= 1.00 PROBATE General Chemical 9/18/90

Acetone Blank		Filter Blank	
Beaker ID.	11	Filter ID:	
Wash Volume:	200.0 ml		
Weight Wash:	200.0 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	104.0549 gm	Tare Weight:	.4 gm
Tare Weight:	104.0549 gm	Tare Weight:	
Average Tare Wt.:	104.0549 gm	Average Tare Wt.:	.4 gm
Final Weight:		Final Weight:	
Final Weight:	104.055 gm	Final Weight:	.4 gm
Final Weight:	104.055 gm	Final Weight:	
Average Final Wt.:	104.055 gm	Average Final Wt.	.4 gm
Net Weight:	0.1 mg	Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.0005	Correction Factor (mg.)	0

Back Half Run number: 3102

Acetone Sample		Filter Sample	
Beaker ID.	9	Filter ID:	
Wash Volume:	548.0 ml		
Weight Wash:	548.0 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	99.9188 gm	Tare Weight:	.0 gm
Tare Weight:	99.9187 gm	Tare Weight:	.0 gm
Average Tare Wt.:	99.91875 gm	Average Tare Wt.:	.0 gm
Final Weight:		Final Weight:	
Final Weight:	99.9323 gm	Final Weight:	.0 gm
Final Weight:	99.9323 gm	Final Weight:	.0 gm
Average Final Wt.:	99.9323 gm	Average Final Wt.	.0 gm
Net Weight:	21.35 mg	Net Weight:	0.0 mg
Blank Correction:	-0.27 mg	Blank Correction:	0.0 mg
Correct Net Wt.:	21.28 mg	Correct Net Wt.:	0.0 mg

Actual Total: 21.280 mg

Acetone Density(gm/ml)=	0.787	FORMATE	General Chemical	9/18/90

Acetone Blank		Filter Blank	
Beaker ID.	18	Filter ID:	
Wash Volume:	150.0 ml		
Weight Wash:	118.05 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	101.9513 gm	Tare Weight:	.4 gm
Tare Weight:	101.9514 gm	Tare Weight:	
Average Tare Wt.:	101.95135 gm	Average Tare Wt.:	.4 gm
Final Weight:		Final Weight:	
Final Weight:	101.9553 gm	Final Weight:	.4 gm
Final Weight:	101.9551 gm	Final Weight:	
Average Final Wt.:	101.9552 gm	Average Final Wt.	.4 gm
Net Weight:	3.85 mg	Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.032613299	Correction Factor (mg.)	0

Front Half Run number: 3103

Acetone Sample		Filter Sample	
Beaker ID.	2	Filter ID:	7011
Wash Volume:	450.0 ml		
Weight Wash:	354.15 gm		
Tare Weight:		Tare Weight:	
Tare Weight:	100.2100 gm	Tare Weight:	.3592 gm
Tare Weight:	100.2107 gm	Tare Weight:	.3592 gm
Average Tare Wt.:	100.21075 gm	Average Tare Wt.:	.3592 gm
Final Weight:		Final Weight:	
Final Weight:	100.2538 gm	Final Weight:	.3611 gm
Final Weight:	100.2539 gm	Final Weight:	.3611 gm
Average Final Wt.:	100.25385 gm	Average Final Wt.	.3611 gm
Net Weight:	43.1 mg	Net Weight:	1.9 mg
Blank Correction:	-11.55 mg	Blank Correction:	0.0 mg
Correct Net Wt.:	33.55 mg	Correct Net Wt.:	1.9 mg

Actual Total: 35.450 mg

Water Density(gm/ml)=	1.00	PROBATE	General Chemical	9/18/90

Acetone Blank			Filter Blank	
Beaker ID.	11		Filter ID:	
Wash Volume:	200.0 ml			
Weight Wash:	200.0 gm			
Tare Weight:			Tare Weight:	
Tare Weight:	104.0849 gm		Tare Weight:	.4 gm
Tare Weight:	104.0849 gm		Tare Weight:	
Average Tare Wt.:	104.0849 gm		Average Tare Wt.:	.4 gm
Final Weight:			Final Weight:	
Final Weight:	104.085 gm		Final Weight:	.4 gm
Final Weight:	104.085 gm		Final Weight:	
Average Final Wt.:	104.085 gm		Average Final Wt.	.4 gm
Net Weight:	0.1 mg		Net Weight:	0.0 mg
Correction Factor (mg. Blank/gm	0.0005		Correction Factor (mg.)	0

Back Half Run number: 3103

Acetone Sample			Filter Sample	
Beaker ID.	12		Filter ID:	
Wash Volume:	325.0 ml			
Weight Wash:	325.0 gm			
Tare Weight:			Tare Weight:	
Tare Weight:	100.4637 gm		Tare Weight:	.0 gm
Tare Weight:	100.4630 gm		Tare Weight:	.0 gm
Average Tare Wt.:	100.46375 gm		Average Tare Wt.:	.0 gm
Final Weight:			Final Weight:	
Final Weight:	100.4886 gm		Final Weight:	.0 gm
Final Weight:	100.4886 gm		Final Weight:	.0 gm
Average Final Wt.:	100.4886 gm		Average Final Wt.	.0 gm
Net Weight:	22.85 mg		Net Weight:	0.0 mg
Blank Correction:	-0.2625 mg		Blank Correction:	0.0 mg
Correct Net Wt.:	22.5875 mg		Correct Net Wt.:	0.0 mg

Actual Total: 22.5875 mg