EVALUATOR CMC EVALUATION DATE 7/13/92

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: WY FACILITY: Rhone-Poulenc WY Inc. TEST DATE: 5/9/90

PROCESS(ES) TESTED: [illegible] 45C-10
trona ore calciner w/ cyclone & scrubber

SAMPLING DURATION 2
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

run 3 27 dscf - ✓

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given

no

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

36.2% @ 162 °F ok

FIELD DATA is field data on standard forms, and does raw data correspond with printout 3

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

BACK-HALF 3
if any, what method was used to catch and recover condensible matter

W7 - water

EQUIPMENT were a borosilicate glass probe liner and a glass fiber filter used 3

CALIBRATION were both pre- and post-test calibrations performed for
meter box 3
pitot tube 3
temperature sensor 3
nozzle (3 #) 3

LEAK CHECKS both pre- and post-test 3

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 3

SAMPLE PREP 3
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

EVALUATOR CMC EVALUATION DATE 7/13/92

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: WY FACILITY: Rhone-Poulenc WY TEST DATE: 5/10/90

PROCESS(ES) TESTED: 4 SC-12A
soda ash dryer w/ cyclone & scrubber

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given
90

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]
~~40% @ 160°F~~ 42%@162°F

FIELD DATA is field data on standard forms, and does raw data correspond with printout 3

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

BACK-HALF 3
if any, what method was used to catch and recover condensible matter
WY - H.O

EQUIPMENT were a borosilicate glass probe liner and a glass fiber filter used 3

CALIBRATION were both pre- and post-test calibrations performed for
meter box 3
pitot tube 3
temperature sensor 3
nozzle (3 #) 3

LEAK CHECKS both pre- and post-test 3

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 3

SAMPLE PREP 3
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

EVALUATOR CMC EVALUATION DATE 7/13/92

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: WY FACILITY: Rhone-Poulenc WY TEST DATE: 5/11/90

PROCESS(ES) TESTED: 5 KS-10
trona ore calciner w/ cyclone & ESP

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given
no

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA is field data on standard forms, and does raw data correspond with printout 3

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

BACK-HALF 3
if any, what method was used to catch and recover condensible matter
WY - H_2O

EQUIPMENT were a borosilicate glass probe liner and a glass fiber filter used 3

CALIBRATION were both pre- and post-test calibrations performed for
meter box 3
pitot tube 3
temperature sensor 3
nozzle (3 #) 3

LEAK CHECKS both pre- and post-test 3

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 3

SAMPLE PREP 3
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

EVALUATOR CMC EVALUATION DATE 7/13/92

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: WY FACILITY: Rhone-Poulenc WY TEST DATE: 5/12/90

PROCESS(ES) TESTED: SES-12

soda ash dryer w/ cyclone & cooler w/ baghouse & cyclone, all vented to ESP

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given
no

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA is field data on standard forms, and does raw data correspond with printout 3

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

BACK-HALF 3
if any, what method was used to catch and recover condensible matter

H_2O - WY

EQUIPMENT were a borosilicate glass probe liner and a glass fiber filter used 3

CALIBRATION were both pre- and post-test calibrations performed for
meter box 3
pitot tube 3
temperature sensor 3
nozzle (3 #) 3

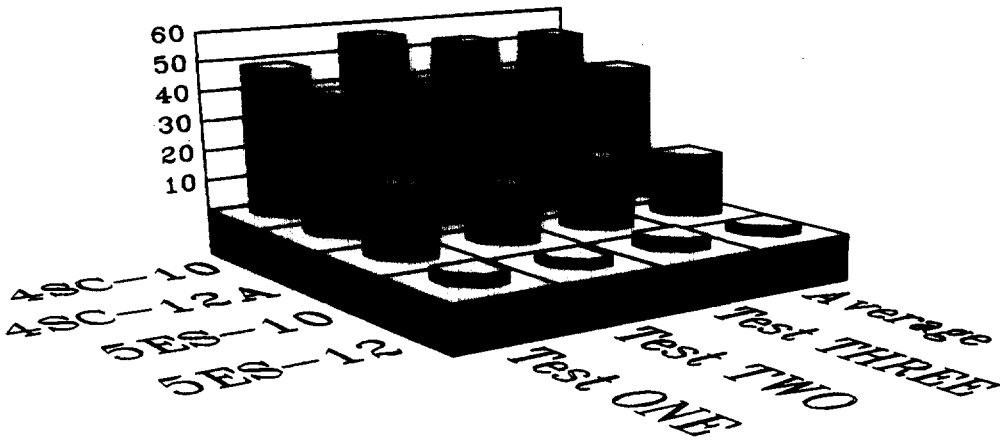
LEAK CHECKS both pre- and post-test 3

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 3

SAMPLE PREP 3
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

RHONE-POLUENC WYOMING CO.
PARTICULATE EMISSION COMPLIANCE PROGRAM
UNIT 4 ; CALCINER and DRIER KILN SCRUBBER EXHAUST
UNIT 5 ; CALCINER and DRIER KILN PRECIPITATOR EXHAUST



Prepared for:

RHONE-POULENC WYOMING CO.
P.O Box 513
Green River, Wyoming 82935

Prepared By:

TRC ENVIRONMENTAL MEASUREMENTS DIVISION
7002 S. Revere Parkway
Suite 60
Englewood, Colorado 80112

TRC Project Reference No. 7700-E32

May 21, 1990

TRC

Environmental Consultants

7002 South Revere Parkway
Suite 60
Englewood, CO 80112

(303) 792-5555

A TRC Company

→ Chuck
Lee
Lee
File

MEMORANDUM

TO: RHONE-POULENC COMPLIANCE FILE

THROUGH: BERNIE DAILEY, FOR ENGINEERING SUPERVISOR

FROM: DAN OLSON, COMPLIANCE OFFICER

DATE: JUNE 11, 1990

SUBJECT: PARTICULATE STACK TESTS ON SOURCES 4SC-10, 4SC-12A, 5ES-10 AND 5ES-12 CONDUCTED THE WEEK OF MAY 7, 1990

The subject stack test report was received by the Division on May 31, 1990. The tests were performed by TRC Environmental Consultants of Englewood, Colorado during the week of May 7, 1990.

The test report was reviewed for consistency with the requirements of Reference Methods 1-5 for particulate. For each of the four separate test series the placement and number of sampling points correctly followed the guidelines. Test procedures appear to have been followed correctly in each case.

The raw test data included with the test report was independently analyzed for comparison with the results obtained by the testing firm. The calculations on an individual basis generally agreed, however, for the third test on source 4SC-10 the test data indicated a collected water volume of 369.2 ml while TRC utilized a value of 303.2 in their calculations. This was enough of a difference to boost the tested average over the allowable in the TRC calculations. I placed a call to TRC on June 11, 1990 and spoke to a Mr. Kurt Parker asking for verification of the correct value of collected water for this test. He returned my call later in the day and indicated that the correct value was 369.2 ml.

Another discrepancy in the report was also found in that all of the summary tables (3-1, 3-2, 3-3, and 3-4) incorrectly presented the three test average results. Rather than presenting the true average of the three tests, the TRC computer program averaged only the first two tests in each case. Mr. Parker was also advised of this problem. He indicated that an errata would be forthcoming.

The results of the analysis performed by the Division together with the corrected average results obtained by TRC is given in the table below. These results are for the total particulate catch, including front and back halves.

EMISSION RATES (lb/hr)

SOURCE	TRC	AQD	ALLOWABLE
SCRUBBER(4SC-10)	53.33	52.29	52.6
SCRUBBER(4SC-12A)	45.35	46.81	51.6
PRECIPITATOR(5ES-10)	21.53	21.53	23.1
PRECIPITATOR(5ES-12)	3.89	3.89	12.0

(NOTE: The AQD results for source 4SC-12A represent an average of only two tests since field data from the first test was not included in our copy of the report. TRC's 1st test results were comparable to the other two however so the three test average should be also.)

The results of this analysis indicate that all sources tested are in compliance with applicable particulate limits. However, source 4SC-10 is very marginal in performance. Rhone-Poulenc has indicated that they suspect an inadequate spray distribution on this unit and that they are investigating this possibility. I would suggest that this source because of its marginal operation should be subjected to an additional test after the company's evaluation of this possible problem.

cc: Lee Gribovicz

Rhone-Poulenc
Scrubber 45C-10
5/9/90

Data Sheet

24 pts

P_{std} = 29.92 in Hg

T_{std} = 530° R

		Test 1	Test 2	Test 3
P_{bar}	= barometric pressure at site (in Hg)	24.05	24.05	24.07
P_s	= absolute stack gas pressure (in Hg)	24.04	24.043	24.062
T_s	= absolute average stack gas temp. (°R)	615.4	615.7	615.8
T_m	= absolute average dry gas meter temp. (°R)	530.8	536.6	537.4
V_{ic}	= total volume of water collected (ml)	426.2	367.2	369.2
V_m	= volume of gas through dry gas meter (ft^3)	45.93	38.206	34.721
ΔH	= average pressure drop across orifice (in H_2O)	1.9954	1.2783	0.9871
C_p	= pitot tube coefficient	0.84	0.84	0.84
$(\sqrt{\Delta p})_{ave}$	= average velocity head of stack gas (in H_2O)	0.4159	0.3640	0.3208
A_s	= cross-sectional area of stack (ft^2)	63.62	63.62	63.62
M_n	= total amount of particulate collected (g) FRONT	0.2646 0.2702	0.2967 0.3036	0.2660 0.2725
Θ	= total sampling time (min.)	60.	60	60
A_n	= cross-sectional area of nozzle (ft^2)	0.0007467		

(FAIL)

Orsat Analysis

	Test 1	Test 2	Test 3
% CO_2	8.0	7.4	7.4
% O_2	10.4	9.8	10.2
% CO	0.0	0.0	0.0
% N_2	81.6	82.8	82.4

STACK TEST CALCULATIONS

****

SOURCE: RHONE-POULENC, SCRUBBER 4SC-10 (FRONT HALF)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/09/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

****

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.405E+01	2.405E+01	2.407E+01
ABS. STACK GAS PRESSURE (in Hg)	2.404E+01	2.404E+01	2.406E+01
ABS. AVE. STACK GAS TEMP (*R)	6.154E+02	6.157E+02	6.158E+02
ABS. AVE. DGM TEMP (*R)	5.308E+02	5.366E+02	5.374E+02
TOT. VOL. H2O COLLECTED (ml)	4.262E+02	3.692E+02	3.692E+02
VOL. THRU DGM (ft3)	4.593E+01	3.871E+01	3.472E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.995E+00	1.278E+00	9.871E-01
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	4.159E-01	3.640E-01	3.208E-01
STD VOL. SAMPLED (scf)	3.693E+01	3.072E+01	2.752E+01
H2O VAPOR IN GAS @STP (ft3)	2.006E+01	1.738E+01	1.738E+01
MOL. WT. WET (lb/lb mole)	2.558E+01	2.539E+01	2.510E+01
MOL. WT. DRY (lb/lb mole)	2.970E+01	2.958E+01	2.959E+01
VEL. STACK GAS (fps)	2.987E+01	2.625E+01	2.326E+01
FLOW RATE, DRY @ STP (scfm)	5.094E+04	4.410E+04	3.752E+04
CONCENTRATION (gr/scf)	1.105E-01	1.489E-01	1.491E-01
CONCENTRATION (lb/scf)	1.578E-05	2.128E-05	2.130E-05
EMISSION RATE (lb/hr)	4.824E+01	5.629E+01	4.794E+01
% ISOKINETIC	1.030E+02	9.901E+01	1.042E+02

Ave: 50.82 lb/hr

STACK TEST CALCULATIONS

****

*

* SOURCE: RHONE-POULENC, SCRUBBER 4SC-10 (TOTAL)

*

* TESTED BY: SMITH & HAWLEY

* TRC

*

* DATE TESTED: 05/09/90

*

* OBSERVED BY: LEE GRIBOVICZ

*

* EVALUATED BY: DAN OLSON

*

****

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.405E+01	2.405E+01	2.407E+01
ABS. STACK GAS PRESSURE (in Hg)	2.404E+01	2.404E+01	2.406E+01
ABS. AVE. STACK GAS TEMP (*R)	6.154E+02	6.157E+02	6.158E+02
ABS. AVE. DGM TEMP (*R)	5.308E+02	5.366E+02	5.374E+02
TOT. VOL. H2O COLLECTED (ml)	4.262E+02	3.692E+02	3.692E+02
VOL. THRU DGM (ft3)	4.593E+01	3.871E+01	3.472E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.995E+00	1.278E+00	9.871E-01
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	4.159E-01	3.640E-01	3.208E-01
STD VOL. SAMPLED (scf)	3.693E+01	3.072E+01	2.752E+01
H2O VAPOR IN GAS @STP (ft3)	2.006E+01	1.738E+01	1.738E+01
MOL. WT. WET (lb/lb mole)	2.558E+01	2.539E+01	2.510E+01
MOL. WT. DRY (lb/lb mole)	2.970E+01	2.958E+01	2.959E+01
VEL. STACK GAS (fps)	2.987E+01	2.625E+01	2.326E+01
FLOW RATE, DRY @ STP (scfm)	5.094E+04	4.410E+04	3.752E+04
CONCENTRATION (gr/scf)	1.128E-01	1.524E-01	1.555E-01
CONCENTRATION (lb/scf)	1.612E-05	2.177E-05	2.222E-05
EMISSION RATE (lb/hr)	4.926E+01	5.760E+01	5.002E+01
% ISOKINETIC	1.030E+02	9.901E+01	1.042E+02

acfm = 63.62 ft² × 60 sec/min × Vel Stack Gas (fps)

29.87 = 114,020

26.75 = 100,202

23.26 = 88,788

101,003 avg

Ave: 52.29 lb/hr.

permitted: 50 lb/hr

Phone - Pauline.

Scrubber 4SC-12A

5/10/90 12PD

Data Sheet

P_{std} = 29.92 in Hg

T_{std} = 530° R

Data Missing

		Test 1	Test 2	Test 3
P_{bar}	= barometric pressure at site (in Hg)		23.62	23.64
P_s	= absolute stack gas pressure (in Hg)		23.631	23.651
T_s	= absolute average stack gas temp. (°R)		621.9	622.4
T_m	= absolute average dry gas meter temp. (°R)		546.8	552.7
V_{ic}	= total volume of water collected (ml)		459	455.1
V_m	= volume of gas through dry gas meter (ft^3)		39.524	39.086
ΔH	= average pressure drop across orifice (in H_2O)		1.180	1.175
C_p	= pitot tube coefficient		0.84	0.84
$(\sqrt{\Delta p})_{ave}$	= average velocity head of stack gas (in H_2O)		0.6293	0.6255
A_s	= cross-sectional area of stack (ft^2)		23.76	23.76
M_n	= total amount of particulate collected (g)		FRONT 0.4097 0.4111	0.4067 0.4074
θ	= total sampling time (min.)		60.0	60.0
A_n	= cross-sectional area of nozzle (ft^2)		0.0004493	→

89 TPH avg

Process Rate (TPH) 85 89 94 (PASS)

Orsat Analysis

	Test 1	Test 2	Test 3
% CO_2		6.0	6.0
% O_2		11.8	12.0
% CO		0.0	0.0
% N_2		82.2	82.0

STACK TEST CALCULATIONS

SOURCE: RHONE-POULENC, SCRUBBER 4SC-12A (FRONT HALF)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/10/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

	TEST #1	TEST #2
AMBIENT PRESSURE (in Hg)	2.362E+01	2.364E+01
ABS. STACK GAS PRESSURE (in Hg)	2.363E+01	2.365E+01
ABS. AVE. STACK GAS TEMP (*R)	6.219E+02	6.224E+02
ABS. AVE. DGM TEMP (*R)	5.468E+02	5.527E+02
TOT. VOL. H2O COLLECTED (ml)	4.590E+02	4.551E+02
VOL. THRU DGM (ft3)	3.952E+01	3.909E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.180E+00	1.175E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	6.293E-01	6.255E-01
STD VOL. SAMPLED (scf)	3.023E+01	2.960E+01
H2O VAPOR IN GAS @STP (ft3)	2.161E+01	2.142E+01
MOL. WT. WET (lb/lb mole)	2.467E+01	2.464E+01
MOL. WT. DRY (lb/lb mole)	2.943E+01	2.944E+01
VEL. STACK GAS (fps)	4.667E+01	4.642E+01
FLOW RATE, DRY @ STP (scfm)	2.602E+04	2.574E+04
CONCENTRATION (gr/scf)	2.090E-01	2.119E-01
CONCENTRATION (lb/scf)	2.986E-05	3.027E-05
EMISSION RATE (lb/hr)	4.661E+01	4.676E+01
% ISOKINETIC	1.025E+02	1.014E+02

Ave: 46.69 lb/hr

STACK TEST CALCULATIONS

****

SOURCE: RHONE-POULENC, SCRUBBER 4SC-12A (TOTAL)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/10/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

****

	TEST #1	TEST #2
AMBIENT PRESSURE (in Hg)	2.362E+01	2.364E+01
ABS. STACK GAS PRESSURE (in Hg)	2.363E+01	2.365E+01
ABS. AVE. STACK GAS TEMP (*R)	6.219E+02	6.224E+02
ABS. AVE. DGM TEMP (*R)	5.468E+02	5.527E+02
TOT. VOL. H2O COLLECTED (ml)	4.590E+02	4.551E+02
VOL. THRU DGM (ft3)	3.952E+01	3.909E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.180E+00	1.175E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	6.293E-01	6.255E-01
STD VOL. SAMPLED (scf)	3.023E+01	2.960E+01
H2O VAPOR IN GAS @STP (ft3)	2.161E+01	2.142E+01
MOL. WT. WET (lb/lb mole)	2.467E+01	2.464E+01
MOL. WT. DRY (lb/lb mole)	2.943E+01	2.944E+01
VEL. STACK GAS (fps)	4.667E+01	4.642E+01
FLOW RATE, DRY @ STP (scfm)	2.602E+04	2.574E+04
CONCENTRATION (gr/scf)	2.097E-01	2.123E-01
CONCENTRATION (lb/scf)	2.996E-05	3.032E-05
EMISSION RATE (lb/hr)	4.677E+01	4.684E+01
% ISOKINETIC	1.025E+02	1.014E+02

acfm = 23.76 ft² × 60 sec/min × Vel Stack Gas (fps)

46.67 = 66,533
46.42 = 66,176

66,355 avg acfm

Ave: 46.81 lb/hr

Permitted: 50 lb/hr.

Rhone-Poulenc
Precipitator - SES-10
5/11/90
24pts.

Data Sheet

P_{std} = 29.92 in Hg

T_{std} = 530° R

		Test 1	Test 2	Test 3
P_{bar}	= barometric pressure at site (in Hg)	23.54	23.50	23.47
P_s	= absolute stack gas pressure (in Hg)	23.524	23.484	23.454
T_s	= absolute average stack gas temp. (°R)	849.5	851.3	854.3
T_m	= absolute average dry gas meter temp. (°R)	507.4	514.1	528.9
V_{ic}	= total volume of water collected (ml)	259.5	257.4	241.2
V_m	= volume of gas through dry gas meter (ft^3)	40.12	37.696	39.20
ΔH	= average pressure drop across orifice (in H_2O)	1.265	1.1583	1.2104
C_p	= pitot tube coefficient	0.84	0.84	0.84
$(\sqrt{\Delta p})_{ave}$	= average velocity head of stack gas (in H_2O)	0.6163	0.6169	0.6237
A_s	= cross-sectional area of stack (ft^2)	62.49	62.49	62.49
M_n	= total amount of particulate collected (g) front Half.	0.0808 0.0826	0.0585 0.0630	0.0761 0.0779
θ	= total sampling time (min.)	60.0	60.0	60.0
A_n	= cross-sectional area of nozzle (ft^2)	0.0004789 →		

140 TPH avg

TPH Process Rate 139 138 142 (PASS)

Orsat Analysis

	Test 1	Test 2	Test 3
% CO_2	9.8	9.2	9.4
% O_2	8.8	9.8	9.2
% CO	0.0	0.0	0.0
% N_2	81.4	81.0	81.4

STACK TEST CALCULATIONS

SOURCE: RHONE-POULENC, PRECIPITATOR 5ES-10 (FRONT HALF)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/11/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.354E+01	2.350E+01	2.347E+01
ABS. STACK GAS PRESSURE (in Hg)	2.352E+01	2.348E+01	2.345E+01
ABS. AVE. STACK GAS TEMP (*R)	8.495E+02	8.513E+02	8.543E+02
ABS. AVE. DGM TEMP (*R)	5.074E+02	5.141E+02	5.289E+02
TOT. VOL. H2O COLLECTED (ml)	2.595E+02	2.514E+02	3.412E+02
VOL. THRU DGM (ft3)	4.012E+01	3.770E+01	3.920E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.265E+00	1.158E+00	1.210E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	6.163E-01	6.169E-01	6.237E-01
STD VOL. SAMPLED (scf)	3.296E+01	3.051E+01	3.080E+01
H2O VAPOR IN GAS @STP (ft3)	1.221E+01	1.183E+01	1.606E+01
MOL. WT. WET (lb/lb mole)	2.670E+01	2.655E+01	2.580E+01
MOL. WT. DRY (lb/lb mole)	2.992E+01	2.986E+01	2.987E+01
VEL. STACK GAS (fps)	5.147E+01	5.176E+01	5.321E+01
FLOW RATE, DRY @ STP (scfm)	6.880E+04	6.807E+04	6.353E+04
CONCENTRATION (gr/scf)	3.780E-02	2.957E-02	3.810E-02
CONCENTRATION (lb/scf)	5.400E-06	4.225E-06	5.443E-06
EMISSION RATE (lb/hr)	2.229E+01	1.725E+01	2.075E+01
% ISOKINETIC	1.043E+02	9.754E+01	1.055E+02

Ave: 20.10 lb/hr

STACK TEST CALCULATIONS

SOURCE: RHONE-POULENC, PRECIPITATOR 5ES-10 (TOTAL)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/11/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.354E+01	2.350E+01	2.347E+01
ABS. STACK GAS PRESSURE (in Hg)	2.352E+01	2.348E+01	2.345E+01
ABS. AVE. STACK GAS TEMP (*R)	8.495E+02	8.513E+02	8.543E+02
ABS. AVE. DGM TEMP (*R)	5.074E+02	5.141E+02	5.289E+02
TOT. VOL. H2O COLLECTED (ml)	2.595E+02	2.514E+02	2.412E+02
VOL. THRU DGM (ft3)	4.012E+01	3.770E+01	3.920E+01
AVE. DEL P ACROSS GRIFICE (in H2O)	1.265E+00	1.158E+00	1.210E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	6.163E-01	6.169E-01	6.237E-01
STD VOL. SAMPLED (scf)	3.296E+01	3.051E+01	3.089E+01
H2O VAPOR IN GAS @STP (ft3)	1.221E+01	1.183E+01	1.135E+01
MOL. WT. WET (lb/lb mole)	2.670E+01	2.655E+01	2.667E+01
MOL. WT. DRY (lb/lb mole)	2.992E+01	2.986E+01	2.987E+01
VEL. STACK GAS (fps)	5.147E+01	5.176E+01	5.233E+01
FLOW RATE, DRY @ STP (scfm)	6.880E+04	6.807E+04	6.946E+04
CONCENTRATION (gr/scf)	3.864E-02	3.185E-02	3.900E-02
CONCENTRATION (lb/scf)	5.520E-06	4.550E-06	5.572E-06
EMISSION RATE (lb/hr)	2.279E+01	1.858E+01	2.322E+01
% ISOKINETIC	1.043E+02	9.754E+01	9.651E+01

Ave: ~~20.887~~ lb/hr
21.53

Rounded: 23.0 lb/hr.

$acfm = 62.49\,ft^2 \times \frac{60\,sec}{min} \times vel.\,stk.\,gas\,(fps)$ (A_s)

51.47 = 192,982
51.76 = 194,069
52.33 = 196,206
194,419 avg

Rhone-Poulenc

Precipitator SES-12

5/12/90 12 pts

Data Sheet

P_{std} = 29.92 in Hg

T_{std} = 530° R

		Test 1	Test 2	Test 3
P_{bar}	= barometric pressure at site (in Hg)	23.69	23.70	23.71
P_s	= absolute stack gas pressure (in Hg)	23.698	23.708	23.718
T_s	= absolute average stack gas temp. (°R)	696.8	705.6	705.4
T_m	= absolute average dry gas meter temp. (°R)	519.2	533	539.6
V_{lc}	= total volume of water collected (ml)	271	366.3	333.2
V_m	= volume of gas through dry gas meter (ft^3)	42.683	57.431	60.78
ΔH	= average pressure drop across orifice (in H_2O)	1.4158	2.440	2.681
C_p	= pitot tube coefficient	0.84	0.84	0.84
$(\sqrt{\Delta p})_{ave}$	= average velocity head of stack gas (in H_2O)	0.4047	0.5348	0.5560
A_s	= cross-sectional area of stack (ft^2)	28.27	→	→
M_n	= total amount of particulate collected (g)	Front half .0422 / 0434	0.0522 / 0.0335	0.0477 / 0.0566
θ	= total sampling time (min.)	60	60	60
A_n	= cross-sectional area of nozzle (ft^2)	0.000 7.266	→	→

5 | avg TPH

TPH Process Rate 49 50 55 (PASS)

Orsat Analysis

	Test 1	Test 2	Test 3
% CO_2	8.4	8.6	8.6
% O_2	9.8	10.0	10.0
% CO	—	—	—
% N_2	81.8	81.4	81.4

STACK TEST CALCULATIONS

****

SOURCE: RHONE-POULENC, PRECIPITATOR 5ES-12 front half

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/12/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN OLSON

****

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.369E+01	2.370E+01	2.371E+01
ABS. STACK GAS PRESSURE (in Hg)	2.370E+01	2.371E+01	2.372E+01
ABS. AVE. STACK GAS TEMP (*R)	6.968E+02	7.056E+02	7.054E+02
ABS. AVE. DGM TEMP (*R)	5.192E+02	5.330E+02	5.396E+02
TOT. VOL. H2O COLLECTED (ml)	2.710E+02	3.663E+02	3.332E+02
VOL. THRU DGM (ft3)	4.268E+01	5.743E+01	6.078E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.416E+00	2.440E+00	2.681E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	4.047E-01	5.348E-01	5.560E-01
STD VOL. SAMPLED (scf)	3.451E+01	4.539E+01	4.750E+01
H2O VAPOR IN GAS @STP (ft3)	1.276E+01	1.724E+01	1.568E+01
MOL. WT. WET (lb/lb mole)	2.657E+01	2.653E+01	2.685E+01
MOL. WT. DRY (lb/lb mole)	2.974E+01	2.978E+01	2.978E+01
VEL. STACK GAS (fps)	3.057E+01	4.067E+01	4.201E+01
FLOW RATE, DRY @ STP (scfm)	2.272E+04	2.964E+04	3.179E+04
CONCENTRATION (gr/scf)	1.886E-02	1.094E-02	1.549E-02
CONCENTRATION (lb/scf)	2.694E-06	1.563E-06	2.212E-06
EMISSION RATE (lb/hr)	3.673E+00	2.780E+00	4.219E+00
% ISOKINETIC	9.858E+01	9.937E+01	9.697E+01

Ave 3.557 lb/hr

STACK TEST CALCULATIONS

SOURCE: RHONE-POULENC, PRECIPITATOR 5ES-12 (TOTAL)

TESTED BY: SMITH & HAWLEY
TRC

DATE TESTED: 05/12/90

OBSERVED BY: LEE GRIBOVICZ

EVALUATED BY: DAN

	TEST #1	TEST #2	TEST #3
AMBIENT PRESSURE (in Hg)	2.369E+01	2.370E+01	2.371E+01
ABS. STACK GAS PRESSURE (in Hg)	2.370E+01	2.371E+01	2.372E+01
ABS. AVE. STACK GAS TEMP (*R)	6.968E+02	7.056E+02	7.054E+02
ABS. AVE. DGM TEMP (*R)	5.192E+02	5.330E+02	5.396E+02
TOT. VOL. H2O COLLECTED (ml)	2.710E+02	3.663E+02	3.332E+02
VOL. THRU DGM (ft3)	4.268E+01	5.743E+01	6.078E+01
AVE. DEL P ACROSS ORIFICE (in H2O)	1.416E+00	2.440E+00	2.681E+00
PITOT TUBE COEFFICIENT	8.400E-01	8.400E-01	8.400E-01
AVE. VEL. HEAD OF STACK GAS (in H2O)	4.047E-01	5.348E-01	5.560E-01
STD VOL. SAMPLED (scf)	3.451E+01	4.539E+01	4.750E+01
H2O VAPOR IN GAS @STP (ft3)	1.276E+01	1.724E+01	1.568E+01
MOL. WT. WET (lb/lb mole)	2.657E+01	2.653E+01	2.685E+01
MOL. WT. DRY (lb/lb mole)	2.974E+01	2.979E+01	2.978E+01
VEL. STACK GAS (fps)	3.057E+01	4.067E+01	4.201E+01
FLOW RATE, DRY @ STP (scfm)	2.272E+04	2.964E+04	3.179E+04
CONCENTRATION (gr/scf)	1.940E-02	1.138E-02	1.837E-02
CONCENTRATION (lb/scf)	2.771E-06	1.626E-06	2.625E-06
EMISSION RATE (lb/hr)	3.777E+00	2.892E+00	5.007E+00
% ISOKINETIC	9.855E+01	9.957E+01	9.697E+01

Ave: 3.892 lb/hr

Permitted: 12 lb/hr

Ac

acfm = 28.27 ft² × 60 sec/min × vel stack gas (fps)

30.57 = 51,853
40.67 = 68,984
42.01 = 71,257

64,031 avg acfm

RHÔNE-POULENC

RHÔNE-POULENC OF WYOMING CO.

P.O. BOX 513
GREEN RIVER, WY 82935
TEL: (307) 875-2600

May 25, 1990

Mr. Lee Gribovicz, District Engineer
Air Quality Division
Department of Environmental Quality
210 Lincoln Street
Lander, Wyoming 82520

Dear Lee:

Enclosed are the results of emissions' tests performed by TRC on 4SC-10, 4SC-12A, 5ES-10 and 5ES-12. As I reported to you in our phone conversation of 5/25/90, the average emissions from 4SC-10 were approximately one pound over the permitted level. The test results show a change in air flow from about 114,000 DSCFM to 88,000 DSCFM during the three tests. Nothing in the collected control room data indicates this could have happened, so we feel the test results are somewhat suspect; however, we have cut production in Unit 4 Dissolvers from 128 TPH to no more than 120 TPH in an effort to stay in compliance with permitted allowables.

An internal inspection of 4SC-10 showed a possibility that the spray distribution pattern was not adequate. We may further evaluate this possibility next week. I will keep you posted on this matter, and will also inform you of dates for retesting emission rates.

As I reported to you, opacity values did not correlate well with tested emission rates. If you have any information regarding opacity/emission relationship, or why correlation between these two parameters was so poor, we would like to receive it.

If you have any questions regarding this information, please contact me.

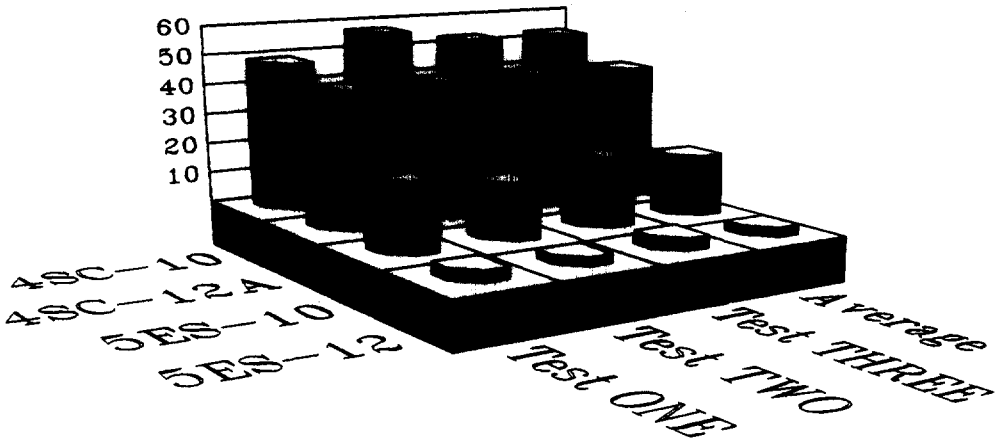
Ronald K. Smith
Environmental Services
Supervisor

RECEIVED
MAY 30 1990
DIVISION
LANDER, WYOMING

RKS/lm

CC: Charles Collins (W/Attachments)

RHONE-POLUENC WYOMING CO.
PARTICULATE EMISSION COMPLIANCE PROGRAM
UNIT 4 ; CALCINER and DRIER KILN SCRUBBER EXHAUST
UNIT 5 ; CALCINER and DRIER KILN PRECIPITATOR EXHAUST



Prepared for:

RHONE-POULENC WYOMING CO.
P.O Box 513
Green River, Wyoming 82935

Prepared By:

TRC ENVIRONMENTAL MEASUREMENTS DIVISION
7002 S. Revere Parkway
Suite 60
Englewood, Colorado 80112

TRC Project Reference No. 7700-E32

May 21, 1990

TRC

Environmental Consultants

7002 South Revere Parkway
Suite 60
Englewood, CO 80112

(303) 792-5555

A TRC Company

TABLE OF CONTENTS

TRC

1.0 INTRODUCTION

The Rhone-Poulenc of Wyoming Co. operates a trona mining and processing facility is located in southwestern Wyoming near Green River, Wyoming. The facility is required by Wyoming Department of Environmental Quality (WDEQ) to demonstrate particulate emission compliance for selected control equipment. Particulate emissions from the following control equipment was evaluated during this compliance program:

4SC-10	*Scrubber*	*Unit 4*
4SC-12A	*Scrubber*	*Unit 4*
5ES-10	*Precipitator*	*Unit 5*
5ES-12	*Precipitator*	*Unit 5*

TRC Environmental Consultants, Inc. was retained by the Rhone-Poulenc of Wyoming Co., to provide the required particulate compliance program for the four (4) sources. The test program was conducted during the week of May 7, 1990 by the Environmental Measurements Division of the TRC Englewood, Colorado office. Coordination of the test effort and collection of the process data was provided by Mr. Ron Smith and Mr. John Hawley of the Rhone-Poulenc of Wyoming Co., facility. Observing the field test methods and procedures was Mr. Lee Gribovicz, District Air Quality Engineer representing Wyoming DEQ.

Testing was performed following established procedures of the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, EPA-600/4-77-027B, August 1977, Code of Federal Register, Title 40 part 60 Appendix A, and the Wyoming Department of Environmental Quality Source Testing Manual.

2.0 SUMMARY OF RESULTS

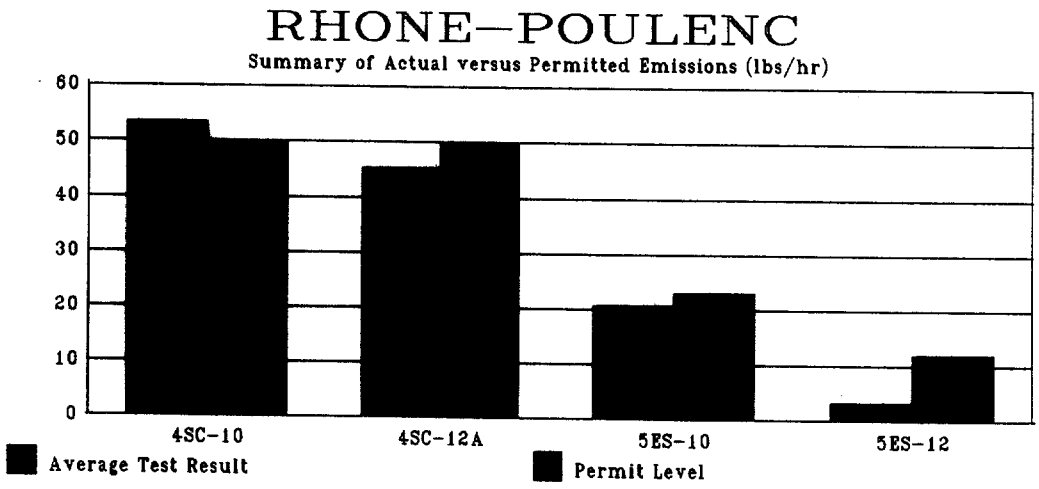
The Rhone-Poulenc of Wyoming Co. facility test program encompassed the field effort for determination of particulate pollutant emission compliance from four separate sources. The following section presents a summary of the overall average compliance test results for each unit and a comparison of the to the permitted emission limits established for the facility. Proceeding sections in this report detail individual Reference Method test results for each unit, the specific test procedures and test methodology, instrumentation utilized in the field effort, and quality assurance. Corresponding calculational summaries, laboratory data, process data, and raw field data are provided in the appendix of this report.

The emission test program was conducted to independently evaluate particulate measurements from the individual exhaust stacks of Unit 4 scrubbers (4SC-10 and 4SC-12A) and the Unit 5 electrostatic precipitators ((5ES-10 and 5ES-12). An overall summary of the test results from each source is provided in Table 2-1 below. Average mass pollutant emission rates in pounds per hour (lbs/hr) are presented for each source. In addition, Figure 2-1 provides a graphic illustration of the comparison of particulate emission levels to the permitted levels.

Table 2-1

Source	*Flow Rate (DSCFM)*	*Temperature (F)*	*Measured Emissions (lbs/hr)*	*Permitted Emissions (lbs/hr)*
4SC-10	*107,140*	*155.5*	*53.41*	*50.0*
4SC-12A	*25,488*	*160.8*	*45.33*	*50.0*
5ES-10	*68,375*	*390.4*	*20.68*	*23.0*
5ES-12	*26,160*	*241.2*	*3.34*	*12.0*

Figure 2-1



TRC

3.0 DISCUSSION OF RESULTS

The following section provides a general discussion of the individual test results obtained during the particulate compliance test program for each source. Detailed descriptions of the Reference Method test procedures and the laboratory analyses provided for the program is provided in Section 5.0 of this report. All sample analyses for particulate mass loading, including both front and back half analyses, was performed in TRC's Englewood, Colorado laboratory on May 13 through 15, 1990.

3.1 Scrubber Particulate Tests

Emission testing for particulate was completed for the Unit 4 scrubbers between May 9, 1990 and May 10, 1990. Tests for the scrubber associated with the dissolver section (4SC-10) were designated 4SE10-2 through 4SE10-4 and conducted on May 9, 1990. Tests for the scrubber associated with the evaporator section (4SC-12A) were designated 4SE12A-1 through 4SE12A-3 and were conducted on May 10, 1990. PArticulate tests for each source were comprised of Reference Method 5 procedure consisting of collecting three independent samples. The total extraction time for each test was sixty (60) minutes utilizing two ports at the sampling location.

3.1.1 Scrubber 4SC-10

Four particulate tests were initiated for this unit. Test 4SE10-1 was voided due to process down time fifteen minutes in the test sequence. Due to insufficient sample time, the test was not recovered and analyzed. The particulate emission test for the following triplicate test series revealed variation in the calculated particulate levels. The calculated particulate emissions ranged from 49.24 (Test 4SE10-2) to 57.58 lbs/hr (4SE10-3). Immediately after sampling was completed, field personnel investigated the condition of the sample train. The glass fibre filter indicated slight discoloration and the initial impinger of the condensate train was found to be cloudy.

During the sampling program for this source, it was evident that the wind played a significant role in the velocity measurements collected during the sampling traverse. This was evident during the second and third tests of the triplicate series. Twenty-four total (12 on each port) points were used to assist in reducing the relative flow measurement error influenced by the wind conditions. As indicated from the results, the calculated flow varied from 114,067 DSCFM to 87,877 DSCFM for the first to the third test, respectively. At the conclusion of each sample run, filters and each probe wash were labeled, sealed and transported to the TRC laboratory for analysis. Prior to transport from the plant, chain of custody forms were completed and signed by the test crew.

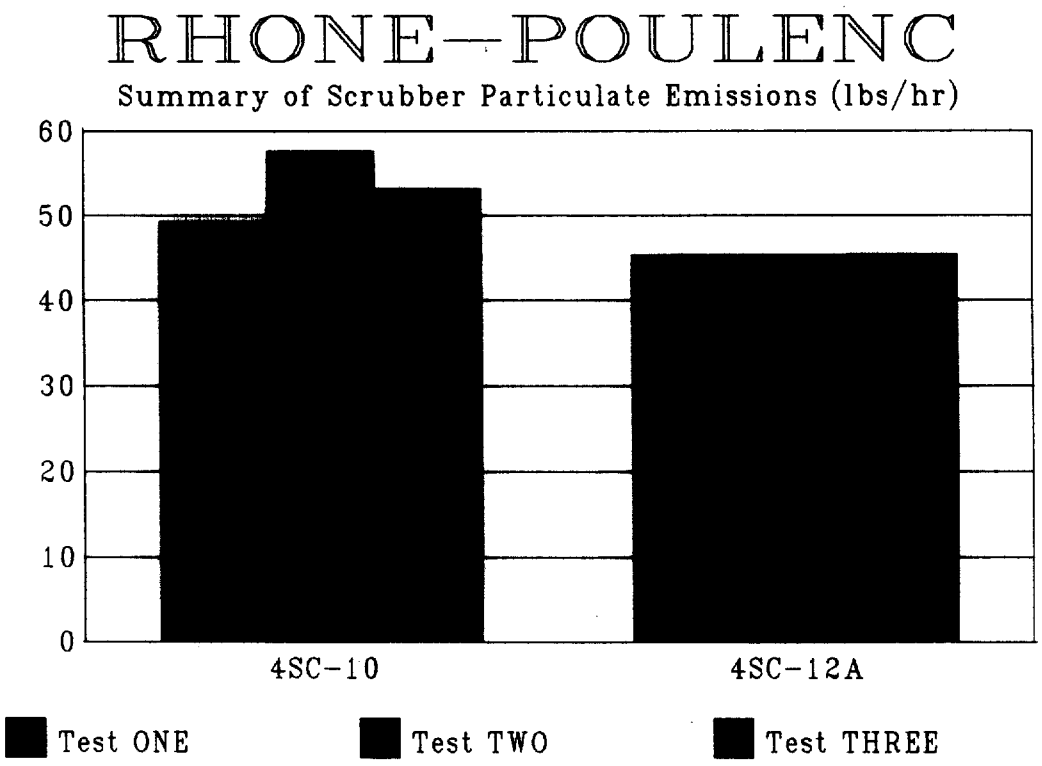
Table 3-1 presents the results of the triplicate test series for Unit 4 SC-10 particulate emission results along with specific source parameters collected during the test. Associated with Table 3-1, Figure 3-1 provides an illustration of the triplicate test results for the source. The overall average particulate emission for the source was determined to be 53.41 pounds per hour.

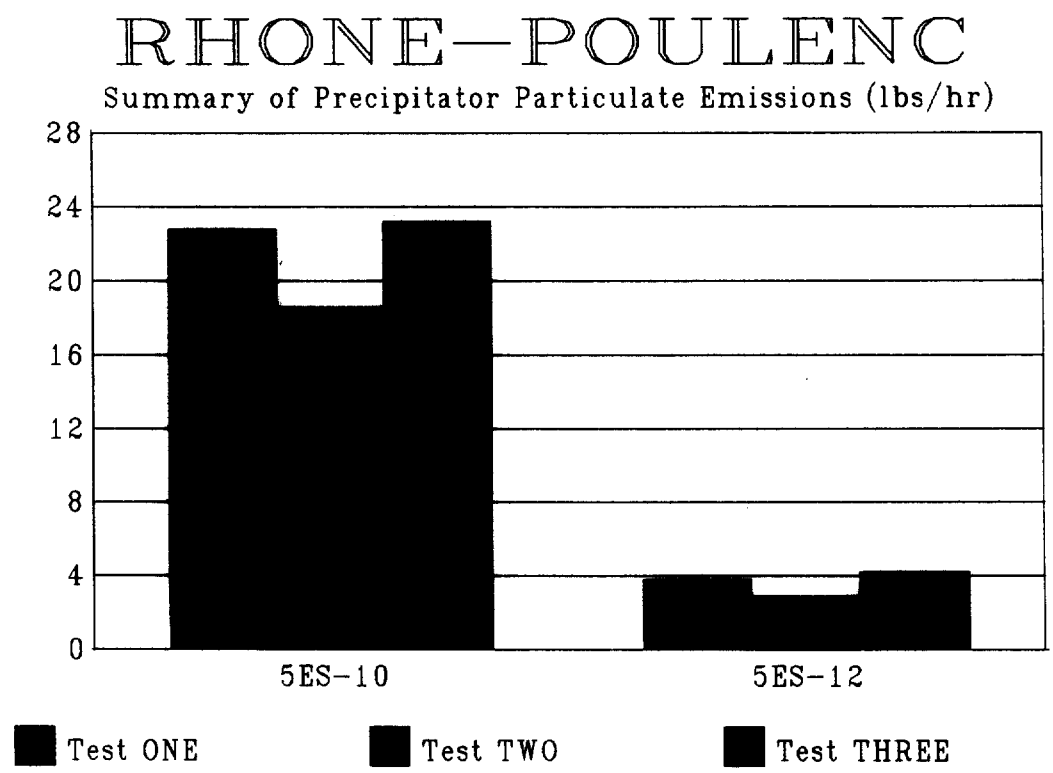
Table 3-1
SUMMARY OF PARTICULATE EMISSIONS
CALCINER KILN SCRUBBER EXHAUST : 4SC-10
RHONE-POULENK COMPANY
GREEN RIVER, WYOMING

TEST NO.	4SE10-2	4SE10-3	4SE10-4	
DATE	05-09-90	05-09-90	05-09-90	
TIME (HRS)	1410-1513	1601-1705	1734-1838	AVERAGE
SAMPLE CONDITIONS				
SAMPLE TIME (MIN)	60	60	60	60
VOLUME (DSCF)	36.94	30.72	27.51	33.83
NONCONDENSIBLE PARTICULATE (mg)	264.6	296.7	266.0	280.7
CONDENSIBLE PARTICULATE (mg)	5.6	6.9	11.5	6.3
TOTAL PARTICULATE (mg)	270.2	303.6	277.5	286.9
SOURCE CONDITIONS				
FLOWRATE (ACFM)	114,067	100,212	87,877	107,140
FLOWRATE (DSCFM)	50,886	44,048	39,849	47,467
STACK TEMPERATURE (F)	155.4	155.7	155.8	155.5
ISOKINETICS (%)	103.09	99.06	98.07	101.1
MOISTURE (%)	35.26	36.19	34.22	35.7
OXYGEN (%)	10.4	9.8	10.2	10.1
CARBON DIOXIDE (%)	8.0	7.4	7.4	7.7
NITROGEN (%)	81.6	82.8	82.4	82.2
TOTAL PARTICULATE EMISSIONS				
CONCENTRATION (GRAINS/DSCF)	1.13E-01	1.53E-01	1.56E-01	1.33E-01
CONCENTRATION (LBS/DSCF)	1.61E-05	2.18E-05	2.22E-05	1.90E-05
NONCONDENSIBLE EMISSIONS (LBS/HR)	48.22	56.27	50.96	52.25
CONDENSIBLE EMISSIONS (LBS/HR)	1.02	1.31	2.20	1.16
TOTAL EMISSIONS (LBS/HR)	49.24	57.58	53.16	53.41
TOTAL EMISSIONS (TONS/YR)	215.67	252.20	232.86	233.94

TRC

Figure 3-1


RHONE—POULENC
Summary of Scrubber Particulate Emissions (lbs/hr)
60
50
40
30
20
10
0
4SC-10
4SC-12A
Test ONE
Test TWO
Test THREE


RHONE—POULENC
Summary of Precipitator Particulate Emissions (lbs/hr)
28
24
20
16
12
8
4
0
5ES-10
5ES-12
Test ONE
Test TWO
Test THREE

3.1.2 Scrubber 4SC-12A

The particulate emission test results for this source indicated minimal variation in the calculated particulate emission results. The overall average for the triplicate test series was calculated at 45.33 pounds per hour. Variation between the triplicate tests were found from 44.33 (4SE12A-1 and 4SE12A-2) and 45.4 pounds per hour for the third test 4SE12A-3. Table 3-2 presents the particulate emission test results along with specific process parameters collected during the test series. In addition, Figure 3-1 provides an illustration of the triplicate test results for the source.

At the conclusion of each sample run, filters and each probe wash were examined then transferred to labeled containers for transport to the TRC Englewood, Colorado laboratory for analysis. The glass fibre filters from the test series was found to have a slight discoloration with a corresponding cloudy first impinger of the condenser assembly.

3.2 Precipitator Particulate Tests

Emission testing for particulate was completed for the Unit 5 electrostatic precipitators between May 11, 1990 and May 12, 1990. Tests for the precipitator associated with the dissolver section (5ES-10) were designated 5SE10-1 through 4SE10-3 and conducted on May 11, 1990. Tests for the scrubber associated with the evaporator section (5ES-12) were designated 5ES12-1 through 5ES12-3 and were conducted on May 12, 1990. Particulate tests for each source were followed that of the previous scrubber series using Reference Method 5 procedures consisting of collecting three independent samples. The total extraction time for each test was sixty (60) minutes utilizing two ports at the sampling location.

3.2.1 Precipitator 5ES-10

Particulate emission testing was accomplished at the Unit 5 ESP during normal operations between the period of 0754 through 1208 on May 11, 1990. No process upsets were experienced throughout the test series. The results of the particulate emissions were variable for the triplicate series. The test results varied from 18.58 lbs/hr for the second test (5ES10-2) to 23.21 lbs/hr for the third test (5ES10-3).

Table 3-3 presents the calculated particulate emission results for the triplicate tests performed at Dissolver section precipitator. Test parameters collected in conjunction with the particulate test are included with the resultant concentrations and emissions. Figure 3-2a provide a graphic illustration of the particulate test results this precipitator source. The average particulate emission for this source was determined to be 20.68 pounds per hour.

Table 3-2
SUMMARY OF PARTICULATE EMISSIONS
DRIER KILN SCRUBBER EXHAUST - 4SC-12A
RHONE-POULENK COMPANY
GREEN RIVER, WYOMING

TEST NO.	4SE12A-1	4SE12A-2	4SE12A-3	
DATE	05-10-90	05-10-90	05-10-90	
TIME (HRS)	1117-1221	1250-1352	1105-1208	AVERAGE
SAMPLE CONDITIONS				
SAMPLE TIME (MIN)	60	60	60	60
VOLUME (DSCF)	31.04	30.23	29.60	30.64
NONCONDENSIBLE PARTICULATE (mg)	404.7	409.7	406.7	407.2
CONDENSIBLE PARTICULATE (mg)	8.0	1.4	0.7	4.7
TOTAL PARTICULATE (mg)	412.7	411.1	407.4	411.9
SOURCE CONDITIONS				
FLOWRATE (ACFM)	63,464	64,549	64,198	64,007
FLOWRATE (DSCFM)	25,772	25,203	24,934	25,488
STACK TEMPERATURE (F)	159.8	161.9	162.4	160.8
ISOKINETICS (%)	102.98	102.56	101.49	102.8
MOISTURE (%)	39.88	41.75	42.05	40.8
OXYGEN (%)	12	11.8	12.0	11.9
CARBON DIOXIDE (%)	6.2	6.0	6.0	6.1
NITROGEN (%)	81.8	82.2	82	82.0
TOTAL PARTICULATE EMISSIONS				
CONCENTRATION (GRAINS/DSCF)	2.05E-01	2.10E-01	2.12E-01	2.08E-01
CONCENTRATION (LBS/DSCF)	2.93E-05	3.00E-05	3.03E-05	2.96E-05
NONCONDENSIBLE EMISSIONS (LBS/HR)	44.45	45.18	45.32	44.81
CONDENSIBLE EMISSIONS (LBS/HR)	0.88	0.15	0.08	0.52
TOTAL EMISSIONS (LBS/HR)	45.33	45.33	45.40	45.33
TOTAL EMISSIONS (TONS/YR)	198.53	198.56	198.85	198.55

TRC

Table 3-3
SUMMARY OF PARTICULATE EMISSIONS
CALCINER KILN PRECIPITATOR - 5ES-10
RHONE-POULENK COMPANY
GREEN RIVER, WYOMING

TEST NO.	5ES10-1	5ES10-2	5ES10-3	
DATE	05-11-90	05-11-90	05-11-90	
TIME (HRS)	0754-0858	0936-1034	1105-1208	AVERAGE
SAMPLE CONDITIONS				
SAMPLE TIME (MIN)	60	60	60	60
VOLUME (DSCF)	32.96	30.51	30.80	31.73
NONCONDENSIBLE PARTICULATE (mg)	80.8	58.5	76.1	69.7
CONDENSIBLE PARTICULATE (mg)	1.8	4.5	1.8	3.2
TOTAL PARTICULATE (mg)	82.6	63.0	77.9	72.8
SOURCE CONDITIONS				
FLOWRATE (ACFM)	193,013	194,112	196,259	193,563
FLOWRATE (DSCFM)	68,742	68,009	69,398	68,375
STACK TEMPERATURE (F)	389.5	391.3	394.3	390.4
ISOKINETICS (%)	104.31	97.58	96.56	100.9
MOISTURE (%)	27.09	28	26.99	27.5
OXYGEN (%)	8.8	9.8	9.2	9.3
CARBON DIOXIDE (%)	9.8	9.2	9.4	9.5
NITROGEN (%)	81.4	81	81.4	81.2
TOTAL PARTICULATE EMISSIONS				
CONCENTRATION (GRAINS/DSCF)	3.87E-02	3.19E-02	3.90E-02	3.53E-02
CONCENTRATION (LBS/DSCF)	5.52E-06	4.55E-06	5.58E-06	5.04E-06
NONCONDENSIBLE EMISSIONS (LBS/HR)	22.29	17.25	22.68	19.77
CONDENSIBLE EMISSIONS (LBS/HR)	0.50	1.33	0.54	0.91
TOTAL EMISSIONS (LBS/HR)	22.79	18.58	23.21	20.68
TOTAL EMISSIONS (TONS/YR)	99.80	81.37	101.68	90.59

TRC

3.2.2 Precipitator 5ES-12

Particulate emission testing was conducted at the precipitator associated with the evaporator section of Unit 5 on May 12, 1990 during normal load operations. No process upsets were experienced throughout the test series. The triplicate test series revealed variation between the individual tests but demonstrated overall, reduced particulate emissions from the previous sources. The system emissions varied from 2.89 lbs/hr for the second test of the series to 5.01 lb/hr for the final test of the series. Variability was demonstrated in the measured flow rates for this source with a relative range of 51,875 to 71,293 DSCFM. The flow rates were found to increase from the beginning to the end of the test series.

Table 3-4 provides the calculated particulate emission results and associated source parameters collected during the period of 0716 through 1132. Figure 3-2 provides a similar graphic illustration of the test series for this precipitator. Test parameters collected in conjunction with the particulate test are included with the tabulated particulate concentrations and emissions.

All filters and probe wash samples collected for this source were labeled and sealed for transport to the TRC Englewood, Colorado laboratory. Prior to removing the collected samples from the facility, chain of custody forms were completed and signed by the field test crew.

Table 3-4
SUMMARY OF PARTICULATE EMISSIONS
DRIER KILN PRECIPITATOR : 5ES-12
RHONE-POULENK COMPANY
GREEN RIVER, WYOMING

TEST NO.	5ES12-1	5ES12-2	5ES12-3	
DATE	05-12-90	05-12-90	05-12-90	
TIME (HRS)	0716-0818	0904-1006	1030-1132	AVERAGE
SAMPLE CONDITIONS				
SAMPLE TIME (MIN)	60	60	60	60
VOLUME (DSCF)	34.48	45.39	47.50	39.93
NONCONDENSIBLE PARTICULATE (mg)	42.2	32.2	47.7	37.20
CONDENSIBLE PARTICULATE (mg)	1.2	1.3	8.9	1.25
TOTAL PARTICULATE (mg)	43.4	33.5	56.6	38.45
SOURCE CONDITIONS				
FLOWRATE (ACFM)	51,875	69,009	71,293	60,442
FLOWRATE (DSCFM)	22,699	29,620	31,767	26,160
STACK TEMPERATURE (F)	236.8	245.6	245.2	241.2
ISOKINETICS (%)	98.36	99.23	96.84	98.8
MOISTURE (%)	27.06	27.85	24.87	27.5
OXYGEN (%)	9.8	10.0	10.0	9.9
CARBON DIOXIDE (%)	8.4	8.6	8.6	8.5
NITROGEN (%)	81.8	81.4	81.4	81.6
TOTAL PARTICULATE EMISSIONS				
CONCENTRATION (GRAINS/DSCF)	1.94E-02	1.14E-02	1.84E-02	1.54E-02
CONCENTRATION (LBS/DSCF)	2.78E-06	1.63E-06	2.63E-06	2.20E-06
NONCONDENSIBLE EMISSIONS (LBS/HR)	3.68	2.78	4.22	3.23
CONDENSIBLE EMISSIONS (LBS/HR)	0.10	0.11	0.79	0.11
TOTAL EMISSIONS (LBS/HR)	3.78	2.89	5.01	3.34
TOTAL EMISSIONS (TONS/YR)	16.55	12.67	21.93	14.61

TRC

4.0 PROCESS DESCRIPTIONS

The Rhone-Poulenc Facility Test Program included the evaluation of pollution control equipment for Unit 4 and Unit 5. The compliance program included the evaluation of particulate pollutant emissions during representative operations of the Units. This section provides a brief description of the individual control devices that were evaluated.

4.1 Scrubber 4SC-10

4SC-10 is a venturi scrubber controls the particulate emissions from the dissolver section of Unit 4. The unit is connected to a Kiln (4K-1) with a cyclone (4CY-1) in between. The kiln is used to calcine trona ore. The scrubber offgas is discharged through a nine foot stack with the sampling ports located at approximately 1.8 diameters upstream (196.5") and 3.92 diameters downstream (432.5") from the nearest disturbance.

4.2 Scrubber 4SC-12A

4SC-12A is a venturi scrubber controls the particulate emissions from the evaporator section of Unit 4. The unit is connected to a Kiln (4K-2) with a cyclone (4CY-2) in between. The kiln is used to dry soda ash. The scrubber offgas is discharged through a sixty five inch (65") stack with the sampling ports located at approximately 4.7 diameters upstream (306") and 8.9 diameters downstream (582.0") from the nearest disturbance.

4.3 Precipitator 5ES-10

5ES-12 is an electrostatic precipitator that controls the particulate emissions from the dissolver section of Unit 5. The unit is connected to a Kiln (5K-1) with a cyclone (5CY-1) in between. The kiln is used to dry trona ore. The precipitator offgas is discharged through a one hundred and seven inch (107") stack with the sampling ports located at approximately 0.45 diameters upstream (48") and 3.3 diameters downstream (353") from the nearest disturbance.

4.4 Precipitator 5ES-12

5ES-12 is an electrostatic precipitator that controls the particulate emissions from the evaporator section of Unit 5. The unit is connected to a Kiln (5K-2) with a cyclone (5CY-2) in between. The kiln is used to dry soda ash. The five and one half (5.5') stack that receives the discharge from the 5ES-12 also receives the soda ash dust from a baghouse (5BH-13) from the cooler-classifiers with a cyclone in between (5CY-4). A portion of this exhaust gas is returned to the front of the Kiln (5K-2) with the remainder being exhausted to the stack.

4.2 Process Operation During Test(s)

During the particulate testing each unit was operated at representative conditions according to established operating procedures. Process operations were as continuous and steady as possible. Appropriate documentation of individual test start and stop times, along with documentation of process operations, which include pertinent operating conditions, were monitored and collected.

During the test program, plant personnel were designated for specific data collection responsibilities. In coordination with the particualte sampling conducted by TRC, designated Rhone-Poulenc personnel collected process data on the unit operation(s) as well as visually measured opacity.

5.0 TEST PROGRAM DESCRIPTION

Particulate emission compliance testing was performed in a manner to assure accurate and reliable data. All Reference Method tests were performed in triplicate. For purposes of reporting compliance, the arithmetic mean of the triplicate tests were utilized. In addition to the data reporting requirements, for purposes of acceptance of the particulate sampling, the isokinetics (normalized extraction rate) was required to be within ten percent of the expected rate (100% +/- 10%).

The primary methods utilized in this emission test program included the necessary procedures for determining the pollutant emissions based upon established Reference Methods 1 through 5. The following section provides a general discussion of the individual methods and test procedures that were incorporated into this annual compliance test program. Reference Method 1 was performed prior to the unit(s) test program to assist in qualifying the measurement and traverse locations for the particulate tests.

5.1 Selection of Traverse Points

EPA Reference Method 1, "Sample and Velocity Traverses for Stationary Sources," amended June, 1986, was utilized to determine the proper pollutant measurement points at the each test location of the four units. This was performed by taking the cross-section of the stack (inside diameter), at the measurement location, and dividing the calculated area into a number of equal areas.

The applicability of this method was to provide the proper number of traverse points for representative particulate sampling based upon the existing test port locations of the stack. Particulate sampling and volumetric flow rate measurements (velocity) are optimally performed at the test location that is at least eight stack diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion joint, or elbow. Sampling for RM 5 was provided on two separate traverses from the two sample ports aligned at ninety degrees to one another.

5.2 Flow Rate Determination

EPA Reference Method 2 "Determination of Stack Gas Velocity and Volumetric Flow rate (Type S Pitot Tube)," amended June, 1986, was utilized to measure and quantify the volumetric flow rate from each stack measurement location. A stainless steel type-S pitot tube was interconnected to an inclined oil manometer (differential pressure gauge) with an effective inclined range of 0-1 inch (0.01 resolution) and a vertical range of 1-10 inches (0.1 resolution).

Differential pressure measurements were taken at the selected traverse point locations (according to RM1) utilizing this instrument configuration. In addition, simultaneous effluent gas temperature were measured and recorded with the pressure measurements. The temperature was measured with a type-K thermocouple attached at the measurement tip of the pitot tube (in the same measurement plane). The Type-K thermocouple was interconnected to a calibrated digital temperature indicator providing accurate real time temperature measurements.

5.3 Molecular Weight Determination

EPA Reference Method 3, "Gas analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight," was provided for this measurement for each test series at the four unit stack outlets. Integrated gas samples were collected into clean, dry Tedlar bags from a stainless steel probe and a squeeze bulb. The integrated sample(s) were collected during each test series and subjected to analysis after the completion of each test.

The analysis was provided by the use of a Hays Republic Orsat Analyzer. The "orsat" is designed to measure carbon dioxide and oxygen concentrations of collected samples. Carbon monoxide analysis was not provided from this method as it was estimated the concentrations were well below the acceptable measurement limits of the analyzer (0.5%).

5.4 Percent Moisture Determination

EPA Reference Method 4 "Determination of Moisture Content in Stack Gases," was utilized and incorporated into the particulate sample system. The moisture determination procedure, as a "stand alone" procedure, utilizes a condenser assembly (glass bottle impingers partially immersed in an ice bath), interconnected in between a heated extraction probe and extraction pump.

The condenser assembly is comprised of four glass bottle impingers set in an ice bath. The first two interconnected impingers that come into contact with the extracted effluent stream contain a measured amount (volume) of deionized water. The third bottle is left empty to "catch" any potential condensate carryover, and the fourth impinger contains a pre-weighed amount of silica gel to act as the "absolute" collector of residual condensate and to protect the extraction pump from heavily saturated streams.

A known volume of stack gas (measured by a metering system connected to the extraction pump) is passed through a heated probe (to eliminate possible condensation) and directed to the condenser assembly over a selected time period. After the extraction has been completed, the amount of liquid (condensate) in the first three impingers is measured volumetrically and the net gain is determined. The fourth impinger net gain is determined gravimetrically. The total condensate gain of the condenser assembly is determined and incorporated with the calculated volume of gas that was directed through the system. The subsequent moisture content is determined from these collected variables.

5.5 Particulate Determination

EPA Reference Method 5 "Determination of Particulate Emissions from Stationary Sources," was performed to determine actual particulate emission rates of each unit effluent. This method required the isokinetic extraction of particulate matter from each stack. The extracted particulate was collected on a

glass fiber filter maintained at a controlled temperature range of 248 +/-25 degrees Fahrenheit. The condensible particulate fraction was collected in the back half of the sample train (unheated). The total particulate mass, which included the noncondensible (at or above the filtration temperature) and condensible fractions. The total mass was determined gravimetrically, after the removal of uncombined water.

A Nutech sampling system that incorporated a calibrated stainless steel nozzle, heated stainless steel probe, heated oven (housing the filter holder and substrate), a condenser assembly (as detailed in RM 4), and a calibrated extraction system was utilized for RM 5 sampling. The system is designed to operate under a vacuum for sample collection through all the leak free components of the sample system. The entire system was "leak checked" before and after each individual test to verify the integrity of all the components throughout the sample period.

An initial extraction (sampling) rate was determined for the stack conditions based upon preliminary measurements of temperature, flow rate, pressure, and estimated moisture collected prior to the sampling program. The sampling rate was calculated from these variables to assist in providing and maintaining isokinetic sampling throughout the entire test period. At isokinetic conditions, the velocity of the stack gas entering the nozzle, of the extraction system, is equal to the effluent velocity at the sample point. The extraction system is designed to provide for a proper manual adjustment of the sample rate when a change in any of the designated variables that would affect isokinetically have occurred. TRC incorporated the use of programmable hand-held HP-41CV calculators to provide immediate feedback on parameter changes and subsequent flow rate adjustments required to maintain isokinetic sampling.

The individual stack flow rates and the selection of the proper sample nozzle dictated the required sample time. Sampling was provided at equal time intervals along the selected traverse points as determined by RM1. Based upon the sample location, a minimum of six (6) or twelve (12) points on each traverse were utilized. The test(s) were conducted for a minimum of 60 minutes.

After the completion of each individual test, the particulate sample was carefully recovered. The collected sample was comprised of the particulate that had been deposited inside the extraction nozzle, heated probe, and filter holder, as well as the particulate collected on the filter substrate (designated as the front half). In addition to the front half collection, the condensible fraction, collected in the impinger train was retained to determine total particulate collection.

For particulate sample recovery, the filter was removed from its respective sample holder (after sufficient time had been provided to allow the glass filter holder to cool) with tweezers, and placed in a labeled petri dish, and sealed accordingly. The front half was washed with distilled water and the washing collected in a glass jar. A probe brush was utilized to assist in removing particulate which adhered to the inner walls of the front half components. The condensate, collected in the back-half impinger train, was measured volumetrically then transferred to sample bottles for transport to the laboratory.

Filters from the individual test runs were removed from their respective containers and placed in a desiccating chamber for a minimum of twenty-four hours for conditioning. After the conditioning criteria had been met, the filters were subjected to repeated weighing until a constant weight achieved. A constant weight is determined by the difference of two consecutive weighing not deviating more than +/- 0.5 milligrams.

The front-half and back-half washing were separately and quantitatively transferred to conditioned (desiccated) and tared glass beakers. The final volumes of the collected washing were recorded in the laboratory notebook. The beakers were placed under a controlled laboratory fume hood and evaporated to dryness. The beakers were then returned to the desiccator for final conditioning before weighing to a constant weight. A "blank sample" retained from the distilled water lot utilized in the field was subjected to the same recovery procedure as the samples. Any residual weight gain from the water blank was applied to each sample gain to derive the final net particulate gain for the front half.

The two net gains (front-half and back-half) were totaled and the particulate concentration calculated based upon the field test data collected and calculated laboratory data. For purposes of comparison, the front-half (non-condensible) and back-half (condensible) fractions were reported separately and in total.

6.0 INSTRUMENTATION AND EQUIPMENT

Key to the completion of required Reference Method and equivalent test procedures in the field was the equipment and instrumentation utilized in the field. The instrumentation specific for each selected method, was integrated into the sample program to provide quality assured and representative information on the specific source components, namely flow rate, moisture, and pollutant concentrations.

The following provides a brief description of the key components utilized in the selected method test procedures for this emission evaluation program. All instrumentation, equipment, and calibration procedures provided for this field effort conformed to the minimum requirements, as established in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, where applicable.

6.1 Flow Rate Measurements

6.1.1 Type-S pitot. The pitot tube is constructed of 316 stainless steel tubing with an outside diameter of 3/8 inch. The pitot tubes utilized in this measurement program are supplied by NuTech Corporation. The tubes are configured and calibrated according to the requirements provided in 40CFR60 Appendix A RM 2 section 4.0 (alignment procedures).

6.1.2 Differential pressure gauge. The manometer utilized for velocity measurements is a ten (10) inch inclined manometer. The manometer, manufactured by Dwyer, and incorporated into the extraction control console, has an incline range of 0, to 1.00 inch and a vertical range of 2.0 to 10.0 inches of water. The manometer utilized 0.826 red gauge oil and is calibrated for direct reading in inches of water.

6.1.3 Temperature sensor. The temperature of the gas stream is measured with a Type-K (Chromel/Alumel) thermocouple. The Type-K thermocouple is attached to the pitot tube and is interconnected to a digital compensator/indicator. The indicator has a dynamic operating range of 0-1999 degrees fahrenheit with a +/- 5 degree accuracy and one degree resolution. The temperature indicator is also integrated into the extraction control console.

6.1.4 Orsat. Gas samples are analyzed using a Hays Orsat model 621-A analyzer. The orsat allows for sampled gas to be passed through a series of absorbing reagents that have a specificity for carbon dioxide and oxygen. The collected sample is first passed through the Cardiosorber to determine volume of carbon dioxide, then the residue is passed through SEEZO2 to determine oxygen concentration. The system has an operational range of 0 to 25% with a buret (volumetric reading) accuracy of +/- 0.2%.

6.1.5 Collection Bags. Gas samples are collected in NuTech model 219 Tedlar (PVF) bags having a nominal capacity of four liters. The bags are
non-reactive and have a low permeability. A leak tight stainless Roberts valve is provided on each bag to assist in filling and depleting sample from the bag.

6.2 Particulate Sampling

6.2.1 Control console. The sample gas is extracted utilizing a NuTech modular 2010 Isokinetic control console. The console houses the extraction pump (Gast fiber vane pump), manometer (Dwyer incline), temperature indicators (Datel Systems), dry gas meter (Rockwell), and solid state temperature controllers (NuTech).

6.2.2 Probe. The extraction probe is a constructed of 3/8" O.D. stainless steel liner heat traced with 22 gauge coated nichrome wire and protected by a 316 stainless sheath. The inner glass liner is held in the outer sheath by a 5/8" stainless steel Swagelok union with Teflon ferrules.

6.2.3 Filter Holder. A glass filter holder assembly of "double bell" configuration is used in this sampling scheme. The glass fiber filter (110 mm) is supported on a stainless steel frit and then is sandwiched together by the inlet and outlet halves of the glass holder. The system (halves and frit) are held together by a screw-type retainer ring that, when tightened, pulls each filter half against the gasket material on the outer edge of the support frit to provide a leak tight joint.

6.2.4 Filter Holder Oven. Associated with the control console is a NuTech model 202-700 modular sample case that provides an insulated filter box (oven) for operation and maintenance of the filter holder assembly at an elevated temperature. Solid state heaters and controls, for the system, is provided on the control console.

6.2.5 Condensate trap. A impinger train, to remove moisture from the extracted gas stream and to collect the condensible fraction of the gas stream, is comprised of a set of four (4) glass impinger bottles and inserts interconnected to the filter holder and the extraction pump (control console). The impingers are interconnected by a glass "U" tube and maintained in a leak free configuration by the use of ground glass 28/15 ball and socket joints. The impingers are partially immersed in an ice bath to assist in condensing water vapor in the extracted gas stream.

7.0 QUALITY ASSURANCE

The TRC Quality Assurance Program is designed to ensure that emission measurement work is performed by qualified persons using proper equipment and following written procedures, in order to provide accurate, defensible data. The program is based upon the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I and III.

Methods 2, 3, 4, and 5 quality control specifications for sampling and analysis were performed as described in 40 CFR 60, Appendix A, June 1986. In the field, sampling was performed to assure data precision. Data was recorded on standard forms, and field notebooks were utilized to record observations, pertinent information, and calculations.

In the laboratory, analysts recorded calibration and analysis data in notebooks and summarized specific data on prepared data sheets. Resultant data sheets and calculations were reviewed by the Project Manager. Other quality control aspects of the Reference Method Tests are as follows:

- *Instrumentation is uniquely identified and the history of each unit's calibration and/or maintenance is recorded and maintained in an instrument history file.*
- *Control units (Dry gas meters) are calibrated before and after each field effort and documented in project files.*
- *Temperature measurement instrumentation is calibrated and verified for proper operation prior to each field mobilization.*
- *Field and reagent blanks are collected to determine the integrity of the sample media.*

In addition to the quality assurance procedures dictated by TRC policy, periodic blind weighings are preformed as well as verification of gravimetric balance accuracy utilizing certified Class-S weights. All laboratory data sheets and support documentation for the analysis of the collected field samples and audit samples are located in Appendix B of this report.

APPENDIX A
CALCULATION SUMMARIES

TRC

DATA REDUCTION
AND
CALCULATIONS

Data reduction requirements required to support this test program is provided in the following appendix. For the most part, all calculations and data reduction procedures follow that provided in 40 CFR 60 Appendix A for the specific Reference Methods. All gaseous parameters are reported in terms of concentration (ppm) and calculated in unit of emissions for comparison to applicable standards (lbs/hr, lbs/MMBTU, etc). Particulate emissions were reduced and reported in terms of the grains per dry standard cubic foot (gr/DSCF) and pounds per hour. Where applicable, particulate emissions related to process production rates to provide reported emissions in pounds of pollutants per process weight (i.e. lbs of pollutant per ton of processed material)

Included with each calculational scheme is a brief definition of terms and general nomenclature utilized in the data reduction process. Selected methods allow for overlap or concurrent evaluation (i.e. RM 4 conducted during RM 5 sampling) therefore calculations for specific parameters (i.e moisture, standard volume) may be found under multiple methods .

TRC

EPA Reference Method 2 - FLOW RATE DETERMINATION

The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a type-S (Stausscheibe) pitot tube.

NOMENCLATURE

A	-	Cross sectional area of stack or duct, FT^2
C_P	-	Pitot tube coefficient, dimensionless
MW (dry)	-	Molecular weight of gas, dry basis, LB/LB-MOLE
MW (wet)	-	Molecular weight of gas, moisture corrected, LB/LB-MOLE
P_B	-	Uncorrected barometric pressure at site, inches H_G
P_G	-	Static pressure of gas, inches H_20
P_S	-	Absolute pressure of gas, inches H_G
$ACFM$	-	Effluent flow in actual cubic feet per minute
$SCFM$	-	Effluent flow in standard cubic feet per minute
T_S	-	Absolute average gas temperature, ^0R
VPS	-	Average gas velocity in feet per second
W_P	-	Velocity head of gas, inches H_20
% CO_2	-	Percent carbon dioxide by volume, dry basis
% O_2	-	Percent oxygen by volume, dry basis
% H_20	-	Determined percent moisture of effluent sampled

CALCULATIONS

Stack pressure

$$"H_G \times (P_S) = P_B + \frac{P_S}{13.6}$$

Mol. Weight (dry)

$$(MW\ DRY) = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ (100 - \%CO - \%O_2)$$

Mol. Weight (wet)

$$(Mw\ WET) = Mw\ (DRY) \times \left(\frac{1 - \%H_20}{100}\right) + 18\left(\frac{\%H_20}{100}\right)$$

Velocity (Vps)

$$(VPS) = 85.49 \times (C_P) \times (W_{P\ AVE})^{1/2} \times \left[\frac{Ts}{(P_S)(MW\ WET)}\right]^{1/2}$$

Flow Rate (ACFM)

$$(ACFM) = (VPS) \times (A) \times 60$$

Flow Rate (SCFM)

$$(SCFM) = 60 \times (17.64) \times \frac{(100 - \%H_2O)}{100} \times \left[\frac{Ps}{Ts}\right] \times (VPS)$$

TRC

EPA Reference Method 4 - MOISTURE DETERMINATION

A gas sample is extracted from the source and moisture is removed from the sample stream and determined eitiher volumetrically or gravimetrically.

NOMENCLATURE

B_{WO}	-	Water vapor in gas stream, proportion by volume
P_B	-	Uncorrected barometric pressure at testing site, inches H_G
T_M	-	Absolute average dry gas meter temperature, ^{O}R
V_M	-	Volume of gas sampled as measured by dry gas meter, DCF
V_{MSTD}	-	Volume of gas sampled corrected to standard conditions, DSCF
VH20	-	Volume of water collected in condenser system (ML)
V_{SG}	-	Net gain of weight of silica gel in condenser system (G)
V_W	-	Volume of water vapor
Y	-	Dry gas meter calibration factor, dimensionless
dH	-	Average pressure differential, inches H_20

CALCULATIONS

Volume of H_20 Vapor

$$(V_W) = 0.04707 (VH_20) + 0.04715 (V_{SG})$$

Fraction Water Vapor

$$(B_{WO}) = \left[\frac{V_M}{(V_W) + (V_{MSTD})} \right]$$

% Moisture

$$\% H_20 = B_{WO} \times 100$$

EPA Reference Method 5 - PARTICULATE EMISSIONS

Particulate matter is extracted isokinetically from a source and collected on a heated glass fiber filter. The particulate mass is determined gravimetrically after removal of uncombined water. This method is applicable for determining particulate emissions from stationary sources.

NOMENCLATURE

V_M	-	Total meter sample volume
T	-	Total sample time
Y_D	-	Dry gas meter calibration factor
T_{STD}	-	Standard temperature (F)
T_M	-	Average dry meter temperature
P_B	-	Barometric pressure (uncorrected)
dH	-	Average orifice pressure drop ("H_2O)
P_{STD}	-	Standard pressure ("Hg)
V_I	-	Volume of condensate collected
V_{SG}	-	Volume collected in silica gel (net gain)
M_D	-	Molecular weight of gas (dry)
$\%CO_2$	-	Percent carbon dioxide
$\%O_2$	-	Percent oxygen
$\%CO$	-	Percent carbon monoxide
$\%N_2$	-	Percent nitrogen
P_S	-	Average duct static pressure ("H_2O)
T_S	-	Average duct temperature (F)
V_S	-	Average duct velocity (ft/min)
C_P	-	Pitot tube coefficient
A_S	-	Cross sectional area of duct
Q	-	Volumetric flow rate (acfm)
Q_{STD}	-	Volumetric flow rate (dscfm)
D_N	-	Diameter of extractive nozzle
C_S	-	Actual particulate concentration (grains/acf)
ER	-	Particulate emission rate (lbs/hr)
M_N	-	Total particulate collected (mg)

CALCULATIONS

Stack Gas flow (STANDARD)

$$Qs = \frac{1058.8\ (Vs)\ As\ (M_D)\ Ps}{(Ts + 460)}$$

Percent Isokinetic

$$\%I = \frac{(Ts + 460)\ [\ 0.002668\ V_W + (V_{MS} / 17.64)\ ]}{60\ (T)\ V_S\ (P_S)\ A_N} \times 100$$

Dry Particulate Emissions

Grains per Dry Standard Cubic Foot

$$GR/DSCF = C(PART) \times (0.0154) / V_{MSTD}$$

Pounds per Hour

$$LB/HR = [\ (GR/DSCF) \times DSCFM \times 60\ ] / 7000$$

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-09-90
TIME OF TEST	1410-1513
TEST AND RUN NUMBER	4SE10-2
SAMPLE LOCATION	CALCINER KILN SCRUBBER EXHAUST
REMARKS	Final Results

METER VOLUME	45.350	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	270.20	MILLIGRAMS
DUCT AREA	63.6200	SQUARE FEET
NOZZLE DIAMETER	0.3700	INCHES
SQR ROOT OF AVG VEL DP	0.4159	
AVG ORIFICE DELTA H	1.995	INCHES H2O
METER TEMPERATURE	70.79	DEGREES F
STACK TEMPERATURE	155.42	DEGREES F
BAROMETRIC PRESSURE	24.05	INCHES HG
STACK PRESSURE	0.13	INCHES H2O NEGATIVE
WATER COLLECTED	426.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	0.0	DSCF/MMBTU
OXYGEN	10.40%	
CARBON DIOXIDE	8.00%	
NITROGEN	81.60%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	36.935	DSCF
	1.0409	DSCM
SAMPLE FLOW RATE EQUALS	0.6156	DSCFM
	1.3801	ACFM AT NOZZLE
	0.0173	DSCMM
STACK GAS MOLECULAR WEIGHT	25.57	
PERCENT MOISTURE	35.26%	
PERCENT ISOKINETIC	103.09%	
AVERAGE STACK GAS VELOCITY	29.88	FEET/SEC
STACK GAS FLOW RATE	114067.4	ACFM
	50886.1	DSCFM
PARTICULATE MASS CONCENTRATION	0.1129	GRAINS/DSCF
	0.0503	GRAINS/ACF (STACK)
	0.2596	GRAMS/DSCM
	0.1158	GRAMS/ACM
PARTICULATE MASS EMISSION	49.2253	LBS/HOUR
	161.26E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POLUENC	
PLANT LOCATION	GREEN RIVER, WYOMING	
DATE OF TEST	05-09-90	
TIME OF TEST	1601-1705	
TEST AND RUN NUMBER	4SE10-3	
SAMPLE LOCATION	CALCINER KILN SCRUBBER EXHAUST	
REMARKS	Final Results	
METER VOLUME	38.217	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	303.60	MILLIGRAMS
DUCT AREA	63.6200	SQUARE FEET
NOZZLE DIAMETER	0.3700	INCHES
SQR ROOT OF AVG VEL DP	0.3640	
AVG ORIFICE DELTA H	1.278	INCHES H2O
METER TEMPERATURE	76.60	DEGREES F
STACK TEMPERATURE	155.67	DEGREES F
BAROMETRIC PRESSURE	24.05	INCHES HG
STACK PRESSURE	0.09	INCHES H2O NEGATIVE
WATER COLLECTED	369.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	0.0	DSCF/MMBTU
OXYGEN	9.80%	
CARBON DIOXIDE	7.40%	
NITROGEN	82.80%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	30.721	DSCF
	0.8658	DSCM
SAMPLE FLOW RATE EQUALS	0.5120	DSCFM
	1.1651	ACFM AT NOZZLE
	0.0144	DSCMM
STACK GAS MOLECULAR WEIGHT	25.39	
PERCENT MOISTURE	36.19%	
PERCENT ISOKINETIC	99.06%	
AVERAGE STACK GAS VELOCITY	26.25	FEET/SEC
STACK GAS FLOW RATE	100211.6	ACFM
	44048.3	DSCFM
PARTICULATE MASS CONCENTRATION	0.1525	GRAINS/DSCF
	0.0670	GRAINS/ACF (STACK)
	0.3506	GRAMS/DSCM
	0.1541	GRAMS/ACM
PARTICULATE MASS EMISSION	57.5613	LBS/HOUR
	217.84E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC	
PLANT LOCATION	GREEN RIVER, WYOMING	
DATE OF TEST	05-09-90	
TIME OF TEST	1734-1838	
TEST AND RUN NUMBER	4SE10-4	
SAMPLE LOCATION	CALCINER KILN SCRUBBER EXHAUST	
REMARKS	Final Results	
METER VOLUME	34.282	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	277.50	MILLIGRAMS
DUCT AREA	63.6200	SQUARE FEET
NOZZLE DIAMETER	0.3700	INCHES
SQR ROOT OF AVG VEL DP	0.3208	
AVG ORIFICE DELTA H	0.987	INCHES H2O
METER TEMPERATURE	77.44	DEGREES F
STACK TEMPERATURE	155.75	DEGREES F
BAROMETRIC PRESSURE	24.07	INCHES HG
STACK PRESSURE	0.11	INCHES H2O NEGATIVE
WATER COLLECTED	303.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	12.0	DSCF/MMBTU
OXYGEN	10.20%	
CARBON DIOXIDE	7.40%	
NITROGEN	82.40%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	27.513	DSCF
	0.7754	DSCM
SAMPLE FLOW RATE EQUALS	0.4586	DSCFM
	1.0114	ACFM AT NOZZLE
	0.0129	DSCMM
STACK GAS MOLECULAR WEIGHT	25.63	
PERCENT MOISTURE	34.22%	
PERCENT ISOKINETIC	98.07%	
AVERAGE STACK GAS VELOCITY	23.02	FEET/SEC
STACK GAS FLOW RATE	87876.8	ACFM
	39848.5	DSCFM
PARTICULATE MASS CONCENTRATION	0.1556	GRAINS/DSCF
	0.0706	GRAINS/ACF (STACK)
	0.3579	GRAMS/DSCM
	0.1623	GRAMS/ACM
PARTICULATE MASS EMISSION	53.1460	LBS/HOUR
	222.33E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POLUENC	
PLANT LOCATION	GREEN RIVER, WYOMING	
DATE OF TEST	01-10-90	
TIME OF TEST	1117-1221	
TEST AND RUN NUMBER	4SE12A-1	
SAMPLE LOCATION	DRIER KILN SCRUBBER EXHAUST	
REMARKS	Final Data	
METER VOLUME	39.745	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	412.70	MILLIGRAMS
DUCT AREA	23.0438	SQUARE FEET
NOZZLE DIAMETER	0.2870	INCHES
SQR ROOT OF AVG VEL DP	0.6241	
AVG ORIFICE DELTA H	1.280	INCHES H2O
METER TEMPERATURE	84.79	DEGREES F
STACK TEMPERATURE	159.75	DEGREES F
BAROMETRIC PRESSURE	23.72	INCHES HG
STACK PRESSURE	0.15	INCHES H2O POSITIVE
WATER COLLECTED	436.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	0.0	DSCF/MMBTU
OXYGEN	12.00%	
CARBON DIOXIDE	6.20%	
NITROGEN	81.80%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	31.039	DSCF
	0.8748	DSCM
SAMPLE FLOW RATE EQUALS	0.5173	DSCFM
	1.2741	ACFM AT NOZZLE
	0.0146	DSCMM
STACK GAS MOLECULAR WEIGHT	24.90	
PERCENT MOISTURE	39.88%	
PERCENT ISOKINETIC	102.98%	
AVERAGE STACK GAS VELOCITY	45.90	FEET/SEC
STACK GAS FLOW RATE	63464.4	ACFM
	25772.4	DSCFM
PARTICULATE MASS CONCENTRATION	0.2052	GRAINS/DSCF
	0.0833	GRAINS/ACF (STACK)
	0.4718	GRAMS/DSCM
	0.1915	GRAMS/ACM
PARTICULATE MASS EMISSION	45.3124	LBS/HOUR
	293.08E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC	
PLANT LOCATION	GREEN RIVER, WYOMING	
DATE OF TEST	05-10-90	
TIME OF TEST	1250-1352	
TEST AND RUN NUMBER	4SE12A-2	
SAMPLE LOCATION	DRIER KILN SCRUBBER EXHAUST	
REMARKS	Final Results	
METER VOLUME	39.025	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	411.10	MILLIGRAMS
DUCT AREA	23.0438	SQUARE FEET
NOZZLE DIAMETER	0.2870	INCHES
SQR ROOT OF AVG VEL DP	0.6293	
AVG ORIFICE DELTA H	1.180	INCHES H2O
METER TEMPERATURE	86.75	DEGREES F
STACK TEMPERATURE	161.92	DEGREES F
BAROMETRIC PRESSURE	23.62	INCHES HG
STACK PRESSURE	0.15	INCHES H2O POSITIVE
WATER COLLECTED	459.00	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	0.0	DSCF/MMBTU
OXYGEN	11.80%	
CARBON DIOXIDE	6.00%	
NITROGEN	82.20%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	30.231	DSCF
	0.8520	DSCM
SAMPLE FLOW RATE EQUALS	0.5038	DSCFM
	1.2907	ACFM AT NOZZLE
	0.0142	DSCMM
STACK GAS MOLECULAR WEIGHT	24.66	
PERCENT MOISTURE	41.75%	
PERCENT ISOKINETIC	102.56%	
AVERAGE STACK GAS VELOCITY	46.69	FEET/SEC
STACK GAS FLOW RATE	64549.3	ACFM
	25203.3	DSCFM
PARTICULATE MASS CONCENTRATION	0.2098	GRAINS/DSCF
	0.0819	GRAINS/ACF (STACK)
	0.4825	GRAMS/DSCM
	0.1884	GRAMS/ACM
PARTICULATE MASS EMISSION	45.3204	LBS/HOUR
	299.76E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-10-90
TIME OF TEST	1418-1521
TEST AND RUN NUMBER	4SE12A-3
SAMPLE LOCATION	DRIER KILN SCRUBBER EXHAUST
REMARKS	Final Results

METER VOLUME	38.592	CUBIC FEET
METER Y FACTOR	1.013	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	407.40	MILLIGRAMS
DUCT AREA	23.0438	SQUARE FEET
NOZZLE DIAMETER	0.2870	INCHES
SQR ROOT OF AVG VEL DP	0.6255	
AVG ORIFICE DELTA H	1.175	INCHES H2O
METER TEMPERATURE	92.71	DEGREES F
STACK TEMPERATURE	162.42	DEGREES F
BAROMETRIC PRESSURE	23.64	INCHES HG
STACK PRESSURE	0.15	INCHES H2O POSITIVE
WATER COLLECTED	455.10	GRAMS OR ML
PITOT COEFFICIENT	0.84	
FUEL CONVERSION FACTOR	0.0	DSCF/MMBTU
OXYGEN	12.00%	
CARBON DIOXIDE	6.00%	
NITROGEN	82.00%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	29.597	DSCF
	0.8342	DSCM
SAMPLE FLOW RATE EQUALS	0.4933	DSCFM
	1.2703	ACFM AT NOZZLE
	0.0139	DSCMM
STACK GAS MOLECULAR WEIGHT	24.63	
PERCENT MOISTURE	42.05%	
PERCENT ISOKINETIC	101.49%	
AVERAGE STACK GAS VELOCITY	46.43	FEET/SEC
STACK GAS FLOW RATE	64197.9	ACFM
	24934.7	DSCFM
PARTICULATE MASS CONCENTRATION	0.2124	GRAINS/DSCF
	0.0825	GRAINS/ACF (STACK)
	0.4884	GRAMS/DSCM
	0.1897	GRAMS/ACM
PARTICULATE MASS EMISSION	45.3847	LBS/HOUR
	303.41E-07	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-11-90
TIME OF TEST	0754-0858
TEST AND RUN NUMBER	5ES10-1
SAMPLE LOCATION	CALCINER KILN PRECIPITATOR
REMARKS	Final Results

METER VOLUME	39.741	CUBIC FEET
METER Y FACTOR	1.010	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	82.60	MILLIGRAMS
DUCT AREA	62.4900	SQUARE FEET
NOZZLE DIAMETER	0.2963	INCHES
SQR ROOT OF AVG VEL DP	0.6163	
AVG ORIFICE DELTA H	1.265	INCHES H2O
METER TEMPERATURE	47.42	DEGREES F
STACK TEMPERATURE	389.46	DEGREES F
BAROMETRIC PRESSURE	23.54	INCHES HG
STACK PRESSURE	0.22	INCHES H2O NEGATIVE
WATER COLLECTED	259.50	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	8.80%	
CARBON DIOXIDE	9.80%	
NITROGEN	81.40%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	32.961	DSCF
	0.9289	DSCM
SAMPLE FLOW RATE EQUALS	0.5493	DSCFM
	1.5427	ACFM AT NOZZLE
	0.0155	DSCMM
STACK GAS MOLECULAR WEIGHT	26.69	
PERCENT MOISTURE	27.09%	
PERCENT ISOKINETIC	104.31%	
AVERAGE STACK GAS VELOCITY	51.48	FEET/SEC
STACK GAS FLOW RATE	193013.4	ACFM
	68741.9	DSCFM
PARTICULATE MASS CONCENTRATION	0.0387	GRAINS/DSCF
	0.0138	GRAINS/ACF (STACK)
	0.0889	GRAMS/DSCM
	0.0317	GRAMS/ACM
PARTICULATE MASS EMISSION	22.7795	LBS/HOUR
	552.40E-08	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-11-90
TIME OF TEST	0936-1034
TEST AND RUN NUMBER	5ES10-2
SAMPLE LOCATION	CALCINER KILN PRECIPITATOR
REMARKS	Final Results

METER VOLUME	37.341	CUBIC FEET
METER Y FACTOR	1.010	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	63.00	MILLIGRAMS
DUCT AREA	62.4900	SQUARE FEET
NOZZLE DIAMETER	0.2963	INCHES
SQR ROOT OF AVG VEL DP	0.6169	
AVG ORIFICE DELTA H	1.158	INCHES H2O
METER TEMPERATURE	54.10	DEGREES F
STACK TEMPERATURE	391.25	DEGREES F
BAROMETRIC PRESSURE	23.50	INCHES HG
STACK PRESSURE	0.22	INCHES H2O NEGATIVE
WATER COLLECTED	251.40	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	9.80%	
CARBON DIOXIDE	9.20%	
NITROGEN	81.00%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	30.506	DSCF
	0.8598	DSCM
SAMPLE FLOW RATE EQUALS	0.5084	DSCFM
	1.4514	ACFM AT NOZZLE
	0.0143	DSCMM
STACK GAS MOLECULAR WEIGHT	26.54	
PERCENT MOISTURE	28.00%	
PERCENT ISOKINETIC	97.58%	
AVERAGE STACK GAS VELOCITY	51.77	FEET/SEC
STACK GAS FLOW RATE	194112.0	ACFM
	68009.1	DSCFM
PARTICULATE MASS CONCENTRATION	0.0319	GRAINS/DSCF
	0.0112	GRAINS/ACF (STACK)
	0.0733	GRAMS/DSCM
	0.0257	GRAMS/ACM
PARTICULATE MASS EMISSION	18.5722	LBS/HOUR
	455.23E-08	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-11-90
TIME OF TEST	1105-1208
TEST AND RUN NUMBER	5ES10-3
SAMPLE LOCATION	CALCINER KILN PRECIPITATOR
REMARKS	Final Results

METER VOLUME	38.831	CUBIC FEET
METER Y FACTOR	1.010	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	77.90	MILLIGRAMS
DUCT AREA	62.4900	SQUARE FEET
NOZZLE DIAMETER	0.2963	INCHES
SQR ROOT OF AVG VEL DP	0.6237	
AVG ORIFICE DELTA H	1.210	INCHES H2O
METER TEMPERATURE	68.85	DEGREES F
STACK TEMPERATURE	394.29	DEGREES F
BAROMETRIC PRESSURE	23.47	INCHES HG
STACK PRESSURE	0.22	INCHES H2O NEGATIVE
WATER COLLECTED	241.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	9.20%	
CARBON DIOXIDE	9.40%	
NITROGEN	81.40%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	30.804	DSCF
	0.8682	DSCM
SAMPLE FLOW RATE EQUALS	0.5134	DSCFM
	1.4522	ACFM AT NOZZLE
	0.0145	DSCMM
STACK GAS MOLECULAR WEIGHT	26.67	
PERCENT MOISTURE	26.99%	
PERCENT ISOKINETIC	96.56%	
AVERAGE STACK GAS VELOCITY	52.34	FEET/SEC
STACK GAS FLOW RATE	196259.2	ACFM
	69398.3	DSCFM
PARTICULATE MASS CONCENTRATION	0.0390	GRAINS/DSCF
	0.0138	GRAINS/ACF (STACK)
	0.0897	GRAMS/DSCM
	0.0317	GRAMS/ACM
PARTICULATE MASS EMISSION	23.2068	LBS/HOUR
	557.44E-08	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC	
PLANT LOCATION	GREEN RIVER, WYOMING	
DATE OF TEST	05-12-90	
TIME OF TEST	0716-0818	
TEST AND RUN NUMBER	5ES12-1	
SAMPLE LOCATION	DRIER KILN PRECIPITATOR	
REMARKS	Final Results	
METER VOLUME	42.496	CUBIC FEET
METER Y FACTOR	1.004	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	43.40	MILLIGRAMS
DUCT AREA	28.2743	SQUARE FEET
NOZZLE DIAMETER	0.3653	INCHES
SQR ROOT OF AVG VEL DP	0.4047	
AVG ORIFICE DELTA H	1.142	INCHES H2O
METER TEMPERATURE	59.17	DEGREES F
STACK TEMPERATURE	236.83	DEGREES F
BAROMETRIC PRESSURE	23.69	INCHES HG
STACK PRESSURE	0.11	INCHES H2O POSITIVE
WATER COLLECTED	271.00	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	9.80%	
CARBON DIOXIDE	8.40%	
NITROGEN	81.80%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	34.478	DSCF
	0.9717	DSCM
SAMPLE FLOW RATE EQUALS	0.5746	DSCFM
	1.3135	ACFM AT NOZZLE
	0.0162	DSCMM
STACK GAS MOLECULAR WEIGHT	26.56	
PERCENT MOISTURE	27.06%	
PERCENT ISOKINETIC	98.36%	
AVERAGE STACK GAS VELOCITY	30.58	FEET/SEC
STACK GAS FLOW RATE	51875.4	ACFM
	22699.3	DSCFM
PARTICULATE MASS CONCENTRATION	0.0194	GRAINS/DSCF
	0.0085	GRAINS/ACF (STACK)
	0.0447	GRAMS/DSCM
	0.0195	GRAMS/ACM
PARTICULATE MASS EMISSION	3.7783	LBS/HOUR
	277.47E-08	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-12-90
TIME OF TEST	0904-1006
TEST AND RUN NUMBER	5ES12-2
SAMPLE LOCATION	DRIER KILN PRECIPITATOR
REMARKS	Final Results

METER VOLUME	57.179	CUBIC FEET
METER Y FACTOR	1.004	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	33.50	MILLIGRAMS
DUCT AREA	28.2743	SQUARE FEET
NOZZLE DIAMETER	0.3653	INCHES
SQR ROOT OF AVG VEL DP	0.5348	
AVG ORIFICE DELTA H	2.440	INCHES H2O
METER TEMPERATURE	73.00	DEGREES F
STACK TEMPERATURE	245.58	DEGREES F
BAROMETRIC PRESSURE	23.70	INCHES HG
STACK PRESSURE	0.11	INCHES H2O POSITIVE
WATER COLLECTED	366.30	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	10.00%	
CARBON DIOXIDE	8.60%	
NITROGEN	81.40%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	45.388	DSCF
	1.2792	DSCM
SAMPLE FLOW RATE EQUALS	0.7565	DSCFM
	1.7627	ACFM AT NOZZLE
	0.0213	DSCMM
STACK GAS MOLECULAR WEIGHT	26.53	
PERCENT MOISTURE	27.58%	
PERCENT ISOKINETIC	99.23%	
AVERAGE STACK GAS VELOCITY	40.68	FEET/SEC
STACK GAS FLOW RATE	69008.9	ACFM
	29619.9	DSCFM
PARTICULATE MASS CONCENTRATION	0.0114	GRAINS/DSCF
	0.0049	GRAINS/ACF (STACK)
	0.0262	GRAMS/DSCM
	0.0112	GRAMS/ACM
PARTICULATE MASS EMISSION	2.8909	LBS/HOUR
	162.70E-08	LBS/DSCF

TRC

***** TRC METHOD 5/17 DATA REDUCTION *****

**** INPUT DATA ****

CLIENT	RHONE-POULENC
PLANT LOCATION	GREEN RIVER, WYOMING
DATE OF TEST	05-12-90
TIME OF TEST	1030-1132
TEST AND RUN NUMBER	5ES12-3
SAMPLE LOCATION	DRIER KILN PRECIPITATOR
REMARKS	Final Results

METER VOLUME	60.514	CUBIC FEET
METER Y FACTOR	1.004	
SAMPLE TIME	60.00	MINUTES
PARTICULATE MASS GAIN	56.60	MILLIGRAMS
DUCT AREA	28.2743	SQUARE FEET
NOZZLE DIAMETER	0.3653	INCHES
SQR ROOT OF AVG VEL DP	0.5560	
AVG ORIFICE DELTA H	2.681	INCHES H2O
METER TEMPERATURE	79.58	DEGREES F
STACK TEMPERATURE	245.42	DEGREES F
BAROMETRIC PRESSURE	23.71	INCHES HG
STACK PRESSURE	0.11	INCHES H2O POSITIVE
WATER COLLECTED	333.20	GRAMS OR ML
PITOT COEFFICIENT	0.84	
OXYGEN	10.00%	
CARBON DIOXIDE	8.60%	
NITROGEN	81.40%	

**** RESULTS ****

SAMPLE VOLUME EQUALS	47.504	DSCF
	1.3388	DSCM
SAMPLE FLOW RATE EQUALS	0.7917	DSCFM
	1.7772	ACFM AT NOZZLE
	0.0223	DSCMM
STACK GAS MOLECULAR WEIGHT	26.85	
PERCENT MOISTURE	24.87%	
PERCENT ISOKINETIC	96.84%	
AVERAGE STACK GAS VELOCITY	42.02	FEET/SEC
STACK GAS FLOW RATE	71293.2	ACFM
	31767.2	DSCFM
PARTICULATE MASS CONCENTRATION	0.0184	GRAINS/DSCF
	0.0082	GRAINS/ACF (STACK)
	0.0423	GRAMS/DSCM
	0.0188	GRAMS/ACM
PARTICULATE MASS EMISSION	5.0050	LBS/HOUR
	262.63E-08	LBS/DSCF

TRC

APPENDIX B
LABORATORY and QA/QC DATA

PROJECT: Front Half - Glass Fibre Filters

NOTEBOOK No.:

Continued From Page 1 of 2

I.D.	RUN #	DATE	TARE	DATE	FINAL	DATE	FINAL	
3000	Blank	05-02-90	0.5069	5-15	0.5069	5-16-90	0.5069	0.00
3001	4SC10-1		0.5069	5-15	0.5284		0.5283	0.0214
3002	4SC10-2		0.5071	5-15	0.6943		0.6944	0.1873
3003	4SC10-3		0.5034	5-15	0.6724		0.6724	0.1690
3004	4SC10-4		0.5056	5-15	0.6892		0.6893	0.1837
3005	4SC12A-1		0.5071	5-15	0.8845		0.8846	0.3775
3006	4SC12A-2		0.5042	5-15	0.8743		0.8742	0.3700
3007	4SC12A-3		0.5026	5-15	0.8841		0.8840	0.3814
3008			0.5039					
3009	SES12-1		0.5022	5-15	0.5220	5-16-90	0.5220	0.0198
3010	SES12-2		0.5055	5-15	0.5255		0.5255	0.0200
3011	SES10-1		0.5047	5-15	0.5469		0.5470	0.042
3012	SES10-2		0.5066	5-15	0.5422		0.5421	0.0355
3013	SES10-3		0.5105	5-15	0.5501		0.5500	0.039
3014	SES12-3		0.5066	5-15	0.5287		0.5287	0.022
3015			0.5081					
3016			0.5092					
3017			0.5132					
3018			0.5088					
3019			0.5121					
3020			0.5078					
3021			0.5091					
3022			0.5105					
3023			0.5085					
3024			0.5153					
3025			0.5095					
3026		05-17-90	0.5102					
3027								
3028								

Continued on Page

Read and Understood By

Signed

Date

Signed

5-16-90

Date

FRONT HALF-AND-BACK HALF WATER RINSES

Continued From Page 2 of 2

RUN #	DATE	TARE	DATE	FINAL	DATE	FINAL	TOTAL ML	
4SC10-2F	05-14-90	103.5727	5-16-90	103.6501	5-16-90	0.0774	356	0.0001
4SC10-2B	05-14-90	104.5395	5-16-90	104.5454	5-16-90	0.0059	210 + 528 (738)	0.0003
4SC10-3F	05-14-90	102.8779	5-16-90	103.0058	5-16-90	0.1279	446	0.0002
4SC10-3B	05-14-90	100.9510	5-16-90	100.9582	5-16-90	0.0072	235 + 423 (658)	0.0003
4S10-4F	05-14-90	106.0889	5-15-90	106.1714	5-16-90	0.0825	345	0.0002
~~4S10-4B~~	~~05-14-90~~	~~96.88~~						
4SC10-4B	05-14-90	103.5564	5-16-90	103.5681	5-16-90	0.0117	185 + 355 (540)	0.0002
4SC12A-1F	05-14-90	103.4435	5-16-90	103.4709	5-16-90	0.0274	413	0.0002
4SC12A-1B	05-14-90	~~99.9193~~ ~~100.7449~~	5-16-90	99.9226	5-16-90	0.0083	245 + 508 (753)	0.0003
4SC12A-2F	05-14-90	100.7813	5-16-90	100.8212	5-16-90	0.0399	412	0.0002
4SC12A-2B	05-14-90	99.9770	5-16-90	99.9787	5-16-90	0.0017	415 + 380 (795)	0.0003
4SC12A-3F	05-14-90	101.5093	5-16-90	101.5347	5-16-90	0.0254	305	0.0001
4SC12A-3B	05-14-90	96.7703	5-16-90	96.7713	5-16-90	0.0010	295 + 438 (733)	0.0003
4ES10-1F	05-14-90	96.9022	5-16-90	96.9408	5-16-90	0.0386	345	0.0001
4ES10-1B	05-14-90	99.0901	5-16-90	99.0921	5-16-90	0.0020	475	0.0002
4ES10-2F	05-14-90	100.6005	5-16-90	100.6236	5-16-90	0.0231	338	0.0001
4ES10-2B	05-14-90	101.0193	5-16-90	101.0240	5-16-90	0.0047	498	0.0002
4ES10-3F	05-14-90	94.9374	5-16-90	94.9741	5-16-90	0.0367	362	0.0001
4ES10-3B	05-14-90	96.7184	5-16-90	96.7204	5-16-90	0.0020	528	0.0002
5ES12-1F	05-14-90	99.9669	5-16-90	99.9895	5-16-90	0.0226	510	0.0002
5ES12-1B	05-14-90	102.1828	5-16-90	102.1842	5-16-90	0.0014	490	0.0002
5ES12-2F	05-14-90	109.1224	5-16-90	109.1348	5-16-90	0.0124	440	0.0002
5ES12-2B	05-14-90	97.0353	5-16-90	97.0368	5-16-90	0.0015	512	0.0002
5ES12-3F	05-14-90	111.5859	5-16-90	111.6117	5-16-90	0.0258	495	0.0002
5ES12-3B	05-14-90	98.4420	5-16-90	98.4511	5-16-90	0.0091	524	0.0002
Field Blk	05-14-90	109.4351	5-16-90	109.4353	5-16-90	0.0002	500	

Blank Correction

Continued on Page

Read and Understood By

5-16-90

DRY GAS METER CALIBRATION SHEET

DATE: 12-21-89

DRY GAS METER IDENTIFICATION NuTech #2

STANDARD METER IDENTIFICATION Rockwell 38979

BAROMETRIC PRESSURE 24.57 in Hg

LEAK TEST 0.001 CFM AT 19 INCHES OF VACUUM

TECHNICIAN HSO

VOLUMES						TEMPERATURE				PRESSURE		TIME	FLOW RATE	STANDARD METER	DRY GAS METER	dH@
VOLUME OF STANDARD (Vs)			VOLUME OF DRY GAS METER (Vdg)			STANDARD	DRY GAS METER			STANDARD	DGM					
INITIAL	FINAL	TOTAL	INITIAL	FINAL	TOTAL	(Ts) F	IN F	OUT F	AVE. F	(Ps) "H2O	dH "H2O	MIN	SCFM	(Vs)	(Vd)	
608.398	615.128	6.730	510.390	517.023	6.633	69	64	63	63.5	-0.07	0.50	15.0	0.3967	1.006	1.008	1.709
615.128	621.880	6.752	517.023	523.701	6.678	70	70	67	68.5	-0.07	0.50	15.0	0.3702	1.006	1.013	1.688
621.880	628.612	6.732	523.701	530.414	6.713	71	75	70	72.5	-0.07	0.50	15.0	0.3684	1.006	1.010	1.692
629.415	635.653	6.228	531.221	537.460	6.239	69	78	74	76.0	-0.08	1.00	10.0	0.5132	1.006	1.014	1.738
635.653	641.831	6.178	537.460	543.683	6.223	69	80	76	78.0	-0.08	1.00	10.0	0.5091	1.006	1.012	1.760
641.831	648.034	6.203	543.683	549.943	6.260	68	82	78	80.0	-0.08	1.00	10.0	0.5121	1.006	1.016	1.732
648.723	657.163	8.440	550.634	559.158	8.524	70	85	79	82.0	-0.11	2.00	10.0	0.6941	1.006	1.012	1.890
657.163	665.597	8.434	559.158	567.690	8.532	70	87	81	84.0	-0.11	2.00	10.0	0.6936	1.006	1.014	1.886
665.597	674.025	8.428	567.690	576.221	8.531	70	87	82	84.5	-0.11	2.00	10.0	0.6931	1.006	1.015	1.887
674.927	685.395	10.468	577.150	587.773	10.623	70	90	84	87.0	-0.135	3.00	10.0	0.8608	1.006	1.014	1.838
685.395	695.832	10.437	587.773	598.376	10.623	70	92	84	88.0	-0.135	3.00	10.0	0.8583	1.006	1.012	1.845
695.832	706.252	10.420	598.396	609.024	10.628	70	92	85	88.5	-0.135	3.00	10.0	0.8569	1.006	1.011	1.850
													AVERAGE		1.0127	1.7930

TRC

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7002 South Revere Parkway
Suite 60
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(303) 792-5555

NUTECH # 2 INLET

THERMOCOUPLE CALIBRATION DATA SHEET

Ambient Temperature °R 532 Barometric Pressure _____

Date 6/30/88 Calibrator RWB

Reference Thermometer No. S-W Mercury-Glass

NES Calibration Points _____

TC No. IN	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
NUTECH#2 FF21002B	531		532	0.2
	515		516	0.2
	500	—	501	-0.2
			Average	0.2

[a]Reference temperature at ± 10% of expected temperature

[b]Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

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NUTech # 2
Outlet

THERMOCOUPLE CALIBRATION DATA SHEET

Ambient Temperature °R 532 Barometric Pressure _____

Date 6/30/88 Calibrator R.W.B

Reference Thermometer No. 5-W Mercury Glass

NES Calibration Points _____

TC No. OUT	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
NUTech 2 FEB1002.8	531		532	0.2
	527		529	0.4
	503		502	-0.2
			Average	0.26

[a] Reference temperature at ± 10% of expected temperature

[b] Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

DRY GAS METER CALIBRATION SHEET

DATE 03-26-90
DRY GAS METER IDENTIFICATION NuTech #3
STANDARD METER IDENTIFICATION Rockwell 38979
BAROMETRIC PRESSURE 24.64
LEAK TEST 0.001 CFM AT 15 INCHES OF VACUUM
TECHNICIAN D. Virbick

VOLUMES						TEMPERATURE				PRESSURE		TIME	FLOW	STANDARD	DRY GAS	dH@
VOLUME OF STANDARD (Vs)			VOLUME OF DRY GAS METER (Vdg)			STANDARD	DRY GAS METER			STANDARD	DQM		RATE	METER	METER	
INITIAL	FINAL	TOTAL	INITIAL	FINAL	TOTAL	(Ts) F	IN F	OUT F	AVE. F	(Ps) "H2O	dH "H2O	MIN	SCFM	(Ys)	(Yd)	
162.202	169.023	6.821	998.974	005.863	6.889	68	74	70	72.0	-0.075	0.50	16.0	0.3530	1.006	1.002	1.851
169.023	175.420	6.397	005.863	012.332	6.469	69	78	73	75.5	-0.075	0.50	15.0	0.3531	1.006	1.007	1.837
175.420	181.836	6.416	012.332	018.821	6.489	69	81	76	78.5	-0.075	0.50	15.0	0.3535	1.006	1.011	1.823
182.169	188.078	5.969	019.102	025.129	6.027	69	84	78	81.0	-0.085	1.00	10.0	0.4993	1.006	1.016	1.869
188.078	194.059	5.981	026.129	031.174	6.045	69	86	79	82.5	-0.085	1.00	10.0	0.4942	1.006	1.017	1.857
194.059	200.046	5.987	031.174	037.217	6.043	70	89	81	84.0	-0.085	1.00	10.0	0.4938	1.006	1.020	1.855
204.991	213.277	8.286	042.172	050.464	8.292	69	80	77	78.5	-0.110	2.00	10.0	0.6847	1.006	1.017	1.961
213.277	225.024	11.747	050.464	062.202	11.738	71	77	76	76.5	-0.110	2.00	14.0	0.6907	1.006	1.011	1.934
225.024	233.308	8.284	062.202	070.518	8.316	72	83	77	80.0	-0.110	2.00	10.0	0.6806	1.006	1.011	1.979
234.124	244.458	10.334	071.318	081.665	10.347	73	82	78	80.0	-0.135	3.00	10.0	0.8490	1.006	1.010	1.919
244.458	255.751	11.293	081.665	092.973	11.308	73	87	80	83.5	-0.135	3.00	11.0	0.8419	1.006	1.015	1.939
255.751	266.016	10.265	092.973	103.282	10.309	73	90	82	86.0	-0.135	3.00	10.0	0.8418	1.006	1.017	1.931
													AVERAGE		1.0128	1.8962

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Nutech #3

THERMOCOUPLE CALIBRATION DATA SHEET

6845716

Ambient Temperature °R 534 Barometric Pressure

Date 6/30/88 Calibrator RWB

Reference Thermometer No. S-W Mercury in glass

NES Calibration Points

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
Nutech 3 DGM IN	494		493	0.2
	502		501	0.2
	534		533	0.2

Average 0.20

[a]Reference temperature at ± 10% of expected temperature

[b]Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

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Nutech #3
THERMOCOUPLE CALIBRATION DATA SHEET
6845716

Ambient Temperature °R 534 Barometric Pressure _____

Date 6/30/88 Calibrator RWB

Reference Thermometer No. S-W Mercury in glass

NES Calibration Points _____

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
Nutech #3 OGM OUT	493		491	0.4
	501		500	0.2
	534	—	533	0.2
			Average	0.26

[a] Reference temperature at ± 10% of expected temperature

[b] Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

DRY GAS METER CALIBRATION SHEET

DATE 12-21-89
DRY GAS METER IDENTIFICATION N-Tech #4
STANDARD METER IDENTIFICATION Rockwell 38979
BAROMETRIC PRESSURE 24.56 in Hg
LEAK TEST 0.001 CFM AT 18 INCHES OF VACUUM
TECHNICIAN OV / HSO

VOLUMES						TEMPERATURE				PRESSURE		TIME	FLOW RATE	STANDARD METER	DRY GAS METER	dH@
VOLUME OF STANDARD (Vs)			VOLUME OF DRY GAS METER (Vdg)			STANDARD	DRY GAS METER			STANDARD	DGM dH					
INITIAL	FINAL	TOTAL	INITIAL	FINAL	TOTAL	(Ts) F	IN F	OUT F	AVE. F	(Ps) "H2O	"H2O	MIN	SCFM	(Vs)	(Vd)	
512.402	518.874	6.472	711.002	717.507	6.505	71	73	71	72.0	-0.07	0.50	15.0	0.3541	1.006	1.001	1.833
518.874	525.360	6.486	717.507	724.034	6.527	73	78	74	76.0	-0.07	0.50	15.0	0.3535	1.006	1.004	1.825
525.360	531.842	6.482	724.034	730.610	6.576	70	80	75	77.5	-0.07	0.50	15.0	0.3553	1.006	1.004	1.802
532.009	538.024	6.015	730.774	736.862	6.088	72	84	78	81.0	-0.08	1.00	10.0	0.4927	1.006	1.007	1.868
538.024	544.054	6.030	736.862	742.990	6.128	72	87	81	84.0	-0.08	1.00	10.0	0.4939	1.006	1.009	1.848
544.054	550.126	6.072	742.990	749.156	6.166	71	82	81	81.5	-0.08	1.00	10.0	0.4983	1.006	1.007	1.824
550.736	559.135	8.399	749.775	758.274	8.499	71	85	82	83.5	-0.11	2.00	10.0	0.6892	1.006	1.011	1.912
559.135	567.512	8.377	758.274	766.774	8.500	71	88	82	85	-0.11	2.00	10.0	0.6873	1.006	1.011	1.916
567.512	575.873	8.361	766.774	775.272	8.498	73	90	83	86.5	-0.11	2.00	10.0	0.6835	1.006	1.008	1.933
576.908	587.130	10.222	776.311	786.659	10.348	71	92	84	88.0	-0.13	3.00	10.0	0.8387	1.006	1.016	1.932
587.130	597.380	10.250	786.659	797.062	10.403	71	94	86	90.0	-0.13	3.00	10.0	0.8410	1.006	1.017	1.914
597.380	607.632	10.252	797.062	807.491	10.429	70	94	87	90.5	-0.13	3.00	10.0	0.8427	1.006	1.018	1.904
														AVERAGE	1.0095	1.876

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NuTech #4
THERMOCOUPLE CALIBRATION DATA SHEET
6845717

Ambient Temperature °R 533 Barometric Pressure _____

Date 6/30/88 Calibrator R.W.B.

Reference Thermometer No. S-W Mercury-Glass

NBS Calibration Points _____

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
NuTech #4 IN	493		494	0.2
	502		503	0.2
	534	—	535	0.2
			Average	0.2

[a]Reference temperature at ± 10% of expected temperature

[b]Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

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Nutech #4

THERMOCOUPLE CALIBRATION DATA SHEET

#6845715

Ambient Temperature °R 533 Barometric Pressure _____

Date 6/30/88 Calibrator RWB

Reference Thermometer No. S-W Mercury-Glass

NBS Calibration Points _____

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
Nutech #4 out	493		494	0.2
	502		503	0.2
	534		535	0.2
			Average	0.2

[a]Reference temperature at ± 10% of expected temperature

[b]Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

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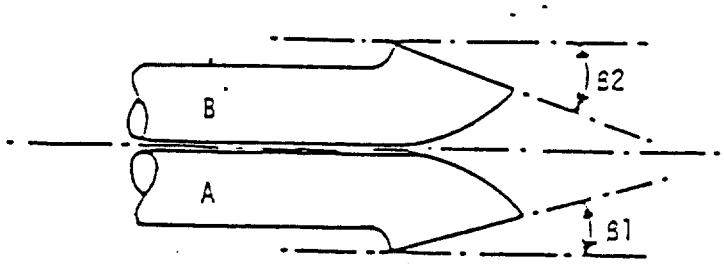
(303) 792-5555

PITOT TUBE CALIBRATION

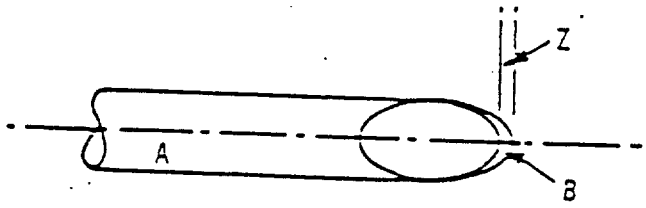
PITOT TUBE ID : 9.0'

DATE : 2-28-90

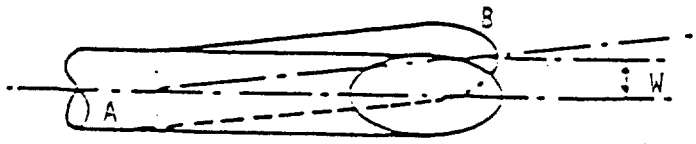
TECHNICIAN : L. Rosberg



β 1 = -0.1° β 2 = 1.0



Z = 0.2°



W = 0.0

PITOT COEFFICIENT (Cp) = 0.84

TRC Environmental Consultants, Inc.

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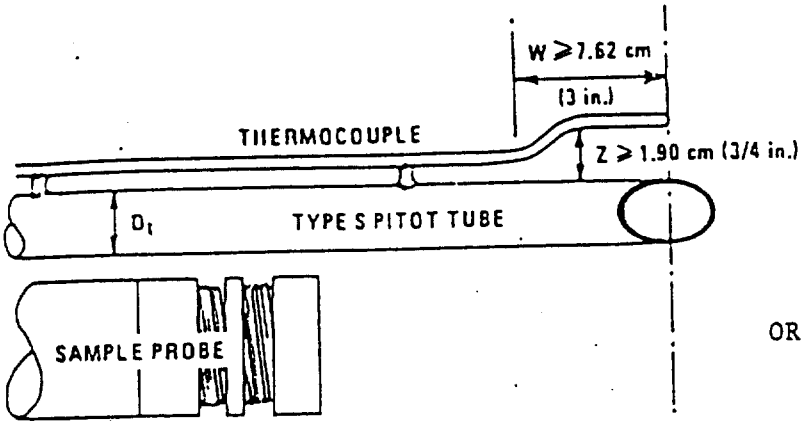
Suite 60
Englewood, CO 80112
(303) 792-5555

PROBE AND PITOT TUBE CALIBRATION

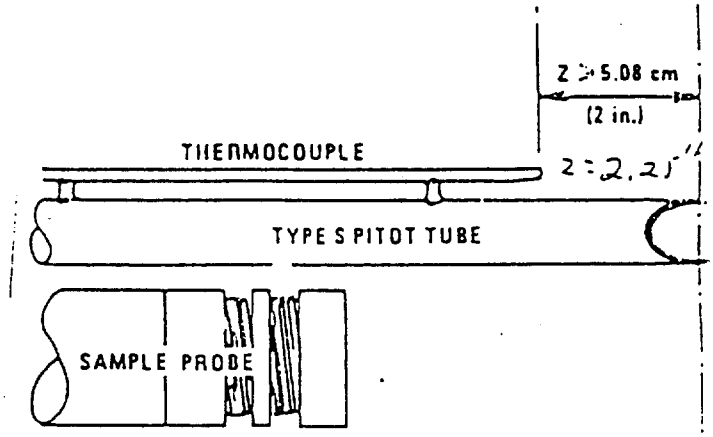
PROBE ID : 9.0'

DATE : 02-28-90'

TECHNICIAN : _____

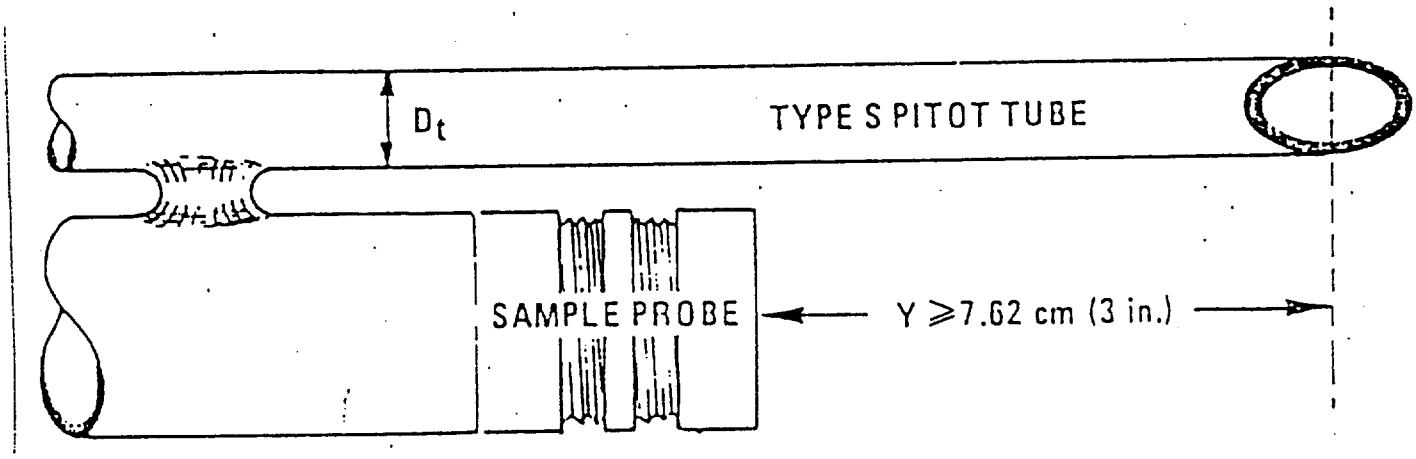


OR



W = N/A Z = N/A

Z = _____



Y = 7.65

TRC Environmental Consultants, Inc.

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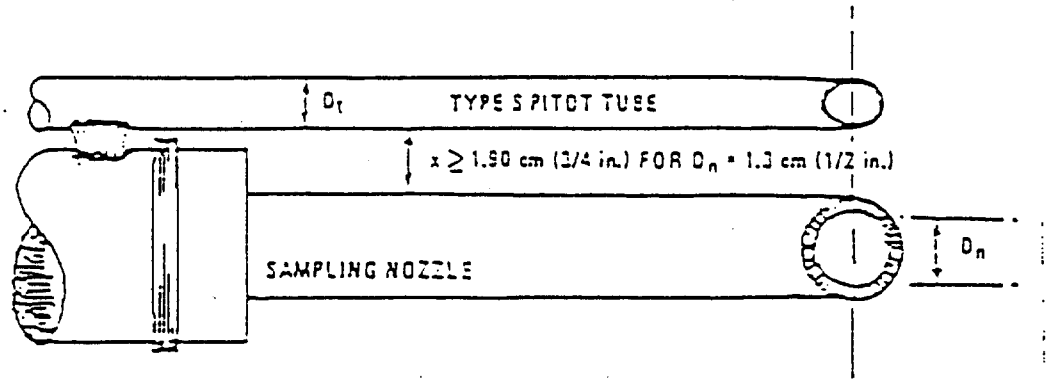
Suite 60
Englewood, CO 80112
(303) 792-5555

PROBE AND PITOT TUBE CALIBRATION

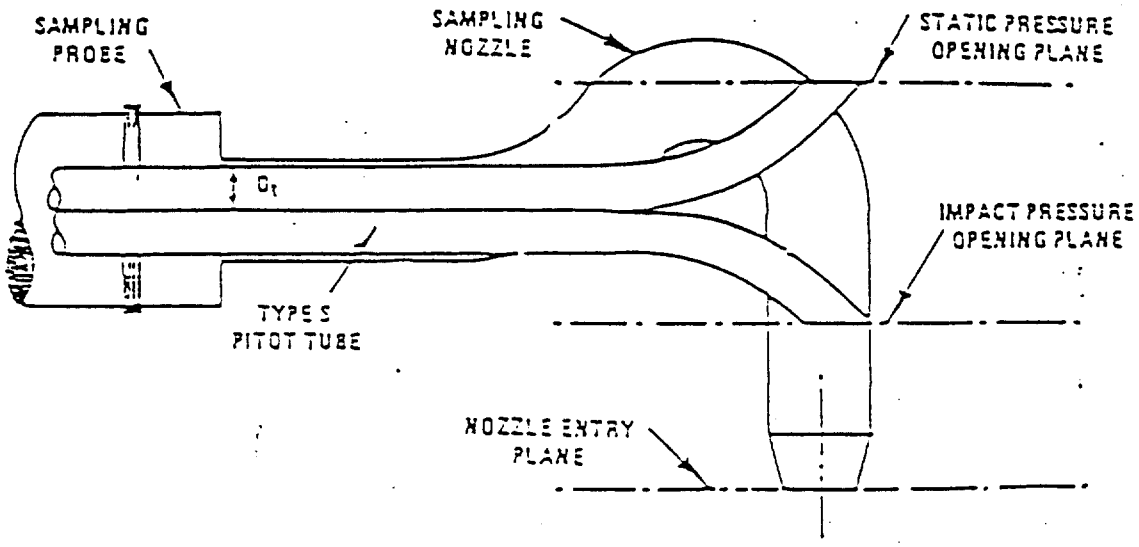
PROBE ID : 9.0'

DATE : 02-28-90

TECHNICIAN : J. Rosburg



D_t = 0.95 x = 2.28 D_n = 1.3



Configuration correct ? YES

TRC Environmental Consultants, Inc.

7002 South Revere Parkway
Suite 60
Englewood, CO 80112
(303) 792-5555

9' Probe
THERMOCOUPLE CALIBRATION DATA SHEET

Ambient Temperature °R 528 Barometric Pressure _____

Date 1/18/89 Calibrator RB

Reference Thermometer No. SN 80015 0.1 Immersion

NES Calibration Points _____

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
9 FT. Probe	528		530	0.381
	590		594	0.673
	612		617	0.810
	658		663	0.754
	714		718	0.557
	735		742	0.943
			Average	0.686

[a] Reference temperature at ± 10% of expected temperature

[b] Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

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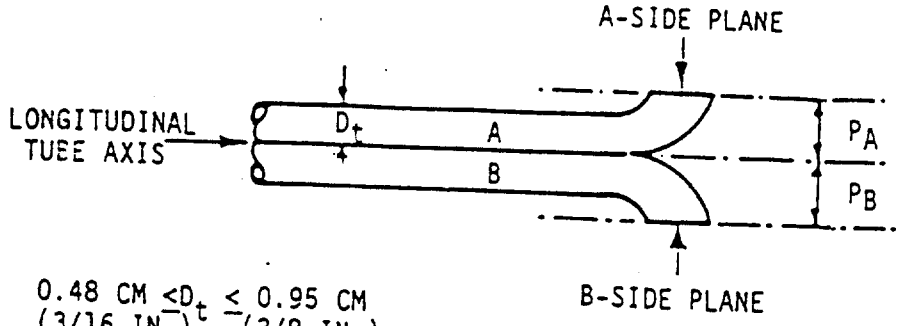
Suite 60
Englewood, CO 80112
(303) 792-5555

PITOT TUBE CALIBRATION

PITOT TUBE ID: 6-2 Foot

DATE: 02-07-90

TECHNICIAN: DV

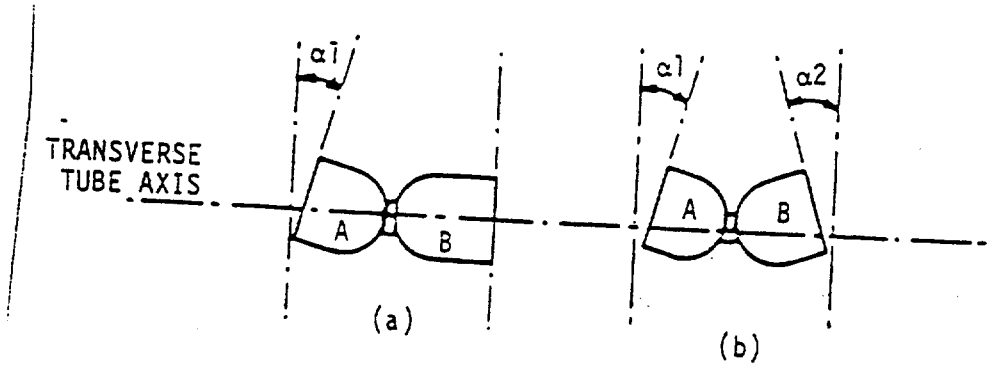


NOTE:

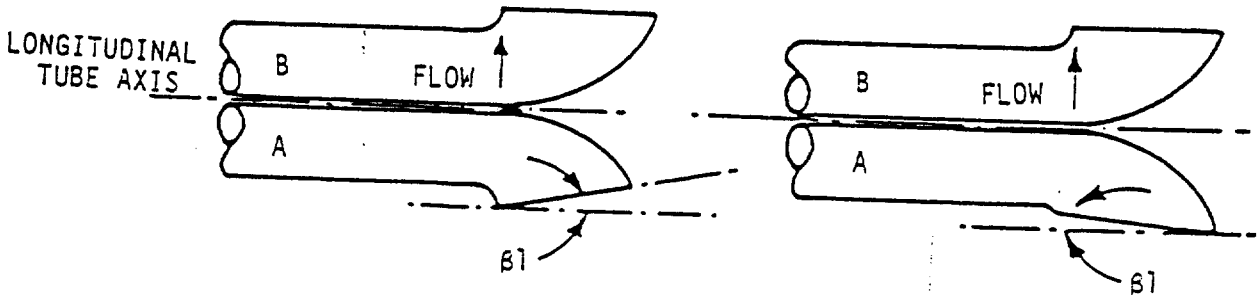
$\begin{cases} 1.05\ D_t < P < 1.50\ D_t \\ P_A = P_B \end{cases}$

0.48 CM $\leq D_t \leq$ 0.95 CM
(3/16 IN.) (3/8 IN.)

D_t = 3/8" P_A = 0.5" P_B = 0.5"



1 = < 1° 2 = < 1°



1 = < 1° 1 = < 1°

TRC Environmental Consultants, Inc.

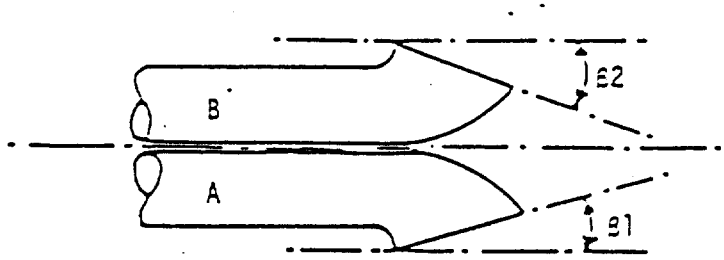
7002 South Revere Parkway
Suite 60
Englewood, CO 80112
(303) 792-5555

PITOT TUBE CALIBRATION

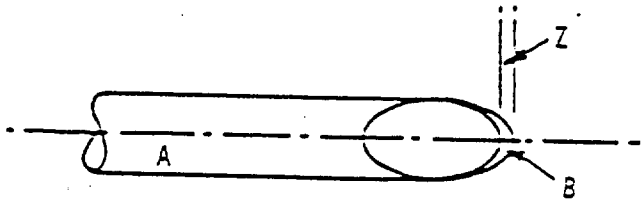
PITOT TUBE ID : 6-2 Foot

DATE : 02-02-90

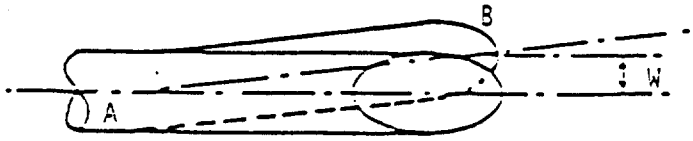
TECHNICIAN : D.V.



β 1 = <1° β 2 = <1°



Z = 0.0625"



W = <1°

PITOT COEFFICIENT (Cp) = 0.84

TRC Environmental Consultants, Inc.

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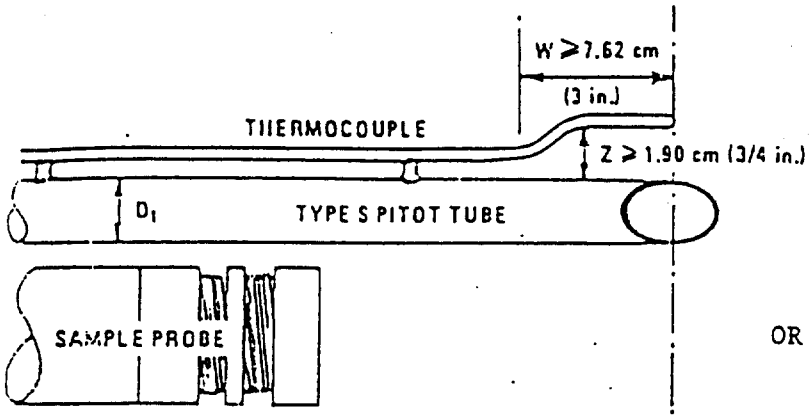
Suite 60
Englewood, CO 80112
(303) 792-5555

PROBE AND PITOT TUBE CALIBRATION

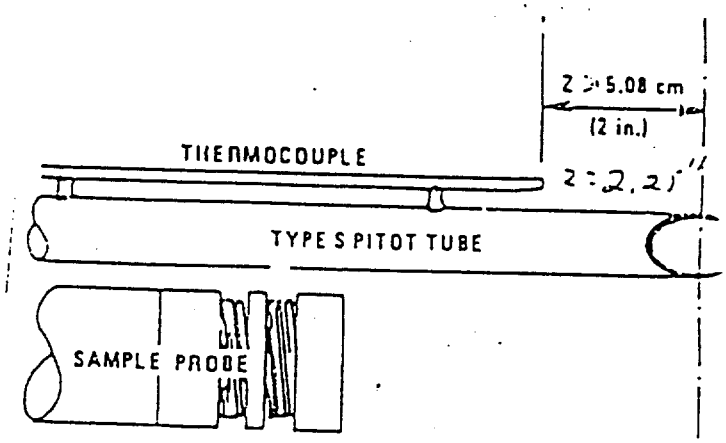
PROBE ID : 6-3 Foot

DATE : 02-07-90

TECHNICIAN : D.V

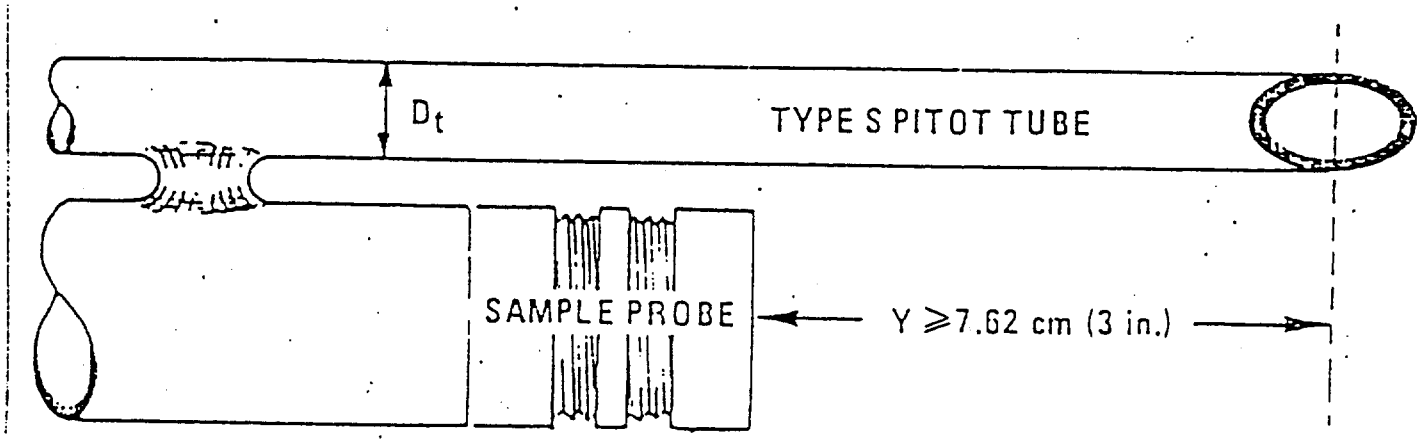


OR



W = 4.0" Z = 1.0"

Z = NA



Y = 3.625

TRC Environmental Consultants, Inc.

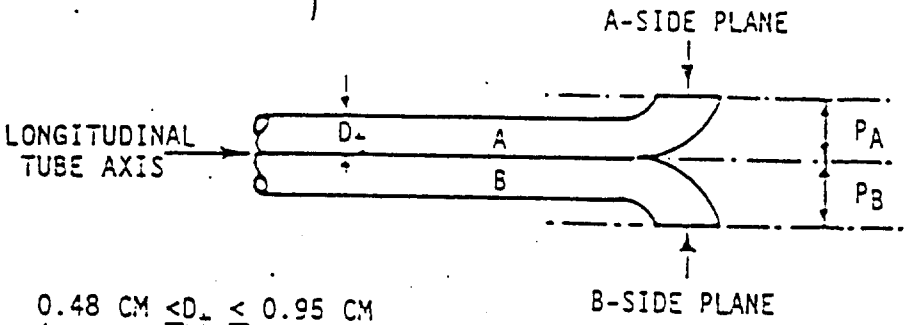
7002 South Revere Parkway
Suite 60
Englewood, CO 80112
(303) 792-5555

PITOT TUBE CALIBRATION

PITOT TUBE ID: 9.0'

DATE: 02-28-90

TECHNICIAN: S. Rosberg

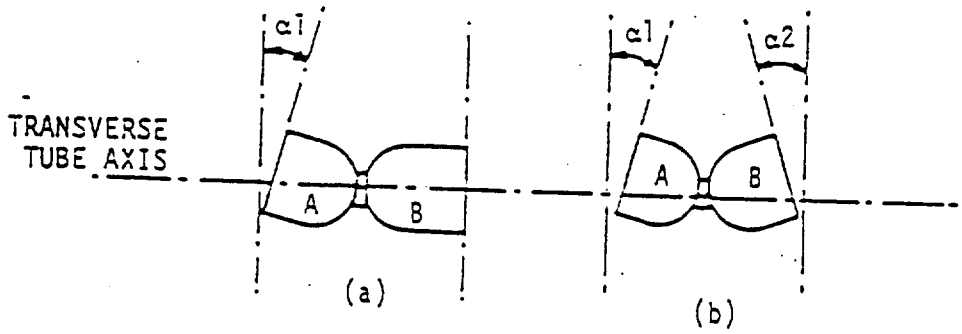


NOTE:

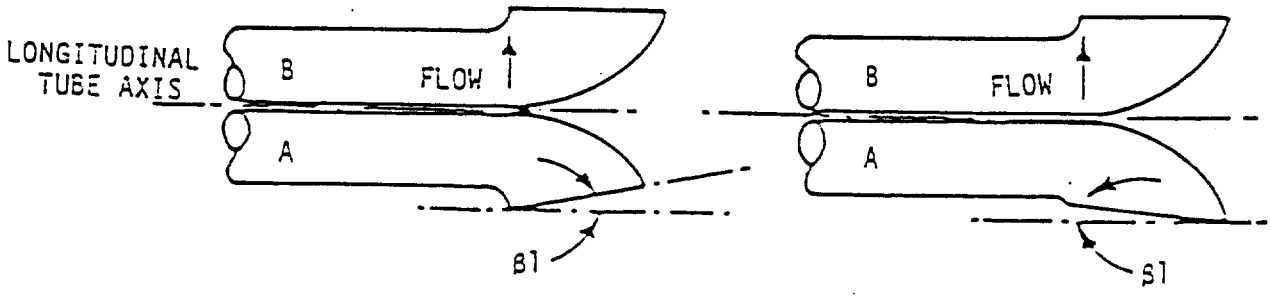
$\begin{cases} 1.05\ D_t < P < 1.50\ D_t \\ P_A = P_B \end{cases}$

0.48 CM $\leq D_t \leq$ 0.95 CM
(3/16 IN.) (3/8 IN.)

D_t = 0.95 P_A = 1.25 P_B = 1.25



$\alpha 1$ = -1.0° $\alpha 2$ = 0.0



$\beta 1$ = -1.0 $\beta 1$ = -0.20

TRC Environmental Consultants, Inc.

7002 South Revere Parkway
Suite 60
Englewood, CO 80112
(303) 792-5555

THERMOCOUPLE CALIBRATION DATA SHEET

Ambient Temperature °R 528 Barometric Pressure _____

Date 1/18/89 Calibrator RS

Reference Thermometer No. SW 80015 Oil immersion

NBS Calibration Points _____

TC No.	TC Temperature (°R)	Reference TC[a] Temperature (°R)	Reference Thermometer Temperature[a] (°R)	Difference (%)[b]
6 FT New Prob.	528		529	0.189
	586		589	0.509
	599		604	0.828
	648		653	0.766
	694		699	0.715
	730		736	0.8152
			Average	0.637

[a]Reference temperature at ± 10% of expected temperature

[b]Average Percent Difference ≤ 1.5%, Percent Difference = $\left[\frac{\text{Ref. Temp.} - \text{TC Temp.}}{\text{Ref. Temp.}}\right] \times 100$

APPENDIX C
PLANT and PROCESS DATA

TRC

RANTEC CORPORATION
P.O. Box 729
RANCHESTER, WYOMING 82839
(307) 655-9565

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY: _____ DATE _____

SCALE _____

STACK TEST

1) STATE [redacted] WITNESS

2) MAY 8th to 12th

3) TRC

4SC-10

4SC-12A

[redacted]-

5ES-10

5ES-12

4) Operating Conditions included

Emissions Testing Control Room Data Sheet — Test 1

45C-10

Test Date 5-9-90 Test Start Time Approx. 2:10 Test Finish Time Approx. 3:20

Time	Ore Rate (TPH)	X100 Gas Flow Rate (CFM)	4K-1 Exhaust Temp (°F)	Prod Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H_2O)	Venturi Press. Drop (>32.5) (ΔP)"	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) Flow to Tangentials (GPM)	Equal Flow To Sprays (Yes/no)	Cyclones (OK or not)	>75% Scrubber Level (%)	(<1.04) Recirc. H_2O Specific Gravity
2:10	128/102%	3775	360	285	4237	1.5	35	460	205	YES	OK	97	1.0x08
2:25	128/102	4114	360	289	4225	1.5	35	460	205	YES	OK	97	
2:40	128/102	4465	357	290	4223	1.55	35	460	205	yes	OK	94	1.0x08
2:55	128/102	4808	356	295	4199	1.6	35	450	205	YES	OK	92	
3:10	128/102	5262	362	295	4215	1.6	34	480	210	YES	OK	91	1.010
3:15													

Comments: 1:00 PM 3:00 PM O_2 stayed at 9-10 through out test

	PSI E	PSI W	PSI E	PSI W
VENTURI:	E	W	E	W
TOP 1+2	6	8	6	8
TANG. 1+2	9	14	13	14
TANG. 3	12	13	13	14
TOP 3*	2.5	0	2	0

* MAKE UP WATER

1:00 ALL OPEN

5/9/90

Signed John A. Hawley

Emissions Testing Control Room Data Sheet

Test 2

45C-10

Test Date 5-9-90 Test Start Time Approx. 4:00 PM Test Finish Time 4:10

Time	Ore Rate (TPH)	x100 Gas Flow Rate (CFM)	4K-1 Exhaust Temp (°F)	Prod Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H_2O)	Venturi Press. Drop (>32.5) (ΔP)"	Flow to Top Sprays (GPM) (RECIR.)	Flow to Tangentials (GPM) (MAKE-UP)	Equal Flow To Sprays (Yes/no)	Cyclones (OK or not)	>75% Scrubber Level (%)	(<1.01) Recirc. H_2O Specific Gravity
4:05	128/102%	6410	360	292	4224	1.6	34	460	205	Yes	Yes	92	1.008
4:15	128/102	6700	360	294	4216	1.7	35	460	210	YES	YES	92	
4:30	128/102	6973	359	291	4174	1.65	34	460	200	YES	YES	92	1.01
4:45	128/102	7321	358	286	4212	1.65	34	460	205	YES	YES	92	
5:00	128/102	7708	370	296	4243	1.6	34	460	205	YES	YES	92	1.01
5:15	128/102	8035	363	295	4228	1.75	35	460	205	YES	YES	92.5	

Comments: 5:00 PM PSE

O_2 stayed between 9 & 10 through out test

VENTURI	E	W
TOP 1+2	6	8
TANG 1+2	14	15
TANG 3	14	14
TOP 3 *	2	0

* MAKE UP WATER 5:00 PM ALL OPEN

Signed John D. Hawley

Emissions Testing Control Room Data Sheet — Test 3

4SC-10

Test Date 5-9-90 Test Start Time Approx. 5:35 Test Finish Time Approx. 6:45

Time	Ore Rate (TPH)	X100 Gas Flow Rate (CFM)	4K-1 Exhaust Temp (°F)	Prod Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H_2O)	Venturi Press. Drop (>32.5) (ΔP)"	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) Flow to Tangentials (GPM)	Equal Flow To Sprays (Yes/no)	Cyclones (OK or not)	(>75%) Scrubber Level (%)	(<1.04) Recirc. H_2O Specific Gravity
5:45	128/102%	8742	363	294	4221	1.55	34	460	205	Yes	Yes	93	1.016
6:00	128/102	9091	360	303	4182	1.65	34	460	205	YES	YES	93.5	
6:15	128/102	9426	362	298	4188	1.65	34	460	205	YES	YES	94	1.011
6:30	128/102	9787	362	293	4206	1.5	34	460	210	YES	YES	95	
6:45	128/102	0180	363	300	4173	1.6	34	460	210	YES	YES	98	1.011

Comments: 6:00 PM PST

VENTURIS:	E	W
TOP 1+2	6	8
TANG. 1+2	14	15
TANG. 3	13	14
TOP 3*	2	0

* MAKE UP WATER

6:00 PM ALL OPEN

Signed John A. Hamler

TEST 1A ABORT

Emissions Testing Control Room Data Sheet

45C-10

Test Date 5-9-90 Test Start Time 9:20 AM Test Finish Time

Time	Ore Rate (TPH)	Gas Flow Rate (CFM)	4K-1 Exhaust Temp (°F)	Prod Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H_2O)	Venturi Press. Drop (>32.5) (ΔP)"	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) * Flow to Tangentials (GPM)	Equal Flow To Sprays (Yes/no)	Cyclones (OK or not)	Scrubber Level (%)	(<1.04) Recirc. H_2O Specific Gravity
9:15AM	128		351	312	4246	1.3	36	450	220	YES	OK	100	1.008
9:20	128/102%		355	317	4227	1.5	35	420	210	YES	OK	91 ~~100~~	1.010
9:35	128/102%												

Abort - 4C-3 won't run

(MOTOR BURNED OUT)

Comments: 8:15 PSI

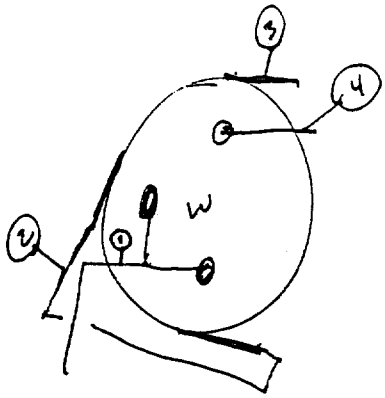
VENTURI:	E	W
TOP 1+2	9	6
TANG 1+2	14	14
TANG 3	14	13
TOP 3*	0	2

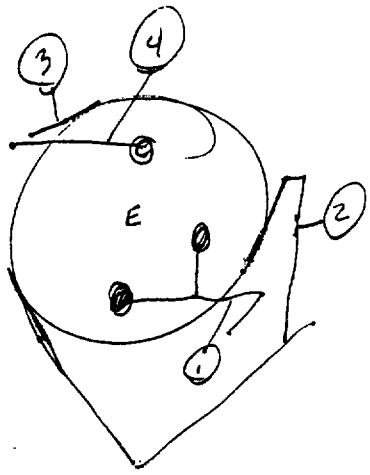
* MAKE UP WATER

8:15 ALL OPEN

Signed John D. Hawley

N





WEST	EAST
① TOP 1+2	① TOP 1+2
② TANG 1+2	② TANG 1+2
③ TANG 3	③ TANG 3
④ TOP 3	④ TOP 3 ← BOTH ARE ON MAKE UP WATER (FRESH H_2O)

Emissions Testing Control Room Data Sheet — Test 1

4SC-12A

Test Date 5-10-90 Test Start Time Approx. 11:15 AM Test Finish Time Approx. 12:20 PM

Time	Prod. Rate (TPH)	4K-2 Exhaust Temp (°F)	X100 Gas Flow Rate (CFM)	Prod. Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H2O)	Venturi Press. Drop >30 ("H2O)	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) Flow to Tangential (GPM)	Equal Flow to Sprays (Yes/No)	Cyclones (Knocked)	Scrubber Level (%)	Recirc H2O Specific Gravity (<1.08)
11:15	84.5	341	784.15	335	4170	2.6	28.5	360	200	Yes	Yes	25	1.006
11:30	89.0	347	78607	338	4169	2.8	28.0	350	190	Yes	Yes	44	*
11:45	84.0	345	78784	338	4170	3.0	28.0	360	200	Yes	Yes	60	
12:00	87.1	347	788.69	336	4170	3.0	28.0	350	190	Yes	Yes	75	1.022
12:15	82.0	345	19133	339	4172	3.0	28.0	360	190	Yes	Yes	87	

4K TPH
Avg

Add reading 27 to 28

HRLY. Avg. 86.2 TPH 11:00 - 12:00 from TDC

Comments:

11:15 AM

TOP SPRAYS 20 psig

TAN 6.5 > 32 mg/in²

* 2 on Make up & 2 on Recir.

12:15 PM

SAME

Signed John D. Hawley

Emissions Testing Control Room Data Sheet — Test 2

YSC-12A

Test Date 5-10-90 Test Start Time Approx. 12:50 PM Test Finish Time Approx. 1:55

Time	Prod. Rate (TPH)	4K-2 Exhaust Temp (°F)	Gas Flow Rate (CFM)	Prod. Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H2O)	Venturi Press. Drop >30 ("H2O)	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) Flow to Tangentials (GPM)	Equal Flow to Sprays (Yes/No)	Cyclones (Yes/No)	Scrubber Level (%)	Recirc H2O Specific Gravity (<1.08)
12:45	88.3	353	79521	342	4170	2.7	28	360	180	Yes	Yes	>100	1.020
1:00	84.0	342	79741	~~336~~ 326	4170	3.0	28	360	200	Yes	Yes	>100	~~1.020~~
1:15	91	340	79961	331	4170	2.9	28	350	180	Yes	Yes	>100	1.022
~~1:30~~ 1130	91	354	80071	345	4172	3.1	28	350	190	Yes	Yes	>100	
1745	87	344	80333	336	4173	3.0	28	360	180	Yes	Yes	>100	
2:00	90.2	341	80458	335	4172	2.9	28	350	190	Yes	Yes	>100	
	89 KPH						all readings over 27 to 28						
	089												

Comments:

1:15 PM 2:15 PM

TOP SPRAYS 20 psi 20

TANK 6.5' > 32 oz/in² > 32

+ 2 on Make up + 2 on Recir.

12:00 – 1:00 PM HRLY AVE 86.6 TPH } from TDC

1:00 – 2:00 PM 87.3 TPH }

++ At 1:45 4E-2 side clutch was opened - it had been closed due to a broken air line - prod. should come up

Signed John D. Stanley

Emissions Testing Control Room Data Sheet

4SC-12A

Test 3

Test Date 5-10-90 Test Start Time Approx. 2:20 Test Finish Time Approx. 3:30

Time	Prod. Rate (TPH)	4K-2 Exhaust Temp (°F)	Gas Flow Rate (CFM)	Prod. Temp (°F)	Fan Speed (RPM)	4K-1 Draft ("H_2O)	Venturi Press. Drop >30 ("H_2O)	(RECIR.) Flow to Top Sprays (GPM)	(MAKE-UP) Flow to Tangentials (GPM)	Equal Flow to Sprays (Yes/No)	Cyclones (normal)	Scrubber Level (%)	Recirc H_2O Specific Gravity (<1.08)
2:15	96	327	580633	318	4170	2.7	27-28	180	350	Yes	Yes	>100	1.015
2:30	92	347	580950	335	4168	2.9	27-28	180	350	Yes	Yes	>100	"
2:45	92	341	581160	333	4170	2.5	27-28	180	360	Yes	Yes	>100	
3:00	94	334	581290	~~334~~ 324	4172	3.0	27-28	190	340	Yes	Yes	>100	1.020
3:15	95	334	581394	321	4171	2.8	27-28	180	350	Yes	Yes	>100	
3:30			581575		4170	2.8	27-28	180	350	Yes	Yes	>100	

4K-1911 Dry

Comments: 2:45

TOP SPRAYS 20 psig

TANGS ~32 g/in²

+ 2 on Make up + 2 on Recir

2:00 - 3:00 Hrly Ave. 94 TPH from TOC

3:00 - 4:10 " " 95 " "

Signed John A. Hawley

Emission Testing Control Room Data Sheet — Test 1

SES-10

Test Date 5-11-90 Test Start Time Approx 7:55 AM Test Finish Time Approx 9:00 AM

Time	Ore Rate (TPH)	SK-1 Exhaust Gas Temp (°F)	SK-1 Draft ("H2O)	Gas Flow Rate (CFM)	Prod Temp (°F)	Cyclones (OK or Not)	PC-19 (OK or Not)
7:45	135	397	2.2	57809	356	OK	OK
8:00	135	396	2.3	58233	356	OK	OK
8:15	135	396	2.3	58615	356	OK	OK
8:30	135	397	2.2	58971	355	OK	OK
8:45	150	390	2.2	59396	359	OK	OK
9:00	142	397	2.1	59935	358	OK	OK
139 avg	↑ from strip chart						

Precipitator Gauge Readings

	KV DC	SPARKS/MIN.	V AC	AMPS DC	Amps AC
Initial Readings:					
Set 1	42	0	170	0.090	38
Set 2	38	0	315	0.73	230
Set 3	42	0	295	1.45	230
Final Readings:					
Set 1	41	0	170	0.90	30
Set 2	37.5	0	310	0.73	230
Set 3	40	0	290	1.45	230

All Rectifier Sets on? Yes

Comments:

135 TPH ← from strip chart

Signed: John J. Hawley

Emission Testing Control Room Data Sheet — TEST 2

SES-10

Test Date 5-11-90 Test Start Time Approx. 9:35 AM Test Finish Time Approx. 10:40 AM

Time	Ore Rate (TPH)	SK-1 Exhaust Gas Temp (°F)	SK-1 Draft ("H2O)	Gas Flow Rate (CFM)	Prod Temp (°F)	Cyclones (OK or Not)	PC-19 (OK or Not)
9:30	3469	398	2.2	60546	344	OK	OK
9:45	3503	398	2.3	61011	367	OK	OK
10:00	3536	397	2.3	61440	370	OK	OK
10:15	3572	396	2.3	61856	368	OK	OK
10:30	3605	397	2.4	62322	369	OK	OK
10:45	3641	396	2.2	62631	370	OK	OK
	↑ 138 TPH ↑ from Ramsey						

Precipitator Guage Readings

	KV DC	SPARKS min.	V AC	Amps DC	Amps AC
Initial Readings:					
Set 1	41	0	170	0.090	30
Set 2	325	0	310	0.73	230
Set 3	40	0	290	1.45	230
Final Readings:					
Set 1	41.5	0	170	0.90	30
Set 2	39	0	315	0.74	230
Set 3	41	0	300	1.46	230

All Rectifier Sets on? yes

Comments: TPH ± from ~~open~~ strip chart

	TPH
9:30	138
9:45	140
10:00	138
10:15	140
10:30	138

Signed: John A Hawley

Emission Testing Control Room Data Sheet — Test 3

SES-10

Test Date 5-11-90 Test Start Time Approx 11:05 AM Test Finish Time Approx. 12:10 PM

Time	Ore Rate (TPH)	SK-1 Exhaust Gas Temp (°F)	SK-1 Draft ("H2O)	Gas Flow Rate (CFM)	Prod Temp (°F)	Cyclones (OK or Not)	PC-19 (OK or Not)
11:00	3675	397	2.2	63025	369	OK	OK
11:15	3709	396	2.3	63460	370	OK	OK
11:30	3745	396	2.2	63910	369	OK	OK
11:45	3781	395	2.2	64362	368	OK	OK
12:00 NOON	3814	396	2.2	64659	369	OK	OK
12:15 PM	3851	395	2.2	65064	369	OK	OK

↑ 142 TPH (from Ramsey)

Precipitator Gauge Readings

	KV DC	SPARKS/MIN.	V AC	AMPS DC	Amps AC
Initial Readings:					
Set 1	42	0	170	0.08	30
Set 2	39	0	320	0.73	230
Set 3	41	0	300	1.45	230
Final Readings:					
Set 1	42	0	170	0.08	30
Set 2	39	0	320	0.72	230
Set 3	41	0	295	1.45	230

All Rectifier Sets On? Yes

Comments:

TPH (from chart)

11:00	140
11:15	140
11:30	140
11:45	140
12:00	138

Signed: John S. Hawley

Emissions Testing Control Room Data Sheet — Test 1

SES-12

Test Date 5-12-90 Test Start Time Approx. 7:15 AM Test Finish Time Approx. 8:20 AM

Time	Prod. Rate (TPH)	Gas Flow Rate (CFM)	5K-2 Exhaust Gas Temp (°F)	5K-2 Draft ("H_2O)	Prod. Temp (°F)	Cyclones (OK or Not)	Cooler (5BH-13) Classifier (TOTAL ΔP) Bag house 1st cell ("ΔP)	2nd cell ("ΔP)	3rd cell ("ΔP)
7:15AM	49	3900	319	-8.29	310	OK		1.8	
7:45	50	3910	314	-9.14	304	OK		1.7	
8:00	50	3907	310	-8.34	303	OK		1.7	
8:15	49	3910	319	-8.24	309	OK		1.6	
8:30	45	3911	343	-8.32	325	OK		1.6	

WATER 0.4

Precipitator Gauge Readings

	PRIMARY A-C Volts	PRIMARY Amps	LOAD VOLT. K Volts	LOAD VOLT. DC Amps	sparks/min
Initial Readings:					
Set 1	130	0	25-30	0	50
Set 2	225	42	32	0.18	5
Set 3	225	34	40	0.3	0
Set 4	200	25	30	0.38	38
Final Readings:					
Set 1	260	25	32	0.1	24
Set 2	225	40	30	0.18	4
Set 3	225	34	38	0.3	0
Set 4	280	25	30	0.35	38

All Rectifier Sets On? yes

Group 5 1) 5K-2 Draft ("H_2O)
2) BAG HOUSE (ΔP)

Group 14 1) TPH
2) Exh. Temp
3) Prod. Temp.

Comments:

Signed John D. Hawley

Emissions Testing Control Room Data Sheet

Test 2

5E5-12

Test Date 5-12-90 Test start time Approx. 9:50 ~~9:45~~ AM Test Finish Time Approx. 10:10 ~~10:00~~ AM

Time	Prod. Rate (TPH)	Gas Flow Rate (CFM) (X10)	5K-2 Exhaust Gas Temp (°F)	5K-2 Draft ("H_2O)	Prod Temp (°F)	Cyclones (OK or Not)	Cooler (5BH-13) Classifier Bag house (TOTAL ΔP) 1st Cell ("ΔP)	2nd Cell ("ΔP)	3rd Cell ("ΔP)
8:45	48	3905	344	-6.99	330	OK		1.6	
9:00	49	3910	337	-5.51	324	OK		1.7	
9:15	~~49~~ 50	3906	328	-5.55	318	OK		1.7	
9:30	50	3905	335	-6.00 -2.45	320	OK		1.6	
9:45	48	3901	347	~~-2.45~~	328	OK		1.6	
10:00	55	3910	324	-1.05	308	OK		1.6	
10:15	53	~~3910~~ 4100	326	-0.99	310	OK		1.6	

Precipitator Gauge Readings

	PRIMARY A.C Volts	PRIMARY Amps	LOAD VOLT A KV Volts	LOAD VOLT A DC Amps	Sparks/min
Initial Readings:					
Set 1	260	25	32	0.1	24
Set 2	225	40	30	0.18	4
Set 3	225	34	38	0.3	0
Set 4	200	25	30	0.35	38
Final Readings:					
Set 1	225	0	31	.05	30
Set 2	225	50	30	.2	5
Set 3	225	35	39	.3	0
Set 4	200	25	32	.35	40

All Rectifier Sets On? yes

Comments:

Signed John A. Hawley

Emissions Testing Control Room Data Sheet

SES-12

Test 3

Test Date 5-12-90 Test Start Time Approx 10:30 Am Test Finish Time Approx 11:35

Time	Prod. Rate (TPH)	Gas Flow Rate (C.F.M.)	5K-2 Exhaust Gas Temp (°F)	5K-2 Draft ("H₂O)	Prod. Temp (°F)	Cyclones (OK or Not)	Cooler (5BH+13) Bag house 1st c/ll ("ΔP)	2nd c/ll ("ΔP)	Classifier (TOTAL ΔP) 3rd c/ll ("ΔP)
10:30	55	4500	295	.56	287	OK		1.7	
10:45	55	4300	307	0.59	303	OK		1.7	
11:00	56	4380	308	0.18	302	OK		1.7	
11:15	56	4337	313	0.58	304	OK		1.8	
11:30	54	4340	315	0.59	307	OK		1.7	

Precipitator Gauge Readings

	PRIMARY A-C Volts	PRIMARY Amps	COND Volts K	COND DC Amps	Sparks / MIN.
Initial Readings:					
Set 1	225	0	36	.05	30
Set 2	225	50	30	.2	5
Set 3	225	35	37	.3	0
Set 4	200	25	32	.35	40
Final Readings:					
Set 1	160	0	25	0	48
Set 2	225	32	30	.1	6
Set 3	250	34	39	.3	0
Set 4	210	25	32	.35	40

All Rectifier Sets On? yes

Comments:

Signed

Emissions Testing Control Room Data Sheet

SES-12

TEST 1A

ABOK1

Test Date 5-11-90 Test start time Approx. 2:20 PM Test Finish Time Approx. 3:25 PM

Time	Prod. Rate (TPH)	Gas Flow Rate (CFM)	SK-2 Exhaust Gas Temp (°F)	SK-2 Draft ("H_2O)	Prod. Temp (°F)	Cyclones (OK or Not)	Cooler (SB4-13) (TOTAL ΔP) Bag house 1st cell ("ΔP)	2nd cell ("ΔP)	3rd cell ("ΔP)
1:30PM	52	26764	301	0.59	298	OK		1.6	
2:00PM	53	28430	299	-0.75	294	OK	1.7	~~1.6~~	
2:15	53	29790	300	-0.16	295	OK		1.7	

Classifier

Precipitator Gauge Readings

		PRI. VOLT. AC VOLTS	PRI. VOLT. AC AMPS	LOAD V. KiloVolts	LOAD CUR. DC Amp.	~~LOAD~~ ~~CUR.~~ SPARKS/MIN
Initial Readings:						
Set	1	150	0	20-30	0.02	42
Set	2	225	40	31	0.14	10
Set	3	225	35	38	0.30	0
Set	4	200	25	32	0.3-0.4	39
Final Readings:						
Set	1					
Set	2					
Set	3					
Set	4					

*1 → DRYER OUTLET PRESS. Group 14

All Rectifier Sets On? yes

Comments:

Group 14/5

Signed John S. Hawley

Emissions Testing Control Room Data Sheet

SES-12

Test Date _____ Test Start Time _____ Test Finish Time _____

Time	Prod. Rate (TPH)	Gas Flow Rate (CFM)	SK-2 Exhaust Gas Temp (°F)	SK-2 Draft ("H_2O)	Prod. Temp (°F)	Cyclones (OK or Not)	(SBK-13) Cooler Classifier Bag house (TOTAL ΔP) 1st c/ll ("ΔP)	2nd c/ll ("ΔP)	3rd c/ll ("ΔP)	Precipitator Gauge Readings
										Initial Readings:
										Final Readings:

All Rectifier Sets On? _____

Comments:

Signed _____

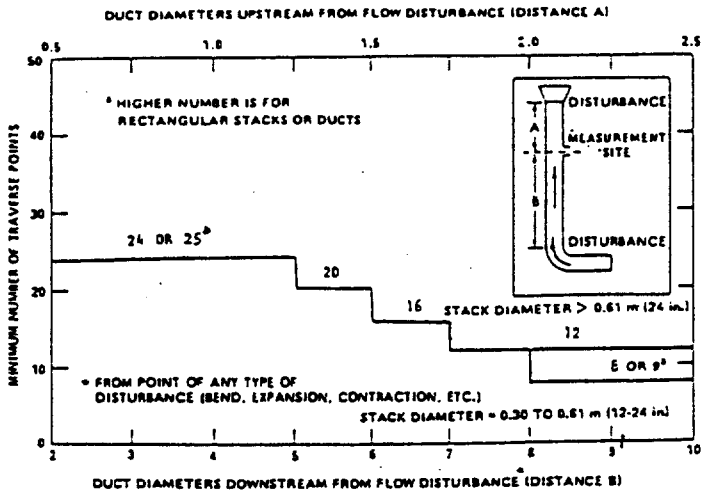
APPENDIX D
FIELD DATA SHEETS

TRC

EPA REFERENCE METHOD 1
FIELD DATA SHEET

Firm Name: Rhone-Poulenc
Plant Location: Green River, Wy.
Sampling Location: SES10-Precipitator
TRC Project No.:
Date: 05-11-90
Technician: J. Rasburg

Stack Diameter: 72"
Sample Port Diameter: 4.0"
Sample Port Depth: 2.0"
Distance Upstream: 396" (Diameters = 5.22)
Distance Downstream: 656" (Diameters = 9.11)



Traverse Point Number	Number Traverse Points On A Diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Traverse Points	
No.	Distance From Wall
1	3.17 * pan length
2	10.51
3	21.31
4	50.69
5	61.49
6	68.83
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #2	DUCT DIA.	72"	BAROMETRIC PRESS	23.69
PLANT LOCATION	Green River, Wyo	PROBE I.D.	6.0'	DUCT AREA	28.274577 ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	~~ESP-2~~ ESP-12-1	NOZZLE I.D.	A-12	TEST DURATION	60.0	METER γd	1.0044
LOCATION	ESP-12 - Precipitator	NOZZLE DIA.	0.365, 0.365, 0.366 Avg 0.3653	TRAVERSE INTERVAL	5.0	ORIFICE dH@	1.8035
PROJECT NO.		FILTER TYPE	6" F.	FILTER TEMP	248±25	K FACTOR	0.1688/0.2816
DATE	05-12-90	FILTER NO.	3009	PROBE TEMP	248±25	START TIME	0716
TECHNICIAN	J. Rosburg			ASSUMED MOISTURE	28	STOP TIME	0818

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
N	1	0.0	0.04	0.35	48	48	to.10	235	87.707	225	43	2.0	228
	2	5.0	0.20	1.68	52	50	to.12	238	90.02	229	43	6.0	232
	3	10.0	0.24	1.96	57	51	to.12	239	93.48	230	44	7.5	234
	4	15.0	0.13	1.06	58	52	to.11	240	97.57	233	45	5.0	235
	5	20.0	0.13	1.08	62	54	to.11	241	100.72	237	46	5.5	235
	6	25.0	0.12	0.99	64	57	to.11	239	103.97	236	47	5.0	238
E	7	30.0	0.11	0.91	64	58	to.10	238	107.068	242	50	5.0	237
	8	35.0	0.22	1.82	67	60	to.10	233	111.04	250	50	7.5	235
	9	40.0	0.25	2.07	68	60	to.13	238	114.25	253	50	9.0	236
	4	45.0	0.28	2.32	68	61	to.14	238	118.06	248	52	10.0	238
	5	50.0	0.20	1.66	69	62	to.11	237	122.66	255	58	8.0	232
	6	55.0	0.14	1.16	68	62	to.10	233	126.61	254	61	8.0	230
		60.0							130.203				
AVERAGE									42.496				

$\overline{\sqrt{\Delta P}} = 0.4047$ $\overline{\Delta H} = 1.4158$ $T_m = 59.17$ $\overline{P_s} = 0.11$ $T_s = 236.83$

DATA REDUCTION — QUALITY CHECK DATA

MOISTURE DATE

WATER COLLECTED	INITIAL	FINAL
Impinger 1	100	288
Impinger 2	100	170
Impinger 3	—	—
SILICA GEL	300	313.0
TOTAL		271

VELOCITY 30.53
MOISTURE ~~26.97~~ 27.02
ISOKINETIC % 98.61
STD. VOLUME

START 0.002 CFM@ 15.0 "HG
END 0.002 CFM@ 13.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wy	BAROMETRIC PRESSURE	23.69
TEST NO.	5 ES12-1	STACK PRESSURE	-0.11
SAMPLING LOCATION	ES12- Precipitator	AMBIENT TEMP	50
TRC PROJECT NO.		PERCENT MOISTURE	~26
DATE	05-12-90	COLLECTION TIME	0719-0810
TECHNICIAN	J. Rosburg	ANALYSIS TIME	0850

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	8.4	8.4	8.4	8.4			8.4
O2	18.2	9.8	18.2	9.8			9.8
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #2	DUCT DIA.	72"	BAROMETRIC PRESS	23.70
PLANT LOCATION	Green River, Wy	PROBE I.D.	6.0'	DUCT AREA	28.2743 FT²	PITOT COEFFICIENT	0.84
TEST NUMBER	5E3/2-2	NOZZLE I.D.	A-12	TEST DURATION	60.0	METER Yd	1.0049
LOCATION	5E3/2-Incin Stack	NOZZLE DIA.	A-12 0.3653	TRAVERSE INTERVAL	5.0	ORIFICE dH@	1.8035
PROJECT NO.		FILTER TYPE	G.F.	FILTER TEMP	248 ± 25	K FACTOR	8.426/8.477
DATE	05-12-90	FILTER NO.	5010	PROBE TEMP	248 ± 25	START TIME	0904
TECHNICIAN	CTH			ASSUMED MOISTURE	28	STOP TIME	1006

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	ΔH	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
N	1	00	0.26	2.19	66	64	+0.	10	242	130.418	228	50	9.0	231
	2	05	0.28	2.36	68	65	+0.	10	243	134.777	230	48	10.0	229
	3	10	0.30	2.53	71	66	+0.	10	245	139.455	229	49	11.0	229
	4	15	0.19	1.60	72	66	+0.	10	246	143.932	230	51	8.0	230
	5	20	0.38	3.20	74	68	+0.	12	247	148.300	230	54	15.0	231
	6	25	0.23	1.95	76	69	+0.	10	245	153.711	234	57	9.0	232
E	1	30	0.35	2.97	76	71	+0.	12	242	158.006	247	56	13.0	233
	2	35	0.35	2.97	78	72	+0.	12	245	163.311	234	56	13.0	232
	3	40	0.27	2.29	80	74	+0.	12	248	168.548	240	60	11.0	230
	4	45	0.26	2.20	82	75	+0.	11	249	173.277	237	60	10.5	231
	5	50	0.29	2.46	82	76	+0.	10	248	177.788	240	60	11.0	233
	6	55	0.30	2.56	84	77	+0.	11	247	182.978	244	61	12.0	240
		60								187.597				
AVERAGE										57.179				

$\sqrt{\Delta P} = 0.5348$ $\Delta H = 2.4490$ $T_M = 73.00$ DATA REDUCTION $P_s = 0.11$ $T_S = 245.58$ LEAK CHECK DATA VM

MOISTURE DATE

WATER COLLECTED	INITIAL	FINAL
Impinger 1	160	380
Impinger 2	160	167
Impinger 3	—	—
SILICA GEL	300	319.3
TOTAL		366.3

VELOCITY	40.64
MOISTURE	27.56
ISOKINETIC %	99.35
STD. VOLUME	

START 0.007 CFM@ 16.0 "HG
END 0.005 CFM@ 17.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	INTEGRATED
PLANT LOCATION	Green River, WY	BAROMETRIC PRESSURE	23.70
TEST NO.	SES12 [redacted]	STACK PRESSURE	+0.12
SAMPLING LOCATION	SES12 - Precip Stack	AMBIENT TEMP	48°F
TRC PROJECT NO.		PERCENT MOISTURE	28%
DATE	05-12-90	COLLECTION TIME	0904 - 1005
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1070

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	8.6	8.6	8.6	8.6			8.6
O2	18.6	10.0	18.6	10.0			10.0
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.

		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #2	DUCT DIA.	72"	BAROMETRIC PRESS	23.71
PLANT LOCATION	Green River, WY	PROBE I.D.	6.0 ft	DUCT AREA	28.2743 ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	SES12-3	NOZZLE I.D.	A-12	TEST DURATION	60 min	METER Yd	1.0044
LOCATION	SES12 - Prairie Stack	NOZZLE DIA.	0.5653	TRAVERSE INTERVAL	5-0 min	ORIFICE dH@	1.8035
PROJECT NO.		FILTER TYPE	Gelman	FILTER TEMP	248 ± 25	K FACTOR	8.6314
DATE	05-12-90	FILTER NO.	3014	PROBE TEMP	248 ± 25	START TIME	1080
TECHNICIAN	JBO			ASSUMED MOISTURE	28	STOP TIME	1132

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
N	1	0 6 0	0.25	2.16	80	79	+0.11	241	187.821	232	60	3.5	228
	2	0 5 0	0.38	3.27	81	79	+0.12	242	192.355	234	50	5.5	229
	3	1 0 0	0.28	2.42	83	79	+0.10	246	197.837	236	52	5.0	230
	4	1 5 0	0.35	3.02	83	78	+0.12	248	202.753	243	52	5.5	232
	5	2 0 0	0.38	3.27	83	79	+0.12	247	208.806	244	53	6.0	235
	6	2 5 0	0.26	2.24	82	78	+0.10	246	213.600	245	55	5.0	238
E	1	3 0 0	0.35	3.02	79	77	+0.11	248	218.381	247	54	5.5	232
	2	3 5 0	0.29	2.50	79	77	+0.10	248	223.364	247	53	5.5	236
	3	4 0 0	0.33	2.85	81	78	+0.11	246	228.577	254	58	6.0	235
	4	4 5 0	0.24	2.07	81	78	+0.12	244	233.380	256	60	5.0	231
	5	5 0 0	0.30	2.59	81	77	+0.10	244	238.332	254	58	5.0	238
	6	5 5 0	0.32	2.76	81	77	+0.10	245	243.321	256	62	5.5	236
		6 0 0							248.335				
AVERAGE									60.514				

$\sqrt{\Delta P}$ = 0.3560 $\quad \Delta H$ = 2.6808 $\quad T_m$ = 79.58 $\quad P_s$ = 0.10 $\quad T_s$ = 245.42

DATA REDUCTION $\qquad$ LEAK CHECK DATA

MOISTURE DATE

WATER COLLECTED	INITIAL	FINAL
Impinger 1	100	360
Impinger 2	100	252
Impinger 3	—	—
SILICA GEL	300	321.2
TOTAL		333.2

VELOCITY	41.99
MOISTURE	24.85
ISOKINETIC %	96.95
STD. VOLUME	(63.21)

START 0.003 CFM@ 150 "HG
END 0.002 CFM@ 11.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wy	BAROMETRIC PRESSURE	23.71
TEST NO.	SES 12-3	STACK PRESSURE	-0.10
SAMPLING LOCATION	SES12 - Precipitator	AMBIENT TEMP	54
TRC PROJECT NO.		PERCENT MOISTURE	≈26
DATE	05-12-90	COLLECTION TIME	1034 - 1128
TECHNICIAN	J. Rosbury	ANALYSIS TIME	1155

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 17.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	8.6	8.6	8.6	8.6			8.6
O2	18.6	10.0	18.6	10.0			10.0
CO							

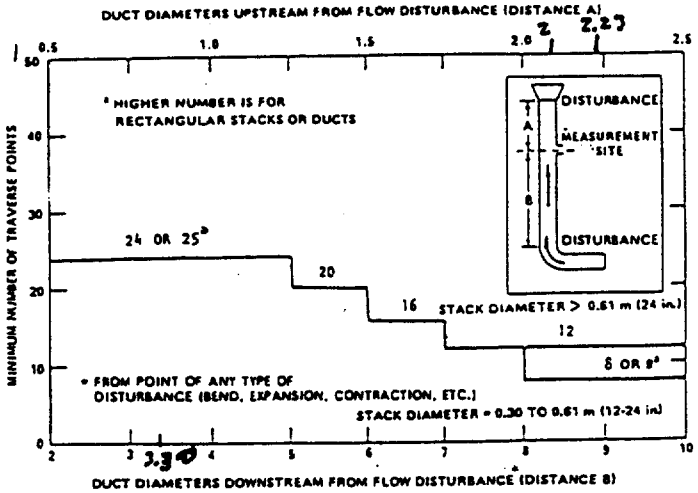
COMMENTS:

TRC

EPA REFERENCE METHOD 1
FIELD DATA SHEET

Firm Name: Rhone Poulenc
Plant Location: Green River, Wyo
Sampling Location: SES 10 - Precipitator
TRC Project No.:
Date: 05-11-90
Technician: J. Rosburg

Stack Diameter: 107"
Sample Port Diameter: 4.0"
Sample Port Depth: 2.0"
Distance Upstream: 48" Dia = 0.45
Distance Downstream: 353" Dia = 3.30



Traverse Point Number	Number Traverse Points On A Diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	38.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Traverse Points	
No.	Distance From Wall
1	2.25 + port
2	7.17
3	12.63
4	18.94
5	26.75
6	38.09
7	68.91
8	80.25
9	88.06
10	94.37
11	99.83
12	104.75
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

TRC

EPA REFERENCE METHOD 2
FIELD DATA SHEET

FIRM NAME	Rhone Poulenc	STACK DIMENSIONS	8.92' 107" AREA 62.49
PLANT LOCATION	Green River	BAROMETRIC PRESSURE	23.54
TEST NO.	Flow	STACK PRESSURE	-0.20
SAMPLING LOCATION	SES 10	GAS MOLECULAR WEIGHT	
TRC PROJECT NO.		PERCENT MOISTURE	≅ 10.0
DATE	05-11-90	PITOT NO.	~~0.849.0'~~ Cp 0.84
TECHNICIAN	J. Rehurg	TEST TIME	0730

PORT	POINT	dP	dP	Ts F
5		0.39		391
		0.40		392
		0.42		392
		0.45		393
		0.45		393
		0.44		392
		0.42		387
		0.38		388
		0.34		386
		0.31		384
		0.28		382
		Average	0.6221	389.27F

PORT	POINT	dP	dP	Ts F
		Average		F

VELOCITY 52.31 (FPS)

FLOWRATE 195,995 ACFM 67,040 DSCFM _____

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.

		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech 4	DUCT DIA.	107"	BAROMETRIC PRESS	23.50
PLANT LOCATION	Corpus River, WV	PROBE I.D.	9.0 Ft.	DUCT AREA	62.497	PITOT COEFFICIENT	0.84
TEST NUMBER	5810-2	NOZZLE I.D.	C-10	TEST DURATION	60.0	METER Yd	1.0095
LOCATION	5810 - Precip. Stack	NOZZLE DIA.	0.2963	TRAVERSE INTERVAL	2.5 min	ORIFICE dH@	1.876
PROJECT NO.		FILTER TYPE	Gelf	FILTER TEMP	248 ± 25	K FACTOR	3.0214
DATE	05-11-90	FILTER NO.	3012	PROBE TEMP	241 ± 25	START TIME	0936
TECHNICIAN	HJD			ASSUMED MOISTURE	28	STOP TIME	1039

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
5	1	00	0.38	1.15	48	49	0.22	393	412.269	229	47	4.0	261
	2	2.5	0.38	1.15	51	49	0.22	393	413.82	231	45	4.0	262
	3	5.0	0.38	1.15	52	50	0.22	393	415.48	232	45	4.0	267
	4	7.5	0.40	1.21	53	50	0.22	393	417.19	234	45	4.0	263
	5	10.0	0.43	1.30	54	50	0.22	393	418.99	233	46	4.0	263
	6	12.5	0.46	1.39	55	51	0.23	394	420.10	233	47	4.0	262
	7	15.0	0.44	1.33	55	51	0.24	392	421.78	231	47	4.5	263
	8	17.5	0.41	1.24	56	52	0.23	391	423.44	233	47	4.0	263
	9	20.0	0.38	1.15	56	52	0.21	388	425.07	231	48	4.0	260
	10	22.5	0.35	1.06	56	52	0.22	387	426.62	234	48	4.0	255
	11	25.0	0.29	0.88	57	52	0.20	388	428.03	231	49	3.0	252
	12	27.5	0.23	0.69	56	52	0.20	389	429.45	233	48	3.0	255
E	1	30.0	0.37	1.12	55	52	0.21	388	430.70	233	49	3.5	254
	2	32.5	0.37	1.12	56	52	0.21	393	432.24	235	48	4.0	262
	3	35.0	0.40	1.21	58	53	0.23	392	433.66	242	49	4.0	267
	4	37.5	0.45	1.36	58	53	0.24	390	435.31	244	48	4.0	266
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	313
Impinger 2	100	128
Impinger 3	-	-
SILICA GEL	300	310.4
TOTAL		251.4

DATA REDUCTION

VELOCITY
MOISTURE
ISOKINETIC %
STD. VOLUME

LEAK CHECK DATA

START 0.004 CFM@ 13.0 "HG
END 0.002 CFM@ 7.0 "HG

A - upstream - 4.0'
B = 29.4' downstream

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech 4	DUCT DIA.	107"	BAROMETRIC PRESS	23.50
PLANT LOCATION	Geismar, LA	PROBE I.D.	9.0FT	DUCT AREA	62.48 ft	PITOT COEFFICIENT	0.84
TEST NUMBER	5670-2	NOZZLE I.D.	C-10	TEST DURATION	60 min	METER Yd	1.0095
LOCATION	5670 - Pump Stack	NOZZLE DIA.	0.2963	TRAVERSE INTERVAL	2.5 min	ORIFICE dH@	1.876
PROJECT NO.		FILTER TYPE	G.F.	FILTER TEMP	248 ± 25	K FACTOR	3.0214
DATE	05-11-90	FILTER NO.	3012	PROBE TEMP	248 ± 25	START TIME	0936
TECHNICIAN	JBO			ASSUMED MOISTURE	28	STOP TIME	1039

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
											48		
5	5	40	0.47	1.42	58	54	-0.26	391	438690	248	48	5.0	268
4	6	425	0.46	1.39	58	53	-0.22	390	438871	247	48	5.0	269
7	7	450	0.43	1.30	59	53	-0.22	393	440393	249	49	5.0	273
3	8	475	0.40	1.21	59	54	-0.22	391	442101	249	49	5.0	271
1	9	600	0.35	1.06	59	54	-0.23	394	443673	249	50	5.0	270
10	10	525	0.32	0.97	59	54	-0.20	395	445521	247	50	4.0	270
	11	550	0.30	0.91	59	54	-0.20	391	446666	246	50	4.0	268
	12	575	0.34	1.03	59	55	-0.20	388	448101	246	50	4.5	266
		600							449610				
AVERAGE			0.6169	1.1583		54.10	-0.22	391.25	37.34				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	313
Impinger 2	100	128
Impinger 3	-	-
SILICA GEL	300	310.4
TOTAL		251.4

DATA REDUCTION

VELOCITY	51.77
MOISTURE	27.98
ISOKINETIC %	97.61
STD. VOLUME	42.36

LEAK CHECK DATA

START 0.004 CFM@ 13.0 "HG
END 0.002 CFM@ 7.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	23.54
TEST NO.	SES10-1	STACK PRESSURE	-0.20
SAMPLING LOCATION	SES10 - Precipitator	AMBIENT TEMP	44
TRC PROJECT NO.		PERCENT MOISTURE	≈ 10
DATE	05-11-16	COLLECTION TIME	0754-0850
TECHNICIAN	J. Rosberg	ANALYSIS TIME	0940

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 19.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	9.8	9.8	9.8	9.8			9.8
O2	19.6	8.8	18.6	8.8			8.8
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech 4	DUCT DIA.	107"	BAROMETRIC PRESS	23.54
PLANT LOCATION	Green River, Wy	PROBE I.D.	710	DUCT AREA	62.49 ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	SEB10-1	NOZZLE I.D.	S-16	TEST DURATION	60.0	METER Yd	1.0075
LOCATION	SEB10- Precipitator	NOZZLE DIA.	0.294, 0.298, 0.297 Ave: 0.963	TRAVERSE INTERVAL	2.5	ORIFICE dH@	1.896
PROJECT NO.		FILTER TYPE	G.F	FILTER TEMP	248±25	K FACTOR	3.4310
DATE	05-11-90	FILTER NO.	3011	PROBE TEMP	248±25	START TIME	0254
TECHNICIAN	J. Zerberg			ASSUMED MOISTURE	22	STOP TIME	0858

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
S	1	0.0	0.38	1.30	44	43	-0.20	392	373.209	230	43	3.0	260
	2	2.5	0.40	1.37	45	44	-0.20	392	374.899	232	44	3.0	260
	3	5.0	0.42	1.44	45	44	-0.20	392	376.554	231	44	3.0	260
	4	7.5	0.45	1.54	47	44	-0.20	393	378.226	232	44	3.0	265
	5	10.0	0.45	1.54	47	44	-0.21	392	379.902	231	44	3.0	266
	6	12.5	0.45	1.54	47	44	-0.22	391	381.717	232	45	3.5	266
	7	15.1	0.42	1.44	49	44	-0.21	388	383.358	233	50	4.0	262
	8	17.6	0.36	1.24	49	45	-0.20	387	384.827	230	52	3.5	260
	9	20.0	0.33	1.13	49	45	-0.20	386	386.189	236	54	3.5	248
	10	22.5	0.31	1.06	49	45	-0.20	385	387.542	238	55	3.0	246
	11	25.0	0.30	1.03	49	45	-0.20	384	388.993	232	56	3.0	243
	12	27.5	0.30	1.03	50	46	-0.20	384	391.142	231	56	3.0	244
E	1	30.0	0.38	1.30	48	46	-0.21	390	392.880	235	50	3.0	262
	2	32.5	0.37	1.27	49	46	-0.21	391	394.545	230	52	3.0	263
	3	35.0	0.40	1.37	50	46	-0.22	392	396.165	228	53	3.5	264
	4	37.5	0.45	1.54	51	47	-0.25	393	397.881	231	54	4.0	262
AVERAGE													

MOISTURE DATE	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	244
Impinger 2	100	200
Impinger 3	-	—
SILICA GEL	300	315.5
TOTAL		859.5

DATA REDUCTION

VELOCITY	
MOISTURE	
ISOKINETIC %	
STD. VOLUME	

LEAK CHECK DATA

START 0.002 CFM@ 13.0 "HG

END 0.002 CFM@ 7.0 "HG

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech 4	DUCT DIA.	107"	BAROMETRIC PRESS	23.54
PLANT LOCATION	Green River, WY	PROBE I.D.	7.4'	DUCT AREA	62.49 ft	PITOT COEFFICIENT	0.84
TEST NUMBER	SRM10-1	NOZZLE I.D.	C-10	TEST DURATION	600	METER Yd	1.0095
LOCATION	SRM10-Precip Stack	NOZZLE DIA.	@ 2963	TRAVERSE INTERVAL	2.5 min	ORIFICE dH@	1.876
PROJECT NO.		FILTER TYPE	Q.F.	FILTER TEMP	248±25	K FACTOR	5.0096
DATE	~~05-11-90~~ 05-11-90	FILTER NO.	3011	PROBE TEMP	248±25	START TIME	0754
TECHNICIAN	JBO			ASSUMED MOISTURE	28	STOP TIME	0858

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
	5	40.0	0.45	1.54	51	47	-0.26	393	399.57	236	55	4.0	271
	6	42.5	0.46	1.38	51	47	-0.26	393	401.35	236	55	4.0	272
	7	45.0	0.44	1.32	51	47	-0.28	393	403.02	237	57	4.0	271
	8	47.5	0.41	1.23	51	47	-0.26	390	404.70	238	58	4.0	268
	9	50.0	0.39	1.14	51	47	-0.25	389	406.31	239	59	4.0	265
	10	52.5	0.34	1.02	52	48	-0.23	388	407.91	240	58	3.5	256
	11	55.0	0.30	0.90	52	48	-0.22	386	409.44	237	57	3.0	255
	12	57.5	0.23	0.69	52	48	-0.19	383	410.84	237	57	3.0	251
		60.0							412.950				
AVERAGE			0.6163	1.2675		47.42	-0.22	389.46	39.74				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	284
Impinger 2	100	200
Impinger 3	—	—
SILICA GEL	300	315.5
TOTAL		259.5

DATA REDUCTION

VELOCITY	51.48
MOISTURE	27.0%
ISOKINETIC %	104.74
STD. VOLUME	45.20

LEAK CHECK DATA

START 0.002 CFM@ 13.0 "HG
END 0.002 CFM@ 7.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	23.50
TEST NO.	SES10-2	STACK PRESSURE	-0.21
SAMPLING LOCATION	SES10-Precipitator	AMBIENT TEMP	45
TRC PROJECT NO.		PERCENT MOISTURE	≈28
DATE	05-11-90	COLLECTION TIME	0940 - 1033
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1100

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	9.2	9.2	9.2	9.2			9.2
O2	19.0	9.8	19.0	9.8			9.8
CO							

COMMENTS:

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.

FIRM NAME: Rhone-Poulenc
PLANT LOCATION: Gurnee River, WV
TEST NUMBER: SES10-3
LOCATION: SES10 Precip Stack
PROJECT NO.:
DATE: 05-11-90
TECHNICIAN: WJO

EQUIPMENT

CONTROL BOX NO.: Nutech 4
PROBE I.D.: 9.0 FT
NOZZLE I.D.: C-10
NOZZLE DIA.: 0.2963
FILTER TYPE: Gn. F.
FILTER NO.: 3013

SITE I.D.

DUCT DIA.: 107"
DUCT AREA: 62.49 ft
TEST DURATION: 60 min
TRAVERSE INTERVAL: 2.5 min
FILTER TEMP: 248 ± 25
PROBE TEMP: 248 ± 25
ASSUMED MOISTURE: 28

NOMOGRAPH

BAROMETRIC PRESS: 23.47
PITOT COEFFICIENT: 0.84
METER Yd: 1.0095
ORIFICE dH@: 1.876
K FACTOR: 3.02534 / 3.027 Y
START TIME: 1105
STOP TIME: 1203

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
S	1	00	0.36	1.10	60	58	0.22	395	449.787 Y	229	55	4.5	263
	2	25	0.37	1.13	61	58	0.20	395	451.39	231	53	4.5	266
	3	50	0.38	1.16	62	58	0.20	395	452.95	232	54	4.5	263
	4	75	0.43	1.31	63	58	0.21	396	454.52	232	54	4.5	265
	5	100	0.47	1.45	64	59	0.23	397	456.15	231	55	5.0	262
	6	125	0.47	1.45	66	60	0.23	396	457.87	228	57	5.0	264
	7	150	0.44	1.36	68	60	0.23	394	459.61	237	60	5.0	262
	8	175	0.41	1.27	70	61	0.20	393	461.30	241	63	5.0	266
	9	200	0.35	1.08	71	63	0.23	392	462.96	245	64	4.5	247
	10	225	0.36	1.11	73	64	0.22	391	464.53	247	66	5.0	242
	11	250	0.32	0.91	74	65	0.20	390	466.10	248	65	4.0	240
	12	275	0.27	0.83	75	66	0.20	388	467.53	251	65	4.0	239
E	1	300	0.39	1.22	74	67	0.22	396	469.21	254	68	4.5	244
	2	325	0.38	1.19	76	68	0.22	396	470.95	256	66	4.5	245
	3	350	0.38	1.19	76	68	0.22	397	472.61	257	64	4.5	244
	4	375	0.43	1.35	77	69	0.24	398	473.77	254	63	4.5	250
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	277
Impinger 2	100	152
Impinger 3	–	
SILICA GEL	300	312
TOTAL		741.2

DATA REDUCTION

VELOCITY
MOISTURE
ISOKINETIC %
STD. VOLUME

LEAK CHECK DATA

START 0.004 CFM@ 13.0 "HG
END 0.002 CFM@ 7.0 "HG

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.

FIRM NAME	Rhone-Poulenc	EQUIPMENT		SITE I.D.		NOMOGRAPH	
PLANT LOCATION	Green River, WY	CONTROL BOX NO.	Nutech 4	DUCT DIA.	107"	BAROMETRIC PRESS	23.47
TEST NUMBER	SES10-3	PROBE I.D.	9.0 feet	DUCT AREA	62.4977	PITOT COEFFICIENT	0.84
LOCATION	SES10 - Precip Stack	NOZZLE I.D.	C-10	TEST DURATION	60 min	METER Yd	1.0095
PROJECT NO.		NOZZLE DIA.	0.29823	TRAVERSE INTERVAL	2.5 min	ORIFICE dH@	1.876
DATE	05-11-90	FILTER TYPE	Gelman	FILTER TEMP	247 ± 25	K FACTOR	3.1251/3.1425
TECHNICIAN	DTO	FILTER NO.	3017	PROBE TEMP	248 ± 25	START TIME	1105
				ASSUMED MOISTURE	28	STOP TIME	1208

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	5	400	0.46	1.44	76	70	-0.26	399	475.42	250	63	5.0	268
	6	425	0.47	1.47	77	70	-0.26	398	477.16	250	65	5.0	265
	7	450	0.44	1.38	78	71	-0.25	397	478.96	248	66	5.0	262
	8	475	0.42	1.32	79	72	-0.23	395	480.69	248	65	5.0	261
	9	500	0.38	1.19	78	72	-0.24	392	482.39	247	67	5.0	265
	10	525	0.36	1.13	78	72	-0.23	391	484.02	246	66	5.0	260
	11	550	0.34	1.07	78	72	-0.20	392	485.60	245	66	4.5	258
	12	575	0.30	0.94	77	73	-0.19	390	487.15	246	67	4.0	252
		600							488.61				
AVERAGE			0.6237	1.2104		68.85	-0.22	394.29	30.831				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	277
Impinger 2	100	152
Impinger 3	—	—
SILICA GEL	300	312.2
TOTAL		741.2

DATA REDUCTION

VELOCITY	52.34
MOISTURE	26.96
ISOKINETIC %	96.60
STD. VOLUME	42.18

LEAK CHECK DATA

START	0.004	CFM@	13.0 "HG
END	0.002	CFM@	7.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone - Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	23.47
TEST NO.	5ES10-3	STACK PRESSURE	-0.21
SAMPLING LOCATION	5E10 Precipitator	AMBIENT TEMP	50
TRC PROJECT NO.		PERCENT MOISTURE	≅28
DATE	05-11-90	COLLECTION TIME	1109 - 1205
TECHNICIAN	J. Rasburg	ANALYSIS TIME	1243

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.9

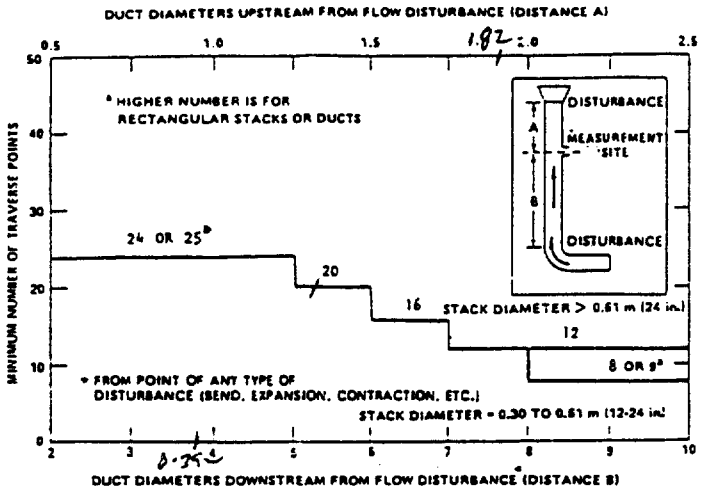
MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	9.4	9.4	9.4	9.4			9.4
O2	18.6	9.2	18.6	9.2			9.2
CO							

COMMENTS:

EPA REFERENCE METHOD 1
FIELD DATA SHEET

Firm Name:	Rhone-Poulenc	Stack Diameter	9.0' = 108"
Plant Location:	Green river, Wyoming	Sample Port Diameter	4.0"
Sampling Location:	4SE10	Sample Port Depth	4.0" w/nipple
TRC Project No.:		Distance Upstream	196.5"
Date:	05-08-90	Distance Downstream	423.5"
Technician:	J. Rosburg		



Traverse Point Number	Number Traverse Points On A Diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	38.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Traverse Points		
No.	Distance From Wall	
1	8.75	5.80
2	19.77	11.74
3	35.97	17.24
4	80.03	23.62
5	96.23	31.50
6	107.25	~~42.85~~
7		~~79~~ 79.05
8		85.50
9		93.38
10	~~97.76~~	~~105.26~~
11		105.26
12		100.69
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone - Poulenc	CONTROL BOX NO.	Nutech #3	DUCT DIA.	108"	BAROMETRIC PRESS	29.05
PLANT LOCATION	Greenriver, Wy.	PROBE I.D.	9.0	DUCT AREA	63.62 ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	4SB10-2	NOZZLE I.D.	C-12	TEST DURATION	60.0	METER Yd	1.0128
LOCATION	4SB10-Scrubber	NOZZLE DIA.	~~0.373, 0.375, 0.378 Ave 0.375~~	TRAVERSE INTERVAL	2.5	ORIFICE dH@	1.8962
PROJECT NO.		FILTER TYPE	G.F.	FILTER TEMP	248 ± 25	K FACTOR	~~9.9880~~ / 10.0632 / 9.8821
DATE	05-09-90	FILTER NO.	3002	PROBE TEMP	248 ± 28	START TIME	1410
TECHNICIAN	J. Rosburg	NOZZLE DIA= 0.3700 0.3700 CAL = 0.369, 0.370, 0.371		ASSUMED MOISTURE	30.0	STOP TIME	1513

DOWN 0930-1400

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	1	0.0	0.13	1.31	66	66	-0.10	157	600.893	239	56	4.0	225
	2	2.5	0.12	1.20	67	66	-0.10	155	602.611	236	55	4.0	228
	3	5.0	0.12	1.20	67	66	-0.10	155	604.220	238	54	4.0	229
	4	7.5	0.14	1.41	68	67	-0.10	155	605.880	244	53	4.0	228
	5	10.0	0.16	1.61	69	68	-0.10	156	607.571	248	52	4.0	228
	6	12.5	0.13	1.28	71	68	-0.11	156	609.134	248	52	4.5	228
	7	15.0	0.36	3.56	71	69	-0.22	156	611.055	248	53	9.0	228
	8	17.5	0.45	4.45	74	69	-0.22	156	613.688	242	54	11.5	228
	9	20.0	0.48	4.78	75	69	-0.24	156	616.666	244	55	13.0	229
	10	22.5	0.52	5.17	75	69	-0.26	156	619.822	228	55	14.0	229
	11	25.0	0.50	4.84	75	70	-0.25	156	622.886	228	56	14.0	229
	12	27.5	0.48	4.74	75	70	-0.22	156	625.952	230	57	14.0	229
S	1	30.0	0.05	0.47	71	70	-0.08	154	628.015	234	58	4.0	228
	2	32.5	0.05	0.49	71	70	-0.02	154	630.406	239	60	4.0	230
	3	35.0	0.06	0.59	71	70	-0.07	154	631.111	237	58	4.0	230
	4	37.5	0.06	0.59	71	70	-0.09	154	632.728	234	55	4.0	228
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	378
Impinger 2	100	222
Impinger 3	-	-
SILICA GEL	300	326.2
TOTAL		426.2

DATA REDUCTION

VELOCITY
MOISTURE
ISOKINETIC %
STD. VOLUME

LEAK CHECK DATA Note - miss last point by 2 inches

START 0.004 CFM@ 15.0 "HG
END 0.002 CFM@ 14.0 "HG

5/9/90

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.

FIRM NAME	Rhone-Poulenc
PLANT LOCATION	Greenriver, Wy
TEST NUMBER	4SC10-2
LOCATION	4SC10 - Scrubber
PROJECT NO.	
DATE	05-09-90
TECHNICIAN	J. Rasburg

EQUIPMENT

CONTROL BOX NO.	Nutech #3
PROBE I.D.	9.0'
NOZZLE I.D.	C-12
NOZZLE DIA.	0.3900
FILTER TYPE	G.F.
FILTER NO.	3002

SITE I.D.

DUCT DIA.	108"
DUCT AREA	63.62 ft²
TEST DURATION	60.0
TRAVERSE INTERVAL	5.0
FILTER TEMP	248 ± 25
PROBE TEMP	248 ± 25
ASSUMED MOISTURE	20

NOMOGRAPH

BAROMETRIC PRESS	24.05
PITOT COEFFICIENT	0.84
METER Yd	1.0128
ORIFICE dH@	1.8962
K FACTOR	9.8821
START TIME	1410
STOP TIME	1513

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
5	5	40.0	0.04	0.39	71	70	-0.09	156	633.43	232	55	3.5	228
	6	42.5	0.04	0.37	72	71	-0.08	156	634.41	235	54	3.5	229
	7	45.0	0.14	1.39	73	71	-0.12	156	635.35	232	54	6.0	228
	8	47.6	0.16	1.58	74	71	-0.11	156	637.06	232	53	6.0	228
	9	50.0	0.18	1.78	75	72	-0.11	155	638.91	237	52	6.5	229
	10	52.5	0.15	1.48	76	72	-0.10	155	640.85	243	53	6.0	229
	11	55.0	0.17	1.68	76	72	-0.09	155	642.60	242	54	6.0	228
	12	57.5	0.14	1.39	76	72	-0.08	155	644.49	240	54	6.0	228
		60.0							646.243				
AVERAGE			0.4159	1.9954	70.79		-0.13	155.42	4.53.50				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	378
Impinger 2	100	322
Impinger 3	—	—
SILICA GEL	300	326.2
TOTAL		426.2

DATA REDUCTION

VELOCITY	29.82
MOISTURE	35.24
ISOKINETIC %	103.43
STD. VOLUME	57.03

LEAK CHECK DATA

START	6.004	CFM@	15.0	"HG
END	0.002	CFM@	14.0	"HG

5/9/90

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	24.05
TEST NO.	4SE10-2	STACK PRESSURE	-0.13
SAMPLING LOCATION	4SE10-Scrubber	AMBIENT TEMP	48
TRC PROJECT NO.		PERCENT MOISTURE	35.
DATE	05-07-90	COLLECTION TIME	1410-1505
TECHNICIAN	J. Rasberry	ANALYSIS TIME	1745

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	8.0	8.0	8.0	8.0			8.0
O2	18.4	10.4	18.4	10.4			10.4
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.

FIRM NAME: Rhone-Poulenc
PLANT LOCATION: Greenriver, Ky
TEST NUMBER: 45E10-3
LOCATION: 45E10-Scrubber
PROJECT NO.:
DATE: 05-09-96
TECHNICIAN: J. Rosberg

EQUIPMENT

CONTROL BOX NO.: Nutech #3
PROBE I.D.: 4.0
NOZZLE I.D.: C-12
NOZZLE DIA.: ~~0.2773~~ 0.3700
FILTER TYPE: 6.F
FILTER NO.: 3003

SITE I.D.

DUCT DIA.: 108"
DUCT AREA: 63.6274
TEST DURATION: 60.0
TRAVERSE INTERVAL: 2.5
FILTER TEMP: 248 ± 25
PROBE TEMP: 245 ± 25
ASSUMED MOISTURE: 35

NOMOGRAPH

BAROMETRIC PRESS: 27.05
PITOT COEFFICIENT: 0.84
METER Yd: 1.0128
ORIFICE dH@: 1.8962
K FACTOR: 8.9222
START TIME: 1601
STOP TIME: 1705

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	5	40.0	0.048	0.71	77	76	-0.06	155	672.912	244	53	5.0	227
	6	42.5	0.08	0.71	78	76	-0.06	156	674.17	250	52	5.0	231
	7	45.0	0.12	1.07	78	76	-0.08	156	675.43	250	52	6.0	232
	8	47.5	0.18	1.61	78	76	-0.20	156	676.92	252	52	8.0	232
	9	50.0	0.21	1.87	78	76	-0.13	156	678.77	253	52	9.0	234
	10	52.5	0.12	1.07	77	76	-0.13	157	680.78	253	53	7.0	234
	11	55.0	0.08	0.71	79	76	-0.10	156	682.29	254	53	5.5	235
	12	57.5	0.06	0.54	78	76	-0.06	156	683.56	254	53	5.0	236
		60.0							684.662				
AVERAGE			0.3640	1.2783		76.60	-0.09	155.67	38.217				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	403
Impinger 2	100	152
Impinger 3	-	-
SILICA GEL	300	317.2
TOTAL		369.2

DATA REDUCTION

VELOCITY: 26.51
MOISTURE: 36.17
ISOKINETIC %: 98.12
STD. VOLUME: 48.13

LEAK CHECK DATA

START 0.002 CFM@ 16.0 "HG
END 0.001 CFM@ 12.0 "HG

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.

		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #3	DUCT DIA.	108"	BAROMETRIC PRESS	24.05
PLANT LOCATION	Kincaid River, Wy	PROBE I.D.	9.0'	DUCT AREA	63.62 ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	4SB10-3	NOZZLE I.D.	C-12	TEST DURATION	60.0	METER Yd	1.0128
LOCATION	4SB10 - Scrubber	NOZZLE DIA.	0.2947 0.3700	TRAVERSE INTERVAL	2.5	ORIFICE dH@	1.8962
PROJECT NO.		FILTER TYPE	G.F.	FILTER TEMP	248 ± 25	K FACTOR	8.9222
DATE	05-09-90	FILTER NO.	3003	PROBE TEMP	248 ± 25	START TIME	1601
TECHNICIAN	J. Fosburg			ASSUMED MOISTURE	30	STOP TIME	1705

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
#3	1	0.0	0.16	1.43	76	76	-0.11	156	646445	227	52	5.0	227
	2	2.5	0.17	1.34	78	76	-0.11	156	648.22	230	50	5.0	228
	3	5.0	0.20	1.78	77	76	-0.12	156	649.91	230	50	6.0	228
	4	7.5	0.22	1.96	77	76	-0.11	156	651.80	230	50	6.0	227
	5	10.0	0.20	2.68	79	76	-0.10	155	653.80	232	48	8.0	228
	6	12.5	0.20	2.68	79	75	-0.12	155	656.15	233	48	9.0	229
	7	15.0	0.20	1.78	78	75	-0.12	156	658.49	234	49	7.0	230
	8	17.5	0.20	1.78	77	76	-0.13	155	660.46	236	50	7.0	231
	9	20.0	0.21	1.87	78	75	-0.13	156	662.43	235	51	7.5	232
	10	22.5	0.23	2.05	77	74	-0.15	155	664.40	237	52	8.0	231
	11	25.0	0.08	0.71	77	74	-0.10	155	666.87	237	52	6.0	230
	12	27.5	0.08	0.71	76	75	-0.10	155	668.81	236	52	6.0	230
#E	1	30.0	0.03	0.27	76	75	-0.04	155	669.05	240	53	4.0	232
	2	32.5	0.05	0.45	77	75	-0.05	155	669.87	242	53	4.0	232
	3	35.0	0.05	0.45	77	75	-0.05	156	670.89	241	54	4.0	231
	4	37.5	0.05	0.45	78	76	-0.06	156	671.90	242	54	4.0	231
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	407
Impinger 2	100	153
Impinger 3	-	-
SILICA GEL	300	313.2
TOTAL		

DATA REDUCTION

VELOCITY
MOISTURE
ISOKINETIC %
STD. VOLUME

LEAK CHECK DATA

START 0.002 CFM@ 16.0 "HG
END 0.001 CFM@ 12.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	24.05
TEST NO.	4SC10-3 Scrubber	STACK PRESSURE	-0.09
SAMPLING LOCATION	4SC10 - Scrubber	AMBIENT TEMP	48
TRC PROJECT NO.		PERCENT MOISTURE	≈ 36
DATE	05-09-90	COLLECTION TIME	1610 - 1700
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1950

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 17.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	7.4	7.4	7.4	7.4			7.4
O2	17.2	9.8	17.2	9.8			9.8
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 2

TEST I.D.

FIRM NAME	Rhone-Poulenc
PLANT LOCATION	Green River, Wy
TEST NUMBER	4SB10-4
LOCATION	4SB10-Scrubber
PROJECT NO.	
DATE	05-09-90
TECHNICIAN	J. Rosburg

EQUIPMENT

CONTROL BOX NO.	Nutech #3
PROBE I.D.	9.0'
NOZZLE I.D.	C-18
NOZZLE DIA.	0.2943 0.3700
FILTER TYPE	6.F
FILTER NO.	3004

SITE I.D.

DUCT DIA.	108"
DUCT AREA	62.624 ft²
TEST DURATION	60.0
TRAVERSE INTERVAL	7.5
FILTER TEMP	248 ± 25
PROBE TEMP	248 ± 25
ASSUMED MOISTURE	30.0

NOMOGRAPH

BAROMETRIC PRESS	24.07
PITOT COEFFICIENT	0.84
METER Yd	1.0128
ORIFICE dH@	1.8962
K FACTOR	9.0232
START TIME	1734
STOP TIME	1838

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	1	0.0	0.05	0.45	76	76	-0.10	156	684.793	230	58	7.0	228
	2	2.5	0.05	0.45	77	76	-0.10	156	685.82	232	53	4.0	229
	3	5.0	0.08	0.72	77	76	-0.11	157	686.87	234	52	5.0	230
	4	7.5	0.08	0.72	78	76	-0.12	157	688.10	235	52	5.0	230
	5	10.0	0.10	0.90	78	76	-0.13	156	689.36	236	52	6.0	231
	6	12.5	0.14	1.26	78	76	-0.14	156	690.78	236	52	7.0	231
	7	15.0	0.18	1.62	79	76	-0.13	156	692.38	238	52	7.5	232
	8	17.5	0.14	1.26	79	76	-0.12	156	694.18	239	52	7.5	232
	9	20.0	0.12	1.08	79	76	-0.11	156	695.90	240	52	7.0	234
	10	22.5	0.05	0.45	80	77	-0.09	155	697.42	240	52	5.0	235
	11	25.0	0.08	0.72	80	77	-0.09	155	698.44	241	52	6.0	234
	12	27.5	0.03	0.27	80	77	-0.08	155	699.66	241	52	4.0	234
5	1	30.0	0.06	0.54	79	77	-0.08	155	700.46.5	241	52	4.0	234
	2	32.5	0.08	0.72	80	77	-0.10	155	701.60	242	53	5.0	232
	3	35.0	0.11	0.99	81	77	-0.11	155	702.87	243	53	6.0	230
	4	37.5	0.11	0.99	81	77	-0.11	155	704.34	241	53	6.0	232
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	403
Impinger 2	100	156
Impinger 3	tr	-
SILICA GEL	300	316.2
TOTAL		303.2

DATA REDUCTION

VELOCITY	
MOISTURE	
ISOKINETIC %	
STD. VOLUME	

LEAK CHECK DATA

START	0.003	CFM@	16.0	"HG
END	0.001	CFM@	12.0	"HG

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 2 OF 2

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #3	DUCT DIA.	108"	BAROMETRIC PRESS	24
PLANT LOCATION	Green River, Wy	PROBE I.D.	9.0'	DUCT AREA	63.62 Ft²	PITOT COEFFICIENT	0.84
TEST NUMBER	45E10-4	NOZZLE I.D.	C-1R	TEST DURATION	60.0	METER Yd	1.0128
LOCATION	45E10 - Scrubber	NOZZLE DIA.	0.2943 0.2700	TRAVERSE INTERVAL	2.5	ORIFICE dH@	1.8962
PROJECT NO.		FILTER TYPE	6.F	FILTER TEMP	248±25	K FACTOR	9.0232
DATE	05-09-96	FILTER NO.	3004	PROBE TEMP	248±25	START TIME	1734
TECHNICIAN	J. Rosburg			ASSUMED MOISTURE	30.0	STOP TIME	1838

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
5	5	40.0	~~0.47~~ 0.67	~~1.49~~ 1.99	79	76	-0.13	157	705837	243	53	7.5	233
	6	42.5	0.23	2.08	79	75	-0.13	156	707.572	244	54	10.0	234
	7	45.0	0.25	2.26	79	75	-0.13	156	709.668	244	54	10.5	235
	8	47.5	0.19	1.71	79	75	-0.13	155	711.442	241	55	10.0	234
	9	50.0	0.10	0.90	80	76	-0.12	155	713.278	241	54	8.0	235
	10	52.5	0.08	0.72	79	75	-0.09	156	715.126	242	54	7.0	236
	11	55.0	0.08	0.72	78	75	-0.08	156	716.965	241	55	7.0	238
	12	57.5	0.08	0.72	77	75	-0.09	156	718.781	242	55	7.0	237
		60.0							719.075				
AVERAGE			0.3208	0.9871		77.4	-0.11	155.7	334.202				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	102	403
Impinger 2	100	156
Impinger 3	-	6
SILICA GEL	300	310.2
TOTAL		383.2

DATA REDUCTION

VELOCITY	23.26
MOISTURE	34.89
ISOKINETIC %	97.08
STD. VOLUME	41.81

LEAK CHECK DATA

START 0.001 CFM@ 16.0 "HG
END 0.001 CFM@ 12.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	27.07
TEST NO.	4SC10-4	STACK PRESSURE	-0.11
SAMPLING LOCATION	4SC10 - Scrubber	AMBIENT TEMP	45
TRC PROJECT NO.		PERCENT MOISTURE	35
DATE	05-09-90	COLLECTION TIME	1740 - 1812
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1955

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 15.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 17.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	7.4	7.4	7.4	7.4			7.4
O2	17.6	10.2	17.6	10.2			10.2
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.

FIRM NAME	Rhone-Poulenc
PLANT LOCATION	Green River, Wy
TEST NUMBER	4SR10-1
LOCATION	4SR10 Scrubber
PROJECT NO.	
DATE	05-09-90
TECHNICIAN	S. Rasbury

EQUIPMENT

CONTROL BOX NO.	Nutech #3
PROBE I.D.	9.0'
NOZZLE I.D.	C-10
NOZZLE DIA.	a293, 0.295, a295 Ave 0.294
FILTER TYPE	61 F.
FILTER NO.	3001

0.293, 0.295, a 295

SITE I.D.

DUCT DIA.	108"
DUCT AREA	63.62
TEST DURATION	60.0
TRAVERSE INTERVAL	5.0
FILTER TEMP	248±25
PROBE TEMP	248±25
ASSUMED MOISTURE	27

NOMOGRAPH

BAROMETRIC PRESS	24.05
PITOT COEFFICIENT	0.84
METER Yd	1.0128
ORIFICE dH@	1.8962
K FACTOR	4.2019 / 4.2714
START TIME	0920
STOP TIME	

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	1	0.0	0.15	0.67	57	56	to.13	157	593.403	235	50	4.0	228
	2	5.0	0.14	0.60	61	58	to.13	157	596.06	243	49	4.0	230
	3	10.0	0.22	0.94	65	63	to.17	174	598.38	257	48	4.0	220
	4	15.0							600.578				
	5	20.0											
	6	25.0											
S	1	30.0											
	2	35.0											
	3	40.0											
	4	45.0											
	5	50.0											
	6	55.0											
		60.0											
AVERAGE			0.1902	0.7233		60.00	to.13	157	7.175				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	103
Impinger 2	100	104
Impinger 3	-	-
SILICA GEL	300	7.5
TOTAL		55.5

DATA REDUCTION

VELOCITY	
MOISTURE	30.58 %
ISOKINETIC %	
STD. VOLUME	

LEAK CHECK DATA Down 0934 VOID TEST

START 0.002 CFM@ 11.0 "HG

END _____ CFM@ _____ "HG

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET _____ OF _____

TEST I.D. | EQUIPMENT | SITE I.D. | NOMOGRAPH

FIRM NAME: Rhone-Poulenc
PLANT LOCATION: Greenriver
TEST NUMBER: 45C10 - Flow
LOCATION: 45C10 - Scrubber
PROJECT NO.:
DATE: 05-09-90
TECHNICIAN: J. Rosburg

CONTROL BOX NO.:
PROBE I.D.: 9.0'
NOZZLE I.D.:
NOZZLE DIA.:
FILTER TYPE:
FILTER NO.:

DUCT DIA.: 108"
DUCT AREA: 63.62
TEST DURATION:
TRAVERSE INTERVAL:
FILTER TEMP:
PROBE TEMP:
ASSUMED MOISTURE:

BAROMETRIC PRESS: 24.05
PITOT COEFFICIENT: 0.84
METER Yd: 1.0128
ORIFICE dH@: 1.8962
K FACTOR:
START TIME: 0730
STOP TIME:

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
			0.14				-0.1	160					
			0.11					159					
			0.14					159					
			0.40					158					
			0.45					158					
			0.43					159					
AVERAGE													

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1		
Impinger 2		
Impinger 3		
SILICA GEL		
TOTAL		

DATA REDUCTION

VELOCITY
MOISTURE
ISOKINETIC %
STD. VOLUME

LEAK CHECK DATA

START _____ CFM@ _____ "HG
END _____ CFM@ _____ "HG

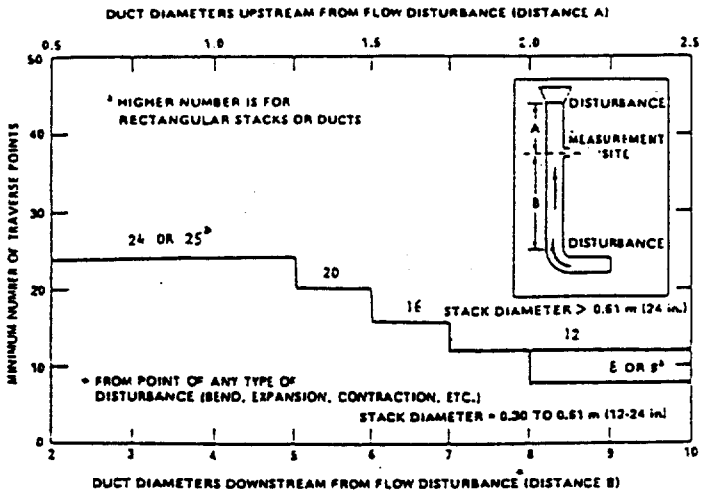
45E12A

DOWNSTREAM = 25.5' 306" 4.71 Upstream Down
Upstream = 48.5 582" 8.95 Diameters Up

TRC

EPA REFERENCE METHOD 1
FIELD DATA SHEET

Firm Name:	Rhone-Poulenc	Stack Diameter	65.0"
Plant Location:	Green River, Wy	Sample Port Diameter	4.0
Sampling Location:	4SC 12A	Sample Port Depth	6.0" w/ nipple
TRC Project No.:		Distance Upstream	306" (4.7 Diameters)
Date:	05-09-90	Distance Downstream	582" (8.9 Diameters)
Technician:	J. Rosberg		



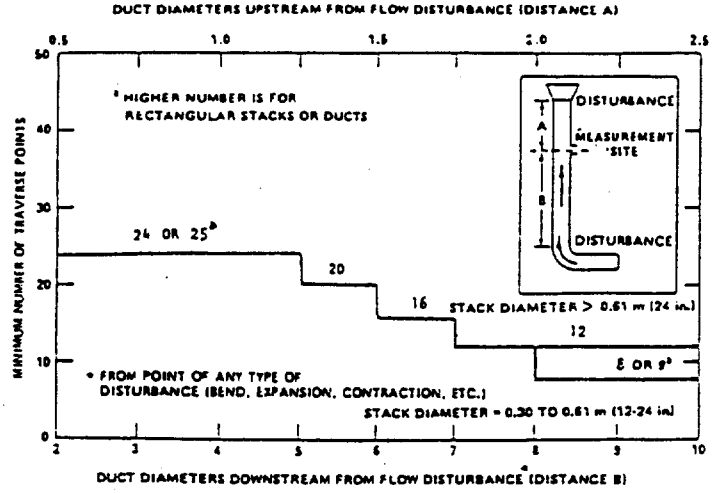
Traverse Point Number	Number Traverse Points On A Diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	38.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Traverse Points	
No.	Distance From Wall
1	8.86"
2	15.49"
3	25.24"
4	51.76"
5	61.51"
6	68.14"
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

TRC

EPA REFERENCE METHOD 1
FIELD DATA SHEET

Firm Name:	Rhone-Poulenc	Stack Diameter	5.5' = 66"
Plant Location:	Greenriver, Wyoming	Sample Port Diameter	4.0"
Sampling Location:	4 SP 12 A	Sample Port Depth	
TRC Project No.:		Distance Upstream	
Date:	05-08-90	Distance Downstream	
Technician:	J. Rosburg		



Traverse Point Number	Number Traverse Points On A Diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

Traverse Points	
No.	Distance From Wall
1	2.90" + Port Depth
2	9.64"
3	19.54"
4	46.46"
5	56.36"
6	63.10"
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wyo	BAROMETRIC PRESSURE	23.77
TEST NO.	45C12A-1	STACK PRESSURE	+0.14
SAMPLING LOCATION	45C12A - Scrubber	AMBIENT TEMP	60
TRC PROJECT NO.		PERCENT MOISTURE	≈35.0
DATE	05-10-90	COLLECTION TIME	1117 - 1210
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1230

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	6.2	6.2	6.2	6.2			6.2
O2	18.2	12.0	18.2	12.0			12.0
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.

FIRM NAME: Rhone-Poulenc
PLANT LOCATION: Green River, WY
TEST NUMBER: 45C12A-3
LOCATION: 45C12A - Scrubber
PROJECT NO.:
DATE: 05-10-90
TECHNICIAN: J. Fosburg / HSa

EQUIPMENT

CONTROL BOX NO.: Nutech #3
PROBE I.D.: 6.0'
NOZZLE I.D.: A-10
NOZZLE DIA.: 0.2870
FILTER TYPE: G.F.
FILTER NO.: 3007

SITE I.D.

DUCT DIA.: 65"
DUCT AREA:
TEST DURATION: 60.0
TRAVERSE INTERVAL: 5.0
FILTER TEMP: 248 ± 25
PROBE TEMP: 248 ± 25
ASSUMED MOISTURE: 39

NOMOGRAPH

BAROMETRIC PRESS: 23.64
PITOT COEFFICIENT: 0.84
METER Yd: 1.0128
ORIFICE dH@: 1.8962
K FACTOR: 2.0094
START TIME: 1418
STOP TIME: 1521

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	1	0.0	0.36	1.08	92	92	+0.15	162	798.63	259	59	5.0	230
	2	5.0	0.41	1.23	94	92	0.14	163	801.80	260	66	5.5	231
	3	10.0	0.43	1.29	94	92	0.15	162	805.05	262	64	6.0	234
	4	15.0	0.41	1.23	95	92	0.16	162	808.45	266	64	6.0	235
	5	20.0	0.40	1.20	95	92	0.15	161	811.78	248	64	6.0	229
	6	25.0	0.35	1.05	96	93	0.14	161	815.05	255	62	5.5	233
N	1	30.0	0.35	1.05	95	93	0.15	161	818.16	255	61	6.0	234
	2	35.0	0.39	1.17	93	91	0.15	163	821.26	255	61	6.5	233
	3	40.0	0.41	1.23	93	91	0.15	163	824.35	252	62	6.5	231
	4	45.0	0.40	1.20	93	91	0.15	164	827.58	251	62	7.0	228
	5	50.0	0.41	1.23	93	91	0.14	164	830.80	253	66	7.0	231
	6	55.0	0.38	1.14	92	90	0.14	163	834.05	249	67	6.5	229
		60.0							837.225				
AVERAGE			0.6255	1.1750		92.71	+0.15	162.42	38.592				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	160	434
Impinger 2	100	204
Impinger 3	-	-
SILICA GEL	300	317.1
TOTAL		955.1

DATA REDUCTION

VELOCITY: ~~46.39~~ 46.43
MOISTURE: 42.03
ISOKINETIC %: 101.51
STD. VOLUME: 51.06

LEAK CHECK DATA

START 0.008 CFM@ 17.0 "HG
END 0.001 CFM@ 9.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River, Wy	BAROMETRIC PRESSURE	23.64
TEST NO.	45C12A-3	STACK PRESSURE	-0.15
SAMPLING LOCATION	45C12A - Scrubber	AMBIENT TEMP	65
TRC PROJECT NO.		PERCENT MOISTURE	~=39
DATE	05-10-90	COLLECTION TIME	1418-1510
TECHNICIAN	J. Rosburg	ANALYSIS TIME	1600

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 5 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	6.0	6.0	6.0	6.0			6.0
O2	18.0	12.0	18.0	12.0			12.0
CO							

COMMENTS:

TRC

EPA REFERENCE METHOD 5
FIELD DATA SHEET

SHEET 1 OF 1

TEST I.D.		EQUIPMENT		SITE I.D.		NOMOGRAPH	
FIRM NAME	Rhone-Poulenc	CONTROL BOX NO.	Nutech #7	DUCT DIA.	65"	BAROMETRIC PRESS	23.62
PLANT LOCATION	Green River, wy	PROBE I.D.	6.0	DUCT AREA		PITOT COEFFICIENT	0.84
TEST NUMBER	45C12A-2	NOZZLE I.D.	A-10	TEST DURATION	60.0	METER Yd	1.0128
LOCATION	45C12A - Scrubber	NOZZLE DIA.	0.3870	TRAVERSE INTERVAL	5.0	ORIFICE dH@	1.8967
PROJECT NO.		FILTER TYPE	G.F.	FILTER TEMP	248 ± 25	K FACTOR	2.9653
DATE	05-10-90	FILTER NO.	3006	PROBE TEMP	248 ± 25	START TIME	1250
TECHNICIAN	J. Rosburg			ASSUMED MOISTURE	39	STOP TIME	1352

PORT	PT.	TIME	dP	dH	METER TEMP IN	METER TEMP OUT	Ps	STACK TEMP (F)	METER VOL. (FT3)	FILTER TEMP	COND. TEMP	PUMP VACUUM	PROBE TEMP
E	1	0.0	0.40	1.19	82	81	+0.14	162	759.322	256	69	6.0	223
	2	5.0	0.43	1.28	83	81	0.15	160	762.552	258	57	7.5	226
	3	10.0	0.45	1.33	85	83	0.16	161	765.900	256	56	8.0	229
	4	15.0	0.41	1.22	87	83	0.15	162	769.131	258	57	8.0	230
	5	20.0	0.38	1.13	88	84	0.14	164	772.655	266	58	7.5	237
	6	25.0	0.33	0.99	89	85	0.15	163	775.828	248	58	7.0	235
N	1	30.0	0.36	1.07	89	86	0.15	163	778.918	255	59	7.5	238
	2	35.0	0.39	1.16	90	86	0.16	162	782.117	250	64	7.5	234
	3	40.0	0.42	1.25	91	87	0.16	162	785.274	251	64	8.5	235
	4	45.0	0.41	1.22	92	88	0.15	162	788.556	251	65	8.5	234
	5	50.0	0.40	1.19	93	88	0.15	161	791.190	250	65	8.5	233
	6	55.0	0.38	1.13	93	88	0.14	161	795.174	250	66	8.5	234
		60.0							798.347				
AVERAGE			0.6293	1.1800		86.75	+0.15	161.92	39.025				

MOISTURE DATE

	INITIAL	FINAL
WATER COLLECTED		
Impinger 1	100	182+170
Impinger 2	100	205
Impinger 3	—	8
SILICA GEL	306	324.0
TOTAL		469

DATA REDUCTION

VELOCITY	46.39
MOISTURE	41.72
ISOKINETIC %	103.23
STD. VOLUME	51.87

LEAK CHECK DATA

START 0.001 CFM@ 14 "HG
END 0.008 CFM@ 10.0 "HG

TRC

EPA REFERENCE METHOD 3
FIELD DATA SHEET

FIRM NAME	Rhone-Poulenc	SAMPLE TYPE	Integrated
PLANT LOCATION	Green River	BAROMETRIC PRESSURE	23.62
TEST NO.	45C12A-2	STACK PRESSURE	+0.14
SAMPLING LOCATION	45C12A · Scrubber	AMBIENT TEMP	65
TRC PROJECT NO.		PERCENT MOISTURE	≅ 39
DATE	05-10-90	COLLECTION TIME	1250 - 1345
TECHNICIAN	J. Rasburg	ANALYSIS TIME	1420

ORSAT EQUIPMENT CHECK

ORSAT CHECK: PRE-TEST LEAK CHECK:

INITIAL 18.0 ML @ 0 MINUTES

FINAL 18.0 ML @ 6 MINUTES

PRE-TEST AMBIENT O2 19.8

MOLECULAR WEIGHT DETERMINATION

RUN	1		2		3		AVERAGE
	ACTUAL READING		ACTUAL READING		ACTUAL READING		
GAS	ML	%	ML	%	ML	%	%
CO2	6.0	6.0	6.0	6.0			6.0
O2	17.8	11.8	17.8	11.8			11.8
CO							

COMMENTS:

Opacity data

Summary

Unit	Date	Time	Reading
4SC-10	5-9	9:01	17.7
		9:23	16.9
		1:00	16.7
		1:20	15.4
		2:15	17.3
		3:16	19.2
		4:00	18.1
		4:30	17.3
		5:25	16.3
		6:00	18.3
1SC-12A	5-10	9:39	28.3
		10:01	25.2
		10:48	26.1
		11:14	25.0
		12:32	23.3
		1:27	21.5
		2:30	21.7
5ES-10	5-11	7:30	1.7
		9:57	2.3
		11:09	2.5
3S-12	5-11	8:14	11.7
		10:14	15.4
		11:00	11.0
		12:45	7.9
	5-12	9:51	13.8
		10:59	12.3

OPACITY WORKSHEET

DATE 5-7-90

STACK ASC-10

TECH [illegible]

PROD RATE _____ TPH

TIME 9.01 to 9.07

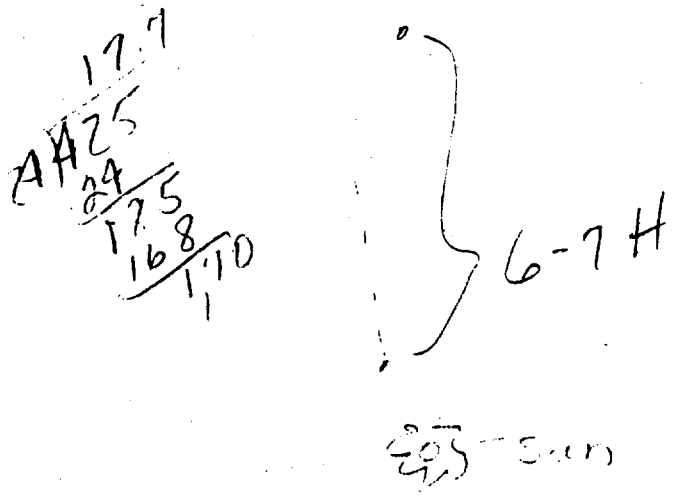
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



READINGS

1. 15	9. 15	17. 20
2. 15	10. 15	18. 25
3. 20	11. 25	19. 20
4. 20	12. 20	20. 20
5. 25	13. 15	21. 15
6. 20	14. 15	22. 15
7. 15	15. 15	23. 15
8. 15	16. 15	24. 15
145	135	145

TOTAL 425 AVERAGE 17.7 % OPACITY

OPACITY WORKSHEET

DATE 5-7-90

STACK 451-10

TECH (?)

PROD RATE _____ TPH

TIME 1:23 to _____

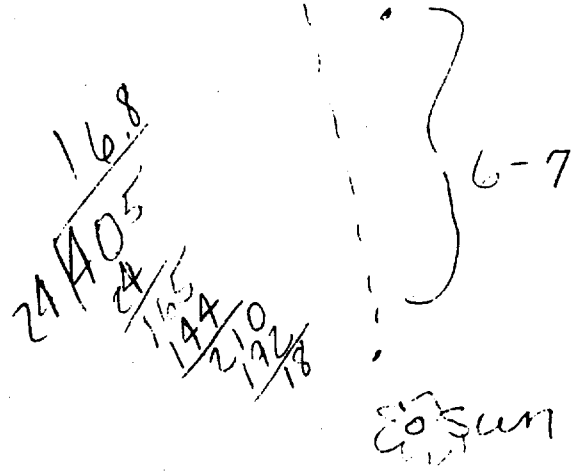
ΔP _____

WIND SPEED 10 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH ↑N →W

LAYOUT OF AREA



READINGS

1. 15	9. 25	17. 15
2. 20	10. 15	18. 15
3. 15	11. 20	19. 15
4. 15	12. 15	20. 15
5. 20	13. 20	21. 20
6. 15	14. 15	22. 20
7. 20	15. 15	23. 15
8. 15	16. 15	24. 15
135	140	130

TOTAL 405 AVERAGE 16.9 % OPACITY

OPACITY WORKSHEET

DATE 5-9-90

STACK ASC-10

TECH [illegible]

PROD RATE _____ TPH

TIME 1:00 to _____

ΔP _____

WIND SPEED 15-20 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH ↑ N ↓ W

16.7
24|400
24
160
144
16

6-7H

[illegible]

READINGS

1. 15	9. 25	17. 20
2. 15	10. 20	18. 15
3. 20	11. 15	19. 15
4. 15	12. 20	20. 15
5. 10	13. 20	21. 10
6. 15	14. 20	22. 15
7. 15	15. 15	23. 20
8. 15	16. 15	24. 20
120	150	130

TOTAL 400 AVERAGE 16.7 % OPACITY

OPACITY WORKSHEET

DATE 5-9-90

STACK 4SC-10

TECH pm

PROD RATE ______ TPH

TIME 120 to ______

ΔP ______

WIND SPEED 10-15 MPH

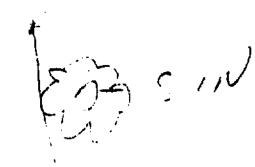
WIND DIRECTION ↑N

LAYOUT OF AREA

RELATIONSHIP TO NORTH → W

15.4
24|365
24
125
120
50

6-7H



READINGS

1.	10	9.	20	17.	20
2.	10	10.	15	18.	15
3.	15	11.	15	19.	10
4.	20	12.	20	20.	10
5.	15	13.	15	21.	10
6.	20	14.	15	22.	10
7.	20	15.	15	23.	15
8.	20	16.	20	24.	10
	130		135		100

TOTAL 365

AVERAGE 15.4 % OPACITY

OPACITY WORKSHEET

DATE 5-9-90

STACK ASC-10

TECH rm

PROD RATE _____ TPH

TIME 215 to _____

ΔP _____

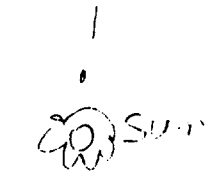
WIND SPEED 10-15 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH

17.3
415
24
175
168
70



READINGS

1. 20	9. 20	17. 20
2. 20	10. 15	18. 20
3. 20	11. 15	19. 15
4. 15	12. 15	20. 20
5. 15	13. 20	21. 15
6. 20	14. 20	22. 20
7. 15	15. 15	23. 15
8. 15	16. 15	24. 15
140	135	140

TOTAL 415 AVERAGE 17.3 % OPACITY

OPACITY WORKSHEET

DATE 5-9-90

STACK ASC-10

TECH [illegible]

PROD RATE _____ TPH

TIME 316 to _____

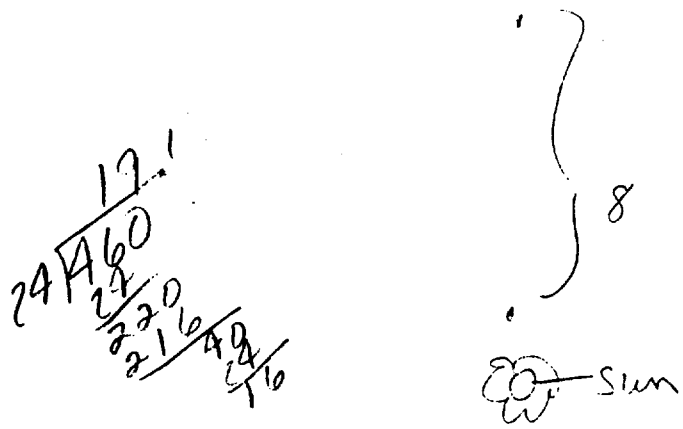
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH

LAYOUT OF AREA



READINGS

1. 15	9. 15	17. 20
2. 20	10. 25	18. 20
3. 25	11. 20	19. 25
4. 15	12. 15	20. 25
5. 20	13. 25	21. 20
6. 10	14. 20	22. 20
7. 20	15. 15	23. 15
8. 25	16. 20	24. 10
150	155	155

TOTAL 460 AVERAGE 19.2 % OPACITY

OPACITY WORKSHEET

DATE 5-7-90

STACK ASC-10

TECH [illegible]

PROD RATE _____ TPH

TIME 400 to _____

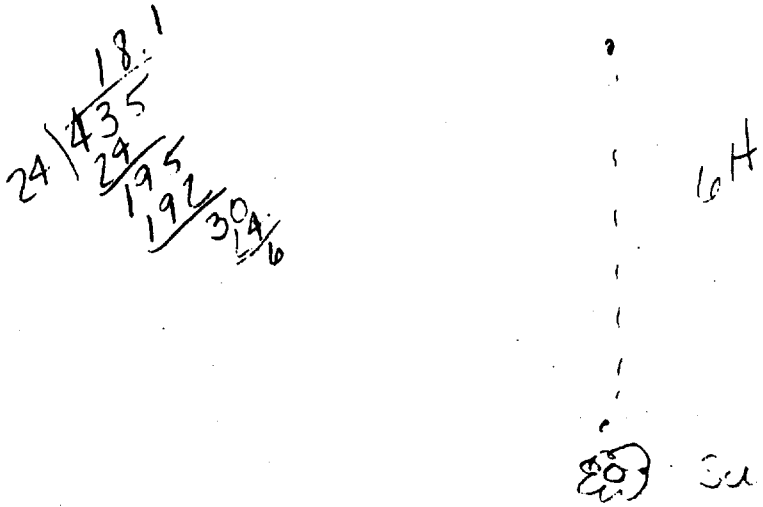
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION ← N

RELATIONSHIP TO NORTH ↗ W

LAYOUT OF AREA



READINGS

1. 15	9. 15	17. 15
2. 20	10. 20	18. 20
3. 25	11. 15	19. 20
4. 20	12. 15	20. 15
5. 15	13. 20	21. 25
6. 20	14. 20	22. 20
7. 15	15. 20	23. 15
8. 15 / 145	16. 15 / 140	24. 20 / 150

TOTAL 435 AVERAGE 18.1 % OPACITY

OPACITY WORKSHEET

DATE 5-7-70

STACK ASC-10

TECH m

PROD RATE _____ TPH

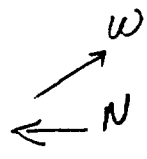
TIME 430 to _____

ΔP _____

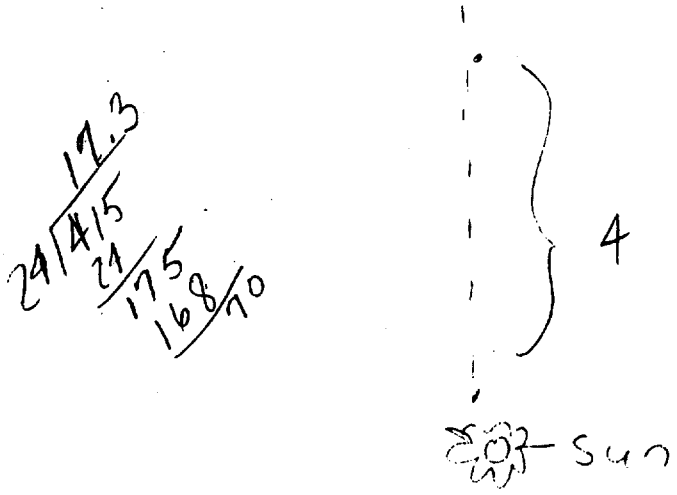
WIND SPEED 10-15 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH



LAYOUT OF AREA



READINGS

1. 15	9. 15	17. 20
2. 15	10. 15	18. 25
3. 15	11. 15	19. 15
4. 20	12. 20	20. 20
5. 20	13. 20	21. 20
6. 15	14. 15	22. 20
7. 20	15. 15	23. 15
8. 15	16. 15	24. 15
135	130	150

TOTAL 415 AVERAGE 17.3 % OPACITY

OPACITY WORKSHEET

5-7-90

DATE _____

STACK ASC 10

TECH jm

PROD RATE _____ TPH

TIME 525 to _____

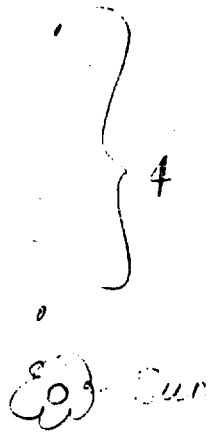
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION W →

RELATIONSHIP TO NORTH ← N

LAYOUT OF AREA



16.3
24|390
24
150
144
6

READINGS

1. 15	9. 15	17. 20
2. 15	10. 10	18. 20
3. 20	11. 15	19. 15
4. 15	12. 20	20. 20
5. 15	13. 20	21. 15
6. 15	14. 15	22. 20
7. 15	15. 10	23. 20
8. 15	16. 15	24. 15
125	120	145

TOTAL 390 AVERAGE 16.3 % OPACITY

OPACITY WORKSHEET

DATE 5-9-90

STACK 481-10

TECH jm

PROD RATE _____ TPH

TIME 600 to _____

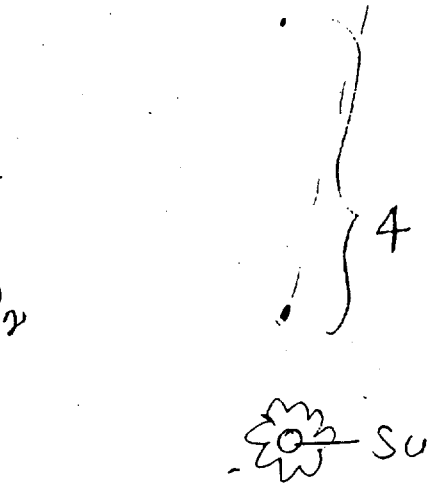
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION → W

RELATIONSHIP TO NORTH ↑ N

LAYOUT OF AREA



18.3
24|440
24
200
192
80
72

READINGS

1. 20	9. 20	17. 15
2. 20	10. 25	18. 15
3. 25	11. 20	19. 15
4. 20	12. 15	20. 20
5. 20	13. 25	21. 10
6. 15	14. 15	22. 20
7. 15	15. 20	23. 20
8. 15	16. 15	24. 20
150	15	135

TOTAL 440 AVERAGE 18.3 % OPACITY

252-2307

OPACITY WORKSHEET

DATE 5-10-76

STACK 4SC-12A

TECH jm

PROD RATE _____ TPH

TIME 939 to _____

ΔP _____

WIND SPEED 0-5 MPH

WIND DIRECTION RELATIONSHIP TO NORTH

LAYOUT OF AREA

28.3
24 680
48
200
192
80
72

4

Sun

READINGS

1. 30	9. 35	17. 25
2. 35	10. 25	18. 30
3. 30	11. 20	19. 20
4. 25	12. 35	20. 30
5. 20	13. 25	21. 35
6. 20	14. 20	22. 35
7. 30	15. 25	23. 30
8. 35	16. 35	24. 30
225	220	235

TOTAL 680 AVERAGE 28.3 % OPACITY

OPACITY WORKSHEET

DATE 5-10-90

STACK ASC-12A

TECH [illegible]

PROD RATE _____ TPH

TIME 1001 to _____

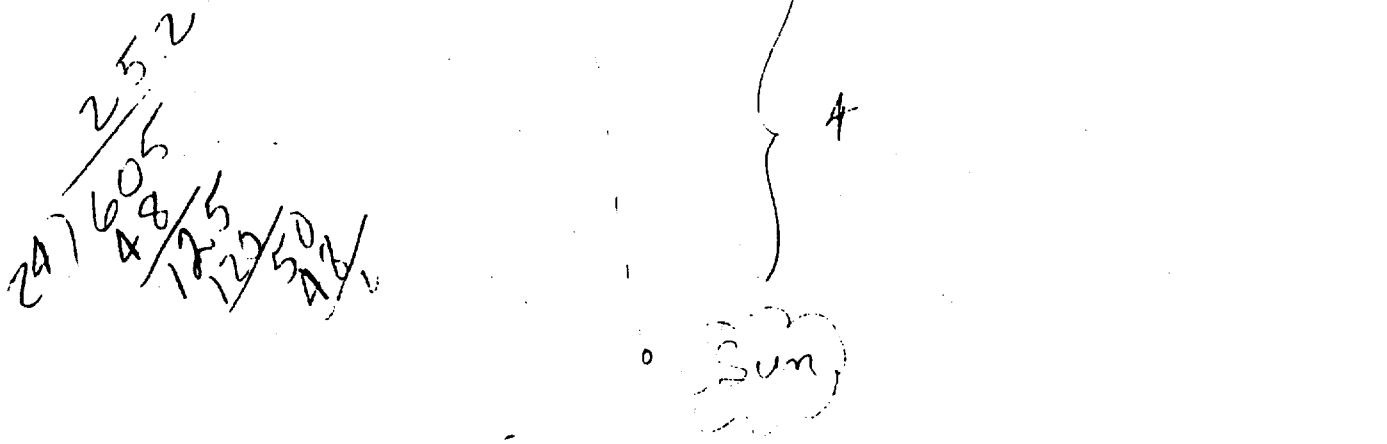
ΔP _____

WIND SPEED 0-5 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



READINGS

1. 20	9. 35	17. 25
2. 25	10. 25	18. 30
3. 20	11. 25	19. 20
4. 30	12. 30	20. 25
5. 20	13. 30	21. 25
6. 25	14. 30	22. 20
7. 20	15. 25	23. 25
8. 30	16. 20	24. 25
190	220	195

TOTAL 605 AVERAGE 25.2 % OPACITY

OPACITY WORKSHEET

DATE 5-[illegible]-20

STACK 13? 12A

TECH [illegible]

PROD RATE _____ TPH

TIME 1049 to _____

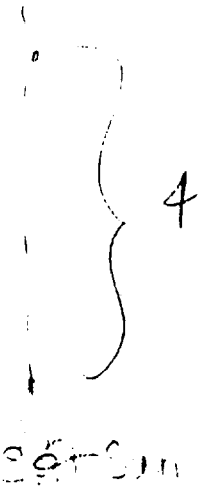
ΔP _____

WIND SPEED 0-5 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH

LAYOUT OF AREA



26
24 | 625
48
145
144
10

READINGS

1. 25	9. 30	17. 20
2. 20	10. 30	18. 20
3. 20	11. 25	19. 30
4. 15	12. 30	20. 25
5. 30	13. 30	21. 35
6. 35	14. 25	22. 20
7. 25	15. 30	23. 35
8. 20	16. 25	24. 25
190		210

TOTAL 625 AVERAGE 26.1 % OPACITY

OPACITY WORKSHEET

DATE 5-10-90

STACK 451-12A

TECH [illegible]

PROD RATE _____ TPH

TIME 1114 to _____

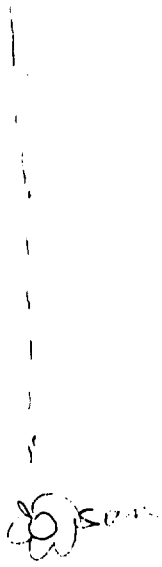
ΔP _____

WIND SPEED 0-5 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH

LAYOUT OF AREA



Interference w/ 3FS-10

25
24|600
48
120
120

READINGS

1. 30	9. 25	17. 25
2. 25	10. 20	18. 30
3. 25	11. 25	19. 30
4. 25	12. 20	20. 25
5. 35	13. 20	21. 30
6. 20	14. 25	22. 20
7. 20	15. 25	23. 25
8. 20	16. 20	24. 25
200	110	210

TOTAL 600 AVERAGE 25 % OPACITY

OPACITY WORKSHEET

DATE 5-10-90

STACK 451-12

TECH [illegible]

PROD RATE _____ TPH

TIME 1232 to _____

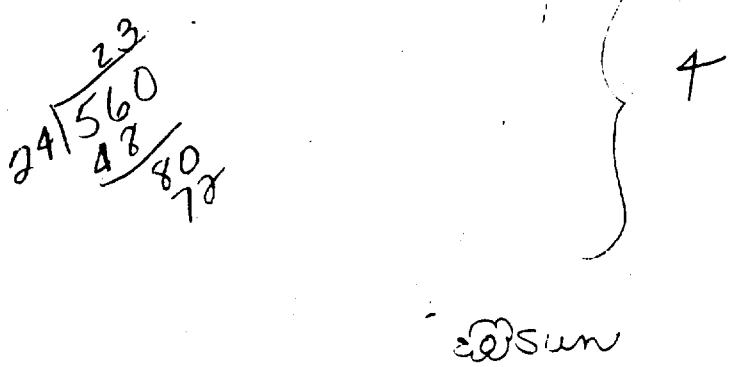
ΔP _____

WIND SPEED 0-5 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



READINGS

1. 25	9. 20	17. 25
2. 20	10. 30	18. 20
3. 20	11. 25	19. 15
4. 25	12. 20	20. 30
5. 20	13. 15	21. 30
6. 30	14. 20	22. 25
7. 25	15. 25	23. 25
8. 20	16. 35	24. 15
185	190	185

TOTAL 560 AVERAGE 23.3 % OPACITY

OPACITY WORKSHEET

DATE 5-10

STACK 430- 18 A

TECH jm

PROD RATE _____TPH

TIME 127 to _____

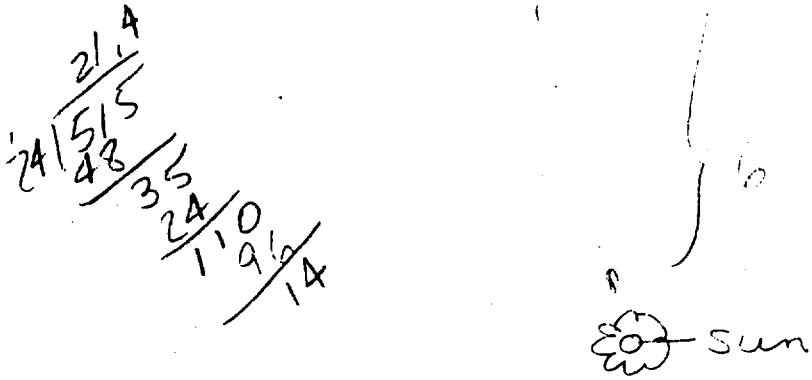
ΔP _____

WIND SPEED 5 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



READINGS

1. 20	9. 20	17. 15
2. 20	10. 25	18. 20
3. 25	11. 25	19. 20
4. 15	12. 20	20. 20
5. 20	13. 25	21. 20
6. 25	14. 25	22. 20
7. 20	15. 30	23. 15
8. 20	16. 25	24. 25
165	195	155

TOTAL 515 AVERAGE 21.5 % OPACITY

OPACITY WORKSHEET

DATE _____

STACK [illegible]

TECH 5-10-20

PROD RATE _____ TPH

TIME 230 to _____

ΔP _____

WIND SPEED ~~5~~ 5-10 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH

N

W

21.7
24 | 520
48
40
24
160

READINGS

1. 15	9. 15	17. 30
2. 20	10. 25	18. 25
3. 30	11. 25	19. 30
4. 20	12. 20	20. 30
5. 15	13. 15	21. 25
6. 15	14. 15	22. 20
7. 25	15. 15	23. 20
8. 20	16. 25	24. 25
160	150	205

TOTAL 520 AVERAGE 21.7 % OPACITY

OPACITY WORKSHEET

DATE 5-11-90

STACK SFS 10

TECH Lm

PROD RATE _____ TPH

TIME 730 to _____

ΔP _____

WIND SPEED 5-10 MPH

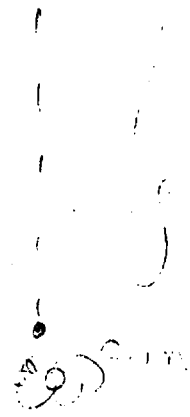
WIND DIRECTION W → N

LAYOUT OF AREA

RELATIONSHIP TO NORTH

Windy
hard to read
but looks good

1.6
24|40
24
160
144
16



READINGS

1. 0	9. 0	17. 5
2. 5	10. 0	18. 0
3. 0	11. 0	19. 0
4. 0	12. 0	20. 0
5. 0	13. 5	21. 5
6. 5	14. 5	22. 5
7. 5	15. 0	23. 0
8. 0	16. 0	24. 0
15	10	15

TOTAL 40 AVERAGE 1.7 % OPACITY

OPACITY WORKSHEET

DATE 5-11-70

STACK [illegible]

TECH [illegible]

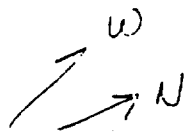
PROD RATE _____TPH

TIME 8 26 to _____

ΔP _____

WIND SPEED 5-10 MPH

WIND DIRECTION



LAYOUT OF AREA

RELATIONSHIP TO NORTH

Boiler

READINGS

1. 5	9. _____	17. _____
2. 5	10. _____	18. _____
3. 5	11. _____	19. _____
4. 5	12. _____	20. _____
5. 0	13. _____	21. _____
6. 0	14. _____	22. _____
7. 0	15. _____	23. _____
8. _____	16. _____	24. _____

TOTAL _____ AVERAGE _____ % OPACITY

OPACITY WORKSHEET

DATE 5-11-90

STACK SSC 10

TECH [illegible]

PROD RATE _____ TPH

TIME 957 to _____

ΔP _____

WIND SPEED 5-15 MPH

WIND DIRECTION [illegible] N

LAYOUT OF AREA

RELATIONSHIP TO NORTH

[illegible]

[illegible]

READINGS

1. 0	9. 0	17. 0
2. 5	10. 5	18. 5
3. 0	11. 0	19. 0
4. 0	12. 5	20. 0
5. 5	13. 5	21. 0
6. 0	14. 0	22. 5
7. 5	15. 0	23. 5
8. 5 / 20	16. 5 / 20	24. 0 / 15

TOTAL 55 AVERAGE 2.3 % OPACITY

OPACITY WORKSHEET

5-11

STACK 5-10

PROD RATE _____ TPH

ΔP _____

DATE _____

TECH _____

TIME 1107 to _____

WIND SPEED 10 MPH

WIND DIRECTION (W) → N

LAYOUT OF AREA

RELATIONSHIP TO NORTH

2.5
24/60
47/8

READINGS

1. 5	9. 0	17. 0
2. 5	10. 5	18. 5
3. 5	11. 0	19. 0
4. 0	12. 0	20. 5
5. 0	13. 5	21. 5
6. 0	14. 5	22. 0
7. 5	15. 5	23. 5
8. 0	16. 0	24. 0

TOTAL 60 AVERAGE 2.5 % OPACITY

OPACITY WORKSHEET

DATE 5-11-90

STACK 588-12

TECH [illegible]

PROD RATE _____ TPH

TIME 814 to _____

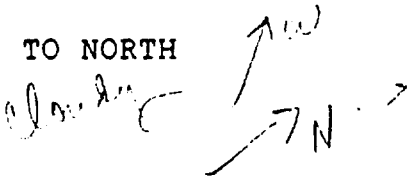
ΔP _____

WIND SPEED [illegible] MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



11 (20) 24 10 24 10

24

READINGS

1. 10	9. 10	17. 10
2. 5	10. 15	18. 10
3. 10	11. 15	19. 15
4. 10	12. 15	20. 10
5. 15	13. 15	21. 15
6. 10	14. 10	22. 15
7. 5	15. 15	23. 10
8. 15 / 80	16. 10 / 105	24. 10 / 75

TOTAL 280 AVERAGE 11.7 % OPACITY

OPACITY WORKSHEET

DATE 5-11-20

STACK 553-12

TECH [illegible]

PROD RATE _____ TPH

TIME 1014 to _____

ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION (W)

RELATIONSHIP TO NORTH (N)

LAYOUT OF AREA

15.4
24)370
24
130
120
10
10

READINGS

1. 15	9. 15	17. 10
2. 15	10. 20	18. 10
3. 20	11. 15	19. 15
4. 10	12. 10	20. 10
5. 25	13. 15	21. 10
6. 10	14. 15	22. 15
7. 15	15. 20	23. 20
8. 20	16. 20	24. 20
130		110

TOTAL 370 AVERAGE 15.4 % OPACITY

OPACITY WORKSHEET

DATE 5-11-90

STACK SEC 12

TECH [illegible]

PROD RATE _____ TPH

TIME 1100 to _____

ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION 10 NW

LAYOUT OF AREA

RELATIONSHIP TO NORTH

READINGS

1. 10	9. 20	17. 10
2. 10	10. 10	18. 10
3. 10	11. 15	19. 10
4. 5	12. 15	20. 5
5. 10	13. 20	21. 10
6. 10	14. 5	22. 10
7. 20	15. 10	23. 10
8. 10	16. 15	24. 5
95	110	110

TOTAL 265 AVERAGE 11.0 % OPACITY

OPACITY WORKSHEET

DATE 5-11-90

STACK SSC-12

TECH jm

PROD RATE _____ TPH

TIME 1245 to _____

ΔP _____

WIND SPEED 5-10 MPH

WIND DIRECTION

RELATIONSHIP TO NORTH

LAYOUT OF AREA

79
24 | 190
168
220

3

20 sum

READINGS

1. 10	9. 15	17. 10
2. 5	10. 5	18. 5
3. 5	11. 10	19. 10
4. 10	12. 15	20. 5
5. 5	13. 10	21. 5
6. 10	14. 10	22. 10
7. 10	15. 5	23. 5
8. 5	16. 5	24. 5
60		

TOTAL 190 AVERAGE 7.9 % OPACITY

OPACITY WORKSHEET

DATE 5-12-90

STACK 5ESD

TECH [illegible]

PROD RATE _____ TPH

TIME 951 to 959

ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION → W

LAYOUT OF AREA

RELATIONSHIP TO NORTH ↑ N

13.7
24 | 330
24
90
72
168
12

3

READINGS

1. 10	9. 15	17. 15
2. 15	10. 10	18. 15
3. 15	11. 15	19. 20
4. 10	12. 15	20. 10
5. 15	13. 15	21. 15
6. 10	14. 10	22. 15
7. 20	15. 10	23. 15
8. 15	16. 10	24. 15
110	100	120

TOTAL 330 AVERAGE 13.8 % OPACITY

OPACITY WORKSHEET

DATE 5-12-90

STACK SEC 10

TECH [illegible]

PROD RATE _____ TPH

TIME 1059 to _____

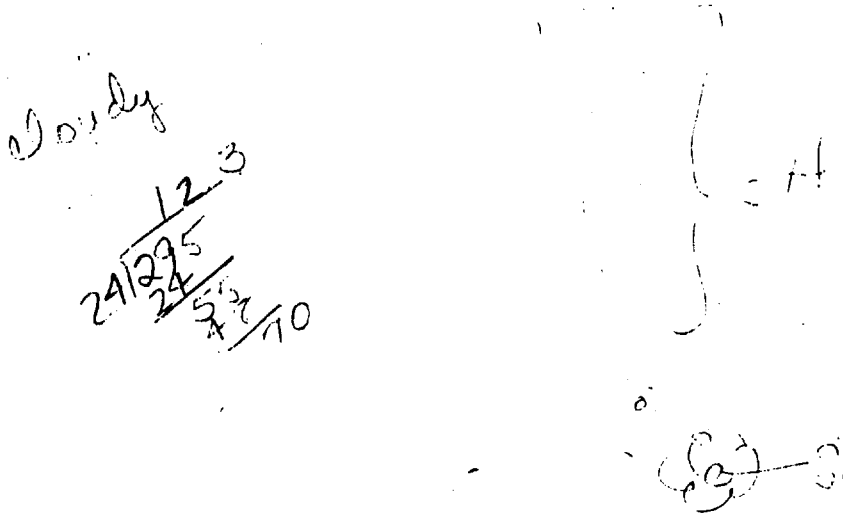
ΔP _____

WIND SPEED 10-15 MPH

WIND DIRECTION

LAYOUT OF AREA

RELATIONSHIP TO NORTH



READINGS

1. 10	9. 15	17. 10
2. 10	10. 15	18. 15
3. 15	11. 10	19. 15
4. 15	12. 10	20. 15
5. 10	13. 15	21. 10
6. 10	14. 15	22. 15
7. 10	15. 10	23. 15
8. 10	16. 10	24. 10
90	100	105

TOTAL 295 AVERAGE 12.3 % OPACITY