AGRICO COGENERATION CORPORATION
SAN JOAQUIN, CALIFORNIA

DRYER AND GAS TURBINE

EMISSION TESTS
JUNE 12, 1991

PREPARED FOR:

AGRICO COGENERATION CORPORATION
8105 SOUTH LASSEN AVENUE
SAN JOAQUIN, CALIFORNIA 93660

PREPARED BY:

GENESIS ENVIRONMENTAL SERVICES COMPANY
1145 W. COLUMBUS AVENUE
BAKERSFIELD, CALIFORNIA 93301

REPORT # 7777-0263

TEST CONDUCTED BY MICHAEL L. BAKALOR
RESULTS VERIFIED BY MICHAEL L. BAKALOR
OPERATIONS MANAGER

SUMMARY OF SOURCE TEST RESULTS

Company: Agrico Cogeneration
Test Date: 6-12-91

EMISSIONS

POLLUTANT	Concentration gr/scf	Concentration @12%	PPMv	@15% O2	lb/hr	lb/MMBTU
Particulate						
Sulfate						
SO2 (wet)						
NOx as NO2 (dry)			20.4 20.8 22.1 21.1	25.9 26.2 28.0 26.7	32.30 32.85 34.87 33.34	0.0989 lb/MMBtu
NMHC			10.3 11.1 10.7		5.58 6.03 5.81	
CO			238.3 238.3 238.8 238.4		229.50 229.50 229.98 229.66	

Comments:

For Fresno County Use Only:

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INTRODUCTION

At the request of Mr. Bill Gibbs of Agrico Cogeneration Corporation, Genesis Environmental Services conducted a series of emission tests at their plant located in San Joaquin, California.

Testing was conducted for NOx,CO,O_2,NMHC and volumetric flow rate on the gas turbine HRSG stack. The Dryer was tested for volumetric flow rate only. TABLE 1-1 contains a summary of test results from this test series. Figure 1-1 contains the calculations used to determine the results.

The purpose of the testing was to comply with Fresno County Air Pollution Control District Rules.

Emission tests were performed on June 12, 1991 by Mr. Michael L. Bakalor, Mr. Kevin Orton and Mr. Dennis Wingfield of Genesis Environmental Services Company. Agrico representative Mr. Bill Gibbs was present during the testing. The average MW output during the test was 27.3 MW. The average water injection rate during the test was 21.4 gpm. The following is a list of tests performed.

HRSG STACK OUTLET

CONSTITUENT	METHOD	QUANTITY
NOx	CARB 1-100	TRIPLICATE
CO	CARB 1-100	TRIPLICATE
O_2	CARB 1-100	TRIPLICATE
NMHC	EPA METHOD 18	DUPLICATE
VOLUMETRIC FLOW RATE	EPA METHOD 1-4	TRIPLICATE

DRYER STACK OUTLET

VOLUMETRIC FLOW RATE	EPA METHOD 1-4	DUPLICATE

Section 2.0 of this report contains Continuous Emission Monitoring protocols and results. Section 3.0 of this report contains Hydrocarbon Analysis procedures and results.

TABLE 1-1

SUMMARY OF TEST RESULTS

AGRICO COGENERATION PLANT
San Joaquin, California
June 12, 1991
Turbine Outlet
(Combine Turbine & Dryer Flow Rate)

Test #	% O2	CO ppm	NOx ppm	NOx @ 15% O2	SDCFM	NOx Lb/MMbt	NOx Lbs/hr	CO Lbs/hr	NMHC lbs/hr
1	16.25	238.3	20.4	25.9	217443	0.0960	32.30	229.50	5.58
2	16.23	238.3	20.8	26.2	217443	0.0972	32.85	229.50	6.03
3	16.25	238.8	22.1	28.0	217443	0.1036	34.87	229.98	N/A
AVG.	16.24	238.4	21.1	26.7	217443	0.0989	33.34	229.66	5.81

Figure 1-1

Calculation of Results

1. $Fd_{68} = \frac{10^6 (3.64\%H + 1.53\%C + .57\%S + .14\%N - 46\%O)}{GCV}$

   Where: GCV = BTU/lb

   $Fd_{60} = \frac{520}{528}$

2. Corrected to 15% O_2

   $ppm @ 15\% O_2 = ppm * \left[\frac{(5.9)}{(20.9 - O_2\%)}\right]$

3. $C_s = (ppm) * (2.595^{-9}) * (MW)$

   Where: C_s = pollutant concentration (lbs/scf)

4. $E = (C_s) * (Fd) * \left[\frac{(20.0)}{(20.9-O_2\%)}\right]$

   Where: E = emission rate (lbs/MMBTU)

5. $Bws = \left[\frac{Vwc(std)}{Vwc(std) + Vm(std)}\right]$

   Where: Bws * 100 = % H_2O in gas stream

6. $V_s = K_p C_p * (\sqrt{\Delta p})\ avg. * \left[\frac{Ts\ (avg)}{P_{std}}\right]$

   Where: V_s = stack velocity (ft/sec)

7. $Qstd = 60(1-B_{ws})V_s A * \left[\frac{Tstd}{T_s(avg)}\right] * \left[\frac{Ps}{P_{std}}\right]$

   Where: Qstd = stack flow rate (sdcfm)

8. $E = (C_s) * (SDCFM) * (60)$

   Where: E = emission rate (lbs/hr)

NOMENCLATURE

A = Cross-sectional area of stack (ft^2)
A_n = Cross-sectional area of nozzle (ft^2)
B_{ws} = Proportion of water vapor, by volume, in the gas stream
C_a = Acetone blank residue concentration, (mg/g)
C_p = Pitot tube coefficient, dimensionless
C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, (gr.dscf)
C_{so2} = Concentration of sulfur dioxide, dry basis corrected to standard conditions, (lb/dscf)
C_{h2so4} = Sulfuric acid (including SO_2) concentration, corrected to standard conditions, (lb/dscf)
ΔH = Average pressure differential across the orifice meter, (in H_2O)
K_p = Pitot tube constant
$85.49 \frac{ft}{sec} \left[\frac{(lb/lb\text{-}mole)(in.\ Hg)}{(R)(in\ H_2O)}\right] 1/2$
L_p = Leakage rate observed during the post-test check, (cfm)
L_a = Maximum acceptable leakage rate, (0.02 cfm or 4% of average sampling rate, whichever is less)
L_i = Individual leakage rate observed during the leak check conducted prior to the "ith" component change, (cfm)
m_a = Mass of residue of acetone after evaporation, mg.
M_d = Molecular weight of stack gas, dry basis, (lb/lb-mole)
m_n = Total weight of particulate matter collected, mg.
M_s = Molecular weight of stack gas, wet basis, (lb/lb-mole)
M_w = Molecular weight of water, 18 lb/lb-mole
N = Normality of barium perchlorate titrant, (milliequivalents/ml)
Δp = Velocity head of stack gas, (in. H_2O)
P_{bar} = Barometric pressure at measurement site (in. Hg)
P_g = Stack static pressure, (in. Hg)
P_m = Absolute pressure at the dry gas meter
P_s = Absolute stack gas pressure (in. Hg)
P_{std} = Standard absolute pressure, 29.92 in. Hg
Q_{std} = Dry volumetric stack gas flow rate, standard conditions (dscfm)
R = Ideal gas constant, 21.85 (in Hg) (ft_3)/lb/-mole) (R)
t_s = Stack temperature, (F)
T_m = Absolute temperature at meter, (R)
T_{std} = Standard absolute temperature at meter, (520R)
T_s = Absolute stack temperature, (460 + t_s)
V_a = Volume of sample aliquot titrated, (ml)
V_{ab} = Volume of acetone blank, ml
V_m = Dry gas volume measured by dry gas meter, (dcf)
$V_{m(std)}$ = Dry gas volume measured by dry gas meter, corrected to standard conditions, (dscf)

$V_{wc(std)}$ = Volume of water vapor condensed corrected to standard conditions, (scf)

$V_{wsg(std)}$ = Volume of water vapor collected in silica gel corrected to standard conditions (scf)

V_{lc} = Volume of water vapor condensed in impingers and silica gel, (ml)

V_f = Final volume of condensed water, ml

V_i = Initial volume of condensed water, ml

V_s = Average stack gas velocity, (ft/sec)

V_{soln} = Total volume of solution in which the sulfur dioxide sample is contained (ml)

V_t = Volume of barium perchlorate titrant used for the sample is contained (ml)

V_{tb} = Volume of barium perchlorate titrant used for the blank, (ml)

W = Final weight of silica gel or silica gel plus impinger, (g)

W_i = Initial weight of silica gel or silica gel plus impinger, (g)

Y = Dry gas meter calibration factor

ρ_w = Density of water, (0.002202 lb/ml @ 60F)

ρ_a = Density of acetone, (g/ml) (see bottle label)

MF = Moisture factor

$\%CO_2$ = Percent CO_2 by volume (dry basis)

$\%O_2$ = Percent O_2 by volume (dry basis)

%CO = Percent CO by volume (dry basis)

%N = Percent N by volume (dry basis)

0.264 = Ratio of O_2 to N_2 in air v/v

0.280 = Molecular weight of N_2 or CO, divided by 100

0.320 = Molecular weight of O_2, divided by 100

0.440 = Molecular weight of CO_2, divided by 100

60 = Conversion Factor, (sec/min)

18.0 = Molecular weight of water, (lb/lb-mole)

32.02 = Equivalent weight of sulfur dioxide

θ = Total sampling time (min)

θ^1 = Sampling time interval, from the run beginning until first component change, (min)

θ_1 = Sampling time interval, between two successive component changes, beginning with the interval between the first and second changes, (min)

θ_p = Sampling time interval, from the final (n_{th}) component change until the end of the sampling run, (min)

FIELD DATA SHEET

Site/Location: Agrico, Turbine Outlet

Test #		Test # 1	Test # 2	Test # 3
Vlc	- Volume of water collected in train, ml	65.70	68.20	28.80
Vm	- Sample gas volume, dcf	26.44	31.77	13.00
Yd	- Meter calibration factor	1.00	1.00	1.00
Pbar	- Barometric pressure, in. Hg.	29.80	29.80	29.80
Ps	- Stack static pressure, inches of H2O	0.10	0.10	0.08
Delta H	- Average meter differential pressure, inches of H2O	1.80	2.00	2.20
Tm	- Absolute meter temperature, R	558.45	546.69	564.44
Vm(std)	- Standard sample gas volume	24.63	30.26	12.00
Bws	- Water vapor in gas stream, % moisture	11.01%	9.47%	10.02%
MF	- Moisture factor	0.89	0.91	0.90
CO2	- Dry, volume %	2.80	2.80	2.80
O2	- Dry, volume %	16.43	16.43	16.43
N2	- Dry, volume %	80.77	80.77	80.77
CO	- Dry, volume %	0.00	0.00	0.00
Md	- Molecular weight of stack gas, dry	29.11	29.11	29.11
Ms	- Molecular weight of stack gas, wet	27.88	28.05	27.99
Cp	- Pitot tube coefficient	0.83	0.83	0.83
P (avg)	- Average of the square roots of each delta P	1.02	1.03	1.04
Ts	- Absolute stack temperature, R	820.53	821.53	823.03
As	- Area of the stack, sq. ft.	78.21	78.21	78.21
Qstd	- Volumetric flowrate, dscfm	189603	194519	194157

FIELD DATA SHEET

Site/Location: Agrico, Dryer Outlet

Test #		Test # 1	Test # 2
Vlc	- Volume of water collected in train, ml	112.00	121.00
Vm	- Sample gas volume, dcf	27.19	27.50
Yd	- Meter calibration factor	1.00	1.00
Pbar	- Barometric pressure, in. Hg.	29.80	29.80
Ps	- Stack static pressure, inches of H2O	0.15	0.15
Delta H	- Average meter differential pressure, inches of H2O	2.20	2.20
Tm	- Absolute meter temperature, R	550.50	551.75
Vm(std)	- Standard sample gas volume	25.73	25.96
Bws	- Water vapor in gas stream, % moisture	16.80%	17.78%
MF	- Moisture factor	0.83	0.83
CO2	- Dry, volume %	1.20	1.20
O2	- Dry, volume %	18.75	18.75
N2	- Dry, volume %	80.05	80.05
CO	- Dry, volume %	0.00	0.00
Md	- Molecular weight of stack gas, dry	28.94	28.94
Ms	- Molecular weight of stack gas, wet	28.94	28.94
Cp	- Pitot tube coefficient	0.83	0.83
P (avg)	- Average of the square roots of each delta P	0.44	0.44
Ts	- Absolute stack temperature, R	598.63	598.38
As	- Area of the stack, sq. ft.	21.31	21.31
Qstd	- Volumetric flowrate, dscfm	24803	24563

Section 2.0

Continuous Emission Monitoring

SECTION 2.0

CONTINUOUS EMISSION MONITORING: NOx, CO & O_2

The analyzers utilized in the Genesis continuous monitor test trailer are presented in Table 2-2. Figure 2-1 is a schematic of the continuous monitoring systems. The protocol used to continuously monitor stack gases for NO_x, Oxygen and CO follow CARB Method 100 recommendations.

Stack gas is extracted from the stack using a 316 stainless steel probe. A stainless steel sintered filter (99 percent efficiency @ 0.6 micron particles) is attached to the inlet of the probe. From the sample probe, sample gas is transported through a heated Teflon sample line by a Teflon-lined diaphragm pump to a series of Greenburg-Smith knock-out impingers and condenser system.The clean, dry sample gas is then transported to the continuous analyzer system through a Teflon line. Prior to the analyzers another filter (Balston glass fiber filter, efficiency of 99% @ 0.3 microns) is installed. A series of flowmeters, valves, and a by-pass regulator maintain constant flow through the system at a constant pressure.

At the onset of each test series, a leak-check is performed on the continuous monitor sampling system. The sample probe is removed from the stack and the inlet is sealed. A leak free system is verified when flow through rotameters to the individual analyzers all drop to zero. A mandatory leak-check is performed at the completion of each test series.

Analyzer calibrations are performed at the start of the test run by introducing zero and span gases for each analyzer and making the necessary adjustments. EPA Protocol 1 certified calibration gas values are recorded on the strip chart and field data sheet. A calibration check is also performed at the end of each one hour test run and recorded on the strip chart. If adjustments are necessary to the analyzers they are made after documentation has been made of any zero or calibration drift. At the conclusion of the test series, a system calibration (bias check) is performed of the sample system. This is accomplished by first removing the sample probe from the stack and allowing ambient air to purge the system. After the system has been purged to verify a zero reading, a system gas which has been named against the standard EPA protocol gas is introduced at the sample nozzle. System pressure and vacuum are maintained as in normal operation during this procedure. The system gas is then allowed to flow through the sample conditioning system to the analyzers. Once a stable reading has been achieved, it is recorded and used to calculate the system efficiency which has a tolerance of 5% of the system gas introduced.

Data is recorded in 10 minute averages for each forty minute test run. Table 2-1 gives a summary of 10 minute averages and calculated emission factors.

TABLE 2-1a

Continuous Monitor Data Summary
Ten Minute Averages
AGRICO
Turbine Outlet
Test # 1
June 12, 1991
(Combined Turbine & Dryer Flow Rate)

Time	% O2	CO ppm	NOx ppm	NOx @ 15% O2	SDCFM	NOx Lb/MMbtu	NOx Lbs/hr	CO Lbs/hr
920	16.25	237.5	20.8	26.4	217443	0.0977	32.89	228.78
930	16.25	238.5	20.2	25.6	217443	0.0949	31.94	229.74
940	16.25	239.0	20.3	25.8	217443	0.0954	32.10	230.22
950	16.25	238.0	20.4	25.9	217443	0.0959	32.26	229.26
AVG.	16.25	238.3	20.4	25.9	217443	0.0960	32.30	229.50

Calibration Data

	% O2	CO ppm	NOxppm
ZERO	0.00	1.50	0.0
Span	14.78	100.30	79.2
Gas Value	14.88	100.30	80.3
Zero Factor	0	0	0
Span Factor	0	0	0

TABLE 2-1b

Continuous Monitor Data Summary
Ten Minute Averages
AGRICO
Turbine Outlet
Test # 2
June 12, 1991
(Combined Turbine & Dryer Flow Rate)

Time	% O2	CO ppm	NOx ppm	NOx @ 15% O2	SDCFM	NOx Lb/MMbtu	NOx Lbs/hr	CO Lbs/hr
1035	16.24	236.5	21.0	26.6	217443	0.0985	33.21	227.81
1045	16.23	237.5	20.7	26.2	217443	0.0968	32.73	228.78
1055	16.20	238.5	20.5	25.7	217443	0.0953	32.42	229.74
1105	16.25	240.5	20.9	26.5	217443	0.0982	33.05	231.67
AVG.	16.23	238.3	20.8	26.2	217443	0.0972	32.85	229.50

Calibration Data

	% O2	CO ppm	NOxppm
ZERO	0.00	-1.5	1.30
Span	14.70	100.70	81.0
Gas Value	14.88	100.30	80.3
Zero Factor	0	0	0
Span Factor	0	0	0

TABLE 2-1c

Continuous Monitor Data Summary
Ten Minute Averages
AGRICO
Turbine Outlet
Test # 3
June 12, 1991
(Combined Turbine & Dryer Flow Rate)

Time	% O2	CO ppm	NOx ppm	NOx @ 15 % O2	SDCFM	NOx Lb/MMbtu	NOx Lbs/hr	CO Lbs/hr
1150	16.25	239.0	21.9	27.8	217443	0.1029	34.63	230.22
1200	16.25	240.0	21.8	27.7	217443	0.1024	34.47	231.19
1210	16.25	237.0	22.3	28.3	217443	0.1048	35.26	228.30
1220	16.25	239.0	22.2	28.2	217443	0.1043	35.10	230.22
AVG.	16.25	238.8	22.1	28.0	217443	0.1036	34.87	229.98

Calibration Data

	% O2	CO ppm	NOxppm
ZERO	0.00	-1.50	1.5
Span	14.98	100.30	81.5
Gas Value	14.88	100.30	80.3
Zero Factor	0	0	0
Span Factor	0	0	0

Figure 2-1

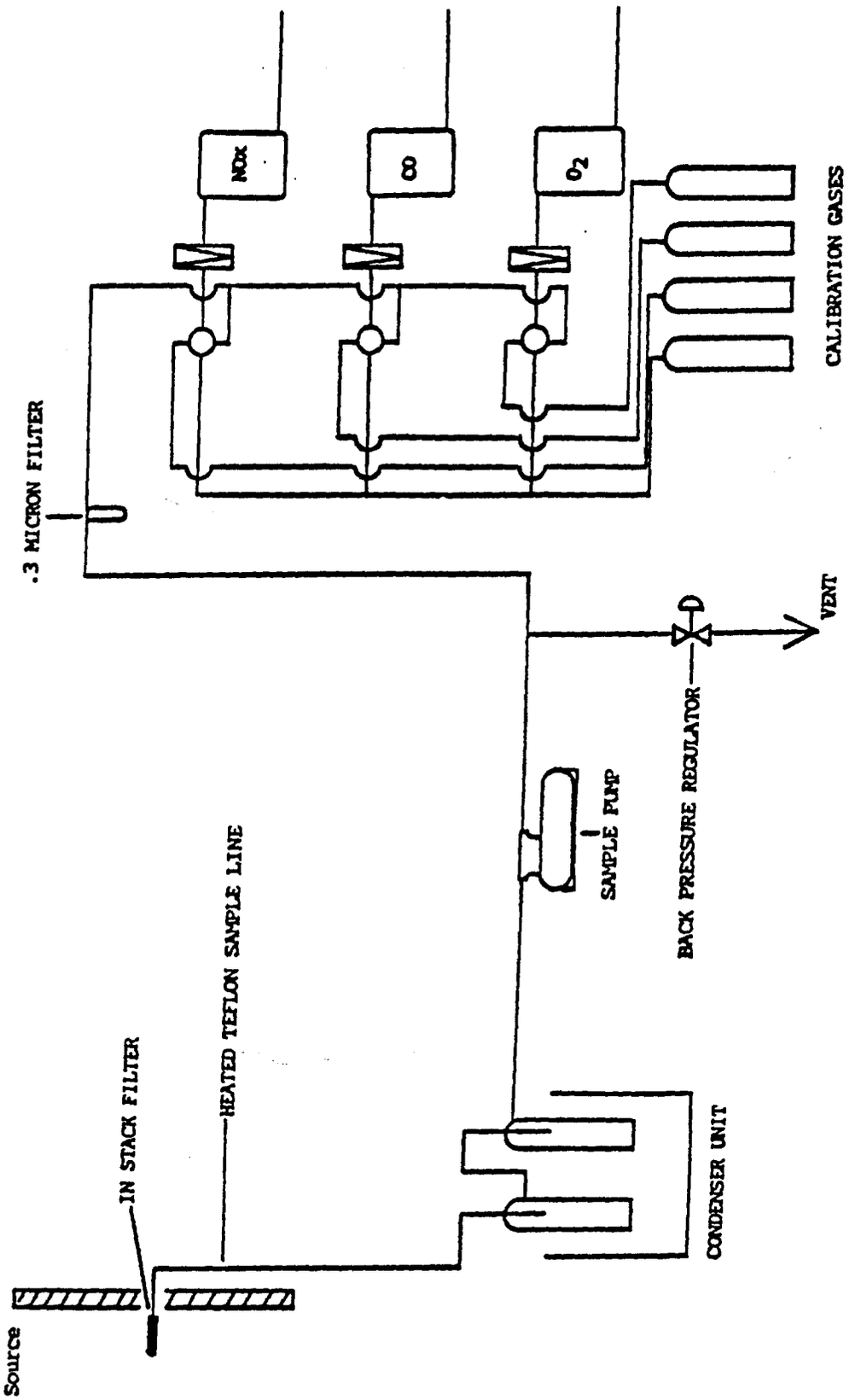

NOx
CO
O_2
CALIBRATION GASES
.3 MICRON FILTER
VENT
BACK PRESSURE REGULATOR
SAMPLE PUMP
HEATED TEFLON SAMPLE LINE
IN STACK FILTER
CONDENSER UNIT
Source

Table 2-2

Analyzer Specifications

NO_x CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10AR

Response time	(0-90%)	1.5 sec-- NO mode 1.7 sec -- NO_x mode
Zero Drift		Negligible after 1/2 hour warmup
Linearity		less than 1% of full scale
Accuracy		Derived from the NO or NO_2 calibration gas, 1% of full scale
Output		0.100 mV, 0-10 mV, 0-5 V, 0-10 V

O_2 ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326RA

Response Time	(0-90%)	60 seconds
Accuracy		less than 1% of scale at constant temperatures; less than 1% of scale of less than 5%of reading, whichever is greater, over the operating temp. range 0-1 V

CO INFRARED ANALYZER -- TECO MODEL 48

Response Time	(0-90%)	1.2 seconds
Zero Drift		less than 1% / 24 hr full scale
Span Drift		less than 1% / 24 hr full scale
Linearity		1%
Repeatability		less than 0.5% of full scale
Output		0-1 V

STRIP CHART RECORDED (4 PEN) -- Linseis Model 7045

Response Time	less than 0.35 sec.
Span -- Full Scale	1 mV through 10 V
Zero Set	Electronically adjustable full scale with 1 full scale of zero suppression
Accuracy	Plus or minus 0.35 %
Linearity	Plus or minus 0.25 %

SECTION 3.0

HYDROCARBON ANALYSIS

SECTION 3.0

HYDROCARBON ANALYSIS

Hydrocarbon analysis is performed as outlined in EPA Method 18. Hydrocarbon samples are collected in Tedlar Sample Bags as detailed in EPA Method 18, section 5.3.2

Hydrocarbon components of the gas sample are separated and analyzed by Gas Chromatography using a flame ionization detector and a 9 meter stainless steel packed column. The column is composed of 27% DC-200 and Chromosorb-P with a mesh size of 60/80. The retention times of each separated component are compared to those of known compounds from an injection standard under identical conditions.

TABLE 3-1 contains a summary of Non Methane Hydrocarbon results from this test series. Emission rate calculations for NMHC are calculated as Methane using the molecular weight of Methane.

TABLE 3-1

Non Methane Hydrocarbon Results

AGRICO COGENERATION
Turbine Outlet
June 12, 1991

Test #	Ethane ppm	Hexane ppm	Total NMHC ppm	SDCFM	NMHC lbs/hr
1	8.48	1.81	10.29	217443	5.58
2	9.61	1.49	11.10	217443	6.03
Avg.	9.05	1.65	10.70	217443	5.81

NOTE: Non Methane Hydrocarbons Calculated as Methane.

Appendix A-1

Fuel Analysis

ZALCO LABORATORIES, INC.
Analytical & Consulting Services

GENESIS ENVIRONMENTAL
1145 W. Columbus Ave.
Bakersfield, CA 93301

Lab. No.: 027897_002
Received: Jun 20, 1991
Reported: Jun 21, 1991

Attention: Mike Bakalor

Sample Description: Agrico Test H2 Test #2 6/12/91

* CHROMATOGRAPHIC ANALYSIS (Z 1635) *

Components	Mole %	Wt %	CHONS	Wt %
Hydrogen	0.000	0.000	CARBON	71.52
Carbon Dioxide	1.444	3.704	HYDROGEN	23.24
Oxygen	.403	.752	OXYGEN	3.45
Nitrogen	1.094	1.787	NITROGEN	1.79
Carbon Monoxide	0.000	0.000	SULFUR	0.00
Hydrogen Sulfide	0.000	0.000		
Methane	94.376	88.281	Totals	99.99
Ethane	2.046	3.587	Total H/C	.32
Propane	.453	1.165		
IsoButane	.045	.151		
N-Butane	.067	.226		
IsoPentane	.015	.064		
N-Pentane	.010	.042		
Hexanes+	.048	.240		
Totals =	100.000	100.000		

SPECIFIC GRAVITY (Air = 1)		.5935
SPECIFIC VOLUME, cu.ft./lb	*	22.08
GROSS CALORIFIC VALUE, BTU/cu.ft.	*	994.57
GROSS CALORIFIC VALUE, BTU/cu.ft.	**	1011.77
GROSS CALORIFIC VALUE, BTU/lb	**	22338.00
NET CALORIFIC VALUE, BTU/cu.ft.	**	911.90
NET CALORIFIC VALUE, BTU/lb	**	20133.06
DSCF EXHAUST PER SCF FUEL (0% Oxygen)		8.5895
COMPRESSIBILITY FACTOR 'Z' (60 F,1 ATM)		.9980
EPA 'F' Factor @ 68 F:		8625.351 DSCF / MM Btu.
KCAPCD 'F' Factor @ 60 F:		8495.971 DSCF / MM Btu.

* Water Saturated

** Dry Gas @ 60 F, 14.73 psia

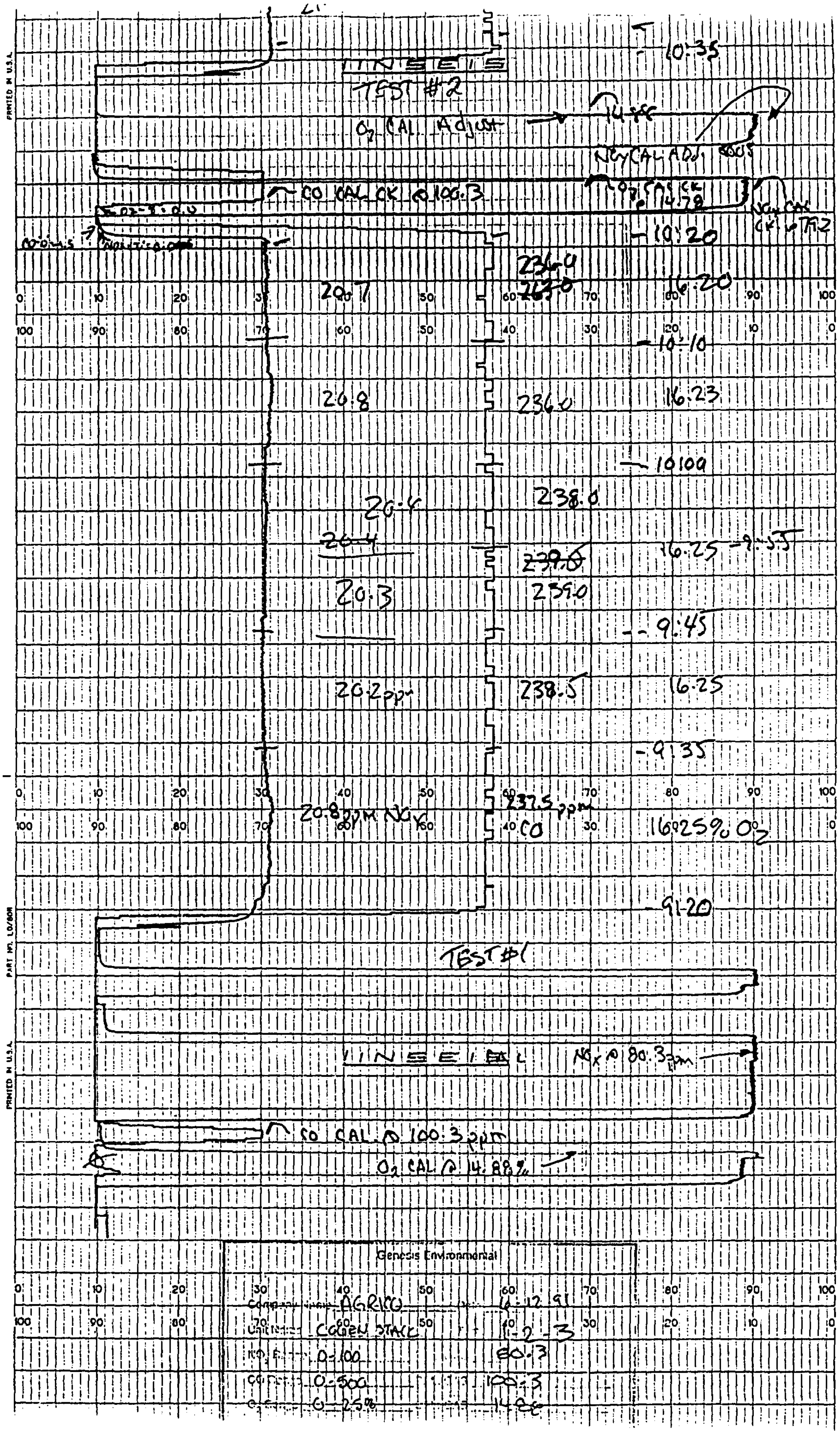
Maryann W. Benoit
Organics Supervisor

Richard L. Penner
Laboratory Director

4309 Armour Avenue Bakersfield, California 93308
(805) 395-0539 FAX (805) 395-3069

Appendix A-2

Raw Data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CO CAL CK @ 100.3
O2 CAL CK
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20.7
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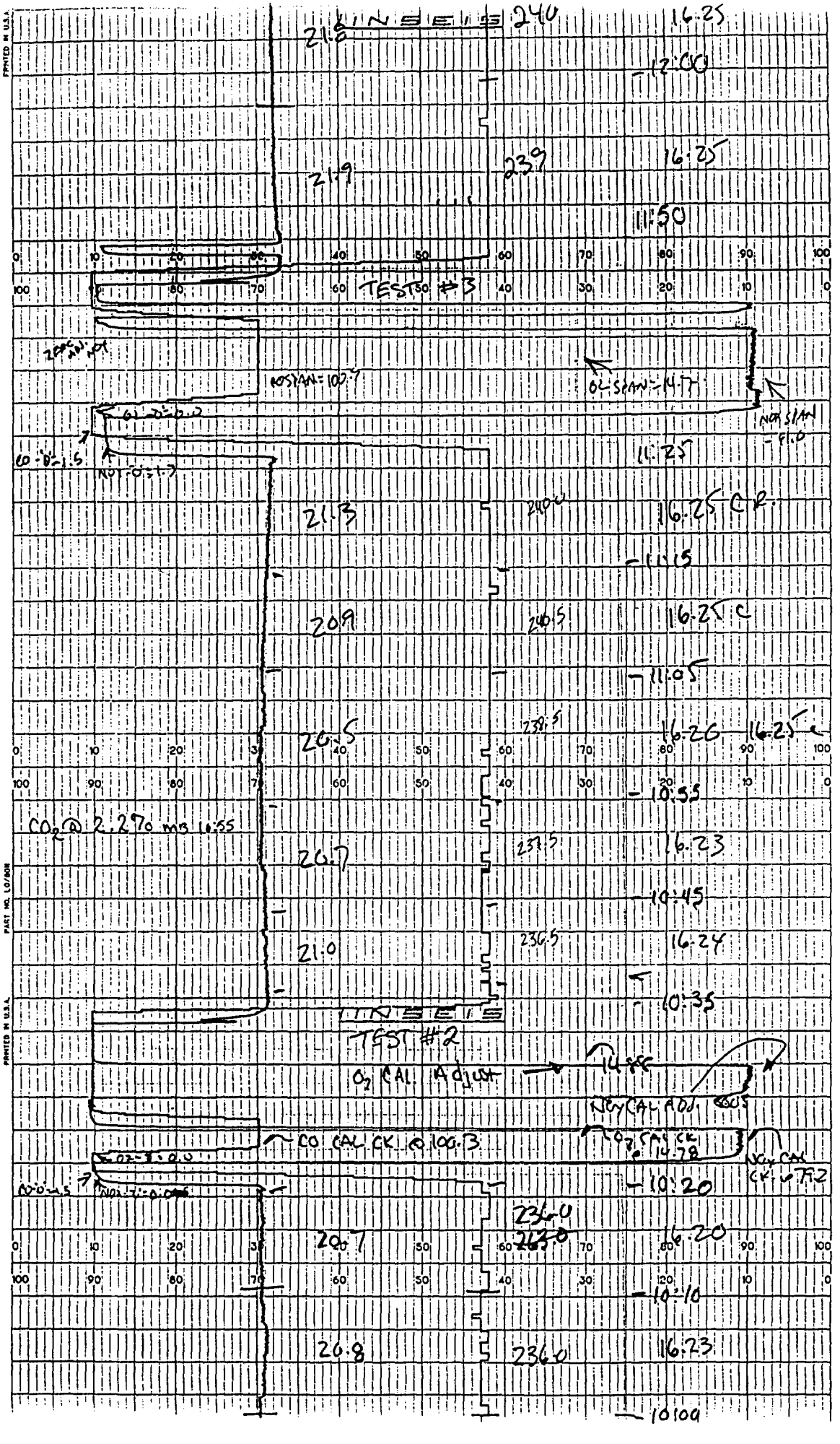
20.8
236.0
16.23
10:09
20.4
238.0
20.3
239.0
16.25
9:45
20.2 ppm
238.5
16.25
9:35
20.8 ppm NOx
237.5 ppm CO
16.25% O2
9:20
TEST #1
NOx @ 80.3 ppm
CO CAL @ 100.3 ppm
O2 CAL @ 14.88%
Genesis Environmental
AGRICO
COGEN STACK
0-100
0-500
0-25%
80.3
100.3
14.88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TEST #3
TINSELS
TEST #2
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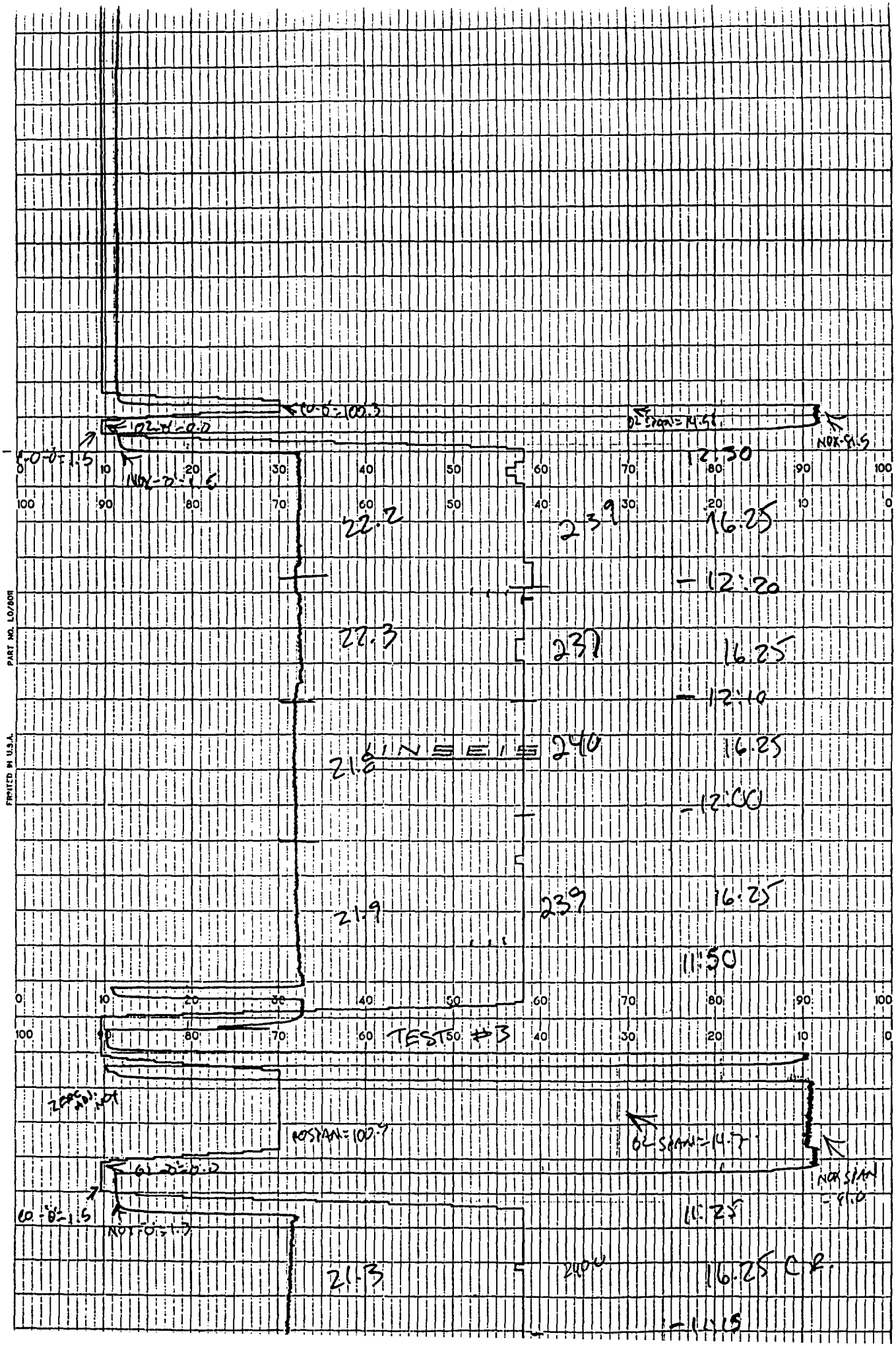
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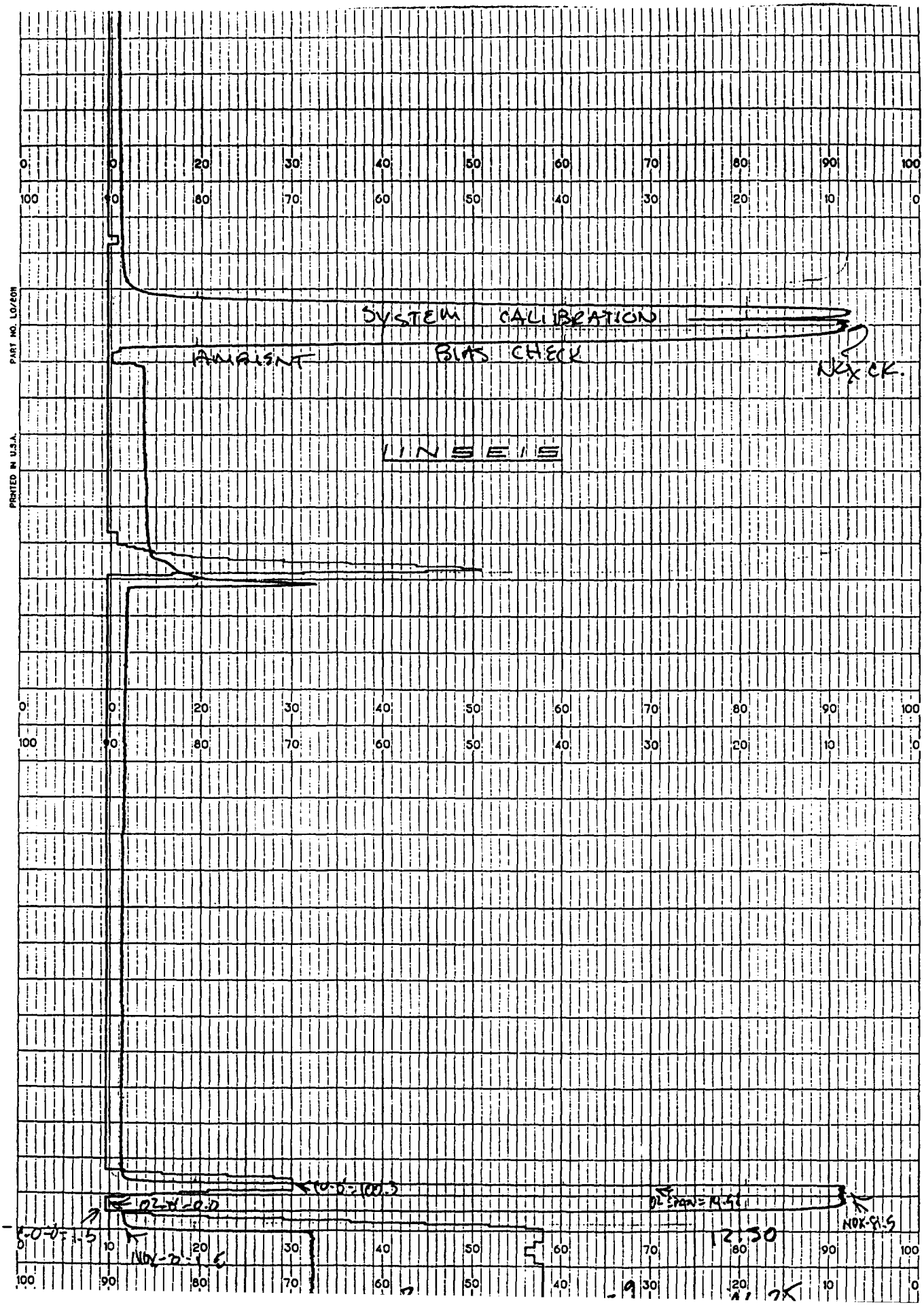
11:15
11:25


SYSTEM CALIBRATION
AMBIENT BIAS CHECK
NOX CK.
LINES
PART NO. LO/EOII
PRINTED IN U.S.A.

Company AGRICO　　　　Date 6-12-91

Station CO-GEN　　　　Test Run 1

Time	$\%O_2$	$\%CO_2$	ppm CO		ppm SO_2		ppm NO_x	
			drift not corrected	drift corrected	drift not corrected	drift corrected	drift not corrected	drift corrected
09:20	16.25	N/A		237.5	N/A	N/A		20.8
09:30	16.25			238.5				20.2
09:40	16.25			239.0				20.3
09:50	16.23			238.0				20.4
Mean								

Calibration	$\%O_2$	$\%CO_2$	ppm CO	ppm SO_2	ppm NO_x
zero reading	0.0	N/A	1.5	N/A	0.0
span reading	14.78		100.3		79.2
span gas value	14.88 cyl # CC 2F437		100.3 cyl # AAL4994		80.3
* span drift corr. factor					
* zero drift corr. factor					

*Apply drift correction factors to the mean value only, for each test run. See calculations on next page.

Company AGRICO Date 6-12-91

Station Co-GEN Test Run 2

Time	%O_2	%CO_2	ppm CO		ppm SO_2		ppm NO_x	
			drift not corrected	drift corrected	drift not corrected	drift corrected	drift not corrected	drift corrected
10:35	16.24	N/A		236.5	N/A	N/A		21.0
10:45	16.23			237.5				20.7.
10:55	16.20			238.5				20.5
11:05	16.25			240.5				20.9
Mean	16.23			238.25				20.78

	Calibration	%O_2	%CO_2	ppm CO	ppm SO_2	ppm NO_x
	zero reading	0.0	N/A	-1.5	N/A	1.3
	span reading	14.7		100.7		81.0
	span gas value	14.89 Cyl # CC26437		100.3 Cyl # AAL4994		80.3
*	span drift corr. factor					
*	zero drift corr. factor					

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

Company AGRICO Date 6-12-91

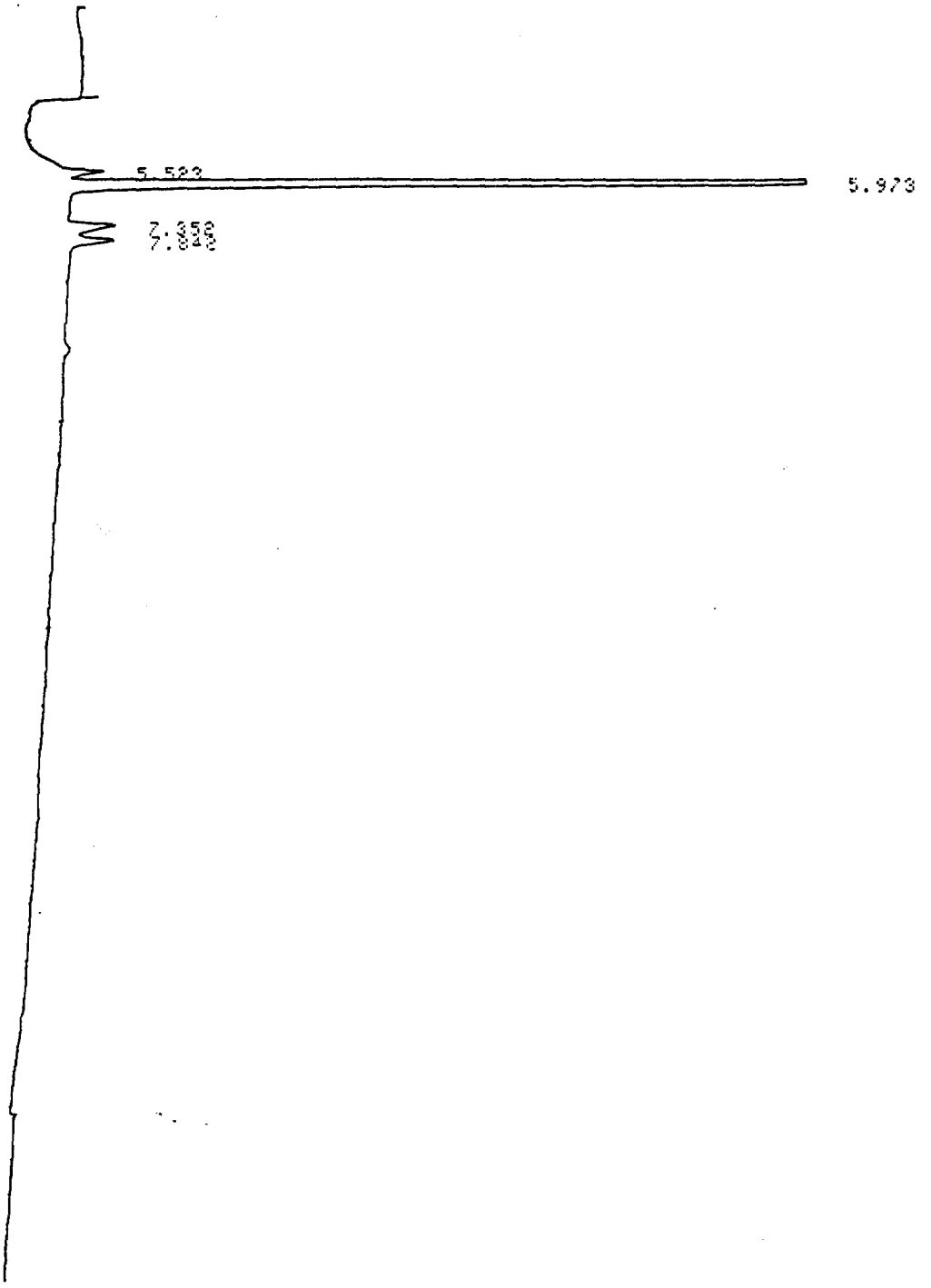
Station CO-GEN Test Run 3

Time	%O_2	%CO_2	ppm CO		ppm SO_2		ppm NO_x	
			drift not corrected	drift corrected	drift not corrected	drift corrected	drift not corrected	drift corrected
11:50	16.25	N/A		239.0	N/A	N/A		21.9
12:00	16.25			240.0				21.8
12:10	16.25			237.0				22.3
12:20	16.25			239.0				22.2
Mean								

Calibration	%O_2	%CO_2	ppm CO	ppm SO_2	ppm NO_x
zero reading	0.0	N/A	-1.5	N/A	1.5
span reading	14.98		100.3		81.5
span gas value	14.89 NYC Tec 26437		100.3 CYL# AAL4944		80.3
* span drift corr. factor					
* zero drift corr. factor					

*Apply drift correction factors to the mean value only, for each test run.
See calculations on next page.

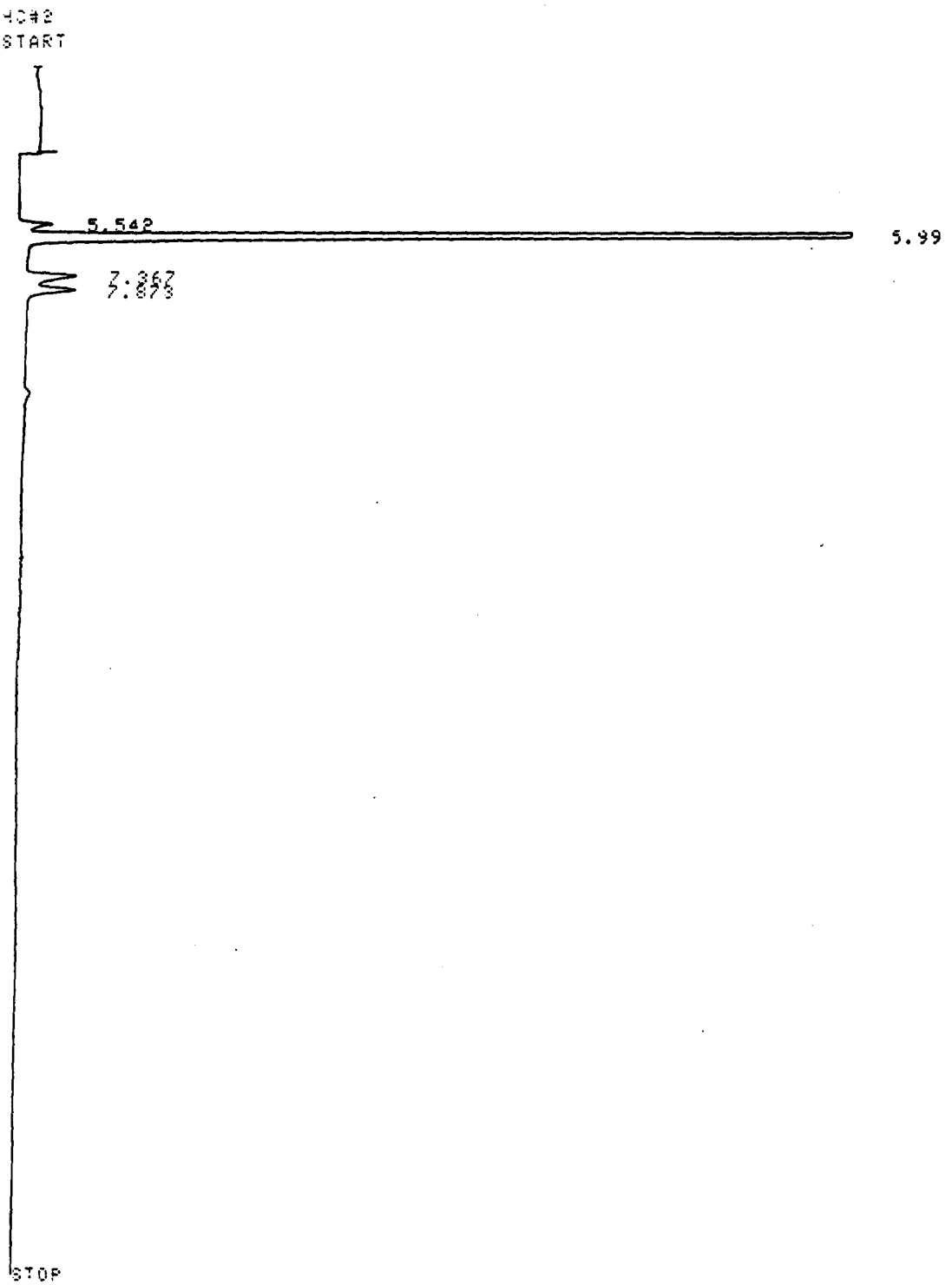
740#1
COSEN OUTLET
START



CHROMATOPAC C-R6A1 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 668 SAMPLE WT 100

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	5.523	1050		1	1.8075	HEXANE
2	5.973	22262	V	2	221.0059	METHAN
3	7.352	890		3	4.6387	ETHANE
4	7.842	738	V	3	3.8434	ETHANE

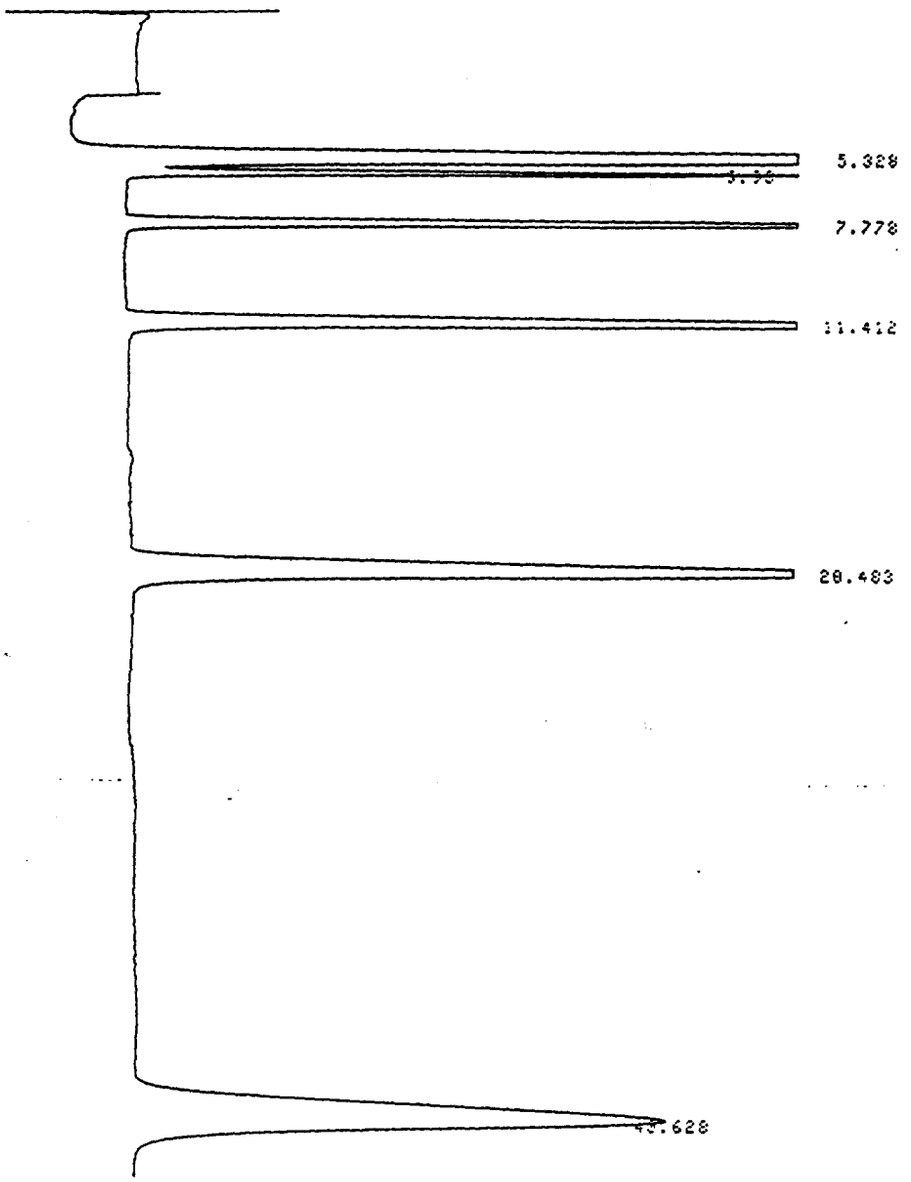
092



CHROMATOPAC C-R6A1 FILE 1
SAMPLE NO 0 METHOD 44
REPORT NO 670 SAMPLE WT 100

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	5.542	869		1	1.4948	HEXANE
2	5.99	24194	V	2	240.178	METHAN
3	7.367	988		3	5.1498	ETHANE
4	7.873	856	V	3	4.4589	ETHANE
	TOTAL	26906			251.2814	

6-12-91
CALIB
AGRICO
START



CHROMATOPAC C-R6A1
SAMPLE NO 0
REPORT NO 565

FILE 1
METHOD 44
SAMPLE WT 100

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	5.328	54216		1		HEXANE
2	5.93	19623	V	2		METHAN
3	7.778	18366		3		ETHANE
4	11.412	28184		4		PROPAN
5	20.483	36735		5		BUTANE
6	40.628	44674		6		PENTAN
	TOTAL	192198				

CALIBRATION MADE IN IDENTIFICATION FILE 1
MODE= 1 WINDOW 6

IDNO	NAME	TIME	FACTOR	CONC
1	HEXANE	5.32	0.00172088	93.3
2	METHAN	5.93	0.00992734	99.5
3	ETHANE	7.77	0.00521077	95.7
4	PROPAN	11.41	0.00347011	97.8
5	BUTANE	20.48	0.00260517	95.7
6	PENTAN	40.62	0.00210187	93.9

HRSG OUTLET

GENESIS
ENVIRONMENTAL SERVICES COMPANY

Company AGRICO
Date 6-12-91
Operator MB, DW
Test # #1
Stack Diameter 119.75
Barometer 29.80

Meter Box # CB1002
Meter Delta H 1.25
Y Factor 1.004
Pitot Coifc. .83
Probe Length 11'
Stack Pressure .10

Nozzle I.D. —
Nozzle Diam. —
Leak Rate .001@15'
Liner Material SS
Filter # N/A

Trav. Pnt. #	Sample Time	DGM Meter CF	Δ P H2O "	Δ H H2O "	Stack Temp F	DGM IN Temp	DGM Out Temp	Probe Temp	Box Temp	Imp. Temp	Vac. Hg"
1		173.265	1.05	1.8	366.5	97.6	98.1				7
2			1.05	1.8	364.1	97.7	98.2				7
3			.98	1.8	366.7	97.6	98.1				7
4			0.90	1.8	366.5	98.1	97.9				7
5			0.95	1.8	365.5	98.4	98.0				7
6		180.61	1.03	1.8	363.8	98.9	97.8				7
7			1.10	1.8	361.2	99.5	98.0				7
8			1.13	1.8	361.2	99.9	97.9				7
9			1.14	1.8	361.6	100-	97.9				7
10		184.20	1.17	1.8	360.6	99.9	97.9				7
11			1.07	1.8	356.6	99.8	97.9				7
12			.95	1.8	336.2	99.9	97.9				7
0		199.70									
1			1.05		362.9						
2			1.05		362.7						
3			1.02		362.9						
4			0.95		363.0						
5			0.95		362.8						
6			0.97		361.8						
7			1.15		361.7						
8			1.18		363.9						
9			1.18		364.2						
10			1.22		364.0						
11			1.10		361.2						
12			.78		331.1						
0											

TURBINE OUT.

GENESIS
ENVIRONMENTAL SERVICES COMPANY

Company AGRICO
Date 6-12-91
Operator K.O.
Test # #2
Stack Diameter 119.75
Barometer 29.8

Meter Box # CB1002
Meter Delta H 1.25
Y Factor 1.001
Pitot Coifc. .84
Probe Length 10.0'
Stack Pressure .10

Nozzle I.D. 0
Nozzle Diam. 0
Leak Rate .002 @ 15.0"
Liner Material SS
Filter # 0

PITOT LK OK. END LK-CK .002 @15.0"

Trav. Pnt. #	Sample Time	DGM Meter CF	P H2O "	H H2O "	Stack Temp F	DGM IN Temp	DGM Out Temp	Probe Temp	Box Temp	Imp. Temp	Vac. Hg"
1 12	0.0	213.020	1.05	2.0"	359.8°	86.5	87.8	0	0	68°	13.0"
2 11	5.0	218.380	1.05		360°	86.	85	0	0	60°	13.0"
3 10	10.0	223.680	1.10		360°	87.	85	0	0	53°	13.0"
4 9	15.0	229.022	1.00		360°						
5 8			1.05		360°						
6 7	~~0.0~~		1.10		360°						
7 6			1.10		361°						
8 5			1.15		360°						
9 4			1.15		363°						
10 3			1.20		362°						
11 2			1.15		359°						
12 1			1.00		358°						
0											
1 12	0.0	229.022	1.10	2.0	365°	86.6	87.4	0	0	59°	13.0"
2 11	5.0	234.360	1.05		366°	88.0	86.	0	0	52	13.0"
3 10	10.0	239.545	0.95		365°	89.0	86	0	0	48°	13.0"
4 9	15.0	244.743	0.90		366°						
5 8			0.95		366°	86.7					
6 7		31.773	1.05		364°						
7 6			1.10		361°						
8 5			1.10		361°						
9 4			1.15		361°						
10 3			1.15		360°						
11 2			1.10		359°						
12 1			1.00		358°						
0											

361.5

Turbine Out TEST #3

GENESIS
ENVIRONMENTAL SERVICES COMPANY

Company [illegible]
Date 6-12-91
Operator K On
Test # 2 Velocity
Stack Diameter
Barometer

Meter Box # CB1002
Meter Delta H 1.25
Y Factor 1.001
Pitot Coifc. 0.84
Probe Length 10.0'
Stack Pressure .10
Pitot LC OK OK

Nozzle I.D. -0-
Nozzle Diam. -0-
Leak Rate -0-
Liner Material SS
Filter # NA

1:38
1:51
11:50
12:07

Trav. Pnt. #	Sample Time	DGM Meter CF	P H2O "	H H2O "	Stack Temp F	DGM IN Temp	DGM Out Temp	Probe Temp	Box Temp	Imp. Temp	Vac. Hg"
1 12		200.0	1.05	2.2	366.7	103.9	105.4				8
2 11			1.00		366.4						
3 10			0.95		366.6						
4 9			0.90		366.7						
5 8			0.95		365.7						
6 7			1.00	2.2	364.1	104.6	104.2				8
7 6		203.0	1.10		361.7						
8 5			1.10		362.2						
9 4			1.15		361.5						
10 3			1.15		360.1						
11 2			1.05		359.8						
12 1		206.0	0.95	2.2	358.7						
0											
1 12		206.0	1.05	2.2	362.6	104.4	104.1				8
2 11			1.05		362.4						
3 10			1.00		363.9						
4 9			0.95		363.7						
5 8			0.95		363.3						
6 7		209.90	1.00	2.2	362.5	104.0	104.9				8
7 6			1.10		363.4						
8 5			1.15		364.0						
9 4			1.20		364.5						
10 3			1.15		363.5						
11 2			1.10		359.9						
12 1			1.00	2.2	358.7						
0		213.0									

GENESIS

Moisture Content

Site: AGRICO Sample Date: 6-12-91
Sample Location: HRSG STACK Operator(s): MB, KG, DW
Comments:

Sample Run No.: #1 Analysis Date: 6-12-91 Analyzed By: MLB
P_m: 29.8 in. Hg T_m: 558.45 °R V_m: 26.44 DCF
$V_{M(Std)}$: 24.63 SDCF B_{ws}: 11.01 Comments:

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1	H_2O	622.6	584.2	38.4
#2	H_2O	621.6	604.5	17.1
#3	ø	489.0	488.3	.7
#4				
Silica Gel		813.6	804.1	9.5
			Total	65.7

Sample Run No.: #2 Analysis Date: 6-12 Analyzed By: MLB
P_m: 29.8 in. Hg T_m: 546.69 °R V_m: 31.77 DCF
$V_{M(Std)}$: 30.26 SDCF B_{ws}: 9.47 Comments:

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1	H_2O	639.9	583.5	56.4
#2	H_2O	576.0	573.8	2.2
#3	ø	470.0	470.0	ø
#4				
Silica Gel		791.1	782.5	8.6
			Total	68.2

GENESIS
ENVIRONMENTAL SERVICES COMPANY

Moisture Content

Site: AGRICO Sample Date: 6-12-91
Sample Location: HRSG STACK Operator(s): MB, RG, DW
Comments: _____

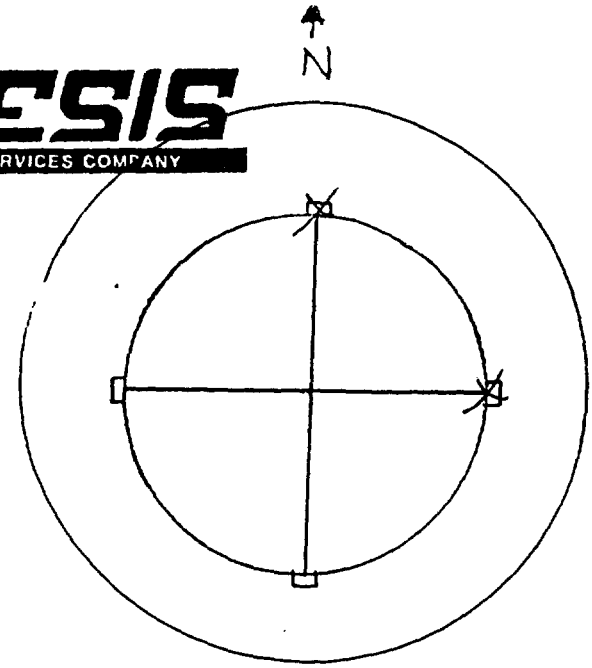
Sample Run No.: #3 Analysis Date: 6-12 Analyzed By: MLB
P_m: 29.8 in. Hg T_m: 564.44 °R V_m: 13.0 DCF
$V_{M(Std)}$: 12.00 SDCF B_{ws}: 10.02 Comments: _____

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1	H_2O	603.4	584.2	19.2
#2	H_2O	607.4	603.3	4.1
#3	~~0~~	468.9	468.9	0
#4				
Silica Gel		798.4	792.9	5.5
			Total	28.8

Sample Run No.: _____ Analysis Date: _____ Analyzed By: _____
P_m: _____ in. Hg T_m: _____ °R V_m: _____ DCF
$V_{M(Std)}$: _____ SDCF B_{ws}: _____ Comments: _____

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1				
#2				
#3				
#4				
Silica Gel				
			Total	

GENESIS
ENVIRONMENTAL SERVICES COMPANY



Company AGRICO
Date 6-12-91.
Unit DRYER STACK.
Power @ BASE 120 1PH/VAC
Stack I.D. 6.25"
Nipple 6" EXT x 2" L
Operator K. OLIVER

Point #	inches	+nipple
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

VELOCITY TRAVERSE

Port WEST

Point	^P	Ts
1	.30	139°
2	.28	138°
3	.25	138°
4	.22	138°
5	.20	138°
6	.16	138°
7	.12	138°
8	.15	138°
9	.16	138°
10	.19	138°
11	.18	138°
12	.12	138°
AVG.		

Port SOUTH

Point	^P	Ts
1	.28	139
2	.30	139
3	.28	139
4	.22	138
5	.14	139
6	.17	138
7	.15	139
8	.16	139
9	.18	140
10	.18	140
11	.16	140
12	.17	140
AVG.		

COMMENTS:

EQUIPMENT: 1 KEY 40' ROPE

Meter Box # GB1001 Probe Length 4.0'

Pitot Coif. 0.83 Pitot Leak CK. OK.

Barometer 29.82 Date & Time 08:00 6/12.

DRYER STACK

METHOD 4 MOISTURE

GENESIS
ENVIRONMENTAL SERVICES COMPANY

Company AGRICO
Date 6-12-91
Operator K Enton
Test # 1
Stack Diameter 6.20"
Barometer

Meter Box # CB1001
Meter Delta H
Y Factor
Pitot Coifc. 0.84
Probe Length 10.0
Stack Pressure

Nozzle I.D. 0
Nozzle Diam. 0
Leak Rate .015 @ 15" HG
Liner Material SS
Filter # 0

Pitot LK CK OK - CB LK CK .010 @ 05" HG

Trav. Pnt. #	Sample Time	DGM Meter CF	P H2O "	H H2O "	Stack Temp F	DGM IN Temp	DGM Out Temp	Probe Temp	Box Temp	Imp. Temp	Vac. Hg"
1	0.0	396.179	0		148°	87°	84°	0	0	67°	6.0
2	5.0	399.745			145°	91°	85°			58°	6.0
3	10.0	404.480			147°	95°	87°			50°	6.0
4	15.0	408.880			138°	96°	89°			43°	6.0
5	20.0	413.380			136°	96°	90°			38°	6.0
6	25.0	417.875			138°	96°	90°			35°	6.0
7	30.0	422.372									
8		27.193									
9						(90.5)					
10		(illegible)									
11		112									
12											
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
0											

GENESIS
ENVIRONMENTAL SERVICES COMPANY

DRYER

Company AGRICO
Date 6-12-91
Operator KO
Test # #2
Stack Diameter 62.5
Barometer 29.8

Meter Box # CB1061
Meter Delta H 2.2
Y Factor 1.001
Pitot Coifc. .83
Probe Length 7'
Stack Pressure .15

Nozzle I.D. —
Nozzle Diam. —
Leak Rate .001015
Liner Material
Filter #

MOISTURE + VELOCITY

Trav. Pnt. #	Sample Time	DGM Meter CF	P H2O "	H H2O "	Stack Temp F	DGM IN Temp	DGM Out Temp	Probe Temp	Box Temp	Imp. Temp	Vac. Hg"
1		430.60	.31	2.2	137	88	85				
2			.27	2.2	138						
3			.26	2.2	137	93	86				
4		435.00	.22	2.2	139						
5			.20	2.2	138						
6			.15	2.2	138	95	88				
7			.13	2.2	137						
8			.15	2.2	139						
9			.16	2.2	138	97	91				
10			.17	2.2	139						
11			.19	2.2	138	97	92				
12			.12	2.2	138						
0		458.10				97	92				
1			.27		138						
2			.30		139						
3			.29		139						
4			.22		138						
5			.18		138						
6			.18		139						
7			.16		138						
8			.15		139						
9			.18		139						
10			.18		140						
11			.17		139						
12			.16		139						
0											

GENESIS

Moisture Content

Site: AGRICO Sample Date: 6-12-91
Sample Location: DRYER Operator(s): KC, MB
Comments:

Sample Run No.: #1 Analysis Date: 6-12 Analyzed By: MB
P_m: 29.80 in. Hg T_m: 550.5 °R V_m: 27.19 DCF
$V_{M(Std)}$: 25.73 SDCF B_{ws}: 16.8 Comments:

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1	H_2O	714.5	611.4	103.1
#2	H_2O	584.1	584.1	0
#3	0	483.2	483.2	0
#4				
Silica Gel		801.3	792.4	8.9
			Total	112.0

Sample Run No.: #2 Analysis Date: 6-13 Analyzed By: MB
P_m: 29.80 in. Hg T_m: 551.75 °R V_m: 27.50 DCF
$V_{M(Std)}$: 25.96 SDCF B_{ws}: 17.78 Comments:

Impinger	Contents	Final Weight grams	Tare Weight grams	Net Weights grams
#1	H_2O	708.2	608.1	100.1
#2	H_2O	593.4	583.2	
#3	0	485.9	484.9	1.0
#4				
Silica Gel			794.3	9.7
			Total	121.00

AGRICO COGENERATION

WATER INJECTION TEST

DATE: 6-12-91

Time of Test	0830	0900	0930	1000	1030
CTG MW	21.0	20.9	20.9	20.8	20.8
STG MW	7.4	7.3	7.4	7.4	7.4
Net Output, MW	27.9	27.6	27.5	27.5	27.7
CTG Fuel Rate	277.6	276.8	271.3	270.5	275.7
Coen Fuel Rate	—	—	—	—	—
Water Injection Flow, gpm	21.4	21.3	21.3	21.3	21.3
HRSG Stack Flow	217	213	212	208	215K
HRSG Stack Temp	353	356	356	356	356
KVB O2	16.0	15.9	16.0	15.9	16.0
KVB Nox	27	28	28	28	28
KVB CO	286	283	283	287	283
Dryer Product	POMACE	POMACE	POMACE	POMACE	POMACE
Bypass Damper Position	20%	33%	33%	35%	36%
Ambient Dry Bulb	75	75	77	83	86
Ambient Wet Bulb	67	63	65	62	68
Data Taken By	MS	MS	MS	MS	[illegible]
Comments					
MASS FLOW DRYER DUCT					95.4K
~~DUCT~~ DUCT PRESS.					0.4
DUCT TEMP.					800

Estimated Fuel Water Ratio:

AGRICO COGENERATION

WATER INJECTION TEST

DATE: 4/12/91

Time of Test	1100	1130	1200	1230	1300
CTG MW	20.6	20.6	20.5	20.4	20.0
STG MW	7.4	7.3	7.2	7.3	7.3
Net Output, MW	27.1	27.3	27.3	26.7	26.6
CTG Fuel Rate	275.6K	273.4K	274.9K	265.1K	265.8K
Coen Fuel Rate	—	—	—	—	—
Water Injection Flow, gpm	21.4	21.4	21.4	21.4	15.3
HRSG Stack Flow	205K	208K	205K	205K	207
HRSG Stack Temp	356	355	355	356°	355
KVB O2	16.0	15.8	16.0	16.0	16.0
KVB Nox	28	28	28	28	38
KVB CO	290	291	290	278	221
Dryer Product	POMACE	POMACE	POMACE	POMACE	POMACE
Bypass Damper Position	36%	37%*	37%	38%	33
Ambient Dry Bulb	87	88	89	89	90
Ambient Wet Bulb	70	71	71	70	69
Data Taken By	KIMBLE	KIMBLE	KIMBLE	KIMBLE	KIMBLE
Comments MASS FLOW → DRYER	99.4K	102.7K	10.79K	117.4	117.3K
DUCT PRESS	0.4	0.4	0.4	0.5	0.2
DUCT TEMP	803	804	804	805	805

* NOT CHANGED DUE TO TEST IN PROGRESS.

Estimated Fuel Water Ratio:

Appendix A-3

Calibrations and Certifications

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

GENE01

TO: DATE : 03/14/91

ATTN: KEVIN
GENESIS ENVIRONMENTAL SERVICES
1145 W. COLUMBUS AVE
BAKERSFIELD, CA 93301

CUSTOMER ORDER NUMBER: 7173 /Reanalysis PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO.: CC28437					
			Varian Model 1860		03/07/91
Oxygen	14.88 ± 0.15 %	GMIS	S/N None	09/07/92	14.88 %
		Cylinder #	Thermal Conductivity		14.90 %
Nitrogen	Balance	CC12233	Gas Chromatography		14.86 %
Cylinder Pressure: 1600 psig		@ 23.86 %	Last Cal Date: 03/12/91	Mean:	14.88 %

RECEIVED MAR 2 5 1991

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with EPA-1987 Traceability Protocol # 1, Section 3.0.4, Procedure G1.

Analyst: _____ Approved: _____

M.S. Calhoun J.T. Marrin

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.

SCOTT - MARRIN, INC. 2001 THIRD ST., UNIT H RIVERSIDE, CALIFORNIA 92507

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: 7173/Reanalysis

CHRONOLOGICAL RECORD OF CERTIFIED CONCENTRATIONS

CYLINDER NUMBER: CC28437

DATE	Oxygen		
09/27/88	14.87 mole-%		
01/23/89	14.89 mole-%		
03/07/91	14.88 mole-%		
AVERAGE	14.88 mole-%		

ALPHAGAZ
DIVISION OF LIQUID AIR CORPORATION

MIXED AND SPECIALTY GASES

P.O. Box 5548
2445 South Street

Phone (213) 492-5300
Long Beach, CA 90805

March 4, 1991 P.O. Number: VERBAL

Customer: HOPPER GAS & WELDING SUPPLY Lot Number: 261

CERTIFICATION OF CYLINDER: AL-1085

Component	MOLE
NITRIC OXIDE	80.3 PPM
NITROGEN	BALANCE

Analyst

SCOTT-MARRIN, INC.
2001 THIRD ST. • UNIT H • RIVERSIDE, CA 92507
TELEPHONE (714) 784-1240

REPORT OF ANALYSIS

TO: Mike Bakalor
Genesis Environmental Services
5650 District #14
Bakersfield, CA 93113

DATE: 22 September 1989

CUSTOMER ORDER NUMBER: Verbal/Mike Reanalysis

CYLINDER NUMBER AAL4994

COMPONENT	CONCENTRATION(v/v)
Carbon Monoxide	100.3 ± 1.0 ppm
Nitrogen	Balance
Cylinder Pressure:	550 psig

(The above analysis is traceable to the National Institute of Standards and)
(Technology SRM 1679, Cylinder Number 87962DU.)

ANALYST Mark Monson
M.J. Monson

APPROVED John T. Marrin
J.T. Marrin

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.