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SUMMARY OF RESULTS

SUMMARY OF SOURCE TEST RESULTS

COMPANY: **DESTEC, CHALK CLIFF** APCD #: 4175001

TEST DATE: DECEMBER 15,16,17,18 1992 UNIT #: GAS TURBINE

EMISSIONS	gr/scf	@12%CO2	ppm	ppm @15% O2	lb/ MMBtu	lb/hr	lb/day	Permit Limits
PARTICULATE	0.00036 0.00039	0.00168 0.00182				0.88 0.97	21.1 23.3	
Mean:	**0.00038**	**0.00175**				**0.93**	**22.2**	**5.86 lb/hr**
SULFUR (3 fuel samples)			in fuel 1.5 2.7 2.1			in exhaust	in exhaust	
Mean:			**2.1**			**0.065**	**1.56**	**0.14 lb/hr 1/**
NOx (dry) (RUNS 1-10)								**0.018 lb/MMBtu**
Mean:			**3.19**	**3.48**	**0.01282**	**5.54**	**133**	**7.95 lb/hr**
CO (RUNS 1-6)								
Mean:			**17.54**	**19.15**		**18.54**	**445**	**53.26 lb/hr**
NMHC turbine plus 3 lube oil vent								
Mean:						**0.98**	**23.50**	**6.06 lb/hr**
AMMONIA NH3 (RUNS 1-9)								
Mean:			**7.05**	**7.64**		**4.59**	**109**	**20 ppmv**

RELATIVE ACCURACY	% RA Related to Referance Method	% RA Related to Applicable Standard	PERMIT LIMITS Related to Referance Method	PERMIT LIMITS Related to Applicable Standard
NOx	0.79	NA	20 %	10 %
O2	0.55	NA	20 %	NA
NH3	44.29	15.61	20 %	10 %

For San Joaquin Unified APCD Use Only:

1/ As per December 7, 1992 addendum to protocol (enclosed).

ANNUAL 2101 ; 48.0 MW PUC GAS TURBINE/COGEN
W STEAM INJ & NH3/SCR CAT

R/A, O_2, NH_3, NO_x

3/5/93

SUMMARY OF SOURCE TEST RESULTS

COMPANY: DESTEC CHALK CLIFF APCD # 4175001

TEST DATE: DECEMBER 18, 1992 UNIT #:TURBINE, LUBE OIL VENTS A,B,C

HYDROCARBON EMISSIONS SUMMARY

			Total lbs/hr	Total lbs/day
VENT "A"			0.0004	0.0084
VENT "B"			0.0307	0.7359
VENT "C"			0.0325	0.7806
TURBINE MAIN STACK			1.18 1.09 0.48	28.3 26.2 11.5
Mean			0.92	22.0
TOTAL EMISSIONS Turbine plus three lube oil vent			0.98	23.5

Comments:

INTRODUCTION

INTRODUCTION

On December 15, 16, 17, & 18, 1992, Petro-Chem Environmental Services, Inc. (PCES) performed a series of emission source tests for Destec Operating Company at their Chalk Cliff Cogeneration Facility located near Maricopa, California. The unit tested was a 48.0 MW GE LM-5000 gas fired turbine. Concentrations and emissions of particulate, NH_3, NOx, CO, O_2, hydrocarbons, and Spec II, III relative accuracy for NOx, NH_3, and O_2 were determined using the following procedures:

Parameters	Method	# Test Runs
Particulate	EPA Method 5; Gravimetric	2 - 24 hour
Ammonia, NH_3	BAAQMD ST-1B / EPA Method 350.3 Spec Ion Electrode	9
SO_2 / SO_4	EPA Method 20 & 19; Fuel Total Sulfur Analysis and emissions calculated as sulfur	3
Hydrocarbons	EPA Method 18; C_1 - C_{6+}	3
NOx	EPA Method 20; Chemiluminescent Analyzer	9 - 30 min (runs 1-4)
CO	EPA Method 10; GFC Analyzer	6 - 30 min (runs 1-4)
O_2	EPA Method 20; Fuel Cell O_2 Analyzer	9 - 30 min (runs 1-4)
Molecular Weight O_2, CO_2, N_2	EPA Method 3; Orsat Analysis	2
Volume Flow DSCFM	EPA Method 2; Pitot Tube Traverse	2
Relative Accuracy NOx, NH_3, O_2	Title 40 CFR Performance Spec II & III	9 - 30 min

All sampling was performed by Tim Brennan, Doug Towne, Scott Harrison, and John Hinkle of Petro Chem Environmental Services, Inc. The hydrocarbons, NH_3, and PM analyses were performed by Terry Rowles of PCES. Scott Kicker of Destec Operating Company supervised the testing. Greg LaFore of San Joaquin Valley Unified APCD, Southern Region, was present to witness the testing.

METHOD 5 DATA

COMPANY : Destec
UNIT : Chalk Cliff Turbine Exhaust
DATE : 12-15,16,17-92
REPORT : 100-288

METHOD 1-5
FIELD DATA @ 60°F

RUN #:	1	2	
TIME :	1547-1615	1715-1742	Average
Vm (dry gas sampled)	721.08	745.56	
Y (meter calib. factor)	0.989699	0.989699	
P bar (Barometric pressure)	29	28.98	
P static (stack pressure, " H2O)	-0.5	-0.5	
Delta H (differential meter press, " H2O)	0.4	0.68	
Tm (meter temperature, R°)	515	523	
Vol H2O mls	2920.9	3104.1	
Vm(std),dscf	699.13	711.82	
Bws-H2O vapor	0.1626	0.1685	0.1655
MF-moisture factor	0.837447	0.831530	0.8345
% CO2	3.1	3.1	
% O2	15.5	15.5	
% N2	81.4	81.4	
Md-MW stk gas,dry	29.12	29.12	
Ms-MW stk gas,wet	27.31	27.24	
Cp-pitot tube	0.836	0.836	
Avg sq rt ^p	1.05	1.07	
T stack, R°	731	733	
Stack area,ft2	95.033	95.033	
Vs-fps	72.19	73.86	73.03
Qstd-dscfm	237383	240337	238860
Area noz,ft2	1.93E-04	1.93E-04	
Sample time	1440	1440	
% Isokinetic	100.8	101.4	

COMPANY : Destec
UNIT : Chalk Cliff Turbine Exhaust
DATE : 12-15,16,17-92
REPORT : 100-288

EPA METHOD 5 DATA
@ 60°F

RUN #1

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr	lbs/day
Probe & Nozzle:	8.30	0.000183	0.000153	0.000708	0.37	8.88
Filter:	2.60	0.000057	0.000048	0.000222	0.12	2.88
Condensables:	8.80	0.000194	0.000162	0.000750	0.39	9.36
Total:	19.70	0.000434	0.000363	0.001680	0.88	21.12

ADDITIONAL DATA:

TIME

start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1547	1615	15.5	3.1	16.26	699.13	237383

RUN #2

PARTICULATE RESULTS:	net mg	gr/dscf	gr/scf	gr/dscf @ 12% CO2	lbs/hr	lbs/day
Probe & Nozzle:	8.70	0.000188	0.000157	0.000729	0.39	9.36
Filter:	0.60	0.000013	0.000011	0.000050	0.03	0.72
Condensables:	12.40	0.000268	0.000223	0.001038	0.55	13.20
Total:	21.70	0.000469	0.000390	0.001817	0.97	23.28

ADDITIONAL DATA:

TIME

start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1715	1742	15.5	3.1	16.85	711.82	240337

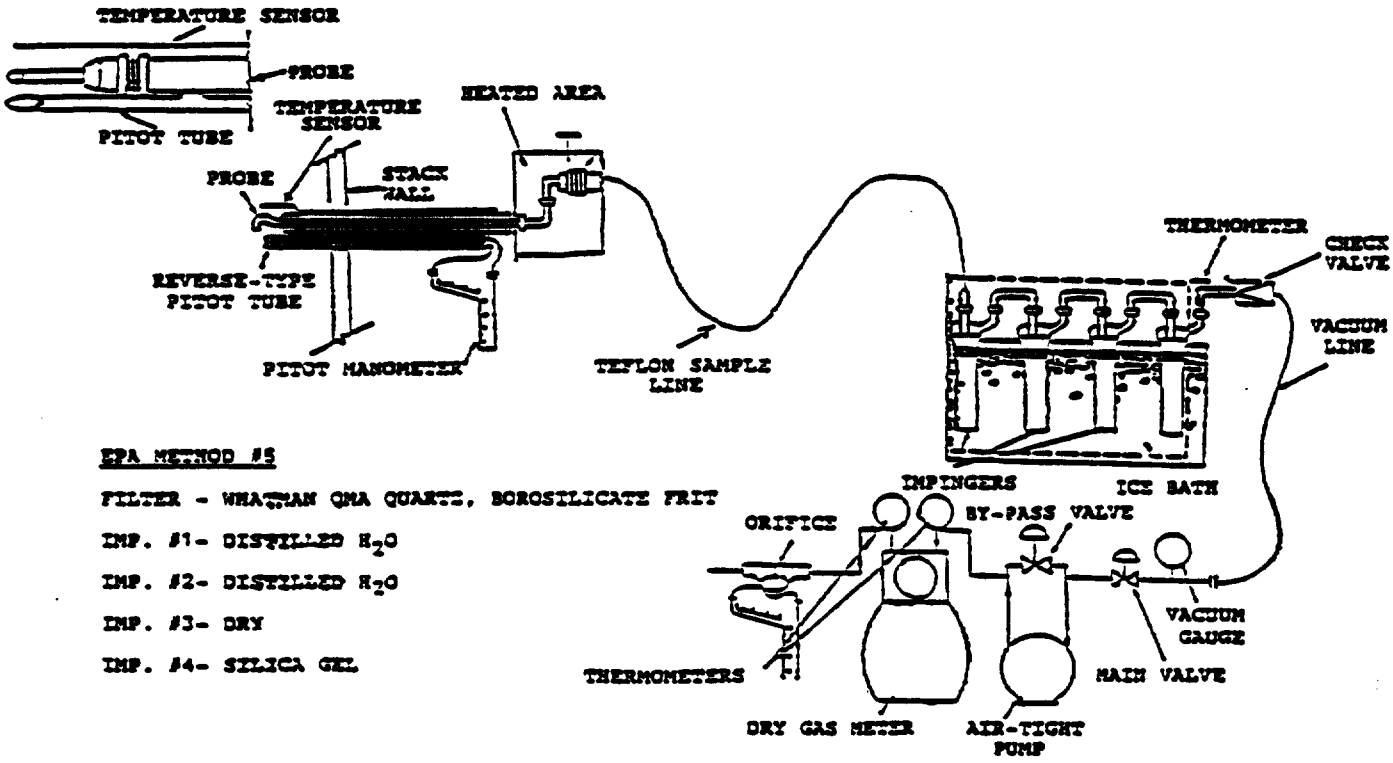
SAMPLING AND ANALYTIC PROCEDURES

REF: EPA Code of Federal Regulations, Title 40, Part 60, Appendix A. Method 1, 2, 3, 4, and 5

Sampling Apparatus

The sampling apparatus consisted of a nozzle, a heater wrapped probe, and a heated filter holder (see data sheets for type of nozzle, probe, and filter). The filter was connected to a heated teflon filter-to-impinger line. A series of impingers (see data sheet for type and contents) was connected in tandem and immersed in an ice bath. Following the absorption train was a gas pump, dry test meter, and a calibrated restriction orifice fitted with a magnehelic differential pressure gauge. A type 'S' pitot tube and temperature probe was then positioned alongside the probe terminating at the sample nozzle for the purpose of monitoring duct conditions throughout the test.

Sampling Diagram



EPA Method 1: Sampling and Velocity Traverses for Stationary Sources

Prior to the source test a site assessment was performed in order to locate sample points for obtaining the best representative measurements of pollution concentrations and volumetric flow rates. EPA Method 1 takes into account duct area, straight run and cyclonic or stratified flow patterns.

EPA Method 2: Velocity and Volumetric Flow Rates

A computer was used in selection of suitable sample/traverse points. The calibrated pitot tube was connected to a magnehelic gauge and leak checked. A temperature and Δ-P was then recorded at each traverse point and a duct static pressure was also measured and recorded. A volume flow rate was calculated from the measured required traverse points.

EPA Method 3: % CO_2, % O_2, Dry Molecular Weight

Concurrent with each particulate sampling, an integrated gas sample was withdrawn from the summation of the traverse points through the train and collected at the outlet of the meter into a sample bag. Then the contents of the sample bladder were analyzed by Orsat for fixed gas composition.

EPA Method 4: Percent Water

Tare weights of the charged individual impingers was recorded. After sampling, the final weights was then recorded. Percent water was calculated from the weight of water collected and the dry gas volume sampled.

EPA Method 5: Particulate Emissions

A series of preliminary measurements was made prior to conducting the particulate test. EPA Methods 1, 2, and 3 was performed to determine location and number of traverse points, average gas velocity, and pressure and gas molecular weight. Percent water was determined by a psychrometric chart or from combustion analysis of the fixed gases. The results of these measurements were entered into the field computer for the purpose of determining an appropriate nozzle size for isokinetic sampling.

The method 5 apparatus was then prepared on-site in the mobile laboratory. The absorption train was charged with freshly prepared chemicals, weighted on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe was brushed out and rinsed with distilled water and acetone, then the filter holder was charged. The sampling apparatus was sealed and transported to the sampling site were it was assembled and leak tested at 15 inches mercury vacuum.

The probe, filter and impinger line heaters were set at 250 °F and the probe was then positioned into the duct at the first traverse point with the nozzle out of the flow.

The nozzle was positioned into the gas flow and the vacuum pump was started immediately and adjusted to obtain an isokinetic sample rate. A complete traverse was performed while sampling at a minimum of two minutes per sample point. Upon completion of the traverse the vacuum pump was turned off and the probe was transferred into the next sample EPA port where an identical sample-traverse was then performed. Duct conditions (temperature, Δ-P)

and sampling conditions (meter temperature, volume and pressure, probe, filter, sample line, impinger temperatures, and absorption train vacuum) was monitored and recorded regularly for each sample point.

Upon completion of sampling, the apparatus was leak tested at a vacuum greater than the highest observed vacuum. The leak was recorded and the apparatus was then sealed and transported to the mobile laboratory. The heated filter-to-impinger line was rinsed with a known amount of distilled water into the first impinger.

The filter and any loose particulate was carefully removed from the filter holder with tweezers. It was then placed in a labeled petri dish and transported to the P.C.E.S. laboratory. The nozzle, probe, and filter top housing was rinsed and brushed three times with distilled water and acetone. The sample fractions were combined, bottled, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory. Aliquots of distilled water and acetone were similarly treated for blank analysis.

The absorption train was inspected for abnormalities and disassembled. The impingers were weighed on a digital balance for a percent moisture determination. The contents of the impingers were quantitatively transferred into separate bottles, sealed, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory for analysis, if required. Aliquots of the reagent grade impinger contents were saved for blank analysis.

The filter was transferred to an oven and heated at 105 °F for 2-3 hours and then placed in a desiccator for 24 hours. The filter was then weighed on a Mettler digital balance to the nearest 0.01 mg. Additional six hour desiccations and weighings were then performed until the difference between consecutive weighings were less than 0.5 mg or one percent of the total filtrate weight (weighed to a constant weight).

The nozzle/probe/filter top wash was then examined for any leakage during transportation and transferred to a tared evaporation dish. The wash was then evaporated at an elevated temperature, below the boiling point of the wash, with occasional swirling. The dish and wash residue was then desiccated and weighed to a constant weight.

If required by the regulatory agency, the contents of the first impinger were recovered and diluted volumetrically to a known volume. An aliquot of this sample was then evaporated, desiccated, and then weighed to a constant weight.

The net weight of particulate was calculated from the two fractions (three fractions including the impinger contents, if required). Concentrations (gr/DSCF) and emissions (lbs/hr) or other applicable units were then calculated and reported.

EPA METHOD 2
STACK GAS VELOCITY AND VOLUMETRIC FLOWRATE

Average Stack Gas Velocity
Eq. 2-6 & Eq. 2-9

$$P_g = \frac{\text{Static Pressure, } H_2O}{13.6}$$

$$P_s = P_{bar} + P_g$$

$$V_s = K_p \, C_p \, (\sqrt{\Delta P})avg \sqrt{\frac{T_{s\,(\,avg\,)}}{P_s \, M_s}}$$

Average Stack Gas Dry Volumetric Flow Rate
Eq. 2-10

$$Q_{std} = 60\,(1 - B_{ws})\, v_s\, A \left(\frac{T_{std}}{T_{s\,(avg\,)}}\right) \left(\frac{P_s}{P_{std}}\right)$$

$$\frac{Q_{std}}{MF} = SCFM$$

EPA METHOD 3
DRY MOLECULAR WEIGHT OF STACK GAS
Eq. 3-2

$$M_d = 0.44\,(\%\,CO_2) + 0.320\,(\%\,O_2) + 0.280\,(\%\,N_2 + \%\,CO)$$

Wet Molecular Weight of Stack Gas

$$M_s = M_d\,(1 - B_{ws}) + 18\,(B_{ws})$$

EPA METHOD 4
DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Volume of Water Vapor Condensed
Eq. 4-1

$$V_{wc\,(std)} = \frac{(V_f - V_i)\rho_w\ RT_{std}}{P_{std}\ M_w} = K_1 (V_f - V_i)$$

Where: $K_1 = 0.04646\ \frac{ft^3}{ml}$ @ 520° R

Volume of Water Vapor Collected in Silica Gel
Eq. 4-2

$$V_{wsg\,(std)} = \frac{(W_f - W_i)\ RT_{std}}{P_{std}\ M_w\ (453.6\ g/lb)}$$

$$= K_2 (W_f - W_i)$$

Where: $K_2 = 0.04651\ \frac{ft^3}{g}$ @ 520 ° R

Sample Gas Volume
Eq. 4-3

$$V_{m\,(std)} = V_m\ Y \left(\frac{(P_m)(T_{std})}{(P_{std})(T_m)} \right)$$

$$= K_3\ Y\ \frac{V_m\ P_m}{T_m}$$

Where: $K_3 = 17.38\ \frac{° R}{in.\ Hg}$ @ 520 ° R

Moisture Content
Eq. 4-4

$$B_{ws} = \frac{V_{wc\ (std)} + V_{wsg\ (std)}}{V_{wc\ (std)} + V_{wsg\ (std)} + V_{m\ (std)}}$$

$B_{ws} \times 100 = \%\ H_2O$ *in gas stream*

$MF = 1 - B_{ws}$

EPA METHOD 5
DETERMINATION OF PARTICULATE EMISSIONS FROM STATIONARY SOURCES
Use in Method 5 and 8 combinations runs

Dry Gas Volume
Eq. 5-1

$$V_m(std) = V_m Y \left(\frac{T_{std}}{T_m}\right)\left[P_{bar} + \frac{\Delta H}{13.6}\right]$$

$$= K_1 V_m Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

$$= K_1 = 17.38 \frac{^\circ R}{in.Hg} @ 520\ ^\circ R$$

*In case of leak rate beyond allowable limits, correct Eq. 5-1 as follows:
Case 1 - No component changes made during run.

$$V_m = V_m - (L_p - L_a)\theta$$

Case 2 - One or more component changes made during run.

$$V_m = \left[V_m - (L_1 - L_a)\theta_1 - \sum_{i=2}^{n}(L_i - L_a)\theta_i - (L_p - L_a)\theta_p\right]$$

Volume of Water Vapor
Eq. 5-2

$$V_{wc}(std) = V_1 c \left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right)$$

$$= K_2 V_1 c$$

Where: $K_2 = 0.04646 \frac{ft^3}{ml} @ 60\ ^\circ F$

Moisture Content
Eq. 5-3

$$B_{ws} = \frac{V_{wc}(std)}{V_m(std) + V_{wc}(std)}$$

EPA METHOD 5
(con't)

Acetone Blank Concentration
Eq. 5-4

$$C_a = \frac{M_a}{V_a \rho_a}$$

Acetone Wash Blank
Eq. 5-5

$$W_a = C_a V_{aw} \rho_a$$

Particulate Concentration
Eq. 5-6

$$C_s = \frac{gr}{dscf} = \left(0.001 \frac{g}{mg} \right) \left(\frac{M_n}{V_m (std)} \right) (15.432)$$

$$gr/dscf\,(MF) = \frac{gr}{scf}$$

Corrected to 12 % CO_2

$$\frac{gr}{dscf} @ 12\%\ CO_2 = \frac{\frac{gr}{dscf} \times 12\ \%\ CO_2}{\%\ CO_2\ (dry)}$$

Isokinetic Variation
Eq. 5-7 and 5-8

$$\%\ I = 100 \times \frac{T_s \left[V_{lc} K_3 + \frac{V_m}{T_m} \left(P_b + \frac{\Delta H}{13.6} \right) \right]}{60\ \theta\ A_n\ V_s\ P_s}$$

Where: $K_3 = 0.002669$

Mass Emission Rate

$$\frac{lbs}{hr} = \frac{.000434}{\frac{gr}{dscf}} \times dscfm \times 60 \frac{m}{hr} \times \frac{1\ lb}{7000\ gr}$$

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NOMENCLATURE

(1 of 3)

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 SO3) 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 $\frac{ft\ [(lb/lb\text{-}mole)(in\ Hg)]^{\frac{1}{2}}}{sec[\ (^\circ R)\ (in\ H_2O)\ ]}$

L_p = Leakage rate observed during the post-test leak 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 "i^{nth}" 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, ($P_{bar} + \Delta H/13.6$)

NOMENCLATURE

(2 of 3)

P_s = Absolute stack gas pressure, (inches 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) $(ft^3)/(lb\text{-}mole)(^\circ R)$

t_s = Stack temperature, ($^\circ F$)

T_m = Absolute temperature at meter, ($^\circ R$)

$T_{(std)}$ = Standard absolute temperature, (520°R)

T_s = Absolute stack temperature, ($460^\circ + t_s$)

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_{ic} = 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, (ml)

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

W_f = 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 @ 60°F)

NOMENCLATURE

(3 of 3)

ρa	=	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)
$\%N_2$	=	Percent N_2 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)
32.03	=	Equivalent weight of sulfur dioxide
θ	=	Total sampling time (min)
θ_i	=	Sampling time interval, between two successive component changes, beginning with the interval between the first and second changes, (min)
θ_1	=	Sampling time interval, from the run beginning until first component change, (min)
θ_p	=	Sampling time interval, from the final (n^{th}) component change until the end of the sampling run, (min)

METHOD 350.3, ST-1B DATA

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

AMMONIA (NH3)

EPA 350.3 / BAAQMD ST 1-B

	Run - 1 12/16	Run - 2 12/16	Run - 3 12/16	AVERAGE
NH3 (mg/L)	5.71	5.58	5.22	
Sample Volume (ml)	445	475	475	
Total NH3 (mg)	2.54	2.65	2.48	
Vm, acf (sampled)	15.20	15.25	15.15	
delta-H	0.65	0.65	0.65	
Meter Temp, °F	54	54.7	55.2	
% O2	15.5	15.4	15.5	
Vstd,dscf =	14.77	14.79	14.68	
DSCFM =	238860	238860	238860	
ppm NH3 =	8.46	8.81	8.30	8.53
ppm NH3 @ 15% 02 =	9.25	9.45	9.07	9.26
lbs/hr NH3 =	5.43	5.66	5.33	5.47

Calculations:

$$Vstd = \frac{(17.38 * Vm * (Pb + (H/13.6)) * MC)}{Tm}$$

Pbar..... 28.98
Meter Coeff..... 0.989699

$$ppm\ NH3 = \frac{mg * 836}{Vstd * MW}$$

Where:

Vstd = Corrected sample volume, SDCF @ 60°F & 29.92 in Hg
Vm = Uncorrectd meter volume, ft3
Tm = Absolute meter temperature in °R
Pb = Barometric pressure, in. Hg
17.38 = A constant correcting to 60°F & 29.92 in. Hg (520 R/29.92" Hg)
MC = Dry gas meter calibration coefficient
mg = Total wt. of NH3 in the impinger catch (in mg)
836 = A constant derived from the molar gas volume and correcting to 60F and 29.92 inches Hg.
delta-H = Pressure differential at meter orifice
MW = Molecular weight of ammonia, 17 gm/mole

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15,16-92
REPORT : 100-288

AMMONIA SUMMARY

	NH3		
RUN #	ppm	ppm @ 15% O2	lbs/hr
1	8.46	9.25	5.43
2	8.81	9.45	5.66
3	8.30	9.07	5.33
4	4.56	4.89	2.93
5	6.56	7.17	4.21
6	7.29	7.97	4.68
7	6.83	7.20	4.39
8	5.57	6.08	3.57
9	7.07	7.72	4.54
AVERAGE	7.05	7.64	4.53

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-18-92
REPORT : 100-288

AMMONIA (NH3)

EPA 350.3 / BAAQMD ST 1-B

	Run - 4 12/18	Run - 5 12/18	Run - 6 12/18	AVERAGE
NH3 (mg/L)	3.88	4.49	4.86	
Sample Volume (ml)	360	439	449	
Total NH3 (mg)	1.40	1.97	2.18	
Vm, acf (sampled)	15.06	15.08	15.04	
delta-H	0.35	0.38	0.38	
Meter Temp, °F	53.8	64.9	65.3	
% O2	15.4	15.5	15.5	
Vstd,dscf =	15.07	14.77	14.72	
DSCFM =	238860	238860	238860	
ppm NH3 =	4.56	6.56	7.29	6.14
ppm NH3 @ 15% 02 =	4.89	7.17	7.97	6.68
lbs/hr NH3 =	2.93	4.21	4.68	3.94

Calculations:

$$Vstd = \frac{(17.38 * Vm * (Pb + (H/13.6)) * MC)}{Tm}$$

Pbar..... 28.98
Meter Coeff #1..... 1.019573

$$ppm\ NH3 = \frac{mg * 836}{Vstd * MW}$$

Where:

Vstd = Corrected sample volume, SDCF @ 60°F & 29.92 in Hg
Vm = Uncorrectd meter volume, ft3
Tm = Absolute meter temperature in °R
Pb = Barometric pressure, in. Hg
17.38 = A constant correcting to 60°F & 29.92 in. Hg (520 R/29.92" Hg)
MC = Dry gas meter calibration coefficient
mg = Total wt. of NH3 in the impinger catch (in mg)
836 = A constant derived from the molar gas volume and correcting to 60F and 29.92 inches Hg.
delta-H = Pressure differential at meter orifice
MW = Molecular weight of ammonia, 17 gm/mole

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-18-92
REPORT : 100-288

AMMONIA (NH3)

EPA 350.3 / BAAQMD ST 1-B

	Run - 7 12/18	Run - 8 12/18	Run - 9 12/18	AVERAGE
NH3 (mg/L)	4.98	4.61	5.83	
Sample Volume (ml)	417	365	365	
Total NH3 (mg)	2.08	1.68	2.13	
Vm, acf (sampled)	15.26	15.13	15.03	
delta-H	0.39	0.37	0.39	
Meter Temp, °F	65	63.3	62	
% O2	15.3	15.5	15.5	
Vstd,dscf =	14.94	14.86	14.80	
DSCFM =	238860	238860	238860	
ppm NH3 =	6.83	5.57	7.07	6.49
ppm NH3 @ 15% 02 =	7.20	6.08	7.72	7.00
lbs/hr NH3 =	4.39	3.57	4.54	4.17

Calculations:

$$Vstd = \frac{(17.38 * Vm * (Pb + (H/13.6)) * MC)}{Tm}$$

Pbar..... 28.98
Meter Coeff..... 1.019573

$$ppm\ NH3 = \frac{mg * 836}{Vstd * MW}$$

Where:

Vstd = Corrected sample volume, SDCF @ 60°F & 29.92 in Hg
Vm = Uncorrectd meter volume, ft3
Tm = Absolute meter temperature in °R
Pb = Barometric pressure, in. Hg
17.38 = A constant correcting to 60°F & 29.92 in. Hg (520 R/29.92" Hg)
MC = Dry gas meter calibration coefficient
mg = Total wt. of NH3 in the impinger catch (in mg)
836 = A constant derived from the molar gas volume and correcting to 60F and 29.92 inches Hg.
delta-H = Pressure differential at meter orifice
MW = Molecular weight of ammonia, 17 gm/mole

SOURCE TEST PROCEDURE BAAQMD ST-1B
AMMONIA, INTEGRATED SAMPLING

1. Applicability

   1.1 This method is used to quantify emissions of ammonia.

2. Principle

   2.1 Sample gas is drawn through a solution of 0.1 normal (0.1N) hydrochloric acid which absorbs the ammonia. The ammonia is then analyzed according to Analytical Procedure EPA 350.3.

3. Range

   3.1 The minimum measurable concentration of ammonia is 1 ppm at the sample volume specified in this procedure.

   3.2 Elevated concentrations of ammonia may be determined by increasing the concentration of the absorbing reagent, hydrochloric acid solution. The concentration of reagent to be used may be determined by stoichiometry, allowing a 50% excess.

4. Interference

   4.1 See EPA Method 350.3.

5. Apparatus

   5.1 Probe - The probe is constructed of borosilicate glass tubing fitted with a glass wool filter in the nozzle.

   5.2 Condensers - Use three Greenberg-Smith impingers as absorber/condensers. The final impinger has a thermometer attached to the inlet stem.

   5.3 Cooling system - Use an ice bath to contain the impingers.

   5.4 Sample pump - Use a leak-free vacuum pump capable of maintaining a 14.3 liter/min (0.5 CFM) flow rate at 15 inches of mercury. The pump must have a flow control valve and vacuum gauge attached to the inlet.

   5.5 Silica gel tube - Use approximately 500cc of silica gel (with a Drierite indicator) to insure that the gas entering the dry test meter is dry.

   5.6 Dry test meter - Use a dry gas test meter accurate within + 2% of the true volume and equipped with a thermometer to measure the outlet temperature.

5.7 Connections - Use Teflon tubing in making all connections that come in contact with the sample. Vinyl tubing is acceptable for all other connections.

5.8 Barometer - Use a barometer that is accurate to within + 0.2 inches of mercury.

5.9 Rotameter - Use a calibrated rotameter to measure the sampling rate.

6. Reagents

6.1 Hydrochloric acid, 0.1N. Dissolve 7.30 ml concentrated HCl in sufficient water to make a 1.0 liter solution.

7. Pre-test Procedures

7.1 Add 100 ml of the HCl solution to each of two impingers.

7.2 Stopper the impingers.

7.3 Retain 100 ml of the HCl solution to analyze as a blank.

7.4 Assemble the sampling train as shown in Figure IV-4.

7.5 Leak-test the sampling train by starting the pump, plugging the probe, and adjusting the pump inlet vacuum to 10 inches Hg. The leak rate must not exceed 0.6 liter/min (0.02 CFM) through the dry test meter. Before stopping the pump, carefully release the plug in the sample probe to avoid back flow of the impinger solution.

7.6 Record the initial dry test meter reading and barometric pressure on the sampling data sheet.

7.7 If there is evidence of concentration stratification, select the sampling traverse points according to ST-18. Otherwise, sample at a single point.

8. Sampling

8.1 Each test run shall be of thirty minute duration when testing emissions from continuous operations. Each test run at batch process operation shall be for 90% of the batch time or thirty minutes, whichever is less.

8.2 Position the probe at the sampling point and start the pump.

8.3 Sample at a constant rate of 14.3 liter/min (0.5 CEM) during the test as determined by the rotameter. Use the rotameter only to establish the initial sampling rate. Then remove it from the system.

8.4 Record the following information at five minute intervals.

A. Dry test meter temperature
B. Impinger outlet temperature
C. Dry test meter volume

8.5 Add ice as necessary to maintain impinger temperatures at 7 °C (45 °F) or less.

8.6 At the conclusion of each run, stop the pump, remove the probe from the stack, record the final meter reading. Point the probe upward and purge the sample train with ambient air.

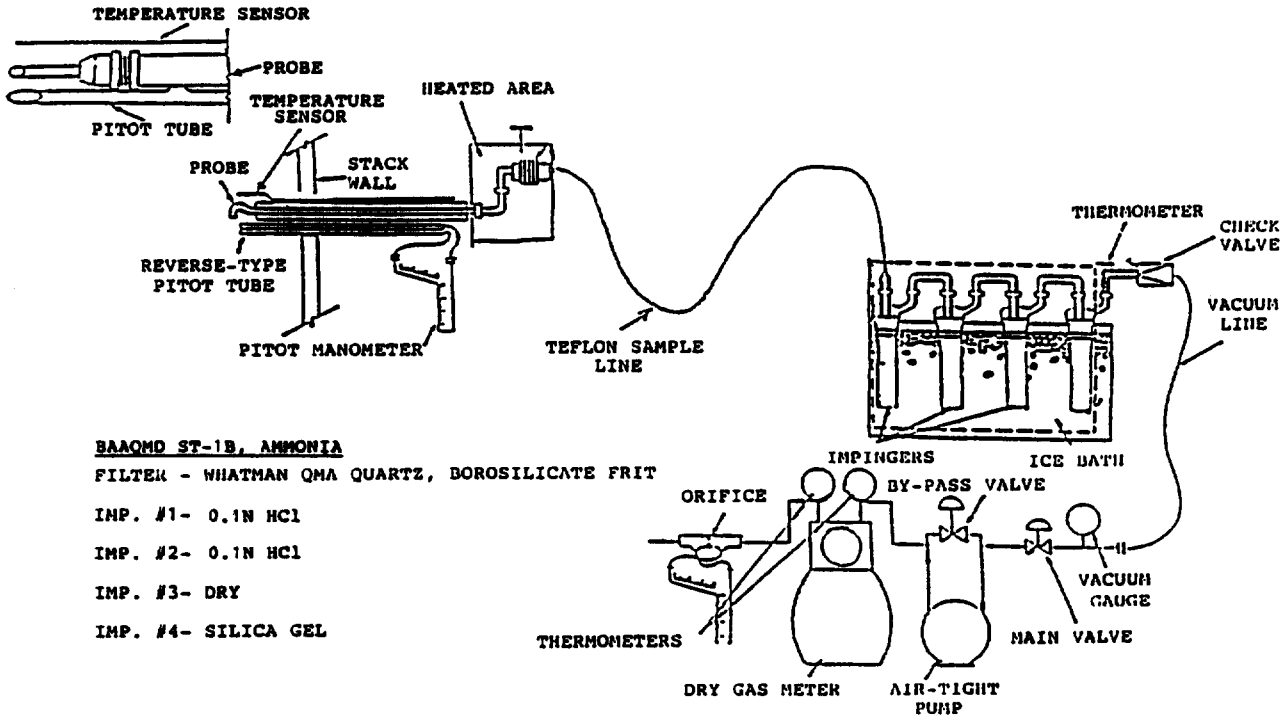
8.7 Take three consecutive samples.

9. Post-test Procedures

9.1 Stopper the impingers until they are analyzed.

9.2 Individually analyze the hydrochloric acid solutions and blank for total ammonia content according to analytical procedure Lab 1.

Sampling Diagram



NITROGEN, AMMONIA

Method 350.3
Potentiometric, Ion Selective Electrode

1. Scope and Application

   1.1 This method is applicable to the measurement of ammonia-nitrogen in drinking, surface, and saline waters, domestic and industrial wastes.

   1.2 This method covers the range from 0.03 to 1400 mg NH_3-N/l. Color and turbidity have no effect on the measurements, thus, distillation may not be necessary.

2. Summary of method

   2.1 The ammonia is determined potentiometrically using an ion selective ammonia electrode and a pH meter having an expanded millivolt scale or specific ion meter.

   2.2 The ammonia electrode uses a hydrophobic gas-permeable membrane to separate the sample solution from an ammonia chloride internal solution. Ammonia in the sample diffuses through the membrane and alters the pH of the internal solution, which is sensed by a pH electrode. The constant level of chloride in the internal solution is sensed by a chloride selective ion electrode which acts as the reference electrode.

3. Sample Handling and Preservation

   3.1 Samples may be preserved with 2 ml of conc. H_2SO_4 per liter and stored at 4°C.

4. Interferences

   4.1 Volatile amines act as a positive interference.

   4.2 Mercury interferes by forming a strong complex with ammonia. Thus, the samples cannot be preserved with mercuric chloride.

5. Apparatus

   5.1 Electrometer (pH meter) with expanded mV scale or a specific ion meter.

   5.2 Ammonia selective electrode, such as Orion Model 95-10 or EIL Model 8002-2.

   5.3 Magnetic stirrer, thermally insulated, and Teflon-coated stirring bar.

6. Reagents

6.1 Distilled water: Special precautions must be taken to insure that the distilled water is free of ammonia. This is accomplished by passing distilled water through an ion exchange column containing a strongly acidic cation exchange resin mixed with a strongly basic anion exchange resin.

6.2 Sodium hydroxide, 10N: Dissolve 400 g of sodium hydroxide in 800 ml of distilled water. Cool and dilute to 1 liter with distilled water (6.1)

6.3 Ammonia chloride, stock solution: 1.0 ml = 1.0 mg NH_3-N. Dissolve 3.819 g NH_4Cl in water and bring to volume in a 1 liter volumetric flask using distilled water (6.1).

6.4 Ammonia chloride, standard solution: 1.0 ml = 0.01 mg NH_3-N. Dilute 10.0 ml of the stock solution (6.3) to 1 liter with distilled water (6.1) in a volumetric flask.

NOTE 1: When analyzing saline waters, standards must be made up in synthetic ocean water (SOW); found in Nitrogen, Ammonia: Calorimetric, Automated Phenate Method (350.1)

7. Procedures

7.1 Preparation of standards: Prepare a series of standard solutions covering the concentration range of the samples by diluting either the stock or standard solutions of ammonium chloride.

7.2 Calibration of electrometer: Place 100 ml of each standard solution in clean 150 ml beakers. Immerse electrode into standard of lowest concentration and add 1 ml of 10N sodium hydroxide solution while mixing. Keep electrode in the solution until a stable reading is obtained.

7.3 Repeat this procedure with the remaining standards, going from lowest to highest concentration. Using semilogarithmic graph paper, plot the concentration of ammonia in mg NH_3-N/li. on the log axis vs. the electrode potential developed in the standard on the linear axis, starting with the lowest concentration at the bottom of the scale.

7.4 Calibration of a specific ion meter: Follow the directions of the manufacturer for the operation of the instrument.

7.5 Sample measurement: Follow the procedure in (7.2) for 100 ml of sample in 150 ml beakers. Record the stabilized potential of each unknown sample and convert the potential reading to the ammonia concentration using the standard curve. If a specific ion meter is used, read the ammonia level directly in mg NH_3-N/li.

8. Precision and Accuracy

8.1 In a single laboratory (EMSL), using surface water samples at concentrations of 1.00, 0.77, 0.19, and 0.13 mg NH_3-N/1, standard deviations were + 0.038, + 0.017, + 0.007, and + 0.003 respectively.

8.2 In a single laboratory (EMSL), using surface water samples at concentrations of 0.19 and 0.13 mg NH_3-N/1, recoveries were 96% and 91%, respectively.

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3. Midgley, D., and Torrance, K., "The Determination of Ammonia in Condensed Steam and Boiler Feed-Water with a Potentiometric Ammonia Probe", Analyst 97, p. 626-633 (1972)

HYDROCARBON DATA

SUMMARY OF SOURCE TEST RESULTS

COMPANY: DESTEC CHALK CLIFF APCD # 4175001

TEST DATE: DECEMBER 18, 1992 UNIT #:TURBINE, LUBE OIL VENTS A,B,C

HYDROCARBON EMISSIONS SUMMARY

			Total lbs/hr	Total lbs/day
VENT "A"			0.0004	0.0084
VENT "B"			0.0307	0.7359
VENT "C"			0.0325	0.7806
TURBINE MAIN STACK			1.18 1.09 0.48	28.3 26.2 11.5
Mean			0.92	22.0
TOTAL EMISSIONS Turbine plus three lube oil vent			0.98	23.5

Comments:

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-280

HYDROCARBON RESULTS
CORRECTED FOR METHOD BLANK

RUN No.: 1
DSCFM: 238860 average of pitot tube velocity profiles

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)	ND *	0.00	0.00	0.00	0.00
Ethane	(C2)		0.95	1.08	1.90	1.15
Propane	(C3)	ND **	0.00	0.00	0.00	0.00
Butane	(C4)	ND **	0.00	0.00	0.00	0.00
Pentane	(C5)	ND **	0.00	0.00	0.00	0.00
Hexane	(C6)		0.01	0.03	0.06	0.04
	Total		0.96	1.11	1.96	1.18
	Total (non methane)		0.96	1.11	1.96	1.18

RUN No.: 2

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)	ND *	0.00	0.00	0.00	0.00
Ethane	(C2)		0.77	0.87	1.54	0.93
Propane	(C3)		0.05	0.08	0.15	0.09
Butane	(C4)	ND **	0.00	0.00	0.00	0.00
Pentane	(C5)	ND **	0.00	0.00	0.00	0.00
Hexane	(C6)		0.02	0.06	0.12	0.07
	Total		0.84	1.02	1.81	1.09
	Total (non methane)		0.84	1.02	1.81	1.09

RUN No.: 3

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)	ND *	0.00	0.00	0.00	0.00
Ethane	(C2)		0.19	0.22	0.38	0.23
Propane	(C3)		0.04	0.07	0.12	0.07
Butane	(C4)	ND **	0.00	0.00	0.00	0.00
Pentane	(C5)	ND **	0.00	0.00	0.00	0.00
Hexane	(C6)		0.05	0.16	0.30	0.18
	Total		0.28	0.44	0.80	0.48
	Total (non methane)		0.28	0.44	0.80	0.48

* During source testing at this facility, a system sample blank of ambient air was captured and tested for hydrocarbons as called for in the test protocol. The results of the blank analysis showed methane content of 17 ppm. While the protocol does not allow subtracting the blank from the test results, methane levels less than or near those shown in the blank should be considered non-detect since test results include ambient background methane concentrations.

** ND - Not detected (See detection limits)

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-280

HYDROCARBON RESULTS
UNCORRECTED

RUN No.: 1
DSCFM: 238860 average of pitot tube velocity profiles

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)		6.18	3.73	6.18	3.73
Ethane	(C2)		0.98	1.11	1.96	1.18
Propane	(C3)	ND **	0.03	0.05	0.09	0.05
Butane	(C4)	ND **	0.02	0.04	0.08	0.05
Pentane	(C5)	ND **	0.02	0.05	0.10	0.06
Hexane	(C6)		0.18	0.58	1.08	0.65
	Total		7.41	5.58	9.49	5.73
	Total (non methane)		1.23	1.84	3.31	2.00

RUN No.: 2

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)		6.20	3.75	6.20	3.75
Ethane	(C2)		0.80	0.91	1.60	0.97
Propane	(C3)		0.07	0.12	0.21	0.13
Butane	(C4)	ND **	0.02	0.04	0.08	0.05
Pentane	(C5)	ND **	0.02	0.05	0.10	0.06
Hexane	(C6)		0.19	0.62	1.14	0.69
	Total		7.30	5.48	9.33	5.64
	Total (non methane)		1.10	1.74	3.13	1.89

RUN No.: 3

			ppm	lb/hr	ppm (as Methane)	lb/hr (as Methane)
Methane	(C1)		9.40	5.68	9.40	5.68
Ethane	(C2)		0.22	0.25	0.44	0.27
Propane	(C3)		0.06	0.10	0.18	0.11
Butane	(C4)	ND **	0.02	0.04	0.08	0.05
Pentane	(C5)	ND **	0.02	0.05	0.10	0.06
Hexane	(C6)		0.22	0.71	1.32	0.80
	Total		9.94	6.84	11.52	6.96
	Total (non methane)		0.54	1.16	2.12	1.28

** ND – Not Detected (See detection limits)

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

HYDROCARBON RESULTS @ 60°F

SYSTEM SAMPLE BLANK, AMBIENT AIR

		ppm	ppm	ppm (as Methane)	
Methane	(C1)		17.17 *		17.17
Ethane	(C2)	less than	0.03	less than	0.06
Propane	(C3)	less than	0.02	less than	0.06
Butane	(C4)	less than	0.02	less than	0.08
Pentane	(C5)	less than	0.02	less than	0.10
Hexane	(C6)		0.17		1.02
Total			17.43	0.00	18.49
Total (non methane)			0.26	0.00	1.32

DETECTION LIMITS

		ppm	ppm (as Methane)
Methane	(C1)	0.05	0.05
Ethane	(C2)	0.03	0.06
Propane	(C3)	0.02	0.06
Butane	(C4)	0.02	0.08
Pentane	(C5)	0.02	0.10
Hexane	(C6)	0.02	0.12
Total		0.16	0.47
Total (non methane)		0.11	0.42

* During source testing at this facility, a system sample blank of ambient air was captured and tested for hydrocarbons as called for in the test protocol. The results of the blank analysis showed methane content of 17 ppm. While the protocol does not allow subtracting the blank from the test results, methane levels less than or near those shown in the blank should be considered non-detect since test results include ambient background methane concentrations.

SUMMARY OF SOURCE TEST RESULTS

COMPANY: DESTEC, CHALK CLIFF PCES REPORT 100-288

TEST DATE: DECEMBER 18, 1992 UNIT #: LUBE OIL VENT "A"

EMISSIONS

	gr/scf	ppm	lb/hr	lb/day
CONDENSABLE HYDROCARBON	0.003540 0.002760		0.00037 0.00033	0.0088 0.0080
Mean:	0.003150		0.00035	0.0084
NONCONDENSABLE NMHC		0.0 0.0	0.0000 0.0000	0.0000 0.0000
Mean:		0.0	0.0000	0.0000
TOTAL HYDROCARBON			0.0004 0.0003	0.0088 0.0080
Mean:			0.0004	0.0084

Comments: _____

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'A'
DATE : 12-18-92
REPORT : 100-288

FIELD DATA @ 60°F

	RUN #:	1	2	
	TIME:	1055	1152	AVERAGE
Vm (dry gas sampled)		24	24.05	
Y (meter calib. factor)		1.005776	1.005776	
P bar (Barometric pressure)		28.98	28.98	
P static (stack pressure, " H2O)		0	0	
Delta H (differential meter press, " H2O)		0.83	0.88	
Tm (meter temperature, R°)		513	519	
Vol H2O mls		2.9	1.2	
Vm(std),dscf		23.75	23.53	
Bws-H2O vapor		0.0056	0.0024	
MF-moisture factor		0.994358	0.9976	
% CO2		0	0	
% O2		20.9	20.9	
% N2		79.1	79.1	
Md-MW stk gas,dry		28.84	28.84	
Ms-MW stk gas,wet		28.78	28.81	
T stack, R°		532	536	
Stack area,ft2		0.009	0.009	
Vs-fpm, hot wire anemometer		1475	1700	1587.5
Q-acfm		13	14	14
Qstd-dscfm		12	14	13
Sample time		40	40	

COMPANY : DESTEC
UNIT : LUBE OIL VENT 'A'
DATE : 12-18-92
REPORT : 100-288

EPA METHOD 4 DATA
@ 60°F

RUN #1

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
RESULTS:	5.49	0.003580	0.003540	0.00037	0.0088

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1055	1135	20.9	0	0.56	23.75	12

RUN #2

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
Probe & Nozzle:	4.23	0.002768	0.002762	0.00033	0.0080

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1152	1232	20.9	0	0.24	23.53	14

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'A'
DATE : 12-18-92
REPORT : 100-288

NON CONDENSABLE
HYDROCARBON RESULTS

RUN No.: 1					
DSCFM: 12					
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	5.02	0.0002	5.02	0.0002
Ethane	(C2)	0	0	0	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	0.0	0.0000	0.0	0.0000
	Total	5.0	0.0002	5.0	0.0002
	Total (non methane)	0.0	0.0000	0.0	0.0000

RUN No.: 2					
DSCFM: 14					
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	4.90	0.00017	4.90	0.00017
Ethane	(C2)	0	0	0	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	0.00	0.0000	0.0	0.0000
	Total	4.90	0.0002	4.9	0.0002
	Total (non methane)	0.00	0.0000	0.0	0.0000

SUMMARY OF SOURCE TEST RESULTS

COMPANY: DESTEC, CHALK CLIFF PCES REPORT 100-288

TEST DATE: DECEMBER 18, 1992 UNIT #: LUBE OIL VENT "B"

EMISSIONS

	gr/scf	ppm	lb/hr	lb/day
CONDENSABLE HYDROCARBON	0.002630 0.001812		0.00923 0.00639	0.2215 0.1535
Mean:	0.002221		0.00781	0.1875
NONCONDENSABLE NMHC		5.5 2.8	0.0303 0.0154	0.7272 0.3696
Mean:		4.2	0.0229	0.5484
TOTAL HYDROCARBON			0.0395 0.0218	0.9487 0.5231
Mean:			0.0307	0.7359

Comments: _____

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_____

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'B'
DATE : 12-18-92
REPORT : 100-288

FIELD DATA @ 60°F

	RUN #:	1	2	
	TIME:	1128	1215	AVERAGE
Vm (dry gas sampled)		24.03	24.01	
Y (meter calib. factor)		0.989699	0.989699	
P bar (Barometric pressure)		28.98	28.98	
P static (stack pressure, " H2O)		0	0	
Delta H (differential meter press, " H2O)		0.83	0.83	
Tm (meter temperature, R°)		519	516	
Vol H2O mls		5	6.5	
Vm(std),dscf		23.13	23.24	
Bws-H2O vapor		0.0099	0.0128	
MF-moisture factor		0.990056	0.9872	
% CO2		0	0	
% O2		20.9	20.9	
% N2		79.1	79.1	
Md-MW stk gas,dry		28.84	28.84	
Ms-MW stk gas,wet		28.73	28.7	
T stack, R°		620	618	
Stack area,ft2		0.307	0.307	
Vs-fpm, hot wire anemometer		1627	1623	1625
Q-acfm		499	498	499
Qstd-dscfm		405	406	406
Sample time		40	40	

COMPANY : DESTEC
UNIT : LUBE OIL VENT 'B'
DATE : 12-18-92
REPORT : 100-288

EPA METHOD 4 DATA
@ 60°F

RUN #1

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
RESULTS:	3.99	0.002657	0.002630	0.00923	0.2215

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1128	1208	20.9	0	0.99	23.13	405

RUN #2

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
Probe & Nozzle:	2.77	0.001836	0.001812	0.00639	0.1535

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1215	1255	20.9	0	1.28	23.24	406

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'B'
DATE : 12-18-92
REPORT : 100-288

NON CONDENSABLE
HYDROCARBON RESULTS

RUN No.: 1					
DSCFM: 405					
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	6.00	0.0061	6.00	0.0061
Ethane	(C2)	0	0	0	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	5.50	0.0303	33.0	0.0338
	Total	11.5	0.0364	39.0	0.0400
	Total (non methane)	5.5	0.0303	33.0	0.0338

RUN No.: 2					
DSCFM: 406					
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	5.91	0.00607	5.91	0.00607
Ethane	(C2)	0	0	0	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	2.79	0.0154	16.7	0.0172
	Total	8.70	0.0215	22.7	0.0233
	Total (non methane)	2.79	0.0154	16.7	0.0172

SUMMARY OF SOURCE TEST RESULTS

COMPANY: DESTEC, CHALK CLIFF PCES REPORT 100-288

TEST DATE: DECEMBER 18, 1992 UNIT #: LUBE OIL VENT "C"

EMISSIONS

	gr/scf	ppm	lb/hr	lb/day
CONDENSABLE HYDROCARBON	0.003838		0.00109	0.0262
	0.001176		0.00036	0.0086
Mean:	0.002507		0.00073	0.0174
NONCONDENSABLE NMHC		126.6	0.0565	1.3560
		15.3	0.0071	0.1704
Mean:		71.0	0.0318	0.7632
TOTAL HYDROCARBON			0.0576	1.3822
			0.0075	0.1790
Mean:			0.0325	0.7806

Comments: _____

_____

_____

_____

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'C'
DATE : 12-18-92
REPORT : 100-288

FIELD DATA @ 60°F

	RUN #:	1	2	
	TIME:	930	1020	AVERAGE
Vm (dry gas sampled)		24.03	24.01	
Y (meter calib. factor)		0.989699	0.989699	
P bar (Barometric pressure)		28.98	28.98	
P static (stack pressure, " H2O)		0	0	
Delta H (differential meter press, " H2O)		0.85	0.83	
Tm (meter temperature, R°)		528	522	
Vol H2O mls		2	7.1	
Vm(std),dscf		22.74	22.98	
Bws-H2O vapor		0.0041	0.0142	
MF-moisture factor		0.995930	0.9858	
% CO2		0	0	
% O2		20.9	20.9	
% N2		79.1	79.1	
Md-MW stk gas,dry		28.84	28.84	
Ms-MW stk gas,wet		28.8	28.69	
T stack, R°		555	550	
Stack area,ft2		0.307	0.307	
Vs-fpm, hot wire anemometer		118	123	120.5
Q-acfm		36	38	37
Qstd-dscfm		33	35	34
Sample time		40	40	

COMPANY : DESTEC
UNIT : LUBE OIL VENT 'C'
DATE : 12-18-92
REPORT : 100-288

EPA METHOD 4 DATA
@ 60°F

RUN #1

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
RESULTS:	5.69	0.003853	0.003838	0.00109	0.0262

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
930	1010	20.9	0	0.41	22.74	33

RUN #2

CONDENSABLE HYDROCARBONS:	net mg	gr/dscf	gr/scf	lbs/hr	lbs/day
Probe & Nozzle:	1.78	0.001193	0.001176	0.00036	0.0086

ADDITIONAL DATA:

TIME						
start	finish	%O2	%CO2	%H2O	Vm(std)	DSCFM
1020	1100	20.9	0	1.42	22.98	35

COMPANY : DESTEC
UNIT : CHALK CLIFF LUBE OIL VENT 'C'
DATE : 12-18-92
REPORT : 100-288

NON CONDENSABLE
HYDROCARBON RESULTS

RUN No.:	1				
DSCFM:	33				
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	0.00	0.0000	0.00	0.0000
Ethane	(C2)	0	0	1	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	126.17	0.0566	757.0	0.0632
	Total	126.6	0.0567	757.9	0.0633
	Total (non methane)	126.6	0.0567	757.9	0.0633

RUN No.:	2				
DSCFM:	35				
		ppm	lb/hr	ppm as CH4	lb/hr (as Methane)
Methane	(C1)	9.60	0.00085	9.60	0.00085
Ethane	(C2)	0.45	0	1	0
Propane	(C3)	0	0	0	0
Butane	(C4)	0	0	0	0
Pentane	(C5)	0	0	0	0
Hexane	(C6)	14.85	0.0071	89.1	0.0079
	Total	24.90	0.0080	99.6	0.0088
	Total (non methane)	15.30	0.0071	90.0	0.0080

EPA METHOD 18
HYDROCARBON EMISSIONS TESTING
FID ANALYSIS

Sampling Procedures

The sample was drawn via evacuated cannister through a stainless steel/teflon probe into a tedlar bag. Each sample bag was evacuated and then filled.

Analytical Procedures

The contents of the tedlar bag are analyzed by gas chromatography. The gas chromatograph is calibrated with an appropriate standard for each carbon #, before and after each set of samples are analyzed. The sample is speciated by carbon #-C_1, C_2, C_3, C_4, C_5, and C_{6+} backflush.

Symbol Identification

i	=	Carbon #; i = 1 to 6+
s	=	Refers to standard for that carbon #
Rx_i	=	Response factor for C_i
MW	=	Molecular weight - g/mole
DSCFM	=	Average volume flow rate of unit tested

Equations

$$Rx_i = \frac{Area_{std}}{ppm_{std}}$$

$$Sample\ ppm_i = \frac{1}{Rx_i} \times Area_i$$

$$Sample\ ppm\ (as\ C_1) = Sample\ ppm \times \#\ of\ carbons$$

$$\frac{lbs}{hr_i} = ppm_i \times MW_i \times DSCFM \times 1.581 \times 10^{-7}$$

$$Total\ non\text{-}methane\ \frac{lbs}{hr} = \sum_{2}^{6+} \frac{lbs}{hr_i}$$

Note 1: If lbs/hr as methane is required, MW will equal 16.0 (MW of methane)
Note 2: # of carbons: ethane = 2; propane = 3; etc...

METHOD 5.4.3.1: Impinger Catch and Extract

5.4.3.1.

The impinger catch consisted of the water and organic solvent * rinsings from the sample train connections between the filter and impingers, plus the impinger contents. These are usually received in 1 to 4 one pint wide-mouth Mason jars.

The methylene chloride used in the extraction also had a blank run on it, similar to those run for the water and acetone. The methylene chloride extraction was corrected the same way the acetone rinse was. The impinger catch extract and impinger catch was weighed to a constant weight as defined earlier.

4.3.1.2

Combine the catch in a separatory funnel of suitable size. The Mason jar was rinsed with methylene chloride into the separatory funnel.

4.3.1.3

Extract the aqueous catch three times with 50 ml-portions of methylene chloride (CH2C12). Each time, extract for 30 seconds with vigorous shaking, then allow the layers to separate (which may sometimes take up to 15 minutes due to emulsion formation). Drain the CH2C12 layers into a breaker of suitable size through a short stem funnel containing a cotton plug, to remove droplets of water from the CH2C12 extract. Save an aqueous layer for use in Section 4.3.1.8.

4.3.1.4

Rinse the funnel and cotton with fresh CH2C12 and concentrate the combined CH2C12 extract to about 25ml under a stream of clean filtered air at room temperature in a hood.

4.3.1.5

Quantitatively transfer the concentrated extract to a tared 50ml beaker and evaporate to dryness under the above conditions and place in a desiccator for one hour.

4.3.1.6

Weigh the extract residue to the nearest 0.1mg.

* Methylene Chloride (CH2C12) unless the source being evaluated dictates otherwise, then usually benzene is used.

4.3.1.7

Record the gross and tare weights and report the net weight as "Impinger Catcher Extract".

4.3.1.8

From Section 4.3.1.3 quantitatively transfer the aqueous phase to a suitable size beaker and concentrate to about 25ml on a hot plate or stem bath with the aid of the clean filtered air steam.

4.3.1.9

Quantitatively transfer the aqueous concentrate to a tared 50ml beaker and evaporate to dryness on a steam bath.

4.3.1.10

Place the beaker containing the residue in a 105° C over one hour and then let cool in a desiccator.

4.3.1.11

Weigh the residue to the nearest 0.1mg.

SULFUR EMISSIONS

ANALYSIS REPORT SHEET

Sulfur Compounds by GC/FPD

Client:	**Petro Chem**	**Lab #:**	21931
Site:	**Fuel Gas 1**	**Date Sampled:**	12-28-92
Can #:	**Tedlar**	**Date Analyzed:**	12-30-92

Compound	MDL ug/m3	Concentration ug/m3	Concentration ppbv
Hydrogen Sulfide	78.0	120	84
Carbonyl Sulfide	78.0	2800	1100
Methyl Mercaptan	78.0	550	280
Dimethyl Sulfide	78.0	not detected	not detected
Carbon Disulfide	39.0	120	38
Total Sulfur, H2S			2100

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE
DATE : 12-16-92, 2000-2300
REPORT : 100-288

SUFUR EMISSION RESULTS

TIME	TS, ppm	MSCFH	FUEL SCFM	SULFUR	
				LBS/HR	LBS/DAY
2000	2.1	366.1	6102	0.065	1.56
2015	2.1	366.6	6110	0.065	1.56
2030	2.1	365.0	6083	0.065	1.55
2045	2.1	365.2	6087	0.065	1.55
2100	2.1	366.0	6100	0.065	1.56
2115	2.1	366.1	6102	0.065	1.56
2130	2.1	364.6	6077	0.065	1.55
2145	2.1	365.9	6098	0.065	1.55
2200	2.1	365.1	6085	0.065	1.55
2215	2.1	367.5	6125	0.065	1.56
2230	2.1	367.2	6120	0.065	1.56
2245	2.1	367.0	6117	0.065	1.56
2300	2.1	366.8	6113	0.065	1.56
AVERAGE	2.1	366.1	6101.41025	0.065	1.56

EQUATION:

SCFM = MCFH * 1000 * 1/60

SULFUR LBS/HR = TS ppm * 32 * SCFM * 1.581 * 10^-7

MW SULFUR = 32

ANALYSIS REPORT SHEET

Sulfur Compounds by GC/FPD

Client:	**Petro Chem**	**Lab #:**	21932
Site:	**Fuel Gas 2**	**Date Sampled:**	12-28-92
Can #:	**Tedlar**	**Date Analyzed:**	12-30-92

Compound	MDL ug/m3	Concentration ug/m3	Concentration ppbv
Hydrogen Sulfide	78.0	140	99
Carbonyl Sulfide	78.0	3100	1300
Methyl Mercaptan	78.0	680	340
Dimethyl Sulfide	78.0	not detected	not detected
Carbon Disulfide	39.0	270	86
Total Sulfur, H2S			2700

ANALYSIS REPORT SHEET

Sulfur Compounds by GC/FPD

Client:	**Petro Chem**	**Lab #:**	21933
Site:	**Fuel Gas 3**	**Date Sampled:**	12-28-92
Can #:	**Tedlar**	**Date Analyzed:**	12-30-92

Compound	MDL ug/m3	Concentration ug/m3	Concentration ppbv
Hydrogen Sulfide	78.0	170	120
Carbonyl Sulfide	78.0	3000	1200
Methyl Mercaptan	78.0	510	260
Dimethyl Sulfide	78.0	not detected	not detected
Carbon Disulfide	39.0	not detected	not detected
Total Sulfur, H2S			1500

RELATIVE ACCURACY

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15,16-92
REPORT : 100-288

ANALYZER NOx

RELATIVE ACCURACY RESULTS

PPMvd

RUN #	REFERENCE METHOD	CEM DATA	DIFFERENCE
1	2.94	2.90	0.04
2	3.21	3.20	0.01
3	3.15	3.20	-0.05
4	3.24	3.25	-0.01
5	3.23	3.25	-0.02
6	3.20	3.20	0.00
7	3.19	3.20	-0.01
8	3.22	3.20	0.02
9	3.26	3.30	-0.04
10	3.25	3.25	0.00
AVERAGE	3.19	3.20	-0.01

RELATIVE ACCURACY RELATED TO THE REFERENCE METHOD		
t .975	=	2.262
STANDARD DEVIATION	=	0.03
CONFIDIENCE COEFFICIENT	=	0.02
REF METHOD	=	3.2
RELATIVE ACCURACY	=	0.79

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15,16-92
REPORT : 100-288

ANALYZER O2

RELATIVE ACCURACY RESULTS

PPMvd

RUN #	REFERENCE METHOD	CEM DATA	DIFFERENCE
1	15.42	15.56	-0.14
2	15.50	15.55	-0.05
3	15.56	15.55	0.01
4	15.54	15.52	0.02
5	15.49	15.52	-0.03
6	15.48	15.55	-0.07
7	15.48	15.54	-0.06
8	15.45	15.56	-0.11
9	15.48	15.53	-0.05
10	15.53	15.54	-0.01
AVERAGE	15.49	15.54	-0.05

RELATIVE ACCURACY RELATED TO THE REFERENCE METHOD		
t .975	=	2.262
STANDARD DEVIATION	=	0.05
CONFIDIENCE COEFFICIENT	=	0.04
REF METHOD	=	15.5
RELATIVE ACCURACY	=	0.55

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16,18-92
REPORT : 100-288

ANALYZER NH3

RELATIVE ACCURACY RESULTS

PPMvd

RUN #	REFERENCE METHOD	CEM DATA	DIFFERENCE
1	8.46	7.3	1.16
2	8.81	7.3	1.51
3	8.30	7.2	1.10
4	4.57	6.3	-1.73
5	6.56	5.1	1.46
6	7.29	4.4	2.89
7	6.83	3.7	3.13
8	5.57	3.2	2.37
9	7.07	2.7	4.37
AVERAGE	7.05	5.2	1.81

RELATIVE ACCURACY RELATED TO THE REFERENCE METHOD			RELATIVE ACCURACY RELATED TO THE APPLICABLE STANDARD		
$t_{.975}$	=	2.306	$t_{.975}$	=	2.306
STANDARD DEVIATION	=	1.71	STANDARD DEVIATION	=	1.71
CONFIDIENCE COEFFICIENT	=	1.32	CONFIDIENCE COEFFICIENT	=	1.32
REF METHOD	=	7.1	LIMIT (APP. STD)	=	20
RELATIVE ACCURACY	=	44.29	RELATIVE ACCURACY	=	15.61

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15,16-92
REPORT : 100-288

PCES REFERENCE METHOD SUMMARY

			NOx			CO		
RUN #	TIME	%O2	ppm	ppm @ 15% O2	lbs/hr	ppm	ppm @ 15% O2	lbs/hr
1	1930-2000	15.42	2.94	3.16	5.10	18.18	19.59	19.22
2	2030-2100	15.5	3.21	3.51	5.58	16.11	17.59	17.03
3	2115-2145	15.56	3.15	3.48	5.48	15.53	17.16	16.42
4	2200-2230	15.54	3.24	3.57	5.64	18.10	19.91	19.14
5	2245-2315	15.49	3.23	3.52	5.61	20.06	21.87	21.21
6	2330-2400	15.48	3.20	3.49	5.56	17.24	18.78	18.23
7	0015-0045	15.48	3.19	3.47	5.54	na	na	na
8	0115-0145	15.45	3.22	3.48	5.59	na	na	na
9	0200-0230	15.48	3.26	3.55	5.67	na	na	na
10	0300-0330	15.53	3.25	3.57	5.64	na	na	na
	AVERAGE	15.49	3.19	3.48	5.54	17.54	19.15	18.54

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #1

NOx/CO/O2 DATA

Stack Gas Measurement Data								
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE		
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
07:30 PM	-	07:40 PM	15.45	2.9	18.6	71.6	21.8	45.8
07:40 PM	-	07:50 PM	15.42	3.0	18.7	71.7	21.9	46.0
07:50 PM	-	08:00 PM	15.40	2.9	17.2	71.8	21.7	43.3
		Averages:	15.42	2.9	18.2	71.7	21.8	45.0

Calibration Data	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.2	39.1	44.5
FINAL zero	10	10	10
FINAL span	93.8	39.2	44.8
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.15	0.02	0.16
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.60	0.10	0.30
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.42	2.94	9.60	3.16	5.10

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.42	18.18	59.42	19.59	19.22

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #2

NOx/CO/O2 DATA

Stack Gas Measurement Data							
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
08:30 PM	-	08:40 PM	15.43	3.15	16.8	71.4	22.9	42.5
08:40 PM	-	08:50 PM	15.48	3.22	16.0	71.1	23.0	41.0
08:50 PM	-	09:00 PM	15.58	3.27	15.5	71.0	23.0	40.0
		Averages:	15.50	3.21	16.1	71.2	23.0	41.2

Calibration Data			
	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.5	40	44.9
FINAL zero	10	10.2	10
FINAL span	92	39.2	44.7
ZERO DRIFT %/ppm	0.00	0.05	0.00
CALIB. DRIFT %/ppm	-0.38	-0.19	-0.10
ZERO DRIFT %fs	0.00	0.20	0.00
CALIB.DRIFT %fs	-1.50	-0.80	-0.20
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.50	3.21	10.65	3.51	5.58

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.50	16.11	53.37	17.59	17.03

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #3

NOx/CO/O2 DATA

Stack Gas Measurement Data								
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE		
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
09:15 PM	-	09:25 PM	15.55	3.13	15.8	72.1	22.6	45.0
09:25 PM	-	09:35 PM	15.57	3.14	15.5	72.1	22.7	44.2
09:35 PM	-	09:45 PM	15.56	3.20	15.2	72.0	23.0	43.5
	Averages:		15.56	3.15	15.5	72.1	22.8	44.2

Calibration Data	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.5	39.2	49.8
FINAL zero	10	10.2	10
FINAL span	93.3	39.2	49.5
ZERO DRIFT %/ppm	0.00	0.05	0.00
CALIB. DRIFT %/ppm	-0.05	0.00	-0.14
ZERO DRIFT %fs	0.00	0.20	0.00
CALIB.DRIFT %fs	-0.20	0.00	-0.30
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.56	3.15	10.57	3.48	5.48

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.56	15.53	52.07	17.16	16.42

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #4

NOx/CO/O2 DATA

Stack Gas Measurement Data							
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
10:00 PM	-	10:10 PM	15.54	3.2	18.1	72.0	23.0	45.0
10:10 PM	-	10:20 PM	15.54	3.2	18.7	72.0	23.0	46.0
10:20 PM	-	10:30 PM	15.54	3.3	17.5	72.0	23.4	43.8
	Averages:		15.54	3.2	18.1	72.0	23.1	44.9

Calibration Data			
	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.4	39.2	44.7
FINAL zero	10.2	10	10
FINAL span	93.2	39.4	44.7
ZERO DRIFT %/ppm	0.05	0.00	0.00
CALIB. DRIFT %/ppm	-0.05	0.05	0.00
ZERO DRIFT %fs	0.20	0.00	0.00
CALIB.DRIFT %fs	-0.20	0.20	0.00
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.54	3.24	10.83	3.57	5.64

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.54	18.10	60.42	19.91	19.14

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #5

NOx/CO/O2 DATA

Stack Gas Measurement Data							
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
10:45 PM	-	10:55 PM	15.49	3.20	21.8	72.1	22.9	52.0
10:55 PM	-	11:05 PM	15.49	3.24	19.0	72.1	23.0	46.5
11:05 PM	-	11:15 PM	15.49	3.26	19.4	72.1	23.0	47.2
	Averages:		15.49	3.23	20.1	72.1	23.0	48.6

Calibration Data			
	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.8	39.4	44.7
FINAL zero	10	10	10
FINAL span	93.8	39.2	44.4
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.00	-0.05	-0.16
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.00	-0.20	-0.30
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.49	3.23	10.89	3.52	5.61

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.49	20.06	66.35	21.87	21.21

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15-92
REPORT : 100-288

RUN #6

NOx/CO/O2 DATA

Stack Gas Measurement Data								
TIME INTERVAL			CONCENTRATIONS			% FULL SCALE		
BEGIN	-	END	O2:%	NOx:ppm	CO:ppm	O2%fs	NOx%fs	CO%fs
11:30 PM	-	11:40 PM	15.51	3.22	17.3	72.2	22.9	43.0
11:40 PM	-	11:50 PM	15.48	3.21	16.6	72.1	22.8	41.8
11:50 PM	-	12:00 AM	15.47	3.18	17.8	72.1	22.6	44.0
		Averages:	15.48	3.20	17.2	72.1	22.8	42.9

Calibration Data			
	O2	NOx	CO
INITIAL zero	10	10	10
INITIAL span	93.8	39.2	44.4
FINAL zero	10	10	10
FINAL span	93.9	39	44.3
ZERO DRIFT %/ppm	0.00	0.00	0.00
CALIB. DRIFT %/ppm	0.02	-0.05	-0.05
ZERO DRIFT %fs	0.00	0.00	0.00
CALIB.DRIFT %fs	0.10	-0.20	-0.10
CAL GAS value	20.9	7.27	17.98
FULL SCALE RANGE	25	25	50

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.48	3.20	10.59	3.49	5.56

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
CO values:	15.48	17.24	56.97	18.78	18.23

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

RUN #7

NOx/O2 DATA

Stack Gas Measurement Data						
TIME INTERVAL			CONCENTRATIONS		% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	O2%fs	NOx%fs
12:15 AM	-	12:25 AM	15.49	3.2	72.2	22.9
12:25 AM	-	12:35 AM	15.48	3.2	72.2	22.8
12:35 AM	-	12:45 AM	15.47	3.2	72.2	22.8
	Averages:		15.48	3.2	72.2	22.8

Calibration Data		
	O2	NOx
INITIAL zero	10	10
INITIAL span	93.9	38.9
FINAL zero	10.2	10
FINAL span	93.8	39.2
ZERO DRIFT %/ppm	0.05	0.00
CALIB. DRIFT %/ppm	-0.02	0.08
ZERO DRIFT %fs	0.20	0.00
CALIB.DRIFT %fs	-0.10	0.30
CAL GAS value	20.9	7.27
FULL SCALE RANGE	25	25

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.48	3.19	10.54	3.47	5.54

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

RUN #8

NOx/O2 DATA

Stack Gas Measurement Data					
TIME INTERVAL		CONCENTRATIONS		% FULL SCALE	
BEGIN	- END	O2:%	NOxppm	O2%fs	NOx%fs
01:15 AM	- 01:25 AM	15.47	3.24	72.0	23.0
01:25 AM	- 01:35 AM	15.45	3.21	72.0	22.9
01:35 AM	- 01:45 AM	15.42	3.21	72.0	22.9
	Averages:	15.45	3.22	72.0	22.9

Calibration Data	O2	NOx
INITIAL zero	9.7	10
INITIAL span	93.8	39.2
FINAL zero	10	10
FINAL span	93.8	39.2
ZERO DRIFT %/ppm	0.07	0.00
CALIB. DRIFT %/ppm	0.00	0.00
ZERO DRIFT %fs	0.30	0.00
CALIB.DRIFT %fs	0.00	0.00
CAL GAS value	20.9	7.27
FULL SCALE RANGE	25	25

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.45	3.22	10.57	3.48	5.59

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

RUN #9

NOx/O2 DATA

Stack Gas Measurement Data					
TIME INTERVAL			CONCENTRATIONS	% FULL SCALE	
BEGIN	-	END	O2:%	NOx:ppm	O2%fs	NOx%fs
02:00 AM	-	02:10 AM	15.47	3.28	72.0	23.1
02:10 AM	-	02:20 AM	15.48	3.30	72.0	23.3
02:20 AM	-	02:30 AM	15.48	3.21	72.0	23.1
	Averages:		15.48	3.26	72.0	23.2

Calibration Data	O2	NOx
INITIAL zero	10	10
INITIAL span	93.8	38.9
FINAL zero	10	10
FINAL span	93.7	39.3
ZERO DRIFT %/ppm	0.00	0.00
CALIB. DRIFT %/ppm	-0.02	0.10
ZERO DRIFT %fs	0.00	0.00
CALIB.DRIFT %fs	-0.10	0.40
CAL GAS value	20.9	7.27
FULL SCALE RANGE	25	25

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr.
NOx values:	15.48	3.26	10.76	3.55	5.67

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-16-92
REPORT : 100-288

RUN #10

NOx/O2 DATA

Stack Gas Measurement Data					
TIME INTERVAL		CONCENTRATIONS		% FULL SCALE	
BEGIN	- END	O2:%	NOxppm	O2%fs	NOx%fs
03:00 AM	- 03:10 AM	15.50	3.2	72.0	23.0
03:10 AM	- 03:20 AM	15.53	3.3	72.0	23.1
03:20 AM	- 03:30 AM	15.56	3.2	72.0	23.0
	Averages:	15.53	3.2	72.0	23.0

Calibration Data		
	O2	NOx
INITIAL zero	10	10
INITIAL span	93.7	39.3
FINAL zero	9.5	10
FINAL span	93.8	39.2
ZERO DRIFT %/ppm	-0.12	0.00
CALIB. DRIFT %/ppm	0.02	-0.02
ZERO DRIFT %fs	-0.50	0.00
CALIB.DRIFT %fs	0.10	-0.10
CAL GAS value	20.9	7.27
FULL SCALE RANGE	25	25

DSCFM = 238860 AVERAGE OF PITOT TUBE VELOCITY PROFILES

	%O2	ppm	@ 3%O2	@15%O2	lb/hr
NOx values:	15.53	3.25	10.82	3.57	5.64

CONTINUOUS EMISSION MONITORING SYSTEM (CEMS)

Reference: Manual of Procedures; ST-13A, ST-19A, Jan 1982, State of California, Air Resources Board, Test Methods 1-100, June 1979.
EPA CFR Title 40, Pt. 60, Appendix A, Method 3A, 6C, 7E, & 10.

Instrument Summary

A constant sample of flue gas was extracted, dried, filtered and delivered to an instrument manifold system for distribution to one or more analyzers. Instrument results are recorded on an analog strip chart recorder. System calibration checks are performed as well as calibration checks at the beginning and end of each test run. Final data reduction includes zero and calibration drift corrections.

Sample Conditioning System

Consists of a borosilicate glass tube or 316 grade stainless steel probe fitted with a cindered stainless steel or pyrex glass wool particulate filter. The probe is fitted with a teflon (TFE) sample line which connects to a water condensation system located at the source. The condensation system consists of three 500-ml short stem glass impingers connected in a series, immersed in an ice bath. The gas is delivered to the instrument trailer with a teflon line (3/8" O.D.) through an in-line Balston particulate filter drawn by a teflon-coated diaphragm pump. The sample system is leak checked prior to sampling by plugging the end of the sample probe and adjusting the sample pump to its maximum rate (approximately 22" Hg). The manifold is by-passed and the leak rate monitored through a gas meter or low range flow meter.

Manifold System

Sample gas is delivered to each analyzer through a five way valve and regulated with a needle valve flow meter. Manifold pressure is controlled by a back pressure regulator which is typically set at three psi. Zero gas (N_2) and calibrated gases are delivered to the analyzers using the same five way valve and flow meter. All manifold parts are glass, stainless steel, or teflon materials.

Analog Strip Chart Data Reduction

Analog recordings consists of averaged time increments as shown on the data pages (typically 5, 10, or 20 minute increments). Data for each increment was recorded at an average percent of full scale. The readings were then compared with the zero and calibration readings for calculation of the average concentration for each time increment. Any deviation of the zero and calibration readings from the start to the end of a test period was corrected by calculating apparent zero and calibration readings for the mid-point of each time increment. The average concentrations were then calculated from the sample readings and the apparent zero and span readings.

RELATIVE ACCURACY
Code of Federal Regualtions, 40 CFR, Pt. 60, App. B, Spec. 2

Arithmetic Mean of the Differences, d
Eq. 8.1

Where: n = Number of data points

$$\overline{d} = \frac{1}{n} \sum_{i=1}^{n} d_i$$

Standard deviation of the differences, S_d
Eq. 8.2

$$S_d = \left(\frac{\sum_{i=1}^{n} d_i^2 - \frac{\left(\sum_{i=1}^{n} d_i \right)^2}{n}}{n-1} \right)^{1/2}$$

Confidence Coefficient, CC
Eq. 8.3

$$CC = t_{0.975} \left(\frac{S_d}{\sqrt{n}} \right)$$

$t_{0.975}$ = t value Table (40 CFR, pg. 1043)

Relative Accuracy, RA
Eq. 8.4

$$RA = \frac{\left| \bar{d} \right| + \left| CC \right|}{\overline{RM}} \times 100$$

Where: $|\bar{d}|$=Absolute value of the mean of differences (from Eq. 8.1)
$\overline{RM}$ = Average from reference method

EMISSION FACTORS
NOx, lbs/MMBtu

COMPANY : DESTEC
UNIT : CHALK CLIFF TURBINE EXHAUST
DATE : 12-15,16-92
REPORT : 100-288

LBS/MMBTU & EPA F FACTOR @ 60°F

NOx

#1	2.94	15.42	0.01166
#2	3.21	15.50	0.01292
#3	3.15	15.56	0.01282
#4	3.24	15.54	0.01314
#5	3.23	15.49	0.01298
#6	3.20	15.48	0.01283
#7	3.19	15.48	0.01279
#8	3.22	15.45	0.01284
#9	3.26	15.48	0.01307
#10	3.25	15.53	0.01315
AVERAGE	3.2	15.49	0.01282

EPA F FACTOR @ 60°F 8579 ref. 40 CFR Pt. 60, App. A, Method 19

CEM - OPERATIONAL DATA
(Supplied by Destec)

*DATA FROM 16DEC92 ; Print Out Retrieved 17 Dec 92 — Ammon ck Data

FG 17DEC92 00:01:02

CONTINUOUS EMISSIONS MONITOR
12 HOUR DATA

LOG # 4 PAGE 1

1 NOX ACTUAL - STACK
2 NOX CORRECTED (15 02) - OUTPUT
3 CO ACTUAL - OUTLET
4 CO CORRECTED (15 02) - OUTLET
5 02 ACTUAL - OUTLET
6 AMMONIA (NH3) STACK GAS
7 CEM SYS IN CALIBRATION
8 CEM SYSTEM TROUBLE
9 AMBIENT TEMPERATURE
10 DEW POINT TEMPERATURE
11 RELATIVE HUMIDTY
12 FUEL GAS FLOW FROM FG COMP

HH:MM:SS	1 AI1425B PPMVD AVG	2 AI1425D PPMVD AVG	3 AI1427B PPMVD AVG	4 AI1427D PPMVD AVG	5 AI1426B PCT VD AVG	6 AI1424 PPMVD AVG	7 XS1435 CALIB	8 XA1129 NORMAL	9 TT1002A DEGF AVG	10 TT1002B DEGF AVG	11 MT1002 PCT AVG	12 FI2712 MSCFH AVG
12:15:00	3.3	3.6	22.4	24.4	15.53	9.2	NORMAL	NORMAL	47.3	40.0	74.8	369.7
12:30:00	3.5	3.9	22.5	24.4	15.52	8.6	NORMAL	NORMAL	47.7	39.8	73.4	369.3
12:45:00	3.8	4.1	22.3	23.8	15.42	8.3	NORMAL	NORMAL	47.6	39.9	73.7	373.4
13:00:00	4.0	4.3	22.6	23.8	15.37	8.1	NORMAL	NORMAL	48.3	40.3	72.9	376.0
13:15:00	3.9	4.3	21.9	23.9	15.44	7.7	NORMAL	NORMAL	49.2	40.3	70.5	375.7
13:30:00	3.8	4.2	21.3	23.4	15.47	8.1	NORMAL	NORMAL	49.7	40.5	69.8	373.4
13:45:00	3.6	4.0	21.9	24.0	15.50	8.2	NORMAL	NORMAL	50.2	40.6	68.8	371.8
14:00:00	3.7	4.1	22.4	24.8	15.54	8.1	NORMAL	NORMAL	50.5	40.6	68.2	369.4
14:15:00	3.6	4.0	21.7	24.0	15.51	8.0	NORMAL	NORMAL	50.1	40.5	68.8	373.7
14:30:00	3.6	3.9	21.7	23.8	15.48	7.3	NORMAL	NORMAL	50.5	40.9	69.1	372.8
14:45:00	3.6	3.9	22.2	24.3	15.49	7.4	NORMAL	NORMAL	52.2	41.5	66.4	373.7
15:00:00	3.7	4.1	20.9	23.0	15.49	7.1	NORMAL	NORMAL	53.1	41.7	64.6	373.7
15:15:00	3.8	4.1	20.3	22.4	15.50	7.2	NORMAL	NORMAL	54.1	42.7	64.7	371.6
15:30:00	3.8	4.2	19.8	21.7	15.48	7.2	NORMAL	NORMAL	54.7	42.7	63.5	372.1
15:45:00	3.9	4.2	19.7	21.7	15.50	6.9	NORMAL	NORMAL	53.8	41.8	63.1	372.3
16:00:00	3.7	4.1	19.5	21.4	15.48	6.5	NORMAL	NORMAL	53.4	41.9	64.4	372.0
16:15:00	3.6	4.0	19.5	21.4	15.49	5.9	NORMAL	NORMAL	53.1	42.0	65.5	370.7
16:30:00	3.6	3.9	20.8	22.8	15.48	6.4	NORMAL	NORMAL	53.0	41.9	65.5	372.4
16:45:00	3.4	3.7	22.1	24.2	15.48	6.7	NORMAL	NORMAL	52.1	41.5	66.5	372.6
17:00:00	3.3	3.7	22.6	25.0	15.51	7.1	NORMAL	NORMAL	51.4	41.2	67.5	370.4
17:15:00	3.3	3.6	23.4	25.8	15.52	7.3	NORMAL	NORMAL	50.1	41.1	70.4	370.9
17:30:00	3.6	3.9	19.0	20.9	15.47	6.9	NORMAL	NORMAL	48.1	41.2	76.2	372.1
17:45:00	3.5	3.8	21.3	23.2	15.46	6.7	NORMAL	NORMAL	47.9	41.2	76.8	371.7
18:00:00	3.5	3.8	20.9	23.0	15.46	6.3	NORMAL	NORMAL	46.5	40.2	77.7	372.1
18:15:00	3.5	3.9	20.6	22.5	15.45	6.8	NORMAL	NORMAL	46.1	40.6	80.3	372.3
18:30:00	3.4	3.7	22.4	24.4	15.45	6.9	NORMAL	NORMAL	46.3	40.6	79.6	372.0
18:45:00	3.4	3.7	20.7	22.7	15.45	7.2	NORMAL	NORMAL	46.0	40.3	79.7	371.5
19:00:00	3.3	3.6	21.2	23.1	15.45	7.1	NORMAL	NORMAL	45.3	39.8	80.0	371.6
19:15:00	3.2	3.5	21.7	23.8	15.46	6.8	NORMAL	NORMAL	45.3	39.4	79.2	369.7
19:30:00	3.3	3.6	19.9	21.8	15.45	7.3	NORMAL	NORMAL	46.0	40.0	78.4	372.0
19:45:00	3.2	3.5	20.4	22.3	15.46	7.1	NORMAL	NORMAL	46.8	40.3	77.4	371.9
20:00:00	3.2	3.5	20.1	22.1	15.46	7.6	NORMAL	NORMAL	46.6	40.1	76.7	371.9
20:15:00	3.3	3.6	20.0	21.9	15.45	7.3	NORMAL	NORMAL	47.1	40.2	76.2	371.5
20:30:00	3.2	3.5	21.7	23.7	15.46	7.1	NORMAL	NORMAL	46.8	39.8	75.7	370.2
20:45:00	3.2	3.5	20.7	22.7	15.45	7.2	NORMAL	NORMAL	46.4	39.9	77.4	370.9
21:00:00	3.2	3.5	21.0	22.8	15.44	7.1	NORMAL	NORMAL	45.8	40.1	79.4	372.2
21:15:00	3.3	3.6	19.4	21.2	15.44	7.6	NORMAL	NORMAL	45.3	39.5	79.1	372.3
21:30:00	3.4	3.7	18.2	19.9	15.46	7.3	NORMAL	NORMAL	44.7	39.2	79.9	370.8
21:45:00	3.4	3.7	17.6	19.3	15.46	7.3	NORMAL	NORMAL	44.9	39.3	79.5	369.5
22:00:00	3.3	3.6	18.9	20.5	15.44	7.0	NORMAL	NORMAL	45.6	38.7	76.1	369.7
22:15:00	3.4	3.6	19.7	21.4	15.42	7.0	NORMAL	NORMAL	46.4	38.4	72.9	371.9
22:30:00	3.4	3.7	17.7	19.3	15.43	7.1	NORMAL	NORMAL	47.3	39.1	72.3	371.7
22:45:00	3.4	3.7	17.4	19.0	15.44	7.0	NORMAL	NORMAL	48.0	39.4	71.2	371.4
23:00:00	3.3	3.6	18.6	20.2	15.45	7.3	NORMAL	NORMAL	48.6	39.6	70.5	370.4
	3.1	3.4	19.9	21.7	15.43	7.0	NORMAL	NORMAL	47.5	39.3	72.1	371.0

7.33
7.30

PD 18DEC92 17:26:22 CONTINUOUS EMISSIONS MONITOR 12 HOUR DATA Ammonia Data LOG # 4 PAGE 1

1 NOX ACTUAL - STACK
2 NOX CORRECTED (15 O2) - OUTPUT
3 CO ACTUAL - OUTLET
4 CO CORRECTED (15 O2) - OUTLET
5 O2 ACTUAL - OUTLET
6 AMMONIA (NH3) STACK GAS
7 CEM SYS IN CALIBRATION
8 CEM SYSTEM TROUBLE
9 AMBIENT TEMPERATURE
10 DEW POINT TEMPERATURE
11 RELATIVE HUMIDITY
12 FUEL GAS FLOW FROM FG COMP

HH:MM:SS	1 AI1425B PPMVD AVG	2 AI1425D PPMVD AVG	3 AI1427B PPMVD AVG	4 AI1427D PPMVD AVG	5 AI1426B PCT VD AVG	6 AT1424 PPMVD AVG	7 XSI435 CALIB	8 XAI429 NORMAL	9 TT1002A DEGF AVG	10 TT1002B DEGF AVG	11 MT1002 PCT AVG	12 FI2712 MSCFH AVG
05:30:00	3.3	3.7	20.5	23.4	15.66	9.2	NORMAL	NORMAL	45.0	37.8	75.1	369.5
05:45:00	3.2	3.6	20.8	23.8	15.67	9.2	NORMAL	NORMAL	44.4	37.7	76.5	368.0
06:00:00	3.2	3.7	20.5	23.5	15.68	9.4	NORMAL	NORMAL	44.9	37.7	74.8	367.8
06:15:00	3.2	3.7	21.3	24.4	15.70	9.6	NORMAL	NORMAL	44.2	37.2	75.6	368.3
06:30:00	3.2	3.6	22.2	25.5	15.69	9.5	NORMAL	NORMAL	43.2	37.6	79.8	368.9
06:45:00	3.1	3.6	23.4	26.8	15.70	9.2	NORMAL	NORMAL	42.1	38.2	84.9	369.2
07:00:00	3.5	4.0	18.7	21.7	15.70	8.8	NORMAL	NORMAL	41.4	37.8	85.9	370.7
07:15:00	11.4	7.8	18.3	10.2	3.73	14.1	CALIB	NORMAL	40.8	37.1	85.3	371.4
07:30:00	25.2	9.3	30.1	50.3	13.13	29.6	NORMAL	NORMAL	41.0	37.2	85.1	370.7
07:45:00	3.7	4.2	15.8	17.3	15.66	5.6	NORMAL	NORMAL	40.5	36.1	83.2	370.5
08:00:00	3.7	4.0	16.7	18.3	15.49	6.2	NORMAL	NORMAL	40.2	35.9	83.4	370.7
08:15:00	3.7	4.0	16.6	18.1	15.47	5.9	NORMAL	NORMAL	40.4	35.7	82.1	371.1
08:30:00	3.7	4.1	16.7	18.3	15.49	5.8	NORMAL	NORMAL	40.6	35.4	80.6	370.8
08:45:00	3.7	4.1	17.4	19.1	15.50	6.0	NORMAL	NORMAL	41.2	36.1	80.6	370.6
09:00:00	3.8	4.2	17.5	19.3	15.50	6.3	NORMAL	NORMAL	43.4	35.9	73.9	369.0
09:15:00	4.0	4.4	15.7	17.3	15.50	6.4	NORMAL	NORMAL	45.0	36.0	69.9	370.4
09:30:00	4.0	4.4	14.7	16.3	15.52	6.3	NORMAL	NORMAL	45.5	35.5	67.1	369.3
09:45:00	4.0	4.4	14.5	15.9	15.50	6.3	NORMAL	NORMAL	46.0	35.8	66.7	370.5
10:00:00	4.0	4.4	14.3	15.7	15.51	6.4	NORMAL	NORMAL	47.0	35.4	63.4	370.0
10:15:00	4.1	4.5	13.7	15.1	15.53	6.6	NORMAL	NORMAL	47.5	35.0	61.2	369.1
10:30:00	4.1	4.6	14.0	15.5	15.54	6.7	NORMAL	NORMAL	47.6	34.2	59.1	369.0
10:45:00	4.3	4.7	13.7	15.2	15.52	6.5	NORMAL	NORMAL	49.4	34.9	56.8	371.3
11:00:00	4.2	4.6	14.9	16.4	15.53	6.4	NORMAL	NORMAL	50.2	34.5	54.3	371.3
11:15:00	4.1	4.5	15.0	16.6	15.55	5.9	NORMAL	NORMAL	49.9	34.6	55.2	369.8
11:30:00	4.0	4.4	15.7	17.4	15.56	5.4	NORMAL	NORMAL	48.3	34.7	58.5	368.7
11:45:00	4.1	4.5	15.3	17.0	15.54	4.9	NORMAL	NORMAL	48.1	34.5	58.6	368.4
12:00:00	4.1	4.5	14.4	15.9	15.50	4.7	NORMAL	NORMAL	48.6	34.7	58.0	369.1
12:15:00	4.2	4.6	14.3	15.7	15.49	5.0	NORMAL	NORMAL	49.2	34.3	55.7	371.2
12:30:00	4.2	4.6	14.6	15.9	15.47	5.0	NORMAL	NORMAL	49.3	33.7	54.1	371.3
12:45:00	4.2	4.5	14.9	16.4	15.48	5.0	NORMAL	NORMAL	48.3	33.9	56.3	371.8
13:00:00	4.2	4.6	15.0	16.4	15.48	5.2	NORMAL	NORMAL	48.0	34.2	58.1	374.7
13:15:00	4.6	4.9	13.5	14.8	15.45	4.8	NORMAL	NORMAL	49.0	33.7	54.9	374.8
13:30:00	4.4	4.9	13.9	15.2	15.47	4.5	NORMAL	NORMAL	50.2	33.8	52.7	375.2
13:45:00	4.3	4.7	14.6	16.1	15.48	3.9	NORMAL	NORMAL	48.8	34.8	57.7	374.1
14:00:00	4.2	4.6	14.2	15.5	15.48	3.8	NORMAL	NORMAL	48.2	34.5	58.4	370.8
14:15:00	4.2	4.6	14.6	15.9	15.45	3.7	NORMAL	NORMAL	48.7	33.9	56.0	372.3
14:30:00	4.3	4.6	15.0	16.3	15.43	3.7	NORMAL	NORMAL	49.3	34.9	56.8	375.0
14:45:00	4.2	4.6	15.7	17.1	15.45	3.6	NORMAL	NORMAL	48.2	34.5	58.3	375.8
15:00:00	4.4	4.5	16.0	17.5	15.46	3.2	NORMAL	NORMAL	47.6	35.0	61.0	373.4
15:15:00	4.0	4.4	15.5	17.1	15.50	2.9	NORMAL	NORMAL	47.3	35.5	62.9	369.3
15:30:00	3.9	4.3	16.4	18.1	15.51	2.6	NORMAL	NORMAL	46.5	35.5	64.7	369.5
15:45:00	3.9	4.3	16.0	17.6	15.51	2.5	NORMAL	NORMAL	46.4	35.4	64.7	369.1
16:00:00	4.0	4.3	16.0	17.6	15.50	2.6	NORMAL	NORMAL	46.6	35.1	63.6	369.1
16:15:00	3.9	4.3	16.7	18.2	15.50	2.7	NORMAL	NORMAL	46.1	35.0	64.5	370.0
16:30:00	4.0	4.4	17.5	19.3	15.51	2.8	NORMAL	NORMAL	45.7	35.0	65.5	369.7
16:45:00	4.1	4.5	17.6	19.4	15.51	2.8	NORMAL	NORMAL	45.7	35.1	65.9	370.2
17:00:00	4.1	4.5	16.0	17.7	15.51	2.4	NORMAL	NORMAL	45.6	34.9	66.5	369.8

4 5 6 7 8 9

RAW DATA

COMPANY : Destec CHALK CLIFFS
UNIT : MAIN STACK Destack
DATE : 12-15-92
REPORT : 100 - 288

Method 5
RUN 1A

ON-SITE DATA

Sec 1B

		RUN TIME	#1	#2	#3
Vm	Dry sampled gas volume, dcf		254.38		
Y	Meter calibration factor (met#_____)				
Pbar	Barometric Pressure, "Hg		28.98		
Pstatic	Stack static pressure, "Hg				
ΔH	Differential meter pressure, "H2O				
Tm	Meter temperature, °F				

15.8% H2O

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H2O	888.7	619.9	268.8		Silica Gel		829.7	805.7	24.0
H2O	837.0	612.0	225.0						
KO	875.3	501.5	373.8						
KO	882.1	493.7	388.4						
KO	582.8	483.0	99.8						
Silica Gel	915.1	860.7	54.4						
									1434.2

V lc volume of H2O, gms

		RUN	#1	#2	#3
CO2	% Dry Volume				
O2	% Dry Volume				
N2	% Dry Volume				
Cp	Pitot tube coefficient (Pit#_____)		.84		
ΔP	Avg P, "H2O				
Ts	Stack temperature, °F				
As	Stack area, sq. ft.				
Ds	Stack diameter, inches		132		
Dn	Nozzle diameter, inches		.188		
Dur	Sampling time, min		1440 min		
% Iso	Mini iso				

Filter # 392
Filter tare weights, gms .6168

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

COMPANY : DESTEC
UNIT : DESTEL TURBINE / chalk Cliff
DATE : 12-16-92
REPORT : 100-288

Method 5
RUN 1B

ON-SITE DATA

		RUN	#1	#2	#3
		TIME	1549-1615		
Vm	Dry sampled gas volume, dcf		721.08		
Y	Meter calibration factor (met# 1002)		.989699		
Pbar	Barometric Pressure, "Hg		29.00		
Pstatic	Stack static pressure, "Hg		-0.50		
ΔH	Differential meter pressure, "H2O		0.40		
Tm	Meter temperature, °F		55		

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H2O	987.4	604.1	383.3		Silica Gel		833.6	833.5	0.1
H2O	975.8	584.2	391.6						
KO	979.4	525.0	454.4						
KO	758.9	501.2	256.8						
KO	488.9	496.0	-8.0						
silica gel	863.6	805.6	58.0				CINEWASH 49.5		
									1486.7
V lc	volume of H2O, gms								

		RUN	#1	#2	#3
CO2	% Dry Volume		3.1	Total Vlc	2920.9
O2	% Dry Volume		15.5		
N2	% Dry Volume		81.4		
Cp	Pitot tube coefficient (Pit# 126-1)		.836		
ΔP	Avg P, "H2O		1.104		
Ts	Stack temperature, °F		271		
As	Stack area, sq. ft.		9503		
Ds	Stack diameter, inches		132		
Dn	Nozzle diameter, inches		.188		
Dur	Sampling time, min		1440		
% Iso	Mini iso		100.24		

Filter # 392
Filter tare weights, gms .61168

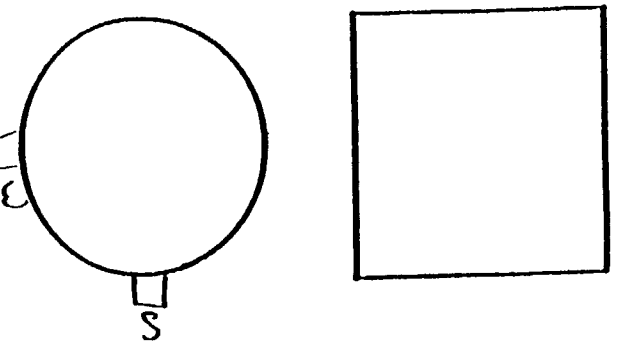
Vel = 69.7
ACFM = 197448
SCFM = 273685

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____ DSCFM = 229895
# of points, total _____
Overall (inches)_____ Coupling _____

VELOCITY TRAVERSE

COMPANY : DESTEC
UNIT : MAIN STACK
DATE : 12-15-92
REPORT : 100-288
RUN # : 1
PUMP # : GAST
METER BOX# : 1004
METER coeff. : .989699
PITOT TUBE# :

TOTAL :
COUPLING :
DIAMETER :
AREA :
Cp :



TRAVERSE POINTS w/o	TRAVERSE POINTS w/coup	no.	WEST Ts (°F)	ΔP	Ts (°F)	ΔP
		12	273	1.1	273	1.0
		11	273	1.1	273	1.1
		10	273	1.1	272	1.0
		9	273	1.10	272	1.0
		8	272	.80	272	.85
		7	272	.75	272	.80
		6	272	.80	272	.80
		5	271	1.0	272	1.0
		4	271	1.0	272	1.0
		3	271	1.1	272	1.0
		2	271	1.2	272	1.1
		1	271	1.2	272	1.1

VELOCITY DATA

Rated Total MMBTU/hr

$\overline{\Delta P}$
$\overline{Ts}$ 270
Static -0.50
Pbar 28.98
MW(wet) 27.5
%H2O 9
%O2
F_{60}

Vel=
DSCFM=
MMBTU/hr=
%Thr=

Additional Data:

N_{02} : .188

METHOD RUN # 1

COMPANY: DESTEC
UNIT: MAIN STACK
DATE: 12-15-92
REPORT: 100-288
TECH: BDM
PUMP #: LAST
METER BOX #: 1002
METER Coeff: .989688 (25)
PITOT TUBE #:

PRE / POST TEST LEAK CHECK
LEAK RATE: 0.002 / .000 cfm
VACUUM: 10 / 5 "Hg

AMBIENT TEMP, °F: 43
Pbar: 28.98
STATIC PRESSURE("Hg): - .50
ASSUMED MOISTURE, %: 10.
MW WET 27.5
AVG. CALIB. NOZZLE DIAM("): .188
PROBE LINER MATERIAL: QUARTZ
FILTER #:
DUCT DIAM ("): 132

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H20	PRESSURE DIFFERENTIAL ΔH rate "H20	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	OUTLET, °F	FILTER HOLDER TEMP °F Probe	Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPINGER °F
12	1547	2	272	1.10	0.489	0.39	638.50	45	45	261	251	
11	1647	2	267	1.15	0.504	0.41	667.8	49	45	261	250	
10	1747	2	269	1.20	0.520	0.43	698.0	55	50	256	250	
9	1847	2	263	1.0	0.478	0.37	729.3	58	54	249	249	
8	1947	2	269	1.0	.470	0.37	757.9	48	48	241	248	
7	2047	2	270	0.9	.443	0.33	786.2	46	44	249	249	
6	2147	2	268	.95	.464	0.35	817.7	56	51	245	247	
5	2247	2	268	1.0	.475	0.37	840.6	54	51	245	246	
4	2347	3	268	1.1	.500	0.40	869.1	56	54	245	249	
3	47	3	268	1.25	.534	0.45	899.1	57	55	243	250	
2	147	3	266	1.25	.526	0.44	931.1	46	48	245	247	
1	247	3	264	1.15	.503	0.41	962.7	46	44	246	248	
EOT	347						992.88					
							997.945	} Leak Check				
							993.59					
AVERAGE					CF	354.38						

28.32

METHOD 5 RUN # 1 cont

COMPANY: Destec
UNIT: MAIN STACK
DATE: 12-16-92
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1002 (.85)
METER coeff: .989699
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .009 / .005 cfm
VACUUM: 11 / 5 "Hg

AMBIENT TEMP, °F: 40°
P'bar: 28.98
STATIC PRESSURE("Hg): -.50
ASSUMED MOISTURE, %: 15%
27.5
AVG. CALIB. NOZZLE DIAM("): .188
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 132

TRAVERSE PT. NUMBER	TIME (c) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPIGER °F
							993.59	51	51	249	250	
12	4:15	2	273	1.55	.587	0.53	28.8	53	51	246	249	
11	5:15	2	273	1.50	.579	0.52	63.6	50	48	250	248	
10	6:15	2	270	1.55	.586	0.54	96.7	57	57	259	255	
9	7:15	2	267	1.115	.577	0.51	133.3	63	56	258	255	
8	8:15	2	268	1.15	.516	0.42	164.3	67	61	257	254	
OUT 7	9:15	2	272	.95	.472	0.36	192.6	66	63	249	253	
6	10:15	2	272	.82	.439	0.31	219.0	66	62	248	253	
5	11:15	2	274	.85	.446	0.32	245.8	59	57	249	253	
4	12:15	2	283	.87	.443	0.32	272.5	63	57	250	255	
3	13:15	2	280	.99	.475	0.36	301.1	64	60	249	253	
2	14:15	2	282	1.05	.491	0.38	331.7	79	68	251	256	
1	15:15	2	276	.94	.477	0.36	360.290					
END	16:15						Vi= 721.08					
							SD= 100.24					
AVERAGE	1440		271	1.104		0.40	VF= 72.30		55			

721.08 354.58 1st 2nd 366.70

COMPANY : Dytec
UNIT : Unit 1
DATE : 12/10, 11/93
REPORT : 100-284

Method 5
2A

ON-SITE DATA

See 2B

		RUN TIME	#1	#2	#3
Vm	Dry sampled gas volume, dcf				
Y	Meter calibration factor (met#_____)				
Pbar	Barometric Pressure, "Hg				
Pstatic	Stack static pressure, "Hg				
ΔH	Differential meter pressure, "H2O				
Tm	Meter temperature, °F				

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	974.6	591.1	383.5		Silica		740.0	740.0	0.0
H_2O	953.7	578.7	379.0		GW		99.5	32.0	-67.5
KO	914.4	501.5	412.9						
KO	881.7	492.8	388.9						
H2O	496.3	497.6	-1.3						
Silica	509.9	736.2	73.7						
									1569.2

V lc volume of H2O, gms

		RUN	#1	#2	#3
CO2	% Dry Volume				
O2	% Dry Volume				
N2	% Dry Volume				
Cp	Pitot tube coefficient (Pit#_____)				
ΔP	Avg P, "H2O				
Ts	Stack temperature, °F				
As	Stack area, sq. ft.				
Ds	Stack diameter, inches				
Dn	Nozzle diameter, inches				
Dur	Sampling time, min				
% Iso	Mini iso				

Filter # 390
Filter tare weights, gms .6121

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

COMPANY : DESTEC
UNIT : DESTEC TURBINE CHALKHILL
DATE : 12-16-92
REPORT : 100 - 256

Method 5
2B

ON-SITE DATA

		RUN	#1	#2	#3
		TIME	1719-1742		
Vm	Dry sampled gas volume, dcf		745.56		
Y	Meter calibration factor (met# 1002)		.989699		
Pbar	Barometric Pressure, "Hg		28.98		
Pstatic	Stack static pressure, "Hg		-.5		
ΔH	Differential meter pressure, "H2O		.68		
Tm	Meter temperature, °F		63		

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O #1	1031.5	608.0	423.5	Silica Gel			840.0	839.7	0.3
H_2O #2	889.3	583.6	305.7						
KO	923.1	486.5	436.6						
KO	849.1	472.6	376.5						
KO	505.1	502.6	2.5						
Silicabel	841.5	780.6	60.9	Unknown			<	71.17	-71.1
									1534.9
V lc	volume of H2O, gms								

H/C = 3.76

		RUN	#1	#2	#3
CO2	% Dry Volume		3.1		3104.7
O2	% Dry Volume		15.5		
N2	% Dry Volume		81.4		
Cp	Pitot tube coefficient (Pit# 126-1)		.836		
ΔP	Avg P, "H2O		1.149		
Ts	Stack temperature, °F		273		
As	Stack area, sq. ft.		95.03		
Ds	Stack diameter, inches		132		
Dn	Nozzle diameter, inches		.188		
Dur	Sampling time, min		1440		
% Iso	Mini iso		108		

Filter # 390
Filter tare weights, gms .6121

Vel 71.3
ACFM = 406724
SCFM = 278344

DSCFM = 233805 @ 16% H_2O

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

METHOD 5 RUN # 2

COMPANY: Destec
UNIT: Main Turbine Stack
DATE: 12-16-92
REPORT: 100-288
TECH: DCM/SAH
PUMP #: GAST
METER BOX#: 1002
METER coeff: .989699 (ΔH: .85)
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .003 / (.001 cfm
VACUUM: 11 / 7 "Hg

AMBIENT TEMP, °F: 48°
Pbar: 28.98
STATIC PRESSURE("Hg): -.50
ASSUMED MOISTURE,%: 15%
MWd 27.5
AVG. CALIB. NOZZLE DIAM("): .188
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 132

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
DCM 12	17:15.0	4	287	1.62	0.615	0.90	361.100	68	68	263	250	
11	18:15	5	277	1.65	0.613	0.92	398.0	58	58	262	244	
10	19:15	4	281	1.65	0.610	0.91	434.8	60	54	259	246	
SAH 9	20:15	4	278	1.55	0.602	0.88	471.4	69	62	256	259	
8	21:15	4	277	1.20	0.523	0.69	507.5	58	59	257	262	
7	22:15	4	277	.95	0.4161	0.57	538.9	60	55	249	260	
6	23:15	4	277	.98	0.463	0.56	566.7	58	53	248	260	
5	00:15	4	277	.90	0.4119	0.54	594.5	56	53	247	260	
4	01:15	4	278	.90	0.4147	0.54	621.4	54	51	247	257	
3	02:15	4	278	.95	0.460	0.56	648.3	54	51	248	255	
2	03:15	4	276	1.0	0.474	0.59	675.9	57	53	247	255	
1	04:15	4	271	1.0	0.483	0.60	704.3	62	62	245	254	
EOP	05:15						733.25					
							737.50					
AVERAGE							372.4					

1ST 372.40
2ND 373.26
745.66

METHOD 5 RUN #2 cont.

COMPANY: Destec
UNIT: Main Turbine Stack
DATE: 12·17·92
REPORT: 100·288
TECH: SAH / DCT
PUMP #: GAST
METER BOX#: 1002
METER coeff: .989699 (ΔH: .85)
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: .006 / <.003 cfm
VACUUM: 18 / 8 "Hg

AMBIENT TEMP, °F: 40°
Pbar: 28.98
STATIC PRESSURE("Hg): -.50
ASSUMED MOISTURE, %: 15%
MWw 27.5
AVG. CALIB. NOZZLE DIAM("): .188
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("): 132

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
SAH 12	0542	2	275	1.2	0.527	0.70	733.60	62	62	254	258	
11	0642	2	275	1.2	0.529	0.70	765.1	66	61	255	259	
↓ 10	0742	2	277	1.15	0.518	0.68	796.9	67	62	253	258	
DCT 9	0842	2	279	1.13	0.515	0.67	827.9	71	62	261	260	
8	0942	2	260	1.00	0.500	0.62	858.8	80	74	254	262	
7	1042	2	273	.80	0.435	0.50	888.8	68	66	250	256	
6	1142	2	275	1.02	0.491	0.61	914.9	70	65	249	254	
5	1242	2	260	1.06	0.516	0.65	944.9	82	75	250	252	
4	1342	2	259	1.25	0.551	0.75	975.3	69	69	252	257	
3	1442	2	258	1.23	0.547	0.74	008.3	71	66	249	251	
2	1542	2	262	1.32	0.568	0.78	041.2	74	69	252	251	
1	1642	2	262	1.17	0.525	0.70	075.2	61	62	252	253	
EOT	1742						106.760					
							Vm= 715.56					
							ISO= 100.21					
AVERAGE			273	1.149		0.68	VF= 73.35		63			

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec

Location/Unit: Chalkcliff Turbine

Report: 100-288

Date Tested: 12/16/92

Analyst: DGS

RUN # 1

Probe/Nozzle/Filter Top

Dish # 15			
#1	#2	#3	Average
final (g) 3.7343	3.7346		3.7345
tare (g) 3.7262			3.7262
NET (g)			0.0083

Filter # 392

#1	#2	#3	Average
final (g) 0.6218	0.6195 ✓	0.6193 ✓	0.6194
tare (g) 0.6168			0.6168
NET (g)			0.0026

Condensable (aliquot 1925ml/3850ml)

Dish # 14			
#1	#2	#3	Average
final (g) 3.7252	3.7256		3.7254
tare (g) 3.7210			3.7210
NET (g)			.0044

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec
Location/Unit: Chalk Cliff Turbine

Report: 100-288
Date Tested: 12/16/92
Analyst: DGS

RUN # 2

Probe/Nozzle/Filter Top

Dish # 13			
#1	#2	#3	Average
final (g) 3.7214	3.7218		3.7216
tare (g) 3.7139			3.7139
NET (g)			0.0077

Filter # 390

#1	#2	#3	Average
final (g) 0.6129	0.6125		0.6127
tare (g) 0.6121			0.6121
NET (g)			0.0006

Condensable (aliquot 1835ml/3670ml)

Dish # 16			
#1	#2	#3	Average
final (g) 3.6829	3.6829		3.6829
tare (g) 3.6767			3.6767
NET (g)			0.0062

METHOD ST 1B RUN # 1

COMPANY: Destec
UNIT: MAIN STACK
DATE: 12-16-92
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1002 (.85)
METER coeff: .989699
PITOT TUBE#:

PRE / POST TEST LEAK CHECK
LEAK RATE: .005 / .002 cfm
VACUUM: 11 / 6 "Hg

AMBIENT TEMP, °F: 50°
Pbar: 29.00
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 15%
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("): 132"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H20	PRESSURE DIFFERENTIAL ΔH rate "H20	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
	8:00	2			.50	.65	75.20	52	54			
	:10	2			.50	.65	80.33	55	55			
	:20	2			.50	.65	85.37	56	52			
	8:30						90.40					
							Vol = 15.20		54.0			
							14.78 DSCF					
							CEM = 7.2					
AVERAGE												

METHOD ST 1B RUN # 2

COMPANY: Destec
UNIT: MAIN STACK
DATE: 12-16-92
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1002 (.85)
METER coeff: .989699
PITOT TUBE#:

PRE / POST TEST LEAK CHECK
LEAK RATE: .006 / .005 cfm
VACUUM: 11 / 6 "Hg

AMBIENT TEMP, °F: 48°
Pbar: 29.00
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 15%
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("): 137

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
	8:15	2			.50	.65	90.70	54	54			
	:35	2			.50	.65	95.80	56	52			
	:05	2			.50	.65	100.90	60	52			
	9:15						105.95					
							Vd= 15.25		54.7			
							14.80 DSCF					
							CEM= 7	4				
AVERAGE												

METHOD ST 1B RUN # 3

COMPANY: Destec
UNIT: Main Stack
DATE: 12-16-97
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1007 (.85)
METER coeff: .9891,99
PITOT TUBE#:

PRE / POST TEST LEAK CHECK
LEAK RATE: .027 / .005 cfm
VACUUM: 10 / 5 "Hg

AMBIENT TEMP, °F: 45°
Pbar: 29.00
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%: 15%
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("): 132"

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPIGH °F
	9:30	2			.50	.65	106.20	55	54			
	:40	2			.50	.65	111.25	56	54			
	:50	2			.50	.65	116.30	54	53			
	10:00						121.35					
							(Vol - 15.15)		55.2			
							14.69 DSCF					
							CEM = 7.2					
AVERAGE												

NO CEM DATA

METHOD NH_3 RUN # 4

COMPANY: Destec
UNIT: Main Turbine Stack
DATE: 12-17-92
REPORT: 100-288
TECH: DCS
PUMP #: GAST
METER BOX#: 1002
METER coeff: .989699 (ΔH: .85)
PITOT TUBE#:

PRE / POST TEST LEAK CHECK

LEAK RATE: .004 / <.003 cfm
VACUUM: 5 / 4 "Hg

AMBIENT TEMP, °F: 50°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: SS
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	ΔH "H2O	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
	10:30	2	270		.5	.61	123.000	66	58			
	:40	2	269		.5	.59	128.1	74	61			
	:50	2	273		.5	.61	133.0	75	62			
	11:00	2	274		.5	.60	138.025	80	66			
	EOT						Vm= 15.03					
			271.50		.5	.60			67.75			
							14.18 DSCF					
AVERAGE												

METHOD ST 1B RUN # 4

COMPANY: Dester
UNIT: Main Turbine Stack
DATE: 12·18·92
REPORT: 100-288
TECH: DCS
PUMP #: GAST
METER BOX#: 1004
METER coeff: 1.019573 (ΔH: 1.08)
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: ≤.005 / ≤ .001 cfm
VACUUM: 10 / 5 "Hg

AMBIENT TEMP, °F: 45°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE, %:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	9:15.0	2	271		.5	.35	107.3	53	53			
2	25	2	271		.5	.30		55	53			
3	35	2	271		.5	.35		55	53			
EOI	9:45.0	2	270		.5	.40	122.360	55	53			
						.35	Vm: 15.06					
									53.75			
							Um: 14.62 DSCF					
AVERAGE												

METHOD ST 1B RUN # 7

COMPANY: Dester
UNIT: Main Turbine Stack
DATE: 12-18-92
REPORT: 100-288
TECH: TXT
PUMP #: GAST
METER BOX#: 1004
METER coeff: 1.019573
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK
LEAK RATE: <.003 / <.003 cfm
VACUUM: 12 / 6 "Hg

AMBIENT TEMP, °F: 45°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE, %:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: Quartz
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	PRESSURE DIFFERENTIAL ΔH "H2O ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	14:00.0	2	280		.5	.40	196.200	65	64	268	257	
2	10	2	279		.5	.40	201.3	66	63	241	261	
3	20	2	280		.5	.39	206.3	67	64	244	259	
EOT	14:30.0	2	280		.5	.38	211.460	66	65	240	257	
							Vm: 15.26					
						.39			65			
							Vm = 14.94					
AVERAGE												

METHOD ST 1B RUN #6

COMPANY: Dynegy
UNIT: Main Turbine Stack
DATE: 12-18-92
REPORT: 100-288
TECH: DCT
PUMP #: GAST
METER BOX#: 10014
METER coeff: 1.019573
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: <.005 / <.004 cfm
VACUUM: 10 / 7 "Hg

AMBIENT TEMP, °F: 50°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: QTZ
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	ΔH "H2O	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	13:15.0	2	279		.5	.37	179.900	64	64	258	258	
2	25	2	278		.5	.35	184.8	69	64	264	258	
3	35	2	279		.5	.40	189.9	66	65	256	254	
EOT	13:45.0	2	279		.5	.38	194.940	65	65	258	254	
							Vm: 15.04					
						.38	14.72		65.3			
AVERAGE												

METHOD ST 1B RUN # B 5

COMPANY: Destec
UNIT: Main Turbine Stack
DATE: 12.18.92
REPORT: 100-288
TECH: DCJ
PUMP #: GAST
METER BOX#: 1004
METER coeff: 1.019573 (ΔH: 1.08)
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE:	<.003	<.003	cfm
VACUUM:	10	7	"Hg

AMBIENT TEMP, °F: 45°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE, %:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: Qtz
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	12:30.0	2	280		.5	.38	164.100	66	66	253	245	
2	40	2	281		.5	.38	169.1	66	64	245	245	
3	50	2	280		.5	.38	174.2	65	64	240	241	
EOT	13:00.0	2	280		.5	.38	179.180	64	64	245	254	
							VM: 15.080					
						.38						
							14.77 dscf		64.9			
AVERAGE												

METHOD ST 1B RUN #9.8

COMPANY: Destec
UNIT: Main Turbine Stack
DATE: 12·18·92
REPORT: 100·288
TECH: DJT
PUMP #: GAST
METER BOX#: 1004
METER coeff: 1.019573
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: <.004 / .012 cfm
VACUUM: 12 / 7 "Hg

AMBIENT TEMP, °F: 45°
Pbar: 28.98
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	14:45.0	2	280		.5	.40	212.200	64	64	270	256	
2	55	2	280		.5	.36	217.2	64	63	257	256	
3	15:05.0	2	280		.5	.35	222.3	64	62	250	254	
EOT	15:15.0	2	280		.5	.35	227.325	63	62	250	255	
						.37	Vm: 15.125		63.25			
							Umeter= 14.86					
AVERAGE												

-100-

Petro Chem Environmental Services, Inc.

METHOD ST 1B RUN # 1 of 9

COMPANY: Deslec
UNIT: Main Turbine Stack
DATE: 12.15.92
REPORT: 100-288
TECH: DCT
PUMP #: CAST
METER BOX#: 1004
METER coeff: 1.019573 (ΔH: 1.08)
PITOT TUBE#: .84

PRE / POST TEST LEAK CHECK

LEAK RATE: <.003 / <.003 cfm
VACUUM: 12 / 6 "Hg

AMBIENT TEMP, °F: 45°
Pbar: 28.95
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL: Qtz.
FILTER #:
DUCT DIAM ("):

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
1	16:00.0	2	280		.5	.40	229.900	61	61	271	260	
2	10	2	280		.5	.38	234.9	61	61	272	257	
3	20	2	278		.5	.40	240.0	65	60	268	256	
EOT	16:30.0	2	278		.5	.39	244.930	68	61	260	256	
						.39	VM: 15.03		62			
						DSCF ~ 14.81						
AVERAGE												

LABORATORY ANALYSIS

EPA METHOD 350.3 - AMMONIA ANALYSIS

Company: Destec

Location/Unit: Cheek cliff

Report: 100-288

Date Tested: 12/15-18/92

Analyst: DGS

Standardization:

mg/L NH_4Cl	mV	Slope
0.1	99.0	
		69.5
1.0	29.5	
		60.4
10.0	-30.9	
		59.4
100.0	-90.3	

Sample #	mV	N mg/l	df	N mg/l	NH_3 mg/l	Sample vol.	T. mg
12/17 System Blank	106.3	2.1	—			357 ml	
12/16 1	-10.4	~~4.0~~ 4.7	—	4.7	5.71	445 ml	2.5
12/16 2	-9.6	4.6	—	4.6	5.58	475 ml	2.7
12/16 3	-8.5	4.3	—	4.3	5.22	475 ml	2.5
~~12/17 4~~	~~-12.9~~	~~5.4~~	~~—~~	~~5.4~~	~~6.56~~	~~425 ml~~	~~2.8~~ *
12/18 4	-1.1	3.2	—	3.2	3.88	360 ml	1.4
12/18 5	-4.6	3.7	—	3.7	4.49	439 ml	2.0
12/18 6	-6.4	4.0	—	4.0	4.86	449 ml	2.2

* NOT USED, NO CEM DATA

LABORATORY ANALYSIS

EPA METHOD 350.3 - AMMONIA ANALYSIS

Company: Destec

Location/Unit: Chalk cliff

Report: 100-288

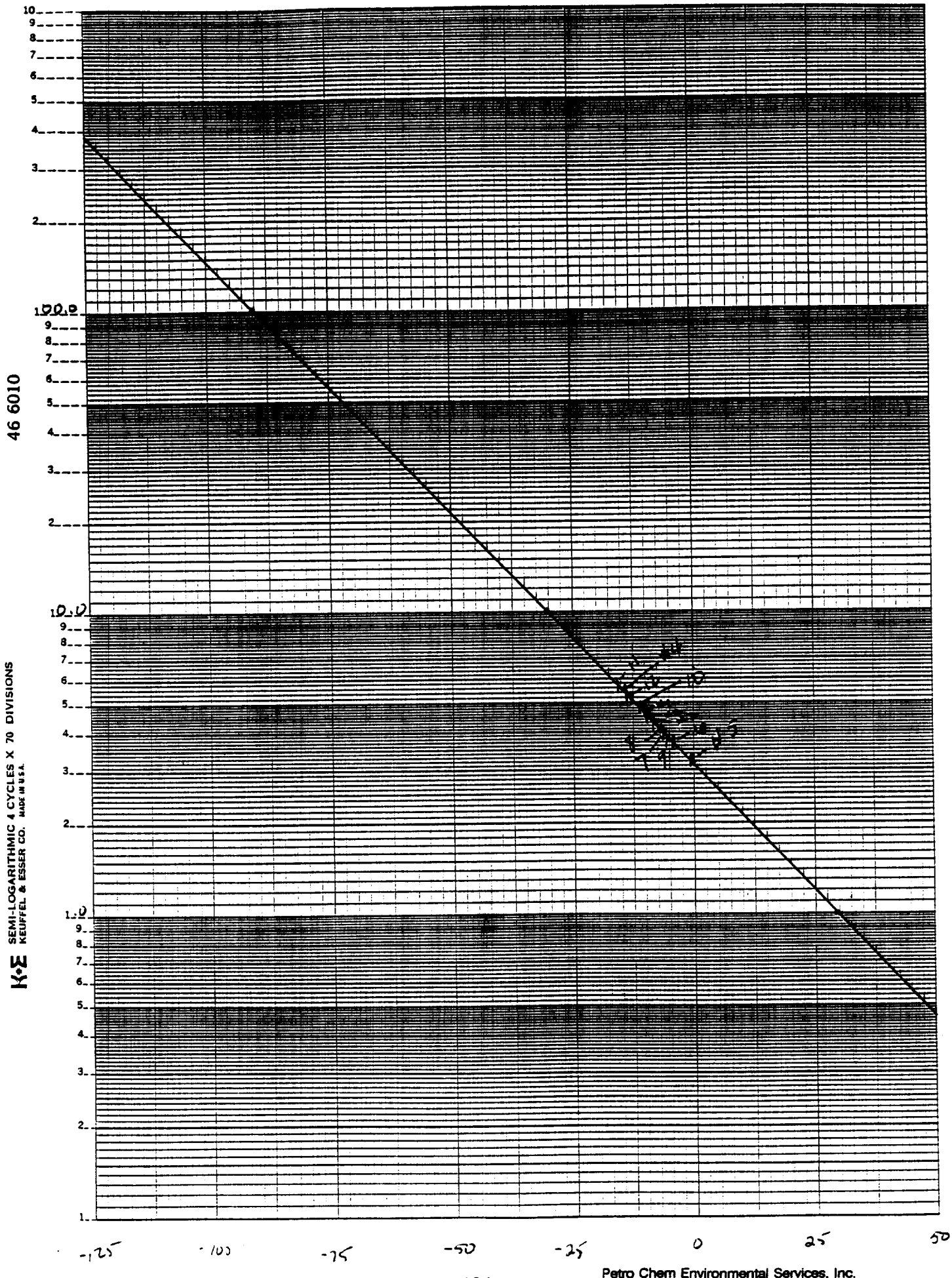
Date Tested: 12/15-18/92

Analyst: PGS

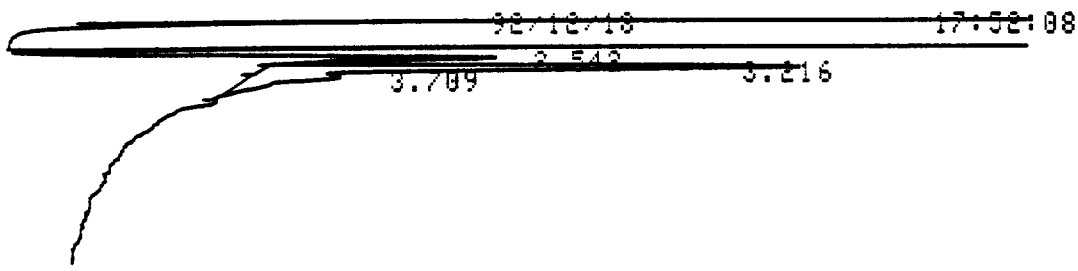
Standardization:

mg/L NH_4Cl	mV	Slope
0.1		
1.0		
10.0		
100.0		

Sample #	mV	N mg/l	df	N mg/l	NH_3 mg/l	Sample vol.	T. mg
8 7	-7.1	4.1	—	4.1	4.98	417ml	2.1
9 8	-5.8	~~5.8~~ 3.8	—	3.8	4.61	365ml	1.7
10 9	-11.5	4.8	—	4.8	5.83	365ml	2.1


46 6010
K+E SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
100.0
10.0
1.0
-125
-100
-75
-50
-25
0
25
50

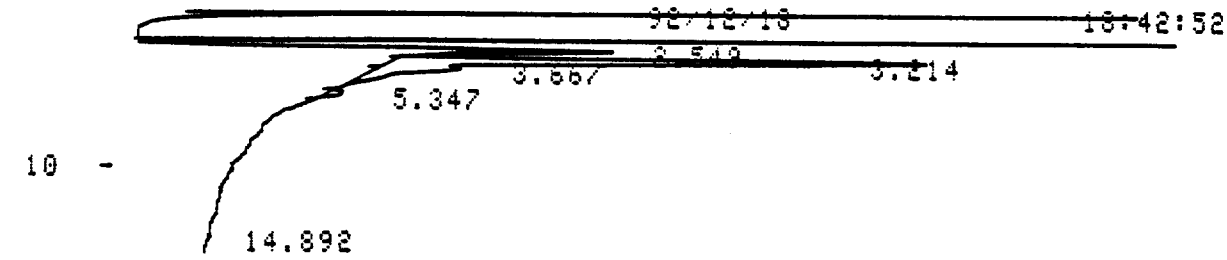
WZI/CHALK CLIFF
12-16-92 REPORT # 100-228
HC SAMPLE # 1



CHROMATOGRAM 14 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.542	8305	C6+	0.18		
2	3.216	43890	C1	1	~~197.0468~~ C-1	6.18
3	3.709	13549	C2	2	~~30.6936~~ C-2	0.98
	TOTAL	65744			227.7404	

WZI/CHALK CLIFF
12-16-92 REPORT # 100-228
HC SAMPLE # 2

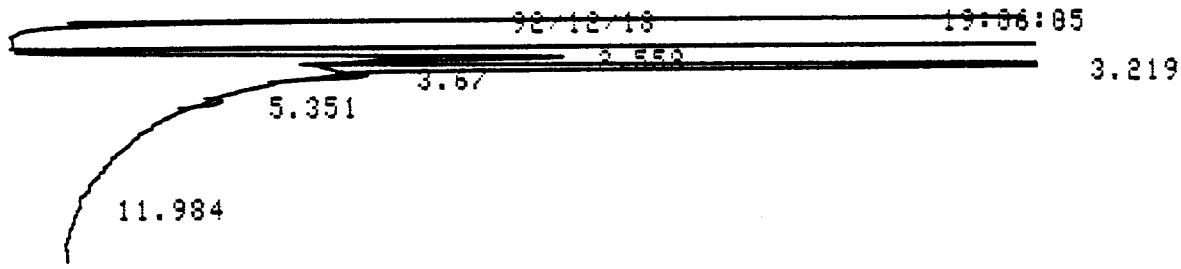


CHROMATOGRAM 15 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.549	8572	C6+	0.19		
2	3.214	43986	C1	1	~~197.477 0.1~~	
3	3.667	11008	VC2	0.80		
4	5.347	1375	C3	0.07		
	TOTAL	64940			197.477	

6.20

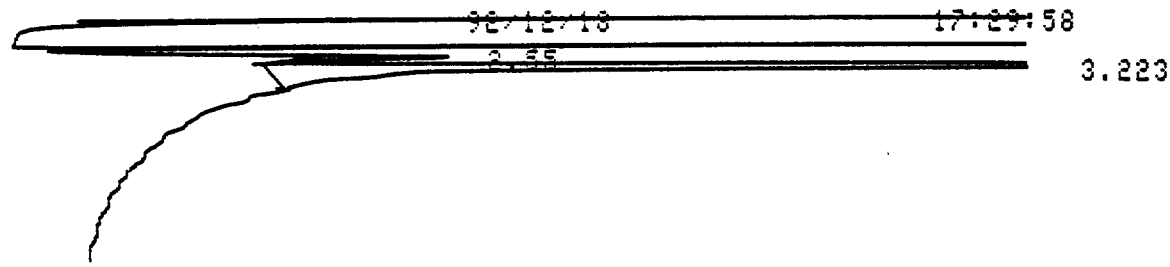
WZI/CHALK CLIFF
12-16-92 REPORT # 100-228
HC SAMPLE # 3



CHROMATOGRAM 16 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.558	9914	C6+	0.22		
2	3.219	66736	C1	1	~~299.6148~~ 9.40	
3	3.67	3075	C_2	0.22		
4	5.351	1348	C_3	~~0.06~~ 0.06		
	TOTAL	81074			299.6148	

WZI/CHALK CLIFF
12-16-92 REPORT # 100-228
HC SAMPLE BLANK



CHROMATOGRAM 13 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.55	7769	C6+		0.17	
2	3.223	121852	C1	1	~~547.0607~~ ~~0.1~~	~~17.16~~ 17.17
	TOTAL	129621			547.0607	

COMPANY : Destec
UNIT : Chalk Cliffs Vent A
DATE : 12/18/92
REPORT : 100-288

John
Train A
Vent Stack A, Control Room

ON-SITE DATA

		RUN	#1	#2	#3
		TIME	1055-1135	1152-1232	
Vm	Dry sampled gas volume, dcf		24.00	24.05	
Y	Meter calibration factor (met# 1001)		1.005776	1.005776	
Pbar	Barometric Pressure, "Hg		28.98	28.98	
Pstatic	Stack static pressure, "Hg		0.0	0.0	
ΔH	Differential meter pressure, "H2O		.83	.88	
Tm	Meter temperature, °F		53	59	

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	658.5	592.9	65.6	654.6	633.2	21.4			
H_2O	587.5	581.5	-6.0	631.8	589.3	42.5			
KO	477.2	477.2	0.0	493.7	494.5	-0.8			
Silica Gel	790.8	786.9	3.9	718.2	714.4	3.8			
Lime Wash	110.5	37.9	-72.6	103.1	37.4	-65.7			
V lc	volume of H2O, gms		2.9			1.2			

		RUN	#1	#2	#3
CO2	% Dry Volume		0	0	
O2	% Dry Volume		20.9	20.9	
N2	% Dry Volume				
Cp	Pitot tube coefficient (Pit#)				
~~ΔP~~	~~Avg P, "H2O~~ FPM		1475	1700	
Ts	Stack temperature, °F		72	76	
As	Stack area, sq. ft.				
Ds	Stack diameter, inches		1.25	1.25	
Dn	Nozzle diameter, inches				
Dur	Sampling time, min		40	40	
% Iso	Mini iso				
	Filter #				
	Filter tare weights, gms				

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

METHOD 1-4 RUN # 1

COMPANY: DESTEC
UNIT: LOBE OIL UNIT A
DATE: 12-18-92
REPORT: 100-280
TECH: JH
PUMP #: GAST
METER BOX#: 1001
METER coeff: 1.005976
PITOT TUBE#: DH@.88

PRE / POST TEST LEAK CHECK

LEAK RATE:	.014	.012	cfm
VACUUM:	10 "Hg	10	"Hg

AMBIENT TEMP, °F: 57°
Pbar:
STATIC PRESSURE("Hg): —
ASSUMED MOISTURE, %: —
AVG. CALIB. NOZZLE DIAM("): —
PROBE LINER MATERIAL: SS
FILTER #: —
DUCT DIAM ("): 1.25

FT/MIN

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate	PRESSURE DIFFERENTIAL ΔH "H2O ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPIGN °F
0	10:55	4	72°	1480	.6	.83	75.8	49	55			58
5	11:00	4			.6	.83	78.8	49	59			58
10	11:05	4			.6	.83	81.8	49	60			58
15	11:10	4	H/C sample		.6	.81	84.8	49	57			58
20	11:15	4	2 LITERS OUT		.6	.83	87.8	48	59			58
25	11:20	4			.6	.83	90.8	48	55			58
30	11:25	4			.6	.84	93.8	48	55			58
35	11:30	4			.6	.84	96.8	48	56			58
40	11:35		71°	1470			99.8					
			72	1475		.83	201		53			
AVERAGE												

METHOD 1-4 RUN # 2

COMPANY: DESTEC
UNIT: LUBE OIL VENTA
DATE: 12-18-92
REPORT: 100-288
TECH: JH
PUMP #: 6AST
METER BOX#: 1001
METER coeff: 1.005776
PITOT TUBE#: DHS 88

(PRE) / POST TEST LEAK CHECK

LEAK RATE:	.016	.005	cfm
VACUUM:	10	5	"Hg

AMBIENT TEMP, °F: 57°
Pbar:
STATIC PRESSURE("Hg): —
ASSUMED MOISTURE,%: —
AVG. CALIB. NOZZLE DIAM("): —
PROBE LINER MATERIAL: SS
FILTER #:
DUCT DIAM ("): 1.25

FT /IN II)

TRAVERSE PT. NUMBER	TIME (e) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPIGR °F
0	11:52	3	74°	1650	.6	.89	100.555	49	52	/	/	60
5	1157	3			.6	.89	103.6	50	61	/	/	60
10	1202	3			.6	.89	106.6	52	66	/	/	60
15	1207	3			.6	.89	109.6	52	66	/	/	60
20	1212	3	11/Sample		.6	.82	112.6	53	66	/	/	61
25	1217	3	2 LITERS	OUT	.6	.89	115.6	54	69	/	/	61
30	1222	3			.6	.89	118.6	56	69	/	/	61
35	1227	3			.6	.89	121.6	58	71	/	/	61
40	1232		78°	1720			124.6					61
			76	1700		.88	24.05'		59			
AVERAGE												

LABORATORY ANALYSIS
EPA METHOD 5 - ORGANIC ANALYSIS

COMPANY: Destec REPORT: 100-288

LOCATION/UNIT: Lube O.I Vent "A" DATE TESTED: 12/18/92

ANALYST: DGS

SAMPLE # 1 aliquot - 216 ml

TIN # 1			
# 1	# 2	# 3	AVERAGE
final (g) 1.59075	final (g) 1.59080	final (g) 1.59078	1.59079
tare (g) 1.58530	tare (g)	tare (g)	1.58530
NET (g)	NET (g)	NET (g)	0.00549

SAMPLE # 2 aliquot - 208 ml

TIN # 2			
# 1	# 2	# 3	AVERAGE
final (g) 1.58604	final (g) 1.58605	final (g)	1.58605
tare (g) 1.58182	tare (g)	tare (g)	1.58182
NET (g)	NET (g)	NET (g)	0.00423

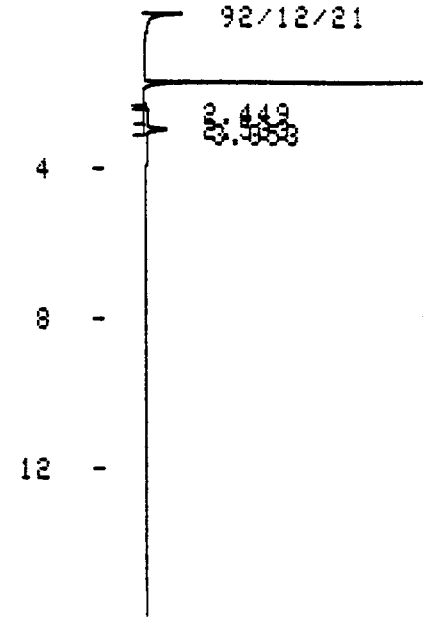
SAMPLE # _____ aliquot - _____

TIN #			
# 1	# 2	# 3	AVERAGE
final (g)	final (g)	final (g)	
tare (g)	tare (g)	tare (g)	
NET (g)	NET (g)	NET (g)	

SAMPLE # _____ aliquot - _____

TIN #			
# 1	# 2	# 3	AVERAGE
final (g)	final (g)	final (g)	
tare (g)	tare (g)	tare (g)	
NET (g)	NET (g)	NET (g)	

DESTEC UNIT: LUBE OIL VENT "A"
12-18-92 REPORT # 100-288
HC SAMPLE # 1

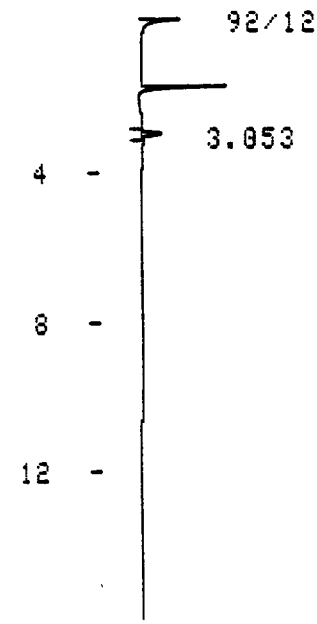


CHROMATOGRAM 11 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.449	55				
2	2.533	358	V			
3	3.053	906		1	5.0153	C-1
	TOTAL	1319			5.0153	

GROUP(NAME)	CONC
C-1	5.0153
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	0

DESTEC UNIT: LUBE OIL VENT "A"
12-18-92 REPORT # 100-288
HC SAMPLE # 2



CHROMATOGRAM 12 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	3.053	885		1	4.9001	C-1
	TOTAL	885			4.9001	

GROUP(NAME)	CONC
C-1	4.9001
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	0

COMPANY : Dedec Chalk Cliff
UNIT : Vent A
DATE : 12/18/92
REPORT : 100-288

Vent B
Scotty

ON-SITE DATA

		RUN	#1	#2	#3
		TIME	1128-1208	1215-1255	
Vm	Dry sampled gas volume, dcf		24.03	24.01	
Y	Meter calibration factor (met# 1002)		.989699	.989699	
Pbar	Barometric Pressure, "Hg		28.98	28.98	
Pstatic	Stack static pressure, "Hg		0	0	
ΔH	Differential meter pressure, "H2O		.83	.83	
Tm	Meter temperature, °F		59	56	

	RUN 1			RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	652.5	553.2	99.3	713.2	607.7	105.5			
H_2O	571.9	571.6	0.3	594.1	593.3	0.8			
Dry	502.0	502.0	0.0	476.4	477.1	-0.7			
Silica	846.8	844.7	2.1	733.6	731.1	2.5			
LW			-96.7			-101.6			
V lc	volume of H2O, gms		5.0			6.5			

		RUN	#1	#2	#3
CO2	% Dry Volume		0	0	
O2	% Dry Volume		20.9	20.9	
N2	% Dry Volume		/	/	
Cp	Pitot tube coefficient (Pit#)		/	/	
ΔP	~~Avg P, "H2O~~ FPM		1627	1623	
Ts	Stack temperature, °F		160	158	
As	Stack area, sq. ft.		/	/	
Ds	Stack diameter, inches		7.50	7.50	
Dn	Nozzle diameter, inches		/	/	
Dur	Sampling time, min		40	40	
% Iso	Mini iso				

Filter # / / /
Filter tare weights, gms / /

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

METHOD 4 RUN # 1

COMPANY: Destec
UNIT: LUBE Oil Vent 73
DATE: 12-18-92
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1002 (.85)
METER coeff: .989699
PITOT TUBE#: Vebeicak

PRE / ~~POST~~ TEST LEAK CHECK
LEAK RATE: .009 / .008 cfm
VACUUM: 11 / 5 "Hg

AMBIENT TEMP, °F: 50°
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE, %:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("):

F/m

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPIGR °F
6	11:28	2	161	1710	.160	.83	188.70	57	59			
5	:38	2	162	1720	.160	.83	194.69	61	58			
4	:48	2	167	1630	.160	.83	200.70	61	57			
3	:58	2	162	1550	.160	.83	206.71	62	57			
2	12:08		158	1550			212.73					
1			153	1600		.83			59			
							Vol = 24.03					
			160	1627								
AVERAGE												

METHOD 4 RUN # 2

COMPANY: Destec
UNIT: Lube Oil Vent B
DATE: 12-18-92
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 11022 (.85)
METER coeff: .989699
PITOT TUBE#: Velocity

PRE / POST TEST LEAK CHECK
LEAK RATE: .01 / .003 cfm
VACUUM: 12 / 6 "Hg

AMBIENT TEMP, °F: 50°
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("):

F/m

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) I120	PRESSURE DIFFERENTIAL ΔH rate "H20	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
6	12:15	2	161	1720	.60	.83	213.10	55	55			
5	12:25	2	167	1700	.60	.83	219.07	57	54			
4	12:35	2	162	1650	.60	.83	225.06	59	53			
3	12:45	2	158	1570	.60	.83	231.07	59	53			
2	12:55		154	1600		.63	237.11					
1			150	1500		.83			56			
							Vol = 24.01					
AVERAGE												

LABORATORY ANALYSIS
EPA METHOD 5 - ORGANIC ANALYSIS

COMPANY: Destec REPORT: 100-288

LOCATION/UNIT: Lube Oil Vent "B" DATE TESTED: 12/18/92

ANALYST: DGS

SAMPLE # 1 aliquot - 215 ml

TIN # 3			
# 1	# 2	# 3	AVERAGE
final (g) 1.59847	final (g) 1.59847	final (g)	1.59847
tare (g) 1.59449	tare (g)	tare (g)	1.59448
NET (g)	NET (g)	NET (g)	0.00399

SAMPLE # 2 aliquot - 214 ml

TIN # 4			
# 1	# 2	# 3	AVERAGE
final (g) 1.58264	final (g) 1.58259	final (g) 1.58260	1.58260
tare (g) 1.57983	tare (g)	tare (g)	1.57983
NET (g)	NET (g)	NET (g)	

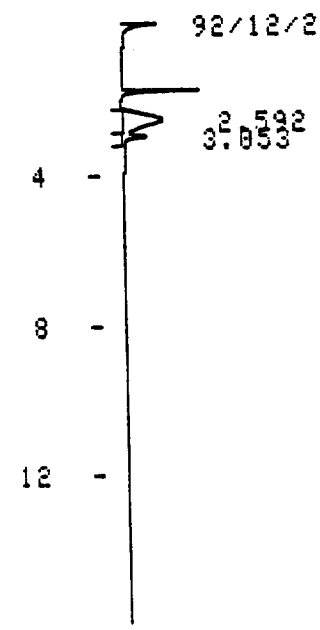
SAMPLE # _____ aliquot - _____

TIN #			
# 1	# 2	# 3	AVERAGE
final (g)	final (g)	final (g)	
tare (g)	tare (g)	tare (g)	
NET (g)	NET (g)	NET (g)	

SAMPLE # _____ aliquot - _____

TIN #			
# 1	# 2	# 3	AVERAGE
final (g)	final (g)	final (g)	
tare (g)	tare (g)	tare (g)	
NET (g)	NET (g)	NET (g)	

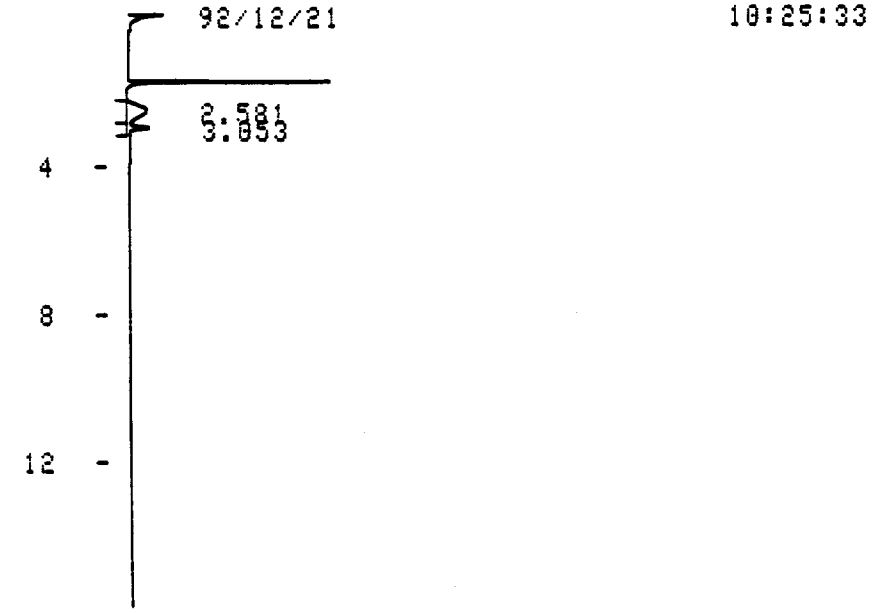
DESTEC UNIT: LUBE OIL VENT "B"
12-18-92 REPORT # 100-288
HC SAMPLE # 1



PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.592	5922		6	5.4963	C-6+
2	3.053	1082	V	1	5.9884	C-1
	TOTAL	7004			11.4847	

GROUP(NAME)	CONC
C-1	5.9884
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	5.4963

DESTEC UNIT: LUBE OIL VENT "B"
12-18-92 REPORT # 100-288
HC SAMPLE # 2



PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.581	3004		6	2.7878	C-6+
2	3.053	1068	V	1	5.9085	C-1
	TOTAL	4071			8.6963	

GROUP(NAME)	CONC
C-1	5.9085
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	2.7878

COMPANY : Dexter Chalk Cliffs Vent C
UNIT :
DATE : 12/18/92
REPORT : 100-288

Scotty

Vent C, NORTHERN

ON-SITE DATA

		RUN	#1	#2	#3
		TIME	930-1010	1020-1100	
Vm	Dry sampled gas volume, dcf		24.03	24.06	
Y	Meter calibration factor (met# 1002)		.989699	.989699	
Pbar	Barometric Pressure, "Hg		28.98	28.98	
Pstatic	Stack static pressure, "Hg		0	0	
ΔH	Differential meter pressure, "H2O		.85	.83	
Tm	Meter temperature, °F		68	62	

	D RUN 1			E RUN 2			RUN 3		
CONTENTS	FINAL	TARE	NET	FINAL	TARE	NET	FINAL	TARE	NET
H_2O	637.4	570.4	67.0	649.8	580.7	69.1			
H_2O	584.6	585.0	-0.4	620.2	620.1	0.1			
KO	502.0	502.2	-0.2	477.1	476.1	1.0			
Silicagel	844.7	840.0	4.7	731.1	726.0	5.1			
Line Wash	105.6	36.5	-69.1	105.0	36.8	-68.2			
V lc volume of H2O, gms			2.0			7.1			

		RUN	#1	#2	#3
CO2	% Dry Volume		0	0	
O2	% Dry Volume		20.9	20.9	
N2	% Dry Volume		/	/	
Cp	Pitot tube coefficient (Pit#)		/	/	
ΔP	~~Avg P, "H2O~~ FPS		118	123	
Ts	Stack temperature, °F		95	90	
As	Stack area, sq. ft.		/	/	
Ds	Stack diameter, inches		7.50	7.50	
Dn	Nozzle diameter, inches		/	/	
Dur	Sampling time, min		40	40	
% Iso	Mini iso		/	/	

Filter # / /
Filter tare weights, gms / /

INITIALS
CONTROL BOX#:
Hi P_____ Lo P_____ Avg P_____ Duct Temp _____
Diameters before disturb_____ After_____
# of points, total _____
Overall (inches)_____ Coupling _____

METHOD 4 RUN # 1

COMPANY: Destec
UNIT: Lure Oil Vent C
DATE: 12-18-97
REPORT: 100-288
TECH: SAH
PUMP #: GAST
METER BOX#: 1002 (.85)
METER coeff: .989699
PITOT TUBE#: Velocicalc

PRE / POST TEST LEAK CHECK
LEAK RATE: .005 / <.001 cfm
VACUUM: 10 / 5 "Hg

DIA = 7.50
AREA = .031

AMBIENT TEMP, °F: 50°
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("):

F/MIN

TRAVERSE PT. NUMBER w/o Leak		TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Δp)	PRESSURE DIFFERENTIAL Δ H rate	PRESSURE DIFFERENTIAL Δ H Δ H	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
7.2	6	9:30	2	92	114	.60	.85	139.50	67	67			
6.4	5	9:40	2	92	124	.60	.85	145.48	68	67			
5.3	4	9:50	2	93	127	.60	.85	151.51	70	67			
2.2	3	10:00	2	95	128	.60	.85	157.53	70	67			
1.1	2	10:10	2	98	108			163.53					
.3	1			98	108								
							.85	Vol = 24.03		66			
				95	116								
AVERAGE													

METHOD 4 | RUN # 2

COMPANY: Petrec
UNIT: Lube Oil Vent C
DATE: 12-18-97
REPORT: 100-288
TECH: SAM
PUMP #: CAST
METER BOX#: 1007 (.85)
METER coeff: .9891699
PITOT TUBE#: Velocicalc.

PRE / POST TEST LEAK CHECK

LEAK RATE:	.004	/ .001	cfm
VACUUM:	10	/ 6	"Hg

AMBIENT TEMP, °F: 55-0
Pbar:
STATIC PRESSURE("Hg):
ASSUMED MOISTURE,%:
AVG. CALIB. NOZZLE DIAM("):
PROBE LINER MATERIAL:
FILTER #:
DUCT DIAM ("):

F/M

TRAVERSE PT. NUMBER	TIME (θ) min.	VACUUM "Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) "H2O	PRESSURE DIFFERENTIAL ΔH rate "H2O	PRESSURE DIFFERENTIAL ΔH ΔH	GAS SAMPLE VOLUME (cu. ft)	GAS SAMPLE TEMP. AT DRY GAS METER INLET, °F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET, °F	FILTER HOLDER TEMP °F Probe	FILTER HOLDER TEMP °F Box	TEMP OF GAS EXIT CONDENSER OR LAST IMPNGR °F
6	10:20	2	91	127	.60	.83	164.10	61	65			
5	:30	2	90	128	.60	.83	170.11	61	63			
4	:40	2	90	128	.60	.83	176.13	61	62			
3	:50	2	90	175	.60	.83	182.15	61	60			
2	11:00		89	120			188.11					
1			90	110								
						.83	Vol = 24.01		62			
			90	123								
AVERAGE												

LABORATORY ANALYSIS
EPA METHOD 5 - ORGANIC ANALYSIS

COMPANY: Destec REPORT: 100-288

LOCATION/UNIT: Lube Oil Vent "C" DATE TESTED: 12/18/92

ANALYST: DGS

SAMPLE # 1 aliquot - 209 ml

TIN # 5		#4 1.60293	
# 1	# 2	# 3	AVERAGE
final (g) 1.60343	final (g) 1.60311	final (g) 1.60297	1.60295
tare (g) 1.59726	tare (g)	tare (g)	1.59726
NET (g)	NET (g)	NET (g)	0.00569

SAMPLE # 2 aliquot - 210 ml

TIN # 6			
# 1	# 2	# 3	AVERAGE
final (g) ~~1.58843~~ 1.58873	final (g) 1.58865	final (g) 1.58863	1.58864
tare (g) 1.58686	tare (g)	tare (g)	1.58686
NET (g)	NET (g)	NET (g)	0.00178

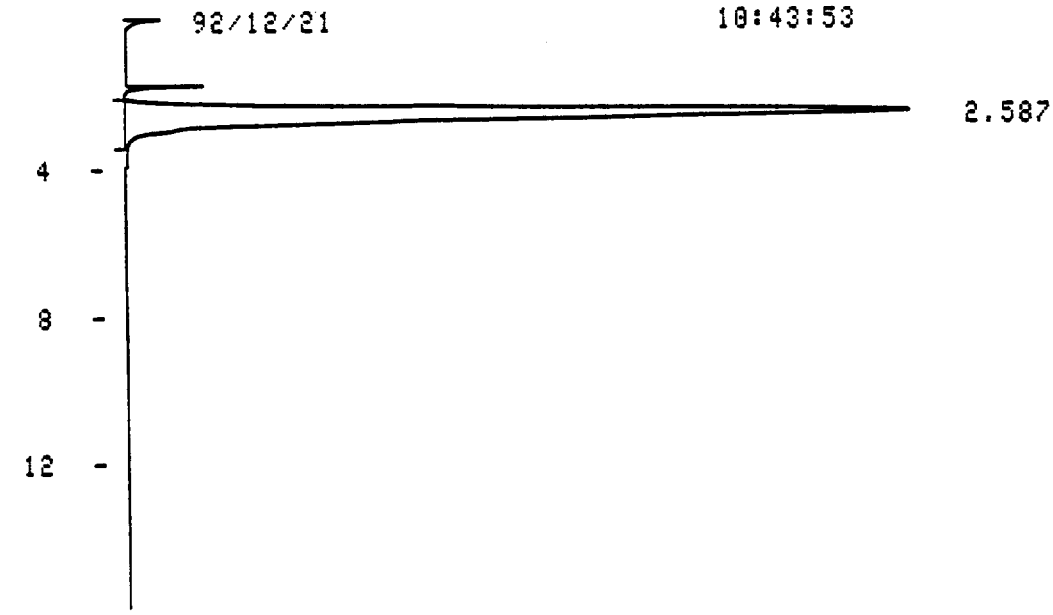
SAMPLE # Blank aliquot - 50 ml

TIN # 7			
# 1	# 2	# 3	AVERAGE
final (g) 1.57809	final (g) 1.57811	final (g)	1.57810
tare (g) 1.57803	tare (g)	tare (g)	1.57803
NET (g)	NET (g)	NET (g)	0.00007

SAMPLE # _____ aliquot - _____

TIN #			
# 1	# 2	# 3	AVERAGE
final (g)	final (g)	final (g)	
tare (g)	tare (g)	tare (g)	
NET (g)	NET (g)	NET (g)	

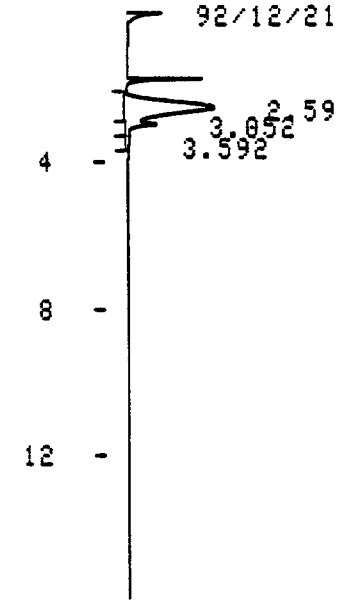
DESTEC UNIT: LUBE OIL VENT "C"
12-18-92 REPORT # 100-288
HC SAMPLE # 1



PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.587	135935		6	126.1724	C-6+
	TOTAL	135935			126.1724	

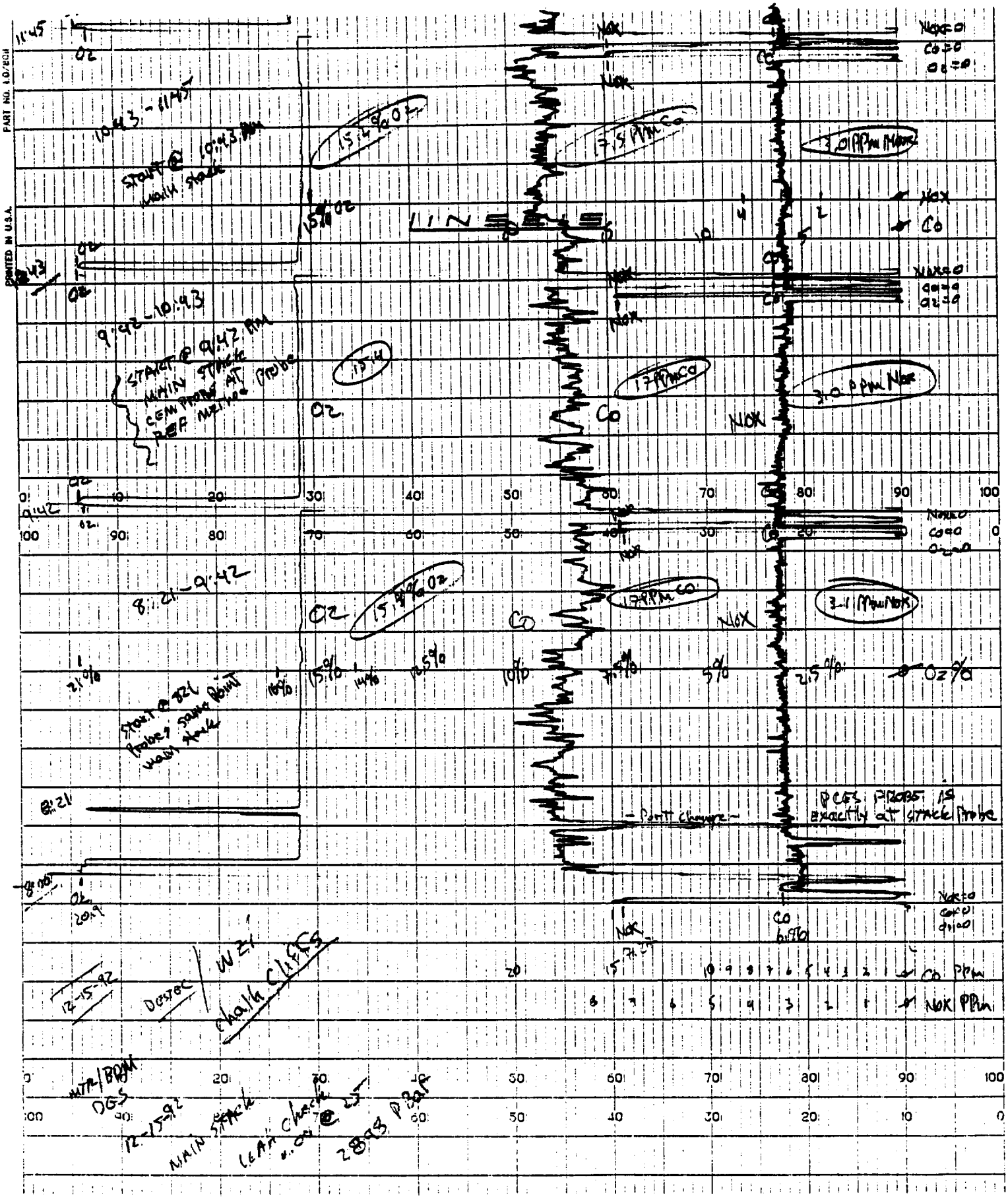
GROUP(NAME)	CONC
C-1	0
C-2	0
C-3	0
C-4	0
C-5	0
C-6+	126.1724

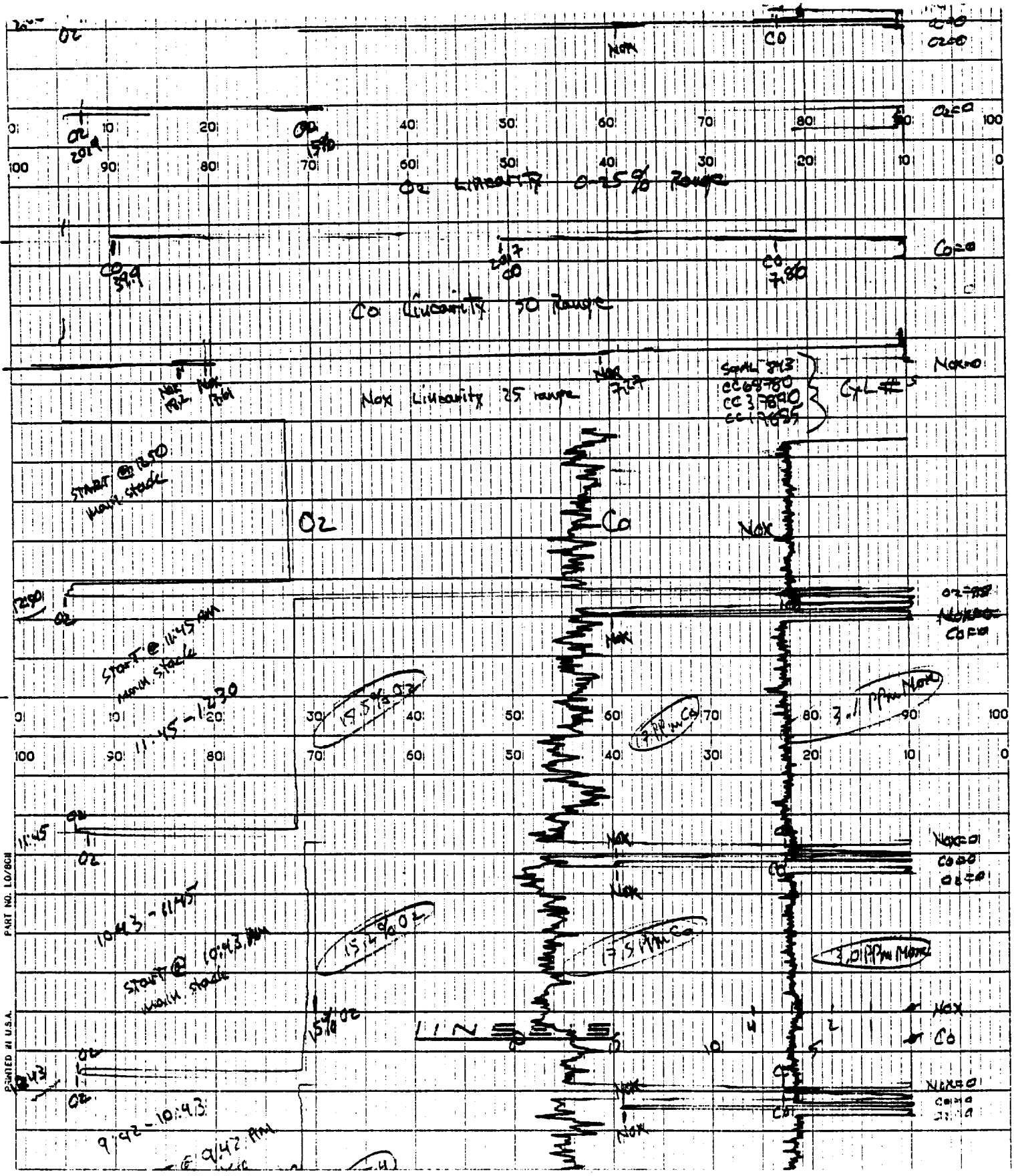
DESTEC UNIT: LUBE OIL VENT "C"
12-18-92 REPORT # 100-288
HC SAMPLE # 2

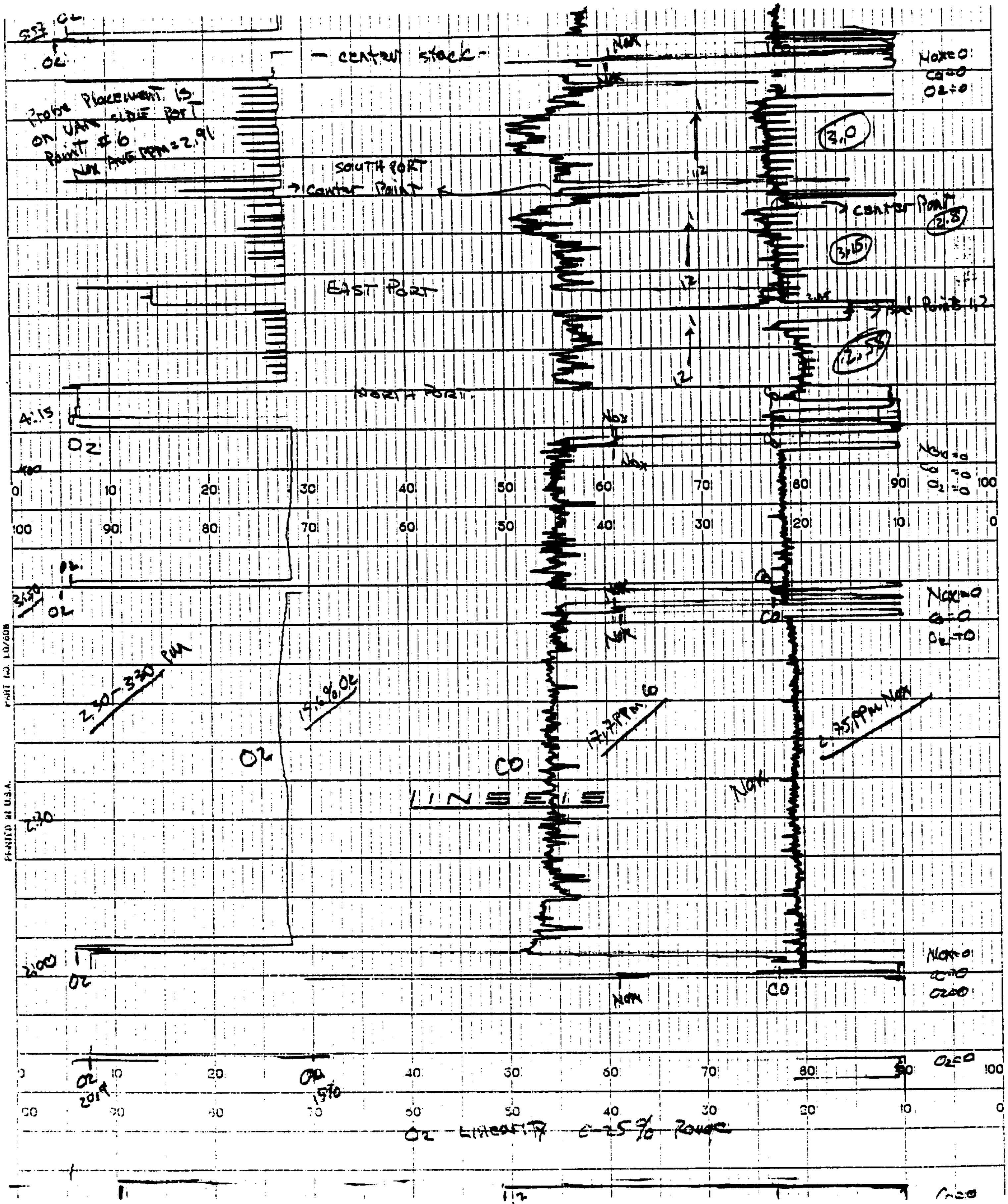


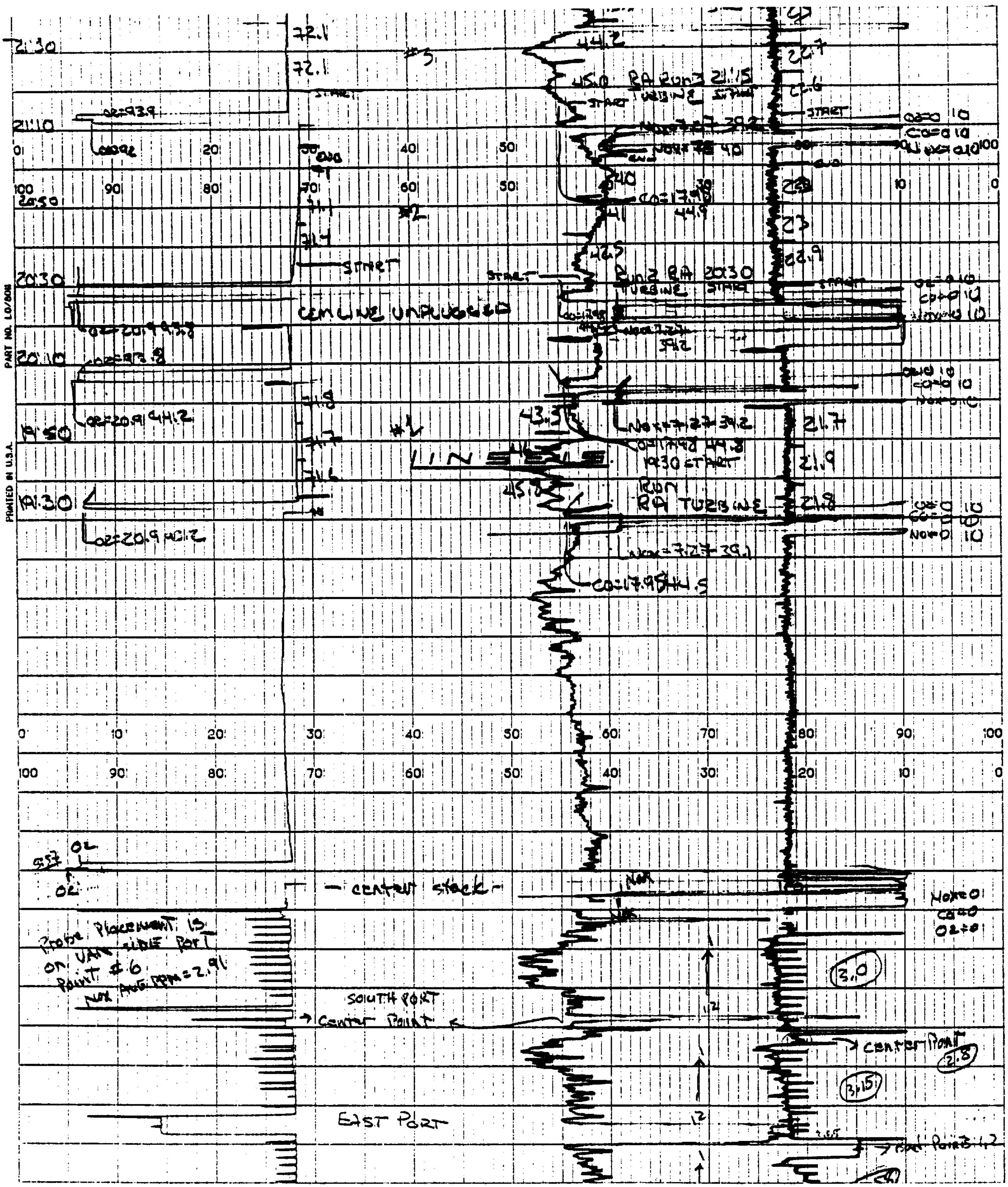
PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.59	16001		6	14.8523	C-6+
2	3.052	1729	V	1	9.5692	C-1
3	3.592	164	V	2	0.4508	C-2
	TOTAL	17895			24.8722	

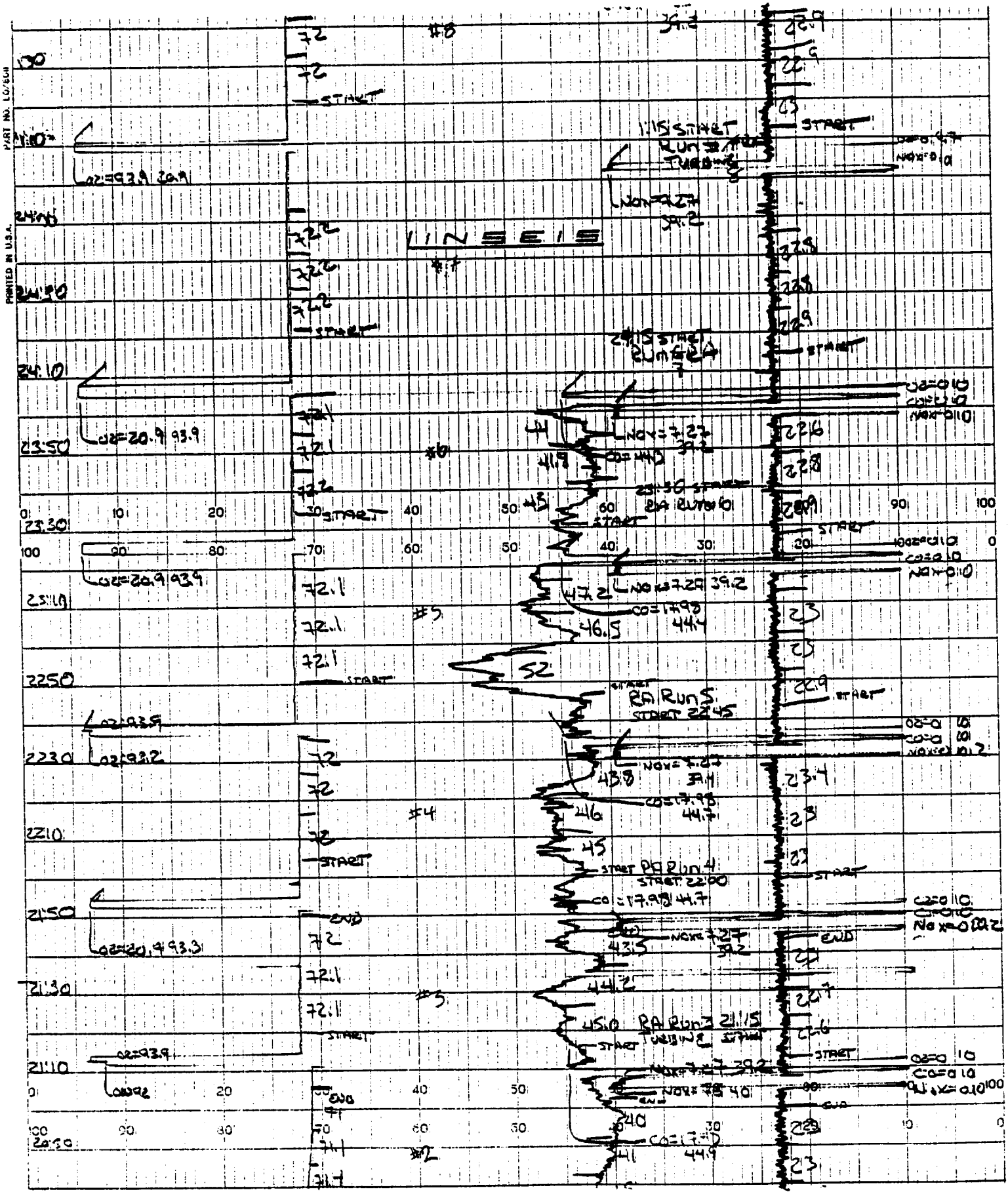
GROUP(NAME)	CONC
C-1	9.5692
C-2	0.4508
C-3	0
C-4	0
C-5	0
C-6+	14.8523

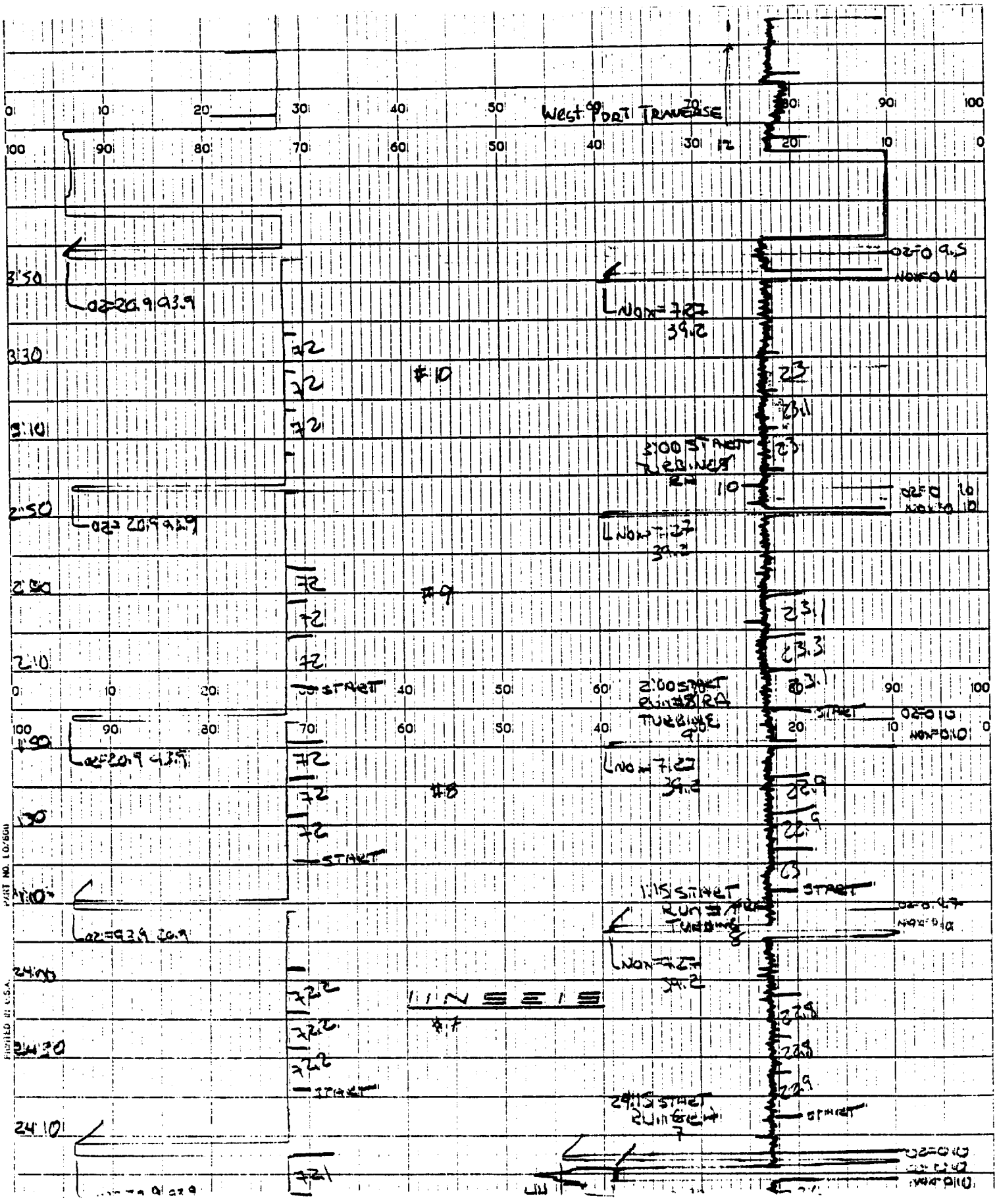

PART NO. LO/2CH
PRINTED IN U.S.A.
11:45
O2
10:43 - 11:45
START @ 10:43 AM
MAIN STACK
15.4% O2
15.1% O2
9:42 - 10:43
START @ 9:42 AM
MAIN STACK
CEM PROBE AT PROBE
PROBE NOZZLE
15.4
O2
8:21 - 9:42
START @ 8:21
PROBE, SAME POINT
MAIN STACK
15.4% O2
8:21
20.9
12-15-92
DCS TEC
MAIN STACK
LEAK CHECK @ 2.5
28.03 PSIG
NOX
CO
17.5 PPM CO
3.01 PPM NOX
17 PPM CO
3.0 PPM NOX
17 PPM CO
3.1 PPM NOX
- POINT CHANGE -
PCGS PROBE IS EXACTLY AT STACK PROBE
NOX=0
CO=0
O2=0
CO PPM
NOX PPM


O2 Linearity 0-25% range
CO Linearity 50 range
NOx Linearity 25 range
O2
CO
NOX
START @ 10:50 main stack
START @ 11:45 main stack
11:45 - 12:30
10:43 - 11:45
9:42 - 10:43
9:42 PM
3.0 PPM NOx
PART NO. L0/80II
PRINTED IN U.S.A.


CENTER STACK
Probe Placement is on VAR side Port Point #6
NOx Avg PPM = 2.91
SOUTH PORT
CENTER POINT
EAST PORT
NORTH PORT
3.0
3.15
2.58
2.8
CENTER POINT
Nox=0
CO=0
O2=0
O2
2:30-3:30 PM
15.6% O2
17.7 PPM CO
2.75 PPM NOx
CO
NOx
O2 LINEARITY @ 25% RANGE


21:30
21:10
20:50
20:30
20:10
19:50
19:30
START
CEMLINE UNPLUGGED
RA RUN 3 21:15
TURBINE START
RUN 2 RA 2030
TURBINE START
1930 START
RA TURBINE
center stack
Probe Placement is on VAN side Port
Point #6
SOUTH PORT
Center Point
center Point
EAST PORT
PART NO. L0/508
PRINTED IN U.S.A.


LINSEIS
#8
#7
#6
#5
#4
#3
#2
#1
START
END
RA RUNS
RA Runs
RA Run 4
RA Run 3
RA Run 2
RA Run 1
PART NO. LO/EGI
PRINTED IN U.S.A.


West 69 DRT TRENCH
#10
#9
#8
#7
START
LINES

QUALITY ASSURANCE

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	12-3-92	AMBIENT TEMP °F:	59
TECH:	BDM	BAROMETRIC Pbar:	29.39
METER I.D.#	1004	TEST METER ID#:	S5M104564
		TEST METER Mcf:	1.023

APPROXIMATE CFM		0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00
	FINAL	7.44	10.01	10.17
	TOTAL	7.44	10.01	10.17
FIELD GAS METER VOLUME CF	INITIAL	332.80	341.20	352.30
	FINAL	340.30	351.41	362.74
	TOTAL	7.50	10.21	10.44
STD TEST METER TEMP (°F)		56.0	57.5	58.0
FIELD GAS METER TEMP (°F)	IN	69.5	72.0	73.5
	OUT	56.0	58.5	62.5
	AVERAGE	62.8	65.3	68.0
STD TEST METER PRESSURE ("H2O)		-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		0.75	0.36	0.12
FIELD GAS METER, Mcf		1.026179	1.017065	1.015477

FIELD AVERAGE Mcf:	1.019573	H@:	0.7394

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	12-4-92	AMBIENT TEMP °F:	58
TECH:	BDM	BAROMETRIC Pbar:	29.39
METER I.D.#	1001	TEST METER ID#:	S5M104564
		TEST METER Mcf:	1.023

APPROXIMATE CFM		0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00
	FINAL	7.38	10.01	10.01
	TOTAL	7.38	10.01	10.01
FIELD GAS METER VOLUME CF	INITIAL	67.60	54.50	42.20
	FINAL	75.08	64.87	52.66
	TOTAL	7.48	10.37	10.46
STD TEST METER TEMP (°F)		60.0	59.5	58.0
FIELD GAS METER TEMP (°F)	IN	63.0	62.0	61.0
	OUT	75.5	73.5	69.0
	AVERAGE	69.3	67.8	65.0
STD TEST METER PRESSURE ("H2O)		-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		1.40	0.52	0.18
FIELD GAS METER, Mcf		1.023692	1.001865	0.991772

FIELD AVERAGE Mcf:	1.005776	H@:	1.4165

PETRO CHEM ENVIRONMENTAL SERVICES, INC.

DRY GAS METER CALIBRATION

DATE:	12-9-92	AMBIENT TEMP °F:	52
TECH:	BDM	BAROMETRIC Pbar:	29.705
METER I.D.#	1002	TEST METER ID#:	S5M104564
		TEST METER Mcf:	1.023

APPROXIMATE CFM		0.75	0.50	0.30
STD TEST METER VOLUME CF	INITIAL	0.00	0.00	0.00
	FINAL	7.32	10.01	10.01
	TOTAL	7.32	10.01	10.01
FIELD GAS METER VOLUME CF	INITIAL	741.20	753.20	765.20
	FINAL	748.67	763.64	775.98
	TOTAL	7.47	10.44	10.78
STD TEST METER TEMP (°F)		56.0	48.0	48.0
FIELD GAS METER TEMP (°F)	IN	66.5	58.0	60.0
	OUT	58.0	50.0	53.0
	AVERAGE	62.3	54.0	56.5
STD TEST METER PRESSURE ("H2O)		-0.60	-0.30	-0.15
FIELD GAS METER PRESSURE ("H2O)		0.71	0.60	0.22
FIELD GAS METER, Mcf		1.012820	0.990978	0.965297

FIELD AVERAGE Mcf:	0.989699	H@:	0.7209

PETRO CHEM ENVIRONMENTAL SERVICES, INC.
PITOT TUBE CALIBRATION

ID. # P12Q-10
6-12-92
BY: BDM

"A" SIDE CALIBRATION				
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(A)
1	0.250	0.350	0.837	0.001
2	0.250	0.350	0.837	0.001
3	0.255	0.360	0.833	-0.002
		Cp (SIDE A)	0.836	

"B" SIDE CALIBRATION				
RUN #	ΔPstd cm H2O (in.H2O)	ΔP(s) cm H2O (in. H2O)	Cp(s)	DEVIATION Cp(s) -Cp(B)
1	0.260	0.365	0.836	0.002
2	0.255	0.360	0.833	-0.001
3	0.255	0.360	0.833	-0.001
		Cp (SIDE B)	0.834	

Cp (SIDE A) - Cp (SIDE B) =	0.002	0.835

Cp=.99 * ΔPstd / ΔP(s)

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

REPORT OF ANALYSIS

CUSTOMER ORDER NUMBER: 1653/Reanalysis

CYLINDER NUMBER CC37890

COMPONENT	CONCENTRATION (v/v)
Carbon Monoxide	6.86 ± 0.14 ppm
Nitric Oxide	7.27 ± 0.15 ppm
Sulfur Dioxide	6.83 ± 0.14 ppm
Nitrogen*	Balance

Cylinder pressure: 1600 psig

*Oxygen-free

Replicate Analysis Data On CO:	01/03/91	6.87 ppm 6.92 ppm 6.83 ppm
	Mean	6.87 ppm

Expiration Date CO: 07/03/92

Replicate Analysis Data On NO:	01/03/91	7.25 ppm 7.25 ppm 7.28 ppm
	Mean	7.26 ppm

Expiration Date NO: 07/03/92

RECEIVED FEB 1 4 1991

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

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

PETRØ1

TO:
RICK WILLIAMS
PETROCHEM ENVIRONMENTAL
3207 ANTONINO AVE.
BAKERSFIELD, CA 93308

DATE : Ø2/11/91

CUSTOMER ORDER NUMBER: Ø1138

PAGE 1

COMPONENT	CONCENTRATION(v/v)	REFERENCE STANDARD	ANALYZER MAKE,MODEL,S/N,DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO.: CC68780						
			Monitor Labs Model 8440		01/11/91	01/22/91
Nitric Oxide	17.61 ± Ø.35 ppm	GMIS	S/N 136	07/22/91	17.62 ppm	17.62 ppm
		Cylinder #	Continuous		17.56 ppm	17.56 ppm
		CC28863	Chemiluminescence		17.56 ppm	17.69 ppm
		@ 19.31 ppm	Last Cal Date: 10/23/90	Mean:	17.58 ppm	17.63 ppm
			Carle Instr Model 8000		01/22/91	01/29/91
Carbon Monoxide	17.98 ± Ø.36 ppm	GMIS	S/N 8249	07/29/91	18.02 ppm	17.99 ppm
		Cylinder #	Methanation/FID		17.93 ppm	18.18 ppm
Nitrogen,O2-Free Balance		CC12168	Gas Chromatography		17.98 ppm	17.93 ppm
Cylinder Pressure: 2000 psig		@ 17.73 ppm	Last Cal Date: 12/24/90	Mean:	17.95 ppm	18.01 ppm

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with EPA-1987 Traceability Protocol # 1, Section 3.Ø.4, Procedure G1.

Analyst: Mark Monson
M.J. Monson

Approved:
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.

213 588-6181

LIQUID CARBONIC
SPECIALTY GAS CORPORATION
5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER PETRO CHEM P.O NUMBER 1579

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE	2635a	FF-30355	24.08 ppm
NITRIC OXIDE GMIS	vs 2629a	SGAL 1093	22.8 ppm
SULFUR DIOXIDE GMIS	vs 1694a	SGAL 1010	95.8 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT CARBON MONOXIDE ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N A12-729
   ANALYTICAL PRINCIPLE NDIR LAST CALIBRATION DATE 12/03/91
   FIRST ANALYSIS DATE 12/20/91 SECOND ANALYSIS DATE 12/30/91

Z 0.0	R 24.0	C 20.6	CONC.	20.6 ppm	Z 0.0	R 24.2	C 20.8	CONC.	20.7 ppm
R 24.0	Z 0.0	C 20.6	CONC.	20.6 ppm	R 24.0	Z 0.0	C 20.6	CONC.	20.7 ppm
Z 0.0	C 20.6	R 24.2	CONC.	20.5 ppm	Z 0.0	C 20.8	R 24.2	CONC.	20.7 ppm
U/M ppm		MEAN TEST ASSAY		20.6 ppm	U/M ppm		MEAN TEST ASSAY		20.7 ppm

2. COMPONENT NITRIC OXIDE GMIS ANALYZER MAKE-MODEL-S/N Beckman 951A S/N 0101354
   ANALYTICAL PRINCIPLE Chemiluminescence LAST CALIBRATION DATE 12/03/91
   FIRST ANALYSIS DATE 01/06/92 SECOND ANALYSIS DATE 01/13/92

Z 0.1	R 91.2	C 71.0	CONC.	17.7 ppm	Z 0.2	R 91.2	C 70.9	CONC.	17.7 ppm
R 91.2	Z 0.0	C 70.3	CONC.	17.6 ppm	R 91.0	Z 0.2	C 70.8	CONC.	17.7 ppm
Z 0.1	C 70.2	R 91.3	CONC.	17.5 ppm	Z 0.3	C 70.8	R 91.2	CONC.	17.7 ppm
U/M mV		MEAN TEST ASSAY		17.6 ppm	U/M mV		MEAN TEST ASSAY		17.7 ppm

3. COMPONENT SULFUR DIOXIDE GMIS ANALYZER MAKE-MODEL-S/N Varian 3300 FPD S/N 13273
   ANALYTICAL PRINCIPLE Flame Photometric LAST CALIBRATION DATE 10/23/91
   FIRST ANALYSIS DATE 12/20/91 SECOND ANALYSIS DATE 12/30/91

Z 0.0	R 336.6	C 102.9	CONC.	29.3 ppm	Z 0.0	R 350.9	C 105.4	CONC.	28.8 ppm
R 335.5	Z 0.0	C 102.1	CONC.	29.2 ppm	R 349.4	Z 0.0	C 105.8	CONC.	29.6 ppm
Z 0.0	C 102.8	R 332.6	CONC.	29.2 ppm	Z 0.0	C 105.9	R 348.5	CONC.	29.1 ppm
U/M SqRT(uV)		MEAN TEST ASSAY		29.2 ppm	U/M SqRT(uV)		MEAN TEST ASSAY		29.0 ppm

THIS CYLINDER NO. SGAL 843
HAS BEEN CERTIFIED ACCORDING TO SECTION 3.0.4
OF TRACEABILITY PROTOCOL NO. 1
PROCEDURE G1
CERTIFIED ACCURACY ± 2 % NIST TRACEABLE
CYLINDER PRESSURE 1500 PSIG
CERTIFICATION DATE 12/30/91
EXPIRATION DATE 06/30/92

CERTIFIED CONCENTRATION

CARBON MONOXIDE	20.7 ppm
NITRIC OXIDE	17.7 ppm
SULFUR DIOXIDE	29.1 ppm
NITROGEN	BALANCE
NOx	18.2 ppm

ANALYZED BY DOUG GRANT CERTIFIED BY KELLY GALLAGHER

AIRCO

518655

Airco Electronic Gases
Union Landing & River Roads
P.O. Drawer No. 272
Riverton
New Jersey 08077
Telephones: Marketing: 609-829-7878
Prod. & Admin.: 609-829-791
International: 609-829-7917

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GAS MIX

CUSTOMER: Bakersfield Welding Supply
CYLINDER #: CC-17885
CYLINDER PRESSURE: 1650 psig
LABORATORY: Riverton, NJ

CERTIFICATION DATE: 11/2/92
EXPIRATION DATE: 5/2/93
REFERENCE #: 24275

MIXTURE COMPONENTS	ACTUAL MIXTURE CONCENTRATION	AIRCO INTERMEDIATE STANDARD CYLINDER #	CONC.	NIST SRM#
Nitric Oxide	40.0 ppm	CC-14977	49.8 ppm	1683B
Carbon Monoxide	39.9 ppm	CC-43310	49.8 ppm	1678C

BALANCE GAS: Nitrogen

COMPONENT 1 GAS ANALYSIS PROCEDURE Chemiluminescence
MAKE/MODEL/SER#: Beckman, 952, 0100204
LAST MULTIPOINT CALIBRATION DATE: 8/3/92

COMPONENT 2 GAS ANALYSIS PROCEDURE Non-Dispersive Infrared
MAKE/MODEL/SER#: Horiba, CO/Analyzer, 56255601
LAST MULTIPOINT CALIBRATION DATE: 8/3/92
R=REFERENCE STANDARD Z=ZERO GAS S=SAMPLE GAS

1ST COMPONENT Nitric Oxide
1ST ANALYSIS: DATE 10/26/92 ANALYST A. Lattanze

1)	Z 0000	R 4550	S 3635	CONC (1)	39.8 ppm
2)	R 4540	Z 0000	S 3640	CONC (2)	39.9 ppm
3)	R 4540	S 3630	Z 0000	CONC (3)	39.8 ppm
				AVE CONC	39.8 ppm

2ND ANALYSIS: DATE 11/2/92 ANALYST A. Lattanze

1)	Z 0000	R 4385	S 3540	CONC (1)	40.2 ppm
2)	R 4400	Z 0000	S 3535	CONC (2)	40.0 ppm
3)	R 4410	S 3540	Z 0000	CONC (3)	40.0 ppm
				AVE CONC	40.1 ppm

2ND COMPONENT Carbon Monoxide
1ST ANALYSIS: DATE 10/26/92 ANALYST A. Lattanze

1)	Z 000	R 491	S 393	CONC (1)	39.9 ppm
2)	R 491	Z 000	S 393	CONC (2)	39.9 ppm
3)	R 491	S 393	Z 000	CONC (3)	39.9 ppm
				AVE CONC	39.9 ppm

2ND ANALYSIS: DATE 11/2/92 ANALYST A. Lattanze

1)	Z 000	R 493	S 395	CONC (1)	39.9 ppm
2)	R 493	Z 000	S 395	CONC (2)	39.9 ppm
3)	R 493	S 395	Z 000	CONC (3)	39.9 ppm
				AVE CONC	39.9 ppm

THIS CALIBRATION STANDARD HAS BEEN CERTIFIED VERSUS EPA TRACEABILITY PROTOCOL NO. 1, PROCEDURE G1, AND ANALYSES PERFORMED PER SECTION 3.0.4.
CERTIFIED CONCENTRATION: Nitric Oxide = 40.0 ppm; Carbon Monoxide = 39.9 ppm
Nitrogen = Balance

APPROVED BY _____ LABORATORY MANAGER

Environmental Analytical Service, Inc.

January 29, 1993
Reference Number: 21931

Terry Rowles
Petro Chem Environmental Services
3207 Antonino Avenue
Bakersfield, CA 93308

Dear Terry:

Enclosed is the analytical report for the samples which were received by Environmental Analytical Service on December 30, 1992, for your report number 100-288.

If you have any questions on the report or the analytical data please contact myself or Vivian Longacre at (805) 541-3666.

Sincerely,

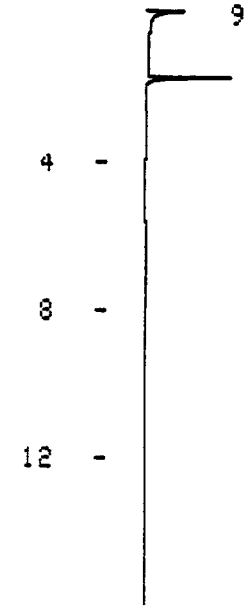
Steven D. Hoyt, Ph.D.
Laboratory Director

SDH/jm
enclosures

Petro Chem Environmental Services, Inc.
170-C Granada San Luis Obispo, CA 93401 (805) 541-3666 FAX: (805) 541-4550

SYSTEM BLANK
UHP NITROGEN

92/12/21 07:45:36



CHROMATOGRAM 7 MEMORIZED
WARNING NO PEAK
~~15PPm HYDROCARBON STANDARD~~

631-9332

PETRO CHEM ENVIRONMENTAL SERVICES, INC.
3207 Antonino Avenue, Bakersfield, CA 93308
(805) 327-7300 FAX (805) 327-3459

CHAIN OF CUSTODY RECORD

Submitted to: ENVIRONMENTAL ANALYTICAL LABS

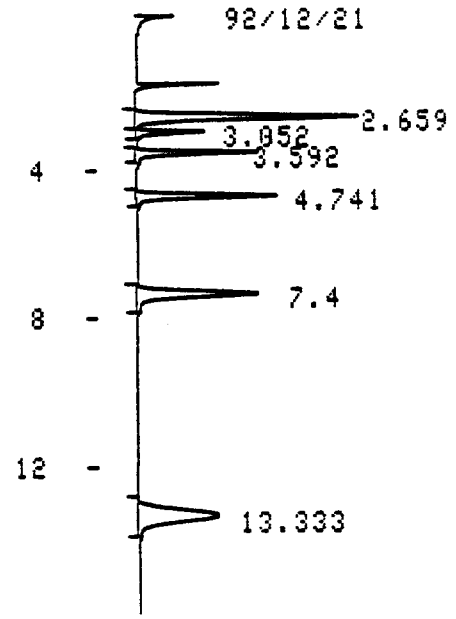
COMPANY	LOCATION/UNIT		
WZI	CHALK CLIFF		
REPORT # 100-288	SAMPLER John Hinkle		
METHOD	REPORT ATTN. Teeea Rowces	PO# 02445	

SAMPLE No/ID	SAMPLE DESCRIPTION	SAMPLE DATE	Liq	Filter	Gas	ANALYSIS REQUEST: TOTAL SULFIDE ANALYSIS ppm
1	FUEL GAS 21931	12/29/92			✓	✓
2	FUEL GAS 21932	12/29/92			✓	✓
3	FUEL GAS 21933	12/29/92			✓	✓

COMMENTS: REPORT TO THE NEAREST .1 ppm

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
John Nibble	12/29/92	Jobe Cox	12/30/92
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE

15PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1



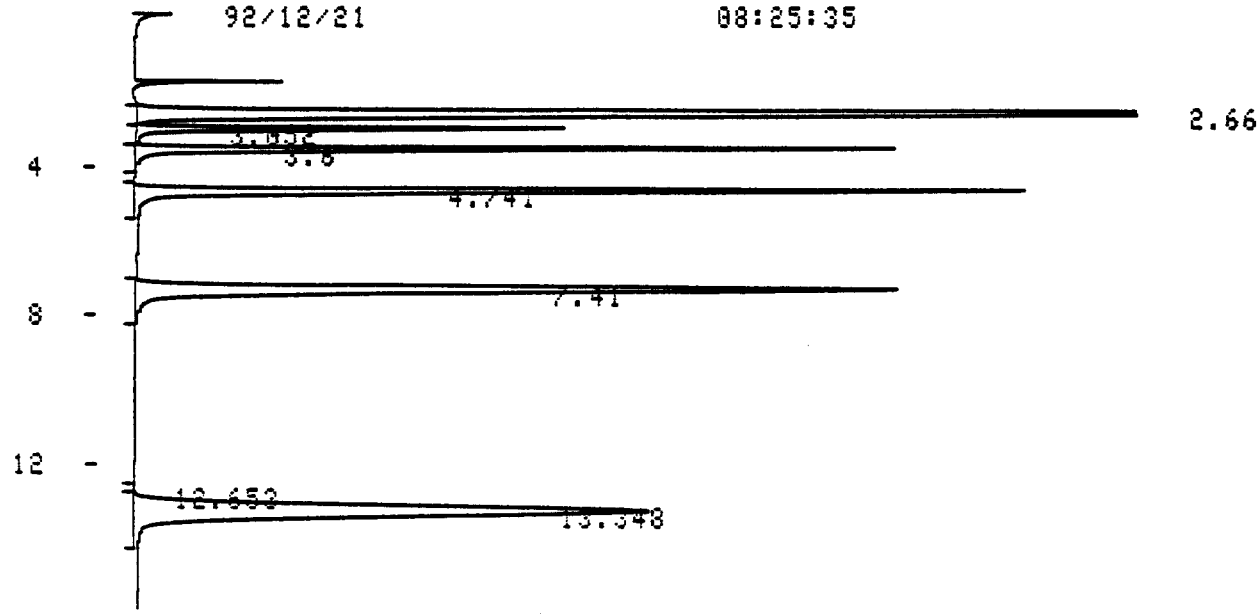
CHROMATOGRAM 8 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.659	16837		6		C-6+
2	3.052	2872		1		C-1
3	3.592	5819		2		C-2
4	4.741	8593		3		C-3
5	7.4	11602		4		C-4
6	13.333	13992		5		C-5
	TOTAL	59714				

IDENTIFICATION FILE 0
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.04	0.00574502	16.5
2	C-2	3.58	0.00283564	16.5
3	C-3	4.72	0.00192027	16.5
4	C-4	7.38	0.00142223	16.5
5	C-5	13.29	0.00105775	14.8
6	C-6+	2.65	0.00090279	15.2
7	C-2	3.85	0.00283564	16.5
8	C-3	4.58	0.00192027	16.5
9	C-4	6.04	0.00142223	16.5
10	C-4	7.02	0.00142223	16.5
11	C-5	10.24	0.00105775	14.8
12	C-5	10.59	0.00105775	14.8
13	C-5	12.73	0.00105775	14.8
14	C-5	11.3	0.00105775	14.8
15	C-5	15.43	0.00105775	14.8
16	C-5	8.79	0.00105775	14.8
17	C-5	11.82	0.00105775	14.8

100PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220



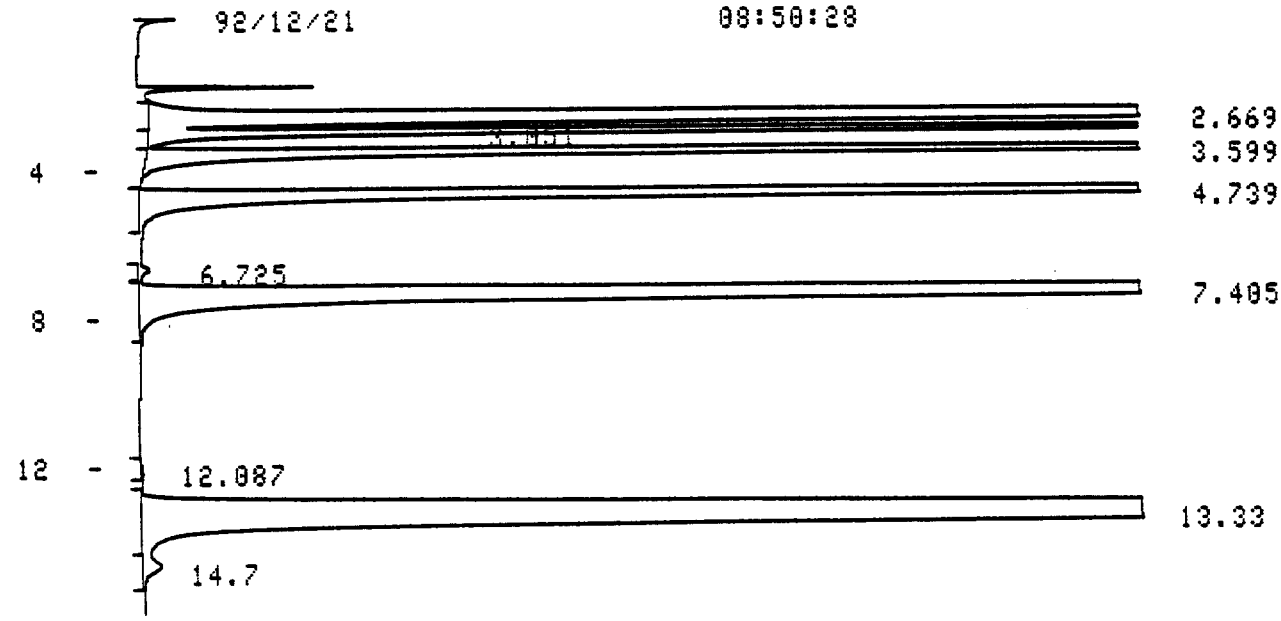
CHROMATOGRAM 9 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.66	107737		6		C-6+
2	3.052	18250		1		C-1
3	3.6	36847		2		C-2
4	4.741	54981		3		C-3
5	7.41	72669		4		C-4
6	12.653	66		13		C-5
7	13.348	87844	V	5		C-5
	TOTAL	378393				

IDENTIFICATION FILE 1
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.04	0.00553438	101
2	C-2	3.59	0.00274108	101
3	C-3	4.72	0.00181882	100
4	C-4	7.38	0.00138986	101
5	C-5	13.3	0.00112814	99.1
6	C-6+	2.65	0.000928184	100
7	C-2	3.9	0.00274108	101
8	C-3	4.35	0.00181882	100
9	C-4	5.75	0.00138986	101
10	C-4	6.7	0.00138986	101
11	C-5	10.21	0.00112814	101
12	C-5	10.59	0.00112814	99.1
13	C-5	12.71	0.00112814	99.1
14	C-5	11.3	0.00112814	99.1
15	C-5	15.27	0.00112814	99.1
16	C-5	12.19	0.00112814	99.1
17	C-5	11.6	0.00112814	99.1

1000PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 224



CHROMATOGRAM 10 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.669	1109961		6		C-6+
2	3.051	187443	V	1		C-1
3	3.599	375156		2		C-2
4	4.739	557212		3		C-3
5	6.725	833				
6	7.405	737301		4		C-4
7	12.087	568				
8	13.33	907896		5		C-5
9	14.7	3454	V			
	TOTAL	3879823				

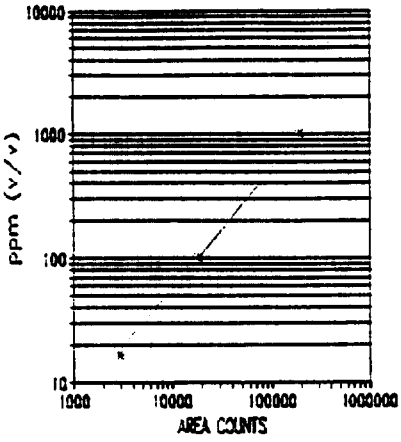
IDENTIFICATION FILE 2
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-1	3.04	0.00533496	1000
2	C-2	3.58	0.00274552	1030
3	C-3	4.72	0.00179465	1000
4	C-4	7.39	0.00136986	1010
5	C-5	13.29	0.00112348	1020
6	C-6+	2.66	0.000905438	1005
7	C-2	3.9	0.00274552	1030
8	C-3	4.52	0.00179465	1000
9	C-4	5.94	0.00136986	1010
10	C-4	7.03	0.00136986	1010
11	C-5	10.21	0.00112348	1020
12	C-5	10.59	0.00112348	1020
13	C-5	12.73	0.00112348	1020
14	C-5	12.53	0.00112348	1020
15	C-5	15.21	0.00112348	1020

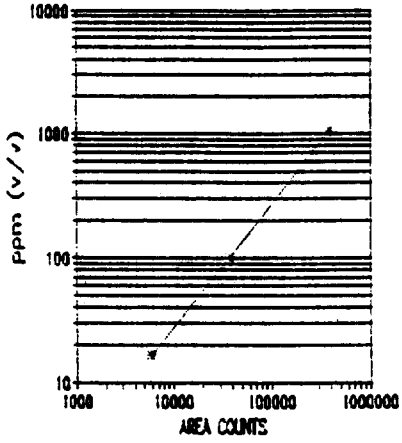
COMPANY : WZI \ DESTEC
UNIT : CHALK CLIFFS, LUBE OIL VENT
DATE : 12-18-93
REPORT : 100-288

HYDROCARBON CALIBRATION LINEARITY GRAPHS
ANALYSIS PERFORMED ON 12-21-92

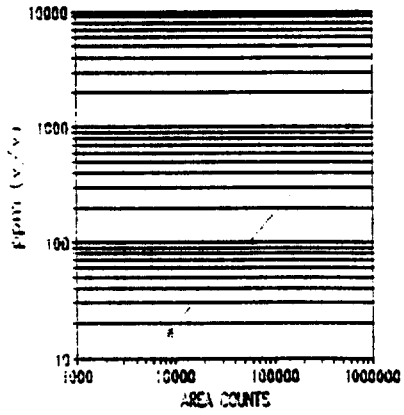
METHANE
CALIBRATION LINEARITY



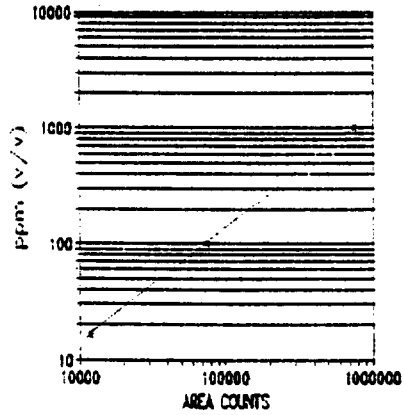
ETHANE
CALIBRATION LINEARITY



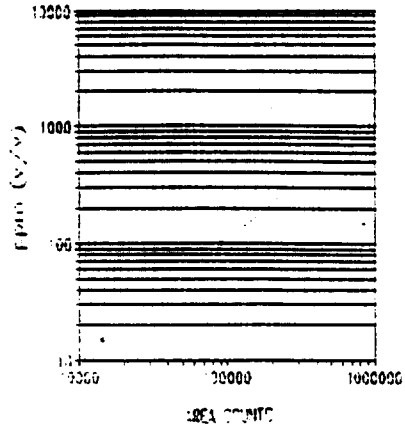
PROPANE
CALIBRATION LINEARITY



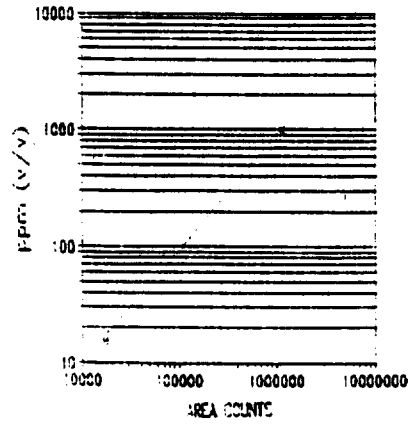
BUTANE
CALIBRATION LINEARITY



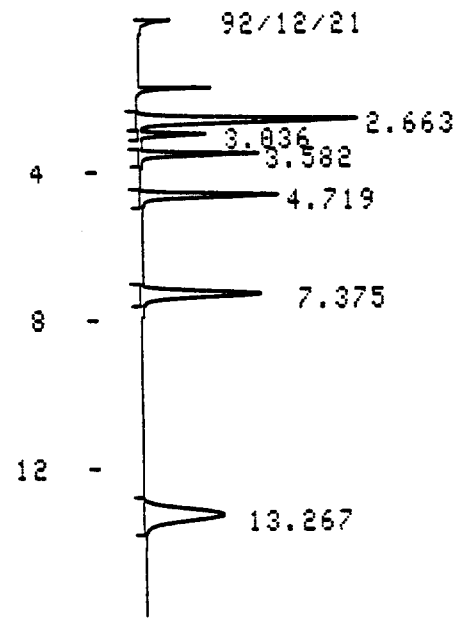
PENTANE
CALIBRATION LINEARITY



HEXANES+
CALIBRATION LINEARITY



POST ANALYSIS CALIBRATION CHECK
15PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1

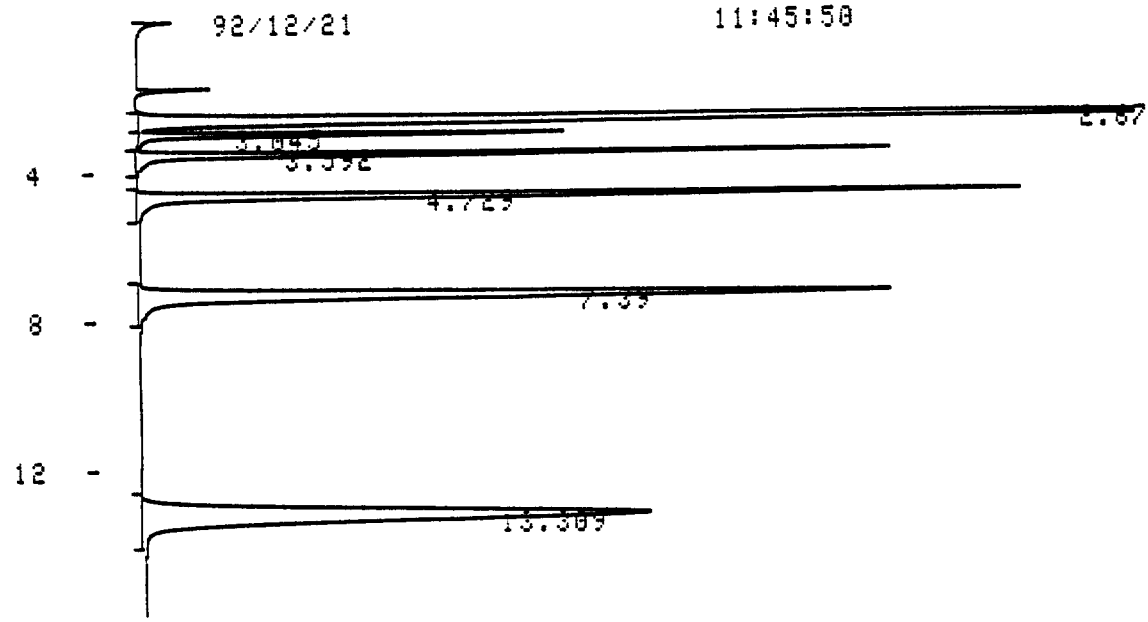


CHROMATOGRAM 17 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.663	16645		6	15.4499	C-6+
2	3.036	2824		1	15.6302	C-1
3	3.582	5797		2	15.8887	C-2
4	4.719	8547		3	15.5458	C-3
5	7.375	11187		4	15.549	C-4
6	13.267	13667		5	15.4182	C-5
	TOTAL	58668			93.4817	

GROUP(NAME)	CONC
C-1	15.6302
C-2	15.8887
C-3	15.5458
C-4	15.549
C-5	15.4182
C-6+	15.4499

POST ANALYSIS CALIBRATION CHECK
100PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 220

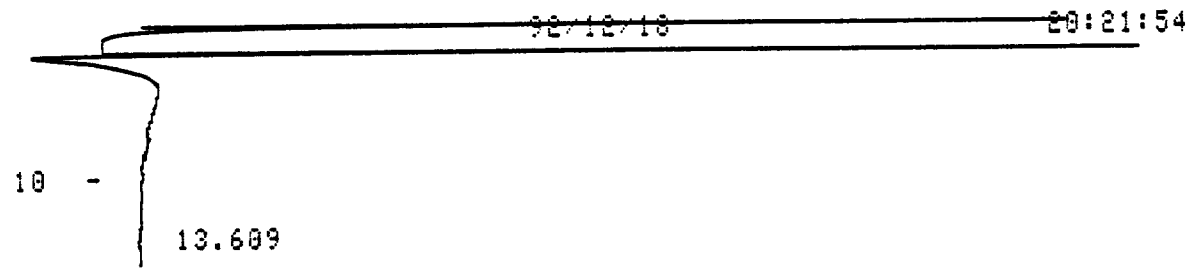


CHROMATOGRAM 18 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.67	106429		6	98.7858	C-6+
2	3.045	17823		1	98.6376	C-1
3	3.592	36506		2	100.0657	C-2
4	4.729	54359		3	98.8692	C-3
5	7.39	71583		4	99.4904	C-4
6	13.309	86339		5	97.4026	C-5
	TOTAL	373039			593.2512	

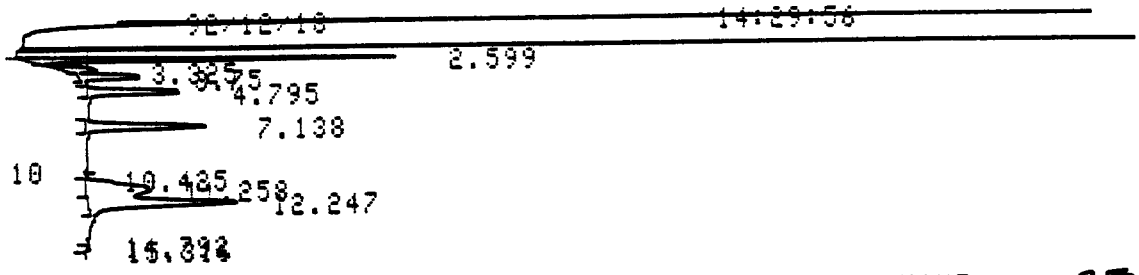
GROUP(NAME)	CONC
C-1	98.6376
C-2	100.0657
C-3	98.8692
C-4	99.4904
C-5	97.4026
C-6+	98.7858

System Blank UHP Nitrogen



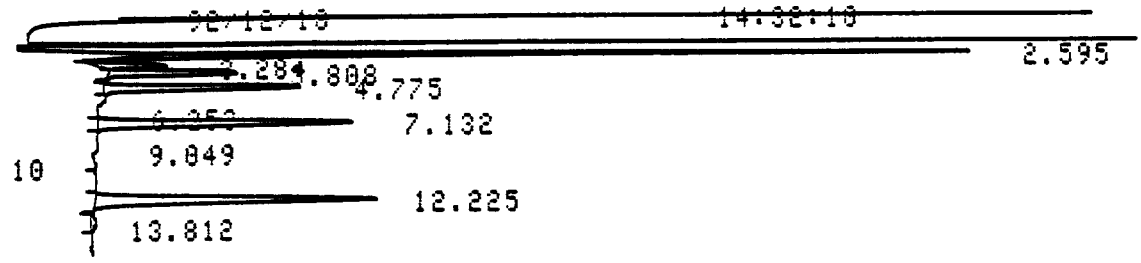
CHROMATOGRAM 17 MEMORIZED
WARNING NO PEAK

0.375ppm HYDROCARBON STANDARD
SCOTTY CAN MIX 1 DIL. 1:40



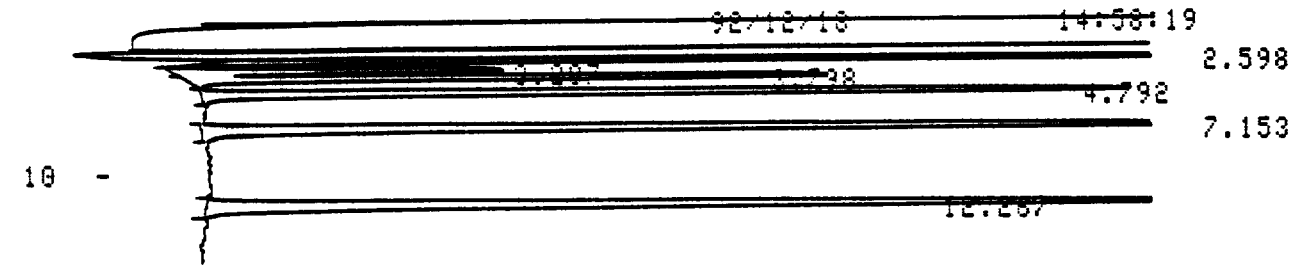
PKNO	TIME	AREA	MK	IDNO	CONC	NAME	RF
					ppm		
1	2.599	17004	CLC		0.380		2.1348 X10^{-5}
2	3.325	2930	C1	1	0.413		1.4096 X10^{-4}
3	3.75	5307	C2	2	0.413		7.7822 X10^{-5}
4	4.795	8510	C3		0.413		4.8531 X10^{-5}
5	7.138	11243	C4	10	0.413		3.6734 X10^{-5}
6	11.258	10225	C5	14	0.37		3.6734 X10^{-5}
7	12.247	18469	VCC				2.0034 X10^{-5}
8	15.316	322		15			
	TOTAL	77010					

0.75PPm HYROCARBON STANDARD
SCOTTY CAN MIX 1 DIL. 1:20



PKNO	TIME	AREA	MK	IDNO	CONC	NAME	RF
1	2.595	38374	C6+		0.760		1.9805X10^{-5}
2	3.284	5825	C1	1	0.825		1.4163 X10^{-4}
3	3.808	11467	C2	2	0.825		7.195 X10^{-5}
4	4.775	18014	C3		0.825		4.5798X10^{-5}
5	7.132	23977	C4	10	0.825		3.4408X10^{-5}
6	12.225	29494	C5		0.740		1.5090 X10^{-5}
7	13.812			5			
	TOTAL	128085					

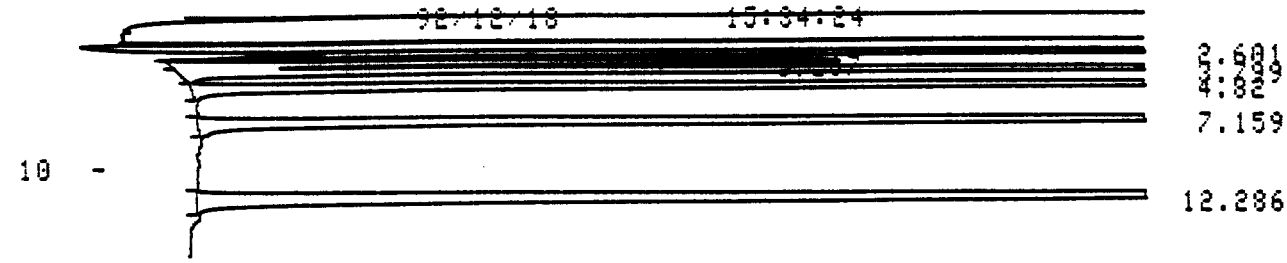
3.75PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1 DIL. 1:4



CHROMATOGRAM 7 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC ppm	NAME	RF
1	2.598	160697	C6		3.800		2.3647X10^{-5}
2	3.287	29208	C1	1	4.125	~~101.1004 C-1~~	1.4123X10^{-4}
3	3.798	58054	C2	2	4.125	~~101.5199 C-2~~	7.1055X10^{-5}
4	4.792	84534	C3		4.125		4.8797X10^{-5}
5	7.153	112113	C4	10	4.125	~~129.243 C-4~~	3.6793X10^{-5}
6	12.267	130040	C5		3.700		2.8453X10^{-5}
	TOTAL	574647				~~991.8933~~	

7.5PPm HYDROCARBON STANDARD
SCOTTY CAN MIX 1 DIL. 1:1



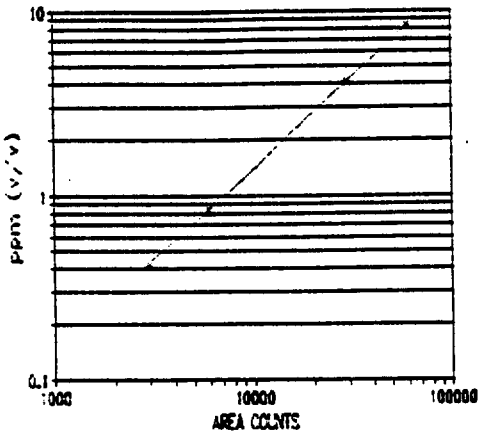
CHROMATOGRAM 8 MEMORIZED

PKNO	TIME	AREA	MK	IDNO	CONC	NAME	RF
1	2.601	331057	CG+		7.60		1.2957 X10-5
2	3.267	59250	C1	1	8.25 ~~266.8065 C-1~~		1.3924 X10-4
3	3.799	120083	C2	2	8.25 ~~272.8437 C-2~~		6.8702 X10-5
4	4.82	175372	C3		8.25		4.7043 X10-5
5	7.159	233097	C4	10	8.25 ~~268.7113 C-4~~		3.5393 X10-5
6	12.286	270173	C5		7.40		2.7390 X10-5
	TOTAL	1189032			~~806.7614~~		

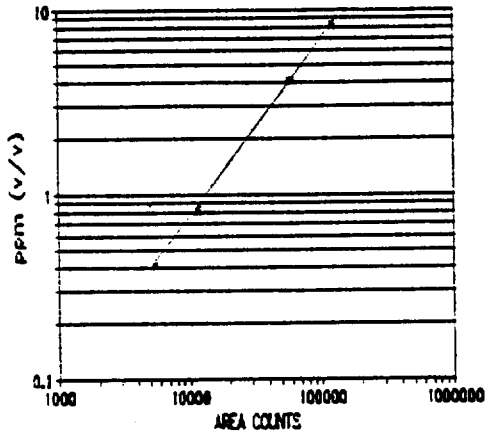
COMPANY : WZI \ DESTEC
UNIT : CHALK CLIFFS, TURBINE
DATE : 12-16-92
REPORT : 100-288

HYDROCARBON CALIBRATION LINEARITY GRAPHS
ANALYSIS PERFORMED ON 12-16-92

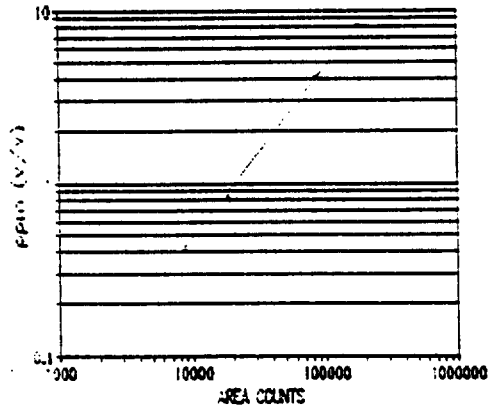
METHANE
CALIBRATION LINEARITY



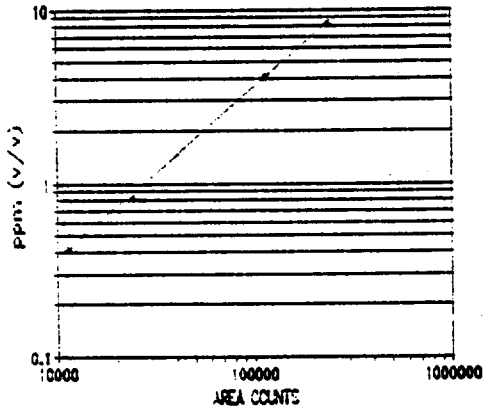
ETHANE
CALIBRATION LINEARITY



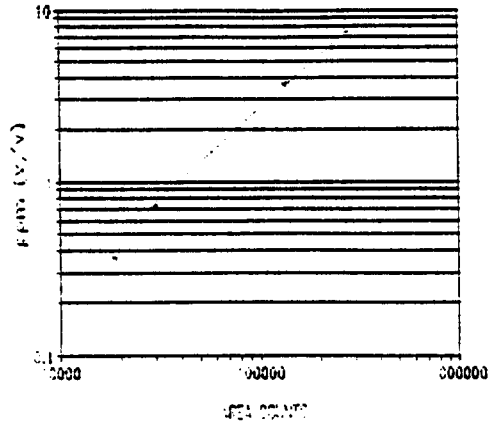
PROPANE
CALIBRATION LINEARITY



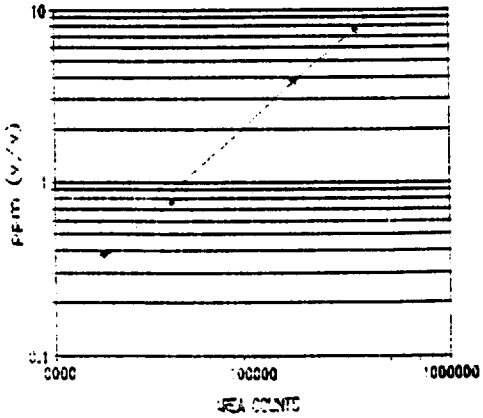
BUTANE
CALIBRATION LINEARITY



PENTANE
CALIBRATION LINEARITY



HEXANES+
CALIBRATION LINEARITY



LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec

Location/Unit: Chalk Cliff Turbine

Report: 100-288

Date Tested: 12/16/92

Analyst: DGS

RUN # Blanks #1

Probe/Nozzle/Filter Top

Dish # 9			
#1	#2	#3	Average
final (g) 3.6570	3.6570		3.6570
tare (g) 3.6561			3.6561
NET (g)			0.0009

Filter # 393

#1	#2	#3	Average
final (g) 0.6179	0.6177		0.6178
tare (g) 0.6178			0.6178
NET (g)			0

Condensable (aliquot 250 ml/ 500 ml)

Dish # 10			
#1	#2	#3	Average
final (g) 3.6747	3.6741		3.6749
tare (g) 3.6740			3.6740
NET (g)			0.0009

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec

Location/Unit: Chalk cliff Turbine

Report: 100-288

Date Tested: 12/16/92

Analyst: DGS

RUN # Blanks #2

Probe/Nozzle/Filter Top

Dish #	#1	#2	#3	Average
final (g)	3.2918	3.2917		3.2918
tare (g)	3.2911			3.2911
NET (g)				0.0007

Filter # 391

	#1	#2	#3	Average
final (g)	0.6163	0.6161		0.6162
tare (g)	0.6163			0.6163
NET (g)				0

Condensable (aliquot 250ml / 500ml)

Dish # 12	#1	#2	#3	Average
final (g)	3.7418	3.7414		3.7416
tare (g)	3.7410			3.7410
NET (g)				0.0006

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec

Location/Unit: Chalkcliff Turbine

Report: 100-288

Date Tested: 12/16/92

Analyst: DGS

RUN # Blank

Probe/Nozzle/Filter Top

Dish #	#1	#2	#3	Average
final (g)				
tare (g)				
NET (g)				

Filter # _____

	#1	#2	#3	Average
final (g)				
tare (g)				
NET (g)				

Reagent H_2O Condensable (aliquot 100ml / 518 ml)

Dish # 11	#1	#2	#3	Average
final (g)	3.6600	3.6602		3.6601
tare (g)	3.6594			3.6594
NET (g)				0.0007

LABORATORY ANALYSIS
EPA METHOD 5 - PARTICULATE ANALYSIS

Company: Destec

Report: 100-284

Location/Unit: Chalk cliff Turbine

Date Tested: 12/16/92

Analyst: DGS

RUN # Blank

Probe/Nozzle/Filter Top

Dish #	#1	#2	#3	Average
final (g)				
tare (g)				
NET (g)				

Filter #

	#1	#2	#3	Average
final (g)				
tare (g)				
NET (g)				

Reagent H2O Condensable (aliquot 100 ml / 518 ml)

Dish # 3	#1	#2	#3	Average
final (g)	3.7006	3.7002		3.7006
tare (g)	3.6910			3.6910
NET (g)				0.0004

SOURCE TEST PROTOCOL

PETRO
CHEM
ENVIRONMENTAL
SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

Chalk Cliff Cogeneration Facility
C/O Gary Fuller (WZI, Inc.)
November 23, 1992

Unit: Gas Turbine and
Three Lube Oil Vent Stacks

SOURCE TEST PLAN

I. Source Information:

A. Unit:

One 48.0 MW GE LM-5000
Gas Fired Turbine
PTO 4175001
Three Oil Vent Stacks

B. Company:

Destec Engineering
Chalk Cliff Cogeneration Facility
Sec. 31, T325, R245
Kern County, California

C/O Gary Fuller (WZI, Inc.)
4800 Easton Drive, Suite 114
Bakersfield, California 93309

II. Testing Firm:

Petro Chem Environmental Services, Inc.
3207 Antonino Avenue
Bakersfield, CA 93308

Attention: Tim Brennan

III. Regulatory Agency:

San Joaquin Valley Unified APCD
Southern Region

IV. Summary:

Determination of concentrations (ppm) and emissions (lb/hr) of particulate, SO_4, SO_2, NMHC, NH_3, NOx, CO, Spec II and NH_3 relative accuracy, from the exhaust of a gas fired Turbine/Generator.

V. Testing Date:

December 15, 16, & 17, 1992

Chalk Cliff Cogeneration Facility
C/O Gary Fuller (WZI, Inc.)
November 23, 1992

Unit: Gas Turbine and
Three Lube Oil Vent Stacks

PROPOSAL FOR COMPLIANCE TESTING ● TURBINE MAIN STACK

Determination of concentrations (ppm) and emissions (lb/hr) of particulate, SO_4, SO_2, NMHC, NH_3, NOx, and CO from the exhaust of one 48 MW gas fired Turbine/Generator. Relative Accuracy testing will be performed for NOx and NH_3 following Title 40 CFR performance Spec II; a minimum of nine thirty minute runs will be performed. All testing and analysis will be performed by PCES at the Bakersfield facility. If sulfur analysis is performed by EPA Method 20 and 19 then EAS Labs of San Luis Obispo will be used (example analysis enclosed). The following methods will be used:

Parameters	Method	# Test Runs	Permit Limit, lb/hr	Detection Limit lb/hr ● 240,000 DSCFM
Particulate	EPA Method 5; Gravimetric	2 - 24 hr	5.86	0.07
*** SO_4	Fuel Analysis / Fuel Rates 30% as SO_4	3	0.00	0.003
*** SO_2	Fuel Analysis / Fuel Rates 70% as SO_2	3	0.28	0.005
Ammonia	One hour BAAQMD ST-1B / EPA Method 350.3; Spec Ion Electrode	9 - 30 min.	N/A	0.03
NMHC	EPA Method 18; C_1-C_6+	3	** 6.06	0.9
* NOx	EPA Method 20; Chemiluminescent Analyzer	9 - 30 min.	7.95 lb/hr 0.018 lb/MMBtu	0.2
* CO	EPA Method 10; GFC Analyzer	4 - 30 min.	53.26	0.1
* O_2	EPA Method 20; Fuel Cell Analyzer	9 - 30 min.	---	---
Molecular Weight $O_2/CO_2/N_2$	EPA Method 3; Orsat	3	---	---
Volume Flow DSCFM	EPA Method 2; Pitot Tube Traverse	3	---	---
Relative Accuracy NH_3/NOx/O_2	Title 40 CFR Performance Spec II	See above NOx, NH_3, O_2	20%	---

* An initial 48 point concentration traverse will be performed to document the point(s) of average concentration. All follow-up runs will be performed at the point(s) of average concentration.

** Includes emissions from lube oil vent stacks.

*** 70% as SO_2
30% as SO_4

Chalk Cliff Cogeneration Facility
C/O Gary Fuller (WZI, Inc.)
November 23, 1992

Unit: Gas Turbine and
Three Lube Oil Vent Stacks

PROPOSAL FOR COMPLIANCE TESTING @ LUBE OIL VENT STACKS

Determination of concentrations (ppm, gr/DSCF) and emissions (lb/hr, lb/day) of condensable and non condensable hydrocarbon emissions from the exhaust of three lube oil vent stacks. The following procedures will be used:

Parameters	Method	# Test Runs/Site
Condensable Hydrocarbons	EPA Method 4; with Gravimetric Organic Extractions Utilizing CARB Method 5.4.3.1	2
Non Condensable Hydrocarbons	EPA Method 18; Bag Sample FID Analysis	2
Volume Flow	EPA Method 2; Pitot Tube or Hot Wire Anemometer	2
Molecular Weight	EPA Method 3; Orsat Analysis	2
% H_2O	EPA Method 4; Condensation	2

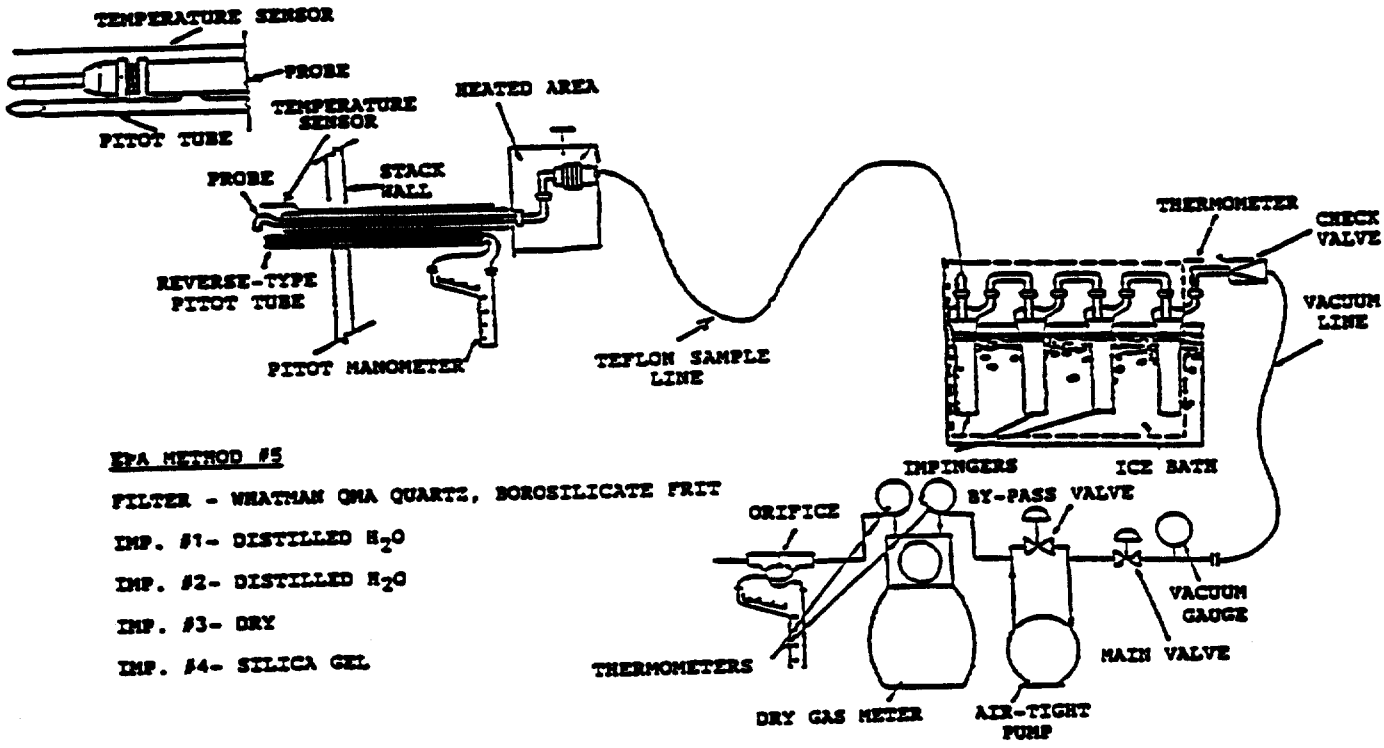
SAMPLING AND ANALYTIC PROCEDURES
EPA METHOD 1,2,3,4, and 5

REF: EPA Code of Federal Regulations, Title 40, Part 60, Appendix A.
EPA METHOD 1,2, 3, 4, and 5

Sampling Apparatus for Methods 1, 2, 3, 4, and 5

The sampling apparatus will consist of a stainless steel nozzle and heater wrapped stainless steel probe, and heated filter holder. The filter will connect to a teflon filter-to-impinger line. A series of impingers (see diagram) will be connected in tandem and immersed in an ice bath. Following the absorption train will be a gas pump, dry test meter, and a calibrated restriction orifice fitted with a magnehelic differential pressure gauge. A type 'S' pitot tube and temperature probe will then be positioned alongside the probe terminating at the sample nozzle for monitoring duct conditions throughout the test.

Sampling Diagram



EPA Method 1: Sampling and Velocity Traverses for Stationary Sources

Prior to the source test a site accessment will be performed in order to locate sample points for obtaining the best representative measurements of pollution concentrations and volumetric flow rates. EPA Method 1 takes into account duct area, straight run and cyclonic or stratified flow patterns.

EPA METHOD 1-5
(con't)

EPA Method 2: Velocity and Volumetric Flow Rates

A computer will be used in selection of suitable sample/traverse points. The calibrated pitot tube will be connected to a magnehelic gauge and leak checked. A temperature and delta-P will then be recorded at each traverse point and a duct static pressure will also be measured and recorded. A volume flow rate will be calculated from the measured required traverse points.

EPA Method 3: % CO2, % O2, Dry Molecular Weight

Concurrent with each particulate sampling, an integrated gas sample will be withdrawn from the summation of the traverse points through the train and collected at the outlet of the meter into a sample bag. The contents of the sample bladder will be analyzed by Orsat for fixed gas composition.

EPA Method 4: Percent Water

Tare weights of the charged individual impingers will be recorded. After sampling, the final weights will be recorded. Percent water will be calculated from the weight of water collected and the dry gas volume sampled.

EPA Method 5: Particulate Emissions

A series of preliminary measurements will be made prior to conducting the particulate test. EPA Methods 1, 2, and 3 will be performed to determine location and number of traverse points, average gas velocity, and pressure and gas molecular weight. Percent water will be determined by a psychrometric chart or from combustion analysis of the fixed gases. The results of these measurements will be entered into the field computer for the purpose of determining an appropriate nozzle size for isokinetic sampling.

The method 5 apparatus will be prepared on-site in the mobile laboratory. The absorption train will be charged with freshly prepared chemicals, weighted on a calibrated digital balance to the nearest 0.1 grams, and assembled. The probe will be brushed out and rinsed with distilled water and acetone and the filter holder will then be charged.

The sampling apparatus will be sealed and transported to the sampling site were it will be assembled and leak tested at 15 inches mercury vacuum.

The probe and filter heaters will be set at 250 °F and the probe will then be positioned into the duct at the first traverse point with the nozzle out of the flow.

The nozzle will be positioned into the gas flow and the vacuum pump will be started immediately and adjusted to obtain an isokinetic sample rate. A complete traverse will be performed while sampling at a minimum of two minutes per

sample point. Upon completion of the traverse the vacuum pump will be turned off and the probe will be transferred into the next sample port where an identical sample-traverse will be performed. Duct conditions (temperature, Δ-P) and sampling conditions (meter temperature, volume and pressure, probe, filter and impinger temperatures, and absorption train vacuum) will be monitored and recorded regularly for each sample point.

Upon completion of sampling, the apparatus will be leak tested at a vacuum greater than the highest observed vacuum. The leak will be recorded and the apparatus will then be sealed and transported to the mobile laboratory. The filter-to-impinger line will be rinsed with a known amount of distilled water into the first impinger.

The filter and any loose particulate will be carefully removed from the filter holder with forceps. It will then be placed in a labeled petri dish and transported to the P.C.E.S. laboratory. The nozzle, probe, and filter top housing will be rinsed and brushed three times with distilled water and acetone. The sample fractions will be combined, bottled, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory. Aliquots of acetone and distilled water will be similarly treated for blank analysis.

The absorption train will be inspected for abnormalities and disassembled. The impingers will be weighed on a digital balance for a percent moisture determination. The contents of the impingers will be quantitatively transferred into bottles, sealed, labeled, and fluid level marked for transportation to the P.C.E.S. laboratory for analysis, if required. Aliquots of the reagent grade impinger contents will be saved for blank analysis.

The filter will be transferred to an oven and heated at 105 °F for 2-3 hours and then placed in a desiccator for 24 hours. The filter will then be weighed on a Mettler digital balance to the nearest 0.01 mg. Additional six hour desiccations and weighings will be performed until the difference between consecutive weighings are less than 0.5 mg or one percent of the total filtrate weight (weighed to a constant weight).

The nozzle/probe/filter top wash will be examined for any leakage during transportation and transferred to a tared evaporation dish. The wash will then be evaporated at an elevated temperature, below the boiling point of the wash, with occasional swirling. The dish and wash residue will then be desiccated and weighed to a constant weight.

If required by the regulatory agency, the contents of the first impinger will be recovered and diluted volumetrically to a known volume. An aliquot of this sample will then be evaporated, desiccated, and then weighed to a constant weight.

The net weight of particulate will be calculated from the two fractions (three fractions including the impinger contents, if required). Concentrations (gr/DSCF) and emissions (lb/hr) or other applicable units will be calculated and reported.

EPA METHOD 2
STACK GAS VELOCITY AND VOLUMETRIC FLOWRATE

Average Stack Gas Velocity
Eq. 2-6 & Eq. 2-9

$$P_g = \frac{\text{Static Pressure, } H_2O}{13.6}$$

$$P_s = P_{bar} + P_g$$

$$V_s = K_p \, C_p \, (\sqrt{\Delta P})avg \sqrt{\frac{T_{s\,(avg)}}{P_s \, M_s}}$$

Average Stack Gas Dry Volumetric Flow Rate
Eq. 2-10

$$Q_{std} = 60\,(1 - B_{ws})\, v_s\, A \left(\frac{T_{std}}{T_{s\,(avg)}}\right) \left(\frac{P_s}{P_{std}}\right)$$

$$\frac{Q_{std}}{MF} = SCFM$$

EPA METHOD 3
DRY MOLECULAR WEIGHT OF STACK GAS
Eq. 3-2

$$M_d = 0.44\,(\%\,CO_2) + 0.320\,(\%\,O_2) + 0.280\,(\%\,N_2 + \%\,CO)$$

Wet Molecular Weight of Stack Gas

$$M_s = M_d\,(1 - B_{ws}) + 18\,(B_{ws})$$

EPA METHOD 4
DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Volume of Water Vapor Condensed
Eq. 4-1

$$V_{wc\ (std)} = \frac{(V_f - V_i)\rho_w\ RT_{std}}{P_{std}\ M_w} = K_1 (V_f - V_i)$$

Where: $K_1 = 0.04646\ \frac{ft^3}{ml}$ @ 520° R

Volume of Water Vapor Collected in Silica Gel
Eq. 4-2

$$V_{wsg\ (std)} = \frac{(W_f - W_i)\ RT_{std}}{P_{std}\ M_w\ (453.6\ g/lb)}$$

$$= K_2 (W_f - W_i)$$

Where: $K_2 = 0.04651\ \frac{ft^3}{g}$ @ 520 ° R

Sample Gas Volume
Eq. 4-3

$$V_{m\ (std)} = V_m\ Y \left(\frac{(P_m)(T_{std})}{(P_{std})(T_m)} \right)$$

$$= K_3\ Y\ \frac{V_m\ P_m}{T_m}$$

Where: $K_3 = 17.38\ \frac{° R}{in.\ Hg}$ @ 520 ° R

Moisture Content
Eq. 4-4

$$B_{ws} = \frac{V_{wc\ (std)} + V_{wsg\ (std)}}{V_{wc\ (std)} + V_{wsg\ (std)} + V_{m\ (std)}}$$

$B_{ws} \times 100 =$ % H_2O *in gas stream*

$$MF = 1 - B_{ws}$$

EPA METHOD 5
DETERMINATION OF PARTICULATE EMISSIONS FROM STATIONARY SOURCES
Use in Method 5 and 8 combinations runs

Dry Gas Volume
Eq. 5-1

$$V_{m\,(std)} = V_m\, Y \left(\frac{T_{std}}{T_m}\right)\left[P_{bar} + \frac{\Delta H}{13.6}\right]$$

$$= K_1\, V_m\, Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

$$= K_1 = 17.38 \frac{^\circ R}{in.Hg} @ 520\,^\circ R$$

*In case of leak rate beyond allowable limits, correct Eq. 5-1 as follows:
Case 1 - No component changes made during run.

$$V_m = V_m - (L_p - L_a)\theta$$

Case 2 - One or more component changes made during run.

$$V_m = \left[V_m - (L_1 - L_a)\,\theta_1 - \sum_{i=2}^{n} (L_i - L_a)\,\theta_i - (L_p - L_a)\,\theta_p\right]$$

Volume of Water Vapor
Eq. 5-2

$$V_{wc\,(std)} = V_{lc}\left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right)$$

$$= K_2\, V_{lc}$$

Where: $K_2 = 0.04646 \frac{ft^3}{ml} @ 60\,^\circ F$

Moisture Contnet
Eq. 5-3

$$B_{ws} = \frac{V_{wc\,(std)}}{V_{m\,(std)} + V_{wc\,(std)}}$$

EPA METHOD 5
(con't)

Acetone Blank Concentration
Eq. 5-4

$$C_a = \frac{M_a}{V_a \rho_a}$$

Acetone Wash Blank
Eq. 5-5

$$W_a = C_a V_{aw} \rho_a$$

Particulate Concentration
Eq. 5-6

$$C_s = \frac{gr}{dscf} = \left(0.001 \frac{g}{mg} \right) \left(\frac{M_n}{V_{m(std)}} \right) (15.432)$$

$$gr/dscf\,(MF) = \frac{gr}{scf}$$

Corrected to 12 % CO_2

$$\frac{gr}{dscf} @ 12\%\ CO_2 = \frac{\frac{gr}{dscf} \times 12\ \%\ CO_2}{\%\ CO_2\ (dry)}$$

Isokinetic Variation
Eq. 5-7 and 5-8

$$\%\ I = 100 \times \frac{T_s \left[V_{lc} K_3 + \frac{V_m}{T_m} \left(P_b + \frac{\Delta H}{13.6} \right) \right]}{60\ \theta\ A_n\ V_s\ P_s}$$

Where: $K_3 = 0.002669$

Mass Emission Rate

$$\frac{lbs}{hr} = \frac{gr}{dscf} \times dscfm \times 60 \frac{m}{hr} \times \frac{1\ lb}{7000\ gr}$$

NOMENCLATURE

(1 of 3)

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 SO3) 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 $\frac{ft\ [(lb/lb\text{-}mole)(in\ Hg)]^{\frac{1}{2}}}{sec[\ (^\circ R)\ (in\ H_2O)\ ]}$

L_p = Leakage rate observed during the post-test leak 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 "i^{nth}" 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, ($P_{bar} + \Delta H/13.6$)

NOMENCLATURE

(2 of 3)

P_s = Absolute stack gas pressure, (inches 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) $(ft^3)/(lb\text{-}mole)(^\circ R)$

t_s = Stack temperature, ($^\circ F$)

T_m = Absolute temperature at meter, ($^\circ R$)

$T_{(std)}$ = Standard absolute temperature, (520°R)

T_s = Absolute stack temperature, ($460^\circ + t_s$)

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_{ic} = 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, (ml)

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

W_f = 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 @ 60°F)

NOMENCLATURE

(3 of 3)

ρa = 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)

$\%N_2$ = Percent N_2 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)

32.03 = Equivalent weight of sulfur dioxide

θ = Total sampling time (min)

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

θ_1 = Sampling time interval, from the run beginning until first component change, (min)

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

CONTINUOUS EMISSION MONITORING SYSTEM (CEMS)

Reference: Manual of Procedures; ST-13A, ST-19A, Jan 1982, State of California, Air Resources Board, Test Methods 1-100, June 1979.
EPA CFR Title 40, Pt. 60, Appendix A, Method 3A, 6C, 7E, & 10.

Instrument Summary

A constant sample of flue gas will be extracted, dried, filtered and delivered to an instrument manifold system for distribution to one or more analyzers. Instrument results will be recorded on an analog strip chart recorder. System calibration checks will be performed as well as calibration checks at the beginning and end of each test run. Final data reduction includes zero and calibration drift corrections.

Sample Conditioning System

Consists of a borosilicate glass tube or 316 grade stainless steel probe fitted with a cindered stainless steel or pyrex glass wool particulate filter. The probe will be fitted with a teflon (TFE) sample line which connects to a water condensation system located at the source. The condensation system will consist of three 500-ml short stem glass impingers connected in a series, immersed in an ice bath. The gas will be delivered to the instrument trailer with a teflon line (3/8" O.D.) through an in-line Balston particulate filter drawn by a teflon-coated diaphragm pump. The sample system will be leak checked prior to sampling by plugging the end of the sample probe and adjusting the sample pump to its maximum rate (approximately 22" Hg). The manifold will be by-passed and the leak rate monitored through a gas meter or low range flow meter.

Manifold System

Sample gas will be delivered to each analyzer through a five way valve and regulated with a needle valve flow meter. Manifold pressure will be controlled by a back pressure regulator which is typically set at three psi. Zero gas (N_2) and calibrated gases will be delivered to the analyzers using the same five way valve and flow meter. All manifold parts are glass, stainless steel, or teflon materials.

Analog Strip Chart Data Reduction

Analog recordings consists of averaged time increments as shown on the data pages (typically 5, 10, or 20 minute increments). Data for each increment will be recorded at an average percent of full scale. The readings will then be compared with the zero and calibration readings for calculation of the average concentration for each time increment. Any deviation of the zero and calibration readings from the start to the end of a test period will be corrected by calculating apparent zero and calibration readings for the mid-point of each time increment. The average concentrations will be calculated from the sample readings and the apparent zero and span readings.

EPA METHOD 18
HYDROCARBON EMISSIONS TESTING
FID ANALYSIS

Sampling Procedures

The sample will be drawn via evacuated cannister through a stainless steel/teflon probe into a tedlar bag. Each sample bag will be evacuated and then filled.

Analytical Procedures

The contents of the tedlar bag will be analyzed by gas chromatography. The gas chromatograph will be calibrated with an appropriate standard for each carbon #, before and after each set of samples are analyzed. The sample will be speciated by carbon #-C_1, C_2, C_3, C_4, C_5, and C_{6+} backflush.

Symbol Identification

i	=	Carbon #; i = 1 to 6+
s	=	Refers to standard for that carbon #
Rx_i	=	Response factor for C_i
MW	=	Molecular weight - g/mole
DSCFM	=	Average volume flow rate of unit tested

Equations

$$Rx_i = \frac{Area_{std}}{ppm_{std}}$$

$$Sample\ ppm_i = \frac{1}{Rx_i} \times Area_i$$

$$Sample\ ppm\ (as\ C_i) = Sample\ ppm \times \#\ of\ carbons$$

$$\frac{lbs}{hr_i} = ppm_i \times MW_i \times DSCFM \times 1.581 \times 10^{-7}$$

$$Total\ non\text{-}methane\ \frac{lbs}{hr} = \sum_{2}^{6+} \frac{lbs}{hr_i}$$

Note 1: If lbs/hr as methane is required, MW will equal 16.0 (MW of methane)
Note 2: # of carbons: ethane = 2; propane = 3; etc...

Method 5.4.3.1: Impinger Catch and Extract

5.4.3.1.

The impinger catch will consist of the water and organic solvent* rinsings from the sample train connections between the filter and impingers, plus the impinger contents. These are usually received in 1 to 4 one pint wide-mouth Mason jars.

The methylene chloride used in the extraction shall also have a blank run on it, similar to those run for the water and acetone. The methylene chloride extraction is to be corrected the same way the acetone rinse is. The impinger catch extract and impinger catch will be weighed to a constant weight as defined earlier.

4.3.1.2

Combine the catch in a separatory funnel of suitable size. The Mason jar will be rinsed with methylene chloride into the separatory funnel.

4.3.1.3

Extract the aqueous catch three times with 50 ml-portions of methylene chloride (CH2C12). Each time, extract for 30 seconds with vigorous shaking, then allow the layers to separate (which may sometimes take up to 15 minutes due to emulsion formation). Drain the CH2C12 layers into a breaker of suitable size through a short stem funnel containing a cotton plug, to remove droplets of water from the CH2C12 extract. Save an aqueous layer for use in Section 4.3.1.8.

4.3.1.4

Rinse the funnel and cotton with fresh CH2C12 and concentrate the combined CH2C12 extract to about 25ml under a stream of clean filtered air at room temperature in a hood.

4.3.1.5

Quantitatively transfer the concentrated extract to a tared 50ml beaker and evaporate to dryness under the above conditions and place in a desiccator for one hour.

4.3.1.6

Weigh the extract residue to the nearest 0.1mg.

* Methylene Chloride (CH2C12) unless the source being evaluated dictates otherwise, then usually benzene is used.

4.3.1.7

Record the gross and tare weights and report the net weight as "Impinger Catcher Extract".

4.3.1.8

From Section 4.3.1.3 quantitatively transfer the aqueous phase to a suitable size beaker and concentrate to about 25ml on a hot plate or steam bath with the aid of the clean filtered air steam.

4.3.1.9

Quantitatively transfer the aqueous concentrate to a tared 50ml beaker and evaporate to dryness on a steam bath.

4.3.1.10

Place the beaker containing the residue in a 105°C over for one hour and then let cool in a dessicator.

4.3.1.11

Weigh the residue to the nearest 0.1mg.

SOURCE TEST PROCEDURE BAAQMD ST-1B
AMMONIA, INTEGRATED SAMPLING

1. Applicability

   1.1 This method is used to quantify emissions of ammonia.

2. Principle

   2.1 Sample gas is drawn through a solution of 0.1 normal (0.1N) hydrochloric acid which absorbs the ammonia. The ammonia is then analyzed according to Analytical Procedure EPA 350.3.

3. Range

   3.1 The minimum measurable concentration of ammonia is 1 ppm at the sample volume specified in this procedure.

   3.2 Elevated concentrations of ammonia may be determined by increasing the concentration of the absorbing reagent, hydrochloric acid solution. The concentration of reagent to be used may be determined by stoichiometry, allowing a 50% excess.

4. Interference

   4.1 See EPA Method 350.3.

5. Apparatus

   5.1 Probe - The probe is constructed of borosilicate glass tubing fitted with a glass wool filter in the nozzle.

   5.2 Condensers - Use three Greenberg-Smith impingers as absorber/condensers. The final impinger has a thermometer attached to the inlet stem.

   5.3 Cooling system - Use an ice bath to contain the impingers.

   5.4 Sample pump - Use a leak-free vacuum pump capable of maintaining a 14.3 liter/min (0.5 CFM) flow rate at 15 inches of mercury. The pump must have a flow control valve and vacuum gauge attached to the inlet.

   5.5 Silica gel tube - Use approximately 500cc of silica gel (with a Drierite indicator) to insure that the gas entering the dry test meter is dry.

   5.6 Dry test meter - Use a dry gas test meter accurate within + 2% of the true volume and equipped with a thermometer to measure the outlet temperature.

5.7 Connections - Use Teflon tubing in making all connections that come in contact with the sample. Vinyl tubing is acceptable for all other connections.

5.8 Barometer - Use a barometer that is accurate to within + 0.2 inches of mercury.

5.9 Rotameter - Use a calibrated rotameter to measure the sampling rate.

6. Reagents

6.1 Hydrochloric acid, 0.1N. Dissolve 7.30 ml concentrated HCl in sufficient water to make a 1.0 liter solution.

7. Pre-test Procedures

7.1 Add 100 ml of the HCl solution to each of two impingers.

7.2 Stopper the impingers.

7.3 Retain 100 ml of the HCl solution to analyze as a blank.

7.4 Assemble the sampling train as shown in Figure IV-4.

7.5 Leak-test the sampling train by starting the pump, plugging the probe, and adjusting the pump inlet vacuum to 10 inches Hg. The leak rate must not exceed 0.6 liter/min (0.02 CFM) through the dry test meter. Before stopping the pump, carefully release the plug in the sample probe to avoid back flow of the impinger solution.

7.6 Record the initial dry test meter reading and barometric pressure on the sampling data sheet.

7.7 If there is evidence of concentration stratification, select the sampling traverse points according to ST-18. Otherwise, sample at a single point.

8. Sampling

8.1 Each test run shall be of thirty minute duration when testing emissions from continuous operations. Each test run at batch process operation shall be for 90% of the batch time or thirty minutes, whichever is less.

8.2 Position the probe at the sampling point and start the pump.

8.3 Sample at a constant rate of 14.3 liter/min (0.5 CEM) during the test as determined by the rotameter. Use the rotameter only to establish the initial sampling rate. Then remove it from the system.

8.4 Record the following information at five minute intervals.

A. Dry test meter temperature
B. Impinger outlet temperature
C. Dry test meter volume

8.5 Add ice as necessary to maintain impinger temperatures at 7 °C (45 °F) or less.

8.6 At the conclusion of each run, stop the pump, remove the probe from the stack, record the final meter reading. Point the probe upward and purge the sample train with ambient air.

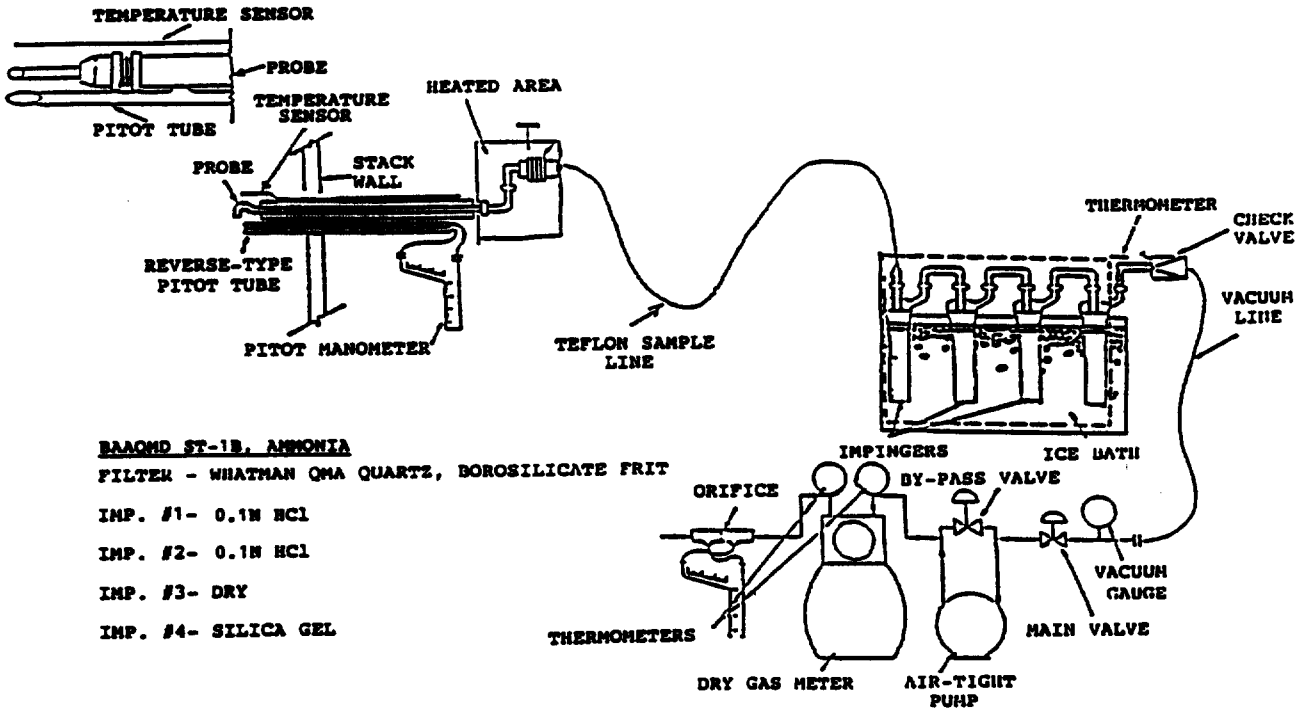
8.7 Take three consecutive samples.

9. Post-test Procedures

9.1 Stopper the impingers until they are analyzed.

9.2 Individually analyze the hydrochloric acid solutions and blank for total ammonia content according to analytical procedure Lab 1.

Sampling Diagram



NITROGEN, AMMONIA

Method 350.3
Potentiometric, Ion Selective Electrode

1. Scope and Application

   1.1 This method is applicable to the measurement of ammonia-nitrogen in drinking, surface, and saline waters, domestic and industrial wastes.

   1.2 This method covers the range from 0.03 to 1400 mg NH_3-N/l. Color and turbidity have no effect on the measurements, thus, distillation may not be necessary.

2. Summary of method

   2.1 The ammonia is determined potentiometrically using an ion selective ammonia electrode and a pH meter having an expanded millivolt scale or specific ion meter.

   2.2 The ammonia electrode uses a hydrophobic gas-permeable membrane to separate the sample solution from an ammonia chloride internal solution. Ammonia in the sample diffuses through the membrane and alters the pH of the internal solution, which is sensed by a pH electrode. The constant level of chloride in the internal solution is sensed by a chloride selective ion electrode which acts as the reference electrode.

3. Sample Handling and Preservation

   3.1 Samples may be preserved with 2 ml of conc. H_2SO_4 per liter and stored at 4°C.

4. Interferences

   4.1 Volatile amines act as a positive interference.

   4.2 Mercury interferes by forming a strong complex with ammonia. Thus, the samples cannot be preserved with mercuric chloride.

5. Apparatus

   5.1 Electrometer (pH meter) with expanded mV scale or a specific ion meter.

   5.2 Ammonia selective electrode, such as Orion Model 95-10 or EIL Model 8002-2.

   5.3 Magnetic stirrer, thermally insulated, and Teflon-coated stirring bar.

6. Reagents

6.1 Distilled water: Special precautions must be taken to insure that the distilled water is free of ammonia. This is accomplished by passing distilled water through an ion exchange column containing a strongly acidic cation exchange resin mixed with a strongly basic anion exchange resin.

6.2 Sodium hydroxide, 10N: Dissolve 400 g of sodium hydroxide in 800 ml of distilled water. Cool and dilute to 1 liter with distilled water (6.1)

6.3 Ammonia chloride, stock solution: 1.0 ml = 1.0 mg NH_3-N. Dissolve 3.819 g NH_4Cl in water and bring to volume in a 1 liter volumetric flask using distilled water (6.1).

6.4 Ammonia chloride, standard solution: 1.0 ml = 0.01 mg NH_3-N. Dilute 10.0 ml of the stock solution (6.3) to 1 liter with distilled water (6.1) in a volumetric flask.

NOTE 1: When analyzing saline waters, standards must be made up in synthetic ocean water (SOW); found in Nitrogen, Ammonia: Calorimetric, Automated Phenate Method (350.1)

7. Procedures

7.1 Preparation of standards: Prepare a series of standard solutions covering the concentration range of the samples by diluting either the stock or standard solutions of ammonium chloride.

7.2 Calibration of electrometer: Place 100 ml of each standard solution in clean 150 ml beakers. Immerse electrode into standard of lowest concentration and add 1 ml of 10N sodium hydroxide solution while mixing. Keep electrode in the solution until a stable reading is obtained.

7.3 Repeat this procedure with the remaining standards, going from lowest to highest concentration. Using semilogarithmic graph paper, plot the concentration of ammonia in mg NH_3-N/li. on the log axis vs. the electrode potential developed in the standard on the linear axis, starting with the lowest concentration at the bottom of the scale.

7.4 Calibration of a specific ion meter: Follow the directions of the manufacturer for the operation of the instrument.

7.5 Sample measurement: Follow the procedure in (7.2) for 100 ml of sample in 150 ml beakers. Record the stabilized potential of each unknown sample and convert the potential reading to the ammonia concentration using the standard curve. If a specific ion meter is used, read the ammonia level directly in mg NH_3-N/li.

8. Precision and Accuracy

8.1 In a single laboratory (EMSL), using surface water samples at concentrations of 1.00, 0.77, 0.19, and 0.13 mg NH_3-N/1, standard deviations were + 0.038, + 0.017, + 0.007, and + 0.003 respectively.

8.2 In a single laboratory (EMSL), using surface water samples at concentrations of 0.19 and 0.13 mg NH_3-N/1, recoveries were 96% and 91%, respectively.

BIBLIOGRAPHY

1. Booth, R.L., and Thomas, R.F., "Selective Electrode Determination of Ammonia in Water and Wastes", Envir. Sci. Technology, 7, p. 523-526 (1973).

2. Banwart, W.L., Bremner, J.M., and Tabatabai, M.A., "Determination of Ammonia in Soil Extracts and Water Samples by an Ammonia Electrode", Comm. Soil Sci. Plant., 3, p. 449 (1952).

3. Midgley, D., and Torrance, K., "The Determination of Ammonia in Condensed Steam and Boiler Feed-Water with a Potentiometric Ammonia Probe", Analyst 97, p. 626-633 (1972)

RELATIVE ACCURACY
Code of Federal Regualtions, 40 CFR, Pt. 60, App. B, Spec. 2

Arithmetic Mean of the Differences, d
Eq. 8.1

Where: n = Number of data points

$$\overline{d} = \frac{1}{n} \sum_{i=1}^{n} d_i$$

Standard deviation of the differences, S_d
Eq. 8.2

$$S_d = \left(\frac{\sum_{i=1}^{n} d_i^2 - \frac{\left(\sum_{i=1}^{n} d_i \right)^2}{n}}{n-1} \right)^{1/2}$$

Confidence Coefficient, CC
Eq. 8.3

$$CC = t_{0.975} \left(\frac{S_d}{\sqrt{n}} \right)$$

$t_{0.975}$ = t value Table (40 CFR, pg. 1043)

Relative Accuracy, RA
Eq. 8.4

$$RA = \frac{\left| \overline{d} \right| + \left| CC \right|}{\overline{RM}} \times 100$$

Where: |d|=Absolute value of the mean of differences (from Eq. 8.1)
RM = Average from reference method

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 275
BAKERSFIELD, CA. 93301
TELEPHONE: (805) 861-3682

Number: 4175001

PERMIT TO OPERATE IS HEREBY GRANTED TO: CHALK CLIFF, LIMITED

FOR EQUIPMENT LOCATED AT: Sec. 31, T32S, R24E

EQUIPMENT OR PROCESS DESCRIPTION: 48.0 MW Gas-Fired Turbine Engine Cogeneration System

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION.

NOTE: The permittee may be required to provide adequate sampling and testing facilities. Equipment modification requires a new permit.

REVOCABLE: This permit does not authorize the emission of air contaminants in excess of those allowed by the Rules and Regulations of the K.C.A.P.C.D.

WILLIAM J. ROODY
AIR POLLUTION CONTROL OFFICER

By:

For Period: 12-31-90 TO 12-31-91

CONDITIONAL APPROVAL:
Compliance with all conditions of approval imposed by any applicable Authority to Construct is required for life of this equipment unless modified by application. Equipment authorized by this Permit to Operate shall comply in full with applicable Rule 210.1 requirement.

EQUIPMENT DESCRIPTION: 48.0 MW Gas-Fired Gas Turbine Engine Cogeneration System, including the following equipment:

a. General Electric, Model LM 5000, 443.2 MM Btu/hr input natural gas-fired gas turbine engine.
b. Inlet air evaporative cooler.
c. Turbine combustor steam injection system for NOx control.
d. Heat recovery steam generator with no supplementary firing.
e. FW Energy Application, Inc., selective catalyst reduction (SCR) NOx control system utilizing ammonia as reducing agent.
f. Continuously recording emission monitors for NOx, NH3 and O2.
g. 48.0 MW electric generator.

OPERATIONAL CONDITIONS:

1. Gas turbine engine shall be fired exclusively with PUC-regulated quality natural gas. (Rule 210.1)
2. Gas turbine engine steam injection rate shall be maintained at steam to fuel ratio documented to result in compliance with emission limits. (Rule 209)
3. Ammonia injection rate shall be controlled to maintain ammonia "break through" to less than 20 ppmv. (Rule 419)
4. Fuel sulfur content shall not exceed 0.8% by weight. (Rule 422)

5. SO2 exhaust stack concentration shall not exceed 0.015% by volume and NO2 exhaust stack concentration shall not exceed 0.0122% by volume at 15% oxygen on a dry basis. (Rule 422)
6. Chalk Cliff Limited shall maintain accurate records of sulfur content in fuel gas and make such records readily available for District inspection upon request. (Rule 422)
7. If steam injection or SCR system is inoperative, gas turbine engine shall be shudown. (Rule 209)
8. Inlet gas temperature to catalyst bed shall be maintained within the range recommended by catalyst manufacturer. (Rule 209)
9. Gas turbine engine shall not burn more than 10.04 MM scf/day of natural gas. (Rule 209)
10. All gas turbine engine exhaust shall flow through catalyst bed. (Rule 210.1)
11. Lube oil tank relief valve shall have visible emissions of zero percent opacity. (Rule 210.1)

SPECIAL CONDITIONS:

aa. Chalk Cliff Limited shall comply in full with Rule 422 (New Source Performance Standards) requirements including notification, recordkeeping and monitoring requirements.
bb. Continuous emission monitoring system for NOx (as NO2), NH3, and 02 serving exhaust gas stream shall conform to Rule 108 specifications. (Rule 108)
cc. Continuous emission monitoring systems shall be calibrated and operated according to EPA guidelines as specified in CFR, Part 60, Appendix B. (Rule 108)
dd. Audits of monitors shall be conducted semi-annually by independent laboratory in accordance with EPA guidelines, witnessed by District, and reports shall be submitted to District within 30 days of such audit. (Rule 108)
ee. Chalk Cliff Limited continuous emission monitoring printouts shall be made readily available for District inspection upon request. (Rule 208)
ff. Chalk Cliff Limited shall keep accurate records of daily fuel consumption of gas turbine engine and shall make them readily available for District inspection upon request. (Rule 209)
gg. Steam produced at this facility for use in oil-production operations shall effect only wells connected to well vent vapor recovery systems owned by Cities Service unless prior District approval is obtained. (Rule 210.1)
hh. Chalk Cliff Limited shall provide design details, including but not limited to engineering drawings of SCR unit for District approval prior to installation. (Rule 209)
ii. Non-compliance with NOx emission sampling limit shall require: shutdown of gas turbine, down-throttling (reduced fuel consumption), or installation of additional SCR catalyst volume - increased emission limit(s) will require modified Authority to Construct before continued operation at such levels pursuant to Section 42350 of California Health & Safety Code, a variance from this condition cannot be obtained. (Rule 209)

WARNING: Failure of catalyst to preform as required because of catalyst poisonging or fouling shall not be recognized as basis for Rule 111 enforcement exemption. (Rule 209)

EMISSION SAMPLING LIMITS:

Particulates:	5.86 lbm/hr	(Rule 210.1)	
Sulfur Compounds:	0.28 lbm/hr	(of SO2)	(Rule 210.1)
	0.00 lbm/hr	(of SO4)	(Rule 210.1)
Oxides of Nitrogen:	7.95 lbm/hr	(as NO2)	(Rule 210.1)
	0.018 lbm/MM Btu	(as NO2)	(Rule 210.1 BACT requirement)
Hydrocarbons:	6.06 lbm/hr	(Rule 210.1)	(including lube oil cooler/ accumulating vent(s))
Carbon Monoxide:	53.26 lbm/hr	(Rule 210.1)	

COMPLIANCE TESTING REQUIREMENTS:

Compliance with particulates, sulfur compounds, oxides of nitrogen, hydrocarbon and carbon monoxide emissions limits shall be demonstrated by District-witnessed sample collection by independent testing laboratory within 60 days after startup of this equipment with all generators operating and with minimum number of generators operating and annually within 60 days prior to permit anniversary date and official test results and field data submitted within 30 days thereafter. (Rule 108.1)

PETRO
CHEM
ENVIRONMENTAL
SERVICES, INC.

3207 Antonino Avenue
Bakersfield, California 93308
(805) 327-7300
FAX (805) 327-3459

December 7, 1992

Gary Fuller
WZI Inc.
4800 Easton Drive
Bakersfield, California 93309

Re: Addendum to Destec, Chalk Cliff Protocol dated November 23, 1992

Dear Mr. Fuller:

At the request of Mr. Norm Harris with San Joaquin Valley Unified APCD we will calculate emissions as sulfur based on a fuel total sulfur analysis and fuel rates. Those emissions will be related to the permit allowable SO_4 and SO_2 emissions. It is my understanding that the total allowable emissions as sulfur will then be 0.14 lbs/hr:

$$0.28\ lb/hr\ SO_2 \times \frac{32\ gr/mole\ S}{64\ gr/mole\ SO_2} = 0.14\ lb/hr$$

$$+\ 0.00\ lb/hr\ SO_4 \times \frac{32\ gr/mole\ S}{96\ gr/mole\ SO_4} = 0.00\ lb/hr$$

$$\textit{Total allowable emissions as sulfur} = 0.14\ lb/hr$$

We will <u>not</u> report sulfur emissions as originally proposed: 70% of fuel sulfur as SO_2 and 30% of fuel sulfur as SO_4.

Also, due to the low levels of hydrocarbon emissions anticipated and the potentially low permitted level of hydrocarbons Petro Chem Environmental Services, Inc. (PCES) will be analyzing the EPA Method 18 samples using analytical sensitivity lower than described in the method.

Method 18 describes a lower limit of detection of 1 ppm. This detection limit might not be accurate enough to determine compliance at the Chalk Cliff Facility.

PCES proposes to analyze the samples using more sensitive gas chromatograph (GC) settings and increased sample volumes. This will increase our sensitivity by one order of magnitude to approximately 0.1 ppm.

I have enclosed the result of our recent method development that were performed to obtain these low sensitivities. Please review the chromatograms and the linearity curves for C_1 through C_6 at this low GC setting. We will be performing similar QA and documentation on the actual Chalk Cliff Method 18 samples.

In addition to the above described QA procedures we will also be analyzing an external audit sample prepared by Performance Analytical, Inc. of Canoga Park, California. The results of this analysis and percent accuracy will be included in the final source test report.

If you have any questions please don't hesitate to call me at (805)327-7300.

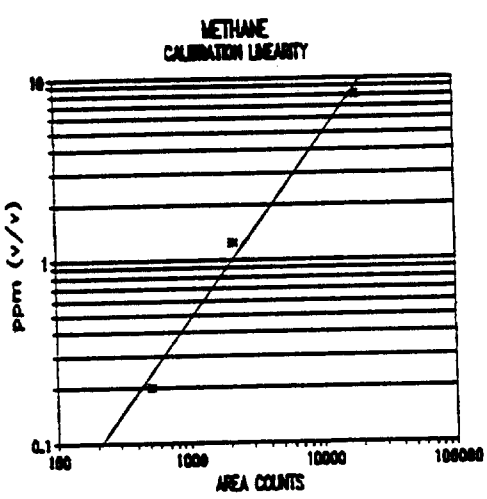
Sincerely,

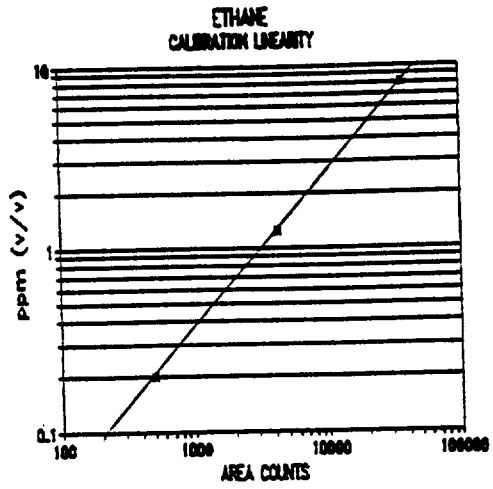
Tim Brennan
Operations Manager

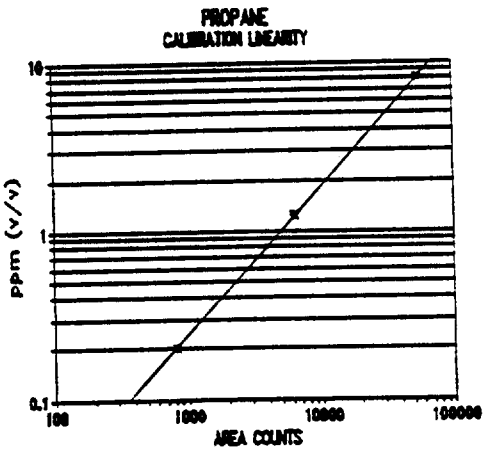
TMB/dt

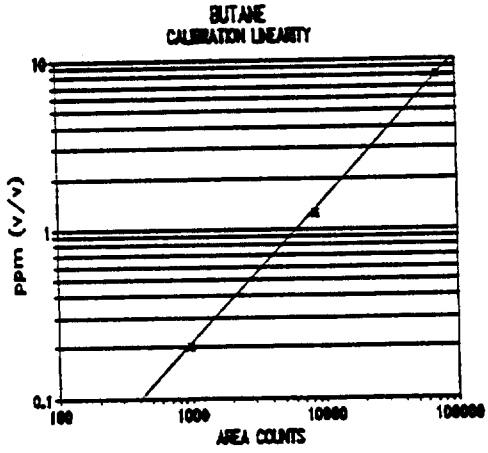
COMPANY : DESTEC
UNIT :
DATE :
REPORT :

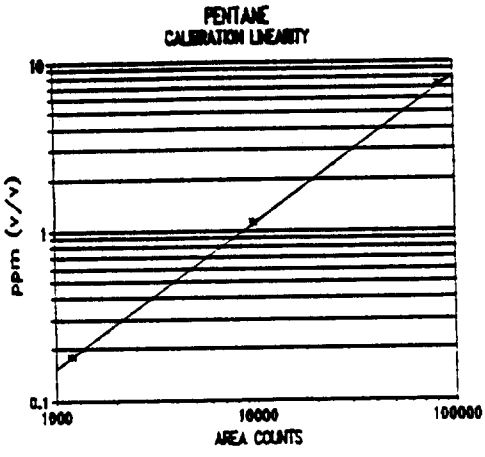
HYDROCARBON CALIBRATION LINEARITY GRAPHS
ANALYSIS; 0.2, 1.0, 8.0 ppm

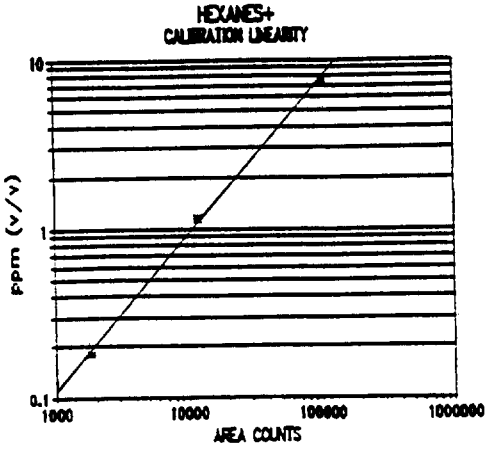




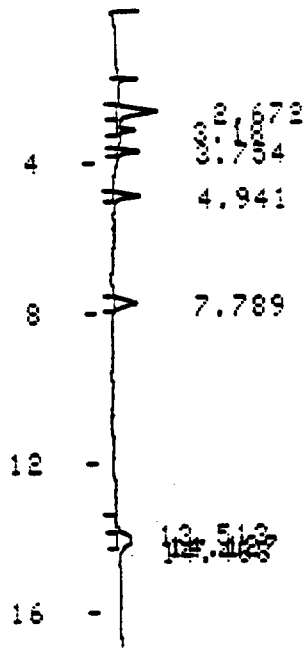








.2PPm HYDROCARBON STANDARD

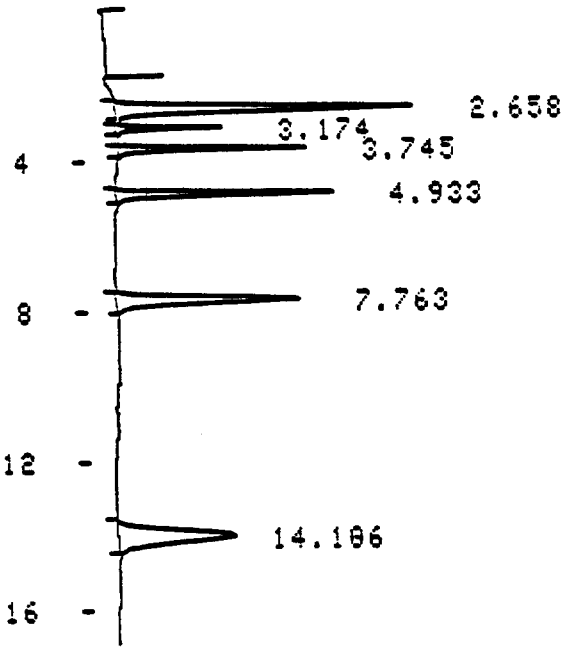


PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.672	1815		1		C-6+
2	3.18	519	V	2		METHANE
3	3.754	493		3		ETHANE
4	4.941	826		4		PROPANE
5	7.789	987		5		BUTANE
6	13.513	342				
7	14.127	1291	V	6		PENTANE
	TOTAL	6183				

CALIBRATION MADE IN IDENTIFICATION FILE 1
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC	Det Lim
1	C-6+	2.67	9.91482E-5	0.18	0.05
2	METHANE	3.17	0.000385181	0.2	0.15
3	ETHANE	3.74	0.000485433	0.2	0.15
4	PROPANE	4.93	0.000242219	0.2	0.10
5	BUTANE	7.77	0.000282716	0.2	0.08
6	PENTANE	14.11	0.000149905	0.18	0.06

100ppm HYDROCARBON STANDARD

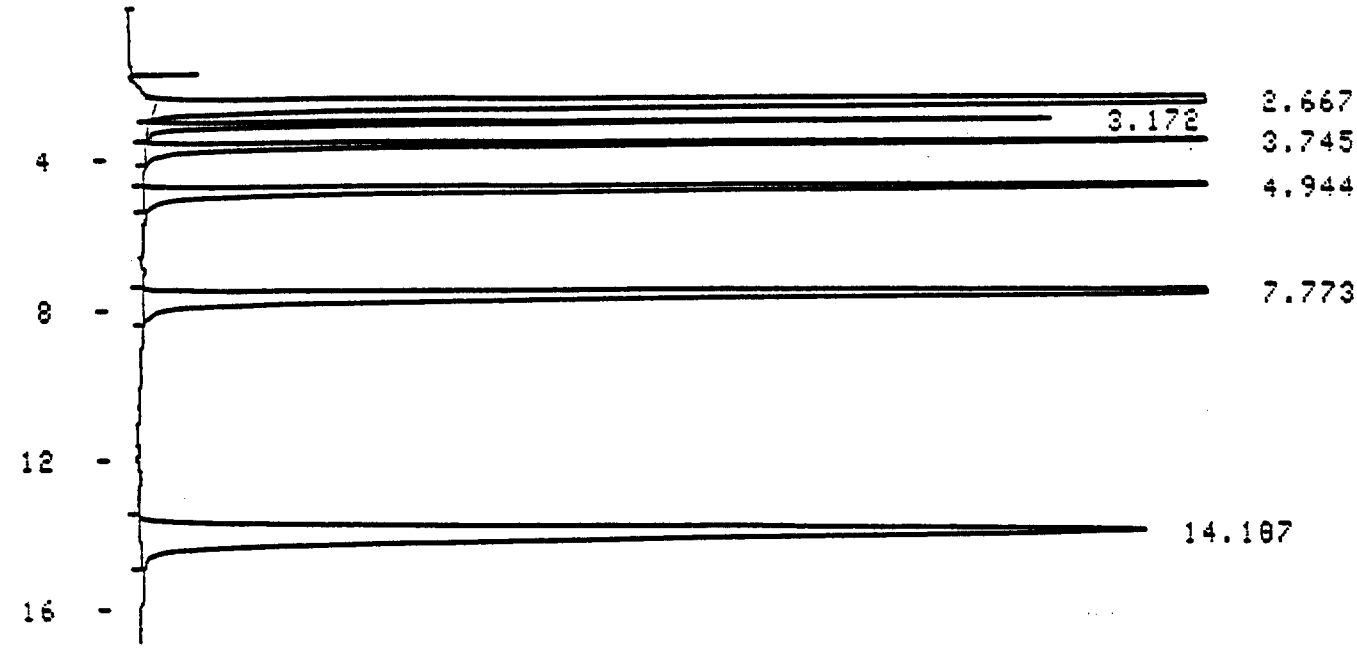


PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.658	12034		1		C-6+
2	3.174	2143		2		METHANE
3	3.745	4288		3		ETHANE
4	4.933	6269		4		PROPANE
5	7.763	8532		5		BUTANE
6	14.186	9689		6		PENTANE
	TOTAL	42876				

CALIBRATION MADE IN IDENTIFICATION FILE 1
MODE= 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-6+	2.65	9.47296E-5	1.14
2	METHANE	3.17	0.00057852	1.24
3	ETHANE	3.74	0.000294663	1.24
4	PROPANE	4.93	0.00019781	1.24
5	BUTANE	7.75	0.00014533	1.24
6	PENTANE	14.09	0.00011456	1.11

80ppm HYDROCARBON STANDARD

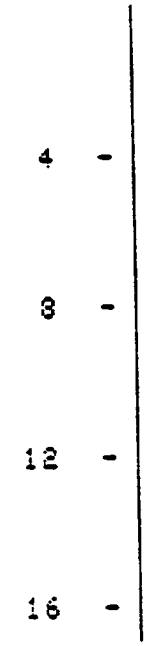


PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.667	183981		1		C-6+
2	3.172	18467		2		METHANE
3	3.745	36633		3		ETHANE
4	4.944	54186		4		PROPANE
5	7.773	71418		5		BUTANE
6	14.187	84824		6		PENTANE
	TOTAL	368549				

CALIBRATION MADE IN IDENTIFICATION FILE 1
MODE$ 101 WINDOW 3

IDNO	NAME	TIME	FACTOR	CONC
1	C-6+	2.66	0.000071799	7.46
2	METHANE	3.16	0.00043862	8.1
3	ETHANE	3.74	0.00022111	8.1
4	PROPANE	4.93	0.000149706	8.1
5	BUTANE	7.77	0.000113416	8.1
6	PENTANE	14.09	8.65233E-5	7.27

SYSTEM BLANK
UHP NITROGEN



WARNING NO PEAK