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Research and Development

Criteria Pollutant Emissions from Internal Combustion Engines in the Natural Gas Industry

Volume II. Appendices A-I

Prepared for:

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U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

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Volume II. Appendices

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Abstract

This report contains emissions data for nitrogen oxides (NO_x), carbon monoxide (CO), methane (CH_4), ethane (C_2H_6), nonmethane hydrocarbons (NMHC), and nonmethane-ethane hydrocarbons (NMEHC) from stationary internal combustion (IC) engines and gas turbines used in the natural gas industry. The emission factors were calculated from test results based on five test campaigns conducted as part of the Gas Research Institute's air toxics study, three of which were cofunded by the EPA. Test results for individual engines tested are presented, along with full load engine family-specific factors, and the calculated emissions factors are evaluated relative to the emission factors published in EPA report AP-42. Units tested included eleven 2-stroke engines and five 4-stroke engines, with and without controls, and two gas turbines. The data will enhance the current database in AP-42 for stationary IC engines. It will not only enlarge the population of engine types covered, but will enhance the emission factor quality of several engine categories which have a limited data set.

FOREWORD

The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the Agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. To meet this mandate, EPA's research program is providing data and technical support for solving environmental problems today and building a science knowledge base necessary to manage our ecological resources wisely, understand how pollutants affect our health, and prevent or reduce environmental risks in the future.

The National Risk Management Research Laboratory is the Agency's center for investigation of technological and management approaches for reducing risks from threats to human health and the environment. The focus of the Laboratory's research program is on methods for the prevention and control of pollution to air, land, water, and subsurface resources; protection of water quality in public water systems; remediation of contaminated sites and groundwater; and prevention and control of indoor air pollution. The goal of this research effort is to catalyze development and implementation of innovative, cost-effective environmental technologies; develop scientific and engineering information needed by EPA to support regulatory and policy decisions; and provide technical support and information transfer to ensure effective implementation of environmental regulations and strategies.

This publication has been produced as part of the Laboratory's strategic long-term research plan. It is published and made available by EPA's Office of Research and Development to assist the user community and to link researchers with their clients.

E. Timothy Oppelt, Director
National Risk Management Research Laboratory

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Appendix A Sample Calculations

This appendix includes sample calculations for load, heat input, heat rate, F_d factor, Method 19 flow rate, wet and dry basis conversions, unit conversions, and fuel flow calculations from an orifice meter.

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Sample Calculations

Load

$$\frac{\text{Operating HP}}{\text{Rated HP}} \times \frac{\text{Rated rpm}}{\text{Operating rpm}} \times 100(\%) = \text{Load } (\%)$$

Heat Input

$$\begin{aligned} & \text{Fuel Flow } \left[\frac{\text{scf}}{\text{min}} \right] \times \text{Heating Value of Fuel } \left[\frac{\text{Btu}}{\text{scf}} \right] \times \left[\frac{60 \text{ min}}{\text{hr}} \right] \times \left[\frac{\text{MMBtu}}{10^6 \text{ Btu}} \right] \\ & = \text{Heat Input } \left[\frac{\text{MMBtu}}{\text{hr}} \right] \text{ Can be based on HHV or LHV} \end{aligned}$$

Heat Rate

$$\begin{aligned} & \text{Heat Input [Based on LHV]} \left[\frac{\text{MMBtu}}{\text{hr}} \right] \times \frac{1}{\text{Operating HP}} \times \left[\frac{10^6 \text{ Btu}}{\text{MMBtu}} \right] \\ & = \text{Heat Rate } \left[\frac{\text{Btu}}{\text{HP-hr}} \right] \text{ Based on LHV} \end{aligned}$$

F_d Factor Calculation

$$\begin{aligned}
 & \frac{1.53 \left[\frac{\text{scf}}{\text{lb}} \right] (\% \text{wt. C}) + 3.64 \left[\frac{\text{scf}}{\text{lb}} \right] (\% \text{wt. H}) + 0.14 \left[\frac{\text{scf}}{\text{lb}} \right] (\% \text{wt. N}) - 0.46 \left[\frac{\text{scf}}{\text{lb}} \right] (\% \text{wt. O})}{\text{HHV} \left[\frac{\text{Btu}}{\text{scf}} \right] \times 385.5 \left[\frac{\text{scf}}{\text{lb-mole}} \right] \times \frac{1}{\text{MW}_{\text{fuel}}} \left[\frac{\text{lb-mole}}{\text{lb}} \right] \times \left[\frac{\text{MMBtu}}{10^6 \text{ Btu}} \right]} \\
 & = F_d \left[\frac{\text{dscf @ 0\% O}_2}{\text{MMBtu}} \right]
 \end{aligned}$$

Example Calculation of F_d Factor

Gas Analysis HHV = 1159 Btu/scf MW_{fuel} = 19.01 $\frac{\text{lb}}{\text{lb-mole}}$

	Mole %	x MW	= Weight per 100 moles	Weight %
N ₂	0.792	28	0.2218	1.169
CO ₂	0.078	44	0.0343	0.1809
CH ₄	80.954	16	12.95	68.30
C ₂ H ₆	16.423	30	4.927	25.99
C ₃ H ₈	1.479	44	0.6508	3.432
i-C ₄ H ₁₀	0.04	58	0.0232	0.1223
n-C ₄ H ₁₀	0.133	58	0.0771	0.4066
i-C ₅ H ₁₂	0.035	72	0.0252	0.1329
n-C ₅ H ₁₂	0.048	72	0.0346	0.1825
C ₆₊ as C ₆ H ₁₄ =	0.018	86	0.0155	0.0818
	<u>100.0</u>		<u>18.96</u>	<u>99.99</u>

$$N = \underline{1.169\% \text{ wt}}$$

$$C = \frac{12}{44} (0.1809) + \frac{12}{16} (68.3) + \frac{24}{30} (25.99) + \frac{36}{44} (3.432) +$$

$$\frac{48}{58} (0.1223) + \frac{48}{58} (0.4066) + \frac{60}{72} (0.1329) + \frac{60}{72} (0.1825)$$

$$+ \frac{72}{86} (0.0818) = \underline{75.64\%}$$

$$H = \frac{4}{16} (68.3) + \frac{6}{30} (25.99) + \frac{8}{44} (3.432) + \frac{10}{58} (0.1223)$$

$$+ \frac{10}{58} (0.4066) + \frac{12}{72} (0.1329) + \frac{12}{72} (0.1825) + \frac{14}{86} (0.0818) = \underline{23.05\%}$$

$$O = \frac{32}{44} (0.1809) = \underline{0.1316\%}$$

$$F_d = \frac{1.53 (75.64) + 3.64 (23.05) + 0.14 (1.169) - 0.46 (0.1316)}{\left[1159 \frac{\text{Btu}}{\text{scf}} \right] \left[\frac{385.5 \text{ scf}}{\text{lb-mole}} \right] \left[\frac{\text{MMBtu}}{10^6 \text{ Btu}} \right] \left[\frac{\text{lb-mole}}{19.01 \text{ lb}} \right]}$$

$$= \underline{8498 \frac{\text{dscf}}{\text{MMBtu}}}$$

Method 19 Flow Rate Calculation

$$F_d \left(\frac{\text{dscf @ 0\% O}_2}{\text{MMBtu}} \right) \times \text{Heat Input} \left(\frac{\text{MMBtu}}{\text{hr}} \right) \times \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \times \left(\frac{20.9}{20.9 - \text{O}_2 \%} \right)$$
$$= \text{Stack Flow Rate} \left(\frac{\text{dscf}}{\text{min}} \right)$$

where $\text{O}_2\%$ is exhaust concentration of O_2 based on CEM results.

Convert ppmvw to ppmvd

$$\text{ppmvw} \times \frac{1}{1 - \frac{\% \text{ H}_2\text{O in exhaust}}{100}} = \text{ppmvd}$$

Convert ppmvd to ppmvd at 15% O_2

$$\text{ppmvd} \times \frac{20.9 - 15}{20.9 - \text{O}_2 \%} = \text{ppmvd @ 15\% O}_2$$

where $\text{O}_2\%$ is dry exhaust concentration of O_2 based on CEM results.

Convert ppmvd to lb/hr

$$\text{ppmvd} \times \left(\frac{1 \text{ million}}{10^6} \right) \times \text{exhaust flow} \left(\frac{\text{dscf}}{\text{min}} \right) \times \left(\frac{60 \text{ min}}{\text{hr}} \right) \times \left(\frac{\text{lb-mole}}{385.5 \text{ scf}} \right) \times$$

$$\text{MW}_{\text{pollutant}} \left(\frac{\text{lb}}{\text{lb-mole}} \right) = \text{emission rate} \left(\frac{\text{lb}}{\text{hr}} \right)$$

Convert lb/hr to g/HP-hr

$$\left(\frac{\text{lb}}{\text{hr}} \right) \times \left(\frac{453.6 \text{ g}}{\text{lb}} \right) \times \frac{1}{\text{operating HP}} = \frac{\text{g}}{\text{HP-hr}}$$

Convert lb/hr to lb/MMBtu

$$\left[\frac{\text{lb}}{\text{hr}} \right] \times \left[\frac{\text{hr}}{\text{MMBtu}} \right] = \frac{\text{lb}}{\text{MMBtu}}$$

Convert lb/hr to tons/yr

$$\left(\frac{\text{lb}}{\text{hr}} \right) \times \left(\frac{\text{ton}}{2000 \text{ lb}} \right) \times \left(\frac{8760 \text{ hr}}{\text{yr}} \right) = \frac{\text{tons}}{\text{yr}}$$

Convert $\mu\text{g/dscf}$ to lb/hr

$$\left(\frac{\mu\text{g}}{\text{dscf}} \right) \times \left(\frac{\text{g}}{10^6 \mu\text{g}} \right) \times \left(\frac{\text{lb}}{453.6 \text{ g}} \right) \times \text{exhaust flow} \left(\frac{\text{dscf}}{\text{min}} \right) \times \left(\frac{60 \text{ min}}{\text{hr}} \right)$$
$$= \text{emission rate} \left(\frac{\text{lb}}{\text{hr}} \right)$$

Fuel Flow Calculations From Orifice Meter

$$C_o \times \left[\sqrt{\frac{2 \times g_c \times \Delta P}{\rho \times (1 - \beta^4)}} \right] \times \pi \times r^2 \times \left[\frac{3600 \text{ sec}}{\text{hr}} \right] = \text{Flow rate} \left(\frac{\text{acf}}{\text{hr}} \right)$$

$$\text{Flow rate (scfm)} = \frac{\text{acf}}{\text{hr}} \times \left[\frac{\text{hr}}{60 \text{ min}} \right] \times \left[\frac{P}{14.7} \right] \times \left[\frac{460 + 68}{460 + T} \right]$$

where

C_o = Orifice Coefficient

$$g_c = 32.2 \left[\frac{\text{ft-lb}}{\text{lb}_f \cdot \text{s}^2} \right]$$

ΔP = Pressure Drop Across Orifice (psia)

$$\rho = \text{gas density} \left[\frac{\text{lb}}{\text{ft}^3} \right] = \frac{MW_g \left[\frac{\text{lb}}{\text{lb-mole}} \right] \times P \text{ (psia)}}{R \left[\frac{\text{psia} \cdot \text{ft}^3}{\text{lb-mole} \cdot ^\circ\text{R}} \right] \times T \text{ (}^\circ\text{R)}}$$

P = Gas Pressure (psia)

T = Gas Temperature ($^\circ\text{R}$)

$$R = \text{Ideal Gas Constant} = 10.73 \left[\frac{\text{psia} \cdot \text{ft}^3}{\text{lb-mole} \cdot ^\circ\text{R}} \right]$$

β = Ratio of Orifice Diameter to Pipe Diameter

r = Orifice Diameter

Appendix B

CEMS and Operating Data

This appendix includes the run-averaged continuous emission monitoring system (CEMS) data and operating data (e.g., horsepower, engine speed, ambient temperature) for all engine and turbine test runs. Chemical emissions measured include oxygen, carbon dioxide, nitrous oxides, carbon monoxide, and total hydrocarbons. Emissions data are presented in concentration (ppmv and percent volume), mass (lb/hr and tons/yr), and emission factor units (g/BHP-hr).

Summary of CEM Test Results.

B.1 Campaign 2

Test Period	7	8
Engine	Cooper	Clark
Engine Type	GMVA-10	BA-6
Date	3/12/94	3/13/94
Test Time	1042-1550	1240-1810
Ambient Conditions		
Barometric Pressure (in Hg)	27.5	27.8
Ambient Temperature (°F)	60	70
Engine Operating Conditions		
Brake horsepower (BHP)	984	994
Engine Speed (rpm)	283	295
Fuel Flow (scf/min) (a)	90	218
Heat Input (MMBtu/hr) (b)	5.4	13.2
NG HHV (Btu/scf)	1012	1012
NG LHV (Btu/scf)	918	918
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	6050	5291
Stack gas temp (F)	564	1092
Moisture (%V)	5.7	9.0
O2 (%V)	15.4	11.4
CO2 (%V)	2.3	3.9
NOx (ppmvd)	233	1819
CO (ppmvd)	79	356
THC (ppmvw)	718	219
Exhaust Emissions		
NOx (ppmvd @ 15% O2)	250	1130
NOx (lb/hr)	10.1	68.9
NOx (g/BHP-hr)	4.7	31.4
NOx (tons/yr)	44	302
CO (ppmvd @ 15% O2)	85	221
CO (lb/hr)	2.1	8.2
CO (g/BHP-hr)	1.0	3.7
CO (tons/yr)	9.1	35.9
THC (ppmvd @ 15% O2)	816	150
THC (lb/hr)	11.5	3.2
THC (g/BHP-hr)	5.3	1.4
THC (tons/yr)	50.2	13.9

a Fuel flow measurements are approximations based on measured fuel flow to several units.

b Based on HHV

01/30/96

ENG-SUM.WK4

B.2 Campaign 3

Station 3A CEM Results Engine 102 C-B LSV-16

Test Period	1	2	3
Load Condition	Full	Full	Low
Date	6/14/94	6/15/94	6/15/94
Test Time	1600-2100	0832-1314	1437-1637
Ambient Conditions			
Barometric Press (" Hg)	29.22	29.22	29.20
Ambient Temperature (F)	87	83	80
Relative Humidity (%)	62.0	73.0	87.0
Absolute Humidity (lb H ₂ O/1000 lb dry air)	17.87	18.35	19.74
Engine Operating Conditions			
Brake horsepower (BHP)	4055	4202	3364
Load (%)	98.0	101	87.0
Engine Speed (rpm)	321	325	302
Fuel Flow (scf/min)	487	497	412
Heat Input (MMBtu/hr) (a)	33.3	33.7	28.0
Heat Rate(Btu/BHP-hr, HHV)	8348	8145	8440
Heat Rate(Btu/BHP-hr, LHV)	7556	7372	7639
NG HHV (Btu/scf)	1159	1148	1148
NG LHV (Btu/scf)	1049	1039	1039
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	7381	6947	6381
Vol. Flow (dscfm) - M 19, Fd (b)	8735	8678	7526
Stack gas temp (F)	976	976	968
Moisture (%V)	13.0	14.1	11.9
O ₂ (%V)	9.6	9.4	9.9
CO ₂ (%V) (c)	6.33	6.33	6.0
NO _x (ppmvd)	1749	1657	825
CO (ppmvd)	203	217	247
THC (ppmvw)	1666	1677	1803
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	913	850	442
NO _x (lb/hr)	109	102.9	44.4
NO _x (g/BHP-hr)	12.2	11.1	6.0
NO _x (lb/MMBtu)	3.3	3.1	1.6
NO _x (tons/yr)	479	451	195
CO (ppmvd @ 15% O ₂)	106	111	132
CO (lb/hr)	7.7	8.2	8.1
CO (g/BHP-hr)	0.9	0.9	1.1
CO (lb/MMBtu)	0.2	0.2	0.3
CO (tons/yr)	33.8	35.9	35.4
THC (ppmvd @ 15% O ₂)	1000	1002	1097
THC (lb/hr)	41.7	42.2	38.3
THC (g/BHP-hr)	4.7	4.6	5.2
THC (lb/MMBtu)	1.2	1.3	1.4
THC (tons/yr)	182	185	168

a Based on HHV

b Used in emission rate calculations

c CEM analyzer not operating, FTIR CO₂ values shown

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

Station 3A CEM Results
Engine 101
C-B LSV-16

Test Period	1	2	3
Load Condition	Low	Full	Full
Date	6/15/94	6/16/94	6/16/94
Test Time	1831-1935	0915-1405	1415-1806
Ambient Conditions			
Barometric Press (" Hg)	29.60	29.40	29.20
Ambient Temperature (F)	84	80	89
Relative Humidity (%)	72.0	78.0	58.0
Absolute Humidity (lb H ₂ O/1000lb dry air)	18.48	17.58	17.90
Engine Operating Conditions			
Brake horsepower (BHP)	3311	4056	4117
Load (%)	85.0	98.0	99.0
Engine Speed (rpm)	303	321	325
Fuel Flow (scf/min)	423	478	486
Heat Input (MMBtu/hr) (a)	28.7	32.4	33.0
Heat Rate(Btu/BHP-hr, HHV)	8800	8118	8126
Heat Rate(Btu/BHP-hr, LHV)	7964	7347	7355
NG HHV (Btu/scf)	1148	1148	1148
NG LHV (Btu/scf)	1039	1039	1039
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	7125	7195	7319
Vol. Flow (dscfm) - M 19, Fd (b)	8581	8421	8409
Stack gas temp (F)	922	962	970
Moisture (%V)	12.2	13.5	13.5
O ₂ (%V)	11.0	9.5	9.3
CO ₂ (%V) (c)	5.51	6.15	6.11
NO _x (ppmvd)	259	1297	1544
CO (ppmvd)	209	258	258
THC (ppmvw)	2269	1950	1879
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	154	671	785
NO _x (lb/hr)	15.9	78.2	93.0
NO _x (g/BHP-hr)	2.2	8.7	10.2
NO _x (lb/MMBtu)	0.6	2.4	2.8
NO _x (tons/yr)	69.7	342.5	407.2
CO (ppmvd @ 15% O ₂)	124	134	131
CO (lb/hr)	7.8	9.5	9.4
CO (g/BHP-hr)	1.1	1.1	1.0
CO (lb/MMBtu)	0.3	0.3	0.3
CO (tons/yr)	34.2	41.5	41.3
THC (ppmvd @ 15% O ₂)	1540	1167	1105
THC (lb/hr)	35.2	47.3	45.5
THC (g/BHP-hr)	7.6	5.3	5.0
THC (lb/MMBtu)	1.9	1.5	1.4
THC (tons/yr)	242	207	199

a Based on HHV

b Used in emission rate calculations

c CEM analyzer not operating, FTIR CO₂ values shown

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

Station 3B CEM Results
Engine 4
C-B GMWA-8

Test Period	1	2
Load Condition	Full	Low
Date	6/18/94	6/18/94
Test Time	0925-1115	1325-1523
Ambient Conditions		
Barometric Press (" Hg)	29.29	29.29
Ambient Temperature (F)	85	94
Relative Humidity (%)	66.0	47.0
Absolute Humidity (lb H2O/1000lb dry air)	17.72	17.10
Engine Operating Conditions		
Brake horsepower (BHP)	1958	1655
Load (%)	98.0	83.0
Engine Speed (rpm)	249	250
Fuel Flow (scf/min)	244	221
Heat Input (MMBtu/hr) (a)	17.4	15.7
Heat Rate(Btu/BHP-hr, HHV)	9003	9645
Heat Rate(Btu/BHP-hr, LHV)	8196	8781
NG HHV (Btu/scf)	1206	1206
NG LHV (Btu/scf)	1098	1098
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	8665	8873
Vol. Flow (dscfm) - M 19, Fd (b)	8290	8462
Stack gas temp (F)	645	610
Moisture (%V)	9.3	7.8
O2 (%V)	14.7	15.4
CO2 (%V) (c)	3.6	3.13
NOx (ppmvd)	1246	384
CO (ppmvd)	53.0	62.3
THC (ppmvw)	1129	1279
Exhaust Emissions		
NOx (ppmvd @ 15% O2)	1186	412
NOx (lb/hr)	74.0	23.3
NOx (g/BHP-hr)	17.1	6.4
NOx (lb/MMBtu)	4.3	1.5
NOx (tons/yr)	324	102
CO (ppmvd @ 15% O2)	50.4	66.8
CO (lb/hr)	1.9	2.3
CO (g/BHP-hr)	0.4	0.6
CO (lb/MMBtu)	0.1	0.1
CO (tons/yr)	8.4	10.1
THC (ppmvd @ 15% O2)	1184	1489
THC (lb/hr)	25.7	29.2
THC (g/BHP-hr)	6.0	8.0
THC (lb/MMBtu)	1.5	1.9
THC (tons/yr)	113	128

a Based on HHV

b Used in emission rate calculations

c CEM analyzer not operating, FTIR CO2 values shown

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

**Station 3B CEM Results
Engine 2
C-B GMV-10TF**

Test Period	1	2	3	4
Load Condition	Low	Full	Full	Full
Date	6/18/94	6/19/94	6/19/94	6/20/94
Test Time	1800-1900	1105-1428	1630-2018	1240-1747
Ambient Conditions				
Barometric Press (" Hg)	29.29	29.36	29.36	29.41
Ambient Temperature (F)	92	91	91	91
Relative Humidity (%)	47.0	51.0	54.0	51.0
Absolute Humidity (lb H ₂ O/1000lb dry air)	15.99	16.74	17.72	16.71
Engine Operating Conditions				
Brake horsepower (BHP)	894	1145	1142	1146
Load (%)	81.0	104	104	104
Engine Speed (rpm)	300	300	300	300
Fuel Flow (scf/min)	119	146	146	141
Heat Input (MMBtu/hr) (a)	8.4	10.4	10.4	10.1
Heat Rate(Btu/BHP-hr, HHV)	9595	9192	9228	8914
Heat Rate(Btu/BHP-hr, LHV)	8735	8360	8393	8108
NG HHV (Btu/scf)	1206	1204	1204	1205
NG LHV (Btu/scf)	1098	1095	1095	1096
Exhaust Gas Conditions				
Vol. Flow (dscfm) - M 2	3323	3377	3391	3217
Vol. Flow (dscfm) - M 19, Fd (b)	4311	3885	3890	3868
Stack gas temp (F)	595	661	660	651
Moisture (%V)	7.5	10.3	9.3	7.8
O ₂ (%V)	15.1	13.0	13.0	13.2
CO ₂ (%V) (c)	3.34	4.35	4.53	4.32
NO _x (ppmvd)	42.8	1287	1366	994
CO (ppmvd)	125	81.0	80.4	83.7
THC (ppmvw)	3117	828	818	865
Exhaust Emissions				
NO _x (ppmvd @ 15% O ₂)	43.5	961	1020	762
NO _x (lb/hr)	1.3	35.8	38.1	27.5
NO _x (g/BHP-hr)	0.7	14.2	15.1	10.9
NO _x (lb/MMBtu)	0.2	3.5	3.7	2.7
NO _x (tons/yr)	5.8	157	167	121
CO (ppmvd @ 15% O ₂)	127	60.5	60.0	64.1
CO (lb/hr)	2.3	1.4	1.4	1.4
CO (g/BHP-hr)	1.2	0.5	0.5	0.6
CO (lb/MMBtu)	0.3	0.1	0.1	0.1
CO (tons/yr)	10.2	6.0	6.0	6.2
THC (ppmvd @ 15% O ₂)	3428	689	674	718
THC (lb/hr)	36.2	8.9	8.7	9.0
THC (g/BHP-hr)	18.4	3.5	3.5	3.6
THC (lb/MMBtu)	4.3	0.9	0.8	0.9
THC (tons/yr)	158	39.1	38.3	39.6

a Based on HHV

b Used in emission rate calculations

c CEM analyzer not operating, FTIR CO₂ values shown

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

**Station CEM Results
Waukesha Engine
Waukesha L7042GU
Before NSCR**

Test Period	3	4
Load Condition	Intermediate	Low
Sampling Location	Before NSCR	Before NSCR
Date	8/23/94	8/24/94
Test Time	1805-2028	1020-1201
Ambient Conditions		
Barometric Pressure (in. Hg)	29.47	29.55
Ambient Temperature (°F)	74	87
Relative Humidity (%)	65.4	36.7
Abs. Humidity (lb H ₂ O/lb dry air)	12.0	10.4
Engine Operating Conditions		
Brake horsepower (BHP)	644	362
Load (%)	88	52
Engine Speed (rpm)	813	779
Fuel Flow (scf/min) (a)	82.8	54.7
Heat Input (MMBtu/hr) (b)	4.95	3.28
Heat Rate (Btu/BHP-hr, HHV)	7809	9185
Heat Rate (Btu/BHP-hr, LHV)	7035	8279
NG HHV (Btu/scf)	1011	1013
NG LHV (Btu/scf)	911	913
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2 (c)	1274	474
Vol. Flow (dscfm) - M19, Fd	716	472
Stack Gas Temperature (°F)	796	641
Moisture (%V)	20.7	20.5
O ₂ (%V)	0.42	0.35
CO ₂ (%V)	11.2	11.5
NO _x (ppmvd)	2843	2542
CO (ppmvd)	3714	2690
THC (ppmvw)	1048	1394
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	819	730
NO _x (lb/hr)	25.9	8.6
NO _x (g/BHP-hr)	18.3	10.8
NO _x (lb/MMBtu)	5.24	2.63
NO _x (tons/yr)	114	37.8
CO (ppmvd @ 15% O ₂)	1070	772
CO (lb/hr)	20.6	5.56
CO (g/BHP-hr)	14.5	6.96
CO (lb/MMBtu)	4.16	1.70
CO (tons/yr)	90.3	24.3
THC (ppmvd @ 15% O ₂)	381	504
THC (lb/hr)	4.19	2.07
THC (g/BHP-hr)	2.96	2.59
THC (lb/MMBtu)	0.85	0.63
THC (tons/yr)	18.4	9.1

a Fuel flow rate is suspect due to data collection difficulties.

b Based on HHV

c Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/27/95

WB-SUM.WK4

**Station CEM Results
Waukesha Engine
Waukesha L7042GU
After NSCR**

Test Period	1	2	5
Load Condition	Full	Full	Low
Sampling Location	After NSCR	After NSCR	After NSCR
Date	8/23/94	8/23/94	8/24/94
Test Time	1146-1345	1424-1722	1210-1306
Ambient Conditions			
Barometric Pressure (in. Hg)	29.54	29.49	29.54
Ambient Temperature (°F)	87	87	92
Relative Humidity (%)	35.2	40.1	27.2
Abs. Humidity (lb H ₂ O/lb dry air)	10.1	11.3	9.3
Engine Operating Conditions			
Brake horsepower (BHP)	692	671	359
Load (%)	95	92	51
Engine Speed (rpm)	809	811	779
Fuel Flow (scf/min) (a)	88.0	84.6	54.7
Heat Input (MMBtu/hr) (b)	5.26	5.05	3.28
Heat Rate (Btu/BHP-hr, HHV)	7717	7646	9275
Heat Rate (Btu/BHP-hr, LHV)	6952	6888	8360
NG HHV (Btu/scf)	1011	1011	1013
NG LHV (Btu/scf)	911	911	913
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2 (c)	1274	1274	474
Vol. Flow (dscfm) - M19, Fd	746	718	464
Stack Gas Temperature (°F)	796	796	641
Moisture (%V)	20.7	20.7	20.5
O ₂ (%V)	0.04	0.06	0.00
CO ₂ (%V)	11.7	11.7	12.0
NO _x (ppmvd)	8.03	8.38	35.3
CO (ppmvd)	68.5	69.5	35.8
THC (ppmvw)	607	640	846
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	2.27	2.37	10.0
NO _x (lb/hr)	0.07	0.08	0.12
NO _x (g/BHP-hr)	0.05	0.05	0.15
NO _x (lb/MMBtu)	0.01	0.02	0.04
NO _x (tons/yr)	0.32	0.33	0.53
CO (ppmvd @ 15% O ₂)	19.4	19.7	10.1
CO (lb/hr)	0.38	0.39	0.07
CO (g/BHP-hr)	0.25	0.26	0.09
CO (lb/MMBtu)	0.07	0.08	0.02
CO (tons/yr)	1.67	1.69	0.32
THC (ppmvd @ 15% O ₂)	217	228	301
THC (lb/hr)	2.43	2.56	1.26
THC (g/BHP-hr)	1.59	1.73	1.59
THC (lb/MMBtu)	0.46	0.51	0.38
THC (tons/yr)	10.6	11.2	5.5

a Fuel flow rate is suspect due to data collection difficulties.

b Based on HHV

c Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/27/95

WA-SUM.WK4

Station CEM Results
Engine 4
C-B GMVC-10C

Test Period	7	9	H	I
Load Condition	Full	Full	Full	Low
Sampling Location	Before Catalyst	Before Catalyst	Before Catalyst	Before Catalyst
Date	8/25/94	8/26/94	8/30/94	8/30/94
Test Time	1705-1906	1310-1537	1605-1630	1656-1735
Ambient Conditions				
Barometric Pressure (in. Hg)	29.44	29.47	29.36	29.35
Ambient Temperature (°F)	85	89	85	84
Relative Humidity (%)	37.8	40.5	29.4	44.8
Abs. Humidity (lb H ₂ O/lb dry air)	10.1	12.4	8.0	11.4
Engine Operating Conditions				
Brake horsepower (BHP)	1732	1674	1705	1422
Load (%)	97	93	95	79
Engine Speed (rpm)	299	300	299	299
Fuel Flow (scf/min)	211	213	212	185
Heat Input (MMBtu/hr) (a)	12.6	12.7	12.7	11.0
Heat Rate (Btu/BHP-hr, HHV)	7368	7706	7550	7880
Heat Rate (Btu/BHP-hr, LHV)	6640	6945	6803	7100
NG HHV (Btu/scf)	1009	1009	1011	1011
NG LHV (Btu/scf)	910	910	911	911
Exhaust Gas Conditions				
Vol. Flow (dscfm) - M 2	8486	NA	8338	8371
Vol. Flow (dscfm) - M19, Fd (b)	6920	6866	6633	6039
Stack Gas Temperature (°F)	574	517	506	507
Moisture (%V)	7.26	7.30	8.20	7.95
O ₂ (%V)	15.5	15.4	15.3	15.5
CO ₂ (%V)	2.86	2.96	2.92	2.81
NO _x (ppmvd)	39.2	34.1	36.9	20.2
CO (ppmvd)	162	181	178	237
THC (ppmvw)	1218	1559	1426	1948
Exhaust Emissions				
NO _x (ppmvd @ 15% O ₂)	43.1	36.9	38.6	22.1
NO _x (lb/hr)	1.94	1.68	1.75	0.87
NO _x (g/BHP-hr)	0.51	0.45	0.47	0.28
NO _x (lb/MMBtu)	0.15	0.13	0.14	0.08
NO _x (tons/yr)	8.50	7.35	7.67	3.83
CO (ppmvd @ 15% O ₂)	179	195	186	260
CO (lb/hr)	4.89	5.41	5.15	6.25
CO (g/BHP-hr)	1.28	1.47	1.37	1.99
CO (lb/MMBtu)	0.39	0.43	0.41	0.57
CO (tons/yr)	21.4	23.7	22.5	27.4
THC (ppmvd @ 15% O ₂)	1446	1817	1624	2317
THC (lb/hr)	22.6	28.8	25.6	31.8
THC (g/BHP-hr)	5.93	7.79	6.82	10.2
THC (lb/MMBtu)	1.80	2.26	2.02	2.88
THC (tons/yr)	99.1	126	112	139

a Based on HHV

b Used in emission calculations.

Note: Two power outages occurred during Run 9

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

Station CEM Results
Engine 4
C-B GMVC-10C

Test Period	8	10
Load Condition	Full	Intermediate
Sampling Location	After Catalyst	After Catalyst
Date	8/26/94	8/26/94
Test Time	1051-1226	1620-1821
Ambient Conditions		
Barometric Pressure (in. Hg)	29.47	29.45
Ambient Temperature (°F)	84	86
Relative Humidity (%)	47.8	42.6
Abs. Humidity (lb H ₂ O/lb dry air)	12.5	11.8
Engine Operating Conditions		
Brake horsepower (BHP)	1773	1600
Load (%)	99	89
Engine Speed (rpm)	299	300
Fuel Flow (scf/min)	211	203
Heat Input (MMBtu/hr) (a)	12.6	12.1
Heat Rate (Btu/BHP-hr, HHV)	7199	7699
Heat Rate (Btu/BHP-hr, LHV)	6488	6938
NG HHV (Btu/scf)	1009	1009
NG LHV (Btu/scf)	910	910
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	8751	NA
Vol. Flow (dscfm) - M19, Fd (b)	6696	6592
Stack Gas Temperature (°F)	517	517
Moisture (%V)	7.26	7.30
O ₂ (%V)	15.4	15.5
CO ₂ (%V)	3.03	2.96
NO _x (ppmvd)	44.0	33.1
CO (ppmvd)	14.2	12.7
THC (ppmvw)	1358	1567
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	46.9	35.9
NO _x (lb/hr)	2.11	1.56
NO _x (g/BHP-hr)	0.54	0.44
NO _x (lb/MMBtu)	0.17	0.13
NO _x (tons/yr)	9.25	6.84
CO (ppmvd @ 15% O ₂)	15.1	13.8
CO (lb/hr)	0.41	0.37
CO (g/BHP-hr)	0.11	0.10
CO (lb/MMBtu)	0.03	0.03
CO (tons/yr)	1.81	1.60
THC (ppmvd @ 15% O ₂)	1559	1837
THC (lb/hr)	24.4	27.8
THC (g/BHP-hr)	6.25	7.87
THC (lb/MMBtu)	1.94	2.29
THC (tons/yr)	107	122

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/26/95

E4A-SUM.WK4

Station CEM Results
Engine 8
I-R KVS-412 (PCC)

Test Period	11	12
Load Condition	Intermediate	Intermediate
Date	8/27/94	8/27/94
Test Time	1108-1503	1639-1921
Ambient Conditions		
Barometric Pressure (in. Hg)	29.45	29.41
Ambient Temperature (°F)	91	86
Relative Humidity (%)	32.7	35.0
Abs. Humidity (lb H ₂ O/lb dry air)	10.8	9.7
Engine Operating Conditions		
Brake horsepower (BHP)	1783	1640
Load (%)	89	82
Engine Speed (rpm)	330	330
Fuel Flow (scf/min)	272	253
Heat Input (MMBtu/hr) (a)	16.2	15.1
Heat Rate (Btu/BHP-hr, HHV)	9239	9340
Heat Rate (Btu/BHP-hr, LHV)	8327	8418
NG HHV (Btu/scf)	1009	1009
NG LHV (Btu/scf)	910	910
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	5726	5737
Vol. Flow (dscfm) - M19, Fd (b)	4975	4706
Stack Gas Temperature (°F)	741	719
Moisture (%V)	11.1	11.1
O ₂ (%V)	11.3	11.4
CO ₂ (%V)	5.36	5.22
NO _x (ppmvd)	69.7	58.7
CO (ppmvd)	352	385
THC (ppmvw)	1937	3290
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	42.8	36.6
NO _x (lb/hr)	2.48	1.98
NO _x (g/BHP-hr)	0.63	0.55
NO _x (lb/MMBtu)	0.15	0.13
NO _x (tons/yr)	10.9	8.7
CO (ppmvd @ 15% O ₂)	216	240
CO (lb/hr)	7.62	7.90
CO (g/BHP-hr)	1.94	2.19
CO (lb/MMBtu)	0.47	0.52
CO (tons/yr)	33.4	34.6
THC (ppmvd @ 15% O ₂)	1336	2308
THC (lb/hr)	27.0	43.4
THC (g/BHP-hr)	6.87	12.0
THC (lb/MMBtu)	1.66	2.87
THC (tons/yr)	118	190

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/26/95

E8-SUM.WK4

Station CEM Results
Engine 9
I-R KVS

Test Period	13	14	17
Load Condition	Intermediate	Full	Full
Sampling Location	Before SCR	Before SCR	Before SCR
Date	8/28/94	8/29/94	8/29/94
Test Time	1254-1520	0858-0932	1613-1700
Ambient Conditions			
Barometric Pressure (in. Hg)	29.46	29.47	29.37
Ambient Temperature (°F)	94	77	91
Relative Humidity (%)	27.8	52.1	31.7
Abs. Humidity (lb H ₂ O/lb dry air)	10.1	10.6	10.3
Engine Operating Conditions			
Brake horsepower (BHP)	1764	1840	1830
Load (%)	88	91	91
Engine Speed (rpm)	330	332	331
Fuel Flow (scf/min)	261	272	266
Heat Input (MMBtu/hr) (a)	15.6	16.3	15.9
Heat Rate (Btu/BHP-hr, HHV)	8950	8978	8821
Heat Rate (Btu/BHP-hr, LHV)	8068	8090	7948
NG HHV (Btu/scf)	1010	1011	1011
NG LHV (Btu/scf)	910	911	911
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	4181	4259	4259
Vol. Flow (dscfm) - M19, Fd (b)	3656	3914	3754
Stack Gas Temperature (°F)	779	779	779
Moisture (%V)	14.4	14.4	14.4
O ₂ (%V)	8.27	8.56	8.33
CO ₂ (%V)	6.95	6.93	7.10
NO _x (ppmvd)	3351	3042	3339
CO (ppmvd)	138	141	126
THC (ppmvw)	947	938	900
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	1566	1454	1567
NO _x (lb/hr)	87.7	85.2	89.7
NO _x (g/BHP-hr)	22.6	21.0	22.3
NO _x (lb/MMBtu)	5.64	5.24	5.65
NO _x (tons/yr)	384	373	393
CO (ppmvd @ 15% O ₂)	64.3	67.6	59.1
CO (lb/hr)	2.19	2.41	2.06
CO (g/BHP-hr)	0.56	0.59	0.51
CO (lb/MMBtu)	0.14	0.15	0.13
CO (tons/yr)	9.6	10.6	9.02
THC (ppmvd @ 15% O ₂)	517	524	493
THC (lb/hr)	10.1	10.7	9.8
THC (g/BHP-hr)	2.59	2.63	2.44
THC (lb/MMBtu)	0.65	0.66	0.62
THC (tons/yr)	44.1	46.8	43.0

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

**Station CEM Results
Engine 9
I-R KVS**

Test Period	15	16
Load Condition	Full	Full
Sampling Location	After SCR	After SCR
Date	8/29/94	8/29/94
Test Time	0959-1330	1413-1549
Ambient Conditions		
Barometric Pressure (in. Hg)	29.45	29.39
Ambient Temperature (°F)	87	93
Relative Humidity (%)	33.1	31.8
Abs. Humidity (lb H ₂ O/lb dry air)	9.3	11.2
Engine Operating Conditions		
Brake horsepower (BHP)	1809	1800
Load (%)	90	90
Engine Speed (rpm)	331	331
Fuel Flow (scf/min)	270	265
Heat Input (MMBtu/hr) (a)	16.1	15.8
Heat Rate (Btu/BHP-hr, HHV)	9051	8924
Heat Rate (Btu/BHP-hr, LHV)	8156	8041
NG HHV (Btu/scf)	1011	1011
NG LHV (Btu/scf)	911	911
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	4259	4259
Vol. Flow (dscfm) - M19, Fd (b)	3890	3804
Stack Gas Temperature (°F)	779	779
Moisture (%V)	14.4	14.4
O ₂ (%V)	8.60	8.56
CO ₂ (%V)	6.78	6.80
NO _x (ppmvd)	677	775
CO (ppmvd)	103	102
THC (ppmvw)	949	1001
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	325	371
NO _x (lb/hr)	18.8	21.1
NO _x (g/BHP-hr)	4.73	5.32
NO _x (lb/MMBtu)	1.17	1.33
NO _x (tons/yr)	82.5	92.5
CO (ppmvd @ 15% O ₂)	49.4	48.6
CO (lb/hr)	1.75	1.69
CO (g/BHP-hr)	0.44	0.42
CO (lb/MMBtu)	0.11	0.11
CO (tons/yr)	7.65	7.39
THC (ppmvd @ 15% O ₂)	532	559
THC (lb/hr)	10.7	11.1
THC (g/BHP-hr)	2.69	2.79
THC (lb/MMBtu)	0.67	0.70
THC (tons/yr)	47.0	48.5

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

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Station CEM Results

Engine 8

I-R KVS

Test Period	A	B	C	D	E	F	G
Load/Timing	92%/8°	85%/8°	84%/5°	88%/5°	88%/8°	87%/11°	80%/11°
Date	8/30/94	8/30/94	8/30/94	8/30/94	8/30/94	8/30/94	8/30/94
Test Time	0745-0815	0903-0944	1013-1042	1100-1145	1150-1228	1234-1302	1307-1339
Ambient Conditions							
Barometric Pressure (in. Hg)	29.41	29.42	29.43	29.42	29.41	29.40	29.39
Ambient Temperature (°F)	73	78	82	85	86	89	90
Relative Humidity (%)	66.4	55.5	47.0	43.2	40.7	37.8	36.4
Abs. Humidity (lb H2O/lb dry air)	11.7	11.6	11.4	11.3	11.3	11.6	11.4
Engine Operating Conditions							
Brake horsepower (BHP)	1846	1693	1656	1708	1783	1687	1621
Load (%)	92	85	84	88	88	87	80
Engine Speed (rpm)	330	329	327	323	335	333	333
Fuel Flow (scf/min)	267	265	276	277	276	254	247
Heat Input (MMBtu/hr) (a)	15.9	15.8	16.5	16.5	16.5	15.1	14.7
Heat Rate (Btu/BHP-hr, HHV)	8757	9477	10094	9819	9375	9116	9226
Heat Rate (Btu/BHP-hr, LHV)	7893	8542	9098	8850	8450	8216	8315
NG HHV (Btu/scf)	1009	1009	1009	1009	1009	1009	1009
NG LHV (Btu/scf)	910	910	910	910	910	910	910
Exhaust Gas Conditions							
Vol. Flow (dscfm) - M 2	4531	4572	4553	4518	4517	4517	4579
Vol. Flow (dscfm) - M19, Fd (b)	4927	4978	5229	5143	5040	4582	4567
Stack Gas Temperature (°F)	746	739	756	766	762	749	733
Moisture (%V)	12.0	11.8	11.7	11.8	11.9	12.1	11.8
O2 (%V)	11.3	11.5	11.6	11.4	11.2	11.1	11.3
CO2 (%V)	5.19	5.06	5.01	5.13	5.23	5.30	5.12
NOx (ppmv)	64.6	53.3	48.7	55.7	60.0	67.0	55.1
CO (ppmv)	378	419	364	331	394	399	451
THC (ppmv)	2333	3569	4143	2897	2683	1926	3298
Exhaust Emissions							
NOx (ppmv @ 15% O2)	39.7	33.4	30.8	34.5	36.5	40.3	34.0
NOx (lb/hr)	2.28	1.90	1.82	2.05	2.17	2.20	1.80
NOx (g/BHP-hr)	0.56	0.51	0.50	0.54	0.55	0.59	0.50
NOx (lb/MMBtu)	0.14	0.12	0.11	0.12	0.13	0.15	0.12
NOx (tons/yr)	10.0	8.32	7.99	8.98	9.48	9.63	7.89
CO (ppmv @ 15% O2)	232	263	230	205	240	240	278
CO (lb/hr)	8.10	9.10	8.29	7.42	8.65	7.96	8.98
CO (g/BHP-hr)	1.99	2.44	2.27	1.97	2.20	2.14	2.51
CO (lb/MMBtu)	0.51	0.58	0.50	0.45	0.53	0.53	0.61
CO (tons/yr)	35.5	39.8	36.3	32.5	37.9	34.9	39.3
THC (ppmv @ 15% O2)	1631	2534	2964	2033	1854	1317	2305
THC (lb/hr)	32.5	50.2	61.1	42.1	38.2	25.0	42.5
THC (g/BHP-hr)	8.0	13.4	16.7	11.2	9.7	6.7	11.9
THC (lb/MMBtu)	2.04	3.17	3.71	2.55	2.32	1.65	2.89
THC (tons/yr)	142	220	268	184	167	109	186

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

Station CEM Results Engine 1 C-B GMVA-10

Test Period	6
Load Condition	Intermediate
Sampling Location	Exhaust
Date	8/25/94
Test Time	0952-1020
Ambient Conditions	
Barometric Pressure (in. Hg)	29.52
Ambient Temperature (°F)	84
Relative Humidity (%)	34.7
Abs. Humidity (lb H2O/lb dry air)	8.9
Engine Operating Conditions	
Brake horsepower (BHP)	1159
Load (%)	87
Engine Speed (rpm)	296
Fuel Flow (scf/min) (a)	-
Heat Input (MMBtu/hr)	-
Heat Rate (Btu/BHP-hr, HHV)	-
Heat Rate (Btu/BHP-hr, LHV)	-
NG HHV (Btu/scf)	1009
NG LHV (Btu/scf)	910
Exhaust Gas Conditions	
Vol. Flow (dscfm) - M 2	NA
Vol. Flow (dscfm) - M19, Fd	-
Stack Gas Temperature (°F)	517
Moisture (%V)	7.30
O2 (%V)	14.6
CO2 (%V)	3.43
NOx (ppmvd)	141
CO (ppmvd)	79.0
THC (ppmvw)	1353
Exhaust Emissions	
NOx (ppmvd @ 15% O2)	132
NOx (lb/hr)	-
NOx (g/BHP-hr)	-
NOx (lb/MMBtu)	-
NOx (tons/yr)	-
CO (ppmvd @ 15% O2)	73.9
CO (lb/hr)	-
CO (g/BHP-hr)	-
CO (lb/MMBtu)	-
CO (tons/yr)	-
THC (ppmvd @ 15% O2)	1364
THC (lb/hr)	-
THC (g/BHP-hr)	-
THC (lb/MMBtu)	-
THC (tons/yr)	-

a Fuel flow measurements from this engine are considered suspect. Due to the computational procedures employed, these inaccuracies affect heat input, heat rate, exhaust flowrate, emission flowrates, and emission factors; therefore, these parameters are not calculated.

B.4 Campaign 5

Test Period	3	4
Equipment	Turbine	Turbine
Date	10/05/94	10/05/94
Test Time	1230-1755	1843-2133
Ambient Conditions		
Barometric Press (" Hg)	29.34	29.35
Ambient Temperature (F)	57.24	51.48
Relative Humidity (%)	51.26	75.12
Absolute Humidity (lb H ₂ O/1000lb dry air)	5.11	6.04
Operating Conditions		
Brake horsepower (BHP)	20000	20000
Fuel Flow (scf/min)	3298	3298
Heat Input (MMBtu/hr)	203	203
Heat Rate(Btu/BHP-hr, HHV)	10151	10151
Heat Rate(Btu/BHP-hr, LHV)	9142	9142
NG HHV (Btu/scf)	1026	1026
NG LHV (Btu/scf)	924	924
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2 (b)	232503	214147
Vol. Flow (dscfm) - M 19	185603	184460
Stack gas temp (F)	239	430
Moisture (%V)	4.03	4.46
O ₂ (%V, dry)	17.7	17.6
CO ₂ (%V, dry)	2.00	2.00
NO _x (ppmvd)	41.4	39.6
CO (ppmvd)	13.2	16.6
THC (ppmvw)	ND	ND
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	75.6	71.9
NO _x ISO (ppmvd)	75.0	73.8
NO _x (lb/hr)	68.9	60.7
NO _x (g/BHP-hr) *	1.56	1.38
NO _x (lb/MMBtu)	0.34	0.30
NO _x (tons/yr)	302	266
CO (ppmvd @ 15% O ₂)	24.1	30.2
CO (lb/hr)	13.4	15.5
CO (g/BHP-hr) *	0.30	0.35
CO (lb/MMBtu)	0.07	0.08
CO (tons/yr)	58.6	68.0
THC (ppmvd @ 15% O ₂)		
THC (lb/hr)		
THC (g/BHP-hr) *		
THC (lb/MMBtu)		
THC (tons/yr)		

a Based on HHV

b Used in emission calculations

* Calculated using rated horsepower of 20,000 BHP

Note: Based on operating parameters, turbine appears to be at full load.

B.5 Campaign 6

GRI Campaign 6 - Station 6A CEM Results Engine 10 Clark BA-5

Test Period	1	3	2
Load Condition	Full	Low	Full
Sampling Location	Exhaust	Exhaust	Exhaust
Date	11/04/94	11/04/94	11/05/94
Test Time	1000-1224	1448-1603	0936-1209
Ambient Conditions			
Barometric Pressure (in. Hg)	26.36	26.35	29.27
Ambient Temperature (°F)	62	51	62
Relative Humidity (%)	62.7	93.0	29.3
Abs. Humidity (lb H ₂ O/1000 lb dry air)	8.2	8.1	3.5
Engine Operating Conditions			
Brake horsepower (BHP)	851	725	910
Load (%)	94	80	100
Engine Speed (rpm)	299	301	299
Fuel Flow (scf/min)	161	147	174
Heat Input (MMBtu/hr) (a)	9.8	8.9	10.5
Heat Rate (Btu/BHP-hr, HHV)	11627	12468	11737
Heat Rate (Btu/BHP-hr, LHV)	10529	11291	10627
NG HHV (Btu/scf)	1025	1025	1021
NG LHV (Btu/scf)	928	928	924
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	7163	7313	7493
Vol. Flow (dscfm) - M19, Fd (b)	4272	4356	4679
Stack Gas Temperature (°F)	458	436	455
Moisture (%V)	10.4	8.8	8.0
O ₂ (%V dry)	14.2	14.9	14.3
CO ₂ (%V dry)	4.3	3.9	4.4
NO _x (ppmvd)	914	373	1337
CO (ppmvd)	86.3	95.5	92.6
THC (ppmvw) (c)	NA	NA	970
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	805	367	1195
NO _x (lb/hr)	28.0	11.6	44.8
NO _x (g/BHP-hr)	14.9	7.28	22.3
NO _x (lb/MMBtu)	2.87	1.31	4.26
NO _x (tons/yr)	122	50.9	196
CO (ppmvd @ 15% O ₂)	76.0	93.9	82.8
CO (lb/hr)	1.61	1.81	1.89
CO (g/BHP-hr)	0.86	1.13	0.94
CO (lb/MMBtu)	0.16	0.20	0.18
CO (tons/yr)	7.04	7.94	8.27
THC (ppmvd @ 15% O ₂)	---	---	943
THC (lb/hr)	---	---	12.3
THC (g/BHP-hr)	---	---	6.12
THC (lb/MMBtu)	---	---	1.17
THC (tons/yr)	---	---	53.8

a Based on HHV

b Used in emission calculations.

c THC analyzer equipment failure. A new instrument arrived on site late on 11/04/94.

NA = Not available

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

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GRI CAMPAIGN 6

- This calculation was required to adjust for an exhaust leak present in Engine 10 at site 6A.
- Tests 1 and 3 were conducted before and after the exhaust leak, however, no test was conducted before the exhaust leak during test 2.
- A correction factor was needed to adjust the CEM exhaust concentrations in Test 2, as well as for moisture and concentrations measured by FTIR, GC, CARB 430, and Method TO-14 for Tests 1, 2, and 3.

TEST	1 (before leak)	1 (after leak)	1 Ratio	3 (before leak)	3 (after leak)	3 Ratio	Correction Factor
O2 (%)	14.2	16.9	0.84	14.9	17.3	0.86	0.85
NOx (ppmv)	914	597	1.53	373	219	1.7	1.63
CO2 (%)	4.3	2.65	1.62	3.88	2.41	1.61	1.63
CO (ppmv)	86.3	51.7	1.68	95.5	59.1	1.61	1.63

To get correction factors, the O2 ratios were averaged to give an O2 correction. The average of all the other ratios for NOx, CO, and CO2 were averaged to give correction factors for these compounds as well as for moisture and compounds measured by FTIR, GC, CARB 430, and Method TO-14 for tests 1, 2, and 3.

Example for Test 2.

2 (after leak)	2 (corrected)
O2=16.8	=14.3
NOx=820	=1337
CO2=2.69	=4.38
CO=56.8	=92.6

-To correct for FTIR, GC, CARB 430, and Method TO-14 multiple dry concentration by 1.63.

Example:

Ethane (measured by FTIR) for Engine 10, Test 1 was 10.6 ppmv, corrected to 17.3 ppmv through the factor 1.63.

GRI Campaign 6 - Station 6C CEM Results
Engine 15
C-B GMVC-10

Test Period	9	10	11
Load Condition	Full	Full	Intermediate
Sampling Location	Exhaust	Exhaust	Exhaust
Date	11/10/94	11/10/94	11/11/94
Test Time	1030-1500	1546-1801	0930-1140
Ambient Conditions			
Barometric Pressure (in. Hg)	26.72	26.64	26.66
Ambient Temperature (°F)	53	58	53
Relative Humidity (%)	46.5	36.2	62.6
Abs. Humidity (lb H ₂ O/1000 lb dry air)	4.4	4.2	5.8
Engine Operating Conditions			
Brake horsepower (BHP)	1827	1830	1523
Load (%)	102	102	85
Engine Speed (rpm)	300	300	299
Fuel Flow (scf/min)	266	266	265
Heat Input (MMBtu/hr) (a)	16.0	16.0	16.0
Heat Rate (Btu/BHP-hr, HHV)	8900	8884	10667
Heat Rate (Btu/BHP-hr, LHV)	8061	8046	9661
NG HHV (Btu/scf)	1020	1020	1020
NG LHV (Btu/scf)	924	924	924
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	7570	7588	7363
Vol. Flow (dscfm) - M19, Fd (b)	7972	7749	8769
Stack Gas Temperature (°F)	581	576	552
Moisture (%V)	7.00	7.00	6.90
O ₂ (%V dry)	15.0	14.8	15.5
CO ₂ (%V dry)	3.68	3.69	3.36
NO _x (ppmvd)	560	638	278
CO (ppmvd)	71.2	71.1	76.2
THC (ppmvw)	971	957	1300
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	560	620	306
NO _x (lb/hr)	31.9	35.4	17.5
NO _x (g/BHP-hr)	7.93	8.77	5.20
NO _x (lb/MMBtu)	1.99	2.21	1.09
NO _x (tons/yr)	140	155	76.5
CO (ppmvd @ 15% O ₂)	71.2	69.1	83.9
CO (lb/hr)	2.47	2.40	2.91
CO (g/BHP-hr)	0.61	0.59	0.87
CO (lb/MMBtu)	0.15	0.15	0.18
CO (tons/yr)	10.8	10.5	12.8
THC (ppmvd @ 15% O ₂)	1044	1000	1538
THC (lb/hr)	20.7	19.9	30.5
THC (g/BHP-hr)	5.15	4.92	9.08
THC (lb/MMBtu)	1.29	1.24	1.91
THC (tons/yr)	90.8	87.0	134

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

GRI Campaign 6 - Station 6C CEM Results
Engine 11
C-B GMVC-10

Test Period	19	22	21	20	24
Load Condition	Full	Intermediate	Intermediate	Full	Full
Sampling Location	Exhaust	Exhaust	Exhaust	Exhaust	Exhaust
Date	11/15/94	11/15/94	11/15/94	11/15/94	11/15/94
Test Time	1020-1120	1225-1300	1350-1415	1622-1655	1730-1813
Ambient Conditions					
Barometric Pressure (in. Hg)	27.02	26.97	26.93	26.91	26.89
Ambient Temperature (°F)	50	55	57	55	51
Relative Humidity (%)	33.5	28.7	26.0	29.3	36.2
Abs. Humidity (lb H ₂ O/1000 lb dry air)	2.8	2.9	2.8	2.9	3.1
Engine Operating Conditions					
Brake horsepower (BHP)	1799	1569	1465	1724	1669
Load (%)	100	87	86	101	95
Engine Speed (rpm)	300	301	284	285	292
Fuel Flow (scf/min)	236	217	199	224	221
Heat Input (MMBtu/hr) (a)	14.2	13.1	12.0	13.5	13.3
Heat Rate (Btu/BHP-hr, HHV)	8038	8474	8323	7961	8113
Heat Rate (Btu/BHP-hr, LHV)	7281	7676	7539	7211	7349
NG HHV (Btu/scf)	1021	1021	1021	1021	1021
NG LHV (Btu/scf)	925	925	925	925	925
Exhaust Gas Conditions					
Vol. Flow (dscfm) - M 2	7501	7310	6833	7019	7172
Vol. Flow (dscfm) - M19, Fd (b)	6983	6880	6243	6312	6528
Stack Gas Temperature (°F)	592	569	561	583	576
Moisture (%V)	6.7	6.5	6.5	7.0	6.8
O ₂ (%V dry)	14.9	15.3	15.3	14.6	14.9
CO ₂ (%V dry)	3.8	3.6	3.5	3.9	3.7
NO _x (ppmvd)	870	309	364	1426	757
CO (ppmvd)	63.6	77.9	74.0	57.0	65.3
THC (ppmvw)	958	1226	1092	895	973
Exhaust Emissions					
NO _x (ppmvd @ 15% O ₂)	857	326	380	1338	745
NO _x (lb/hr)	43.5	15.2	16.3	64.5	35.4
NO _x (g/BHP-hr)	11.0	4.39	5.03	17.0	9.6
NO _x (lb/MMBtu)	3.05	1.16	1.35	4.77	2.65
NO _x (tons/yr)	191	66.6	71.2	282	155
CO (ppmvd @ 15% O ₂)	62.7	82.2	77.3	53.4	64.2
CO (lb/hr)	1.94	2.34	2.01	1.57	1.86
CO (g/BHP-hr)	0.49	0.68	0.62	0.41	0.50
CO (lb/MMBtu)	0.14	0.18	0.17	0.12	0.14
CO (tons/yr)	8.48	10.2	8.8	6.86	8.14
THC (ppmvd @ 15% O ₂)	1012	1384	1219	903	1027
THC (lb/hr)	17.9	22.5	18.2	15.1	17.0
THC (g/BHP-hr)	4.51	6.49	5.62	3.98	4.61
THC (lb/MMBtu)	1.25	1.72	1.51	1.12	1.27
THC (tons/yr)	78.3	98	79.5	66.3	74.3

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/26/95

E11-SUM.WK4

GRI Campaign 6 - Station 6C CEM Results
Engine 9
C-B GMVA-10

Test Period	12	13	14
Load Condition	Intermediate	Full	Full
Sampling Location	Exhaust	Exhaust	Exhaust
Date	11/11/94	11/12/94	11/12/94
Test Time	1600-1800	1000-1405	1515-1645
Ambient Conditions			
Barometric Pressure (in. Hg)	26.59	26.49	26.47
Ambient Temperature (°F)	65	57	59
Relative Humidity (%)	45.8	85.6	82.9
Abs. Humidity (lb H ₂ O/1000 lb dry air)	6.6	9.3	10.0
Engine Operating Conditions			
Brake horsepower (BHP)	1078	1232	1234
Load (%)	88	100	100
Engine Speed (rpm)	299	300	300
Fuel Flow (scf/min)	168	174	173
Heat Input (MMBtu/hr) (a)	10.1	10.5	10.4
Heat Rate (Btu/BHP-hr, HHV)	9511	8631	8566
Heat Rate (Btu/BHP-hr, LHV)	8652	7851	7792
NG HHV (Btu/scf)	1020	1020	1020
NG LHV (Btu/scf)	928	928	928
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	4991	4715	4690
Vol. Flow (dscfm) - M19, Fd (b)	5079	4845	4756
Stack Gas Temperature (°F)	576	586	590
Moisture (%V)	7.2	8.3	8.4
O ₂ (%V dry)	15.1	14.6	14.5
CO ₂ (%V dry)	3.59	3.91	3.95
NO _x (ppmvd)	299	396	391
CO (ppmvd)	69.2	67.6	67.1
THC (ppmvw)	2624	1342	1309
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	302	368	358
NO _x (lb/hr)	10.9	13.7	13.3
NO _x (g/BHP-hr)	4.58	5.06	4.89
NO _x (lb/MMBtu)	1.08	1.31	1.28
NO _x (tons/yr)	47.7	60.2	58.2
CO (ppmvd @ 15% O ₂)	69.9	62.8	61.6
CO (lb/hr)	1.53	1.43	1.39
CO (g/BHP-hr)	0.64	0.53	0.51
CO (lb/MMBtu)	0.15	0.14	0.13
CO (tons/yr)	6.71	6.25	6.09
THC (ppmvd @ 15% O ₂)	2856	1360	1311
THC (lb/hr)	35.8	17.7	16.9
THC (g/BHP-hr)	15.0	6.50	6.22
THC (lb/MMBtu)	3.54	1.69	1.62
THC (tons/yr)	157	77.3	74.1

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/26/95

E9-SUM.WK4

GRI Campaign 6 - Station 6A CEM Results
Engine 12
Clark HBA-5

Test Period	4	5
Load Condition	Low	Intermediate
Sampling Location	Exhaust	Exhaust
Date	11/04/94	11/05/94
Test Time	1702-1832	1345-1802
Ambient Conditions		
Barometric Pressure (in. Hg)	26.37	26.47
Ambient Temperature (°F)	51	71
Relative Humidity (%)	92.3	23.2
Abs. Humidity (lb H ₂ O/1000 lb dry air)	8.0	4.3
Engine Operating Conditions		
Brake horsepower (BHP)	741	839
Load (%)	75	84
Engine Speed (rpm)	297	301
Fuel Flow (scf/min)	140	150
Heat Input (MMBtu/hr) (a)	8.5	9.0
Heat Rate (Btu/BHP-hr, HHV)	11612	10947
Heat Rate (Btu/BHP-hr, LHV)	10516	9912
NG HHV (Btu/scf)	1025	1021
NG LHV (Btu/scf)	928	924
Exhaust Gas Conditions		
Vol. Flow (dscfm) - M 2	4502	4473
Vol. Flow (dscfm) - M19, Fd (b)	4759	4617
Stack Gas Temperature (°F)	540	592
Moisture (%V)	6.8	6.9
O ₂ (%V dry)	15.7	15.1
CO ₂ (%V dry)	3.3	3.7
NO _x (ppmvd)	496	1030
CO (ppmvd)	228	198
THC (ppmvw) (c)	NA	1327
Exhaust Emissions		
NO _x (ppmvd @ 15% O ₂)	559	1053
NO _x (lb/hr)	16.9	34.0
NO _x (g/BHP-hr)	10.3	18.4
NO _x (lb/MMBtu)	1.99	3.76
NO _x (tons/yr)	74.0	149
CO (ppmvd @ 15% O ₂)	258	202
CO (lb/hr)	4.73	3.97
CO (g/BHP-hr)	2.90	2.15
CO (lb/MMBtu)	0.56	0.44
CO (tons/yr)	20.7	17.4
THC (ppmvd @ 15% O ₂)	---	1457
THC (lb/hr)	---	16.4
THC (g/BHP-hr)	---	8.86
THC (lb/MMBtu)	---	1.81
THC (tons/yr)	---	71.8

a Based on HHV

b Used in emission calculations.

c THC analyzer equipment failure. A new instrument arrived on site late on 11/04/94.

NA = Not available

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

10/26/95

E12-SUM.WK4

GRI Campaign 6 - Station 6C CEM Results
Engine 13
C-B GMWC-10

Test Period	15	16	17	18	23
Load Condition	Full	Full	Intermediate	Full	Full
Sampling Location	Exhaust	Exhaust	Exhaust	Exhaust	Exhaust
Date	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94
Test Time	1030-1130	1510-1549	1700-1745	1855-1925	2025-2100
Ambient Conditions					
Barometric Pressure (in. Hg)	26.75	26.76	26.79	26.83	26.87
Ambient Temperature (°F)	62	66	64	55	51
Relative Humidity (%)	24.0	20.9	24.3	42.7	52.5
Abs. Humidity (lb H ₂ O/1000 lb dry air)	3.2	3.2	3.4	4.3	4.5
Engine Operating Conditions					
Brake horsepower (BHP)	3352	3054	2822	3172	3092
Load (%)	96	95	88	91	92
Engine Speed (rpm)	250	230	230	249	240
Fuel Flow (scf/min)	459	421	389	440	426
Heat Input (MMBtu/hr) (a)	27.8	25.5	23.6	26.6	25.8
Heat Rate (Btu/BHP-hr, HHV)	8423	8478	8481	8527	8474
Heat Rate (Btu/BHP-hr, LHV)	7625	7675	7677	7720	7671
NG HHV (Btu/scf)	1025	1025	1025	1025	1025
NG LHV (Btu/scf)	928	928	928	928	928
Exhaust Gas Conditions					
Vol. Flow (dscfm) - M 2	14164	12594	12422	13942	13360
Vol. Flow (dscfm) - M19, Fd (b)	13104	11888	11794	13514	12978
Stack Gas Temperature (°F)	653	651	615	621	617
Moisture (%V)	6.91	7.06	6.67	6.77	6.85
O ₂ (%V)	14.7	14.6	15.0	15.1	15.1
CO ₂ (%V)	3.84	3.96	3.66	3.68	3.72
NO _x (ppmvd)	1695	2105	1425	1204	1449
CO (ppmvd)	114	119	94.9	105	103
THC (ppmvw)	1710	1743	1759	1785	1754
Exhaust Emissions					
NO _x (ppmvd @ 15% O ₂)	1605	1971	1432	1226	1464
NO _x (lb/hr)	159	179	120	116	135
NO _x (g/BHP-hr)	21.5	26.6	19.3	16.7	19.8
NO _x (lb/MMBtu)	5.72	7.02	5.10	4.37	5.22
NO _x (tons/yr)	697	785	527	510	590
CO (ppmvd @ 15% O ₂)	108	111	95.4	107	104
CO (lb/hr)	6.53	6.14	4.88	6.16	5.82
CO (g/BHP-hr)	0.88	0.91	0.78	0.88	0.85
CO (lb/MMBtu)	0.23	0.24	0.21	0.23	0.23
CO (tons/yr)	28.6	26.9	21.4	27.0	25.5
THC (ppmvd @ 15% O ₂)	1739	1756	1895	1951	1902
THC (lb/hr)	60.0	55.5	55.4	64.4	60.9
THC (g/BHP-hr)	8.11	8.25	8.90	9.21	8.93
THC (lb/MMBtu)	2.16	2.18	2.35	2.42	2.36
THC (tons/yr)	263	243	243	282	267

a Based on HHV

b Used in emission calculations.

Note: Heating values based on 60°F reference.

M19 flow rates based on 68°F reference.

GRI Campaign 6 - Station 6B CEM Results
Turbine
Solar Taurus

Test Period	6	7	8
Load Condition	Full	Full	Low
Sampling Location	Exhaust	Exhaust	Exhaust
Date	11/07/94	11/08/94	11/08/94
Test Time	1709-1823	0915-1344	1700-1912
Ambient Conditions			
Barometric Pressure (in. Hg)	26.51	26.50	26.47
Ambient Temperature (°F)	69	76	67
Relative Humidity (%)	44.2	47.2	45.6
Abs. Humidity (lb H ₂ O/1000 lb dry air)	7.5	10.4	7.2
Turbine Operating Conditions			
Brake Horsepower (BHP)	4803	4709	3934
Percent Load (%)	95	95	77
T5 Temperature (°F)	1401	1400	1305
Power Turbine Speed (rpm)	12458	12250	11567
Compressor Suction (psig)	463.7	478.3	471.8
Compressor Discharge (psig)	645.1	658.1	627.2
Suction Temperature (°F)	76.5	76.8	79.1
Discharge Temperature (°F)	130.3	129.0	125.4
Fuel Flow (scf/min)	709.3	745.0	600.7
Heat Input (MMBtu/hr)	42.8	45.0	36.2
Heat Rate (Btu/BHP-hr, HHV)	9040	9691	9355
Heat Rate (Btu/BHP-hr, LHV)	8187	8781	8475
NG HHV (Btu/scf)	1020	1021	1021
NG LHV (Btu/scf)	924	925	925
Exhaust Gas Conditions			
Vol. Flow (dscfm) - M 2	29192	30964	27544
Vol. Flow (dscfm) - M19, Fd	25757	26581	23311
Stack Gas Temperature (°F)	954	941	902
Moisture (%V)	6.4	6.5	6.1
O ₂ (%V dry)	16.0	15.9	16.3
CO ₂ (%V dry)	3.2	3.2	2.9
NO _x (ppmvd)	71.5	70.8	56.0
CO (ppmvd)	ND	ND	ND
THC (ppmvw)	ND	ND	ND
Exhaust Emissions			
NO _x (ppmvd @ 15% O ₂)	86.5	84.1	72.3
NO _x ISO (ppmvd @ 15% O ₂)	91.3	91.8	76.4
NO _x (lb/hr)	13.2	13.5	9.3
NO _x (g/bhp-hr)	1.2	1.3	1.1
NO _x (lb/MMBtu)	0.3	0.3	0.3
NO _x (tons/yr)	57.8	59.0	40.9
CO (ppmvd @ 15% O ₂)	---	---	---
CO (lb/hr)	---	---	---
CO (g/bhp-hr)	---	---	---
CO (lb/MMBtu)	---	---	---
CO (tons/yr)	---	---	---
THC (ppmvd @ 15% O ₂)	---	---	---
THC (lb/hr)	---	---	---
THC (g/bhp-hr)	---	---	---
THC (lb/MMBtu)	---	---	---
THC (tons/yr)	---	---	---

Note: Emission rates are based on the M-19 volumetric flowrate.
Turbine load is based on available load at ambient conditions during testing.
Heating values based on 60°F reference.
M19 flow rates based on 68°F reference.

Appendix C

CEMS Summary Data

This appendix presents a summary of the raw CEMS concentration data for all engine and turbine test runs. Each summary includes the average, standard deviation, maximum, and minimum concentration (e.g., ppmv and percent volume) measured for each pollutant during a given run. Pollutants measured include oxygen, total hydrocarbons, carbon monoxide, carbon dioxide, nitrous oxides, and sulfur dioxide.

Summary of CEM Concentrations for [REDACTED] Testing
Daily Averages

C.1 Campaign 2

Date	Time	Statistic	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)	SO2 (ppm)
3/12/94	1042-1557	Average	15.37	715.46	78.81	2.27	232.67	-0.04
		Std. Dev.	0.11	117.57	14.28	0.05	34.54	0.58
		RSD	0.01	0.16	0.18	0.02	0.15	-13.06
		Max.	15.75	1197.27	108.46	2.39	330.25	1.19
		Min.	15.13	333.58	45.88	2.11	144.23	-1.63
3/13/94	1240-1816	Average	11.44	220.22	355.46	3.86	1819.48	7.28
		Std. Dev.	0.16	78.04	47.52	0.10	91.83	0.69
		RSD	0.01	0.35	0.13	0.03	0.05	0.09
		Max.	12.11	440.62	460.43	4.19	2092.46	8.91
		Min.	11.08	31.51	247.75	3.58	1619.97	4.65

CEM Summary for GRI [REDACTED]
6/14/94

C.2 Campaign 3

Test		Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	Average	102	1600-2100	9.6	1666.1	202.7	7.0	1748.5
	Std. Dev.			0.31	65.03	6.51	0.25	360.64
	RSD			3.2%	3.9%	3.2%	3.6%	20.6%
	Max			10.89	2006.05	232.29	7.41	2757.10
	Min			8.83	1567.07	191.17	6.29	472.19

CEM Summary for GRI/ [REDACTED]
6/15/94

Test		Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	Average	102	0832-1314	9.4	1677.1	216.5	7.3	1656.8
	Std. Dev.			0.06	18.50	3.41	0.53	72.60
	RSD			0.68%	1.10%	1.57%	7.21%	4.38%
	Max			9.56	1725.49	214.90	15.51	1803.66
	Min			9.27	1627.18	208.91	7.02	1432.09
Reduced Load	Average	102	1437-1637	9.9	1802.6	246.5	7.1	824.8
	Std. Dev.			0.08	39.10	2.33	0.07	75.09
	RSD			0.86%	2.17%	0.94%	1.01%	9.10%
	Max			10.05	2010.24	251.53	7.27	968.90
	Min			9.69	1709.61	239.96	6.98	670.09
Low Load	Average	101	1831-1935	11.0	2269.2	208.7	6.4	259.0
	Std. Dev.			0.04	22.00	1.58	0.03	8.82
	RSD			0.33%	0.97%	0.76%	0.53%	3.40%
	Max			11.06	2321.03	211.47	6.45	279.40
	Min			10.90	2225.10	205.26	6.31	233.16

CEM Summary for GRV
6/16/94

Test	Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	101	0915-1405	9.5	1949.8	258.4	7.2	1297.0
			0.13	29.62	5.05	0.12	159.91
			1.36%	1.52%	1.95%	1.72%	12.33%
			9.81	2027.29	268.05	7.41	1621.88
			9.26	1891.11	246.73	6.91	936.34
Load Increase	101	1415-1806	9.3	1879.0	257.6	7.3	1554.7
			0.04	21.20	1.82	0.05	45.99
			0.46%	1.13%	0.71%	0.68%	2.96%
			9.36	1944.55	263.07	7.39	1708.45
			9.13	1830.26	252.55	7.14	1452.49

CEM Summary for GRI 6/18/94

Test	Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	4	0925-1115	Average 14.7	1128.9	53.0	4.2	1246.3
			Std. Dev. 0.04	27.81	0.86	0.02	37.22
			RSD 0.2%	2.5%	1.6%	0.6%	3.0%
Reduced Load	4	1345-1523	Max 14.75	1222.37	55.81	4.22	1330.32
			Min 14.62	1078.03	50.70	4.11	1176.99
			Average 15.4	1264.6	61.8	3.8	390.7
			Std. Dev. 0.03	52.73	2.55	0.03	17.74
			RSD 0.2%	4.2%	4.1%	0.7%	4.5%
Low Load	2	1800-1900	Max 15.45	1382.17	68.69	3.81	427.21
			Min 15.33	1124.32	58.80	3.71	358.02
			Average 15.1	3116.8	124.5	4.0	42.8
			Std. Dev. 0.02	74.50	3.29	0.02	2.03
			RSD 0.1%	2.4%	2.6%	0.5%	4.7%
			Max 15.10	3336.29	132.56	4.02	47.74
			Min 15.02	2961.45	120.28	3.92	38.75

CEM Summary for GRI/ [REDACTED]
6/19/94

Test		Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	Average	2	1105-1428	13.0	827.8	81.0	5.8	1286.5
	Std. Dev.			0.04	19.32	0.90	0.04	36.13
	RSD			0.3%	2.3%	1.1%	0.6%	2.8%
	Max			13.14	894.70	82.78	5.82	1339.21
	Min			12.95	792.43	78.49	5.68	1192.30
Full Load	Average	2	1630-2018	13.0	818.2	80.4	5.0	1366.3
	Std. Dev.			0.02	13.55	1.27	0.04	53.28
	RSD			0.1%	1.7%	1.6%	0.7%	3.9%
	Max			13.07	851.15	82.82	5.08	1428.91
	Min			12.99	782.70	78.55	4.93	1219.38

CEM Summary for GRI/ [REDACTED]
6/20/94

Test		Engine	Time	O2 (%)	THC (ppm)	CO (ppm)	CO2 (%)	NOx (ppm)
Full Load	Average	2	1240-1747	13.2	864.5	83.7	5.1	994.3
	Std. Dev.			0.14	31.27	2.33	0.08	239.88
	RSD			1.0%	3.6%	2.8%	1.5%	24.1%
	Max			13.42	958.42	86.27	5.24	1408.04
	Min			12.99	807.50	78.57	5.00	807.84

CEM Summary for GRI - Campaign 4
8/23/94

Run Number	Engine	Sampling Location	Load Timing	Time		Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
1	Waukesha	After NSCR	Full	1146-1345	Average	87.25	35.20	29.54	0.04	11.69	68.53	69.32	8.03	607.41	693.51
					SD	1.62	2.87	0.01	0.01	0.01	16.10	17.54	0.67	44.70	1.30
					RSD	1.85%	8.15%	0.03%	13.80%	0.10%	23.49%	25.31%	8.38%	7.36%	0.19%
					Max	91.35	39.00	29.55	0.06	11.72	133.35	139.10	10.34	750.90	697.56
2	Waukesha	After NSCR	Full	1424-1722	Average	84.24	28.53	29.52	0.03	11.67	33.96	5.16	6.58	455.33	691.04
					SD	86.61	40.13	29.49	0.06	11.70	69.47	63.94	8.38	639.55	681.22
					RSD	2.81	4.36	0.01	0.01	0.04	19.03	16.46	0.36	40.02	3.40
					Max	90.70	48.33	29.51	0.09	11.76	197.70	162.94	10.09	744.77	690.50
3	Waukesha	Before NSCR	Full	1805-2028	Average	81.39	33.62	29.48	0.03	11.64	36.29	26.52	7.33	493.68	675.16
					SD	74.14	65.35	29.47	0.42	11.22	3742.19	3713.63	2842.50	1048.32	685.18
					RSD	2.83	7.58	0.00	0.01	0.02	80.48	82.07	24.67	35.33	6.85
					Max	79.55	76.10	29.48	1.78%	0.21%	2.15%	2.21%	0.87%	3.37%	1.00%
					Min	70.34	52.32	29.47	0.44	11.28	3996.55	3977.39	2920.88	1191.94	712.84
									0.41	11.17	3557.47	3504.53	2794.23	984.52	680.70

C.3 Campaign 4

CEM Summary for GRI - Campaign 4
8/24/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
4	Waukesha	Before NSCR	52.6 %	1020-1201	Average	86.86	36.69	29.55	11.53	2755.76	2680.29	2542.36	1394.37	685.00
					SD	1.92	2.65	0.00	0.05	130.95	129.24	21.65	513.74	0.86
					RSD	2.22%	7.23%	0.01%	0.41%	4.75%	4.80%	0.85%	36.84%	0.13%
					Max	91.52	41.09	29.55	11.60	3212.48	3150.38	2579.43	2735.90	686.86
5	Waukesha	After NSCR	52 %	1210-1306	Min	83.63	30.14	29.54	11.36	2429.60	2364.63	2475.94	950.24	682.72
					Average	92.43	27.16	29.54	11.99	35.76	30.69	35.33	846.39	716.23
					SD	0.59	1.37	0.00	0.03	23.93	41.81	16.53	398.46	31.41
					RSD	0.63%	5.03%	0.01%	0.28%	66.92%	136.22%	46.77%	47.08%	4.39%
					Max	94.47	30.51	29.54	12.07	107.35	173.82	87.09	2029.84	842.62
					Min	90.96	22.51	29.53	11.92	-7.62	-76.23	-17.62	208.99	669.30

CEM Summary for GRI - Campaign 4
8/25/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
7	Engine 4	Before Cat	96 - 98 %	1705-1906	Average	85.10	37.83	29.44	15.54	2.86	104.24	39.16	1218.09	680.03
					SD	2.26	3.31	0.01	0.07	0.02	6.20	2.41	27.61	1.01
					RSD	2.65%	8.74%	0.03%	0.44%	0.59%	5.95%	6.14%	2.27%	0.15%
					Max	88.38	43.83	29.45	15.63	2.89	119.90	43.73	1260.95	684.52
					Min	80.49	33.18	29.42	15.38	2.83	87.88	35.39	1146.39	677.51

CEM Summary for GRI - Campaign 4
8/26/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
8	Engine 4	After Cat.	97-100%	1051-1226	Average	84.39	47.78	15.36	3.03	14.19	23.57	44.04	1357.57	683.24
					SD	1.78	2.74	0.02	0.01	0.36	2.28	2.58	28.44	0.80
					RSD	2.11%	5.74%	0.15%	0.31%	2.56%	9.69%	5.87%	2.09%	0.12%
					Max	87.98	53.56	15.40	3.06	15.03	29.54	50.00	1420.70	684.91
9	Engine 4	Before Cat.	92-94%	1310-1403 1419-1438 1452-1537	Average	81.31	42.46	15.31	3.01	13.17	17.64	40.03	1304.26	681.63
					SD	89.04	40.48	15.44	2.96	180.78	154.09	34.14	1558.79	681.47
					RSD	1.25	1.93	0.03	0.01	9.51	16.85	2.87	93.04	1.88
					Max	92.11	46.10	0.20%	0.40%	5.26%	10.94%	8.41%	5.97%	0.28%
10	Engine 4	After Cat.	88-90%	1620-1821	Average	85.65	35.58	15.38	2.91	170.98	200.60	37.87	1746.52	687.80
					SD	86.17	42.55	15.47	2.96	12.71	110.15	15.03	1421.13	679.42
					RSD	1.82	3.08	0.01	0.02	0.47	19.78	33.07	1567.44	681.52
					Max	88.85	49.92	0.07%	0.57%	3.69%	13.29%	2.61%	29.01	1.29
					Average	82.42	37.93	15.52	2.98	13.76	25.28	34.80	1623.89	686.47
					Min			15.44	2.90	11.49	12.95	31.14	1501.66	678.10

CEM Summary for GRI - Campaign 4
8/27/94

Run Number	Engine	Sampling Location	Load Timing	Time		Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
11	Engine 8		86-90%	1108-1503	Average	91.36	32.73	29.45	11.28	5.36	351.66	352.60	69.74	1936.91	682.53
					SD	2.92	6.29	0.02	0.32	0.11	9.43	10.43	5.22	178.69	3.34
					RSD	3.20%	19.20%	0.07%	2.85%	2.09%	2.68%	2.96%	7.49%	9.23%	0.49%
					Max	95.94	46.14	29.48	11.39	5.44	372.62	376.69	76.49	2345.82	729.94
					Min	84.92	21.33	29.42	6.39	3.69	278.38	251.10	19.78	1636.11	678.87
12	Engine 8		82%	1639-1921	Average	86.01	35.03	29.41	11.44	5.22	385.36	374.41	58.66	3290.45	598.57
					SD	2.86	3.30	0.00	0.06	0.05	25.34	23.52	9.49	397.77	27.93
					RSD	3.33%	9.42%	0.01%	0.52%	1.01%	6.57%	6.28%	16.18%	12.09%	4.00%
					Max	90.21	40.53	29.42	11.56	5.34	418.98	400.75	124.14	5125.38	764.01
					Min	80.30	28.34	29.40	11.23	5.11	242.53	208.69	48.93	2749.41	675.28

CEM Summary for GRI - Campaign 4
8/28/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
13	Engine 9		87 - 89 %	1254-1520	Average	27.76	29.46	8.27	6.95	137.59	106.70	3351.43	947.38	682.57
					SD	1.60	0.01	0.08	0.04	4.18	14.88	73.49	35.68	0.95
					RSD	5.77%	0.03%	0.97%	0.63%	3.04%	13.94%	2.19%	3.77%	0.14%
					Max	30.76	29.48	8.43	7.03	144.72	137.28	3460.78	1051.58	685.29
					Min	24.44	29.45	8.10	6.85	129.15	51.07	3217.99	875.95	679.15

CEM Summary for GRI - Campaign 4
8/29/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
14	Engine 9	Before SCR	92 %	0858-0932	Average	52.06	29.47	8.56	6.93	141.37	69.83	3041.78	938.04	682.47
					SD	2.59	0.00	0.06	0.03	2.31	19.95	35.59	47.54	0.55
					RSD	4.98%	0.01%	0.65%	0.46%	1.63%	28.57%	1.17%	5.07%	0.08%
					Max	56.67	29.47	8.65	6.97	145.09	120.24	3095.63	1035.88	683.70
15	Engine 9	After SCR	90 - 91 %	0959-1330	Min	46.17	29.47	8.45	6.87	136.65	8.92	2988.03	833.32	681.59
					Average	33.12	29.45	8.60	6.78	103.02	56.74	676.57	948.62	683.85
					SD	4.92	0.02	0.06	0.05	4.56	9.25	63.67	95.90	8.29
					RSD	14.84%	0.07%	0.68%	0.67%	4.43%	16.30%	9.41%	10.11%	1.21%
16	Engine 9	After SCR		1413-1549	Max	44.71	29.47	8.76	6.84	114.25	97.42	764.88	1358.76	731.61
					Min	24.93	29.41	8.51	6.67	95.79	39.94	420.92	784.69	674.80
					Average	31.75	29.39	8.56	6.80	101.70	57.17	775.26	1001.00	687.52
					SD	1.31	0.01	0.10	0.05	3.24	8.23	26.92	91.33	18.95
17	Engine 9	Before SCR		1613-1700	RSD	4.12%	0.02%	1.15%	0.73%	3.19%	14.39%	3.47%	9.12%	2.76%
					Max	34.25	29.40	8.85	6.99	111.61	80.98	833.80	1253.71	743.65
					Min	28.41	29.38	8.24	6.65	90.46	26.36	688.40	823.71	674.88
					Average	31.65	29.37	8.33	7.10	125.84	49.46	3339.11	899.64	678.10
					SD	1.08	0.02	0.02	0.04	2.82	20.36	30.06	40.90	7.36
					RSD	3.42%	0.07%	0.29%	0.63%	2.24%	41.16%	0.90%	4.55%	1.08%
					Max	35.71	29.52	8.39	7.14	142.29	82.32	3381.14	1017.98	682.40
					Min	30.20	29.37	8.29	6.82	122.51	-10.32	3194.57	814.00	635.71

CEM Summary for GRI - Campaign 4
8/30/94

Run Number	Engine	Sampling Location	Load Timing	Time	Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
A	Engine 8		99 % / 8°	0745-815	Average	72.98	66.38	11.31	5.19	377.51	393.85	64.55	2333.04	688.80
					SD	0.75	1.72	0.02	0.01	4.12	5.72	1.67	47.87	1.45
					RSD	1.03%	2.59%	0.14%	0.22%	1.09%	1.45%	2.59%	2.05%	0.21%
					Max	74.10	70.97	11.34	5.22	387.86	411.07	68.74	2454.47	686.89
B	Engine 8		91 % / 8°	0903-0944	Min	71.85	62.86	11.26	5.17	365.76	365.85	61.25	2219.28	685.78
					Average	77.93	55.50	11.48	5.06	419.34	425.85	53.30	3568.48	689.59
					SD	1.32	2.67	0.02	0.01	3.80	9.53	1.72	53.36	1.23
					RSD	1.69%	4.82%	0.15%	0.23%	0.91%	2.24%	3.22%	1.50%	0.18%
C	Engine 8		89 % / 5°	1013-1042	Max	80.36	61.47	11.52	5.10	426.77	519.90	58.16	3680.59	693.91
					Min	75.59	50.56	11.42	5.03	407.78	415.31	50.07	3386.51	687.02
					Average	82.24	47.02	11.56	5.01	364.03	388.38	48.67	4142.90	689.46
					SD	1.11	1.96	0.03	0.02	7.71	9.58	2.71	107.30	1.43
D	Engine 8		92-96 % / 5°	1100-1137	RSD	1.35%	4.17%	0.23%	0.38%	2.12%	2.47%	5.58%	2.59%	0.21%
					Max	84.28	52.18	11.60	5.08	374.61	447.98	70.74	4867.86	694.51
					Min	79.49	43.33	11.44	4.98	320.56	353.98	45.96	3932.70	686.14
					Average	84.51	43.15	11.37	5.13	331.21	367.09	55.69	2896.78	689.20
E	Engine 8		95-96 % / 8°	1150-1228	SD	1.43	2.03	0.05	0.03	12.25	9.38	1.99	104.35	1.12
					RSD	1.69%	4.70%	0.40%	0.50%	3.70%	2.55%	3.58%	3.60%	0.16%
					Max	87.24	47.79	11.44	5.22	394.33	406.01	63.60	3075.36	693.26
					Min	81.47	39.29	11.21	5.10	315.77	350.36	51.00	2616.88	686.50
F	Engine 8		Full / 11°	1234-1251	Average	86.09	40.68	11.21	5.23	393.78	403.48	60.02	2682.76	689.23
					SD	1.11	1.36	0.04	0.02	4.66	5.42	2.17	99.78	1.21
					RSD	1.29%	3.35%	0.32%	0.33%	1.18%	1.34%	3.61%	3.72%	0.18%
					Max	88.78	44.13	11.28	5.29	415.78	421.50	72.30	2834.35	692.87
G	Engine 8		Red / 11°	1307-1339	Min	83.78	37.13	11.02	5.19	382.29	384.33	56.12	2138.12	686.86
					Average	89.00	37.77	11.09	5.30	398.71	405.10	66.97	1925.53	688.92
					SD	0.71	0.84	0.03	0.02	6.23	5.80	2.06	64.69	1.15
					RSD	0.79%	2.23%	0.27%	0.31%	1.56%	1.43%	3.08%	3.36%	0.17%
H	Engine 4		95 %	1555-1618	Max	90.38	39.51	11.17	5.34	409.21	426.24	71.43	2033.96	692.93
					Min	87.78	35.94	11.01	5.26	381.11	391.54	62.36	1792.76	687.13
					Average	89.62	36.36	11.33	5.12	451.19	457.49	55.12	3298.08	688.89
					SD	0.76	0.90	0.02	0.01	3.89	6.70	1.24	39.34	1.47
I	Engine 4		Reduced	1656-1735	RSD	0.85%	2.47%	0.14%	0.18%	0.86%	1.46%	2.25%	1.19%	0.21%
					Max	91.30	38.75	11.37	5.15	461.66	484.10	58.70	3425.83	694.74
					Min	88.33	34.02	11.29	5.09	440.04	434.40	52.32	3195.18	686.35
					Average	85.40	42.20	15.26	2.92	178.04	156.02	36.89	1425.52	686.48
					SD	0.72	1.10	0.01	0.01	2.31	5.12	3.47	22.56	1.43
					RSD	0.84%	2.61%	0.09%	0.27%	1.30%	3.24%	9.41%	1.58%	0.21%
					Max	86.60	44.78	15.29	2.94	182.37	170.54	40.27	1513.57	693.40
					Min	83.89	40.54	15.22	2.90	170.37	142.88	18.26	1374.67	684.29
					Average	83.51	44.76	15.51	2.81	237.35	272.01	20.22	1948.03	685.40
					SD	0.42	0.88	0.01	0.01	2.22	6.25	0.27	24.90	2.09
					RSD	0.51%	1.96%	0.07%	0.29%	0.94%	2.30%	1.34%	1.28%	0.31%
					Max	84.69	46.62	15.54	2.83	242.18	307.60	20.73	2009.62	696.48
					Min	82.72	42.63	15.48	2.79	229.84	240.72	19.65	1876.55	683.44

C.4 Campaign 5

CEM Summary for GRI - Campaign 5
10/05/94

Test Number	Engine	Load Timing	Time		Tamb (°F)	RH (%)	BP (in Hg)	O2 (%)	CO2 (%)	CO low (ppm)	CO high (ppm)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
3	Turbine	Full	1230-1755	Average	57.24	51.26	29.34	17.67	1.97	13.21	12.45	41.39	1.52	684.09
				SD	1.22	3.95	0.02	0.03	0.02	2.60	3.45	0.38	1.96	0.89
				RSD	2.13%	7.71%	0.06%	0.15%	1.26%	19.71%	27.73%	0.92%	129.41%	0.13%
				Max	61.06	64.30	29.37	17.75	2.02	21.78	21.10	42.43	8.03	689.15
				Min	55.09	43.46	29.32	17.60	1.92	8.31	6.57	40.35	0.05	682.43
4	Turbine	Full	1843-2133	Average	51.48	75.12	29.35	17.65	1.99	16.64	16.77	39.60	1.25	685.14
				SD	1.93	6.12	0.01	0.03	0.01	2.24	2.33	0.50	1.22	7.70
				RSD	3.75%	8.14%	0.03%	0.15%	0.65%	13.47%	13.88%	1.27%	97.44%	1.12%
				Max	55.29	86.99	29.36	17.69	2.03	22.78	22.16	41.65	8.90	731.61
				Min	48.34	64.26	29.33	17.58	1.95	11.95	11.16	38.40	0.08	681.54

CEM Summary for 11/04/94
GRI Campaign 6A

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 10	1	Full	1000-1224	Average	62.65	26.36	16.92	2.65	51.36	4.15	596.76	-3.90	629.71
				Std Deviation	14.68	0.01	0.04	0.01	2.41	2.29	24.02	1.64	0.77
				RSD	23.43	0.03	0.21	0.52	4.69	55.17	4.03	-42.11	0.12
				Max	66.32	26.37	16.98	2.68	56.03	5.45	636.85	0.10	631.97
				Min	54.74	26.34	16.83	2.61	45.70	-0.46	554.71	-7.69	627.71
Engine 10	3	Low	1448-1803	Average	92.97	26.35	17.33	2.41	59.14	-0.35	219.06	-6.62	629.57
				Std Deviation	1.64	0.01	0.03	0.02	0.95	0.01	8.54	1.44	1.27
				RSD	1.76	0.03	0.19	0.81	1.61	-1.74	3.90	-21.68	0.20
				Max	95.86	26.37	17.39	2.45	61.99	-0.33	241.67	-3.37	636.31
				Min	89.84	26.34	17.24	2.38	56.94	-0.36	203.69	-12.88	627.48
Engine 12	4	Low	1702-1832	Average	92.28	26.37	15.67	3.33	228.28	-0.35	495.80	-4.06	629.31
				Std Deviation	2.20	0.01	0.03	0.01	3.15	0.01	13.29	1.48	0.84
				RSD	2.38	0.04	0.18	0.37	1.38	-1.48	2.68	-36.48	0.13
				Max	97.21	26.37	15.73	3.36	237.44	-0.34	530.77	-1.18	631.41
				Min	49.74	26.34	15.62	3.31	221.08	-0.36	485.21	-7.19	627.77

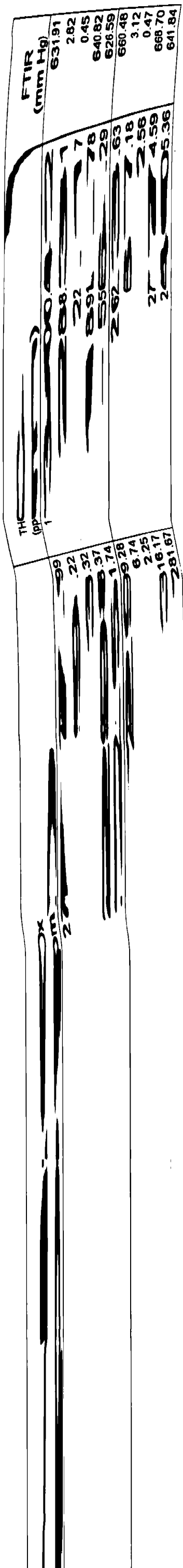
C.5 Campaign 6

**CEM Summary for 11/05/94
GRI Campaign 6A**

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 10	2	Full	0936-1209	Average	29.27	26.50	16.77	2.69	56.77	-3.36	820.38	595.37	632.98
				Std Deviation	3.46	0.02	0.09	0.04	3.31	8.33	43.69	34.87	0.95
				RSD	11.81	0.07	0.51	1.49	5.84	-248.13	5.33	5.86	0.15
				Max	70.57	26.59	16.92	2.78	64.23	-0.29	911.21	683.42	635.90
				Min	56.26	26.47	16.62	2.63	37.92	-27.87	764.73	525.41	630.75
Engine 12	5	Full (80%)	1345-1802	Average	23.23	26.47	15.13	3.67	197.54	-0.51	1029.54	1326.80	633.02
				Std Deviation	3.23	0.01	0.04	0.02	4.01	0.04	28.63	51.29	0.64
				RSD	4.53	0.05	0.26	0.67	2.03	-7.65	2.78	3.87	0.10
				Max	76.47	26.49	15.21	3.73	208.02	-0.45	1079.25	1486.21	634.96
				Min	66.01	26.45	15.05	3.62	187.57	-0.56	953.95	1163.53	631.38

CEM Summary for 11/10/94
GRI Campaign 6C

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 15	9	Full	1030-1500	Average	53.39	46.45	15.00	3.68	71.18	-30.71	559.72	970.78	630.30
				Std Deviation	4.13	9.07	0.10	0.04	0.90	0.00	54.99	38.56	1.41
				RSD	7.74	19.53	0.65	1.19	1.27	-0.00	9.82	3.97	0.22
				Max	59.36	66.49	15.17	3.74	75.93	-30.71	662.94	1105.54	634.52
Engine 15	10	Full	1546-1801	Min	44.83	32.39	14.85	3.60	68.70	-30.71	441.92	878.23	627.02
				Average	58.36	36.16	14.83	3.69	71.05	-30.71	637.87	957.07	628.36
				Std Deviation	1.76	3.58	0.03	0.03	1.00	0.00	22.04	32.04	2.21
				RSD	3.01	9.89	0.18	0.71	1.40	-0.00	3.45	3.35	0.35
Engine 15				Max	60.72	44.82	14.88	3.73	73.13	-30.71	735.07	1055.16	651.31
				Min	54.39	31.50	14.78	3.63	68.53	-30.71	589.95	885.93	625.64



NOx (ppm)		THC (ppm)	FTIR (mm Hg)
395		1342.15	627.75
19		79.40	1.24
5.0		5.92	0.20
442.61		516.75	631.10
352.54		123.89	624.89
390.53		308.51	626.26
11.86		84.78	1.37
3.04		4.95	0.22
21.93		2.17	629.48
57.72		1.84	622.67

CEM Summary for 11/11/94
GRI Campaign 6C

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 15	11	Low	0940-1140	Average	61.88	26.66	15.53	3.36	76.23	-30.72	277.99	1300.42	631.91
				Std Deviation	4.70	0.00	0.05	0.04	0.95	0.01	9.22	288.31	2.82
				RSD	4.41	0.02	0.30	1.15	1.25	-0.03	3.32	22.17	0.45
				Max	57.02	70.64	15.85	3.42	78.68	-30.70	298.37	1891.78	640.82
				Min	48.75	54.07	15.45	3.30	73.37	-30.73	251.74	556.29	626.59
Engine 9	12	Low	1600-1800	Average	64.50	26.59	15.08	3.59	69.20	295.90	299.28	2623.63	660.48
				Std Deviation	1.49	0.01	0.02	0.02	1.20	0.53	6.74	67.18	3.12
				RSD	2.32	0.04	0.16	0.42	1.74	0.18	2.25	2.56	0.47
				Max	66.80	51.58	15.12	3.63	72.20	296.93	316.17	2774.59	668.70
				Min	61.83	39.94	14.99	3.54	66.04	292.36	281.67	2405.36	641.84

CEM Summary for 11/12/94
GRI Campaign 6C

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 9	13	Full	1000-1405	Average	56.63	26.49	14.55	3.91	67.64	171.89	395.93	1342.15	627.75
				Std Deviation	3.09	0.02	0.05	0.03	1.03	8.35	19.79	79.40	1.24
				RSD	5.46	0.09	0.35	0.65	1.52	4.86	5.00	5.92	0.20
				Max	61.05	26.56	14.68	3.95	72.09	212.32	442.61	1516.75	631.10
Engine 9	14	Full	1515-1645	Min	52.13	26.46	14.46	3.81	64.59	104.80	352.54	1123.89	624.89
				Average	59.42	26.47	14.47	3.95	67.11	55.12	390.53	1308.51	626.26
				Std Deviation	0.80	0.01	0.01	0.03	1.02	62.75	11.86	64.78	1.37
				RSD	1.35	0.03	0.08	0.71	1.52	113.85	3.04	4.95	0.22
Engine 9				Max	60.45	26.48	14.49	3.99	69.87	167.41	421.93	1462.17	629.48
				Min	58.18	26.45	14.43	3.89	64.70	0.23	357.72	1101.84	622.67

CEM Summary for 11/15/94
GRI Campaign 6C

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O2 (%)	CO2 (%)	CO (ppm)	NOx (ppm)	THC (ppm)	FTIR (mmHg)	Suction Pressure (psf)	Fuel Pressure (in-H2O)	Fuel Pressure (psi)	Fuel Temp (°F)	Discharge Pressure (psf)	Engine Speed (rpm)	Scavenger Air Temp (°F)
Engine 11	19	Full Speed	1020-1120	Average	33.50	27.02	14.81	3.76	63.64	870.04	858.48	638.58	480.71	42.33	50.23	57.41	707.43	283.75	210.84
				Std Deviation	0.83	0.00	0.02	0.02	2.15	32.72	83.13	1.10	0.63	0.11	0.10	0.36	0.26	0.62	1.14
				RSD	4.08	0.01	0.16	0.56	3.38	3.76	8.67	0.17	0.14	0.27	0.19	0.65	0.04	0.21	0.54
				Max	52.37	27.03	14.87	3.82	68.97	958.53	1319.64	843.35	482.08	42.77	50.55	58.11	708.04	300.73	213.70
Engine 11	22	Low Full Speed	1225-1300	Average	30.03	27.01	14.84	3.71	58.13	784.33	817.28	635.83	459.85	41.95	49.82	58.63	708.98	286.30	207.70
				Std Deviation	28.98	26.87	15.31	3.57	77.88	308.58	1225.78	637.41	481.38	38.32	45.57	60.16	708.40	298.78	185.88
				RSD	9.61	0.01	0.03	0.02	2.39	16.21	116.45	0.91	0.19	0.14	0.12	0.17	0.20	0.77	1.10
				Max	58.64	27.09	15.51	3.80	82.74	355.08	1800.06	840.68	481.79	38.68	45.91	60.45	708.86	301.50	188.41
Engine 11	21	Low Low Speed	1350-1415	Average	27.21	26.98	15.25	3.52	71.83	281.16	888.89	635.54	480.34	37.49	45.23	59.80	705.99	295.82	181.84
				Std Deviation	26.00	26.93	15.25	3.54	73.99	363.83	1061.84	638.11	481.28	35.08	41.28	61.56	704.82	283.80	188.87
				RSD	0.89	0.00	0.02	0.02	2.14	16.87	100.54	1.28	0.12	0.15	0.13	0.17	0.24	0.62	0.82
				Max	59.11	28.08	15.32	3.57	77.84	408.87	1417.61	840.68	481.61	35.40	41.55	61.84	705.41	285.28	171.09
Engine 11	20	Full Low Speed	1622-1655	Average	24.11	26.92	15.19	3.50	87.87	322.23	892.39	635.56	480.82	34.71	40.92	61.25	704.29	282.39	163.32
				Std Deviation	29.32	26.91	14.81	3.68	58.97	1428.37	885.18	635.84	457.91	40.27	47.11	61.20	705.52	283.98	182.74
				RSD	1.71	0.10	0.06	0.01	2.34	44.65	2.34	1.63	0.21	0.22	0.28	2.54	1.11	1.07	
				Max	58.29	27.83	15.01	3.86	80.81	1489.52	1068.61	632.17	470.02	41.38	48.40	62.81	724.42	290.87	186.55
Engine 11	24	Full Low Speed	1730-1813	Average	35.15	26.88	14.54	3.84	52.08	955.09	826.99	633.92	457.35	38.49	48.44	60.85	704.53	282.19	180.79
				Std Deviation	36.23	26.89	14.60	3.71	65.28	757.48	973.40	635.28	458.27	39.20	48.45	60.25	708.51	290.78	188.38
				RSD	0.77	0.00	0.03	0.03	2.16	24.76	75.70	0.84	0.65	0.11	0.12	0.12	0.47	0.81	0.83
				Max	52.07	26.91	14.87	3.77	69.10	854.84	1250.52	637.98	460.05	39.58	48.74	60.41	707.78	282.24	182.21
Engine 11		Full Low Speed		Min	48.73	26.88	14.63	3.65	59.52	688.06	826.67	633.04	457.59	38.82	48.10	59.98	705.89	288.28	188.57

CEM Summary for 11/14/94
GRI Campaign 6B

Engine Number	Test Number	Test Condition	Time	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O ₂ (%)	CO ₂ (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Engine 13	15	Full	1030-1120	Average	24.82	26.75	14.66	3.84	114.16	0.00	1696.92	1705.95	631.89
				Std Deviation	2.40	0.00	0.02	0.03	2.36	0.00	20.85	86.50	1.13
				RSD	9.66	0.00	0.13	0.91	2.06	ERR	1.23	5.07	0.18
Engine 13	16	Full/ Low Speed	1510-1549	Average	20.91	26.76	14.60	3.96	118.51	109.12	2104.70	1742.84	632.57
				Std Deviation	1.20	0.00	0.02	0.01	2.59	80.50	18.07	68.51	1.04
				RSD	5.72	0.01	0.16	0.22	2.18	73.77	0.86	3.93	0.16
Engine 13	17	Low/ Low Speed	1700-1745	Average	24.25	26.79	15.03	3.66	94.90	0.00	1425.03	1759.48	633.39
				Std Deviation	2.48	0.01	0.03	0.01	2.48	0.00	33.87	128.60	8.68
				RSD	10.22	0.02	0.18	0.35	2.62	ERR	2.38	7.31	1.37
Engine 13	18	Low Full Speed	1855-1925	Average	42.74	26.83	15.11	3.68	104.58	0.00	1203.53	1784.69	633.76
				Std Deviation	1.10	0.00	0.02	0.03	2.40	0.00	31.47	156.46	1.02
				RSD	2.57	0.02	0.13	0.92	2.29	ERR	2.61	8.77	0.16
Engine 13	23	Intermediate Int Speed	2025-2100	Average	52.48	26.87	15.06	3.72	102.97	0.00	1449.15	1754.06	634.55
				Std Deviation	1.12	0.01	0.02	0.02	2.57	0.00	31.36	113.20	1.06
				RSD	2.14	0.02	0.12	0.53	2.50	ERR	2.16	6.45	0.17

	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)
5	-30.71	71.52	-0.65
1	0.00	0.31	0.35
8	-0.01	0.44	53.45
4	-30.71	72.01	-0.10
2	-30.72	70.86	-1.19

CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	FTIR (mm Hg)
0.95	-30.71	70.81	626.08
1.08	0.00	0.84	1.32
113.00	-0.01	1.19	0.21
6.78	-30.71	72.24	628.81
-0.18	-30.72	68.85	623.31
0.35	-30.71	58.01	623.55
0.29	0.00	0.64	3.11
84.99	-0.00	1.14	0.50
1.01	-30.70	57.19	-6.56.37
-0.15	-30.72	54.90	521.12

CEM Summary for 11/07/94
GRI Campaign 6B

Engine Number	Test Number	Test Condition	Time	Average	Std Deviation	RSD	Max	Min	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O2 (%)	CO2 (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Turbine	6	Full	1709-1823						68.99	44.16	26.51	16.02	3.21	0.45	-30.71	71.52	-0.65	634.98
									0.98	0.21	0.01	0.03	0.03	0.31	0.00	0.31	0.35	1.44
									1.41	0.47	0.02	0.21	0.91	69.58	-0.01	0.44	-53.45	0.23
									71.14	44.48	26.51	16.09	3.26	1.04	-30.71	72.01	-0.10	637.32
									67.23	43.77	26.50	15.92	3.16	-0.22	-30.72	70.86	-1.19	631.30

CEM Summary for 11/08/94
GRI Campaign 6B

Engine Number	Test Number	Test Condition	Time	Average Std Deviation RSD Max Min	Ambient Temperature (°F)	Relative Humidity (%)	Barometric Pressure (in Hg)	O2 (%)	CO2 (%)	CO (ppm)	Fuel Pressure (psi)	NOx (ppm)	THC (ppm)	FTIR (mm Hg)
Turbine	7	Full	0915-1344	Average	76.40	47.17	26.50	15.93	3.16	0.95	-30.71	70.81	0.76	626.08
				Std Deviation	1.85	0.78	0.03	0.04	0.03	1.08	0.00	0.84	0.94	1.32
				RSD	2.42	1.66	0.12	0.26	0.83	113.00	-0.01	1.19	122.83	0.21
Turbine	8	Low	1700-1912	Max	80.11	48.91	26.54	15.98	3.25	6.78	-30.71	72.24	6.65	628.81
				Min	72.36	45.83	26.45	15.83	2.94	-0.18	-30.72	68.85	-0.25	623.31
				Average	66.64	45.64	26.47	16.33	2.94	0.35	-30.71	56.01	0.64	623.55
				Std Deviation	2.20	0.30	0.02	0.07	0.02	0.29	0.00	0.64	0.21	3.11
				RSD	3.29	0.67	0.06	0.46	0.79	84.99	-0.00	1.14	32.53	0.50
				Max	69.81	46.20	26.49	16.45	2.99	1.01	-30.70	57.19	1.06	656.37
				Min	63.10	44.95	26.45	16.18	2.90	-0.15	-30.72	54.90	0.37	621.12

Appendix D GC Data

This appendix includes the run-averaged gas chromatograph (GC) data for all engine and turbine test runs. Emissions data for methane and ethane are presented in concentration (ppmvw, ppmvd, and ppmvd at 15% O₂), mass (lb/hr and tons/yr), and emission factor units (g/BHP-hr and lb/MMBtu),

Station 3A GC Results
GRI Campaign 3

D.1 Campaign 3

Engine	Condition	Pollutant	Conc. (ppmvw)	Stack Conc. (ppmvd)	Conc. (ppmvd @15% O2)	Emission Rate		
						(lb/hr)	(g/BHP-hr)	(lb/MMBtu)
102	Test 1	Methane	1674	1924	1005	41.9	4.69	1.26
LSV-16	98% Load	Ethane	24.2	27.8	14.5	1.14	0.13	0.034
102	Test 2	Methane	2204	2566	1316	55.4	5.99	1.65
LSV-16	101% Load	Ethane	33.6	39.1	20.1	1.59	0.17	0.047
101	Test 2	Methane	2023	2339	1210	49.0	5.49	1.51
LSV-16	98% Load	Ethane	31.9	36.9	19.1	1.45	0.16	0.045
101	Test 3	Methane	2114	2444	1243	51.2	5.64	1.55
LSV-16	99% Load	Ethane	33.0	38.2	19.4	1.50	0.17	0.05
								224
								6.58

10/30/95

**Station 3B GC Results
GRI Campaign 3**

Engine	Condition	Pollutant	Conc. (ppmvw)	Stack Conc. (ppmv)	Conc. (ppmv @15% O ₂)	Emission Rate			
						(lb/hr)	(g/BHP-hr)	(lb/MMBtu)	(tons/yr)
2 GMV-10TF	Test 1 81% Load	Methane	2382	2575	2620	27.6	14.0	3.29	121
		Ethane	493	533	542	10.8	5.46	1.28	47.1
2 GMV-10TF	Test 2 104% Load	Methane	542	604	451	5.85	2.32	0.56	25.6
		Ethane	105	117	87.4	2.13	0.84	0.20	9.32
2 GMV-10TF	Test 3 104% Load	Methane	568	626	468	6.07	2.41	0.58	26.6
		Ethane	110	121	90.6	2.21	0.88	0.21	9.7

D.2 Campaign 4

GC Results

Engine	Test Period	Sample Location	Pollutant	Stack Conc. (ppmvw)	Conc. (ppmvd @15% O ₂)	Emission Rate		
						(lb/hr)	(g/BHP-hr)	(tons/yr)
Engine 4 C-B GMVC-10C	Test 7 97% Load	Before CO Catalyst	Methane	**	---	---	---	---
			Ethane	40.5	47.7	1.41	0.370	6.18
Engine 4 C-B GMVC-10C	Test 9 93% Load	Before CO Catalyst	Methane	**	---	---	---	---
			Ethane	41.9	48.5	1.45	0.392	6.34
Engine 8 I-R KVS	Test 11 89% Load		Methane	**	---	---	---	---
			Ethane	53.64	37.1	1.40	0.357	6.14
Engine 8 I-R KVS	Test 12 82% Load		Methane	**	---	---	---	---
			Ethane	94.7	66.2	2.34	0.648	10.3
Engine 9 I-R KVS	Test 13 88% Load	Before SCR Catalyst	Methane	**	---	---	---	---
			Ethane	24.9	13.6	0.497	0.128	2.18
Engine 9 I-R KVS	Test 15 90% Load	After SCR Catalyst	Methane	**	---	---	---	---
			Ethane	27.5	15.4	0.583	0.146	2.55

** Methane measurements unavailable due to instrument malfunction

D.3 Campaign 5

Test	Location	Stack flow (dscfm)	Pollutant	Detection Limit (ppmv)	Conc. (ppmv)	Emission Rate		
						(lb/hr)	(g/BHP-hr)	(tons/yr)
3	Turbine	232503	Methane	3	ND			
			Ethane	1	ND			

ND = Non-detect

Gas Chromatograph Results
GRI Campaign 6

D.4 Campaign 6

Engine	Condition	Pollutant	Conc. (ppmvw)	Conc. (ppmvd @ 15% O2)	Emission Rate		
					(lb/hr)	(g/BHP-hr)	(tons/yr)
Engine 11	Test 19	Methane	847	892	15.8	3.99	69.3
C-B GMVC-10	100% Load	Ethane	21.5	22.6	0.75	0.19	3.30
Engine 11	Test 20	Methane	832	838	14.1	3.71	61.8
C-B GMVC-10	101% Load	Ethane	22.5	22.6	0.76	0.19	3.13
Engine 11	Test 21	Methane	861	970	14.4	4.45	62.9
C-B GMVC-10	86% Load	Ethane	24.2	27.3	0.76	0.23	3.31
Engine 11	Test 22	Methane	1144	1289	21.0	6.08	92.0
C-B GMVC-10	87% Load	Ethane	29.2	32.8	1.00	0.29	4.40
Engine 11	Test 24	Methane	795	838	13.9	3.78	60.9
C-B GMVC-10	99% Load	Ethane	22.1	23.3	0.72	0.20	3.17

01/30/96

D-6

GC-SUM6.WK4

**Gas Chromatograph Results
GRI Campaign 6**

Engine	Condition	Pollutant	Conc. (ppmvw)	Conc. (ppmvd @ 15% O2)	Emission Rate		
					(lb/hr)	(g/BHP-hr)	(tons/yr)
Engine 13 C-B GMWC-10	Test 15 96% Load	Methane	1487	1520	52.2	7.08	229
		Ethane	33.4	34.1	2.20	0.30	9.62
Engine 13 C-B GMWC-10	Test 16 95% Load	Methane	1539	1551	49.2	7.31	215
		Ethane	34.8	35.1	2.08	0.31	9.12
Engine 13 C-B GMWC-10	Test 17 88% Load	Methane	1598	1712	50.4	8.11	221
		Ethane	38.6	41.3	2.28	0.37	10.0
Engine 13 C-B GMWC-10	Test 18 91% Load	Methane	1540	1680	55.7	7.97	244
		Ethane	37.3	40.7	2.53	0.36	11.1
Engine 13 C-B GMWC-10	Test 23 92% Load	Methane	1523	1664	53.0	7.78	232
		Ethane	36.1	39.4	2.35	0.35	10.3

Gas Chromatograph Results GRI Campaign 6

Engine	Condition	Pollutant	Conc. (ppmvw)	Conc. (ppmvd @ 15% O2)	Emission Rate		
					(lb/hr)	(g/BHP-hr)	(tons/yr)
Engine 10 Clark BA-5	Test 1 94% Load	Methane					
Engine 10 Clark BA-5	Test 2 100% Load	Ethane	531	522	6.32	3.37	27.7
Engine 10 Clark BA-5	Test 3 80% Load	Methane	7.82	7.69	0.17	0.09	0.76
Engine 12 Clark HBA-5	Test 4 75% Load	Ethane	680	661	8.63	4.31	37.8
Engine 12 Clark HBA-5	Test 5 84% Load	Methane	13.50	13.1	0.32	0.16	1.41
Engine 12 Clark HBA-5	Test 6 95% Load	Ethane	760	819	9.06	5.67	39.7
Turbine Solar Taurus	Test 7 95% Load	Methane	15.80	17.0	0.35	0.22	1.55
Turbine Solar Taurus	Test 8 77% Load	Ethane	1393	1696	17.8	10.9	77.8
Turbine Solar Taurus	Test 9 102% Load (300 rpm)	Methane	33.4	40.6	0.80	0.49	3.49
Engine 15 C-B GMVC-10	Test 10 102% Load (300 rpm)	Ethane	961	1050	11.9	6.44	52.1
Engine 15 C-B GMVC-10	Test 11 85% Load (300 rpm)	Methane	21.4	23.4	0.50	0.27	2.18
Engine 15 C-B GMVC-10	Test 12 88% Load	Ethane	ND	ND	ND	ND	ND
Engine 9 C-B GMVA-10	Test 13 100% Load	Methane	ND	ND	ND	ND	ND
Engine 9 C-B GMVA-10	Test 14 100% Load	Ethane	ND	ND	ND	ND	ND
Engine 9 C-B GMVA-10	Test 15 100% Load	Methane	ND	ND	ND	ND	ND
Engine 9 C-B GMVA-10	Test 16 100% Load	Ethane	ND	ND	ND	ND	ND
Engine 9 C-B GMVA-10	Test 17 100% Load	Methane	718	772	15.4	3.82	67.3
Engine 9 C-B GMVA-10	Test 18 100% Load	Ethane	18.5	19.9	0.74	0.18	3.26
Engine 9 C-B GMVA-10	Test 19 100% Load	Methane	647	673	13.5	3.34	58.9
Engine 9 C-B GMVA-10	Test 20 100% Load	Ethane	17.3	18.0	0.68	0.17	2.96
Engine 9 C-B GMVA-10	Test 21 100% Load	Methane	1692	1986	11.9	5.28	174
Engine 9 C-B GMVA-10	Test 22 100% Load	Ethane	38.9	45.6	0.51	0.24	7.50
Engine 9 C-B GMVA-10	Test 23 100% Load	Methane	1855	2033	10.7	5.28	111
Engine 9 C-B GMVA-10	Test 24 100% Load	Ethane	47.1	51.6	0.63	0.23	2.88
Engine 9 C-B GMVA-10	Test 25 100% Load	Methane	1087	1110	4.66	55.5	276
Engine 9 C-B GMVA-10	Test 26 100% Load	Ethane	26.6	27.2	0.63	0.23	2.76
Engine 9 C-B GMVA-10	Test 27 100% Load	Methane	978	984	0.63	0.23	2.76
Engine 9 C-B GMVA-10	Test 28 100% Load	Ethane	26.0	26.1	0.63	0.23	2.76

GRI CAMPAIGN 6

-This calculation was required to adjust for an exhaust leak present in Engine 10 at site 6A.

-Tests 1 and 3 were conducted before and after the exhaust leak, however, no test was conducted before the exhaust leak during test 2.

-A correction factor was needed to adjust the CEM exhaust concentrations in Test 2, as well as for moisture and concentrations measured by FTIR, GC, CARB 430, and Method TO-14 for Tests 1, 2, and 3.

TEST	1 (before leak)	1 (after leak)	1 Ratio	3 (before leak)	3 (after leak)	3 Ratio	Correction Factor
O2 (%)	14.2	16.9	0.84	14.9	17.3	0.86	0.85
NOx (ppmv)	914	597	1.53	373	219	1.7	1.63
CO2 (%)	4.3	2.65	1.62	3.88	2.41	1.61	1.63
CO (ppmv)	86.3	51.7	1.68	95.5	59.1	1.61	1.63

- To get correction factors, the O2 ratios were averaged to give an O2 correction. The average of all the other ratios for NOx, CO, and CO2 were averaged to give correction factors for these compounds as well as for moisture and compounds measured by FTIR, GC, CARB 430, and Method TO-14 for tests 1, 2, and 3.

Example for Test 2.

2 (after leak)	2 (corrected)
O2=16.8	=14.3
NOx=820	=1337
CO2=2.69	=4.38
CO=56.8	=92.6

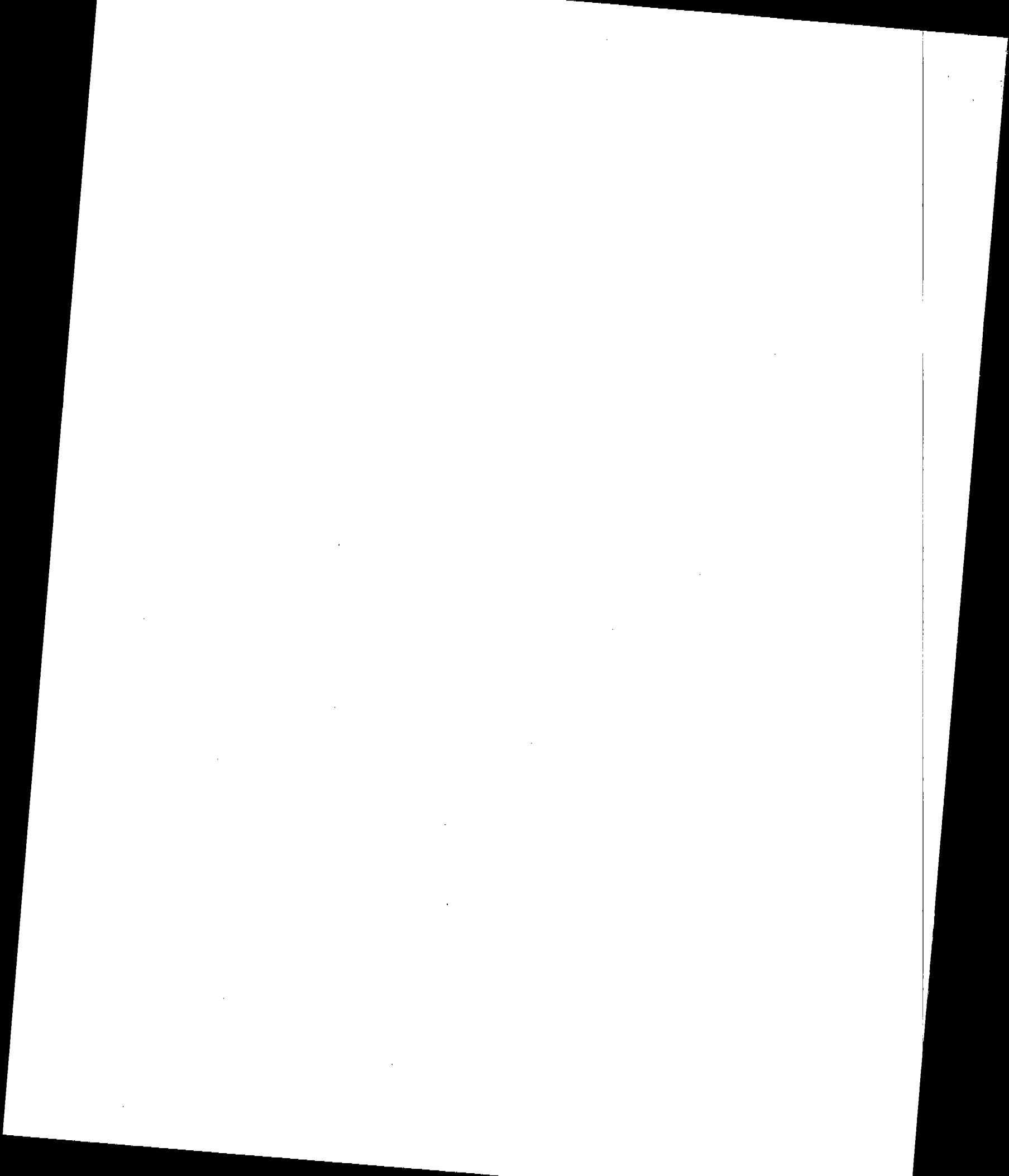
-To correct for FTIR, GC, CARB 430, and Method TO-14 multiple dry concentration by 1.63.

Example:

Ethane (measured by FTIR) for Engine 10, Test 1 was 10.6 ppmv, corrected to 17.3 ppmv through the factor 1.63.

11/03/95

LEAK-COR.WK4



Appendix E

GC Summary Data

This appendix presents a summary of the raw GC data. It includes the chromatograph areas and heights used to calculate pollutant concentrations for all engine and turbine test runs.

GC Summary Data for Campaign 3

[illegible]

August 25, 1994: Run 23 (C1-C7 @ 16 ppmV)

Compound	Concentration			Response Factor	
	(ppmv)	Area	Height	Area	Height
Methane	16.3	2359395	426763	6.91E-06	3.82E-05
Ethane	16.3	4173186	809332	3.91E-06	2.01E-05
Propane	16.3	6138160	968062	2.66E-06	1.68E-05
Butane	16.3	39009088	2277570	4.18E-07	2.16E-05 Suspect
Pentane	16.4	9827194	1219228	1.67E-06	1.35E-05
Hexane	16.9	16666632	1446698	1.01E-06	1.17E-05
Heptane	14.0	22838192	1014833	6.13E-07	1.38E-05

August 25, 1994: Run 24 (C1-C7 @ 100 ppmV)

Compound	Concentration			Response Factor	
	(ppmv)	Area	Height	Area	Height
Methane	100	12707296	2511277	7.87E-06	3.98E-05
Ethane	100	24441744	4940051	4.09E-06	2.02E-05
Propane	100	36146912	5617562	2.77E-06	1.78E-05
Butane	100	55477984	6522515	1.8E-06	1.53E-05
Pentane	100	70451136	7107283	1.42E-06	1.41E-05
Hexane	100	121871680	8048749	8.21E-07	1.24E-05

August 25, 1994: Run 31 (Unit 4 Run 1 Low Level @ 18:24:57

Compound	Concentration (ppmv)		
	Area	Height	Area
Methane	OFF SCALE	OFF SCALE	NA
Ethane	41895458	6166297	171.409
Propane	47578944	7214461	131.627
Butane	81768064	7942419	147.388
Pentane	OFF SCALE	OFF SCALE	0.000
Hexane	OFF SCALE	OFF SCALE	0.000

August 25, 1994: Run 32 (Unit 4 Run 1 Low Level @ 18:50:01

Compound	Concentration (ppmv)		
	Area	Height	Area
Methane	OFF SCALE	OFF SCALE	NA
Ethane	20217200	1979172	82.716
Propane	72475200	1272051	200.502
Butane	9758970	1220798	17.591
Pentane	10834912	1272214	15.379
Hexane	12630024	1364975	10.363

August 25, 1994: Run 33 (Unit 4 Run 1 Low Level @ 19:19:46

Compound	Concentration (ppmv)		
	Area	Height	Area
Methane	OFF SCALE	OFF SCALE	NA
Ethane	81998720	2022515	335.485
Propane	6210208	787341	17.180
Butane	5235882	646644	9.438
Pentane	5601005	657671	7.950
Hexane	5676941	575048	4.658

August 26, 1994: Run 35 (C1-C6 @ 100 ppmV)

Compound	Concentration (ppmv)	Area	Height	Response Factor	
				Area	Height
Methane	100	14821152	2406885	6.75E-06	4.15E-05
Ethane	100	30049648	4594522	3.33E-06	2.18E-05
Propane	100	47163072	5322077	2.12E-06	1.88E-05
Butane	100	64594400	5940787	1.55E-06	1.68E-05
Pentane	100	OFF SCAL	OFF SCALE	NA	NA
Hexane	100	OFF SCAL	OFF SCALE	NA	NA

August 26, 1994: Run 49 (C1-C7 @ 100 ppmV)

Compound	Concentration (ppmv)	Area	Height	Response Factor	
				Area	Height
Methane	100	10695248	2205238	9.35E-06	4.53E-05
Ethane	100	20714880	4102766	4.83E-06	2.44E-05
Propane	100	31533600	4783184	3.17E-06	2.09E-05
Butane	100	47877984	5752483	2.09E-06	1.74E-05
Pentane	100	68225216	6946883	1.47E-06	1.44E-05
Hexane	100	1.22E 08	8121763	8.22E-07	1.23E-05

August 26, 1994: Run 50 (Unit 4 Inlet High Load @

15:16:

Compound	Area		Height		Concentration (ppmV)
	Area	Height	Area	Height	
Methane	OFF SCAL	OFF SCAL	NA	NA	
Ethane	75692352	1718105	365.401	41.877	Integrated Impr
Propane	3668096	491877	11.632	10.283	
Butane	3293896	414818	6.880	7.211	
Pentane	3997981	462522	5.860	6.658	
Hexane	5368208	559219	4.415	6.885	

August 27, 1994: Run 58 (C1-C6 @ 100 ppmV)

Compound	Concentration (ppmv)	Concentration		Response Factor	
		Area	Height	Area	Height
Methane	100	11570576	2309218	8.64E-06	4.33E-05
Ethane	100	22296448	4307853	4.49E-06	2.32E-05
Propane	100	33324208	5001978	3E-06	2E-05
Butane	100	48526624	5922266	2.06E-06	1.69E-05
Pentane	100	67119680	7069267	1.49E-06	1.41E-05
Hexane	100	84309184	8363853	1.19E-06	1.2E-05

August 27, 1994: Run 64 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	678571	161646	5.865	7.000
Ethane	733033	170770	3.288	3.964
Propane	1057158	178414	3.172	3.567
Butane	1393127	187341	2.871	3.163
Pentane	1507707	215975	2.246	3.055
Hexane	8173808	301544	9.695	3.605 Integrated Improper

August 27, 1994: Run 65 (Unit 8 Run 1 13:50:22)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	62438528	1967345	288.038	45.669 Integrated Improper
Propane	3070242	390666	9.213	7.810
Butane	1749320	216895	3.605	3.662
Pentane	1665573	198844	2.481	2.813
Hexane	2131461	211182	2.528	2.525

August 27, 1994: Run 66 (Unit 8 Run 1 @ 14:39:12)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	68243072	2653749	306.071	61.603 Integrated Improper
Propane	3892358	511659	11.680	10.229
Butane	1885128	233063	3.885	3.935
Pentane	1590826	191078	2.370	2.703
Hexane	2155859	208280	2.557	2.490

August 27, 1994: Run 68 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	1146828	149757	9.912	6.485
Ethane	171438	37489	0.769	0.870
Propane	229028	36475	0.687	0.729
Butane	236368	30468	0.487	0.514
Pentane	1042334	124476	1.553	1.761
Hexane	NA	NA	NA	NA Not reported

August 27, 1994: Run 69 (Unit 8 Run 2 @ 16:35:10)

Compound	Area		Concentration (ppmV)	
	Off Scal	Off Scale	Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	24539728	36330094	110.861	843.346
Propane	4703501	515855	14.114	10.313
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	0.000	0.000
Hexane	ND	ND	0.000	0.000

Integrated Impropr

August 27, 1994: Run 70 (Unit 8 After Restart @ 17:18:47

Compound	Area		Concentration (ppmV)	
	Off Scal	Off Scale	Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	77839872	3792629	349.113	88.040
Propane	4805315	679380	14.420	13.582
Butane	1645142	203639	3.390	3.439
Pentane	902861	109934	1.345	1.555
Hexane	1051919	93885	1.248	1.123

Integrated Impropr

August 27, 1994: Run 71 (Unit 8 After Restart @ 17:49:45

Compound	Area		Concentration (ppmV)	
	Off Scal	Off Scale	Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	77806592	4111990	348.964	95.453
Propane	5197370	742973	15.596	14.854
Butane	1688248	209876	3.479	3.544
Pentane	870275	106599	1.297	1.508
Hexane	995474	87806	1.181	1.050

Integrated Impropr

August 27, 1994: Run 72 (Unit 8 After Restart @ 18:26:29

Compound	Area		Concentration (ppmV)	
	Off Scal	Off Scale	Area	Height
Methane	Off Scal	Off Scale	NA	NA
Ethane	28733312	4337546	128.869	100.689
Propane	5456256	781846	16.373	15.631
Butane	1756613	214257	3.620	3.618
Pentane	1882510	126140	2.805	1.784
Hexane	5814128	182870	6.896	2.186

Integrated Impropr

August 27, 1994: Run 73 (Nitrogen Blank)

Compound	Area		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	1818065	439181	15.713	19.019
Ethane	244781	55272	1.098	1.283
Propane	248904	37522	0.747	0.750
Butane	433129	41406	0.893	0.699
Pentane	1106837	71472	1.649	1.011
Hexane	14217704	260840	16.864	3.119

Integrated Impropr

August 28, 1994: Run 86 (C1-C6 @ 100 ppmV)

Compound	Concentration		Response Factor		
	(ppmV)	Area	Height	Area	Height
Methane	100	12780776	2406885	7.82E-06	4.15E-05
Ethane	100	24168288	4594522	4.14E-06	2.18E-05
Propane	100	35656864	5322077	2.8E-06	1.88E-05
Butane	100	47504160	5940787	2.11E-06	1.68E-05
Pentane	100	60844832	6698496	1.64E-06	1.49E-05
Hexane	100	85781632	7471712	1.17E-06	1.34E-05

August 28, 1994: Run 94 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	200789	45299	1.571	1.882
Ethane	207873	45981	0.860	1.001
Propane	300777	48386	0.844	0.909
Butane	384771	49528	0.810	0.834
Pentane	1281490	131931	2.106	1.970
Hexane	9644326	595857	11.243	7.975

August 28, 1994: Run 95 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	178443	39950	1.396	1.660
Ethane	158324	34021	0.655	0.740
Propane	226260	34094	0.635	0.641
Butane	565448	39300	1.190	0.662
Pentane	858382	56669	1.411	0.846
Hexane	8347338	242455	9.731	3.245 Integrated Imprope

August 28, 1994: Run 97 (Unit 9 Inlet @ 14:11:56)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	Off Scale	Off Scale	NA	NA
Ethane	39788128	1146194	161.567	24.947 Integrated Imprope
Propane	1601957	228545	4.493	4.294
Butane	562815	61788	1.185	1.040
Pentane	324486	39052	0.533	0.583
Hexane	1079354	106155	1.258	1.421

August 28, 1994: Run 98 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	1333180	294076	10.431	12.218
Ethane	379036	78783	1.568	1.715
Propane	368992	59583	1.035	1.120
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	0.000	0.000
Hexane	ND	ND	0.000	0.000

August 29, 1994: Run 99 (C1-C6 @ ppmV)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	16.3	783252	170841	2.081E-05
Ethane	16.3	450844	91687	3.615E-05
Propane	16.3	497372	80253	3.277E-05
Butane	16.3	255219	57065	6.387E-05
Pentane	16.4	374050	47062	4.384E-05
Hexane	16.9	479364	49143	3.526E-05

August 29, 1994: Run 101 (C1-C7 @ 100 ppmV)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	16733856	2566907	5.976E-06
Ethane	100	33513360	4921821	2.984E-06
Propane	100	51557088	6630992	1.94E-06
Butane	100	70065024	8605894	1.427E-06
Pentane	100	OFF SCALE	OFF SCALE	NA
Hexane	100	OFF SCALE	OFF SCALE	NA

August 29, 1994: Run 103 (Unit 9 Outlet @ 09:30:42)

Compound	Concentration (ppmV)		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	OFF SCALE	OFF SCALE	NA	NA
Ethane	13341808	1914242	39.810	38.893
Propane	3812670	474997	7.395	7.163
Butane	2311710	296537	3.299	3.446
Pentane	2371272	279166	NA	NA
Hexane	15069672	1069791	NA	NA

August 29, 1994: Run 104 (Unit 9 Outlet @ 10:11:55)

Compound	Concentration (ppmV)		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	OFF SCALE	OFF SCALE	NA	NA
Ethane	6555584	1060823	19.561	21.553
Propane	3011496	376402	5.841	5.676
Butane	2428237	285721	3.466	3.320
Pentane	2505144	279216	NA	NA
Hexane	2222502	238147	NA	NA

August 29, 1994: Run 105 (Unit 9 Outlet @ 10:53:47)

Compound	Concentration (ppmV)		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	OFF SCALE	OFF SCALE	NA	NA
Ethane	9827251	1157173	29.323	23.511
Propane	2366738	291974	4.591	4.403
Butane	1428736	180202	2.039	2.094
Pentane	1616426	182172	NA	NA
Hexane	1727629	174858	NA	NA

August 29, 1994: Run 106 (Unit 9 Outlet @ 11:49:04)

Compound	Area		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	OFF SCALE	OFF SCALE	NA	NA
Ethane	10956408	1301247	32.693	26.438
Propane	2295813	235961	4.453	3.558
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	NA	NA
Hexane	ND	ND	NA	NA

August 29, 1994: Run 107 (Unit 9 Outlet @ 12:15:26)

Compound	Area		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	OFF SCALE	OFF SCALE	NA	NA
Ethane	11171096	1329184	33.333	27.006
Propane	2009079	216747	3.897	3.269
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	NA	NA
Hexane	ND	ND	NA	NA

August 29, 1994: Run 108 (Nitrogen Blank)

Compound	Area		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	5703517	1225823	34.084	47.755
Ethane	596793	125235	1.781	2.544
Propane	434527	56245	0.843	0.848
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	NA	NA
Hexane	ND	ND	NA	NA

August 29, 1994: Run 109 (Nitrogen Blank)

Compound	Area		Concentration (ppmV)	
	Area	Height	Area	Height
Methane	1152786	256495	6.889	9.992
Ethane	318749	66199	0.951	1.345
Propane	329611	53058	0.639	0.800
Butane	ND	ND	0.000	0.000
Pentane	ND	ND	NA	NA
Hexane	ND	ND	NA	NA

August 25, 1994: Run 23 (Cl-C7 @ 16 ppmv)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	16.3	2359395	426763	6.91E-06
Ethane	16.3	4173186	809332	3.91E-06
Propane	16.3	6138160	968062	2.66E-06
Butane	16.3	3900988	2277570	4.18E-07
Pentane	16.4	9827194	1219228	1.67E-06
Hexane	16.9	16666632	1446698	1.01E-06
Heptane	14.0	22838192	1014833	6.13E-07

August 25, 1994: Run 24 (Cl-C7 @ 100 ppmv)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	12707296	2511277	7.87E-06
Ethane	100	24441744	4940051	4.09E-06
Propane	100	36146912	5617562	2.77E-06
Butane	100	55477984	6522515	1.8E-06
Pentane	100	70451136	7107283	1.42E-06
Hexane	100	121871680	8048749	8.21E-07

August 26, 1994: Run 35 (Cl-C6 @ 100 ppmv)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	14821152	2406885	6.75E-06
Ethane	100	30049648	4594522	3.33E-06
Propane	100	47163072	5322077	2.12E-06
Butane	100	64594400	5940787	1.55E-06
Pentane	100	OFF SCALE	OFF SCALE	NA
Hexane	100	OFF SCALE	OFF SCALE	NA

August 26, 1994: Run 49 (Cl-C7 @ 100 ppmv)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	10695248	2205238	9.35E-06
Ethane	100	20714880	4102766	4.83E-06
Propane	100	31533600	4783184	3.17E-06
Butane	100	47877984	5752483	2.09E-06
Pentane	100	68225216	6946883	1.47E-06
Hexane	100	1.22E 08	8121763	8.22E-07

August 29, 1994: Run 99 (C1-C6 @ ppmV)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	16.3	783252	170841	2.081E-05
Ethane	16.3	450844	91687	3.615E-05
Propane	16.3	497372	80253	3.277E-05
Butane	16.3	255219	57065	6.387E-05
Pentane	16.4	374050	47062	4.384E-05
Hexane	16.9	479364	49143	3.526E-05

August 29, 1994: Run 101 (C1-C7 @ 100 ppmV)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	16733856	2566907	5.976E-06
Ethane	100	33513360	4921821	2.984E-06
Propane	100	51557088	6630992	1.94E-06
Butane	100	70065024	8605894	1.427E-06
Pentane	100	OFF SCALE	OFF SCAL	NA
Hexane	100	OFF SCALE	OFF SCAL	NA

August 28, 1994: Run 86 (C1-C6 @ 100 ppmV)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	12780776	2406885	7.82E-06
Ethane	100	24168288	4594522	4.14E-06
Propane	100	35656864	5322077	2.8E-06
Butane	100	47504160	5940787	2.11E-06
Pentane	100	60844832	6698496	1.64E-06
Hexane	100	85781632	7471712	1.17E-06

August 28, 1994: Run 94 (Nitrogen Blank)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	200789	45299	1.571	1.682
Ethane	207873	45981	0.860	1.001
Propane	300777	48386	0.844	0.909
Butane	384771	49528	0.810	0.834
Pentane	1281490	131931	2.106	1.970
Hexane	9644326	595857	11.243	7.975

August 27, 1994: Run 58 (C1-C6 @ 100 ppmv)

Compound	Concentration		Response Factor	
	(ppmv)	Area	Height	Area
Methane	100	11570576	2309218	8.64E-06
Ethane	100	22296448	4307853	4.49E-06
Propane	100	33324208	5001978	3E-06
Butane	100	48526624	5922266	2.06E-06
Pentane	100	67119680	7069267	1.49E-06
Hexane	100	84309184	8363853	1.19E-06

August 27, 1994: Run 64 (Nitrogen Blank)

Compound	Concentration (ppmv)	
	Area	Height
Methane	678571	161646
Ethane	733033	170770
Propane	1057158	178414
Butane	1393127	187341
Pentane	1507707	215975
Hexane	8173808	301544

Integrated Improperly

August 28, 1994: Run 94 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmv)
		Area	Height
Methane	200789	45299	1.571 1.882
Ethane	207873	45981	0.860 1.001
Propane	300777	48386	0.844 0.909
Butane	384771	49528	0.810 0.834
Pentane	1281490	131931	2.106 1.970
Hexane	9644326	595857	11.243 7.975

August 28, 1994: Run 95 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmv)
		Area	Height
Methane	178443	39950	1.396 1.660
Ethane	158324	34021	0.655 0.740
Propane	226260	34094	0.635 0.641
Butane	565448	39300	1.190 0.662
Pentane	858382	56669	1.411 0.846
Hexane	8347138	242455	9.731 3.245

Substituted Nitrobenzene

August 29, 1994: Run 108 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)
			Area Height
Methane	5703517	1225823	34.084 47.755
Ethane	596793	125235	1.781 2.544
Propane	434527	56245	0.843 0.848
Butane	ND	ND	0.000 0.000
Pentane	ND	ND	NA NA
Hexane	ND	ND	NA NA

August 29, 1994: Run 109 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)
			Area Height
Methane	1152786	256495	6.889 9.992
Ethane	318749	66199	0.951 1.345
Propane	329611	53058	0.639 0.800
Butane	ND	ND	0.000 0.000
Pentane	ND	ND	NA NA
Hexane	ND	ND	NA NA

August 28, 1994: Run 98 (Nitrogen Blank)					
Compound	Area	Height	Concentration (ppmV)		
			Area	Height	Area
Methane	1333180	294076	10.431	12.218	
Ethane	379036	78783	1.568	1.715	
Propane	368992	59583	1.035	1.120	
Butane	ND	ND	0.000	0.000	
Pentane	ND	ND	0.000	0.000	
Hexane	ND	ND	0.000	0.000	

August 27, 1994: Run 68 (Nitrogen Blank)

Compound	Concentration (ppmv)		
	Area	Height	Area
Methane	1146828	149757	9.912
Ethane	171438	37489	0.870
Propane	229028	36475	0.729
Butane	236368	30468	0.514
Pentane	1042334	124476	1.761

Hexane	IR	NA	NA	NA	Not reported
Hexane	IR	NA	NA	NA	Not reported

August 27, 1994: Run 73 (Nitrogen Blank)

Compound	Area	Height	Concentration (ppmV)	
			Area	Height
Methane	1818065	439181	15.713	19.019
Ethane	244781	55272	1.098	1.283
Propane	248904	37522	0.747	0.750
Butane	433129	41406	0.893	0.699
Pentane	1106837	71472	1.649	1.011
Hexane	1121170	260840	16.864	3.119
			Integrated Improperly	

Date	10/4/94	10/5/94	10/6/94	10/6/94	10/7/94	10/8/94
Unit	[REDACTED]	Turbine	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Test #	1	3	5	Dup	7	9
Methane, PPMV	4.1	<1	2220	2257	[REDACTED]	[REDACTED]
Ethane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Propane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Butane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Pentane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Hexane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Heptane	[REDACTED]	<1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Quality Control						
R for Methane	0.9991	NA	0.997	0.997	NA	NA
Calib. Check	+15%	NA	+1.0%	+1.0%	NA	NA
Dup. analysis	NA	NA	NA	<1% of Avg.	NA	NA

E.4 Campaign 6

ENGINE #10 RUN 3A (#11, 11/4/94 15:01:23)

COMPOUND	RT (MIN)	AREA	CONCENTRATION (PPMV)	
METHANE	0.626	382404	420.28	
ETHANE	1.031	28739	12.31	
PROPANE	2.467	7034	2.45	
BUTANE	ND	ND	ND	
PENTANE	ND	ND	ND	
HEXANE	10.365	43154	15.63	IMPROPERLY INTEGRATED
HEPTANE	13.908	626017	143.61	IMPROPERLY INTEGRATED

ENGINE #10 RUN 3B (#12, 11/4/94 15:39:20)

COMPOUND	RT (MIN)	AREA	CONCENTRATION (PPMV)	COMMENTS
METHANE	0.619	510006	561.77	
ETHANE	1.024	35213	15.94	
PROPANE	2.461	8419	2.93	
BUTANE	ND	ND	ND	
PENTANE	ND	ND	ND	
HEXANE	ND	ND	ND	
HEPTANE	ND	ND	ND	

ENGINE #10 RUN 3C (#13, 11/4/94 16:10:22)

COMPOUND	RT (MIN)	AREA	CONCENTRATION (PPMV)	COMMENTS
METHANE	0.621	378116	415.53	
ETHANE	1.026	29977	13.01	
PROPANE	2.465	9903	3.45	
BUTANE	ND	ND	ND	
PENTANE	ND	ND	ND	
HEXANE	11.046	75282	27.26	IMPROPERLY INTEGRATED
HEPTANE	14.025	608950	139.69	IMPROPERLY INTEGRATED

Engine #12 Run 4A (#14, 11/4/94 17:12:02)

Compound	RT (min)	Area	Concentration (ppmv)	Comments
Methane	0.618	1075152	1188.43	
Ethane	1.024	78034	39.95	
Propane	2.46	20093	3.63	
Butane	ND	ND	ND	
Pentane	ND	ND	ND	
Hexane	ND	ND	ND	
Heptane	13.938	94383	21.65	

Engine #12 Run 4B (#15, 11/4/94 17:45:20)

Compound	RT (min)	Area	Concentration (ppmv)	Comments
Methane	0.62	4938963	5472.80	
Ethane	1.025	259191	141.50	
Propane	2.462	77254	25.92	
Butane	ND	ND	ND	
Pentane	ND	ND	ND	
Hexane	ND	ND	ND	
Heptane	13.974	53429	12.26	

Engine #12 Run 4C (#16, 11/4/94 18:08:54)

Compound	RT (min)	Area	Concentration (ppmv)	Comments
Methane	0.615	1394358	1542.38	
Ethane	1.021	91486	47.49	
Propane	2.463	23433	4.93	
Butane	ND	ND	ND	
Pentane	ND	ND	ND	
Hexane	ND	ND	ND	
Heptane	13.98	42342	9.71	

Engine #12 Run 4D (#17, 11/4/94 18:30:38)

Compound	RT (min)	Area	Concentration (ppmv)	Comments
Methane	0.616	1249263	1381.49	
Ethane	1.024	84524	43.58	
Propane	2.466	22647	4.63	
Butane	ND	ND	ND	
Pentane	ND	ND	ND	
Hexane	ND	ND	ND	
Heptane	14.08	61552	14.12	

1000 ppmv Standard--Post test

Compound	RT (min)	Area	Concentration (ppmv)	%Target
Methane	0.622	927712	1024.94	101.68%
Ethane	1.028	1830394	1022.31	98.39%
Propane	2.468	2637850	1024.18	102.52%
Butane	5.449	3464061	1025.56	102.66%
Pentane	8.75	4296173	1024.57	101.34%
Hexane	11.904	4923888	993.37	95.79%
Heptane	ND	ND	0.00	0.00%

16 ppmv Standard--Post test

Compound	RT (min)	Area	Concentration (ppmv)	%Target	Comments
Methane	0.618	16182	14.20	88.75%	
Ethane	1.025	31213	13.70	85.62%	
Propane	2.47	46586	13.96	87.24%	
Butane	5.45	60822	13.87	86.70%	
Pentane	8.751	80748	16.39	102.45%	Improperly integrated
Hexane	11.907	298939	48.23	301.41%	Improperly integrated
Heptane	14.016	495798	113.74	710.85%	Improperly integrated

100 ppmv Standard--Post test

Compound	RT (min)	Area	Concentration (ppmv)	%Target	Comments
Methane	0.616	94073	100.57	100.57%	
Ethane	1.023	185384	100.13	100.13%	
Propane	2.468	267548	100.10	100.10%	
Butane	5.451	351515	100.29	100.29%	
Pentane	8.753	431964	100.39	100.39%	
Hexane	11.909	664065	122.84	122.84%	Improperly integrated
Heptane	NA	NA	NA	NA	

GC CALIBRATION STANDARDS

16.3 ppmv

	11/04	11/04	11/04	11/04	11/04	11/05	11/07
Methane	15999						
Ethane	31066	32488	30684	16182	16182	15911	14192
Propane	45916	45301	47045	31213	31213	30666	27608
Butane	60812	61872	56301	46586	46586	45729	40704
Pentane	71702	135964	63949	60822	60822	59763	53720
Hexane	44185	129832	47432	80748	80748	70119	62930
Heptane	69747			298939	298939	42842	64892
				495798	495798	51644	

100 ppmv

	11/04	11/04	11/04	11/05	11/05	11/07	11/08
Methane	95536	94073	94073	93740	68422	82661	81757
Ethane	189807	185384	185384	185185	175687	163932	161654
Propane	273742	267548	267548	265822	256368	235545	232273
Butane	358392	351515	351515	348381	1335619	306969	302856
Pentane	438427	431964	431964	429451	1660235	376637	371839
Hexane	658405	664065	664065	501942	1990563	435754	431897

1000 ppmv

	11/04	11/04	11/04	11/05	11/05	11/10	11/10
Methane	905048	927712	927712	900232	857770	857770	640885
Ethane	1790196	1830394	1830394	1772947	1698373	1698373	1279745
Propane	2575274	2637850	2637850	2550282	2432178	2432178	1831508
Butane	3377422	3464061	3464061	3344176	3199366	3199366	2383574
Pentane	4192752	4296173	4296173	4149996	3963614	3963614	2949845
Hexane	4947248	4923888	4923888	4886861	4686723	4686723	3473872

2000 ppmv

	11/05	11/05	11/10	11/12	11/12	11/12	11/14
Methane	1734171	1666692	1666692	1541790	1571585	1549241	1615651
Ethane	3406936	3280840	3280840	3042006	3103242	3075802	3164674
Propane	5113325	4916179	4916179	4545555	4649421	4601146	4774496
Butane	6649475	6400931	6400931	5891405	5968970	5931344	6327706
Pentane	8229450	7926829	7926829	7259491	7380064	7300013	8000752
Hexane	9625126	9279194	9279194	8468890	8588422	8512026	9542534
							10959000

11/07	11/08	11/08	11/08	11/10	11/11	11/11	11/11
14376	13990	13590	13864	13895	14069	13478	12015
27813	27210	26466	26801	27845	24558	23737	25646
41516	40117	39317	39815	40772	42819		34692
54099	52819	51239	52013	59031	50576	46924	45747
63562	61913	60349	62198	59934	59632	77999	59897
151462	159023	19698	183855	82301	124691	82867	71899
				79529			

11/08	11/10	11/10	11/11	11/11	11/11	11/12	11/12
78889	68422	76897	80597	75838	72301	77954	70648
156337	175687	159296	159365	152468	143178	147071	139301
224254	256368	238885	233669	220134	209912	31281	215086
292331	1335619	307108	301418	293620	277852	266713	270829
359102	1660235	394029	382801	339762	331268	323996	321387
416121	1990563	506254	521841	412181	425471	423134	375743

11/11	11/12	11/12	11/14	11/14	11/15	11/15
382438	851957	1034075	668274	685160	687880	851253
814777	1707167	2076508	1323576	1354267	1348913	1727644
1261730	2549461	3100128	1911283	1959123	1951856	2582496
1565058	3321141	4089774	2524576	2609446	2576493	3373590
1752447	4076989	5033248	3166800	3291882	3204414	4082157
1760153	4771901	5872867	3703336	3910522	3712880	4884451

11/14	11/15	11/15
1586870	1491551	1349055
3110000	2947805	2665917
4686643	4450115	4003160
6204544	5889789	5182672
7831821	7432432	6393024
9324954	8890554	7437994
10740736	10220664	

11/12	11/12	11/14	11/15
13070	11661	13080	12038
30661	26286	33671	23304
	33461	43411	35810
43524	50251	37783	48198
64049	54484	66067	59372
72189	69843	22620	37015
		82246	78764

Average	STD DEV	%RSD
13976	1431	10.24%
28365	3040	10.72%
41741	4277	10.25%
52964	6701	12.65%
69243	17797	25.70%
105501	82698	78.39%
193361	206856	106.98%

11/14	11/15	11/15
72865	73125	72096
144360	143913	143404
212285	209164	207953
282619	278185	270207
349974	350548	336950
426611	424319	

Average	STD DEV	%RSD
79920	8799	11.01%
160281	16521	10.31%
221307	53402	24.13%
360787	252802	70.07%
446565	314972	70.53%
570946	387792	67.92%

Average	STD DEV	%RSD
743973	218766	29.41%
1482067	432092	29.15%
2162379	635074	29.37%
2985723	670198	22.45%
3491218	1062405	30.43%
4069667	1297934	31.89%

Average	STD DEV	%RSD
1577330	107332	6.80%
3107806	205167	6.60%
4665622	305946	6.56%
6084777	410732	6.75%
7568071	532621	7.04%
8894889	664795	7.47%
10640133	379309	3.56%

Number	Drift 11/04	Drift 11/07	Drift 11/08	Drift 11/11	Drift 11/12
17	1.14%	1.30%	-0.90%	-14.60%	-10.78%
19	0.47%	0.74%	-1.50%	4.43%	-14.27%
17	1.46%	1.99%	-0.75%	-18.98%	
19	0.02%	0.71%	-1.53%	-9.55%	15.46%
19	12.62%	1.00%	0.46%	0.44%	-14.93%
19	576.56%	133.41%	15.62%	-42.34%	-3.25%
7	610.85%				

Number	Drift 11/04	Drift 11/05	11/08	11/10	11/11	11/12	11/15
17	-1.53%	-27.01%	-3.51%	-15.72%	-10.29%	-9.37%	-1.41%
17	-2.33%	-5.13%	-3.29%	-8.68%	-10.16%	-5.28%	-0.35%
17	-2.26%	-3.56%	-3.45%	4.64%	-10.17%	587.59%	-0.58%
17	-1.92%	283.38%	-3.48%	6.35%	-7.82%	1.54%	-2.87%
17	-1.47%	286.59%	-3.43%	0.20%	-13.46%	-0.81%	-3.88%
16	0.86%	296.57%	-3.65%	-2.80%	-18.47%	-11.20%	

Number	Drift 11/04	Drift 11/05	Drift 11/10	11/12	11/14	11/15
13	2.50%	-4.72%	129.73%	21.38%	2.53%	23.75%
13	2.25%	-4.21%	135.96%	21.63%	2.32%	28.08%
13	2.43%	-4.63%	138.55%	21.60%	2.50%	32.31%
12	2.57%	-4.33%	ERR	23.14%	3.36%	30.94%
13	2.47%	-4.49%	140.70%	23.46%	3.95%	27.39%
13	-0.47%	-4.10%	153.39%	23.07%	5.59%	31.55%

Number	Drift 11/05	Drift 11/12	Drift 11/14	11/15
10	-3.89%	0.48%	-1.78%	-9.55%
10	-3.70%	1.11%	-1.73%	-9.56%
10	-3.86%	1.22%	-1.84%	-10.04%
10	-3.74%	0.68%	-1.95%	-12.01%
10	-3.68%	0.56%	-2.11%	-13.98%
10	-3.59%	0.51%	-2.28%	-16.34%
3			-1.99%	

Compound	RT (min)	Area for Concentration (ppmv)			Linear Regression		
		16	100	1000	Intercept	Slope	Correlation
Methane	0.617	15999	95536	905048	3376.447	901.8402	0.999993
Ethane	1.022	31066	189807	1790196	6776.749	1783.816	0.999989
Propane	2.462	45916	273742	2575274	10780.84	2565.044	0.999999
Butane	5.445	60812	358392	3377422	14159.34	3363.932	0.999992
Pentane	8.746	71702	438427	4192752	12207.25	4181.236	0.999994
Hexane	11.901	44185	658405	4947248	62950.9	4893.356	0.999272
Heptane	13.789	69747					
				Improperly integrated			RF
				Improperly integrated			0.000229

GC Linear Regression Data

Linear Regression Data					
Date	Compound	Weight	Intercept	Slope	Correlation Coefficient
11/04/94	Methane		3376.447	901.84	0.99999257
	Ethane		6776.749	1783.82	0.99998948
	Propane		10780.84	2565.04	0.99999018
	Butane		14159.34	3363.93	0.99999159
	Pentane		12207.25	4181.24	0.99999419
	Hexane		62950.9	4893.36	0.99927223
11/05/94	Methane		2708.746	897.632	0.99999691
	Ethane		5249.526	1767.97	0.99999512
	Propane		8170.547	2542.4	0.99999721
	Butane		10506.25	3334.05	0.99999722
	Pentane		9341.581	4141.17	0.99999676
	Hexane		-12976.2	4901.95	0.99996059
11/07/94	Methane		1150.286	815.107	two points
	Ethane		1641.524	1622.9	two points
	Propane		3591.429	2319.54	two points
	Butane		5482.095	3014.87	two points
	Pentane		3176.286	3734.61	two points
	Hexane		-5748.38	4415.02	two points
11/08/94	Methane		1082	806.75	two points
	Ethane		1601.619	1600.52	two points
	Propane		3515.857	2287.57	two points
	Butane		5192.905	2976.63	two points
	Pentane		2879.476	3689.6	two points
	Hexane		107047	3248.5	two points

11/10/94	Methane		0	868.438	one point
am	Ethane		0	1740.31	one point
	Propane		0	2548.25	one point
	Butane		0	3689.44	one point
	Pentane		0	3745.88	one point
	Hexane		0	5143.81	one point
11/10/94	Methane		-836.81	920.738	two points
pm	Ethane		-78.2381	1745.2	two points
	Propane		5054.286	2232.36	two points
	Butane		15272.33	2734.92	two points
	Pentane		-3553.43	3967.96	two points
	Hexane		-1229.1	5220.63	two points
11/12/94	Methane	1/x	239.978	794.998	0.99898749
	Ethane	1/x	3985.222	1556.42	0.99918467
	Propane	1/x	-4843.88	2298.78	0.99994
	Butane	1/x	-9150.64	3068.53	0.99802154
	Pentane	1/x	-2430.99	3752.2	0.99834513
	Hexane	1/x	1059.464	4354.76	0.99915915
11/14/94	Methane	1/x	-253.503	758.926	0.99578562
	Ethane	1/x	7086.875	1470.03	0.9946894
	Propane	1/x	3236.354	2224.25	0.99467784
	Butane	1/x	-13071.2	2961.47	0.99482159
	Pentane	1/x	-811.183	3705.42	0.99364179
	Hexane	1/x	-48653.5	4405.24	0.99168796
11/15/94	Methane	1/x	148.5201	726.573	0.99926723
	Ethane	1/x	-172.724	1432.81	0.99912562
	Propane	1/x	-377.334	2133.65	0.99810771
	Butane	1/x	413.7706	2821.25	0.99803006
	Pentane	1/x	-636.619	3545.99	0.99760613
	Hexane	1/x	-29861.5	4231.13	0.99661577

GC Drift Data
GC Drift Data

Date	11/04	11/05	11/07	11/08	11/10	11/11
Standard	1000 ppmv	2000 ppmv	16 ppmv	100 ppmv	100 ppmv	100 ppmv
Methane	2.50%	-3.89%	1.30%	-3.51%	-15.72%	-10.29%
Ethane	2.25%	-3.70%	0.74%	-3.29%	-8.68%	-10.16%
Propane	2.43%	-3.86%	1.99%	-3.45%	4.64%	-10.17%
Butane	2.57%	-3.74%	0.71%	-3.48%	6.35%	-7.82%
Pentane	2.47%	-3.68%	1.00%	-3.43%	0.20%	-13.46%
Hexane a	-0.47%	-3.59%	133.41% a	-3.65%	-2.80%	-18.47%

a Integrator drew baseline inconsistently because of column bleed
Drift = (Final Area - Initial Area)/Initial Area x 100

GC Drift Data

Date	11/12	11/14	11/15
Standard	2000 ppmv	2000 ppmv	2000 ppmv
Methane	0.48%	-1.78%	-9.55%
Ethane	1.11%	-1.73%	-9.56%
Propane	1.22%	-1.84%	-10.04%
Butane	0.68%	-1.95%	-12.01%
Pentane	0.56%	-2.11%	-13.98%
Hexane a	0.51%	-2.28%	-16.34%

a Integrator
Drift = (Fi

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 10 Run 1		C1 as Methane	325.79 a
		C2 as Ethane	4.80 a, f
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	32.76
		Sum C2-C6 as CH4	9.72 a
Engine 10 Run 3		C1 as Methane	465.86 b
		C2 as Ethane	13.75 b, f
		C3 as Propane	2.95 b
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	14.30
		Heptane	94.43
		Sum C2-C6 as C4	122.12 b, c
Engine 12 Run 4		C1 as Methane	~~298.10 a, f~~
		C2 as Ethane	~~13.75 b, f~~
		C3 as Propane	~~2.95 b~~
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	14.44 d, f
		Sum C2-C6 as C4	165.59 d, e
Engine 10 Run 2		C1 as Methane	~~408.21 g~~
		C2 as Ethane	~~8.96 f, g~~
		C3 as Propane	~~0.00 f~~
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	~~7.73~~
		Heptane	~~76.27~~
		Sum C2-C6 as C4	~~61.72 h~~
Engine 12 Run 5		C1 as Methane	961.00 i
		C2 as Ethane	32.02 i
		C3 as Propane	4.47 f, i
		C4 as Butane	0.00 f
		C5 as Pentane	0.11 f
		C6 as Hexane	10.33
		Heptane	60.06
		Sum C2-C6 as C4	139.97 j
Turbine Run 6		C1 as Methane	0.00
		C2 as Ethane	0.00
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.89 f

→ Reanalyzed

→ Reanalyzed

● did not pass drift test

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 12 Run 4		C1 as Methane	1392.72 d, f
		C2 as Ethane	44.61 d
		C3 as Propane	4.61 d, f
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	14.44 d, f
		Sum C2-C6 as C4	103.04 d

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 10 Run 2		C1 as Methane	416.65 g
		C2 as Ethane	8.83 f, g
		C3 as Propane	0.33 f
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	~~7.73~~ NO
		Heptane	76.27
		Sum C2-C6 as C4	65.05 h

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 12 Run 5		C1 as Methane	961.00 i
		C2 as Ethane	32.02 i
		C3 as Propane	4.47 f, i
		C4 as Butane	0.00 f
		C5 as Pentane	0.11 f
		C6 as Hexane	10.33
		Heptane	72.65
		Sum C2-C6 as C4	139.97 j

Corrected
Data
2/27/95
JLSteger

Turbine Run 7	C1 as Methane	0.00
	C2 as Ethane	0.00
	C3 as Propane	0.00
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Sum C2-C6 as C4	0.00
Turbine Run 8	C1 as Methane	0.00
	C2 as Ethane	0.00
	C3 as Propane	0.00
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Sum C2-C6 as C4	0.00
Engine 15 Run 9	C1 as Methane	717.92 f, g
	C2 as Ethane	22.26 g
	C3 as Propane	5.01
	C4 as Butane	1.96
	C5 as Pentane	1.86
	C6 as Hexane	11.54 g
	Heptane	33.58
	Sum C2-C6 as C4	145.97 g, l
Engine 15 Run 10	C1 as Methane	646.63 d, f
	C2 as Ethane	18.86 d
	C3 as Propane	5.62 d
	C4 as Butane	0.70
	C5 as Pentane	0.00
	C6 as Hexane	9.84
	Heptane	44.64 d
	Sum C2-C6 as C4	113.62 d, m
Engine 15 Run 11	C1 as Methane	1692.48 a, f
	C2 as Ethane	41.32 a
	C3 as Propane	8.55 a, f
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Sum C2-C6 as C4	108.27 a
Engine 15 High Rebalance	C1 as Methane	814.21 b, f
	C2 as Ethane	25.87 b
	C3 as Propane	0.00
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Sum C2-C6 as C4	51.74 b
Engine 9 Run 12	C1 as Methane	1854.78 a, f, n
	C2 as Ethane	49.64 a, n
	C3 as Propane	6.33 a, n
	C4 as Butane	0.00

did not pass drift test

Engine 9 Run 13	C1 as Methane	1086.81 o
	C2 as Ethane	30.56 o
	C3 as Propane	4.77 f
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.64 f
	Sum C2-C6 as C4	79.29 o,p
Engine 9 Run 14	C1 as Methane	977.62 b
	C2 as Ethane	27.51 b
	C3 as Propane	6.81 f
	C4 as Butane	5.07 f
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Sum C2-C6 as C4	95.73 b
Engine 13 Run 15	C1 as Methane	~~1486.77 d~~
	C2 as Ethane	~~13.64 d~~
	C3 as Propane	~~2.76 d~~
	C4 as Butane	~~2.42 d~~
	C5 as Pentane	0.00
	C6 as Hexane	~~3.48 f~~ NO
	Heptane	37.32
	Sum C2-C6 as C4	516.63 d,q,r
Engine 13 Run 16	C1 as Methane	~~1537.44 d~~
	C2 as Ethane	~~11.71 d~~
	C3 as Propane	~~5.16 d~~
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	~~1.61 f~~ NO
	Heptane	10.10 a
	Sum C2-C6 as C4	120.03 a,s
Engine 13 Run 17	C1 as Methane	1603.36 t
	C2 as Ethane	47.17 t
	C3 as Propane	7.89 f,t
	C4 as Butane	0.00
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Heptane	3.02
	Sum C2-C6 as C4	117.99 t
Engine 13 Run 18	C1 as Methane	1539.66 t
	C2 as Ethane	46.17 t
	C3 as Propane	7.84 t
	C4 as Butane	5.81
	C5 as Pentane	0.00
	C6 as Hexane	0.00
	Heptane	12.26 t
	Sum C2-C6 as C4	139.11 t

→ Reanalyzed

→ Reanalyzed

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 13 Run 15		C1 as Methane	1486.77 d
		C2 as Ethane	43.04 d
		C3 as Propane	133.26 q
		C4 as Butane	2.47 f, q
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	37.32
		Sum C2-C6 as CH4	495.74 d, q, r

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 13 Run 16		C1 as Methane	1539.41 a
		C2 as Ethane	44.41 a
		C3 as Propane	5.16 f
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	7.91
		Sum C2-C6 as C4	104.30 a

GC DATA CAMPAIGN 6

Engine/Turbine	Load	Pollutant	Stack Conc. (ppmvw)
Engine 13 Run 21		C1 as Methane	861.06 t
		C2 as Ethane	29.31 t
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	0.00
		Sum C2-C6 as C4	58.62 t

Revised
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JCS/ky

Engine 13 Run 23		C1 as Methane	1523.47 t
		C2 as Ethane	44.98 t
		C3 as Propane	7.00 f, t
		C4 as Butane	0.00
		C5 as Pentane	47.94
		C6 as Hexane	0.00
		Heptane	4.22
		Sum C2-C6 as C4	350.66 t, u
Engine 14 Run 19	11	C1 as Methane	846.73 b
		C2 as Ethane	26.54 b
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	13.41 b
		Sum C2-C6 as C4	53.09 b
Engine 15 Run 22	11	C1 as Methane	1143.92 t
		C2 as Ethane	35.15 t
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	3.92 f
		Sum C2-C6 as C4	70.30 t
Engine 16 Run 21	11	C1 as Methane	861.06 t
		C2 as Ethane	29.31 t
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	3.92 f
		Sum C2-C6 as C4	58.62 t
Engine 17 Run 20	11	C1 as Methane	832.43 t
		C2 as Ethane	27.34 t
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	1.53 f
		Sum C2-C6 as C4	54.67 t
Engine 18 Run 24	11	C1 as Methane	794.62 t
		C2 as Ethane	26.92 t
		C3 as Propane	0.00
		C4 as Butane	0.00
		C5 as Pentane	0.00
		C6 as Hexane	0.00
		Heptane	0.00
		Sum C2-C6 as C4	53.84 t

a average of five determinations

did not pass drift test

- b average of three determinations
- c average without hexane is 36.34 ppmv as CH₄
- d average of four determinations
- e average without second sample is 1370.77 ppmv C₁, 43.67 ppmv C₂, 4.40 ppmv C₃, and 100.54 ppmv C₂-C₆ as CH₄
- f extrapolated past calibration curve
- g average of seven determinations
- h average without hexane is 18.32 ppmv as CH₄
- i average of 10 determinations
- j average without hexane is 77.99 ppmv as CH₄
- k average without hexane is 0 ppmv as CH₄
- l average without hexane is 76.70 ppmv as CH₄
- m average without hexane is 54.56 ppmv as CH₄
- n average without first sample is 2119.61 ppmv C₁, 57.28 ppmv C₂, 7.91 ppmv C₃, and 138.30 ppmv C₂-C₆ as CH₄
- o average of 11 determinations
- p average without hexane is 75.43 ppmv as CH₄
- q average without second sample is 4.11 ppmv propane, 0.00 ppmv butane, and 128.27 ppmv as CH₄
- r average without second sample and without hexane is 100.42 ppmv as CH₄
- s average without hexane is 104.30 ppmv as CH₄
- t average of two determinations
- u average without pentane is 110.96 ppmv as CH₄

Appendix F

Raw Operating Data

This appendix presents the raw engine and turbine operating data. Where available, these data include test horsepower, engine speed, percent load, cylinder temperatures, ignition timing, fuel pressures, fuel temperatures, fuel flow rates, compressor suction and discharge pressures, compressor discharge temperatures, and compressor gas flow rates.

Campaign 2 Process Data

Engine Process Data

Date	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94
Time	9:45	10:40	11:55	12:45	
Engine ID	#2 Ref	#2 Ref	#2 Ref	#2 Ref	
Engine Manufacturer	Cooper	Cooper	Cooper	Cooper	
Engine Model	GMV-10	GMV-10	GMV-10	GMV-10	
Rated @site conditions					
Test Hp					
Engine Speed	983.6	983.6	983.6	983.6	
Percent Load	282	284	285	282	
Ignition Timing (degrees)	79.9	79.9	79.9	79.9	
Fuel Flow Rate (chart, 5 Ref)	10	10	10	10	
Fuel Pressure (chart)	4.40	4.40	4.40	4.40	
Fuel Flow Rate (MSCFD, 5 Ref)	6.25	6.25	6.25	6.25	
Fuel Flow Rate (SCFH, per engine)	590.76	590.76	590.76	590.76	
Fuel Pressure (psig, @ manifold inlet)	5445.36	5445.36	5445.36	5445.36	
Scavenger Air Pressure (psig)	33	33	33	32	
Power Cylinder Temperature - Left #1 (F)	1	1	1	1	
Power Cylinder Temperature - Left #2 (F)	603	601	624	618	
Power Cylinder Temperature - Left #3 (F)	456	481	502	504	
Power Cylinder Temperature - Left #4 (F)	558	563	581	576	
Power Cylinder Temperature - Left #5 (F)	545	547	554	557	
Power Cylinder Temperature - Right #1 (F)	530	539	567	557	
Power Cylinder Temperature - Right #2 (F)	651	654	661	659	
Power Cylinder Temperature - Right #3 (F)	639	642	647	650	
Power Cylinder Temperature - Right #4 (F)	608	623	657	648	
Power Cylinder Temperature - Right #5 (F)	644	652	671	675	
Compressor Discharge Temp - Cyl #1 (F)	579	583	592	587	
Compressor Discharge Temp - Cyl #2 (F)			178	177	
Compressor Discharge Temp - Cyl #3 (F)			176	174	
Compressor Discharge Temp - Cyl #4 (F)			59	60	
Compressor Discharge Temp - Cyl #5 (F)			58	58	
Compressor Suction Pressure ("Hg, vacuum)			62	61	
Compressor Disch. Press. Stage 1 (psig)	0.5	0.5	0.5	1.0	
Compressor Disch. Press. Stage 2 (psig)	28.5	29.0	26.0	24.0	
	157	158	168	155	

F.1 Campaign 2

Campaign 2 Process Data

Engine Process Data

Date	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94
Time	13:30	14:30	15:30	16:25	Average	Max	Min
Engine ID	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref
Engine Manufacturer	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper
Engine Model	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10
Rated @site conditions							
Test Hp	983.6	983.6	983.6	983.6	983.6	983.6	983.6
Engine Speed	281	282	282	283	283	285	281
Percent Load	79.9	79.9	79.9	79.9	79.9	79.9	79.9
Ignition Timing (degrees)	10	10	10	10	10	10	10
Fuel Flow Rate (chart, 5 Ref)	4.30	4.30	4.30	4.30	4.35	4.40	4.30
Fuel Pressure (chart)	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Fuel Flow Rate (MSCFD, 5 Ref)	577.33	577.33	577.33	577.33	584.04	590.76	577.33
Fuel Flow Rate (SCFH, per engine)	5305.51	5305.51	5305.51	5305.51	5375.44	5445.36	5305.51
Fuel Pressure (psig, @ manifold inlet)	31	31	31	31	32	33	31
Scavenger Air Pressure (psig)	1	1	1	1	1	1	1
Power Cylinder Temperature - Left #1 (F)	619	621	620	621	616	624	601
Power Cylinder Temperature - Left #2 (F)	499	510	500	503	494	510	456
Power Cylinder Temperature - Left #3 (F)	573	577	576	576	573	581	558
Power Cylinder Temperature - Left #4 (F)	555	555	559	556	554	559	545
Power Cylinder Temperature - Left #5 (F)	559	559	557	556	553	567	530
Power Cylinder Temperature - Right #1 (F)	660	661	660	657	658	661	651
Power Cylinder Temperature - Right #2 (F)	648	647	648	644	646	650	639
Power Cylinder Temperature - Right #3 (F)	653	639	636	654	640	657	608
Power Cylinder Temperature - Right #4 (F)	673	668	669	674	666	675	644
Power Cylinder Temperature - Right #5 (F)	590	590	587	586	587	592	579
Compressor Discharge Temp - Cyl #1 (F)	171	173	173	173	174	178	171
Compressor Discharge Temp - Cyl #2 (F)	169	172	172	171	172	176	169
Compressor Discharge Temp - Cyl #3 (F)	56	58	58	57	58	60	56
Compressor Discharge Temp - Cyl #4 (F)	71	57	57	56	60	71	56
Compressor Discharge Temp - Cyl #5 (F)	59	60		59	60	62	59
Compressor Suction Pressure ("Hg, vacuum)	0.8	1.0	1.2	1.0	0.8	1.2	0.5
Compressor Disch. Press. Stage 1 (psig)	24.0	23.5	23.5	23.5	25.3	29.0	23.5
Compressor Disch. Press. Stage 2 (psig)	147	148	148	150	154	168	147

Campaign 2 Process Data

Date	3/13/94	3/13/94	3/13/94	3/13/94
Time	9:40	10:35	10:55	11:40
Engine ID	#1 Recom	#1 Recom	#1 Recom	#1 Recom
Engine Manufacturer	Clark	Clark	Clark	Clark
Engine Model	BA-6	BA-6	BA-6	BA-6
Rated @site conditions	1140	1140	1140	1140
Test Hp	958.5	958.5	958.5	958.5
Engine Speed	295	289	286	286
Percent Load	88	88	88	88
Ignition Timing (degrees)	12	12	12	12
Fuel Flow Rate (chart, 5 Recom)	9.20	9.25	9.25	9.05
Fuel Pressure (chart)	6.20	6.20	6.20	6.25
Fuel Flow Rate (MSCFD, 5 Recom)	1537.68	1546.04	1546.04	1524.81
Fuel Flow Rate (SCFH, per Cooper engine)	12814.036	12883.678	12883.678	12706.766
Fuel Pressure (psig, @ manifold inlet)	14.0	13.8	13.8	13.8
Scavenger Air Pressure (psig)	936	928	924	931
Power Cylinder Temperature #1 (F)	768	754	751	751
Power Cylinder Temperature #2 (F)	744	735	732	734
Power Cylinder Temperature #3 (F)	840	827	823	823
Power Cylinder Temperature #4 (F)	817	804	800	800
Power Cylinder Temperature #5 (F)	777	761	756	754
Power Cylinder Temperature #6 (F)	213	202	199	209
Compressor Discharge Temp - Cyl #1 (F)	240	249	249	252
Compressor Discharge Temp - Cyl #2 (F)	240	248	249	251
Compressor Discharge Temp - Cyl #3 (F)	225	228	228	228
Compressor Discharge Temp - Cyl #4 (F)	645	645	645	645
Compressor Suction Pressure (psig)	7.30	7.35	7.40	7.45
Compressor Disch. Press. Stage 1 (psig)	6.80	6.85	6.85	6.85
Compressor Gas Flow (chart)	70.0	71.0	71.4	71.9
Compressor Gas Pressure (chart)	49.0	49.0	49.0	49.0
Compressor Gas Flow (MMscfd)				
Compressor Gas Temp (F)				

Oil Heater Data

Oil Heater Data

Date	Time	Engine ID	Engine Manufacturer	Engine Model	Rated @Site conditions	Test Hp	Engine Speed	Percent Load	Ignition Timing (degrees)	Fuel Flow Rate (chart, 5 Recom)	Fuel Pressure (chart)	Fuel Flow Rate (MSCFD, 5 Recom)	Fuel Flow Rate (SCFH, per Cooper engine)	Fuel Pressure (psig, @ manifold inlet)	Scavenger Air Pressure (psig)	Power Cylinder Temperature #1 (F)	Power Cylinder Temperature #2 (F)	Power Cylinder Temperature #3 (F)	Power Cylinder Temperature #4 (F)	Power Cylinder Temperature #5 (F)	Power Cylinder Temperature #6 (F)	Compressor Discharge Temp - Cyl #1 (F)	Compressor Discharge Temp - Cyl #2 (F)	Compressor Discharge Temp - Cyl #3 (F)	Compressor Discharge Temp - Cyl #4 (F)	Compressor Suction Pressure (psig)	Compressor Disch. Press. Stage 1 (psig)	Compressor Gas Flow (chart)	Compressor Gas Pressure (chart)	Compressor Gas Flow (MMscfd)	Compressor Gas Temp (F)
3/13/94	12:05	#1 Recom	Clark	BA-6	1140	958.5	285	88	12	9.05	6.22	1517.49	12645.773	13.8	923	749	732	824	800	756	207	253	253	228	648	7.40	6.87	71.6	49.5		
3/13/94	Average	#1 Recom	Clark	BA-6	1140	958.5	288	88	12	9.16	6.21	1534.46	12787.132	13.9	928	755	735	827	804	761	206	249	248	227	646	7.38	6.84	71.2	49.1		
3/13/94	Max	#1 Recom	Clark	BA-6	1140	958.5	295	88	12	9.25	6.25	1558.51	12987.578	14.0	936	768	744	840	817	777	213	253	253	228	648	7.45	6.87	71.9	49.5		
3/13/94	Min	#1 Recom	Clark	BA-6	1140	958.5	285	88	12	9.05	6.20	1512.61	12605.112	13.8	923	749	732	823	800	754	199	240	240	225	645	7.30	6.80	70.0	49.0		
3/13/94	13:10	#1 Recom	Clark	BA-6	1140	994.2	295	92	12	9.35	6.22	1567.80	13064.97	15.0	942	783	765	864	838	796	202	253	254	235	648	7.50	7.00	74.0	50.0		
3/13/94	13:50	#1 Recom	Clark	BA-6	1140	994.2	293	92	12	9.25	6.22	1551.03	12925.238	15.0	950	785	767	865	840	798	211	255	255	235	650	7.45	7.00	73.5	50.0		
3/13/94	14:45	#1 Recom	Clark	BA-6	1140	994.2	296	92	12	9.30	6.22	1559.41	12995.104	15.0	935	797	780	880	853	816	213	257	257	238	650	7.43	7.00	73.3	50.0		
3/13/94	16:00	#1 Recom	Clark	BA-6	1140	994.2	293	92	12	9.38	6.22	1572.83	13106.89	15.0	930	803	784	883	859	821	215	258	258	238	648	7.35	7.00	72.5	50.0		

F-5

Date	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/13/94	3/14/94	3/14/94	3/14/94
Time	16:50	17:40	18:40	Average	Max	Min	8:25	9:25					
Engine ID	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom	#1 Recom
Engine Manufacturer	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark	Clark
Engine Model	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6	BA-6
Rated @site conditions	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
Test Hp	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2	994.2
Engine Speed	296	293	296	296	296	296	296	296	296	296	296	296	296
Percent Load	92	92	92	92	92	92	92	92	92	92	92	92	92
Ignition Timing (degrees)	12	12	12	12	12	12	12	12	12	12	12	12	12
Fuel Flow Rate (chart, 5 Recom)	9.40	9.33	9.30	9.33	9.40	9.25	9.38	9.30	9.30	9.38	9.30	9.30	9.30
Fuel Pressure (chart)	6.22	6.22	6.30	6.23	6.30	6.22	6.20	6.20	6.20	6.20	6.20	6.20	6.20
Fuel Flow Rate (MSCFD, 5 Recom)	1576.18	1564.44	1579.47	1567.32	1596.45	1551.03	1567.77	1554.40	1567.77	1567.77	1554.40	1554.40	1554.40
Fuel Flow Rate (SCFH, per Cooper engine)	13134.836	13037.024	13162.244	13060.978	13303.773	12925.238	13064.745	12953.319	13064.745	13064.745	12953.319	12953.319	12953.319
Fuel Pressure (psig, @ manifold inlet)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Scavenger Air Pressure (psig)													
Power Cylinder Temperature #1 (F)	923	937	938	936	950	923	939	934	939	939	934	934	934
Power Cylinder Temperature #2 (F)	811	808	805	799	811	783	768	769	768	768	769	769	769
Power Cylinder Temperature #3 (F)	791	790	784	780	791	765	760	763	760	760	763	763	763
Power Cylinder Temperature #4 (F)	888	887	880	878	888	864	856	857	856	856	857	857	857
Power Cylinder Temperature #5 (F)	864	864	860	854	864	838	832	835	832	832	835	835	835
Power Cylinder Temperature #6 (F)	825	824	816	814	825	796	788	789	788	788	789	789	789
Compressor Discharge Temp - Cyl #1 (F)	210	212	224	212	224	202	209	216	209	209	216	216	216
Compressor Discharge Temp - Cyl #2 (F)	254	250	250	254	258	250	252	248	252	252	248	248	248
Compressor Discharge Temp - Cyl #3 (F)				ERR	ERR	ERR							
Compressor Discharge Temp - Cyl #4 (F)				ERR	ERR	ERR							
Compressor Suction Pressure (psig)	256	251	251	255	259	251	251	247	251	251	247	247	247
Compressor Disch. Press. Stage 1 (psig)	238	240	238	237	240	235	240	230	240	240	230	230	230
Compressor Gas Flow (chart)	650	650	650	649	650	648	648	648	648	648	648	648	648
Compressor Gas Pressure (chart)	7.30	7.25	7.40	7.38	7.50	7.25	6.60	6.80					

F-6

Gri Air Toxics Phase 2

Engine Process Data

Engine Process Data

Date	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94
Time	9:45	10:40	11:55	12:45	13:30	14:30	15:30	16:25	Average
Engine ID	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref
Engine Manufacturer	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper
Engine Model	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10
Engine Process Data									

Date	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94	3/12/94
Time	9:45	10:40	11:55	12:45	13:30	14:30	15:30	16:25	Average
Engine ID	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref	#2 Ref
Engine Manufacturer	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper	Cooper
Engine Model	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10	GMV-10
Rated @site conditions									
Test Hp									
Engine Speed	983.6	983.6	983.6	983.6	983.6	983.6	983.6	983.6	983.6
Percent Load	282	284	285	282	281	282	282	283	283
Ignition Timing (degrees)	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9	79.9
Fuel Flow Rate (chart 5 Ref)	10	10	10	10	10	10	10	10	10
Fuel Pressure (chart 5 Ref)	4.40	4.40	4.40	4.40	4.30	4.30	4.30	4.30	4.30
Fuel Pressure (chart 5 Ref)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Fuel Flow Rate (MSCFD, 5 Ref)	590.76	590.76	590.76	590.76	577.33	577.33	577.33	577.33	577.33
Fuel Flow Rate (SCFH, per engine)	5445.36	5445.36	5445.36	5445.36	5305.51	5305.51	5305.51	5305.51	5305.51
Fuel Pressure (psig, @ manifold inlet)	33	33	32	31	31	31	31	31	32

Gri Air Toxics Phase 2 - [REDACTED]

Engine Process Data

Date	3/13/94	3/13/94	3/13/94
Time			
Engine ID			
Engine Manufacturer			
Engine Model			
Date	3/13/94	3/13/94	3/13/94
Time			
Engine ID			
Engine Manufacturer			
Engine Model			
Rated @site conditions			
Test Hp			
Engine Speed			
Percent Load			
Ignition Timing (degrees)			
Fuel Flow Rate (chart, 5 Recomp)			
Fuel Pressure (chart)			
Fuel Flow Rate (MSCFD, 5 Recomp)			
Fuel Flow Rate (SCFH, per Cooper engine)			
Fuel Pressure (psig, @ manifold inlet)			
Scavenger Air Pressure (psig)			
	3/13/94	3/13/94	3/13/94
	Average	Max	Min
	#1 Recom	#1 Recom	#1 Recom
	Clark	Clark	Clark
	BA-6	BA-6	BA-6
	1140	1140	1140
	994.2	994.2	994.2
	295	296	293
	92	92	92
	12	12	12
	9.33	9.40	9.25
	6.23	6.30	6.22
	1567.32	1596.45	1551.03
	13060.978	13303.773	12925.238
	15.0	15.0	15.0

F.2 Campaign 3

GRI Campaign #3
Compressor Station 3B

Engine #4
6/18/94
Run 1 Full Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
825	1848.0	78	174	372	248	244.9
840	1851.0	78	173	372	247	241.7
855	1840.0	78	173	373	248	245.9
1010	1844.0	78	174	373	247	241.3
1025	1844.0	79	173	374	250	242.1
1040	1863.0	78	174	374	249	242.5
1055	1863.0	77	174	374	251	245.0
1110	1871.0	78	173	374	249	244.8
1115	1870.0					244.4
Average	1858.0	78	174	373	249	243.8

Engine #4
6/18/94
Run 2 Reduced Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
1325	1829.0	87	140	342	251	217.0
1400	1823.0	87	140	344	251	221.9
1415	1844.4	88	142	344	250	222
1430	1848.0	87	143	346	249	223.1
1445	1867.0	89	143	344	249	218.5
1500	1859.0	88	144	344	251	223.8
1515	1858.0	88	144	348	251	219.2
Average	1855.1	87	142	344	250	220.8

Engine #2
6/19/94
Run 1 Low Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
1800	896.1	48	142	375	300	119.4
1815	901.8	50	142	385	301	114.8
1830	901.8	48	142	387	298	114.8
1845	879.7	50	142	387	301	121.0
1800	893.8	50	142	370	297	120.1
1915	889.3	50	142	370	303	120.8
Average	893.7	50	142	389	300	118.5

Engine #2
6/19/94
Run 2 High Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
1030	1141	85	219	385	300	145.4
1045	1142	88	218	385	300	145.4
1100	1145	88	217	384	300	145.5
1115	1144	88	218	385	300	145.5
1130	1142	88	217	385	301	145.8
1145	1141	88	219	385	300	145.1
1200	1142	88	218	385	300	145.8
1215	1145	88	219	385	300	145.9
1230	1148	88	217	386	301	148.4
1245	1149	88	218	388	300	145.9
1300	1148	88	219	385	300	145.8
1315	1144	88	219	388	300	145.8
1330	1148	87	217	385	300	146.1
1345	1148	88	219	385	300	146.3
1400	1144	88	219	385	299	145.9
1415	1144	87	217	385	299	146.0
1430	1148	87	219	385	299	145.8
Average	1145	88	218	385	300	145.7

Engine #2
6/19/94
Run 3 High Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
1830	1143	87	219	383	300	145.8
1845	1148	88	219	383	300	145.9
1700	1142	87	219	383	300	145.9
1715	1146	88	218	382	300	146.7
1730	1143.0	87	219	383	300	148.1
1745	1142	88	219	383	300	145.9
1800	1143	87	218	382	300	148.1
1815	1141.0	87	219	382	301	145.9
1830	1143.0	87	219	382	300	148.1
1845	1142.0	87	218	382	300	145.8
1900	1142	87	218	381	300	145.8
1915	1142.0	87	218	382	300	145.8
1930	1143.0	87	219	382	300	148.1
1945	1139.0	87	218	382	300	145.8
2000	1139.0	88	219	382	299	148.2
2015	1139.0	87	217	381	301	145.7
2025	1140.0	87	218	381	300	148.1
Average	1142.1	87	218	382	300	145.9

Engine #2
6/20/94
Run 1 High Load

Time	Indicated Horsepower	Suction Pressure (psi)	Intermed. Pressure (psi)	Discharge Pressure (psi)	Speed (rpm)	Fuel Flow (acfm)
1020	1139	88	217	382	300	145.1
1030	1140	88	217	382	300	145.1
1045	1139	88	217	383	300	145.8
1100	1138	88	218	383	300	145.8
1118	1141	88	219	383	300	145.4
1130	1139	88	217	383	300	145.2
1145	1140	88	218	383	300	145.2
1215	1139	87	218	382	301	145.1
1220	1139	87	217	380	300	145.3
1245	1143	87	218	381	300	145.7
1300	1141	87	218	381	300	145.5
1315	1143	87	220	381	300	145.7
1330	1143	87	220	382	300	145.7
1345	1145	87	219	381	299	146.0
1430	1149	88	212	359	300	138.8
1445	1149	87	212	359	300	138.5
1500	1155	87	212	359	300	138.1
1515	1149	87	212	360	300	138.5
1530	1151	87	212	360	301	139.0
1545	1149	88	212	360	300	139.0
1600	1148	87	213	360	300	139.5
1645	1152	88	212	359	300	138.9
1830	1151	88	213	359	300	139.1
1845	1150	88	213	359	300	139.0
1700	1151	88	213	359	299	139.0
1715	1150	88	213	359	300	139.1
1730	1148	88	213	359	299	139.9
1745	1149	88	213	358	300	139.4
1800	1149	88	213	358	300	139.8
1815	1150	88	212	358	300	139.2
1830	1148	88	213	358	300	138.8
1845	1145	88	212	358	300	138.8
1900	1149	88	212	357	300	138.4
1915	1148	88	212	357	300	138.8
1930	1145	88	212	357	299	139.3
1945	1144	88	212	357	300	139.8
2000	1149	88	212	357	300	139.8
2015	1143	88	212	357	300	138.8
2025	1149	88	213	357	300	138.9
Average	1146	87	214	360	300	141.3

GRI Campaign #3
Compressor Station 3A

Engine 102

6/14/94

Run 1 Full Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
1610	153.2	327	29722	4187
1630	152.2	326	30200	
1650	153.7	327	29961	4193
1705	153.0	326	29753	4163
1720	152.9	327	30092	4191
1740	152.9	327	30150	
1800	152.9	327	30141	3953
1855	152.6	317	28800	4058
1934	152.4	318	28900	4106
2005	152.3	317	28540	4094
2030	152.0	318	28700	4081
2040	151.5	318	28655	
2100	139.0	304	26050	3528
Average	151.6	321	29205	4055

Engine 102

6/15/94

Run 1 Full Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
910	153.5	325	29900	4288
940	154.6	325	29960	4207
955	154.5	325	29900	4209
1030	154.3	325	29550	4194
1110	154.0	324	29500	4210
1130	153.6	325	29670	4188
1145	154.1	325	29760	4163
1205	153.5	325	29950	4224
1225	150.0	325	29850	4187
1250	153.2	325	29500	4176
1315	152.3	325	29760	4176
Average	153.4	325	29755	4202

Engine 102

6/15/94

Run 2 Reduced Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
1500	132.5	302	24800	3400
1510	132.9	302	24800	3371
1525	132.9	302	24850	3340
1550	132.7	302	24690	3360
1605	132.8	302	24650	3336
1625	133.5	302	24600	3375
Average	132.9	302	24732	3364

Engine 101

6/15/94

Run 1 Reduced Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
1830	130.9	303	25280	3292
1850	131.1	303	25300	
1905	130.6	303	25200	3315
1920	130.6	303	25600	
1940	131.1	303	25500	3325
Average	130.9	303	25376	3311

Engine 101

6/16/94

Run 1 Full Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
915	150.7	322	29250	4058
935	152.4	322	29200	4126
945	152.2	322	29150	4101
1000	153.1	322	29200	4124
1015	151.9	322	29250	
1030	153.2	322	29500	4122
1045	152.3	322	29100	4113
1105	152.8	322	29350	4122
1115	153.8	322	25250	4131
1130	153.8	322	29350	4140
1200	154.0	322	29400	4159
1215	153.7	322	29350	4158
1235	150.6	319	28300	4030
1245	148.7	318	28600	3954
1300	149.4	317	28300	3981
1315	147.7	318	28350	3961
1330	148.4	319	28250	3935
1345	147.6	318	28200	3915
1400	145.6	317	28000	3877
Average	151.2	321	28703	4056

Engine 101

6/16/94

Run 2 Full Load

Time	BMEP	Speed	Fuel Flow (cfh)	Power (hp)
1415	153.0	325	29450	4165
1430	152.0	325	29330	4152
1445	151.9	325	29300	4148
1500	151.1	325	29100	
1517	153.4	328	28850	4147
1530	150.7	325	28930	4111
1545	150.6	325	29200	4103
1630	150.1	325	29050	4091
1645	150.1	325	29100	4089
1700	150.4	325	29200	4103
1715	150.6	325	29150	4074
1730	150.3	325	29050	4085
1745	151.5	325	29150	4129
1800	151.1	325	29150	4121
Average	151.2	325	29144	4117

6-14-94

Engine # 102

Test # 1 start: 1600

1610

BMEP: 153.2

Speed: 327

Fuel: 29722 cph

1630

BMEP: 152.2

Speed: 326

Fuel: 30200 cph

1650

BMEP: 153.7

Speed: 327

Fuel: 29961 cph

1705

BMEP: 153

Speed: 326

Fuel: 29753 cph

1720

BMEP: 152.9

Speed: 327

Fuel: 30092 cph

1740

BMEP: 152.9

Speed: 327

Fuel: 30150 cph

1800

BMEP: 152.9

Speed: 327

Fuel: 30141

Rel. hum 1700 = 50%

note

started Eng # 103 @ 1810

6-15-94 Unit # 102

0910 BMEP: 153.5
Speed: 325
Fuel: 29900 cPH

0940 BMEP: 154.6
Speed: 325
Fuel: 29960

0955 BMEP: 154.5
Speed: 325
Fuel: 29900

1030 BMEP: 154.3
Speed: 325
Fuel: 29550

1110 BMEP: 154
Speed: 324
Fuel: 29500
RH: 75%

1130 BMEP: 153.6
Speed: 325
Fuel: 29670

1145 BMEP: 154.1
Speed: 325
Fuel: 29760

1205 BMEP: 153.5

Speed: 325

Fuel: 29950

RH: 66%

1225 BMEP: 15

Speed: 325

Fuel: 29850

1250 BMEP: 153.2

Speed: 325

Fuel: 29500

121315 BMEP: 152.3

Speed: 325

Fuel: 29760

1220 reduced load on Eng #102

stable @ 1420

start run @ 1440

BMEP: 134.2

Speed: 302

Fuel: 24900

1445 - 70° wb / 71° DB

1500 BMEP: 132.5
Speed: 302
Fuel: 24800

1510 BMEP: 132.9
Speed: 302
Fuel: 24800

1525 BMEP: 132.9
Speed: 302
Fuel: 24850

1550 BMEP: 132.7
Speed: 302
Fuel: 24690

WB 71° / DB 74°

1605 BMEP: 132.8
Speed: 302
Fuel: 24650

1625 BMEP: 133.5
Speed: 302
Fuel: 24600

@ 1650 engine # 102 reved to 4312 hp
engine # 101 slowed to 3225 hp

1855 BMEP: 152.6
Speed: 317
Fuel: 28800 cPH

1900 Rel. Humid 59%

1934 BMEP: 152.4
Speed: 318
Fuel: 28900 cPH

2005 BMEP: 152.3
Speed: 317
Fuel: 28540 cPH

Rel. Hum. 75%

2030 BMEP: 152.0
Speed: 318
Fuel: 28700 cPH

2040 BMEP: 151.5
Speed: 318
Fuel: 28655 cPH

2100 BMEP: 139
Speed: 304
Fuel: 26050

Rel Hum. 79%

6-16-94 Engine 2A1 : Full Load - 2401
Test start 0915 : 2401
0915 : 2401

BMEP : 150.7

Speed : 322

Fuel : 29250

Wb : 71°

DB : 75°

0935 Speed : 322

BMEP : 152.4

Fuel : 29200

0945

Speed : 322

BMEP : 152.2

Fuel : 29150

1000

Speed : 322

BMEP : 153.4

Fuel : 29200

1015

Speed : 322

BMEP : 151.9

Fuel : 29250

74° Wb

76° Db

1030

Speed : 322

BMEP : 153.2

Fuel : 29500

1045

Speed: 322
BMEP: 152.3
Fuel: 29100

1105

Speed: 322
BMEP: 152.8
Fuel: 29350

1115

Speed: 322
BMEP: 153.8
Fuel: 25250

Wb: 75°
Db: 81°

1130

Speed: 322
BMEP: 153.8
Fuel: 29350

1200

Speed: 322
BMEP: 154.0
Fuel: 29400

1215

Speed: 322
BMEP: 153.7
Fuel: 29250

Wb: 77°
Db: 84°

1225

Turbine swinging, load on IC's
being adjusted. # 102 & 103 taking
up most of change. ~ 3 RPM change
on # 101

1235

Speed: 319

BMEP: 150.6

Fuel: 28300

1245

Speed: 318

BMEP: 148.7

Fuel: 28600

1300

Speed: 317

BMEP: 149.4

Fuel: 28300

1315

Speed: 318

BMEP: 147.7

Fuel: 28350

Wb: 77°

Db: 85°

1330

Speed: 319

BMEP: 148.4

Fuel: 28250

1345

Speed: 318

BMEP: 147.4

Fuel: 28200

1400

Speed: 317

BMEP: 145.6

Fuel: 28000

load increase on engine #101 started ~ 1405

1415

Speed : 325

BMEP : 153.0

Fuel : 29450

Wb : 78

Db : 89

1430

speed : 325

BMEP : 152

Fuel : 29330

1445

speed : 325

BMEP ~~151~~ : 151.9

Fuel : 29300

1500

speed : 325

BMEP : 151.1

Fuel : 29100

1517

speed : 328

BMEP : 153.4

Fuel : 28850

Wb : 76

Db : 89

1530

speed : 325

BMEP : 150.7

Fuel : 28930

1545

speed : 325

BMEP : 150.6

Fuel : 29200

1630 : speed : 325
BMEP : 150.1
fuel : 29050

Wb : 76°
Db : 89°

1645 : speed : 325
BMEP : 150.1
fuel : 29100

1700 speed : 325
BMEP : 150.4
fuel : 29200

Wb : 77°
Db : 90°

1715 speed : 325
BMEP : 150.6
fuel : 29150

1730 speed : 325
BMEP : 150.3
fuel : 29050

1745 speed : 325
BMEP : 151.5
fuel : 29150

1800 speed : 325
BMEP : 151.1
fuel : 29150

1830 - start test - Eng 101 "low" load

~~2520~~ BEMP: 130.9

speed: 303

Fuel: 25280

Wb: 77°

Db: 86°

1850 BEMP: 131.1

speed: 303

Fuel: 25300

1905 BEMP: 130.6

speed: 303

Fuel: 25200

1920 BEMP: 130.6

speed: 303

Fuel: 25600

1940 BEMP: 131.1

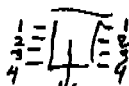
speed: 303

Fuel: 25500

Wb: 76°

db: 82°

Test completed



Exh.

Timing 7.5°

00-10-11
Eng. #4

	0925	0940	0955	1010	1025
Suct Press (psi)	79 psi	78	78	78	79
Int. Press (psi)	174 psi	173	173	174	173
Dis Press (psi)	372 psi	372	373	373	374
Scav Inlet (in Hg)	-3 in Hg	-3	-3	-3	-3
Scav Outlet (in Hg)	+4 in Hg	4.1	4.1	4.05	4.15
#1L Exh (°F)	632	646	633	635	638
#2L Exh (°F)	563	564	564	567	568
#3L Exh (°F)	678	680	683	684	688
#4L Exh (°F)	611	616	615	618	621
#1R Exh (°F)	651	653	652	655	658
#2R Exh (°F)	605	610	606	607	613
#3R Exh (°F)	672	672	672	672	678
#4R Exh (°F)	605	605	606	607	609
Exh Man (°F)	637	637	637	639	644
LB Air (°F)	105	106	108	109	111
RB Air (°F)	106	106	107	109	111
Speed rpm	246	247	249	247	250
Ind Np	1946	1951	1939.7	1943.8	1944.0
Torque	94%	94.1	93.9	94.0	94.3
Cap (mmSCFD)	27.51	27.55	27.44	27.75	27.66
Fuel Rate (scfm)	244.93	241.68	245.91	241.33	242.10
High Gas (°F)			233	234	234
Low Gas (°F)			182	182	183

suction / interstage / discharge pressures (2-stage comp)
Scav. air pressure (turbo inlet {suction}, turbo outlet {manifold})

W _b (°F)					76
O _b (°F)					89

#4 - June 18, 1994 - Full Load
Cont.

	1040	1055	1110	1115 <i>end</i>
Suct Press.	78	77	78	
Int. Press.	174	174	173	
Dis. Press.	374	374	374	
(Air) Scav. Inlet	-3.5	-3.5	-3.5	
(Air) Scav. Outlet	4.15	4.2	4.1	
#1L Exh	641	641	641	
#2L	570	570	576	
#3L	691	692	691	
#4L	623	626	625	
#1R	663	662	662	
#2R	617	616	619	
#3R	682	682	680	
#4R	612	614	615	
LB Air	~~645~~ 112	112	114	
RB Air	~~112~~ 111	112	113	
Speed	~~249~~ 111	251	249	
ind HP	1962.8	1992.8	1970.6	1970.2
Torque	94.0	94.6	94.1	94.2
Rap.	27.76	28.25	27.90	27.67
Fuel	242.61	244.96	244.82	244.35
High gas	236	238	237	
Low gas	184	184	184	
W _b		76		
D _b		86		
Exh Man	645	648	647	

and high load
requested by gas
control

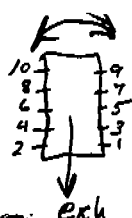
#4 - Reduced Load - 18 June 1994

	1345	1400	1415	1430	1445	1500	1515
Sact Press.	67	67	66	67	69	68	68
Int. Press.	140	140	142	143	143	144	144
Dis. Press	342	344	344	346	344	344	346
Scav. Inlet	3.5	3.6	3.6	3.5	3.6	3.6	3.5
Scav. Outlet	4.1	4.1	4.1	4.1	4.1	4.1	4.1
#1 L Exh	600	600	607	602	~~606~~ ⁶⁰⁴	604	602
#2 L	540	540	545	544	543	543	541
#3 L	647	647	645	653	649	651	648
#4 L	596	596	595	602	600	600	598
#1 R	630	627	630	633	631	633	629
#2 R	590	586	595	601	597	595	593
#3 R	644	650	645	650	649	650	648
#4 R	587	586	585	587	587	589	593
Exh. Man	616	615	617	619	619	619	618
LB Air	119	118	121	122	119	120	120
RB Air	118	118	120	122	119	119	120
Speed	251	251	250	249	249	251	251
Ind. HP *	1628	1623	1644.4	1645.6	1666.6	1688.6	1687.6
Torque	77	77.6	78.2	78.6	78.9	79.0	79.2
Cap.	21.58	21.73	22.15	22.31	22.59	22.71	22.93
Fuel	217.60	221.86	221.84	223.09	216.48	223.82	219.18
High Gas	247	247	246	248	247	245	246
Low Gas	185	185	185	185	185	185	185
W _b	77		77		77		
D _b	95		93		94		

380 No
68 CO
1350 H₂O

F-24

* using 8 steps of unloading for calc., only 7 operating



- Eng #2 - Low Load - 18-June-1954

	1800	1815	1830	1845	1900	1915
Suct. Press.	49	50	49	50	50	50
Int. Press.	142	142	142	142	142	142
Disc. Press.	375	365	367	367	370	370
in H ₂ O Scav Inlet	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75
in H ₂ Scav Outlet	3.5	3.75	3.6	3.4	3.5	3.5
Speed	300	301	298	301	297	303
#1 Cyl	564	572	567	566	553	554
#2	681	682	684	686	686	685
#3	613	612	609	610	612	618
#4	661	665	668	663	670	658
#5	605	607	614	606	607	607
#6	697	700	698	701	701	700
#7	579	569	573	565	565	576
#8	709	712	712	710	708	708
#9	633	647	643	644	647	648
#10	691	688	686	688	689	690
Low Gas #1	201	201	201	200	200	200
Low Gas #2	200	200	200	200	200	200
High Gas #1	224	223	223	222	221	221
High Gas #2	226	226	225	225	224	224
ind. HP	896.1	901.6	901.6	879.7	893.8	889.3
Torque	80.9	80.9	80.9	80.9	81.1	81.1
Cap	13.71	13.87	13.87	13.66	13.90	13.81
Fuel	119.36	114.84	114.84	120.99	120.14	120.8
ω_b	75	75	75		75	
ν_b	93	91	91		90	

- Eng. #2 - 6-19-94 - High Load

	1030	1045	1100	1115	1130	1145	1200	1215
Suct. Pres.	85	86	85.9	86	86	86	86	86
Inter. Press	219	218	217	218	217	219	218	219
Dist. Press	365	365	364	365	365	365	365	365
Seaw. Inlet	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Seaw. Outlet	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Speed	300	300	300	300	301	300	300	300
#1 Cyl	672	672	675	677	678	679	679	681
#2	742	744	748	750	752	754	756	756
#3	702	703	703	706	705	708	708	706
#4	705	705	706	708	709	710	711	711
#5	697	696	696	698	698	699	699	700
#6	755	755	755	757	758	759	761	761
#7	686	686	685	686	689	689	691	691
#8	750	749	751	753	753	755	758	758
#9	697	698	704	705	705	706	708	710
#10	746	746	746	748	750	750	750	750
Low Gas #1	188	188	188	189	189	189	189	189
Low Gas #2	185	185	185	185	186	186	186	186
High Gas #1	184	185	185	186	186	186	185	185
High Gas #2	185	185	185	187	187	186	186	186
ind HP	1140.6	1141.8	1144.5	1143.8	1142.1	1141.1	1141.8	1144.7
Torque	103.9	104	103.8	104.0	104.1	104.2	104.2	104.3
Capacity	13.94	13.96	14.04	14.02	14.0	13.97	13.98	14.01
Fuel	145.43	145.42	145.49	145.45	145.59	145.14	145.60	145.87
W _b	75		76		76		76	
D _b	86		88		88		91	

	1230	1245	1300	1315	1330	1345	1400	1415	1430
Suct. Press.	86	86	86	86	87	86	86	87	87
Int. Press.	217	218	219	219	217	219	219	217	219
Disch Press	366	366	365	366	365	365	365	365	365
Seal In	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Seal Out	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Speed	301	300	300	300	300	300	299	299	299
#1 Cyl	678	679	681	684	680	682	681	681	681
#2 755	756	755	755	759	757	759	759	757	756
#3 707	706	706	706	708	708	708	708	708	706
#4 710	717	710	710	711	711	712	712	712	711
#5 699	698	699	700	702	702	702	703	701	699
#6 759	761	759	760	761	761	762	762	761	761
#7 690	689	691	691	692	692	692	692	691	692
#8 757	757	759	757	759	756	759	757	758	759
#9 710	705	710	710	711	706	752	704	705	705
#10 750	751	752	750	752	750	751	751	753	752
Low Gas #1	189	189	189	189	189	189	189	189	189
Low Gas #2	186	186	186	186	186	186	186	186	186
High Gas #1	184	185	186	185	186	185	185	185	185
High Gas #2	185	186	185	186	187	185	185	186	186
Ind HP	1146.0	1148.8	1148.1	1143.5	1147.5	1145.5	1144.3	1144.3	1146.4
Torque	104.3	104.4	104.3	104.3	104.4	104.4	104.3	104.3	104.2
Capacity	14.02	14.04	14.04	14.04	14.05	14.01	14.02	14.03	14.06
Fuel	146.36	145.93	145.62	145.59	146.09	146.31	145.91	145.98	145.6
W _b	76		76		76		77		77
P _b	92		93		94		95		92

~~XXXXXXXXXX~~ - Eng #2 - 6/19/44 - high load

	1630	1645	1700	1715	1730	1745	1800	1815	1830
Suct. Press	87	86	87	86	87	86	87	87	87
Int. Press	219	219	219	218	219	219	218	219	219
Disc. Press	363	363	363	362	363	363	362	362	362
Seal In	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Seal Out	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Speed	300	300	300	300	300	300	300	301	300
#1 cyl	682	680	680	682	679	680	681	682	681
#2	756	756	757	757	757	756	757	758	755
#3	707	708	708	708	708	708	708	707	708
#4	712	711	713	712	712	713	712	711	711
#5	699	698	700	699	699	698	699	699	699
#6	762	761	763	762	761	762	761	762	760
#7	693	691	691	693	692	694	692	691	690
#8	757	757	759	757	757	757	758	757	757
#9	704	706	703	705	705	705	707	705	711
#10	752	753	752	755	753	754	755	754	753
Low Gas #1	188	188	188	188	188	188	188	188	188
Low Gas #2	185	186	186	185	185	185	185	185	184
High Gas #1	184	184	184	184	184	184	184	183	183
High Gas #2	184	185	184	184	184	184	184	184	184
ind HP	1142.7	1145.7	1141.9	1145.5	1142.7	1142.1	1142.8	1141.3	1142.9
Torque	104.2	104.2	104.2	104.3	104.2	104.2	104.2	104.1	104.2
Capacity	14.11	14.16	14.11	14.15	14.13	14.11	14.13	14.09	14.13
Fuel	145.78	145.86	145.92	145.73	146.13	145.64	146.14	145.89	146.07
W _b	76		76		77		77		76
D _b	93		93		93		91		91

~~XXXXXXXXXX~~ - Eng #2 - 6/19/94 - High Load

	1845	1900	1915	1930	1945	2000	2015	2025	
Suct. Press	86	87	87	87	87	86	87	87	
Int Press	218	218	218	219	218	219	217	218	
Disch Press	362	361	362	362	362	362	361	361	
Seal In	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	
Seal Out	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
#1 Cyl	681	681	682	682	681	682	680	679	680
#2	755	755	755	758	755	756	754	753	756
#3	707	708	708	709	708	708	706	707	708
#4	711	711	711	712	712	711	710	708	711
#5	698	698	698	699	699	700	698	698	699
#6	759	759	759	762	760	759	759	758	761
#7	693	691	692	692	690	691	691	691	691
#8	757	757	756	758	757	757	755	752	757
#9	710	710	710	708	708	707	710	710	708
#10	752	752	752	752	752	751	750	750	752
Low Gas #1	187	187	187	187	187	187	187	187	
Low Gas #2	184	184	184	184	184	184	184	184	
High Gas #1	183	183	183	181	182	181	181	181	
High Gas #2	184	184	183	182	182	182	181	182	
Ind HP	1142.0	1142.2	1142.8	1142.6	1139.4	1138.6	1139.2	1140.4	
Torque	104.1	104.2	104.0	104.0	103.9	103.9	103.8	103.8	
Capacity	14.11	14.12	14.12	14.11	14.07	14.07	14.07	14.08	
Fuel	145.84	145.80	145.77	146.12	145.83	146.23	145.71	146.09	
Speed	300	300	300	300	300	299	301	300	
W _b		77		78		78			
D _b		90		89		87			

High load
6/20/94

GMV-10

(419) 337-9039

(817) 455-2123
(713) 807-1221

	1020	1030	1045	1100	1116	1130	1145	1215	1230
Suct. Press.	86	86	86	86	86	86	86	87	87
Int. Press.	217	217	217	216	219	217	218	218	217
Disch. Press.	362	362	363	363	363	363	363	362	360
Scav. Inlet	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Scav. Outlet	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Speed	300	300	300	300	300	300	300	301	300
Cyl #1	669	668	671	673	673	673	675	676	679
#2	736	737	738	741	747	749	749	751	753
#3	695	695	695	697	700	699	702	702	703
#4	698	699	700	703	704	706	705	706	707
#5	689	690	691	694	694	695	7693	697	698
#6	750	750	751	753	757	756	758	758	760
#7	685	684	687	685	689	689	689	691	689
#8	748	752	750	754	756	755	757	756	759
#9	699	701	701	702	705	704	706	708	708
#10	743	745	745	745	748	749	749	749	750
Low Gas #1	188	188	188	188	188	189	189	189	189
Low Gas #2	184	185	185	185	185	186	186	186	186
High Gas #1	~~185~~ 749	185	185	185	186	187	188	188	187
High Gas #2	187	187	186	186	187	188	189	189	187
Ind HP	1139.1	1140.1	1138.8	1138.2	1140.8	1139.4	1139.5	1139.4	1139.0
Torque	103.5	103.4	103.6	103.6	103.6	103.7	103.7	103.8	103.8
Capacity	13.99	14.01	13.99	13.98	14.03	14.03	14.02	14.06	14.14
Fuel	145.09	145.10	144.59	145.60	145.41	145.18	145.24	145.06	145.34
W _b	73			75		75		74	
D _b	83			85 92		87		90	

High level
6/20/94

	1245	1300	1315	1330	1345	1430	1445	1500	1515
Suct Press	87	87	87	87	87	88	87	87	87
Int. Press	218	218	220	220	219	212	212	212	212
Disch Press	361	361	361	362	361	359	359	359	360
Scav. Inlet	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Scav. Out	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Speed	300	300	300	300	299	300	300	300	300
Cyl. #1	679	680	679	680	681	669	668	668	669
#2	755	757	755	759	759	741	742	741	740
#3	705	706	706	708	708	693	694	693	694
#4	708	708	710	709	711	698	698	699	698
#5	698	698	699	701	701	685	686	686	685
#6	760	759	762	762	762	748	748	749	748
#7	691	693	693	695	695	680	682	681	683
#8	759	759	759	759	759	750	751	753	752
#9	712	711	709	712	711	696	697	696	697
#10	752	750	753	753	754	740	741	740	740
Low Gas #1	189	189	189	189	189	184	184	184	184
Low Gas #2	186	186	186	186	186	184	184	184	184
High Gas #1	185	184	184	184	184	186	186	186	186
High Gas #2	186	186	185	185	185	187	187	187	187
Ind HP	1142.7	1141.3	1143.2	1143.0	1145.4	1149.0	1148.9	1155.4	1148.8
Torque	103.9	104.0	104.1	104.2	104.3	104.6	104.7	104.6	104.7
Capacity	14.18	14.16	14.20	14.19	14.22	14.16	14.15	14.25	14.15
Fuel	145.73	145.57	145.71	145.74	146.01	138.83	138.53	138.10	138.46
w_b	75		74		75		76		77
P_b	90		93		93		95		96

Unit #2
High Load

6-20-94

	1530	1545	1600	1615	1630	1645	1700	1715
Suct Press	87	88	87	88	88	88	88	88
Int. Press	212	212	213	212	213	213	213	213
Disch Press	360	360	360	359	359	359	359	359
Seav. Inlet	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Seav. Outlet	3.5	3.5	3.5	3.5	3.4	3.4	3.4	3.4
Speed	301	300	300	300	300	300	299	300
Cyl #1	668	670	670	670	668	670	671	669
#2	743	741	740	741	741	742	742	740
#3	694	696	694	694	694	695	695	694
#4	701	700	699	699	700	700	699	698
#5	688	687	687	687	687	688	688	685
#6	750	750	748	748	748	750	749	749
#7	683	684	683	683	683	682	683	684
#8	752	752	752	751	751	750	751	750
#9	696	698	699	697	695	698	698	698
#10	743	741	741	741	741	742	742	742
Low Gas #1	183	183	183	183	183	183	183	183
Low Gas #2	183	184	184	183	183	183	183	183
High Gas #1	185	185	185	185	186	185	185	184
High Gas #2	186	186	186	186	187	186	186	185
Ind Hp	1151.4	1149.0	1147.6	1151.8	1151.3	1149.8	1150.9	1149.8
Torque	104.8	104.8	104.9	104.8	104.9	104.9	104.9	104.9
Capacity	14.18	14.17	14.16	14.23	14.23	14.21	14.24	14.73
Fuel	138.97	138.99	139.52	138.85	139.00	139.00	138.96	139.09
Wb		76		76		76		76
Db		94		95		95		93

Eng. #2
High Load

Station

06-20-94

	1730	1745	1800	1815	1830	1845	1900	1915
Suct Press	88	88	88	88	88	88	88	88
Int. Press	213	213	213	212	213	212	212	212
Disch Press	359	358	358	358	358	358	357	357
Scav. Inlet	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
Scav. Outlet	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Speed	299	300	300	300	300	300	300	300
Cyl #1	671	670	667	666	669	668	669	669
#2	742	738	739	738	739	738	738	739
#3	696	696	694	695	694	695	696	696
#4	700	698	697	698	698	699	700	698
#5	688	686	687	687	687	687	688	688
#6	751	748	748	748	748	748	747	748
#7	683	682	684	681	681	681	679	682
#8	750	749	750	751	752	750	751	752
#9	695	697	694	693	695	695	693	694
#10	743	743	741	741	741	741	742	741
Low Gas #1	182	182	182	182	182	182	182	182
Low Gas #2	182	182	182	182	182	182	182	182
High Gas #1	183	184	184	184	184	184	183	182
High Gas #2	184	184	185	185	184	184	184	184
Ind HP	1146.2	1148.8	1149.3	1149.8	1147.6	1145.3	1148.6	1145.7
Torque	104.9	104.7	104.6	104.6	104.6	104.5	104.5	104.5
Capacity	14.19	14.24	14.23	14.25	14.21	14.20	14.25	14.20
Fuel	139.90	139.39	139.60	139.15	138.80	138.68	138.43	138.78
W _b		77		77		78		78
D _b		93		93		93		90

F.3 Campaign 4

Date: 8/22/74
Name of Data Recorder: J. Smith

Time	11:35	12:10	12:33	13:03	13:43	14:18	14:50
Engine Horsepower	696	693	689	688	687	685	680
Engine Speed (rpm)	809	809	808	810	810	810	810
Engine Torque (%)							
Ignition Timing (degrees)							
FUEL MANIFOLD							
Fuel Flow Rate (scfm) Uncorrected	200cf 55.548	900cf 22.54.59	1000cf 40:41.65	40	40	38.39	39.5
Fuel Temperature (°F)		88.5 scfm					
Fuel Header Pressure (psig)	20.4	20.2	20.0	20.2	20.1	19.8	19.9
AIR INTAKE MANIFOLD							
Air Flow Rate (scfm)							
Air Manifold Temperature (°F)	20						
Air Manifold Pressure (in Hg or psig)	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0
EXHAUST MANIFOLD							
Temperature (°F) ~~1000+~~ ¹⁰⁰⁰⁺	1000+	1000+	1000+	1000+	990	995	995
Pressure (in Hg)							
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1							
Cylinder # 2							
Cylinder # 3							
Cylinder # 4							
Cylinder # 5							
Cylinder # 6							
Cylinder # 7							
Cylinder # 8							
Cylinder # 9							
Cylinder # 10							
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscf) ~~dem~~	5.7	5.6	5.4	6.0	N/A	6.3	6.25
Compressor Suction Pressure (psig)	79.8	80.0	79.6	79.8	80.2	79.8	79.9
Compressor Suction Temperature (°F)	95	97	95	98	100	102	101
Compressor Discharge Pressure (psig)	430	430	425	422	420	418	410
Compressor Discharge Temperature (°F)	220	220	220	225	220	220	220
Fuel Flow Corrected	69580				69645	69726	69753
Fuel Flow Uncorrected	25494				22.5		
Barometre	29.554			29.53			29.50
Ambient Temp	84.5			86.3			86.8
Note: 15105 - Suction Pressure dropped 20 psig engine unloader.							

Compressor Cylinder Performance Report

18

Station: XXXXXXXXXX						Unit No.: #4		Date: 6/8/94			
Mfg./Type: Cooper Bessemer GMWA-8						Test Type: Toxic Emission Testing Run #1 Full Load 11:00am.					
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions
1	HE	497.30	250.3	72.05	36.48	73.93	189.65	74.0 °F	165.0 °F	1.0000	1.0000
1	CE	526.84	250.6	80.12	41.49	74.96	187.40	74.0 °F	165.0 °F	1.0000	1.0000
2	HE	435.57	249.1	74.50	44.43	179.81	379.95	133.0 °F	216.0 °F	1.0000	1.0000
2	CE	493.15	249.5	91.75	52.90	181.07	365.36	133.0 °F	216.0 °F	1.0000	1.0000
Pb (psia)= 14.4				R factor= 459.7						(Z) std= 1.000	
Total IHP =		1952.86 @ 249.9		= Average RPM		Mechanical Efficiency = 0.95		Compressor BHP = 2055.64			
Total BHP Load =		Compressor BHP		2055.64		+ Accessory BHP		40.00		= 2095.64	
Mfg. rated BHP =		2000.00 @		250.0 RPM (Manufacture's rated speed)				Curve BHP = 1981			
Adjusted BHP =		1999.06 @		249.9 RPM (average test operating speed)				Load Step = 5			
Test Torque Load =		104.83%						%Difference = -3.77 %			

Cylinder Capacity (Volume)			
Suction Conditions			
Cyl. No.	inmcf	Cyl. No.	inmcf
1 HE	10.836	2 HE	10.165
1 CE	11.952	2 CE	12.058
Total=	22.789	Total=	22.223
Total Capacity= 22.506 inmcf		BHP/inmcf= 93.115	

Discharge Conditions			
Cyl. No.	inmcf	Cyl. No.	inmcf
1 HE	10.827	2 HE	10.799
1 CE	11.941	2 CE	11.847
Total=	22.768	Total=	22.646
Total Capacity= 22.707 inmcf		BHP/inmcf= 92.291	

Cylinder Flow Balance (Qs/Qd)			
Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd
1 HE	1.001	2 HE	0.941
1 CE	1.001	2 CE	1.018
Total Capacity (Qs)/(Qd)= 0.991			

HE Qs/Qd
 CE Qs/Qd

Cylinder Number

0.750
0.800
0.850
0.900
0.950
1.000
1.050
1.100
1.150
1.200
1.250

Discharge Leakage = 1 < Qs/Qd (%) > 1 = Suction Leakage

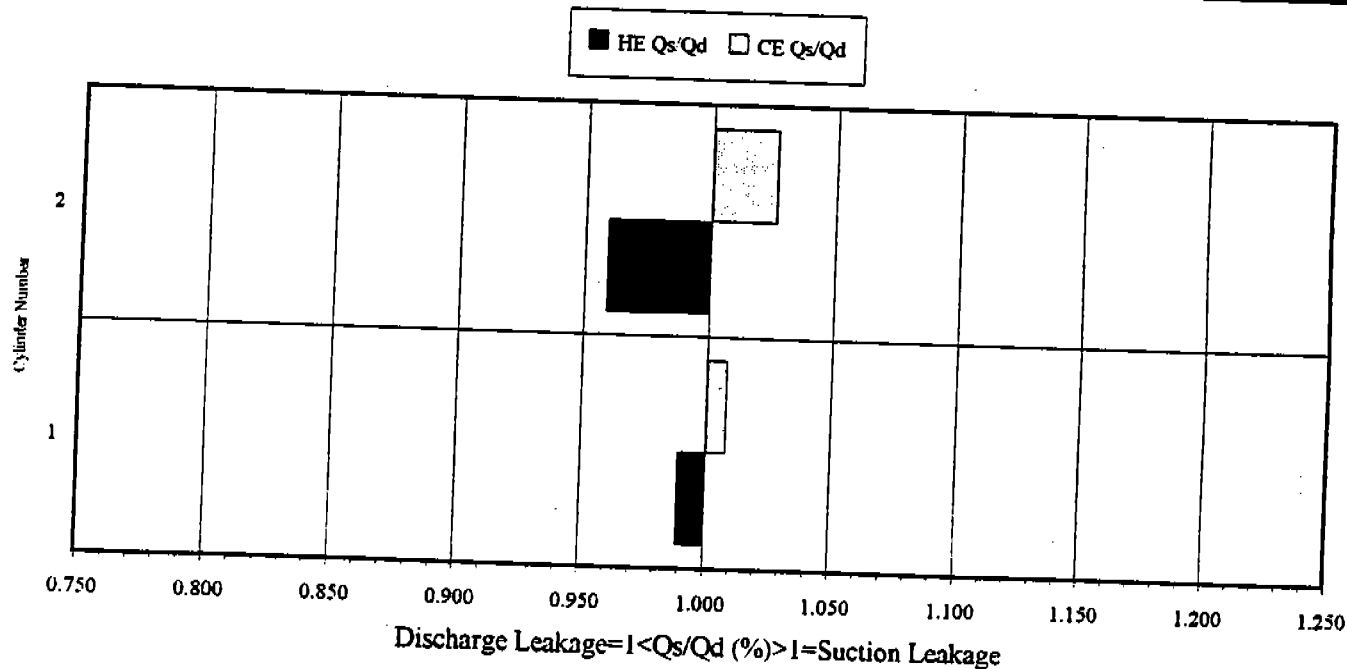
Compressor Cylinder Performance Report

Station: XXXXXXXXXX						Unit No.: #4			Date: 6/7/94				
Mfg./Type: Cooper Bessemer GMWA-8						Test Type: Toxic Emission Testing Run #1 Full Load							
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions		
1	HE	489.35	246.6	72.87	39.11	73.97	181.17	72.0 °F	165.0 °F	1.0000	1.0000		
1	CE	516.87	246.3	80.12	40.63	73.93	188.57	72.0 °F	165.0 °F	1.0000	1.0000		
2	HE	433.42	247.9	75.30	43.55	179.90	384.44	132.0 °F	214.0 °F	1.0000	1.0000		
2	CE	485.40	246.4	91.30	51.12	182.15	375.01	132.0 °F	214.0 °F	1.0000	1.0000		
Pb (psia)= 14.4					R factor= 459.7				(Z) std= 1.000				
Total IHP =		1925.04 @ 246.8		= Average RPM		Mechanical Efficiency = 0.95							
Total BHP Load =		Compressor BHP		2026.36		+ Accessory BHP		40.00		= 2066.36			
Mfg. rated BHP = 2000.00		@ 250.0		RPM (Manufacture's rated speed)				Curve BHP = 1960					
Adjusted BHP = 1974.27		@ 246.8		RPM (average test operating speed)				Load Step = 5					
Test Torque Load = 104.66%						%Difference = -3.39 %							

Cylinder Capacity (Volume)			
Suction Conditions			
Cyl. No.	immcfid	Cyl. No.	immcfid
1 HE	10.841	2 HE	10.246
1 CE	11.655	2 CE	11.936
Total=	22.496	Total=	22.182
Total Capacity= 22.339		immcfid	
BHP/immcfid= 92.500			

Discharge Conditions			
Cyl. No.	immcfid	Cyl. No.	immcfid
1 HE	10.961	2 HE	10.682
1 CE	11.560	2 CE	11.629
Total=	22.520	Total=	22.310
Total Capacity= 22.415		immcfid	
BHP/immcfid= 92.185			

Cylinder Flow Balance (Qs/Qd)			
Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd
1 HE	0.989	2 HE	0.959
1 CE	1.008	2 CE	1.026
Total Capacity (Qs)/(Qd)= 0.997			



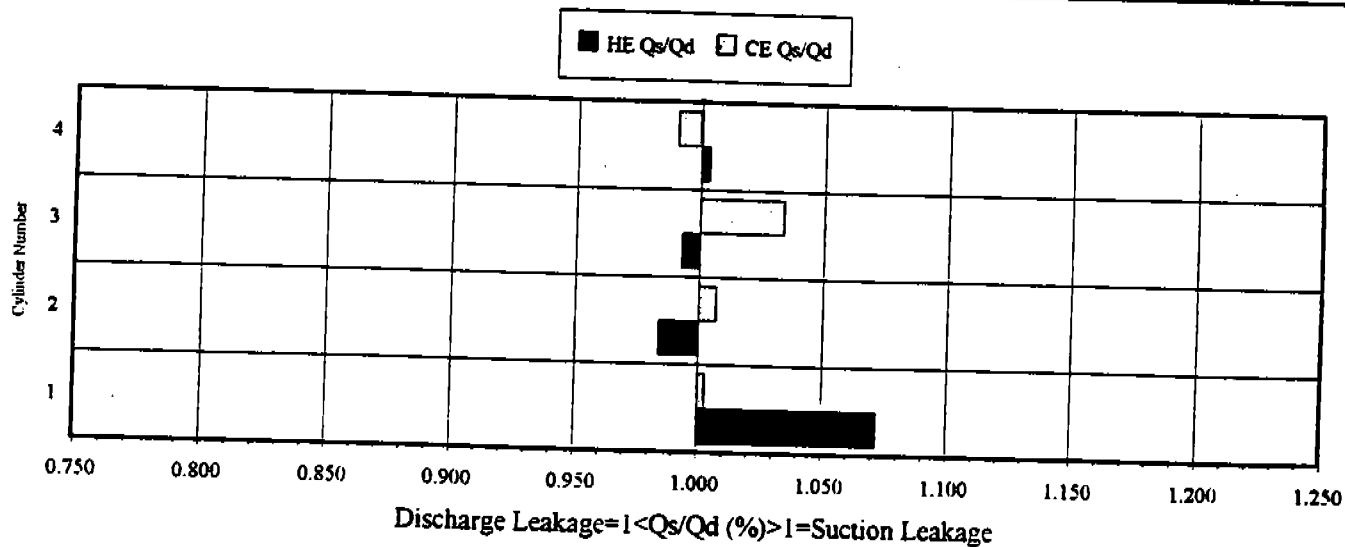
Compressor Cylinder Performance Report

Station: ~~Cooper Bessemer GMV-10TF~~						Unit No.: #2				Date: 6/18/94		
Mfg./Type: Cooper Bessemer GMV-10TF						Test Type: Toxic Emission Testing Run #2; Full Load, 11:30 am.						
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions	
1	HE	164.77	300.8	61.63	29.73	87.86	219.65	74.0 °F	171.0 °F	1.0000	1.0000	
1	CE	159.58	300.4	60.37	31.41	87.86	217.50	74.0 °F	171.0 °F	1.0000	1.0000	
2	HE	103.33	299.9	36.27	18.67	84.60	216.31	74.0 °F	169.0 °F	1.0000	1.0000	
2	CE	230.90	301.1	84.59	42.19	85.76	220.84	74.0 °F	169.0 °F	1.0000	1.0000	
3	HE	105.18	300.2	76.79	50.81	216.31	372.66	112.0 °F	170.0 °F	1.0000	1.0000	
3	CE	93.84	301.0	76.11	48.31	217.38	374.80	112.0 °F	170.0 °F	1.0000	1.0000	
4	HE	110.93	299.6	78.34	51.69	218.45	373.73	112.0 °F	171.0 °F	1.0000	1.0000	
4	CE	97.00	299.9	75.40	50.08	216.55	373.07	112.0 °F	171.0 °F	1.0000	1.0000	
Pb (psia)= 14.7					R factor= 459.7					(Z) std= 1.000		
Total IHP =		1065.53 @ 300.4		= Average RPM		Mechanical Efficiency = 0.95			Compressor BHP = 1121.61			
Total BHP Load =		Compressor BHP		1121.61		+ Accessory BHP			20.00 = 1141.61			
Mfg. rated BHP =		1100.00 @		300.0 RPM (Manufacture's rated speed)					Curve BHP = 1140			
Derated BHP =		1101.33 @		300.4 RPM (average test operating speed)					Load Step = 6			
Test Torque Load =		103.66%								%Difference = 1.61 %		

Cylinder Capacity (Volume)							
Suction Conditions							
Cyl. No.	immcfid	Cyl. No.	immcfid	Cyl. No.	immcfid	Cyl. No.	immcfid
1 HE	3.741	2 HE	2.126	3 HE	3.653	4 HE	3.754
1 CE	3.558	2 CE	4.894	3 CE	3.376	4 CE	3.320
Total=	7.299	Total=	7.020	Total=	7.029	Total=	7.074
Total Capacity = 14.211 immcfid						BHP/immcfid= 80.334	

Discharge Conditions							
Cyl. No.	immcfid	Cyl. No.	immcfid	Cyl. No.	immcfid	Cyl. No.	immcfid
1 HE	3.489	2 HE	2.161	3 HE	3.679	4 HE	3.741
1 CE	3.547	2 CE	4.859	3 CE	3.265	4 CE	3.352
Total=	7.036	Total=	7.019	Total=	6.944	Total=	7.092
Total Capacity = 14.046 immcfid						BHP/immcfid= 81.276	

Cylinder Flow Balance (Qs/Qd)							
Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd
1 HE	1.072	2 HE	0.984	3 HE	0.993	4 HE	1.004
1 CE	1.003	2 CE	1.007	3 CE	1.034	4 CE	0.990
Total Capacity Qs/Qd= 1.012							



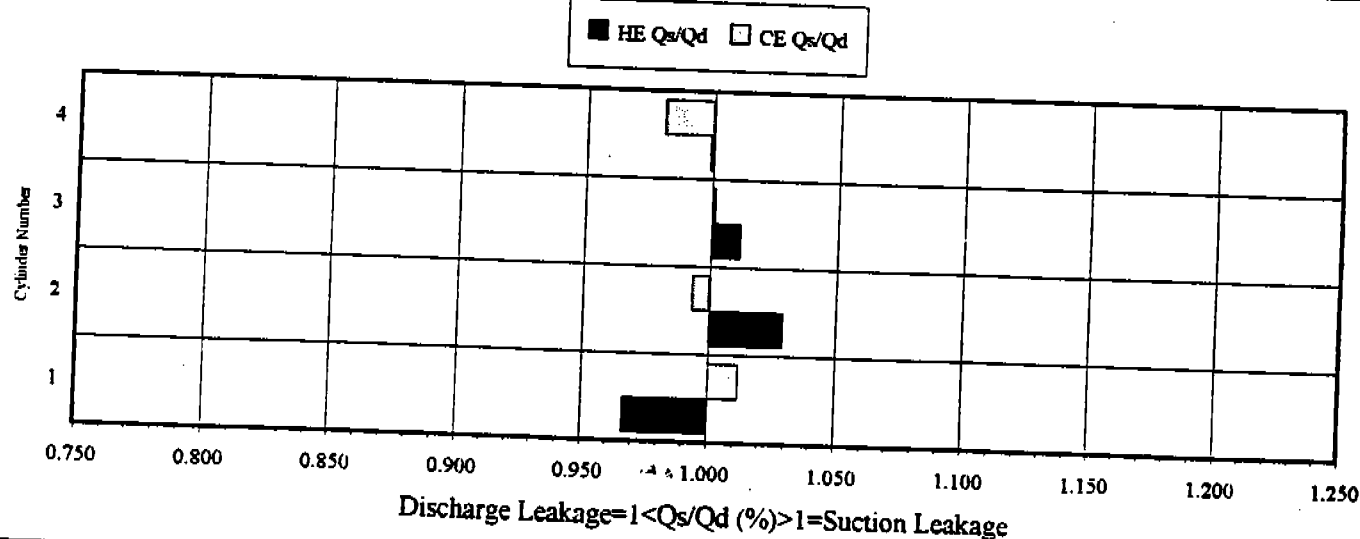
Compressor Cylinder Performance Report

Station: XXXXXXXXXX						Unit No.: #2				Date: 6/19/94	
Mfg./Type: Cooper Bessmer GMV-10TF						Test Type: Toxic Emission Testing Run #3 ; 103 % Load; 6:00 pm.					
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions
1	HE	163.23	299.4	58.09	30.57	85.72	218.58	74.0 °F	171.0 °F	1.0000	1.0000
1	CE	159.32	299.8	61.22	32.21	88.88	215.24	74.0 °F	171.0 °F	1.0000	1.0000
2	HE	103.87	300.1	38.78	19.40	86.74	217.38	74.0 °F	169.0 °F	1.0000	1.0000
2	CE	229.79	300.1	84.59	43.06	86.84	221.91	74.0 °F	169.0 °F	1.0000	1.0000
3	HE	103.90	299.5	76.79	49.92	215.36	370.72	110.0 °F	168.0 °F	1.0000	1.0000
3	CE	92.85	300.6	75.40	49.19	213.22	369.65	110.0 °F	168.0 °F	1.0000	1.0000
4	HE	110.35	299.7	78.34	52.57	219.53	371.59	110.0 °F	170.0 °F	1.0000	1.0000
4	CE	96.14	300.1	75.40	50.97	216.43	370.72	110.0 °F	170.0 °F	1.0000	1.0000
Pb (psia)= 14.7		R factor= 459.7								(Z) std= 1.000	
Total IHP =		1059.47 @ 299.9 = Average RPM				Mechanical Efficiency = 0.95		Compressor BHP = 1115.23			
Total BHP Load =		Compressor BHP 1115.23 + Accessory BHP 20.00 = 1135.23									
Mfg. rated BHP =		1100.00 @ 300.0 RPM (Manufacture's rated speed)						Curve BHP = 1133			
Derated BHP =		1099.71 @ 299.9 RPM (average test operating speed)						Load Step = 6			
Test Torque Load =		103.23%						%Difference = 1.57 %			

Cylinder Capacity (Volume)							
Suction Conditions							
Cyl. No.	immcf	Cyl. No.	immcf	Cyl. No.	immcf	Cyl. No.	immcf
1 HE	3.437	2 HE	2.323	3 HE	3.642	4 HE	3.786
1 CE	3.636	2 CE	4.931	3 CE	3.291	4 CE	3.332
Total=	7.073	Total=	7.254	Total=	6.934	Total=	7.117
						Total Capacity =	14.189 immcf
						BHP/immcf=	80.007

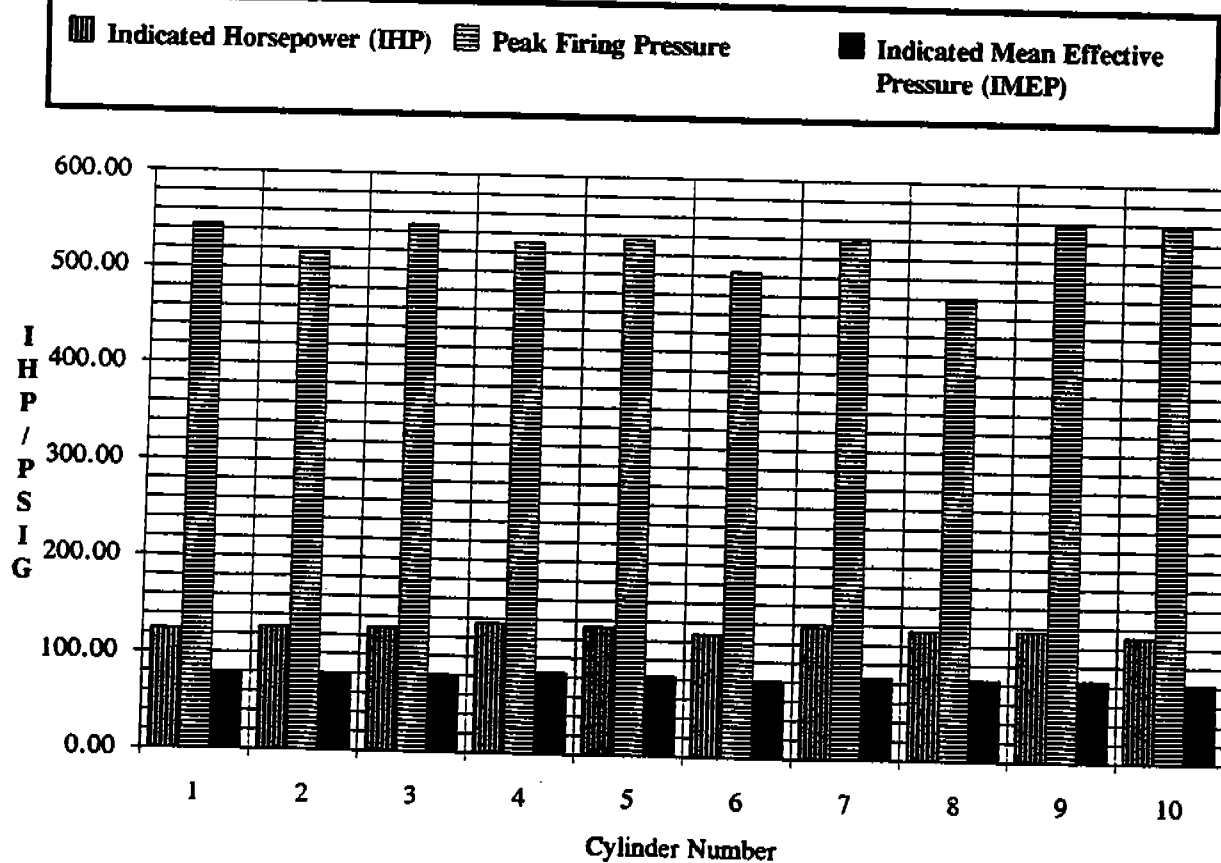
Discharge Conditions							
Cyl. No.	immcf	Cyl. No.	immcf	Cyl. No.	immcf	Cyl. No.	immcf
1 HE	3.556	2 HE	2.257	3 HE	3.600	4 HE	3.791
1 CE	3.594	2 CE	4.965	3 CE	3.287	4 CE	3.398
Total=	7.149	Total=	7.222	Total=	6.888	Total=	7.189
						Total Capacity =	14.224 immcf
						BHP/immcf=	79.812

Cylinder Flow Balance (Qs/Qd)							
Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd
1 HE	0.967	2 HE	1.029	3 HE	1.012	4 HE	0.999
1 CE	1.012	2 CE	0.993	3 CE	1.001	4 CE	0.981
						Total Capacity Qs/Qd=	0.998



Power Cylinder Performance Report

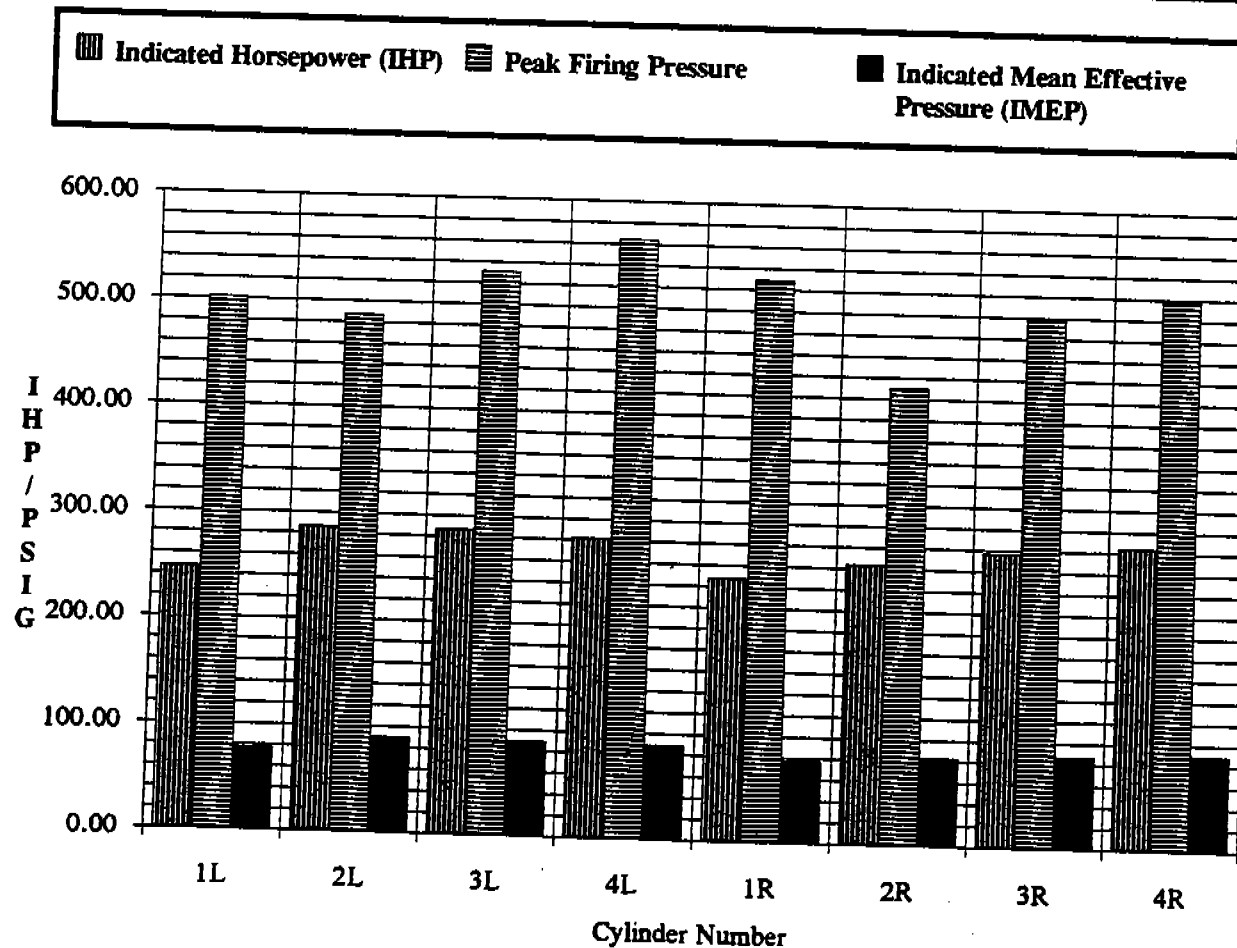
Station: Cooper Bessemer GMV-10TF					Unit No.: #2		Date: 6/19/94	
Mfg: Cooper Bessemer GMV-10TF				Type: GMV-10TF			Rated BHP: 1100	
Cyl. No.	I H P	R P M	Compression Pressure (psig)	Pressure @ TDC (psig)	Peak Firing Pressure (psig)	Peak Pressure Angle (° Atdc)	Terminal Pressure (psig)	Exhaust Temperature (°F)
1	124.59	290.5	240.81	284.69	544.77	14° atdc	46.02	686 °F
2	127.33	290.7	247.10	280.26	516.65	17° atdc	47.07	760 °F
3	128.29	291.1	250.30	305.93	547.68	15° atdc	48.14	711 °F
4	135.02	290.6	247.23	290.04	530.85	17° atdc	46.02	717 °F
5	133.17	290.8	237.60	281.48	535.13	16° atdc	48.16	695 °F
6	128.13	290.9	236.40	269.56	504.89	18° atdc	41.72	750 °F
7	137.18	290.6	241.61	282.24	540.96	17° atdc	48.11	693 °F
8	135.05	290.7	244.02	280.41	480.55	20° atdc	49.23	747 °F
9	135.86	290.4	240.55	288.65	558.07	16° atdc	49.18	725 °F
10	131.26	291.1	234.39	277.20	558.68	16° atdc	44.95	745 °F
Ignition Type: Altronic 2				Timing: 11 Btdc			Primary: 345 Volts	



		Power Cylinder Summary					
Horsepower		Peak Firing Pressure (psig)			Compression / Tdc / Terminal Pressure		
IHP (Total) =	1315.87	Maximum	Average	Minimum	Maximum	Average	Minimum
IHP (Average) =	131.59	558.68	531.82	480.55	250.30	242.00	234.39
IHP (Maximum) =	137.18	Peak Firing Pressure Angle			305.93	284.05	269.56
IHP (Minimum) =	124.59	20°atdc	16.6°atdc	14°atdc	49.23	46.86	41.72

Power Cylinder Performance Report

Station: Compressor Station				Unit No.: #4			Date: 6/19/94	
Mfg: Cooper Bessemer				Type: GMWA-8			Rated BHP: 2000	
Cyl. No.	I H P	R P M	Compression Pressure (psig)	Pressure @ TDC (psig)	Peak Firing Pressure (psig)	Peak Pressure Angle (° Atdc)	Terminal Pressure (psig)	Exhaust Temperature (°F)
1L	247.24	247.3	228.09	250.58	501.16	16° atdc	41.76	640 °F
2L	286.31	248.0	224.88	246.30	487.24	19° atdc	46.05	592 °F
3L	287.00	249.3	228.09	252.72	531.15	16° atdc	44.98	666 °F
4L	282.40	248.1	246.16	290.04	564.03	15° atdc	49.23	628 °F
1R	248.23	248.5	229.16	259.15	529.00	12° atdc	43.91	652 °F
2R	263.71	246.6	209.89	229.16	430.48	23° atdc	43.91	617 °F
3R	277.21	248.4	227.02	249.51	500.09	19° atdc	42.83	680 °F
4R	284.77	248.2	240.00	263.58	519.65	15° atdc	48.22	627 °F
Ignition Type: Bendix SS				Timing: 8 Btdc			Primary: 370 Volts	



Horsepower		Power Cylinder Summary			Compression / Tdc / Terminal Pressure		
		Peak Firing Pressure (psig)					
IHP (Total) =		Maximum	Average	Minimum	Maximum	Average	Minimum
IHP (Average) =		564.03	507.85	430.48	246.16	229.16	209.89
IHP (Maximum) =		Peak Firing Pressure Angle			290.04	255.13	229.16
IHP (Minimum) =		23° atdc	16.9° atdc	12° atdc	49.23	45.11	41.76

Compressor Cylinder Performance Report

Station: ██████████						Unit No.: #2				Date: 6/20/94	
Mfg./Type: Cooper Bessemer GMV-10TF						Test Type: Toxic Emission Testing, Run #4 : 103% Load, 11:00 am.					
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions
1	HE	162.74	300.6	58.09	29.73	84.64	219.65	73.0 °F	170.0 °F	1.0000	1.0000
1	CE	157.43	300.1	60.37	30.63	86.74	216.31	73.0 °F	170.0 °F	1.0000	1.0000
2	HE	102.22	299.6	37.94	18.67	85.72	217.50	73.0 °F	168.0 °F	1.0000	1.0000
2	CE	230.13	300.8	84.00	43.06	84.64	219.65	73.0 °F	168.0 °F	1.0000	1.0000
3	HE	104.39	300.1	76.00	45.47	212.03	371.59	111.0 °F	169.0 °F	1.0000	1.0000
3	CE	92.78	299.9	76.11	48.31	213.10	370.52	111.0 °F	169.0 °F	1.0000	1.0000
4	HE	110.18	300.0	77.57	51.69	217.62	373.07	111.0 °F	171.0 °F	1.0000	1.0000
4	CE	96.57	300.4	75.40	49.19	216.43	372.86	111.0 °F	171.0 °F	1.0000	1.0000
Pb (psia)= 14.7						R factor= 459.7				(Z) std= 1.000	
Total IHP =		1056.45 @ 300.2		= Average RPM		Mechanical Efficiency = 0.95		Compressor BHP =		1112.05	
Total BHP Load =		Compressor BHP 1112.05		+ Accessory BHP 20.00				=		1132.05	
Mfg. rated BHP =		1100.00 @ 300.0		RPM (Manufacture's rated speed)				Curve BHP =		1139	
Derated BHP =		1100.68 @ 300.2		RPM (average test operating speed)				Load Step =		6	
Test Torque Load =		102.85%						%Difference =		2.37 %	
Cylinder Capacity (Volume)											
Suction Conditions											
Cyl. No.	inmcf	Cyl. No.	inmcf	Cyl. No.	inmcf	Cyl. No.	inmcf	Total Capacity = 13.954 inmcf			
1 HE	3.420	2 HE	2.250	3 HE	3.553	4 HE	3.715				
1 CE	3.523	2 CE	4.810	3 CE	3.307	4 CE	3.330	BHP/inmcf= 81.129			
Total=	6.942	Total=	7.060	Total=	6.860	Total=	7.045				
Discharge Conditions											
Cyl. No.	inmcf	Cyl. No.	inmcf	Cyl. No.	inmcf	Cyl. No.	inmcf	Total Capacity = 13.795 inmcf			
1 HE	3.493	2 HE	2.173	3 HE	3.288	4 HE	3.739				
1 CE	3.443	2 CE	4.936	3 CE	3.222	4 CE	3.296	BHP/inmcf= 82.063			
Total=	6.935	Total=	7.109	Total=	6.510	Total=	7.036				
Cylinder Flow Balance (Qs/Qd)											
Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Total Capacity Qs/Qd= 1.012			
1 HE	0.979	2 HE	1.036	3 HE	1.081	4 HE	0.994				
1 CE	1.023	2 CE	0.974	3 CE	1.026	4 CE	1.010				

HE Qs/Qd
 CE Qs/Qd

Discharge Leakage = 1 < Qs/Qd (%) > 1 = Suction Leakage

Compressor Cylinder Performance Report

Station: XXXXXXXXXX						Unit No.: #2				Date: 6/20/94	
Mfg./Type: Cooper Bessemer GMV-10TF						Test Type: Toxic Emission Testing, Run #5; 98% Load; 5:00 pm.					
Cyl. No.	HE/CE	IHP	RPM	Suction AEV (%)	Discharge AEV (%)	Suction Terminal Pressure (psig)	Discharge Terminal Pressure (psig)	Suction Temp. (°F)	Discharge Temp. (°F)	(Z) Suction Conditions	(Z) Discharge Conditions
1	HE	171.33	299.9	63.39	34.00	85.72	206.79	77.0 °F	167.0 °F	1.0000	1.0000
1	CE	160.29	299.0	64.55	33.01	87.81	210.96	77.0 °F	167.0 °F	1.0000	1.0000
2	HE	114.22	299.4	43.06	24.00	85.72	203.57	77.0 °F	168.0 °F	1.0000	1.0000
2	CE	164.52	299.7	62.06	33.01	86.79	213.22	77.0 °F	168.0 °F	1.0000	1.0000
3	HE	104.18	299.6	76.00	49.92	212.26	368.78	110.0 °F	169.0 °F	1.0000	1.0000
3	CE	92.53	300.3	74.67	47.43	210.00	370.72	110.0 °F	169.0 °F	1.0000	1.0000
4	HE	110.33	300.9	76.79	50.81	208.93	367.51	110.0 °F	171.0 °F	1.0000	1.0000
4	CE	96.24	300.2	75.40	49.19	212.26	369.85	110.0 °F	171.0 °F	1.0000	1.0000

Pb (psia)= 14.7

R factor= 459.7

(Z) std= 1.000

Total IHP = 1013.64 @ 299.9 = Average RPM

Mechanical Efficiency = 0.95

Compressor BHP = 1066.99

Total BHP Load = Compressor BHP 1066.99 +

Accessory BHP 20.00 =

1086.99

Mfg. rated BHP = 1100.00 @ 300.0 RPM (Manufacture's rated speed)

Curve BHP = 1150

Derated BHP = 1099.50 @ 299.9 RPM (average test operating speed)

Load Step = 7

Test Torque Load = 98.86%

%Difference = 7.22 %

Cylinder Capacity (Volume)

Suction Conditions							
Cyl. No.	inmcf/d	Cyl. No.	inmcf/d	Cyl. No.	inmcf/d	Cyl. No.	inmcf/d
1 HE	3.735	2 HE	2.532	3 HE	3.557	4 HE	3.556
1 CE	3.764	2 CE	3.591	3 CE	3.211	4 CE	3.273
Total=	7.500	Total=	6.123	Total=	6.767	Total=	6.829
Total Capacity =						13.609 inmcf/d	
BHP/inmcf/d=						79.871	

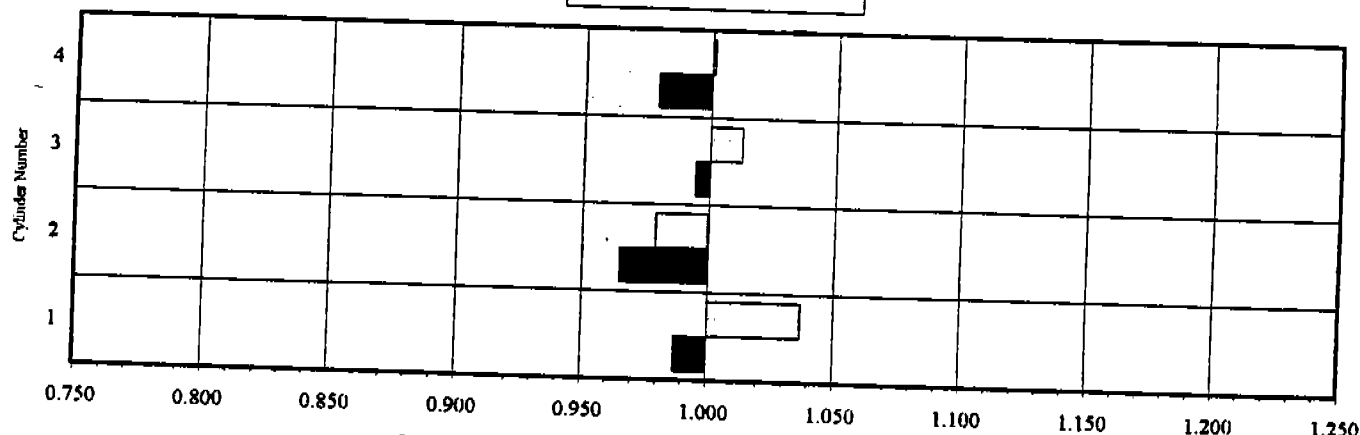
Discharge Conditions

Cyl. No.	inmcf/d	Cyl. No.	inmcf/d	Cyl. No.	inmcf/d	Cyl. No.	inmcf/d
1 HE	3.784	2 HE	2.624	3 HE	3.577	4 HE	3.633
1 CE	3.629	2 CE	3.667	3 CE	3.170	4 CE	3.268
Total=	7.413	Total=	6.291	Total=	6.746	Total=	6.901
Total Capacity =						13.675 inmcf/d	
BHP/inmcf/d=						79.484	

Cylinder Flow Balance (Qs/Qd)

Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd	Cyl. No.	Qs/Qd
1 HE	0.987	2 HE	0.965	3 HE	0.994	4 HE	0.979
1 CE	1.037	2 CE	0.979	3 CE	1.013	4 CE	1.001
Total Capacity Qs/Qd=						0.995	

■ HE Qs/Qd □ CE Qs/Qd



Discharge Leakage = 1 - Qs/Qd (%) = Suction Leakage

F.3 Campaign 4

Date: 8/23/77

Name of Data Recorder: J. J. J.

Time	11:35	12:10	12:33	13:03	13:43	14:18	14:50
Engine Horsepower	696	693	684	688	687	685	680
Engine Speed (rpm)	809	809	808	810	810	810	810
Engine Torque (%)							
Ignition Timing (degrees)							
FUEL MANIFOLD							
Fuel Flow Rate (scfm) Uncorrected	20064 55.44	988cf 22:54.59	1000cf 40:41.65	40	40	38.39	39.5
Fuel Temperature (°F)		88.5 scfm					
Fuel Header Pressure (psig)	20.4	20.2	20.0	20.2	20.1	19.8	19.9
AIR INTAKE MANIFOLD							
Air Flow Rate (scfm)							
Air Manifold Temperature (°F)	20						
Air Manifold Pressure (in Hg or psig)	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0
EXHAUST MANIFOLD							
Temperature (°F) - 1000+ - 1000+ - 1000+	1000+	1000+	1000+	1000+	990	995	995
Pressure (in Hg)							
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1							
Cylinder # 2							
Cylinder # 3							
Cylinder # 4							
Cylinder # 5							
Cylinder # 6							
Cylinder # 7							
Cylinder # 8							
Cylinder # 9							
Cylinder # 10							
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfd) day	5.7	5.6	5.4	6.0	N/A	6.3	6.25
Compressor Section Pressure (psig)	79.8	80.0	79.6	79.8	80.2	79.8	79.9
Compressor Section Temperature (°F)	95	97	95	98	100	102	101
Compressor Discharge Pressure (psig)	430	420	425	422	420	418	410
Compressor Discharge Temperature (°F)	220	220	220	225	220	220	220
Fuel Flow Corrected	69580				69695	69726	69753
Fuel Flow Uncorrected	25454				22.5		
Barometric	29.554			29.53			29.50
Ambient Temp	84.5			86.3			86.8
Note: 15:05 - Section Pressure dropped 20 psig engine unloaded.							

Date: 8/25/94
Name of Data Recorder: _____

[illegible]

wooper After: 60' cast.
Restart

DATE: 8/26/94
NAME OF DATA RECORDER: W. O. Ogle

[illegible]

Date: 08/29/84

Name of Data Recorder: S/LT/CL

↓ ALL OTHER UNITS DOWN
↑ #9 ON RECYCLE

Time	8:30A	9:15A	10:00A	10:45A	11:30A	12:45P	1:30P
Engine Horsepower	1844	1840	1796	1811	1817	1804	1815
Engine Speed (rpm)	332	332	331	332	329	332	331
Engine Torque (%) RATED 2000/330	92%	92%	90%	91%	91%	90%	91%
Ignition Timing (degrees)	12B	12B	12B	12B	11B	12B	12B
FUEL MANIFOLD							
Fuel Flow Rate (acfm) cumulative	271.81	272.86	271.52	270.02	269.66	269.27	268.82
Fuel Temperature (°F)							
Fuel Header Pressure (psig)	16.2	16.2	16.0	16.0	16.2	16.1	16.0
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	127	132	137	131	142	144	148
Air Manifold Pressure (psig or psia)	2.64	2.64	2.59	2.58	2.61	2.57	2.59
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1	865	871	862	862	861	873	872
Cylinder # 2	912	920	908	910	916	912	914
Cylinder # 3 T/C HG	X	X	X	X	X	X	X
Cylinder # 4 T/C NG	X	X	X	X	X	X	X
Cylinder # 5	927	936	923	924	931	933	930
Cylinder # 6 T/C ?	915	925	917	916	920	925	921
Cylinder # 7	854	865	832	859	865	867	870
Cylinder # 8	863	870	864	866	870	874	873
Cylinder # 9	884	890	887	889	893	897	895
Cylinder # 10	900	908	903	902	908	909	911
Cylinder # 11	850	859	845	852	855	859	859
Cylinder # 12	911	916	908	895	901	902	903
Compressor Capacity (MMScfh)	16.3/19.5	16.6/19.4	17.5/19.3	17.4/19.1	17.4/18.9	17.2/19.1	17.0/18.8
Compressor Section Pressure (psig)	400	405	450	430	430	427	440
Compressor Section Temperature (°F)	97	100	102	104	106	111	113
Compressor Discharge Pressure (psig)	2075	2075	2050	2050	2050	2050	2040
Compressor Discharge Temperature (°F)	222	223	225	227	230	234	242
FUEL METER END	1243.0	1286.0	1329.6	1373.9	1418.7	1496.0	1535.4
START	1225.3						
P	26.49	26.31	26.46	26.26	26.22	26.45	26.29
T	77.39	77.75	79.01	81.72	86.33	89.74	93.67
ET (0.11580)	18'03.42"	1-01'40.46"	1-46'12.66"	2-31'37.60"	3-17'07.20"	4-35'17.24"	5-15'01.7"
TOTAL FUEL	271.81	272.94	269.84	266.28	267.51	266.70	265.62
FUEL METER	29.47	29.47	29.47	29.47	29.46	29.43	29.41
FUEL	71.29	71.29	71.29	71.29	71.29	71.29	71.29
FUEL AVG HP	1844	1842	1827	1823	1822	1819	1818

ENGINE OPERATING DATA

Engine Model/Number: KU5-0.1
Date: 08-30-94
Name of Data Recorder: WCB

	0830	0846	0855	0915	0930	0945	1000
Engine Horsepower	1840	1840	1710	1650/165		1695	1657
Engine Speed (rpm)	327	327	330	330	329	329	325
Engine Torque (%) 1850 @ 330	336	99	92	91.6		91%	91%
Ignition Timing (degrees)	8°	8°	8°	8°	8°	8°	5°
FUEL MANIFOLD Fuel Flow Rate (scfm)		269.71	265.73		265.54	264.05	275.40
Fuel Temperature (°F)	75.74	75.93	76.29	76.29	77.40	78.10	78.64
Fuel Header Pressure (psig)	22.72	22.98	23.67	23.91	23.92	23.87	22.97
AIR INTAKE MANIFOLD Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	103	107	107	107	107	107	109
Air Manifold Pressure (in Hg or psig)	7.5	7.5	7.0	6.95	6.9	6.9	6.4
EXHAUST MANIFOLD Temperature (°F)							
Pressure (in Hg)							
Avenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1	830.6	833	830	831	831	831	835
Cylinder # 2	836	834	872	871	877	874	914
Cylinder # 3	826	872	830	880	831	882	901
Cylinder # 4	828	828	753	735	735	731	700
Cylinder # 5	785	780	735	732	736+16	735	723
Cylinder # 6 - 7600-1200 F.P.F.	626	626	619	617	616 S.C.B.	618	629
Cylinder # 7	807	806	804	805	806 S.T.	806	832
Cylinder # 8	849	851	851	852	851 S.S.	852	881
Cylinder # 9	828	822	832	836	839	833	856
Cylinder # 10	897	909	911	910	909	911	935
Cylinder # 11	845	851	847	846	849	848	874
Cylinder # 12	834	815	804	810	808	807	824
Compressor Capacity (M.Mscf/hr) ~ 5000	17.5/20.1	17.5/20.1	17.5/16.9	17.1/16.7		16.1/16.5	16.4/15.6
Compressor Suction Pressure (psig)	430	430	425	420/420		420/420	410/410
Compressor Suction Temperature (°F)	45/45	45/45	42/45	44/46		44/47	46/40
Compressor Discharge Pressure (psig)	2100	2100	2100	2100		2100	2075
Compressor Discharge Temperature (°F)	205/207	205/217	204/222	206/224		206/224	213/228
Pocket Unloader Setting							
Turbo A Ex	768	767	763	770	771	770	796
Turbo B Ex	771	766	754	752	753	753	763
Fuel Start x 100	76548	76507	76583	76596	76612	76627	
End x 100	76560	76574	76590	76603	76622	76633	76654
E Time	11' 08" 22	6:37:39	6:50:50	Last	9:49:46	5:54:75	8:18:41
	1 pkt unload		3 PKT	3 PKT			
							76665
							76655
							9:13:02

Time	12:15	12:30	12:45	12:58	13:00	13:17	
Engine Horsepower	1774		1761		1612		
Engine Speed (rpm)	335	333	333		334	333	333
Engine Torque (°)	96		95		87%		
Ignition Timing (degrees)	30	110	110		110	110	110
FUEL MANIFOLD Fuel Flow Rate (scfm)	275.41	266.46	253.09	260.58	242.64	248.83	245.96
Fuel Temperature (°F)	85.76	85.76	86.96	86.96	86.96	88.17	88.17
Fuel Header Pressure (psig)	22.89	24.54	24.01	25.10	25.19	25.66	25.18
AIR INTAKE MANIFOLD Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	112	111	111		110	110	111
Air Manifold Pressure (in Hg or psig)	7.2	6.2	6.2		5.8	5.7	5.6
EXHAUST MANIFOLD Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1	850	839	827		825	825	826
Cylinder # 2	809	898	886		823	823	879
Cylinder # 3	898	886	869		874	877	880
Cylinder # 4	815	832	822		734	721	725
Cylinder # 5	804	810	807		749	744	751
Cylinder # 6	637	632	618		610	608	609
Cylinder # 7	823	804	802		797	795	798
Cylinder # 8	873	845	841		840	841	842
Cylinder # 9	836	823	826		822	821	826
Cylinder # 10	427	892	895		903	902	903
Cylinder # 11	805	835	839		839	836	839
Cylinder # 12	851	836	834		809	808	811
Compressor Capacity (MMscfh)	15.5/7.5		15.5/17.1		14.6/14.4		14.5/14.4
Compressor Suction Pressure (psig)	396/860		390/860		386/860		
Compressor Suction Temperature (°F)	97/95		99/99		100/101		99/101
Compressor Discharge Pressure (psig)	2075		2075		2075		
Compressor Discharge Temperature (°F)	213/239		217/240		221/251		221/251
Pocket Unloader Setting	0	0	0		1		1
start	1:11:27	1:23:15	1:32:04	1:43:14	1:59:19	1:59:58	2:16:05
Start Fuel X100	76788	76801	76810	76821	76827	76837	76852
End Fuel X100	76801	76810	76821	76827	76837	76852	76863
stop	1:23:15	1:32:04	1:43:14	1:49:19	1:59:58	2:16:05	2:27:57
Turb A	784	766	763		761	760	762
Turb B	793	773	770		750	747	748

Engine Model/Number: Cummins #4
 Date: 08-30-94
 Name of Data Recorder: WJC

Time	1605	1620	1626	1645	1710	1730	1745
Engine Power	1705						
Engine Speed (rpm)	299		299	299	1419	1424	
Engine Torque (%)	95%				299	299	300
Ignition Timing (degrees)	50		50	50	79%	79	
FUEL MANIFOLD					40	50	
Fuel Flow Rate (scfm)							
Fuel Temperature (°F)	92.67		92.24	92.33	93.61	96.71	97.63
Fuel Header Pressure (psig)	61.69		61.42	61.66	61.58	61.60	61.62
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	108		106	99	95	96	97
Air Manifold Pressure (in Hg or psig)	10 psig		8 psig	7.4	7.2	7.0	9.0
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1			587	568	563	563	565
Cylinder # 2			594	591	583	586	587
Cylinder # 3			604	603	597	598	601
Cylinder # 4			561	560	551	551	553
Cylinder # 5			570	570	564	567	566
Cylinder # 6			534	533	525	524	525
Cylinder # 7			545	541	534	534	535
Cylinder # 8			563	558	548	550	551
Cylinder # 9			546	541	534	535	538
Cylinder # 10			579	574	572	577	574
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)	15.7/15.1						
Compressor Suction Pressure (psig)	250/900				136/15.2	13.8/13.9	
Compressor Suction Temperature (°F)	97/91				360/820	370/810	
Compressor Discharge Pressure (psig)	2100				91/89	89/92	
Compressor Discharge Temperature (°F)	223/220				2025	2050	
Pocket Unloader Setting	0				221/209	219/207	
Crank Press ("Hg)	10.5		0.45	0.45	0.5	0.55	0.45
start	0					1:04:41	
Int. Fuel x100	26783		13:42	23:24	38:38	1:20:41	1:20:41
Final Fuel x100	26789		26789	26793	26799	26809	26815
End	13:42		23:24	38:38	1:04:41	1:20:41	1:35:22
Turbo RPM			202	202	202	202	202
Pre-Turbo °F			503	504	505	505	505
Post-Turbo °F			628	629	616	617	618

Name of Data Recorder:

Time	#8 - 1A	#8 - 1C
Engine Horsepower	1852	1840
Engine Speed (rpm)	329	329
Engine Torque (%) <i>RATING 1850 @ 320</i>	100% ~~100%~~	99.5% → ~~99%~~
Ignition Timing (degrees)	8B	8B
FUEL MANIFOLD		
Fuel Flow Rate (scfm)		276.17
Fuel Temperature (°F)		
Fuel Header Pressure (psig)		
AIR INTAKE MANIFOLD		
Air Flow Rate (acfm)		
Air Manifold Temperature (°F)		
Air Manifold Pressure (in Hg or psig)		
EXHAUST MANIFOLD		
Temperature (°F)		
Pressure (in Hg)		
Scavenger Air Pressure (psig)		
CYLINDER TEMPERATURES		
Cylinder # 1		
Cylinder # 2		
Cylinder # 3		
Cylinder # 4		
Cylinder # 5		
Cylinder # 6		
Cylinder # 7		
Cylinder # 8		
Cylinder # 9		
Cylinder # 10		
Cylinder # 11		
Cylinder # 12		
Compressor Capacity (MMscfh) <i>(57/2 sec.)</i>	17.8/19.9	17.5/20.1
Compressor Suction Pressure (psig)	~~430~~	430
Compressor Suction Temperature (°F)	94	93
Compressor Discharge Pressure (psig)	2100	2100
Compressor Discharge Temperature (°F)	217	217
FUEL HTR END		
SHEET	6493.4	6513.4 6532.3
ET		18' 31.75" 36' 02.2"
Pgas	22.99	23.06 22.97
Tgas	74.84	75.02 75.24
Incompressible Fuel		
Barometric P	29.41	29.42
Ambient T	71.52	72.22

Instruction Supplement

Form 11 (Rev. 10/80) Max Transmittal: memo 7671 # of pages: 1	
Cn <i>Philip Mearings</i>	Co <i>James J. Hunt</i>
Dept.	Phone #
Fax #	Fax #

SPECIAL DATA

The following data differs from that given in the standard KVS Instruction Manual and is valid only for the PCC equipped KVS units listed on the front of this form:

I. KVS Engine Specifications

Power Valve Timing:¹

Inlet Valve Opens	50.1° BTDC
Inlet Valve Closes	168.0° ATDC
Exhaust Valve Opens	163.4° ATDC
Exhaust Valve Closes	8.1° ATDC

Fuel Valve Timing:²

Fuel Injection Valve Opens	52.5° ATDC
Injection Begins	64.8° ATDC
Injection Ends	138.7° ATDC
Fuel Injection Valve Closes	139.0° ATDC

II. Manifold Temperatures and Pressures

Power Cylinder Exhaust Temperature; (Full Load & Speed)

Operating (PCC)	700-750°F (371-399°C)
Maximum (PCC)	850°F (454°C)

Fuel Gas Manifold (Full Load & Speed)

PCC Units	18.0 - 20.0 PSIG (124-138 kPa) ³

Air Inlet Manifold (Full Load & Speed)

PCC Units	9.5 PSIG (66.5 kPa) @ 0-1500 ft (4572 m) altitude

Turbocharger Exhaust Gas Outlet Temperature;

(Full Load & Speed) PCC Units	800-700°F (316-371° C)

III. Fuel Gas System

PCC Regulated Supply ³	3 PSIG (20.7 kPa) above air manifold pressure

IV. Lubrication System

Lubricating Oil Pressures;

Napier	35-50 PSIG (241-345 kPa)

V. Other Engine Data

Maximum Operating Speed	330 RPM

Spark Plugs;

Gap Setting (PCC plugs)	0.013-0.016 inch (0.33-0.41 mm)

Tightening Torque (PCC plugs)	50-80 ft.lbs. (68-81 N·m) for dry threads

	40-50 ft.lbs. (54-68 N·m) for lubricated threads

Ignition Timing: (Initial Setting).	12° BTDC

VI. Engine and Running Gear Bolting (Bolt Torques)

Precombustion Chamber Stud Nuts	150 in. lbs. (17 N·m) ⁴

¹ As measured at the pushrod end of the rocker arm, with a 0.20 inch (5.08mm) pushrod lift.

² Based on 0.10 inch (2.54 mm) pushrod lift. Injection points differ from opening and closing points due to design of the fuel gas valve.

³ This value may change with major changes in fuel composition.

⁴ After prestressing by tightening to 200 in. lbs. (23 N·m) in stages.



Date 8/23/94

Order 4

Ambient Temp _____

Item	Found	Final
Engine RPM		808-811
Turbine RPM		
IGN Timing		22-23° BTDC
Manifold Press		7.5" HG
Manifold Temp		100
Fuel Press		
Oil Press		60#
Oil Temp IN/OUT		164/172
Oil Filter D/P		
Water Press		
Water Temp IN/OUT		150/171
Crankcase Press		
Exh Back Press		
Air Filter Pr Drop L/R		
Ignition Primary		190 volts

Total HP

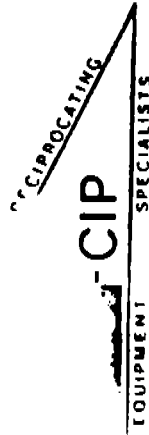
Total IHP = 6.14

$$\text{Comp BHP} = \frac{\text{Comp IHP} (61)}{\text{Conv. Factor} (1.52)} = 40.13$$

$$\text{Total BHP Load} = \text{Comp BHP (67)} + \text{Accessory BHP (35)} = 102 \text{ BHP}$$

$$\% \text{ Load} = \frac{\text{Total BHP Load (707)}}{\text{Rated BHP 940}} = 75\%$$

$$\text{Mech Eff} = \frac{\text{Total EHP Load ()}}{\text{Power Cyl IHP ()}} = \text{NA}$$



ANALYSIS FIELD REPORT

DATE 8/23/94

LOCATION Redding, CA UNIT NO. [REDACTED] MODEL 67042GU Waukesha/Booth

DEFICIENCIES NOTED	RECOMMENDED ACTION	ACTION TAKEN
I. Ignition		
1) Cyl 1R & 6R have compression leaks - the spark plug thread.	1) Repair compression leaks Priority C	
2) Power		
3) The following valves have excess clearance periods: 1R, 4R, 3L, 5L 5R, 1L, 4R, 2L, 6R, 5L	1) Check Rocker Arm Assemblies for wear & adjust for proper operation & ADJUSTMENT Priority C	
2) #3L has slight peak pressure & TD vibrations	2) Inspect rod big & pin/bushing clearances If OK check piston, ring & liner condition (compression check) Priority C	
3) #6R has slight moderate post pressure vibration	3) Inspect rod big & piston pin/bushing clearance Priority C	

[Signature]
ANALYST

RECEIVED BY

UNIT NO. [REDACTED]

ACTION TAKEN

DEFICIENCIES NOTED

RECOMMENDED ACTION

(4) Perform compression check.

If low T-spc. - Head &

rings.

Pinning C

III Compression

1) 66L vibration noted

on compressor

1) Check liner & piston assembly

for looseness

Pinning B

IV main line / support

1) 66L vibration noted

on 66L main big trace

1) Inspect #6 main big &

#6L & 66L Rod bearing clearance.

If OK Check these piston

assembly for excess vertical

clearance. Pinning C

F-55

TEST SUMMARY

Company:
Location
Date:
Atmos press:

RADIAN
8/23/94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:

L 7042 G4 WAKESHA
Altromil III
996 @ 1000

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp(DEG F):
Oil Press.(PSIG):
Oil Temp.(F in/out)
Water Press. (PSIG):
Water Temp.(F in/out)

0	1	2	3	4	5	6	7	8
8:45 AM	10:15 AM	11:39 AM	12:09 PM	12:32 PM	1:04 PM	2:20	2:50	3:25
21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL	21-23.8%OL
800	809	810	810	810	810	810	810	811
11.5" HG	7.5" HG	7.5" HG	7.5" HG	7.5" HG	7.5" HG	7.5" HG	7.5" HG	7.5" HG
	100	100	100	100	100	100	100	100
	60#	60#	60#	60#	60#	60	60	60
	164/177							
	150/171							

80-255-430

COMPRESSOR DATA

80-255-420

Load Step:
IHP 1HE
IHP 1CE

#1 HEUWL	Loaded	Loaded	Loaded	Loaded	Loaded	Loaded	Loaded	Loaded
22	179	179	178	177	178	177	177	176
123	190	189	188	188	188	188	187	186
IHP 2HE	106	129	125	124	123	122	120	119
IHP 2CE	105	120	115	114	114	111	110	107
IHP 3HE		5.7	5.6	5.4	6	6.3	6.25	6.15
IHP 3CE								
IHP 4HE								
IHP 4CE								
IHP 5HE								
IHP 5CE								
IHP 6HE								
IHP 6CE								

Total IHP:
BHP:
% Rated Load:

356	618	608	605	602	601	596	593	585
422	706	696	693	689	688	683	680	671
59%	97%	96%	95%	95%	95%	94%	94%	92%

Comments:

ME Factor .92
FA-IHP 35



TEST SUMMARY

Company:
Location
Date:
Atmos press:

RADIAN
[REDACTED]
8/25/94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:

#1
CB C-MVA
1350 BHP @ 300

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out)

1									
845 AM									
7.8 in									
296									
22.8									
24.8									
142/154									
153/160									

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

IHP 2HE
IHP 2CE

IHP 3HE
IHP 3CE

IHP 4HE
IHP 4CE

~~IHP 5HE~~ AMSCFD 1st
~~IHP 5CE~~ AMSCFD 2nd

IHP 6HE
IHP 6CE

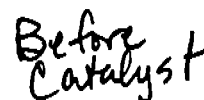
UNL CE 304									
195									
114									
206									
123									
222									
11									
226									
4									
11.2									
14.15									

Total IHP:
BHP:
% Rated Load:

1101									
1159									
87%									

Comments:

ME = .95



Company:
Location
Date:
Atmos press:

RADIAN
8/25/94
14,7

Unit ID:
Unit Type
Ignition Type:
Rating@RPM:

#4
Cooper, Benson, Gmuc 10
Aitronic CPCA II AC/E
1800 2300

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp(DEG F):
Oil Press.(PSIG):
Oil Temp.(F in/out):
Water Press. (PSIG):
Water Temp.(F in/out)

0	1	2	3	4	5
10:45 AM	5:10 PM	5:40 AM	6:10 PM	6:40 PM	7:10 PM
5-6 BTOL	5-6 BTOL	5-6 BTOL	5-6 BTOL	5-6 BTOL	5-6 BTOL
292-298	300-302	299-302L	299-301	299-301	299-301
30#	31	SAME	30	29.5	29.5
9.8#	10#	SAME	SAME	9.5	9.5
105	106	104	101	101	101
16/30	17/31	15/30	16/30	SAME	16/30
144/156	148/161	SAME	SAME	SAME	SAME
155/160	154/160	SAME	SAME	SAME	SAME

△

370-240-2050 157-240-2050 355-240-2050 740-940-2050 225-940-2050 325-940-2050

Load Step:

IHP 1HE
IHP 1CE

All Closed	All Closed	SAME	SAME	SAME	SAME
221	230	230	229	228	230
136	143	142	142	139	140
224	233	234	231	230	232
138	147	146	146	143	146
236	250	249	238	235	239
195	205	202	196	193	198
239	251	250	240	239	243
204	219	218	207	208	211
18.1	16.0	15.7	15.3	15.0	15.5
14.5	16.0	16.2	15.6	15.2	15.6

~~THREE~~ MASCFO 197
~~THREE~~ MASCFO 274

Total IHP:

	1678	1671	1627	1610	1637					
	1766	1759	1713	1701	1723					
	98%	98%	95%	95%	96%					

BHP:

% Rated Load:

Comments:

ME FACTOR = .95

For the purpose of this study, the following hypotheses were formulated:



TEST SUMMARY

Company:
Location:
Date:
Atmos press:

Radian
8/26/94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:

44
Cooper Beames CMUC 10
Altronis CPU
1800E 300

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out)

1	2A	2B	3	4	5	6	7	8
9:30 A	10:00 AM	10:55 A	11:20 A	11:50 A	12:20 P	1:05	1:35 PM	2:25 PM
5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL
299-301	299-301	299-301	298-300	299-300	299-301	299-301	299-301	299-301
31	31	31	31	31	31	30	30	30
10.2	10.2	10.2	10.5	10.3	10.3	10	10	10
100	103	103	106	28	109	110	111	111
17/31	16/30	16/30	16/29	15/29	16/29	15/29	16/29	16/29
143/155	145/158	146/156	149/160	149/161	149/163	151/163	151/163	151/164
151/161	154/161	153/160	150/162	157/162	155/160	154/159	155/161	154/16

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

All Press	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
232		232	231	230	228	227	226	224
143		143	141	142	141	138	138	137

IHP 2HE
IHP 2CE

235		234	234	232	232	229	228	225
146		147	146	146	144	143	141	141

IHP 3HE
IHP 3CE

247	248	250	246	241	239	229	228	226
213	213	213	212	207	203	197	193	193

IHP 4HE
IHP 4CE

259	259	260	260	255	251	241	242	232
228	229	228	225	221	220	210	210	205

IHP 5HE
IHP 5CE

415-940-2050	415-940-2050	420-940-2050	420-940-2050	420-940-2050	420-940-2050	420-940-2050	420-940-2050	420-940-2050

IHP 6HE 155 mm SP
IHP 6CE 220 mm SP

20.7		20.6	20.3	19.4	19.2	18.4	18.2	17.2
16.3		16.2	15.8	15.7	15.2	15.2	14.1	14.7

Total IHP:
BHP:
% Rated Load:

1703	NA	1707	1695	1674	1658	1614	1606	1563
1793	NA	1797	1784	1762	1745	1699	1690	1663
100%	NA	100%	99%	98%	97%	94%	94%	93%

Comments:

115-940-2050
Test 1A - 115-940-2050 on 5L Fuel
Test 1B - 115-940-2050 on 5L Fuel
Radiant Heat from Waste Gas
Line, so Col Insulated Fuel
Line Probe

Test 8 - 2050M 1st AC Power to emissions Trailer. Testing interrupted
while Radian tried to restructure data before power
outage



TEST SUMMARY

Company:
Location:
Date:
Atmos press:

Radiant
8/26/94
14.7

Unit ID:
Unit Type:
Rating@RPM:

#4
Cooper Bessemer G4UC 10
Altronics CPU II
1800 @ 300

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out):

9	10	11	12	13	14
3:10	4:15	4:45	5:15	5:45	6:15 PM
5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL	5' BTOL
299-301	299-301	299-301	299-301	299-301	299-301
29	28.5	28.5	28.5	28	27.5
9.4	9	9	9	9	8.8
16/30	16/30	16/30	16/31	16/31	16/30
151/163	146/157	same	145/156	145/156	same
154/161	154/160	same	153/159	153/160	same

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

IHP 2HE
IHP 2CE

IHP 3HE
IHP 3CE

IHP 4HE
IHP 4CE

IHP 5HE
IHP 5CE

IHP 6HE
IHP 6CE

All Closed	same	same	same	same	same
224	222	224	223	222	221
136	136	135	134	134	133
225	224	223	225	221	222
138	138	139	137	137	137
221	214	212	208	207	205
188	184	184	176	179	176
231	224	224	220	218	217
203	196	196	192	191	188
215/200/2050	215/200/2050	215/200/2050	215/200/2050	215/200/2050	215/200/2050
17.2	16.8	16.8	16.4	16.2	16
13.5	13.4	13.3	13.2	12.9	12.7

Total IHP:
BHP:
% Rated Load:

1566	1538	1537	1515	1509	1499
1648	1619	1618	1595	1584	1578
92%	90%	90%	89%	88%	88%

Comments:

Alt. Fuel = 1.95



TEST SUMMARY

Company:
Location:
Date:
Atmos press:

RADIAN
8/27/94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:
STA Rating

8
IRKUS 412 Lean Burn
Altronic II
2000 @ 330
1850 @ 330

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out)

0	1	2	3	4	5	6	7	8
7:30am	11:15am	11:45am	12:15pm	1:00pm	2:00pm	2:45pm	3:45	4:45pm
8:00L	8:00L	8:00L	8:00L	8:00L	8:00L	8:00L	8:00L	8:00L
327-332	327-333	327-333	327-333	327-333	330-334	330-334	330-334	330-334
20	19.5	19	19	19	19	19	18	17
7.5"	7"	7"	7"	7"	6.8"	6.6"	6	6"
110	110	110	111	111	114	114	114/156	120
72/55	72/55	72/55	72/55	72/55	72/55	72/55	72/55	72/55
148/154	148/154	148/154	148/154	148/154	148/154	148/154	148/160	150/151
159/170	159/170	159/170	159/170	159/170	159/170	159/170	159/170	161/171

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

HE 1/2 UNL	HE 1/2 UNL	SAME	SAME	SAME	SAME	SAME	SAME	SAME
30	30	33	35	36	39	45	44	18
363	361	361	352	357	355	341	32	316
52	49	49	54	54	53	49	45	45
352	354	348	351	347	339	331	319	309
293	291	291	295	293	288	285		280
143	145	144	145	144	142	137		133
291	292	291	291	290	288	285		277
159	157	158	160	161	155	154		151
IHP 5HE								
IHP 5CE								
100/600/2050	300/900/2050	700/1200/2050	775/1200/2050	775/1200/2050	775/1200/2050	775/1200/2050	775/1200/2050	775/1200/2050
15.2	15	15	14.7	14.2	13.7			12.4
18.3	18.4	18.3	18.1	17.1	16.4			14.8

Total IHP:
BHP:
% Rated Load:

1683	1679	1675	1680	1672	1649	1606		1529
1771	1802	1798	1803	1795	1771	1726		1644
90%	90%	90%	90%	90%	89%	86%		82%

Comments:

ME Factor = .95

- 1st test run, 1st test

% load = manufacturer's rating

Test 7: Unit shut down due to loss of turbo after cooler recirculating water pump



TEST SUMMARY

Company:
Location
Date:
Almos press:

RADIAN
8/27/94
14.7

Unit ID:

Unit Type:

Ignition Type:

Rating@RPM:

9
12 KVS 412 LB
ALTRONIC II
2000 @ 330
1850 @ 330 30 cal

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp(DEG F):
Oil Press.(PSIG):
Oil Temp.(F in/out)
Water Press. (PSIG):
Water Temp.(F in/out)

9	10								
5:30 PM	6:00 PM								
8'810C	8'810C								
326.332	328.232								
17.5	17								
6"	6								
120	117								
72/55	72/55								
151/158	150/158								
159/170	159/170								

COMPRESSOR DATA

Load Step:

IHP 1HE

IHP 1CE

IHP 2HE

IHP 2CE

IHP 3HE

IHP 3CE

IHP 4HE

IHP 4CE

IHP 5HE

IHP 5CE

IHP 6HE 1st manifold

IHP 6CE 2nd manifold

112.4	98.4								
28	23								
313	312								
416	415								
306	302								
275	278								
130	133								
279	276								
148	149								
12.4	12.1								
1.5	14.6								

Total IHP:

BHP:

% Rated Load:

1528	1518								
1643	1633								
82.9%	82.9%								

Comments:



TEST SUMMARY

Company:
Location
Date:
Almos press:

Radian
[REDACTED]
8-29-94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:

9
1R 1KVS 412
ALTRONIC CPU II
2000 @ 330 RPM

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out)
Water Press. (PSIG):
Water Temp. (F in/out)

0	1	2	3	4
8:30am	12:45PM	1:30PM	2:15PM	3:00PM
12'850C	12'850C	12'850C	12'850C	12'850C
313-317	329-331	329-331	329-331	329-331
15	16	16	16	16
2.25	2.4	2.4	2.4	2.4
130	144	147	145	145
30/55	30/55	30/55	30/55	30/55
140/151	150/160	150/160	150/160	150/160
158/168	162/175	162/175	162/175	162/175

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

30	34	37	40	35
354	365	361	356	351
4.5	49	43	44	45
334	359	352	348	343
282	286	291	291	286
146	151	150	151	148
257	271	272	273	267
142	150	152	150	150
	15.7	15.4	15.1	14.7
	18	18	17.4	17.1
340/810/2050	340/810/2050	340/810/2050	340/810/2050	340/810/2050

Total IHP:
BHP. +3.5
% Rated Load:

1590	1665	1658	1623	1625
1709	1788	1780	1743	1746
90.2%	89.2%	89.0%	87.2%	87.1%

Comments:

TEST SUMMARY

Company:
Location:
Date:
Atmos press:

RADIAN
2-29-94
147

Unit ID:
Unit Type:
Ignition-Type:
Rating@RPM:

9
1R KVS 412
ALPACON II CPU
2000 @ 330

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out)

1	2	3	4	5	6	7	8	9
9:30AM	9:15AM	10:00AM	10:45AM	11:30AM	12:50PM	1:30PM	2:15PM	3:00PM
12:00L	12:00L	12:00L	12:00L	12:00L	12:00L	12:00L	12:00L	12:00L
324-332	324-333	323-334	323-334	323-334	323-334	323-334	323-333	323-333
16	16	16	16	16	16	16	16	16
2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
127	131	132	132	133	138	140	142	142
30/55	30/55	30/55	30/55	30/55	30/55	30/55	30/55	30/55
142/156	147/160	144/156	147/162	150/163	150/163	149/162	149/162	149/162
157/170	157/170	157/160	160/172	160/172	160/172	160/172	160/172	160/172

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

1-2-4	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
36	75	62	44	43	37	44	40	35
368	365	364	361	365	360	363	360	356

IHP 2HE
IHP 2CE

58	53	56	53	53	51	50	51	50
367	374	356	364	367	365	366	364	361

IHP 3HE
IHP 3CE

200	297	288	201	292	289	287	284	285
154	155	148	151	150	150	150	149	146

IHP 4HE
IHP 4CE

291	293	270	272	272	270	271	272	269
155	154	144	151	151	150	150	150	151

IHP 5HE
IHP 5CE

163	166	17.5	17.4	17.4	17.2	17	16.8	16.4
195	194	19.3	19.2	18.9	19.1	18.8	18.7	18.9

IHP 6HE
IHP 6CE

1100/900/2075	1100/900/2075	1450/860/2050	1450/860/2050	1450/860/2050	1450/860/2050	1450/860/2050	1450/860/2050	1450/860/2050

Total IHP:
BHP:
% Rated Load:

1719	1715	1673	1687	1693	1681	1681	1671	1658
1844	1840	1796	1811	1817	1804	1805	1794	1780
92.90	92.90	90.00	91.00	91.00	90.00	90.00	90.90	89.00

Comments:

THE FACTOR = .75

HYDRAULIC PUMP, 8-1-35

TESTED BY: [Signature] DATE: 2-29-94



TEST SUMMARY

Company:
Location
Date:
Atmos press:

RADIAN
~~XXXXXXXXXX~~
8-29-94
14.7

Unit ID:
Unit Type:
Ignition Type:
Rating@RPM:

9
1R KVS 412
ALTRONIC II CPU
2000 @ 330

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press (PSIG):
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out)
Water Press. (PSIG):
Water Temp. (F in/out)

10	11								
345 PM	5:10								
12.8706	12.8701								
329-333	329-333								
16	16								
2.5	2.6								
144	140								
30/55	30/55								
149/162	149/161								
160/172	160/171								

COMPRESSOR DATA

Load Step:

IHP 1HE

IHP 1CE

IHP 2HE

IHP 2CE

IHP 3HE

IHP 3CE

IHP 4HE

IHP 4CE

IHP 5HE 1st mass. fd

IHP 5CE 2nd mass. fd

IHP 6HE

IHP 6CE Δ

34	29								
379	374								
56	57								
370	366								
288	293								
151	152								
272	275								
150	151								
16.1	16.1								
18.4	20.2								
420/170/2050	420/170/2050								

Total IHP:

BHP:

% Rated Load:

1700	707								
1824	1532								
91%	90%								

Comments:



TEST SUMMARY

Company:
Location:
Date:
Atmos press:

Radian
8-30-94
14.7

Unit ID:
Unit Type
Ignition Type:
Rating@RPM:

8
1R KUS-412 Lean Burn
ALTRONIC II
2000 @ 330 RPM
1850 @ 530 RPM

ENGINE DATA

Test Num:
Amb. Temp (DEG. F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out):

1	2	3	4	5	6	7	8	9
7:45am	8:10am	8:55am	9:15am	9:40	10:10	10:30	10:50	11:20
9' ASDC	9' ASDC	9' ASDC	9' ASDC	9' ASDC	5' ASDC	5' ASDC	5' ASDC	5' ASDC
325-329	325-329	326-331	327-331	327/331	320/327	324/330	321/327	321/327
20	20	19.5	20	19.5	19.5	19.5	20	20
7.6	7.6	7.0	7.0	7.0	7.6	7.6	9.8	7.8
127	127	117	118	118	117	119	120	120
72/55	72/55	72/55	72/55	74/56	74/56	74/56	74/56	72/55
144/152	144/152	145/154	145/154	145/154	145/154	145/154	145/154	145/154
158/170	158/170	159/171	159/171	159/171	161/172	161/172	161/172	162/172

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

1.246	5.601	1.246	5.601	5.601	5.601	5.601	5.601	5.601
32	32	32	32	32	32	32	32	32
372	369	375	367	367	358	355	345	335

IHP 2HE
IHP 2CE

63	57	58	54	54	51	54	51	51
360	362	363	362	360	353	349	333	330

IHP 3HE
IHP 3CE

295	294	295	294	292	290	289	287	281
148	147	13	13	13	12	12	137	138

IHP 4HE
IHP 4CE

244	250	251	289	289	283	285	279	279
162	162	166	165	164	164	162	154	155

IHP 5HE
IHP 5CE

178	173	17.4	17.1	16.1	16.4	16.2	14.7	15.5
19.9	20.1	16.9	16.7	16.5	15.6	16.3	16.9	17.2

IHP 6HE
IHP 6CE Panel press

430/220/2100	430/220/2100	430/220/2100	430/220/2100	430/220/2100	430/220/2100	430/220/2100	430/220/2100	430/220/2100

Total IHP:

1726	1715	1591	1577	1573	1541	1538	1610	1601

BHP:

1852	1840	1710	1695	1691	1657	1654	1730	1720

% Rated Load: Manufacturer

93.70	92.70	96.90	95.90	95.90	94.70	94.90	98.20	97.20

Comments: Load station 100%

99%	92.90	92.90	92.90	91.70	91.70	89.70	94.70	94.70

110 Factor = .95

110 Factor = 35.6

Test 3-5 with #3 CE unloaded

Test 6-7 with #3 CE unloaded + timing set at 5' ASDC

Test 8-9 with #3 CE loaded + timing set at 5' ASDC



TEST SUMMARY

Company:
Location
Date:
Almos press:

CAJAN
[REDACTED]
8/30/04
14.7

Unit ID:
Unit Type
Ignition Type:
Rating@RPM:

8
IRKUS412
ALTWIL CPU II A/C
2000E330

1850 E330 STATION 1A7.09

ENGINE DATA

Test Num:
Amb. Temp (DEG F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out):
Water Press. (PSIG):
Water Temp. (F in/out):

10	11	12	13	14
11:50 AM	12:10 PM	12:30 PM	1:00 PM	1:20 PM
8.8500	5.8500	11.8500	11.8500	11.8500
327/335	227/335	231/334	330/334	330/334
20	20	18	18	18
7.4	7.4	6.2	6.0	6.0
120	120	120	120	120
55/72	55/72	56/72	55/72	55/72
145/154	145/154	145/154	145/154	145/154
162/172	162/172	162/172	162/172	162/172

COMPRESSOR DATA

Load Step:
IHP 1HE
IHP 1CE

10	11	12	13	14
31	31	31	33	32
350	346	347	345	345
57	49	46	47	50
342	321	339	339	338
295	292	292	287	288
144	146	142	12	12
202	287	285	284	281
162	161	158	161	161
15.9	15.5	15.5	14.6	14.5
17.6	17.5	17.1	14.4	14.4

IHP 6HE
IHP 6CE GAUGE PRESS

Total IHP:
BHP:
% Rated Load:
50 cal barrel
Comments:

669	1652	1640	1499	1507
1791	1774	1761	1612	1621
8090	8990	8890	8190	8190
8090	8690	8590	8790	8790



TEST SUMMARY

Company:
Location
Date:
Atmos press:

RADIAN
[REDACTED]
8-30-94
14.7

Unit ID:
Unit Type
Ignition Type:
Rating@RPM:

4
CB GMV - 10 LB
ALTRONIC II CPU
1800 @ 300 RPM

ENGINE DATA

Test Num:
Amb. Temp (DEG F):
Clock Time (24hr.):
Ign. Timing:
AVG. RPM:
Turbo RPM:
Fuel Press (PSIG):
Fuel Temp (DEG F):
Manifold Press/Vac:
Man. Temp (DEG F):
Oil Press. (PSIG):
Oil Temp. (F in/out)
Water Press. (PSIG):
Water Temp. (F in/out)

1	2	3	4						
4:00 PM	4:55 PM	5:20 PM	5:45 PM						
5-6.8500	5-6.8500	5-6.8500	5-6.8500						
294-301	299-301	299-301	299-301						
30	24	25	28.5						
10	7.2	7.0	9						
110	101	98	98						
16/31	16/31	14/32	15/32						
147/159	147/158	147/158	147/158						
155/161	155/161	155/161	155/161						

COMPRESSOR DATA

Load Step:

IHP 1HE

IHP 1CE

IHP 2HE

IHP 2CE

IHP 3HE

IHP 3CE

IHP 4HE

IHP 4CE

IHP 5HE/5CE

IHP 5HE/5CE

IHP 5HE

IHP 5HE GAUGE PRESS

ALL closed	SEE VVV	SAME	ALL Loaded						
231	220	221	225						
143	135	136	140						
233	222	223	230						
145	139	140	145						
219	207	209	226						
196	9	9	202						
241	222	223	244						
212	194	192	215						
15.7	13.6	13.8	17.2						
15.1	13.2	13.9	16.3						
250/909/2100	260/830/2023	250/909/2100	260/830/2023						

Total IHP:

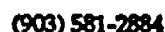
BHP:

% Rated Load:

1620	1548	1353	1627						
1705	1419	1424	1713						
95%	79%	79%	95%						

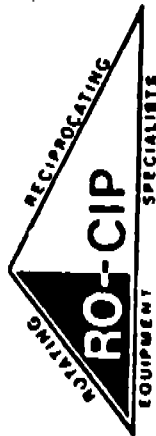
Comments:

ME FUEL = 15



Ambient Temp _____

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ANALYSIS FIELD REPORT

LOCATION Radon / [REDACTED] UNIT NO. 8 DATE 8/27/94 MODEL IRKUS 412

DEFICIENCIES NOTED	RECOMMENDED ACTION	ACTION TAKEN
<u>I. Ignition</u>		
① #10 cyl has a compression leak past the spark plug in pre-combustion cell	① Clean & Inspect Thread & seat Area & Torque plug to specs Priority B	
<u>II. Power cyl</u>		
① #10 cyl has an excessive intake leak at the head flange	① Repair Intake leak Priority C	
② Cyl 10 & 11 have compression leaks past the precomb cell check valve threads	② Repair compression leak Priority C	② Repaired 8/27/94 By Operators
③ The following valves have excess closure action: Exhaust: 2, 5 Intake: 4, 9, 12 Fuel: 7	③ Inspect rocker arm assembly for wear & lifter for proper operation & adjustment Priority C	

ANALYST [Signature]

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Rotating & Reciprocating

Equipment Specialists

3900 S. Timms Tyler, Texas 75701-8451

(903) 581-2884

ANALYSIS SUMMARY

Date 8/28/94

Company RADIAN

Location [REDACTED]

Unit # 9

Model IR KUS 412

Rated BHP 2000 at 330 RPM

Ignition Type ATRONIC CPU II

A/C

Cycle 4

Ambient Temp

Cyl	Found		Final		Pressure		Ignition	
	Temp	IHP	Temp	IHP	Peak	TDC	W	RPM
1			837	141	457	213		12.5/10
2			879	151	537	226		
3			—	156	503	225		
4			—	150	573	223		
5			906	150	489	224		
6			—	153	504	235		
7			817	153	532	244		
8			849	157	514	231		
9			872	153	511	225		
10			892	152	451	217		
11			853	154	537	230		
12			859	161	568	253		

Total IHP

1631

Item	Found	Final
Engine RPM	<u>313-317</u>	<u>329-33</u>
Turbine RPM		
IGN Timing	<u>12.5/10</u>	
Manifold Press	<u>2.25"</u>	
Manifold Temp	<u>130</u>	
Fuel Press	<u>15"</u>	
Oil Press	<u>30/55</u>	
Oil Temp IN/OUT	<u>140/151</u>	
Oil Filter D/P		
Water Press		
Water Temp IN/OUT	<u>158/168</u>	
Crankcase Press		
Exh Back Press		
Air Filter Pr Drop L/R		
Ignition Primary	<u>380m/15</u>	

Cyl No	Bore	Rod Dia	IHP	Volumetric Eff		Too S	Press D	Gas S	Temp D	Gauge S	Gauge D	Pockets	Stage	Comments
1 HE	10.5	3.5	30	—	—	395	395	98	210	390	—	unloaded	1	
CE			354	91.4	52.3	396.6	859.3			850				
2 HE	10.5		45	—	—	396	391	95	209			unloaded	1	
CE			334	91.9	49.2	370.2	847							
3 HE	5.778		282	81.7	49	868.8	1990.9	91	223	880			2	
CE			146	80.3	37.9	849.6	2077.9			2050		Loaded		
4 HE	5.778		257	81.6	46.5	871.7	2071	90	215				2	
CE			142	76.9	42.6	855.1	2045.7							
5 HE														
CE														
6 HE														
CE														
7 HE														
CE														
8 HE														
CE														

Total IHP = 1590

$$\text{Comp BHP} = \frac{\text{Comp IHP} (1590)}{\text{Conv. Factor} (1.95)} = 1074$$

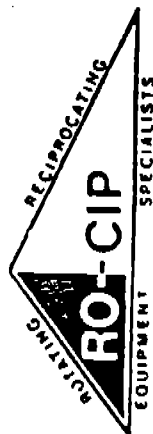
$$\text{Total BHP Load} = \text{Comp BHP} (1074) + \text{Accessory BHP} (35) = 1709 \text{ BHP}$$

$$\% \text{ Load} = \frac{\text{Total BHP Load} (1709)}{\text{Rated BHP} (1990)} = 85.9\%$$

$$\text{Mech Eff} = \frac{\text{Total BHP Load} (1709)}{\text{Power Cyl IHP} (1590)} = 107.5\%$$

F-75

[Signature]



ANALYSIS FIELD REPORT

DATE 8/28/94

MODEL ZKUS 412

UNIT NO. 9

LOCATION Radiar / [REDACTED]

DEFICIENCIES NOTED

RECOMMENDED ACTION

ACTION TAKEN

<u>I. Ignition</u>		
① #5 cyl right spark plug has high arc resistance	① Replace spark plug + inspect coil tower + wire for defects or corrosion	① Coil inspected + found to be full of water. Coil + plug replaced. 8/28/94 by S. S. S. 1
<u>II. Power cyl</u>		
① #1 & 7 cyl Kievic valves are leaking + will not close.	① Replace Kievic valves	① #7 Kievic valve replaced. 8/28/94
<u>② Cyl 4, 9 + 10 have Exhaust leaks at the head flange</u>		
<u>③ Cyl 6 + 11 have Intake leaks at the head flange</u>		
<u>④ Cyl 2, 6, 8 + 9 have fuel intake past Intention valve stem packing</u>		

ANALYST

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DEFICIENCIES NOTED	RECOMMENDED ACTION	ACTION TAKEN
⑤ The following values have excess closure action: Exhaust : - Intake : - Fuel : 2,4 day 7	⑤ Inspect lifters for proper operation & adjustment Priority C	
⑥ Cyl 1 & 6 have slight ring / liner wear & blowby	⑥ Continue to monitor with company analyzer. Inspect ring & liner condition if excess wear develops Priority A	
⑦ Cyl 2 has slight - moderate ring / liner wear & blowby	⑦ Inspect piston ring & liner condition Priority C	
III. Compressors		
① #3 cyl PE 2 has a gas leak where the valve, assembly connects to the intake manifold	① Inspect valve & unloader assembly & make necessary repairs to correct all leakage Priority C	
② #2 cyl has a gas leak at the HE clearance pointer compressor cyl / flange	② Repair gas leak Priority C	

DEFICIENCIES NOTED	RECOMMENDED ACTION	ACTION TAKEN
③ Cyl 203 have slight red pressure packing leaks	③ Repair packing leaks on unit is down for repair Priority C	
④ Cyl 4 HE suction valve was leaking	④ Inspect valves repair or replace Priority B	④ valve replaced by S. Cal 8/28/94
⑤ Cyl 1 has slight vibrations on x head. Vibrations also seen in main big traces	⑤ Inspect x head shoe & slide and x head pin & bushing clearances Priority C	
⑥ High. strg discharge valves are closing late	⑥ Verify valve design is applicable for present operating conditions	
Main frame/support		
① slight vibrations noted in "3,4 & 5 main big area (inspection over 344)	① Inspect all main big & connecting rod bearing clearances in this area Priority B	
② Excessive water pump/Accessory drive vibrations were noted	② Inspect water pump, idler, accessory & drive assemblies for excess slack or wear Priority C	
③ Unit hps low on 1 pressure	③ Make thorough inspection in crankcase for loose or missing oil seals, etc. At 11:00 AM monitor machine construction	



Rotating & Reciprocating

Equipment Specialists

3900 S. Timms Tyler, Texas 75701-8451

(903) 581-2884

ANALYSIS SUMMARY

Company RADIAN

Location [REDACTED]

Rated BHP 1800 at 300 RPM

Cycle 2

Unit # #4

Model GMVC 10

Ignition Type ALTRONIC II CPU AC

Ambient Temp 95

Date 8/25/94
10:45 AM

Cyl	Found		Final		Pressure		Ignition	
	Temp	IHP	Temp	IHP	Peak	TDC	Left	Right
1L	553	178	555	166	741	451		
2L	564	175	568	166	755	481		5-6070L
3L	597	133	591	167	724	491		
4L	565	174	563	172	779	493		
5L	585	168	587	167	737	490		
1R	588	176	585	173	824	509		
2R	620	176	630	173	748	481		
3R	610	168	615	164	717	489		
4R	583	175	589	173	800	486		
5R	592	163	595	163	732	490		
Total IHP		1686		1684				

Item	Found	Final
Engine RPM		292-298
Turbine RPM		
IGN Timing		56° BTDC
Manifold Press		9.8"
Manifold Temp		105°
Fuel Press		30"
Oil Press		32"
Oil Temp IN/OUT		144/152
Oil Filter DP		
Water Press		
Water Temp IN/OUT		155/161
Crankcase Press		
Exh Back Press		
Air Filter Pr Drop L/R		
Ignition Primary		
SFC		.6

Cyl No	Bore	Rod Dia	IHP	Volumetric Eff		Torque		Pressure		Gas Temp		Gauge S	Gauge D	Pockets	Stage	Comments
				% VE _s	% VE _D	S	D	S	D	S	D					
1 HE	5.5	3	221	88.7	47.2	842.6	2111.4	96	204	864	204	864	204	C1	2	
CE			136	79.2	41.4	843	2205.8					2050				
2 HE	5.5	3	224	89.3	47.2	847.6	2108.9	96	204					C1	2	
CE			138	79.9	41.8	849.3	2164.5									
3 HE	9	3	236	86.9	44.5	365.5	901.1	89	192	370	192	860		C1	1	K.I. 275"
CE			195	82.7	40.9	365.6	964.9									
4 HE	9	3	239	86.9	45.8	372	895.5	89	192					C1	1	
CE			204	84.3	42.2	373.2	956									
5 HE																
CE																
6 HE																
CE																
7 HE																
CE																
8 HE																
CE																
Total IHP			1593													

$$\text{Comp BHP} = \text{Comp IHP} (1593) = 1677$$

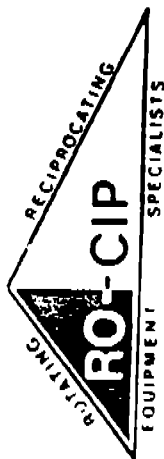
$$\text{Conv. Factor } (.95)$$

$$\text{Total BHP Load} = \text{Comp BHP } (1677) + \text{Accessory BHP } () = 1677 \text{ BHP}$$

$$\% \text{ Load} = \frac{\text{Total BHP Load } (1677)}{\text{Rated BHP } 1776 @ 300 \text{ RPM}} = 94\%$$

$$\text{Mech Eff} = \frac{\text{Total BHP Load } ()}{\text{Power Cyl IHP } ()} =$$

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ANALYSIS FIELD REPORT

LOCATION Indian / [REDACTED] DATE 8/25/94
 UNIT NO. 4 MODEL Coppe Bessner GAVC 10

DEFICIENCIES NOTED	RECOMMENDED ACTION	ACTION TAKEN
I. Injection		
① No deficiencies noted		
II. Power Cyl		
① #1 R fuel injection valve large gasket leaks	① Rep air fuel leak Priority C	
② #4 R cyl base gasket leaks	② Repair air leak Priority C	
③ #4 L Fuel valve has excess opening & closure vibrations	③ Inspect 1. fuel for proper operation & adjustment Priority C	
④ #3 L had poor performance & erratic combustion	④ Replace pre combustion cell check valve Priority A	So Cal ④ Replaced while on site Cyl performance restored 8/25/94

[Signature]
 ANALYST

4

RECOMMENDED ACTION

ACTION TAKEN

III. Conclusions

① H ₂ cyl CE section unloader	① Repair pneumatic fitting
new pneumatic vent line leaks	1 epk
AT fitting	prior to C

AT Fitting

Prior

IV. Main frame / Support Assets

① No deficiencies

WA 33 Site 2/GRI Campaign #5

Engine No. — ~~EAS~~Manufacturer WESTINGHOUSE TURBINEModel W-191-MRated Power ~~20,000~~ HP = 19,310 RATED4810 RPM ←

How is the following measured for each test run?

Stack Gas Velocity/
Volumetric flow rateMETHOD 2

Fuel Flow Rate

Engine Horsepower

Stack Gas Moisture

METHOD 4

Preliminary Test Data

TEST #3 TEST #4

	Run 1	Run 2	Run 3	Run 4
Date	10/5/94	10/5/94		
Start Time	1230	1843		
Stop Time	1755	2133		
Load Condition	YES			
Ambient Temperature	56.8	51.48 Avg.		
Relative Humidity	51.39	75.10 Avg.		
Barometric Pressure	29.34	29.35 Avg.		
Nat. Gas Sample Collected?	YES			
Velocity Run Performed?	YES			
Moisture Run Performed?	~~NO~~ YES			
Fuel Flow Rate	YES			
Engine HP	NO			
CEMS Drift, % of range				
NOx	Zero	-0.0	-0.004	0.0
	Span	-0.014	N/A	-0.214
CO	Zero	-0.052	-0.196	-0.485
	Span	0.219	N/A	0.515
THC	Zero	0.01	0.086	0.015
	Span	-0.035	N/A	-0.102
O2	Zero	0.209	0.04	-0.391
	Span	0.14	N/A	-0.525
CO2	Zero	-0.032	-0.05	-0.116
	Span	-0.047	N/A	-0.643

PRE TESTS
VS
POST TESTS

10/5/94

~~Test #3~~

Test #3 + Test #4

$$\begin{aligned} \text{Differential Pressure} &= 60 = 139.5 \text{ mcf} \\ \text{Static} &= 310 \end{aligned}$$

$$\begin{array}{r} 139.5 \\ \times 34.3474 \text{ (CF)} \\ \hline 4791 \end{array}$$

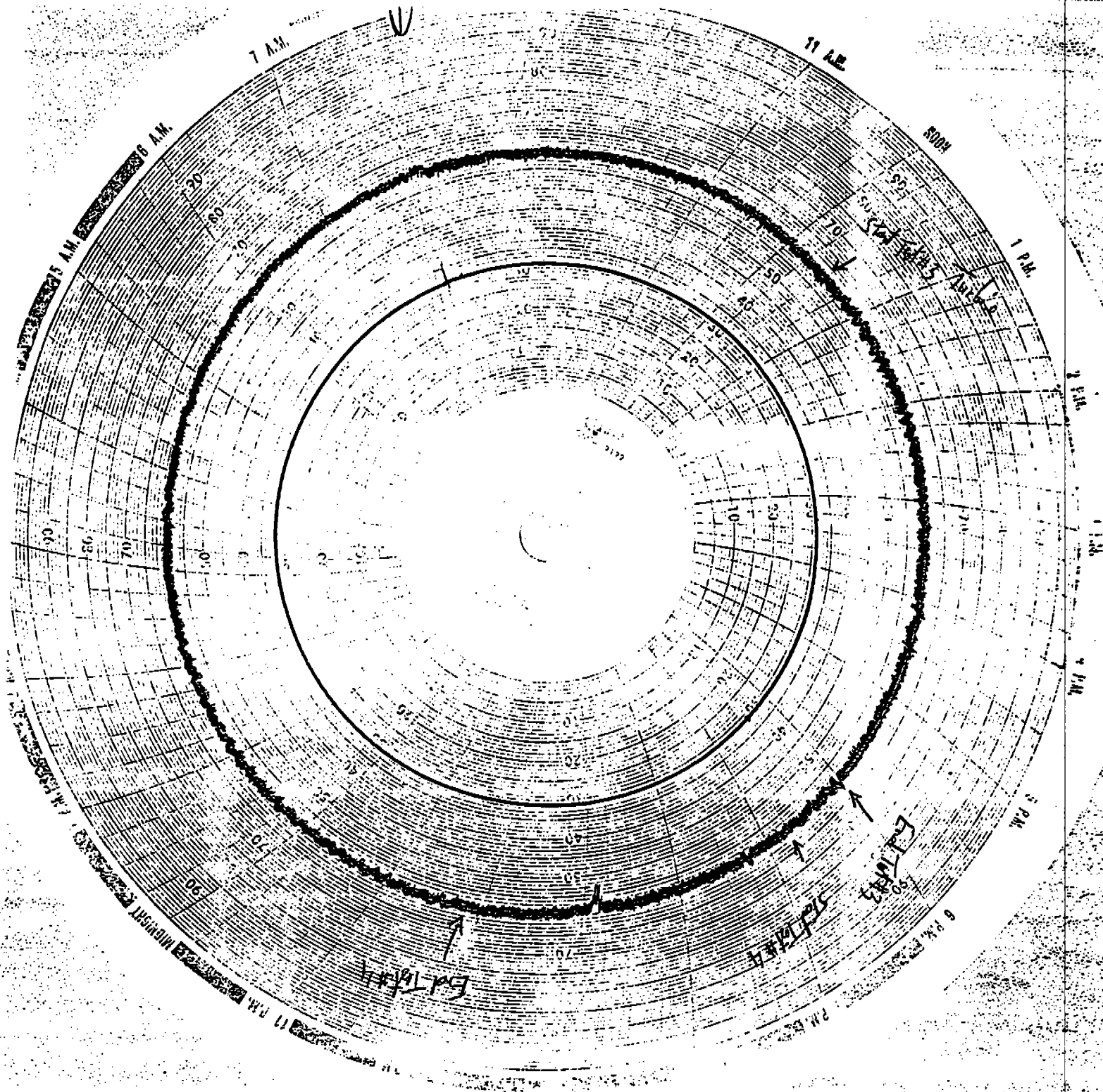
$$\div 24$$

$$\begin{array}{r} 199.6 \\ \times 1 \text{ (Temp CF)} \\ \hline 199.6 \times 10^3 \text{ scfh} \end{array} \Rightarrow 3327 \text{ scfm}$$

Test #4

$$\begin{aligned} \text{D.P.} &= 59 = 138.3 \\ \text{Static} &= 310 \end{aligned}$$

$$197.9 \times 10^3 \text{ scfh} \Rightarrow 3298 \text{ scfm}$$



~~Test #3 + 4~~

Fuel Chart (10/5/94)

#3 Up
Test ~~#4~~ - Turbine 10/5/94
GRE Campaign #5

Time		1850	1900	1930	1945	2000	2015	2030	2048	2100	2115	2130	2145
Fuel AP	in	59	59	59	59	59	59	59	58	57	59	59	59
Fuel Pr	psig	316	316	316	316	316	316	316	316	316	316	316	316
Fuel Temp	°F	81	81	80	80	80	80	80	79	76	78	80	79
prop disch	psig	245	245	245	245	245	247	247	246	246	245	246	246
2nd stage	psig	14	14	14	14	14	14	15	14	14	14	14	14
prop disch	psig	52	52	52	52	52	52	53	52	52	52	52	52
3rd stage	psig	245	243	243	244	245	244	245	243	244	245	245	244
102T Ethyl	psig	29.33	29.33	29.34	29.34	29.35	29.35	29.35	29.35	29.35	29.35	29.36	29.37
disch	in Hg	55	54	52	52	52	51	50	49	48	48	50	47
Bar Pr	°F	17.59	17.61	17.66	17.66	17.66	17.65	17.65	17.67	17.67	17.66	17.68	NA
Amb Temp	%	1.99	1.99	1.99	1.98	1.98	1.98	1.98	1.99	1.99	1.99	1.99	NA
O ₂	%	1.663	1.653	1.628	1.628	1.636	1.641	1.641	1.623	1.623	1.628	1.618	NA
CO ₂	%	Not Avail	4.49	4.60	4.48	4.60	4.62	4.56	4.51	4.51	4.60	4.87	NA
F _o	%	5843	5843	5843	5843	5843	5843	5843	5844	5843	5843	5843	5843
FTIR H ₂ O													
RPM													

Time	2200
Fuel AP	59
Fuel Pr	316
Fuel Temp	80
prop disch	245
2nd stg	14
prop disch	52
3rd stg	243
prop disch	29.36
102T Ethyl	46
disch	NA
Bar Pr	NA
Amb Temp	NA
O ₂	NA
CO ₂	NA
F _o	NA
FTIR H ₂ O	NA
RPM	5843

10-5-94 GRI Campaign #5

Test #2 - Turbine - CEM ONLY during 1st 2 hrs

Time		1240	1255	1310	1325	1345	1400	1415	1430	1445	1500	1515	1530
Fuel AP	in	59	59	60	60	60	60	60	60	59	59	60	60
Fuel Pr	psig	225	225	225	225	225	225	225	225	225	225	225	225
Fuel Temp	°F	78	78	78	78	79	79	79	79	78	78	79	78
prop disc	psig	246	247	245	245	250	247	250	245	245	245	247	247
2 nd stage	psig	14	14	14	14	14	14	14	14	14	14	14	14
3 rd stage	psig	52	52	52	52	53	53	53	52	52	52	52	52
102 nd Ethyl	psig	243	243	245	243	245	244	245	243	244	245	243	242
Bar Pr	in Hg	29.37	29.36	29.36	29.36	29.35	29.35	29.34	29.34	29.34	29.34	29.34	29.34
Amb T	in Hg	57	57	56	57	57	57	56	58	58	57	57	58
O ₂	%	17.65	17.64	17.68	17.70	17.67	17.73	17.70	17.69	17.71	17.70	17.66	17.69
CO ₂	%	1.98	1.93	1.95	1.98	2.00	2.00	1.98	1.97	1.96	1.94	1.95	1.95
F _o	-	1.655	1.689	1.657	1.616	1.615	1.585	1.616	1.629	1.628	1.650	1.662	1.641
FTIR H ₂ O	%	4.41	4.38	4.13	4.54	4.46	4.41	4.40	4.29	4.46	4.40	4.36	4.39
RPM		5843	5843	5844	5843	5843	5843	5843	5843	5843	5844	5843	5843
Time		1545	1600	1615	1630	1645	1700	1715	1745	1757			
Fuel AP	59	59	60	60	59	60	59	60	60				
Fuel Pr	225	227	225	226	226	225	227	227	227				
Fuel Temp	79	79	80	80	80	80	81	81	81				
prop disc	246	246	245	245	245	246	245	246	245				
2 nd stage	14	15	14	14	14	14	14	14	14				
3 rd stage	52	52	52	52	52	52	52	52	52				
102 nd Ethyl	242	243	243	245	245	244	242	244	243				
Bar Pr	29.33	29.33	29.32	29.32	29.32	29.32	29.32	29.32	29.32				
Amb T	60	59	60	58	57	56	58	56	56				
O ₂	17.68	17.65	17.64	17.67	17.60	17.64	17.67	17.66	17.65				
CO ₂	1.94	1.95	1.96	1.96	2.00	2.00	1.99	2.01	2.00				
F _o	1.660	1.667	1.643	1.648	1.650	1.630	1.623	1.629	1.629				
FTIR H ₂ O	4.12	4.67	4.48	4.12	4.56	4.47	4.49	4.48	4.48				
RPM	5843	5843	5843	5843	5843	5843	5843	5843	5843				

Test End

note: fuel pressure = reading + 89.5

F.5 Campaign 6

ENGINE OPERATING DATA

Engine Model/Number: **RA-5 / #10**
 Date: **11/4/94**
 Name of Data Recorder: **WCG**
GRI Campaign #6-A

Time	1000	1020	1140	1055	1105	1120	1135
Engine Horsepower	843.2		846.5		855.9		855.5
Engine Speed (rpm)	299	299	299	299	299	299	299
Engine Torque (%)	92.5		93		93.9		93.9
Ignition Timing (degrees)	11° BTDC						
FUEL MANIFOLD							
Fuel Flow Rate (acfm) <i>AP in H₂O</i>	61.3	61.6	63.0	63.3	63.3	64.1	63.8
Fuel Temperature (°F)	83	84	87	86	86	85	87
Fuel Header Pressure (psig)	20	19	19	20	20	20	21
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	142.8	145	142	142	140	141	139
Air Manifold Pressure (in Hg or (psig))	1.95	1.99	1.99	1.99	1.99	1.99	
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)	<i>2nd Manifold data</i>						
Scavenger Air Pressure (psig)							
CYLINDER TEMPERATURES							
Cylinder # 1	628	629	629	624	626	629	634
Cylinder # 2	635	635	638	642	641	648	646
Cylinder # 3	605	604	607	610	609	608	611
Cylinder # 4	628	627	630	632	634	632	640
Cylinder # 5	583	584	585	591	589	590	591
Cylinder # 6							
Cylinder # 7							
Cylinder # 8							
Cylinder # 9							
Cylinder # 10							
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)	30.92		31.3		31.2		31.23
Compressor Suction Pressure (psig)	420.6		422.5		421		421
Compressor Suction Temperature (°F)	200.65	70	66	67	69	25.67	70
Compressor Discharge Pressure (psig)	700		695		698		690
Compressor Discharge Temperature (°F)	148	147	142	143	143	144	142
Pocket Unloader Setting							
CRIFICE = 3.068"							
3.068							

2.

1045-12

GRI #6-12

[illegible]

ENGINE OPERATING DATA

Engine Model/Number: BA5/210
Date: 11/04/94
Name of Data Recorder: WLG
GRI-46A

[illegible]

Engine Model/Number: NBA-5/#12
Date: 11/04/94
Name of Data Recorder: WCS
GRE - #10

F-90

ENGINE OPERATING DATA

Engine Model/Number: 2A-5/#10
Date: 11/5/94
Name of Data Recorder: WJG
GRI-#6A

Time	0900	0915	0930	0945	1000	1015	1030
Engine Horsepower	912		911		910		906
Engine Speed (rpm)	300	300	300	299	299	300	299
Engine Torque (%)	100%		100		99.9		99.4
Ignition Timing (degrees)	11-						
FUEL MANIFOLD							
Fuel Flow Rate (gpm)	69.6	68.9	69.2	69.2	68.8	68.8	69.1
Fuel Temperature (°F)	82	78	80	78	79	81	80
Fuel Header Pressure (psig)	20	20	20	20	20	20	20
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	132	132	132	133	135	136	135
Air Manifold Pressure (in Hg or psig)							
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig)	3.64	3.45	3.54	3.33	3.47	3.48	3.41
CYLINDER TEMPERATURES							
Cylinder # 1	589	617	619	620	623	619	621
Cylinder # 2	646	650	651	652	651	653	650
Cylinder # 3	620	618	622	619	620	617	620
Cylinder # 4	651	644	646	647	647	646	648
Cylinder # 5	618	589	589	591	590	591	591
Cylinder # 6							
Cylinder # 7							
Cylinder # 8							
Cylinder # 9							
Cylinder # 10							
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)	30.17		30.16		30.6		30.64
Compressor Suction Pressure (psig)	416	417	417	417	420	423	425
Compressor Suction Temperature (°F)	69	67	66	65	66	65	64
Compressor Discharge Pressure (psig)	72.25	72.25	72.5	72.5	72.5	72.5	72.5
Compressor Discharge Temperature (°F)	151	151	150	151	152	150	149
Pocket Unloader Setting							

Engine Model/Number: BA-5/N10
Date: 11/5/94
Name of Data Recorder: WCG
GRI-#6-A

F-92

Engine Model/Number: HBA-5/#12
Date: 11/05/94
Name of Data Recorder: WCS
GRI - #6A

F-93

ENGINE OPERATING DATA

Engine Model/Number: HBA-5 / #12
Date: 11/5/94
Name of Data Recorder: WCS
GRI - #6A

[illegible]

ENGINE OPERATING DATA

Engine Model/Number: NBA-5/#12

Date: 11/05/94

Name of Data Recorder: _____

GR1 - #6A

[illegible]

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: Solar T650

Date: 11/7/94

Name of Data Recorder: WCG

GRI # 6 B

35,000 HP @ 14,300 RPM

Time	1715	1730	1745	1800	1815
Turbine Horsepower					
% Power Turbine Speed	96.6	96.5	96.6	96.7	96.7
Load (%)					
Average Power Turbine Speed (rpm) %	87.0	87.0	87.0	87.2	87.4
<u>FUEL MANIFOLD</u>					
Fuel Flow Rate (scfm)					
Fuel Temperature (°F)	58	61	58	60	59
Fuel Pressure (upstream of meter) (psig)	178	178	178	178	178
Fuel Header Pressure (psig)					
Fuel Differential Pressure (psig)	35.6	35.7	36.4	37.1	37.7
Fuel Meter Orifice Diameter (inches)	1.375				
Fuel Meter Run Diameter (inches)					
<u>AIR INTAKE MANIFOLD</u>					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
<u>EXHAUST MANIFOLD</u>					
Temperature (°F)					
Pressure (in Hg)					
Compressor Capacity (AMSC) <u>AP mhd</u>	4.1				
Compressor Suction Pressure (psig)	462.9	463.7	464.2	465	465
Compressor Suction Temperature (°F)	75.8	76.7	77	76	77
Compressor Discharge Pressure (psig)	640	643.6	644.5	645	645
Compressor Discharge Temperature (°F)	129.3	130.3	130	130	130
Tur. Discharge (T5) Temp °F	1400	1401	1399	1400	1400
Comp Discharge Pr psig	117	117	118	118	118
14.0 inch on disch					
23.12" line					

Eng

4.026 pipe on fuel

Aug. 4303 hp
94.7%

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WCS

GRI - #68

Time	0915	0930	0945	1000	1015
Turbine Horsepower					
% Power Turbine Speed	96.9	96.8	96.7	96.6	96.5
Load (%)					
Average Power Turbine Speed (rpm)	86.9	86.5	86.4	86.2	85.9
<u>FUEL MANIFOLD</u>					
Fuel Flow Rate (scfm)					
Fuel Temperature (°F)	60°	62	59	61	59
Fuel Pressure (upstream of meter) (psig)	181	180	180	180	180
Fuel Header Pressure (psig)					
Fuel Differential Pressure (psig)	42.6	42.2	41.9	41.5	41.5
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
<u>AIR INTAKE MANIFOLD</u>					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
<u>EXHAUST MANIFOLD</u>					
Temperature (°F)					
Pressure (in Hg)					
Compressor Capacity (~~MMscfh~~) A^2 in H_2O	57.0	57.1	57.1	56.8	57.1
Compressor Suction Pressure (psig)	479.5	479.9	480.2	479.9	480.2
Compressor Suction Temperature (°F)	127.5	75	75.4	75.7	75.7
Compressor Discharge Pressure (psig)	664	665.2	665.3	663.9	663.9
Compressor Discharge Temperature (°F)	~~57.0~~ 129	128.4	128.3	128.2	128.1
Eng Disch Temp (T_5) °F	1400	1399	1400	1400	1400
Eng Comp Disch Pres (psig)	119	118	118	117	117

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WCG

GRI - #68

Time	1030	1045	1100	1115	1130
Turbine Horsepower					
% Power Turbine Speed					
Load (%)	96.5	96.4	96.4	96.4	96.5
Average Power Turbine Speed (rpm)	85.9	85.7	85.6	85.7	85.9
<u>FUEL MANIFOLD</u>					
Fuel Flow Rate (scfm)					
Fuel Temperature (°F)	61	63	63	61	60
Fuel Pressure (upstream of meter) (psig)	181	179	182	181	180
Fuel Header Pressure (psig)					
Fuel Differential Pressure (psig) in H ₂ O	40.8	40.3	40.5	40.7	40.9
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
<u>AIR INTAKE MANIFOLD</u>					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
<u>EXHAUST MANIFOLD</u>					
Temperature (°F)					
Pressure (in Hg)					
Compressor Capacity (MMscfh) Air in H ₂ O	55.3	55.5	55.3	56.2	54.6
Compressor Suction Pressure (psig)	479.2	478.9	478.9	478.9	478.6
Compressor Suction Temperature (°F)	75.7	75.9	76.0	76.2	76.2
Compressor Discharge Pressure (psig)	662.1	661.2	659.8	660.7	660.7
Compressor Discharge Temperature (°F)	128.0	127.8	127.9	128.1	128.3
Eng Disch Temp (T ₅) °F	1400	1400	1399	1400	1399
Eng Comp. Disch Pres (psig)	116.5	116	116	116.5	117
				Raining	

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WCG

GRI-26B

Time	1145	1200	1215	1230	1245
Turbine Horsepower					
UGP - % Power Turbine Speed	96.4	96.4	96.2	96.2	96.2
Load (%)					
NPT - Average Power Turbine Speed (rpm)	85.8	85.6	85.2	84.9	85.0
<u>FUEL MANIFOLD</u>					
Fuel Flow Rate (scfm)					
> Fuel Temperature (°F)	61	63	64	64	64
> Fuel Pressure (upstream of meter) (psig)	179	180	179	180	180
* Fuel Header Pressure (psig)					
> Fuel Differential Pressure (psig) ~~AP~~ _{in H₂O}	40.4	40.2	39.2	39.1	39.3
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
<u>AIR INTAKE MANIFOLD</u>					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
<u>EXHAUST MANIFOLD</u>					
Temperature (°F)					
Pressure (in Hg)					
* Compressor Capacity (MMscfh) ~~AP~~ _{in H₂O}	55.7	55.6	55.3	55.4	55.6
- Compressor Suction Pressure (psig)	479.2	479.2	479.9	480.5	481.1
- Compressor Suction Temperature (°F)	76.3	76.3	76.8	76.9	77.3
- Compressor Discharge Pressure (psig)	661.8	659.3	659.3	658.0	658.9
- Compressor Discharge Temperature (°F)	128.2	128.0	128.0	127.8	128.2
- Eng Exh Temp (T ₅) °F	1400	1400	1400	1400	1401
+ Eng Comp. Disch Pres (psig)	116	116	115	114	115

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WCG

GRI-68

Time	1300	1315	1330	1345	
Turbine Horsepower					
N&P % Power Turbine Speed	96.2	96.1	96.0	96.0	
Load (%)					
NPT Average Power Turbine Speed (rpm)	85.2	85.3	85.0	84.9	
<u>FUEL MANIFOLD</u>					
Fuel Flow Rate (scfm)					
> Fuel Temperature (°F)	65	65	67	66	
> Fuel Pressure (upstream of meter) (psig)	~~180~~ 180	180	180	180	
* Fuel Header Pressure (psig)	~~180~~				
> Fuel Differential Pressure (psig) $\Delta P_{in H_2O}$	39.6	39.5	38.7	39.1	
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
<u>AIR INTAKE MANIFOLD</u>					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
<u>EXHAUST MANIFOLD</u>					
Temperature (°F)					
Pressure (in Hg)					
* Compressor Capacity (~~MMscfh~~) $\Delta P_{in H_2O}$	55.8	54.9	54.3	55.5	
- Compressor Suction Pressure (psig)	478.9	477.4	477.4	476.5	
- Compressor Suction Temperature (°F)	77.6	77.0	77.2	77.3	
- Compressor Discharge Pressure (psig)	657.5	656.6	655.2	652.9	
- Compressor Discharge Temperature (°F)	128.8	128.4	128.3	128.2	
- Eng. Exh. Temp. (T5) °F	1400	1400	1400	1400	
+ Eng. Comp. Disch. Press. (psig)	115	114	113	113	

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WCG

Time	1700	1715	1730	1745	1800
Turbine Horsepower					
% Power Turbine Speed	92.6	92.6	92.6	92.6	92.6
Load (%)					
~~Average~~ Power Turbine Speed (~~rpm~~)	80.6	80.7	80.7	80.6	80.8
FUEL MANIFOLD					
Fuel Flow Rate (scfm)					
Fuel Temperature (°F)	59	61	57	57	60
Fuel Pressure (upstream of meter) (psig)	180	180	180	180	180
Fuel Header Pressure (psig)					
Fuel Differential Pressure (psig) in H ₂ O	24.8	24.9	25.4	25.7	26.0
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
AIR INTAKE MANIFOLD					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
EXHAUST MANIFOLD					
Temperature (°F)					
Pressure (in Hg)					
Compressor Capacity (~~MMscfh~~) ΔP in H ₂ O	49.3	48.8	48.6	49.8	50.1
Compressor Suction Pressure (psig)	476.8	473.7	472.8	473.4	473.1
Compressor Suction Temperature (°F)	78.8	78.6	78.5	78.1	78.0
Compressor Discharge Pressure (psig)	633.7	631.9	630.6	628.1	629.1
Compressor Discharge Temperature (°F)	124.5	124.6	124.5	123.8	123.9
T5 (°F)	1311	1310	1309	1309	1305
Eng Disch Press. psig	105	105	105	105.5	106

Process Data Collection Form for Gas Turbine Testing

Turbine Model/Number: T6502

Date: 11/8/94

Name of Data Recorder: WLG

Time	1815	1830	1845	1900	1915
Turbine Horsepower					
% Power Turbine Speed	92.6	92.6	92.6	92.6	92.6
Load (%)					
Average Power Turbine Speed (rpm)	81.0	81.0	81.1	81.2	81.2
FUEL MANIFOLD					
Fuel Flow Rate (scfm)					
Fuel Temperature (°F)	58	60	57	58	57
Fuel Pressure (upstream of meter) (psig)	180	180	179	179	179
Fuel Header Pressure (psig)	26				
Fuel Differential Pressure (psig) in H ₂ O	26.3	26.6	26.6	26.8	27.0
Fuel Meter Orifice Diameter (inches)					
Fuel Meter Run Diameter (inches)					
AIR INTAKE MANIFOLD					
Air Flow Rate (acfm)					
Air Manifold Temperature (°F)					
Air Manifold Pressure (in Hg)					
EXHAUST MANIFOLD					
Temperature (°F)					
Pressure (in Hg)					
Compressor Capacity (MMscfh) in H ₂ O	52.1	51.5	51.9	51.5	51.2
Compressor Suction Pressure (psig)	471.9	471.3	470.7	470.7	471.3
Compressor Suction Temperature (°F)	77.8	77.7	77.6	77.6	77.5
Compressor Discharge Pressure (psig)	628.7	628.2	628.2	627.3	628.7
Compressor Discharge Temperature (°F)	123.8	123.7	123.8	123.8	123.7
T5 Temp (°F)	1305	1304	1301	1300	1299
Exh (Eng) disch pr (psi)	106.5	106.5	107	107	107

ENGINE OPERATING DATA

300 RPM # 45871
1800 HP @ 3310 ft elev.

Engine Model/Number: GMVC-10/415
Date: 11/10/94
Name of Data Recorder: WCG
GRI-#6C

Time	1030	1045	1100	1115	1130	1145	1200
Engine Horsepower	1832.6	1840	1823.6		1828.5		
Engine Speed (rpm)	300	301	300	301	299	299	300
Engine Torque (%)	101.8		101.3		101.5		
Ignition Timing (degrees)	101.8		101.3				
FUEL MANIFOLD							
Fuel Flow Rate (scfh)	15939.0	15938.0	15938.0	15938.0	15939.0	15937.0	15938.0
Fuel Temperature (°F)	67	68	68	69	70	70	71
Fuel Header Pressure (psig)	64	64	65	65	64	64	64
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	112/103	113/103	113/102	113/102	113/102	113/103	113/103
Air Manifold Pressure (in Hg or psig)							
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig) in H ₂ O	246.0	244.0	242.0	242.0	240.0	238.0	238.0
CYLINDER TEMPERATURES							
Cylinder # 1 1L	622	624	624	627	627	626	627
Cylinder # 2 2L	574	574	571	573	570	572	577
Cylinder # 3 3L	603	602	603	605	605	602	603
Cylinder # 4 4L	665	664	666	666	666	665	668
Cylinder # 5 5L	650	651	650	652	651	652	654
Cylinder # 6 1R	621	620	621	624	620	623	626
Cylinder # 7 2R	635	636	636	644	641	643	645
Cylinder # 8 3R	766	764	769	771	767	771	772
Cylinder # 9 4R	678	680	681	684	686	685	686
Cylinder # 10 5R	626	631	626	628	632	629	632
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)	93.3		92.7		95.5		95.5
Compressor Suction Pressure (psig)	508		509		510		
Compressor Suction Temperature (°F)	64		64		64		
Compressor Discharge Pressure (psig)	747.0	747.0	747.0	748.0	749	747.0	746.0
Compressor Discharge Temperature (°F)	122		124		123		
Pocket Unloader Setting							

Engine Model/Number: GMVC-10/415
Date: 11/10/94
Name of Data Recorder: GLG
GRI-6C

F-104

Engine Model/Number: GMUC-10/#5
Date: 11/10/94
Name of Data Recorder: WCG
GRI - #66

F-105

ENGINE OPERATING DATA

Engine Model/Number: GMDC-10/#15
Date: 11/10/94
Name of Data Recorder: WSE
GRI-CC

[illegible]

Engine Model/Number: SIMULC-10 / H15
Date: 11/11/94
Name of Data Recorder: WCB
GRD-10C

F-107

ENGINE OPERATING DATA

Engine Model/Number: GMK 10 / #15
Date: 11/11/99
Name of Data Recorder: WEG
GRI - GC

[illegible]

HP @ 300 RPM = 1350

Engine Model/Number: 5MVA-10/#9
Date: 11/11/94
Name of Data Recorder: ALG
GRI-#6C

F-109

Engine Model/Number: 6MUA-10/29
Date: 11/11/94
Name of Data Recorder: WCG
GRI - 6C

Name of Data Recorder: <u>WCG</u>	
<u>GRI - 6C</u>	
Time	1245 1800 AVE
Engine Horsepower	
Engine Speed (rpm)	300 298 298
Engine Torque (%)	
Ignition Timing (degrees)	
<u>FUEL MANIFOLD</u>	
Fuel Flow Rate (scfh)	10103 9984 10070
Fuel Temperature (°F)	64 63
Fuel Header Pressure (psig)	25 25
<u>AIR INTAKE MANIFOLD</u>	
Air Flow Rate (acfm)	
Air Manifold Temperature (°F)	96/97 94/96
Air Manifold Pressure (in Hg or psig)	
<u>EXHAUST MANIFOLD</u>	
Temperature (°F)	
Pressure (in Hg)	
Scavenger Air Pressure (psig) in H ₂ O	35 35
<u>CYLINDER TEMPERATURES</u>	
Cylinder # 1	680 678
Cylinder # 2	633 629
Cylinder # 3	571 574
Cylinder # 4	587 578
Cylinder # 5	630 628
Cylinder # 6	567 559
Cylinder # 7	628 621
Cylinder # 8	633 638
Cylinder # 9	684 668
Cylinder # 10	597 590
Cylinder # 11	
Cylinder # 12	
Compressor Capacity (MMscfh)	
Compressor Suction Pressure (psig)	
Compressor Suction Temperature (°F)	65 64
Compressor Discharge Pressure (psig)	750 750
Compressor Discharge Temperature (°F)	123 121
Pocket Unloader Setting	

ENGINE OPERATING DATA

Engine Model/Number: 6MVA-10 / 49

Date: 11/12/84

Name of Data Recorder 10/6

GRI #6C

Time	1000	1015	1030	1045	1100	1115	1130
Engine Horsepower							
Engine Speed (rpm)	300	302	299	299	303	299	299
Engine Torque (%)							
Ignition Timing (degrees)							
FUEL MANIFOLD A							
Fuel Flow Rate (scfh)	10431	10537	10494	10456	10599	10493	10492
Fuel Temperature (°F)	58	58	58	58	59	60	60
Fuel Header Pressure (psig)	27	27	27	27	27	27	27
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	83/86	/	88/86	85/86	85/86	85/86	85/87
Air Manifold Pressure (in Hg or psig)							
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig) m H ₂ O	34	34	34	34	34	34	33
CYLINDER TEMPERATURES							
Cylinder # 1	658	660	665	672	662	672	668
Cylinder # 2	618	615	616	614	616	621	621
Cylinder # 3	571	576	576	574	571	575	576
Cylinder # 4	592	593	592	594	594	593	591
Cylinder # 5	629	632	629	630	631	631	634
Cylinder # 6	647	654	651	652	653	650	655
Cylinder # 7	655	652	651	660	656	653	650
Cylinder # 8	652	653	654	650	656	659	658
Cylinder # 9	701	704	704	702	699	701	697
Cylinder # 10	645	645	650	646	645	650	647
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)							
Compressor Suction Pressure (psig)							
Compressor Suction Temperature (°F)	63	-	63	63	64	64	64
Compressor Discharge Pressure (psig)	751	751	750	751	751	750	750
Compressor Discharge Temperature (°F)	122	-	124	124	124	124	124
Pocket Unloader Setting							

ENGINE OPERATING DATA

Engine Model/Number: GMV-10/#9
Date: 11/12/94
Name of Data Recorder: WCS
GRI-6C

Time	1145	1200	1215	1230	1245	1300	1315
Engine Horsepower							
Engine Speed (rpm)	302	297	296	304	299	305	299
Engine Torque (%)							
Ignition Timing (degrees)	27						
FUEL MANIFOLD							
Fuel Flow Rate (scfh)	10430	10406	10311	10377	10342	10309	10251
Fuel Temperature (°F)	61	61	61	62	62	62	63
Fuel Header Pressure (psig)	27	27	27	27	27	27	27
AIR INTAKE MANIFOLD							
Air Flow Rate (acfm)							
Air Manifold Temperature (°F)	87/88	88/88	88/89	90/90	91/90	92/92	93/93
Air Manifold Pressure (in Hg or psig)							
EXHAUST MANIFOLD							
Temperature (°F)							
Pressure (in Hg)							
Scavenger Air Pressure (psig) in H ₂ O	34	34	33	34	33	33	34
CYLINDER TEMPERATURES							
Cylinder # 1	671	667	671	670	675	675	671
Cylinder # 2	613	617	618	618	623	624	627
Cylinder # 3	578	573	576	578	580	580	582
Cylinder # 4	597	598	596	597	598	603	603
Cylinder # 5	634	632	634	634	636	634	637
Cylinder # 6	652	657	657	656	656	657	657
Cylinder # 7	654	647	652	661	660	659	660
Cylinder # 8	653	656	656	656	660	663	658
Cylinder # 9	702	708	706	700	710	704	717
Cylinder # 10	654	654	652	649	652	654	654
Cylinder # 11							
Cylinder # 12							
Compressor Capacity (MMscfh)							
Compressor Suction Pressure (psig)							
Compressor Suction Temperature (°F)	64	64	64	64	65	64	65
Compressor Discharge Pressure (psig)	750	750	750	750	750	749	749
Compressor Discharge Temperature (°F)	124	124	125	125	124	124	125
Pocket Unloader Setting							

ENGINE OPERATING DATA

Engine Model/Number: GMVA-10/19
Date: 11/12/54
Name of Data Recorder: WPG
GR1 #6C

[illegible]

Engine Model/Number: GMWL-10 413
Date: 11/14/94
Name of Data Recorder: GSW

Engine Model/Number: GMWL-10 A13
Date: 11/14/94
Name of Data Recorder: GSW

Name of Data Recorder: GSW

F-114

Engine Model/Number: GMWG10/#13
Date: 11/14/94
Name of Data Recorder: GSW

F-115

ENGINE OPERATING DATA

Engine Model/Number: GMWC-10/#13
Date: 11/14/94
Name of Data Recorder: GSW

[illegible]

ENGINE OPERATING DATA

Engine Model Number: GMK-10/13
Date: 11/14/94
Name of Data Recorder: GSW

[illegible]

Engine Model/Number: GIMWC-10/#13
Date: 11/14/94
Name of Data Recorder: AXG/GSW

Engine Model/Number: GMWC-10/#13
Date: 11/14/94
Name of Data Recorder: AXG/GSW

Name of Data Recorder: ALG/GSW

F-118

#15 10-11-94

Low Load.

#	HP	Peak	HP	Peak	#2
#1 HE	186.3	#1 L-620	171.4	1 R-610	177
CE	167.0	2 L-615	176.5	2 R-625	183.9
#2 HE	188.0	3 L-610	180.1	3 R-620	185.3
CE	185.1	4 L-610	189.3	4 R-625	175.1
#3 HE	186.7	5 L-615	181.5	5 R-600	171
CE	169.3				
#4 HE	191.2				
CE	172.2				

BHP 1,521.8 84,590

Test #15 11-11-94 9:30 AM

HP	P _s	P _D	T _s	T _D	Rm Flow
#1 HE	187.6	492.751	64.123	302	9.56
CE	167.9	496.747		299	8.84
#2 HE	190.3	498.748	64.134	301	9.52
CE	184.1	505.751		302	9.12
#3 HE	182.6	496.754	64.123	301	9.87
CE	169.9	498.741		301	8.91
#4 HE	191.7	498.748	64.123	300	9.69
CE	173.8	497.739		300	8.92
BHP	1529.3	8470 Flow			74.43

Test #16 11-11-94 10 AM

HP	P _s	P _D	T _s	T _D	Rm Flow
#1 HE	186.5	489.750	64.124	300	9.35
CE	170.6	496.749		302	8.93
#2 HE	190.3	493.749	64.135	301	9.40
CE	182.6	510.751		300	9.24
#3 HE	188.8	496.752	64.124	303	9.52
CE	164.8	496.741		298	8.72
#4 HE	192.3	496.748	64.124	301	9.72
CE	175.2	496.741		302	9.04
BHP	1529.5	84.970 Flow			74.00

Test #17 11.11.94 10:30 AM

#15

	H ₂	P _s	P _d	T _s	T _d	RPM	Flow
#1 HE	184.4	494.751	64	124	297	9.48	
CE	168.8	495.750			300	8.72	
#2 HE	189.3	498.748	63	135	300	9.55	
CE	182.2	506.751			300	9.15	
#3 HE	184.9	494.744	64	124	297	9.52	
CE	168.4	498.737			300	8.98	
#4 HE	195.1	493.744	64	124	306	9.83	
CE	171.8	498.736			297	8.95	
3 HP	1520.9	84.5%	Flow			27.76	

Test #18 11.11.94 11 AM

	H ₂	P _s	P _d	T _s	T _d	RPM	Flow
#1 HE	185.2	494.753	64	125	298	9.34	
CE	166.7	495.745			298	8.8	
#2 HE	189.2	497.747	63	135	300	9.45	
CE	181.9	501.751			300	9.03	
#3 HE	186.2	496.756	64	125	299	9.54	
CE	167.8	497.739			299	8.8	
#4 HE	191.6	496.747	64	125	301	9.68	
CE	173.9	494.734			301	8.88	
3 HP	1518.4	84.3%	Flow			73.52	

Test #19 11.11.94 11:30 AM

	H ₂	P _s	P _d	T _s	T _d	RPM	Flow
#1 HE	188.6	494.753	64	124	300	9.65	
CE	167	494.746			298	8.65	
#2 HE	187.5	492.750	64	135	298	9.28	
CE	177.7	504.753			295	8.93	
#3 HE	185.1	493.747	64	124	297	9.53	
CE	167.6	495.740			299	8.81	
#4 HE	190.4	495.750	64	122	299	9.59	
CE	172	499.740			298	8.95	
3 HP	1517.4	83.9%	Flow			73.39	

Test #20 11.11.94 12:00 PM

	H ₂	P _s	P _d	T _s	T _d	RPM	Flow
#1 HE							
CE							
#2 HE							
CE							
#3 HE							
CE							
#4 HE							
CE							
3 HP							

#15

Balance Report

High Load

11-11-94

	HP	Peak
1L	162.3	715
2L	167.3	720
3L	162.3	710
4L	162.2	705
5L	159.3	700
1R	153.6	680
2R	162.2	715
3R	158.5	685
4R	159.3	710
5R	159.2	700

Before

	HP	Peak
1L	162.3	715
2L	167.3	720
3L	162.3	710
4L	162.2	705
5L	159.3	700
1R	160.3	700
2R	162.2	715
3R	159.1	705
4R	159.3	710
5R	159.2	700

After

test #20 11-11-94 12:45 PM

HP Ps Pb Ts Tb Rpm Flow

#1 HE	182.9	492.749	64.123	301	9.34
CE	217.8	494.759		299	11.16
#2 HE	192.2	494.747	64.136	302	9.46
CE	230.5	501.742		299	11.46
#3 HE	234.1	492.754	64.123	300	11.95
CE	219.7	497.749		300	11.43
#4 HE	239.1	493.756	64.123	299	12.02
CE	224.1	498.750		300	11.46
3HP	183.2	101.7			flow 88.28

test #21 11-11-94 1:51 PM

HP Ps Pb Ts Tb Rpm Flow

#1 HE	182.6	496.752	65	124	300	9.26
CE	216.9	496.760			299	11.31
#2 HE	190.8	498.745	65	136	300	9.48
CE	232	496.740			301	11.45
#3 HE	234.1	492.756	65	124	300	11.93
CE	219.7	495.751			301	11.29
#4 HE	237.6	488.749	64	124	298	11.85
CE	224.4	498.751			300	12.03
3HP	1829.5	101.6				flow 88.45

#9 11-12-94

Load 11-12-94
 #1 HE 184.6
 CE 197.9
 #2 HE 219.7
 CE 191.8
 #3 HE 180.5
 CE 200.4
 100%

HP	PEAK	HP	Peak
1L 130.0 -	460	133.2	440
2L 137.8	460	140.1	~~440~~
3L 146.9	420	132.4	410
4L 141.7	440	132.7	440
5L 147.4	420	139.5	440
1R 128.9 ✓	420	137.2	440
2R 135.3	410	133.8	420
3R 135.0	420	137.9	440
4R 132.8	400	132.6	400 -...
5R 129.2 ✓	400	135.	420

HP	Peak	HP	Peak
1L 143	400	1R 143	440
2L 143	420	2R 140	430
3L 143	420	3R 138	420
4L 142	410	4R 147	420
5L 144	440	5R 139	410

avg 142.2

#9

Balance Report

11-11-94

INP	Peak	INP	Peak	Unload
1L 159.8	480	1L 159.8	480	1L 118.4
2L 158.8	490	2L 158.8	490	2L 150.3
3L 152.2	480	3L 152.2	480	3L 139.2
4L 149.6	470	4L 149.6	470	4L 136.1
5L 148.5	480	5L 148.5	480	5L 142.8
1R 134.6	490	1R 145.2	495	1R 108.2
2R 133.0	455	2R 139.2	470	2R 130.7
3R 118.9	415	3R 138.6	485	3R 131.2
4R 109.6	405	4R 138.3	475	4R 724.1
5R 140.3	480	5R 140.3	480	5R 111.8

500748

Before

TEST #1 11-11-94 4:00 PM

1235 HP P_s P_D T_s T_D RPM Flow

#1 HE 178.4 490.744 64-124 299 8.71

CE 159.6 496.756 301 8.04

#2 HE 184.3 496.748 64-124 303 9.14

CE 161.0 497.741 301 8.28

#3 HE 184.5 498.741 64-125 304 9.36

CE 158.0 496.747 297 8.1

3HP 1079.7 87.470 Flow 51.63

After

TEST #2 11-11-94 4:30 PM

HP P_s P_D T_s T_D RPM Flow

#1 HE 178.3 491.741 64-124 299 8.8

CE 158.9 497.755 300 8.1

#2 HE 185.3 495.748 64-127 304 9.2

CE 161.4 498.734 300 8.3

#3 HE 182.4 495.738 64-126 302 9.1

CE 159.6 495.746 299 8.2

3HP 1079.8 87.406 Flow 51.87

Test #3 5:00 PM

HP	T _s	T _D	T _s	T _D	RPM	Flow
#1HE 178.5	494.742	64	124	299	8.96	
CE 157.6	495.754			297	7.85	
#2HE 182.5	498.752	64	127	300	9.15	
CE 159.2	495.742			296	8.0	
#3HE 180	493.741	64	127	299	9.1	
CE 160.5	498.747			300	8.26	
BHP 1071.8	86.7%				Flow 51.32	

#9 11-11-94

Test #4 5:30 PM

HP	T _s	T _D	T _s	T _D	RPM	Flow
#1HE 179.9	495.751	64	124	306	11.5	
CE 160.6	499.752			303	10.4	
#2HE 181.4	499.750	64	125	298	9.19	
CE 161.2	499.739			301	8.32	
#3HE 186.7	499.741	63	125	306	9.45	
CE 159.9	497.746			299	8.24	
BHP 1083.5	87.7%				Flow 57.22	

Test #5 6:00 PM

HP	T _s	T _D	T _s	T _D	RPM	Flow
#1HE 177.5	496.7423	127	297	8.95		
CE 158.1	494.753		298	7.90		
#2HE 185.5	497.749	64	126	304	9.26	
CE 161	497.738		300	8.31		
#3HE 176.4	494.740	63	125	298	9.0	
CE 160.3	499.748		299	8.27		
BHP 1075.6	87.1%				Flow 51.69	

11-12-94
#9 [REDACTED] Test #6 10:00 AM

	HP	P _s	P ₀	T _s	T _d	RPM	Flow
#1 HE	181.4	488	735	62	132	297	8.85
CE	195.9	488	770			302	9.56
#2 HE	216.4	487	744	62	124	298	10.6
CE	194.7	491	754			302	9.82
#3 HE	176.1	493	750	62	124	297	8.76
CE	200.1	493	757			300	9.92
BHP	1230		99.6%			Flow	57.51

Test #7 10:30 AM

	HP	P _s	P ₀	T _s	T _d	RPM	Flow
#1 HE	182.6	488	737	62	124	301	8.81
CE	198.1	494	768			296	9.25
#2 HE	219.6	486	742	63	124	301	10.6
CE	191.5	493	754			298	9.54
#3 HE	184.6	497	748	62	127	304	9.14
CE	197.1	488	748			299	9.76
BHP	1235.3		100%			Flow	57.1

Test #8 11:00 AM

	HP	P _s	P ₀	T _s	T _d	RPM	Flow
#1 HE	182.1	487	736	62	123	298	8.78
CE	200.6	489	769			304	9.86
#2 HE	216.3	489	743	63	125	298	10.6
CE	191.3	490	757			298	9.57
#3 HE	181.9	496	747	62	125	302	9.12
CE	199.7	493	758			303	9.91
BHP	1233.6		99.9%			Flow	57.84

11-12-94

T-5T#9 [REDACTED] #9
11130 AM

	HP	P _s	P ₀	T _s	T _d	RPM	Flow
#1 HE	182.4	489	736	63	124	299	8.81
CE	200.6	487	744			300	9.58
#2 HE	219.8	486	741	63	125	302	10.6
CE	190.7	492	753			297	9.55
#3 HE	180.1	498	744	63	127	301	9.09
CE	198.7	489	755			301	9.69
BHP 1234							99.9%
Test #10 12:00 PM							Flow 57.32

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	181.2	488	734	63	125	296	8.86
CE	200.3	485	763			301	9.56
#2 HE	221.3	487	742	63	125	303	10.7
CE	193.6	489	753			301	9.65
#3 HE	176.7	498	753	63	126	297	8.85
CE	198.2	491	754			300	9.83
BHP 1232.9							99.8%
Test #11 12:30 PM							Flow 57.45

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	187.3	486	735	63	126	301	8.82
CE	199.7	489	761			301	9.69
#2 HE	218.4	486	739	63	127	300	10.5
CE	191.3	491	753			298	9.56
#3 HE	176.7	495	745	63	127	297	10.2
CE	198.5	490	752			301	9.74
BHP 1229.3							99.5%
							Flow 58.01

11-12-94

#9

Test #12 1:00 PM

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	182.7	486	735	63	127	300	8.70
CE	199.5	484	761			302	9.54
#2 HE	215.2	487	741	63	126	297	10.5
CE	192	493	756			299	9.63
#3 HE	178.3	497	744	64	124	299	9.05
CE	197.4	487	750			300	9.63
BHP	1226.4		99.390				Flow 57.05

Test #13 1:30 PM

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	182.2	487	738/	63	127	301	8.77
CE	198.7	487	762			299	9.54
#2 HE	215.2	483	738	63	127	297	10.4
CE	192.3	492	753			299	9.58
#3 HE	182.0	495	744	64	126	302	9.10
CE	199.8	496	758			303	9.91
BHP	1231.7		99.790				Flow 57.30

Test #14 2:00 PM

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	181.2	487	735	64	124	299	8.71
CE	199.3	485	760			299	9.57
#2 HE	218.7	485	741	63	126	301	10.6
CE	193.4	489	754			301	9.59
#3 HE	181.3	496	741	64	126	301	8.99
CE	198.2	489	749			300	9.65
BHP	1233.8		100.90				Flow 57.11

11-12-94 #9

Test # 15 - 3:15

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	182.6	488	740	64	126	302	8.74
120 CE	199.7	489	722	64	126	303	9.71
#2 HE	215.4	484	741	64	126	298	10.50
264 CE	193.7	490	754	64	126	301	9.65
#3 HE	174.0	489	746	64	126	296	8.50
3 CE	199.1	473	757	64	126	302	9.76

BHP = 1225.7 Load = 99.2 %

Flow = 56.86

11-12-94 3:45 Test # 16

	HP	P _s	P _D	T _s	T _D	RPM	Flow
1 HE	183.1	489	745	63	126	304	8.97
120 CE	200.5	487	769	63	126	303	9.71
2 HE	220.6	485	742	63	126	305	10.71
264 CE	194.8	488	753	63	126	302	9.60
3 HE	178.7	495	744	63	126	300	8.96
48 CE	198.9	492	756	63	126	301	9.72

BHP = 1238.5 Load = 100.2 %

Flow = 57.67

11-12-94 4:15 PM Test # 17

	HP	P _s	P _D	T _s	T _D	RPM	Flow
1 HE	182.0	486	734	63	126	299	8.69
CE	198.6	490	771	63	126	300	9.56
2 HE	219.1	486	742	63	126	301	10.65
CE	193.1	491	751	63	126	300	9.63
3 HE	182.1	496	747	63	126	302	9.05
CE	196.1	488	751	63	126	298	9.66

BHP = 1232.6 Load = 99.5 %

Flow = 57.51

██████ #9

11-12-94

TEST #18 4:45 PM

	HP	P _s	P _D	T _s	T _D	RPM	FLOW
1 HE	182.0	487	738	63	126	299	8.80
120 CE	199.8	492	771	63	126	304	9.83
2 HE	219.5	485	742	63	126	302	10.67
204 CE	193.6	490	752	63	126	301	9.64
3 HE	181.4	496	747	63	126	302	9.05
48 CE	199.1	492	759	63	126	301	9.74
BHP = 1237.2		LOAD = 100.1 %		FLOW =		57.73	

██████████ #13 11.11.94
230 RPM Full load

IHP	Peak	IHP	Peak
1L- 336.5	650	1R- 335.5	690
2L- 339.8	685	2R- 325.0	660
3L- 342.3	700	3R- 353.8	750
4L- 352.2	725	4R- 366.9	650
5L- 347.1	700	5R- 345.3	710

#1 HE 514.8

CE 515.5

#2 HE 582.5

CE 516.6

#3 HE 574.2

CE 523.7

BHP 3397.1

~~970%~~
105 1/2%

100% = 3,219 HP @ 230 RPM

230 RPM @ 96% load

IHP	Peak	IHP	Peak
1L- 335.5	670	1R- 326.5	660
2L- 341.0	680	2R- 317.5	650
3L- 338.4	700	3R- 341.1	715
4L- 344.1	705	4R- 333.6	630
5L- 334.8	670	5R- 324.6	685

#1 HE 515.9

CE 516.2

245 532.0

CE 473.4

345 580.6

CE 513.5

3296.4

102%

514.4

514.8

521.2

472.3

537.5

466.4

3185.8

98%

511.6

516.7

521.0

469.4

492.2

425.3

3090.7

96%



#13

11-14-94

Before

Balance

3500

IHP Peak

IHP Peak

#1 HE 572.6

1L-387.1 685 12-353.3 610

CE 511.0

2L-347.4 605 22-374 700

#2 HE 531.7

3L-388.5 705 32-398.7 750

CE 471.1

4L-360.1 662 42-374.2 400

#3 HE 538.4

5L-385.3 695 52-369.3 685

CE 524.3

after 363.8

94% 3314.8

IHP Peak

IHP Peak

63

1L-368.7 685

1L-369.1 690

63

2L-369.5 690

22-367.9 685

61

3L-370.3 695

32-373.7 705

4L-366.8 695

42-372.3 685

502-710

5L-368.2 690

52-365.5 685

TEST #1

Planned #13

11-14-94

IHP

P_sP_DT_sT_DR_{2M}

Flow

#1 HE 571.1

494-708

63

120

250

29.4

CE 522.7

502-718

253

27.4

#2 HE 539.1

494-725

63

120

253

29.0

CE 478.7

491-709

253

26.3

#3 HE 538

489-720

64

120

253

29.1

CE 526.7

503-724

254

29.7

340 3343.5

100%

95.5%

Flow 170,90

IHP

P_sP_DT_sT_DR_{2M}

Flow

#1 HE 587.2

497-705

63

120

254

30.2

CE 525.0

500-714

254

27.6

#2 HE 542.1

495-725

63

120

254

29.5

CE 479.8

489-710

253

26.2

#3 HE 542.4

491-721

64

120

254

29.3

CE 521.5

499-722

252

29.3

340 3344.3

96.1%

Flow 172,10

F-131

Test #3 11-17-94 10:45 Am

I#	P _s	P ₀	T _s	T ₀	R _{pm}	F _{low}
#1 HE	579.6	445	706	63	121	252 29.6
CE	522.8	497	716			253 27.1
#2 HE	542.7	491	724	64	121	254 28.9
CE	480.4	487	708			254 26.2
#3 HE	539.6	487	723	64	121	254 28.8
CE	524.8	500	722			253 29.4
BHP	3357.7		95.9%			170.00

Test #4 11-14-94 11:20 Am

I#	P _s	P ₀	T _s	T ₀	R _{pm}	F _{low}
#1 HE	579.7	494	706	64	121	252 26.4
CE	521.3	498	714			252 26.9
#2 HE	535	491	725	65	121	253 28.8
CE	479.5	487	707			253 26.1
#3 HE	532	488	718	65	121	251 28.7
CE	521.9	497	723			252 29.0
BHP	3340.4		95.4%			Flow 165.90

Test #5 11-14-94 2:30

I#	HP	P _s	P ₀	T _s	T ₀	R _{pm}	F _{low}
#1 HE	486.9	491	714	63	122	230	26.3
CE	486.1	497	720			232	26.8
#2 HE	490.2	480	728	64	122	233	27.7
CE	443.3	483	718			231	25.3
#3 HE	465.4	488	698	64	123	233	26.8
CE	404.1	484	714			233	27.4
BHP	2922.1		91%				Flow 156.30

Test #6
11-14-94 #13 2:55 PM

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	486.0	490	714	64	123	233	26.4
CE	488.9	495	720			233	26.7
#2 HE	485.5	477	726	64	122	233	27.3
CE	477.9	481	717			233	25.3
#3 HE	467.2	486	697			233	26.7
CE	403.8	483	714	64	123	233	23.2
BHP = 2961.4 92.0%							155.60

test #7

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	512	489	712	64	121	232	24.4
CE	515.4	495	720			233	24.9
#2 HE	518.7	478	725	64	121	233	27.6
CE	474.8	479	715			233	25.3
#3 HE	494.6	486	697	64	122	233	24.4
CE	427.5	483	714			233	23.5
3 #P. 3097.8 Load 96.2%							flow 156.3

test #8

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	512.3	491	715	65	123	232	26.3
CE	518.8	495	721			234	24.9
#2 HE	516.9	477	725	65	121	232	27.5
CE	471.4	479	718			232	25.2
#3 HE	492.4	487	698	65	123	233	26.9
CE	428.4	483	714			233	23.2
BHP 3095.1 Load 96.1%							flow 156.0

test #9 11-14-94 3:45 pm #13

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	511.6	489	714	64	123	232	26.3
CE	513.3	494	718			231	26.1
#2 HE	519.1	478	724	65	123	233	27.3
CE	474.5	478	714			233	25.2
#3 HE	493.5	487	699	65	124	233	26.8
CE	428.9	483	714			233	23.2

BHP 3095.4

Test #10 4:00 pm	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	515.1	489	713	64	122	234	26.5
CE	518.4	494	722			233	26.9
#2 HE	517.3	476	724	65	122	232	27.2
CE	471.5	479	714			232	25.2
#3 HE	494.3	484	694	65	122	233	26.5
CE	422.2	483	714			231	23.0

BHP 3150.3

load 97.8%

230 RPM Unloaded

Flow 155.3

IHP	Peak	#1 HE
1L - 263.8	520	469.9
2L - 306.4	610	CE 465.7
3L - 317.7	640	#2 HE 437.7
4L - 307.2	650	CE 437.6
5L - 299.9	600	#3 HE 444.4
11L - 306.6	610	CE 438.6
22L - 295.7	600	BHP 2835.7
32L - 323.0	700	
42L - 319.9	600	
52L - 299.5	600	

88%

Test #11 11.14.94 [REDACTED] #13 - 5:00 PM
230 RPM unloaded

	HP	T _S	P _D	T _S	T _D	RPM	Flow
#1 HE	476	489	708	64	120	234	24.7
CE	469.4	494	726			234	24.5
#2 HE	434.8	485	732	64	120	234	23.2
CE	433	481	709			233	23.4
#3 HE	444.7	485	711	64	120	233	23.9
CE	431.3	489	710			230	24.0
BHP	2830.7		87.9% load				Flow 143.7

Test #12 5:07 PM

	HP	P _S	P _D	T _S	T _D	RPM	Flow
#1 HE	468.1	489	708	64	120	231	24.2
CE	466.8	492	724			233	24.4
#2 HE	432.1	486	729	64	120	232	23.3
CE	423.9	483	708			229	23.2
#3 HE	435.7	488	714	64	120	229	23.8
CE	439.1	491	715			233	24.4
BHP	2706		87.1% load				Flow 143.3

Test #13 5:30 PM

	HP	P _S	P _D	T _S	T _D	RPM	Flow
#1 HE	472.9	488	708	64	122	233	24.1
CE	464.7	493	724			232	23.9
#2 HE	433.8	484	730	64	122	233	22.9
CE	434.6	481	710			234	23.3
#3 HE	445.6	485	713	64	122	233	23.9
CE	436.4	491	714			232	24.2
BHP	2829.4		87.8% load				Flow 142.3

Test #14 6:00 PM 230 RPM Unloaded #13

	HP	P_s	P_o	T_s	T_o	RPM	Flow
#1 HE	474.2	487	707	64	122	233	23.9
CE	468.3	491	723			234	24
#2 HE	436.7	483	729	64	122	234	23.3
CE	432.7	479	709			232	23.1
#3 HE	448.4	484	712	65	122	235	24
CE	438	493	713			232	24.2
BHP	2840.6						
				Load	88.2%		Flow 142.5

HP Peak IN2 Peak

1L-351.4	510	1R-342.6	580
2L-351.5	560	2R-341.5	560
3L-358.6	580	3R-362.7	690
4L-324.6	540	4R-337.7	500
5L-353.6	590	5R-338.6	590

#1 HE 546.4
CE 525.5
#2 HE 491.2
CE 480.2
#3 HE 492.1
CE 479.5 BHP 3173.5

Test #15 18:55 250 RPM Unloaded

	HP	P_s	P_o	T_s	T_o	RPM	Flow
#1 HE	541.9	486	702	63	124	254	26.2
CE	517.5	486	704			253	27.1
#2 HE	495.2	482	718	64	124	255	25.0
CE	484.1	476	706			254	24.9
#3 HE	489.8	485	724	64	125	252	25.0
CE	487	488	717			254	25.6
BHP	3174.2						Flow 153.8
				Load	90.1%		

240 RPM #13 11-14-94
 f Pockets Closed
 IHD Peak IHD Peak
 #1L- 346.7 660 12 348.1 685
 2L- 352.6 695 22- 335.4 670
 3L- 355.8 705 32- 358.0 750
 4L- 355.3 695 42- 348.7 600
 5L- 348.0 670 52 338.2 675

3360 = 100%

#1HE 504.9

CE 546.2

#2HE 448.3

CE 578.3

#3HE 475

CE 502.6

3216.1 95.7%

240 RPM 2 Pockets Closed
 1L- 329.1 600 1R- 339 670
 2L- 341.3 650 22- 331.8 650
 3L- 342.9 690 32- 352 730
 4L- 339.2 665 42- 337.9 590
 5L- 339.3 630 52- 327.7 640

#13
11-14-94 7:05 PM Test #16

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	544.7	486	701	61	123	253	26.2
CE	517.6	485	704			252	25.5
#2 HE	486.6	484	724	65	124	252	24.6
CE	483.4	478	710			254	24.9
#3 HE	494.4	484	723	65	125	254	25.1
CE	484.1	489	718			253	25.5
BHP	3169.2		90.1% load				

Flow 151.8
Test #17 240 RPM & Pockets Closed 8:25 PM

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	507	483	705	63	124	244	24.6
CE	495.2	486	717			243	24.6
#2 HE	448.4	480	731	63	124	241	21.7
CE	511.5	475	709			244	26.0
#3 HE	473.2	483	718	63	124	242	24.2
CE	510.3	482	711			244	26.9
BHP	3100.6		92.3% load				

Flow 148.0
Test #18 8:35 PM

	HP	P _s	P _D	T _s	T _D	RPM	Flow
#1 HE	496.5	481	706	63	124	241	24.3
CE	493	484	714			242	24.4
#2 HE	457.2	477	727	63	124	245	23.3
CE	505.3	473	710			242	25.9
#3 HE	472.7	484	713	63	124	241	24.2
CE	512.2	481	709			244	26.9
BHP	3091.5		Load 72%				

Flow 149.0

 #11 11-15-94

Before

	IHD	Peak	IHD	Peak
#1 HE 232.9	#1L-125.1	520	12- 212.7	785
CE 224.1	2L-208.9	750	22- 191.4	705
#2 HE 231.3	3L-229.3	800	32- 189.1	690
CE 212.9	4L-217.2	800	42- 214.5	780
#3 HE 234.0	5L-208.0	750	5L-204.8	765
CE 214.1				

200

Balance

1L- 185		12-	
2L-		22-	
3L- 206	710	32- 203	710
4L- 204	730	42- 204	715
5L-		52-	

AFTER

1L- 206	710	12- 206	715
2L- 206	705	22- 203	700
3L- 205	700	32- 207	710
4L- 204	705	42- 205	715
5L- 208	710	52- 207	700

#1L- 202.3	710	12- 203.5	710
2L- 205.7	715	22- 201.0	700
3L- 201	700	32- 207.1	700
4L- 202.2	705	42- 201.3	705
5L- 206.7	710	52- 201.8	705

#1 HE 231.2	
CE 221.8	1803.8
#2 HE 229.3	
CE 210.7	100.2%
#3 HE 234.2	
CE 214.3	
#4 HE 197.9	
CE 174.3	

TEST #1 10:00 AM

#11
11-15-94

	HP	P _S	P _D	T _S	T _D	RPM	Flow
#1 HE	229.8	467	712	64	129	300	
CE	221.3	474	713			301	
#2 HE	229.4	468	718	63	125	301	
CE	211.1	467	719			299	
#3 HE	236.6	467	715	63	125	302	
CE	211.2	470	718			297	
#4 HE	197.7	472	693	64	125	300	
CE	173.8	466	698			301	

3HP 1800.5

load 100%

Flow

TEST #2 10:32 AM

	HP	P _S	P _D	T _S	T _D	RPM	Flow
#1 HE	227.6	466	711	64	125	298	11.2
CE	220.1	472	709			299	10.7
#2 HE	229.7	467	719	63	125	301	11.3
CE	211.7	466	721			301	10.4
#3 HE	231.8	464	716	63	125	298	11.2
CE	213.3	468	717			300	10.5
#4 HE	197.7	470	692	64	125	301	9.30
CE	172.8	467	702			299	8.60
	1794.4	99.7%					833

Test #3 11:00 AM

	HP	T_s	P_D	T_s	T_D	RPM	flow
#1 HE	231.6	463	703	64	131	302	11.3
CE	223.1	467	711			303	10.6
#2 HE	225.6	466	718	64	126	301	11.3
CE	210.3	467	717			299	10.4
#3 HE	234.4	464	716	63	127	300	11.2
CE	214.5	468	726			301	10.5
#4 HE	198.1	470	694	63	127	301	8.63
CE	172.2	467	703			298	8.56
BHP	1804			load	100.2	Flow	82.49

Test #4 12:25

	HP	T_s	P_D	T_s	T_D	RPM	flow
#1 HE	201.7	469	697	63	131	302	
CE	179	471	711			300	
#2 HE	191.5	466	696	63	126	299	
CE	170.7	464	694			301	
#3 HE	197.7	469	698	63	127	297	
CE	175.4	473	705			300	
#4 HE	200	474	693	63	125	301	
CE	176.6	470	704			299	
BHP	1573.6			87.30%	load	Flow	

12:00 PM HP

1L 180.0
2L 192.7
3L 176.2
4L 186.4
5L 190.3

Peaks

620
640
610
600
610

HP

1R 183.0
2R 144.5
3R 173.4
4R 174.4
5R 174.1

Peaks

620
540
600
600
600

Load

#1 HE 202.2 #3 HE 201.7
CE 180.6 CE 175.6
2 HE 190.7 4 HE 198.9
CE 170.5 CE 176.4
BHP 1574.9 Load 87.5%

Test 5 12:35

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	199.6	469	696	63	131	299	9.63
CE	177.3	469	709			298	8.68
#2 HE	191.8	465	697	63	126	300	9.60
CE	170.3	464	695			300	8.55
#3 HE	195.7	471	699	63	127	294	9.63
CE	175.8	471	706			301	8.77
#4 HE	198.9	472	695	63	125	299	9.80
CE	177.7	467	698			302	8.93
BHP	1565.3	Load 870%					Flow 73.42

Test 6 1:00 PM

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	200.4	473	701	64	131	301	9.80
CE	176.3	467	711			297	9.56
#2 HE	187.7	467	696	64	127	294	9.40
CE	170.9	462	692			300	8.49
#3 HE	201.2	467	699	64	126	301	9.75
CE	173.2	470	709			298	8.69
#4 HE	199.4	471	693	64	126	300	9.78
CE	177.7	467	698			302	8.79

BHP 1565.1
RPM @ HP 295

Load 86.9%

	Peak	HP	Peak
1L	590	1R	600
2L	620	2R	500
3L	600	3R	540
4L	610	4R	590
5L	620	5R	540

Flow 73.26

#1 HE	181.3	#4 HE	184.6
CE	166.1	CE	168.6
#2 HE	177.1		
CE	162.3		
#3 HE	187.4		
CE	164.4		
BHP	1470		86%

1710
11-15-94 PIRANS 11A
Test #7

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	184.6	471	701	64	129	284	
CE	166	467	706			285	
2 HE	179.2	465	705	64	127	285	
CE	161.8	465	694			285	
3 HE	185.5	470	702	64	126	284	
CE	162.8	471	704			283	
4 HE	185.5	470	694	64	125	287	
CE	166.7	469	704			284	

BHP 146.5

Load 85.670

Flow

Test #	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
Test # 2.30							
#1 HE	186.7	471	699	64	129	286	9.22
CE	164.5	471	715			283	8.22
2 HE	177.6	468	702	64	127	283	8.91
CE	163.1	463	700			288	9.49
#3 HE	186	464	701	64	126	284	9.20
CE	162.7	471	703			282	8.20
#4 HE	181.6	468	692	64	125	283	9.11
CE	167.2	469	700			285	8.40
	1462.5		85.570				69.75

1 HE 184
CE 204.2

2 HE 191.6

CE 195.7

BHP 1411.5

3 HE 217

CE 197.8

4 HE 187.5

CE 162.8

9470

#1 HE 183.6

CE 207.5

#2 HE 212.8

CE 197.5

BHP 1653.3 96.670

#3 HE 218.6

CE 200.5

#4 HE 185.6

CE 164.6

1710 11-15-94 300PM
~~11-15-94~~

#1 HE 215.2

CE 208.6

2 HE 209.5

CE 198.5

3 HE 219.4

CE 204.2

4 HE 213.9

CE 164.6

BHP 1719.8 Load 100.5%
 Plains #11

TEST #9

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE 213.4	460	705	64	128	284		
CE 220.7	470	694			285		
#2 HE 212.1	464	713	64	127	285		
CE 198.6	467	710			285		
#3 HE 220.8	467	711	64	124	286		
CE 204.2	467	711			285		
#4 HE 215.4	463	714	64	124	286		
CE 164.2	467	707			285		

BHP 1736.8

Load 106.5% Flow

HP	Peak
1L - 192.7	812 12- 191.9 840
2L - 201.4	820 2R- 1862 790
3L - 188.1	790 3R- 181.5 790
4L - 188.1	790 4R- 180.9 800
5L - 195.3	820 5R- 180.1 780

11-15-94 11A [REDACTED]

Test #10 4:15 PM

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
#1 HE	214.8	460	706	64	128	285	10.5
CE	207.6	470	694			285	10.2
2 HE	213.1	462	709	64	127	286	10.6
CE	198.2	466	709			285	9.90
3 HE	218.9	464	708	64	124	285	10.7
CE	202.9	466	707			293	9.98
4 HE	213.5	461	715	64	124	283	10.4
CE	164.6	465	708			285	8.10
3HP	1719.5	101.0% load				flow	80.4

Test #11

	HP	P _s	P ₀	T _s	T ₀	RPM	Flow
1 HE	216.6	461	710	64	130	287	10.0
CE	208.4	469	694			285	9.75
2 HE	213.3	460	706	63	126	286	10.0
CE	198.6	464	711			286	9.29
3 HE	221.1	464	711	63	126	287	10.1
CE	204.5	465	713			285	9.37
4 HE	215.3	460	712	64	126	285	10.5
CE	164.4	465	705			285	8.06
3HP	1728.6	101.1% load				Flow	77.1

1758

11-15-94

11A

Test 12 J130

	HP	P _s	P _d	T _s	T _d	RPM	Flow
1 HE	189.2	467	694	63	131	292	
CE	212.8	471	726			293	
2 HE	186	463	704	63	128	293	
CE	204.1	468	709			292	
3 HE	190.2	465	701	63	125	292	
CE	208.4	467	716			291	
4 HE	223.6	467	711	64	125	292	
CE	170.8	467	705			293	

BHP 1667.8 HP @ 292

Load 95.2 90

1 HE 190.2

3 HE 193.6

CE 211.4

CE 207.6

2 HE 185.0

4 HE 223.0

CE 204.4

CE 169.4

BHP 1668

9590

	HP	Peak
1L	189.2	670
2L	201.3	680
3L	184.3	660
4L	188.1	670
5L	189.6	680
1R	189.6	700
2R	181.2	620
3R	177.4	600
4R	185.1	660
5R	179.1	640

Test 16 Pin 11-15-94
540 pm

	HP	P _s	P _d	T _s	T _d	RPM	Flow
1 HE	189	467	692	63	131	291	9.31
CE	210	468	718			290	10.3
2 HE	184.1	463	700	63	128	290	8.96
CE	206.2	464	707			293	10.1
3 HE	192.3	463	696	63	125	294	9.21
CE	210.6	469	718			294	10.3
4 HE	223.2	466	714	64	125	291	10.9
CE	169.7	466	708			291	8.33
BHP 1668.6		Load 95.2				Flow 77.4	

Test 17 6:10

	HP	P _s	P _d	T _s	T _d	RPM	Flow
1 HE	190.3	465	691	63	130	293	9.34
CE	212.6	465	720			293	10.3
2 HE	186.1	462	699	64	126	293	9.12
CE	204.4	467	711			292	10.1
3 HE	190.3	469	704	64	120	291	9.24
CE	208.5	468	720			291	10.2
4 HE	223.7	466	711	63	125	293	10.9
CE	170.3	465	705			291	8.30
BHP 1669.0		Load 95.390				Flow 77.5	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	301.0	RPM	L O INLET	136.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	58.0	DEG F
FUEL FLOW	14195.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	213.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	5.0	MILS	POWER CYL 5L	66.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10: 20: 10

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	299.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	50.0	PSIG	FUEL GAS	58.0	DEG F
FUEL FLOW	14141.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	212.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	5.0	MILS	POWER CYL 5L	67.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	10: 25: 10

1	3	5	7	9	11	13	15
TATION						PRINT	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	301.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	58.0	DEG F
FUEL FLOW	14257.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	5.0	MILS	POWER CYL 5L	67.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10:30:10

F-150

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	299.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	50.0	PSIG	FUEL GAS	50.0	DEG F
FUEL FLOW	14154.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VERATION	6.0	MILS	POWER CYL 5L	67.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2023.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	10:36:02

1	3	5	7	9	11	13	15
FATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	50.0	PSIG	FUEL GAS	58.0	DEG F
FUEL FLOW	14143.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	212.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	66.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10:40:20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	50.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14159.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	67.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3161	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10: 45: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	301.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	50.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14143.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	212.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	68.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10: 50: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14195.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	212.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	66.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 10: 55: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	299.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	"H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14188.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	"H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	67.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 11: 00:19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14177.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	68.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 11: 05: 20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	301.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	J W OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14206.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	210.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	68.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	11: 10: 29

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	299.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	43.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	69.0	DEG F
FUEL FLOW	14258.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	211.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	69.0	DEG F
FUEL VALVE OUTPUT	63.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	11: 15: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	299.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	51.0	PSIG	FUEL GAS	59.0	DEG F
FUEL FLOW	14162.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	210.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	69.0	DEG F
FUEL VALVE OUTPUT	62.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3162	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 11: 20: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	302.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	61.0	DEG F
FUEL FLOW	13061.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	198.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	70.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3163	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 12: 25: 19

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1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	61.0	DEG F
FUEL FLOW	12989.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	196.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	70.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3163	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 12: 30: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13006.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	197.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	70.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3163	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	12: 35: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	38.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	45.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	12953.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	196.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3163	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 12:40:20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	302.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13103.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	194.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	70.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3163	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 12: 45: 20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	302.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	38.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	12951.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	197.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3164	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	12: 50: 19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	302.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	38.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	12941.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	196.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3164	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	12: 55: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	300.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	38.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	12962.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	197.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3164	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	13: 00:19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	301.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	28.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	46.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13058.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	196.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3164	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	13: 05: 30

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	42.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11949.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	168.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 13: 50: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	42.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11917.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	170.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	13: 55: 19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	283.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	J W OUTLET	170.0	DEG F
FUEL STATIC	41.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11901.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	167.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	14: 00: 20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	41.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11923.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	168.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	14: 05: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	42.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11970.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	168.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	14:10:19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	283.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	152.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	35.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	41.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	11919.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	168.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	55.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 14: 15: 19

1	3	5	7	9	11	13	15
TATIO						PRINT	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	162.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	37.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	43.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	12325.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	169.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	73.0	DEG F
FUEL VALVE OUTPUT	56.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3165	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2823.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1077.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	14: 20: 19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	286.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13436.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	183.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	73.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	285.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13422.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	182.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	8.0	MILS	POWER CYL 5L	74.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16: 25: 19

1	3	5	7	9	11	13	15
TATION						PRINT	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	283.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13455.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	181.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	76.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 16:30:19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	285.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13416.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	182.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	78.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16: 35: 19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	285.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13441.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	184.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	77.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16:40:19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	285.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	63.0	DEG F
FUEL FLOW	13462.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	183.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	10.0	MILS	POWER CYL 5L	74.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3167	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16:45:19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	284.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	48.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13560.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	183.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	76.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16: 50: 20

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	286.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	25.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13470.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	183.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	710.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	8.0	MILS	POWER CYL 5L	75.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1024.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	16: 55: 20

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	292.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13177.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	189.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	293.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	166.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	165.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13304.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	188.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	293.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13215.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	190.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1024.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	291.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13220.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	189.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3168	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	291.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	165.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13286.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	188.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	17: 50: 29

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	291.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13242.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	189.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	74.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	292.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	156.0	DEG F
L O FILTER DIFF	2.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	J W OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13247.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	190.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 18: 00: 19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	294.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13242.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	191.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	72.0	DEG F
FUEL VALVE OUTPUT	58.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	18: 05: 19

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	292.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	62.0	DEG F
FUEL FLOW	13258.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	190.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94	18: 10: 19

1	3	5	7	9	11	13	15
TATION						PRINT	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	291.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	39.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	61.0	DEG F
FUEL FLOW	13215.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	190.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 18:15:20

F-194

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	291.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	26.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	40.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	47.0	PSIG	FUEL GAS	61.0	DEG F
FUEL FLOW	13235.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	189.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	6.0	MILS	POWER CYL 5L	70.0	DEG F
FUEL VALVE OUTPUT	59.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 18: 20: 20

1	3	5	7	9	11	13	15
TATION						PRINT	

UNIT NO. 11

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	298.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	27.0	PSIG	L O OUTLET	155.0	DEG F
L O FILTER DIFF	2.0	PSIG	JW INLET	164.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	170.0	DEG F
FUEL STATIC	48.0	PSIG	FUEL GAS	61.0	DEG F
FUEL FLOW	13682.0	SCFHR	POWER CYL 1L	2192.0	DEG F
SCAV PRESS	201.0	" H2O	POWER CYL 2L	2192.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	2192.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	2192.0	DEG F
VIBRATION	7.0	MILS	POWER CYL 5L	71.0	DEG F
FUEL VALVE OUTPUT	60.0	%	POWER CYL 1R	2192.0	DEG F
MONTHLY FIRED HOURS	3169	HRS	POWER CYL 2R	2192.0	DEG F
POWER CYL TRABON COUNT	2843.0	QTS	POWER CYL 3R	2192.0	DEG F
COMP CYL TRABON COUNT	1084.0	QTS	POWER CYL 4R	2192.0	DEG F
POWER CYL 24 HR. TOT	20.0	QTS	POWER CYL 5R	2192.0	DEG F
COMP CYL 24 HR. TOT	8.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/15/94 18:25:10

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	249.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	154.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	173.0	DEG F
FUEL STATIC	63.0	PSIG	FUEL GAS	70.0	DEG F
FUEL FLOW	27487.0	SCFHR	POWER CYL 1L	648.0	DEG F
SCAV PRESS	192.0	" H2O	POWER CYL 2L	696.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	658.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	717.0	DEG F
VIBRATION	34.0	MILS	POWER CYL 5L	652.0	DEG F
FUEL VALVE OUTPUT	81.0	%	POWER CYL 1R	682.0	DEG F
MONTHLY FIRED HOURS	1541	HRS	POWER CYL 2R	737.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	638.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	885.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	658.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	10: 31: 58

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	251.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	154.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	173.0	DEG F
FUEL STATIC	63.0	PSIG	FUEL GAS	70.0	DEG F
FUEL FLOW	27579.0	SCFHR	POWER CYL 1L	649.0	DEG F
SCAV PRESS	195.0	" H2O	POWER CYL 2L	696.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	660.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	33.0	MILS	POWER CYL 5L	654.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	681.0	DEG F
MONTHLY FIRED HOURS	1541	HRS	POWER CYL 2R	736.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	638.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	885.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	659.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 10:36:05

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	248.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	154.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	173.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	70.0	DEG F
FUEL FLOW	27618.0	SCFHR	POWER CYL 1L	653.0	DEG F
SCAV PRESS	192.0	" H2O	POWER CYL 2L	694.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	658.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	720.0	DEG F
VIBRATION	34.0	MILS	POWER CYL 5L	654.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	684.0	DEG F
MONTHLY FIRED HOURS	1541	HRS	POWER CYL 2R	739.0	DEG F
POWER CYL TRABON COUNT	2674.0	QTS	POWER CYL 3R	639.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	887.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	658.0	DEG F
COMP CYL 24 HR. TOT	18.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 10: 41: 03

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	251.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	164.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	59.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG F
FUEL FLOW	27636.0	SCFHR	POWER CYL 1L	652.0	DEG F
SCAV PRESS	194.0	" H2O	POWER CYL 2L	697.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	658.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	721.0	DEG F
VIBRATION	36.0	MILS	POWER CYL 5L	654.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	684.0	DEG F
MONTHLY FIRED HOURS	1541	HRS	POWER CYL 2R	737.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	638.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	884.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	668.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 10: 46: 13

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	250.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	154.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG F
FUEL FLOW	27426.0	SCFHR	POWER CYL 1L	651.0	DEG F
SCAV PRESS	194.0	" H2O	POWER CYL 2L	695.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	658.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	719.0	DEG F
VIBRATION	38.0	MILS	POWER CYL 5L	655.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	683.0	DEG F
MONTHLY FIRED HOURS	1542	HRS	POWER CYL 2R	737.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	638.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	892.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	657.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 10: 52: 43

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	251.0	RPM	L O INLET	139.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	164.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG F
FUEL FLOW	27528.0	SCFHR	POWER CYL 1L	654.0	DEG F
SCAV PRESS	192.0	" H2O	POWER CYL 2L	698.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	659.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	36.0	MILS	POWER CYL 5L	653.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	681.0	DEG F
MONTHLY FIRED HOURS	1542	HRS	POWER CYL 2R	741.0	DEG F
POWER CYL TRABON COUNT	2674.0	QTS	POWER CYL 3R	639.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	886.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	660.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 10: 55: 36

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	249.0	RPM	L O INLET	138.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	153.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	165.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	174.0	DEG F
FUEL STATIC	84.0	PSIG	FUEL GAS	72.0	DEG F
FUEL FLOW	27520.0	SCFHR	POWER CYL 1L	648.0	DEG F
SCAV PRESS	190.0	" H2O	POWER CYL 2L	699.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	658.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	34.0	MILS	POWER CYL 5L	655.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	683.0	DEG F
MONTHLY FIRED HOURS	1542	HRS	POWER CYL 2R	738.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	639.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	886.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	657.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 11: 16: 58

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	251.0	RPM	L O INLET	137.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	157.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	164.0	DEG F
FUEL DIFF	58.0	" H2O	JW OUTLET	173.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	64.0	DEG F
FUEL FLOW	27549.0	SCFHR	POWER CYL 1L	651.0	DEG F
SCAV PRESS	191.0	" H2O	POWER CYL 2L	696.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	660.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	717.0	DEG F
VIBRATION	30.0	MILS	POWER CYL 5L	655.0	DEG F
FUEL VALVE OUTPUT	80.0	%	POWER CYL 1R	684.0	DEG F
MONTHLY FIRED HOURS	3139	HRS	POWER CYL 2R	738.0	DEG F
POWER CYL TRABON COUNT	2803.0	QTS	POWER CYL 3R	639.0	DEG F
COMP CYL TRABON COUNT	1069.0	QTS	POWER CYL 4R	890.0	DEG F
POWER CYL 24 HR. TOT	19.0	QTS	POWER CYL 5R	660.0	DEG F
COMP CYL 24 HR. TOT	7.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 11: 32: 38

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	231.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	25288.0	SCFHR	POWER CYL 1L	656.0	DEG F
SCAV PRESS	156.0	" H2O	POWER CYL 2L	702.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	664.0	DEG F
DISCHARGE GAS	711.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	39.0	MILS	POWER CYL 5L	653.0	DEG F
FUEL VALVE OUTPUT	73.0	%	POWER CYL 1R	686.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	745.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	635.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	868.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	649.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 14: 51: 00

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION

ENGINE SPEED	230.0 RPM
LUBE OIL PRESS	35.0 PSIG
L O FILTER DIFF	1.0 PSIG
FUEL DIFF	49.0 " H2O
FUEL STATIC	64.0 PSIG
FUEL FLOW	25226.0 SCFHR
SCAV PRESS	154.0 " H2O
INLET DIFF	3.0 " H2O
DISCHARGE GAS	712.0 PSIG
VIBRATION	29.0 MILS
FUEL VALVE OUTPUT	73.0 %
MONTHLY FIRED HOURS	1546 HRS
POWER CYL TRABON COUNT	2574.0 QTS
COMP CYL TRABON COUNT	982.0 QTS
POWER CYL 24 HR. TOT	45.0 QTS
COMP CYL 24 HR. TOT	16.0 QTS
CRANKCASE COUNTS	0.0 QTS

DESCRIPTION

L O INLET
L O OUTLET
J W INLET
JW OUTLET
FUEL GAS
POWER CYL 1L
POWER CYL 2L
POWER CYL 3L
POWER CYL 4L
POWER CYL 5L
POWER CYL 1R
POWER CYL 2R
POWER CYL 3R
POWER CYL 4R
POWER CYL 5R

VALUE UNITS

134.0	DEG F
149.0	DEG F
163.0	DEG F
172.0	DEG F
74.0	DEG F
652.0	DEG F
702.0	DEG F
666.0	DEG F
718.0	DEG F
654.0	DEG F
688.0	DEG F
742.0	DEG F
636.0	DEG F
877.0	DEG F
649.0	DEG F

11/14/94 15:00:20

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	228.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	J W OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	25294.0	SCFHR	POWER CYL 1L	656.0	DEG F
SCAV PRESS	155.0	" H2O	POWER CYL 2L	703.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	665.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	34.0	MILS	POWER CYL 5L	652.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	686.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	741.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	636.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	874.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	647.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15: 13: 09

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	231.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	26214.0	SCFHR	POWER CYL 1L	665.0	DEG F
SCAV PRESS	156.0	" H2O	POWER CYL 2L	703.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	665.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	719.0	DEG F
VIBRATION	33.0	MILS	POWER CYL 5L	654.0	DEG F
FUEL VALVE OUTPUT	73.0	%	POWER CYL 1R	686.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	742.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	636.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	871.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	649.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15: 15: 26

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	J W OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	25189.0	SCFHR	POWER CYL 1L	655.0	DEG F
SCAV PRESS	156.0	" H2O	POWER CYL 2L	701.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	665.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	720.0	DEG F
VIBRATION	35.0	MILS	POWER CYL 5L	553.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	686.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	741.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	635.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	876.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	648.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15:20:10

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION

ENGINE SPEED
LUBE OIL PRESS
L O FILTER DIFF
FUEL DIFF
FUEL STATIC
FUEL FLOW
SCAV PRESS
INLET DIFF
DISCHARGE GAS
VIBRATION
FUEL VALVE OUTPUT
MONTHLY FIRED HOURS
POWER CYL TRABON COUNT
COMP CYL TRABON COUNT
POWER CYL 24 HR. TOT
COMP CYL 24 HR. TOT
CRANKCASE COUNTS

VALUE UNITS

230.0 RPM
35.0 PSIG
1.0 PSIG
49.0 " H2O
64.0 PSIG
25191.0 SCFHR
156.0 " H2O
3.0 " H2O
712.0 PSIG
48.0 MILS
73.0 %
1547 HRS
2574.0 QTS
982.0 QTS
45.0 QTS
16.0 QTS
0.0 QTS

DESCRIPTION

L O INLET
L O OUTLET
J W INLET
J W OUTLET
FUEL GAS
POWER CYL 1L
POWER CYL 2L
POWER CYL 3L
POWER CYL 4L
POWER CYL 5L
POWER CYL 1R
POWER CYL 2R
POWER CYL 3R
POWER CYL 4R
POWER CYL 5R

VALUE UNITS

134.0 DEG F
149.0 DEG F
163.0 DEG F
172.0 DEG F
74.0 DEG F
656.0 DEG F
700.0 DEG F
665.0 DEG F
718.0 DEG F
652.0 DEG F
687.0 DEG F
745.0 DEG F
633.0 DEG F
873.0 DEG F
648.0 DEG F

11/14/94 15:50:51

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	25208.0	SCFHR	POWER CYL 1L	654.0	DEG F
SCAV PRESS	155.0	" H2O	POWER CYL 2L	703.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	669.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	718.0	DEG F
VIBRATION	38.0	MILS	POWER CYL 5L	653.0	DEG F
FUEL VALVE OUTPUT	73.0	%	POWER CYL 1R	686.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	742.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	634.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	877.0	DEG F
POWER CYL 24 HR. TOT	43.0	QTS	POWER CYL 5R	649.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15:30:45

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	229.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	26241.0	SCFHR	POWER CYL 1L	655.0	DEG F
SCAV PRESS	156.0	" H2O	POWER CYL 2L	639.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	664.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	717.0	DEG F
VIBRATION	36.0	MILS	POWER CYL 5L	654.0	DEG F
FUEL VALVE OUTPUT	73.0	%	POWER CYL 1R	687.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	744.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	633.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	876.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	650.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15:45:13

1	3	5	7	9	11	13	15
STATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	229.0	RPM	L O INLET	134.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	50.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	25460.0	SCFHR	POWER CYL 1L	653.0	DEG F
SCAV PRESS	155.0	" H2O	POWER CYL 2L	700.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	666.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	716.0	DEG F
VIBRATION	32.0	MILS	POWER CYL 5L	652.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	684.0	DEG F
MONTHLY FIRED HOURS	1547	HRS	POWER CYL 2R	744.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	633.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	872.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	646.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 15:55:10

1	3	5	7	9	11	13	15
STATION						PRINT	

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	232.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	"H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23342.0	SCFH	POWER CYL 1L	632.0	DEG F
SCAV PRESS	149.0	"H2O	POWER CYL 2L	676.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	643.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	668.0	DEG F
VIBRATION	26.0	MILS	POWER CYL 5L	631.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	602.0	DEG F
MONTHLY FIRED HOURS	1546	HRS	POWER CYL 2R	720.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	613.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	623.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	628.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

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11/11/90 11/11/90

1	3	5	7	9	11	13	15
TATIC				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	231.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	41.0	"H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23255.0	SCFHR	POWER CYL 1L	638.0	DEG F
SCAV PRESS	149.0	"H2O	POWER CYL 2L	674.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	644.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	684.0	DEG F
VIERRATION	26.0	MILS	POWER CYL 5L	632.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	718.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	612.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	827.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	628.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17: 25: 30

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	231.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23387.0	SCFHR	POWER CYL 1L	639.0	DEG F
SCAV PRESS	150.0	" H2O	POWER CYL 2L	678.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	643.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	684.0	DEG F
VEARATION	30.0	MILS	POWER CYL 5L	631.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	611.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	838.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	627.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:30:30

1	3	5	7	9	11	13	15
RATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	"H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23401.0	SCFHR	POWER CYL 1L	629.0	DEG F
SCAV PRESS	150.0	"H2O	POWER CYL 2L	678.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	642.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	686.0	DEG F
VIBRATION	25.0	MILS	POWER CYL 5L	632.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	613.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	841.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	628.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:36:07

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	41.0	"H2O	J W OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23208.0	SCFHR	POWER CYL 1L	640.0	DEG F
SCAV PRESS	150.0	"H2O	POWER CYL 2L	677.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	642.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	683.0	DEG F
VIBRATION	24.0	MILS	POWER CYL 5L	632.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	662.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	611.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	837.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	629.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:41:37

1	3	5	7	9	11	13	15
FATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	132.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	41.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23249.0	SCFHR	POWER CYL 1L	633.0	DEG F
SCAV PRESS	151.0	" H2O	POWER CYL 2L	678.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	643.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	685.0	DEG F
VIBRATION	28.0	MILS	POWER CYL 5L	632.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	718.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	612.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	824.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	626.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 17:46:38

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	232.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	147.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	43.0	"H2O	J W OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23650.0	SCFHR	POWER CYL 1L	629.0	DEG F
SCAV PRESS	152.0	"H2O	POWER CYL 2L	679.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	645.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	684.0	DEG F
VIBRATION	25.0	MILS	POWER CYL 5L	631.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	662.0	DEG F
MONTHLY FIRED HOURS	1549	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	614.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	825.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	626.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 17:50:41

1	3	5	7	9	11	13	15
RATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	228.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	147.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	42.0	" H2O	J W OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	73.0	DEG F
FUEL FLOW	23390.0	SCFHR	POWER CYL 1L	638.0	DEG F
SCAV PRESS	147.0	" H2O	POWER CYL 2L	675.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	642.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	684.0	DEG F
VEARATION	23.0	MILS	POWER CYL 5L	630.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	660.0	DEG F
MONTHLY FIRED HOURS	1549	HRS	POWER CYL 2R	713.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	614.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	833.0	DEG F
POWER CYL 24 HRL TOT	45.0	QTS	POWER CYL 5R	626.0	DEG F
COMP CYL 24 HRL TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:56:05

1	3	5	7	9	11	13	15
FATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	147.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	73.0	DEG F
FUEL FLOW	23399.0	SCFHR	POWER CYL 1L	633.0	DEG F
SCAV PRESS	151.0	" H2O	POWER CYL 2L	677.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	644.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	684.0	DEG F
VIBRATION	28.0	MILS	POWER CYL 5L	631.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	663.0	DEG F
MONTHLY FIRED HOURS	1549	HRS	POWER CYL 2R	713.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	612.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	831.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	628.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 18:01:04

1	3	5	7	9	11	13	15
RATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	228.0	RPM	L O INLET	133.0	DEG F
LUBE OIL PRESS	35.0	PSIG	L O OUTLET	147.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	73.0	DEG F
FUEL FLOW	23595.0	SCFHR	POWER CYL 1L	632.0	DEG F
SCAV PRESS	148.0	" H2O	POWER CYL 2L	680.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	642.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	681.0	DEG F
VIBRATION	24.0	MILS	POWER CYL 5L	631.0	DEG F
FUEL VALVE OUTPUT	71.0	%	POWER CYL 1R	659.0	DEG F
MONTHLY FIRED HOURS	1549	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	610.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	832.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	627.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	18: 05: 56

1	3	5	7	9	11	13	15
RATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNI
ENGINE SPEED	249.0	RPM	L O INLET	136.0	DEG
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	150.0	DEG
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG
FUEL DIFF	54.0	" H2O	J W OUTLET	172.0	DEG
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG
FUEL FLOW	26494.0	SCFHR	POWER CYL 1L	638.0	DEG
SCAV PRESS	190.0	" H2O	POWER CYL 2L	682.0	DEG
INLET DIFF	4.0	" H2O	POWER CYL 3L	649.0	DEG
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	701.0	DEG
VIBRATION	38.0	MILS	POWER CYL 5L	640.0	DEG
FUEL VALVE OUTPUT	76.0	%	POWER CYL 1R	672.0	DEG
MONTHLY FIRED HOURS	1550	HRS	POWER CYL 2R	717.0	DEG
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	622.0	DEG
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	863.0	DEG
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	646.0	DEG
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 18: 55: 29

F-224

1	3	5	7	9	11	13
TATION						PR

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	248.0	RPM	L O INLET	136.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	53.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG F
FUEL FLOW	26297.0	SCFHR	POWER CYL 1L	635.0	DEG F
SCAV PRESS	186.0	" H2O	POWER CYL 2L	681.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	646.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	699.0	DEG F
VIBRATION	24.0	MILS	POWER CYL 5L	640.0	DEG F
FUEL VALVE OUTPUT	77.0	%	POWER CYL 1R	669.0	DEG F
MONTHLY FIRED HOURS	1550	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	623.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	860.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	645.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 19: 00: 29

F-225

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	247.0	RPM	L O INLET	136.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	53.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	71.0	DEG F
FUEL FLOW	26316.0	SCFHR	POWER CYL 1L	637.0	DEG F
SCAV PRESS	186.0	" H2O	POWER CYL 2L	682.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	646.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	699.0	DEG F
VIBRATION	35.0	MILS	POWER CYL 5L	638.0	DEG F
FUEL VALVE OUTPUT	77.0	%	POWER CYL 1R	665.0	DEG F
MONTHLY FIRED HOURS	1550	HRS	POWER CYL 2R	717.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	621.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	855.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	646.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 19:05:20

F-226

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	249.0	RPM	L O INLET	136.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	53.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	70.0	DEG F
FUEL FLOW	26345.0	SCFHR	POWER CYL 1L	637.0	DEG F
SCAV PRESS	188.0	" H2O	POWER CYL 2L	679.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	647.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	697.0	DEG F
VIBRATION	36.0	MILS	POWER CYL 5L	639.0	DEG F
FUEL VALVE OUTPUT	76.0	%	POWER CYL 1R	667.0	DEG F
MONTHLY FIRED HOURS	1550	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	624.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	859.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	645.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 19: 10: 30

F-227

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	250.0	RPM	L O INLET	136.0	DEG F
LUBE OIL PRESS	37.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	53.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	70.0	DEG F
FUEL FLOW	26485.0	SCFHR	POWER CYL 1L	633.0	DEG F
SCAV PRESS	189.0	" H2O	POWER CYL 2L	676.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	649.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	697.0	DEG F
VIBRATION	36.0	MILS	POWER CYL 5L	639.0	DEG F
FUEL VALVE OUTPUT	76.0	%	POWER CYL 1R	668.0	DEG F
MONTHLY FIRED HOURS	1550	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	621.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	862.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	645.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 19: 15: 30

F-228

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	240.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	50.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	69.0	DEG F
FUEL FLOW	25558.0	SCFHR	POWER CYL 1L	635.0	DEG F
SCAV PRESS	176.0	" H2O	POWER CYL 2L	683.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	651.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	695.0	DEG F
VIBRATION	24.0	MILS	POWER CYL 5L	639.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	672.0	DEG F
MONTHLY FIRED HOURS	1551	HRS	POWER CYL 2R	717.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	622.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	855.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	641.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 20: 25: 20

F-229

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	241.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	150.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	50.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	69.0	DEG F
FUEL FLOW	25752.0	SCFHR	POWER CYL 1L	638.0	DEG F
SCAV PRESS	175.0	" H2O	POWER CYL 2L	684.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	651.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	694.0	DEG F
VIBRATION	29.0	MILS	POWER CYL 5L	637.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	668.0	DEG F
MONTHLY FIRED HOURS	1551	HRS	POWER CYL 2R	717.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	621.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	851.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	640.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 20: 30: 20

F-230

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	240.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	50.0	" H2O	JW OUTLET	172.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	68.0	DEG F
FUEL FLOW	25582.0	SCFHR	POWER CYL 1L	641.0	DEG F
SCAV PRESS	177.0	" H2O	POWER CYL 2L	662.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	648.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	697.0	DEG F
VIBRATION	23.0	MILS	POWER CYL 5L	640.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	671.0	DEG F
MONTHLY FIRED HOURS	1551	HRS	POWER CYL 2R	717.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	618.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	853.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	642.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 20: 35: 29

F-231

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	241.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	49.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	68.0	DEG F
FUEL FLOW	25491.0	SCFHR	POWER CYL 1L	636.0	DEG F
SCAV PRESS	176.0	" H2O	POWER CYL 2L	682.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	648.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	696.0	DEG F
VIBRATION	28.0	MILS	POWER CYL 5L	638.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	670.0	DEG F
MONTHLY FIRED HOURS	1551	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	621.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	852.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	640.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 20:40:19

F-232

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	239.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	49.0	" H ₂ O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	68.0	DEG F
FUEL FLOW	25519.0	SCFHR	POWER CYL 1L	632.0	DEG F
SCAV PRESS	176.0	" H ₂ O	POWER CYL 2L	680.0	DEG F
INLET DIFF	4.0	" H ₂ O	POWER CYL 3L	649.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	693.0	DEG F
VIBRATION	21.0	MILS	POWER CYL 5L	637.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	668.0	DEG F
MONTHLY FIRED HOURS	1552	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	619.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	851.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	640.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94

21: 00: 09

F-233

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	240.0	RPM	L O INLET	135.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	149.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	50.0	" H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	68.0	DEG F
FUEL FLOW	25667.0	SCFHR	POWER CYL 1L	640.0	DEG F
SCAV PRESS	175.0	" H2O	POWER CYL 2L	677.0	DEG F
INLET DIFF	4.0	" H2O	POWER CYL 3L	648.0	DEG F
DISCHARGE GAS	714.0	PSIG	POWER CYL 4L	692.0	DEG F
VIBRATION	26.0	MILS	POWER CYL 5L	639.0	DEG F
FUEL VALVE OUTPUT	74.0	%	POWER CYL 1R	668.0	DEG F
MONTHLY FIRED HOURS	1552	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	620.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	853.0	DEG F
POWER CYL 24 HR. TOT	45.0	QTS	POWER CYL 5R	641.0	DEG F
COMP CYL 24 HR. TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 21: 05: 30

F-234

1	3	5	7	9	11	13	15
TATION				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	2300	RPM	LO INLET	133.0	DEG F
LUBE OIL PRESS	30.0	PSIG	LO OUTLET	440.0	DEG F
LO INLET DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	"H2O	JW OUTLET	474.0	DEG F
FUEL STATIC	64.0	PSIG	FIRE GAS	74.0	DEG F
FUEL FLOW	23400.0	SCFH	POWER CYL 4L	637.0	DEG F
SCAV PRESS	149.0	"H2O	POWER CYL 2L	673.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	644.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	634.0	DEG F
VIBRATION	25.0	MILS	POWER CYL 5L	633.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 4R	664.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	746.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	675.0	DEG F
COMP CYL TRABON COUNT	962.0	QTS	POWER CYL 4R	633.0	DEG F
POWER CYL 24 HRL TOT	45.0	QTS	POWER CYL 6L	620.0	DEG F
COMP CYL 24 HRL TOT	16.0	QTS			
CRANKCASE COUNTS	6.0	QTS			

4414404	17:00:07
1114494	17:00:07

1	3	5	7	9	11	13	15
RATIO				FRONT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	231.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	"H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23416.0	SCFHR	POWER CYL 1L	638.0	DEG F
SCAV PRESS	151.0	"H2O	POWER CYL 2L	681.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	643.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	687.0	DEG F
VIBRATION	21.0	MILS	POWER CYL 5L	634.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	716.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	615.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	825.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	629.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94 17:10:19

1	3	5	7	9	11	13	15
TATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	230.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	JW INLET	163.0	DEG F
FUEL DIFF	42.0	"H2O	JW OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23433.0	SCFHR	POWER CYL 1L	630.0	DEG F
SCAV PRESS	150.0	"H2O	POWER CYL 2L	680.0	DEG F
INLET DIFF	3.0	"H2O	POWER CYL 3L	644.0	DEG F
DISCHARGE GAS	713.0	PSIG	POWER CYL 4L	685.0	DEG F
VERATION	25.0	MILS	POWER CYL 5L	634.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	664.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	718.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	614.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	828.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	626.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:15:31

1	3	5	7	9	11	13	15
RATIO				PRINT			

UNIT NO. 13

DESCRIPTION	VALUE	UNITS	DESCRIPTION	VALUE	UNITS
ENGINE SPEED	229.0	RPM	L O INLET	131.0	DEG F
LUBE OIL PRESS	36.0	PSIG	L O OUTLET	146.0	DEG F
L O FILTER DIFF	1.0	PSIG	J W INLET	163.0	DEG F
FUEL DIFF	41.0	" H2O	J W OUTLET	171.0	DEG F
FUEL STATIC	64.0	PSIG	FUEL GAS	74.0	DEG F
FUEL FLOW	23272.0	SCFHR	POWER CYL 1L	639.0	DEG F
SCAV PRESS	147.0	" H2O	POWER CYL 2L	678.0	DEG F
INLET DIFF	3.0	" H2O	POWER CYL 3L	644.0	DEG F
DISCHARGE GAS	712.0	PSIG	POWER CYL 4L	685.0	DEG F
VERATION	22.0	MILS	POWER CYL 5L	632.0	DEG F
FUEL VALVE OUTPUT	70.0	%	POWER CYL 1R	661.0	DEG F
MONTHLY FIRED HOURS	1548	HRS	POWER CYL 2R	715.0	DEG F
POWER CYL TRABON COUNT	2574.0	QTS	POWER CYL 3R	611.0	DEG F
COMP CYL TRABON COUNT	982.0	QTS	POWER CYL 4R	829.0	DEG F
POWER CYL 24 HR TOT	45.0	QTS	POWER CYL 5R	627.0	DEG F
COMP CYL 24 HR TOT	16.0	QTS			
CRANKCASE COUNTS	0.0	QTS			

11/14/94	17:20:50

1	3	5	7	9	11	13	15
RATIO				PRINT			

Appendix G

Manual Measurement Data

This appendix presents a summary of the manual velocity (Method 2) and moisture (Method 4) data collected for each engine and turbine tested.

Plant Name: [REDACTED]

Location: Refrigeration Engine Stack

Type of Sample: [REDACTED]

G.1 Campaign 2

Run No.	One
Date	03/12/94
Time Start	1312
Time Finish	1533
Operator	GM
Initial Leak Rate	0.008
Final Leak Rate	0.01
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.29
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	0.985
Nozzle Diameter (inches)	0.1500
Barometric Pressure ("Hg)	27.5
Static Pressure ("H2O)	0.1
Meter Volume (acf)	49.400
Average square root of delta p	2.1000
Average delta H (" H2O)	1.10
Average Stack Temperature (F)	564
Average DGM Temp (F)	91.0
Test Duration (minutes)	80.0
Condensed Water (g)	55.0
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	2.6
% O2	15.4
% N2	82.0
Meter Volume (dscf)	42.983
Flue Gas Moisture (%)	5.7
Gas Molecular Weight (Wet) (g/g-n)	28.40
Absolute Stack Pressure (" Hg)	27.51
Absolute Stack Temperature (R)	1024
Average Gas Velocity (f/sec)	172.64
Avg Flow Rate (acfm)	13,539
Avg Flow Rate (dscfm)	6,050
Isokinetic Sampling Rate (%)	94.60

Plant Name: [REDACTED]

Location: **Recompression Engine Stack**

Type of Sample: [REDACTED]

Run No.	One
Date	03/13/94
Time Start	1340
Time Finish	1554
Operator	GM
Initial Leak Rate	0.007
Final Leak Rate	0.004
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.29
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	0.985
Nozzle Diameter (inches)	0.1500
Barometric Pressure ("Hg)	27.8
Static Pressure ("H2O)	-2.6
Meter Volume (acf)	45.900
Average square root of delta p	2.3300
Average delta H (" H2O)	1.00
Average Stack Temperature (F)	1092
Average DGM Temp (F)	81.5
Test Duration (minutes)	80.0
Condensed Water (g)	85.6
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	4.8
% O2	11.4
% N2	83.8
Meter Volume (dscf)	41.069
Flue Gas Moisture (%)	9.0
Gas Molecular Weight (Wet) (g/g-m)	28.22
Absolute Stack Pressure (" Hg)	27.61
Absolute Stack Temperature (R)	1552
Average Gas Velocity (f/sec)	236.16
Avg Flow Rate (acfm)	18,519
Avg Flow Rate (dscfm)	5,291
Isokinetic Sampling Rate (%)	103.36

Plant Name: GRI Campaign #3 - Plant A

Location: Engine 102 Exhaust

G.2 Campaign 3

Type of Sample: Velocity/Moisture - Preliminary

Run No.	One
Date	06/13/94
Time Start	1730
Time Finish	1853
Operator	GM
Initial Leak Rate	0.003
Final Leak Rate	0.004
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.83
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	0.968
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.06
Static Pressure ("H2O)	-1.5
Meter Volume (acf)	13.280
Average square root of delta p	1.5200
Average delta H (" H2O)	0.50
Average Stack Temperature (F)	993
Average DGM Temp (F)	106.0
Test Duration (minutes)	N/A
Condensed Water (g)	38.7
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	7.1
% O2	9.5
% N2	83.4
Meter Volume (dscf)	11.662
Flue Gas Moisture (%)	13.5
Gas Molecular Weight (Wet) (g/g-n)	27.96
Absolute Stack Pressure (" Hg)	28.95
Absolute Stack Temperature (R)	1453
Average Gas Velocity (f/sec)	146.25
Avg Flow Rate (acfm)	23,157
Avg Flow Rate (dscfm)	7,036
Isokinetic Sampling Rate (%)	N/A

Plant Name: GRI Campaign #3 - Plant B

Location: Engine 4 Exhaust

Type of Sample: Velocity/Moisture - High Load

Run No.	One
Date	06/18/94
Time Start	935
Time Finish	1115
Operator	GM
Initial Leak Rate	0.005
Final Leak Rate	0.006
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.60
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	0.968
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.29
Static Pressure ("H2O)	8.4
Meter Volume (acf)	40.890
Average square root of delta p	2.0080
Average delta H (" H2O)	1.00
Average Stack Temperature (F)	645
Average DGM Temp (F)	90.0
Test Duration (minutes)	N/A
Condensed Water (g)	80.8
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	4.2
% O2	14.7
% N2	81.1
Meter Volume (dscf)	37.292
Flue Gas Moisture (%)	9.3
Gas Molecular Weight (Wet) (g/g-n)	28.22
Absolute Stack Pressure (" Hg)	29.91
Absolute Stack Temperature (R)	1105
Average Gas Velocity (f/sec)	165.01
Avg Flow Rate (acfm)	20,006
Avg Flow Rate (dscfm)	8,665
Isokinetic Sampling Rate (%)	N/A

Plant Name: **GRI Campaign #3 - Plant B**
 Location: **Engine 2 Exhaust**
 Type of Sample: **Velocity/Moisture - Full Load**

Run No.	One
Date	06/19/94
Time Start	905
Time Finish	915
Operator	GM
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.00
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.36
Static Pressure ("H2O)	9.5
Meter Volume (acf)	N/A
Average square root of delta p	1.9670
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	661
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	5.2
% O2	13.0
% N2	81.8
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	10.3
Gas Molecular Weight (Wet) (g/g-n)	28.18
Absolute Stack Pressure (" Hg)	30.06
Absolute Stack Temperature (R)	1121
Average Gas Velocity (f/sec)	162.49
Avg Flow Rate (acfm)	7,657
Avg Flow Rate (dscfm)	3,249
Isokinetic Sampling Rate (%)	N/A

Note: The moisture data is based on the average of the moisture measured during the two PM10 samples.

Plant Name: **GRI Campaign #4**
 Location: **Cooper/Bessemer #4 Engine Exhaust**
 Type of Sample: **Velocity Full Load**

Run No.	One
Date	08/25/94
Time Start	1715
Time Finish	1730
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	2.00
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.54
Static Pressure ("H2O)	1.2
Meter Volume (acf)	N/A
Average square root of delta p	1.2040
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	574
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	3.0
% O2	15.3
% N2	81.7
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	7.26
Gas Molecular Weight (Wet) (g/g-mole)	28.29
Absolute Stack Pressure (" Hg)	29.63
Absolute Stack Temperature (R)	1034
Average Gas Velocity (f/sec)	96.04
Avg Flow Rate (acfm)	18,102
Avg Flow Rate (dscfm)	8,486
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.

The moisture data originated from a moisture sample.

Sample points 1 and 12 are less than 1 inch
 from the duct walls and therefore were not included.

Plant Name: GRI Campaign #4
 Location: Cooper/Bessemer #4 Engine Exhaust
 Type of Sample: Velocity Full Load

Run No.	Two
Date	08/26/94
Time Start	855
Time Finish	910
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	2.00
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.49
Static Pressure ("H2O)	1.45
Meter Volume (acf)	N/A
Average square root of delta p	1.2080
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	517
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	3.0
% O2	15.3
% N2	81.7
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	7.3
Gas Molecular Weight (Wet) (g/g-mole)	28.28
Absolute Stack Pressure (" Hg)	29.60
Absolute Stack Temperature (R)	977
Average Gas Velocity (f/sec)	93.72
Avg Flow Rate (acfm)	17,666
Avg Flow Rate (dscfm)	8,751
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.
 The moisture data represents the average of the PM10 and
 CARB 429 samples.

Sample points 1 and 12 are less than 1 inch
 from the duct walls and therefore were not included.

Plant Name: **GRI Campaign #4**
 Location: **Ingersol #8 Engine Exhaust**
 Type of Sample: **Velocity Full Load**

Run No.	One
Date	08/27/94
Time Start	1115
Time Finish	1125
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.63
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.47
Static Pressure ("H2O)	-1.5
Meter Volume (acf)	N/A
Average square root of delta p	1.3800
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	741
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	5.3
% O2	11.1
% N2	83.6
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	10.8
Gas Molecular Weight (Wet) (g/g-mole)	28.07
Absolute Stack Pressure (" Hg)	29.36
Absolute Stack Temperature (R)	1201
Average Gas Velocity (f/sec)	119.63
Avg Flow Rate (acfm)	14,886
Avg Flow Rate (dscfm)	5,726
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.
 The moisture data represents the average of a PM10 sample
 and CARB 429 sample.

Plant Name: **GRI Campaign #4**
 Location: **Ingersol #8 Engine Exhaust**
 Type of Sample: **Velocity Full Load**

Run No.	Two
Date	08/27/94
Time Start	2050
Time Finish	2102
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.63
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.47
Static Pressure ("H2O)	-1.5
Meter Volume (acf)	N/A
Average square root of delta p	1.3700
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	719
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	5.3
% O2	11.1
% N2	83.6
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	10.8
Gas Molecular Weight (Wet) (g/g-mole)	28.07
Absolute Stack Pressure (" Hg)	29.36
Absolute Stack Temperature (R)	1179
Average Gas Velocity (f/sec)	117.67
Avg Flow Rate (acfm)	14,642
Avg Flow Rate (dscfm)	5,737
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.
 The moisture data represents the average of a PM10 sample
 and CARB 429 sample.

Plant Name: **GRI Campaign #4**
 Location: **Ingersol #9 Engine Exhaust**
 Type of Sample: **Velocity Full Load**

Run No.	One
Date	08/28/94
Time Start	1300
Time Finish	1320
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.63
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.5
Static Pressure ("H2O)	-0.63
Meter Volume (acf)	N/A
Average square root of delta p	1.0600
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	779
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	7.0
% O2	8.6
% N2	84.4
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	14.4
Gas Molecular Weight (Wet) (g/g-mole)	27.81
Absolute Stack Pressure (" Hg)	29.45
Absolute Stack Temperature (R)	1239
Average Gas Velocity (f/sec)	93.61
Avg Flow Rate (acfm)	11,649
Avg Flow Rate (dscfm)	4,181
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.
 The moisture data represents the average of a PM10 sample
 and CARB 429 sample collected on 8/29.

Plant Name: **GRI Campaign #4**
 Location: **Ingersol #9 Engine Exhaust**
 Type of Sample: **Velocity Full Load**

Run No.	Two
Date	08/29/94
Time Start	808
Time Finish	820
Operator	SJR/CSG
Initial Leak Rate	N/A
Final Leak Rate	N/A
Duct Dimensions (ft)	0
Stack Diameter (ft)	1.63
Pitot Tube Correction Factor (Cp)	0.84
Dry Gas Meter Calibration (Yd)	N/A
Nozzle Diameter (inches)	N/A
Barometric Pressure ("Hg)	29.47
Static Pressure ("H2O)	-0.77
Meter Volume (acf)	N/A
Average square root of delta p	1.0800
Average delta H (" H2O)	N/A
Average Stack Temperature (F)	779
Average DGM Temp (F)	N/A
Test Duration (minutes)	N/A
Condensed Water (g)	N/A
Filter Weight Gain (g)	N/A
PNR Weight Gain (g)	N/A
Impinger Residue (g)	N/A
% CO2	6.9
% O2	8.6
% N2	84.5
Meter Volume (dscf)	0.000
Flue Gas Moisture (%)	14.4
Gas Molecular Weight (Wet) (g/g-mole)	27.80
Absolute Stack Pressure (" Hg)	29.41
Absolute Stack Temperature (R)	1239
Average Gas Velocity (f/sec)	95.47
Avg Flow Rate (acfm)	11,880
Avg Flow Rate (dscfm)	4,259
Isokinetic Sampling Rate (%)	N/A

The oxygen and carbon dioxide data originated from the CEM.
 The moisture data represents the average of a PM10 sample
 and CARB 429 sample.

G.4 Campaign 5

Facility: GRI
 Date: 10/5/94
 Location: Turbine
 Run Number: 3
 Sample Type: M-0010

Total Sampling Time (min)	
Corrected Barometric Pressure (in Hg)	168.0
Absolute Stack Pressure (in H ₂ O)	29.32
Stack Static Pressure (in H ₂ O)	29.39
Average Stack Temperature (°F)	1.00
Stack Area (sq in)	239.42
Actual Meter Volume (cu ft)	7238.23
Average Meter Pressure (in H ₂ O)	145.828
Average Meter Temperature (°F)	2.16
Moisture Collected (g)	69.81
Carbon Dioxide Concentration (%V)	127.80
Oxygen Concentration (%V)	2.0
Nitrogen Concentration (%V)	17.7
Dry Gas Meter Factor	80.4
Nozzle Diameter (in)	1.0005
Pitot Constant	0.186
	0.84

Average Sampling Rate (dscfm)	0.853
Standard Metered Volume (dscf)	143.328
Standard Metered Volume (dscm)	4.059
Stack Moisture (%V)	4.03
Mole Fraction Dry Stack Gas	0.960
Dry Molecular Weight	29.02
Wet Molecular Weight	28.58
Stack Gas Velocity (fpm)	6500.75
Stack Gas Velocity (mpm)	1981.43
Volumetric Flow Rate (acfm)	326763.19
Volumetric Flow Rate (acmm)	9253.93
Volumetric Flow Rate (dscfm)	232503.44
Volumetric Flow Rate (dscmm)	6584.50
Percent Isokinetic	97.75
Percent Excess Air	494.16
Fuel Factor	1.645
Ultimate CO ₂	12.7

Facility: GRI
 Date: 10/5/94
 Location: Turbine
 Run Number: 3-DUP
 Sample Type: M-0010

Total Sampling Time (min)	168.0
Corrected Barometric Pressure (in Hg)	29.34
Absolute Stack Pressure (in H2O)	29.41
Stack Static Pressure (in H2O)	1.00
Average Stack Temperature (°F)	429.71
Stack Area (sq in)	7238.23
Actual Meter Volume (cu ft)	135.405
Average Meter Pressure (in H2O)	2.14
Average Meter Temperature (°F)	57.42
Moisture Collected (g)	134.90
Carbon Dioxide Concentration (%V)	2.0
Oxygen Concentration (%V)	17.7
Nitrogen Concentration (%V)	80.4
Dry Gas Meter Factor	1.0005
Nozzle Diameter (in)	0.186
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.812
Standard Metered Volume (dscf)	136.359
Standard Metered Volume (dscm)	3.862
Stack Moisture (%V)	4.46
Mole Fraction Dry Stack Gas	0.955
Dry Molecular Weight	29.02
Wet Molecular Weight	28.53
Stack Gas Velocity (fpm)	7645.74
Stack Gas Velocity (mpm)	2330.42
Volumetric Flow Rate (acfm)	384316.62
Volumetric Flow Rate (acmm)	10883.85
Volumetric Flow Rate (dscfm)	214146.99
Volumetric Flow Rate (dscmm)	6064.64
Percent Isokinetic	100.97
Percent Excess Air	492.86
Fuel Factor	1.633
Ultimate CO2	12.8

Plant Name: **GRI Campaign #6 Plant A**

G.5 Campaign 6

Location: **Clark BA-5 #10 Engine Exhaust**

Type of Sample: **Velocity Profile**

Test No.	Preliminary	One	Three	Two
Engine Load	Full	Full	Low	Full
Date	11/03/94	11/04/94	11/04/94	11/05/94
Time Start	1520	940	1611	924
Time Finish	1546	943	1620	932
Operator	CSG	CSG	LAR	LAR/LDO
Initial Leak Rate	N/A	N/A	N/A	N/A
Final Leak Rate	N/A	N/A	N/A	N/A
Duct Dimensions (ft)	0	0	0	0
Stack Diameter (ft)	1.96	1.96	1.96	1.96
Pitot Tube Correction Factor (Cp)	0.84	0.84	0.84	0.84
Dry Gas Meter Calibration (Yd)	N/A	N/A	N/A	N/A
Nozzle Diameter (inches)	N/A	N/A	N/A	N/A
Barometric Pressure ("Hg)	26.36	26.36	26.36	26.51
Static Pressure ("H2O)	-0.65	-0.6	-0.8	-0.85
Meter Volume (acf)	N/A	N/A	N/A	N/A
Average square root of delta p	1.0400	1.0500	1.0500	1.0800
Average delta H (" H2O)	N/A	N/A	N/A	N/A
Average Stack Temperature (F)	453	458	436	455
Average DGM Temp (F)	N/A	N/A	N/A	N/A
Test Duration (minutes)	N/A	N/A	N/A	N/A
Condensed Water (g)	N/A	N/A	N/A	N/A
Filter Weight Gain (g)	N/A	N/A	N/A	N/A
PNR Weight Gain (g)	N/A	N/A	N/A	N/A
Impinger Residue (g)	N/A	N/A	N/A	N/A
% CO2	2.6	2.6	2.4	2.7
% O2	16.9	16.9	17.3	16.8
% N2	80.5	80.5	80.3	80.5
Meter Volume (dscf)	0.000	0.000	0.000	0.000
Flue Gas Moisture (%)	5.6	6.4	5.4	4.9
Gas Molecular Weight (Wet) (g/g-m)	28.47	28.38	28.48	28.56
Absolute Stack Pressure (" Hg)	26.31	26.32	26.30	26.45
Absolute Stack Temperature (R)	913	918	896	915
Average Gas Velocity (f/sec)	82.45	83.59	82.47	85.36
Avg Flow Rate (acfm)	14,926	15,133	14,930	15,453
Avg Flow Rate (dscfm)	7,163	7,163	7,313	7,493
Isokinetic Sampling Rate (%)	N/A	N/A	N/A	N/A

Plant Name: **GRI Campaign #6 Plant A**
 Location: **Clark HBA-5 #12 Engine Exhaust**
 Type of Sample: **Velocity Profile**

Test No.	Four	Five
Engine Load	Low	High
Date	11/04/94	11/05/94
Time Start	1724	1513
Time Finish	1735	1802
Operator	LAR	CSG
Initial Leak Rate	N/A	N/A
Final Leak Rate	N/A	N/A
Duct Dimensions (ft)	0	0
Stack Diameter (ft)	1.29	1.29
Pitot Tube Correction Factor (Cp)	0.84	0.84
Dry Gas Meter Calibration (Yd)	N/A	N/A
Nozzle Diameter (inches)	N/A	N/A
Barometric Pressure ("Hg)	26.37	26.47
Static Pressure ("H2O)	-2	-2
Meter Volume (acf)	N/A	N/A
Average square root of delta p	1.6000	1.6300
Average delta H (" H2O)	N/A	N/A
Average Stack Temperature (F)	540	592
Average DGM Temp (F)	N/A	N/A
Test Duration (minutes)	N/A	N/A
Condensed Water (g)	N/A	N/A
Filter Weight Gain (g)	N/A	N/A
PNR Weight Gain (g)	N/A	N/A
Impinger Residue (g)	N/A	N/A
% CO2	3.3	3.7
% O2	15.6	15.1
% N2	81.1	81.2
Meter Volume (dscf)	0.000	0.000
Flue Gas Moisture (%)	6.8	6.9
Gas Molecular Weight (Wet) (g/g-mole)	28.39	28.42
Absolute Stack Pressure (" Hg)	26.22	26.32
Absolute Stack Temperature (R)	1000	1052
Average Gas Velocity (f/sec)	133.16	138.79
Avg Flow Rate (acfm)	10,442	10,884
Avg Flow Rate (dscfm)	4,502	4,473
Isokinetic Sampling Rate (%)	N/A	N/A

Plant Name: GRI Campaign #6 Plant B
Location: Solar Taurus Turbine Exhaust
Type of Sample: Velocity Profile

Test No.	Six	Seven	Eight
Engine Load	High	High	Low
Date	11/07/94	11/08/94	11/08/94
Time Start	1550	810	1505
Time Finish	1626	910	1525
Operator	LAR	CSG/LDO	LAR
Initial Leak Rate	N/A	N/A	N/A
Final Leak Rate	N/A	N/A	N/A
Duct Dimensions (ft)	0	0	0
Stack Diameter (ft)	2.96	2.96	2.96
Pitot Tube Correction Factor (Cp)	0.84	0.84	0.84
Dry Gas Meter Calibration (Yd)	N/A	N/A	N/A
Nozzle Diameter (inches)	N/A	N/A	N/A
Barometric Pressure ("Hg)	26.5	26.54	26.54
Static Pressure ("H2O)	0.9	0.9	0.9
Meter Volume (acf)	N/A	N/A	N/A
Average square root of delta p	2.3200	2.4500	2.1400
Average delta H (" H2O)	N/A	N/A	N/A
Average Stack Temperature (F)	954	941	902
Average DGM Temp (F)	N/A	N/A	N/A
Test Duration (minutes)	N/A	N/A	N/A
Condensed Water (g)	N/A	N/A	N/A
Filter Weight Gain (g)	N/A	N/A	N/A
PNR Weight Gain (g)	N/A	N/A	N/A
Impinger Residue (g)	N/A	N/A	N/A
% CO2	3.2	3.3	2.9
% O2	16.0	15.9	16.4
% N2	80.8	80.8	80.7
Meter Volume (dscf)	0.000	0.000	0.000
Flue Gas Moisture (%)	6.4	6.5	6.1
Gas Molecular Weight (Wet) (g/g-mole)	28.44	28.43	28.44
Absolute Stack Pressure (" Hg)	26.57	26.61	26.61
Absolute Stack Temperature (R)	1414	1401	1362
Average Gas Velocity (f/sec)	227.92	239.43	206.17
Avg Flow Rate (acfm)	94,106	98,857	85,124
Avg Flow Rate (dscfm)	29,192	30,964	27,544
Isokinetic Sampling Rate (%)	N/A	N/A	N/A

Plant Name: GRI Campaign #6 Plant C

Location: Copper Bessemer #15 Engine Exhaust

Type of Sample: Velocity Profile

Test No.	Preliminary	Nine	Ten	Eleven
Engine Load	Full	Full	Full	Low
Date	11/09/94	11/10/94	11/10/94	11/11/94
Time Start	1604	1130	1808	933
Time Finish	1620	1458	1818	940
Operator	LAR	CSG	LAR	LAR/LDO
Initial Leak Rate	N/A	N/A	N/A	N/A
Final Leak Rate	N/A	N/A	N/A	N/A
Duct Dimensions (ft)	0	0	0	0
Stack Diameter (ft)	1.62	1.62	1.62	1.62
Pitot Tube Correction Factor (Cp)	0.84	0.84	0.84	0.84
Dry Gas Meter Calibration (Yd)	N/A	N/A	N/A	N/A
Nozzle Diameter (inches)	N/A	N/A	N/A	N/A
Barometric Pressure ("Hg)	26.5	26.78	26.78	26.66
Static Pressure ("H2O)	-1.3	-1.5	-1.5	-1.3
Meter Volume (acf)	N/A	N/A	N/A	N/A
Average square root of delta p	1.6800	1.7300	1.7300	1.6600
Average delta H (" H2O)	N/A	N/A	N/A	N/A
Average Stack Temperature (F)	576	581	576	552
Average DGM Temp (F)	N/A	N/A	N/A	N/A
Test Duration (minutes)	N/A	N/A	N/A	N/A
Condensed Water (g)	N/A	N/A	N/A	N/A
Filter Weight Gain (g)	N/A	N/A	N/A	N/A
PNR Weight Gain (g)	N/A	N/A	N/A	N/A
Impinger Residue (g)	N/A	N/A	N/A	N/A
% CO2	3.7	3.6	3.7	3.3
% O2	14.8	15.3	14.8	15.6
% N2	81.5	81.1	81.5	81.1
Meter Volume (dscf)	0.000	0.000	0.000	0.000
Flue Gas Moisture (%)	7.2	7	7	6.9
Gas Molecular Weight (Wet) (g/g-n)	28.38	28.40	28.40	28.38
Absolute Stack Pressure (" Hg)	26.40	26.67	26.67	26.56
Absolute Stack Temperature (R)	1036	1041	1036	1012
Average Gas Velocity (f/sec)	141.86	145.63	145.29	138.11
Avg Flow Rate (acfm)	17,544	18,011	17,969	17,080
Avg Flow Rate (dscfm)	7,320	7,570	7,588	7,363
Isokinetic Sampling Rate (%)	N/A	N/A	N/A	N/A

Plant Name: **GRI Campaign #6 Plant C**

Location: **Copper Bessemer #9 Engine Exhaust**

Type of Sample: **Velocity Profile**

Test No.	12	13	14
Engine Load	Low	Full	Full
Date	11/11/94	11/12/94	11/12/94
Time Start	1830	845	1734
Time Finish	1852	900	1745
Operator	LAR	CSG	LAR/LDO
Initial Leak Rate	N/A	N/A	N/A
Final Leak Rate	N/A	N/A	N/A
Duct Dimensions (ft)	0	0	0
Stack Diameter (ft)	1.29	1.29	1.29
Pitot Tube Correction Factor (Cp)	0.84	0.84	0.84
Dry Gas Meter Calibration (Yd)	N/A	N/A	N/A
Nozzle Diameter (inches)	N/A	N/A	N/A
Barometric Pressure ("Hg)	26.66	26.55	26.46
Static Pressure ("H2O)	7	7.5	7
Meter Volume (acf)	N/A	N/A	N/A
Average square root of delta p	1.7800	1.7100	1.7100
Average delta H (" H2O)	N/A	N/A	N/A
Average Stack Temperature (F)	576	586	590
Average DGM Temp (F)	N/A	N/A	N/A
Test Duration (minutes)	N/A	N/A	N/A
Condensed Water (g)	N/A	N/A	N/A
Filter Weight Gain (g)	N/A	N/A	N/A
PNR Weight Gain (g)	N/A	N/A	N/A
Impinger Residue (g)	N/A	N/A	N/A
% CO2	3.5	3.9	4.0
% O2	15.0	14.7	14.5
% N2	81.5	81.4	81.5
Meter Volume (dscf)	0.000	0.000	0.000
Flue Gas Moisture (%)	7.2	8.3	8.4
Gas Molecular Weight (Wet) (g/g-m)	28.36	28.28	28.28
Absolute Stack Pressure (" Hg)	27.17	27.10	26.97
Absolute Stack Temperature (R)	1036	1046	1050
Average Gas Velocity (f/sec)	148.21	143.45	144.07
Avg Flow Rate (acfm)	11,623	11,249	11,298
Avg Flow Rate (dscfm)	4,991	4,715	4,690
Isokinetic Sampling Rate (%)	N/A	N/A	N/A

Volumetric Flow Spreadsheet

Plant	GRI - Campaign 6	O2 Percent	15.06
Date	11/14/94	CO2 Percent	3.72
Sampling Location	Engine 13	N2 Percent	81.22
Run Number	23	Stack Moisture (%)	6.85
Ambient Temperature (°F)	51.00	Mole Fraction (dry)	0.93
Barometric Pressure (in Hg)	26.87	Molecular Weight (dry)	29.20
Static Pressure (in H2O)	4.50	Molecular Weight (wet)	28.43
Operator	GSW	Stack ID (in)	23.50
Time	2040-2050	Stack Area (sq ft)	3.01

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	3.50	550	1.87	153.82	9229.41
A-2	4.50	640	2.12	182.03	10921.63
A-3	5.20	650	2.28	196.56	11793.66
A-4	4.50	648	2.12	182.69	10961.28
B-1	3.90	508	1.97	158.96	9537.76
B-2	4.70	642	2.17	186.20	11171.84
B-3	5.10	650	2.26	194.66	11679.71
B-4	4.30	648	2.07	178.58	10714.93
Averages		617.00	2.11	179.19	10751.28

Actual Volumetric Flow Rate (acfm)	32383.45
Standard Volumetric Flow Rate (scfm)	14374.97
Dry Standard Volumetric Flow Rate (dscfm)	13360.09

Volumetric Flow Spreadsheet

Plant	GRI - Campaign 6	O2 Percent	15.11
Date	11/14/94	CO2 Percent	3.68
Sampling Location	Engine 13	N2 Percent	81.21
Run Number	18	Stack Moisture (%)	6.77
Ambient Temperature (°F)	55.00	Mole Fraction (dry)	0.93
Barometric Pressure (in Hg)	26.83	Molecular Weight (dry)	29.19
Static Pressure (in H2O)	4.10	Molecular Weight (wet)	28.44
Operator	GSW	Stack ID (in)	23.50
Time	1905-1915	Stack Area (sq ft)	3.01

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	4.00	550	2.00	164.44	9866.66
A-2	4.80	642	2.19	188.17	11290.06
A-3	5.70	652	2.39	205.98	12358.77
A-4	4.80	651	2.19	188.93	11336.08
B-1	4.20	530	2.05	166.83	10009.68
B-2	5.10	640	2.26	193.78	11626.96
B-3	5.60	650	2.37	203.98	12238.86
B-4	4.80	650	2.19	188.85	11330.98
Averages		620.63	2.20	187.62	11257.26

Actual Volumetric Flow Rate (acfm)	33907.49
Standard Volumetric Flow Rate (scfm)	15000.99
Dry Standard Volumetric Flow Rate (dscfm)	13941.92

Volumetric Flow Spreadsheet

Plant GRI - Campaign 6
 Date 11/14/94
 Sampling Location Engine 13
 Run Number 15
 Ambient Temperature (°F) 61.00
 Barometric Pressure (in Hg) 26.75
 Static Pressure (in H2O) 4.50
 Operator GSW
 Time 1100-1115

O2 Percent 14.67
 CO2 Percent 3.81
 N2 Percent 81.52
 Stack Moisture (%) 6.91
 Mole Fraction (dry) 0.93
 Molecular Weight (dry) 29.20
 Molecular Weight (wet) 28.42
 Stack ID (in) 23.50
 Stack Area (sq ft) 3.01

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	3.30	585	1.82	151.93	9115.84
A-2	4.30	660	2.07	179.55	10772.81
A-3	5.00	670	2.24	194.47	11668.38
A-4	3.60	670	1.90	165.02	9900.95
B-1	3.80	630	1.95	166.51	9990.55
B-2	4.50	658	2.12	183.51	11010.65
B-3	4.70	668	2.17	188.38	11302.90
B-4	3.60	669	1.90	164.94	9896.57
Averages		651.25	2.02	174.29	10457.33

Actual Volumetric Flow Rate (acfm) 31498.07
 Standard Volumetric Flow Rate (scfm) 13551.01
 Dry Standard Volumetric Flow Rate (dscfm) 12594.31

Volumetric Flow Spreadsheet

Plant	GRI - Campaign 6	O2 Percent	15.06
Date	11/15/94	CO2 Percent	3.72
Sampling Location	Engine 11	N2 Percent	81.22
Run Number	24	Stack Moisture (%)	6.76
Ambient Temperature (°F)	51.00	Mole Fraction (dry)	0.93
Barometric Pressure (in Hg)	26.87	Molecular Weight (dry)	29.20
Static Pressure (in H2O)	6.20	Molecular Weight (wet)	28.44
Operator	GSW	Stack ID (in)	17.50
Time	1740-1750	Stack Area (sq ft)	1.67

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	2.90	455	1.70	132.34	7940.37
A-2	4.00	601	2.00	167.37	10042.20
A-3	4.10	614	2.02	170.48	10229.07
A-4	4.00	615	2.00	168.47	10108.26
B-1	3.40	490	1.84	146.01	8760.63
B-2	4.30	602	2.07	173.61	10416.88
B-3	4.50	616	2.12	178.77	10726.41
B-4	4.20	615	2.05	172.63	10357.88
Averages		576.00	1.98	163.71	9822.71

Actual Volumetric Flow Rate (acfm)	16407.22
Standard Volumetric Flow Rate (scfm)	7671.19
Dry Standard Volumetric Flow Rate (dscfm)	7171.80

Volumetric Flow Spreadsheet

Plant GRI - Campaign 6
 Date 11/15/94
 Sampling Location Engine 11
 Run Number 20
 Ambient Temperature (°F) 55.00
 Barometric Pressure (in Hg) 26.91
 Static Pressure (in H2O) 5.80
 Operator GSW
 Time 1630-1645

O2 Percent 14.61
 CO2 Percent 3.86
 N2 Percent 81.53
 Stack Moisture (%) 6.98
 Mole Fraction (dry) 0.93
 Molecular Weight (dry) 29.20
 Molecular Weight (wet) 28.42
 Stack ID (in) 17.50
 Stack Area (sq ft) 1.67

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	2.90	465	1.70	133.06	7983.66
A-2	3.90	608	1.97	165.81	9948.55
A-3	4.20	620	2.05	173.03	10381.95
A-4	4.00	623	2.00	169.10	10145.81
B-1	3.00	491	1.73	137.23	8233.51
B-2	4.00	612	2.00	168.24	10094.14
B-3	4.40	624	2.10	177.43	10645.93
B-4	3.90	624	1.97	167.05	10022.81
Averages		583.38	1.94	161.37	9682.04

Actual Volumetric Flow Rate (acfm) 16172.25
 Standard Volumetric Flow Rate (scfm) 7507.89
 Dry Standard Volumetric Flow Rate (dscfm) 7019.12

Volumetric Flow Spreadsheet

Plant	GRI - Campaign 6	O2 Percent	14.91
Date	11/15/94	CO2 Percent	3.76
Sampling Location	Engine 11	N2 Percent	81.33
Run Number	19	Stack Moisture (%)	6.73
Ambient Temperature (°F)	50.00	Mole Fraction (dry)	0.93
Barometric Pressure (in Hg)	27.02	Molecular Weight (dry)	29.20
Static Pressure (in H2O)	6.00	Molecular Weight (wet)	28.44
Operator	GSW	Stack ID (in)	17.50
Time	1035-1045	Stack Area (sq ft)	1.67

Traverse Point Number	Velocity Head dP (in H2O)	Stack Ts (°F)	Square Root of dP	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A-1	3.40	519	1.84	148.22	8893.38
A-2	4.40	605	2.10	175.87	10552.19
A-3	4.80	620	2.19	184.98	11098.77
A-4	4.80	621	2.19	185.07	11103.91
B-1	3.40	512	1.84	147.69	8861.52
B-2	4.60	613	2.14	180.50	10829.81
B-3	4.90	622	2.21	187.07	11224.17
B-4	4.60	622	2.14	181.25	10875.14
Averages		591.75	2.08	173.83	10429.86

Actual Volumetric Flow Rate (acfm)	17421.36
Standard Volumetric Flow Rate (scfm)	8023.38
Dry Standard Volumetric Flow Rate (dscfm)	7501.05

Appendix H Fuel Analysis Results

This appendix presents the fuel analysis performed at each campaign including fuel composition (e.g., liquid volume percent and weight percent) and higher and lower heating values.



PHOENIX LABORATORIES, INC.

5025 PRINCETON AVE.
MIDLAND, TEXAS 79703

SUITES 3 & 4
(915) 520-9803

H.1 Campaign 2

SAMPLE NUMBER: G5993
DATE RECEIVED: 7/6/93

SAMPLE I.D.: CRYO RESIDUE COMPOSITE @ PLT 193
COMPANY: [REDACTED]
LOCATION: [REDACTED]
SAMPLED BY: L. SEABOURNE
PRESSURE: 630#
TIME SAMPLED:
EFFECTIVE DATE
TEMPERATURE:
DATE SAMPLED: 7/6/93

FRACTIONAL GAS ANALYSIS AT 14.65 AND 60 DEGREES F

COMPOUND	MOL. %	GPM	SP. GR.	CORRECTED SPECIFIC GRAVITY	
CARBON DIOXIDE	0.00		0.0000		0.5741
NITROGEN	1.64		0.0159		
			0.0000	B.T.U./CU. FOOT:	
METHANE	95.85		0.5309	(H ₂ S FREE)	1012
ETHANE	2.44	0.649	0.0253	DRY BASIS	995
PROPANE	0.07	0.019	0.0011	WET BASIS	
ISO-BUTANE	0.00	0.000	0.0000	PENTANES PLUS	
N-BUTANE	0.00	0.000	0.0000	GPM:	0.000
ISO-PENTANE	0.00	0.000	0.0000		
N-PENTANE	0.00	0.000	0.0000	H ₂ S PPM:	0
HEXANES PLUS	0.00	0.000	0.0000		
				'Z' FACTOR	0.9979
TOTALS	100.00	0.668	0.5732		

COMMENTS:

ANALYST: *Drury Cooke*

**Gas Analysis
Campaign 3
Station 3A**

Date	Engine	Test	Fd factor (dscf/MMBtu)	High HV (Btu/scf)	Low HV (Btu/scf)
6/14/94	102	1	8498	1159	1049
6/15/94	102	2	8498	1148	1039
	102	3	8498	1148	1039
	101	1	8509	1148	1039
	101	2	8509	1148	1039
	101	3	8509	1148	1039

Certificate of Analysis No. 226

Company: RADIAN CORP.
 Sample of: NATURAL GAS
 Sample by: W. GRAY of RADIAN
 Sample date: 07/15/94 at 1216

For: RADIAN CORPORATION

July 29, 1994
 Date/Time of Anal:
 Data Were Normalized to

Components Listed in Chromatographic

Component	Mole %	Weight %
Nitrogen	1.802	2.633
Carbon Dioxide	0.181	0.416
Methane	79.531	66.560
Ethane	16.766	26.300
Propane	1.565	3.600
i-Butane	0.037	0.112
n-Butane	0.095	0.288
i-Pentane	0.008	0.030
n-Pentane	0.011	0.041
2,3-Dimethylbutane	0.000	0.001
4-Methyl-c-pentene-2	0.000	0.001
2-Methylpentane	0.001	0.004
3-Methylpentane	0.000	0.002
n-Hexane	0.001	0.005
Methylcyclopentane	0.000	0.001
Cyclohexane	0.000	0.001
2-Methylhexane	0.000	0.001
3-Methylhexane	0.000	0.001
n-Heptane	0.000	0.001
Methylcyclohexane	0.000	0.001
	100.000	100.000

Paul W. Dwyer

Certificate of Analysis No. 226306

Company : RADIAN CORP.
 Source : NO.2 MANIFOLD
 Sample of : NATURAL GAS
 Conditions: At Pressure of 30 psia & Temperature of: 84 °F
 Sampled By: W.GRAY of RADIAN Date: 09/15/94 Time: 1216

For : RADIAN CORPORATION

Test By G.C. GPA Method 2261 Factors From GPA-2145, Jan. 01, 1994

Analysis:	Mol %	GPM at 14.696 psia
Nitrogen	1.802	
Carbon Dioxide	0.181	
Methane	79.531	
Ethane	16.766	4.474
Propane	1.565	0.430
i-Butane	0.037	0.012
n-Butane	0.095	0.030
i-Pentane	0.008	0.003
n-Pentane	0.011	0.004
Hexane Plus	0.004	0.000
	100.000	4.953

Specific Gravity at 60°F (air=1) Perfect Gas ... 0.6618
 Real Gas ... 0.6637

Calculated Molecular Weight ... 19.17

Calculated Gross B.T.U./ft³ at 14.696 psia and 60 °F
 Perfect Gas Dry basis ... 1144
 Saturated basis ... 1124

Deviation Factor... 0.9968

Real Gas Dry basis ... 1148
 Saturated basis ... 1128

n-HEXANE	0.005 Wt. %	0.001 Mol. %
BENZENE	< 0.001 Wt. %	< 0.001 Mol. %
ETHYL BENZENE	< 0.001 Wt. %	< 0.001 Mol. %
TOLUENE	< 0.001 Wt. %	< 0.001 Mol. %
XYLENES	< 0.001 Wt. %	< 0.001 Mol. %

Certificate of Analysis No. 226306

Calculated Net B.T.U./ft³ at 14.696 psia and 60 °F

Perfect Gas Dry basis ... 1036
 Saturated basis ... 1018

Deviation Factor... 0.9968

Real Gas

 Dry basis ... 1039
 Saturated basis ... 1021

Southern Petroleum Laboratories, Inc.

Fred W. Angelo

Certificate of Analysis No. 226307

Company: RADIAN CORP.
 Sample of: NATURAL GAS
 Sample by: W.C.G. of RADIAN
 Sample date: 06/14/94 at 1300

For: RADIAN CORPORATION

July 29, 1994
 Date/Time of Anal:
 Data Were Normalized to 100.00%

Components Listed in Chromatographic Ord.

Component	Mole %	Weight %
Nitrogen	0.792	1.157
Carbon Dioxide	0.078	0.181
Methane	80.954	68.316
Ethane	16.423	25.977
Propane	1.479	3.430
i-Butane	0.040	0.122
n-Butane	0.133	0.406
i-Pentane	0.035	0.134
n-Pentane	0.048	0.182
2,3-Dimethylbutane	0.001	0.005
4-Methyl-c-pentene-2	0.001	0.003
2-Methylpentane	0.004	0.020
3-Methylpentane	0.002	0.010
n-Hexane	0.005	0.022
Methylcyclopentane	0.001	0.006
Cyclohexane	0.001	0.004
2-Methylhexane	0.000	0.002
3-Methylhexane	0.001	0.003
n-Heptane	0.001	0.006
Methylcyclohexane	0.001	0.005
	100.000	100.000

Fred D. Angelo

Certificate of Analysis No. 226307

Company : RADIAN CORP.
 Source : XXXXXXXXXX ENG.NO.2 MANIFOLD
 Sample of : NATURAL GAS
 Conditions: At Pressure of 20 psia & Temperature of: 85 °F
 Sampled By: W.C.G. of RADIAN Date: 07/14/94 Time: 1300

For : RADIAN CORPORATION

Test By G.C. GPA Method 2261 Factors From GPA-2145, Jan. 01, 1994

Analysis:

	<u>Mol %</u>	<u>GPM at 14.696 psia</u>
Nitrogen	0.792	
Carbon Dioxide	0.078	
Methane	80.954	
Ethane	16.423	4.382
Propane	1.479	0.407
i-Butane	0.040	0.013
n-Butane	0.133	0.042
i-Pentane	0.035	0.013
n-Pentane	0.048	0.017
Hexane Plus	0.018	0.005
	<u>100.000</u>	<u>4.879</u>

Specific Gravity at 60°F (air=1) Perfect Gas ... 0.6564
 Real Gas ... 0.6582

Calculated Molecular Weight ... 19.01

Calculated Gross B.T.U./ft³ at 14.696 psia and 60 °F
 Perfect Gas Dry basis ... 1155
 Saturated basis ... 1135

Deviation Factor... 0.9968

Real Gas Dry basis ... 1159
 Saturated basis ... 1139

n-HEXANE	0.022 Wt. %	0.005 Mol. %
BENZENE	< 0.001 Wt. %	< 0.001 Mol. %
ETHYL BENZENE	< 0.001 Wt. %	< 0.001 Mol. %
TOLUENE	< 0.001 Wt. %	< 0.001 Mol. %
XYLENES	< 0.001 Wt. %	< 0.001 Mol. %

Certificate of Analysis No. 226307

Calculated Net B.T.U./ft³ at 14.696 psia and 60 °F
Perfect Gas Dry basis ... 1046
 Saturated basis ... 1027
 Deviation Factor... 0.9968
Real Gas Dry basis ... 1049
 Saturated basis ... 1030

Southern Petroleum Laboratories, Inc.

H-9

Fred W. Angelo

**Gas Analysis
Campaign 3
Station 3B**

Date	Engine	Test	Fd factor (dscf/MMBtu)	High HV (Btu/scf)	Low HV (Btu/scf)
6/18/94	4	1	8467		
	4	2	8467	1206	1098
	2	1	8465	1206	1098
6/19/94	2	2	8465	1204	1095
	2	3	8465	1204	1095
	2	4	8465	1205	1096

DATE: 06/20/94
TIME: 09:26
617 618 619 620

ANALYSIS TIME: 225
CYCLE TIME: 240
MODE: RUN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 09:22

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL DENSITY
C 6 +	108	0.150	0.731	7.94	0.00
PROPANE	102	3.967	8.884	100.05	0.06
I-BUTANE	103	0.302	0.892	9.85	0.00
N-BUTANE	104	0.944	2.787	30.87	0.01
NEO C5	107	.000000	0.000	0.00	0.00
IPENTANE	105	0.149	0.546	5.97	0.00
NPENTANE	106	0.169	0.619	6.79	0.00
NITROGEN	114	0.594	0.845	0.00	0.00
METHANE	100	82.055	66.837	830.65	0.45
C O 2	117	0.057	0.128	0.00	0.00
ETHANE	101	11.612	17.732	205.96	0.12
TOTALS		100.000	100.000	1198.07	0.68

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z) = 1.0032
ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1201.9
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1201.9
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1181.4
REAL RELATIVE DENSITY = 0.6818
UNNORMALIZED TOTAL = 100.98

DATE: 06/20/94
TIME: 20:07
617 618 619 620

ANALYSIS TIME: 225
CYCLE TIME: 240
MODE: RUN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 20:03

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL DENSITY
C 6 +	108	0.160	0.775	8.46	0.00
PROPANE	102	4.062	9.047	102.45	0.06
I-BUTANE	103	0.315	0.925	10.28	0.00
N-BUTANE	104	0.991	2.908	32.39	0.01
NEO C5	107	.000000	0.000	0.00	0.00
IPENTANE	105	0.161	0.587	6.46	0.00
NPENTANE	106	0.185	0.674	7.43	0.00
NITROGEN	114	0.603	0.853	0.00	0.00
METHANE	100	81.617	66.111	826.20	0.45
C O 2	117	0.058	0.128	0.00	0.00
ETHANE	101	11.849	17.992	210.16	0.12
TOTALS		100.000	100.000	1203.83	0.683

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z) = 1.0032
ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1207.7
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1207.7
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1187.1
REAL RELATIVE DENSITY = 0.6856
UNNORMALIZED TOTAL = 100.30

DATE: 06/19/94
TIME: 09:26
617 618 619 620

ANALYSIS TIME: 220
CYCLE TIME: 240
MODE: RUN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 09:22

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL D _W
C 6 +	108	0.151	0.733	7.97	0.005
PROPANE	102	4.006	8.960	101.09	0.061
I-BUTANE	103	0.318	0.957	10.37	0.015
N-BUTANE	104	0.961	2.830	31.41	0.015
NEO C5	107	0.000000	0.000	0.00	0.000
IPENTANE	105	0.150	0.548	6.00	0.000
NPENTANE	106	0.171	0.525	6.87	0.015
NITROGEN	114	0.592	0.840	0.00	0.000
METHANE	100	81.908	66.592	829.15	0.455
C O 2	117	0.057	0.127	0.00	0.000
ETHANE	101	11.385	17.309	207.25	0.120
TOTALS		100.000	100.000	1200.11	0.611

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z)
 ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1.0032
 DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1203.9
 SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1203.9
 REAL RELATIVE DENSITY UNNORMALIZED TOTAL = 1133.4
 = 0.6831
 = 100.57

DATE: 06/19/94
TIME: 20:06
617 618 619 620

ANALYSIS TIME: 225
CYCLE TIME: 240
MODE: RUN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 20:02

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL D _W
C 6 +	108	0.158	0.768	8.35	0.005
PROPANE	102	4.009	8.956	101.09	0.061
I-BUTANE	103	0.320	0.943	10.44	0.015
N-BUTANE	104	0.971	2.859	31.75	0.015
NEO C5	107	0.000000	0.000	0.00	0.000
IPENTANE	105	0.155	0.568	6.23	0.000
NPENTANE	106	0.177	0.647	7.11	0.015
NITROGEN	114	0.593	0.842	0.00	0.000
METHANE	100	81.936	66.583	829.44	0.455
C O 2	117	0.057	0.127	0.00	0.000
ETHANE	101	11.624	17.708	206.17	0.120
TOTALS		100.000	100.000	1200.58	0.611

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z)
 ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1.0032
 DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1204.4
 SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1204.4
 REAL RELATIVE DENSITY UNNORMALIZED TOTAL = 1183.9
 = 0.6834
 = 100.68

DATE: 06/18/94
TIME: 09:12
617 618 619 620

ANALYSIS TIME: 225
CYCLE TIME: 240
MODE: RLN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 08:08

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL D
C 6 +	108	0.153	0.740	8.12	0.00
PROPANE	102	4.274	9.473	107.79	0.00
I-BUTANE	103	0.326	0.953	10.63	0.00
N-BUTANE	104	1.022	2.984	33.41	0.00
NEO C5	107	.000000	0.000	0.00	0.00
IFENTANE	105	0.154	0.557	6.16	0.00
NPENTANE	106	0.180	0.653	7.23	0.00
NITROGEN	114	0.616	0.866	0.00	0.00
METHANE	100	81.163	65.428	821.61	0.44
C O 2	117	0.056	0.124	0.00	0.00
ETHANE	101	12.056	18.220	213.84	0.12
TOTALS		100.000	100.000	1208.80	0.68

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z)

ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1.0032
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1212.7
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1212.7
REAL RELATIVE DENSITY = 1192.0
UNNORMALIZED TOTAL = 0.6889
= 101.26

DATE: 06/18/94
TIME: 18:13
617 618 619 620

ANALYSIS TIME: 225
CYCLE TIME: 240
MODE: RUN

STREAM SEQUENCE: 1234
STREAM#: 3
CYCLE START TIME: 18:09

COMP NAME	COMP CODE	LIQ VOL%	WEIGHT%	B.T.U.*	REL DENS
C 6 + <i>C₆H₁₄</i>	108	0.154	0.753	8.14	0.0051
PROPANE	102	3.851	8.648	97.11	0.0586
I-BUTANE	103	0.301	0.891	9.82	0.0060
N-BUTANE	104	0.925	2.737	30.23	0.0186
NEO C5	107	.000000	0.000	0.00	0.0000
IPENTANE	105	0.151	0.555	6.06	0.0038
NPENTANE	106	0.175	0.641	7.01	0.0043
NITROGEN	114	0.619	0.882	0.00	0.0060
METHANE	100	82.343	67.267	833.56	0.4561
C O 2	117	0.058	0.129	0.00	0.0009
ETHANE	101	11.425	17.496	202.64	0.1186
TOTALS		100.000	100.000	1194.57	0.6780

* @ 14.730 PSIA & UNCORRECTED FOR COMPRESSIBILITY

COMPRESSIBILITY FACTOR (1/Z)

ACTUAL B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1.0031
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1198.3
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1198.3
REAL RELATIVE DENSITY = 1177.9
UNNORMALIZED TOTAL = 0.6798
= 100.57

Campaign 4 Fuel Analyses

Sample Date	8/23/94	8/24/94	8/26/94	8/27/94	8/28/94	8/29/94 +	8/30/94 +	Average
Methane (mol%)	93.2940	93.1060	93.8620	93.5120	93.2740	89.9110	87.2560	93.4096
Ethane (mol%)	2.82600	2.90000	2.53600	2.52200	2.74100	2.52500	2.45400	2.70500
Propane (mol%)	0.38300	0.45200	0.35500	0.41000	0.45400	0.41000	0.35100	0.41080
iso-Butane (mol%)	0.04259	0.04730	0.03611	0.04741	0.04689	0.04304	0.02300	0.04406
n-Butane (mol%)	0.07615	0.08192	0.05487	0.07920	0.07286	0.06869	0.04800	0.07300
iso-Pentane (mol%)	0.02177	0.02464	0.01734	0.02333	0.01412	0.02198	0.02200	0.02024
n-Pentane (mol%)	0.01902	0.02262	0.01503	0.02024	0.01081	0.01894	0.02200	0.01754
C6 plus (mol%)	0.03330	0.03208	0.02363	0.03334	0.01369	0.02921	0.02500	0.02721
CO2 (mol%)	0.47100	0.71100	0.77700	0.71100	0.67800	0.69400	0.73700	0.66960
O2 (mol%)	0.13700	0.16300	0.12900	0.19800	0.20300	0.82800	1.96800	0.16600
N2 (mol%)	2.69500	2.45900	2.19400	2.44300	2.49100	5.45000	7.09400	2.45640
Real HHV, BTU/ft ³	1011.2	1012.9	1009.4	1009.1	1009.7	971.8	940.7	1010.5
Real LHV, BTU/ft ³	911.4	913.1	909.7	909.5	910.1	875.9	847.8	910.8
Specific Gravity	0.5924	0.5952	0.5907	0.5930	0.5934	0.6083	0.6202	0.5929

+ Sample appears to have been improperly purged; therefore, excluded from average.

The Gas Company

Engineering Department



September 12, 1994

Larry Ogle
Radian Corporation
Box 201088
Austin, Texas 78720

Southern California
Gas Company

Mailing Address:
Box 1249
Los Angeles, CA
90051-1249

Dear Larry,

Attached are the hydrocarbon gas analysis results for seven of the eight samples submitted to [REDACTED] during August 22 - Sept. 7. All of the samples were analyzed using a HP 5880 gas chromatograph (GPA Standard 2261-90). Daily calibration checks were performed to assure quality.

The Unit #8 sample collected by WCG at 2:00 PM on 8/30/94 was not received until 9/6/94 and was empty (< 1 mole % hydrocarbons) when we analyzed the sample and therefore not reported.

Also, the Unit #4 sample was not received until 9/6/94. The Unit #4 sample may have leaked due to the high level of inerts (≈ 10 mole %). This was verified by subsequent analyses of the sample.

The sample cylinders will be vented and sent to your attention at 8501 N. Mopac, Austin, Texas 78759.

If you have any questions, please call at (310) 806-4364.

Sincerely,

Dan Meltzer
Senior Engineer

cc: Gregg A. Arney
John A. Thompson (w/o attachments)
Deanna Haines (w/o attachments)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-01
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: WAUKESHA ENGINE
 SAMPLE DATE: 8/23/94 13:45

Component	Mol %	(1) HHV	(2) LHV	(3) SG	HHV BTU/SCF	LHV BTU/SCF	SG
METHANE	93.29400	1010.0	909.4	0.5539	942.3	848.4	0.5168
ETHANE	2.82600	1769.6	1618.7	1.0382	50.0	45.7	0.0293
PROPANE	0.38300	2516.1	2314.9	1.5226	9.6	8.9	0.0058
iso-BUTANE	0.04259	3251.9	3000.4	2.0068	1.4	1.3	0.0009
n-BUTANE	0.07615	3262.3	3010.8	2.0068	2.5	2.3	0.0015
iso-PENTANE	0.02177	4000.9	3699.0	2.4910	0.9	0.8	0.0005
n-PENTANE	0.01902	4008.9	3706.9	2.4910	0.8	0.7	0.0005
C6 plus	0.03330	5194.6	4411.1	3.2521	1.7	1.5	0.0011
CARBON DIOXIDE	0.47100	0.0	0	1.5196	0.0	0.0	0.0072
OXYGEN	0.13700	0.0	0	1.1048	0.0	0.0	0.0015
NITROGEN	2.69500	0.0	0	0.9672	0.0	0.0	0.0261
Totals ----->	100.00				1009.1	909.6	0.5912

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	3.3
A = (Total SG)(0.0101)	0.00597
B = (Total Non-HC)(.0070)	0.00023
Z = 1.00369 - A + B	0.99795

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	1011.2 BTU/real cubic foot
LHV	911.4 BTU/real cubic foot
Specific Gravity	0.5924

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig.23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-04
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: WAUKESHA FUEL GAS
 SAMPLE DATE: 8/24/94 12:45

Component	Mole %	HHV (BTU/lb)	LHV (BTU/lb)	SG	HHV (BTU/cu ft)	LHV (BTU/cu ft)	BTU/cu ft
METHANE	93.10600	1010.0	909.4	0.5539	940.4	846.7	0.5157
ETHANE	2.90000	1769.6	1618.7	1.0382	51.3	46.9	0.0301
PROPANE	0.45200	2516.1	2314.9	1.5226	11.4	10.5	0.0069
iso-BUTANE	0.04730	3251.9	3000.4	2.0068	1.5	1.4	0.0009
n-BUTANE	0.08192	3262.3	3010.8	2.0068	2.7	2.5	0.0016
iso-PENTANE	0.02464	4000.9	3699.0	2.4910	1.0	0.9	0.0006
n-PENTANE	0.02262	4008.9	3706.9	2.4910	0.9	0.8	0.0006
C6 plus	0.03208	5194.6	4411.1	3.2521	1.7	1.4	0.0010
CARBON DIOXIDE	0.71100	0.0	0	1.5196	0.0	0.0	0.0108
OXYGEN	0.16300	0.0	0	1.1048	0.0	0.0	0.0018
NITROGEN	2.45900	0.0	0	0.9672	0.0	0.0	0.0238
Totals —>	100.00				1010.8	911.2	0.5939

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	3.3
A = (Total SG)(0.0101)	0.00600
B = (Total Non-HC)(.0070)	0.00023
Z = 1.00369 - A + B	0.99792

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	1012.9 BTU/real cubic foot
LHV	913.1 BTU/real cubic foot
Specific Gravity	0.5952

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig. 23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-05
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: COOPER ENGINE GROUP
 SAMPLE DATE: 8/26/94 10:00

Component	Mole %	HHV, Btu/lb	LHV, Btu/lb	SG	HHV, Btu/scf	LHV, Btu/scf	SG
METHANE	93.86200	1010.0	909.4	0.5539	948.0	853.6	0.5199
ETHANE	2.53600	1769.6	1618.7	1.0382	44.9	41.1	0.0263
PROPANE	0.35500	2516.1	2314.9	1.5226	8.9	8.2	0.0054
iso-BUTANE	0.03611	3251.9	3000.4	2.0068	1.2	1.1	0.0007
n-BUTANE	0.05487	3262.3	3010.8	2.0068	1.8	1.7	0.0011
iso-PENTANE	0.01734	4000.9	3699.0	2.4910	0.7	0.6	0.0004
n-PENTANE	0.01503	4008.9	3706.9	2.4910	0.6	0.6	0.0004
C6 plus	0.02363	5194.6	4411.1	3.2521	1.2	1.0	0.0008
CARBON DIOXIDE	0.77700	0.0	0	1.5196	0.0	0.0	0.0118
OXYGEN	0.12900	0.0	0	1.1048	0.0	0.0	0.0014
NITROGEN	2.19400	0.0	0	0.9672	0.0	0.0	0.0212
Totals —>	100.00				1007.3	907.8	0.5895

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	3.1
A = (Total SG)(0.0101)	0.00595
B = (Total Non-HC)(.0070)	0.00022
Z = 1.00369 - A + B	0.99795

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	1009.4 BTU/real cubic foot
LHV	909.7 BTU/real cubic foot
Specific Gravity	0.5907

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig. 23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-08
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: [REDACTED] DINGERSOLL #9 W/ POG FUEL GAS (METHANE)
 SAMPLE DATE: 8/27/94 12:35

Component	Mole %	HHV (BTU/lb)	LHV (BTU/lb)	SG	HHV (BTU/scf)	LHV (BTU/scf)	SG
METHANE	93.51200	1010.0	909.4	0.5539	944.5	850.4	0.5180
ETHANE	2.52200	1769.6	1618.7	1.0382	44.6	40.8	0.0262
PROPANE	0.41000	2516.1	2314.9	1.5226	10.3	9.5	0.0062
iso-BUTANE	0.04741	3251.9	3000.4	2.0068	1.5	1.4	0.0010
n-BUTANE	0.07920	3262.3	3010.8	2.0068	2.6	2.4	0.0016
iso-PENTANE	0.02333	4000.9	3699.0	2.4910	0.9	0.9	0.0006
n-PENTANE	0.02024	4008.9	3706.9	2.4910	0.8	0.8	0.0005
C6 plus	0.03334	5194.6	4411.1	3.2521	1.7	1.5	0.0011
CARBON DIOXIDE	0.71100	0.0	0	1.5196	0.0	0.0	0.0108
OXYGEN	0.19800	0.0	0	1.1048	0.0	0.0	0.0022
NITROGEN	2.44300	0.0	0	0.9672	0.0	0.0	0.0236
Totals ---->	100.00				1007.0	907.6	0.5917

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	3.4
A = (Total SG)(0.0101)	0.00598
B = (Total Non-HC)(.0070)	0.00023
Z = 1.00369 - A + B	0.99795

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	1009.1 BTU/real cubic foot
LHV	909.5 BTU/real cubic foot
Specific Gravity	0.5930

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig.23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-12
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: INGERSOLL #9 W/SHORTLEIGH GAS (METHANE)
 SAMPLE DATE: 8/22/94 13:30

Component	Mole %	(1) HHV	(2) LHV	(3) SG	HHV (BTU/SCF)	LHV (BTU/SCF)	SG
METHANE	93.27400	1010.0	909.4	0.5539	942.1	848.2	0.5167
ETHANE	2.74100	1769.6	1618.7	1.0382	48.5	44.4	0.0285
PROPANE	0.45400	2516.1	2314.9	1.5226	11.4	10.5	0.0069
iso-BUTANE	0.04689	3251.9	3000.4	2.0068	1.5	1.4	0.0009
n-BUTANE	0.07286	3262.3	3010.8	2.0068	2.4	2.2	0.0015
iso-PENTANE	0.01412	4000.9	3699.0	2.4910	0.6	0.5	0.0004
n-PENTANE	0.01081	4008.9	3706.9	2.4910	0.4	0.4	0.0003
C6 plus	0.01369	5194.6	4411.1	3.2521	0.7	0.6	0.0004
CARBON DIOXIDE	0.67800	0.0	0	1.5196	0.0	0.0	0.0103
OXYGEN	0.20300	0.0	0	1.1048	0.0	0.0	0.0022
NITROGEN	2.49100	0.0	0	0.9672	0.0	0.0	0.0241
Totals	100.00				1007.6	908.2	0.5921

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	3.4
A = (Total SG)(0.0101)	0.00598
B = (Total Non-HC)(.0070)	0.00024
Z = 1.00369 - A + B	0.99795

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	1009.7 BTU/real cubic foot
LHV	910.1 BTU/real cubic foot
Specific Gravity	0.5934

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig.23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI Test at
 REPORTED BY: S. RAZZAK
 REPORT DATE: 9/6/94
 TEST LOCATION: STATION UNIT #4
 SAMPLE DATE: 8/30/94 @ 18:10 WCG

Component	Molecular Weight	Volume %	Weight %	Specific Gravity	Higher Heating Value (BTU/cu ft)	Lower Heating Value (BTU/cu ft)	Specific Gravity	
METHANE	16.04	87.25600	1010.8	909.4	0.5539	881.3	793.5	0.4833
ETHANE	30.07	2.45400	1769.6	1618.7	1.0382	43.4	39.7	0.0255
PROPANE	44.10	0.35100	2516.1	2314.9	1.5226	8.8	8.1	0.0053
iso-BUTANE	58.12	0.02300	3251.9	3000.4	2.0068	0.7	0.7	0.0005
n-BUTANE	58.12	0.04800	3262.3	3010.8	2.0068	1.6	1.4	0.0010
iso-PENTANE	72.15	0.02200	4000.9	3699.0	2.4910	0.9	0.8	0.0005
n-PENTANE	72.15	0.02200	4008.9	3706.9	2.4910	0.9	0.8	0.0005
C6 plus	86.17	0.02500	5194.6	4411.1	3.2571	1.3	1.1	0.0008
CARBON DIOXIDE	44.01	0.73700	0.0	0	1.5196	0.0	0.0	0.0112
OXYGEN	32.00	1.96800	0.0	0	1.1048	0.0	0.0	0.0217
NITROGEN	28.02	7.09400	0.0	0	0.9672	0.0	0.0	0.0686
Totals —→		100.0000				938.9	846.2	0.6190

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	9.8
A = (Total SG)(0.0101)	0.00625
B = (Total Non-HC)(0.0070)	0.00069
Z = 1.00369 - A + B	0.99812

(5) Adjusted Values (14.73 psia, 60F. Gross, Dry, real volume basis)

HHV	940.7 BTU/real cubic foot
LHV	847.8 BTU/real cubic foot
Specific Gravity	0.6202

FOOTNOTES

- (1) Higher Heating Value per Ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per Ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig. 23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)

ENGINEERING ANALYSIS CENTER

BTU Content of Natural Gas by Gas Composition

PROJECT NO: GRI4-CAN-15
 REPORTED BY: S. RAZZAK
 REPORT DATE: 8/31/94
 TEST LOCATION: INGERSOLL #9 W/ SCRIPPS GAS
 SAMPLE DATE: 8/29/94 09:45

Component	Mass %	(1) HHV	(2) LHV	(3) SG	(4) HHV BTU/cu ft	(4) LHV BTU/cu ft	(5) Specific Gravity
METHANE	89.91100	1010.0	909.4	0.5539	908.1	817.7	0.4980
ETHANE	2.52500	1769.6	1618.7	1.0382	44.7	40.9	0.0262
PROPANE	0.41000	2516.1	2314.9	1.5226	10.3	9.5	0.0062
iso-BUTANE	0.04304	3251.9	3000.4	2.0068	1.4	1.3	0.0009
n-BUTANE	0.06869	3262.3	3010.8	2.0068	2.2	2.1	0.0014
iso-PENTANE	0.02198	4000.9	3699.0	2.4910	0.9	0.8	0.0005
n-PENTANE	0.01694	4008.9	3706.9	2.4910	0.8	0.7	0.0005
C6 plus	0.02921	5194.6	4411.1	3.2521	1.5	1.3	0.0009
CARBON DIOXIDE	0.69400	0.0	0	1.5196	0.0	0.0	0.0105
OXYGEN	0.82800	0.0	0	1.1048	0.0	0.0	0.0091
NITROGEN	5.45000	0.0	0	0.9672	0.0	0.0	0.0527
Totals —>	100.00				969.9	874.2	0.6071

(4) Compressibility Factor (Z) for mixed gases

Total Non-Hydrocarbons	7.0
A = (Total SG)(0.0101)	0.00613
B = (Total Non-HC)(.0070)	0.00049
Z = 1.00369 - A + B	0.99805

(5) Adjusted Values (14.73 psia, 60F, Gross, Dry, real volume basis)

HHV	971.8 BTU/real cubic foot
LHV	875.9 BTU/real cubic foot
Specific Gravity	0.6083

FOOTNOTES

- (1) Higher Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Association (GPA) Standard 2145-94
- (2) Lower Heating Value per ideal cubic foot @ 14.696 psia
Gas Processors Suppliers Association (GPSA) Vol. II - Sec. 23 - Fig.23-2 (1987)
- (3) Specific Gravity
Gas Processors Association (GPA) Standard 2145-94
- (4) Empirical formula for compressibility factor
American Gas Association's Transmission Report No. 5.
- (5) Values are adjusted to reflect real volumes rather than ideal volumes by dividing by the compressibility factor.
ex: (BTU/Ideal Gas Volume)/Z where Z=(Real Gas Volume/Ideal Gas Volume)



CERTIFICATE OF ANALYSIS NO. 228192

Company : RADIAN CORP.
Source : Ingersoll #9 W/SCR
Sample of : Fuel Gas

Sampled By: LD of Radian Date: 08/29/94 Time: 9:45
Remarks : GRI4-CAN-16; Radian Lab. #2

For : RADIAN CORPORATION

Test By G.C. GPA Method 2261 Factors From GPA-2145, Jan. 01, 1994

Analysis:	Mol %	GPM at 14.650 psia
Nitrogen	0.443	
Carbon Dioxide	0.610	
Methane	95.587	
Ethane	2.703	
Propane	0.463	0.719
i-Butane	0.056	0.127
n-Butane	0.056	0.018
i-Pentane	0.020	0.018
n-Pentane	0.016	0.007
Hexane Plus	0.046	0.006
		0.020
	<u>100.000</u>	<u>0.915</u>

Specific Gravity at 60 Deg. F (air=1)	Perfect Gas	0.5830
	Real Gas ...	0.5840

Calculated Molecular Weight ... 16.88

Calculated Gross B.T.U. / Cu. ft at 14.650 psia and 60 Deg. F	Perfect Gas	
	Dry basis ...	1030
	Saturated basis ...	1012

Deviation Factor... 0.9978

Real Gas	Dry basis ...	1032
	Saturated basis ...	1014

	<u>Wt. %</u>
Normal Hexane	0.023
Benzene	0.001
Ethyl Benzene	<0.001
Toluene	<0.001
Xylenes	<0.001



CERTIFICATE OF ANALYSIS NO. 228192

Calculated Net B.T.U. / Cu. ft at 14.650 psia and 60 Deg. F
Perfect Gas

Dry basis ... 928
Saturated basis ... 912

Deviation Factor... 0.9978

Real Gas

Dry basis ... 930
Saturated basis ... 914

Southern Petroleum Laboratories, Inc.

Fred W. Angelo



CERTIFICATE OF ANALYSIS NO. 228192

Company: RADIAN CORP.
Sample of: Fuel Gas
Sample by: LD of Radian
Sample date: 08/29/94 at 9:45
Remarks: GRI4-CAN-16; Radian Lab. #2

For: RADIAN CORPORATION

September 26, 1994

Normalized to 100.00%

Components Listed in Chromatographic Order

Component	Mole %	Weight %
Nitrogen	0.443	0.734
Carbon Dioxide	0.610	1.589
Methane	95.587	90.801
Ethane	2.703	4.812
Propane	0.463	1.210
i-Butane	0.056	0.194
n-Butane	0.056	0.194
i-Pentane	0.020	0.087
n-Pentane	0.016	0.067
2,2-Dimethylbutane	0.001	0.003
2,3-Dimethylbutane	0.001	0.003
4-Methyl-c-pentene-2	0.001	0.004
2-Methylpentane	0.004	0.021
3-Methylpentane	0.002	0.012
n-Hexane	0.005	0.023
2,2-Dimethylpentane	0.000	0.001
Methylcyclopentane	0.002	0.011
2,4-Dimethylpentane	0.000	0.001
Benzene	0.000	0.001
Cyclohexane	0.003	0.013
2-Methylhexane	0.001	0.006
2,3-Dimethylpentane	0.000	0.002
1,1-Dimethylcyclopentane	0.000	0.001
3-Methylhexane	0.001	0.006
3,4-Dimethyl-c-pentene-2	0.000	0.002
1c,3-Dimethylcyclopentane	0.000	0.001
1t,2-Dimethylcyclopentane	0.000	0.002
n-Heptane	0.002	0.009
Methylcyclohexane	0.003	0.018
3,4-Dimethylhexane	0.000	0.002
1c,2t,3-Trimethylcyclopentane	0.000	0.002
3-Ethylhexane	0.001	0.003
n-Octane	0.000	0.002
n-Nonane	0.000	0.001



CERTIFICATE OF ANALYSIS NO. 228192

Component	Mole %	Weight %
n-Decane	0.000	0.002
1-Methyl-2-i-propylbenzene	0.000	0.001
Unknown IC11	0.000	0.002
Unknown IC11	0.000	0.003
Unknown IC11	0.001	0.007
1,2-Dimethyl-4-ethylbenzene	0.001	0.007
Unknown IC11	0.000	0.002
Unknown IC11	0.000	0.001
1,2-Dimethyl-3-ethylbenzene	0.000	0.002
1-Ethyl-2-i-propylbenzene	0.000	0.001
n-Undecane	0.010	0.090
1-Ethyl-4-i-propylbenzene	0.001	0.008
(2-Methylbutyl)benzene	0.002	0.013
1,2,3,5-Tetramethylbenzene	0.000	0.003
1-t-Butyl-2-methylbenzene	0.000	0.001
A2	0.001	0.005
Unknown IC12	0.000	0.004
A3	0.000	0.002
A4	0.000	0.003
1-Methyl-3-n-butylbenzene	0.000	0.002
1,3-Di-i-propylbenzene	0.000	0.003
1-Methyl-2-n-butylbenzene	0.000	0.001
1,2,3,4-Tetrahydronaphthalene	0.000	0.001
Naphthalene	0.000	0.002
	100.000	100.000

Paul H. Angelo

Chain of Custody Record

Page 2 of 2

PROJECT GRI Campaign 4		NO. OF CONTAINERS		ANALYSES		REMARKS		SAM ID NO. (for lab use only)	
FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	ANALYSES	REMARKS	SAM ID NO.	DATE	TIME	
GRI4-PM1-10	Bottom Filter	8-26-94	2	✓	Cooper #14		9/12	0830	
11	Filter Holder	↓	1	✓					
12	Impinger 1+2+3	↓	1	✓					
13	Top Filter	8-27-94	2	✓	Ingersoll 8				
14	Filter Holder	↓	1	✓					
15	Impinger 1+2+3	↓	1	✓					
16	Top Filter	8-28-94	2	✓	Ingersoll 9				
17	Filter Holder	↓	1	✓					
18	Impinger 1+2+3	↓	Impinger 1+2+3		Fraction Unidid				
REMARKS Be Careful in Washing filter components -									
RECEIVED BY:		DATE	TIME	RELINQUISHED BY:	DATE	TIME	RELINQUISHED BY:		

LAB USE ONLY

RECEIVED FOR LABORATORY BY:		DATE	TIME	AIRBILL NO.	DATE	TIME	TEMP	SEAL	CONDITION
Lester E. Haver		9/12	1100		9/12	0830		and no	excellent
REMARKS									

AUSVOC
Chain of Custody

Canister #:

HL 846

Project:

GRI Comp #4

(TM

FPAS

TBA)

To Be Completed By Field Sampler

Field ID:

GRI4-CAN-07

Circle One:

(Routine Dup Blank)

Sample Collected:

Date:

8/23/94

Start Time:

15:50

End Time:

16:18

Sampling Site:

Waikeshu Fuel gas after fuel meter

OVA Reading (Peak):

Sampler's Initials:

[Signature]

Type of Sample (Circle one): Ambient or Point Source (specify):

Methane

Field Pressures (PSIG):

Comments:

Waikeshu engine fuel gas
 $V_1 = -27.6$ "Hg

 $V_2 = -2.8$ "Hg

To Be Completed By Lab (Part One)

	Date/Init.	Value (ppbV-C)	Initial Lab Pressure	VFR # <u>135</u>	Date/Init.
1. Canister cleaned	<u>8-6-94</u>		<u>-14.24</u> PSIG	Cleaned: <u> </u>	
2. Canister blanked	<u>8-1-94</u>	<u>.20</u>	$\Delta PL = 11.98$ PSIG	Blanked: <u> </u>	
3. Canister humidified			$\Delta PF = 12.18$ PSIG	Calibrated: <u> </u>	
4. Canister reblanked			$\Delta PL - \Delta PF = -0.20$ PSIG	Turns = <u> </u>	
5. Canister evacuated	<u>8-15-94</u>			mL/min = <u> </u>	
6. Canister shipped	<u>8-16-94</u>				
7. Canister received	<u>9-5-94</u>				
8. Analysis completed	<u>9-5-94</u>				
9. Sample discarded					

To Be Completed By Lab (Part Two)

Parameter	Dilution 1	Dilution 2	Dilution 3	Dilution 4
Initial Pressure	<u>-14.24 PSIG</u>			
Final Pressure	<u>-2.26 PSIG</u>			
Add Diluent (He, Air, N ₂)	<u>+21.70 PSIG</u>			
Dilution Factor	<u>0.3291</u>			
FINAL Dilution Factor				
Dilution Date	<u>9-16-94</u>			
Dilution Time	<u>1030</u>			
Initials	<u>[Signature]</u>			

REPORT

H-28

AUSVOC
Chain of Custody

Canister #: 958

Project: GRI-

(TM) FPAS TBA

To Be Completed By Field Sampler

Field ID:

GRI4-CAN-06

Circle One:

(Routine) Dup Blank

Sample Collected:

Date: 8/26/94

Start Time: 13:20

End Time: 13:30

Sampling Site:

Croper Engine - Before Catalyst Exhaust Gas

OVA Reading (Peak):

Sampler's Initials:

ZAO

Type of Sample (Circle one): Ambient or Point Source (specify):

Engine Exhaust

Field Pressures (PSIG):

$V_1 = -27.2$ "Hg

$V_2 = -18.2$ "Hg

Comments:

Grab sample

To Be Completed By Lab (Part One)

	Date/Init.	Value (ppbV-C)	Initial Lab Pressure	VFR # <u>None</u>	Date/Init.
1. Canister cleaned	<u>8-6-94, C</u>		<u>-14.15</u> PSIG	Cleaned:	
2. Canister blanked	<u>8-9-94, C</u>	<u>.51</u>	$\Delta PL = 4.43$ PSIG	Blanked:	
3. Canister humidified			$\Delta PF = 4.42$ PSIG	Calibrated:	
4. Canister reblanked			$\Delta PL - \Delta PF = 0.01$ PSIG	Turns =	
5. Canister evacuated	<u>8-15-94, C</u>			mL/min =	
6. Canister shipped	<u>8-16-94, C</u>				
7. Canister received	<u>9-9-94, C</u>				
8. Analysis completed	<u>9-30-94, C</u>				
9. Sample discarded					

To Be Completed By Lab (Part Two)

Parameter	Dilution 1	Dilution 2	Dilution 3	Dilution 4
Initial Pressure	<u>-14.15 PIA</u>			
Final Pressure	<u>-9.72 PIA</u>			
Add Diluent (He, Air, N ₂)	<u>+22.20 PIA</u>			
Dilution Factor	<u>0.1201</u>			
FINAL Dilution Factor				
Dilution Date	<u>9-16-94</u>			
Dilution Time	<u>1106</u>			
Initials	<u>W</u>			

AUSVOC
Chain of Custody

Canister #: AC-789

Project: [REDACTED]
(TM FPAS TBA)

To Be Completed By Field Sampler

Field ID: GREY-CAN-09
Sample Collected: 8/27/94 Date: 12:35 Start Time: 13:03 End Time: 13:03
Sampling Site: Ingersoll Wk PCC
OVA Reading (Peak): 200
Sampler's Initials: [Signature]
Type of Sample (Circle one): Ambient or Point Source (specify): Point Source

Circle One:

(Routine) Dup Blank

Field Pressures (PSIG):

$V_1 = 27.0$ kg
 $V_2 = 4.0$ kg

Comments:

Top Valve open before removing plug, closed and removed plug.
Methane Fuel Gas

To Be Completed By Lab (Part One)

	Date/Init.	Value (ppbV-C)	Initial Lab Pressure	VFR #	Date/Init.
1. Canister cleaned	8-5-94, C		- 14.24		
2. Canister blanked	8-5-94, C	3551	APL = 11.39 PSIG	Cleaned: _____	
3. Canister humidified			APF = 11.30 PSIG	Blanked: _____	
4. Canister reblanked			APL - APF = 0.09 PSIG	Calibrated: _____	
5. Canister evacuated	8-15-94, C			Turns = _____	
6. Canister shipped	8-16-94, C			mL/min = _____	
7. Canister received	9-8-94, C				
8. Analysis completed	9-14-94, C				
9. Sample discarded					

To Be Completed By Lab (Part Two)

Parameter	Dilution 1	Dilution 2	Dilution 3	Dilution 4
Initial Pressure	- 14.24 PSIG			
Final Pressure	- 2.85 PSIG			
Add Diluent (He, Air, N ₂)	+ 22.20 PSIG			
Dilution Factor	17.30670.3087			
FINAL Dilution Factor	9-16-94			
Dilution Date	7/4/3			
Dilution Time				
Initials				

MEASUREMENT INFORMATION PROCESSING SYSTEM (MIPS)
 BTU POSTING BOOK REPORT
 08/01/94 TO 08/31/94

08/23/94 10:24:11
 PAGE 1

UTTER ID: 2671

ID	Lab	Effective Date	Date Ret	Date Removed	BTU	SGV	CO2	N2	NETCHANGE
10409	MGAC-A	08/01/94	08/01/94	08/09/94	1043	0.603	1.16	1.04	93.65
10690	MGAC-A	08/09/94	08/09/94	08/17/94	1040	0.601	1.13	1.10	93.64

CUSTOMER ID: 80CALGAS

*** END OF REPORT ***



CERTIFICATE OF ANALYSIS NO. 229244

Company : RADIAN CORP.
Source : [REDACTED] Field: Turbine Fuel Gas Test # 3
Sample of : Natural Gas

Sampled By: JM of Radian Date: 10/05/94 Time: 14:50

For : RADIAN CORPORATION

Test By G.C. GPA Method 2261 Factors From GPA-2145, Jan. 01, 1994

Analysis:	Mol %	GPM at 14.696 psia
Nitrogen	1.278	
Carbon Dioxide	0.057	
Methane	95.346	
Ethane	3.100	0.827
Propane	0.197	0.054
i-Butane	0.010	0.003
n-Butane	0.012	0.004
	<u>100.000</u>	<u>0.888</u>

Specific Gravity at 60 Deg. F (air=1)	Perfect Gas ...	0.5770
	Real Gas ...	0.5780

Calculated Molecular Weight ... 16.71

Calculated Gross B.T.U. / Cu. ft at 14.696 psia and 60 Deg. F

Perfect Gas	Dry basis ...	1024
	Saturated basis ...	1006
	Deviation Factor...	0.9979
Real Gas	Dry basis ...	1026
	Saturated basis ...	1008

	Wt%
Normal Hexane	<0.001
Benzene	<0.001
Ethyl Benzene	<0.001
Toluene	<0.001
Xylenes	<0.001



CERTIFICATE OF ANALYSIS NO. 229244

Company: RADIAN CORP.
Sample of: Natural Gas
Sample by: JM of Radian
Sample date: 10/05/94 at 14:50

For: RADIAN CORPORATION

October 19, 1994

Normalized to 100.00%

Components Listed in Chromatographic Order

Component	Mole %	Weight %
Nitrogen	1.278	2.142
Carbon Dioxide	0.057	0.150
Methane	95.346	91.532
Ethane	3.100	5.578
Propane	0.197	0.520
i-Butane	0.010	0.035
n-Butane	0.012	0.042
i-Pentane	0.000	0.001
n-Pentane	0.000	0.001
2-Methylpentane	0.000	0.000
3-Methylpentane	0.000	0.000
n-Hexane	0.000	0.000
	100.000	100.000

Michael D. Angelo



CERTIFICATE OF ANALYSIS NO. 229244

Calculated Net B.T.U. / Cu. ft at 14.696 psia and 60 Deg. F

Perfect Gas	Dry basis	...	922
	Saturated basis	...	906

Deviation Factor... 0.9979

Real Gas	Dry basis	...	924
	Saturated basis	...	908

Southern Petroleum Laboratories, Inc.

H-34

Fred W. Angelo

Fred DuAngelo

of

PROJECT						GRT Campaign #5					
SITE											
COLLECTED BY (Signature)						<i>[Signature]</i>					
FIELD SAMPLE I.D.						SAMPLE MATRIX					
DATE/TIME						NO. OF CONTAINERS					
ANALYSES						REMARKS					
SAMPLER ID NO. (for lab use only)											
Turbine Test #3	Natural Gas	10/5/94									
600 Boiler Test #5	"	10/6/94									
400 Boiler Test #1	"	10/4/94									
Long Head Test #3	"	10/2/94									
Small Head Test #9	"	10/3/94									
	Empty										
	"										
	"										
REMARKS											
RECEIVED BY:						RELINQUISHED BY:					
DATE						DATE					
TIME						TIME					
LAB USE ONLY											
RECEIVED BY:						RELINQUISHED BY:					
DATE						DATE					
TIME						TIME					

STRENGTH & POWER

Analysis
 Andrew 67 Model 6 GPA - 3386 Pa 8TEX, HAV, LHV, Specific Grav. Constant analysis
 Reference PO# 341607 - 9/23/94 Send Results to: Jim McCaughy

PO Box 3000
Asheville Triangle Park, N.C. 27409

H.5 Campaign 6

Source: WALLS
 Station #: UNIT 10 FUEL GAS
 Station Name: UNIT 10 FUEL GAS
 Field: [REDACTED]

Report Date: 11/04/1994
 Sample Date: 11/04/94
 Flowing Pressure: 30 psig
 Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
 File: c:\ezchrom\chrom\ [REDACTED]

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.097	0.000	0.011	
Methane	94.240	956.199	0.522	
CO2	1.303	0.000	0.020	
Ethane	2.765	49.156	0.029	0.741
H2S	0.000	0.000	0.000	
Propane	0.410	10.364	0.006	0.113
i-Butane	0.056	1.829	0.001	0.018
n-Butane	0.062	2.032	0.001	0.020
i-Pentane	0.018	0.724	0.000	0.007
n-Pentane	0.013	0.524	0.000	0.005
Hexanes-Plus	0.036	1.855	0.001	0.016

Ideal Total 100.000 1022.682 0.592 0.919

Gross BTU/Real Cu. Ft.
 (@ 60 deg F, 14.730)
 Dry = 1024.908
 Sat. = 1008.275
 Actual = 1024.908
 (0.000 lbs. water/MMCF)

Gasoline Content
 Propane GPM = 0.113
 Butane GPM = 0.038
 Gasoline GPM = 0.027
 26# Gasoline GPM = 0.047
 Total GPM = 0.178

Real Specific Gravity Calculated = 0.5927
 On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks:

Source: WALLS
Station #: UNIT 10 FUEL GAS
Station Name: UNIT 10 FUEL GAS
Field: [REDACTED]

Report Date: 11/04/1994
Sample Date: 11/04/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED] 1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.090	0.000	0.011	
Methane	94.254	956.341	0.522	
CO2	1.302	0.000	0.020	
Ethane	2.756	48.996	0.029	0.739
H2S	0.000	0.000	0.000	
Propane	0.428	10.819	0.007	0.118
1-Butane	0.055	1.797	0.001	0.018
n-Butane	0.062	2.032	0.001	0.020
1-Pentane	0.018	0.724	0.000	0.007
n-Pentane	0.013	0.524	0.000	0.005
Hexanes-Plus	0.022	1.134	0.001	0.010

Ideal Total 100.000 1022.365 0.591 0.916

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1024.588
Sat. = 1007.960
Actual = 1024.588
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.118
Butane GPM = 0.038
Gasoline GPM = 0.021
26# Gasoline GPM = 0.041
Total GPM = 0.177

Real Specific Gravity Calculated = 0.5924
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks: _____

Source: JONES
Station #: 14-480-01-3 2
Station Name: SUCT
Field:

Report Date: 11/04/1994
Sample Date: 05/11/94
Flowing Pressure: 500 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom\14480.1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.498	0.000	0.014	
Methane	94.328	957.091	0.522	
CO2	0.999	0.000	0.015	
Ethane	2.642	46.970	0.027	0.708
H2S	0.000	0.000	0.000	
Propane	0.357	9.024	0.005	0.099
i-Butane	0.073	2.385	0.001	0.024
n-Butane	0.060	1.966	0.001	0.019
i-Pentane	0.013	0.523	0.000	0.005
n-Pentane	0.010	0.403	0.000	0.004
Hexanes-Plus	0.020	1.031	0.001	0.009

Ideal Total 100.000 1019.392 0.589 0.867

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1021.578
Sat. = 1005.000
Actual = 1021.578
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.099
Butane GPM = 0.043
Gasoline GPM = 0.017
26# Gasoline GPM = 0.036
Total GPM = 0.159

Real Specific Gravity Calculated = 0.5899
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9979

Remarks:

Source: WALLS
Station #: UNIT 10 FUEL GAS
Station Name: UNIT 10 FUEL GAS
Field: [REDACTED]

Report Date: 11/04/1994
Sample Date: 11/04/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED].1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.090	0.000	0.011	
Methane	94.254	956.341	0.522	
CO2	1.302	0.000	0.020	
Ethane	2.756	48.996	0.029	0.739
H2S	0.000	0.000	0.000	
Propane	0.428	10.819	0.007	0.118
1-Butane	0.055	1.797	0.001	0.018
n-Butane	0.062	2.032	0.001	0.020
1-Pentane	0.018	0.724	0.000	0.007
n-Pentane	0.013	0.524	0.000	0.005
Hexanes-Plus	0.022	1.134	0.001	0.010

Ideal Total 100.000 1022.365 0.591 0.916

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1024.588
Sat. = 1007.960
Actual = 1024.588
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.118
Butane GPM = 0.038
Gasoline GPM = 0.021
26# Gasoline GPM = 0.041
Total GPM = 0.177

Real Specific Gravity Calculated = 0.5924
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks: _____

Sample Collected 11/5/94

STREAM # 1 Nov. 7, 1994 9:35 00-000-00 0 Record: 23

Batch J-2 Schedule 2205

COMP	UMOL%	MOL%	GPM
H2S	0.00	0.00	0.000
N2	1.33	1.33	0.000
C1	94.50	94.04	0.000
CO2	1.26	1.25	0.000
C2	2.76	2.75	0.736
C3	0.51	0.51	0.141
IC4	0.04	0.04	0.013
NC4	0.06	0.06	0.019
IC5	0.00	0.00	0.000
NC5	0.00	0.00	0.000
C6+	0.02	0.02	0.009

S U M M A R Y	
Base Mol %	100.48
Total GPM	0.917
Real SPGR	0.593
Real BTU	1020
Total SPHT	1.304
Z	0.9978

Total Normalized Mol% = 100.00

ARC-00000-0-94-311-311-J-01-00-00000
0000 0133 9404 0125 0275 0051 0004 0006 0000 0000 0002 0593 00917 1020

STREAM # 1 Nov. 7, 1994 9:48 00-000-00 0 Record: 24

Batch J-2 Schedule 2205

COMP	UMOL%	MOL%	GPM
H2S	0.00	0.00	0.000
N2	1.03	1.03	0.000
C1	94.64	94.42	0.000
CO2	1.26	1.26	0.000
C2	2.78	2.77	0.741
C3	0.43	0.42	0.116
IC4	0.04	0.04	0.013
NC4	0.06	0.06	0.019
IC5	0.00	0.00	0.000
NC5	0.00	0.00	0.000
C6+	0.00	0.00	0.000

S U M M A R Y	
Base Mol %	100.24
Total GPM	0.889
Real SPGR	0.590
Real BTU	1021
Total SPHT	1.304
Z	0.9978

Total Normalized Mol% = 100.00

ARC-00000-0-94-311-311-J-01-00-00000
0000 0103 9442 0126 0277 0042 0004 0006 0000 0000 0000 0590 00889 1021

Source: WALLS
Station #: TURB.
Station Name: TURB.
Field:

Report Date: 11/07/1994
Sample Date: 11/07/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom\1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	2.239	0.000	0.022	
Methane	93.676	950.476	0.519	
CO2	0.584	0.000	0.009	
Ethane	2.990	53.156	0.031	0.802
H2S	0.000	0.000	0.000	
Propane	0.326	8.240	0.005	0.090
i-Butane	0.075	2.450	0.002	0.025
n-Butane	0.065	2.130	0.001	0.021
i-Pentane	0.015	0.603	0.000	0.006
n-Pentane	0.012	0.483	0.000	0.004
Hexanes-Plus	0.018	0.928	0.001	0.008
Ideal Total	100.000	1018.467	0.589	0.954

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1020.633
Sat. = 1004.070
Actual = 1020.633
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.090
Butane GPM = 0.045
Gasoline GPM = 0.018
26# Gasoline GPM = 0.038
Total GPM = 0.153

Real Specific Gravity Calculated = 0.5905
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9979

Remarks:

Source: WALLS
Station #: [REDACTED] TURB.
Station Name: [REDACTED] TURB.
Field: [REDACTED]

Report Date: 11/07/1994
Sample Date: 11/07/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED].1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	2.315	0.000	0.022	
Methane	93.628	949.989	0.519	
CO2	0.548	0.000	0.008	
Ethane	2.999	53.316	0.031	0.804
H2S	0.000	0.000	0.000	
Propane	0.325	8.215	0.005	0.090
i-Butane	0.078	2.548	0.002	0.026
n-Butane	0.064	2.098	0.001	0.020
i-Pentane	0.014	0.563	0.000	0.005
n-Pentane	0.011	0.443	0.000	0.004
Hexanes-Plus	0.018	0.928	0.001	0.008
Ideal Total	100.000	1018.099	0.589	0.957

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1020.262
Sat. = 1003.705
Actual = 1020.262
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.090
Butane GPM = 0.046
Gasoline GPM = 0.017
26# Gasoline GPM = 0.037
Total GPM = 0.153

Real Specific Gravity Calculated = 0.5905
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9979

Remarks: _____

Source: WALLS
Station #: [REDACTED] TURB.
Station Name: [REDACTED] TURB.
Field: [REDACTED]

Report Date: 11/08/1994
Sample Date: 11/08/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED].1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	2.221	0.000	0.021	
Methane	93.363	947.300	0.517	
CO2	0.607	0.000	0.009	
Ethane	3.428	60.943	0.036	0.919
H2S	0.000	0.000	0.000	
Propane	0.299	7.558	0.005	0.083
i-Butane	0.035	1.143	0.001	0.011
n-Butane	0.027	0.885	0.001	0.009
i-Pentane	0.007	0.281	0.000	0.003
n-Pentane	0.005	0.201	0.000	0.002
Hexanes-Plus	0.008	0.412	0.000	0.003
Ideal Total	100.000	1018.724	0.590	1.029

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1020.894
Sat. = 1004.327
Actual = 1020.894
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.083
Butane GPM = 0.020
Gasoline GPM = 0.008
26# Gasoline GPM = 0.016
Total GPM = 0.110

Real Specific Gravity Calculated = 0.5908
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9979

Remarks: _____

Source: WALLS
Station #: [REDACTED] TURB.
Station Name: [REDACTED] TURB.
Field: [REDACTED]

Report Date: 11/08/1994
Sample Date: 11/08/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\[REDACTED]
File: c:\ezchrom\chrom\[REDACTED].1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	2.199	0.000	0.021	
Methane	93.395	947.625	0.517	
CO2	0.599	0.000	0.009	
Ethane	3.435	61.068	0.036	0.921
H2S	0.000	0.000	0.000	
Propane	0.294	7.432	0.004	0.081
i-Butane	0.033	1.078	0.001	0.011
n-Butane	0.027	0.885	0.001	0.009
i-Pentane	0.007	0.281	0.000	0.003
n-Pentane	0.005	0.201	0.000	0.002
Hexanes-Plus	0.006	0.309	0.000	0.003

Ideal Total 100.000 1018.879 0.590 1.028

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1021.048
Sat. = 1004.479
Actual = 1021.048
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.081
Butane GPM = 0.019
Gasoline GPM = 0.007
26# Gasoline GPM = 0.016
Total GPM = 0.108

Real Specific Gravity Calculated = 0.5905
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9979

Remarks: _____

Source: WALLS
Station #: 16-320-01
Station Name: FUEL
Field:

Report Date: 11/09/1994
Sample Date: 11/09/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom\1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.314	0.000	0.013	
Methane	93.561	949.309	0.518	
CO2	1.205	0.000	0.018	
Ethane	3.400	60.445	0.035	0.911
H2S	0.000	0.000	0.000	
Propane	0.366	9.252	0.006	0.101
i-Butane	0.044	1.437	0.001	0.014
n-Butane	0.051	1.671	0.001	0.016
i-Pentane	0.016	0.643	0.000	0.006
n-Pentane	0.012	0.483	0.000	0.004
Hexanes-Plus	0.031	1.597	0.001	0.014
Ideal Total	100.000	1024.839	0.594	1.067

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1027.080
Sat. = 1010.411
Actual = 1027.080
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.101
Butane GPM = 0.031
Gasoline GPM = 0.024
26# Gasoline GPM = 0.040
Total GPM = 0.155

Real Specific Gravity Calculated = 0.5948
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks:

Source: WALLS
Station #: 16-320-01
Station Name:
Field:

Report Date: 11/09/1994
Sample Date: 11/09/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom\ 1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.300	0.000	0.013	
Methane	93.578	949.482	0.518	
CO2	1.197	0.000	0.018	
Ethane	3.400	60.445	0.035	0.911
H2S	0.000	0.000	0.000	
Propane	0.371	9.378	0.006	0.102
i-Butane	0.043	1.405	0.001	0.014
n-Butane	0.051	1.671	0.001	0.016
i-Pentane	0.016	0.643	0.000	0.006
n-Pentane	0.012	0.483	0.000	0.004
Hexanes-Plus	0.032	1.649	0.001	0.014

Ideal Total 100.000 1025.156 0.594 1.068

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1027.400
Sat. = 1010.724
Actual = 1027.400
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.102
Butane GPM = 0.030
Gasoline GPM = 0.024
26# Gasoline GPM = 0.040
Total GPM = 0.157

Real Specific Gravity Calculated = 0.5947
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks: _____

[REDACTED]

Source: WALLS
Station #: 16-320-01
Station Name: [REDACTED] FUEL
Field: [REDACTED]

Report Date: 11/10/1994
Sample Date: 11/10/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED].1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.187	0.000	0.011	
Methane	94.366	957.477	0.523	
CO2	1.390	0.000	0.021	
Ethane	2.494	44.338	0.026	0.669
H2S	0.000	0.000	0.000	
Propane	0.391	9.883	0.006	0.108
i-Butane	0.056	1.829	0.001	0.018
n-Butane	0.064	2.098	0.001	0.020
i-Pentane	0.018	0.724	0.000	0.007
n-Pentane	0.014	0.564	0.000	0.005
Hexanes-Plus	0.020	1.031	0.001	0.009

Ideal Total 100.000 1017.944 0.591 0.836

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1020.142
Sat. = 1003.589
Actual = 1020.142
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.108
Butane GPM = 0.039
Gasoline GPM = 0.020
26# Gasoline GPM = 0.041
Total GPM = 0.167

Real Specific Gravity Calculated = 0.5920
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks: _____

Source: WALLS
Station #: 16-320-01
Station Name: FUEL
Field:

Report Date: 11/10/1994
Sample Date: 11/10/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom.1

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.161	0.000	0.011	
Methane	94.430	958.126	0.523	
CO2	1.380	0.000	0.021	
Ethane	2.475	44.001	0.026	0.663
H2S	0.000	0.000	0.000	
Propane	0.382	9.656	0.006	0.106
i-Butane	0.055	1.797	0.001	0.018
n-Butane	0.064	2.098	0.001	0.020
i-Pentane	0.019	0.764	0.000	0.007
n-Pentane	0.014	0.564	0.000	0.005
Hexanes-Plus	0.020	1.031	0.001	0.009

Ideal Total 100.000 1018.035 0.591 0.828

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1020.232
Sat. = 1003.678
Actual = 1020.232
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.106
Butane GPM = 0.038
Gasoline GPM = 0.021
26# Gasoline GPM = 0.041
Total GPM = 0.165

Real Specific Gravity Calculated = 0.5916
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks:

STREAM # 2 Nov. 15, 1994 8:53 00-000-00 0 Record: 56

Batch J-999 Schedule 1101

COMP	UMOL%	MOL%	GPM	SUMMARY	
H2S	0.00	0.00	0.000		
N2	1.06	1.05	0.000		
C1	94.71	94.31	0.000	Base Mol %	100.43
CO2	1.21	1.20	0.000	Total GPM	0.929
C2	2.90	2.88	0.770	Real SPGR	0.591
C3	0.46	0.46	0.127	Real BTU	1023
IC4	0.04	0.04	0.013	Total SPHT	1.304
NC4	0.06	0.06	0.019	Z	0.9978
IC5	0.00	0.00	0.000		
NC5	0.00	0.00	0.000		
C6+	0.00	0.00	0.000		

Total Normalized Mol% = 100.00

ARC-00000-0-94-316-319-J-01-00-00000

0000 0105 9431 0120 0288 0046 0004 0006 0000 0000 0000 0591 00929 1623

STREAM # 2 Nov. 15, 1994 9:07 00-000-00 0 Record: 57

Batch J-999 Schedule 1101

COMP	UMOL%	MOL%	GPM	SUMMARY	
H2S	0.00	0.00	0.000		
N2	1.02	1.01	0.000		
C1	94.84	94.33	0.000	Base Mol %	100.55
CO2	1.21	1.20	0.000	Total GPM	0.935
C2	2.91	2.90	0.776	Real SPGR	0.591
C3	0.46	0.46	0.127	Real BTU	1024
IC4	0.04	0.04	0.013	Total SPHT	1.304
NC4	0.06	0.06	0.019	Z	0.9978
IC5	0.00	0.00	0.000		
NC5	0.00	0.00	0.000		
C6+	0.00	0.00	0.000		

Total Normalized Mol% = 100.00

ARC-00000-0-94-316-319-J-01-00-00000

0000 0101 9433 0120 0290 0046 0004 0006 0000 0000 0000 0591 00935 1024

STREAM # 1 Nov. 15, 1994 8:40 00-000-00 0 Record: 55

Batch J-999 Schedule 1101

Warning, NO FLOW DETECTED AT SAMPLE INJECT

Flow Switch = 1.00

COMP	UMOL%	MOL%	GFM
H2S	0.00	0.00	0.000
N2	2.06	2.04	0.000
C1	92.60	91.97	0.000
CO2	2.01	2.00	0.000
C2	2.00	1.99	0.532
C3	1.01	1.00	0.276
IC4	0.20	0.20	0.065
NC4	0.20	0.20	0.063
IC5	0.20	0.20	0.073
NC5	0.20	0.20	0.072
C6+	0.20	0.20	0.087

S U M M A R Y

Base Mol % 100.70
Total GFM 1.169
Real SPGR 0.621
Real BTU 1033
Total SFHT 1.303
Z 0.9977

Total Normalized Mol% = 100.00

ARC-00000-0-94-315-319-J-01-00-00000

0000 0204 9197 0200 0199 0100 0020 0020 0020 0020 0020 0621 01169 1033

Source: WALLS
Station #: 16-320-01
Station Name: [REDACTED] FUEL
Field: [REDACTED]

Report Date: 11/14/1994
Sample Date: 11/14/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\ [REDACTED]
File: c:\ezchrom\chrom\ [REDACTED]

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.112	0.000	0.011	
Methane	94.260	956.401	0.522	
CO2	1.274	0.000	0.019	
Ethane	2.744	48.783	0.028	0.736
H2S	0.000	0.000	0.000	
Propane	0.411	10.389	0.006	0.114
i-Butane	0.066	2.156	0.001	0.022
n-Butane	0.070	2.294	0.001	0.022
i-Pentane	0.021	0.844	0.001	0.008
n-Pentane	0.016	0.644	0.000	0.006
Hexanes-Plus	0.026	1.340	0.001	0.011

Ideal Total 100.000 1022.852 0.591 0.918

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1025.077
Sat. = 1008.441
Actual = 1025.077
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.114
Butane GPM = 0.044
Gasoline GPM = 0.025
26# Gasoline GPM = 0.047
Total GPM = 0.182

Real Specific Gravity Calculated = 0.5925
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks: _____

Source: WALLS
Station #: 16-320-01
Station Name: FUEL
Field:

Report Date: 11/15/1994
Sample Date: 11/15/94
Flowing Pressure: 30 psig
Flowing Temp.: 60 F

Method: c:\ezchrom\methods\
File: c:\ezchrom\chrom\

Gas Analysis by Chromatograph

Name	Mole %	BTU	SG	GPM
Nitrogen	1.198	0.000	0.012	
Methane	94.402	957.842	0.523	
CO2	1.306	0.000	0.020	
Ethane	2.554	45.405	0.027	0.685
H2S	0.000	0.000	0.000	
Propane	0.347	8.771	0.005	0.096
i-Butane	0.070	2.287	0.001	0.023
n-Butane	0.068	2.229	0.001	0.021
i-Pentane	0.019	0.764	0.000	0.007
n-Pentane	0.014	0.564	0.000	0.005
Hexanes-Plus	0.022	1.134	0.001	0.010

Ideal Total 100.000 1018.995 0.590 0.847

Gross BTU/Real Cu. Ft.
(@ 60 deg F, 14.730)
Dry = 1021.195
Sat. = 1004.624
Actual = 1021.195
(0.000 lbs. water/MMCF)

Gasoline Content
Propane GPM = 0.096
Butane GPM = 0.044
Gasoline GPM = 0.022
26# Gasoline GPM = 0.043
Total GPM = 0.162

Real Specific Gravity Calculated = 0.5915
On-Site Specific Gravity = 0.0000

Gas Compressability = 0.9978

Remarks:

Appendix I

Quality Assurance and Quality Control (QA/QC)

This appendix presents the CEMS calibration drift and bias summaries and GC calibration data. The CEMS drift tables include the analyzer range, calibration drift for zero and span, and the span concentration. The CEMS bias tables include the analyzer range, QC input, QC response, percent bias, and the relative standard deviation. Where available, the GC QA/QC summary tables present linearity, drift, standard deviation, and relative standard deviation.

I.1.1 CEMS Calibration Drift/Bias Summary

I.1 Campaign 2

CALIBRATION DRIFT GRI CAMPAIGN 2

Date	Analyzer	Range	Calibration Drift		Span Concentration
			Zero	Span	
03-12-94	O2	25	-0.18	-0.28	20.9
	CO2	20	0.03	-0.05	17.97
	CO	20000	-0.03	-4.26	20000
	NOx	1000	0.22	-10.36	936
	THC	10000	-0.03	0.59	998.7
03-13-94	O2	25	-0.09	-0.32	20.9
	CO2	20	0.08	0.45	17.97
	CO	20000	-0.01	-0.17	20000
	NOx	2500	-0.02	-1.83	936
	THC	10000	0.01	0.09	998.7

Note: Drift calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

CALCULATED RESPONSE (PPM)	
ZERO	SPAN
-0.044	20.83
0.005	17.96
-6.817	19149
2.249	832.4
-2.83	1057.6
-0.022	20.82
0.015	18.06
-1.849	19966
-0.452	890.2
1.019	1007.61

QC BIAS
GRI CAMPAIGN 2

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
03-12-94	O2	25	14.02	14.03	0.04	--
	CO2	20	10	8.53	-7.35	--
	CO	20000	15020	13778	-6.21	--
	NOx	1000	248	244	-0.40	--
	THC	10000	667.7	545.7	-1.22	--
03-13-94	O2	25	14.02	14.08	0.24	--
	CO2	20	10	8.5	-7.50	--
	CO	20000	15020	13846	-5.87	--
	NOx	2500	786	747.7	-1.53	--
	THC	10000	165.7	150.6	-0.15	--

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

I.1.2 GC Calibration Data

CEM QC SUMMARY

CALIBRATION GASES

O2	ALM039913	20.9 %
CO	"	20000 PPMV
CO2	"	17.97 %
THC	CC20348	998.7 PPMV C3H8
NOx	AAL4348	936 PPMV NO
SO2	BB6703	4005 PPMV

3-09-94	CERT. CONC.	OBSERVED CONC.	% REC.	COMMENT
O2 %	14.02	14.13	100.8	O2, CO, CO2 CYL.#ALM032250
THC PPMV	165.7	144.6	87.3	THC CYL.#ALM039815 (497ppm CH4)
CO PPMV	15020	13603	90.6	
CO2 %	10	8.2	82.0	
NOx PPMV	786	781.3	99.4	NOx CYL.#1L3824
SO2 PPMV	1997	2024	101.4	SO2 CYL.#CC105415

3-10-94	CERT. CONC.	OBSERVED CONC.	% REC.	COMMENT
O2 %	14.02	14.23	101.5	AMETEK O2 ANALYZER FAILED DURING TBS
THC PPMV	667.7	623.5	93.4	THC CYL.#ALM39877 (2003ppm CH4)
CO PPMV	15020	13563	90.3	
CO2 %	10	8.47	84.7	
NOx PPMV	786	790	100.5	
SO2 PPMV	1997	2066.5	103.5	

3-11-94	CERT. CONC.	OBSERVED CONC.	% REC.	COMMENT
O2 %	14.02	14.07	100.4	O2 ON SERVOMEX ANALYZER
THC PPMV	667.7	558	83.6	
CO PPMV	15020	13843	92.2	
CO2 %	10	9.4	94.0	CO2 SPAN CUT TO 1/2 IN CAL. TO ENABL
NOx PPMV	248	242.7	97.9	
SO2 PPMV	1997	2048	102.6	

3-12-94	CERT. CONC.	OBSERVED CONC.	% REC.	COMMENT
O2 %	14.02	14.03	100.1	
THC PPMV	667.7	545.7	81.7	

CO PPMV	15020	13778	91.7
CO2 %	10	8.53	85.3
NOX PPMV	248	244	98.4
SO2 PPMV	1997	2027	101.5

CO2 SPAN RETURNED TO NORMAL

3-13-94	CERT. CONC.	OBSERVED CONC.	% REC.
O2 %	14.02	14.75	105.2
THC PPMV	165.7	150.6	90.9
CO PPMV	15020	13846	92.2
CO2 %	10	8.5	85.0
NOX PPMV	786	747.7	95.1
SO2 PPMV	1997	2030	101.7

COMMENT

O2, CO, CO2 CYL.#ALM005823 SAME CONC.
THC CYL.#ALM039815 (497ppm CH4)

NOX CYL.#1L3824

3-14-94	CERT. CONC.	OBSERVED CONC.	% REC.
O2 %	14.02	14.1	100.6
THC PPMV	165.7	176.6	106.6
CO PPMV	15020	14007	93.3
CO2 %	10	8.53	85.3
NOX PPMV	801	810.7	101.2
SO2 PPMV	1997	2022	101.3

COMMENT

NOX CYL.#1L14416

3-15-94	CERT. CONC.	OBSERVED CONC.	% REC.
O2 %	14.02	14.4	102.7
THC PPMV	467.3	412.4	88.3
CO PPMV	15020	13559	90.3
CO2 %	10	8.3	83.0
NOX PPMV	248	225.5	90.9
SO2 PPMV	1997	1993	99.8

COMMENT

THC CYL.#AAL20403 (1402ppm CH4)

CERT. CONC.	OBSERVED CONC.	% REC.

COMMENT

I.2.1 CEMS Calibration Drift/Bias Summary

CALIBRATION DRIFT
GRI CAMPAIGN 3

Date	Analyzer	Range	Calibration Drift		Span Concentration
			Zero	Span	
6-14-94	O2	25	0.17	0.12	20.9
	CO2	20	-0.21	-0.67	18
	CO	1000	-0.01	-0.69	900
	NOx	10000	0.05	-0.63	5003
	THC	10000	-0.06	-0.11	2003
6-15-94	O2	25	0.03	-0.34	20.9
	CO2	20	-0.23	0.59	18
	CO	1000	-0.02	-1.36	900
	NOx	10000	-0.05	-6.9	5003
	THC	10000	0.06	-0.15	2003
6-16-94	O2	25	0.13	-0.84	20.9
	CO2	20	-0.16	-0.13	18
	CO	1000	-0.01	-1.47	900
	NOx	10000	0.15	-6.16	5003
	THC	10000	0.05	-0.28	2003
6-18-94	O2	25	0.19	-0.34	20.9
	CO2	20	0.23	0.18	18
	CO	1000	-0.02	-0.99	900
	NOx	10000	0.23	-2.83	5003
	THC	10000	0.05	-0.62	2003
6-19-94	O2	25	0.02	-0.43	20.9
	CO2	20	-0.36	0.89	18
	CO	1000	-0.01	0.20	901
	NOx	10000	0.15	-0.75	2005
	THC	10000	0.08	-0.72	5028
6-20-94	O2	25	0.11	-0.58	20.9
	CO2	20	0.06	0.14	18
	CO	1000	-0.01	-0.58	900
	NOx	10000	0.11	-4.24	5003
	THC	10000	0.07	-0.69	2003

Note: Drift calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

y	b	VOLTAGE RESPON	
		ZERO	SPAN
25.02	0.0013	0.0001	0.831
201.64	0.0297	-0.0005	0.09
100.46	0.6843	-0.0074	8.982
2588.55	-6.3511	0.0084	0.748
975.1	50.0853	-0.0427	5.031

QC BIAS
GRI CAMPAIGN 3

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
6-14-94	O2	25	3	3	0	0.50
		25	3	2.97	-0.12	
		25	7.5	7.49	-0.04	--
	CO2	20	3.5	3.9	2	2.74
		20	3.5	4.12	3.1	
		20	7.49	7.79	1.5	--
	CO	1000	350	335	-1.5	--
		1000	500	463	-3.7	0.86
		1000	500	471	-2.9	
	NOx	10000	936	1041	1.05	--
	THC	10000	917	927	0.1	--
6-15-94	O2	25	3	2.99	-0.04	--
		25	7.5	7.51	0.04	--
	CO2	20	3.49	4.08	2.95	--
		20	7.49	8.07	2.9	--
	CO	1000	500	472	-2.8	--
		1000	350	344	-0.6	--
	NOx	10000	936	1101	1.65	0.05
		10000	936	1100	1.64	
	THC	10000	917	965	0.48	--
		10000	1402	1435	0.33	--
6-16-94	O2	25	3	3.01	0.04	--
		25	7.5	7.52	0.08	0.13
		25	7.5	7.5	0	
	CO2	20	3.49	3.99	2.5	--
		20	7.49	7.83	1.7	2.91
		20	7.49	8.3	4.05	
	CO	1000	350	343	-0.7	0.44
		1000	350	346	-0.4	
		1000	500	472	-2.8	--
	NOx	10000	936	1018	0.82	--
		10000	2005	1946	-0.59	2.53
		10000	2005	2047	0.42	
	THC	10000	917	933	0.16	--
		10000	1402	1415	0.13	--

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

QC BIAS
GRI CAMPAIGN 3

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
6-18-94	O2	25	7.5	7.5	0	0.07
		25	7.5	7.49	-0.04	
	CO2	20	7.49	8	2.55	0.12
		20	7.49	8.02	2.65	
	CO	1000	350	344	-0.6	0.43
		1000	350	347	-0.3	
	NOx	10000	2005	2030	0.25	0.37
		10000	2005	2015	0.1	
	THC	10000	917	927	0.1	1.15
		10000	917	906	-0.11	
6-19-94	O2	25	7.5	7.49	-0.04	0.78
		25	7.5	7.61	0.44	
		25	7.5	7.48	-0.08	
		25	7.5	7.48	-0.08	
	CO2	20	7.49	9.53	10.2	9.08
		20	7.49	7.76	1.35	
		20	7.49	8.09	3	
		20	7.49	8.09	3	
	CO	1000	350	348	-0.2	4.89
		1000	350	381	3.1	
		1000	350	341	-0.9	
		1000	350	341	-0.9	
	NOx	10000	936	1000	0.64	6.32
		10000	936	874	-0.62	
		10000	936	1005	0.69	
		10000	936	1005	0.69	
	THC	10000	917	886	-0.31	3.75
		10000	917	830	-0.87	
		10000	917	908	-0.09	
		10000	917	908	-0.09	
6-20-94	O2	25	7.5	7.52	0.08	0.13
		25	7.5	7.5	0	
	CO2	20	7.49	8.02	2.65	0.00
		20	7.49	8.02	2.65	
	CO	1000	350	345	-0.5	0.00
		1000	350	345	-0.5	
	NOx	10000	936	997	0.61	0.45
		10000	936	1006	0.7	
	THC	10000	917	958	0.41	2.10
		10000	917	999	0.82	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

I.2.2 GC Calibration Data

GC QA/QC Summary Table

GRI Campaign 3

Date	GC Linearity		GC Drift	
	Methane	Ethane	Methane	Ethane
6-14-94	0.99995	0.99997	1.3	1.3
6-15-94	0.99986	0.99998	-4.6	-4.3
6-16-94	0.99992	0.99999	6.3	5.1
6-19-94	0.99996	0.99994	10	9.5

I.3.1 CEMS Calibration Drift/Bias Summary

CALIBRATION DRIFT
GRI CAMPAIGN 4

Date	Analyzer	Range	Calibration Drift		Span Concentration
			Zero	Span	
8-23-94	O2	25	0.16	-1.04	20.9
	CO2	20	0.05	-0.15	18
	CO	20000	0.24	0.69	20000
	NOx	10000	0.02	0.10	5003
	THC	10000	1.18	-1.28	9026
8-25-94	O2	25	0.04	1.20	20.9
	CO2	20	-0.20	-1.75	18
	CO	20000	0.03	1.22	20000
	NOx	10000	0.04	-2.04	5003
	THC	10000	-0.14	-0.91	9026
8-26-94	O2	25	-0.04	-0.60	20.9
	CO2	20	-0.10	0.95	18
	CO	100	-2.84	-1.92	99
	NOx	10000	0.00	0.16	5003
	THC	10000	0.19	0.41	9026
8-27-94	O2	25	-0.12	-1.96	20.9
	CO2	20	0.60	0.40	18
	CO	500	0.83	-0.39	500
	NOx	10000	0.07	0.53	5003
	THC	10000	0.06	-0.39	9026
8-29-94	O2	25	-0.12	-1.40	20.9
	CO2	20	0.35	0.95	18
	CO	500	-0.39	-1.45	500
	NOx	10000	0.06	0.03	5003
	THC	10000	-0.09	-0.14	9026
8-30-94	O2	25	-0.36	-1.72	20.9
	CO2	20	-0.05	-1.00	18
	CO	500	0.03	-0.12	500
	NOx	10000	-0.01	-0.20	5003
	THC	10000	0.18	0.31	9026

Note: Drift calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

QC BIAS
GRI CAMPAIGN 4

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
8-23-94	O2	25	10	10.06	0.24	0.54
		25	10	9.93	-0.28	
		25	10	9.97	-0.12	
	CO2	20	7	7.07	0.35	0.37
		20	7	7.06	0.30	
		20	7	7.01	0.05	
	CO	20000	10000	9883	-0.59	0.67
		20000	10000	9747	-1.27	
		20000	10300	9741	-2.80	
	NOx	10000	938	939	0.01	3.21
		10000	938	942	0.04	
		10000	938	1006	0.68	
	THC	10000	917	1059	1.42	5.14
		10000	917	940	0.23	
		10000	917	968	0.51	
		10000	497	586	0.89	
8-25-94	O2	25	10	10.06	0.24	0.65
		25	10	9.93	-0.28	
	CO2	20	7	6.91	-0.45	0.95
		20	7	6.78	-1.10	
	CO	20000	10300	10165	-0.68	1.41
		20000	10100	9883	-1.09	
	NOx	10000	509	519	0.10	2.77
		10000	509	491	-0.18	
		10000	936	956	0.20	
	THC	10000	917	880	-0.37	--
8-26-94	O2	25	10	9.84	-0.64	0.25
		25	10	9.89	-0.44	
	CO2	20	7	7.03	0.15	0.64
		20	7	7.12	0.60	
	CO	20000	10000	9866	-0.67	2.22
		20000	10300	10313	0.07	
	NOx	10000	938	957	0.19	--
		10000	509	515	0.06	--
	THC	10000	917	908	-0.09	--
		10000	2003	2058	0.55	0.44
		10000	2003	2076	0.73	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

QC BIAS
GRI CAMPAIGN 4

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
8-27-94	O2	25	3	2.87	-0.52	--
	CO2	20	15	15.04	0.20	--
		20	3.5	3.52	0.10	--
	CO	500	99.7	99.8	0.02	--
		500	91	84.31	-1.34	--
	NOx	1000	509	518	0.90	--
		100	78	84	6.00	--
		10000	503	521	0.18	--
		10000	938	967	0.29	--
	THC	10000	917	920	0.03	0.38
		10000	917	913	-0.04	
		10000	2003	1996	-0.07	
8-29-94	O2	25	10	10.03	0.12	--
	CO2	20	7	7.07	0.35	--
		20	15	15.03	0.15	--
	CO	500	90	79.6	-2.08	--
	NOx	10000	503	526	0.23	--
		100	78	85.7	7.70	--
	THC	10000	917	901	-0.16	1.26
		10000	917	924	0.07	
8-30-94	O2	25	3	2.92	-0.32	--
		25	10	9.9	-0.4	0.00
		25	10	9.9	-0.4	
	CO2	20	7	6.96	-0.20	0.07
		20	7	6.97	-0.15	
		20	3.5	3.49	-0.05	--
		20	15	14.78	-1.10	--
	CO	500	100	101.5	0.30	--
		500	90	86	-0.80	--
	NOx	10000	938	943	0.05	--
		10000	503	505	0.02	--
		100	78	82.9	4.90	--
	THC	10000	917	902	-0.15	0.78
		10000	917	888	-0.29	
		10000	2003	2004	0.01	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

I.3.2 GC Calibration Data

GRI Campaign 4 GC QC/QA Data

Precision Data for 16.3 ppmv Standard on 8/25

	Average	STD DEV	%RSD	Number
Methane	2657496	317507	11.95%	5
Ethane	4356863	173339	3.98%	5

Drift Data for 100 ppmv Standard

08/28

Methane -5.23%

Ethane -4.28%

Zero Nitrogen Concentration (ppmv)

	08/26	08/26	08/27	08/28	08/28	08/28	08/28
Methane	ND	ND	ND	ND	ND	ND	ND
Ethane	ND	ND	1	ND	1	2	1

I.4 Campaign 5

I.4.1 CEMS Calibration Drift/Bias Summary

CALIBRATION DRIFT GRI CAMPAIGN 5

Date	Analyzer	Range	Calibration Drift		Span
			Zero	Span	Concentration
10-05-94	O2	25	-0.40	-0.52	20.85
	CO2	20	-0.10	-0.85	18.2
	CO	20000	-0.01	-0.01	500
	NOx	10000	-0.00	-0.21	2392
	THC	10000	0.02	-0.10	917

Note: Drift calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

CALCULATED RESPONSE (PPM)	
ZERO	SPAN
-0.1	20.72
-0.02	18.03
-1.27	498.29
-0.03	2370.61
1.5	906.8

QC BIAS
GRI CAMPAIGN 5

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
10-5-94	O2	25	9.99	10.04	0.20	0.20
		25	9.99	10	0.04	
		25	14.01	13.89	-0.48	0.18
		25	14.01	13.94	-0.28	
	CO2	20	5	5.18	0.90	0.31
		20	10.01	9.98	-0.15	
		20	10.01	9.91	-0.50	
		20	10.01	9.97	-0.20	
	CO	20000	51	47.19	-0.02	3.63
		20000	51	47.2	-0.02	
		20000	51	50.92	-0.00	
	NOx	10000	51	48.38	-0.03	0.42
		10000	939	965	0.26	
		10000	939	957	0.18	
	THC	10000	497	502	0.05	1.14
		10000	497	508	0.11	
		10000	497	494	-0.03	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

I.4.2 GC Calibration Data

GC QA/QC Summary Table
GRI Campaign 5

	GC Linearity	
	Methane	Ethane
10-04-94	0.9991	NA
10-06-94	0.997	NA

I.5.1 CEMS Calibration Drift/Bias Summary

CALIBRATION DRIFT
GRI CAMPAIGN 6

Date	Analyzer	Range	Calibration Drift		Span Concentration	y	b	Voltage Response		Calc. Response	
			Zero	Span				ZERO	SPAN	ZERO	SPAN
11-05-94 0751-1249	O2	25	-0.20	-0.16	20.85	24.91	-0.141	0.0036	0.841	-0.05082	20.8088
	CO2	20	-0.10	-0.11	18.2	19.62	-0.029	0.0005	0.928	-0.01929	18.1782
	CO	500	0.66	-0.18	452	484.22	5.6297	-0.0048	0.92	3.305444	451.112
	NOx	1000	0.10	0.87	890	97.75	1.9024	-0.0091	9.174	1.012875	898.660
	THC	2500	-3.05	1.45	2003	111.38	-76.98	0.0029	8.015	-76.6542	815.733
11-05-94 1323-1842	O2	25	-0.08	-1.32	20.85					-0.02	20.52
	CO2	20	0.20	-0.25	18.2					0.04	18.15
	CO	500	0.47	0.36	452					2.36	453.76
	NOx	2500	0.05	-0.62	2480					1.18	2464.56
	THC	2500	1.73	1.45	2003					43.15	2039.15
11-07-94	O2	25	-0.44	-1.84	20.85					-0.11	20.36
	CO2	20	0.25	-0.20	18.2					0.05	18.16
	CO	100	0.64	-0.75	90.7					0.64	89.95
	NOx	250	-0.13	0.91	213					-0.33	215.27
	THC	100	-1.55	-1.36	92.9					-1.55	91.54
11-08-94	O2	25	-0.12	0.36	20.85					-0.03	20.94
	CO2	20	0.15	1.15	18.2					0.03	18.43
	CO	100	-0.20	0.79	90.7					-0.2	91.49
	NOx	250	0.25	-2.90	213					0.63	205.75
	THC	100	0.01	-2.32	92.9					0.01	90.58
11-10-94	O2	25	-0.20	-0.68	20.85					-0.05	20.68
	CO2	20	0.05	-2.20	18.2					0.01	17.76
	CO	100	-0.53	1.18	90.7					-0.53	91.88
	NOx	1000	-0.02	0.65	890					-0.17	896.55
	THC	2500	0.02	-0.55	2003					0.44	1989.31
11-12-94	O2	25	-0.08	-0.64	20.85					-0.02	20.69
	CO2	20	0.20	-1.70	18.2					0.04	17.86
	CO	100	0.41	1.64	90.7					0.41	92.34
	NOx	1000	0.01	0.82	890					0.08	898.24
	THC	2500	0.49	-1.09	2003					12.21	1975.84
11-14-94	O2	25	-0.52	0.08	20.85					-0.13	20.87
	CO2	20	0.30	0.50	18.2					0.06	18.3
	CO	100	0.79	-0.83	90.7					0.79	89.87
	NOx	1000	0.49	-1.39	890					4.94	876.06
	THC	2500	-0.09	2.43	2003					-2.19	2063.69
11-15-94	O2	25	0.12	-0.04	20.85					0.03	20.84
	CO2	20	-0.05	-0.35	18.2					-0.01	18.13
	CO	100	0.96	0.10	90.7					0.96	90.8
	NOx	1000	0.22	-1.56	890					2.16	874.35
	THC	2500	-0.13	-2.23	2003					-3.33	1947.26

Note: Drift calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

QC BIAS
GRI CAMPAIGN 6

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
11-05-94	O2	25	14.01	14.22	0.84	0.40
		25	14.01	14.09	0.32	
		25	14.01	14.11	0.40	
	CO2	20	10.01	10.19	0.90	0.44
		20	10.01	10.1	0.45	
		20	10.01	10.09	0.40	
	CO	500	90.7	91.89	0.24	1.14
		500	90.7	89.39	-0.26	
		500	90.7	91.04	0.07	
	NOx	1000	509	517.02	0.80	1.65
		1000	509	500.2	-0.88	
	THC	2500	917	897.47	-0.78	-
		2500	1402	1439.38	1.50	
11-07-94	O2	25	14.01	14.14	0.52	0.11
		25	14.01	14.17	0.64	
	CO2	20	10.01	10.28	1.35	0.10
		20	10.01	10.3	1.45	
	CO	100	51.2	51.53	0.33	0.78
		100	51.2	52.34	1.14	
	NOx	250	77.5	83.57	2.43	0.19
		250	77.5	83.89	2.56	
	THC	100	92.9	93.14	0.24	0.44
		100	92.9	92.32	-0.58	
11-08-94	O2	25	14.01	14.03	0.08	0.19
		25	14.01	13.97	-0.16	
		25	14.01	14.02	0.04	
	CO2	20	10.01	10.18	0.85	0.30
		20	10.01	10.17	0.80	
		20	10.01	10.24	1.15	
	CO	100	51.2	52.18	0.98	0.26
		100	51.2	52.5	1.30	
		100	51.2	52.26	1.06	
	NOx	250	77.5	83.54	2.42	1.42
		250	77.5	82.43	1.97	
		250	77.5	80.7	1.28	
	THC	100	92.9	93.15	0.25	1.41
		100	92.9	90.49	-2.41	
		100	92.9	90.34	-2.56	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

QC BIAS
GRI CAMPAIGN 6

Date	Analyzer	Range	QC Input	Response	Bias (%)	RSD (%)
11-10-94	O2	25	14.01	14.07	0.24	0.23
		25	14.01	13.99	-0.08	
		25	14.01	14.03	0.08	
	CO2	20	10.01	10.1	0.45	0.81
		20	10.01	9.94	-0.35	
		20	10.01	9.92	-0.45	
	CO	500	51.2	51.18	-0.00	2.29
		500	51.2	53.13	0.39	
		500	51.2	50.3	-0.18	
	NOx	1000	509	515	0.60	0.33
		1000	509	516	0.70	
		1000	509	519	1.00	
	THC	2500	1402	1398	-0.16	0.44
		2500	1402	1392	-0.40	
		2500	1402	1407	0.20	
11-12-94	O2	25	14.01	14.15	0.56	0.44
		25	14.01	14	-0.04	
		25	14.01	14.05	0.16	
	CO2	20	10.01	10.09	0.40	0.50
		20	10.01	9.99	-0.10	
		20	10.01	9.98	-0.15	
	CO	500	51.2	52.09	0.18	0.29
		500	51.2	52.39	0.24	
		500	90.7	90.46	-0.05	
	NOx	1000	509	518	0.90	0.50
		1000	509	519	1.00	
		1000	509	524	1.50	
	THC	2500	1402	1405	0.12	0.29
		2500	1402	1404	0.08	
		2500	1402	1396	-0.24	
11-14-94	O2	25	14.01	14.17	0.64	0.14
		25	14.01	14.21	0.8	
	CO2	20	10.01	10.15	0.70	0.49
		20	10.01	10.25	1.20	
	CO	500	90.7	88.58	-0.42	1.00
		500	90.7	90.37	-0.07	
	NOx	1000	509	518	0.90	0.68
		1000	509	511	0.20	
	THC	2500	1402	1443	1.64	0.07
		2500	1402	1441	1.56	
11-15-94	O2	25	14.01	14.04	0.12	0.50
		25	14.01	14.18	0.68	
	CO2	20	10.01	10.12	0.55	0.10
		20	10.01	10.1	0.45	
	CO	500	90.7	88.98	-0.34	1.05
		500	90.7	90.86	0.03	
	NOx	1000	509	518	0.90	0.38
		1000	509	522	1.30	
	THC	2500	1402	1417	0.60	1.03
		2500	1402	1388	-0.56	

Note: Bias calculated for only those runs performed at loads greater than 90 percent and speeds greater than 95 percent except as noted in the report.

I.5.2 GC Calibration Data

GC Drift Data GC Drift Data

Date	Date	11/04	11/05	11/07	11/08	11/10	11/11	11/12	11/14	11/15
Standard	Standard	1000 ppmv	2000 ppmv	16 ppmv	100 ppmv	100 ppmv	100 ppmv	2000 ppmv	2000 ppmv	2000 ppmv
Methane	Methane	2.50%	-3.89%	1.30%	-3.51%	-15.72%	-10.29%	0.48%	-1.78%	-9.55%

Drift = (Final A Drift - Initial Area - Initial Area)/Initial Area x 100

Methane
Ethane

GRI Campaign 6 GC Drift Summary

	Average	STD DEV	%RSD	Number	Drift		Drift		Drift		Precision
					11/04	11/07	11/08	11/11	11/12		
Methane	13976	1431	10.24%	17	1.14%	1.30%	-0.90%	-14.60%	-10.78%		11/04 -100.00%
Ethane	28365	3040	10.72%	19	0.47%	0.74%	-1.50%	4.43%	-14.27%		4.58%

	Average	STD DEV	%RSD	Number	Drift			Drift			Precision
					11/04	11/05	11/08	11/10	11/11	11/12	
Methane	79920	8799	11.01%	17	-1.53%	-27.01%	-3.51%	-15.72%	-10.29%	-9.37%	-1.41%
Ethane	160281	16521	10.31%	17	-2.33%	-5.13%	-3.29%	-8.68%	-10.16%	-5.28%	-0.35%

	Average	STD DEV	%RSD	Number	Drift			Drift			Precision
					11/04	11/05	11/10	11/12	11/14	11/15	
Methane	743973	218766	29.41%	13	2.50%	-4.72%	129.73%	21.38%	2.53%	23.75%	
Ethane	1482067	432092	29.15%	13	2.25%	-4.21%	135.96%	21.63%	2.32%	28.08%	

	Average	STD DEV	%RSD	Number	Drift			Drift			Precision
					11/05	11/12	11/14	11/15			
Methane	1577330	107332	6.80%	10	-3.89%	0.48%	-1.78%	-9.55%			
Ethane	3107806	205167	6.60%	10	-3.70%	1.11%	-1.73%	-9.56%			

GC Linear Regression Data
GRI Campaign 6

Date	Compound	Weight	Linear Regression Data		
			Intercept	Slope	Correlation Coefficient
11/04/94	Methane		3376.447	901.84	0.99999257
	Ethane		6776.749	1783.82	0.99998948
11/05/94	Methane		2708.746	897.632	0.99999691
	Ethane		5249.526	1767.97	0.99999512
11/07/94	Methane		1150.286	815.107	two points
	Ethane		1641.524	1622.9	two points
11/08/94	Methane		1082	806.75	two points
	Ethane		1601.619	1600.52	two points
11/10/94 am	Methane		0	868.438	one point
	Ethane		0	1740.31	one point
11/10/94 pm	Methane		-836.81	920.738	two points
	Ethane		-78.2381	1745.2	two points
11/12/94	Methane	1/x	239.978	794.998	0.99898749
	Ethane	1/x	3985.222	1556.42	0.99918467
11/14/94	Methane	1/x	-253.503	758.926	0.99578562
	Ethane	1/x	7086.875	1470.03	0.9946894
11/15/94	Methane	1/x	148.5201	726.573	0.99926723
	Ethane	1/x	-172.724	1432.81	0.99912562

GC Calibration Summary

GRI Campaign 6

Compound	Concentration ppmv	No. of Injections	Area Resp Average	%RSD
Methane	0	2	0	
	16.3	17	13976	10.24%
	100	17	79920	11.01%
	1008	13	743973	29.41%
	2000	10	1577330	6.80%
	Linearity (R Squared)		0.9987793	
Ethane	0	2	0	
	16.3	19	28365	10.72%
	100	17	160281	10.31%
	1039	13	1482067	29.15%
	2000	10	3107806	6.60%
	Linearity (R Squared)		0.9978751	

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/R-96-020b		2.	3. RECIPIENT'S ACCESSION NO.	
4. TITLE AND SUBTITLE Criteria Pollutant Emissions from Internal Combustion Engines in the Natural Gas Industry; Volume II. Appendices A - I		5. REPORT DATE February 1996		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Gerald S. Workman, Jr., Rachel G. Adams, and Gunseli Sagun Shareef		8. PERFORMING ORGANIZATION REPORT NO. 275-114/298-130-33		
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15. SUPPLEMENTARY NOTES EPA project officer is C. C. Masser, Mail Drop 62, 919/541-7586. (*) Consponsor is Gas Research Institute, 8600 West Bryn Mawr Ave., Chicago, IL 60631. GRI project manager is J. M. McCarthy. GRI report No. GRI-95/0270.2.				
16. ABSTRACT The report summarizes emission factors for criteria pollutants (NOx, CO, CH4, C2H6, THC, NMHC, and NMEHC) from stationary internal combustion engines and gas turbines used in the natural gas industry. The emission factors were calculated from test results from five test campaigns conducted as part of the Gas Research Institute's air toxics study, three of which were cofunded by the EPA. Test results for individual engines tested are presented, along with full load engine family-specific emissions factors, and the calculated emission factors are evaluated relative to the emission factors published in EPA report AP-42. Units tested included eleven 2-stroke engines and five 4-stroke engines, with and without controls, and two gas turbines.				
17. KEY WORDS AND DOCUMENT ANALYSIS				
a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS		c. COSATI Field/Group
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