ECHO BAY

MEMO

Date: March 22, 1994

To: All Security Guards

From: Songlin Zhang SZ

Subject: Fuel Catalyst Test

A fuel catalyst test is scheduled to begin March 29. One of the 100,000 gallon fuel tanks at the shop fuel station will be pre-treated with fuel catalyst, the second tank will be filled with untreated fuel only, and isolated for backup during test period.

This test is scheduled to run for approximately 6 weeks. During this period, I will need your help in maintaining appropriate treated and untreated fuel inventories. Right now, it appears that we will need two truck loads of fuel or approximately 20,000 gallons treated each day. Your role in this study will be to select two truck loads of fuel each day, supply appropriate amount of catalyst (approximately 2 gallons per truck load) to the drivers, insure the catalyst is added by the drivers, and direct the drivers to the proper storage tank.

The attachments are a detailed outline of the study, a copy of procedures for adding catalyst to fuel and a log form. Please read the attached MSDS sheet.

Don't hesitate to call me at ext. 369 if you have any questions.

Thanks!

CC. Bryan Mahoney

HUMBOLDT PRINTERS 03-89-106

CATALYST FUEL PERFORMANCE STUDY

INTRODUCTION

FPC-1 catalyst is a combustion catalyst which may, when added to fuel, improve the combustion reaction to increase engine efficiency and reduce fuel consumption. The manufacturer claims that fuel consumption may be reduced 4% to 9% with catalyst fuel treatment.

The manufacturer of the product warrants that the catalyst will not damage or shorten the life of an engine. If the test shows that there is no economic benefit for adding the catalyst to fuel, the manufacturer will refund the difference between the catalyst cost and any fuel savings realized.

The fuel treatment is $0.023 per gallon. The breakeven point will be $0.023 per gallon or 3.54% in fuel savings.

A fuel catalyst test, therefore, will be conducted in order to confirm the potential savings and benefit for adding the catalyst to fuel.

INVOLVED EQUIPMENT

The following trucks and shovels have been selected for use in the coming fuel study.

Truck Units	Model	Capacity	Engine Model	Operating hours as of 3/10/94
3232	CAT-785	150	CAT-3512	5399
3233	CAT-785	150	CAT-3512	8694
3239	CAT-785	150	CAT-3512/EUI	2125
3240	CAT-785	150	CAT-3512/EUI	1782
3351	CAT-789	190	CAT-3516	13810
3352	CAT-789	190	CAT-3516	13739
3353	CAT-789	190	CAT-3516	13710
3481	WISEDA KL2450	250	MTU16V396	1236
3483	WISEDA KL2450	250	MTU16V396	4436
3484	WISEDA KL2450	250	MTU16V396	3501

Shovel Units	Model	Engine Model	Operating hours as of 3/10/94	
2551	HITACHI	CUMMINS KTA38C	Right:	2903
			Left:	2903
2552	HITACHI	CUMMINS KTA38C	Right:	3922
			Left:	1276
2553	HITACHI	CUMMINS KTA38C	Right:	1769
			Left:	13934
2554	HITACHI	CUMMINS KTA38C	Right:	4602
			Left:	4602

The units will be filled with treated fuel during the test period. The other equipment will use untreated fuel from the Cove satation.

MEASUREMENTS

The manufacturer will use carbon mass balance as a criterion to evaluate fuel consumption. They will bring their own instruments and carry out the base line measurement on the selected units on March 29. The units will then be filled with treated fuel. Six weeks later or after the units have run approximately 500 operating hours on treated fuel, the carbon mass balance measurement will be conducted again on the test units. The change in the fuel consumption rates is then calculated as the difference between the base line and treated measurements.

Data from the mine's dispatch system will also be used to compare both treated and untreated groups.

TEST PROCEDURES

1. Test is scheduled to begin March 29, and run for approximately 6 weeks. Two drums of catalyst are required for the test, and one drum of catalyst was ordered on March 12. The cost for the catalyst is $115/gallon, total $6325/drum plus tax and freight.

2. 10 haul trucks and 4 shovels were selected for the testing period.

3. Catalyst will be added to one a 100000 gallon fuel tank only. The rate of addition is 1 gallon per 5000 gallon fuel. The second tank will be filled with untreated fuel only, and isolated for backup during the test period.

4. Prior to March 29, the test tank will be treated with the proper amount of the catalyst. During the test period, Two truck loads of fuel (approximately 20,000 gallons) will be placed in the 100,000 gallon test tank each day. All other fuel delivery trucks will go to Cove station.

5. When a truck load of fuel is selected to be placed in the test tank, catalyst will be added to the delivery truck by the truck driver.

6. The selected haul trucks will be filled at shop fuel station. The test shovels will be fueled from the treated tank by the mine's fuel truck. All others will use untreated fuel from the Cove station.

7. The base line measurement is scheduled for Tuesday, March 29. The test units will run approximately 500 operating hours on fuel with catalyst. A final measurement to determine catalyst effectiveness is tentatively scheduled for May 9.

RESPONSIBILITIES

Project Leader:

Songlin Z. will be the Echo Bay project leader. Responsibility includes supervising measurements, data collection and analysis, pre-treatment of tank fuel, posting signs, giving memos or log forms to security, pit department supervisors, and monitoring test tank level.

Security:

Responsible to Select one or two truck loads of fuel to place in the test fuel tank every day. Security shall transfer the appropriate amount of catalyst to a 2 gallon container, and provide it to the truck driver. Insure the truck driver add catalyst to the truck load. Fill the test tank log form.

Shift supervisors:

Insure the crew members are aware of the test and that the proper fuel is used during the test period.

Haul Truck Drivers:

The truck drivers must fill their trucks with the proper fuel at the appropriate stations during the test period. Signs will be posted inside the cab, beside the truck fuel tank and fuel stations to remind the drivers. Fuel is to be reported to dispatch as is currently done.

Lube Men:

Fill selected shovels with the treated fuel.

PM Crew:

Collect duplicate engine oil samples from the test equipment, label with date and unit number, and hold for FPC.

FPC Manufacture:

Supply all necessary instruments to conduct the carbon mass balance measurements. Supply qualified personnel for conducting the measurements. Provide necessary pre-test training to Echo Bay involved personnel.

Echo Bay:

Provide an 110V/1000W/10A generator.

PROCEDURES FOR ADDING CATALYST TO FUEL

1. One to two truck loads of fuel (approximate 10,000 gallons each) are to be selected each day by security for treating with catalyst.

2. The following protective personal equipment is required to be worn at all the times when handling the catalyst: goggles, rubber gloves and face shield.

3. Security will transfer the appropriate amount of catalyst from the 55 gallon drum to a 2 gallon container, and give the measured catalyst to the truck driver. The adding rate is 1 gallon catalyst per 5000 gallon fuel.

4. The truck driver will add the catalyst to the truck load before leaving the gate.

5. The truck driver will place the treated fuel into the 100,000 gallon test tank.

6. Security will log the treated fuel for future reference.

7. Songlin will monitor the test tank level each day and notify security if the treated fuel is to be added to the test tank.

8. All untreated fuel trucks will be sent to the Cove fuel station.

MSDS Information for Handling the Catalyst

1. The FPC is a combustion catalyst, highly flammable. Please keep away from open flame, sparks, and heat. Shut off all sources of ignition, such as running engine and cigarette, before handling the catalyst.

2. The FPC is a toxic and irritant material. Harmful if swallowed, inhaled or absorbed through skin. The following protective personal equipment is required to be worn at all times when handling the catalyst: goggles, rubber gloves and face shield.

3. If spilled, recover as much spilled catalyst liquid as possible, then absorb on porous clay or vermiculite.

4. Cloth can be stained. A rain coat is recommended to be worn when handling the catalyst.

5. Contact with skin can make the contacted area yellowish. Wash the skin with soap and water immediately if there is any contact with the catalyst.

100,000 TEST TANK FILLING FORM

One truck load of fuel is to be placed in the 100,000 test tank. Tank 1 will be the test tank. Tank 2 has been filled with untreated fuel for use in case of an emergency. Valve must be changed to acsess fuel in tank 2. Please add catalyst to the truck tank at the front gate, and then inform the truck driver to add the treated fuel to the test tank. The adding rate is 1 gallon catalyst per 5,000 gallon fuel. Use the log below to insure one load/day is sent to the test tank. Thank you.

Date	Gallons of Fuel Treated	Gallons of Catalyst Used	Security Signature

MSDS
Material Safety Data Sheet

Identity

Product Name: *Fuel Performance Catalyst - 1 (FPC-1®)*

Date Prepared: **September 9, 1993 (supersedes all other MSDS's for this product).**

Section I - Manufacturer's Information

UHI Corporation
2230 N. University Parkway, Suite 4B
Provo, UT 84604

Emergency Phone Number: **(800) 424-9300**

Information Phone Number: (801) 374-9010
Fax Number: (801) 374-0345

Section II - Hazardous Ingredients/Identity Information

The composition of this hazardous mixture is a trade secret. In the event of a medical emergency, compositional information will be provided to a physician or nurse. For additional information see section VI.

Section III - Physical/Chemical Characteristics

Specific Gravity:	0.848
Evaporation Rate (n-Butyl Acetate = 1):	2.0
Vapor Density in Air:	3.0
Solubility in Water:	Negligible
Appearance:	Emerald Green Liquid
Odor:	Hydrocarbon

MSDS
Material Safety Data Sheet

Section IV - Fire Hazard

Flash Point: 55 Degrees F (13 Degrees C) Tag Closed Cup

Flammable Limits: Lel = 1.3%; Uel = 6.8%

Extinguishing Media:
Water Spray (Fog)
Dry Chemical Powder, Foam, or Halon

Special Fire Fighting Procedures:
Wear self-contained breathing apparatus, rubber boots. Heavy rubber gloves, and other protective clothing. Use water spray to cool fire exposed surfaces and to protect personnel. Allow fire to burn itself out. Cover small residual fires with foam.

Unusual Fire Hazards:
Do not store with strong oxidants. Liquid spills can readily form flammable, gaseous mixtures at room temperature above the flash point. Containers exposed to intense heat from fires should be cooled with water to prevent vapor pressure buildup which could result in container rupture.

Section V - Reactivity Data

Stability: Stable

Incompatibilities (Materials to Avoid):
Strong Oxidizing Agents
Strong Acids
Strong Bases
Hazardous Combustion or Decomposition Products:
Carbon Dioxide, Carbon Monoxide, and Nitrogen Oxides

Hazardous Conditions to Avoid:
May decompose on prolonged exposure to air.
Highly Flammable. Keep away from heat, sparks, and open flame.

Hazardous Polymerization: Will not occur.

MSDS
Material Safety Data Sheet

Section VI - Health Hazard Data

Acute and Chronic Effects of Exposure:

Toxic! Irritant!

Warning:

Harmful if swallowed, inhaled, or absorbed through skin. Vapor or mist is irritating to the eyes, mucous membranes, and upper respiratory tract. Ingestion of material may result in vomiting; aspiration of vomitus into the lungs must be avoided. Exposure can cause gastrointestinal disturbances, nausea, headache, vomiting, and narcotic effects. Chronic effects may cause damage to the liver and damage to the kidneys. The use of alcohol can increase the narcotic effect and the blood effects. Early to moderate central nervous system (CNS) depression may be evidenced by giddiness, headache, dizziness, and nausea. In extreme cases, unconsciousness and/or death may occur.

Emergency First Aid Procedures:

In case of contact, immediately flush eyes and skin with large amounts of water for at least 15 minutes while removing contaminated clothing. Assure adequate flushing of the eyes by separating eyelids with fingers. After adequate flushing, wash skin with soap and water. If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a Physician. Wash Contaminated Clothing Before Use.

Section VII - Precautions for Safe Handling and Use

Steps to be Taken if Material is Released or Spilled:

Shut off all sources of ignition. Evacuate area. Wear self-contained breathing apparatus, grubber boots, heavy rubber gloves, and other protective clothing. Recover as much spilled liquid as possible, then absorb on porous clay or vermiculite. Take up, place in a closed container, and hold for waste disposal. Ventilate area and wash spill site with hot water and detergent after material pickup is complete. Keep petroleum products out of streams and sewage systems.

Waste Disposal Method:

Burn in a chemical incinerator equipped with an afterburner and scrubber, but exercise extra caution in igniting as this material is highly flammable. Observe all federal, state, and local disposal regulations.

Precautions to be Taken in Handling and Storage:

Only properly trained personnel should handle
Handle with caution
Chemical safety goggles and face shield (8 inch minimum)
Impervious rubber gloves
OSHA/MSHA approved respirator
Impervious protective clothing
Safety shower and eye bath
Mechanical exhaust required
Avoid breathing vapor (adequate ventilation)
Do not get in eyes, on skin, or on clothing
Readily absorbed through skin
Avoid prolonged or repeated exposure
Wash thoroughly after handling
Air and moisture sensitive
Keep tightly closed when not in use (hygroscopic)
Store in a cool, dry place
Use non-sparking tools
Highly flammable liquid

Section VIII - Control Measures

Please refer to Section I for emergency phone numbers and Section VII for handling precautions

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not.

ECHO BAY

MEMO

Date: March 22, 1994

To: Pit Department Supervisors

From: Songlin Zhang SZ

Subject: Fuel Catalyst Test

A fuel catalyst test is scheduled to begin March 29. The manufacturer of this product claims it will provide 6--8 percent in fuel savings, which could be equal to $130,000--$230,000 per year at McCOY/COVE. One of the 100,000 gallon fuel tanks at the shop fuel station will be treated with catalyst for use during the test. The test is scheduled to run approximately 6 weeks. The following units have been selected for use in the test group.

Trucks: 3232, 3233, 3239, 3240; 3351, 3352, 3353; 3481, 3483, 3484.
Shovels: 2551, 2552, 2553, 2554.

During the test period, the test haul trucks will be filled with treated fuel at the shop station. The shovels will be fueled from the shop station by the mine's fuel truck. All other equipment will use untreated fuel from the Cove station.

One issue that has come to light in planning this test is the inability of the Cove fuel station to handle all equipment. This was because fuel delivery trucks without a pump were not able to unload fuel at this station, and were required to go to the shop station where there is a pump. A permanent pump is now being added to the station to allow off loading of all trucks.

The security guards and I will insure that catalyst will be added to the fuel as required. Pit operations will need to insure trucks and shovels use the proper fuel. Please report fuel to dispatch as you are currently doing. Pit maintenance will need to collect duplicate engine oil samples from the test trucks and shovels. Please label these samples with the date and unit number, and hold for FPC's manufacturer to analyze soot levels and particle size.

The attachment is a detailed outline of the study. Please take some time to review the outline and discuss with your crews. Don't hesitate to contact me if you have any questions at ext. 369.

Thanks for your help and cooperation!

HUMBOLDT PRINTERS 03-89-106

CATALYST FUEL PERFORMANCE STUDY

INTRODUCTION

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3483	WISEDA KL2450	250	MTU16V396	4436
3484	WISEDA KL2450	250	MTU16V396	3501

Shovel Units	Model	Engine Model	Operating hours as of 3/10/94	
2551	HITACHI	CUMMINS KTA38C	Right:	2903
			Left:	2903
2552	HITACHI	CUMMINS KTA38C	Right:	3922
			Left:	1276
2553	HITACHI	CUMMINS KTA38C	Right:	1769
			Left:	13934
2554	HITACHI	CUMMINS KTA38C	Right:	4602
			Left:	4602

The units will be filled with treated fuel during the test period. The other equipment will use untreated fuel from the Cove satation.

MEASUREMENTS

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Data from the mine's dispatch system will also be used to compare both treated and untreated groups.

TEST PROCEDURES

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5. When a truck load of fuel is selected to be placed in the test tank, catalyst will be added to the delivery truck by the truck driver.

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RESPONSIBILITIES

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Songlin Z. will be the Echo Bay project leader. Responsibility includes supervising measurements, data collection and analysis, pre-treatment of tank fuel, posting signs, giving memos or log forms to security, pit department supervisors, and monitoring test tank level.

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Shift supervisors:

Insure the crew members are aware of the test and that the proper fuel is used during the test period.

Haul Truck Drivers:

The truck drivers must fill their trucks with the proper fuel at the appropriate stations during the test period. Signs will be posted inside the cab, beside the truck fuel tank and fuel stations to remind the drivers. Fuel is to be reported to dispatch as is currently done.

Lube Men:

Fill selected shovels with the treated fuel.

PM Crew:

Collect duplicate engine oil samples from the test equipment, label with date and unit number, and hold for FPC.

FPC Manufacture:

Supply all necessary instruments to conduct the carbon mass balance measurements. Supply qualified personnel for conducting the measurements. Provide necessary pre-test training to Echo Bay involved personnel.

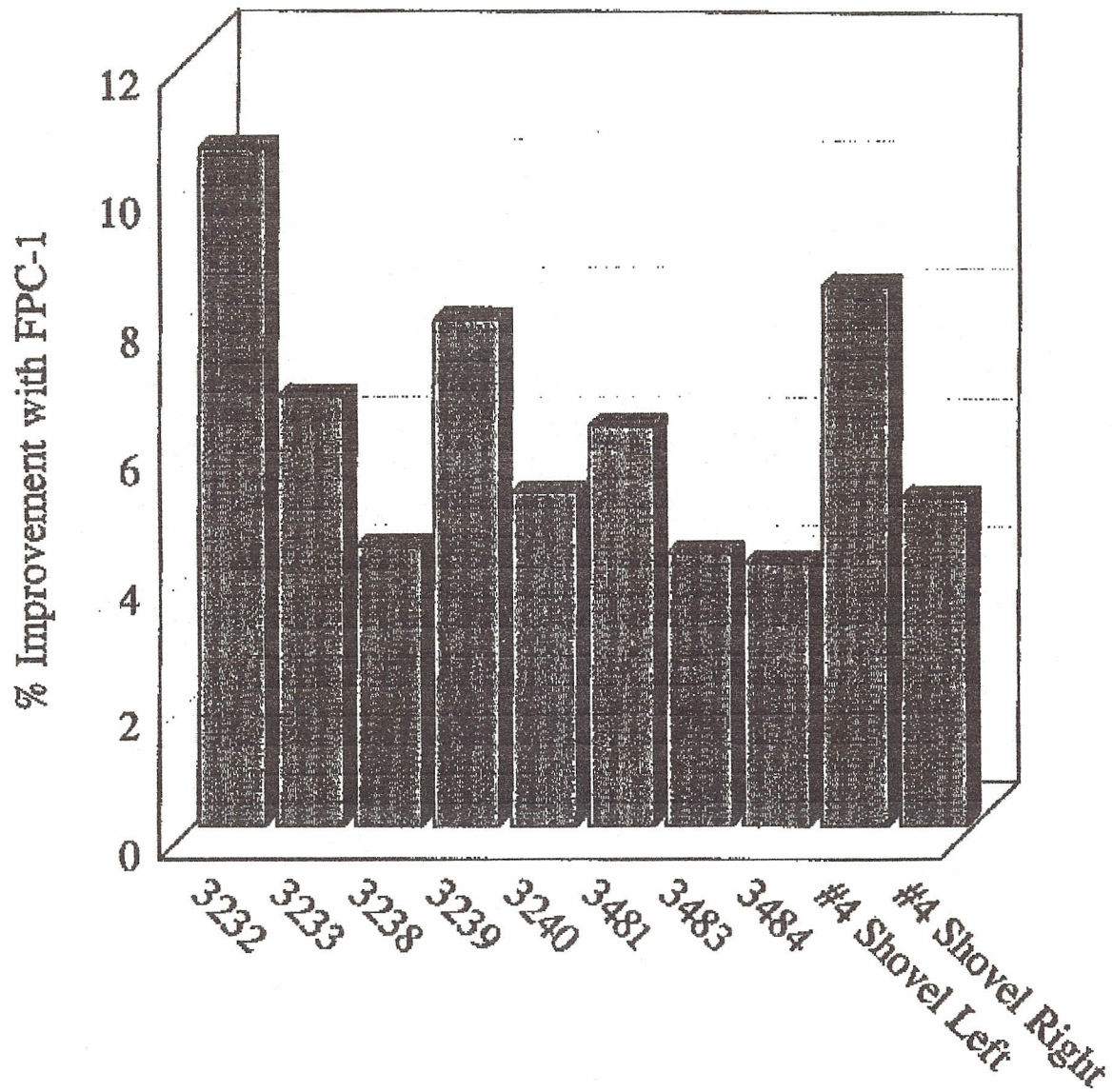
Echo Bay:

Provide an 110V/1000W/10A generator.

Echo Bay Minerals

McCoy Mine

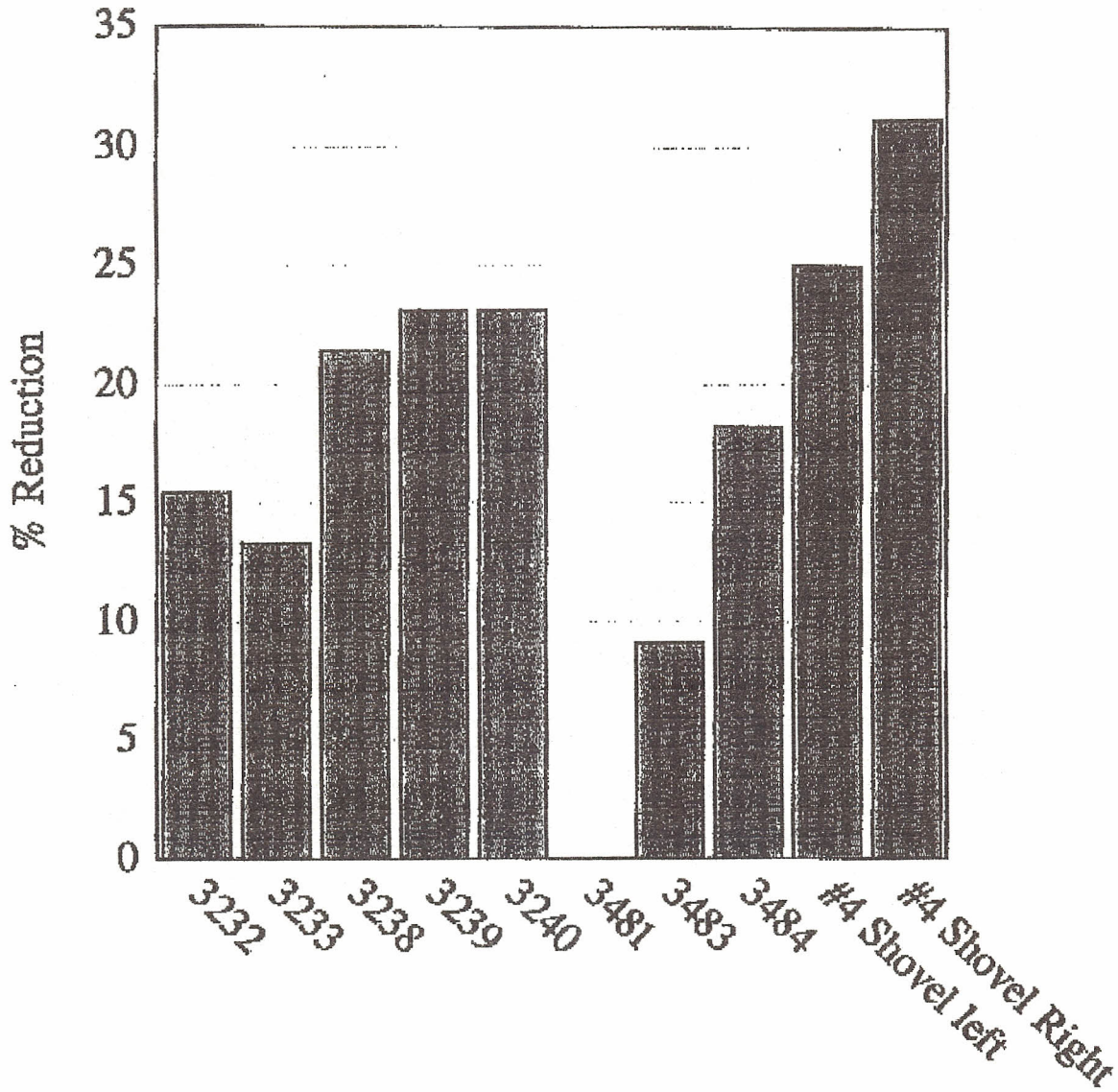
Fuel Efficiency Improvement



Echo Bay Minerals

McCoy Mine

% Smoke Reduction



APPENDICES

CARBON BALANCE METHOD TECHNICAL APPROACH:

All test instruments were calibrated and zeroed prior to both baseline and treated fuel data collection. The SGA-9000 NDIR exhaust gas analyzer was internally calibrated using Scott Calibration Gases (BAR 90 Gases), and a leak test on the sampling hose and connections was performed. The same procedure was repeated after each test segment to determine any instrument drift.

Each vehicle's engine was brought up to operating temperature at a set rpm and allowed to stabilize as indicated by the engine water and exhaust temperature, and exhaust pressure. No exhaust gas measurements were made until each engine had stabilized at the rpm selected for the test. Engine rpm was set using the dash mounted tachometer (with the exception of shovel's #1 and #4) and checked peridocally to prevent any change in engine speed during the data collection period. # 2 diesel was used exclusively throughout the evaluation. Fuel specific gravity (density) and temperature were also taken.

The baseline fuel consumption test consisted of a minimum of five sets of measurements of CO_2, CO, HC, O_2, and exhaust temperature and pressure made at 90 second intervals. Each engine was tested in the same manner. Engine rpm were also recorded at approximately 90 second intervals.

After the baseline test the fuel storage tanks were treated with FPC-1® at the recommended level of 1 oz. of catalyst to 40 gallons of fuel (1:5000 volume ratio). Each succeeding fuel shipment was also treated with FPC-1®. The equipment was operated on treated fuel until the final test was run.

During the two test segments, an internal self-calibration of the exhaust analyzer was performed after every two sets of measurements to correct instrument drift, if any.

From the exhaust gas concentrations of $C0_2$, CO, HC, and O_2 measured during the test, the average molecular weight of these gases, and the temperature and volumetric flow rate of the exhaust stream, the mass flow rate of the fuel to the engine (rate of fuel consumption) may be expressed as a engine "performance factor" which relates the fuel consumption of the treated fuel to the baseline. The calculations are based on the assumption that engine operating conditions are essentially the same throughout the test. Engines with known mechanical problems or having undergone repairs affecting fuel consumption are removed from the sample.

A sample calculation is found in Figure 2.

COMPUTER PRINTOUTS

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	12 Inches		
Engine Type:	Wiseda	*Mile/Hrs*	4308		
Equipment Type:	MTU	*ID #:*	3484	*Baro*	30.23
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1125

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1902	440.6	0.22	0.06	13	2.71	15.5	
1902	434.4	0.24	0.06	13	2.7	15.5	
1902	435	0.22	0.06	19	2.71	15.6	
1903	434	0.22	0.06	19	2.72	15.6	
1903	435.6	0.22	0.05	21	2.71	15.6	
1902	433.4	0.22	0.05	22	2.72	16	
1902	435	0.22	0.05	24	2.72	16.2	
1902	429.8	0.22	0.05	25	2.73	16.6	
1902.250	**434.725**	**.223**	**.055**	**19.500**	**2.715**	**15.825**	Mean
0.46291005	**2.97789475**	**0.00707107**	**0.005345225**	**4.53557368**	**0.0092582**	**0.40266966**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.95E-05	0.00055	0.02715	0.15825	29.068531	222,048	103,561

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	12 Inches		
Engine Type:	Wiseda	*Mile/Hrs:*	5293		
Equipment Type	MTU	*ID #:*	3484	*Baro:*	29.76
Fuel Sp. Gravity:	0.842	*Temp:*	52		
SG Corr Factor:	1			*Time:*	1240

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1903	431.8	0.2	0.07	17	2.82	14.9	
1903	431.6	0.2	0.07	17	2.81	14.7	
1903	431.4	0.18	0.07	17	2.82	14.7	
1903	431.2	0.18	0.07	17	2.82	14.6	
1903	431.8	0.18	0.07	17	2.85	14.8	
1903	432	0.18	0.07	17	2.82	14.8	
1903	431.4	0.18	0.07	17	2.81	14.8	
1903	431	0.18	0.07	16	2.82	14.8	
1903.000	**431.525**	**.185**	**.070**	**16.875**	**2.821**	**14.763**	Mean
0	**0.337003603**	**0.0092582**	**0**	**0.35355339**	**0.01246423**	**0.09161254**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.69E-05	0.0007	0.0282125	0.147625	29.0428788	212,712	107,755

Performance factor adjusted for fuel density: 107,755

****% Change PF= 4.05 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	12 Inches		
Engine Type:	MTU	*Mile/Hrs*	5696		
Equipment Type:	Wiseda	*ID #:*	3481	*Baro*	30.21
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1215

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1902	443.4	0.24	0.05	14	3.06	15.4	
1901	443.4	0.24	0.05	14	3.06	15.5	
1901	440.8	0.25	0.05	17	3.04	14.7	
1901	442	0.24	0.04	17	3.04	14.8	
1901	442	0.24	0.05	17	3.05	14.8	
1901	442	0.24	0.06	15	3.05	14.6	
1901	441.4	0.24	0.06	17	3.05	14.5	
1901	442.6	0.24	0.06	17	3.05	14.3	
1901.125	**442.200**	**.241**	**.053**	**16.000**	**3.050**	**14.825**	Mean
0.353553391	**0.907114735**	**0.00353553**	**0.007071068**	**1.41421356**	**0.00755929**	**0.42003401**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.60E-05	0.000525	0.0305	0.14825	29.081928	198,581	89,285

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	12 Inches		
Engine Type:	MTU	*Mile/Hrs:*	6678		
Equipment Type	Wiseda	*ID #:*	3481	*Baro:*	29.78
Fuel Sp. Gravity:	0.842	*Temp:*	50		
SG Corr Factor:	1			*Time:*	1210

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1901	436	0.22	0.04	10	3.12	14	
1901	436	0.22	0.04	10	3.1	14	
1901	436.4	0.22	0.04	13	3.1	14.1	
1901	436.4	0.2	0.04	11	3.07	14.5	
1901	436.2	0.2	0.05	17	3.09	14.4	
1901	436.6	0.2	0.05	17	3.09	14.3	
1901	437.4	0.2	0.05	17	3.1	14.2	
1901	437.6	0.18	0.05	9	3.11	14.4	
1901	438	0.2	0.05	10	3.12	14.4	
1901	438.4	0.2	0.05	10	3.11	14.4	
1901	438.6	0.2	0.05	9	3.11	14.4	
1901.000	**437.055**	**.204**	**.046**	**12.091**	**3.102**	**14.282**	Mean
0	**0.976077493**	**0.01206045**	**0.00504525**	**3.33030165**	**0.0147093**	**0.17786614**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.21E-05	0.000463636	0.03101818	0.142818182	29.0682649	195,772	94,851

Performance factor adjusted for fuel density: 94,851

****% Change PF= 6.23 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/ McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	10 Inches		
Engine Type:	3512	*Mile/Hrs*	248756		
Equipment Type:	CAT 785	*ID #:*	3233	*Baro*	30.18
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1250

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1650	440	0.56	0.03	10	2.81	15.4	
1600	442.2	0.58	0.03	10	2.79	15.4	
1600	442.6	0.58	0.02	12	2.81	15.5	
1600	445.6	0.58	0.03	10	2.83	15.5	
1600	445.8	0.58	0.04	10	2.86	15.4	
1600	446.2	0.58	0.03	10	2.87	15.4	
1600	447.2	0.6	0.03	13	2.87	15.4	
1600	442.8	0.6	0.03	12	2.82	15.3	
1600	444.2	0.6	0.03	12	2.82	15.3	
1600	444	0.58	0.03	12	2.84	15.3	
1605.000	**444.060**	**.584**	**.030**	**11.100**	**2.832**	**15.390**	Mean
15.8113883	**2.199090721**	**0.01264911**	**0.004714045**	**1.197219**	**0.02740641**	**0.07378648**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.11E-05	0.0003	0.02832	0.1539	29.0693638	215,351	89,662

Company Name:	Echo Bay/ McCoy	*Location:*	Battle Mountain	*Test Date:*	5/17/94
Test Portion:	Treated	*Stack Diam:*	10 Inches		
Engine Type:	3512	*Mile/Hrs:*	254789		
Equipment Type	CAT 785	*ID #:*	3233	*Baro:*	29.85
Fuel Sp. Gravity:	0.842	*Temp:*	55		
SG Corr Factor:	1			*Time:*	1005

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	401.2	0.56	0.04	10	2.64	16.9	
1600	403.2	0.56	0.04	10	2.65	17	
1600	403.4	0.54	0.04	10	2.65	17.1	
1600	404.4	0.55	0.04	10	2.65	16.9	
1600	404.6	0.55	0.04	10	2.67	16.9	
1600	404.6	0.55	0.04	13	2.65	16.8	
1600	405.2	0.55	0.04	13	2.67	16.8	
1600	406.2	0.55	0.04	12	2.65	17	
1600	405.2	0.55	0.03	12	2.65	17.1	
1600	405.2	0.55	0.03	11	2.64	17.2	
1600	405.2	0.55	0.04	10	2.64	17.4	
1600.000	**404.400**	**.551**	**.038**	**11.000**	**2.651**	**17.009**	Mean
0	**1.362350909**	**0.0053936**	**0.004045199**	**1.26491106**	**0.01044466**	**0.18140863**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.10E-05	0.000381818	0.02650909	0.170090909	29.1051471	229,449	95,650

Performance factor adjusted for fuel density: 95,650

****% Change PF= 6.68 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	10 Inches		
Engine Type:	3512	*Mile/Hrs*	199291		
Equipment Type:	CAT 785	*ID #:*	3239	*Baro*	30.18
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1335

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	472.8	0.52	0.06	10	3.27	14.6	
1600	465.8	0.5	0.05	12	3.35	14.6	
1600	472.2	0.5	0.04	13	3.34	14.7	
1600	467.4	0.5	0.04	15	3.35	14.8	
1600	460.4	0.5	0.06	12	3.31	14.9	
1600	460	0.5	0.06	17	3.29	14.8	
1600	460.4	0.5	0.04	13	3.32	14.8	
1600	461.2	0.5	0.05	13	3.28	14.7	
1600	455.6	0.5	0.05	13	3.33	14.7	
1600	458.6	0.5	0.05	12	3.29	14.8	
1600.000	**463.440**	**.502**	**.050**	**13.000**	**3.313**	**14.740**	Mean
0	**5.829274779**	**0.00632456**	**0.008164966**	**1.88561808**	**0.02945807**	**0.09660918**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.30E-05	0.0005	0.03313	0.1474	29.120434	183,592	83,326

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	10 Inches		
Engine Type:	3512	*Mile/Hrs:*	206877		
Equipment Type	CAT 785	*ID #:*	3239	*Baro:*	29.80
Fuel Sp. Gravity:	0.842	*Temp:*	50		
SG Corr Factor:	1			*Time:*	1115

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	436.2	0.46	0.05	6	3.16	15.3	
1600	432.6	0.46	0.05	8	3.16	14.5	
1600	431.4	0.45	0.05	9	3.17	14.3	
1600	430.6	0.45	0.05	8	3.16	14.3	
1600	429.6	0.45	0.05	10	3.17	14.3	
1600	427.4	0.45	0.05	9	3.11	14.4	
1600	427	0.45	0.05	9	3.12	14.4	
1600	426.2	0.45	0.05	9	3.13	14.4	
1600	425.6	0.45	0.05	9	3.11	14.5	
1600	423.6	0.45	0.06	9	3.19	14.4	
1600	423.6	0.45	0.06	9	3.15	14.4	
1600	422.8	0.45	0.06	9	3.15	14.4	
1600	423	0.45	0.06	9	3.14	14.4	
1600.000	**427.662**	**.452**	**.053**	**8.692**	**3.148**	**14.462**	Mean
0	**4.17243703**	**0.00375534**	**0.004803845**	**0.94733093**	**0.02454718**	**0.25993096**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
8.69E-06	0.000530769	0.03147692	0.144615385	29.0825965	192,789	89,883

Performance factor adjusted for fuel density: 89,883

****% Change PF= 7.87 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	10 Inches		
Engine Type:	3512	*Mile/Hrs*	198991		
Equipment Type:	CAT 785	*ID #:*	3240	*Baro*	30.15
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1435

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	630	0.86	0.01	9	5.13	11	
1600	630	0.9	0.01	8	5.14	11	
1600	630	0.9	0	8	5.2	11	
1600	632	0.88	0.01	8	5.22	11.6	
1600	633	0.9	0.02	8	5.23	11.2	
1600	629.5	0.9	0.02	6	5.16	11.2	
1600	632	0.89	0.01	9	5.12	11.7	
1600	618.2	0.88	0.02	8	5.12	11.8	
1600.000	**629.338**	**.889**	**.013**	**8.000**	**5.165**	**11.313**	Mean
0	**4.67483766**	**0.01457738**	**0.007071068**	**0.9258201**	**0.04535574**	**0.33567629**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
8.00E-06	0.000125	0.05165	0.113125	29.279364	120,080	44,465

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	10 Inches		
Engine Type:	3512	*Mile/Hrs:*	206440		
Equipment Type	CAT 785	*ID #:*	3240	*Baro:*	29.80
Fuel Sp. Gravity:	0.842	*Temp:*	50		
SG Corr Factor:	1			*Time:*	1130

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	594.2	0.78	0.01	5	5.07	10.7	
1600	593.4	0.8	0.01	5	5.05	10.6	
1600	593	0.8	0.01	5	5.05	10.7	
1600	589.6	0.8	0.01	5	5.05	14.1	
1600	589	0.8	0.01	7	5.04	11.1	
1600	588.2	0.8	0.01	5	5.03	11.2	
1600	587.4	0.82	0.01	8	5.03	11.2	
1600	587.2	0.82	0.01	5	5.03	11	
1600	586.8	0.82	0	5	5.03	10.9	
1600	587	0.8	0	5	5.02	10.9	
1600	587.6	0.8	0	5	5.05	10.9	
1600.000	**589.400**	**.804**	**.007**	**5.455**	**5.041**	**11.209**	Mean
0	**2.797141398**	**0.01206045**	**0.004670994**	**1.03572548**	**0.01445998**	**0.97923904**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
5.45E-06	7.27273E-05	0.05040909	0.112090909	29.2552255	123,091	46,772

Performance factor adjusted for fuel density: 46,772

****% Change PF= 5.19 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain		*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	10	Inches		
Engine Type:	3512	*Mile/Hrs*	245923			
Equipment Type:	CAT 785	*ID #:*	3232		*Baro*	30.15
Fuel Sp. Gravity(SG	0.8420	*Temp:*				
					Time:	1515

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	495	0.46	0.01	9	2.84	15.5	
1600	488.6	0.48	0.01	10	2.88	15.4	
1600	485	0.48	0.02	10	2.88	15.5	
1600	483.2	0.48	0.01	12	2.88	15.4	
1600	478.1	0.48	0.01	12	2.88	15.5	
1600	470.4	0.48	0.02	12	2.87	15.5	
1600	476.2	0.48	0.03	10	2.88	15.4	
1600	472.4	0.48	0.03	10	2.87	15.4	
1600.000	**481.113**	**.478**	**.018**	**10.625**	**2.873**	**15.450**	Mean
0	**8.385947003**	**0.00707107**	**0.008864053**	**1.18773494**	**0.0138873**	**0.05345225**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.06E-05	0.000175	0.028725	0.1545	29.0782163	213,357	100,183

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain		*Test Date:*	5/17/94
Test Portion:	Treated	*Stack Diam:*	10	Inches		
Engine Type:	3512	*Mile/Hrs:*	251750			
Equipment Type	CAT 785	*ID #:*	3232		*Baro:*	29.85
Fuel Sp. Gravity:	0.842	*Temp:*	47			
SG Corr Factor:	1				*Time:*	1100

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	412.2	0.45	0.04	12	2.57	16.7	
1600	410.2	0.45	0.04	12	2.54	16.8	
1600	409.2	0.44	0.04	12	2.54	16.7	
1600	408	0.44	0.04	12	2.53	16.6	
1600	407.4	0.45	0.04	12	2.54	16.6	
1600	407	0.45	0.04	12	2.51	16.5	
1600	407	0.44	0.04	12	2.53	16.4	
1600	405.8	0.44	0.04	10	2.56	16.8	
1600	404.2	0.44	0.04	10	2.57	16.9	
1600	403.8	0.44	0.04	10	2.56	16.9	
1600	403.2	0.45	0.04	12	2.56	16.9	
1600.000	**407.091**	**.445**	**.040**	**11.455**	**2.546**	**16.709**	Mean
0	**2.777572518**	**0.00522233**	**8.33E-10**	**0.93419873**	**0.01911687**	**0.17002674**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.15E-05	0.0004	0.02546364	0.167090909	29.0764462	238,275	110,748

Performance factor adjusted for fuel density: 110,748

****% Change PF= 10.55 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs*	5088		
Equipment Type:	Hitachi Shovel	*ID #:*	#4 left side	*Baro*	30.20
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	955

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	555.2	3	0	6	3.8	12.9	
Full Throttle	555.8	3	0	5	3.78	12.9	
Full Throttle	556	3.2	0	5	3.76	13.2	
Full Throttle	558.8	3.2	0.01	4	3.8	13.8	
Full Throttle	563.8	3.2	0.01	5	3.8	13.9	
Full Throttle	558.8	3.2	0.01	5	3.79	14	
Full Throttle	557	3.2	0.01	5	3.79	13.7	
Full Throttle	549.2	3.2	0	5	3.79	13.7	
Full Throttle	559.6	3.2	0	5	3.8	13.7	
#DIV/0!	**557.133**	**3.156**	**.004**	**5.000**	**3.790**	**13.533**	Mean
#DIV/0!	**3.966106403**	**0.08819171**	**0.005270463**	**0.5**	**0.01322876**	**0.42130749**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.00E-06	4.44444E-05	0.0379	0.135333333	29.1480233	163,137	48,444

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs:*			
Equipment Type	Hitachi Shovel	*ID #:*	#4 left side	*Baro:*	29.68
Fuel Sp. Gravity:	0.842	*Temp:*	53		
SG Corr Factor:	1			*Time:*	1645

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	564.4	2.8	0	3	3.79	13.7	
Full Throttle	564.6	2.7	0	3	3.81	13.8	
Full Throttle	565.6	2.7	0	2	3.78	13.9	
Full Throttle	565.2	2.7	0	3	3.72	13.4	
Full Throttle	565	2.7	0	1	3.72	13.3	
Full Throttle	565	2.7	0	2	3.75	13.3	
Full Throttle	568	2.7	0	1	3.74	13.3	
Full Throttle	573	2.7	0	3	3.72	13.2	
Full Throttle	573.2	2.7	0	3	3.72	13.2	
Full Throttle	573.4	2.7	0	3	3.73	13.2	
Full Throttle	568.2	2.8	0	4	3.79	13.4	
Full Throttle	569.2	2.7	0	2	3.81	13.4	
Full Throttle	570.2	2.7	0	4	3.81	13.4	
#DIV/0!	**568.077**	**2.715**	**.000**	**2.615**	**3.761**	**13.423**	Mean
#DIV/0!	**3.458842255**	**0.03755338**	**0**	**0.96076892**	**0.03817974**	**0.23149459**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
2.62E-06	0	0.03760769	0.134230769	29.1387978	164,611	52,519

Performance factor adjusted for fuel density: 52,519

****% Change PF= 8.41 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/29/94
Test Portion:	Baseline	*Stack Diam.*	12 Inches		
Engine Type:	MTU	*Mile/Hrs*	5187		
Equipment Type:	Wiseda	*ID #:*	3483	*Baro*	30.14
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1550

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1901	448.8	0.4	0.08	13	3.02	14.4	
1901	447.2	0.36	0.06	17	2.99	14.3	
1901	433.4	0.36	0.08	18	3.01	14.3	
1901	445.4	0.36	0.05	25	2.98	14.4	
1901	450.8	0.36	0.04	25	3.05	14.9	
1901	450.6	0.36	0.05	30	3.04	14.9	
1901	449.8	0.34	0.04	27	2.99	14.8	
1901	451.8	0.36	0.06	30	3.02	14.8	
1901	451.4	0.34	0.03	25	2.99	14.7	
1901	452.2	0.34	0.04	22	2.99	14.6	
1901.000	**448.140**	**.358**	**.053**	**23.200**	**3.008**	**14.610**	Mean
0	**5.602420112**	**0.0175119**	**0.017029386**	**5.65292451**	**0.02394438**	**0.24244129**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
2.32E-05	0.00053	0.03008	0.1461	29.0670256	200,859	74,293

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	12 Inches		
Engine Type:	MTU	*Mile/Hrs:*	6118		
Equipment Type	Wiseda	*ID #:*	3483	*Baro:*	29.76
Fuel Sp. Gravity:	0.842	*Temp:*	52		
SG Corr Factor:	1			*Time:*	1300

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1901	447.6	0.34	0.05	13	3.03	14.2	
1901	446.4	0.34	0.05	13	3.02	14.1	
1901	445.6	0.32	0.05	14	3.02	14.1	
1901	445.2	0.32	0.05	13	3.02	14.2	
1901	443.8	0.32	0.05	12	3.02	14.8	
1901	443.2	0.32	0.05	10	3.04	14.8	
1901	442.8	0.3	0.05	12	3.04	15.1	
1901	442.6	0.32	0.05	13	3.03	14.2	
1901	442.2	0.32	0.05	13	3.02	14.1	
1901	442.2	0.32	0.05	12	3.02	14.2	
1901	442.2	0.32	0.05	10	3.03	14.2	
1901.000	**443.982**	**.322**	**.050**	**12.273**	**3.026**	**14.364**	Mean
0	**1.910925525**	**0.0107872**	**1.31709E-09**	**1.27207776**	**0.0080904**	**0.35573228**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.23E-05	0.0005	0.03026364	0.143636364	29.0594755	200,262	77,453

Performance factor adjusted for fuel density: 77,453

****% Change PF= 4.25 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs*			
Equipment Type:	Hitachi Shovel	*ID #:*	#4 right side	*Baro*	30.20
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1020

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	547.4	3.4	0	3	3.71	13.5	
Full Throttle	549.8	3.4	0	3	3.71	13.5	
Full Throttle	551.6	3.4	0	2	3.71	13.6	
Full Throttle	546	3.4	0	4	3.67	13.6	
Full Throttle	543.4	3.4	0	5	3.67	13.9	
Full Throttle	548.2	3.4	0	5	3.72	13.9	
Full Throttle	546	3.4	0	0	3.67	13.8	
#DIV/0!	**547.486**	**3.400**	**.000**	**3.143**	**3.694**	**13.686**	Mean
#DIV/0!	**2.705197819**	**6.8826E-08**	**0**	**1.77281052**	**0.02299068**	**0.17728105**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
3.14E-06	0	0.03694286	0.136857143	29.1386966	167,556	47,706

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs:*			
Equipment Type	Hitachi Shovel	*ID #:*	#4 right side	*Baro:*	29.68
Fuel Sp. Gravity:	0.842	*Temp:*	53		
SG Corr Factor:	1			*Time:*	1620

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	526	3	0	3	3.62	13.7	
Full Throttle	526.4	3	0	3	3.65	13.7	
Full Throttle	528	3	0	3	3.64	13.8	
Full Throttle	528.4	3	0	3	3.64	13.5	
Full Throttle	528.8	3	0	3	3.64	13.5	
Full Throttle	528.8	3.1	0	4	3.64	13.5	
Full Throttle	528.8	3.1	0	3	3.62	13.6	
Full Throttle	527.8	3.1	0	3	3.64	13.6	
Full Throttle	527	3.1	0	3	3.64	13.6	
Full Throttle	526.6	3.1	0	3	3.64	13.6	
Full Throttle	526.4	3.1	0	3	3.64	13.6	
#DIV/0!	**527.545**	**3.055**	**.000**	**3.091**	**3.637**	**13.609**	Mean
#DIV/0!	**1.092120539**	**0.0522233**	**0**	**0.30151134**	**0.00904534**	**0.09438798**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
3.09E-06	0	0.03637273	0.136090909	29.1265065	170,112	50,154

Performance factor adjusted for fuel density: 50,154

****% Change PF= 5.13 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs*			
Equipment Type:	Hitachi Shovel	*ID #:*	#1 left side	*Baro*	30.17
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1243

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	536.6	1.8	0.01	4	3.4	13.5	
Full Throttle	537	2	0.01	4	3.38	13.6	
Full Throttle	539.2	2	0.01	5	3.38	13.5	
Full Throttle	540.4	2	0.01	6	3.41	13.2	
Full Throttle	542.6	2	0.01	5	3.4	13.2	
Full Throttle	543	2	0.01	5	3.38	13.2	
Full Throttle	539.6	2	0.01	6	3.36	13.5	
Full Throttle	543.6	2	0.01	5	3.38	13.5	
#DIV/0!	**540.250**	**1.975**	**.010**	**5.000**	**3.386**	**13.400**	Mean
#DIV/0!	**2.66565457**	**0.07071068**	**1.24453E-10**	**0.75592895**	**0.0159799**	**0.16903085**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.00E-06	0.0001	0.0338625	0.134	29.07809	181,809	67,640

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs:*			
Equipment Type	Hitachi Shovel	*ID #:*	#1 left side	*Baro:*	29.75
Fuel Sp. Gravity:	0.842	*Temp:*	55		
SG Corr Factor:	1			*Time:*	1400

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	563.8	1.8	0	2	3.82	13.4	
Full Throttle	563.6	1.8	0	3	3.78	13.3	
Full Throttle	563.4	1.8	0	2	3.8	13.3	
Full Throttle	564.4	1.8	0	1	3.8	13.4	
Full Throttle	564.4	1.8	0	2	3.77	13.4	
Full Throttle	564.4	1.8	0	1	3.77	13.5	
Full Throttle	564.8	1.8	0	2	3.76	13.5	
Full Throttle	564.8	1.8	0	4	3.81	13.2	
Full Throttle	564.8	1.8	0	4	3.81	13.1	
Full Throttle	564.8	1.8	0	4	3.81	13.1	
Full Throttle	564.4	1.8	0	5	3.8	13	
#DIV/0!	**564.327**	**1.800**	**.000**	**2.727**	**3.794**	**13.291**	Mean
#DIV/0!	**0.508115949**	**0**	**0**	**1.34839972**	**0.0201359**	**0.17002674**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
2.73E-06	0	0.03793636	0.132909091	29.1387764	163,183	63,905

Performance factor adjusted for fuel density: 63,905

****% Change PF = -5.52 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs*	339		
Equipment Type:	Hitachi Shovel	*ID #:*	#1 right side	*Baro*	30.17
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1257

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	537.8	2	0.01	5	3.35	13.5	
Full Throttle	532	2	0.01	6	3.33	13.6	
Full Throttle	536.4	2	0.01	5	3.35	13.6	
Full Throttle	536.4	2	0.01	5	3.34	13.4	
Full Throttle	534.8	2	0.01	5	3.34	13.4	
Full Throttle	533	2	0.01	5	3.34	13.3	
#DIV/0!	**535.067**	**2.000**	**.010**	**5.167**	**3.342**	**13.467**	Mean
#DIV/0!	**2.225908054**	**0**	**0**	**0.40824829**	**0.00752773**	**0.12110601**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.17E-06	0.0001	0.03341667	0.134666667	29.073633	184,191	67,920

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	8 Inches		
Engine Type:	KTA Cummins 38	*Mile/Hrs:*			
Equipment Type	Hitachi Shovel	*ID #:*	#1 right side	*Baro:*	29.75
Fuel Sp. Gravity:	0.842	*Temp:*	55		
SG Corr Factor:	1			*Time:*	1400

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	554.4	2.1	0	2	3.75	13.9	
Full Throttle	554	2	0	2	3.72	14	
Full Throttle	553.8	2	0	2	3.72	14.1	
Full Throttle	553	2	0	3	3.71	14	
Full Throttle	553.2	2	0	2	3.7	13.6	
Full Throttle	553.8	2	0	2	3.7	13.5	
Full Throttle	552.4	2.1	0	3	3.69	13.5	
Full Throttle	553.2	2	0	2	3.69	13.6	
Full Throttle	553.2	2	0	4	3.71	13.5	
Full Throttle	553.2	2	0	4	3.69	13.5	
Full Throttle	553.2	2	0	4	3.6	13.5	
#DIV/0!	**553.400**	**2.018**	**.000**	**2.727**	**3.698**	**13.700**	Mean
#DIV/0!	**0.55136195**	**0.04045199**	**0**	**0.90453403**	**0.03709938**	**0.24494897**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
2.73E-06	0	0.03698182	0.137	29.1398673	167,399	61,580

Performance factor adjusted for fuel density: 61,580

****% Change PF= -9.34 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	10 Inches		
Engine Type:	3512	*Mile/Hrs*	194286		
Equipment Type:	CAT 785	*ID #:*	3238	*Baro*	30.15
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1550

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	509	0.6	0.04	8	3.31	14.2	
1600	497.2	0.6	0.04	8	3.31	14.2	
1600	496.2	0.6	0.04	10	3.31	14.2	
1600	492.4	0.6	0.04	10	3.33	15.1	
1600	487.4	0.6	0.04	9	3.31	15.2	
1600	486.4	0.6	0.04	9	3.32	15.2	
1600	482.8	0.62	0.04	10	3.31	15	
1600	481.4	0.62	0.04	10	3.31	15.2	
1600	480	0.62	0.04	9	3.33	15.2	
1600.000	**490.311**	**.607**	**.040**	**9.222**	**3.316**	**14.833**	Mean
0	**9.365421032**	**0.01**	**6.58545E-10**	**0.83333333**	**0.00881917**	**0.47958315**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
9.22E-06	0.0004	0.03315556	0.148333333	29.1243571	184,156	77,090

Company Name:	Echo Bay/McCoy	*Location:*	Battle Mountain	*Test Date:*	5/16/94
Test Portion:	Treated	*Stack Diam:*	10 Inches		
Engine Type:	3512	*Mile/Hrs:*	202543		
Equipment Type	CAT 785	*ID #:*	3238	*Baro:*	29.80
Fuel Sp. Gravity:	0.842	*Temp:*	48		
SG Corr Factor:	1			*Time:*	1040

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	462.8	0.54	0.06	9	3.19	14.5	
1600	459.2	0.56	0.06	9	3.2	14.5	
1600	456.2	0.56	0.06	9	3.24	14.5	
1600	455.4	0.56	0.05	9	3.25	14.4	
1600	454.2	0.56	0.06	9	3.25	14.4	
1600	452.4	0.56	0.06	9	3.22	14.3	
1600	443.4	0.56	0.05	10	3.19	14.7	
1600	448.4	0.56	0.06	10	3.19	14.7	
1600	447.6	0.56	0.05	10	3.18	14.6	
1600	446	0.56	0.05	10	3.18	18.6	
1600	445	0.56	0.06	10	3.21	14.6	
1600	444	0.55	0.06	10	3.18	14.6	
1600.000	**451.217**	**.558**	**.057**	**9.500**	**3.207**	**14.867**	Mean
0	**6.400260411**	**0.00621582**	**0.00492366**	**0.52223297**	**0.02708013**	**1.18193473**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
9.50E-06	0.000566667	0.03206667	0.148666667	29.1082843	189,236	80,447

Performance factor adjusted for fuel density: 80,447

****% Change PF= 4.35 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Echo Bay/McCoy	*Location*	Battle Mountain	*Date:*	3/30/94
Test Portion:	Baseline	*Stack Diam.*	10 Inches		

Engine Type:	CAT 3512	*Mile/Hrs*	242165		
Equipment Type:	785 Haul Truck	*ID #:*	3237	*Baro*	30.10
Fuel Sp. Gravity(SG	0.8420	*Temp:*			
				Time:	1600

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	477.4	0.64	0.03	9	2.69	16.1	
1600	455.2	0.64	0.03	10	2.68	16.1	
1600	455	0.62	0.03	10	2.62	16.2	
1600	453	0.62	0.03	10	2.67	16.2	
1600	450	0.62	0.03	10	2.7	16.2	
1600	447.2	0.62	0.03	9	2.67	16.3	
1600	445.2	0.62	0.03	9	2.66	16.4	
1600	442.4	0.64	0.03	10	2.67	16	
1600	440.8	0.64	0.03	10	2.67	15.9	
1600	436	0.6	0.04	10	2.66	16.1	
1600.000	**450.220**	**.626**	**.031**	**9.700**	**2.669**	**16.150**	Mean
0	**11.45326736**	**0.01349897**	**0.003162278**	**0.48304589**	**0.0213177**	**0.14337209**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
9.70E-06 6.3758933	0.00031 910.22	0.02669 0.54515889	0.1615 0.04381633	29.0736026 14.2869108	228.347 3.7780301	93.018 2258.73941

Company Name: Echo Bay/McCoy *Location:* Battle Mountain *Test Date:* 5/16/94

Test Portion: Treated *Stack Diam:* 10 Inches

Engine Type: CAT 3512 *Mile/Hrs:*

Equipment Type 785 Haul Truck *ID #:* 3237 *Baro:* 29.80

Fuel Sp. Gravity: 0.842 *Temp:* 48

SG Corr Factor: 1 *Time:* 1005

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	363.4	0.44	0.05	9	2.62	16.3	
1600	370	0.44	0.05	9	2.6	16.3	
1600	370	0.44	0.05	9	2.63	16.2	
1600	371	0.44	0.05	10	2.63	16.5	
1600	370.8	0.44	0.05	10	2.58	15.5	
1600	370.6	0.44	0.05	10	2.6	15.5	
1600	370.8	0.44	0.05	10	2.66	15.4	
1600	370.2	0.44	0.05	10	2.62	15.7	
1600	370.5	0.44	0.05	10	2.61	15.7	
1600	370.6	0.44	0.05	11	2.6	15.7	
1600.000	**369.790**	**.440**	**.050**	**9.800**	**2.615**	**15.880**	Mean
0	**2.270805046**	**0**	**1.24176E-09**	**0.63245553**	**0.02223611**	**0.40221608**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
9.80E-06	0.0005	0.02615	0.1588	29.0541684	231,178	105,566

Performance factor adjusted for fuel density: 105,566

****% Change PF= 14.72 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

FPC-1 Treated Carbon Mass Balance Outliers

ID #: 3484

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1903	432	0.2	7	17	2.87	14.9	
1903	431.2	0.2	7	17	2.87	14.9	
1903.000	**431.600**	**.200**	**7.000**	**17.000**	**2.870**	**14.900**	Mean
0	**0.565685425**	**0**	**0**	**0**	**0**	**0**	Std Dev

FPC-1 Treated Carbon Mass Balance Outliers

ID #: 4 left side

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
Full Throttle	564.4	2.7	0	3	3.79	13.7	
Full Throttle	564.6	2.7	0	3	3.81	13.8	
Full Throttle	565.6	2.7	0	2	3.78	13.9	
Full Throttle	568.2	2.7	0	4	3.79	13.4	
Full Throttle	569.2	2.7	0	2	3.84	13.4	
Full Throttle	570.2	2.7	0	1	3.81	13.4	
	567.033	**2.700**	**.000**	**2.500**	**3.803**	**13.600**	Mean
	2.489712165	**0**	**0**	**1.04880885**	**0.02160247**	**0.22803509**	Std Dev

FPC-1 Treated Carbon Mass Balance Outliers

ID #: 3238

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1500	491.6	0.5	0.06	6	305	14.9	
1600	487	0.48	0.06	8	302	14.9	
1550.000	**489.300**	**.490**	**.060**	**7.000**	**303.500**	**14.900**	Mean
70.71067812	**3.252691193**	**0.01414214**	**0**	**1.41421356**	**2.12132034**	**0**	Std Dev