CASE STUDY

CORI PUNO SAC,
Untuca Camp
Consorcio Minero Horizonte SA
Peru

Fuel: Diesel
Machine/Type: Generators
Test: Gas (CO) Emissions Control and Efficiency

Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

CASE STUDY

Monday, April 18, 2011

MINERA CORI PUNO Unit: UNTUCA

Att: Ing. Jorge Ríos Cabrera

Report on the monitoring of combustion emissions from generators Nº1 and 3.

The following is the test results report from the generators that provide electricity to the mining company Cori Puno, UNTUCA camp. The test that was conducted after Xp3 was added to the diesel fuel stored in two diesel fuel tanks.

1. TEST OBJECTIVE

The objective of the test is to show the benefits obtained by using Xp3 as a combustion improver, compared to the fuel without additive as used in previous operations.

2. TEST STAGES

Two stages were considered 1) the simple comparison of the combustion efficiency report of the fuel without Xp3 and with Xp3, and 2) monitored the combustion emissions of the fuel without treatment compared to the combustion efficiency parameters once the fuel was treated with Xp3.

Dosage:
One part of Xp3 for each 4000 parts of fuel was used. It was poured into the main supply tank to the generators. The treatment was done on March 24 at 15: 30 hours.

3. EVALUATION TECHNIQUE

The following evaluation equipment used was as follows:

a. Combustion gas emissions analysis - We used the combustion gases Analyzer Bacharach model PA-2 mark.

b. Fuel consumption recording - The monitoring was done by the company Cori Puno.

Yield was determined by measuring the electrical power (KW) and the consumption of fuel, which in this case was a D-2 fuel (gal/h,) which was used to establish the efficiency (%), and the specific consumption of heat (KJ/KWh).

Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

4. **MEASURING EQUIPMENT**

4.1 Combustion gases Analyzer "BACHARACH" model PCA-2

This instrument meets the highest quality standard confirmed by the ISO 9001 certificate. Certificates of calibration for all important parameters.

Pressure measurement is integrated, in the graphic display, and can display up to 6 channels simultaneously. The current readings can be printed immediately or stored in the internal memory of the control unit. The scanner measured all necessary combustion parameters. O2, CO, CO2, NO, SO2 will be measured, and it will store the following parameters: temperature, pressure, and provide the calculation of the combustion efficiency.

Level Measurement	**Air temperature**	**-4° to 999° F** **-4° to 2192° F**
	Oxygen	**0 to 20.9%**
	Carbon Monoxide (H2 compensated)	**0 to 4.000 ppm**
	Carbon Monoxide (high end)	**4.001 to 20.000 ppm**
	Nitric Oxide	**0 to 3000 ppm**
	Nitrogen Dioxide	**0 to 500 ppm**
	Sulphur Dioxide	**0 to 5.000 ppm**
	Pressure/Project	**72-72 nwv**

4.2 - Diesel Fuel Characteristics

SPECIFICATIONS				
Commercial Name:	**DIESEL 2 BIODIESEL B2**			
Use:	**COMERCILA - INDUSTRIAL**			
Physical-Chemical Characteristics	**GENERAL DATA**			
	ASTM Method	**Diesel 2**	**Specs**	
			Min	**Max**
VOLATILITY				
Gravity API at 15.6° C	**D287/00**	**34.5**	**Report**	**Report**
Flash point, °C	**D-93/02**	**55**	**52**	**Report**
VISCOSITY				
Cinematic Viscosity at 40°C (cal)	**D-445/03**	**3.2**	**1.7**	**4.1**
COMPOSITION				
Sulfur, % mass	**D4294/02**	**0.18**	**Report**	**0.5**
CONTAMINATION				
Water and Sediments	**D-1796/02**	**0.0**	**Report**	**0.05**
COMBUSTION				
Gross Calorific Value BTU/gal	**D-4868/00**	**138800**	**Report**	
Quality				
> based on the International ASTM test and Peruvian Norma and MSDS				

Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Test Process

The monitoring of gas emissions report from the two generators (No. 1 and 2) belongs to different times and dates. They are shown on graph reports No. 1 and 2.

1. OPERATING CONDITIONS OF THE GENERATOR AND CALORIFIC POWER OF THE FUEL

The generator has been working under the following operating conditions, which are the variables in which it normally operates.

OPERATIONAL CONDITIONS	
Parameters	**Values**
Oil Pressure	Automatic
Air Pressure	
Effective load conditions (approx.)	1500 RPM
D-2 Gross Calorific Value (theoretic)	138 800 BTU

2. TECNICAL STUDIES REPORT

A.1. Gas Emissions

Tables No. 1 and 2 show the report of each of the recorded measurements for detailed parameters.

The detail of each chart is as follows:

- conditions of combustion without the fuel treatment were monitored on day 24.
- The report of day 25 and 26 belong to the treated fuel with the Xp3 fuel improver.

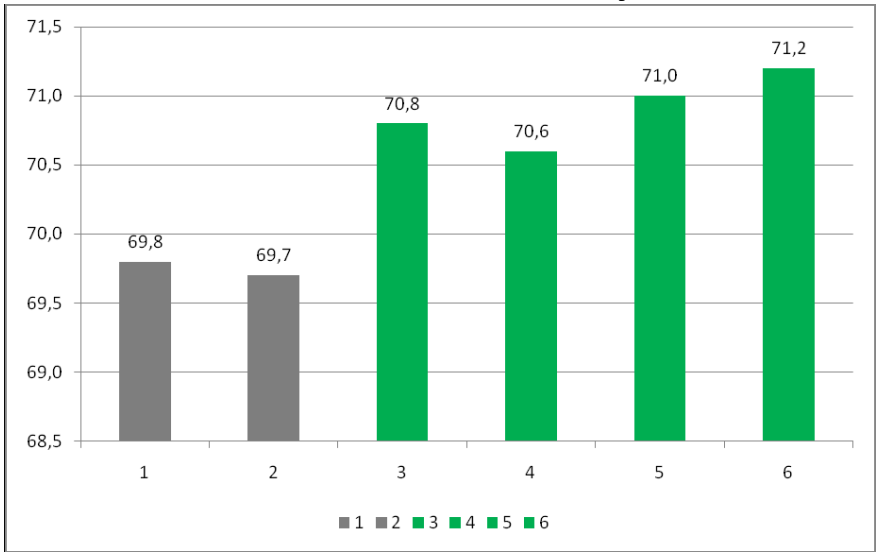
Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Chart No. 1 Combustion Analysis Report for Generator 1

Generator No. 1	w/o Xp3		w/ Xp3			
	24-Mar	24-Mar	25-Mar	25-Mar	26-Mar	26-Mar
O2..... (%)	12,6	12,5	12,7	12,6	12,8	12,9
CO.....(ppm)	126	123	101	95	73	75
Eff. Combustion. (%)	69,8	69,7	70,8	70,6	71,0	71,2
CO2..... (%)	6,2	6,3	6,1	6,2	6,0	5,9
Gas temperature... (°C)	318	320	314	317	301	304
Temperature.....(°C)	17,2	19,5	23,8	24,3	19,4	19,9
Air Excess ..... (%)	141,8	138,4	143	141,1	147,3	150,4
NOx.....(ppm)	1199	1262	1145	1201	1133	1163
SO2.....(ppm)	64	80	75	79	107	105
Time	10:27:33	10:31:06	11:21:58	11:23:26	9:09:42	9:10:34

(*)It should be noted that the NOx maximum emissions of = 460 mg/m3 and maximum SO2 = 2000 mg/m3. These values are taken as reference of those established by the World Bank as the maximum limit concentration of environmental pollutants (World Bank International Finance Corporation IFC/IBRD. General Environmental Guidelines (01-07-98).

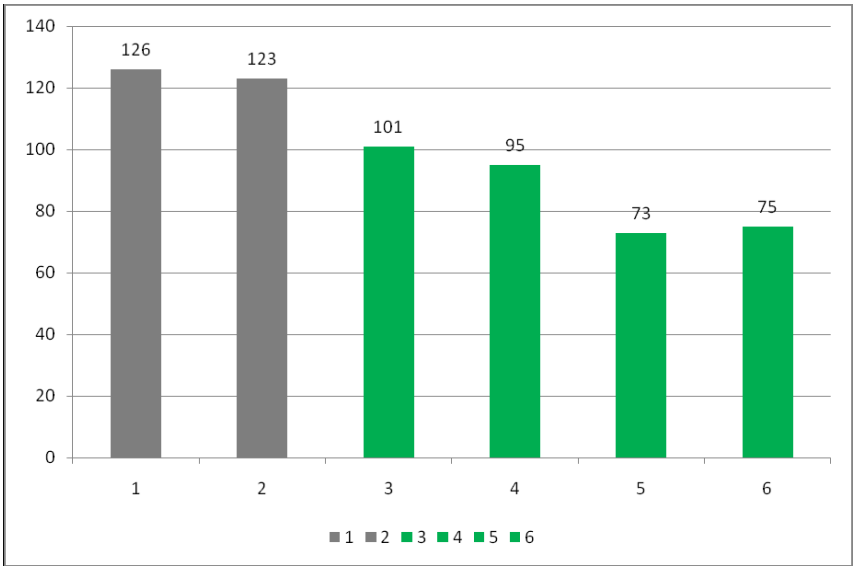
Combustion Efficiency



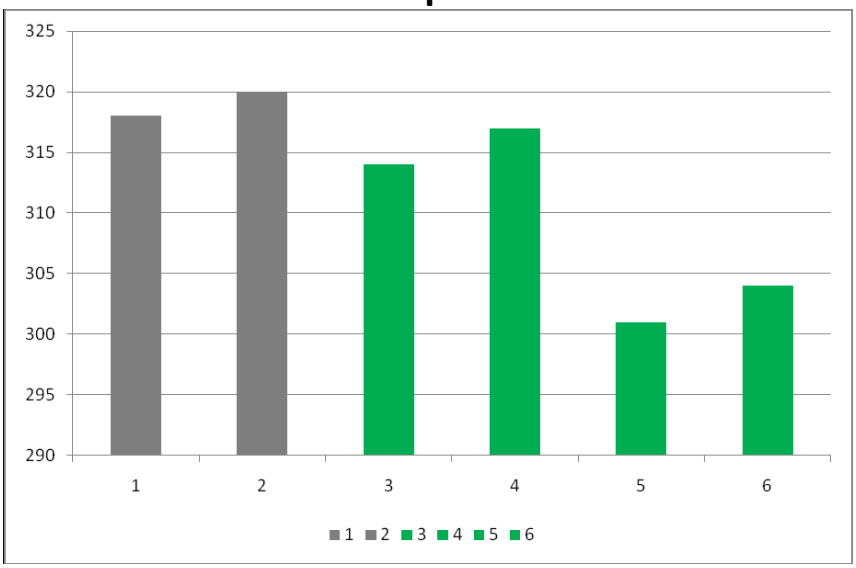
Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

CASE STUDY

Carbon Monoxide



Gas Temperature



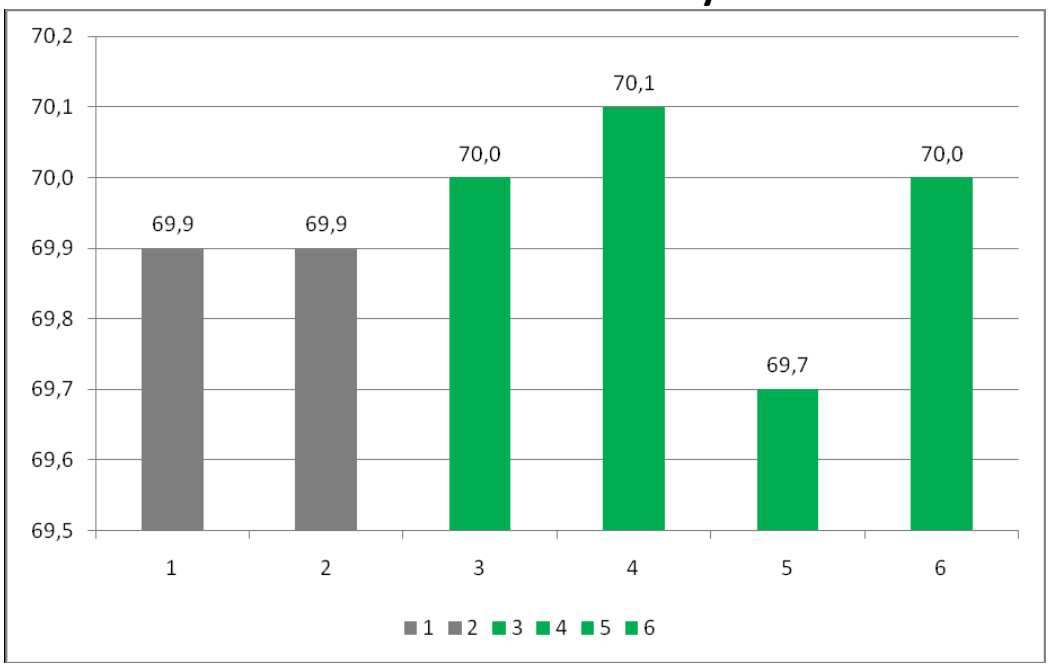
Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Chart No. 2 Combustion Analysis Report for Generator 2

Generator No. 2	w/o Xp3		w Xp3			
	24-Mar	24-Mar	25-Mar	25-Mar	26-Mar	26-Mar
O2..... (%)	10,7	10,7	11,4	11,4	11,6	11,6
CO.....(ppm)	285	242	121	125	79	83
Eff. Combustion. (%)	69,9	69,9	70,0	70,1	69,7	70,0
CO2..... (%)	7,2	7,6	7,1	7,1	6,9	7,0
Gas temperature..(°C)	387	387	360	359	352	352
Temperature.....(°C)	22,6	24,6	20,7	21,7	14,7	17,1
Air Excess ..... (%)	96,8	97,4	111,9	1118	116,1	114,7
NOx.....(ppm)	1748	1814	1279	1313	1264	1298
SO2.....(ppm)	118	80	102	97	138	153
Time	10:34:26	10:37:51	11:17:11	1:18:58	9:06:07	9:07:30

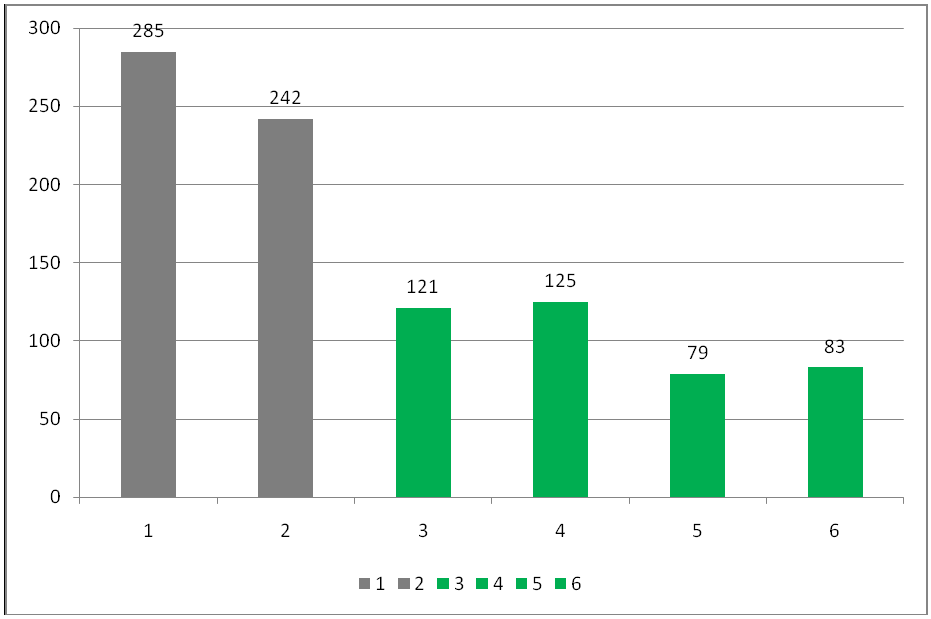
(*)It should be noted that the NOx maximum emissions of = 460 mg/m3 and maximum SO2 = 2000 mg/m3. These values are taken as reference of those established by the World Bank as the maximum limit concentration of environmental pollutants (World Bank International Finance Corporation IFC/IBRD. General Environmental Guidelines (01-07-98).

Combustion Efficiency

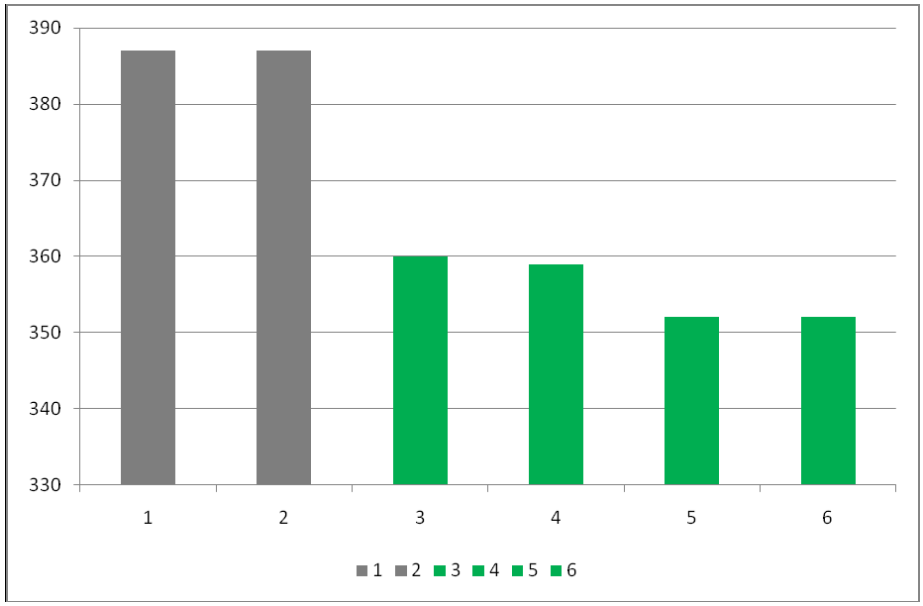


Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Carbon Monoxide



Gas Temperature



Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Comments and information analysis

Combustion is a set of oxidation reactions with heat detachment that is produced between two elements: fuel, which can be a solid (coal, wood, etc.), a liquid (gas oil, Fuel-oil, etc.) or a gas (Natural, propane, etc.) and the OXIDANT, oxygen

On the charts Monitoring Report of the Gases from Combustion, it shows the combustion efficiency parameters carbon monoxide and gas temperature. From this graph we can conclude:

- Combustion efficiency is the measurement of how effectively the energy contained in a fuel is converted into useful heat. On generators, when energy efficiency is defined, it takes into account the amount of electrical energy obtained by a particular process, in proportion to the amount of raw material or energy used, which should aim to be reduced progressively when the Xp3 fuel improver was used.

  In this case the efficiency is significantly better after treating diesel fuel; the combustion efficiency reaches improvement over 1%.

- The carbon monoxide parameter highlights the difference of a better combustion with Xp3 application; it declined by more than 50% in generator No. 1, and in generator No. 3 it reached a 70% reduction. Those are fundamental values that indicate a reduction of wasted fuel by poor combustion or incomplete combustion in addition to the normal combustion products, carbon dioxide (CO2) and water.

- The flue gas outlet temperature decreased between 5% and 10%.

  It is known that the recovery of residual heat from flue gases, in this case, roughly a decrease of 20 ° C in the gases emission temperature means an increase in energy efficiency. Given that the combustion gases come out very hot, the possible reduction of the lost temperature is a significant saving in fuel consumption. The use of the extra heat increases significantly the energy efficiency of electric generators

Xp Lab, Inc.
946 Hawthorn St. San Diego, CA 92101
Tel. (619) 233-3111 Fax: (619)233-3112
Xp3@xplab.com http://www.xp3.com

Additional Information:

Fuel savings will not be the only benefit obtained when Xp3 is used. Improving the combustion also improve the life of filters, injectors and engine maintenance savings in general are obtained, all these in addition to reducing the emissions of carbon monoxide and other polluting gases.

Yours very truly,

Ing. Aldo Rojas Misari
Technical director XPLAB, INC.