

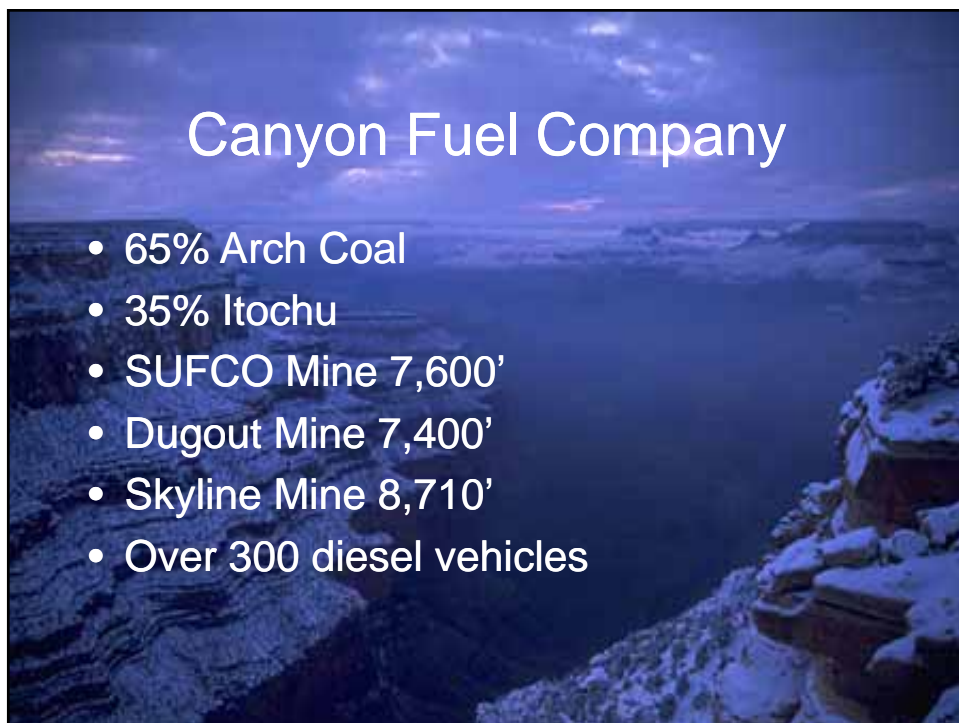


CANYON FUEL COMPANY, LLC
Dugout/Skyline/Sufco Mines

**Diesel Emissions
Reduction Program**

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MDEC 2001



Canyon Fuel Company

- 65% Arch Coal
- 35% Itochu
- SUFCO Mine 7,600'
- Dugout Mine 7,400'
- Skyline Mine 8,710'
- Over 300 diesel vehicles

MSHA 1997 Diesel Regulations

- Low sulfur fuel (less than 500 ppm)
- Required diesel maintenance
- Weekly emission testing
- Specific ventilation requirements per engine
- Wide scale engine replacement to MSHA approved clean engines

Canyon Fuels approach

- Find the base line
- Find out where we should be
- Develop a plan to get there
- Analyzer

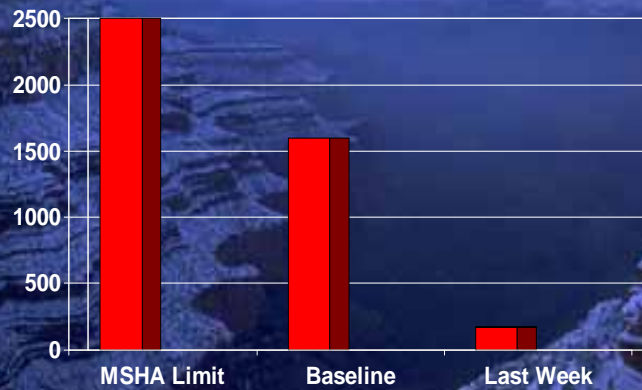
Base line

- November 1997 1597 ppm Carbon Monoxide and 947 ppm NOX
- These results were with engines and drive trains set to OEM specifications

Where is Canyon Fuel at now?

- Last week 154 ppm CO & 445 ppm NOX
- A 90% reduction in CO and 50% reduction in NOX

Picture of the Progress



How did we get here?

- Asking questions about engines, torque converters and transmissions
- Trying to match the drive train components to this altitude and the duty cycle
- Studying available information from all sources

Component Interaction

- Engine with Torque Converter
- Torque Converter with Transmission
- Engine, Torque Converter, and Transmission with the Vehicle

New tools to use.

- Emissions Contour Map

New Tools to Use

- Torque Absorption Chart

Putting It All Together

- Contour emissions map
- Torque Absorption Chart
- Consistent Test Methods
- Accurate Test Tools

New Tools to Use

- Enerac 3000
CO,CO₂,O₂,NO,NO₂,STACK TEMP,
DATE AND TIME
- Enerac 60 CO
- Enerac 400 CO,CO₂,O₂,NO,NO₂,
STACK TEMP,DATE AND TIME
- All data is downloaded onto a PC for a
history on each machine

What This Meant During a Recent Longwall Move

- Cleaner work environment for miners
- Ability to operate multiple pieces of
equipment without nearing Action Levels
- Diesel exhaust gas levels on the set up &
recovery faces
 - CO 1.0ppm - 10 ppm
 - NO₂ was 0 ppm -1 ppm

Other Benefits

- Fuel consumption cut back by 23% per engine.
- Visibility
- Less down time
- Engine replacements
 - 1996 we replaced 23 engines
 - 2000 we replaced 3 engines.

DPM Compliance Objectives

- To provide a healthier underground atmosphere for personnel
- To find proven cost effective means that will provide a healthier environment

Preliminary Findings

- 3306 PCNA 45.88 (modified) was found to be 48% less DPM output than 3306 DITA 10.20 (non-modified)
- Dry type after treatment DPM output was twice the amount of modified non-after treatment machines
- OEM set engines were found to produce 64 to 75% higher DPM than modified non-after treatment machines
- Wet bed paper filters had 19% higher output of DPM of modified machines

Additional Studies

- Dugout Canyon Mine is conducting a DPM study during a Longwall Move
- Western Mine "A" Completed a DPM study during a Longwall Move
- Western Mine "B" Completed a DPM study during a Longwall Move
- Field test of wet bed paper filter type at Western mine "C"
- Planned in field tests of catalyzed soot traps on new introduced equipment at Dugout Canyon Mine and Sufco Mine

Conclusion

- Engines need to run at certification levels to achieve DPM reductions even with after treatment.
- Good Maintenance is the key
- More in field testing needs to be done