

Diesel Equipment Maintenance and After Treatment Controls

Twentymile Coal Company
Foidel Creek Mine



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ITEMS TO BE COVERED

- HISTORY OF TWENTYMILE COAL
- TYPES OF EQUIPMENT USED
- PREVENTIVE MAINTENANCE PROGRAM
- EMISSIONS CONTROL SYSTEMS



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History of Twentymile Coal Co.

- Twentymile Coal is located in Northwest Colorado
- Wadge Coal Seam
- Average seam height 9 ft.
- Average Overburden 1100 ft.
- Elevation is 7000 ft.
- 360 Employees
- Production Began 1983
- Average Production 7.5 M clean tons.



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TYPES OF EQUIPMENT

- FORD AND DODGE TRUCKS
- WAGNER 25 AND 30X SHIELD HAULERS
- WAGNER 14X LHD's
- WAGNER 3-1/2 LHD's
- GEHL SKID STEER LOADER's
- WELDERS AND POWER PACKS



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TCC UNDERGROUND EQUIPMENT

- 60 FORD AND DODGE TRUCKS FOR MANTRIP, SUPPORT VEHICLES
- 18 HEAVY DUTY (OUTBY)
- 13 HEAVY DUTY (INBY)
- 20 LIGHT DUTY
- 111 TOTAL FLEET



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PREVENTIVE MAINTENANCE PROGRAM

- SCHEDULED SERVICES AND MAINTENANCE TASKS BY HOURS OR MILES.
- OIL SAMPLING PROGRAM.
- WEEKLY PERMISSIBILITY AND SAFETY INSPECTIONS.
- SEMI-ANNUAL FIRE SUPPRESSION INSPECTIONS AND SERVICES.
- SCHEDULED COMPONENTS CHANGES BY HOURS OR MILES.
- EXTENSIVE COST TRACKING BY PIECE OF EQUIPMENT.



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MANTRIPS

- WEEKLY PERMISSIBILITY CHECKS (COVERING ALL REGULATORY AND SAFETY RELATED ITEMS INCLUDING FIRE SUPPRESSION)
- 250 MILE SERVICE
- 2000 MILE SERVICE
- SEMI-ANNUAL FIRE SUPPRESSION INSPECTION AND SERVICE



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HEAVY DUTY

- WEEKLY PERMISSIBILITY CHECKS. (COVERING ALL REGULATORY AND SAFETY RELATED ITEMS INCLUDING FIRE SUPPRESSION.)
- 250 HOUR SERVICE.
- 500 HOUR SERVICE.
- 1000 HOUR SERVICE.
- SEMI-ANNUAL FIRE SUPPRESSION INSPECTION AND SERVICE.
- COMPONENT REPLACEMENTS.



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250 HOUR SERVICE

- SAMPLE ENGINE, TRANS, HYDRAULIC AND AXLES.
- ENGINE OIL AND FUEL FILTER CHANGES.
- TRANSMISSION AND HYDRAULIC FILTER CHANGES.
- SERVICE ITEM INSPECTION.
- SAFETY RELATED ITEMS.
- FIRE SUPPRESSION SYSTEM CHECK.
- OPERATORS CONTROLS AND GAUGES.
- CHECK CONDITION OF AFTER TREATMENT SYSTEM AND CLEANING IF NEEDED.
- WASH EQUIPMENT.



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500 HOUR SERVICE

- SAMPLE ENGINE, TRANS, HYDRAULIC AND AXLES.
- ENGINE OIL AND FUEL FILTER CHANGES
- TRANSMISSION OIL AND FILTER CHANGE.
- SERVICE ITEM INSPECTION.
- FIRE SUPPRESSION SYSTEM CHECK.
- OPERATORS CONTROLS AND GAUGES.
- CHECK CONDITION OF AFTER TREATMENT SYSTEM AND CLEANING IF NEEDED.
- WASH EQUIPMENT.



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1000 HOUR SERVICE

- COVER SAME AS 250 AND 500 HOUR SERVICE PLUS.
- SAMPLE ENGINE, TRANS, HYDRAULIC AND AXLES.
- CHANGE ALL FLUIDS AND FILTERS.
- VERIFY TIMING, RACK AND AFC SETTINGS.
- ADJUST VALVE SETTINGS.
- RUN EMISSIONS TEST AND RECORD ALL READINGS.

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FIRE SUPPRESSION

- ALL NEW INSTALLATIONS DONE BY VENDOR.
- WEEKLY CHECKS DONE BY MECHANIC WHILE DOING PERMISSIBILITY.
- SEMI-ANNUAL SERVICE DONE IN-HOUSE ACCORDING TO MFG. RECOMMENDATIONS.

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COMPONENTS

- ENGINES (10,000 HOURS)
- TRANSMISSIONS (8,000 HOURS)
- CONVERTER (4,000 HOURS)
- BRAKES (2,500 HOURS)
- AXLES (10,000 HOURS)



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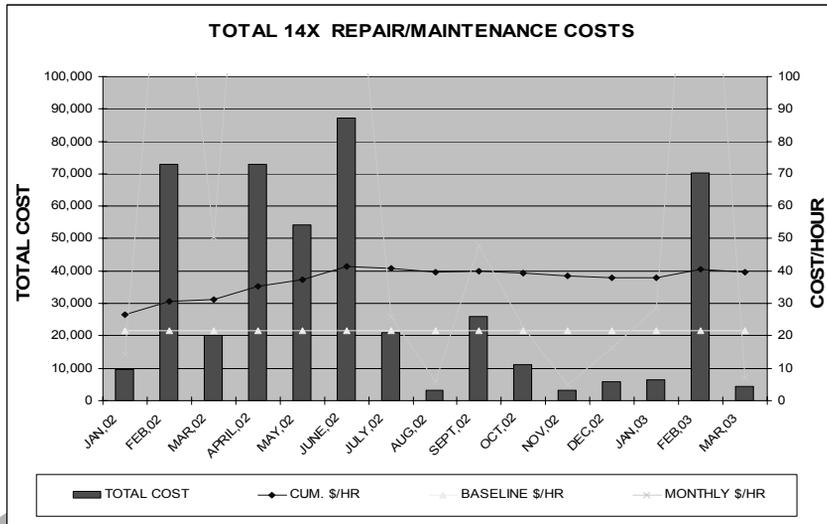
COST TRACKING

- ESTABLISHED BASELINE COST PER HOUR.
- TOTAL COST PER MONTH.
- TOTAL HOURS OPERATED PER MONTH.
- CUMULATIVE COST PER HOUR.
- AVAILABILITY FOR MONTH.
- UTILIZATION FOR THE MONTH.

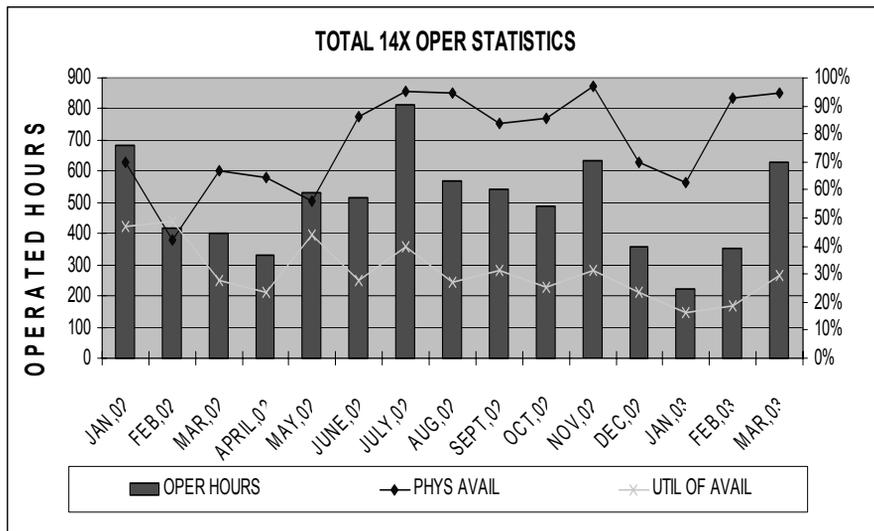


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COST GRAPH



AVAILABILITY GRAPH

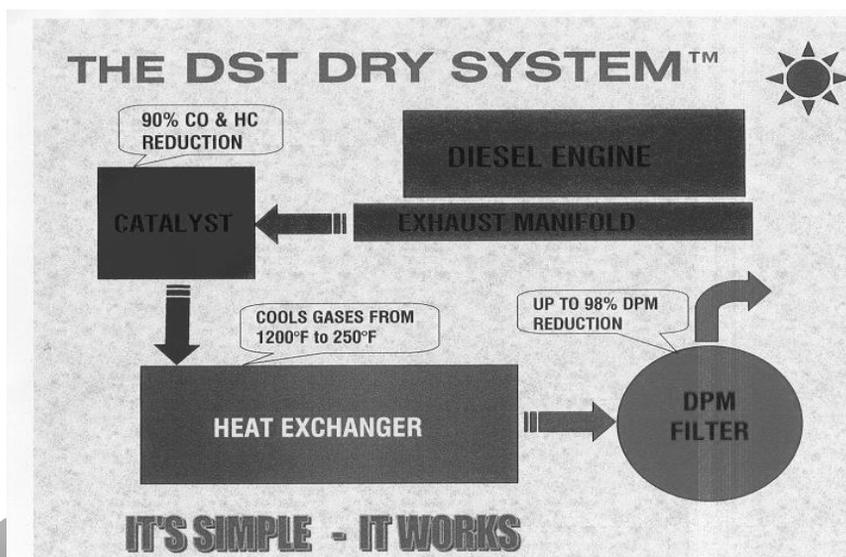


EMISSION CONTROLS

- DST (DRY SYSTEMS TECHNOLOGY)
- PASSIVE REGENERATED TRAP.
- FILTER AND WATER COLLECTOR ON WET SCRUBBER.

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BREAKDOWN OF DST UNIT

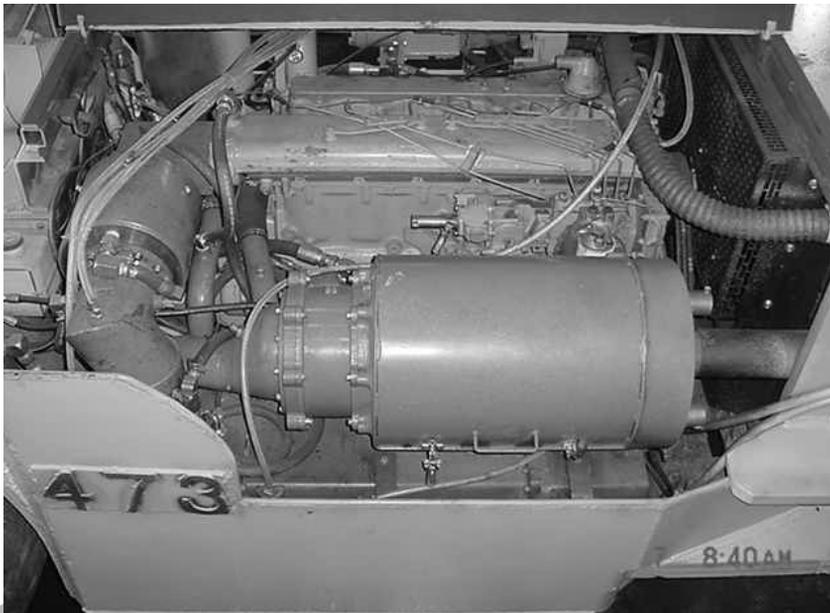


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DST UNITS

- (12) UNITS CURRENTLY FITTED
- (4) 3306 PCNA CAT 150 HP INBY
- (2) 3306 PCTA CAT 190 HP OUTBY
- (4) 3306 PCTA CAT 190 HP INBY
- (1) 3304 PCNA CAT 100 HP OUTBY
- (1) 3406 DITA CAT 305 HP OUTBY
- CURRENTLY 9,758 OPERATING HOURS ON EXISTING DST SYSTEMS

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DST PERFORMANCE

- 10-12" WG. INITIAL EXHAUST BACKPRESSURE
- 200-230 F EXHAUST TEMPERATURE
- 40-65 HRS FILTER LIFE
- >98% DPM REDUCTION
- <30 PPM UNDILUTED CO EMISSIONS



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DST ECONOMICS

- REQUIRES LITTLE MAINTENANCE
- ON-BOARD CLEANING SYSTEM
- LONG FILTER LIFE
- NO NEED TO FLUSH AND ADD WATER TO THE SCRUBBER
- FEW PARTS TO REPLACE
- UNIT HAS LONG LIFE AND DURABILITY FOR MINE DUTY



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OPERATORS COMMENTS ON DST SYSTEMS

- NO NOTICEABLE DIESEL SMELL
- CLEAN AMBIENT ENVIRONMENT
- LOW MAINTENANCE
- INCREASED AVAILABILITY
- NO POWER LOSS WITH PROPER MAINTENANCE



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TCC SITE COORDINATOR FOR RESPIRABLE DUST

- SUBSTANTIAL REDUCTION IN RESPIRABLE DUST ON CM UNITS
- FROM .3 TO .5 mg TO .1 TO .2 mg ON INTAKE AIR TO SECTION
- MINER OPERATOR BEFORE AND AFTER DST MACHINE RUNNING IN SECTION (.8 mg to .5 mg)
- INTAKE AIR APPEARED TO BE A LOT CLEARER (FREE FROM SMOKE)



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CERAMIC TRAPS

- ON ONE MACHINE FAILED THREE TIMES AND REQUIRED REPLACEMENT DUE TO HOLES IN CORE
- TRAPS DO NOT REGENERATE
- NOT AVAILABLE FOR PERMISSIBLE APPLICATIONS



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INBY SYSTEMS WITH WATER SCRUBBERS AND FILTERS

- FILTER LIFE LESS THAN 8 HOURS
- HIGH SCRUBBER MAINTENANCE
- REDUCED AVAILABILITY DUE TO INCREASED MAINTENANCE



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CONCLUSION

- DUE TO KNOWN OPERATING HISTORY
- OPERATOR COMMENTS
- INCREASED MACHINE AVAILABILITY
- INCREASE AIR QUALITY IN MINE
- FILTER LIFE
- TCC PLANS TO REPLACE CERAMIC TRAPS AND REMAINING WET SCRUBBERS WITH THE DST UNITS

