



Heavy Equipment Testing

Air quality in mining concerns, especially underground mining, is tightly regulated. Emissions from heavy equipment is of concern. Normally, large amounts of fresh air is circulated through ventilation shafts into the mine proper to meet air quality regulations. The creation and maintenance of ventilation shafts is a significant expense.

In order to help alleviate some of the expense of creating and maintaining ventilation shafts, while still meeting air quality regulations, a global mining company tested OptiFuel™ in equipment that was regularly monitored for emission levels.

The engines in the equipment tested had paper diesel particulate filters, but no NO_x reduction equipment. This suggests that the engines were to Euro III standard or equivalent.

A baseline emission level at idle and high idle for various pieces of equipment was determined, then OptiFuel™ was added to their fuel by dosing the fuel storage unit at the mine's central refueling station. After allowing the engines of the equipment to become conditioned with the catalysts, emissions at idle and high idle were again determined. The following table indicates the reductions in carbon monoxide (CO), nitrogen oxide (NO), nitrogen dioxide (NO₂), and mixed nitrogen oxides (NO_x) noted as compared to baseline levels.

Reductions in Gaseous Emissions.

% Reductions in Emissions				
MONTH	CO	NO	NO ₂	NO _x
April - Idle	80.5%	99.4%	58.8%	91.9%
April - High Idle	69.2%	99.6%	54.5%	93.6%
May Idle	81.4%	99.4%	61.4%	92.3%
May High Idle	68.8%	99.6%	56.6%	94.0%

The reductions in overall NO_x, CO, NO, and NO₂ emissions were highly significant and the emissions measuring equipment was subsequently sent away to have its sensors and calibration checked. The calibration check indicated that the emissions measuring equipment was within tolerance and working correctly. The site engineer also commented on the lack of black smoke emitted from the mining vehicles.

There was also a recorded reduction in PM of 47% and an improvement in fuel consumption of 12.34%. The fuel consumption improvement was determined by cross-referencing the total fuel consumed at the mine by the amount of overburden and usable ore delivered to the surface.