

MIRATECH & Cashman Team Up To Cut Down On Mountain Utilities Diesel Particulates

Even in a remote, skier's Shangri-La like Kirkwood, Calif., diesel particulates matter. Kirkwood's Mountain Utilities planned to upgrade power generation capabilities. But the utility had to stay within some of the nation's strictest limits on diesel particulate emissions.

Mountain Utilities began a couple of decades ago as a power plant strictly for the Kirkwood Ski Resort. The utility now serves not only the resort and Kirkwood Village, nestled high in the Sierra Nevada Mountains 17 miles from South Lake Tahoe, but also portions of neighboring counties. As part of a 2003 Mountain Master Development Plan, Mountain Utilities began upgrades of services and capacity to prepare for expected growth in its customer base.

The planned upgrades included replacing two of the six Mountain Utilities Caterpillar D399 engines with a single engine, the Cat 3516C. With the new 4-stroke, 16-cylinder V engine online, Mountain Utilities would see a net gain in capacity of about 600 KW, according to Mountain Utilities President John Jensen.

The problem: while the Cat 3516C was designed for a relatively low output of exhaust particulate matter (PM), the engine is far from compliance "out of the box" with California air quality rules for diesel exhaust emissions.

The rules cap PM at 0.01 g/bhp for stationary diesel engines above 50 hp in prime power applications.

The challenge – for Mountain Utilities and its longtime engine supplier, the Nevada-based Caterpillar dealership, Cashman Equipment – was to achieve the upgrade without exceeding the limit on PM.

Plus, Jensen added, the utility needed a particulate solution that could handle Mountain Utilities' huge load swings. "We're a load-following operation," Jensen explained. "During our peak season, when skiers are on the Mountain, we operate at high loads. But that falls off dramatically as we move towards summer. We even see big load swings over the course of a single day, sometimes. We needed a particulate reduction system that would keep us in compliance in all operating conditions."



This CombiKat® diesel particulate filter is reducing to some of the nation's lowest regulatory limits exhaust particulates from a brand new Cat 3516C diesel engine installed in a prime power application at Mountain Utilities in Kirkwood, Calif.

The chosen solution: the MIRATECH CombiKat® Diesel Particulate Filter.

CombiKat: Ultra-High Performance Verified by The California Air Resources Board.

The CombiKat is the best-verified solution in stationary diesel PM reduction.

In rigorous testing, the California Air Resources Board (CARB) verified CombiKat performance exceeding the nation's toughest diesel particulate filter criteria. CARB awarded the CombiKat Level 3 Verification for emergency power



Level 3 CARB Verification. When the CombiKat met its most demanding criteria in rigorous testing, the California Air Resources Board awarded the CombiKat Level 3 Verification in 2005.

systems when the unit proved its ability to reduce PM by 85 percent or more in conditions reflecting real-world operation.

"Initial CARB Verification was 'Conditional' in the sense that durability testing had not yet been completed. This 'Conditional' verification fully satisfies permitting requirements," explained MIRATECH Research and Development Manager Don Newbury.

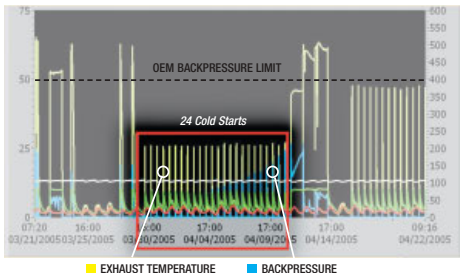
"The 1,000-hour durability testing, as well as testing for prime power applications, has now been completed, and we expect full CARB Verification for both standby and prime power applications soon," Newbury added.

For Mountain Utilities, Jensen says, CARB Verification offered a major benefit. "We didn't have to test and verify the unit's performance for permitting. CARB Verification means the CombiKat has already been proven to meet state standards," Jensen said.

In CARB testing, Newbury pointed out, the CombiKat stayed within backpressure limits specified by the engine OEM through 24 successive cold starts with 30-

minute idles, without the need to run the engine up to “regeneration” or soot burn-off temperatures.

“In emergency power applications, that’s equivalent to **two years’ worth of monthly maintenance runs without having to add a full load to your engine.** No other diesel particulate filter tested by CARB has performed at this level.”



CARB-Verified: 24 cold starts to 30-minute idles within the engine OEM’s backpressure limit – without adding a full load to the engine. The CombiKat is the only CARB-tested diesel particulate filter to perform at this level, which is perfect for standby generation.

“Unlike other particulate filters, the CombiKat **does not require costly low sulfur diesel fuel.** In areas where low or ultra-low sulfur fuel is not mandatory, as it is in California, that can save you as much as nine percent or more on fuel costs,” added MIRATECH West Coast Regional Sales Manager Nick Detor.

Benefits – By Design.

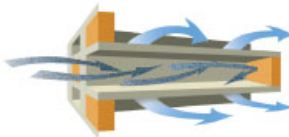
The CombiKat uses modular, thermally durable Silicon Carbide (SiC) filters coated with a catalyst that resists sulfur poisoning. Because the **filters are “stackable,”** the CombiKat’s PM-reduction capability can be **tailored to specific engines and applications,** Detor explained. “With the CombiKat, you don’t have to settle for a one-size-fits-all solution.”

The SiC filters, with “wall-flow” filter construction, have a **much higher soot trapping and “storage” capacity** than you’ll find with other types of diesel particulate filter, Newbury said. “That pays off in longer service life, less maintenance and longer maintenance intervals.”

In the CombiKat filter manufacturing process, channels with thin, porous walls are formed in the filter material, Newbury explained. In the “wall-flow monolith” design, alternating channels are left open and plugged at opposite ends. Engine-out exhaust flows through the open end to the blockage and is forced to flow through the porous channel wall to an adjacent channel. As exhaust flows through the filter, particulates are trapped on the surface of channel walls and even within the walls.

The CombiKat’s sulfur-tolerant catalyst

allows collected diesel PM to oxidize – or burn – on the filter at exhaust temperatures above 700°F without an additional heat source. This leaves only a fine ash, which can be washed off, vacuumed off or blown off the filters with high pressure air. An optional, add-on burner system for the CombiKat



CombiKat Wall-Flow Design

allows “active regeneration” to keep an operation in PM compliance at any exhaust temperature or engine load.

“For customers like Mountain Utilities, the CombiKat’s **low level of maintenance, longer service intervals, and ease of maintenance** are major benefits” Detor said.

“Unlike other diesel particulate filters, the CombiKat is equipped with side-access and filter ports. That means you can service the unit in place without disassembly. When you have a power generation system to run and customers to serve, minimizing the hassle and labor involved in soot trap maintenance is a big plus.”

In addition to PM compliance, the CombiKat provides **noise reduction** as a built-in bonus. In many applications, this eliminates the need for a silencer or muffler.

World-Class Solutions. Headquarters: USA.

“Only MIRATECH soot traps give you proven soot-reduction technologies developed by the acknowledged world leader in the field: Swiss-based HUG Engineering,” said MIRATECH Vice President Bill Clary.

“As HUG’s North American partner, we put the world’s most advanced solutions to work for our customers, backed by expert, full-service MIRATECH engineering, training and technical support close to home. If there’s a question, we’ll answer it. If there’s a problem, we’ll fix it, whatever it takes. No ifs, ands, or buts,” Clary said.

Mission: Accomplished.

“The Cat 3516C is a very new engine,” said Dick Partridge, President of R.F. Partridge & Associates, a leading West Coast distributor for MIRATECH. “As you’d expect, there were some wrinkles that had to be ironed out.”

When Kirkwood and Cashman confronted the diesel particulate control issue, 23-year Cashman veteran Rebel Hooper called on Partridge, who called MIRATECH in turn.

The order for the CombiKat was placed in July 2005, and work was actually begun in August. By late December, the project was ready for commissioning.

“At the last minute, we ran into some problems with the exhaust system piping and some other issues that held things up for awhile. Working closely with Cashman, Partridge and the folks at Kirkwood, we straightened things out,” said Detor.

“The project has gone through the same startup issues as most projects involving new equipment,” Mountain Utilities’ Jensen said.

As of mid-March, 2006, the new system had been **operating continuously for 1,790 hours with no backpressure problems,** Cashman’s Hooper pointed out. “Other diesel particulate filters require service every couple of weeks or so. The CombiKat really needs only yearly maintenance,” he added.

“MIRATECH was very helpful in the project. And I’d have to say Dick Partridge is probably my best supplier. He’s President of his company, but his involvement is very hands-on,” Hooper said.

“This has been a good partnership,” Partridge agreed. “Mountain Utilities has upgraded within strict air quality limits. And Cashman was able to supply a solution to a tough set of problems a lot of stationary diesel engine operators are facing these days. Helping to deliver solutions like that is what Partridge & Associates and MIRATECH are in business to do.”

Cashman Equipment is “Nevada’s Caterpillar equipment dealer.” The company provides new and used equipment for sale and rental as well as high quality parts and service to the construction, paving, mining, logging, truck engine and power systems industries. With headquarters in Las Vegas, Cashman has eight locations in Nevada and California. The company’s current CEO, MaryKaye Cashman, represents the third generation of family members of the founder, “Big Jim” Cashman, to run the company. It is now ranked as the largest woman-owned business employer in Las Vegas. Contact Cashman Equipment at its Las Vegas headquarters location: 3101 E. Craig Road, North Las Vegas, NV 89030; Phone: 800-937-2326; www.cashmanequipment.com

MIRATECH Corporation and its subsidiary MIRATECH SCR Corp. are leaders in emissions control and engine performance. Based in Tulsa, Okla., the companies have sales offices across North America.

For more information about the CombiKat Diesel Particulate Filter, call 1-800-640-3141, or visit www.MIRATECHcorp.com

For reliable background information, visit www.soottraps.com



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