

## 2010 Technology Debate Rages

Navistar, competitors continue sparring over SCR.



**T**he word-war over the two paths being taken to meet 2010 exhaust limits by North American truck and engine builders continued at the Mid-America Trucking Show last month in Louisville, Ky., as officials of Navistar International again declared that its Advanced EGR approach is superior and aggressively criticized the SCR method planned by all its competitors.

Daimler, Mack, Volvo and Cummins quickly refuted the charges during an unusual “summit” of eight executives representing those builders, plus Pilot Travel Centers, TravelCenters of America and Petro truckstops, a maker of diesel exhaust fluid and the U.S. Environmental Protection Agency.

Navistar’s ongoing campaign seeks to discredit selective catalytic reduction, which injects urea fluid to treat exhaust gases and cut nitrogen oxide to near-zero levels. The SCR method is expensive, its equipment is heavy and bulky, and the fluid is toxic and volatile, the company’s leaders have been saying. Their arguments took on a pep-talk fervor during a meeting of customers and dealers in an auditorium on March 18, the night before the

Louisville show’s opening. The attack was led by Dee Kapur, Navistar International’s Truck Group president, and joined by Jim Hebe, senior vice president of sales and marketing, plus Jack Allen, president of Navistar’s North American Truck Group.

Navistar’s use of enhanced fuel and air handling and higher doses of exhaust gas into the cylinders – Advanced EGR – will effectively reduce NOx while eliminating the need to buy diesel exhaust fluid and pour it into a special tank on the chassis, as SCR users will have to. Executives predicted that long-haul truckers will have trouble finding the fluid and it probably will be expensive, and that drivers will be exposed to dangerous fumes while handling it. Meanwhile, development of a non-fluid method of SCR is likely to make the fluid technology obsolete in a few years and ruin the resale value of trucks with it, they say.

From the perspective of truck owners and drivers, nothing will be mechanically different about International trucks built starting next January, the executives asserted. Navistar is taking care of the exhaust emissions problem for its customers, so all they’ll have to

Tom Berg • Senior Equipment Editor

do is buy and operate them as now. Owners of SCR-equipped trucks, however, will face not only the hassle of dealing with DEF but new enforcement from the EPA. That Navistar is going it alone on this issue is an example of how "we do things differently," as Kapur said, and how the company is "breaking all the rules" of truck building, as Hebe put it.

But harsh criticism of SCR is "a lot of marketing over matter," countered Denny Slagle, president and CEO of Mack Trucks, at the competitors' summit the next morning. "All of us up here today know EGR, we're experts in EGR, and that's why we're using SCR." Neither he nor the others at the presenters' table used Navistar's name as they addressed that company's charges.

EPA has not taken sides on the SCR versus Advanced EGR issue, said Byron Bunker of the agency's Office of Transportation and Air Quality. EPA set the limits and manufacturers decided how to meet them. But "the industry stood up and took responsibility," he said by way of praise. EPA is satisfied that availability of diesel exhaust

fluid for SCR is being taken care of, so officials are no longer concerned about its supporting infrastructure.

At their sales meeting, Navistar executives didn't mention the drawbacks of Advanced EGR, including higher heat rejection and larger cooling modules required to deal with it. But competitors noted them at their summit and at other events during the truck show. Competitors also said that "massive" EGR will require more active regenerations of diesel particulate filters, and will deliver no gain in fuel economy over current diesels.

They reiterated that SCR is being successfully used in Europe, where distribution of DEF is widespread and the fluid is reasonably priced, and the same thing will happen here. Cummins, for instance, will have DEF at hundreds of distributors by October and in 8,000 locations as 2010 unfolds. TA, Petro and Pilot will all sell the fluid starting at hundreds of truckstops late this fall and will expand its availability throughout next year.

Extensive testing shows that their 2010 engines will use 3 percent to 5 percent less fuel, said Cummins, Daimler (which includes Detroit Diesel), Volvo and

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Mack (both of which use engines from Volvo Powertrain). This comes partly from eliminating most if not all active regenerations of diesel particulate filters, which requires injection of fuel. The better fuel economy will more than offset the cost of buying DEF, which will be "dosed" at about 2 percent of fuel use.

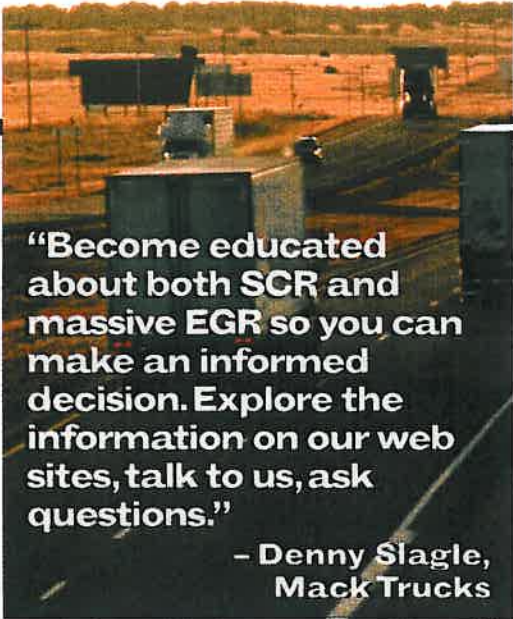
The price of DEF is generally tied to that of natural gas (about the only point that the two sides of this issue agree on) because gas is the feedstock from which DEF is made. At a press conference earlier in the week, Cummins managers said they expected the cost of DEF to be about the same as diesel fuel. Navistar executives said no one knows what DEF will cost, but pointed out that Mercedes-Benz auto dealers now charge \$35 a gallon for BlueTec fluid.

Ammonia, the active ingredient of DEF, is made from natural gas, then processed into urea, explained Barry Lonsdale, president of Terra Environmental Technologies. Urea is then mixed with ultra-pure water to form the fluid; the mix is about 34 percent urea to 76 percent de-ionized water. Rigid industry standards and vigilance by distributors ensures its quality. DEF has been used for decades to cut NOx in North American industrial diesels, so is neither a new nor unfamiliar substance. The fluid begins freezing at 12 degrees, but heaters in vehicles' DEF tanks thaws it quickly so a stream of fluid flows to dosing chambers when needed, engine makers have said. Cold-started diesels produce little or no NOx, so the delay is not important.

DEF is non-toxic and won't harm anyone who happens to touch it or breathe its vapors, even at high temperatures where it begins degrading, said Lonsdale and others. However, diesel fuel, motor oil and windshield washer fluid are all toxic "and we handle them safely every day," said Chris Patterson, president and CEO of Daimler Trucks North America. DEF is biodegradable and can safely be disposed of by pouring it on the ground, said another fluid maker. If further diluted to maybe 25 percent, the urea in DEF will even fertilize grass.

The shelf life of DEF is about a year, but probably more if stored at temperatures below 86 degrees and above freezing, Lonsdale said. But stocks of the fluid should turn over in far less than a year. Even if degraded, DEF will still work in engines' dosing chambers with no harm to components, engine builders have said. However, impure fluids can cause thousands of dollars of damage to SCR parts.

Cooled EGR is an effective way to cut formation of



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**- Denny Slagle,  
Mack Trucks**

NOx in diesel cylinders, but the higher levels planned by Navistar are unwise, competitors argued. "We use EGR today, and we know it puts additional stress on an engine," said Mack's Slagle. "We know it generates a lot of heat, even at today's levels. We're managing all of this extraordinarily well. But we've reached the limit of what can be accomplished with EGR. More is definitely not better."

"According to the sole adopter of massive EGR, we've all made the wrong choice," said Per Carlson, president and CEO of Volvo Trucks. "This will certainly come as a surprise to the many customers around the world who are already using SCR... very successfully. Fuel economy is what customers demand, and fuel economy is what SCR delivers."

However, Advanced EGR will lower the total cost of ownership for International customers, said Navistar executives at their meeting, suggesting that International engines might cost less than competitors'. There will be an upcharge for 2010 International trucks, they said previously, but have not yet determined how much.

Only Volvo has so far announced a "non-negotiable surcharge" of \$9,600 for trucks with its SCR diesels; sister-company Mack's upcharge will probably be "in the same general ballpark," executives said at a press conference. Others say they are still nailing down costs before declaring any price increases.

The development of non-fluid methods of SCR by GE Tenneco and Eaton could give Navistar a further method of meeting exhaust regulations, executives hinted. Competitors said they are watching those developments, but aren't sure they will work and know they won't be ready soon, which is another reason they decided on SCR. Cummins, which reversed its earlier plans to use only cooled EGR and other in-cylinder improvements for its highway engines, adopted SCR for its fuel economy benefits and overall simplicity, said Jim Kelly, president of engine business.

Competitors have previously acknowledged that their SCR equipment will add 300 to 400 pounds to a truck's weight - a point made by Navistar at its sales meeting. Navistar executives also charged that the bulky equipment will require longer frames and wheelbases, but competitors have begun showing SCR configurations that will allow "clean" frames and close mounting of bodies behind cabs.

Mack's Slagle urged customers to "become educated about both SCR and M (massive) EGR so you can make an informed decision. Explore the information on our web sites, talk to us, ask questions."