

SUSPENSION SPECIAL: LIFTING, LOWERING & AIRBAGS

SPORT TRUCK

VOLUME 16 ■ NUMBER 05 ■ MAY 2003

old school customs



PRIMEDIA

DISPLAY UNTIL 04/15/03
U.S.A. \$3.99 CANADA \$4.99



TECH

CHEVY HD FORD HEADER GRILLE INSTALL

PLUS: COMPLETE SUSPENSION BUYER'S GUIDE

WWW.SPORTTRUCK.COM MORE EDITORIAL, EVENTS, BUYER'S GUIDES & PRODUCT INFORMATION

BY DREW HARDIN
PHOTOGRAPHY: DREW HARDIN

Gale Banks wants to change your mind about diesel engines—and he's going about it in a pretty spectacular way.

The Dakota pickup you see here was clocked in excess of 222 mph on the Bonneville Salt Flats. In doing so it set international speed records for production-based pickup trucks. Getting it there was diesel power in the form of a specially modified 5.9L Cummins inline six similar (in architecture anyway) to the engine that powers fullsize Ram diesels.

Yet land-speed racing is just one of the tasks this truck was designed to tackle. Banks wants to race his truck, nicknamed Sidewinder, in just about every high-speed motorsport you can think of, from drag racing to open-track events. He's doing it all in a quest to prove the performance mettle of diesel power.

If you're familiar with Banks, you understand why. Gale Banks Engineering sells a lot of upgrades for diesel trucks, from exhaust systems and turbochargers to engine exhaust brakes. The parts are for towing and work rigs mostly, but Banks' years of experience with diesel motivation have shown him that "diesel can be an extraordinary performance engine configuration." Banks believes "the future fuel is diesel. There is an inherent efficiency. If we can show that the rough edges are gone, or going rapidly, and we can show that this technology gets you 50 percent better fuel economy, without a sacrifice in power, diesel is gonna be hip!"

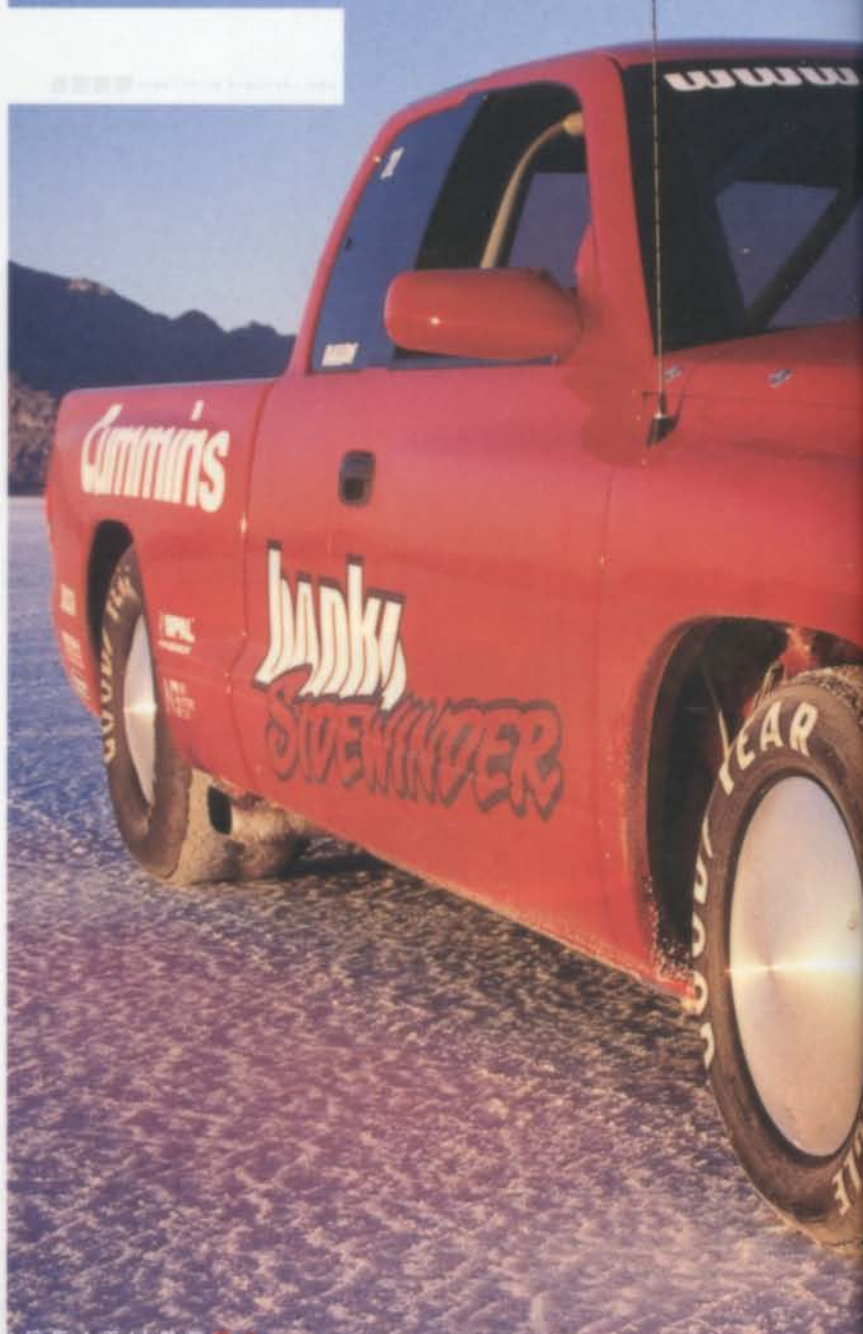
OK, we may not go so far as to call diesel hip, but let's take you behind the scenes in the building and testing of this awesome Dakota and see if you don't agree with Banks about diesel's performance potential.

BUILDING THE SIDEWINDER

Sidewinder started life as a bone-stock Dakota extended-cab pickup with a four-cylinder engine. To begin the project, Banks dyno-tested the truck to determine rear-wheel horsepower (a whopping 98 hp), and then took it out for some top-speed testing to find out where the pickup's terminal velocity would be given its stock motor and body envelope—aerodynamics, ride height, and so on. With that data, Banks' engineers calculated just how much more horsepower the truck would need to hit the 200-mph-plus speed goal. The number crunching turned up a horsepower target of well more than 800 hp. Figuring that a race-trim Cummins would be good for around 600 hp, the Banks team realized it would have to do considerable aerodynamics work to make it slippery enough to hit the speed target.

To reduce the truck's frontal area, the suspen-

FLAT OUT 0

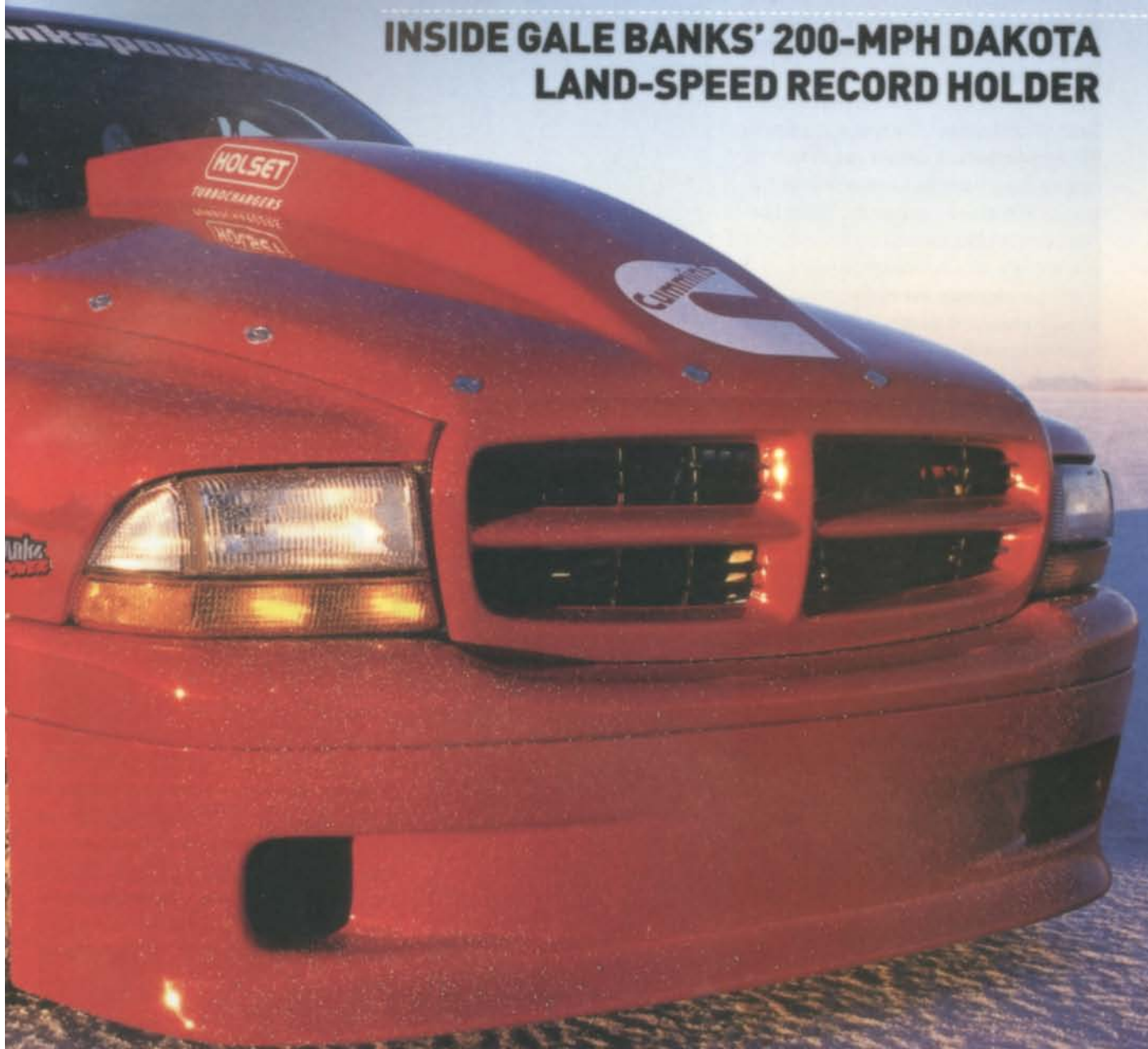


FEATURE 04



THE SALT FLATS

INSIDE GALE BANKS' 200-MPH DAKOTA
LAND-SPEED RECORD HOLDER



FLAT OUT ON THE SALT FLATS

sion took a giant whack: 12 inches were taken out of the Dakota's ride height. In front, the stock suspension was replaced by a NASCAR-based setup designed by Sheldon Tackett, who spearheaded the whole Sidewinder project, and Sidewinder driver Don Alexander. Tackett built unequal-length, tubular-steel control arms and attached them to modified Busch Grand National spindles. The system is sprung by ride-height-adjustable coilover shocks from the Progress Group. In the rear, a custom chromoly four-link was hung on new framerails that Tackett fabricated from 2x4-inch rectangular steel tubing and joined with the stock frame under the cab.

The rear suspension was designed to accept two different rearends. For the Bonneville runs, the truck would be equipped with a massive quick-change rearend from Quality Machine. Fitted with a Dana 60 3.07:1 ring-and-pinion and a Detroit Locker, the quick-change had spur gears that could be swapped around to give the truck a final drive ratio as low as 1.89:1 if needed. For the street—yes, Gale Banks will drive this truck on the street—the quick change will be swapped for a Speedway Engineering Track 9 Grand National housing with a Ford 9-inch center section and Grand National axles and hubs.

Lowering the suspension helped the Dakota's aero profile, but the sheetmetal needed some massaging, too. Surprisingly, though, not much was done, as you can see from the photos. A new chin spoiler was fashioned to both channel air from in front of the truck and to provide new inlets for the turbocharger. A new hood was built to clear the Cummins transplant, and a partial tonneau was mounted to the bedrails. The truck's suspension was set up to give the truck a slight nose-down rake so that the air flowing over the roof and onto the tonneau would create downforce on the rear tires. Otherwise, the Dakota's body remained surprisingly stock.

Far more work was required to physically plant the massive Cummins and its tranny into the Dakota. The entire interior was stripped out (to fit the engine and construct the in-cab safety equipment), and the firewall was cut away. Now that they had some room to maneuver, Tackett and crew opted to set the engine/trans back for better weight distribution. They moved it off the truck's centerline to the right by an inch to allow more space for engine accessories and to give Alexander a little more leg room between the fender and the transmission tunnel. When all was said and done, the truck's dashboard was moved back a whopping 14 inches. But Tackett then fabricated stock-looking dash panels to cover



PROJECT SIDEWINDER WAS BUILT AT GALE BANKS ENGINEERING IN AZUSA, CALIFORNIA, ALONGSIDE OTHER INTERESTING GO-FAST PROJECTS SUCH AS A TWIN-TURBOCHARGED MERCEDES-BENZ DRAG RACE CAR AND A STREETABLE 200-MPH '89 CAMARO. IN THIS PHOTO YOU CAN SEE THE BASELINE "SALT QUAKE" CUMMINS TURBO DIESEL THAT MADE 393 HP AND 600 LB-FT OF TORQUE.



THERE WASN'T AN AFTERMARKET SUSPENSION KIT APPROPRIATE FOR THE DAKOTA'S PERFORMANCE ENVELOPE, SO SIDEWINDER PROJECT LEADER SHELDON TACKETT BUILT ONE. THE FRONT SUSPENSION UTILIZED FABRICATED TUBULAR-STEEL CONTROL ARMS, MODIFIED BUSCH GRAND NATIONAL SPINDLES AND HUBS, AND HEIGHT-ADJUSTABLE PROGRESS GROUP COIL-OVERS. HERE YOU CAN ALSO SEE THE BRACKET FOR THE TORSION-BAR-TYPE FRONT SWAY BAR FROM SPEEDWAY ENGINEERING. TACKETT SET IT UP THIS WAY SO HE COULD INTERCHANGE FROM LIGHT TO HEAVY BARS DEPENDING ON WHAT SORT OF COMPETITION THE SIDEWINDER WOULD BE RUNNING IN.



NASCAR INSPIRED NOT ONLY THE FRONT SUSPENSION BUT SIDEWINDER'S BRAKES AS WELL. UP FRONT, TACKETT INSTALLED WILWOOD SIX-PISTON GRAND NATIONAL CALIPERS ON 12.9-INCH ROTORS, WHILE FOUR-POT WILWOODS WENT ON THE REAR 12.16-INCH ROTORS. THESE CALIPERS ARE CAST ALUMINUM, WHICH IS MORE RIGID THAN BILLET BUT A LITTLE HEAVIER.



TACKETT FABRICATED NEW FRAMERAILS FROM THE CAB BACK TO CLEAR THE FAT REAR MEATS THAT THE TRUCK WOULD USE AT BONNEVILLE, AND ALSO TO HANG THE FOUR-LINK REAR SUSPENSION. IN THIS PHOTO THE QUALITY MACHINE QUICK-CHANGE REAREND IS IN PLACE, THOUGH THE FOUR-LINK WOULD ALSO HOOK UP TO A TRACK 9 GRAND NATIONAL 9-INCH REAREND. NOTE THE RECEIVER HITCH CHANNEL BUILT INTO THE FRAME. BANKS PLANNED ON SIDEWINDER TOWING ITS OWN PARTS TRAILER ONTO THE SALT.



THIS PHOTO, TAKEN FURTHER ALONG IN THE BUILDUP PROCESS, SHOWS THE FOUR-LINK REAR SUSPENSION. THE RODS ARE HEIGHT-ADJUSTABLE TO TUNE THE REAR TIRE'S BITE INTO THE ROAD SURFACE, WHICH COMES IN HANDY WHEN YOU'RE RACING ON EVERYTHING FROM DRAG STRIPS TO SALT FLATS. THE REAREND WAS ALSO SET UP WITH A WATTS LINK, RATHER THAN A PANHARD BAR, AS IT WON'T ALLOW THE AXLE TO GO THROUGH ANY SIDE-TO-SIDE MOVEMENT, TACKETT EXPLAINED.

the gap, giving the truck's modified IP an OE finish.

The heart of the Sidewinder project, of course, is its diesel engine, a prototype Cummins 5.9L 24-valve turbodiesel. In base form, with a Holset HX40 turbocharger, common-rail fuel injection and Cummins-modified electronics, the "Salt Quake" diesel pumped out 393 hp and 600 lb-ft of torque. Nice place to start, huh? From there, Tackett and crew fabricated new intake and exhaust manifolds, extensively ported the cylinder head, modified the common-rail injection system, and opened up the exhaust.

From Holset came a new turbocharger, the HY55, with variable geometry technology. This consists of a sliding ring nozzle that varies the velocity of the exhaust gas entering the turbine side of the snail. This allows the turbo to maintain boost levels while controlling turbo shaft speed, which improves power output and virtually eliminates turbo lag.

The turbo can produce as much as 50 psi of boost, but that also generates high intake temperatures to nearly 500 degrees F. To fight the heat, Tackett designed a high-flow air-to-water intercooler system using twin Cummins intercoolers that are fed by dual electric water pumps and an ice-water tank located in the truck's bed.

With all the modifications made, the engine went back on Banks' dyno (which was specially built for this project, by the way) and produced 700-plus horsepower and more than 1,200 lb-ft of torque.

What sort of transmission can handle that sort of output? Banks used a prototype New Venture Gear NV5600 six-speed manual transmission designed to be used behind gasoline-fed V-10s and standard Cummins diesels. The trans was blueprinted by NVG and fitted with a top-mounted integral shifter, so no linkage was required. Between the engine and the trans is a billet-steel flywheel and a custom-made, 12-inch, dual-disc clutch with organic and Kevlar friction material on the discs.

We first saw the Sidewinder project under construction in January 2002, and it was well underway at that point. Yet the tremendous amount of work required to modify the truck to go 200 mph meant Banks, Tackett, and the rest of the Sidewinder crew put in nearly a year's worth of long hours and late nights before it would be ready to test at Bonneville. Finally, in October, the team hauled Sidewinder east to Wendover and the Southern California Timing Association/Bonneville Nationals Inc. (SCTA/BNI) 2002 World Finals for its record runs.



HERE'S THE BASELINE "SALT QUAKE" 5.9L CUMMINS TURBODIESEL ENGINE ON BANKS' NEW COMPRESSION IGNITION ENGINE DYNO. THE CELL WAS BUILT TO HANDLE ENGINES PUTTING OUT UP TO 1,000 HP AND 3,000 LB-FT OF TORQUE. IN THIS CONFIGURATION, THE CUMMINS WAS PRODUCING "ONLY" 393 HORSES AND 600 LB-FT OF TORQUE. BY THE TIME IT APPEARED IN RACING TRIM, THE MOTOR WENT UP TO MORE THAN 700 HP AND 1,200 LB-FT OF TORQUE.



THERE'S A LOT TO SEE IN THIS PHOTO, INCLUDING THE MASSIVE HOLSET HY55 VARIABLE-GEOMETRY TURBOCHARGER, THE SEWER-PIPE-SIZE DOWNPIPE LEADING FROM IT, AND THE FRONT OF THE PROTOTYPE NV5600 SIX-SPEED TRANSMISSION. ALSO NOTICE HOW FAR BACK THE ENGINE IS SITTING IN THE TRUCK. THAT RED LINE OF SHEETMETAL AT THE TOP OF THE PHOTO IS WHERE THE ORIGINAL FIREWALL WAS CUT AWAY.



8
HERE'S ANOTHER VIEW OF THE TUNNEL-LIKE, 4-INCH EXHAUST PIPE LEADING FROM THE ENGINE.



9
BECAUSE OF THE SPECIALIZED NATURE OF THE CUMMINS, MANY OF THE COMPONENTS NEEDED TO BUILD THE MOTOR HAD TO BE FABRICATED OR HEAVILY MODIFIED AT BANKS' FACILITY. HERE, A RAW BANKS BIG HOSS INTAKE MANIFOLD CASTING UNDERGOES MACHINING.



10
A FEW MONTHS LATER, THE SAME BIG HOSS MANIFOLD IS MACHINED, PAINTED AND ON THE ENGINE, READY TO BE FED BY THE COMMON-RAIL FUEL INJECTION ABOVE IT. THOUGH THOSE FUEL LINES LEADING TO THE INJECTORS DON'T LOOK IT, THEY'RE THE SAME LENGTH.



11
DESPITE NEEDING A FEW AERODYNAMIC TRICKS TO CHEAT THE WIND TO REACH 200 MPH, THE SIDEWINDER RETAINED MUCH OF THE DAKOTA'S ORIGINAL SHEETMETAL. ONE AREA THAT DID RECEIVE MAJOR MODIFICATIONS WAS THE HOOD, AS A BULGE WAS NEEDED TO CLEAR THE CUMMINS' TALL CYLINDER HEAD. HERE, A RAW FIBER-GLASS HOOD, RIGHT OUT OF THE MOLD, IS TEST-FIT ON THE DODGE.



12
THE OTHER BODY PART TO RECEIVE A LOT OF AERO ATTENTION WAS THE CHIN SPOILER. THE SPOILER HAD TWO JOBS TO DO: DEFLECT AIR FROM FLOWING UNDER THE TRUCK AND DIRECT AIR INTO THE TURBOCHARGER INLETS. HERE, SEAN TORRES FASHIONS A CLAY MOCKUP OF THE PIECE SO A MOLD CAN BE MADE.



13
THERE ARE TWO THINGS OF NOTE HERE. ONE IS THE CROSS-BRACE STRETCHING ACROSS THE COWL. THAT'S PART OF THE SAFETY CAGE TACKETT BUILT FOR THE DAKOTA. THE OTHER IS THE SUPPORT BRACKET FOR THE STEERING COLUMN, NECESSARY BECAUSE OF THE STEERING WHEEL SETBACK. THE FIREWALL WAS HACKED AWAY AND THE INSTRUMENT PANEL MOVED BACK SOME 14 INCHES TO MAKE ROOM FOR THE TURBODIESEL.



14
MIDWAY THROUGH THE BUILDING PROCESS, SIDEWINDER WAS PUT TOGETHER (COSMETICALLY, ANYWAY) FOR CUMMINS TO DISPLAY AT THE CON EXPO TRADE SHOW IN LAS VEGAS. GALE BANKS MADE A SPECIAL VIDEO TO PLAY IN THE BOOTH THAT EXPLAINED THE TRUCK'S PURPOSE.



15
ONCE THE VIDEO CAMERA WAS PUT AWAY, WORK RESTARTED ON THE TRUCK IN EARNEST.

SMASHING RE

Gale Banks' mission at the Southern California Timing Association/Bonneville Nationals Inc. (SCTA/BNI) 2002 World Finals was two-fold. As we said earlier, his main objective was to prove the viability of diesel as a performance power plant. But he also had a more personal goal in mind. Back in 1990, Banks set a pickup truck land speed record of 204 mph with a modified GMC Syclone. He hoped the Sidewinder would break his old record, and in the process, smash the existing speed record for diesel trucks of 159.647 mph.

On the way to the record there were some chores to be done, though. To emphasize the fact that the Sidewinder was a street truck as well as a land-speed racer, Banks had the truck tow its own spare-parts trailer onto the salt flats. (Tackett had integrated a receiver channel into the new rear frameraills just for that purpose.) And then there was the matter of Don Alexander's racing license. A stock-car racer, suspension tuning guru, and automotive journalist, Alexander had driven any number of competition vehicles before coming to Bonneville, but did not have a license from the SCTA to run at 200 mph. So he used the Sidewinder's first couple of passes not only to shake down the truck but also to make his licensing runs.

Alexander pedaled the car on his first pass and was clocked at 172 mph. The drive back up course was a little faster, 192 mph, and the 182.613-mph average of the two set a FIA international land speed record for Category B (production vehicle), Group 3 (diesel, supercharged), Class 17 (engine size 5.5-6.0L) vehicles, as well as a BNI record in Class C/Diesel Truck. Banks and his team were elated at setting the new record and held a small celebration in Sidewinder's pits. "I'm happy with it," said Banks, "but there is a magic number, and that's 200. 199.99 just doesn't make it."

So at that point the Banks crew descended on the truck to tweak and tune it for runs the next day. Rearend ratios were changed; the truck's ride height was lowered an inch; bigger fuel injectors were swapped in; and

RDS ON THE BONNEVILLE SALT FLATS



AT BONNEVILLE IN OCTOBER, THE SIDEWINDER ATTEMPTED TO SET SPEED RECORDS WITH BOTH THE FEDERATION INTERNATIONALE DE L'AUTOMOBILE (FIA), WHICH KEEPS INTERNATIONAL SPEED RECORDS, AND THE SOUTHERN CALIFORNIA TIMING ASSOCIATION/BONNEVILLE NATIONALS INC. (SCTA/BNI), WHICH TRACKS U.S. RECORDS. EACH GROUP SETS ITS OWN RULES FOR ESTABLISHING RECORDS AND USES DIFFERENT COURSE LENGTHS ON THE SALT FLATS. SOME OF SIDEWINDER'S RUNS QUALIFIED FOR RECORDS WITH BOTH GROUPS, WHILE OTHERS WERE GOOD FOR JUST ONE.



AT BONNEVILLE, DRIVER DON ALEXANDER HAS TO PRACTICE BAIL-OUT MANEUVERS WHILE WEARING HIS DRIVING SUIT. THE SCTA ASKS THIS OF NEW LAND-SPEED RACERS TO MAKE SURE THE DRIVERS KNOW WHAT TO DO IN CASE OF EMERGENCY.



BETWEEN RUNS ON THE SALT, THE INJECTORS WERE SWAPPED TO GET MORE FUEL TO THE MOTOR.



ANOTHER ON-THE-SALT FIX (THIS ONE AT NIGHT) WAS ONE OF SEVERAL CHANGES MADE TO THE SPUR GEARS IN THE QUICK-CHANGE REAR END. THE FINAL DRIVE RATIO WOULD EVENTUALLY DROP TO 1.97:1.



SIDEWINDER TEAM MEMBERS FILL THE REAR TANK WITH ICE. THIS IS PART OF THE TURBOCHARGER'S INTERCOOLER SYSTEM, AND IT ALSO HELPS TO ADD BALLAST OVER THE REAR WHEELS FOR TRACTION HELP.



HERE'S THE ACTUAL TIMING SLIP SHOWING THE FIRST FIA/BNI RECORDS CLAIMED BY SIDEWINDER. A DAY LATER THOSE MPH NUMBERS WOULD CLIMB TO MORE THAN 200 MPH.

changes were made to the truck's computer to give the engine more fuel at higher rpms.

During the tune-up, Alexander described his runs as "rock solid" and "phenomenally entertaining." He said the course was "a little bumpy in the middle," but that the Dakota "just barreled over it and was just dead stable."

When we asked him how it felt to go so fast in the pickup, he admitted that there was very little sense of speed out on the salt because the truck was so solid and there were so few reference points on the course. "All you have are the course markers. You know they're a mile apart, and when you get going they come up pretty fast."

From the sidelines you'd never know the Sidewinder was diesel powered. It was actually quieter than some of the uncorked hot rod

motors running at the Finals, and the only black smoke that came out of the exhaust pipes were little puffs between gear shifts.

On the second day of racing, Alexander put the Sidewinder through the 7-mile FIA course at 218.593 mph, and backed up that run with a 216.034-mph pass, averaging 217.314 mph and breaking the FIA/BNI record he'd set the day before. An attempt to set another record on BNI's shorter, 5-mile course went sour, though, when a timing-clock snafu invalidated Sidewinder's first short-course pass. Those clocks that did function caught the truck at just more than 220 mph at the end of the timing area. A second short-course run recorded the truck covering the measured mile at 217.212 mph and hitting 222.139 as it exited the traps.

BNI's rules don't mandate a record run's

second pass be made within an hour of the first (as does the FIA), so the next run on the 5-mile course was made the following morning. During the pass, the engine's massive torque twisted off the Dana 60's pinion gear. Even so, the pickup coasted through the measured mile at 209 mph, which, when averaged with the previous day's speed, set yet another BNI record at 213.583 mph.

Though it wasn't the ending that Team Sidewinder wanted, they were ecstatic about claiming so many records and besting Banks' previous efforts on the salt. A stouter pinion gear is already in the works for racing the salt in 2003, and Banks plans to move ahead with his goal to race the Sidewinder in other speed contests. As we said earlier, he's a man on a mission. And knowing Gale Banks, it's a mission he'll complete successfully. ☺