Diesel-NH3 Fumigation

The second prototype built by Hydrofuel Inc. was the conversion of a 6.7L 2007 Dodge Ram 3500 diesel truck to diesel-NH3 dual fuel operation.Â The objective of this prototype was to develop a basic diesel-NH3 dual fuel controller for compression ignition engines.Â We expect that the market for this system would be the agricultural and stationary diesel engine conversions.Â We chose a diesel truck as a prototype to demonstrate that diesel-NH3 dual fuel systems were feasible and to simplify the testing of the controller and fuel system.Â To complete this phase of development, we need to do endurance testing of the fuel system for durability and fuel compatibility in addition to performance and emissions.

We had to overcome a number of challenges in building this prototype.Â The major challenge in building this prototype was designing and sourcing automotive NH3-compatible fuel system components.Â The second challenge was to build a fully programmable fuel system controller for optimum fuel control.

This prototype uses a venturi upstream of the turbocharger to generated a pressure differential used for supplying NH3.Â The NH3 controller monitors intake manifold pressure and engine speed, which it uses to controlNH3 flow.Â The system also monitors engine cooling water temperature to enable NH3 operation above a minimum temperature.Â It also monitors the NH3 regulator gas temperature to prevent it from frosting.Â Finally, the system has an exhaust gas temperature sensor to ensure that the engine is not overfueled with NH3.Â In the event that all of the onboard NH3 fuel is consumed, the system reverts back to 100% diesel operation.