TRINITY FUEL ADDITIVES

# Mechanical and Efficiency Improvements - Case Study

- **5-yr case study using original base chemistry formula**
- **2007 Volvo tractor with a Cummins ISX 400 ST (EGR) engine (at the time of the final inspection on September 16, 2014, the tractor had about 675,000 miles on it)**
- **Truck was driven by only one owner-operator who bought it new**
- **Tractor had two 150-gallon fuel tanks**
- **Dosing ratio of 1 ounce of product to 30 gallons of ULSD was used (1: 3,840) for a period of approximately 5 years**

**Mechanical and Efficiency Improvements - Measurements**

- **Summary Results**

**At 600,000 miles of service, visual inspection of exhaust spaces and exhaust ports showed no carbon deposition or soot buildup (for example, exhaust valve stems were shiny and clean, and exhaust ports were also clean). Chemical analysis of lubricating oil showed no soot levels, with oil changes occurring at intervals of over 100,000 miles. Engine runs quieter, more smoothly, and without black smoke during high acceleration periods. Owner uses online fuel consumption program ("Kevin Rutherford Online") to determine average mileage; getting about 7.75 to 8.0 miles per gallon with the additive (hauling ~36-40K pounds of load); this is significantly higher for the given load than what would be expected for this engine, as compared with other equivalent tractors.**

- **Performance Benefits**

1. **The engine runs quieter and more smoothly; no black smoke in exhaust, especially under high throttle conditions**
2. **One year ago (as part of routine maintenance), truck turbocharger and EGR valve replaced, exhaust manifold dismantled, new gasket put on exhaust manifold –**
    a. **As part of this work, mechanic (Sweeten Volvo Truck Center, Houston I-10 Hwy) noticed that exhaust manifold remarkably clean with no soot and carbon buildup anywhere on manifold**
    b. **This was so unusual the mechanic called to show this to Owner; mechanic shined a light inside cylinder head and showed exhaust valves and combustion chamber were completely clean with no soot buildup and carbonization**
3. **Owner reported about 7 months after he bought truck, and prior to using additive, EGR valve failed –**

a. **At the time of repair, noticed EGR valve completely clogged with soot, to the extent it was stuck and could not function properly**

b. **Owner was told water jacket in EGR valve was too small and was cause of failure, and a new valve with a larger water jacket was installed**

c. **New valve also failed within less than one year, and upon inspection was also found to be clogged with soot**

d. **A third EGR valve was installed; around this time, Owner started using fuel additive**

e. **Subsequently, after 2 years of trouble-free operation, Owner went in for routine maintenance and opened EGR valve to see its condition (not because it had failed); upon inspection, observed no soot or carbon deposition but only a light carbon film the consistency of "baby powder" on the EGR valve surface**

4. **An inspection of the exhaust and emissions side of the engine provided the following results –**

    a. **EGR cooler inside is cleaner**

    b. **EGR valve is not clogging up and failing**

    c. **The turbocharger insides are cleaner**

    d. **The exhaust pipe insides are cleaner without the heavy soot buildup experienced earlier**

5. **Overall, Owner reports a reduction in his maintenance and operating costs, and has recommended the product to several other truck owners**