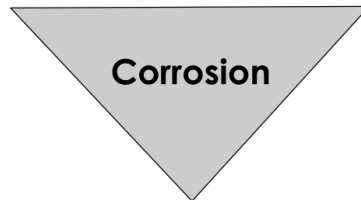


HYPOTHESIS:
Aggressive chemical species present in ULSD systems are facilitating aggressive corrosion.



Which chemical species are capable of facilitating corrosion?

Ethanol

Acetic acid

Were these chemical species present in UST systems inspected?

Yes.
Analysis showed trace levels of ethanol in water bottom and fuel samples.

Yes.
Analysis showed significant amounts of acetic acid in the water bottom, headspace vapor, and fuel.

Can the chemical species be responsible for the aggressive corrosion?

No.

- Ethanol pKa = 15.5, similar pKa to water
- Reaction rate is too slow to account for the observed aggressive corrosion.
- Trace amounts of ethanol measured would not be responsible for the aggressive corrosion observed.

Yes.

- Acetic acid pKa = 4.75
- Reaction rate is appropriate to account for observed aggressive corrosion.
- Substantial concentrations of acetic acid measured in the vapor, fuel, and water bottom samples correlate to the acetic acid found in the scraping samples.



HYPOTHESIS VERIFIED
Acetic acid may be responsible for the aggressive corrosion.

Figure 3. Aggressive Chemical Species Hypothesis Evaluation