Earthsafe Systems, Inc.
Diesel Fuel Quality Considerations

Diesel fuel for emergency power often requires long periods of storage under varying temperature conditions. The quality of the diesel fuel may be adversely affected during storage such that the reliability of power generation is compromised.

The primary issues for maintaining diesel fuel quality are (a) cold weather problems, (b) hot weather problems, and (c) bacterial growth. The following issues are discussed along with recommendations for addressing the problems to assure reliable power generation.

Cold Weather Problems
2 diesel fuel contains paraffin wax which remains dissolved when the fuel is warm. Wax precipitates form as the fuel cools and this wax can plug fuel lines, filters, valves, and screens. There are two basic terms to describe the formation of wax in No. 2 diesel fuel: cloud point and pour point.

Cloud Point is the temperature at which wax begins to precipitate from the fuel mixture. The fuel is fluid but the wax can collect on fine filters and cause the flow to be restricted. The cloud point is approximately +5 to +10 degrees F for # 2 diesel, and -15 to –30 degrees F for # 1 diesel.

Pour Point is a lower temperature where the wax solids are large enough that the fuel will not flow in bulk volume from tanks through piping and valves. The pour point is approximately 6 to 10 degrees F below the cloud point for #2 diesel, and –20 degrees F for # 1 diesel.

Cold Weather Recommendations

1. Use a winter blend of # 1 and # 2 diesel, or straight # 1 diesel to provide a cloud point below the expected minimum temperature.

2. Heat trace and insulate piping systems. This is especially important in systems where water could accumulate in low points and freeze in winter conditions.

3. Heat and insulate aboveground storage tanks where a winter blend fuel is not sufficient protection for the application.

4. Additives for cold weather treatment are <u>not</u> recommended because " a particular additive generally will not perform equally well in all fuels" and "the best additive and treat rate for a particular fuel cannot be predicted; it must be determined experimentally" (Chevron Diesel Fuel Technical Review).

Hot Weather Problems
High temperature exposure for diesel fuel accelerates the formation of solid particulates. These particulates will have the effect of clogging filters. Specific information on the rate of particulate

formation versus temperature is not readily available because of the variety inherent in diesel fuel refining. Oxidation through exposure to air can also accelerate particulate formation.

Hot Weather Recommendations

1. Provide filtration for diesel fuel tanks in addition to engine inlet filters.

2. Provide return fuel cooling with radiators mounted to generator sets.

Bacterial Growth Problems

Bacteria growth occurs at the water – fuel interface that occurs as water accumulates at the bottom of fuel storage tanks. The fuel provides nutrients while the water is a source of oxygen and minerals. Bacterial growth will be especially active in hot and humid climates. The bacterial contamination of fuel will cause plugged filters.

Bacterial Growth Prevention

1. Provide coalescing filtration for fuel storage tanks to minimize water accumulation.

2. Use cylindrical tanks to minimize the water fuel interface area.

3. Treat the fuel twice annually (late Spring and early Fall) with a water-soluble biocide. Alternate the use of two biocides to prevent adaptation immunity.

Sources of Information

Chevron Diesel Fuels Technical Review, 1998
Amoco Product Information No. 13-A
Caterpillar Fuel Specifications and Recommendations

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