Industry: Financial Processing Center, Hospitals, Airports, etc. Machine Type: Emergency Diesel Generators

History

A North American computer processing center for an international credit card company occupies an entire city block and has redundant electric current monitors, uninterrupted power source protected, hot on-line emergency diesel generators to maintain operations in the event of a brown out or power failure. The monitoring systems and generators are routinely brought on-line for 30 minutes every calendar quarter to prove availability.

During a recent power outage, the system successfully switched to their diesel generators. However, the diesel engines failed four hours into the power outage, resulting in a crash of the entire computer operations system.

Inspection of the generators determined that the injector tips were badly fouled and the fuel filters were plugged with a black slimy residue.

Lubricant laboratory analysis

A fuel filter, injector and fuel samples from the top, middle and bottom of the main fuel storage tank were analyzed. Laboratory analysis of the top and middle fuel samples were clean and of good quality. Analysis of the bottom fuel sample showed a free water layer. Microbial analysis showed large amounts of algae in the oil and water. Lab analysis showed the residues to be algae.

A site visit to the computer center found two main fuel storage tanks, which supplied day tanks for the emergency generators. Water with algae growth were detected in the main fuel tanks and the day tanks.

Evaluation

The 30 minute availability test of the emergency diesel generators each calendar quarter was not long enough to drain the day tanks low enough to trip the refill floats, causing the day tanks to be refilled during operation. Day tanks were usually refilled after the availability test, and then not normally used until the next availability test.

When the generators were put into continuous use for several hours, the level in the day tanks dropped low enough to engage the automatic refill mechanism. The fuel rushing in from the main storage tank stirred up the water, sludge and algae on the bottom of the day tanks enough to get sucked into the suction lines to the generators, where it fouled the injectors and filters severely enough to stop the engines.

Solution

The company initiated an SKF Lubricant and Fuel Quality Monitoring Program that:

- Analyzes their diesel fuel quarterly for water, algae and oxidation
- Treats the diesel fuel regularly with algaecides, biocides and anti-oxidants
- Inspects the tanks periodically for proper maintenance
- Filters (polishes) the stored diesel fuel to remove water, dirt, contaminants and algae if any evidence of contamination is found

Impact

Although another failure has not occurred, this managed program minimizes risk of operational unavailability, financial and legal losses.

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