



ECT Inc. “On-Line LM 2500 Engine Washing” - Case Study

Our customer is a provider of midstream natural gas and NGL services, and is one of the largest independent midstream energy companies in the country. Their assets are located in several states including Texas, Louisiana, California, and consist of fractionation, storage, terminalling, transportation and distribution.

Their processing includes the operation of three Solar Centaur engines for gas compression, a GE Frame 5 and a GE LM 2500 for the Cryogenic #1 and Cryogenic #2 Gas Processing Facilities respectively, and a Solar Co-gen Centaur 50 to power the entire plant.

Their situation is very unique, in which their production requires operating all gas turbine engines 24 hours a day; therefore, crank washes can only be accomplished during scheduled outages. Another factor is the operation of these engines in an environment where temperatures in the Summer months can reach 90° to 100° F, the humidity can reach up to 90% and adding to this, a marine atmosphere (since they are located next to the gulf), makes it very difficult to keep the engines in top performance to meet their yearly production requirements. As mentioned, this is particularly more evident in the Summer time, costing them millions of dollars from low power and down time during outages. Not to mention increased repair costs at the time of engine overhaul.

We were contacted by the customer for a solution. It was determined that their only option was to adopt an “On-Line” cleaning program. The program had to be tailored for the different engine models to minimize costs. ECT Inc. provided our manufactured application hardware, which includes: injection nozzles, ring assemblies and high pressure hoses for each engine model. The M 10 Turbine Wash Skid which was already at the customer site, was modified to do wash cycles for each engine model.

The customer installed the “On-Line” wash hardware on the GE LM 2500 first. It was decided that two ECT Inc. Technical Representatives would conduct the first “On-Line” wash, training seven of the customer’s maintenance personnel at the same time.

We selected the ECT “RMC” Engine Gas Path Cleaner to do the engine wash. This is the only engine cleaner that can be used safely for “On-Line” cleaning washes. It is non toxic (no alkalis, phosphate acids or 2-butoxyethanol), biodegradable, non-flammable and has no VOC’s.

The engine had been crank washed about 2 months prior to the arrival of the ECT Technicians, and it was beginning to show some performance degradation. Based on this, the following “On-Line” wash cycle procedure was implemented:

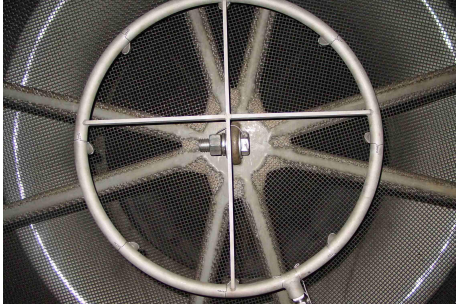
- Mix the RMC in the detergent tank of the M 10 skid, 4:1 ratio using R/O, or DI water
- Fill rinse tank on M 10 skid with R/O or DI water
- Follow all procedures according to the M 10 operation manual
- Check all connections for leaks
- Take base line performance reading at the control room
- First run - inject RMC cleaner 2 mins, wait 45 mins and rinse for 2 mins
- Wait 10 mins and take a performance reading at the control room
- Second run - inject RMC cleaner 4 minutes, wait 45 mins and rinse 4 mins
- Wait 10 mins and take a performance reading at the control room
- Third run - inject RMC cleaner 6 mins, wait 45 mins and rinse 7 mins
- Wait 10 mins and take a performance reading at the control room

The results were impressive; the following chart depicts the readings taken after each of the injection cycles:

RUN No.	CDP PSIG	EGT ° F	FUEL FLOW Lbs/Hr
START BASELINE	209.6	1393.1	10451.0
FIRST RUN 2 MIN	209.2	1402.6	10556.0
AFTER FIRST RUN	209.5	1392.2	10273.0
SECOND RUN 4 MIN	210.2	1369.8	10192.0
AFTER SECOND RUN	211.3	1368.2	10355.0
THIRD RUN 6 MIN	209.3	1343.1	9989.0
RESULTS		IMPROVEMENT 50° F	IMPROVEMENT 462 PSIG

RESULTS:

From the start to the last wash i **we improved EGT by 50° F and lowered fuel gas over 4.4%; this is while keeping CDP and mass flow constant.** The successful implementation of our "On-Line" cleaning procedure for all the engines will make our customer a more cost effective and profitable company.



ECT LM Manifold



M-20 Wash Skid

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