

DLE MAPPING FOR GAS TURBINES

GE LM6000PD™ DLE GAS TURBINE FAULT DIAGNOSIS

Problem

The client operates two GE LM6000PD™ Gas Turbines amongst other non DLE units, on its Power plant located in Eastern central Africa. The units (Unit 1 and Unit 2) are employed in a power generation application, and since their original installation have been maintained via an LTSA contract by the OEM.

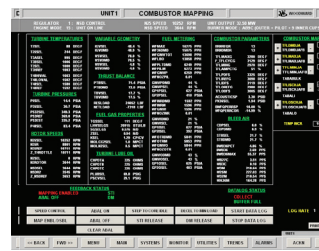
During operation unit 1 was tripping regularly at high load in ABC mode due to insipient blowout.

The HPI Energy Services Solution

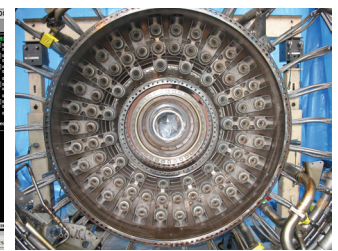
HPI Energy Services Ltd. (HPI) was approached by the operator for assistance, other vendors had also been approached but were unable to solve the problem. HPI mobilised an in house DLE Mapping Engineer, and on arrival at site the unit was at high Load around 32.5MW in T3 Temp control, with a T2 temp of 89 Deg F. CO level was found to be at 256 ppm. Following a small increase in the bulk flame schedule, the combustor relit and CO levels dropped to 35 ppm, however resultant T48 temperature rises meant the unit staged down to AB Mode. This combined with other sampled data led to the conclusion that the unit was struggling to operate in ABC mode.

An attempt was made to complete the correct combustor mapping of ABC mode with the following issues.

- Very small changes in the flame schedule temperatures (10 Deg F) would cause insipient blowout to occur rapidly.
- T48SEL temperatures had to be maintained high to compensate for blowout detection, with the result being numerous stage downs to AB mode on high T48 Temp.



HMI Mapping Screen



DLE Pre-Mixer Configuration

- Under normal running with no changes being made to the TFLAME schedules the unit was very unstable in operation.

Based upon HPI's vast experience of DLE mapping, it was believed that the unit may have a G03 combustor fitted, where airflows over the inner dome can possibly lead to insipient blowout. This was confirmed via the OEM by using the as built part number. Therefore ABC mode was disabled, and AB9C mode was enabled which is not susceptible to the same flame out issues as ABC mode with this combustor configuration.

Outcomes

It has been proven that by enabling the mode AB9C, suitable stable operation can be obtained without any loss in power from the unit. Therefore AB9C was enabled and full combustor mapping completed of this mode. It could be seen in this mode that the unit experienced greater stability, larger operating windows and better emissions levels than could be achieved in ABC. For this reason the unit was left operating in AB9C mode with ABC mode being disabled in the software, giving the operator increased availability.

Successful conclusion and a job safely completed that offered the customer a quick and cost-effective solution to an issue they had been experiencing for some time.

To see how HPI Energy Services can help you, please call us on +44 (0)1522 519944 or email info@hpienergy.com