

Case Study - Filter Element Upgrade

Beryl Field UKCS

The Beryl Field utilises 3 No. 24 MW Gas Turbines in power generation and mechanical drive application (2 x PG, 1 x MD) across its Beryl assets.

The original combustion air inlet filtration housing arrangement was a low velocity 2 stage system, utilising F8 (EN779:2002) grade filtration to the specified OEM standard.



Problem

The operator was experiencing heavy compressor degradation and thus frequent trips due to fouling. In turn this had significant cost impacts as power demand could not be met and production was halted during periods of down time.

In summary, the machine in Sales Compressor Service was operating at max exhaust gas temperature (typically 24 MW) and was being water washed based on compressor performance on 5-6 week intervals.

Alternatively, the two power generation packages were being operated at part load (typically ~12 MW) and were historically being washed on a 6 week interval, however this was frequently delayed due to operational power redundancy requirements.

Solution

The HydroCel excels in the environment found offshore in the North Sea. It is the ability of the AAF HydroCel to operate in constant wet/dry conditions, effectively removing sub-micron particulate, dry salt and water containing salt in solution, that makes the HydroCel the leading technology in this environment.

Due to the recognised successes of the HydroCel in the North Sea, AAF was approached to offer its solution. On the back of discussions with the AAF Oil & Gas team, the operator made the decision to upgrade the filter elements in their existing filter housings, moving from F8 classification filters to AAF HydroCel E12 filters on all 3 packages.



BETTER AIR IS OUR BUSINESS®



GAS TURBINE
DIVISION



Compressor package boroscopes 6,570 hrs
Operation (9 months) post AAF E12 upgrade



The operator also quoted;

"the only maintenance was; the unit had the compressor section serviced at 50,000h to replace the damping media on the compressor stator vanes."

"Other considerations, the engine was 99.9% of the time on gas fuel, the engine was loaded 50-70% in generator service so had very few stops."

"Post strip down the engine was in excellent condition, hot section damage was blistering of the nozzle guide vanes, this was attributed to a known period of salt contamination in the units mid-life period prior to E12 technology application. The rest of the engine was basically like new."

The Successful Outcome

Economic Benefits to the Operator

Following the installation of the HydroCel E12 (H)EPA elements, Exxon Mobil reported;

Benefits of AAF HydroCel E12 filters on Compressor Package;

- Operated for 6,570 hours operation (9 months) at max exhaust gas temperature, with no measurable loss in compressor efficiency.
 - At 9 months unit shutdown to complete safety critical maintenance.
 - Operator settled on fixed 6 month 2 day outages to complete package maintenance.
 - Significant reduction of package trips from on engine pneumatic control hardware.
- Subsequent yearly availability increased from 96% to 99% due to trip reduction and reduced water wash outage.

Benefits of AAF HydroCel E12 filters on Power Generation Packages;

- Extended operation possible during periods of power critical activities
 - In one instance the machine ran for 22,000 hrs. with no water wash and remained very clean.
- Increased package reliability with fixed 6 month planned maintenance shutdowns
 - Increased planned maintenance effectiveness.
 - Reduction in outstanding maintenance.
 - During shutdown the operator took advantage of opportunity to water wash, despite the compressors not showing evidence of wash requirements.
- Record 84,000 hrs. hot end life - a world record for this GT model.

It should also be noted that filter elements were installed as an upgrade to the existing filtration equipment and as a result were over rated in terms of air flow per cell. Therefore during 'normal offshore operational conditions' filter operational life will significantly exceed the periods of time stated below. Nevertheless, the operator still reported filter operational life on the compressor package at maximum exhaust gas temperature of 6 months for AAF AmerKleen M80 pre-filters and 18 months for the AAF HydroCel E12 (H)EPA filter.

Europe & North Africa

AAF Ltd

Bassington Lane, Cramlington,
Northumberland, NE23 8AF, UK
Tel: +44 (0) 1670 713 477
Fax: +44 (0) 1670 714 370
email: info@aafgb.com

Middle East & Asia

AAF International FZE,

FZS1BC01-FZS1BC04
Free Zone South Dubai,
PO Box 263120
Jebel Ali, Dubai, UAE.
Tel: +971 4 889 4886
Fax: +971 4 889 4887

AAF[®]
INTERNATIONAL
BETTER AIR IS OUR BUSINESS[®]



GAS TURBINE
DIVISION