

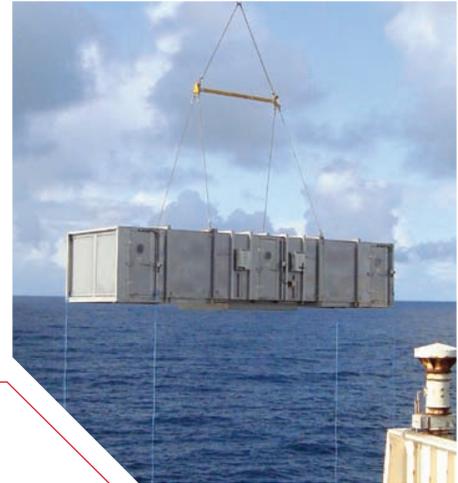
Offshore FPSO

Gas Turbine Filtration Retrofit / Upgrade

Offshore gas turbines typically operate continuously in remote areas with harsh environmental and operating conditions, in order to supply power and gas compression for platform operations.

Salt / saline solution is prevalent offshore and can significantly contribute to a reduction in machine availability, reliability and service life.

On a North Sea UKCS FPSO, 2 off Solar Mars power generation gas turbines were suffering from saline contamination within the combustion air stream, and on one machine this was significant enough to damage to the turbine blading by hot corrosion.



Combustion air intake blades showing saline contamination



Exposed double sided air intake filtration unit on FPSO



Single piece lift of double air intake unit during installation



Installed Equipment solution

Problem

Hot corrosion of the compressor can be caused by salts from the fuel, gas or liquid, or entrained in the combustion intake air. This aggressively attacks the hot gas compressor components and reduces the expected maintenance period of the gas turbine, due to a reduction in performance and failures. The associated reduction in service life results in considerable cost to replace the engine and also to provide fuel for power generation during GT downtime.

A gas turbine combustion air intake filtration system on an FPSO is inherently located closer to sea level than the same equipment on a rig / platform - resulting in greater exposure to higher concentration levels of naturally occurring salt and sea spray. Due to the location of the 2 GT units and air intake systems on the FPSO, one unit was directly exposed to sea spray, with the other afforded greater protection from surrounding equipment.

Both units suffered from saline contamination of the combustion air, which was found in large volumes within the clean air system, however, the more exposed unit suffered from hot corrosion and saline was identified as a contributor to the hot corrosion experienced.

Solution

Both FPSO GT combustion air intakes consisted of identical 2 sided inlets, utilising dated F8 "marine" grade filtration.

In order to eliminate saline bypass of the filtration system and ensure the combustion air flow is free from saline solution, the operator decided to upgrade/retrofit these existing filtration systems.

AAF identified that a means of reducing or eliminating hot gas corrosion is to improve the filtration efficiency and to use the latest marine grade filtration, ensuring a satisfactory seal is maintained between filters and the holding matrix, in order to prevent air/saline solution bypass.

AAF's proposed low velocity solution, in order of airflow, consisted of weather hoods, AmerVane VI mist eliminating vane, Amerkleen M80 coalescing pre-filter and HydroCel F9 grade marine filters.

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 - eliminating compressor fouling and dramatically reducing the potential for hot end corrosion related breakdowns by the unmatched removal of hydrocarbons, salt and seawater from the combustion airstream.

AAF's global site services division initially surveyed the units, to collect the relevant existing dimensional data and to ensure any potential solution would be practical from a deconstruct and subsequent install perspective.

Due to the close proximity of the 2 GT's, AAF designed a custom fit equipment solution, to supply a single lift component which consisted of 2 off HydroCel marine grade F9 air intakes.

AAF designed & manufactured the unit prior to delivering to Aberdeen and then carrying out the turn-key installation of equipment, lifting the whole assembly as a one piece lift.



Engine intake salt deposits

The benefits

Working with AAF, the Client was able to identify a cost effective solution which would also allow a reduced installation time period, keeping operational down time to a minimum. AAF equipment design allowed the turnkey installation to be carried out swiftly and to introduce the latest HydroCel marine grade filtration - providing unmatched performance in removing saline and hydrocarbon contaminants in a marine environment and allowing for unmatched gas turbine availability, reliability and service intervals.

AAF the solutions provider for Gas Turbine auxiliary equipment repair, refurbishment, upgrade, retrofit & noise abatement solutions to meet your assets specific requirements:

AAF Limited also offer:

- Air Intake Filtration Systems
- Intake Systems
- Hot Gas Exhaust Systems
- Waste Heat Recovery Units (WHRU)
- GT & AC Generator Acoustic Enclosures
- Ventilation Systems
- Bespoke Acoustic Screens
- Barriers and Enclosures for noise suppression.

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