

Gas Turbine Online Water Wash

At a Glance

What is it?

Currently, U.S. Navy surface ship gas turbine generators and main propulsion engines are periodically shutdown and washed to improve compressor performance and extend operating life. The online waterwash system allows the compressor wash to be performed while the engine is in operation. This extends the period between offline washes and improves performance in the interim.

How does it work?

For affordability, the online waterwash system utilizes and augments the existing offline wash equipment architecture. For each Ship Service Gas Turbine Generator (SSGTG) and Gas Turbine Main (GTM) engine, it consists, simply, of a set of nozzles, hoses, and an automated 3-way diverter valve to send wash fluid to either online or offline nozzles.

What will it accomplish?

Online water wash will reduce maintenance, improve starter life, and reduce fuel consumption by extending the time between offline washes and keeping the compressor section of the gas turbine cleaner in the interim.

Metrics:

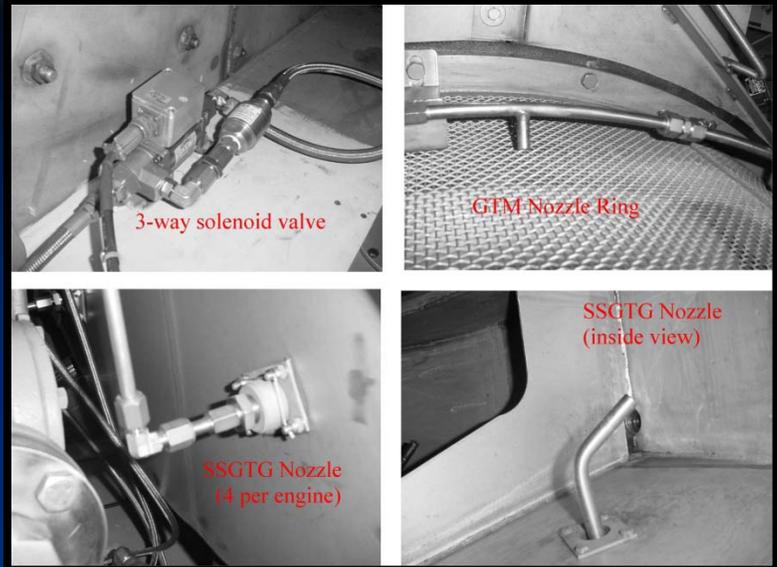
- 800 barrels of fuel/yr per DDG

Applications:

- Installed on USS Prebble (DDG-88)

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Description:

Offline wash (also referred to as *crankwash*) maintenance is intended to extend gas turbine life, improve engine efficiency, and improve maximum power output by removing salt, dirt and soot from the internal compressor components.

It is possible to utilize the existing crankwash piping, supply tank, and overall piping to supply water to an **online waterwash system**. NAVSEA 05Z (Petter Kristiansen) funded the evaluation of DDG-51 Online Water Wash under the Fleet Readiness R&D Program. This evaluation included the installation of an entire ship set of gas turbine online water wash systems on USS PREBLE (DDG-88) each consisting of the following:

- Online water wash nozzle (fine orifice) array
- Automated, integrated, 3-way solenoid valve
- Associated fittings and tubing

The evaluation, which began in FY08 and concludes at the end of CY09, will culminate in a final report to NAVSEA 05Z verifying system impacts to maintenance, man-power, and fuel efficiency.

Challenges and Opportunities:

- Installing an affordable, functional online water wash system onboard a DDG-51 class ship
- Evaluating system performance, maintenance savings, and fuel efficiency improvements in a real-time shipboard application