

BUSINESS PARTNERS

Thermal clamps help prevent coking in GT liquid-fuel lines

Reliable operation of dual-fuel gas turbines on oil demands that owner/operators protect against coking of oil in fuel-system valves and piping. Active cooling is one solution available to users for assuring both reliable starts on liquid fuel and reliable fuel transfers from gas to oil.

“Cool valves, piping improve engine reliability when called to burn oil,” CCJ 1Q/2016 (p 69) and available at www.ccj-online.com (type headline into the search-function box), discusses several cooling options offered by JASC. One of these, the so-called “thermal clamp,” was introduced as that article was in preparation.

Early results available from the first commercial installation (Fig 1, *before*; Figs 2 and 3, *after* point to success both in protecting against coking and eliminating the need for “verification” firing of oil monthly to confirm liquid-fuel system reliability.

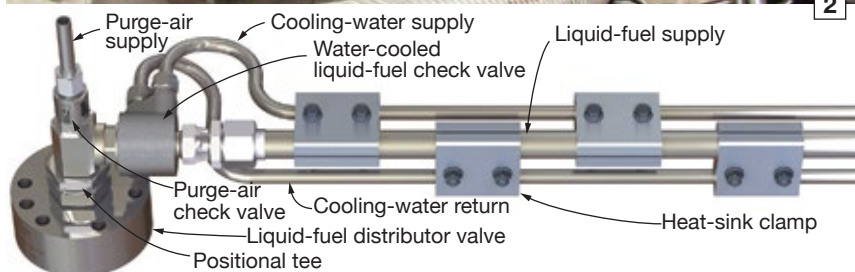
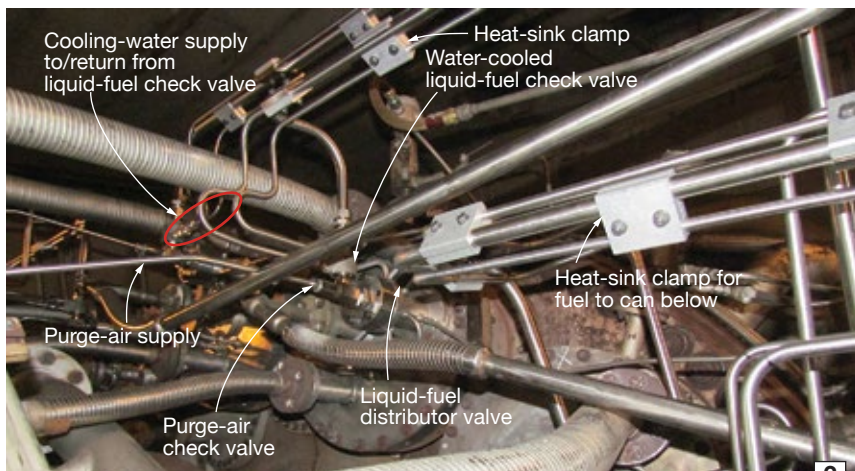
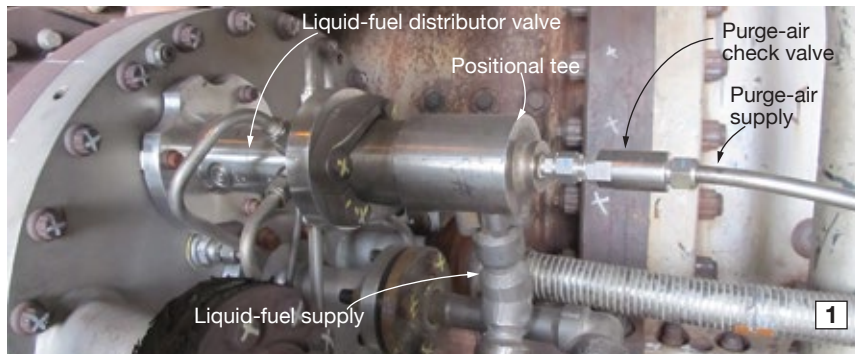
JASC’s (Tempe, Ariz) Schuyler McElrath told the editors, “With our latest system configuration consisting of rerouting fuel piping, incorporation of heat-sink clamps to keep fuel lines cool, water-cooled fuel controls, and component connections which don’t use O-rings, we are now offering the capability of running on liquid fuel at semi-annual intervals, or longer, without sacrificing back-up liquid-fuel system reliability.

“In the first test of this latest configuration, the second of two 7F gas turbines operated on liquid fuel during commissioning of the fuel-system upgrade in April 2016. The site operated exclusively on natural gas over the next nine months, burning oil only during the second week of January

2017. The next run on liquid fuel was in July 2017. Both times, the turbines started and operated on liquid fuel without incident.”

Thus the two-unit site burned liquid fuel successfully *twice* in the 15-month period ending in July. The typical site needing to confirm oil firing capability on two units would have paid approximately \$60,000 each month the test was conducted. Thus, not having to run tests for 13 of the 15 months since the upgrade was completed saved more than three-quarters of a million dollars.

Based on this success, the owners of other sites currently are upgrading the fuel systems on some of their 7FA engines. These particular upgrades present a variation on the original concept in that they will be using JASC water-cooled 3-way purge valves to replace either standard 3-way purge valves or check-valve and purge-air configurations. Piping modifications highlighted here will be incorporated.



Piping arrangement before the fuel-system upgrade is in Fig 1. Figs 2 and 3 show the system *after* the upgrade, from different angles. Note that the positional tee is an important part of the system: It can be rotated so connections to purge air and fuel can be made without having to modify existing piping. Not visible in the photos is that O-rings for sealing at the distributor-valve flange and check valves have been replaced with copper crush gaskets for long life. An advantage of the new sealing system is that check valves can be removed and reinstalled multiple times before the crush gaskets must be replaced

Updating the Mark V communication interface overload issue

“Mark V goes haywire, shuts down F-class units lube-oil pumps,” caught many in the industry by surprise when it was published in CCJ ONSite May 3, 2017 judging from the social media and online user-group chatter we were told occurred the days following, a passing mention by a GE engineer at a recent meeting, and a call from Scott Muster of Turbine Technology Services (TTS).

What the editors learned recently came in too late to include in the article with the same title appearing in CCJ’s 1Q/2017 print edition. The material that follows updates CCJ’s coverage on the subject, which was based on the industry alert Abel Rochwarger, chief engineer at Gas Turbine Controls, shared with the editors for publication.

GE Power responded to the article with Product Service Information Bulletin (PSIB) 20170519A, “Mark V Communication Interface Overload—Loss of Lube Oil.” The overview for that document states, “A recent loss of lubrication event on an F-class unit using Mark V controls has highlighted the need to communicate the capabilities of the Mark V controller in the context of today’s demanding applications.” The OEM said the Mark V controller was released in 1991 and has accumulated more than 200-million operating hours in a variety of applications with a good record for safety and reliability.

In basic terms, “heavy command traffic” was cited by the OEM as the cause of the accident described. GE said laboratory testing confirmed that symptoms similar to those observed can be recreated by increasing network traffic significantly above the recommended limit of 10 commands per second from all sources.

The PSIB recommended that owner/operators not make changes to lube-oil pump controls without first consulting GE. It also referenced four background documents on communications protocols. Plant personnel who do not have a copy of 20170519A should contact their GE representative for one.

Online discussion revved up after GE released the PSIB. TTS’s Muster contacted CCJ after learning of customer concerns. He told the editors that his company’s Turbine Monitoring System (TMOS), which is a direct replacement for existing Mark V <I> and <HMI> systems, actively manages

and regulates the transfer of instructions from all site devices (BOP, DCS, SCADA, operator stations) to the Mark V, ensuring that the type of communication overload associated with the lube-oil failure is not possible.

Muster said the TMOS has been in the field since 2001 and has maintained an “outstanding record for safety and reliability for more than 60-million operating hours.” More material pertinent to this discussion is available on the TTS website at www.turbinetech.com.

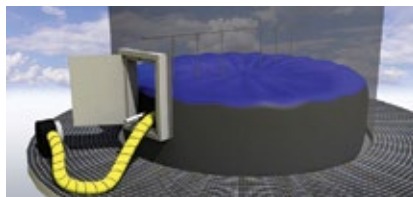
Stack-balloon design upgrade incorporates internal drain system

Gary Werth, the stack-balloon guy, called to tell the editors about the design upgrade for his product, which now features an internal drainage system. Werth listened to personnel at the many plants that have purchased the stack balloon since the first installation at Whiting Clean Energy (today Nipsco) in November 2004 regarding their ideas on how to facilitate installation, improve durability, and deal with rainwater accumulation.

And that intel contributed significantly to the stack balloon shown in the drawing. Note that the top surface is angled from the perimeter edge towards the center drain. As rainwater accumulates on the top surface, it is directed to the 4-in.-diam PVC pipe; latter can be connected to a gutter system or the stack drain.

This second-generation stack balloon, which includes a layer of heavy-duty fabric around the perimeter to increase wear resistance, is installed perpendicular to the stack.

In retrofit applications, the access-door size must be changed from 30 ×



30 in. to 36 × 24 in. Werth reported that his company has been working with HRST Inc on access doors; HRST also can supply balloon support cable and hanger hardware.

Werth says he has sold five of the new stack balloons already, including one in the Tacoma (Wash) area—a good location to check drain performance. Feedback has been thumbs-up.

Eight Bells: Mike Gough, 61

“Sudden, unexpected” were the words used to describe the passing of Michael Collier Gough, general manager of Calpine Corp’s Morgan Energy Center, Decatur, Ala., on July 9, 2017. He



was held in high esteem by industry colleagues, including the CCJ editors, and the people he managed and worked alongside at power and process plants owned and/or operated by Calpine, NAES, Tenaska, Diamond Shamrock, and Occidental Chemical.

A maintenance manager told the editors, “Mike pursued excellence in everything that he did and installed that same pursuit in every person that he came in contact with.” A plant manager said he was “a really good guy.” Yet another colleague described him simply as “awesome.” Gough’s plant frequently shared its best practices with CCJ subscribers, receiving several awards over the years, including a Best of the Best.

Kohler launches Victory Turbine

Rodney W Kohler, a familiar face at user-group meetings over the last decade, recently launched Victory Turbine LLC to deliver owner/operators solutions for O&M and efficiency improvements.



First business arrangements are with the following companies:

- Zokman Products Inc, to provide an environmentally responsible, water-based compressor cleaner and corrosion inhibitor to help maintain maximum efficiency and heat rate.
- Caldwell Energy, to offer fogging and wet-compression technology for OEM equipment.

By way of background, Kohler, like many others in power generation, got his start in the military—the US Air Force, as a ground equipment mechanic. A degreed engineer with a specialty in fluid mechanics, he got his industry work experience at GE, Whitton Technology, Gas Turbine Efficiency, Caldwell Energy, and Danfoss