



JUNE 2004

COOLING AND SEALING AIR

The cooling and sealing air system on Frame 5 turbines is often overlooked during major overhauls. It is only upon return to operation that mistakes made during the overhaul are discovered in the form of high wheel-space temperatures.

Rule #1: Obtain all the wheel space temperature data possible prior to unit shut down.

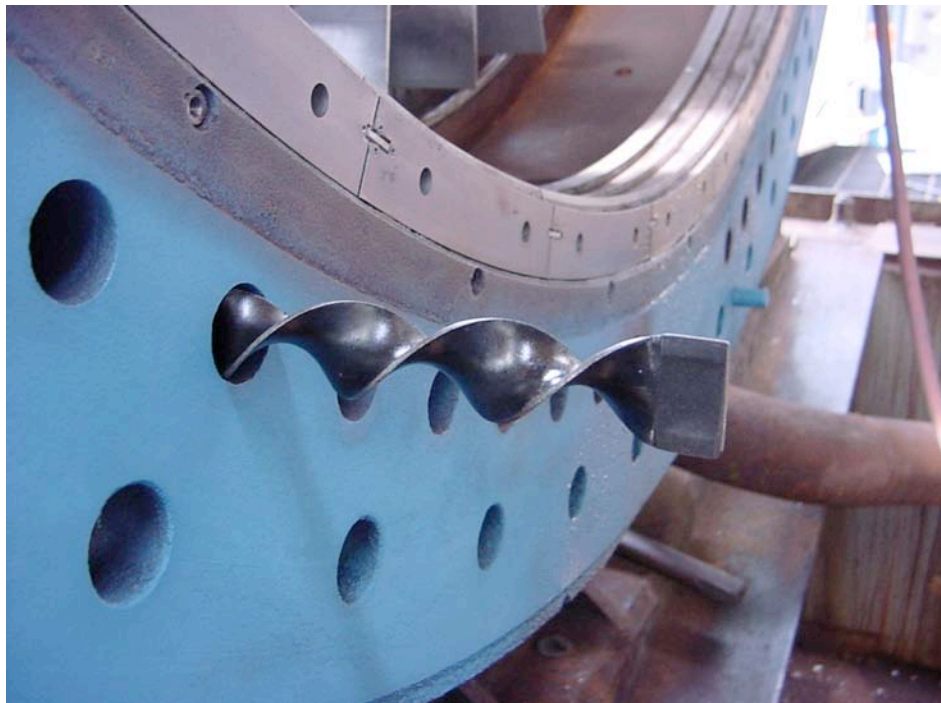
Rule #2: Ensure that the locations and sizes of the cooling and sealing air system orifices are recorded. Most folks like to wire the orifice right to the pipe in the location from which it was removed.

Rule #3: Use a drawing to verify that the locations of the orifices recorded are correct. Remember, it is possible that the last time the unit was put back together it was assembled incorrectly. Never assume the folks who did the job last did it correctly.

Now for **the most overlooked item during a Frame 5 overhaul**. There are turbine shell cooling holes that pass through the turbine shell into the exhaust frame. The cooling air transmitted through these holes not only cools the turbine shell, it is also used to cool the second stage aft wheel space. Any plugging of these holes increases turbine shell temperature AND limits the amount of cooling air available to the second stage aft wheel space. Remember, the maximum allowable wheel space temperature on an older Frame 5 is 800 degrees Fahrenheit. The problem with cleaning these passages is that removal of the turbine shell and/or the exhaust frame is required to access the holes. No problem for the cooling holes in the upper halves of the turbine shell and exhaust frame, as these casings are normally removed during a major overhaul. The problem is the lower half turbine shell and exhaust frame. Sorry, but to do the job correctly you will have to remove the lower half of the exhaust frame. Failure to clean the lower half cooling holes can cause high differential temperatures between the upper and lower halves of the turbine shell. This can lead to casing warpage, leaking and rubbing of buckets. In addition, a high differential temperature between second stage aft wheel space thermocouples will occur. So remove that lower half exhaust frame, clean the cooling holes, add a tight wire alignment to your work scope and do the job correctly. Purchase new swirl strips as all the old ones will be destroyed during removal.



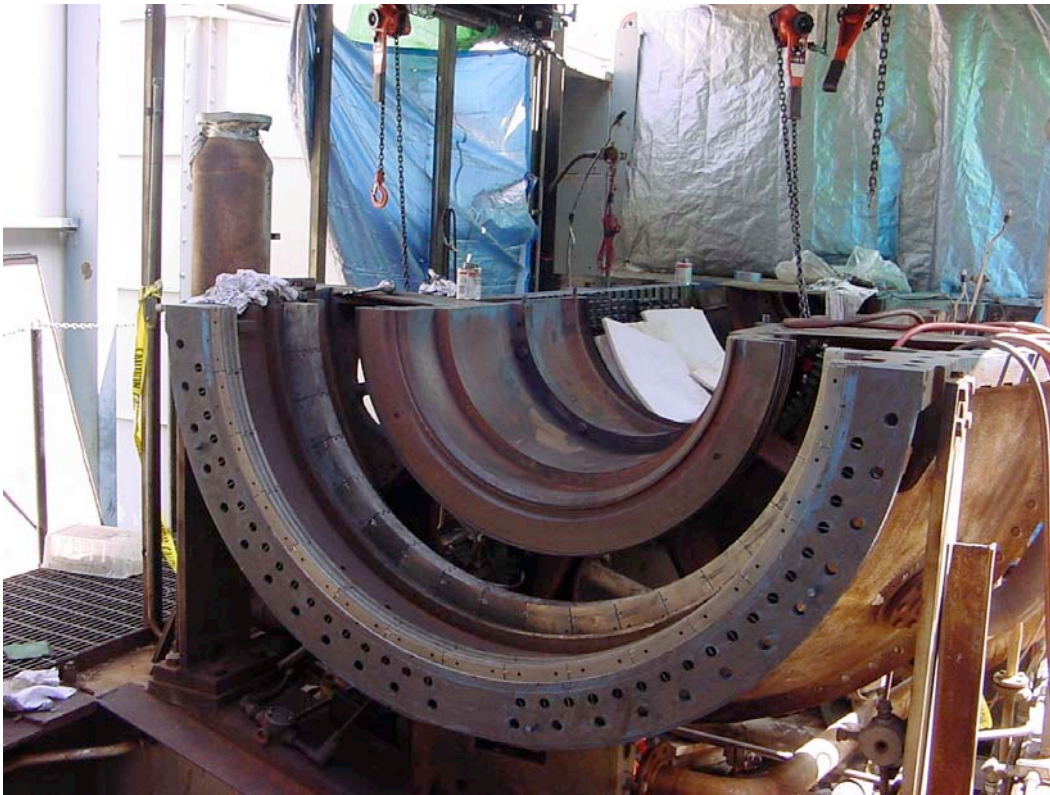
CLEANING THE COOLING AIR PASSAGES



NEW SWIRL STRIP INSERTED HALFWAY IN COOLING PASSAGE



TAPPING NEW SWIRL STRIPS INTO PLACE



ALL NEW LOWER HALF SWIRL STRIPS INSTALLED