
Question 2: What procedures do you use to test alkylation unit rapid deinventory systems? Do you perform a functional test using acid?

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High level guidelines and philosophy of testing of the valves (as well as all other components) of HF alky safety systems –including rapid acid deinventory or “Dump” systems -is covered in API RP 751 section 2.3.6. The bits of that section that are directly applicable to dump valve testing suggest that the testing procedure should include valve stroking and testing of primary elements and controls. It also says that in addition to individual component tests, each active mitigation system as a whole should be tested to confirm that the system will work as designed. It also says that a service history should be maintained to assist in identifying and correcting problem areas.

Exactly how to do this in each individual unit depends a lot on the specific dump system design in the particular unit. Some units have locked open manual isolation valves that can be temporarily closed to allow testing the dump system as a whole without actually dumping the acid. In units that do not have this sort of manual isolation available, one possible strategy is to decouple the actuators from the valves and test the dump control system separately from the valves. Then, the valves are tested separately by periodically "bumping" them out of the fully closed position to ensure that they have not "frozen" in place.

The frequency of these tests also depends on the individual unit, and the experience of each unit. The feedback Honeywell UOP has received suggests that most refiners test the control system and valve movement about 2 -4 times per year. This frequency is adjusted based on the results -if there are control or mechanical failures in the system, then the frequency must be increased (for example, the frequency and maintenance program can be adjusted to achieve a target such as “less than 1 component failure per 10 tests”).

Testing the dump system as a whole is typically done once each turnaround. There are 2 different ways to test the whole system. Many refiners practice one of these two methods:

1)As the unit is being shut down in preparation for a turnaround, the olefin feed is stopped and then the dump system is activated. This provides a test of the dump system with acid at actual processing conditions at the end of the run.

2)During the startup dry out following a turnaround, the dump system is activated while there is still just iC4 in the system (no acid). This provides a test of the system at the beginning of a run to help ensure that everything is fully operational as the unit comes out of turnaround.

Honeywell UOP recommends that a unit perform a full functional test of the dump system with acid in the system at least once each turnaround. This will prove that the system works as expected and more importantly, it will give the operations staff confidence that activating the dump system will move the unit to a safer condition –and that there will not be any serious problems caused by activating the dump system.

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