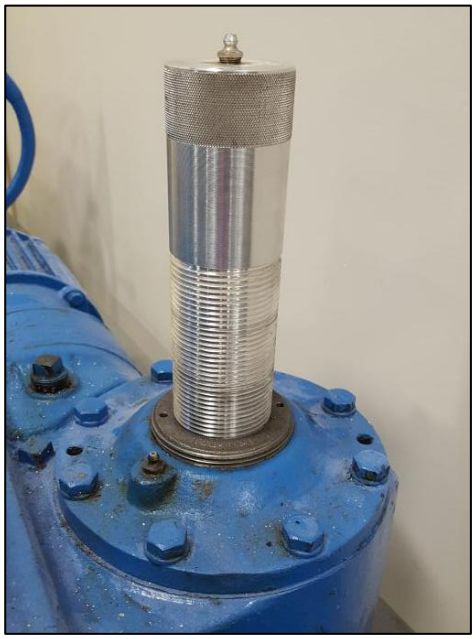
StemThief™ for Grease Lubrication, Sampling, and Analysis of Motor Operated Valves

The StemThief provides an efficient, safe, and cost-effective method for stem relubrication. Created in response to NRC Information Notice 2010-03. The StemThief is able to displace old grease and establish a new lubricating film between the stem and stem nut. Effective relubrication is achieved while providing a sample to evaluate the purged grease in the system, and condition of the threads.



For years, grease analysis has been used as an essential tool to monitor the health of greases, surfaces they lubricate, and optimize grease life. In this case study, multiple StemThief tools were used to relubricate MOVs at the Palo Verde Nuclear Power Plant. The tools enabled quick and effective lubrication during 2-hour LCO windows, avoiding stem or actuator disassembly. SMB-00, SMB-0, and SMB-3 tools have been in use since August 2014 to relubricate selected valves in the facility. Benefits of the StemThief include the ability to lubricate ¼-turn and short-stroke valves without disassembly. All Limitorque SMB valves can be lubricated without stroking the actuator, limiting blocking requirements. In addition to time and labor saved, Palo Verde personnel found that using the StemThief helped to reduce the coefficient of friction. From values as high as 0.15 to the expected 0.10 COF. A recognized increase in safety was achieved by eliminating rigging requirements for some applications. In addition to the use of the StemThief, Palo Verde has an on-site laboratory which performs grease analysis to make data-based maintenance decisions and provide engineering justification for regulatory relief.

Using the StemThief

The stem protector is removed, and a pipe-to-straight thread adapter is installed. Then the lubricator tool is installed. The lubricator is made of aluminum with an O-ring to mate to the flat surface top of the stem nut. The Zerk fitting allows grease to enter through the nut and displace the old grease, applying a fresh layer of lubricant to the threads. The entire operation can be completed in minutes, where in the past disassembly and rigging requirements often extended maintenance time beyond a 2-hour LCO.

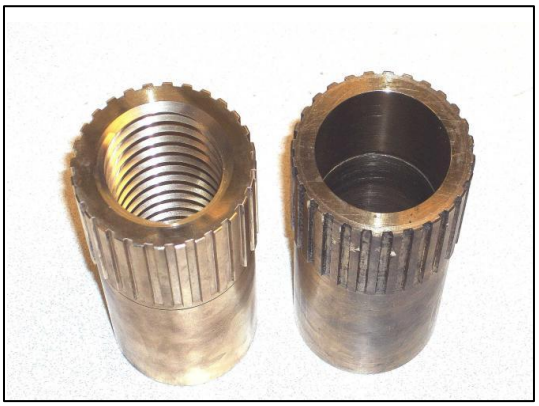


Figure 1. Shows severe stem nut wear on the right.

Grease Sampling and Lab Testing

In-service grease analysis provides an affordable, easy, and effective way to monitor the health of assets and extend life. Periodic scheduled sampling can help to understand how the components are aging over time and develop maintenance best practices. In-service grease analysis leads to identification of potential problems, and further lab analysis can recognize and correct issues before they lead to failure. While Palo Verde has invested in an on-site grease analysis lab, other plants now have a similar option with the introduction of the Grease Thief® PocketLab.

StemThief Advantages:

- Allows for rapid, in-situ stem relubrication in MOVs without disassembly.
- Representative in-service grease samples per ASTM D7718 can be taken from gearbox and stem nuts and can be screened with The Grease Thief PocketLab.
- Outlier samples can be sent to a full-service lab for further analysis to determine metal particle types, severity of wear modes present, and identify contamination.