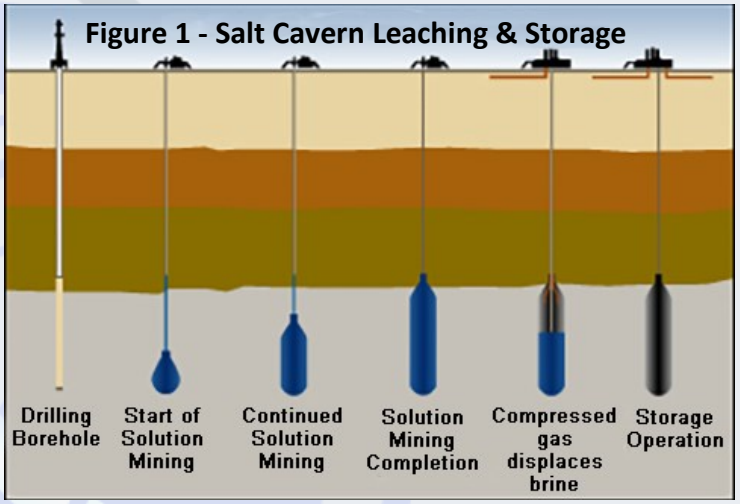
Salt Dome/ Cavern Storage

Underground salt formations offer another option for gas/liquid storage. These formations are well suited for storage in that salt caverns, once formed, allow little injected gas/liquid to escape from the formation unless specifically extracted. The walls of a salt cavern also have the structural strength of steel, which makes it very resilient against reservoir degradation over the life of the storage facility.

Essentially, salt caverns are formed out of existing salt deposits. They can be as large as a mile in diameter and 30,000 feet in height. Typically, salt domes used for gas/liquid storage are between 1,500 and 6,000 feet beneath the surface, although in certain circumstances they can come much closer to the surface.

Once a suitable salt dome deposit is discovered, and deemed suitable for gas/liquid storage, it is necessary to develop a 'salt cavern' within the formation. Essentially, this consists of using water to dissolve and extract a certain amount of salt from the deposit, leaving a large empty space in the formation. This is done by drilling a well down into the formation, and cycling large amounts of water through the completed well. This water will dissolve some of the salt in the deposit, and be cycled back up the well, leaving a large empty space that the salt used to occupy. This process is known as 'salt cavern leaching'. However, once created, a salt cavern offers an underground natural gas/liquid storage vessel that is highly reusable. (See Figure 1)

Figure 1 - Salt Cavern Leaching & Storage



THE PROBLEM:

When leaching the cavern, not only do you bring up salt crystals, but also sand and minerals. This mixture can be very damaging to a valve. Also calcium carbonate forms in the pipe and in the valve. The abrasion effecting the ball, stem and seats will destroy a valve over time. The buildup of the calcium carbonate inside the valve cavity causes the most damage especially in a standard ball or plug valve design. Although, this could happen in any valve that has a cavity for the product to scrape against. When storing gas/liquids in the cavern and pumping them out of the cavern, the media being stored will also have some particles of salt, sand or minerals being pumped out of the cavern, causing valve problems.

THE SOLUTION:

The end user placed QuadroSphere® ball valves in the worst applications and the valves have worked so well Val-Matic was written as a no equal in their specifications. Valve sizes from 4" to 12", ASME Classes 150-600#, in carbon steel bodies, with stainless trim and PEEK seats, were installed. The original valves have been installed for 6 years and no leakage to report. The longer life is due to the unique contoured ball design, that allows the media to flow around the ball and aids in flushing out the ball cavity so no particulates can cause scratching of the ball during open/close cycles. The lip edges on the ball scrape off any media on the seats so no buildup can occur on the seat surfaces.

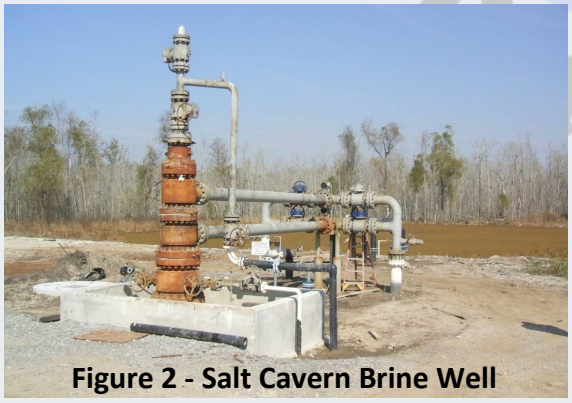


Figure 2 - Salt Cavern Brine Well

THE RESULT:

The original valves are still in service after 6 years, resulting in less down time, maintenance costs and buying new valves, saving the end user money. (See Figure 2)