

## Corrosion Protection for 2 Double Bottom Storage Tanks on Sand/Gravel by Underside Injection IDS

### Project Specifics

Installation Dates  
May 5-13, 2020

Location  
Minnesota, USA

Environmental Conditions  
Between 26-50°F and 31-80% humidity, rained entire first day of project and no rain remaining days.

Details  
Diameter: Tank 1 (100-ft), Tank 2 (100-ft)  
Vessel Construction: No Anchor Bolt(s), No Cathodic Protection (CP) System, Concrete Ring Wall, Liner  
Foundation Details: Sand/Gravel

Inhibitor Delivery System (IDS)  
Underside Injection IDS  
ER Probe Monitoring System

Zerust Product(s) Used  
Zerion® FVS-B15 (Corrosion Inhibiting Powder)



T-1: Deteriorating concrete and extremely heavy caulk needed in the intra-chime area, calls into question the over-all integrity of these tanks.



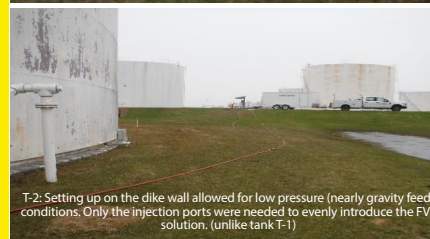
T-1: Sparse remnants of old chime seal tape imply repairs are long overdue.



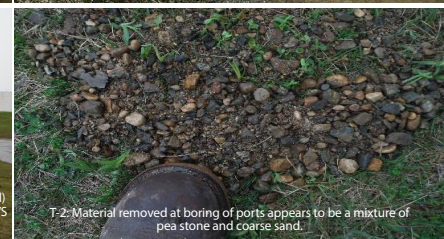
T-1: Regularity of leaks from intra-chime area confirmed even distribution but called for very slow introduction of FVS solution to mitigate loss.



T-1: All 8-ports (injection and probe) were employed to attain best distribution of FVS solution.



T-2: Setting up on the dike wall allowed for low pressure (nearly gravity feed) conditions. Only the injection ports were needed to evenly introduce the FVS solution. (unlike tank T-1)



T-2: Material removed at boring of ports appears to be a mixture of pea stone and coarse sand.



T-2: Slow injection proceeded until FVS solution appeared at the opened probe ports. Virtually no chime leaks, possibly due to less metal loss in intra-chime area versus T-1 which allowed for more effective caulking.



T-2: Mixing by way of recirculation proved very efficient. Enclosed trailer easily contained waste during very windy conditions.

### Project Specifics

The client wanted corrosion protection for two aboveground storage tanks on sand/gravel foundation with concrete ring walls, liners, no anchor bolt(s), and no present CP system.

### Zerust Solution

The engineers at Zerust® Oil & Gas developed custom solutions for this client, and with the support of local contractors, successfully completed the injection of the corrosion inhibiting solution on both tanks using Zerust's Underside Injection IDS method.

### Project Installation

**Tank 1**  
The double-bottom was installed in 1992 with 4" of sand filling the space between the old and new floors. Noted 1-2" gaps in intra-chime area. The last 653 inspection was in 2013.

Eight (8) ports were drilled into Tank 1 and a wet/dry vacuum was used to extract the sand for the insertion of a pipe into each port. The gaps between the dead shell and second bottom filled were sealed.

### Project Installation Continued

Due to cold temps the sealant was given a day to cure while the team worked on preparation on Tank 2. Once sealant was cured, a strong mixture of the corrosion inhibitor solution was slowly pumped into all 8 available ports.

#### Tank 2

The double-bottom was installed to same specs as Tank 1 in 1981. 1" or less gaps in intrachime area. A considerable concrete filling of the intra-chime holes was necessary. The last 653 inspection was in 2017.

Three useable ports were drilled and remaining unuseable were filled. The chime area was slightly better on Tank 13, a better caulk job was possible and no leaks other than about the probe pipes were observed. This allowed for using injection ports only for FVS introduction. As previously done, a near gravity-feed pressure was used at each injection port until FVS solution was observed coming out of near-by probe ports.

### Conclusion

All provided corrosion inhibitor solution was applied beneath the targeted tanks and ER probes for IDS monitoring were installed.