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July 1, 2014

Mike Cole, P.E.  
Utility Project Manager  
City of Gillette  
611 Exchange Ave.  
Gillette, WY 82717

Re: Pine Ridge Steel Tank Comparison and Recommendations

Dear Mr. Cole:

The purpose of this letter is to discuss the disadvantages of bolted steel tanks when compared to welded steel tanks and to confirm the recommendation for construction of a welded steel tank at the Pine Ridge site for the GMMP project.

### **Bolted vs Welded Tank Comparison**

Bolted steel tank walls are assembled with steel plates that are bolted together. Sealant is applied to the joints prior to wall plates being bolted together. The sealant has a life of 10 to 15 years, if it is applied correctly. This type of steel tank would require over 1100 linear feet of joint sealant be installed and inspected on a regular basis. There would be approximately 3,000 bolts used to fasten the wall plates together which would also need to be inspected and repaired periodically. The bolts corrode easily because they are exposed to the atmosphere and contain many crevices to harbor corrosion. Alternatively, welded steel tanks have wall plates that are assembled by fully seal welding joints by certified welders, welding machines, and inspected by radiographic testing. The welded steel tank wall plates are field painted to provide a seamless lining that needs minimal maintenance with a useful life of 20 to 30 years.

Historically, bolted steel tanks are prone to leakage at joints. The only way to fix leaks in bolted steel tanks is to use more sealant. However, sealant does not properly adhere to itself so the old sealant must be removed and reapplied. It may be necessary to pull off entire wall panels, clean the sealant off, and reapply new sealant to perform proper repairs. Alternatively, leakage has not been an issue with welded steel tanks.

Leaks in bolted steel tanks are difficult to locate and repair from inside the tank because the water may be running along a plate seam to make its way out of the tank (the interior damaged area may be several feet from the actual exterior leakage point). As indicated above, leakage has typically not been an issue with welded steel tanks.

Bolted steel tanks have a life expectancy of 10 to 15 years which is based on removal and reinstallation of the wall panel sealant. The cost of sealant replacement may exceed the cost of the initial installation of the panel. In contrast, the welded steel tank has a life expectancy of 50

Mike Cole, P.E.  
City of Gillette  
July 1, 2014  
Page 2

years using the same criteria. The welded steel tank could be repainted at least three times without exceeding the cost of the initial installation.

Based on shop applied wall panel coatings and the speed of erection, there could be cost savings expected for a bolted steel tank. However, according to recent pricing received from the bolted steel tank providers, we have not found this to be the case. As such when comparing quality and value, the bolted steel tank option has not been in the best interest of our clients.

### **Recommendation**

Burns & McDonnell strongly recommends against using a bolted steel tank for the Pine Ridge Tank project based on the potential leakage, future maintenance requirements, and cost of ownership, presented above. The possible cost savings of a bolted steel tank do not out-weigh the long-term costs associated with maintenance and repair.

Please call me if you require any additional information or have any further questions on steel tank types. I can be reached at (303) 474-2220.

Sincerely,



Andy Hundley, P.E.  
Project Structural Engineer