

Date: Tuesday, April 24, 2018

Project: Arlington County North Side Salt Tank Structural Review

Project No: 18124.01

Submitted by: Rocky K. Styer, PE (RKS)

Purpose: Structural Conditions Survey

Discussion:

On this date, at the request of Arlington County, the writer, along with Rami Natour (ACG), visited the North Side Salt Storage Tank structure at 4753 Old Dominion Drive in Arlington, Virginia. The County, with S3E's design support, had temporarily rehabilitated the structure back in May of 2012 to extend its life. A full replacement of the tank was not pursued at the time due to limited funding. The structure is a round metal storage tank resting on grade. The sides of the tank are curved steel panels riveted together to form the cylindrical shape. A metal roof covers the structure and a concrete slab and foundation provides its base. The 2012 effort was provided as a temporary repair to extend the life of the structure without replacement of the skin. At that time the structure was already showing significant signs of corrosion and loading vehicle damage to the concrete base at the entrance. The limited 2012 effort introduced interior, perimeter columns and beams to support the existing roof framing and limit loading on the existing metal skin. Plating was also added to portions of the skin to repair some of the most corroded areas. Existing concrete bases were repaired and new concrete wraps were provided at the base of each new column.

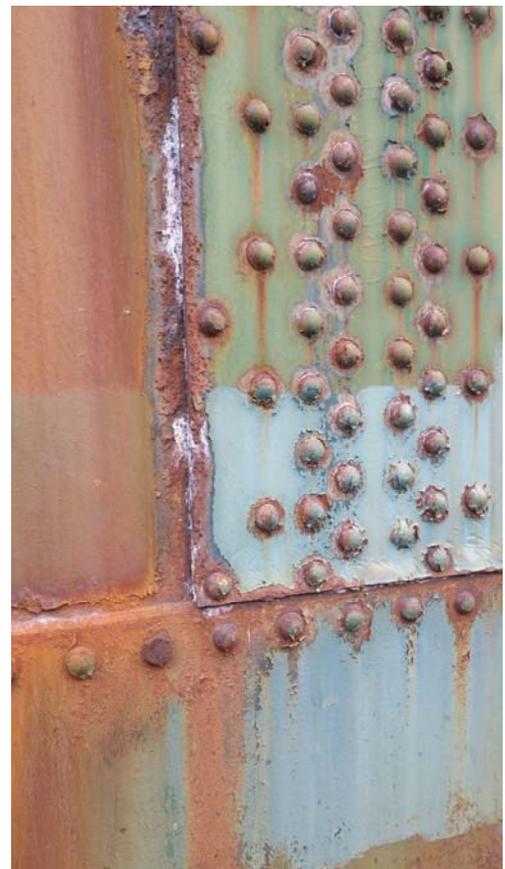
The current walkthrough noted a continuing deterioration of the existing metal plate walls and surface deterioration of the new columns installed in 2012. It also noted significant damage to the base concrete at the entrance. In some areas the perimeter steel plates have bulged (see photo above) under the pressure of the stored materials. They also are pocketed with a myriad of individual corrosion holes around the majority of the tank. These holes are of various sizes and in many occurrences the stored material can be observed as it is pressed against the walls. As it was raining during our visit we noted the wet sides of the tank and noted that the material can react with the rain water and possibly leech down the side of the tank. Some such leeching was observed. The number and concentration of the skin damage suggests the potential for a localized side wall rupture which might further expose the stored chemical to the environment.





The damage noted to the perimeter skin aside, there is also corrosion on the interior columns (see above) added in the 2012 effort. This corrosion was noted on the exposed steel columns just above the stored chemical pile. The original paint has peeled under the effects of the corrosion. Only a small sample could be viewed owing to the volume of material currently stored in the building but it is likely that similar conditions occur at all the columns on some level. Surprisingly no significant roof leaks were noted during our visit. The open entrance however allows significant moisture to enter the base of the tank and puddle at the threshold. Adjacent to the threshold there is significant damage to the concrete base ring around the tank. It is not clear if this is all new damage or if original repairs were not pursued. There is exposed, corroded rebar and concrete spalls around.

Based on our observations it is our opinion that the extent of damage to the tank skin makes it near impossible to adequately repair. However, if it does not receive some attention it will continue to leech material (see photo on right) and likely experience additional bulges and localized failures as the material inside is loaded and unloaded. The perimeter should therefore be repaired or replaced or an



interior liner added to strengthen the remaining material and secure the stored contents. The interior steel needs attention as well to maintain the structural integrity. It needs to be abraded to remove the corrosion and then coated with a chemical resistant paint or coating. Current buried columns will need to be exposed to review their condition as well. As in the original 2012 documents the concrete damage to the base should also be repaired. Given the risks involved with the current tank situation, the costs involved to further the repair, and the unsightliness of the tank in general, the County may wish to replace the structure in its entirety.

The above is the observations and recollections of the writer. Any discrepancies, disputes, or misunderstandings should be issued in writing for clarification.

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