Spring 2021 – 653-2051

Title: Allow Limited Extension of Bottom Service Interval After Non-Complying Robotic Inspection Results

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Revision: ~~0~~2

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Purpose: Make sure Owners are not put in the position of having to take tanks out of service unexpectedly after performing in-service bottom inspections.

Source: Earl Crochet

Impact: Significant

Discussion:

When API 653 was created, the only way to inspect and determine bottom plate thickness was when the tank was out of service. Advancements in technology now allows Owners to get bottom plate integrity data while the tank is in service, under certain conditions. In addition, based on existing technology, it may become possible to do an equivalent bottom inspection while the tank is in service in the not too distance future.

So, what happens today if you perform a bottom assessment and find that the tank is below the limits of Table 4.4 but the tank is not leaking? When API 653 is used either as a regulation or as a company procedure, there is no current way to handle this situation.

The use of robotics and other online and onstream data collection technologies continue to gain acceptance in the industry. For these technologies to continue to be used in the industry, Owner/Operators need a reasonable time frame to handle the results of the inspections.

For additional context, liquid pipelines regulated by DOT/PHMSA are inspected every 5 years by ILI or “smart pigs”. These pipelines operate at pressures from 285 psi to over 1,000 psi. PHMSA allows pipeline operators time to inspect and remediate the pipelines based on the severity of the findings. Tanks operate at much lower pressures and the risk to the public is significantly less with a tank in a facility than a pipeline outside the fence.

Proposed Changes:

Existing

6.4.1.2 All tanks shall have a formal internal inspection conducted at the intervals defined by 6.4.2. The authorized inspector shall supervise or conduct a visual examination and assure the quality and completeness of the nondestructive examination (NDE) results. If the internal inspection is required solely for the purpose of determining the condition and integrity of the tank bottom, the internal inspection may be accomplished with the tank in-service utilizing various ultrasonic robotic thickness measurement and other on-stream inspection methods capable of assessing the thickness of the tank bottom, in combination with methods capable of assessing tank bottom integrity as described in 4.4.1. Electromagnetic methods may be used to supplement the on-stream ultrasonic inspection. If an in-service inspection is selected, the data and information collected shall be sufficient to evaluate the thickness, corrosion rate, and integrity of the tank bottom and establish the internal inspection interval, based on tank bottom thickness, corrosion rate, and integrity, utilizing the methods included in this standard.

Table 4.4—Bottom Plate Minimum Thickness

Minimum Bottom Plate Thickness at Next Inspection (in.)	Tank Bottom/ Foundation Design
0.10	Tank bottom/foundation design with no means for detection and containment of a bottom leak.
0.05	Tank bottom/foundation design with means to provide detection and containment of a bottom leak.
0.05	Applied tank bottom reinforced lining, > 0.05 in. thick, in accordance with API 652.

Proposed Change

6.4.1.3

If after using the on stream ~~alternative~~ inspection methods allowed in 6.4.1.2, it is determined that the bottom has one or more ~~areas~~ indications less than the minimum allowed by Table 4.4, the following shall happen:

- Calculate the corrosion rate based on the last out of service inspection and the deepest pit found during the latest ~~online~~ on stream inspection.
- The tank shall be ~~scheduled to be~~ removed from service either ~~the lesser of~~:
  - When the calculated minimum thickness remaining is ~~estimated~~ calculated to be half of the value in Table 4.4
  - Or ~~6~~ 12 months, whichever comes first