

CASE STUDY

Identifying Damaged Trays in an Amine Regenerator Tower

THE CHALLENGE

Many of our customers deal with the experience of poor throughput on their amine systems. In this case, the amine regenerator had low differential pressure and a high temperature on the overhead outlet. It was not stripping the H₂S out of the amine effectively. The towers were in operation and the customer did not want to experience an unplanned shutdown without an action plan.

OUR RESPONSE

ScanTech was asked to perform a Gamma Scan on the amine regenerator tower to determine the fluid characteristics and the status of the trays within the tower.

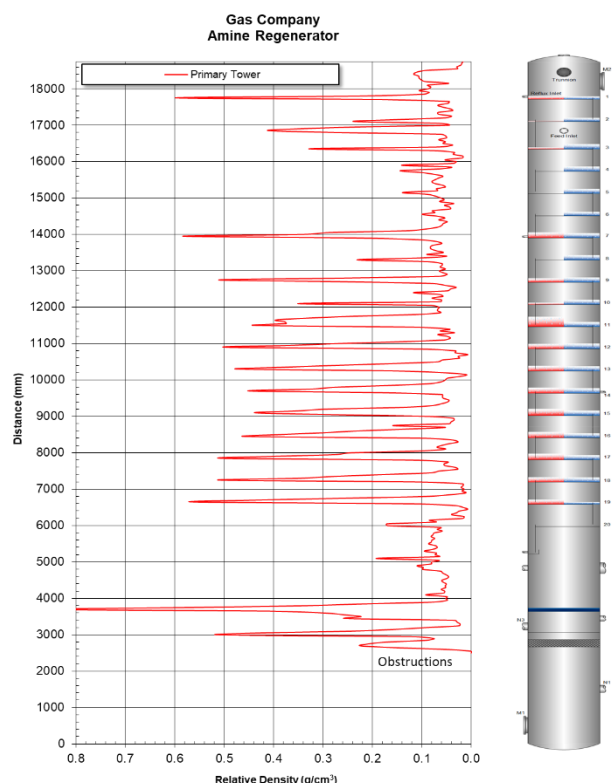
THE SPECIFICS

No alterations to the operating conditions or preparation to the tower were required. The scanning crew used existing platforms and ladders to access the top of the tower.

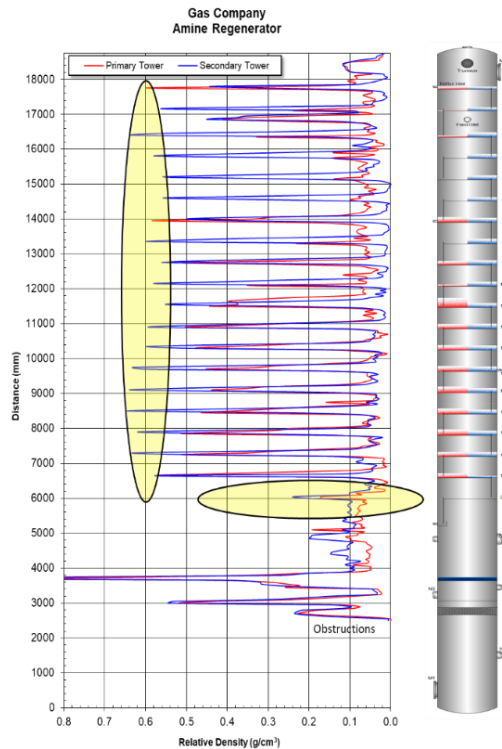
GAMMA SCANNING RESULTS

A non-invasive Gamma Scan was completed on the tower under operating conditions. The scanning crew saw the graphical results in real time and could immediately see that several trays were not in position or were damaged. Trays 2 to 6, 8, 10 and 20 showed irregular gamma scan profiles which could indicate missing or damaged trays. Tray 11 displayed a high erratic liquid level which could have been caused by tray debris from above.

The Gamma Scan data obtained correlated with the operational data of a low differential pressure and higher overhead temperature due to the missing trays allowing vapour to bypass quickly up the tower. The missing trays were responsible for the lack of liquid to vapour interaction resulting in poor amine quality leaving the regenerator.



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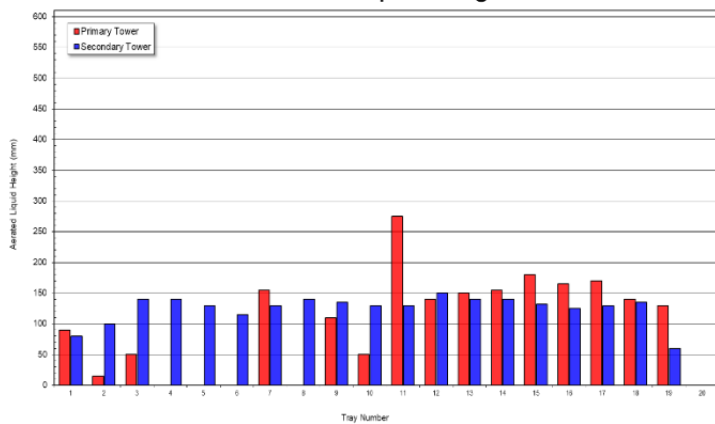


An identical amine train was operating on the same customer site with no apparent issues. The customer asked the scanning crew to scan the working amine tower to obtain a direct comparison to the poorly operating tower.

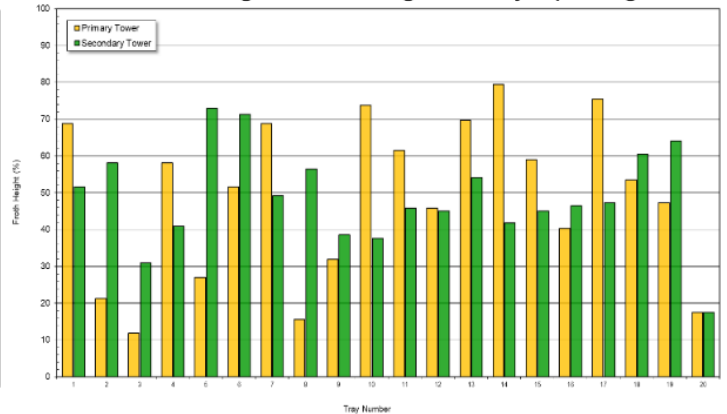
The Gamma Scan from the primary tower and the secondary tower were overlaid on the same plot for direct comparison. In contrast to the primary tower, the secondary tower showed most of the trays to be in position with consistent tray profiles, uniform liquid heights and good liquid to vapour disengagement between the trays.

Unexpectedly, the bottom most tray in the secondary tower was found to be damaged and not holding an aerated liquid level. This was identified by the low absorption profile compared to the trays above.

Aerated Liquid Height



Froth Height Percentage of Tray Spacing



CASE STUDY CONCLUSION

- The customer had received the necessary information to order the tray parts in advance of stopping production and shutting down. They could efficiently plan for minimized downtime.
- Parts could be ordered for the secondary amine regenerator as it was noted that a bottom tray and seal pan were required to be installed at the next planned or unplanned shutdown.
- Any future issues with the towers would likely only require one scan after having a baseline scan of the almost perfectly working secondary tower.

For more information on how Gamma Scanning can assist your operation, contact us at don@scanningtech.com or call us at 780-410-0563.

