

**CASE STUDY**

## Identifying Maldistribution of a Packed Tower with Gamma Scans

### THE CHALLENGE

Customers often have towers that are underperforming and are at a loss as to the cause of the issue with the available troubleshooting methods on site. In this case study, the tower had limited stripping capacity while the operating parameters remained within “normal” boundaries. The customer suspected possible fouling within the packing and requested a Gamma Scan to confirm.

### OUR RESPONSE

ScanTech suggested a Grid Gamma Scan be performed on the wash tower to determine not only the mechanical integrity within the tower but also the relative liquid and vapour distribution within the packing.

### THE SPECIFICS

The tower had 2 beds of random plastic high flow rings. Gamma Scanning was conducted while the tower was on-line, using existing platforms and ladders to access the top of the tower. Four Gamma Scans were arranged in an equidistant grid pattern and completed in approximately 6 hours, overlaying all the results for comparison.

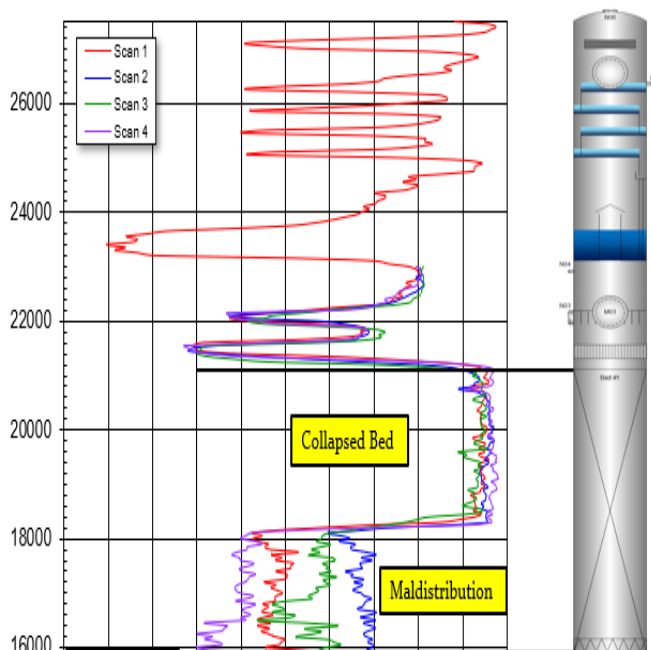
### GAMMA SCANNING RESULTS

The demister and the 4 trays within the reflux section were all in position and displayed uniform tray profiles. The chimney tray was in position and holding the expected liquid level.

The feed inlet pipe and distributor were in position above the upper packed bed. The profiles were uniform among all 4 scans.

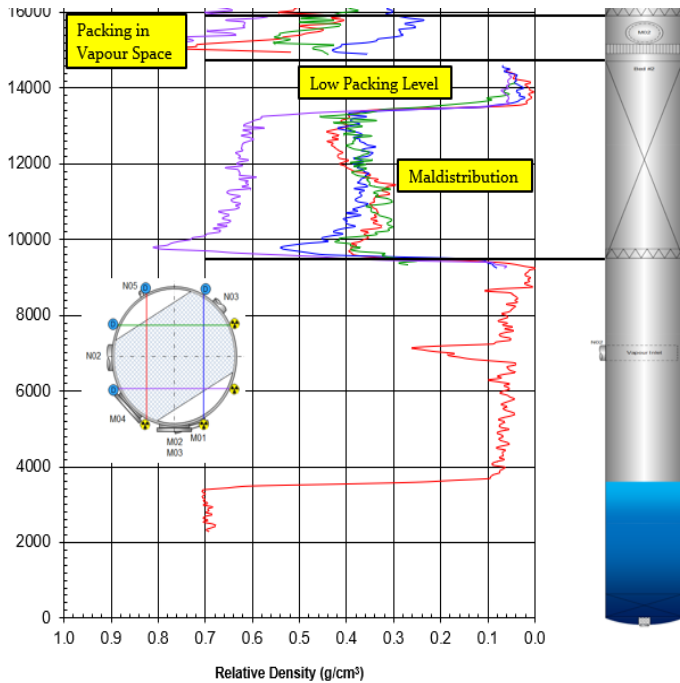
The top of the upper bed displayed a vapour density for 3 meters indicating that no packing was present in this location. The bottom of this bed appeared to have collapsed and fallen to the level of the distributor below. The liquid distribution was non-uniform with a higher density on Scan 4 indicating more liquid on this side of the tower and the least liquid on the Scan 2 side of the tower.

*Petrochemical Company Wash Tower  
Top of Tower Scanning Results*



## CASE STUDY

### Petrochemical Company Wash Tower Bottom of Tower Scanning Results



The vapour space between the packed beds exhibited a high density due to the presence of the packing from the bed above.

The distributor above the lower bed did not display well due to the packing and liquid maldistribution affecting its scan profile.

The lower bed was approximately 1 meter below design height with the remainder of the packed bed in position. The lower packed bed also displayed maldistribution with the most liquid again on the Scan 4 side of the tower.

Clear vapour was present beneath the lower bed with a density absorption due to the vapour inlet piping. The liquid level in the base of the tower was 3600 mm above the lower tangent line.

Graphical representation of the density distribution along the scan lines in the upper and lower beds.



### CASE STUDY CONCLUSION

- All the trays in the reflux section of the tower were in position and holding liquid.
- The upper bed had collapsed through the support to rest on the lower distributor. The top of the bed was now 3 meters below design elevation. This bed displayed severe maldistribution.
- The lower bed height was determined to be about 1 meter below design with this bed also experiencing flow maldistribution.

For more information on applying Grid Gamma Scans in your packed towers, contact us at [don@scanningtech.com](mailto:don@scanningtech.com) or call us at 780-410-0563.

