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**Question 55: What are your effective ways of measuring vacuum overflash flow in a gravity seal loop (not pumped)? Please comment on overflash measurement for controlling wash oil flow.**

**MAUREEN PRICE** (Fluor)

Fluor's standard design to measure overflash that is not pumped uses a simple loop and an orifice plate. Having adequate elevation difference to route the overflash return to the top stripping tray is needed. It is easy to do on a new unit, and sometimes more difficult to do on a revamp. One of Fluor's clients did not have adequate elevation difference between the overflash draw nozzle and the return nozzle to overcome the orifice plate dP (differential pressure; delta P;  $\Delta P$ ) and other minor friction losses. In this revamp scenario, the overflash has been routed to the vacuum tower sump. Other clients will not accept this reroute to the sump, as the flow could be 1 to 2% of the bottoms product that is not stripped. Steam-tracing is required for lines, instrumentation tubing, and the sample panel.

It is not recommended to control the wash oil flow rate directly via a cascade from the overflash rate. Instead, sample the overflash and back-calculate the percent gas oil in the overflash; then, calculate the gpm /f<sup>2</sup>(gallons per minute/square foot) of gas oil leaving the bottom of the wash bed. Some clients will be targeting the flux as low as 0.1 gpm/f<sup>2</sup>; others prefer to stay closer to 0.25 gpm /f<sup>2</sup>. The wash oil is on flow control only and set point changes are made manually based on the flux calculation after samples are analyzed.

Sample collection is challenging due to the high temperature and sub-atmospheric pressure. The use of an evacuated sample bomb in a gravity flow-through loop may be an effective means of sample collection. Analysis of the wash oil and the overflash (high-temperature simulated distillation) are needed to distinguish between spent wash oil and entrained flash zone liquid.

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