**Regeneration of Ligand Depleted Media**

The purpose of this work was to explore the addition of ligand to a media that was ligand depleted in use. The following experiment was completed. 30L of Brine simulant 1M was passed through 2g of Media 1M -50+100 (ratio of 15,000 to 1) at 70oC under standard process conditions within a model column, 1.6 cm by 15 cm. Total pump time was approximately 320 hour. The media that remained lost 32% of the ligand that was originally bound to it.

By introducing fresh ligand in the brine during pH equilibration after REE stripping it was anticipated that the ligand equilibrium between the media substrate and the solution would be driven toward the substrate thus regenerating the ligand concentration on media

Approximately 1 g of depleted media was placed in a standard microcosm shaker test vessel. At 70oC the vessel was charged with 75 ml of Brine 1M at pH 5.5 containing 40 mg of ligand. It was agitated for 4 hours and samples taken for analysis.

98% of the available ligand was removed from solution and sorbed onto the media effectively regenerating the media. This work was extended to in situ ligand replacement on the depleted media within a working sorption column.

The experimental setup was the standard column, packed with 5 g media 1 -50+100. Brine 1CF was used. The complete proof of concept protocol follows.

* Column Equilibration – 9.1 ml Brine 1CF, pH 5.5
* Load 412 ml - 100 ppm TREE-7 in Brine 1CF
* Wash - 50 ml Brine 1CF
* Strip - 15 ml (2 void volumes) 1.5 M HNO3
* Rinse – 50 ml Brine 1CF
* Wash – 15 ml DI water
* Regenerate – 8 ml 1.56M NaOH w/ 4.1% ligand
* Wash – 15 ml DI water
* Wash – 100 ml Brine 1CF, pH 5.5

This protocol was repeated to represent two complete Load/Strip/Regenerate cycle. The load and strip results from both cycles were equivalent. All of the REEs in the load were removed by the media and they were quantitatively recovered in the strip. The load was 0.8 % by wt, approximating what might be experienced at a commercial operation. No degradation in the column was noticed.