LIGHTNIN
EXTRACTION news
A Newsletter for Solvent Extraction Engineers
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Full-scale Testing Proves Lab Estimates Of LIGHTNIN SX System Performance

Calibrating the flow weir.

Using a 9,000-gallon tank and a 73-inch diameter impeller, LIGHTNIN proved to a customer in a full-scale test that its new solvent extraction system not only met, but exceeded, small-scale performance estimates.

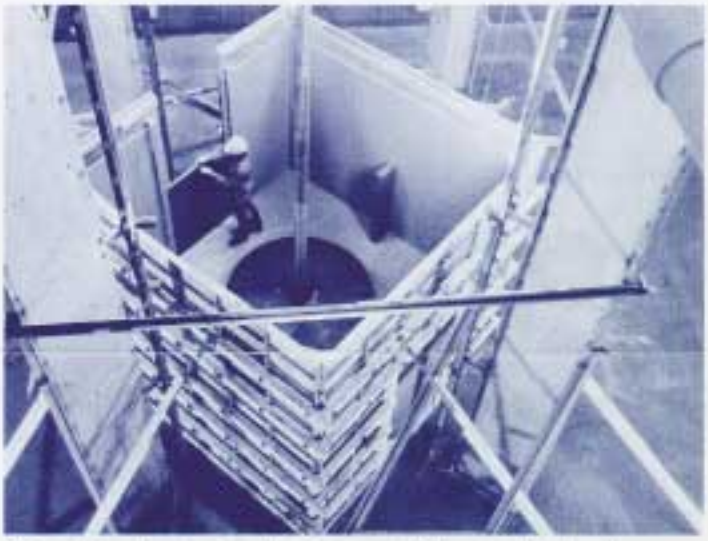
Last year, LIGHTNIN was requested to design a solvent extraction system for a customer building a new plant in South America. LIGHTNIN responded with a system that incorporated the new R-320 pumper impeller for proper head, flow and hydraulic efficiency and the A-6000 auxiliary impeller for good contacting and minimal shear.

Because of the newness of the technology, the customer required that LIGHTNIN guarantee process results, including flow and head, that were determined in lab-scale tests using a 6-inch R-320 impeller.

To do this, LIGHTNIN built a 9,000-gallon container within its 50-foot test tank at its Rochester headquarters and installed the 73-inch metal R-320 impeller that would be used in the actual installation.

Based on the lab-scale experiments, LIGHTNIN guaranteed a flow of 2400 cubic meters per hour against 32 inches of head. With the customer and the engineering company witnessing the full-scale casts, flow and head values exceeded predictions by more than 10 percent.

The unit was shipped in May. Start-up is expected by the end of the year.



Full-scale testing confirmed scale-up predictions and allowed LIGHTNIN to guarantee results.

Senior Research Technician Dick Hawk shows lab-size impeller compared to full-size version.

Defining the Process Will Influence the Mixing System

Fluid mixing can be a simple process, with every aspect of mixer performance easily evaluated, or it can be extremely complex, with many independent steps involving a variety of process phenomena. Problems can arise when trying to distinguish between processes to which comparatively simple and visual concepts can be applied and those for which more elaborate quantitative aspects must be explored.

Here are some examples:

Solid-Liquid Reactions

Consider a mixing process, such as copper leaching, that requires the suspension of solids in a liquid and also requires a chemical reaction between components of the liquid and solid phases. If the process engineer decides that the chemical reaction should occur when a suitable degree of solids suspension has been achieved, it would be appropriate for the engineer to issue specifications calling only for a specific degree of solids suspension.

Gas-Liquid-Solid Reaction

Consider gold bio-oxidation as an example of a chemical reaction in the liquid phase that involves gas-liquid contacting, gas-liquid mass transfer, and the suspension of solid catalyst particles. In this case, it might be tempting to issue a specification calling for the "dispersion of 1,000 SCFM of gas" in the liquid, for example. Although the dispersion of gas is obviously required, it may not necessarily be the limiting factor. First, the specification might not be interpreted consistently, because there are many definitions of "dispersion." Second, even if you can see gas being dispersed into liquid, this doesn't necessarily mean adequate mass transfer is occurring.

Heat Transfer

Control of the flow of heat in a desired manner is an important consideration in designing reactors for such applications as pressure sulfide oxidation of gold ores. Uniformity of temperature may also be critical. Many chemical and biological processes are either endothermic or exothermic, and usually require some kind of heat transfer control.

Conclusion

The key to specifying a mixing process is to separate the simple from the complicated. Try to identify what is controlling the process and focus on that.

LIGHTNIN Debuts Solvent Extraction Model at SME

Research that led to the development of the new R320 pumper impeller was presented at the Society for Mining, Metallurgy and Exploration conference and exhibit in March.

The R320 impeller can increase yields and greatly lower organic entrainment levels in copper solvent extraction. Details were presented in a technical paper, "Improve the Performance of Your Copper Solvent Extraction Process by Optimizing the Design and Operation of Your Pumper and Auxiliary Impellers," written by Thomas A. Post, Michael A. Giralico and Michael Preston.

The R-320 composite pumper impeller.

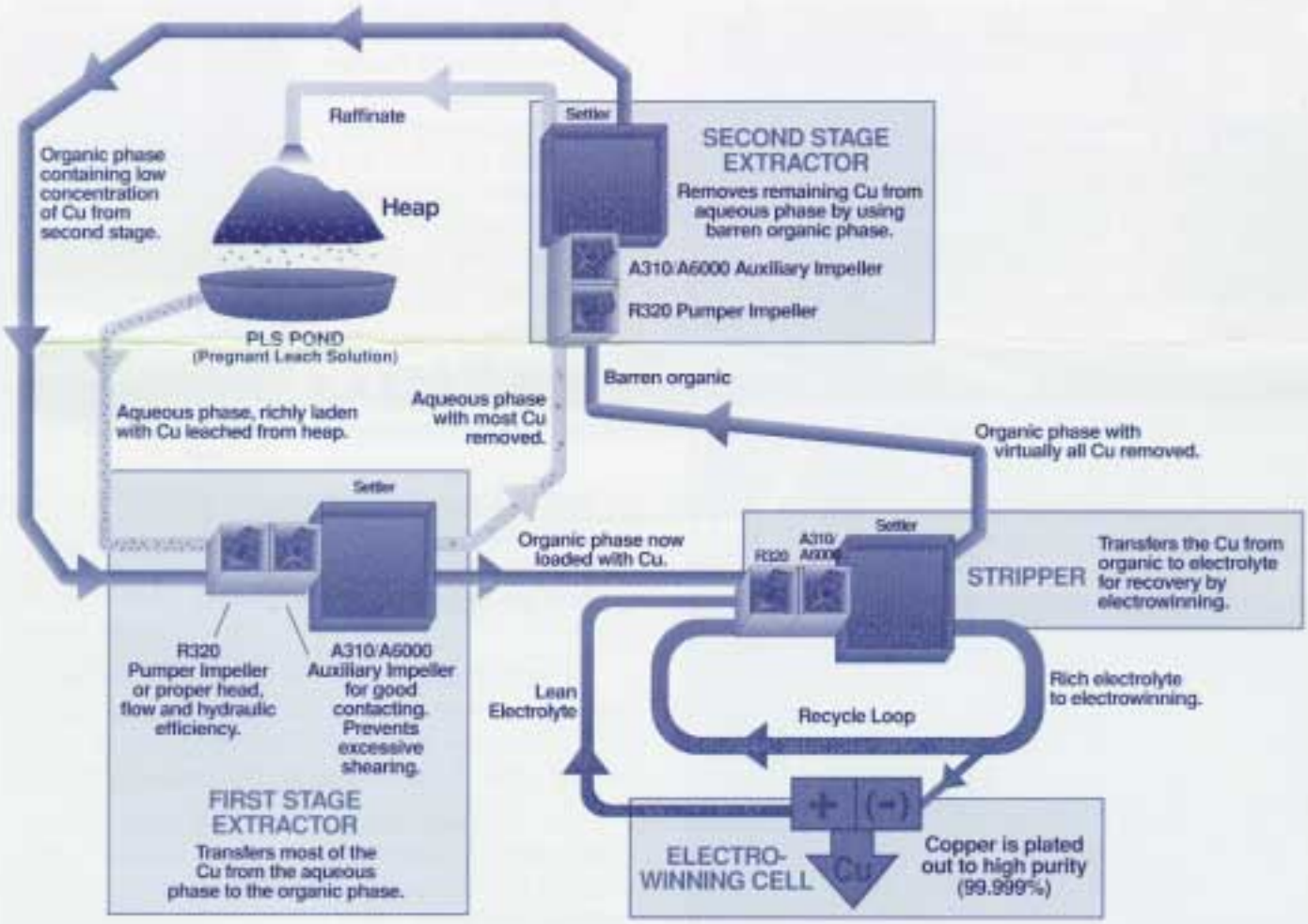
Guaranteed Results

Working together, you and LIGHTNIN determine how mixing can optimize your process. Then we guarantee the results.

LIGHTNIN operates the world's largest mixing labs, in which we can test your actual materials to determine optimal flow, head, power and other factors. Our proprietary computer software predicts performance for your specific process conditions and allows us to select the proper mixing box and impeller configuraton.

Once we recommend an impeller, you can study its operation in a mixing vessel during a variety of lab-scale tests. Simultaneously, you see all of the relevant parameters measured. All of this is recorded on video tape for immediate or future analysis.

The Solvent Extraction Circle



For additional product or application information, call your local LIGHTNIN sales engineer, located in principal cities around the world. In the United States, call toll free, **1-800-320-3526, ext. 633**, for the name and phone number of the LIGHTNIN representative in your area.

Questions or comments for the LIGHTNIN Extraction News should be forwarded to:
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Richard Howk
Senior Research Technician Dick Howk, an 18 year veteran at LIGHTNIN, is primarily responsible for research testing. Dick has an AAS degree from Rochester Institute of Technology.

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Senior Application Engineer Mike Giralico is responsible for solvent extraction and electro-winning market development worldwide. He has been with LIGHTNIN seven years. Mike has a bachelor of science degree in environmental engineering from the University of Dayton.

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