

# AQUEOUS-ORGANIC INTERFACE MONITORING IN THE SETTLERS OF THE SX PLANT BY ULTRASONIC METHOD

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## Abstract

Heap leaching, solvent extraction, and electrowinning do extraction of copper from oxide ores at Sarcheshmeh Copper Complex. Sulfuric acid is the leaching agent, which is distributed on the ore heap. The pregnant leach solution (PLS) containing 3-3.5 g/l copper ions is delivered to the SX plant where an organic phase containing ACORGA or LIX extractant selectively extracts copper ion in mixer-settler units.

Aqueous and organic phases are separated in the settlers. The system was originally designed to measure the depth of each phase in the settler manually by a graduated glass tube called DEEP, and the level of the phases were manually controlled utilizing an adjustable rotating weir.

In this investigation, an ultrasonic system with appropriate software is designed for continuous measurement of the depth of the phases and the results are recorded in a computer. The results of this investigation show high accuracy of the operation of the system. Also several parameters such as; reduction of the organic phase loss, reduction of environmental pollution, safe operation for operators, and decreasing the organic phase entrainment in the aqueous phase can be optimized with the new ultrasonic controlling system.

## Introduction

Leaching, solvent extraction and electro-winning (LX, SX, EW) processes have become increasingly important to concentrate, purify and separate metal ions and inorganic salts. The most common commercial application of these processes is in the copper industry [1]. A large number of commercial SX/EW plants have been successfully commissioned all over the world in the last two decades [2].

Typically, the process starts with the crushing and grinding of ore. The ground material is collected in large heaps, which are sprayed with an acid solution to dissolve out the metal from the ore. The metal is transferred to the aqueous phase, called the pregnant leach solution (PLS). After the leaching stage, the solution contains impurities, which have to be removed. A simplified flow diagram of the process is shown in Figure 1.

The solvent extraction stage decreases the proportion of impurities and concentrates the solution. The metal ions are selectively removed from the aqueous PLS via the