

USER'S MANUAL FOR THE U.S. BUREAU OF MINES IN SITU COPPER OXIDE MINING COST MODEL

By Joseph M. Pugliese, Mining Engineer
Orin M. Peterson, Mathematician.
Twin Cities Research Center,
U.S. Bureau of Mines, Minneapolis, MN.

ABSTRACT

The U.S. Bureau of Mines has produced a generic in situ copper mine design manual, which contains a computerized cost model for in situ copper oxide mining. The model specifies (1) site-specific parameters, which must be quantified for mine design, (2) a method for minesite design based on those parameters, and (3) a procedure for assessing economic viability for the mine design. The menu-driven computer program performs calculations for developing commercial mine design specifications, as well as capital and operating costs. The default values are based on 1986 dollars, and indices for updating costs are included. The program also provides discounted-cash-flow rate of return (DCFROR) and allows for sensitivity analyses for an in situ mining operation at any specific undisturbed copper oxide deposit.

This report is to be used with the 1990 version of the computer program, which has been made user friendly. It describes the files, tutorial, input phase, help function, and monitor display of all calculated values and of the DCFROR table. The monitor-displayed discounted initial value of investment and annual operating costs are defined. The dual rate-of-return situation and sensitivity analyses are also briefly discussed. Information is provided on obtaining the computer program on diskette.

INTRODUCTION

The U.S. Bureau of Mines believes that the competitive position of the Nation's copper industry can be significantly improved with the application of in situ leach mining techniques. A long-term objective of the Bureau is to increase the probability of the domestic production of copper by the private sector, using in situ leach mining methods. As part of the effort to meet this objective, the Bureau is conducting research to provide the mining industry with the means to design the most economically successful in situ copper operation for any specific deposit.

In 1986, the Bureau initiated a research program emphasizing in situ mining of shallow to moderately deep (500 to 2,000 ft) copper oxide ores. At that time, the Bureau contracted with Science Applications International Corp. (SAIC), McLean, VA, to provide a generic in situ copper mine design manual for developing economically successful mining operations in copper oxide deposits. The contractor examined two copper oxide sites near Casa Grande, AZ, and designed an in situ copper-leaching field experiment and a