Comparison of laboratory, pilot plant, and tankhouse copper cathodes

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The criteria that serve as the basis for the engineering design of a commercial plant are frequently based on other commercial operations. Where conditions are not within those of ordinary industrial practice it is necessary to rely upon results of small-scale investigations.

Laboratory- and pilot-scale copper electrowinning work was performed to determine whether small-scale experiments can be used to predict tankhouse cathode quality. Five-day copper plates were made from commercial copper tankhouse electrolyte on 14- by 13-cm and 95- by 27-cm starter sheets. The experimental cathodes were compared with a commercial cathode produced by the same operating plant that supplied the electrolyte. Cathodes produced in laboratory and pilot plant cells met chemical specifications for LME Grade "A" copper cathode, and they exhibited a morphology similar to the tankhouse cathode.

Glow discharge mass spectrographic (GDMS) analyses are presented, as well as photomicrographs of cathode cross-sections. Current efficiencies and energy consumptions are reported. Details of the experimental electrowinning cells and experimental methods are given.