عنوان مقاله:

Energy Conservation in Fluid Process Plants By Hydraulic Optimization

محل انتشار:

دومین کنفرانس بین المللی رویکردهای نوین در نگهداشت انرژی (سال: 1391)

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خلاصه مقاله:

Mineral beneficiation processing such as coal, gold, copper, iron, and a host of other ores are aqueous separation processes which usually require huge volumes of water that are continually recycled. Scale formation in process lines and equipments can be quite severe. Plant downtime due to uncontrolled scale formation can have a direct negative economic effect. In the present paper, a case study is done for a copper smelting process. In the fluid-process plant, pumping costs can run as the main operation costs. The diameter of the pipe strongly influences the present value of the plant, through both the annual cost of electric power and the installation cost of the piping system including pipes, pumps, and valves. Scale formation on the inner side of a pipe results in increasing the pressure drop; therefore, required energy for pumping is increased. Anti-scale material injection can prevent calcium carbonate deposition at numerous points in the process that are susceptible to scale formation including pipes, pumps, and etc. In the present project, Factors which affect scale formation including PH, temperature, turbulence, pressure, and aeration are investigated in detail. A technical method by using scale coupons is introduced to measure scale growth in process lines. By this method, a quantitative determination is also possible in addition to a qualitative analysis of the scale formation by visual inspection. The combination of three mechanism including inhibition of crystal formation, particulate dispersion, and modification of crystal structures results in excellent scale protection at optimum cost performance. The effect of scale formation on the energy consumption is studied for slurry pipeline of copper factory.

کلمات کلیدی:

Energy Conservation, Fluid, Hydraulic, Optimization, Energy Saving