Synergies Between Reducing Relief Loads and Improving Energy Efficiency

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The work processes involved in addressing relief system capacity and energy efficiency are similar in some ways, especially when the relief system is viewed as a utility in which "consumers" take up capacity in the system. In both cases, a survey will be made of the system as a whole both to identify the major consumers (of energy or relief system capacity). Unnecessary consumptions may be eliminated first; then attention will be given to the largest loads since their reduction can potentially give the best payout.

There is another connection between these two tasks, however, beyond the similarity in work process. It is that in many cases achieving the goal of reduced relief loads may improve energy efficiency as well. The reason for this synergy is clear: Both goals generally can be achieved by reducing the normal input of high-quality energy to the process. High value energy is expensive to consume, and it also tends to result in larger excesses of energy during relief scenarios - energy that will likely produce large relief loads.

The dual benefits are not automatic, of course. There is no guarantee that reducing required relief loads will necessarily improve energy efficiency, or vice versa. If a process change intended to reduce relief loads is to also improve efficiency, it must be accomplished through means that change the normal process energy balance. Relief load reduction via a shutdown system that is active only during the failure event will have no effect on efficiency, of course, so there is no benefit in that area. In the same way, some equipment changes that reduce normal energy consumption may not result in reduced relief loads.

This paper will expand on on the synergies between required relief loads and energy efficiency, and offer examples of the dual benefits to be achieved by considering changes to several common processes.