Management of Change: Have We Captured All of the Impacts of a Change?

by Bill Lape

A few years ago, an engineer working for my "friend's plant" chose to replace their evaporative condenser with an adiabatic condenser. On the surface, this seemed like a good idea. Adiabatic condensers often provide higher heat rejection with lower water and electricity usage. The condenser was purchased and installed, and all seemed well.

However, this plant was located just North of the 45th parallel. For those unfamiliar with this area, it tends to get cold during a good portion of the year. In fact, it tends to drop below freezing for a good portion of that time.

An evaporative condenser loses about 65% of its capacity when it is run dry. In this area of the country, depending upon the particular installation, the required heat rejection drops sufficiently to allow the facility to run their condenser dry when the temperature drops below freezing. Their control system is often set up to start up the pumps if the heat load rises to the point where the condenser cannot maintain the head pressure set point with the fans running at 100%. This usually works without problems as the heat load rarely rises to the point of needing the pumps when the temperature is below freezing.

However, an adiabatic condenser usually loses about 95% of its capacity when run dry. When the condenser in question was installed, the engineer failed to account for this fact and did not make any modifications to the condenser control program. The result is that the condenser could not adequately handle the system heat load without water. The fans would ramp to 100% and then the pumps would kick on to supplement the heat rejection. However, with the fans at 100%, the water being picked up by the airflow of the condenser would be blown out the top of the condenser. This caused ice to build up on the condenser and precipitated the need for a maintenance mechanic to climb a ladder in sub-freezing temperatures to chip ice off the top of the unit. Needless to say, this was an unacceptable hazard.

The EHS manager over this plant was adamant that the condenser be replaced with a new, standard evaporative condenser that would not have this problem. Given the fact that the existing unit had only been installed a few years prior, it was economically infeasible to replace it due to the remaining depreciation. Instead, a controls engineer sat down and took a hard look at the program for the condenser control. He was able to modify the program to call for water before the fans ramped to 100%, allowing the water to better do its job which resulted in lower

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fan speeds overall and prevented the water from being blown out the top of the condenser. This served to eliminate ice buildup on the condenser and eliminated the safety hazard.

The point to all of this is that we often fail to realize the impact that a change may have on the safety of the covered process through unforeseen avenues. The engineer in this instance failed to realize that the existing condenser control program would have a negative impact on the operational safety of the condenser. It is for this reason that it is vital that we ask as many questions as possible regarding the change being considered. A logical question in this case would be: Is the capacity difference during dry operation sufficient to handle predicted loads? If it is not, as it was in this case, then how does our condenser control program handle dry/wet transitions?

If a Management of Change is started when the equipment shows up on a truck, it is unlikely that all of the potential impacts will be captured properly. Do yourselves a favor and start the MOC when you first start planning the project. Ask the What-If questions early in the process. Consult experts in the process in question. Question, question, and question again. The more thorough your questioning is during the early stages and the more people involved in the questioning, the more likely it will be that you will have a sufficient budget for the change, and, more importantly, you will be less likely to overlook a potentially hazardous impact of the change.

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