Hershey's Chocolate Auxiliary Cooling Problem

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Client: Hershey's Chocolate of Virginia in Stuarts Draft, Virginia
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Hershey's Chocolate of Virginia sought an alternative means to cool a coolant line that cools machinery within the manufacturing plant. The current system in place made use of an R-22 evaporator which cooled a 30% propylene glycol (PPG) and water solution. The current R-22 system consists of two compressors and operates at 75% of its maximum capacity. Hershey's problem was that if one of the compressors were to be shut down, an entire production within the facilities must also be shut down. The lack of production of their products could potentially lower profits for the company. The engineers within the plant desired to use a nearby chiller to cool the PPG rather than the current system. The nearby chiller also used R-22 at a temperature 40ºF cooler, and it was used to cool a citrus oil line. This citrus oil chiller was only running at about 45% of its maximum capacity, and Hershey desired to use the excess capacity of this system to cool the PPG. Hershey's goal through this project was to use the alternative cooling system as the primary cooling system for the PPG, and the existing PPG chiller would then function as a backup in the event of failure or maintenance on the citrus oil skid.

The team began by calculating current cooling loads on the PPG to determine the amount of heat the citrus oil system would have to absorb. When this was done, and all necessary conditions were calculated, the team contacted FES, a company that constructed the existing PPG chiller skid. The team requested that FES would provide two different heat exchangers – one that would use R-22 from the citrus oil chiller to cool the PPG, and the other would use the citrus oil itself to cool the PPG. After this, the team proceeded to analyze the capacities of the systems to determine the amount of remaining cooling capacity the citrus oil chiller would have. It turned out that the citrus oil chiller did not have enough capacity to cool the PPG line to the necessary specifications. It was

already being used to cool a citrus oil line, and even if it was not cooling the citrus oil, the system did not have the needed capacity to cool the PPG.

Hershey's Chocolate desired for us to test the feasibility of using the citrus oil chiller to cool the PPG line. This turned out to be an impossible solution when constrained to only using the two systems. The team did not research alternative solutions because Hershey was only seeking an alternative short-term solution that would implement the citrus oil line until a new chiller for the PPG could be purchased and constructed. After a presentation to the client, they were satisfied with the results.

Very Respectfully:

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