SUMMARY

The current design of the spent fuel storage cask allows for passive cooling via natural circulation of air in the annulus between the steel canister and the concrete surrounding container. While this is an effective means of safe storage and cooling for spent fuel that has been cooled in the spent fuel pool for a number of years, the goal of this design challenge is to enhance the cooling capacity of the storage cask so that spent fuel can be offloaded from the pool sooner. This allows for less spent fuel in the spent fuel pool during normal operation, which in turn creates a safer environment in the case of loss of offsite power. In a station black out in currently operating plants, the pumps cooling the spent fuel pool do not have power to run, and without that cooling mechanism the pool will heat and start to boil off. If the spent fuel is no longer submerged in water, it will continue to heat and eventually melt. In order to avoid something like that from happening again, research is being conducted in finding ways to increase the cooling capacity of the spent fuel storage cask without changing the overall design of the cask, just by adding to it. A few methods explored further in this report include filling the annulus with water and mounting a heat exchanger on the top of the storage cask and introducing fins, and even fluid-filled fins, into the annulus to increase heat transfer area while still only using air as the primary fluid.