3.3 Cooling Tower Selection

Based on the CT data sheet, the Vendor provided three (3) CT design, namely,

- Mechanical Draft Wet Cooling Tower
- Natural Draft Wet Cooling Tower
- Air2Air Cooling Tower

It should be noted that the "hybrid" CT design (Wet/Dry) was dropped from further consideration by SPX since the Air2Air CT design is an improvement over the "hybrid" design of Wet/Dry CT design, and it results in higher water savings. Hence, this study deleted the hybrid CT option from further consideration.

The Air2Air CT design recovers some of the water that is evaporated in a standard wet mechanical draft tower design. This is done by utilization of a series of PVC heat exchanger packs in the tower plenum area, using cooler, ambient air to condense much of the moisture before it exits the tower.

Recovered water can be returned directly to the cooling tower basin or used as pure water for other uses.

SPX informed us that the natural draft cooling tower, in order to develop an effective natural draft, requires a minimum of 20°F range. For the open loop cooling system, with the cooling tower located ahead of the condenser, this 20°F range requirement could not be accommodated since the upper bound of the range is the lake water temperature. For the design conditions, with the lake water temperature at 99°F, the 20°F range would result in cold water temperature of 79F, leaving only 3°F approach to the design wet bulb temperature of 76°F. For this reason the natural draft cooling tower could not be used for the open loop cooling system.

WGI has also reviewed the Parallel Air Cooled Condenser (ACC) concept for the Secondary side Cooling Water system in order to make this an all-inclusive study. The primary benefit of this system is water conservation. However, due to the complexity of layout, which would require three (3) very large and long overhead steam ducts between the three surface condenser sections and the ACC units, complex valve arrangement, civil support structures for the steam ducts, additional real estate required for the ACC, and due to the fact that this design would be "first-of-a-kind" design for a nuclear power plant in the US, it was concluded that this design would be considered only if water use becomes a problem. Further, the licensing of such complex design for a new nuclear plant would become a major challenge. Hence, the ACC design is also dropped from further consideration.

The results of the CT selection by SPX/Marley is provided in Table 4. All water requirements are discussed in Section 3.6 of this report.

TXU has recently requested for drift eliminator as part of the CT design. This feature will be considered during the conceptual design phase of the CWS and CT design.