

## SUMMARY – Facility D

In September of 1998, Supersymmetry conducted an energy efficiency survey of Facility D located in Southwestern US. The survey focused on mechanical systems in the building including pumps, fans, chillers and air compressors. Facility D is a research facility of microelectronics. Facility D is a 227,000 sf facility which houses some class 10 cleanroom spaces and office spaces.

The central plant consists of three evaporative cooled chillers with one serving as backup. The chillers are rated at 1300 tons apiece. The average load of the chillers during the monitoring period was 2200 tons. There are also three cooling towers, hot water boilers, three solvent exhaust fans and three scrubbed exhaust fans. Facility D has its own de-ionized (DI) water and nitrogen plants. Compressed air and process vacuum are also serving the cleanroom.

The central plant and a class 10 cleanroom (12,500 primary sf) were monitored for three to six days. Trended measurements were taken at one minute intervals for the chilled water, DI water and compressed air systems. Spot measurements were taken to characterize the make up air handlers, recirculation air handlers and exhaust fans. Some of the most important metrics are summarized below in Tables 1 and 2. Note that these metrics were calculated based on the data collected during the monitoring period and may not reflect the current operating conditions.

**Table 1. Metric Results for Facility D**

<b>Metric Name</b>	<b>Metric Value</b>
Central Plant Chiller Efficiency	0.54 KW/ton
Central Plant Chilled Water System Efficiency	0.80 KW/ton
Class 10 Make Up Fan Efficiency	590 cfm/kW
Class 10 Recirculation Fan Efficiency	1,900 cfm/kW

The metrics indicate that the chillers are operating at a moderate efficiency level. The overall chilled water system efficiency is also moderate. The ducted HEPA, recirculation system efficiency for the class 10 cleanroom is low. However, benchmarks for recirculation air handler efficiencies have not been determined for other class 10 facilities. The make up air handler efficiency is in the lower percentage of the measured range of 540 – 1800 cfm/kW between the monitored sites.

Overall, Supersymmetry developed 52 different energy efficient recommendations for Facility D. The high priority, energy efficiency measures (17 measures) proposed by Supersymmetry estimated annual energy savings of 7,300 MWh.