



Background:

A Fortune 200 defense contractor occupies multiple buildings in what was a 1950s era Air Force base. Each building had its own (sometimes multiple) small central plant with chillers and towers ranging in age from 20 to 40 years. The chillers were not efficient and the maintenance team was constantly repairing or replacing compressors and other components.

As part of the corporate strategy to reduce energy usage at all their facilities, the energy management team took a close look at the cooling systems for this location. They determined that by updating several air handlers and cooling coils, replacing/adding some chilled water piping, and replacing up to nine small central plants with one extremely efficient central plant they could meet their goals of reducing energy use on-site.

Manufacturer of Integrated Central Plants

Location: Arizona

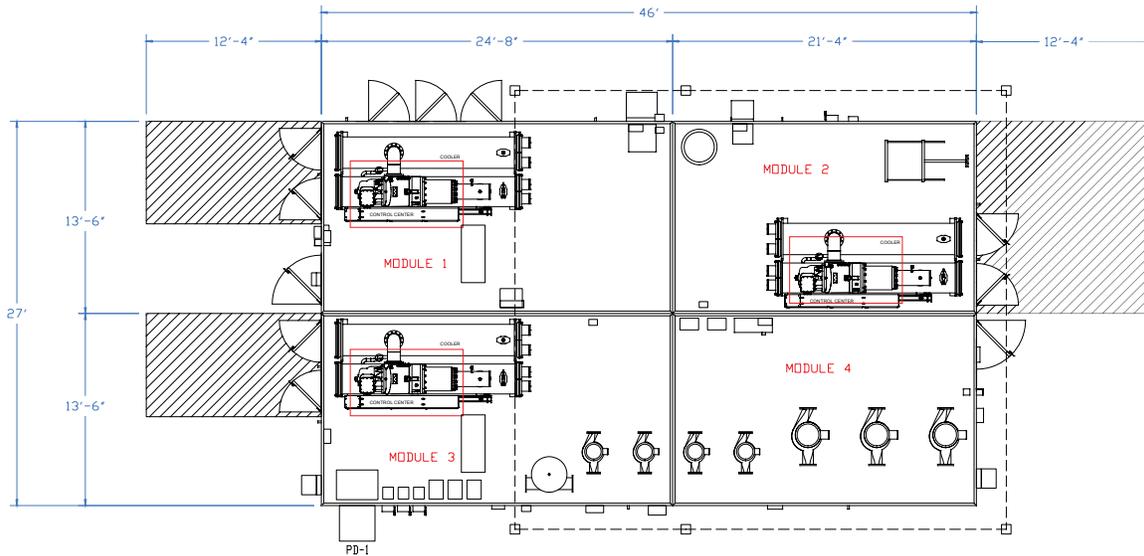
Cooling Tons: 945

Application: Mission Critical/
Comfort Cooling

System Design: Elevated Cooling Towers

System Pumping: Variable Primary Flow

Modules: Four



Chil-Pak® was called to visit the site and a couple of challenges were quickly apparent. First, there was very little room for a new central plant. The only space available was next to an old blimp hangar, but the new packaged central plant could not block the right-of-way required by emergency vehicles. In order to fit the 945 ton modular central plant into the space available, a compact layout that provided excellent service access to all components was developed and the towers were installed above the packaged chilled water plant.

The modular central plant provided 945 tons of cooling capacity utilizing three Carrier 23XRV chillers. These chillers were chosen over several magnetic bearing alternatives because they are more efficient and their variable speed tri-screw compressors are extremely robust.

The facilities being cooled included an internal data center for this worldwide corporation and reliability was a key factor in making the decision to go with the Carrier chiller. In addition to the chiller selected, the design of the central plant included a redundant chiller, chilled water pump, condenser water pump, and cooling tower.

Challenges:

- Size Constraints
- High Security Location
- Elevated Cooling Towers
- Cooling Efficiency



Design elements included to increase efficiency of the Chil-Pak® also included a 300 ton flat plate heat exchanger for water side economizing. This allowed the facility to use “free” cooling during much of the year in the dry Southwest desert environment. The chilled water pumping was updated to variable primary flow in order to further reduce energy use. All of the equipment was designed to be controlled by a state-of-the-art adaptive control system that continuously adjusts temperature set points and water flow rates in order to minimize the total energy used.

There was no electricity available where the modular central plant was to be deployed so a new substation was installed. The cost of the new substation was kept to a minimum since the Chil-Pak® solution required only one electrical feed. All internal power distribution was factory installed which reduced costly field labor.

Through close coordination and cooperation between the entire team of owners, engineers, mechanical contractors, and Chil-Pak® this project was successfully installed only sixteen weeks after the original purchase order was released.

Solutions:

- Optimized Footprints
- Integrated Adaptive Controls
- Redundant CHW & CW Pumps
- Redundant Chiller & Tower
- 16 Week Lead Time