

## Joint Forces Headquarters and Readiness Center Addition



This three-story LEED Silver addition to the Joint Forces Readiness Center Headquarters on the Camp Rapid campus in Rapid City was originally designed as part of the Headquarters building but was removed because of funding restrictions. It was then redesigned with refined mechanical and electrical systems and bid as a separate project. The Addition houses CFMO (Construction and Facilities Management Office), training and classroom facilities, and over 11,000 square feet of storage for various Guard units. Many of the Addition's features mirror or extend those of the Headquarters building, including the lighting control, security, plumbing, fire sprinkler, HVAC control, and main and emergency electrical power systems. (2011 - \$7,300,000)

### Project Data

#### Owner

US Department of Defense  
National Guard Bureau  
South Dakota Army National Guard

#### Location

Rapid City, SD

#### Building Type

Office, Storage

#### Building Area

35,000 GSF

#### Mechanical Systems / Features

Ground Loop Heat Exchanger  
Fan-Powered VAV Terminal Units  
Geothermal Heat Recovery Chiller  
Rooftop Air Handling Units  
Wet Pipe Fire Sprinkling System  
TCP/IP Energy Management System  
Integration to State EMS

#### Electrical Systems / Features

Interior/Exterior Lighting  
Lighting Control System  
Occupancy and Daylighting Controls  
Extension of Facility Normal Power  
Intrusion Detection System  
Access Control System  
Telecommunications and Cabling  
CAT 6 GIGAMAX Communications  
Fire alarm System

#### Construction Cost

\$7,300,000

#### Completion Date

2011



#### Mechanical Engineering

The key component of the HVAC system in the Addition is the heat recovery chiller system. This system allows energy recovery from spaces requiring air conditioning to those requiring heating. The system was designed for potential connection of the Headquarters building's HVAC systems, allowing for more profound energy savings. When there is excess heat (as when the system is cooling the building) or insufficient heat (as when the system is heating the building), the chiller system uses 63 250-foot deep ground loops as a heat sink or source.

To augment energy efficiency, energy recovery ventilators were applied, reducing energy spent on heating and cooling ventilation. Although not required for ventilation, the rooftop air handling units were fitted with full economizer function to take advantage of the area's typically cool summertime mornings and evenings. These rooftop units distribute conditioned air to a mix of fan-powered and single-duct VAV terminals with hydronic reheat coils, which are also connected to the heat recovery chiller system.

Plumbing systems connected to the Headquarters building's water heaters and water and sewer piping, and water efficient plumbing fixtures were chosen to reduce overall facility water use.

#### Electrical Engineering

Facility lighting utilized a combination of LED and high efficiency fluorescent technologies integrated with an owner-selected lighting control system to facilitate occupancy and day lighting controls.

Desires for LEED measurement and verification resulted in per-circuit level power use metering integrated with the HVAC BMS for reporting.

System designs included extension of intrusion detection, access control, fire alarm. Communications utilized a very specific Gigamax CAT 6 solution to the Clients specifications