

## Rapid City Fire Department – Fire Stations



Growth in Rapid City prompted the design and construction of fire station #6 located on Highway 16 on the south side of the city. In addition, the addition of a 2-man ambulance crew dictated the replacement of an aged fire station #3 with a new 4-bay, 4-man station on the northwest side of Rapid City.

These fire stations feature apparatus bay radiant floor heating, snow melt, vehicle exhaust, backup emergency generators and specialized radio-activated facility sound controls. Design challenges include the incorporation of sleeping quarters in close proximity to an active apparatus bay, lightning protection, and provisions for decontamination of hazardous materials.

### Project Data

#### Owner

City of Rapid City, Fire Department

#### Location

Rapid City, South Dakota

#### Building Type

Fire Station(s)

#### Building Area

7,500 square feet (Station #6)  
7,000 square feet (Station #3)  
7,600 square feet (Station #7)

#### Mechanical Systems / Features

Radiant Floor & Snow Melt  
Energy Recovery  
Vehicle Exhaust  
CO/NO<sub>x</sub> Detection

#### Electrical Systems / Features

Lightning Protection  
Emergency Generator  
Station Fire Call Initiated Lighting Controls

#### Construction Cost

\$1,000,000 Station #6  
\$1,100,000 Station #3  
\$1,600,000 Station #7

#### Completion Date

January 2003 (Station #6)  
December 2003 (Station #3)  
July 2010 (Station #7)

#### Mechanical Engineering

A primary/secondary pumping system with injection pumps was employed for control of the radiant floor zones and the snow melt system. Individual occupant comfort in the sleeping quarters was achieved by perimeter fin tube radiation and split system cooling systems.

Occupant protection from apparatus bay diesel exhaust was achieved by redundant exhaust systems. The first line of defense is localized collection of engine exhaust by a Nederman Magnatrack system. In addition, CO/NO<sub>x</sub> detection was utilized in conjunction with an overall exhaust system for the apparatus bay.

Outdoor air for the living quarters is preconditioned with an energy recovery ventilator using exhaust from the living quarters.

#### Electrical Engineering

Electrical design included emergency call lighting controlled from separate radio system(s) facilitating response teams exiting during calls. In addition, the Fire calls and/or ambulance calls initiate temporary lighting and kitchen equipment shutdown via relays.

The power system design included a 30 KW dual fuel standby generator, transient voltage suppression equipment, arc-fault breakers in the sleeping quarters, and lightning protection.

Systems featured intercom controlled from separate radio system(s) and an addressable fire alarm system.