

PLAINS TALK

A Publication of West Plains Engineering, Inc.

Casper WPE: Casper Fire-EMS Station #3 Ready To Respond And Serve

• The Casper Fire Station #3 was opened in 1954 and operated at its original location until March of 2011. The building was under sized and had a number of significant maintenance and repair issues. The construction of the new facility began on April 13, 2010 and was completed the following March. The new location for Fire Station #3 provides faster response times to the District 3 area in Casper. The new design closely followed LEED requirements but did not seek LEED Certification.

The new fire station also became the backup dispatch call center for the city. As a backup dispatch call center the fire station has to be provided with backup emergency power. This was accomplished by two dual fuel 130 KW generators that are capable of operating on either natural gas or propane. Two underground propane storage tanks were provided capable of running these generators for 72 hours.

The new fire station is a 12,200 square foot facility. It consists of six sleeping quarters, captain's quarters, common living area, training room, exercise



Casper Fire-EMS Station No. 3 is impressive from the outside...



...And stores this great classic fire truck on the inside!

room, and three double-deep apparatus bays. The main living area is conditioned by four high efficiency furnaces equipped with heat pumps. The apparatus bays are equipped with a specialized vehicle exhaust system for the fire engines that incorporated a rail

system with break-away hoses, and heated by infrared radiant tubes. Artificial lighting is supplemented with natural light provided through solar tubes in the living area of the facility. The six sleeping quarters are provided with occupancy sensors to control the lights. This new facility has a full building fire suppression and alarm system.

The architect for this \$3 million dollar facility was GSG Architecture from Casper, Wyoming. W.N. McMurry Construction from Casper, Wyoming was the general contractor on the project. West Plains Engineering, Inc. provided the electrical, mechanical, and plumbing design and construction administration on this project.

Photos above courtesy of Lee Chamberlain

About the Author:
Brian Ames is Mechanical Engineer in the Casper Office.



Rapid City WPE: South Dakota Game, Fish & Parks

• South Dakota Game Fish and Parks began looking for a site for their outdoor campus in 2006. The old offices of Game Fish and Parks were cramped and had several people in each office. They had already constructed a similar facility in Sioux Falls, South Dakota, which has an average annual traffic flow of over 100,000 people. Numerous sites were considered for this facility. The 30 acre site offers numerous amenities including a waterfall, a beach, a casting pier, five outdoor classrooms, a picnic shelter, a treehouse, a hunting center, and numerous other features. The 28,000 square foot main building is the focal point of the site, with three distinct areas. The new facility has offices that include room for expansion. The remainder of the facility was designed as a learning and education center. The interpretive area, has numerous stations that represent the various seasons of the year. The education area and includes an approximately 5,000 gallon (50,000 lbs!) aquarium with a wetlands learning area and three state of the art classrooms.

The site also includes a shop building with bays for storage. Within the shop is a necropsy room, which is a space to dissect animals. Adjacent to the shop building is a cold storage facility.



Sylvan rock display and aquarium, a sure attraction



Interpretive four-season interactive displays

The design team included Arc International (architect), Albertson Engineering (structural), and Wyss Associates (landscape design and civil). The construction team was headed up by J. Scull Construction as the general contractor, Action Mechanical as the plumber and HVAC contractor, Freeman's Electric as the electrical contractor, and Site Works Specialists. West Plains Engineering, Inc., provided electrical and mechanical design services for the facility.

The project is currently on track to meet LEED Gold. Like all projects that West Plains designs, this project incorporated many energy and water saving techniques. The building is estimated to use over 40% less energy and 38% less water than a standard building.

The building and associated site are open and are free to the public, so the next time you are in Rapid City, swing in and learn about the local wildlife.



About the Author:
Michael Heinrich is Mechanical Engineer in the Rapid City Office.

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Welcome... **David Clark** began working at the **Cedar Rapids** office in November of 2011 as a Mechanical Engineer. David graduated from Iowa State University in May 2010 with a degree in mechanical engineering and a minor in nuclear engineering. He enjoys golfing, running, snowboarding, traveling, and spending time with his family and friends.

Sioux Falls WPE: SDSU Data Center

- The SDSU Administration Building Data Center is the hub to the campus wide network. The data center is critical to more than just SDSU as they provide services to the entire state of South Dakota. The space also has several campus departments' servers within the space. Many systems have long running programs that a loss of power would cause the loss of weeks worth of computations.

This project started as a study in 2007 to secure an NSF (National Science Foundation) grant to update the infrastructure for the SDSU campus data center.

The site didn't have an emergency generator, but did have an Uninterruptible Power Supply (UPS). Two Natural Gas generators were installed in parallel with provisions for a third. The main service to the administration building was replaced and required a weekend shutdown (a 20 hour outage). This was completed after the generators were online so power to the critical systems was maintained.

Two 150KVA UPS units were installed. One major challenge was to keep the data center up and running while installing new equipment in the limited "free" space available. Both UPS's had to be installed with a remote battery cabinet. As other equipment was removed, additional batteries were installed.

New cable tray was installed to allow SDSU to



UPS line up for back up power and conditioning



Parallel back up generators to weather any storm

move all the low voltage cabling from below the floor. This freed up the under floor for power distribution. Several additional branch panels were added for additional capacity and several racks were relocated and refed. Dust was a constant concern and great care was taken to keep the dust from getting into the equipment.

Surge Protective Devices (SPD) were installed at multiple levels to protect from external and internal power events. Metering was installed at multiple locations so the University could better analyze the power utilization.

There was a tight 5 month construction schedule. The generators were purchased and installed under a separate contract to get the equipment ordered and on site in time for the main service replacement. The project was completed

August 9, 2011.

West Plains worked with Muth Electric who switched out the service and completed the Data Center renovations as well as Englestad Electric who provided the generator installation.

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Cedar Rapids WPE: Kirkwood Community College

• To meet the growing need for wind energy training, Kirkwood Community College in Cedar Rapids, Iowa created a new program, “Energy Production and Distribution Technologies.” This program helps students develop the core skills needed for a career as a Wind Technician. With a gracious donation of a turbine base casting and hub casting from Clipper Windpower, Inc.

Kirkwood was able to provide the students with the hands on skills that are required for the program.

The building was designed by Ament Inc. with the purpose of housing the large turbine base casting, as well as the hub casting. The energy Lab provides ample room for tools that are necessary to complete tasks performed by the students. Included in the design is a second story walk out balcony that students use to learn the proper techniques to rappel down a tower.

Two gas/electric rooftop units provide HVAC service to the two main technology areas: The Nacelle Lab and Energy Lab. Complete wet sprinkler coverage was also designed into the project. Inside the labs, all of the overhead utilities were exposed but painted white to emphasize the open needs of the areas. The ductwork design incorporates passive



Multi-facet addition helps students learn about the wind

sound attenuation on the supply and the return ducts, plus low sound duct and register design selections.

It is interesting to learn the different electrical components that make up the windmill. All power and communications that normally fit in the base of the windmill are installed in a 24” wide trenchduct in the floor. This allows for all the fiber optic cable, data cable and power to be run between the windmill components. The 30’ tall build-

ing that houses the head of the windmill is illuminated with high-bay light fixtures. With the majority of the addition being glass, we chose to install LED floodlights to wash the windmill and make it “glow” at night. There are sensors installed throughout the building to test wind speed and direction. Variable speed fans are installed on the ceiling to test how the windmill reacts to varying winds.

West Plains remains committed to assisting our clients with renewable energy efforts.

About the Author:

Jacob Mc Vey is a CAD Technician in the Cedar Rapids Office.

