



Pit Vipers beat the chill

Pit Vipers fit for cold climate

The city of Butte, MT, was once one of America's biggest mining regions. Named "the richest hill on Earth," its underground operations eventually extended to some 12,000 miles of drifts. Today it is the Continental Pit mine that dominates the landscape and, since 2005, two Pit Viper drill rigs that feed production.

The continental pit

Today, many cities that saw their rise in the late 19th century offer a skyline of Victorian architecture and brick high rises, but not many also have head frames jutting out amidst their skylines. In its heyday, Butte's population was nearly three times its current size, numbering over 100,000 inhabitants. Everyone was focused on building fortunes in a growing metals market or offering services to the mining industry.

A dozen antique head frames now mark the former underground activity, like monuments to an unforgotten period of history. One of the country's leading mining institutions, Montana Tech at the University of Montana, still keeps a decline active so tomorrow's geologists and engineers can learn from the past.

Underground mining ceased in 1975 and large scale open-pit mining began in 1955 with development of the Berkeley Pit, which closed in 1983. The Continental Pit opened in 1980 and is currently 7,320 ft long, 3,640 ft wide and 380 ft deep. Projected dimensions are 8,000 x 6,000 x 800 ft.

Mining in Butte today takes on a very different look. Montana Resources bought the property from Atlantic Richfield in 1986 and reopened the Continental Pit. The company stopped mining in 2000 due to high electricity costs and resumed in 2003.

From 1986 to 2006, the Continental Pit has given up 1.4 billion pounds



PV271's team up to quickly finish holes on a blast pattern.



From left, Gary Hayes and Clint Byington discuss outfitting the rig with tank heaters.

of copper and 163 million pounds of molybdenum from 285 million tons of milled (dry) ore.

According to Wikipedia, from 1880 through 2005, the mines of the Butte district have produced more than 9.6

million tons of copper, 2.1 million tons of zinc, 1.6 million tons of manganese, 381 thousand tons of lead, 87 thousand tons of molybdenum, 715 million troy ounces of silver, and 2.9 million ounces of gold.



Cold package solution with heater blanket mounted on air receiver tank.

A city on a hill

From the top of the west ridge, on the impressive campus of Montana Tech, one looks out to a grand view of a city that slides away to the valley below. The active Continental Pit nips at the city's edge, cresting at the far eastern ridge. As the older Berkley Pit grew over the years and the city has shrunk in population, hundreds of homes have been sacrificed to the growth of the mine.

On a daily basis, 102,000 tons of rock are mined from the pit with 52,000 tons of ore milled. To keep the three shovels and 170- and 240-ton haul trucks moving, Montana Resources uses two Atlas Copco Pit Viper Series PV271 drills, which were acquired in May of 2005 to replace four older drills.

In the past Montana Resources had used electric drills, but because diesel provided mobility and convenience with no electric power cables, "the decision was made to purchase diesel drills," says Gary Hayes, maintenance supervisor for Montana Resources mobile fleet.

"They've done really well for us," says Hayes. The availability for the month was at 94 percent, with year to date being 85 percent. The goal for availability is 90 percent, but staying ahead of the shovels is what counts.

Cold package

Because cold is an issue in Montana, the mine has had to make accommodations for the weather. Each drill is outfitted with a 40 kW generator to run the cold package, which includes heat blankets and heaters for the hydraulic tanks, batteries, separator tank ...etc. The engine is kept warm when not in operation with a ProHeat system. The mine is currently in the process of routing engine exhaust through the water tanks to keep the drilling water from freezing during the winter. Previously alcohol was used as freeze protection but as costs rise, the mine wants to utilize the drill's spent energy to keep costs down.

"The key is to keep going," says Hayes. Shutting down means heating up the system to get started again.



Drilling on the Continental Pit in Butte, Montana.

Growing the mine

Montana Resource's driller Brian Lankford likes operating the PV271, commenting on benefits such as how the speed of the bit can be changed and about the drill's maneuverability. "Having no cable is a plus, but simply turning it is better with this drill," says Lankford.

"Changing the bit and bushing takes about 22 minutes with this drill. Our old drills took three hours," explains the operator. The mine bench where this PV271 is working is seven holes wide with 22 ft x 22 ft spacing. The bench is

over a hundred yards long with holes 48 ft deep. Lankford says the rock nearest the high wall is harder, taking 28 minutes to drill the 9 $\frac{7}{8}$ inch holes. But further out, holes take as few as 12 minutes to drill.

Stamina and longevity

Since the drills went into production in 2005, they have had few issues. The first drill is due for a complete rebuild in December. "If you run a piece of equipment 24/7, things start wearing out," the operator remarks. "We have had no structural issues, as of yet."

Montana Resources works closely with their dealer, Modern Machinery, which keeps a complete supply of parts to cover any standard issue. Hayes says they really rely on Modern Machinery. "Modern has a couple guys who can walk right to a problem if there is one, and they have done a great job working with our guys to educate them on the drills," says Hayes.

"When we reopened in 2003, 70 percent of our employees were new to mining," states Hayes. "We put six guys with Modern technicians and had classes to educate them on the maintenance and operation of the drills."

Once called the "richest hill" on Earth, mining is showing no sign of slowing around Butte. Although there are 12,000 miles of underground mine workings under Butte, it is up to Montana Resources to change the landscape of Butte, and the PV271 is a big part of that future.

Acknowledgements

This article first appeared in Atlas Copco Mining & Construction magazine No 3 2007. Story and pictures by Scott Ellenbecker, Ellenbecker Communications.



Brian Lankford finds the control console easy to monitor in order to make adjustments.



Brian Lankford takes measurements of a 9 7/8-inch hole to 28 feet deep.