

Rod Aldrich and Danny Dial, Mustang Engineering, USA, discuss operations on the Minncan Pipeline project and the unique challenges of pipelay in Minnesota.

PIPELAY IN THE LAND OF LAKES

Oil and gas transmission pipeline projects come in all shapes and sizes, and almost all have at least one challenge. Weather, terrain, water crossings, right-of-way issues, logistics and other obstacles usually become factors dictating the cost, schedule, safety and overall success of the project. The recently-completed Minncan Pipeline Project presented more than its share of challenges for its owner Minnesota Pipe Line Company, operator Koch Pipeline Company, L.P. and all participants in its construction.



Figure 1. River flood waters nearly took with it HDD pipe designed to go underneath the river.



Figure 2. Construction mats helped protect the environment and heavy equipment traverse wet and thawing conditions along the ROW.



Figure 3. HDD was used to route the pipeline under numerous wetlands.

The 304 mile, 24 in. line delivers crude oil from northern Minnesota to refineries in the Minneapolis/St. Paul area. Its purpose was to increase the crude oil supply for the populous Twin Cities region, providing it with greater flexibility in meeting its fuel demand and supporting the continuous growth of the metropolitan area.

Extremely caution was taken in protecting the environment, using thousands of wooden mats to help safeguard the area, while controlling soil erosion and sedimentation.

Not generally known about Minnesota is what's below the surface. Cobble and gravel are prevalent in

A team comprised of representatives from Mustang's Pipeline and Process & Industrial Business Units was contracted to provide management assistance in completing the complex project, which was contracted on a time and materials (T&M) basis, not the norm for this type of work.

Mustang was responsible for project management and served as the owner's consultant for controlling costs and schedule. The team also provided the overall construction project management, constructability and inspection services, with a key focus on assuring safety and quality on the project. Rod Aldrich served as Project Manager and Danny Dial headed up the construction management effort.

The project was opposed and legally challenged by several property owners along the right-of-way. Part of the opposition was due to the line's route, which traversed numerous waterways, wetlands, highway and railroad crossings, existing pipelines and other obstructions. Minnesota is known as 'The Land of 10 000 Lakes' and, to the contractors, it often appeared as if each of them had to be navigated at least once.

Horizontal Directional Drilling (HDD) was used to route the pipeline under

many parts of the state, including along the MinnCan route. Stones ranging from softball- to truck-size continually hampered the digging and caused delays.

Of all the adverse factors encountered by the construction team, however, weather was by far the most challenging. Winter temperatures in late 2007 and early 2008 dropped to as low as minus 30 °F with a windchill factor of minus 50 °F, freezing the ground to rock hardness at a depth of six feet below grade. Despite the frozen conditions, the construction contractors Henkels & McCoy and Minnesota Limited maintained steady production of 3500 - 4000 ft per day. From March to May 2008, load limit restrictions placed on carriers limited the transport of critical equipment and pipe on the highways, causing further headaches. Following those conditions, in the Summer of 2008 Minnesota experienced unusually heavy rains and flooding. The Minnesota River and many other waterways breached their banks, hampering construction and increasing the precautions needed to protect the environment along the right-of-way.

With all of its many challenges, the MinnCan Pipeline could have easily become a nightmare with cost and schedule overruns. Instead, it was completed on schedule in late 2008 within budget and without any serious safety incidents, making it ready for operation in Q1 2009. Its success was due, in large part, to the experience and management expertise of the Mustang team. **WP**



Figure 4. Winter cold froze the ground to six feet below grade.



Figure 5. Large cobblestones, native to the region, hampered drilling operations, road bores and HDDs.