



# HDD Facilitates Alaskan Pipeline Relocation

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When Alaska Pipeline Company – a wholly owned subsidiary of SEMCO Energy, sister company of ENSTAR Natural Gas the gas distribution supplier to South Central Alaska – needed to relocate a section of the Beluga Natural Gas Pipeline Transmission system crossing the Susitna River, they knew the project presented special challenges.

Following the summer seasonal flow on the Big Susitna River, inspection showed a significant bank loss on the eastern channel. The river crossing was in danger due to a pending pipeline exposure. The 20-inch diameter Beluga gas transmission pipeline transports 50 percent of the natural gas used in Alaska's Cook Inlet. Immediate action was necessary to replace the pipeline during the upcoming winter construction season. Following a hydrology review, environmental applications were requested which included ice road construction, a 5,200 foot directional drill, and trenching operations associated with tie-in operations. The crossing is located in the Susitna Game Refuge, environmental restrictions required that the work be carried out during the winter construction season.

Three previous HDD operations in the Susitna area provided an experience base that gave confidence to the planning, execution and success of the project. Soil conditions in the way of finely packed sands and silts had proven conducive to extended HDD crossings. CONAM Construction was selected as the general contractor for the replacement utilizing ARB to perform HDD operations.

## Smooth sailing

From the owner's perspective the project was executed flawlessly. Weather conditions cooperated in both the construction of the ice roads/bridges and also during the HDD operations. A tight schedule was maintained by contractors ensuring the crossing would be completed and equipment could be demobilized before spring conditions could cause deterioration to the frozen right-of-way. The project was completed on time and within budget.

In December of 2005, a great deal of planning and preparation was implemented and completed by ARB's team prior to the start of any drilling activity, scheduled for February, 2006. ARB had to mobilize equipment, spares and supplies from California to Alaska and purchase two buildings to house the



drilling equipment and crew on entry and exit sides of the crossing.

In early January, CONAM Construction built 11 miles of ice road with three ice bridges and two large ice pads; one on each side of the Susitna River that flows into the Knik Arm of Cook Inlet. Temperatures in the area ranged from -32° F to +35° F. As Prime Contractor, CONAM performed all of the pipe fabrication work including stringing, welding, coating, handling the pipe section during pullback, and performing tie-ins and cleanup. In addition, CONAM performed both pre-installation and post-installation hydrostatic tests on the new pipe.

On each ice pad, ARB set up large fabric structures. The largest (72 x 200 feet) housed the drilling rig, rig side, and two smaller ones joined together (65 x 104 feet and 72 x 80 feet) were set up on the pipe side. One million BTU diesel fired heaters were used to heat the buildings; two on the rig side and one on the pipe side. "Tru Tracker" wire coils were set up on the sur-

face along the centerline of the bore path to insure the pilot bore was drilled along the designed drill path. On each side of the river channel, ARB set up complete, independent mixing, cleaning and pumping equipment so the returning fluids could be dealt with at either side of the bore.

Actual drilling of the 9-7/8-inch pilot bore started Saturday afternoon, Feb. 4, 2006. During this interval, the decision was made to install a temporary string of surface casing. The 12-inch diameter 112-foot-long casing was drilled into place to help maintain the integrity of the initial portion of the entry hole. On the evening of Feb. 8, the pilot bore was completed as the bit was pushed out of the ground, 5,124 feet away from the drilling machine and was dead on; right in front of the pipe side structure. Apparently, this was a distance record for Alaska, surpassing the old one by almost 800 feet. Prior to the intermediate ream pass, a circulating sub pass was made to place fresh drilling fluid in the hole and to remove the wire line and spiders from inside the drill



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pipe which were used for steering during the drilling of the pilot bore. The 12-inch surface casing was removed just before the 28-inch reamer was pulled out at entry. Both the 28- and 36-inch ream passes went according to plan. After each ream pass, ARB ran a circulating sub pass for drilling fluid

replacement while tripping the tail string back to pipe side. Both reamers were pulled back from pipe side to rig side.

### Pipe installation

By Feb. 19, both the 28- and 36-inch ream passes had been completed. A 30-inch barrel reamer was selected for a swab pass to insure the bore path was clean and ready to accept the pipe section. Upon completing the swab pass, the mile long section of 20-inch pipe was given a final check. The pull back began Friday afternoon at 1:45 p.m.. Some 7 hours and 55 minutes later, the 20-inch was back to the rig. The drilling team was able to match the project schedule.

The drilling fluid properties were maintained with Extra High Yield Bentonite and Uni-Drill liquid polymer in this manner: pilot bore viscosity was 45 – 55 sec/qt, fluid loss 10 – 11 cc's and the density was less than 9.0 lb/gal. For reaming, circulating sub passes, as well as the final product pull the fluid loss stayed in the same low range; the viscosity increased to 55 – 65 sec/qt and due to the presence of some "ultra fines" the density increased to a range of 9.2 – 10.2 lb/gal.

There were a few onsite problems encountered along the way. They were all handled by the excellent on site crews headed by ARB's Operations Manager Jody Parrish and Superintendents Ron Rhodes and Monte Rhodes and resulted in a minimum of down time. It got a little "dicey" when the outside temperature rose into the 30's for a couple of days, threatening the ice bridges over the channels. Naturally, the heaters were shut off and workers got a little wet, but the operation never missed a beat. Thankfully, it cooled back down by the end of the job for rig down and demobilization. The project was a huge success, and everyone involved

was glad they were part of it.

Other key personnel involved in the project included: Bob Stinson, President of CONAM Construction Co.; Horizontal Technology, Inc., Steering Technicians Jimmy Pohorelsky, Mike Streams and James Henry; ARB Inc., Superintendent Tommy Der-

ryberry; and Wyo-Ben Inc., Vice President of Sales Bob Stitchman.

### FOR MORE INFORMATION:

HDD contractor: ARB

Steering: Horizontal Technology

Mud: Wyo-Ben