CASE STUDY
PIPE JACKING | SLURRY MICROTUNNELING

Project Name:
Kaw Lake Water Supply

Prime/Sub Contractors:
Super Excavators, Inc.

Location:
Enid, OK

Owner:
City of Enid, OK

Ground Conditions:
Hard rock with High Hydrostatic Water Head

Akkerman Equipment:
SL74P MTBM System, AZ-100 Total Guidance System, 800-ton MT Jacking Frame, High Pressure Pit Seal & Pipe Clamp

Pipe:
72-in. Steel Casing

Total Length/Longest:
510-lf.

PROJECT OVERVIEW

The 100-ft deep water intake tunnel was the last 510-ft remaining of a 70-mile fresh water expansion project to supply fresh water to over 50,000 residents of Enid, Oklahoma. Designed as an underwater retrieval, the equipment included High-Pressure shaft seals, HD cutterhead, and bulkheads for under water retrieval.

THE CHALLENGES

- Hard Rock Conditions: The 510-foot tunnel had to be excavated through extremely hard rock, demanding specialized cutting capabilities and high-powered equipment.
- High Hydrostatic Water Head: Operating at a depth of 100 feet below the surface, the project faced intense water pressure, significantly increasing the risk of inflow or equipment failure.
- Underwater Retrieval Requirement: The design called for retrieval of the MTBM underwater at the lake's intake point, requiring careful planning and sealing measures.
- Final Phase of Critical Infrastructure: As the last segment of a 70-mile water supply expansion, the success of this drive was essential to delivering fresh water to over 50,000 residents.

THE SOLUTION

- Heavy-Duty MTBM Configuration: The SL74P MTBM system was equipped with a hard rock cutterhead and supported by an 800-ton jacking frame, ensuring sufficient torque and thrust for the tough geology.
- Advanced Pressure Control: A high-pressure shaft seal and pipe clamp were utilized to safely manage hydrostatic pressures and prevent water ingress throughout the drive.
- Total Guidance Precision: The AZ-100 guidance system provided real-time, high-accuracy positioning to ensure the tunnel remained on line and grade.
- Engineered for Underwater Retrieval: The MTBM was outfitted with retrieval bulkheads and sealing systems, enabling successful submerged recovery at the lakebed.

OUTCOME

- Successful Completion Under Pressure: The 510-foot tunnel was completed through hard rock and under extreme hydrostatic conditions without incident.
- Precision and Performance: The SL74P MTBM system maintained exact line and grade, validating the effectiveness of the AZ-100 guidance system.
- Seamless Underwater Retrieval: The MTBM was retrieved as planned at the lake intake point using bulkheads and sealing systems, demonstrating engineering precision.
- Critical Milestone Achieved: This final tunnel segment marked the successful close of a 70-mile infrastructure project, securing a reliable water source for over 50,000 residents in Enid, OK.

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