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## INSTALLING CRUDE OIL SUB-RIVER PIPELINES, AL FATHAH, TIGRIS RIVER, IRAQ

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### **ABSTRACT**

*Nine months in the planning and logistics, plus six months to implement in an unsecured, hostile and post-war conflicted zone, Horizontal Controlled Directional Drilling was successfully applied to install crude oil sub-river pipelines at Al Fathah Bridge, Tigris River, Iraq in 2004. The project was technically challenged by water-saturated sands and gravels, and watersaturated fractured carbonates and train-box car sized caverns where control of the drill bit was limited at best until significant cement grouting was introduced to stabilize the drilling media.*

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**Reference:** *Popkin, B.P. 2005. Installing crude oil sub-river pipelines, Al Fathah, Tigris River, Iraq. Journal of Environmental Hydrology, Vol. 13, Paper 10.*

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