

**Integrated Technologies for *In Situ* Source Management at an
Operating Wood Treatment Site**

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Ground water beneath an active wood-treating facility in Colorado contains nonaqueous phase liquids (NAPLs) which are the source of the dissolved constituents of interest (COI), including pentachlorophenol (penta) and polynuclear aromatic hydrocarbons (PAHs). Significant free-phase NAPL recovery at this facility is technically impracticable. The on-site dissolved penta concentrations range from about 1,800 to 20,000 $\mu\text{g/L}$ and PAHs concentrations range from about 2,600 to 30,000 $\mu\text{g/L}$. Remediation of the shallow site ground water therefore requires water management and low-cost, *in situ* treatment. Assessment of intrinsic biodegradation rates and numerical modeling of various impermeable barrier wall configurations led to the selection of an *in situ* groundwater remedy that integrated multiple technologies. These include; an impermeable barrier wall to direct ground water flow; an *in situ* aerobic bioreactor to treat dissolved-phase COI; enhanced anaerobic bioremediation to help mitigate COI load into the bioreactor; and phytoremediation. The installation of a 2,400-foot impermeable barrier wall, an anaerobic treatment zone, and a 210-foot aerobic treatment curtain was completed in February 2000; phytoremediation will be implemented in the spring of 2001. System operation, maintenance, economics, and performance to date will be reviewed herein.