

## Kinder Morgan, Mission Terminal, San Diego, California

### Challenge

Required to remove nitrate from a groundwater stream to a discharge limit of less than 1 part per million (ppm), Kinder Morgan needed a reliable, cost-effective treatment solution that could also accommodate the limited space available for such a system.

### Solution

In April 2008, Envirogen Technologies, Inc. (Envirogen) was subcontracted to design, manufacture, provide installation oversight and start up a 400-gallon per minute (gpm) fluidized bed reactor (FBR) system for the treatment of nitrate.

An electron donor (acetic acid) is pumped into the FBR where it is used in the anoxic, biological reduction process of reducing nitrate to carbon dioxide, water and nitrogen gas and additional biomass growth. Nitrate-free water from the FBR proceeds through an aeration system before being discharged.

Envirogen also provided additional process control/integration support.

The system is designed to meet the treatment objectives for the anticipated influent contaminant concentrations and provide additional water quality criteria for groundwater re-injection.

The scope of equipment supply consisted of a 400-gpm system with a fluid bed reactor with FBR media and proprietary inoculum, a FBR fluidization pump, a post-aeration system, chemical feed assembly and a PLC-based control system.

Envirogen also provided the integration of process controls into the FBR Process Control System Panel. This included integrating the pumping system motor controls and instrumentation to provide for a single operator interface. This will allow for the groundwater treatment system to be controlled from one centralized panel.

