Green Remediation Focus

Minimizing the environmental footprint of site cleanup

A Profile in Using Green Remediation Strategies

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British Petroleum Site
Casper, WY

WY Voluntary Cleanup

Cleanup Objectives: Remediate gasoline-contaminated ground water for 50 to 100 years

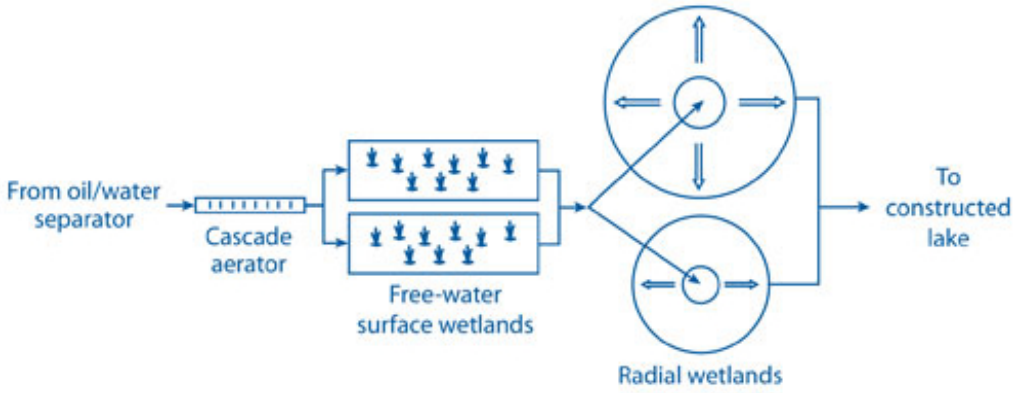
Green Remediation Strategy: Installed radial-flow engineered wetlands operating in tandem with free-water surface wetlands and a cascading aeration system

- Employed Smart Growth principles to complement conversion of the site's former refinery to an office park and recreational facilities
- Designed wetland components for subsurface locations as much as possible to increase operational control and reduce offensive odors or insects
- Constructed radial-flow treatment beds consisting of crushed concrete previously reclaimed during refinery demolition
- Insulated wetland treatment beds with a six-inch layer of mulch to accommodate temperatures reaching -35°F
- Planted emergent wetland plants such as bulrushes, switchgrass, and cordgrass in each of the four wetland areas

Results:

- Treats up to 700,000 gallons of contaminated ground water each day
- Achieves a 50% reduction in BTEX concentrations when compared to influent of the pre-wetlands aeration process
- Achieves non-detectable concentrations of benzene and other hydrocarbons in water prior to discharge into a basin created by former refinery effluent discharge
- Operates year-round despite cold climate
- Incurred construction cost of $3.4 million, in contrast to projected $15.9 million for alternative pump-and-treat system employing air stripping and catalytic oxidation
- Found beneficial use for onsite demolition material
- Uses passive-energy systems to biodegrade contaminants
- Allowed for office park occupation within 10 months after the aerated/engineered wetland system began operating

Point of Contact: Vickie Meredith, WY Department of Environmental Quality



Pumped ground water passes through a forced-bed cascade aerator to enhance contaminant volatilization and ferrous iron oxidation. Aerated water is directed through subsurface pipes to one of two parallel free-water surface wetlands, and then passes through additional subsurface pipes to one of two center-feed treatment beds. From there, water radiates under natural hydraulic conditions toward the bed perimeter while undergoing both biodegradation and phytoremediation (including phytovolatilization).

After two years of growth, vegetation covered approximately 50% of the radial-flow engineered wetland.

British Petroleum Site
http://www.cluin.org/greenremediation/profiles/subtab_d18.cfm

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response (5202P)

For more information:
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