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CONTACT INFORMATION AND COMMENTS ON THE DRAFT DOCUMENT

The draft design will be available to review for 30 days at the Sunnyvale and Mountain View libraries on June 30, 2004.

Comments are requested by July 31, 2004.

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FACT SHEET

Draft Final Design Permeable Reactive Barrier

NASA Ames Research Center Moffett Field, California

June 2004

The National Aeronautics and Space Administration (NASA) Ames Research Center (ARC) has completed a draft design for a permeable reactive barrier (PRB) to address a chlorinated solvent plume migrating onto Ames from the upgradient Orion Park Military Housing Area (OPHA) (see Figure 1). The PRB will constitute a voluntary protective action (VPA) to treat chlorinated hydrocarbons in the groundwater as they enter NASA property. The PRB will prevent further contamination from migrating onto NASA.

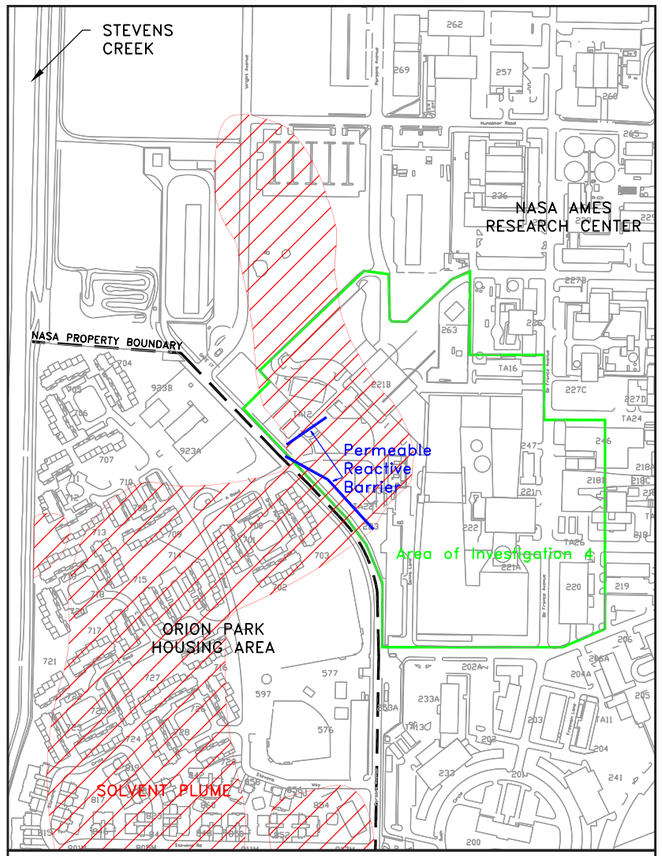

Figure 1: Orion Park Housing Area and Solvent Plume

A description of the four technologies evaluated, and the associated site applicability of each, was presented in the previous fact sheet titled "Boundary Treatment Technology Evaluation (BTTE)" dated July 2003. The goal of this evaluation was to develop a preferred VPA to stop the continuing migration of chlorinated solvents in the groundwater. The PRB was selected as the VPA because: (1) it will reduce Trichloroethene (TCE) and Dichloroethene (DCE) to Ethene, which is nontoxic, (2) it provides overall protection of human health and the environment, and complies with state and federal regulations, and, (3) it does not require surface equipment that would impair future site use.

DESCRIPTION OF PERMEABLE REACTIVE BARRIER

The PRB is a subsurface vertical treatment system designed to intercept and treat groundwater plumes. PRBs are intended to direct groundwater flow through a reactive media that treats the solvents in the groundwater (see Figure 2). The reactive medium selected for this project is zero-valent iron (ZVI). ZVI is the most common reactive material placed in PRBs. The ZVI provides an environment which allows the TCE to be reduced to Ethene. The ZVI is placed in a trench excavated across the flow path of the plume. As water flows through the system, chemicals react with the material, transforming the chemicals into a less toxic or more readily biodegradable state. Thus, the PRB is a barrier to chemicals, but a conduit for groundwater flow. PRBs are considered to be a promising alternative to pump-and-treat systems because of the passive nature of their operation.

The installation of the PRB is shown in Figure 3. The PRB will be installed in two different sections. This configuration was chosen based on the hydrogeology, groundwater flow direction, and chemical mass migrating from OPHA. The longer section is built across a large sand channel through which there is the greatest groundwater flow and mass movement. The channel narrows to the north where the second section is located. This configuration allows the contamination to be in contact with the ZVI for a longer period of time. A longer contact time provides a greater chance that the TCE will be reduced to Ethene and will thus stop further contamination of groundwater below NASA ARC.

The trench for the PRB will be excavated to a depth of approximately 15 feet below the surface. ZVI will be placed in the trench to a height of approximately 12 feet. The ZVI will then be covered with three feet of native soil backfill. The PRB will be three feet in thickness.

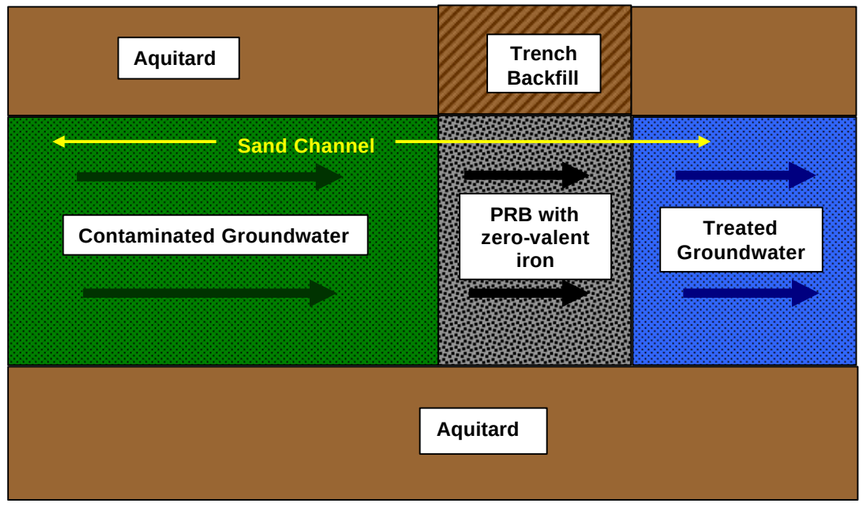

Figure 2: Schematic of a Permeable Reactive Barrier
Contaminated groundwater, flowing in the direction given, enters the PRB filled with zero-valent iron. The PRB removes the contamination. Treated groundwater leaves the PRB.

TREATMENT GOAL

The treatment goal for groundwater that passes through the boundary treatment zone is 5.0 micrograms per liter (µg/l) for TCE and 6.0 µg/l for 1,2-DCE. The treatment goal is based on maximum contaminant levels (MCL) for TCE and DCE. The Environmental Protection Agency (EPA) is re-evaluating the toxicity of TCE.

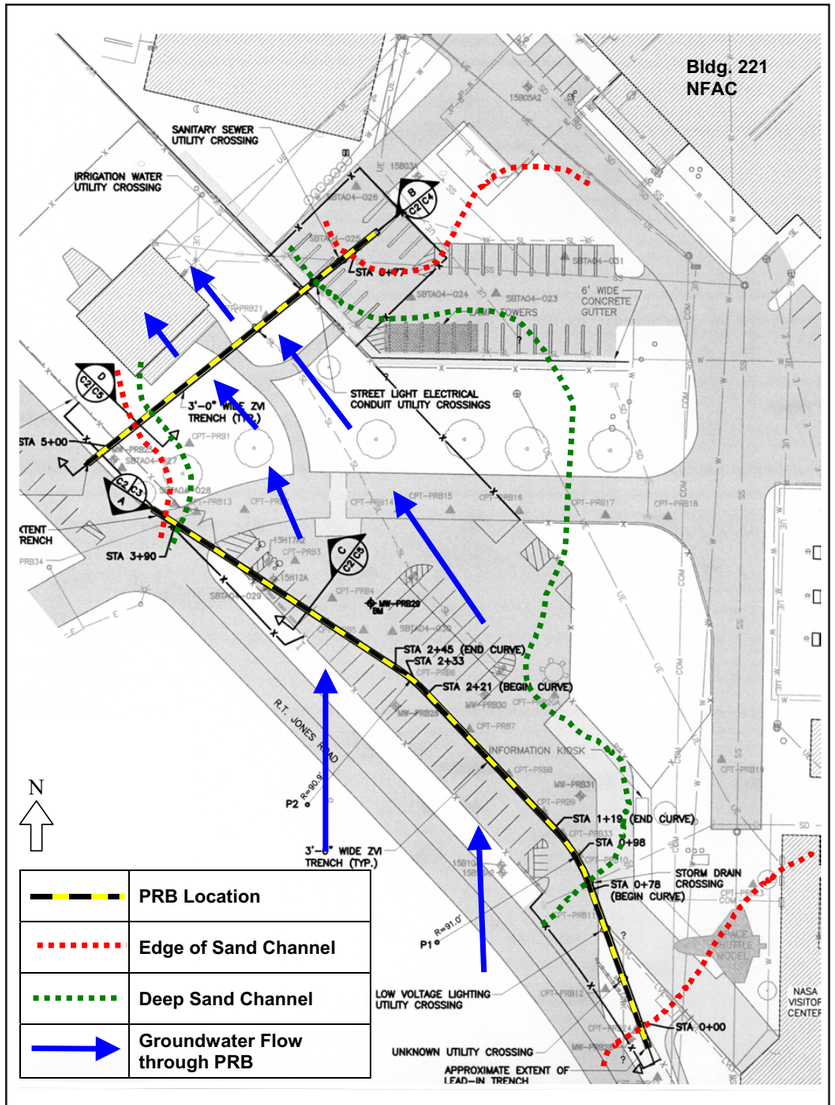

Figure 3: ZVI PRB Installation

ACRONYMS

AOI	Area of Investigation
ARC	Ames Research Center
BTTE	Boundary Treatment Technology Evaluation
DCE	Dichloroethene
EPA	Environmental Protection Agency
MCL	Maximum Contaminant Levels
NASA	National Aeronautics and Space Administration
OPHA	Orion Park Military Housing Area
PRB	Permeable Reactive Barrier
TCE	Trichloroethene
VPA	Voluntary Protective Action
ZVI	Zero Valent Iron
µg/l	Micrograms Per Liter