Proposed NABIR Field Research Center at Oak Ridge, Tennessee

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The Environmental Sciences Division at Oak Ridge National Laboratory (ORNL) proposes to establish a Field Research Center (FRC) on DOE's Oak Ridge Reservation (ORR) in Tennessee for the DOE Office of Biological and Environmental Research. The proposed FRC would provide a site for NABIR investigators to conduct research and obtain samples related to in situ bioremediation.

The proposed FRC would include a contaminated area to be used for conducting experiments on a plume of contaminated groundwater, a background area that would provide for comparison studies in an uncontaminated area, and ancillary structures that would be located within a 3.2-mile (5.2-km) radius of each other on the ORR. The contaminated and background areas would be located on DOE land in Bear Creek Valley, which is within the Y-12 Plant area. Both of these sites are well characterized, well instrumented and should be available for the duration of the proposed NABIR FRC (5 to 10 years). The water table resides at 0 to 3 m below the surface and would be readily accessible to the rapid instrumentation of multilevel groundwater monitoring wells. ORNL's unique track-mounted pneumatic hammer has the capability of installing drive-point wells deep within the unconsolidated zone and transition zone and offers an effective and cheap alternative to traditional drilling technologies.

The proposed FRC contaminated field site would include the co-mingled groundwater plume found in the shallow unconsolidated sediments (<10 m depth), Nolichucky Shale and Maynardville Limestone that originated from a combination of the S-3 Waste Disposal Ponds and the Bone Yard/Burn Yard. However, the primary focus of NABIR investigations would be on the easily accessible shallow unconsolidated sediments that overlie the Nolichucky Shale. Contaminants in this plume and in the shallow saturated and unsaturated soils include uranium, Tc-99, strontium metal, nitrate, barium, cadmium, volatile organic contaminants (VOCs) and other inorganics and radionuclides believed to be of interest to the NABIR investigators.

Injection of non-toxic tracers into groundwater has been conducted as part of numerous research projects on the ORR and does not require any state permits. Based on recent discussions with the state of Tennessee, injection of indigenous and non-indigenous naturally occurring bacteria should be possible at the proposed FRC. ORNL staff have experience with hydrocarbons, methane, air, nutrients, gases, volatile acids, various ionic and inert tracers, and microbial injections into the subsurface either on the ORR or in nearby environments. The adjacent soil lysimeters (OBER-funded research) would also be available to NABIR researchers for bioaugmentation, biostimulation and other studies.