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Beltsville Agricultural Research Center
BARC 27: Beaver Dam Road Landfill

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The U.S. Department of Agriculture's Agricultural Research Service completed a Remedial Investigation (RI) and Feasibility Study (FS) at the Beaver Dam Road Landfill (BARC 27) site, at the Beltsville Agricultural Research Center (BARC).

An RI is a carefully structured process for collecting samples from potentially contaminated media (including soil, surface water, sediment, groundwater, and/or air), analyzing them for environmental contamination, and evaluating the potential risks discovered contaminants may pose to human health and the environment. The FS evaluates possible alternatives for cleanup to address any identified risks, while considering factors like regulatory requirements, effectiveness, cost, and community acceptance.

Background

The Beaver Dam Road Landfill (BDRLF) is located approximately 1,700 feet east of the intersection of Beaver Dam Road and Research Road, on the north bank of the Beaver Dam Creek stream valley. The dome-shaped landfill has steeply sloped sides surrounded by woods to the east and south, and is covered with vegetation. BDRLF is upstream of the floodplain of Beaver Dam Creek.

BDRLF was reportedly used as a disposal site for non-hazardous substances such as construction rubble, furniture, and other debris. This site was used from the early 1940s through the 1980s, after which the landfill was closed and capped.

Several environmental studies of BDRLF have taken place. These included a field reconnaissance study (1996), a baseline groundwater sampling (1997), and a Site Screening Process (SSP) investigation (1999). These early investigations identified the presence of chlorinated volatile organic compounds (VOCs) within the shallow groundwater system at the site. As a result, a more comprehensive RI/FS was initiated. The RI/FS identified the types, quantities, and locations of contaminants and developed ways to address the contamination problem.

Completed Remedial Investigation Activities

RI field activities included soil conductivity probing and field screening of soil gas samples; surface water, sediment, and shallow groundwater sampling; and advancing soil borings to collect surface and subsurface soil samples. Wetlands delineation of the floodplain south and east of the landfill were also performed to determine wetland boundaries.

The RI identified a plume of groundwater contaminated with the VOC trichloroethylene (TCE) approximately 650 feet wide, by 450 feet long southeast (downgradient) of the landfill. While it’s believed the source of TCE was within the landfill, a specific location remains unknown.

Chemical analyses of the soil borings were used to locate five additional monitoring wells at various locations south of the landfill that were installed in 2004. Nine monitoring wells (four existing wells and five new wells) are sampled annually.

Baseline Risk Assessment and Feasibility Study

As part of the RI/FS, ARS conducted a baseline risk assessment to determine current and future effects of contaminants on human health and the environment. There are no current residents at or near the BDRLF site, and there is no groundwater use within a one-mile radius of the site. The baseline risk assessment focused on health effects for current receptors (trespassers, visitors, or site workers), and children and adults in a future hypothetical residential setting. In addition, an assessment of ecological risks from exposure to site contaminants was completed.

Although the risk assessments showed that there are no significant risks to human or ecological receptors associated with exposure to surface water or sediment (i.e., in Beaver Dam Creek and its nearby tributaries), or surface soil at the BDRLF, contaminated groundwater south of the BDRLF contains chemicals of concern found at concentrations that pose an unacceptable risk if the groundwater were to be used in the future as a source of potable water.

A baseline ecological risk assessment did not identify any unacceptable risks to wildlife from exposure to compounds in the surface water or sediment in nearby Beaver Dam Creek and its tributaries. As a result, no action was needed to address potential ecological risks at the BDRLF.

Following EPA acceptance of the RI report, an FS report was prepared. The FS examined various remedial alternatives to address the contaminated groundwater. These included land use controls and groundwater monitoring; extraction, on-site treatment, and recharge; and groundwater treatment using a mulch biowall permeable reactive barrier.

Based on the findings from the RI/FS process, a permeable reactive barrier (PRB) or biowall was selected as the best remedy for the site.

Biowalls are permeable trenches filled with biologically active materials, such as mulch, compost, and/or vegetable oil, and are used to capture and remediate chlorinated VOCs in groundwater as it moves through the PRB.

At a July 2009 public meeting, the selection of a mulch biowall as the groundwater remedy was presented, and following the public comment period a Record of Decision (ROD) was drafted which documented and formalized the decision. In 2011, EPA approve the ROD.

A mulch biowall was installed at the BDRLF in July 2013. Monitoring wells were installed within the biowall in August 2013 to allow researchers to monitor groundwater conditions within the biowall. In collaboration with ARS researchers, a Performance Monitoring Plan (PMP) was developed that details ongoing data collection and sampling activities. Performance Monitoring is conducted on a quarterly basis to evaluate whether the biowall is achieving performance requirements.

ARS completed a Comprehensive Five-Year Review in 2018 in accordance with the provisions of the Comprehensive Environmental Liability and Compensation Act (CERCLA). The review indicates that the biowall is significantly reducing the concentration of TCE in groundwater; however, geochemical considerations such as low pH are inhibiting the growth of microorganisms that degrade TCE fully. Additionally, performance monitoring suggests that carbon sources within the biowall, essential for microbial growth, are being expended.

ARS researchers are developing solutions to enhance performance in 2019, and will continue to monitor progress over time.

For More Information:
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