Many Voices Working for the Community

Oak Ridge Site Specific Advisory Board

May 12, 2017

Jay Mullis
Acting Manager
Oak Ridge Office of Environmental Management
U.S. Department of Energy
P.O. Box 2001, EM-90
Oak Ridge, TN 37831

Dear Mr. Mullis:

Recommendation 235: Recommendations on Groundwater Investigations at the U.S. Department of Energy Oak Ridge Reservation.

At our May 10, 2017, meeting, the Oak Ridge Site Specific Advisory Board approved the enclosed recommendation Groundwater Investigations at the U.S. Department of Energy Oak Ridge Reservation.

There are five specific points in the recommendation that the board would like you to address in your response.

We appreciate your consideration of our recommendation and look forward to receiving your response by August 14, 2017.

Sincerely,

Belinda Price

Belinda Price, Chair
BP/rsg

Enclosure

cc/enc:
Dave Adler, DOE-ORO
Dave Borak, DOE-HQ
Kristof Czartoryski, TDEC
Connie Jones, EPA Region 4
Terry Frank, Anderson County Mayor
Melyssa Noe, DOE-ORO
John Owsley, TDEC
Mark Watson, Oak Ridge City Manager
Ron Woody, Roane County Executive
File Code 140

Oak Ridge Site Specific Advisory Board Recommendation 235: Recommendations on Groundwater Investigations at the U.S. Department of Energy Oak Ridge Reservation, Oak Ridge, Tennessee

Background

As a result of past research and industrial activities on the Oak Ridge Reservation (ORR), groundwater beneath several areas of the reservation has become contaminated. Groundwater investigations have been done on and adjacent to the ORR since the 1980s, but a dedicated effort began in 2013 to sample numerous offsite locations and identify near-term onsite groundwater remediation projects. At that time, the Department of Energy's Oak Ridge Office of Environmental Management (OREM), the Tennessee Department of Environment and Conservation (TDEC), and the Environmental Protection Agency (EPA) collaborated on a series of workshops to develop a groundwater strategy for the ORR.

A Groundwater Strategy Team was formed, which held a series of workshops to develop a groundwater strategy. Three workshops reviewed conceptual site models for each ORR watershed; identified affected groundwater plumes and related data gaps; and identified potential groundwater projects.

Two workshops combined and ranked the identified plumes using a modified EPA Hazard Ranking System. Potential projects were ranked, and early action projects were selected.

The final workshop reviewed groundwater use restrictions and policies and alternatives to engineered groundwater restoration.

The strategy team used the findings of the workshops to develop a groundwater strategy document (DOE/OR/01-2628). A number of strategy objectives were identified to guide the path forward for groundwater remediation on the ORR. Those objectives include:

- Identify and address potential threats to offsite public health from exposure to groundwater contaminated by ORR sources.
- Pursue selected remedial actions, as necessary, to prevent unacceptable risk and groundwater degradation and to restore groundwater to beneficial use where practicable.
- Achieve final ORR cleanup, including final groundwater decisions.

As noted above, the strategy team discussed all of the known contaminated groundwater plumes located on the ORR and placed them in the hazard ranking system based on the size of the plumes, contaminant concentrations, and if a plume was moving, especially if it might migrate off the reservation. The team identified 36 potential projects to address the 35 plumes.

Two projects were selected to begin right away. The first was an offsite groundwater assessment. Work began in 2014 to sample 49 offsite locations – 34 wells and 15 springs – to determine if contamination existed. Secondly, if contamination was found, the assessment would investigate if it originated from DOE operations on the ORR.

Three rounds of sampling have been completed. The first round of sampling at 43 locations was completed in the second quarter of FY 2015. Three locations showed contaminant exceedances of EPA National Primary Drinking Water standards for lead, gross alpha activity, or radium. The second round at 48

locations in the fourth quarter of FY 15 and the third round at 18 locations in the second quarter of FY 16 showed no exceedances of the EPA National Primary Drinking Water standards.

The second project undertaken was the creation of a regional groundwater flow model to help determine how groundwater moves. In 2015, a flow model was developed and a test case done on an 8-square mile area at Y-12 National Security Complex. The test was successful and the flow model was expanded to a regional scale model of the ORR and surrounding area.

According to the Federal Facility Agreement, the document that sets milestones for cleanup actions on the ORR, the first large scale decisions on groundwater will be made at East Tennessee Technology Park (ETTP). In 2005 a remedial investigation/feasibility study was done to offer alternatives to treat groundwater at ETTP.

One of the alternatives is a technique known as *in situ* thermal treatment, which heats water, and volatile organic contaminants are extracted from the vapor. The technique might be used to restore groundwater contaminated with dense non-aqueous phase liquids (DNAPLs). DNAPLs were used in large quantities for degreasing equipment at ETTP. Five plume sources at ETTP are thought to have DNAPLs.

If a second round characterization determines *in situ* thermal treatment is a viable alternative, a proposed plan will recommend the treatment in a record of decision scheduled for signing in 2023.

Other groundwater projects are being evaluated. One is the Melton Valley/Bethel Valley Exit Pathways Study to gather data on groundwater behavior in the valleys. The study would look at five plumes at Oak Ridge National Laboratory (ORNL) identified in the groundwater strategy document. Data gathered would be used with flow modeling to evaluate possible scenarios for groundwater flow westward off the reservation under the Clinch River.

Another possible project is the 7000 Area Trichloroethylene Plume Remediation Project in the East Campus of the ORNL. A pilot test done earlier using bioremediation has shown positive results. Bioremediation employs microbes to consume certain contaminants, but additional characterization needs to be done.

Discussion

The Oak Ridge Site Specific Advisory Board (ORSSAB) has been interested in the status of groundwater on and around the ORR for a number of years, and during that time DOE and contractor experts have provided several presentations on groundwater conditions and possible consequences of contaminated groundwater migrating offsite. DOE has even provided some residents to the west of the ORR with water from local water systems so private wells can be monitored for any contaminants that may be related to ORR operations and also ensure the safety of those residents.

Most recently DOE Groundwater Program Manager Dennis Mayton provided a presentation to the board on January 11, 2017, on the status of the Groundwater Strategy. He gave an overview of the groundwater monitoring program in place.

ORSSAB members participated in a tour of groundwater problem sites at ETTP and ORNL on January 25. The board's Environmental Management & Stewardship Committee had a detailed discussion with DOE personnel, including Mr. Mayton, on January 25.

ORSSAB appreciates the substantial effort that has been expended toward monitoring groundwater and developing an understanding of groundwater movement. This is important so that the potential for contaminant migration can be understood and future actions prioritized.

Recommendations

The potential for contaminant migration in groundwater represents an ongoing and future risk to the environment via the potential for media transfer to surface water and to human health if groundwater is used in the future for drinking water. Protection of groundwater therefore is important to the surrounding communities and to ORSSAB.

ORSSAB offers the following recommendations:

1. ORSSAB recommends diligent and continued efforts to monitor for potential offsite migration and to implement appropriate actions to mitigate or prevent offsite migration in areas such as Melton Valley and White Oak Creek if the need should arise. The board requests additional surveillance monitoring to establish a monitoring framework in Bethel Valley and annual reports of results to the board.
2. The Groundwater Strategy document was completed in 2014. At that time only five actions were given priority although 35 plumes were noted as high risk. We recommend that DOE should continue to prioritize based on the highest risk to lowest risk. In addition, with the upcoming completion of the offsite groundwater investigation, ORSSAB urges DOE to include a five-year review of the strategy (in 2019) to revisit the ranking of plumes to ensure that highest-risk plumes are addressed expeditiously and to adjust priorities and budgets based on changes in conditions (such as increased risk to the environment or public health).
3. ORSSAB recommends placing a high priority on site-specific modeling in the Melton Valley area to include installation of additional monitoring wells (if needed) and the implementation of treatability and/or pilot-scale options as funding allows. To that end, ORSSAB supports and encourages DOE to move forward with the Melton Valley/Bethel Valley Exit Pathways Study to gather data on groundwater behavior in the valleys. DOE should formulate and initiate a strategy to cooperate with the Tennessee Valley Authority, to commence, continue, and/or enhance sharing of relevant groundwater data and information with the Tennessee Valley Authority.
4. ORSSAB recommends that DOE should fully fund and schedule preliminary planning, study, and technology demonstrations so that full-scale final cleanup efforts can begin no later than 2025; as an example, move forward with the 7000 Area Trichloroethylene Plume Remediation Project. In order to achieve this, the board recommends considering refocusing available money from plus-ups, surpluses, etc., toward the groundwater effort. The board requests that DOE provide updates to the board as strategies are developed to allow for comment.
5. ORSSAB recommends that DOE maintain communications with offsite groundwater users, especially in Melton Valley and Bethel Valley, as necessary to remain cognizant of planned usage that may pose an unacceptable risk.