



Many Voices Working for the Community

Oak Ridge Site Specific Advisory Board

Monthly Meeting of the Oak Ridge Site Specific Advisory Board

Approved April 10, 2024, Meeting Minutes

The Oak Ridge Site Specific Advisory Board (ORSSAB) held its full board monthly meeting virtually via Zoom and in person at 1 Science.gov Way on Wednesday, April 10, 2024, at 6 p.m. Copies of referenced meeting materials are attached to these minutes. A video of the meeting was made and is available on the board's YouTube site at www.youtube.com/user/ORSSAB/videos.

Members Present

Kris Bartholomew
Mary Butler
Harold Conner, Jr.
Paul Dill
Rosario Gonzalez
Amy Jones
Noah Keebler
Mike Mark

Thomas McCormick
Harriett McCurdy
Christine Michaels
Charles Moore
Tonya Shannon
Michael Sharpe
Rachel Stewart
Tom Tuck

Members Absent

Atilio Anzellotti
Candace Atkinson

Raiyan Bhuiyan

¹Third consecutive absence

Liaisons, Deputy Designated Federal Officer, and Alternates Present

Melyssa Noe, ORSSAB Deputy Designated Federal Officer (DDFO), OREM
Roger Petrie, ORSSAB Alternate DDFO, OREM
Teresa Mathews, Oak Ridge National Laboratory (ORNL)
Kristof Czartoryski, Tennessee Department of Environment and Conservation (TDEC)
Samantha Urquhart-Foster, EPA

Others Present

Leah Alexander, OREM
Jared Brabazon, TDEC
Dana Casey, TDEC

Emily Day, UCOR
Abby Hill, OREM
Shelley Kimel, ORSSAB Staff
Sara McManamy-Johnson, ORSSAB Staff
Tab Peryam, TDEC
Erin Sutton, OREM
Kelsey Waterson, TDEC

Three members of the public were present.

Liaison Comments

Ms. Noe – Ms. Noe began her comments by discussing a recent agreement between OREM and the national labor organization, North American Building Trades and Unions. She said the agreement will boost pay and benefits for workers in Oak Ridge, including a 20 percent wage increase over a three-year period, plus paid holidays and a retention bonus. She said OREM has been facing some attrition and this agreement will help OREM retain workers. Oak Ridge is the first EM site to do this.

Next, Ms. Noe said crews had finished a major infrastructure upgrade project for the waste treatment system at ORNL. The project included replacing two miles of piping at the Liquid and Gaseous Waste Treatment facility, which is essential for ongoing operations at ORNL. The work involved more than 5,000 hours of welding, and workers completed the project \$900,000 under budget and three months ahead of schedule.

Lastly, she said crews wrapped up early site preparations for the Environmental Management Disposal Facility (EMDF) and have moved into the second phase of the project, which is the groundwater fill demonstration study.

Mr. Czartoryski – No comments.

Ms. Urquhart-Foster – Ms. Urquhart-Foster said a per- and polyfluoroalkyl substances (PFAS) maximum contaminant level (MCL) was added that day to the Safe Drinking Water Act.

Presentation

Mr. Bartholomew introduced ORNL's Teresa Mathews to present the topic of discussion, Aquatic Ecology Research and Technology Development in East Fork Poplar Creek.

Ms. Mathews began her presentation by giving members an overview of ORNL's biological monitoring program, which has been underway for 40 years, and mercury remediation technology development program, which is in its tenth year. She said mercury contamination and remediation is very complex, so the lab utilizes the 40 years of history and expertise at the lab as well as partnerships across the site and the DOE complex and experts throughout the world in order to get the most cutting-edge science to apply in Oak Ridge.

Next, Ms. Mathews discussed mercury as a global pollutant. She said any remediation technology developed in Oak Ridge is applicable around the world. Mercury can undergo several different transformations in the environment; it can be oxidized or reduced through photo oxidation from the sun; it can bind with dissolved organic matter in aquatic ecosystems; it can volatilize and travel for hundreds

of thousands of miles before it settles back down to earth. She said the most important transformation is the methylation of mercury, which happens in aquatic ecosystems.

Mercury can be methylated to an organic form called methylmercury, which looks like an essential amino acid and so is readily taken up by cells and then not given up, so it tends to bioaccumulate in organisms. Humans' biggest dose of mercury comes from eating contaminated fish. She said because mercury is transformed in the environment, our exposure is affected by aquatic systems and risk and toxicity, and how we remediate is going to be very different based on these different forms.

Mercury is one of the only metals that is known to bio-magnify in aquatic systems, meaning it becomes increasingly concentrated as it moves up the food chain, and that is specifically true of methylmercury. EPA guidelines for mercury include both mercury in water and mercury in fish tissue, which is 0.3 micrograms per gram in fish fillet. She said that fish tissue guideline is considered to be a more accurate indicator of exposure and risk.

Ms. Mathews next discussed mercury pollution in the United States as a whole and globally, illustrating the widespread nature of mercury contamination.

She then discussed mercury in Oak Ridge and its origins. She said the world's stockpile of mercury was brought to Oak Ridge in the 1950s and '60s. During that time, mercury was used to separate lithium isotopes. About 11 million kilograms of mercury was used during that time and about 3 percent of that amount was lost to the environment. Since then, mercury remediation has focused on source control – water treatment systems, sewer relining, soil removal, etc.

Next, Ms. Mathews specifically discussed Poplar Creek in Oak Ridge. This creek runs from Y-12 National Security Complex (Y-12) into the City of Oak Ridge and is the largest stream on the Oak Ridge Reservation (ORR) at about 25 kilometers long.

She said the Aquatic Ecology Laboratory measures mercury concentrations in the water and in the fish, targeting fish that could potentially be for human consumption, so larger fish. Additionally, they collect water samples that are then taken back to the lab and exposed to lab organisms under controlled conditions. They also do field studies at various sites to make sure communities living in the creek are diverse because diversity in the aquatic community means good water quality.

Next, Ms. Mathews summarized the remediation actions taken over the years, which included water treatment systems, storm drains, cleaning or re-routing flows, soil removal or stabilization, and chemical additions. In 2019, construction also began on the Mercury Treatment Facility. She said a number of these actions have significantly decreased mercury concentrations in the water. Researchers have now started looking at ways to decrease methylmercury concentrations to further decrease concentrations in fish. She said there are three key factors that are recognized to control mercury concentrations in fish; first is the amount of mercury, next is the conversion of inorganic mercury to methylmercury, and then is the bioaccumulation of mercury through the food web.

She said this program was designed to address those three factors. The first task is decreasing mercury source inputs and flux by focusing on soil and groundwater source control; the second task is decreasing mercury concentration and methylation by focusing on water chemistry and sediment; the third task

focuses on ecology to decrease bioaccumulation. She then described some of the different studies the lab is doing or has done, including measuring erosion in certain areas along the stream and looking at ways to stabilize the soil, as well as looking at potential sorbents to add to the soil to remove mercury. Another study the lab has been doing involves looking at the capacity for mussels to filter mercury out of the water. She said East Tennessee and the Southeast in general are hotspots for freshwater mussels, which filter water and particulates over their gills to feed and in doing so affect water quality. The Aquatic Ecology Lab is working with the Tennessee Wildlife Resource Agency (TWRA) to re-seed local streams with native species of mussels.

Ms. Mathews said the take-home message is that because of the complexity of mercury itself and the local situation, there will not be just one solution. There may need to be a watershed-scale approach.

Board members asked the following questions:

- Ms. McCurdy asked what the advantage is of methylating mercury for the organism.
 - Ms. Mathews said there is no known advantage for the organism.
- Mr. Bartholomew asked if vegetation takes up the mercury.
 - Ms. Mathews said it does, so plants can be used as a phyto-remediator, however as you plant things you might decrease the water flow, which tends to accumulate organic matter and can ultimately contribute to a hotspot for mercury methylation. She said it's not that phyto-remediation is not an option, but caution would be needed. She said it is being discussed as a potential option for bank stabilization.
- Mr. Keebler asked what areas along the creek are of concern.
 - Ms. Mathews said there's a layer in the stream banks that is buried. One area is around kilometer 23, behind the National Oceanic and Atmospheric Administration (NOAA), and the other is by the old Bruners market.
- Mr. Keebler asked if there are any plans to remediate those areas.
 - Mr. Petrie said they were already remediated.
- Ms. Michaels asked for additional description of sorbents and how they are disseminated.
 - Ms. Mathews said the different sorbents look very different; the particle sizes are different and how they behave in water are different. She said for this study, they were put in porous bags within mesh bags, and those bags were put in the soil.
- Ms. Stewart asked what mercury remediation activities have been done at other places that have been successful.
 - Ms. Mathews said there is a site in Virginia that's about 10 years ahead of us in

terms of where they are in remediation, so the Aquatic Ecology Lab has been active in those discussions and been collaborating with some of the scientists and students from there. She said their river is larger than ours, but it's a similar site.

- Mr. Czartoryski asked if any methylation was measured in the mercury absorbed during a year-long sorbent field deployment.
 - Ms. Mathews said they did not look at methylation during the field deployment because the sorbents were deployed over a period of a year and mercury can be methylated and then flow downstream, so there's no way to get to that question in the field. However, she said, there are currently long-term lab experiments underway.
- Mr. Conner asked how confident she was, based on lab studies, that the Mercury Treatment Facility (MTF) will make a difference in the methylmercury and downstream.
 - Ms. Mathews said she thinks it will be effective at the goal of the facility, which is to treat mercury coming out of Outfall 200. She said that is reducing mercury that is going downstream that would then be available for methylation.
- Ms. Jones asked how far downstream is tested for mercury.
 - Ms. Mathews said the biological monitoring program tests as far down as kilometer 6.3. They have also just deployed a monitoring station for water downstream of that, and there are also long-term monitoring stations downstream of the Oak Ridge Reservation (ORR) all the way to the Tennessee River. She said they sample throughout the Clinch River, both upstream and downstream of the ORR and then down to the Tennessee River.
- Ms. Butler asked if methylmercury accumulates in all tissues of the fish or just certain tissues or organs.
 - Ms. Mathews said it accumulates in all tissues, but especially in protein, so muscle tissues.

Public Question

- Public Question #1 – Mr. Luther Gibson asked if they anticipated any impact on mercury from the Tennessee Valley Authority (TVA) shutting down the coal-fired plants.
 - Ms. Mathews said coal releases mercury into the atmosphere, so shutting down coal plants will definitely have an impact but she doesn't know the specific impacts.

Public Comment

- Public Comment #1 – Mr. Luther Gibson discussed ecological enhancement as a remedy in CERCLA decision documents and planning additional ORSSAB topics. (See attached.)

Board Business/Motions

- Ms. Jones asked for a motion to approve the agenda.
 - 4.10.24.1 Motion made by Ms. Michaels and seconded by Mr. Keebler. Motion passed.
- Ms. Jones asked for a motion to approve meeting minutes.
 - 4.10.24.2 Motion to approve the March 13, 2024, meeting minutes.
Motion made by Mr. Tuck and seconded by Mr. Moore. Motion passed.

Responses to Recommendations & DDFO Report

Ms. Noe said there were no open recommendations, but the board is actively working on the budget recommendation. She said Oak Ridge will be hosting the EM SSAB Chairs Meeting in September, so staff is working on the venue and will provide additional information after everything is confirmed.

Committee Reports

Executive – Mr. Bartholomew said the committee met April 3 and discussed the fall chairs meeting and the new member orientation. He said the budget issue group hopes to have a draft recommendation available in time for the April 24 EMS committee meeting.

EM & Stewardship – Ms. Butler said the next committee meeting will be held April 24 and the committee will discuss and vote on the draft budget recommendation at that time. Additionally the committee will continue discussion on the current topic, although there is no recommendation being requested on this topic.

Additions to the Agenda & Open Discussion

Ms. Jones said the board will not meet in May, so the next meeting will be in June.

Action Items

None

The meeting adjourned at 7:10 p.m.

I certify that these minutes are an accurate account of the April 10, 2024, meeting of the Oak Ridge Site Specific Advisory Board.



Amy Jones, Chair



Harriett McCurdy, Secretary

June 12, 2024

Oak Ridge Site Specific Advisory Board

AJ/sbm