Pine River Progress

EPA's Update on the Velsicol Site
St. Louis, Michigan

EPA United States Environmental Protection Agency

VOLUME 6, ISSUE 1

SUMMER 2021

Learn More About the Cleanup

www.epa.gov/superfund/velsicol-chemical-michigan

See cleanup-related documents at the information repository:

T.A. Cutler Memorial Library
312 Michigan Ave.
St. Louis, Michigan

Contact EPA staff:

Diane Russell,
Community Involvement Coordinator
russell.diane@epa.gov
989-395-3493

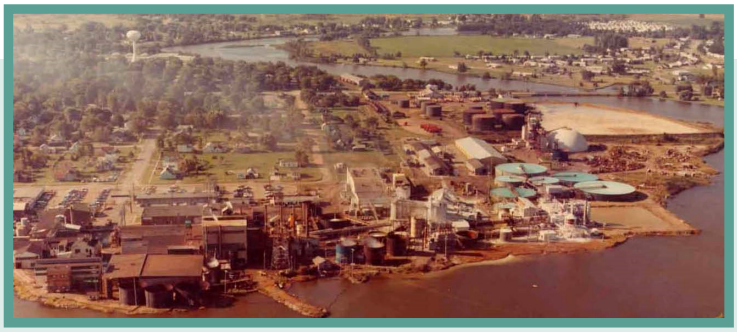
Thomas Alcamo,
Project Manager
alcamo.thomas@epa.gov
312-886-7278
800-621-8431, Ext. 67278

Inside this Issue

The Third and Final Phase of Thermal Treatment Now Underway

In April, EPA started thermal treatment at a 1.5-acre area that was the location of the former Michigan Chemical DDT plant site. It is also the location where EPA identified contamination underground that needed to be removed. This area, identified as Phase 2 of Area 2, will be the third and final area that EPA will be using thermal treatment technology on the former plant site to extract contaminants out of the ground by heating the soil and groundwater to the boiling point of water, or 212 degrees Fahrenheit. EPA plans to use the same technology at a nearby site known as the Velsicol Burn Pit when funding is made available for that cleanup.

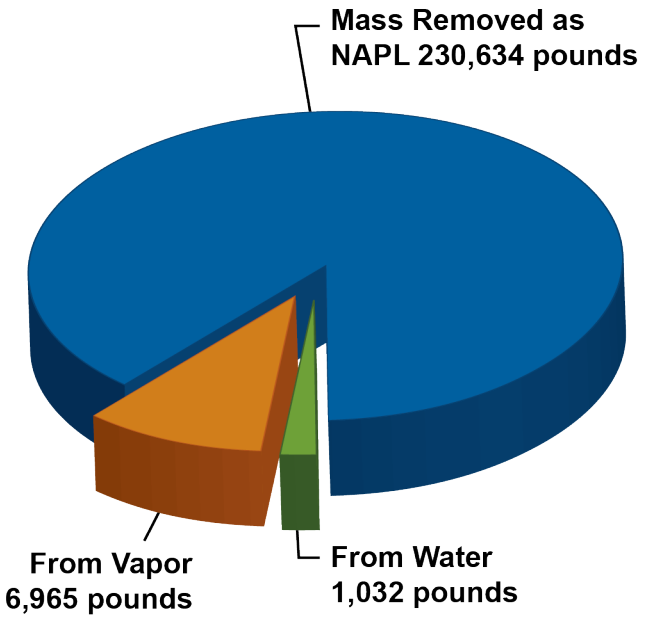
For the last four years, EPA has used this technology at the former drum storage area, or Area 1, and a former Bromine and Fine Chemicals plant, or Phase 1 of Area 2. Those projects successfully removed more than 239,000 pounds of contaminants, or about the weight of 47 pickup trucks (see page 2 for more details). As of July 2021, approximately 50,000 pounds of contaminants have been removed from the final treatment area. The final phase is expected to be completed this fall, all while utilizing 100% green power (see page 3, Project Spotlight).



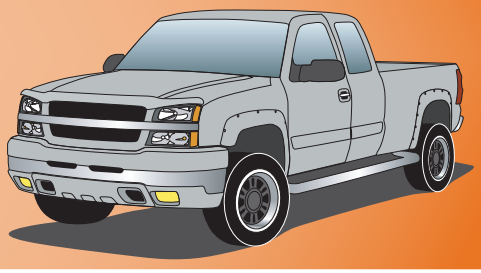
Velsicol Chemical Site *Then* and Now

Thermal Treatment Numbers

Estimated Total Contamination Removed



Did you know that the amount of contamination removed is equivalent to the weight of over 47 pickup trucks?



Energy Use

= 200 homes

Since March 2018, enough electricity has been used to power over 2,162 homes for one year.

Velsicol Chemical Site

Project Spotlight

The Velsicol thermal treatment system is now using 100 percent green electrical power!

The thermal treatment system uses a large amount of electricity to heat the soil and groundwater and to run the on-site treatment plant. The City of St. Louis is providing all of the electricity for the thermal treatment through wind, solar and hydroelectric generation.

What is Green Power?

Green power is a subset of renewable energy and represents those renewable energy resources and technologies that provide the highest environmental benefit. The U.S. Voluntary Green Power Market defines green power as electricity produced from solar, wind, geothermal, biogas, eligible biomass, and low-impact small hydroelectric sources. Green power is often bought for its zero emissions profile and carbon footprint reduction benefits.

Renewable energy includes resources that rely on fuel sources that restore themselves over short periods of time and do not diminish. Such fuel sources include the sun, wind, moving water, organic plant and waste material (eligible biomass), and the earth's heat (geothermal). Although the impacts are small, some renewable energy technologies can have an impact on the environment.

Benefits of Using Green Power

Conventional electricity can be a significant source of air pollution and greenhouse gas emissions. Switching to green power can help improve the environmental profile of the electricity use, while also providing other valuable benefits. Using green power helps to:

- Support renewable energy development (either directly or indirectly)
- Reduce the carbon footprint associated with purchased electricity
- Hedge against future electricity price increases and volatility (certain products)

Community Corner

Alma College iGEM team Examines Soil Cleanup at Local Superfund Site

Improving on last year's finish, team wins gold medal at international competition

The Alma College iGEM team, competing at an international synthetic biology competition for only the second time, won a gold medal in November for a project being developed to break down the chemical compounds in contaminated soil at the Velsicol Superfund site in St. Louis, Michigan.

The nonprofit International Genetically Engineered Machine (iGEM) Foundation brings together more than 6,000 participants from across the world every year for its annual Giant Jamboree, which they deem "the largest synthetic biology innovation event in the world." Synthetic biology is a field of science that involves redesigning organisms for useful purposes by engineering them to have new abilities.

The Alma College 2019 team won a silver medal at the Giant Jamboree last year for their project, the development of a counteracting bacterium to degrade Trimethylamine, or TMA, which promotes plaque formation in arteries. Devin Camenares, assistant professor of biochemistry and IGEM coordinator, said this year's team improved to win a gold medal, despite restrictions put in place as a result of the COVID-19 pandemic.

"There were definitely challenges in terms of organizing the team and getting the work done, but the students rose to the challenge," said Camenares. "They did a really job good of preparing themselves, communicating over the summer and completing their projects. I'm excited to see what they come up with next year and beyond."

Abbey Killian, a junior from Traverse City and vice president of the Alma College team, said the team focused on two aspects of the ongoing soil cleanup project: one that made the project less expensive and another that made it less harmful to the environment.

Velsicol Chemical Corporation, and its predecessor Michigan Chemical Corporation, produced various chemical compounds from 1936 until 1978, when the plant shut down. The chemicals polluted the groundwater, soil and Pine River that bordered the plant. In the early 1980s, the factory was demolished, but pollution remains to this day. Federal and state agencies, as well as local groups and volunteer organizations, have for many years committed to cleaning up and rehabilitating the site.

Killian said the Alma College team is working to develop a bacterium that, when applied to soil and water samples from the Velsicol site, would be able to determine the severity of toxicity in those samples. Such a measuring stick would enable groups like the U.S. Environmental Protection Agency (EPA) to better focus their resources on impacted areas.

"We did a cost-benefit analysis and determined that this biosensor could save hundreds of thousands, if not millions of dollars annually," said Killian. "When we made contact with the EPA and told them about our findings, they were very interested. We think our biosensor could not only save money, but also time."

ALMA COLLEGE

In addition to the "biosensor," the iGEM team is also working to develop a new way to break down the chemical compound dichlorodiphenyltrichloroethane (DDT) and its derivatives, which are some of the most common contaminants at the Velsicol site. By capitalizing on the fact that full or partial pathways to degrade DDT already exist in nature, Killian said, the team is showcasing how synthetic biology can be used in a practical way.

"We want to take this chemical that exists in nature and change it in a way that is environmentally friendly," Killian said. "It's an ambitious goal, but if we succeed, we'll be able to revive an ecosystem that has been damaged by problems from the past, while minimizing the risk to the future."

The Alma College team created content for a number of media platforms to discuss the raw science it was producing in college laboratories, including a podcast, a website and a web video that mimicked a 1980s TV broadcast. iGEM teams typically present their findings in person at the Jamboree, but Camenares said that this year's event was entirely virtual due to the pandemic.

"One of the aspects of iGEM that I really appreciate is that it forces students to not only do the research, but to communicate their findings in a way that is accessible to the public. That makes your circle wider, which means your project is more influential," Camenares said. "The students really took advantage of the restrictions brought upon by the pandemic and produced some clever media to disseminate their message."

Creating the "TV broadcast" led to collaborations with the student-run production company Bitworks, as well as the Alma College Theatre Department. With student "reporters" carrying large microphones on-screen, and distortion that resembled a video cassette recording, Killian said the video was an especially memorable way to get their message across.

"We decided to do an '80s-themed video because the contamination primarily took place in the 1970s and '80s," she said. "It ended up being a really cool, fun collaboration with different groups across campus."

While the results are encouraging thus far, Killian and Camenares said, the team is not finished looking into the Velsicol site. They intend to return to the competition next year — which is tentatively scheduled to be held in Paris, France — and repeat their gold medal effort.

"It felt great to improve on last year's result and win a gold," Killian said. "We want to keep on improving, by adding new members to our team and having the same success, on a truly international stage."

Alma College iGEM team member Aryaan Misra '23 "reported" on the Velsicol Chemical Corporation disaster as part of the team's gold-medal winning entry at the International Genetically Engineered Machine (iGEM) Foundation Gant Jamboree in November.

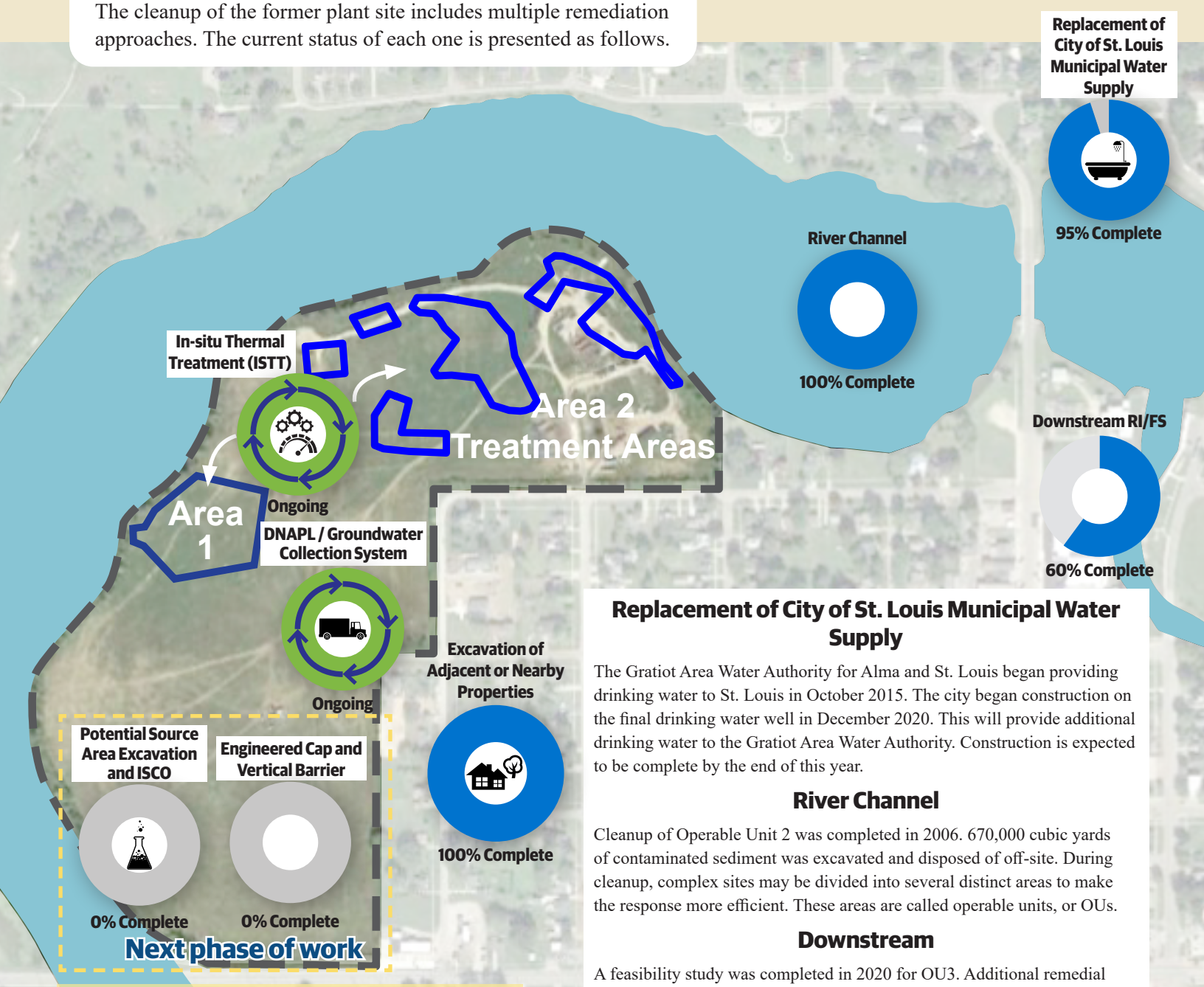
Team members included:

Connor Arens '22, White Lake
Gary Carter '23, Niles
Elizabeth Elliott-Redlin '23, Kalamazoo
Paul Fischer '23, Bloomfield Hills
Pedro Granja '21, Juigalpa, Nicaragua
Rhianna Haynes '22, Lake Isabella
Madison Hibbs '22, Whitmore Lake
Kaissidy Homolka '23, Petersburg
Abbey Killian '22, Traverse City
Paige Lamoreaux '24, Benzonia
Ruby Lovasz '22, Clio
Marleigh Matthews '21, Davison
Aryaan Misra '23, Noida, India
Izzy Oakley '22, Trenton
Tatym Plath '21, Perrinton
Kaleb Ramon '21, Mount Pleasant
Gavin Swiecicki '23, Bay City
Kelsey Taylor '21, Plymouth

Story originally published on the Alma College website on January 05, 2021

Velsicol Progress Tracker

The cleanup of the former plant site includes multiple remediation approaches. The current status of each one is presented as follows.



Potential Source Area Excavation and ISCO

Two potential source areas will be excavated, approximately 75,000 cubic yards of soil, with off-site disposal and another two areas will be evaluated for treatment with in-situ chemical oxidation, or ISCO, which will be used to lower chemical concentrations found in soils and groundwater.

Engineered Cap and Vertical Barrier

A cap will be installed to eliminate direct contact threat and prevent infiltration. A vertical barrier will be installed to decrease the potential of contaminants directly discharging to the Pine River.

Replacement of City of St. Louis Municipal Water Supply

The Gratiot Area Water Authority for Alma and St. Louis began providing drinking water to St. Louis in October 2015. The city began construction on the final drinking water well in December 2020. This will provide additional drinking water to the Gratiot Area Water Authority. Construction is expected to be complete by the end of this year.

River Channel

Cleanup of Operable Unit 2 was completed in 2006. 670,000 cubic yards of contaminated sediment was excavated and disposed of off-site. During cleanup, complex sites may be divided into several distinct areas to make the response more efficient. These areas are called operable units, or OUs.

Downstream

A feasibility study was completed in 2020 for OU3. Additional remedial investigation activities will be conducted at OU4 in 2021-2022. Phase 2 of the carbon amendment study is underway with anticipated completion in 2022.

In-situ Thermal Treatment (ISTT)

ISTT is the process of removing harmful chemicals from soil using heat. ISTT for Area 1 was completed in November 2018. Construction of Area 2, Phase 1 was completed in September 2019 and operations conducted in September 2020. Construction of Area 2, Phase 2 is underway with anticipated completion in 2022.

DNAPL / Groundwater Collection System

Approximately 20,000 gallons of contaminated groundwater from the site are removed weekly and shipped off-site for treatment. This is a continuing operation.

Site Happenings

In Remembrance:

Phillip Ramsey, a longtime resident of Gratiot County, passed away on July 6, 2021 at the age of 88. Throughout the community, Phil was known for having invaluable knowledge of local environmental matters—specifically, historic knowledge of the Velsicol site. Having grown up in St. Louis, Phil saw the pollution from the site firsthand as a kid.

In recent years, Phil would often visit the Velsicol site to talk with EPA and the site team. He would ask how the thermal treatment system worked and about other site activities.

Phil also attended many of the site tours and would give his historical viewpoint of the site. Phil was a member of the Pine River Superfund Citizen Task Force and earned the honor of being named their Person of the Year in 2017.

We will remember Phil for his desire to see the site cleaned up, his involvement with the CAG, and his sense of humor. We extend our sincere condolences to his wife and family.

"Phil's visits were always fun. He would ask questions and tell stories and offer the team encouragement. Cleaning up the site was very important to him."

- Scott Pratt, Jacobs Project Manager

Wildlife at the Velsicol Site

A variety of wildlife animals have been observed at the Velsicol site over the years. Deer are commonly roaming the area. In fact, a set of twin fawns were born on the site this spring!

Eagles and hawks have been spotted flying near the site along the river. Other wildlife observed include turtles, woodchucks, and numerous birds including geese and ducks. Smaller mammals such as mice, voles and chipmunks are also commonly seen.

Fawns playing at the site.

A soft-shell turtle wandering around the Velsicol site.

Where to find more information:

Velsicol websites:
www.epa.gov/superfund/velsicol-chemical-michigan
www.epa.gov/superfund/velsicol-burnpit

To see monitoring work in action, visit www.epa.gov/superfund/velsicol-chemical-michigan and look for **Sampling and Monitoring** under Cleanup Activities.

Sign up on EPA's List Serve to have site information and updates emailed to you. Go to the Velsicol website, and click on Stay Updated, Get Involved.

Information Repository
T.A. Cutler Memorial Library
312 Michigan Ave.
St. Louis

Pine River Progress

EPA United States Environmental Protection Agency

Inside this Issue

About this Publication

Pine River Progress is a biannual newsletter that covers topics related to EPA's cleanup of the Velsicol Superfund site. We welcome feedback and ideas for future articles. If you would like to receive a copy of this newsletter, please contact EPA Community Involvement Coordinator, Diane Russell at russell.diane@epa.gov or call 989-395-3493 9:30 a.m. to 5:30 p.m., weekdays.

Fawn sleeping at the Velsicol site. See Page 7 to learn more about wildlife at the site.

RETURN SERVICE REQUESTED

FIRST CLASS

EPA United States Environmental Protection Agency
Region 5 Superfund Division
Community Information Office
1300 Bluff St., Suite 140
Flint, MI 48504