

## Billings PCE Groundwater State Superfund Site

July 2019

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The Montana Department of Environmental Quality recently conducted indoor air sampling, as well as soil and groundwater sampling, at the Billings PCE Groundwater State Superfund Site – an 855-acre area in east and southeast Billings with groundwater contaminated by dry cleaning chemicals and other industrial sources. The air quality sampling was focused on buildings that sit directly over the contaminated groundwater.

Results show that, at some locations, contaminants have moved from groundwater through soil and entered the overlying structures, a problem known as “vapor intrusion.” The contaminants of concern include the chlorinated solvents tetrachloroethylene (PCE) and trichloroethylene (TCE) and other compounds.

### Background

Solvent contamination in the downtown Billings area was reported in the early 1990s and preliminary investigations identified Big Sky Linen, at 715 Central Avenue, as the most contaminated source area. DEQ also continued to receive reports of chlorinated solvent contamination in areas outside of Big Sky Linen.

In 1992, the area was designated a State Superfund Site, technically referred to as a “facility” under the State Comprehensive Environmental Cleanup & Responsibility Act (CECRA). DEQ used federal funding to conduct preliminary investigations from 1992 through 2001.

In 2008, EPA conducted an aggressive removal in the Big Sky Linen area that included:

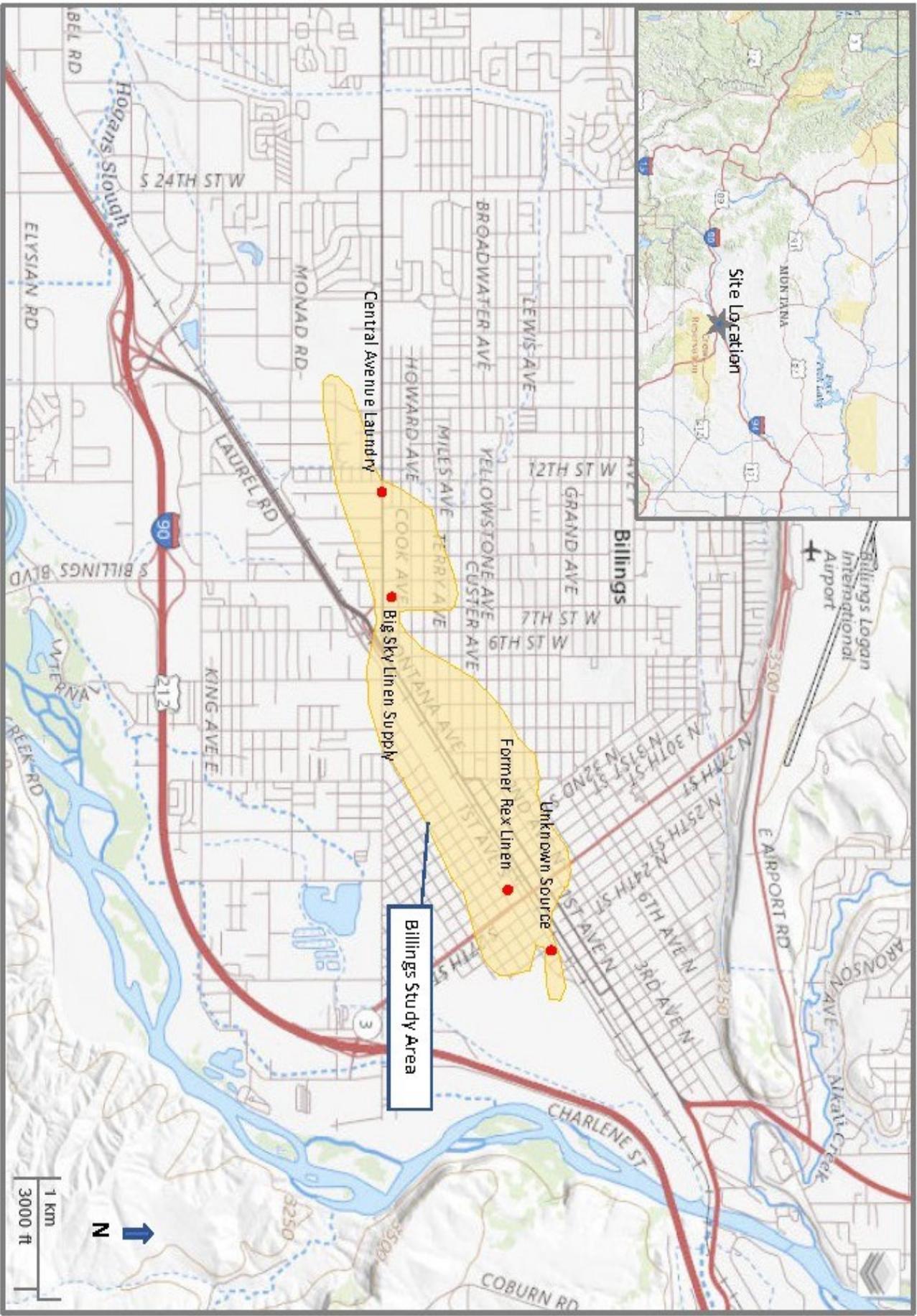
- Removal and disposal of highly contaminated soil.
- Chemical injection to help break down groundwater contamination.
- Installation of a barrier wall around the most contaminated groundwater.
- A groundwater model to forecast how the groundwater contamination would respond to the cleanup over time.

EPA also installed vapor mitigation systems at seven structures near Big Sky Linen. Vapor mitigation systems limit vapor from accumulating in indoor air. The vapor is collected from underneath the structure and discharged into the atmosphere above the structure, much like a radon mitigation system.

### Why did DEQ conduct additional sampling?

Data collected at leaking underground storage tank sites and other property investigations after the EPA removal work led DEQ to suspect other sources were contributing to groundwater contamination. DEQ performed what is called a remedial investigation under the State Superfund program to determine the current nature and extent of contamination, if other sources were contributing to contamination, and if vapor intrusion was occurring elsewhere. Since 2000, vapor intrusion science has continued to evolve and scientists have learned more about how to evaluate indoor air contamination and potential health risks. The remedial investigation also evaluated the effectiveness of the mitigation systems to see if they were still functioning as designed.

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Outline approximates the Billings PCE Groundwater State Superfund Site where PCE has been detected.

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## Results

The remedial investigation showed multiple sources of contamination, identifying four source areas based on soil, groundwater and vapor data. The remedial investigation also showed that groundwater contamination coming from these sources is larger than previously understood and is causing vapor intrusion into overlying structures.

### Here is an overview of key results from the remedial investigation:

**Soil:** The soil investigation was conducted to evaluate known and potential contaminant source areas and to provide an understanding of contaminant distribution.

- The Big Sky Linen area, 715 Central Avenue where removal work was performed by EPA in 2007, remains the largest contaminant source area.
- Residual contaminated soils were discovered at Big Sky Linen in areas that were inaccessible via the technologies used in EPA's 2008 removal activities and are likely contributing to groundwater contamination.
- Results confirmed the former Central Avenue Laundry and Rex Cleaners (see map on opposite page) as source areas that are contributing low-level chlorinated solvent contamination to groundwater.
- None of the soil samples analyzed contained chlorinated solvents in their pure form.
- Soil contamination next to the top of the water table is generally at higher concentrations than in shallower soils. Contamination also was found in surface-level soils that may contribute contamination to groundwater. It should be noted, however, that contamination in surface-level soils was at low concentrations that do not present a direct contact risk to humans.

**Groundwater:** The groundwater study area is approximately 3.3 miles long and 0.75 miles at its widest. There are at least four chlorinated solvent sources areas: Central Avenue Laundry; Big Sky Linen (where EPA conducted the 2008 removal action); former Rex Cleaners (where a City of Billings sewer line is compromised); and an unknown source near the intersection of Minnesota Avenue and South 23rd Street.

- Groundwater contaminants have moved northeastward in the direction of the groundwater flow.
- Sampling results from a bedrock aquifer investigation in the Big Sky Linen source area, where groundwater concentrations are the highest, indicate that deeper bedrock groundwater is not contaminated.
- Groundwater concentrations decreased after the EPA removal work; however, groundwater contamination is still well above Montana's water quality standards in much of the area.
- Other sources and left-over soil contamination that was inaccessible at Big Sky Linen via the technology used during EPA's 2008 removal action are contributing to groundwater contamination.
- Chlorinated solvents in groundwater interact with areas of leaked fuels, resulting in pockets with higher TCE concentrations.

**Vapor intrusion (VI):** DEQ sampled indoor air in 49 structures to better characterize the nature and extent of vapor intrusion into buildings above the site. Sampled structures included locations previously sampled by EPA, locations near chlorinated solvent source areas, and locations overlying more sensitive areas such as homes, schools and day-cares. Samples were collected during the winter when vapor intrusion is most likely to occur.

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DEQ calculated indoor air site-specific screening levels (SSSLs) based on 11 compounds found in indoor air site-wide. The SSSLs were calculated assuming all chemicals found across the site could potentially be present in one structure. So far, no structure has had all 11 chemicals detected in indoor air.

- Resampling of previously sampled buildings showed indoor air contamination has decreased since the 2008 removal effort. VI appears to be occurring or potentially occurring in 39 of the 49 structures tested.
- Sampling at Billings Central Catholic High School indicated that some vapor intrusion may be occurring, but not at levels that require mitigation at this time. Samples from Young Families indicated that some contaminants were present due to indoor sources and not vapor intrusion. At Washington Elementary, no concentrations exceeded SSSLs.
- VI generally occurred in areas where groundwater contained PCE at or above 50 micrograms per liter ( $\mu\text{g/L}$ ).
- During the remedial investigation, DEQ obtained access to five of the seven buildings where EPA installed mitigation systems. Two of the five buildings had vapor mitigation systems that were not operating, and indoor air concentrations exceed SSSLs at those locations. One of the systems needed to be turned on, and DEQ is working with the Montana Department of Public Health and Human Services (DPHHS) to repair the other.

**Stormwater/Surface Water/Sediment:** Stormwater/surface water samples and co-located sediment samples were collected from ditches that are connected to the Yellowstone River. Soil and groundwater contamination in other parts of the site have the potential to contaminate these systems.

- Low levels of PCE were detected at the outfall for the City of Billings' storm sewer system. While its presence may be related to the Billings PCE Groundwater site, the concentration is well below Montana's water quality standard, and it is not considered a risk to human or ecological health at this time.
- Some metals were found to exceed the most protective human or aquatic health screening levels. However, these metals are likely coming from upstream due to erosion of natural soils, surface water runoff, and/or roadway surface runoff (metals from roadway applications or automobile-related) and are not related to the Billings PCE Groundwater site. DEQ provided this information to the City of Billings.

## Conclusions

People may be exposed to contaminants in indoor air from vapor intrusion if their homes are directly above the contaminated groundwater areas in the Billings PCE Groundwater site. It is difficult to predict how potential indoor contaminant levels could vary from building to building.

Vapor intrusion rates may vary widely and can be influenced by the season, preferential pathways such as utility corridors, soil type and depth, groundwater conditions, variations in building construction, foundation conditions, heating systems, and building ventilation.

Also, the affected groundwater is impacted by multiple sources, including dry-cleaning, fuel and other contaminants. In some areas, the groundwater contains chemicals that may interact.

So far, vapor intrusion testing has been limited and more testing is needed, especially in areas of the site where PCE concentrations in groundwater are 50 milligrams per liter ( $\mu\text{g/L}$ ) or greater. Where elevated contaminant levels are present, mitigation systems can lower them. These sub-slab depressurization systems act much like a home radon mitigation system installed to reduce radon exposure.

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Other ways to lessen potential exposure include sealing cracks in floors, increasing indoor air circulation and increasing air exchange in the structure by altering the existing heating and ventilation systems.

PCE and TCE contaminants were the primary focus of the investigation. Not everyone who breathes these and other contaminants will experience health effects. Cancers linked to long-term PCE exposure include non-Hodgkin's Lymphoma, leukemia, bladder cancer, breast cancer and liver cancer. Similarly, exposure to TCE above the SSSLs has been linked to kidney toxicity, immune system effects (decreased thymus weights in rats and developmental immunotoxicity in mice), and heart malformations in mice offspring exposed in utero. Cancers linked to long-term TCE exposure include kidney, lymphoid and liver cancers.

During sampling, some residents indicated that incidents of cancer seemed high for this area. A DPHHS evaluation determined that the incidents of the cancers linked to these compounds were not higher than expected for the general population.

For more information regarding health effects associated with specific compounds, please visit the Agency for Toxic Substances & Disease Control's website <https://www.atsdr.cdc.gov/toxfaqs/index.asp>. If you do not have access to the Internet, one of the people listed below can mail you the information. If you would like to discuss individual health concerns, please contact DPHHS Epidemiologist, Connie Garrett at 406-444-5954, or [connie.garrett@mt.gov](mailto:connie.garrett@mt.gov), DPHHS State Toxicologist, Matt Ferguson at 406-444-3284 or [matthew.ferguson@mt.gov](mailto:matthew.ferguson@mt.gov).

### **What's next?**

DEQ asked EPA to resample indoor air at the 49 properties sampled in March 2018 to confirm the data gathered in the first round of testing. EPA completed this sampling in March 2019. The results, which are undergoing review, will be shared with owners and tenants of the buildings tested, as were DEQ's previous results.

Because there are still ongoing sources of groundwater contamination, the agencies will explore options for cleaning up the remaining contamination and mitigating vapor intrusion. Options may include: proposing the site be placed on EPA's National Priorities List, exploring additional EPA emergency removal actions, looking at potential sources of state funding, or a combination of options. Based on the size of the Billings PCE Groundwater site, state resources to mitigate potential risks and clean up the ongoing sources of groundwater contamination may be limited.

### **What is the National Priorities List?**

EPA's Superfund program is specifically designed to address large and complex sites like the Billings PCE Groundwater Site by adding them to the National Priorities List (NPL). The NPL contains sites that have known or threatened releases of contaminants that may be harmful to human health or the environment. Sites on the NPL warrant additional assessment, evaluation of site risks associated with the contamination, and possible cleanup, if needed. NPL sites are eligible for federal funds to conduct these actions.

The primary mechanism for placing a site on the NPL is through the Hazard Ranking System screening tool. Sites evaluated using the Hazard Ranking System that score above 28.5 are eligible to be added to the NPL. Prior to proposing to add a new site to the NPL, it is EPA's policy to obtain a support letter from the State's governor. After a site is proposed to be added to the NPL, the public has an opportunity to comment on the proposal prior to determining if a site is to be added to the NPL.

Site information can be viewed at [deq.mt.gov/Land/statesuperfund/Billings-PCE](http://deq.mt.gov/Land/statesuperfund/Billings-PCE)

Paper copies can be reviewed at the Billings Public Library at 510 North Broadway, Billings, MT, 59101, 406-657-8258; or at the DEQ Waste Management & Remediation Division, 1225 Cedar Street, Helena, MT 59601.

# Public Meeting

**Thursday, July 25**

**7-9 pm**

**Lewis & Clark Middle School**

**1315 Lewis Ave., Billings**

Agency staff will share results of indoor air sampling, as well as soil and groundwater sampling, from the Billings PCE Groundwater State Superfund Site.

The agencies also will seek public input on options for addressing the contamination.

DEQ will make reasonable accommodations for persons with disabilities who wish to participate. If you require an accommodation, please contact Autumn Daniels at 406-444-6591 or [adaniels2@mt.gov](mailto:adaniels2@mt.gov) at least three days before the meeting.

## Contact Information

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**For additional site information visit**

**[deq.mt.gov/land/statesuperfund/billings-pce](http://deq.mt.gov/land/statesuperfund/billings-pce)**