

ENVIRONMENTAL UPDATE #28

for 150 Sohier Road, Beverly, Massachusetts

MassDEP Site No. 3-0485
November 2020

A periodic newsletter published for those interested in the environmental cleanup efforts at the site.

Summary in Brief

The most recent groundwater testing for the cleanup program at the former Varian facility in Beverly, Massachusetts, continues to show that progress is being made toward achieving cleanup goals as discussed below.

As part of the cleanup, Varian performed treatment activities during late 2019 and early 2020 to address the contamination (chemicals known as volatile organic compounds or VOCs) present in the soil and groundwater. While test results at some locations on the property continue to indicate VOCs may be present, test results in multiple locations on and off the former Varian property indicate significant improvement since the start of treatment. Test results from locations off the property generally show lower or similar levels of VOCs in groundwater compared to levels prior to the start of cleanup. At locations where contamination levels have not decreased, other test methods, including indoor air sampling, show there is no risk. This indicates that the cleanup plan is achieving one of its primary goals: maintaining control and limiting further movement of the contamination from the former Varian facility property.

As part of cleanup activities, Varian continued operation of two treatment systems to remove VOCs beneath facility buildings on the property. Testing of groundwater was performed in November 2019, February 2020, and May 2020, and will continue to be performed into 2021. Additional test wells were installed in late 2019 to test for contamination adjacent to one manufacturing building. Based on test results from these wells, Varian completed additional treatment in this area in the spring of 2020. Additionally, two new deep horizontal wells were installed beneath this building in 2020 to assess if additional treatment is necessary at this building.

In the residential areas to the west of Tozer Road, previous testing indicated there was no risk from the site. Test results from 2019 and 2020 continue to demonstrate no risk to residents. Varian will continue to conduct periodic tests to ensure the site present no risk to residents. Historic Environmental Updates and reports, including those referenced below, can be accessed online and at the Information Repository established for the site (see back page for location).

Varian Cleanup Moving Toward Completion

Permanganate Treatment

Varian is continuing the groundwater treatment program at its former facility in Beverly, Massachusetts. The cleanup program has involved injecting sodium permanganate for several years to destroy VOCs in both soil and groundwater. Over time, as areas have been cleaned up, the extent of the injection areas and the amount injected have been reduced. It is common following reductions in VOC levels after treatment to see partial increases in VOC levels or rebound. In recent years, treatment has been focused on areas where rebound in VOC levels have been noted in test results in order to limit potential migration of VOC in groundwater. Permanganate treatment was performed in November 2018, May 2019 and most recently from October to December 2019. The 2019 treatments focused on a limited area at the north end of the former Varian facility and another limited area at the south end of the former facility. Post-treatment groundwater test results from May 2020 showed contamination in groundwater reduced in both treatment areas, including a decrease of VOCs to below testing limits (i.e., none detected) in the southern treatment area. Results of planned groundwater testing in November 2020 will be evaluated and, if needed, additional permanganate treatment will be conducted.

Soil Vapor Extraction

Previous tests showed that VOCs are present in very shallow soil beneath Building 3. Shallow VOCs can affect indoor air and could cause a condition known as an Imminent Hazard, so in order to address this situation, Varian installed a system to remove the VOCs

from beneath the manufacturing building. The system uses a technology known as soil vapor extraction (SVE). Once this system began operating, indoor air quality inside the building significantly improved which reduced potential risk to building occupants below state action levels. Operation of the system has successfully removed over 1,800 pounds of contamination from beneath the building and resulted in decreased VOC levels beneath the building. In addition, this system reduces potential movement of remaining VOCs under the building into the indoor air. Indoor air tests were completed inside Building 3 in December 2019, March 2020 and June 2020. Results of those tests indicate only low levels of VOCs are present in indoor air. Although the Building 3 SVE will continue operation, the data suggest progress toward shutdown of this system.

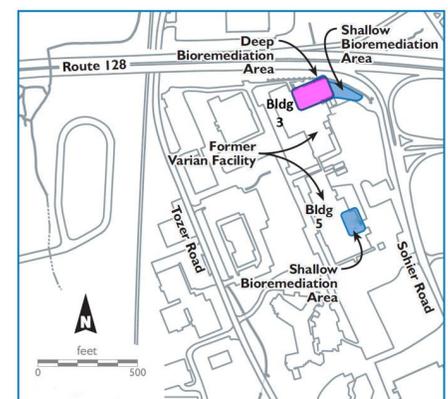
An SVE system was also installed in Building 5 to address the presence of VOCs in indoor air. Due to several factors, including a very shallow water table in this area, the Building 5 system has removed less contamination from beneath the building than at Building 3 – approximately 129 pounds. However, contamination levels in soil vapor beneath Building 5 have decreased substantially since the operation of the SVE system began. Air tests conducted within Building 5 show only low levels of VOCs are present in indoor air with the systems operating. As discussed in the next section, the shallow bioremediation in this area has also reduced contamination in groundwater beneath the building.

Bioremediation

Additionally, Varian has used a cleanup approach known as bioremediation for several years. This approach includes providing nutrients to naturally occurring bacteria, along with introducing supplemental

natural bacteria, to accelerate the rate at which the VOCs are naturally broken down into harmless substances. Bioremediation has been conducted in a shallow and a deep area near Building 3 at the north end of the former Varian facility, and in a shallow area at Building 5 (see map). This approach had previously been successfully implemented to achieve cleanup goals in a shallow groundwater area near a stream at the north end of the site.

Bioremediation treatment was completed in 2018. New test wells installed in 2019 indicated an area of shallow contamination adjacent to and beneath Building 3. Rounds of bioremediation injections were conducted in September 2019 and March 2020 to treat groundwater in this area. These activities included applying an emulsified vegetable oil solution (food source for bacteria) in the shallow groundwater in the Building 3 treatment area. Results from groundwater testing in May 2020 showed levels of individual VOCs in shallow groundwater decreasing by 75% to greater than



Former Varian Facility

99% following the March 2020 treatment. Follow-up groundwater tests will be completed to monitor the progress of treatment and to evaluate if additional shallow bioremediation injections are needed in the Building 3 area.

The new shallow drilling at Building 3, along with test results from deep wells next to the building, indicated that deep groundwater contamination could still be present beneath Building 3. As a result, Varian recently installed deep wells angled to pass beneath the building. Test results from these new wells are still being evaluated. However, it is expected that additional deep bioremediation will be completed in the Building 3 area to continue the cleanup.

In the shallow overburden at Building 5, bioremediation treatment was last conducted in October 2018. Results from post-treatment testing events in November 2019, February 2020, and May 2020 indicate most VOC levels in shallow groundwater at Building 5 wells are now below test detection limits. Test data show that complete breakdown of VOCs is occurring. As groundwater VOC concentrations in the Building 5 Area continue to decrease, a positive effect (decrease) on concentrations of VOCs measured in indoor air within Building 5 is expected. Test results from November 2020 and February 2021 will be reviewed to monitor the effectiveness of shallow bioremediation treatment at Building 5.

Cleanup Summary

Groundwater test results continue to show that the cleanup program is effectively treating site groundwater consistent with treatment goals. Varian closely monitors all test results and has made changes to the ongoing cleanup program based on these.

More Information Available

Varian will continue to produce new [Environmental Updates](#) during site cleanup. Copies of all previous Environmental Updates, the reports mentioned here, and past reports containing environmental data for the site can be reviewed at the Information Repository at the Beverly Public Library, 32 Essex Street, 978.921.6062. Past updates and reports are also on file at the Department of Environmental Protection Northeast Regional Office, 978.694.3320; the Beverly Board of Health at 90 Colon Street; and the Beverly Conservation Commission Office at 191 Cabot Street. Information and e-copies of reports for this site are also available by clicking on supporting documents at the following Mass DEP web page. <https://eeaonline.eea.state.ma.us/portal#!/wastesite/3-0000485>

For more information or to be added to the cleanup mailing list, please contact either:

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Improvements to the cleanup program will continue to be made based on site conditions and test results. The permanganate cleanup program has resulted in dramatic decreases of contaminants in test wells. The bioremediation treatment program has accelerated the rate at which VOCs are completely broken down, and has successfully met cleanup goals in a shallow cleanup area near Building 3. Both the Building 3 and Building 5 SVE systems continue to remove VOCs from beneath each building. Air tests conducted within the buildings show there is no significant risk with the systems operating. Results of groundwater testing conducted in February and May 2020, indoor air testing conducted in March and June 2020, and details of cleanup activities conducted from January through June 2020 are available in the July 2020 "Phase V Remedy Operation Status Inspection and Monitoring Report."

Continuing Activities in 2020 and 2021

Varian will be conducting deep groundwater bioremediation in the Building 3 area in late 2020 and may complete additional bioremediation in the spring of 2021. The treatment will include injections at existing wells and may also include injections at the two new deep wells angled beneath Building 3. The Building 3 and 5 SVE systems will continue to operate into 2021. Additional tests will be conducted to monitor progress toward treatment goals. Sitewide groundwater testing activities will continue to be conducted through the end of 2020 and in 2021. These test results will be used to evaluate and optimize treatment to ensure cleanup goals continue to be met. Details of the continuing treatment programs and additional test results will be provided in upcoming status reports. The next Remedy Operation Status Report will be issued in January 2021.