

Dartmouth College Rennie Farm Value Assurance Program FAQs, December 2022

What is the Rennie Farm property?

The property is a 223 acre parcel in Etna, New Hampshire acquired by Dartmouth in 1965. The chemical 1,4 dioxane was discovered in the soil and groundwater on the farm in 2011.

What is the extent of the contamination in the Rennie Farm area?

The area of contamination, or plume, is shown in orange on the attached map of Rennie Farm and the surrounding parcels.

What is Groundwater Management Zone (GMZ) and what does it show?

Based upon the investigation of the site, including geological mapping, geophysical mapping, surveys, and data evaluation, the GMZ was approved by the New Hampshire Department of Environmental Services (DES) and it shows the area of contamination (the plume), as well as a buffer area that is to be monitored to assure that the contamination is not spreading. The boundary of the GMZ is shown in red on the attached map.

How many wells that supply water to homes have been tested in the area?

Over 140 water supply wells serving homes have been tested in the area around Rennie Farm. It is important to understand that only one, located at 9 Rennie Road and within the plume, contained amounts of 1,4 dioxane from the Dartmouth site in excess of the New Hampshire groundwater standard.

On how many non-Dartmouth properties has 1,4 dioxane been detected?

The chemical has been detected on only three non-Dartmouth properties; all three of which are located immediately downgradient of the contamination site. Only one of the three properties has a private water supply well that has tested positive for 1,4 dioxane. Based on Dartmouth's investigation, there are no data

indicating that the water supply in the greater area surrounding Rennie Farm is at risk.

How is Dartmouth capturing contaminated groundwater on site to prevent migration off the property?

Dartmouth has installed an extensive, state of the art, groundwater pump and treatment system at Rennie Farm that is successfully removing 1,4 dioxane from the site. Based upon the relatively small size of the plume, the absence of detectable levels of 1,4 dioxane in all but one of the 140 private wells tested, and the ongoing successful remediation efforts, Dartmouth is confident that risks from the contamination are being contained.

What results have been produced by the pump and treat system to remove the contamination and keep it from spreading?

The pump and treat system is working. Water quality monitoring shows no expansion of the plume and reductions in 1,4 dioxane. Ongoing sampling continues to indicate significant reductions in the concentration of 1,4 dioxane.

What has Dartmouth done to mitigate contamination off-site?

Dartmouth reached an agreement in February 2019 with an abutting owner to install a groundwater extraction system that pumps groundwater to the existing treatment facility on the Rennie Farm property. The combined system is expediting site remediation.

How long is it expected to take to remove the contamination from the groundwater supply in the area?

Based on data collected thus far, the pump and treat system is reducing the concentration on-site as well as downgradient of the source area on the Rennie Farm property. It is difficult to predict how long removal of the 1,4 dioxane will take on the Rennie Farm site, but the goal is to achieve removal on the site within 3 to 7 years. It is expected that the removal off-site will occur over a somewhat

longer period of time. The goal is to remove completely the amount of 1,4 dioxane in groundwater to within the State standard.

What ongoing monitoring exists?

Pursuant to the Groundwater Management Permit issued by DES in 2017 and recently renewed, at least 96 water quality monitoring locations (groundwater, surface water, and water supply wells) were established and are monitored regularly. Reports are shared with the public quarterly and an annual report is published. There has been no expansion of the plume.

Have any other contaminants been detected in excess of New Hampshire groundwater standards?

No, no other contaminants have been detected in excess of the standards.

What is Dartmouth Value Assurance Program?

In February 2017 Dartmouth announced its Value Assurance Program (VAP), which assures property owners in the defined Program Area (48 properties) that they will receive fair market value for their property if sold within the five-year program. In 2021, due to the success of the program, the VAP was extended another five years through February 2027.

The properties in the VAP are shown in green on the attached map. Any properties that were contiguous with the Rennie Farm property were included, plus a buffer zone containing properties contiguous with those properties. The properties in the VAP were not selected as a result of the discovery of 1,4 dioxane in their private water supply wells. Since entire tracts of land are shown on the map, the VAP area includes acreage that is quite distant from even the GMZ. Thus, the VAP covers an area far larger than the area of contamination.

If an owner in the VAP is unable to sell a property satisfactorily, Dartmouth will either buy the property at fair market value or pay the difference between an offer to purchase and the fair market value, as determined through an established listing and appraisal process. To date, Dartmouth has purchased 11 properties as

part of the VAP. Seven have houses on them, four are large vacant parcels. All the homes have been resold and 4 other homes have been sold directly to third parties by owners in the Program Area.

Why did Dartmouth decide to sell some of the acquired properties?

Dartmouth initiated the Value Assurance Program (VAP) in 2016 to stabilize the real estate market in the Rennie Farm neighborhood and assure property owners in the program area that they would be paid fair market value for their property consistent with the VAP requirements. Now that the college has completed a thorough investigation of the contamination, the treatment system is working as planned, and the contamination is being contained and managed pursuant to State and Federal permits, the sale of select properties has added a renewed vitality in the neighborhood, supported the real estate market in the neighborhood, and permitted the college to recover some of the monies it has contributed to the VAP.

Were the acquired properties purchased as investments by Dartmouth?

No, the properties were acquired to assist neighbors who were impacted by the concerns about contamination from Rennie Farm. Ultimately, the goal was to steady the real estate market in the neighborhood, which had been negatively impacted by the initial discovery and the lack of thorough knowledge about the contamination.

If the college cannot obtain an offer to purchase at a price equal to or greater than the acquisition price, will the college nonetheless sell an acquired property?

Dartmouth did not acquire VAP properties to make money. The program was initiated to help the neighborhood recover from the discovery of the Rennie Farm contamination. Our goal is to sell properties and encourage the market in the neighborhood. Sale negotiation will be treated like any other prudent real estate transaction.

Did the college consider renting the acquired properties and if so why has it not rented any?

Yes, Dartmouth considered renting the acquired properties, but it chose not to do so. The properties are outside of the physical area Dartmouth typically rents so management and maintenance of the properties present a greater challenge. In addition, the area is made up of single- family residences and Dartmouth wants to maintain these properties consistent with that character.

What impact has the sale of some of the acquired properties had on both eligible and ineligible VAP owners?

Dartmouth believes that selling the properties to willing buyers has been a benefit to all property owners in the area. Sales provided residents for vacant houses and demonstrated that the threat to the real estate market from the site contamination was dissipating. Sales activity in the program area should also encourage the market generally and help meet housing demand.

What asking price did the College use with respect to the properties it list for sale?

Since the purchases were based upon appraisals by three different appraisers and valuing property in rural Hanover is difficult due to the lack of comparables, the College settled on listing the properties at the values the Town set for tax assessment purposes, which is a straightforward and consistent method. The market then determines what the ultimate price is in each case.

Will Dartmouth offer any special arrangements for sales to college employees?

At this time the college has not decided to offer any special arrangements for sales to Dartmouth employees.

Are there any restrictions on possible purchasers?

Dartmouth has not placed any restrictions on possible purchasers, although the hope is that families will be the ultimate purchasers, consistent with the status of the area as a beautiful neighborhood of single-family homes.

Has Dartmouth received input from the neighbors and local real estate agents with respect to its sale of the acquired properties?

The college was encouraged by both owners in the neighborhood and real estate agents to sell the acquired properties, so that any vacant houses were occupied again by families.

Have any of the private wells on the properties marketed tested positive for 1,4 dioxane or any other contaminants?

No, and only one private well out of the over 140 wells that serve homes in the area has tested positive for 1, 4 dioxane.

Is Dartmouth concerned that purchasers of the properties are at risk for exposure to 1, 4 dioxane or any other contaminants?

No, if Dartmouth were concerned that the purchasers would be at risk, the college would not have marketed the properties.

Are purchasers eligible participants in the VAP, and if not, why not?

No, the purchasers are not be eligible participants in the VAP since they have purchased with full knowledge of the contamination and paid a price that they thought appropriate.

What information is available to residents in the Rennie Farm area?

The college has maintained a website with extensive disclosures of the history and efforts to address the contamination. Results from the monitoring of the site are available at: <https://www.dartmouth.edu/ehs/rennie.html>

How did the college use the Rennie Farm property in the mid-1960s through 1978 that resulted in the contamination?

During this time, a ½ acre area on the property was used by Dartmouth as a state-licensed burial site for animal carcasses from medical and other research. In addition, for a brief time, human remains used in teaching at Dartmouth Medical

School were buried in a separate approximately 10-foot by 10-foot area adjacent to the animal carcasses burial area.

How and when was contamination found at Rennie Farm?

In 2011, the college removed the animal carcasses and conducted extensive site investigation under the process established by state and federal law. The activity was approved by the New Hampshire Department of Health and human Services, Radiological Health Section (RHS). Unexpected chemical waste was encountered and contaminated materials removed, including approximately 40 tons of potentially contaminated materials, which were shipped off-site to licensed disposal sites. Before, during, and after the excavation, soil and groundwater samples were collected and analyzed, consistent with state regulations, for purposes of site closure. After analyzing samples, RHS deemed the site free of radiological contamination and safe for unrestricted use.

When was 1,4-dioxane first discovered at the site?

Prior to the excavation of animal carcasses during late 2011, for groundwater-monitoring wells were installed and were regularly sampled for radiological and chemical contaminants. 1,4-dioxane was not detected prior to the excavation, and it was not known that the chemical was contained within the source area. In April 2012, for the first time, groundwater analysis detected the chemical at concentrations exceeding the New Hampshire groundwater standard. No other contaminants have been discovered in groundwater in excess of state groundwater standards.

How did the contamination occur at Rennie Farm?

The source of the 1,4 dioxane was the animal carcasses since the 1.4 dioxane had been used as part of the medical and other research with the carcasses.

How did the college determine the extent of the contamination?

Working with the DES and consistent with State environmental requirements, Dartmouth conducted an extensive phased investigation including geologic

mapping, geophysical mapping, surveys, data evaluation, groundwater testing of over 140 private water supply wells. Based on the investigation, the contaminated area or plume was identified as part of the Groundwater Management Permit approval process and is continuously monitored.

What role has the DES played in ensuring that the contamination is addressed?

The DES has worked with Dartmouth to monitor and guide the investigation of the contamination, as well as the effort to mitigate and remove 1,4 dioxane from the site and groundwater. The college's activities are now subject to a Groundwater Management Permit issued in 2017 by DES, and the property will be managed and monitored until it meets State standards.

What role has the United States Environmental Protection Agency (EPA) played with respect to Rennie Farm?

In April, 2017, the EPA authorized a permit to increase the rate of groundwater treatment and established water quality standards for the discharge of treated water.

What happens to the 1,4 dioxane that is removed from the groundwater?

The 1,4 dioxane is collected in the pump and treat system and regularly transported off-site. Water from which the 1,4 dioxane has been removed is released on-site subject to the permit granted by the EPA. The water released is tested to ensure that it does not contain detectable levels of 1,4 dioxane.

Has Dartmouth excavated the entire animal carcasses burial area?

Dartmouth has not excavated the entire animal carcasses burial area, although a substantial portion of it was removed in 2011. 1,4 dioxane is highly soluble in water, and based on the soil and groundwater data collected, the remaining 1,4 dioxane at the site may be dissolved in groundwater located within the soil and fractured rock, and removal of soil alone will likely not remove all of the residual 1,4 dioxane. Tests will determine whether there is any residual contamination in the soil, and if so, excavation of soil could be used at that time under the

supervision of DES to remove any residual sources of contamination. However, it is viewed unlikely that substantial amounts of 1,4 dioxane is being retained in the soil.

Do the human remains buried on the property pose a risk to the water supply?

No, the human remains do not pose a risk to the water supply system.

The bodies were buried in zinc lined wooden boxes that were (and still are) commonly used for transporting human remains. The anatomy bodies were embalmed with embalming fluid containing 0.5% formaldehyde. Most of the bodies were used in the anatomy laboratory for 1-2 years; during that length of time, a great majority of the fluid drains and most of the volatiles (including formaldehyde) evaporate.

Groundwater samples were collected from two monitoring wells near the human remains for analysis for formaldehyde. Laboratory analysis of the samples did not detect formaldehyde within the groundwater samples.

Are there any radiological materials left on the site and do they pose a risk to the water supply?

No, there are no radiological materials left on the site and so there is no risk to the water supply from radiological materials. During the removal and excavation of tons of contaminated and potentially contaminated materials and soil in 2011, numerous soil and groundwater samples were collected and analyzed. RHS deemed the site free of radiological contamination and safe for unrestricted use. To supplement and confirm the historical results, samples of 1,4 dioxane contaminated groundwater were collected in June 2016 and analyzed for the long-lived radioisotopes of concern (tritium, carbon-14, cesium 137, lead 210 and nickel 63). None of the samples contained radiological materials above background levels.

What are the risks associated with 1,4-dioxane?

1,4-Dioxane is manmade and has been primarily used as an additive in solvents. It has also been used in varnishes and paint strippers, and can be present in certain personal care products. Fish and plants will not accumulate 1,4-dioxane in their tissues. Please see the link for the summary sheets developed by the United States Department of Health and Human Services and the DES that provide information regarding 1,4-dioxane.