SUPERFUND

PROPOSED PLAN

Davis Liquid Waste Superfund Site Smithfield, RI

U.S. EPA | HAZARDOUS WASTE PROGRAM AT EPA NEW ENGLAND

THE SUPERFUND PROGRAM protects human health and the environment by locating, investigating, and cleaning up abandoned hazardous waste sites and engaging communities throughout the process. Many of these sites are complex and need long-term cleanup actions. Those responsible for contamination are held liable for cleanup costs. EPA strives to return previously contaminated land and ground-water to productive use.

CLEANUP PROPOSAL SNAPSHOT

EPA issues this Proposed Plan presenting the Preferred Remedial Alternative for an interim remedy that addresses groundwater contamination at the Davis Liquid Waste Superfund Site in Smithfield, Rhode Island. The proposed approach includes the following components:

- *In situ* treatment of groundwater in the shallow bedrock zone in an area determined to contain the majority of the Dense Non-Aqueous Phase Liquid (DNAPL), which is a continuing source of groundwater contamination.
- Monitoring of the contaminated groundwater plume to evaluate the performance of the interim remedy.
- Institutional Controls to prevent exposure to Site contaminants.

The performance of the interim remedy will be assessed at the end of a twelve-year implementation period. This interim remedial action will allow EPA to better determine a final remedy to this contamination.

The interim remedy is estimated to cost approximately $6.7 million and is estimated to take approximately 12 years to design and implement.

A virtual Public Informational Meeting immediately followed by a Formal Public Hearing will be held:

WEDNESDAY • JUNE 24, 2020
BEGINNING AT 7 P.M.

Go to **www.epa.gov/superfund/davisliquid**

Click **"Join EPA Skype meeting"** button OR

Open the PDF presentation and join by phone:

1-857-299-6148
PIN: 616539680#

continued on next page >

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YOUR OPINION COUNTS: OPPORTUNITIES TO COMMENT ON THE PLAN

EPA[1], as the lead agency, will be accepting public comments on this proposed change in the cleanup plan from June 15 through July 15, 2020. You don't have to be a technical expert to comment. If you have a concern, suggestion, or preference regarding the Proposed Plan, EPA wants to hear from you before making a decision on how to protect your community.

EPA is also specifically soliciting public comment concerning its determination that the Preferred Remedial Alternative is the least environmentally damaging practicable alternative for protecting wetland resources. Comments can be sent by mail, email or fax. People also can offer oral comments during the formal public hearing (see page 29 for details). If you have specific needs for the public meeting or hearing, questions about access, or questions on how to comment, please contact Sarah White (see below).

HOW TO PARTICIPATE IN EPA'S VIRTUAL MEETING AND HEARING

To participate in EPA's virtual meeting and hearing, go to www.epa.gov/superfund/davisliquid, then click on "Join EPA Skype meeting".

For those without computer access you may participate by telephone at the following call-in number +1 (857) 299-6148; PIN: 616539680#. Please notify the EPA project manager or Community Involvement Coordinator for the materials to participate over the telephone. The meeting is an opportunity for residents and other interested persons to learn more about the Proposed Plan to clean up the Site and provide formal comments on the Proposed Plan, which will be recorded, transcribed and included in the Site Administrative Record.

It should be noted that during the public meeting portion of the event, EPA will give a presentation describing the proposed cleanup plan for the Site. During the hearing portion of the event that will immediately follow the public meeting, EPA will accept public comment on the Davis Liquid Waste Proposed Plan which will be recorded for the Site Administrative Record. EPA will NOT be responding to comments during the hearing, but will be providing written responses to comments as part of its final decision document, which is expected to be issued later this year.

[1] Rhode Island Department of Environmental Management (RIDEM) is the support agency for the Site.

Additionally, EPA will accept public comments during the 30-day public comment period from June 15, 2020 through July 15, 2020. Comments can also be faxed, mailed or emailed no later than July 15, 2020 to the EPA project manager:

FAX: 617-918-0336

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EPA has established a dedicated voice mailbox at 617-918-1820 to receive oral comments during the comment period.

Copies of the EPA's Davis Liquid Waste Proposed Plan may be viewed on the web page at: www.epa.gov/superfund/davisliquid or obtained by contacting:

Sarah White, Community Involvement U.S. EPA Region 1
617-918-1026
white.sarah@epa.gov

After issuing the Proposed Plan, EPA will consider all written and oral comments submitted by residents, members of the public and interested stakeholders during the comment period and then make a formal decision selecting a cleanup plan. That cleanup plan will be set forth in a formal document known as the Record of Decision (ROD), which will include a Response to Comments section to address all comments received during the public comment period. EPA expects to issue the ROD before the end of September 2020.

SITE LOCATION AND SITE MAP:

The Davis Liquid Waste Superfund Site is located in Smithfield, Rhode Island (Figure 1a), east of Rhode Island Route 7 and south of Log Road (Figure 1b). The yellow-highlighted area in Figure 1b is the extent of groundwater contamination and the approximate extent of the Site. The orange object labeled "Site" in Figure 1b is the Former Source Area (FSA). Figure 1c is rotated 90º clockwise such that north is to the right of this detailed map of the Site. Figure 1c shows the Site monitoring network and general features in the area. Groundwater contamination flows northward and is bound on the east by the "Dike Structure."

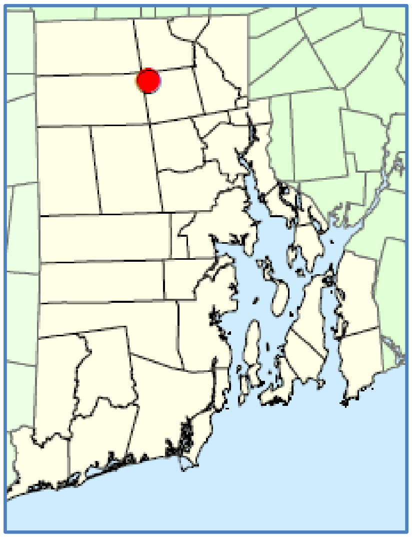

Figure 1a

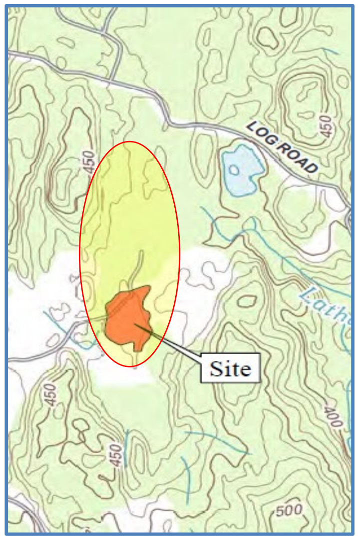

Figure 1b

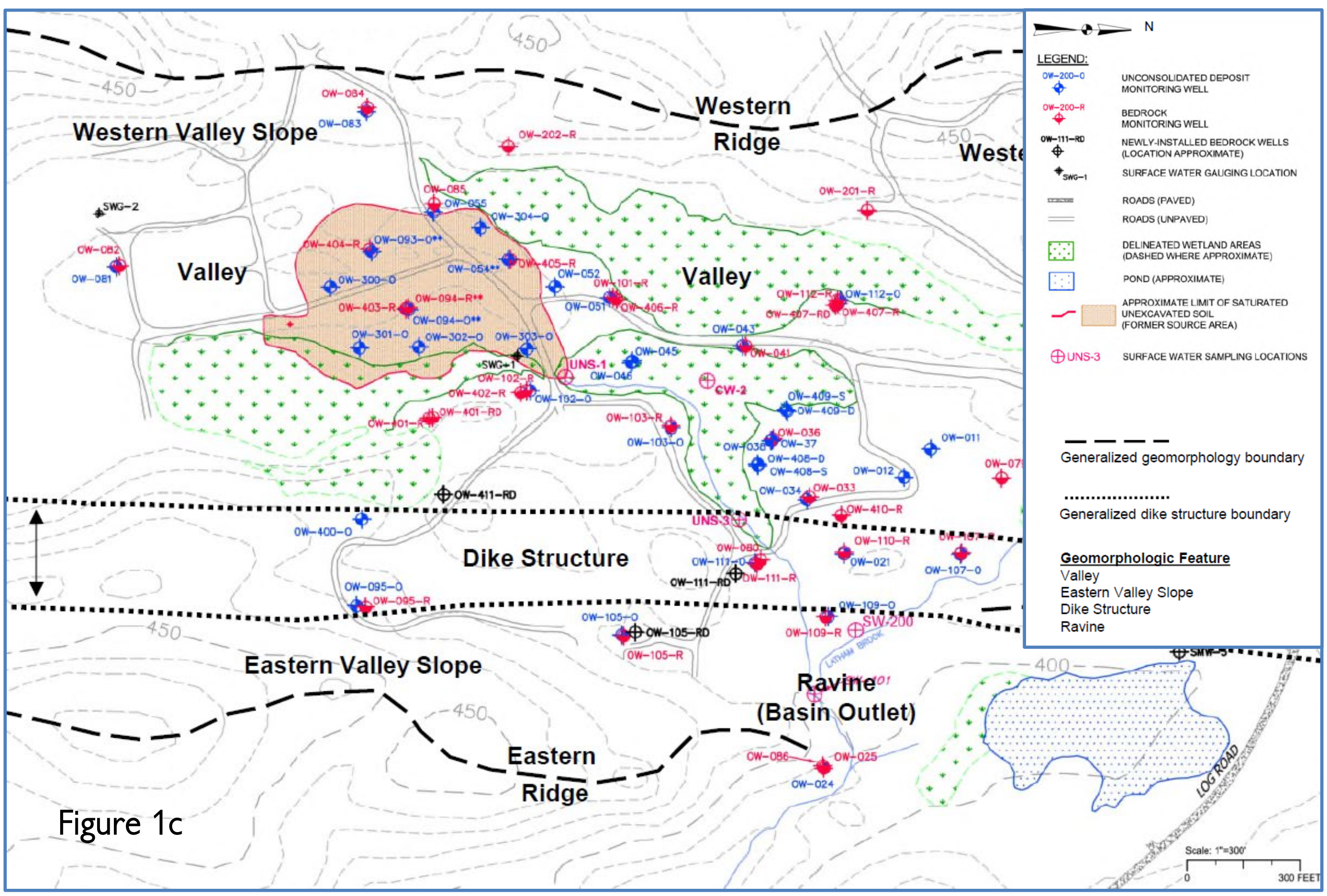

Figure 1c

A CLOSER LOOK AT EPA'S PROPOSED CLEANUP APPROACH

Introduction

This Proposed Plan presents the remedial alternatives evaluated in the April 2020 Feasibility Study (FS) along with the Agency's Preferred Remedial Alternative for an interim remedial action at the Davis Liquid Waste Superfund Site (the Site) in Smithfield, Rhode Island.[2] This proposed interim remedy would change the remedy for Site groundwater that was initially selected in 1987 and amended in 2010 in the Record of Decision Amendment (ROD Amendment) for groundwater.

This Proposed Plan also discusses EPA's rationale for selecting an interim remedy for contaminated groundwater at the Site.[3] The FS identified remedial alternatives for a final remedy for groundwater. EPA is deferring the selection of a final groundwater remedy for the Site pending further evaluation of data collected during the performance of the interim remedial action. EPA proposes this approach because additional information is needed to assess the technical feasibility of groundwater restoration approaches and to refine estimates of cleanup times. Current estimates of cleanup times for groundwater exceed 100 years for any remedial alternative proposed in the Feasibility Study. Therefore, rather than select one of the remedial alternatives evaluated in the FS, this Proposed Plan proposes EPA's Preferred Remedial Alternative, which includes components from the remedial alternatives in the FS, to begin restoration and evaluate the ability of remedial alternatives for a final remedy to meet cleanup levels in groundwater at the Site in a reasonable timeframe.

If, following comments from the public and the Rhode Island Department of Environmental Management (RIDEM), the interim remedy is selected, it will result in a Record of Decision Amendment 2 (Interim Remedy) for Operable Unit 2 (OU-2) (groundwater) (OU-2 ROD Amendment 2), which will supersede the 2010 ROD Amendment for OU-2. The OU-2 ROD Amendment 2 will direct the implementation of an interim remedy and its evaluation over a period of 12 years before a final remedy is selected.

EPA's Cleanup Approach

Uncertainty regarding the ability of remedial alternatives to restore groundwater are due to the presence of an unknown amount of Dense Non-Aqueous Phase Liquids (DNAPL) within the bedrock beneath and surrounding the Former Source Area (FSA), the area where past disposal of hazardous substances has occurred. This DNAPL, comprised of pure chlorinated solvents such as trichloroethene, tetrachloroethene, and similar contaminants, dissolves slowly from narrow fractures and other geologic structures into bedrock groundwater, causing a contaminant plume to migrate northward in the bedrock aquifer. Because groundwater flow in the area of the FSA is also upward, the contaminants enter the overburden aquifer and create an overburden contaminant plume that also flows northward.

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[2] In accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the law that established the Superfund program, this document summarizes EPA's cleanup proposal. For detailed information on the cleanup options evaluated for use at the Site, see the Davis Liquid Waste Feasibility Study and other documents contained in the Site's Administrative Record available for review online at http://www.epa.gov/superfund/davisliquid

[3] For further discussion on EPA's decision to propose an interim remedial action for groundwater at the Site, see the May 2020 memorandum, *Determination to Evaluate and Propose an Interim Remedial Action for OU-2 (Groundwater), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island*, which can be found in the Administrative Record for this Proposed Plan.

The interim remedy EPA proposes in this Proposed Plan has the following components:

- *In-situ* treatment of groundwater contaminants with amendments to reduce the mass of DNAPL. The amendments may include oxidants, bio-amendments or some combination to be determined by pre-design studies. These amendments will be injected into targeted areas of the bedrock aquifer.
- Filling an existing man-made trench to maintain amendments in groundwater that flow into the overburden and focus groundwater flow in the overburden aquifer.
- Monitoring of the dissolved groundwater contaminant plume that extends northward in both the overburden and bedrock aquifers.
- Institutional Controls to: 1) prevent contact with contaminated groundwater and the installation of new or modification of existing wells where drinking water criteria or risk-based concentrations are exceeded and/or which may cause migration of the contaminated plume; and 2) require either a vapor intrusion evaluation or vapor mitigation system be installed if a new building constructed over the contaminated groundwater plume.
- Continued monitoring and assessment as well as Five-Year Reviews to assess the performance of the interim remedy and ensure the Site remains protective of human health and the environment.

These actions will prevent current and future human health exposure to, and risk from, hazardous materials. The first Five-Year Review will include an assessment of the need for changes to the interim remedy and the second will evaluate progress in reducing the DNAPL mass and attaining cleanup levels in groundwater.

The interim action that EPA proposes defers the selection of a final groundwater remedy for the Site pending an evaluation of the effectiveness of *in situ* treatment to reduce the presence of DNAPL. The estimated total present value[4] of this proposed cleanup approach, including construction, operation and maintenance, and long-term monitoring is approximately $6.7 million. Each component of the proposed cleanup approach is discussed further in this Proposed Plan.

Potential Community Impacts

Impacts to the community during implementation of the proposed interim remedial action are expected to be minimal. The remedy has few active construction components: filling a man-made trench and installing wells. All treatment reagents are non-hazardous and non-toxic. Proper transport, handling, and storage will ensure the safety of the treatment reagents. All treatment reactions will occur in the subsurface and there is substantial distance between the treatment area and nearby residences. Other impacts may include periodic monitoring, restrictions on the use of groundwater, and installation of vapor mitigation features to prevent potential exposures via vapor intrusion into future occupied structures.

EPA, the lead agency for the Site, developed this Proposed Plan in consultation with the Rhode Island Department of Environmental Management (RIDEM), the support agency. The EPA, in consultation with RIDEM, will select an interim remedy for groundwater at the Site after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with RIDEM, may modify the Preferred Remedial Alternative or select another response action presented in this Proposed Plan based on new information or public comments.

[4] "Present value" is the amount of money set aside today to ensure that enough money is available over the expected life of the project, assuming certain economic conditions (e.g., inflation).

Waivers and Determinations

Section 404 of the Clean Water Act, federal regulations at 44 CFR Part 9, and Executive Order 11990 (Protection of Wetlands) require a determination that there is no practicable alternative to taking federal actions in waters of the United States or wetlands. EPA has determined that significant contamination exists in close proximity to and perhaps in wetland areas of the Site. Because of this, EPA has determined that there is no practicable alternative to conducting work near and in these wetland areas.

Once this determination is made, EPA must evaluate what the least damaging practicable alternative is for addressing contamination that impacts wetland areas. The Preferred Remedial Alternative will require construction of access roads and installation of monitoring and injection wells either in or in close proximity to wetland areas. Monitoring will be performed to ensure that reagent injections do not have adverse impacts on wetlands. EPA has determined that the Preferred Remedial Alternative is the least damaging practicable alternative. Once EPA determines that there is no practicable alternative to conducting work in wetlands and proceeds with the least damaging practicable alternative, EPA is then required to minimize potential harm or avoid adverse effects to the maximum extent practicable. Appropriate actions will be taken to minimize or mitigate for any project-related impacts.

Through this Proposed Plan, EPA is specifically soliciting public comment concerning its determination that there is no practicable alternative to conducting work that may impact wetlands and that the Preferred Remedial Alternative is the least environmentally damaging practicable alternative.

BACKGROUND INFORMATION

Site Description and Land Use

The Davis Liquid Waste Site lies on approximately 10 acres in a semi-rural, residential area in the northwest corner of the Town of Smithfield, Rhode Island between Log Road to the north and Tarkiln Road to the southwest. The area outside of the Site is rural residential, 5-acre minimum zoning, with single family homes scattered on wooded lots. The properties that contain the Site are wooded, with scattered working areas of gravel removal. Several ponds have been excavated on the properties for recreational use.

The area surrounding the Site, and much of Smithfield, consists of glacial deposits that overlie metamorphosed bedrock. The glacial sands and gravels, also called overburden, in the area of the Site vary in depth, but are no greater than 40 feet deep. The sands transition to thin, compact till deposits resting on the bedrock. Bedrock consists of a Pre-Cambrian gneiss with lenses of schist, cut by horizontal, release-type fractures in the upper sections of bedrock that connect to high-angle fractures that continue to depths greater than 400 feet. The gneiss is intruded east of the Site by a Triassic, mafic dike that strikes north-south, dips approximately 90 degrees, and appears to control groundwater flow to the east. (See Figure 1c on page 4.) This region of Rhode Island has many of these vertical, Triassic-age dikes, all oriented generally north-south, that are several kilometers long, and extend to depths likely greater than 1 kilometer.

The hydrology of the area is typical of New England. Surface water and shallow groundwater flow from the Site into an unnamed brook that connects to Latham Brook, that flows into Stillwater Reservoir. Stillwater Reservoir is not a drinking water supply. Stillwater Reservoir flows into the Woonasquatucket River and then into Narragansett Bay 10 miles downriver. At the Site, a water-table aquifer in the overburden sands and gravels flows generally northward before turning east to flow through what is likely a filled fracture in the Triassic dike east of the Site. The overburden groundwater results not only from infiltration but also upward flow from the bedrock groundwater.

Site History of Contamination, Investigations, and Remedial Actions

During the 1970s, the Site owner accepted and disposed of liquid wastes containing hazardous substances into unlined lagoons in the FSA. Some of the contaminants flowed into bedrock groundwater to depths as great as 400 feet. In 1978, a court order stopped further dumping into the lagoons. The contaminants spread through the aquifer, and in the early 1980s had spread to contaminate drinking water in wells serving homes on Log Road north of the Site, and on Tarkiln Road, south of the Site. Figure 2 shows this operation and how contamination spread.

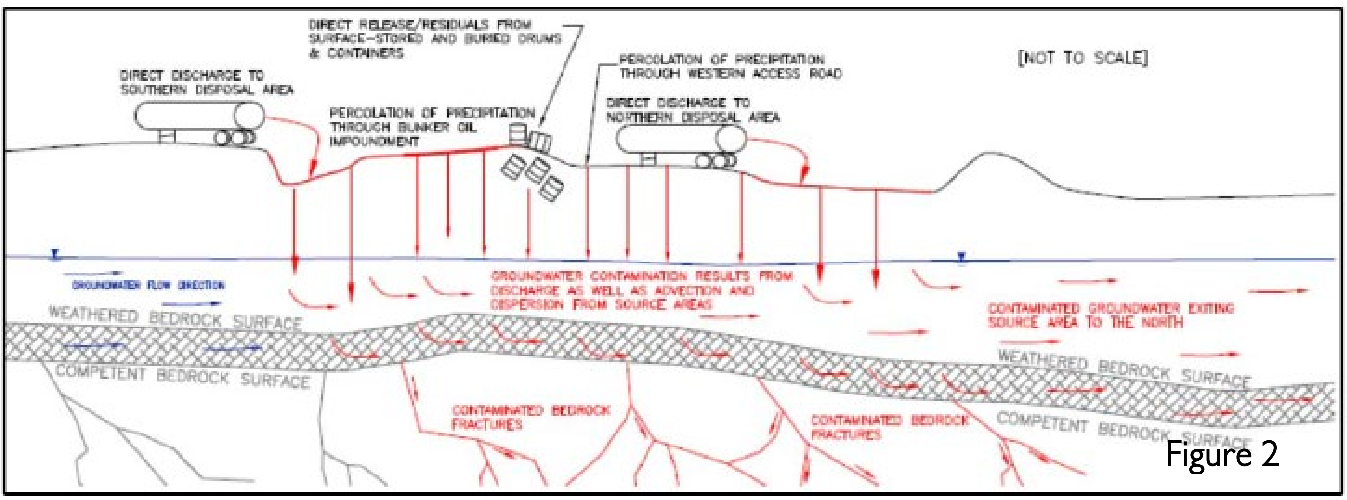

Figure 2. Operations at the Davis Liquid Waste Site in the late 1970s and the mechanisms responsible for the spread of contamination in groundwater. *This is Figure 7 in a 2009 Conceptual Site Model prepared by Nobis Engineering.*

The Site was listed on the National Priorities List in 1983. Subsequent investigations resulted in a 1987 Record of Decision (1987 ROD) that: provided public water to those with contaminated wells (Operable Unit 1 (OU-1)); chose groundwater pump-and-treat to clean up the contaminated groundwater (Operable Unit 2 (OU-2)); and treated or disposed of off-site contaminated soils in the FSA (Operable Unit 3 (OU-3)). Currently, the only remaining contamination is in groundwater.

The groundwater cleanup was delayed during the cleanup of the contaminated soils in the FSA and surrounding area. Cleanup of the FSA, the source control remedy (OU-3), began in the late 1990s and was completed in 2001, included removing, treating and disposing of approximately 100,000 cubic yards of contaminated soil, hundreds of drums, and six-million tires. Once the surface contamination was addressed, pre-design investigations found that the groundwater remedy (OU-2) of the 1987 ROD could not work. Specifically, water treated in a pump-and-treat groundwater facility could not be injected in the bedrock at design rates. Also, it was believed that the highest groundwater contamination was in the near-surface sands and gravels of the FSA, the overburden aquifer. By the early 2000s the contaminant plume had retreated from Log and Burlingame Roads to the general area enclosed by the yellow oval on Figure 1b.

Based on those conditions, EPA completed a 2010 Focused Feasibility Study (2010 FFS) and issued the 2010 ROD Amendment for Operable Unit 2 (groundwater). The 2010 ROD Amendment changed the groundwater remedy from pump-and-treat to i*n situ* chemical oxidation and enhanced biodegradation of contaminants in the overburden aquifer.

Further investigations by the responsible parties, the Davis Site Group (DSG), preparing to implement the 2010 ROD Amendment groundwater remedy, found conditions different from those in the 2010 FFS. Those findings are described in detail in a 2017 Conceptual Site Model (CSM) and are summarized here:

- Groundwater contaminants at the Site exist as pure phases inside fractures as deep as 400 feet in the bedrock that underlies the FSA. The pure phase materials, also called Dense Non-Aqueous Phase Liquids (DNAPL), consist primarily of oil-like solvents called Volatile Organic Compounds (VOCs).
- The amount of DNAPL present is unknown but is estimated to be between 3,080 to 308,000 pounds. VOCs and other contaminants dissolve outward from the exposed DNAPL and into the bedrock aquifer.
- Groundwater flows upwards from the bedrock, carrying contaminants dissolved from the DNAPL into the overlying unconsolidated sands and gravels at the Site.
- The dissolved contaminants radiate northward from the FSA to create a plume of contaminants exceeding drinking water standards that is approximately 2400 feet north to south and 1000 feet east to west in both the overburden and bedrock aquifers to a depth of 400 feet.
- Natural abiotic and biotic processes destroy the contaminants before they migrate off the property and stop further migration of the contaminant plume. However, it appears that these processes are currently inadequate to reduce the DNAPL in the bedrock.

Based on these findings, EPA determined that the groundwater remedy selected in the 2010 ROD Amendment should be reexamined, directing the DSG to complete a Remedial Investigation (RI) and a Feasibility Study (FS) for a comprehensive bedrock and overburden groundwater remedy.

WHY CLEANUP IS NEEDED

Releases of hazardous wastes to the environment during past operations at the Davis Liquid Waste Site resulted in the contamination of groundwater in the overburden and bedrock aquifers. The Site aquifer has the potential to be used in the future for drinking water. Although there are currently no structures on the parcels overlying the contaminated groundwater plume, these parcels have been zoned by the Town of Smithfield for rural density residential use (R-200). Groundwater flow from the bedrock conveys contaminants into the shallow, overburden groundwater aquifer that underlies areas that may have future inhabited structures.

Additional actions are therefore required to address the potential human health risks associated with the future ingestion of contaminated groundwater and the inhalation of contaminated vapors in structures constructed over the overburden groundwater contaminant plume. The proposed interim action is necessary to begin restoration of groundwater and to prevent unacceptable risks from future exposure to Site groundwater while gathering additional information to inform a final remedial action.

Site Contaminants

The main Contaminants of Concern (COCs) at the Site include, but are not limited to:

Volatile Organic Compounds, which include a variety of chemicals that are used in glue, paint, solvents, and other products, and easily evaporate. Common VOCs include trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), vinyl chloride, cis-1,2-dichloroethene (cis-1,2-DCE), and others. These compounds were found in bedrock and overburden groundwater.

Ether Compounds, detected in groundwater at the Site include tetrahydrofuran, commonly used as a pipe cement, 1,4-dioxane and bis(2-chloroethyl) ether, both of which are used in industrial chemical synthesis.

Metals, which are minerals that naturally occur in the Earth's crust and may be mobilized by industrial activities or releases. Metals present in groundwater at the Site include arsenic and manganese, which are likely natural metals released from the native rock through dissolution by the contaminants.

Risk and Exposure Pathways Considered

Exposures occur when people eat, drink, breathe or have direct skin contact with a substance or waste material. Based on existing or reasonably anticipated future land and groundwater use, EPA develops different exposure scenarios to determine potential risks to human health, and appropriate cleanup actions, as needed to meet the site cleanup levels. Currently, the Davis Liquid Waste Site is owned by private parties, and the land is zoned by the Town of Smithfield, Rhode Island, as suitable for residential uses.

The May 2019 Final Human Health and Ecological Risk Report (HHERA) evaluated potential cancer risks and non-cancer hazards associated with exposures to COCs in groundwater, surface water, soils, and sediment at the Site based on current and potential future land and groundwater use. Based on the results of the ecological evaluation in the HHERA, EPA and RIDEM concluded that there were no threats to the environment.

Table 1 below summarizes the human health exposure pathways evaluated in the HHERA, as well as the cancer and non-cancer risks for each receptor. The results of the HHERA show unacceptable risks at the Site associated with future residential use of the Site from contaminated groundwater, and with future Site monitoring activities for Site Assessment Workers (those people collecting environmental samples) exposed to groundwater, but not surface water or sediment.

HOW IS RISK TO PEOPLE EXPRESSED?

In evaluating risk to humans, estimates for risk from carcinogens and non-carcinogens (chemicals that may cause adverse effects other than cancer) are expressed differently.

For carcinogens, risk estimates are expressed in terms of probability. For example, exposure to a particular carcinogenic chemical may present a 1 in 10,000 increased chance of causing cancer over an estimated lifetime of 70 years. This can also be expressed as 1×10^{-4}. The EPA acceptable risk range for carcinogens is 1×10^{-6} (1 in 1,000,000) to 1×10^{-4} (1 in 10,000). In general, calculated cancer risks higher than this range are considered unacceptable under CERCLA and would require consideration of clean-up alternatives.

For non-carcinogens, exposures are first estimated using certain assumptions and then compared to an oral reference dose (RfD) or a reference concentration (RfC) for inhalation. RfDs and RfCs are toxicity values developed by EPA scientists to estimate the amount of a chemical a person (including the most sensitive person) could be exposed to over a lifetime without developing adverse health effects. The exposure dose is divided by the RfD or RfC to calculate the measure known as a hazard quotient (HQ) (a ratio) and a cumulative hazard index (HI). An HQ or HI greater than 1 suggests that adverse effects may be possible.

Table 1 - Davis Liquid Waste Risk Summary		
Receptor	Cancer Risk	Non-Cancer Risk
Current and Future Site Assessment Worker exposed to contaminants in groundwater	1.6×10^{-3}	3.2
Current and Future Site Assessment Worker exposed to contaminants in surface water	6.1×10^{-7}	0.00079
Future Resident exposed to contaminants in drinking water from the plume core	4.3×10^{-2}	1,500
Current and Future Trespasser exposed to contaminants in surface water and sediment	2.4×10^{-6}	0.017
Current and Future Recreator exposed to contaminants in surface water and sediment	1.3×10^{-6}	0.0053
Future Resident exposed to contaminants in drinking water from the dilute plume	5.9×10^{-4}	11
Unacceptable risks are highlighted in yellow.		

The greatest cancer risk driver for the Site Assessment Worker is vinyl chloride in plume core overburden groundwater (6.2×10^{-4}) and plume core bedrock groundwater (1.0×10^{-3}). Trichloroethene (TCE) is the greatest non-cancer risk driver with a Hazard Quotient (HQ) of 2.0. Potential exposures to COCs in surface water (cancer risk of 6.1×10^{-7} and cumulative HQ of 0.00079) are acceptable. The risk to Site Assessment Workers will be addressed through the implementation of an Agency-approved Health and Safety Plan.

For the Future Resident exposed to contaminants in drinking water from the plume core, the greatest cancer risk drivers within plume core bedrock groundwater are: arsenic, bis(2-chloroethyl) ether, 1,1-dichloroethane (DCA), 1,2-DCA, 1,4-dioxane, ethylbenzene, tetrachloroethene (PCE), TCE, and vinyl chloride. Arsenic, manganese, 1,1,2-TCA, 1,4-dioxane, cis-1,2-DCE, PCE, and TCE are the greatest non-cancer risk drivers, with HQs greater than 10.

For the Future Resident exposed to contaminants in drinking water from the dilute plume, the primary cancer risk drivers are arsenic, bis(2-chloroethyl) ether, 1,4-dioxane, and vinyl chloride. No individual HQ exceeds 10; however, the following COCs have an HQ exceeding 1.0: arsenic, manganese, and TCE. Table 2, below, lists the contaminants that are COCs at the Site and the corresponding Preliminary Remediation Goals (PRGs) developed in the FS.

The overburden groundwater plume also poses a potential threat to future structures due to the intrusion of groundwater vapors. Vapor intrusion was determined to be an incomplete exposure pathway in the HHERA; however, the HHERA states that vapor intrusion pathways will be assessed according to a U.S. EPA-approved work plan prior to the construction of habitable structure(s) within the plume area, or prevented by means of vapor intrusion mitigation structures (e.g., active or passive sub-slab ventilation) as part of the construction.

The current extent of groundwater contamination is shown in Figures 3 and 4 (pages 13 & 14):

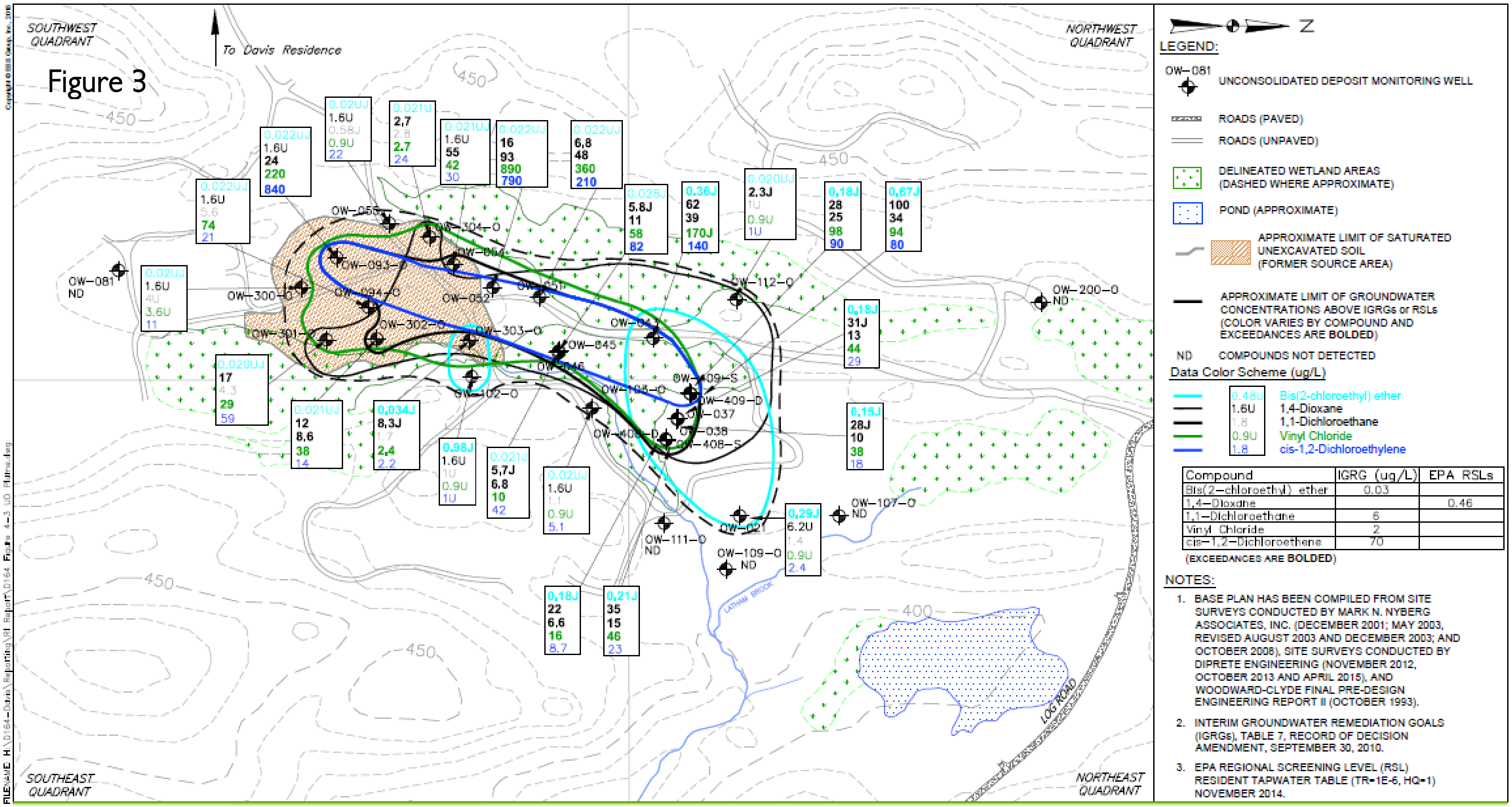

Figure 3. Shows the Overburden contaminant plume for key contaminants of concern (COCs). For the sand and gravel overburden, the COCs are bis(2-chloroethyl) ether, 1,4-dioxane, 1,1-dichloroethane, vinyl chloride, and cis-1,2-dichloroethene. The plume lines mark the extent of contamination that exceeds drinking water standards shown in the small table on the right side of the figure. The orange, oblong feature on the left is the Former Source Area. Groundwater flows north (to the right of this figure) and then east (to the bottom of the figure). *This figure is extracted from Figure 4-2 of the 2018 Remedial Investigation Report (2018 RI Report).*

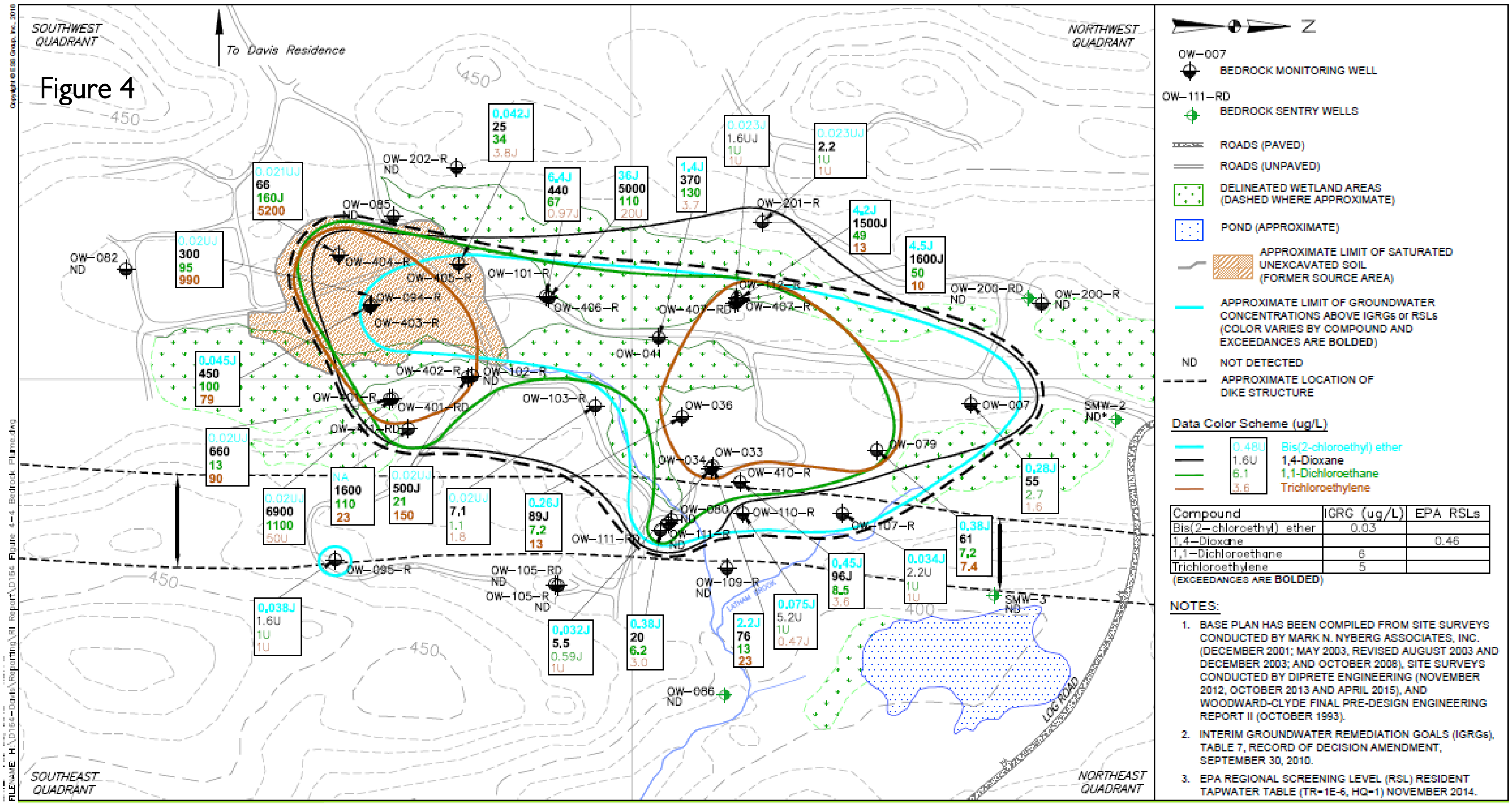

Figure 4. The bedrock contaminant plume for key Contaminants of Concern (COCs). For the sand and gravel overburden the COCs are bis(2-chloroethyl) ether, 1,4-dioxane, 1,1-dichloroethane, and trichloroethene. The plume lines mark the extent of contamination that exceeds drinking water standards shown in the small table on the right side of the figure. *This figure is extracted from Figure 4-3 of the 2018 RI Report.*

Principal Threat Waste

The National Contingency Plan (NCP), which governs EPA cleanups, at 40 C.F.R. § 300.430(a)(1)(iii), states that EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable" and "engineering controls, such as containment, for waste that poses a relatively low long-term threat" to achieve protection of human health and the environment. This expectation is further explained in an EPA fact sheet (OSWER #9380.3-06FS), which states that principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Low-level threat wastes are source materials that generally can be reliably contained and that would present only a low risk in the event of exposure.

The concept of principal threat and low-level threat waste is applied on a site-specific basis when characterizing source material. Source material is defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, air, or act as a source of direct exposure.

Although EPA has not established a threshold level of toxicity/risk to identify a principal threat waste, generally where toxicity and mobility combine to pose an excess carcinogenic risk of 10^{-3} or greater, the source material is considered principal threat waste. Volatile Organic Compounds and their additives occurring as residual non-mobile DNAPL principally located within the fractured crystalline bedrock create a continuing, long-term source of contaminants in groundwater that, as shown in Table 1, above, pose an excess carcinogenic risk greater than 10^{-3}.

It is EPA's current judgment that the Preferred Remedial Alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances, including principal threat waste, into the environment and that treatment of the principle threat waste has been included as a component of the Preferred Remedial Alternative to the extent practicable.

CLEANUP ALTERNATIVES CONSIDERED

Remedial Action Objectives

Once possible exposure pathways and potential risks have been identified at a site, cleanup alternatives are developed to reduce and/or mitigate the identified unacceptable risks and achieve site-specific Remedial Action Objectives (RAOs). The FS developed the following RAOs for a final groundwater remedy at the Site:

- Prevent human exposure to groundwater that contains COC concentrations that exceed their respective EPA Maximum Contaminant Levels (MCLs), exceed their respective non-zero Maximum Contaminant Level Goals (MCLGs), exceed their respective RIDEM Groundwater Quality Standards for Class GA Groundwater, pose cancer risk exceeding 1×10^{-6}, or pose a non-carcinogenic risk greater than a HQ of 1.0.
- Restore groundwater quality to below COC MCLs, below COC non-zero MCLGs, below COC RIDEM Groundwater Quality Standards for Class GA Groundwater, and below COC concentrations that result in excess cancer risk of 1×10^{-6} or a non-carcinogenic HQ of 1.0.

- Mitigate actual or potential impacts to potential future building occupants and public health resulting from subsurface-to-indoor vapor intrusion into buildings, including potential future buildings, at the Site.[5]

EPA has determined that proposing an interim remedial action is appropriate at this Site to initiate groundwater restoration while additional information is collected to better assess the practicability of aquifer restoration prior to the determination of final cleanup levels and selection of a final remedial action. Accordingly, interim RAOs have been developed that prioritize reduction of exposure risk and reduction of contaminant mass through treatment. The interim RAOs will not include attainment of specific remediation levels. The interim RAOs include:

- Reduce residual DNAPL mass in bedrock to reduce, or maintain the stability of, the contaminant plume. This action will improve the observed natural attenuation of contaminants in the downgradient contaminated groundwater plume.
- Prevent human exposure to contaminated groundwater through restricting withdrawal of the water within the contaminated groundwater plume for purposes other than remediation.
- Mitigate actual or potential impacts to potential future building occupants and public health resulting from subsurface-to-indoor vapor intrusion into buildings, including potential future buildings, at the Site.[6]

Preliminary Remediation Goals

In general, Preliminary Remediation Goals (PRGs) are used to develop long-term contaminant concentrations needed to be achieved to meet RAOs by the remedial alternatives. PRGs are identified in a feasibility study and used to develop final cleanup levels in a decision document for a final remedial action. The PRGs for groundwater remedies are typically based on chemical-specific Applicable and Relevant and Appropriate Requirements (ARARs) such as Safe Drinking Water Act promulgated MCLs or risk-based concentrations if ARARs are not available or not sufficiently protective. The FS developed PRGs for the remedial alternatives developed for a final groundwater remedy. These PRGs are presented in Table 2-4 of the FS and are summarized in Table 2 of this document on page 12.

The limited scope of this proposed interim action, which does not include restoration of the groundwater to beneficial use as a drinking water source, is not expected to attain groundwater PRGs. Therefore, the PRGs developed in the FS are not being adopted as cleanup levels for this interim remedial action. Final cleanup levels will be selected as part of the final remedy determination for Site groundwater. However, on-going monitoring data will be compared against the PRGs presented in this Proposed Plan to inform the determination of a final remedy for groundwater at the Site.

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[5] The first two RAOs were proposed in the Development Memo and approved by EPA. The third RAO, relating to vapor intrusion, was added after the finalization of the Development Memo and included in the 2020 FS.

[6] The 2020 FS explained that while future vapor intrusion risk was not evaluated in the Final Human Health and Ecological Risk Assessment (EHS Support, submitted to EPA May 2019) because future site use is unknown at this time and there are currently no occupied structures within the plume areas, VOC concentrations in shallow groundwater may pose potential vapor intrusion risks for future occupied structures. Accordingly, in the 2020 FS, the vapor intrusion RAO was developed to address potential future exposure to impacted indoor air due to vapor intrusion into an occupied structure proposed for consideration within the plume areas. This RAO is retained as an interim RAO in order to reduce exposure risk.

Table 2 Contaminant Preliminary Remediation Goals (PRGs) as presented in the 2020 Feasibility Study, Davis Liquid Waste Superfund Site, Smithfield, Rhode Island		
Contaminant of Concern	PRG (µg/l)	Basis, notes.
Volatile Organic Compounds		
1,1,2-Trichloroethane	5	MCL/RIDEM GA
1,1-Dichloroethane	2.8	Cancer risk-based, this would supersede the 2010 ROD Amendment value
1,2-Dichloroethane	5	MCL/RIDEM GA
1,4-Dioxane	0.46	Cancer risk-based
Benzene	5	MCL/RIDEM GA
Chloroform	80	MCL/RIDEM GA
cis-1,2-Dichloroethene	70	MCL/RIDEM GA
Ethylbenzene	700	MCL/RIDEM GA
Methylene Chloride	5	MCL/RIDEM GA
Tetrachloroethene	5	MCL/RIDEM GA
Tetrahydrofuran	3,400	Non-cancer risk-based
Trichloroethene	5	MCL/RIDEM GA
Vinyl Chloride	2	MCL/RIDEM GA
Xylene	10,000	MCL/RIDEM GA
Semi-Volatile Organic Compounds		
Bis(2-chloroethyl) ether	0.03	Cancer risk-based and analytic capability
Naphthalene	100	MCL/RIDEM GA
Metal Contaminants		
Arsenic	10	MCL/RIDEM GA
Manganese	430	Non-cancer hazard-based, this would supersede the 2010 ROD Amendment value
µg/l: micrograms per liter or parts per billion. MCL: Maximum Contaminant Level in the Safe Drinking Water Act. RIDEM GA: Rhode Island Department of Environmental Management GA Groundwater Objective.		

Summary of Remedial Alternatives

CERCLA requires that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs (or waive them), and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable.

The proposed interim action is intended to provide protection of human health and environment in the short term while gathering additional information to inform the selection of a final remedial action. The Preferred Remedial Alternative complies with those federal and state requirements that are ARARs for this limited scope action and is cost effective. This action is an interim solution only and is not expected to attain chemical-specific

ARARs identified as PRGs for groundwater, which will be used to develop cleanup levels for a final remedial action that will attain groundwater ARARs, unless a technical impracticability waiver under CERCLA Section 121(d)(4) is deemed appropriate by EPA in the final remedy decision. Location-specific and action-specific ARARs will be met.

A complete listing of ARARs for the Preferred Remedial Alternative, should it be selected, will be provided in the ROD Amendment 2. As an interim solution only, this limited scope action is not intended to address the statutory mandate to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. And although the proposed interim remedial action does employ treatment of residual DNAPL mass, because the proposed action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action.

The 2020 FS developed and evaluated five remedial alternatives for a final groundwater response action, which are summarized below. More detailed descriptions of the groundwater remedial alternatives can be found in the FS.

The estimated time to attain cleanup levels, using the remedial alternatives, in the overburden and bedrock aquifers was the subject of extensive modeling efforts over many months. The cleanup timeframes from the modeling effort are presented in Appendix 3-3 of the FS. The cleanup timeframes were developed based on assumptions regarding the amount of DNAPL present and the ability of the proposed remedial alternatives to contact and perform as designed in reducing DNAPL sources. Table 3-1 in Appendix 3-3 of the FS lists the modeled cleanup times for all alternatives developed in the FS. Using the assumptions developed for purposes of the restoration timeframes evaluation, all remedial alternatives were estimated to have cleanup times greater than 100 years with several ranging at nearly 1,000 years, suggesting that no remedial alternative would be capable of meeting the RAOs for a significant amount of time.

However, as acknowledged in the conclusions of the restoration timeframes evaluation in Appendix 3-3 of the FS, the estimates are highly dependent on the amount of residual DNAPL mass as well as the geometry and hydraulic properties of the Site geology. There is significant uncertainty regarding the amount of DNAPL present and the geology of the Site. The potential amount of suspected DNAPL in bedrock ranges two orders of magnitude, between 3,080 pounds and 308,000 pounds. And it is understood that fractures within the Site geology have trapped much of the DNAPL, limiting its mobility and exposure but allowing it to slowly dissolve into groundwater.

EPA has determined that it is necessary to test the assumptions and determine if the DNAPL can be reduced prior to the determination of final cleanup levels and selection of a final remedy. Thus, EPA has determined that none of the remedial alternatives in the FS can be selected at this time. Instead, this Proposed Plan proposes as an interim remedy the Preferred Remedial Alternative of injection-based enhanced depletion of accessible shallow bedrock DNAPL with monitoring and institutional controls, further described below. This Preferred Remedial Alternative is a subset of Alternative GW-5 (which includes all components of GW-2), which is described and evaluated in the FS and summarized below.

Preferred Remedial Alternative – Injection-Based Enhanced Depletion of Accessible Shallow Bedrock DNAPL with Monitoring and Institutional Controls

The Preferred Remedial Alternative for an interim remedy will treat an area of approximately 1-acre, in a zone that ranges from approximately 20 feet below ground surface to a total depth of 65-feet. The treated volume will be about 50,000 cubic meters and approximately 30,000 to 75,000 gallons of groundwater. It is estimated that between 600 and 3,750 gallons of DNAPL is in this area.

The Preferred Remedial Alternative consists of injecting nutrients into the accessible upper 40 feet of bedrock in the southwest corner of the FSA. This area is conceptualized to include over 75% of the residual DNAPL mass at the Site. This will foster increased biologic activity that will metabolize the DNAPL contaminants faster than through natural processes. The proposed interim remedy will metabolize contaminants into ethane, methane, and aqueous chloride. Other contaminants will be similarly consumed or, in the case of any metal contaminants, immobilized through oxidation as the ambient groundwater regime is restored. Figure 5 shows a cross-section of the area of application.

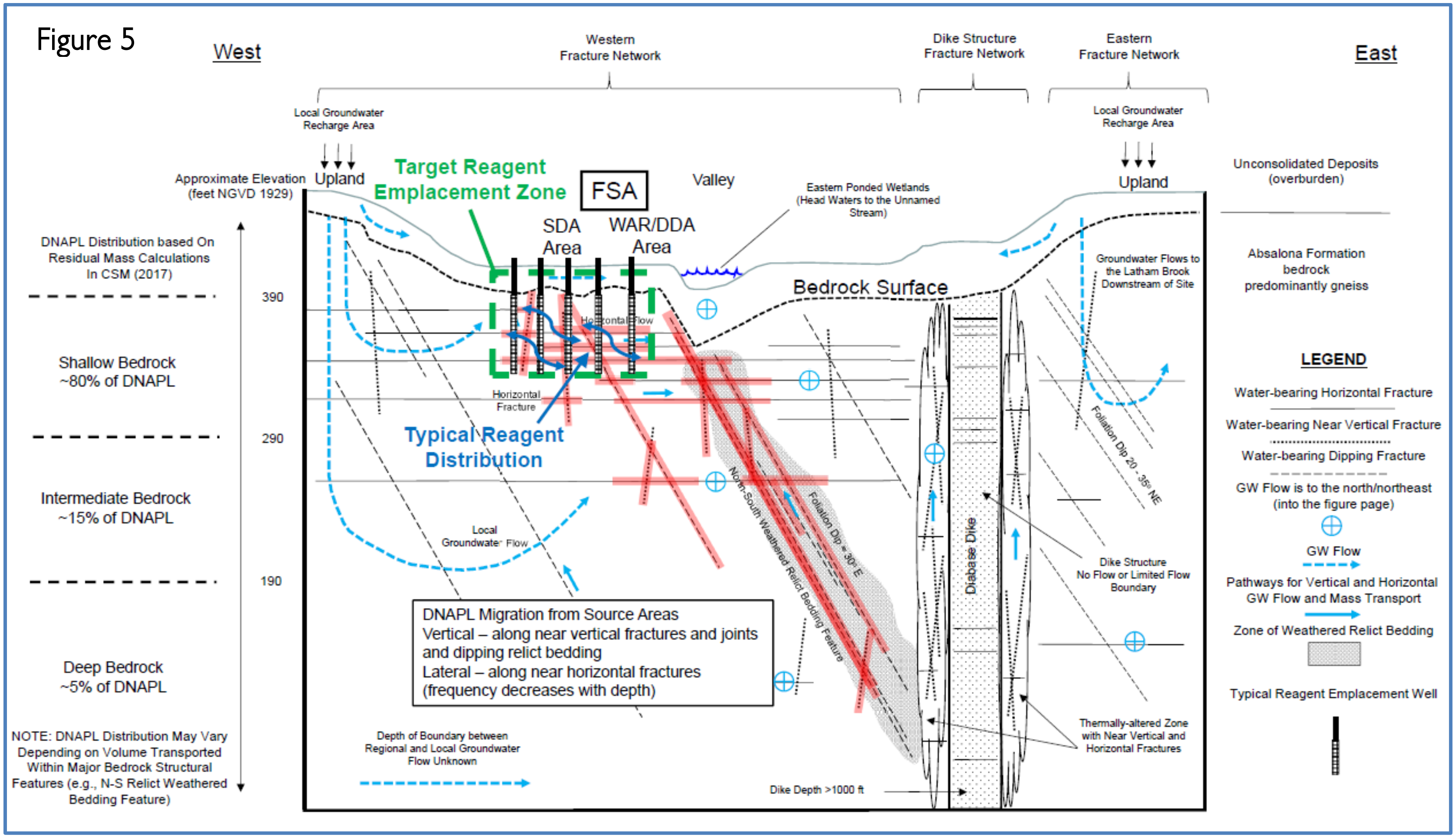

Figure 5. The area of the Preferred Remedial Alternative for an interim remedy as shown in cross-section looking north. The treatment would be applied in the area noted as "Target Reagent Emplacement Zone." The features of the subsurface are shown in this figure which is also Figure 4-5b in the FS.

Additional studies will be required to determine the best treatment or amendment type and application, but it will likely be bioaugmentation of the existing groundwater microbiome. By contrast to GW-5, there will be no re-injection of reagents at year 10.

This proposed interim remedy will use the attenuative processes that have reduced the plume to its present state. Monitoring will allow the evaluation of the effectiveness of the active component of the interim remedy, while ensuring that the existing processes are not disturbed by the injection of reagents. Institutional controls will be required on four properties to prevent contact with contaminated groundwater and exposure to vapor intrusion from contaminated groundwater into structures. (See Figure 6, on the following page for conceptual locations of monitoring wells and parcels proposed for institutional controls).

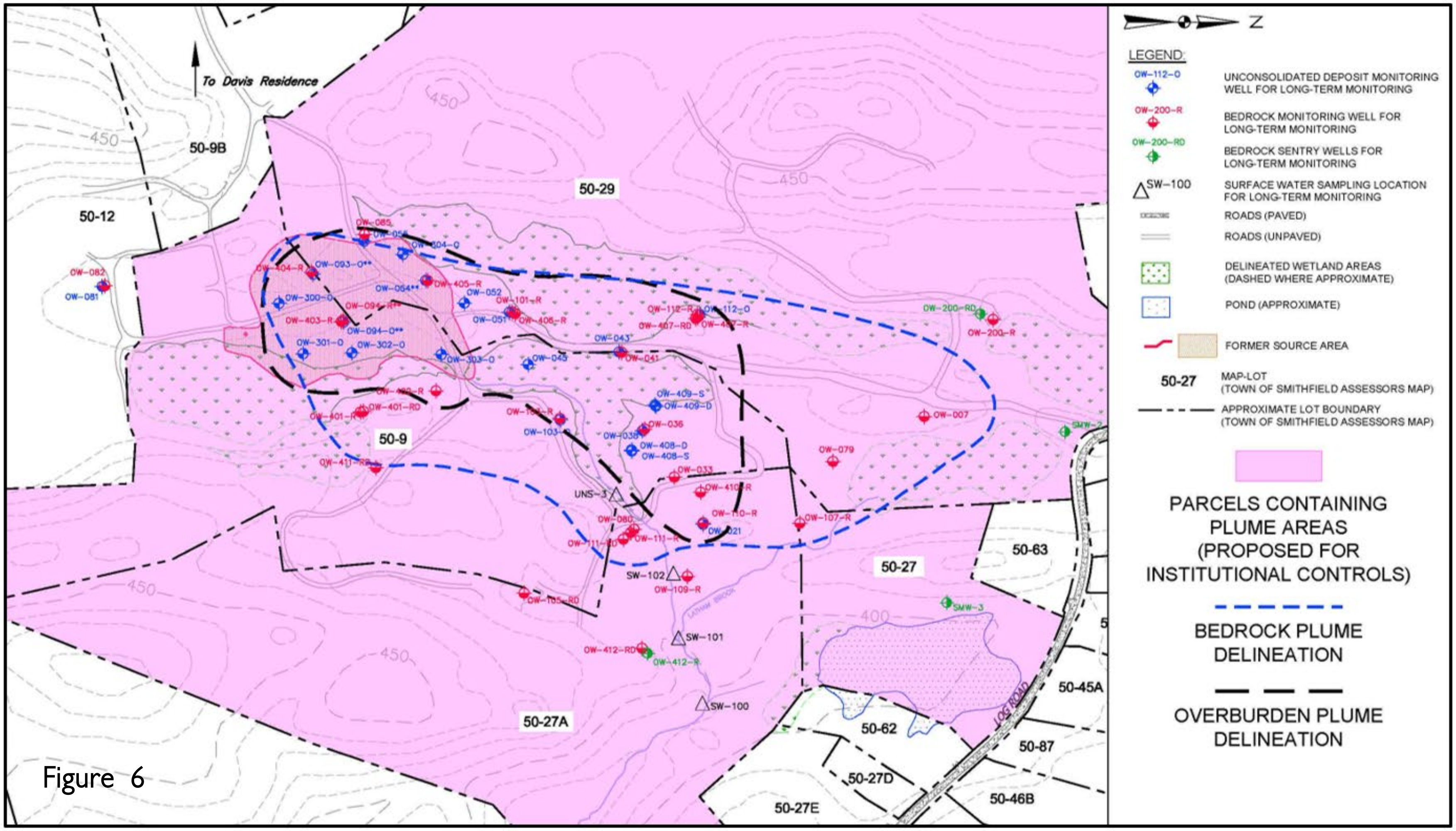

Figure 6. Conceptual locations of monitoring wells and parcels proposed for institutional controls (this is Figure 4-2 of the FS).

Lastly, the proposed interim remedy will require Five-Year Reviews to ensure the remedy remains protective. The Five-Year Reviews for this proposed interim remedy will also serve as evaluation points, during which the performance of the interim remedy in reducing the mass of contamination will be reviewed. EPA expects that two Five-Year Review cycles will be completed to evaluate the proposed interim remedy during its implementation.

EPA's Preferred Remedial Alternative for an interim remedy, including monitoring and institutional controls, has an estimated total cost of $6.7 million in the net present value.[7] The initial capital cost of the proposed remedy is $3.7 million, and future Operation and Maintenance (O&M) cost is $3 million. Operation and Maintenance, including reporting, is anticipated to cost $350,000 per year. Detailed cost estimates and supporting conceptual assumptions for the Preferred Remedial Alternative are provided in Attachment A to the May 2020 memorandum, *Determination to Evaluate and Propose an Interim Remedial Action for OU-2 (Groundwater), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island*, which can be found in the Administrative Record for this Proposed Plan.

The proposed interim remedy is expected to prevent the ingestion of contaminated groundwater and prevent further migration of contaminants in the aquifer. Following implementation of the proposed interim remedy, the Site will also be ready for re-use with limitations.

Alternatives Evaluated

Alternative GW-1 – No Action

EPA regulations require the inclusion of the No Action Alternative, GW-1, to be used as a baseline for comparison to other remedial alternatives. Total cost of $0 million in the net present value.

Alternative GW-2 – Institutional Controls Coupled with Monitored Natural Attenuation

Remedial Alternative GW-2, would require Institutional Controls over four properties, Smithfield Assessor Map-Lot Nos. 50-9, 50-27, 50-27A, and 50-29. These properties are shown on Figure 4-2 of the FS. The contaminants in the dissolved plume and that exists as DNAPL in the FSA would be destroyed by existing natural biotic and abiotic processes that have operated over the past 40 years to reduce contamination to its present levels. Groundwater and surface water quality in Latham Brook will be monitored to verify that natural attenuation of contaminants is ongoing and to evaluate where contaminated groundwater is migrating. Because contaminants will have been left in place on the Site above safe levels, a review of site conditions would be performed every 5 years to assess the protectiveness of this alternative. Total estimated cost of $6.7 million in the net present value ($1.7 million of initial capital cost and $5.0 million of O&M cost).

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[7] "Present Value" is the amount of money set aside today to ensure that enough money is available over the expected life of the project, assuming certain conditions (e.g., inflation). The discount rate of 7% was applied for the 12 years of the expected life of the Preferred Remedial Alternative.

Alternative GW-3 – Pump-and-Treat Enhanced Depletion of Whole Bedrock DNAPL Body Plus Institutional Controls Coupled with Monitored Natural Attenuation

In addition to the components described under Remedial Alternative GW-2, Remedial Alternative GW-3 would be performed by installing 9 wells of varying depths into bedrock with the design of recovering 25 to 35 gallons of contaminated water per minute, treating that groundwater through settling, air-stripping and recovery of contaminants and then discharging the treated water to the unnamed brook that flows to Latham Brook. The plan view of these wells is shown in Figure 7. GW-3 would also include closing a man-made trench drain adjacent to the FSA to maintain shallow groundwater flow. Total estimated cost of $23.1 million in the net present value ($6.7 million of initial capital cost and $15.4 million of O&M cost).

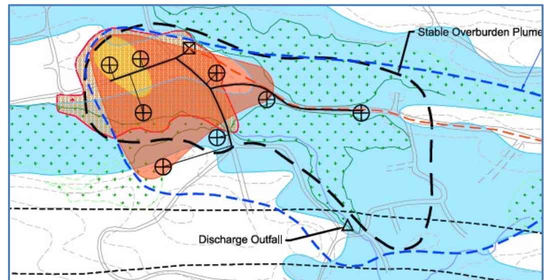

Figure 7: Excerpted from the FS, Figure 4-3a. The plan view of wells in remedial alternative GW-3.

Alternative GW-4 – Injection-Based Enhanced Depletion of Whole Bedrock DNAPL Body, Institutional Controls and Monitored Natural Attenuation

In addition to the components described under Remedial Alternative GW-2, Remedial Alternative GW-4 would include treatment of the whole body of DNAPL, to a depth of 400 feet, with a bio-amendment designed to metabolize and destroy the contaminants. Wells would be installed in the vicinity of the FSA at varying depths to deliver the treatment amendments to whole body of suspected DNAPL. Figure 8 shows a general layout of wells to distribute the amendment. GW-4 would also include closing a man-made trench drain adjacent to the FSA to maintain shallow groundwater flow. Total estimated cost of $17.6 million in the net present value ($6.3 million of initial capital cost and $11.3 million of O&M cost).

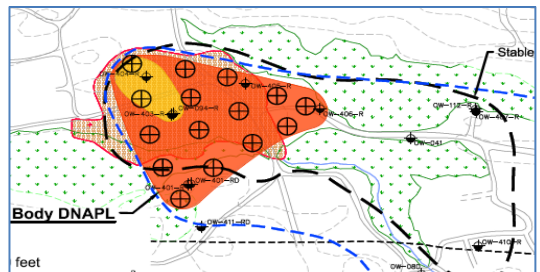

Figure 8: Excerpted from the FS, Figure 4-4a. Shows the plan view of wells in remedial alternative GW-4.

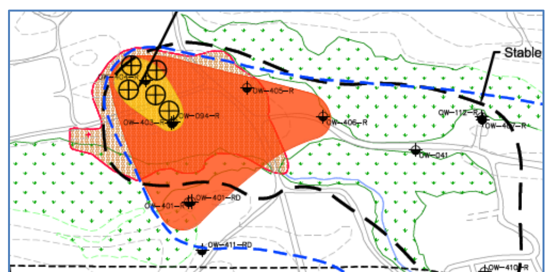

Figure 9: Excerpted from the FS, Figure 4-5a. Shows the plan view of wells in remedial alternative GW-5.

Alternative GW-5 – Injection-Based Enhanced Depletion of Accessible Shallow Bedrock DNAPL, Institutional Controls, and Monitored Natural Attenuation

In addition to the components described under Remedial Alternative GW-2, Remedial Alternative GW-5 would treat a narrow area of the FSA by installing five wells up to a depth of approximately 65 feet in an area suspected to hold the majority of DNAPL, approximately 1-acre in size. Amendments would be injected to reduce the mass of DNAPL *in situ*. The remainder of the whole body would remain untreated although it is expected that amendments would flow further and deeper into the aquifer through diffusive advection. GW-5 would also include closing a man-made trench drain adjacent to the FSA to maintain shallow groundwater flow. Total estimated cost of $11.2 million in the net present value ($3.7 million of initial capital cost and $7.5 million of O&M cost).

THE NINE CRITERIA FOR CHOOSING A CLEANUP PLAN

EPA uses nine criteria to evaluate cleanup alternatives and select a final cleanup plan. An evaluation of how well each of the cleanup alternatives developed for the final groundwater remedy at the Davis Liquid Waste Superfund Site meets the first seven criteria is presented in the Feasibility Study. EPA has determined that none of the remedial alternatives in the FS can be selected at this time and proposes an interim remedial action. Because the Preferred Remedial Alternative is a subset of Alternative GW-5 (which includes GW-2), components of GW-5 have been evaluated against the No Action Alternative (GW-1) under the applicable criteria. Once comments from the state and the community are received and considered, EPA will select the cleanup plan for the interim remedy. The evaluation criteria are:

1. Overall Protection of human health and the environment: Will it protect you and the plant and animal life on and near the site? EPA will not choose a cleanup plan that does not meet this basic criterion.

2. Compliance with Applicable and Relevant and Appropriate Requirements (ARARs): Does the alternative meet all federal and state environmental statutes, regulations and requirements? The cleanup plan must meet this criterion unless a waiver is invoked.

3. Long-term effectiveness and permanence: Will the effects of the cleanup plan last or could contamination cause future risk?

4. Reduction of toxicity, mobility or volume through treatment: Using treatment, does the alternative reduce the harmful effects of the contaminants, the spread of contaminants and the amount of contaminated material?

5. Short-term effectiveness: How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?

6. Implementability: Is the alternative technically feasible? Are the right goods and services (i.e. treatment equipment, space at an approved disposal facility) available?

7. Cost: What is the total cost of an alternative over time? EPA must select a cleanup plan that provides the necessary protection for a reasonable cost.

8. State Acceptance: Do State environmental agencies agree with EPA's proposal?

9. Community Acceptance: What support, objections, suggestions or modifications did the public offer during the public comment period?

COMPARISON OF CLEANUP ALTERNATIVES

The NCP specifies the evaluation of alternatives by grouping the criteria first as Threshold criteria, those that must be met for an alternative to be considered further, Balancing criteria that are used to determine which among the alternatives offer the greatest benefit, and Modifying criteria that tell EPA how the State and public view the proposal. The following discussion presents a general comparison summary of the alternatives with greater detail included in the FS for GW-1 through GW-5.

Because EPA has determined that none of the remedial alternatives evaluated in the FS for a final groundwater remedy can be selected at this time, EPA is proposing an interim remedial action and a Preferred Remedial Alternative that includes injection-based enhanced depletion of accessible shallow bedrock DNAPL, monitoring, and institutional controls. (These components are similar to those in Remedial Alternative GW-5 (which includes GW-2), but the Preferred Remedial Alternative is expected to have an implementation time of approximately 12 years and will exclude the re-injection of reagents event at year 10, as contemplated for Alternative GW-5.) Thus, only these remedy components are being proposed for this limited scope action and are being evaluated below against the No Action Alternative (GW-1).

Protection of Human Health and the Environment

Only those remedy components considered for this limited scope action are addressed in this criterion. A complete evaluation of the nine criteria for all groundwater alternatives is contained in the FS. Alternative GW-1 does not protect human health and the environment because no actions will be taken to decrease the potential for future exposure to impacted groundwater. GW-1 would not meet this threshold criterion of the NCP. The Preferred Remedial Action will rely on institutional controls to decrease the potential for future exposure to impacted groundwater and includes monitoring of groundwater to assess the performance of the ongoing natural attenuation of contaminants and verify that groundwater is not migrating towards any potential receptors. The Preferred Remedial Alternative also protects human health and the environment through *in situ* treatment of residual DNAPL, which may shrink the dissolved plume areas to potentially reduce the overall timeframe to restore groundwater.

Compliance with Applicable or Relevant and Appropriate Requirements

Only those federal and state requirements that are ARARs for the remedy components considered for this limited scope action are addressed for this criterion. This action is an interim solution only and is not expected to attain chemical-specific ARARs identified in the FS as PRGs for groundwater, which will be used to develop cleanup levels for a final remedial action that will attain groundwater ARARs, unless a technical impracticability waiver under CERCLA Section 121(d)(4) is deemed appropriate by EPA in the final remedy decision. Chemical-specific ARARs are therefore not being selected for this proposed interim action. There are no location-specific or action-specific ARARs or TBCs for Alternative GW-1. The Preferred Remedial Alternative will be designed, constructed, and operated to comply with the location-specific and action-specific ARARs and TBCs. A complete listing of ARARs for the Preferred Remedial Alternative, should it be selected, will be provided in the ROD Amendment 2.

Long-Term Effectiveness and Permanence

Only those remedy components considered for this limited scope action are addressed in this criterion. Alternative GW-1 would not provide long-term effectiveness and permanence in protecting human health and the environment through reduction, control, or elimination of contaminant source areas because no actions will be taken to reduce, control, or eliminate contamination or prevent future use of impacted groundwater. The Preferred Remedial Action provides reasonable long-term effectiveness and permanence until a final remedy is selected for Site groundwater. The HHERA concluded that risks associated with the current Site conditions are acceptable. Institutional controls are a component of the Preferred Remedial Alternative. Therefore, long-term risks will be controlled. Although the Preferred Remedial Alterative does not seek to restore groundwater to meet cleanup levels, it is expected that implementation of the Preferred Remedial Alternative will reduce DNAPL mass and therefore cleanup times as well.

Reduction of Toxicity, Mobility, and Volume Through Treatment

As an interim solution only, this limited scope action is not intended to address the statutory mandate to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because the proposed interim action does not constitute the final remedy for groundwater at the Site, the statutory preference in CERCLA Section 121(b)(1) for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action. Nonetheless, the Preferred Remedial Action does employ active treatment components to address residual contaminant mass. Alternative GW-1 provides no active treatment of contaminated groundwater and therefore would not satisfy CERCLA's statutory preference for treatment.

Short-Term Effectiveness

GW-1 will not impact the community, Site workers or the environment, since no actions are performed. This no-action alternative would also not address risks, including short-term risks, to the community, Site workers or the environment.

Minimal impacts to the environment are anticipated from installation of any additional wells under the Preferred Remedial Alternative. The active injection-based depletion of DNAPL under this alternative will have minimal impact on the community. There is the potential for injected reagents to discharge to wetlands and surface water bodies due to the complexities in the flow paths within the bedrock. Monitoring will be performed to ensure that reagent injections do not have adverse impacts on wetlands and waterways. An Agency-approved Health and Safety Plan (HASP) will mitigate risks to Site workers during potential well installation, reagent injection events, and monitoring. The Preferred Remedial Alternative will rely on the implementation of institutional controls for protectiveness in the short term. It is anticipated that implementation of the institutional controls can be achieved within five years.

Implementability

Alternative GW-1 is the easiest to implement since there are no proposed actions. The Preferred Remedial Alternative will require the construction of access roads and installation of monitoring and injection wells, but is readily implementable. This alternative uses technologies that have been implemented and demonstrated to be implementable at other sites with similar contaminants. Monitoring requirements for the Preferred Remedial Alternative are easily implemented. The existing monitoring well networks can continue to be used to evaluate natural attenuation progress and effectiveness of injection-based enhanced depletion of DNAPL. Additional monitoring wells might also need to be installed in support of long-term monitoring.

Cost

There are no costs associated with Alternative GW-1. The estimated cost of the Preferred Remedial Alternative for an interim remedy over 12 years of operation is $6.7 million as detailed in Table 3 below.

Table 3 - Summary of Cost Estimates
Preferred Remedial Alternative (Interim Remedy)

Assumed Life (years)	12
Initial Capital	$3,650,480
Annual O&M	$350,304
Future Capital	$0
Total Cost (simple sum)	$7,854,128
Total Future Cost [1]	$8,348,789
Total Present Value (2019) [2]	$6,711,335

NOTES:
1. Inflation Rate = 2%
2. Discount Rate = 7%

WHY EPA RECOMMENDS THIS PROPOSED INTERIM ACTION

EPA has determined that none of the remedial alternatives in the FS can be selected at this time, as additional data regarding the extent of DNAPL presence and the ability of present technologies to reduce its mass in an effective means is necessary before a final remedy for groundwater at the Site can be selected. EPA has determined that the Preferred Remedial Alternative for an interim remedy will supply the necessary information.

The Preferred Remedial Alternative includes components of Alternative GW-5, which was evaluated in the FS. These components include a subset of the active component of injection-based enhanced depletion of accessible shallow bedrock DNAPL, monitoring, and institutional controls. These components were preferred for the following reasons:

- The area that the Preferred Remedial Alternative targets (the same as proposed in GW-5) is conceptualized to contain the majority of the DNAPL.

- The area targeted for treatment has high transmissivity. Higher rates of groundwater flow will provide increased certainty of the amendment application. High flow rates allow for easier monitoring and understanding of the aquifer.
- The area is limited in extent and any upsets to the system due to the treatment will not be widespread throughout the contaminant plume and disturb the existing natural processes currently limiting plume migration.

In addition to the above technical reasons, the Preferred Remedial Alternative meets the interim Remedial Action Objectives for the Site; is protective of human health and environment in the short term while additional information is gathered to inform the selection of a final remedial action; complies with those federal and state requirements that are ARARs for this limited scope action; and is cost effective. As an interim solution only, this limited scope action is not intended to address the statutory mandate to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, or the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element (although the proposed interim remedial action does employ treatment of residual DNAPL mass). These statutory requirements will be addressed by the final response action.

The preferred interim cleanup approach has minimal impact to residents and would also avoid significant impacts to wetland areas to the extent practicable and provide restoration for unavoidable damage.

WHAT IS A FORMAL COMMENT?

EPA will accept public comments during a 30-day formal comment period – June 15 through July 15, 2020. EPA considers and uses these comments to improve and understand support for its cleanup approach. EPA will hold an informational meeting prior to the start of the formal Public Hearing. EPA can accept written comments via mail, email, and fax. Comments may also be made orally during the formal Public Hearing, during which a stenographer will record all offered comments during the hearing. Additionally, EPA has established a dedicated voice mailbox at 617-918-1820 to receive oral comments during the comment period. EPA will not respond to your comments during the formal Public Hearing.

EPA will review the transcript of all formal oral comments received at the hearing and via the voicemail box, and all written comments received during the formal comment period, before making a final decision on the interim remedy. EPA will then prepare a written response to all the formal written and oral comments received. Your formal comment will become part of the official public record. The transcript of comments and EPA's written responses will be issued in a document called the Responsiveness Summary when EPA releases the final cleanup plan for the interim remedy in the Record of Decision Amendment 2 (Interim Remedy) for Operable Unit 2 (OU-2) (groundwater) (ROD Amendment 2). This ROD Amendment 2 will modify the groundwater remedy in the 1987 ROD and 2010 ROD Amendment. The Responsiveness Summary and the ROD Amendment 2 will be made available to the public on the EPA website for the Davis Liquid Waste Site. EPA will announce the final decision on the cleanup plan for the interim remedial action through the local media and via EPA's website.

FOR MORE DETAILED INFORMATION

The Administrative Record, which includes all documents that EPA has considered or relied upon in proposing this cleanup plan for groundwater at the Site, is available for public review and comment and can be found on-line, along with other Site information at: www.epa.gov/superfund/davisliquid

SEND US YOUR COMMENTS

Provide EPA with your written comments about this Proposed Plan for groundwater at the Davis Liquid Waste Superfund Site. Please fax, mail or email comments, postmarked no later than Wednesday, July 15, 2020 to:

FAX: 617-918-0336

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Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cis-1,2-DCE	cis-1,2-Dichloroethene
COC	Contaminant of Concern
CSM	Conceptual Site Model issued in 2017
DNAPL	Dense, Non-Aqueous Phase Liquids
EPA	United States Environmental Protection Agency
FS	2020 Feasibility Study
FSA	Former Source Area
HHERA	Human Health and Ecological Risk Assessment
HI	Hazard Index, non-cancerous
HQ	Hazard Quotient, non-cancerous
ICs	Institutional Controls
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MNA	Monitored Natural Attenuation
NPL	National Priorities List
PCE	Tetrachloroethene
RAO	Remedial Action Objective
RI	Remedial Investigation
RIDEM	Rhode Island Department of Environmental Management
ROD	Record of Decision
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
VOC	Volatile Organic Compound
1,2-DCA	1,2-Dichloroethane
1,1,2-TCA	1,1,2-Trichloroethane