

These compounds are shown to cause cancer in laboratory animal studies, and EDB and DBCP also are shown to cause reproductive problems. The COCs are contaminants released to the environment by former Site activities as presented in the Final Baseline Risk Assessment Report (1999). Since 1995, EPA has been operating a groundwater **pump and treat system**. While the system has been effective in removing contaminants from groundwater in many areas, COCs contained in the source area soil continue to be transported by the groundwater moving through the source area (Figure 2).

The selected remedy continues the ongoing groundwater pump and treat system and implements an action to clean up the pesticides in the source area to prevent further groundwater contamination and protect the future use of groundwater. The remedy selected will reduce the highest levels of contamination in source area soils, continue to contain and treat the contaminated groundwater and protect the health of the public and environment.

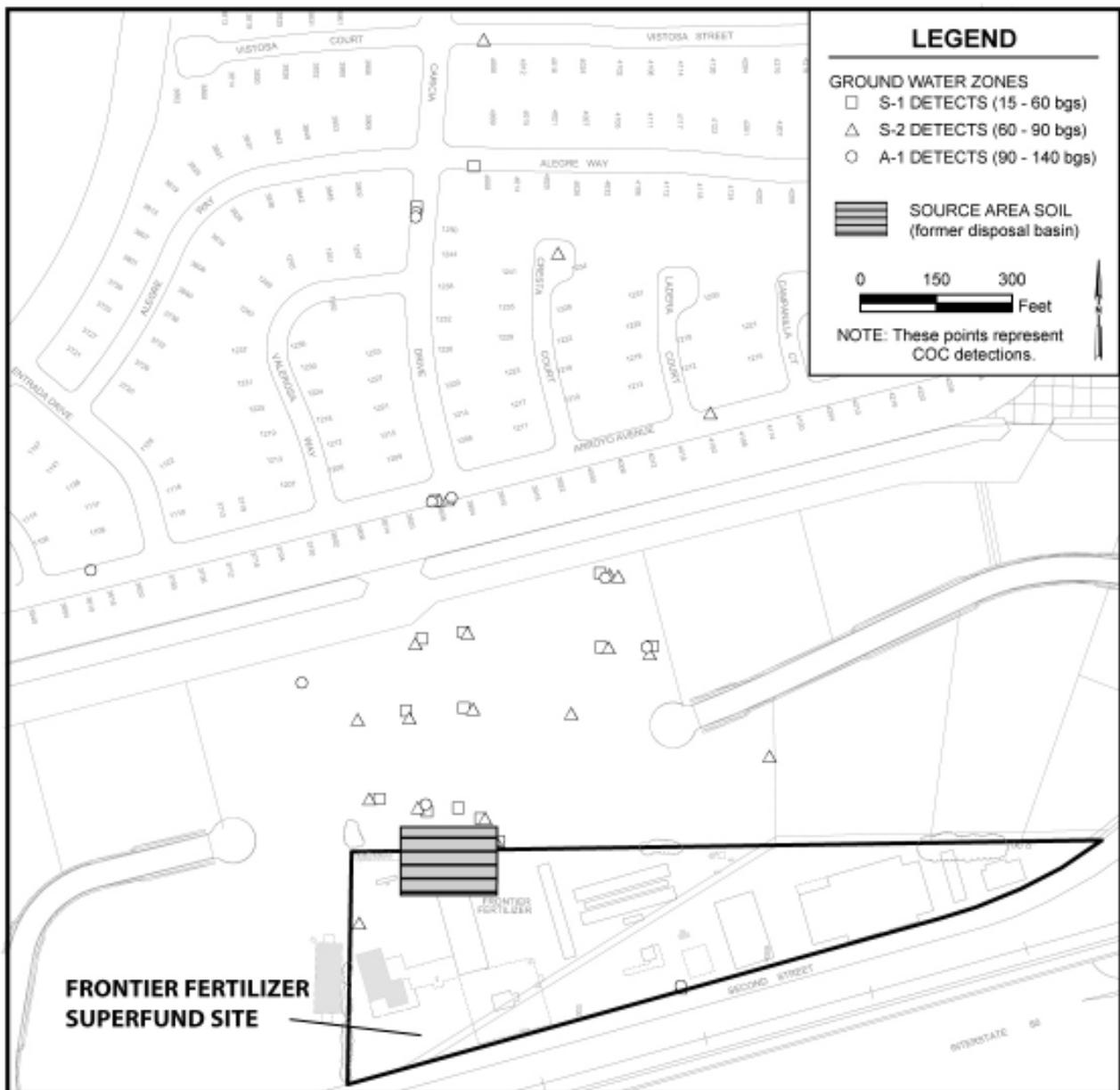


Figure 2: Source Area Soil and COC Detection Locations (bgs: below ground surface)

SELECTED REMEDY

The major components of the Frontier Fertilizer final remedial action are:

1.) In-situ (in place) Heating Using Electrical Energy

EPA will design a system that will heat the soil and groundwater down to 60-90 feet below ground surface. The total source area soil targeted for cleanup is approximately 89,000 cubic yards located near an on-site disposal basin (Figure 2). The temperature will be determined during the design phase prior to construction. The soil cleanup levels are based on protection of groundwater for future beneficial uses.

Vapor organic compounds controls (vapor) will include an impermeable layer of plastic over the source area, soil vapor collection and treatment, and air monitoring. Any soil vapor or condensate generated will be collected, treated and monitored. Vapor and

liquid phase **granular activated carbon** (GAC) or other available technologies will be utilized to treat any vapor and condensate emissions generated by heating the source area (Figure 3).

2.) Groundwater Extraction and Treatment System

EPA will continue operating the present groundwater extraction and treatment system along with groundwater monitoring to determine if additional **pumping (extraction) wells** or **monitoring wells**, or other modifications to the system are necessary. Currently, the contaminants in extracted groundwater are treated with GAC. Soil source treatment will reduce concentrations available to enter the groundwater, resulting in less GAC usage. Once the GAC adsorbs its capacity of contaminant, it is replaced with fresh GAC. The spent GAC is sent offsite for treatment and ultimately is re-used.

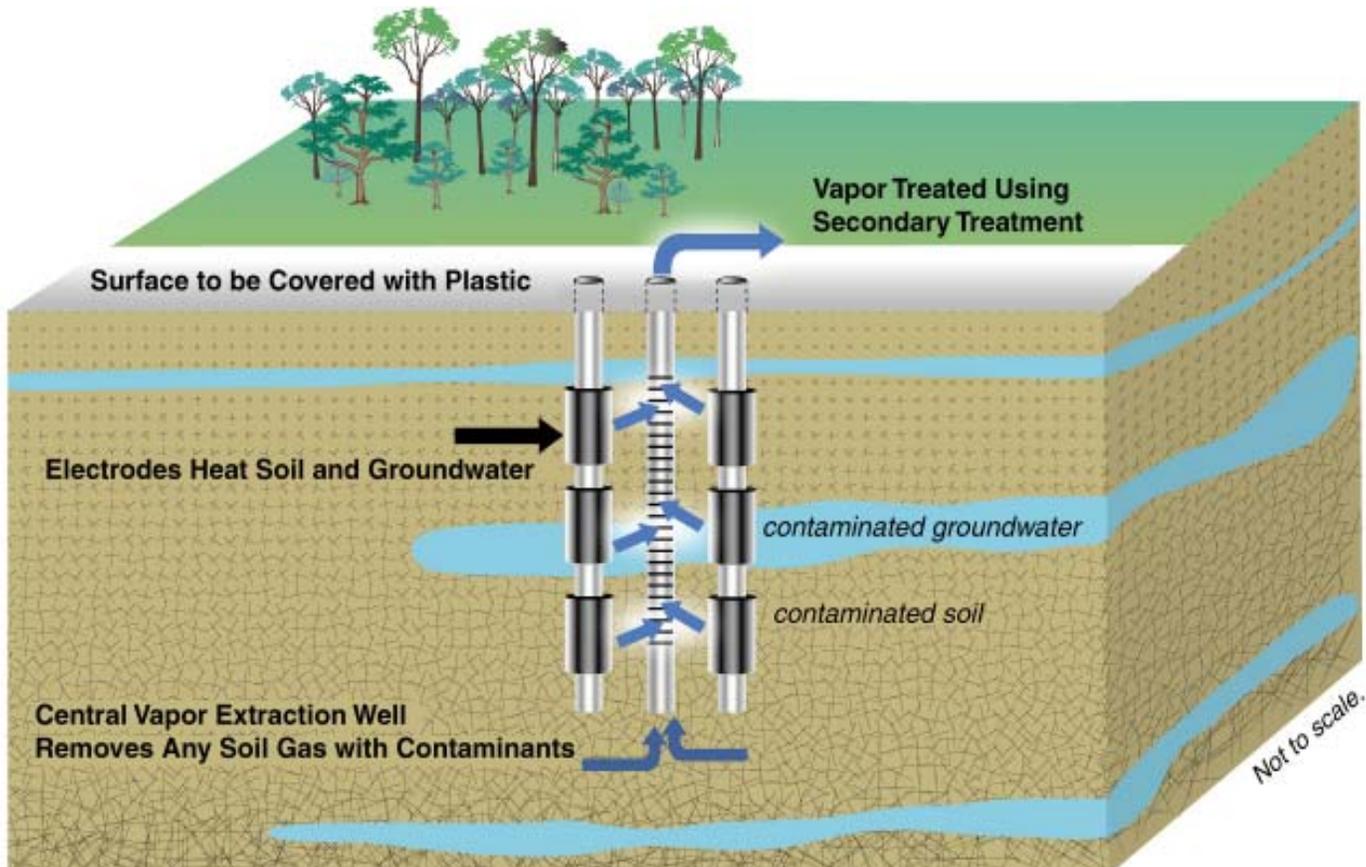


Figure 3: In-Place Soil & Groundwater Heating

Groundwater treatment will continue until monitoring indicates that the Federal and California Maximum Contaminant Levels (MCLs) for groundwater are achieved. The MCLs are established in the ROD as the cleanup levels for groundwater.

3.) Possible Secondary Enhanced Anaerobic Biological Treatment of Nitrate

Nitrate is not treated by in-situ heating. However, enhanced biological treatment may be used to treat nitrate and will be evaluated during the design phase. Nitrate is not considered a primary contaminant of concern, however it was included as part of the remedy because it is found in many Site monitoring wells and other wells in the Davis area at concentrations above the MCL. Groundwater containing nitrate is collected by the groundwater extraction system but is not treated by the on-site GAC treatment plant. Once the extracted groundwater is treated at the GAC on-site plant, it is discharged to the City of Davis sanitary sewer system and processed at the Wastewater Treatment Plant.

The decision to add treatment of nitrate using enhanced anaerobic biological treatment will be based on an evaluation planned for the design phase. This evaluation will include a comparison of nitrate levels in the Site groundwater and Davis monitoring/drinking water wells and further discussions with the City of Davis to determine whether any changes are anticipated for the Site's nitrate discharge requirements. The City of Davis has indicated that they may establish a nitrate discharge requirement in the future. This may require treatment either in-situ (in place) or as part of the groundwater treatment at the on-site plant.

4.) Institutional Controls (Restrictive Covenant)

Descriptions of the restrictions (institutional controls) for contaminated groundwater and soil will be incorporated into the property

Technical Assistant Grant (TAG)

EPA believes it is important for community members to provide input about how to clean up Superfund sites. One of EPA's tools is to give an eligible group a grant to hire an independent technical advisor to help them interpret and comment on EPA decision documents. The Frontier Fertilizer Superfund Oversight Group has been the recipient of the TAG for this Site since 1995. The primary point of contact for the TAG is Pamela Nieberg who can be reached at (530) 756-6856.

deeds. This will help minimize the risk of exposure during and after the cleanup. Restrictions may include prohibiting residential use and groundwater extraction. Excavating, grading and trenching may also be limited in the soil source area until cleanup is complete. Specific commercial building requirements in the source area, such as ventilation systems, may also be included in the restrictive covenant.

5.) Access Restrictions

Access to the Site and contaminated surface soil are restricted with fencing and signage preventing access by unauthorized personnel until cleanup is complete.

6.) Cap

Wood chips, pavement or gravel will cover the Site to prevent animals from contacting contaminated surface soil until development takes place. Pavement also could be used to prevent exposure to surface soils. If the proposed development does not occur, the surface soil can be resampled to assess the existing risk. If soil sampling demonstrates that COCs are below ecological screening levels, then the cap will not be needed to protect ecological receptors.

HOW LONG AND HOW MUCH WILL IT COST?

It will take approximately 1½ years to plan, design and construct the heating system. After construction is finished, it is predicted to take approximately one year for heating treatment to be complete and an additional five years of the secondary enhanced biological treatment to significantly reduce nitrate concentrations. The pump and treat system will be needed during and after the heating is complete to treat the contaminated groundwater to drinking water standards. Groundwater COC levels in and adjacent to the source area are expected to reduce sharply after the heating portion is finished; however, it is expected to take approximately 38 years for all impacted groundwater to reach drinking water standards. The cost estimate for the selected remedy can be found in Table 1 below.

NEXT STEPS AT FRONTIER FERTILIZER: PLANNING AND DESIGN

EPA is currently in the remedial design phase of the Frontier Fertilizer Site cleanup. Throughout 2007, EPA and contractors will prepare the design documents and drawings to heat the on-site source area soil which will include vapor controls to prevent exposure to the workers and the nearby community. Design specifications and workplans will define construction, operation and maintenance activities necessary to effectively implement the treatment activities. The design drawings will show the locations of the heating wells, location and components of the treatment plant, and piping diagrams depicting how any contaminated vapors and groundwater will be transported to the appropriate treatment equipment. Further field and/or laboratory testing also

Table 1: Cost Estimate for In-Situ Heating Plus Groundwater Pump and Treat; Possible Secondary Biological Treatment of Nitrate

Cost Elements	Non-Discounted Cost (\$)	Present Value Cost (\$)
Capital Cost Elements	7,520,000	7,520,000
Total Annual O&M*	34,245,000	10,552,000
Total Periodic Cost	2,636,000	341,000
Total	44,401,000	18,413,000

*Estimated average annual Operation and Maintenance (O&M) is \$778,300.

may be needed to finish the design. Construction of the heating system is expected to begin in Fall 2007. The design documents will be available in the Information Repositories and circulated to the Technical Assistant Grant recipients for review and comment.

COMMUNITY INVOLVEMENT OPPORTUNITIES

Technical Assistant Grant (TAG)

EPA will meet with the technical assistance grant (TAG) recipient and their technical advisor periodically to discuss the design, receive input and assist in the planning of the public involvement activities for the design and construction phase of the project (See page 4 for more information on TAG contacts).

Revision of Community Involvement Plan

A community involvement plan (CIP) is a document developed early on in the cleanup process to facilitate two-way communication between the community affected by and interested in the site cleanup. The latest revision, dated January 1, 1998, is located at the Site repositories (see page 7 for locations). With the start of the remedial design phase of the cleanup, EPA will update the plan by conducting community interviews. If you would like to participate in this process, please contact Jackie Lane, Community Involvement Coordinator, at (415) 972-3236 or leave a message toll-free at 800 231-3075.

GLOSSARY

Chemicals of Concern (COCs): Site-specific chemicals identified in the risk assessment.

Granular Activated Carbon (GAC): Pure carbon that can adsorb pollutants.

Groundwater: The supply of water found below the ground surface, usually in aquifers.

Groundwater Extraction Wells: Wells designed to remove groundwater. Groundwater extracted from these wells is sent to a treatment facility for cleanup.

In-situ: Actions conducted in their original location. With respect to remedial actions, in-situ refers to cleanup in place where soil or groundwater contamination exists.

Monitoring Well: Used to collect samples of groundwater or used to measure groundwater level.

Pump and Treat System: Extraction wells that remove contaminated groundwater. The water is then treated by removing the contamination by carbon absorption.

Record of Decision (ROD): A legal document issued by EPA that provides the remedy actions for cleaning up a Superfund site.

Responsiveness Summary: A written summary of oral and/or written comments, criticisms, and new relevant information received by the agency during a public comment period and the Agency's responses to these comments. A responsiveness summary is an appendix to a Record of Decision.

Volatile Organic Compounds (VOCs): Carbon-containing chemical compounds that evaporate readily at room temperature.

Volatilize: Turn to vapor.

FOR MORE INFORMATION

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INFORMATION REPOSITORIES

The Site repositories below house a copy of the ROD and all Site documents that helped EPA make cleanup decision at the Site. In addition, there is a copy of the ROD on-line as well as other Site documents at the EPA web page. Go to the following web address, scroll down to the fourth paragraph, and click on "Site Overviews." <http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf>

Yolo County Library, Davis Branch

Attn: Marilyn Corocan
315 East 14th Street
Davis, California 95616
(530) 757-5593

Hours: Monday: 1-9 pm
Tuesday-Thursday: 10 am – 9 pm
Friday, Saturday: 10 am - 5:30 pm
Sunday: 1-5 pm

Shields Library

Government Documents Department
Attn: Linda Kennedy
University of California
Davis, California 95616
(530) 752-6561

Hours: Monday-Thursday: 7:30 am- 12 midnight
Friday: 7:30 am – 6 pm
Saturday: 12 pm – 6 pm
Sunday: 12 pm – 12 midnight



Frontier Fertilizer Record of Decision Signed



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United States Environmental Protection Agency
Region 9
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San Francisco, CA 94105
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