



EPA

FRONTIER FERTILIZER SUPERFUND SITE

United States Environmental Protection Agency Region 9

September 1997

Update on Frontier Fertilizer Superfund Site

This fact sheet provides an update of the U.S. Environmental Protection Agency (EPA) cleanup activities underway at the Frontier Fertilizer Superfund site in Davis, California. The site is located at 4303 and 4309 Second Street, about 1/3 mile west of Mace Boulevard (see Figure 1).

State and Federal environmental agencies have determined that soil and groundwater at Frontier Fertilizer are contaminated as a result of pesticide storage and distribution activities conducted at the facility until 1987.

This fact sheet presents a brief history of the site and summarizes the measures taken to control and clean up soil and groundwater. The fact sheet includes an explanation of how EPA's groundwater extraction and treatment system is preventing contaminated groundwater from migrating further away from the site or downward into the City of Davis' clean drinking water supply, a summary of the results of EPA's investigations at the site, and a description of the next cleanup steps.

Additional information regarding EPA's work at Frontier Fertilizer is available at the Information Repository listed on Page 6 and by contacting the EPA representatives, also listed on Page 6.

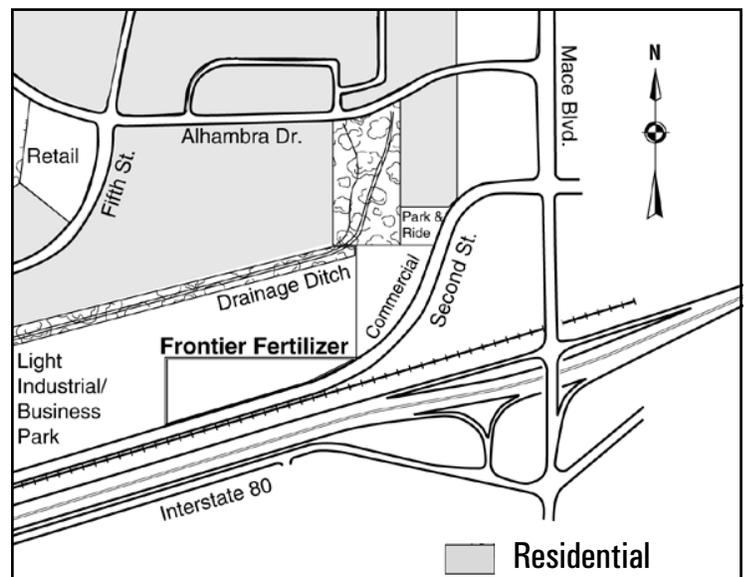
SITE HISTORY

The property now occupied by the Frontier Fertilizer Superfund site was originally used as farmland. During the 1950s and 1960s, the site was used as a labor camp for Mexican field workers. Beginning in the 1970s, a fertilizer and pesticide distribution business operated on the western four acres of the site. This business sold bulk and pre-mixed fertilizers and pesticides to local farmers. Fertilizer and pesticide storage and application operations stopped at the site in March 1987.

Prior to 1983, unused chemicals were routinely washed off machinery and disposed of on the ground or in one or more shallow, unlined ponds near the northwest corner of the facility. This resulted in contamination of soil and groundwater. The groundwater contamination has spread beyond the facility's northern boundary.

Figure 1

Site
Location
Map



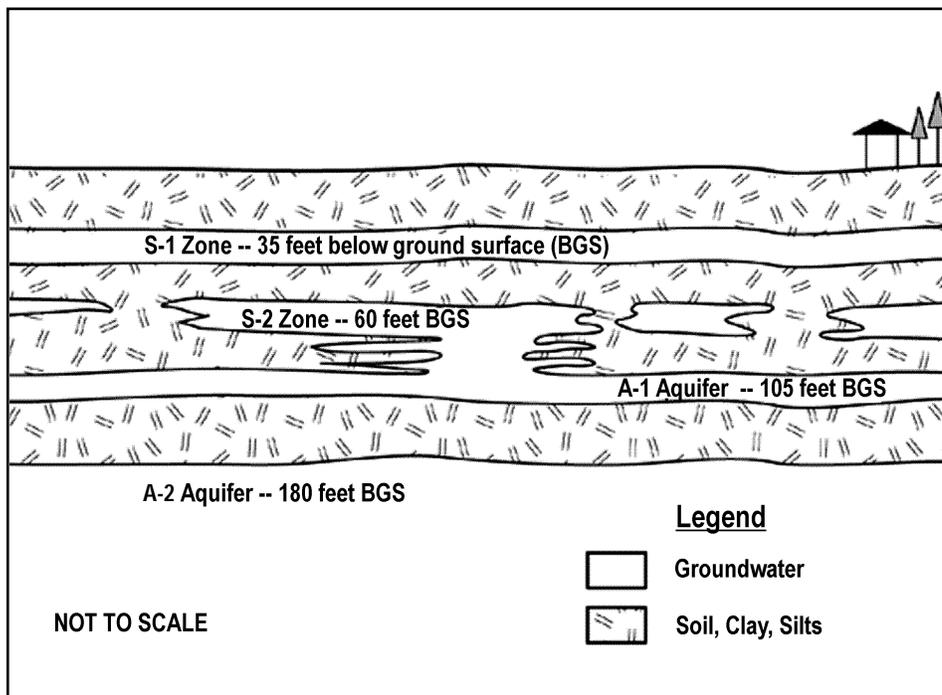


Figure 2

There are four water-bearing zones beneath Frontier Fertilizer, separated by layers of clay. Clay acts as an impediment to groundwater movement between the zones. The upper three zones are contaminated with EDB, DCP, DBCP, and carbon tetrachloride. The shallow zone, called the S-1, is the most highly contaminated zone. This zone extends from approximately 30 to 50 feet below ground surface (bgs). Below the S-1 zone is the S-2 zone. The S-2 zone extends from approximately 60 to 90 feet bgs. The A-1 aquifer, which is the least contaminated of the upper three zones, extends from approximately 110 to 130 feet bgs. The drinking water supply for the City of Davis comes from the deep A-2 aquifer, which extends from 180 to 350 feet bgs.

Early Investigations

It was during its use as a fertilizer and pesticide distribution operation that the Frontier Fertilizer site first came under regulatory scrutiny. In 1983, an employee's dog died after exposure to water ponded in an unlined disposal basin. The Yolo County Public Health Department asked the State for assistance with sampling and testing at the site.

Testing by the California Department of Health Services, Toxic Substances Control Division, (now California EPA, Department of Toxic Substances Control, DTSC) showed that soil and groundwater under the site had been contaminated with pesticides, solvents, and insecticides. The principle chemicals in soil and groundwater were three soil fumigants: ethylene dibromide (EDB), 1,2-dichloropropane (DCP), and 1,2-dibromo-3-chloropropane (DBCP). In addition, groundwater was contaminated with the solvent, carbon tetrachloride. EDB, DBCP and carbon tetrachloride are suspected human carcinogens.

Between June 1985 and March 1986, DTSC installed 24 monitoring wells on or near the facility to help define the

soil beneath the site and determine the extent of groundwater contamination. Figure 2 is a cross-sectional representation of the groundwater beneath and in the vicinity of Frontier Fertilizer.

In March 1985, DTSC placed Frontier Fertilizer on the State Priority Ranking List of hazardous waste sites slated for cleanup. In 1994, the EPA assumed responsibility for all investigation and cleanup efforts after the site was placed on the National Priorities List (Superfund).

Early Action Taken to Control Chemicals

The first cleanup measures were taken in April 1985 under the supervision of the Regional Water Quality Control Board and DTSC. Approximately 1,100 cubic yards of soil from the pesticide disposal basin area were excavated and treated. The excavation did not remove all of the contaminated soils from the disposal basin area, but it did reduce the immediate threat to human health and groundwater posed by the disposal basin.

In order to prevent the further spread of contaminated groundwater, the DTSC installed a small groundwater

extraction and treatment system in early 1993. Groundwater was extracted from two wells with the highest concentrations of pesticides. These wells are approximately 100 feet north of the former pesticide disposal basin. This system operated until May 1995, when EPA installed a larger system. Since July 1995, EPA has gradually increased the rate of groundwater treatment to its present rate of about 50 gallons per minute (72,000 gallons per day).

Changes in groundwater flow direction caused by pumping water from the extraction wells is preventing contaminated groundwater from migrating further away from the site or from migrating downward into the City of Davis' clean drinking water supply. Groundwater is treated in a warehouse on the Frontier Fertilizer site to meet maximum contaminant levels (MCLs), which are federal standards that groundwater must meet if it is to be used for drinking water. MCLs are expressed in parts per billion (ppb). For example, the MCL for EDB is 0.05 ppb, i.e., 0.05 parts of EDB in one billion parts of groundwater. About 30 to 40 percent of the treated groundwater is routed to injection wells and the rest to the City

Table 1

The concentrations of chemicals in treated groundwater meet or exceed EPA standards for safe drinking water.

Chemical	Concentration Before Treatment (parts per billion)	Concentration After Treatment (parts per billion)	Federal MCL (parts per billion)
DBCP	14	0.052	0.2
EDB	1100	0.052	0.05
DCP	5900	1	5
Carbon Tetrachloride	6	0.5	5

of Davis sanitary sewer system. Table 1 illustrates that the treatment system effectively treats groundwater to meet drinking water quality standards.

WHERE ARE WE NOW?

EPA’s April 1997 Interim Remedial Investigation Report further describes the sources, nature, extent, transport and fate of the contaminants associated with the Frontier Fertilizer site.

The report focuses primarily on EDB, DCP, DBCP and carbon tetrachloride; however, both soil and groundwater have been analyzed for numerous other pesticides, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). Although the report describes traces of other contaminants in soil and groundwater, none was found in quantities as great as EDB, DCP, DBCP and carbon tetrachloride. The groundwater treatment system removes all these trace contaminants as well.

Soil Contamination

The investigation determined that soil contamination is limited to the disposal basin area. The area with the greatest concentration of chemicals is approximately 15-30 feet below the ground surface. The chemicals in the subsurface extend roughly 200 feet in the east-west direction and 100-150 feet in the north-south direction, indicating that as much as 30,000 cubic yards of soil may be contaminated. Based on information presented in the Interim Remedial Investigation Report, there appear to have been three disposal basins at the facility.

Groundwater Contamination

Groundwater immediately north of the former disposal basin contains high concentrations of EDB, DBCP and DCP in the S-1 and S-2 zones. These concentrations decrease sharply a short distance from the former disposal basin. For

example, in five wells located less than 400 feet north of the former disposal basin, concentrations were not detected or were less than 5 ppb; contrast this with concentrations exceeding 10,000 ppb in four wells immediately north of the former disposal basin.

Results indicate that the concentrations near the disposal basin area may be due to a nonmobile or residual dense non-aqueous phase liquid (DNAPL) source. A DNAPL is pure contaminant undiluted by water. The presence of a DNAPL will be discussed in detail in a future fact sheet.

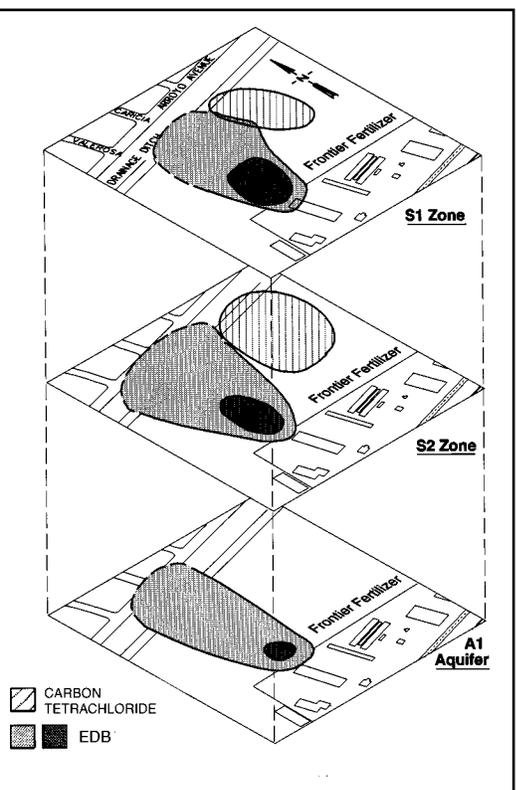
EPA was unable to locate the source of the carbon tetrachloride groundwater plume. However, the area of carbon tetrachloride contamination is not expanding, indicating that its source may no longer exist. (Figure 3 shows the approximate lateral and vertical extent of contaminated groundwater.)

The Interim Remedial Investigation Report identified additional information that EPA will attempt to gather through field work this Fall. New monitoring wells will be installed to completely delineate the area of groundwater contamination. Sampling and analysis will be conducted to confirm the presence of a DNAPL. Soil gas sampling and analysis will be conducted to evaluate if chemicals are migrating upward from contaminated groundwater to the land surface. Soil gas sampling measures the concentration of chemicals in the spaces between soil particles. These samples will be collected around the former disposal basin and along a

Continued page 5

Figure 3

Distribution of EDB and carbon tetrachloride in S-1, S-2 and A-1 groundwater. Darkest shade indicates area of highest concentrations of EDB.



What is Superfund?

In 1980, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly called Superfund. This law provides EPA with the authority and necessary tools to respond directly or to compel potentially responsible parties (PRPs) to respond to releases or threatened releases of hazardous substances, pollutants or contaminants. CERCLA created two parallel and complementary programs aimed at achieving this goal.

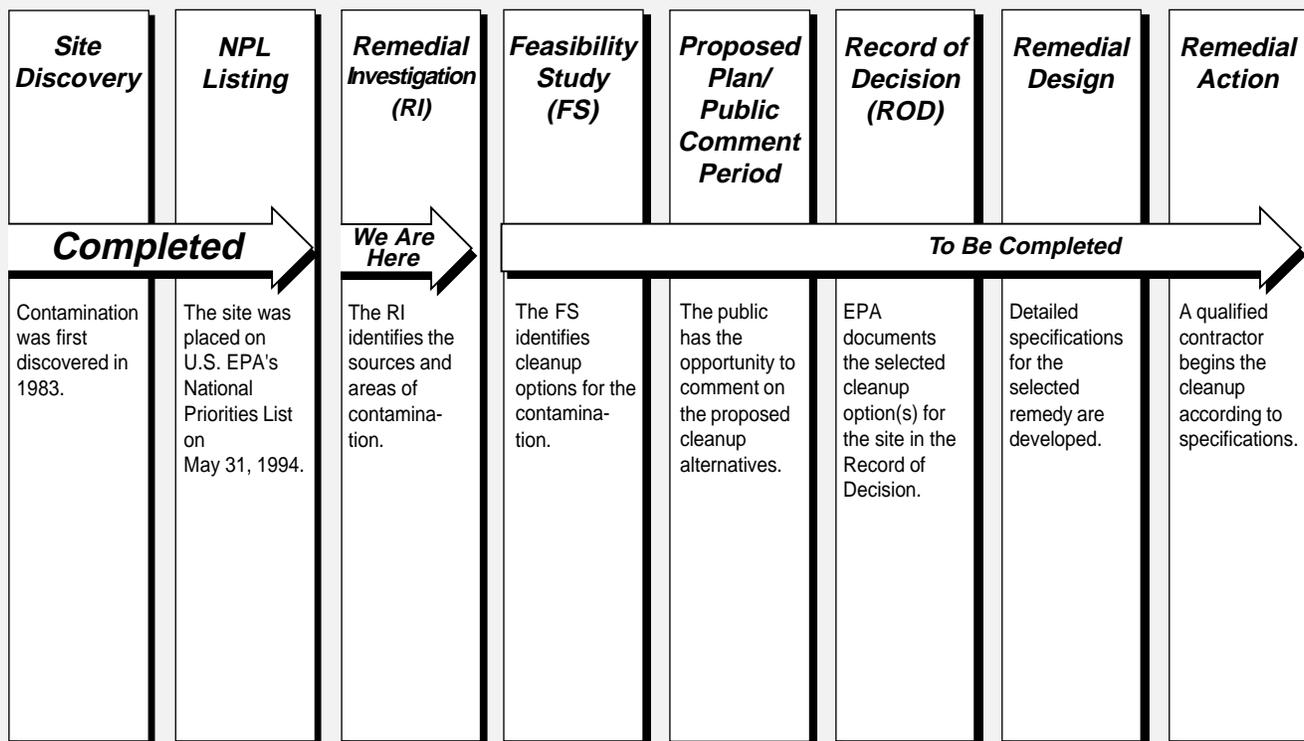
The first program involves the creation of a trust fund financed through a special tax on the chemical and petroleum industries. This fund, known as the Superfund, may be available for site remediation when no viable PRPs are found or when PRPs fail to take necessary response action. PRPs are defined as parties identified as having owned or operated hazardous substance sites, or who have transported or arranged for disposal or treatment of hazardous substances, pollutants or contaminants at such sites. At the Frontier Fertilizer site, EPA is paying to clean up the site, since a financially viable PRP does not exist. The second program provides EPA with the authority to negotiate settlements, to issue orders to PRPs directing them to take necessary response actions, or to sue PRPs to repay the costs of such actions when the trust fund has been used for these purposes.



How does it Work?

The steps in the Superfund process are shown below.

Superfund also authorizes short-term removal actions intended to stabilize a hazardous incident or remove contaminants from a site that pose an imminent and substantial threat to human health or the environment. EPA's removal authority was used to install the interim groundwater extraction and treatment system at Frontier Fertilizer.



Public Involvement Activities Occur Throughout the Superfund Process

Continued from page 3

line extending from the disposal basin to the housing development north of the site. Soil gas sampling and analysis conducted in 1992 by the Mace Ranch Park developer did not detect EDB, DCP or benzene in soil gas above the most highly contaminated groundwater.

Upon completion of this work, the Interim Remedial Investigation Report will be updated and finalized and a Feasibility Study Report will be prepared.

FRONTIER FERTILIZER SUPERFUND OVERSIGHT GROUP

In 1995, EPA awarded a technical assistance grant to a group of East Davis citizens who were interested in the Frontier Fertilizer site. The community group, called Frontier Fertilizer Superfund Oversight Group (FFSOG), acts as a local resource for community involvement. The grant provides funding for FFSOG to hire a technical advisor to review and comment on technical documents. FFSOG shares this information through their newsletter, *Back At the Ranch*. You can contact FFSOG through their president, Pam Neiberg, at (916)756-6856. ☘

What About The Mace Ranch Park Development?

The land adjacent to the Frontier Fertilizer site is zoned for residential and light industrial/commercial uses as part of the Mace Ranch Park development. Starting in late 1989, Mace Ranch Park Investors, owners of the property west and north of Frontier Fertilizer, conducted an investigation of the extent of contamination at Frontier Fertilizer and prepared a human health risk assessment report to support their request for approval to develop their property for residential use. In March 1992, DTSC agreed that development of the Mace Ranch Park property beyond 2,000 feet from the Frontier Fertilizer site could proceed with no potential hazard to future residents. However, DTSC determined that additional information was required before development of portions of the property within 2,000 feet of the Frontier Fertilizer site could be approved. DTSC also imposed restrictions on the use of groundwater beneath Mace Ranch Park to ensure that future residents are not exposed to potentially contaminated groundwater.

Most of the new groundwater monitoring wells will be installed in the Mace Ranch Park development. Installation will occur over a two month period. Residents may see workers wearing protective clothing, such as white coveralls. This is a standard precautionary measure for worker safety. Monitoring well installation is a safe procedure and will not pose a health risk to residents in the area. The wells will be installed in streets level with the pavement. In addition, approximately five soil gas samples will be collected in the neighborhood.

Additional information regarding this work, including the locations of the monitoring wells and soil gas sample collection points, work hours, and measures to minimize disruptions to residents, will be provided in a flyer before the work begins. If you have questions or concerns, you are encouraged to contact the representatives listed on the back page.



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- If there is a change in your address.
- If you would like to be deleted from our list.
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Name: _____

Address: _____

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Return to: Carmen White, U.S. EPA, 75 Hawthorne Street, (SFD-3), San Francisco, CA 94105

Information Repositories

Public information repositories have been established at the following locations to provide Davis community members with access to site-related documents:

Yolo County Library, Davis Branch

315 E. Fourteenth Street
Davis, CA 95616
(916) 757-5593

Hours:

Monday: 1:00 p.m. - 9:00 p.m.
Tuesday - Friday: 10:00 a.m. - 9:00 p.m.
Saturday: 10:00 a.m. - 5:00 p.m.

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Government Documents Department
University of California
Davis, CA 95616
(916) 752-1624

Hours:

Monday - Friday: 9:00 a.m. - 5:00 p.m.
Saturday - Sunday: 1:00 p.m. - 5:00 p.m.

For More Information

**If you have questions or would like more information on
EPA's activities, please contact:**

Carmen White, Community Involvement Coordinator

U.S. EPA 75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
(415) 744-2183

Janet Rosati, Remedial Project Manager

U.S. EPA 75 Hawthorne Street (SFD-7-4)
San Francisco, CA 94105
(415) 744-2403

or leave a message on EPA's TOLL-FREE line:

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