AEROJET GENERAL CORP. SUPERFUND SITE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION 9 • AUGUST 2004

Rancho Cordova, California

Western Groundwater Cleanup

2004 Progress Report

In 1979, routine testing found industrial solvents in drinking water wells near the Aerojet General Corporation (Aerojet) property in Rancho Cordova, California. Since then, State of California environmental agencies and the U.S. Environmental Protection Agency (USEPA) have overseen Aerojet's cleanup of hazardous chemical releases from their Rancho Cordova operations. Under state and federal orders, Aerojet has been investigating contaminated groundwater in the area and alternatives for cleanup. Based on this work, USEPA proposed the first cleanup plan for the site in 2000, and the regulatory agencies have since taken actions to improve management of the cleanup, setting the stage for construction of cleanup systems for the Western Groundwater area of the Site in 2003 and 2004. Nevertheless, recent data indicates that the plume of contaminated groundwater continues to spread. This newsletter brings you up to date on the ongoing efforts to clean up the Aerojet General Corp. Superfund site.

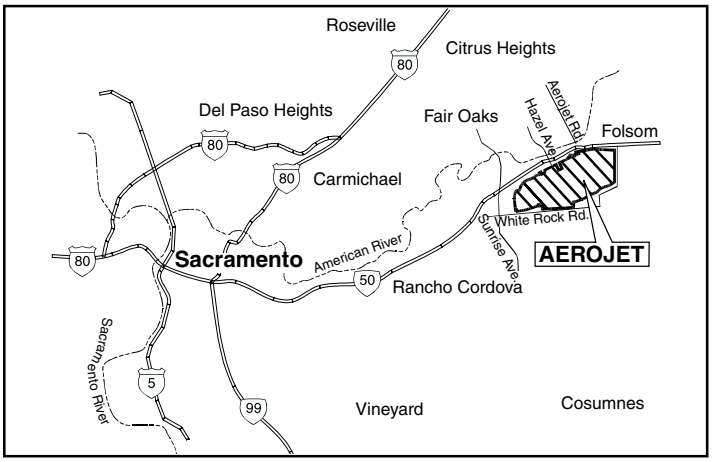


Figure 1: Aerojet property and surrounding communities

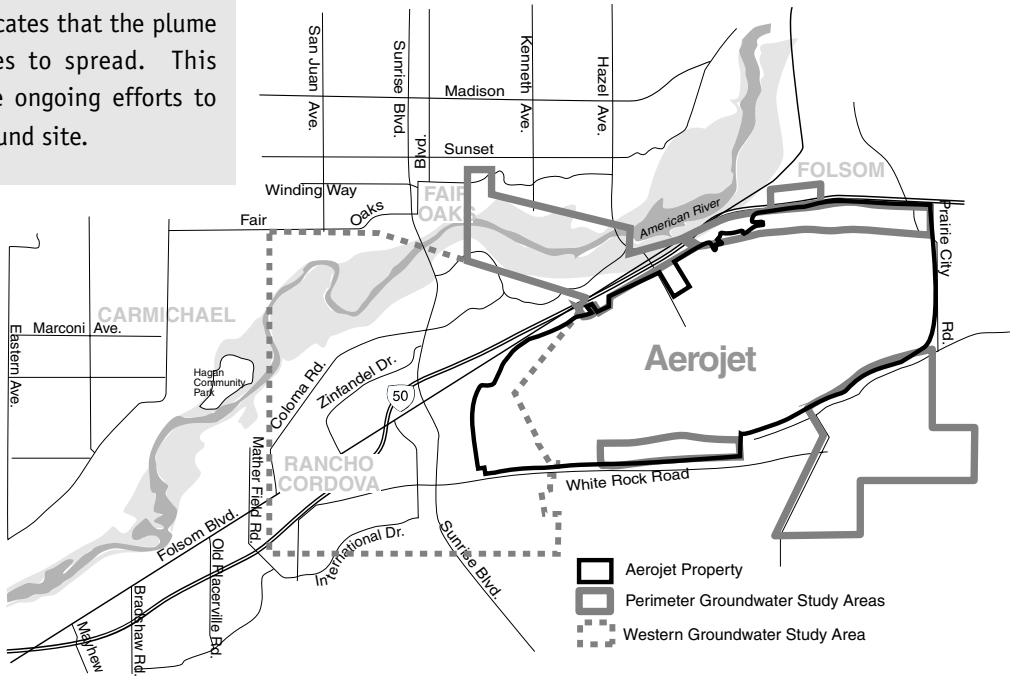


Figure 2: Location of Aerojet property, showing Western Groundwater Study Area and Perimeter Groundwater Study Area

INSIDE **PAGE**

See: *Government Agencies Seek Comment on Changes in Legal Agreement*, August 2001, which provides details on the modification of the Partial Consent Decree that defines and organizes the site for investigation and cleanup, at **http://yosemite .epa .gov/r9/sfund/fsheet. nsf** under Aerojet General Corp., 2001, September.

See also: *Partial Consent Decree for RI/FS –modification*, at **http:// yosemite.epa.gov/r9/ sfund/enforcex.nsf** under Aerojet General Corp.

Site Reorganization allows Aerojet to propose development

USEPA and Aerojet agreed in 2001 to divide the Aerojet groundwater contamination site into smaller areas, for better management of investigation and cleanup (see sidebar at left). Under this approach, Aerojet will address the different areas, called Operable Units or OUs, by beginning cleanup in the higher priority areas while continuing to investigate other areas (see Figure 1 on page 1). The first operable unit in this process is the Western Groundwater OU, where contamination has shut down drinking water wells and is threatening other drinking water wells.

In the same modified agreement, USEPA and Aerojet also agreed to change the definition of the Superfund site so that it would no longer include surface areas where Aerojet generally did not conduct operations and where the investigations had found no soil contamination from Aerojet operations (also referred to as carve-out lands). Aerojet is now proposing to develop a part of the carve-out lands and a part of the Superfund site, as the Easton project, a mixed residential/commercial development (see Figure 3, below). The area under Superfund would be cleaned up before it is developed.

USEPA issues Western Groundwater cleanup decision and enforcement order

The Western Groundwater OU encompasses approximately 14 square miles of contaminated aquifer on the western side of the Aerojet site, of which 10 square miles are beyond the Aerojet property boundary. Of the 15 contaminants of concern in groundwater, the primary contaminants are:

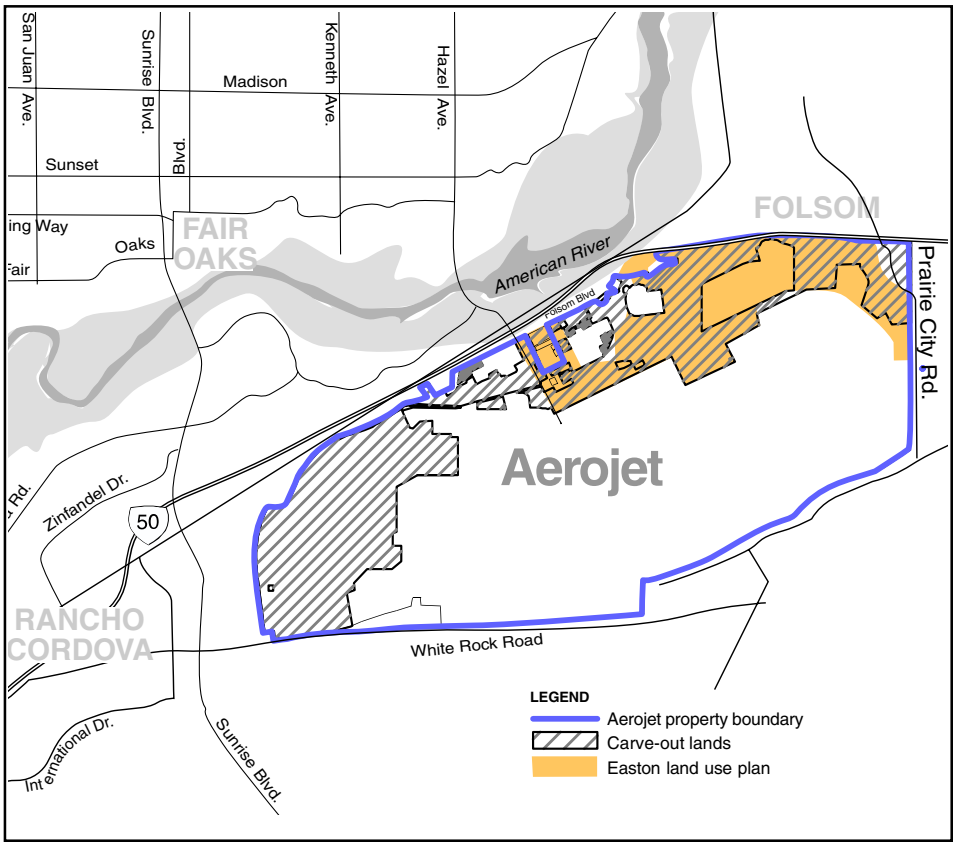


Figure 3: Aerojet site showing carve-out lands and and Easton Land Use Plan

- trichloroethylene (TCE), a volatile organic compound (VOC) used as an industrial solvent
- perchlorate, used in solid rocket fuels, and
- n-nitrosodimethylamine (NDMA), which is related to liquid aerospace fuels.

In November 2000, the USEPA proposed a plan to clean up the plume of contamination in the Western Groundwater operable unit (see sidebar at right). After holding two public hearings and responding to over 400 comments on the proposal, USEPA issued its Record of Decision (ROD) specifying the selected remedy in July 2001.

- **Cleanup system.** The Western Groundwater extraction and treatment system will contain contaminated groundwater on the western side of Aerojet and restore the quality of water west of Aerojet. The ROD envisioned two sets of extraction wells arranged roughly in concentric arcs at the inner and outer boundaries of the plume (see Figure 4, below). Pumps would send the extracted water to one or more groundwater treatment systems.

- **Water re-use.** The ROD allows for direct re-use of the treated water for drinking water supplies if the water meets all available federal and State drinking water standards and the State's Department of Health Services permits it, or for discharge to surface waterways and indirect re-use of the water downstream. Several efforts have since attempted to determine how the water from the cleanup system will be used. Sacramento County is developing alternatives to reuse the water from the cleanup systems.

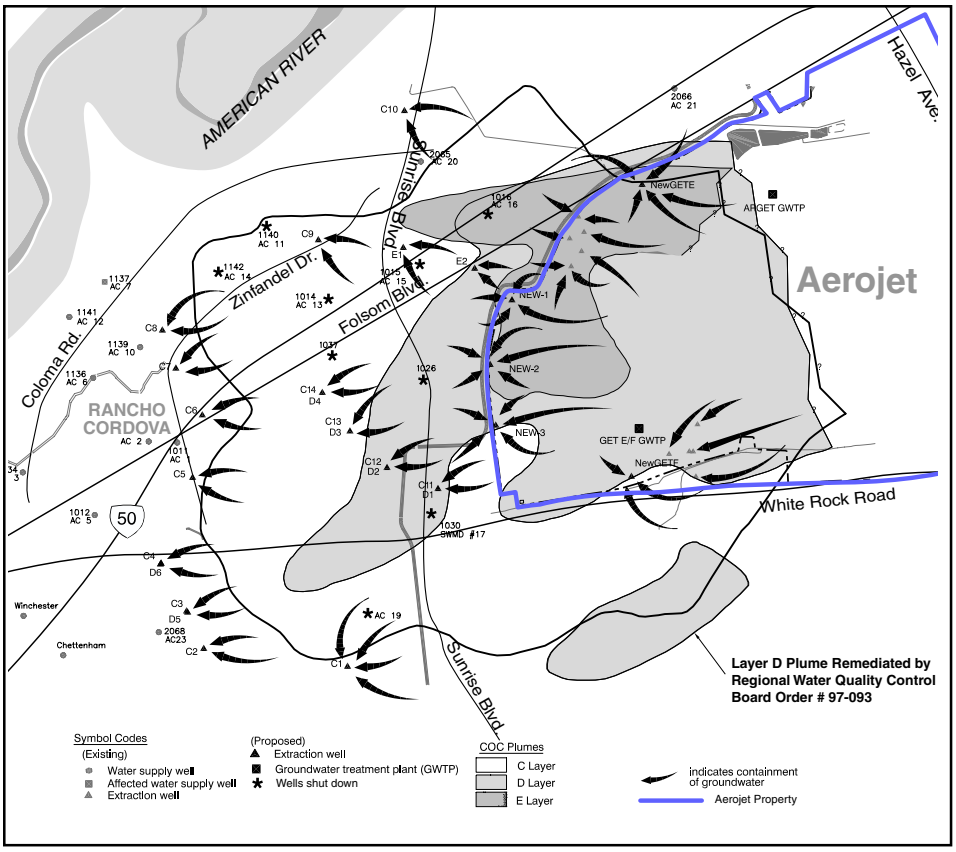


Figure 4: Western Groundwater Record of Decision wells and extent of plume, 2000 (see Figure 5 for current western extent of contamination)

See: *EPA Proposes a Plan to Address Groundwater Contamination in the Western Area of the Aerojet Site*, at **http://yosemite. epa. gov/r9/sfund/fsheet.nsf** under Aerojet General Corp., 2000, November. After holding two public hearings and responding to over 400 comments on the proposal, USEPA issued its Record of Decision (ROD) specifying the selected remedy in July 2001.

See also: *Record of Decision for the Western Groundwater Operable Unit (OU-3), Aerojet Sacramento Site, Rancho Cordova, California*, July 2001, at **http://yosemite. epa. gov/r9/sfund/rodex.nsf** under Aerojet General Corp.

See: *Unilateral Administrative Order– Western Groundwater Operable Unit*, August 2002, at **http://yosemite.epa.gov/r9/sfund/enforcex.nsf** under Aerojet General Corp.

- **Replacement drinking water planning**. The ROD (and the later unilateral order) require Aerojet to develop contingency plans to replace water supplies lost to contamination, to the extent that demand exceeds supply, using both short-term, interim measures and long-term solutions.

Negotiations on a legal agreement, or Consent Decree, with Aerojet to conduct the Western Groundwater cleanup failed, so in August 2002 USEPA ordered Aerojet to implement the remedy specified in the Record of Decision (see sidebar at left). The Order provides for flexibility in implementing the ROD, allowing Aerojet to install parts of the remedy earlier at the leading edge of the plume; use smaller, more local treatment plants; and discharge treated water to existing storm drains. Aerojet is working on designs for several areas of the operable unit.

Aerojet begins installing Western Groundwater remedy

Final design documents for the Western Groundwater remedy are due from Aerojet for agency review in December 2004. Even before the design was complete, however, Aerojet began a first phase of installing off-property extraction wells in September

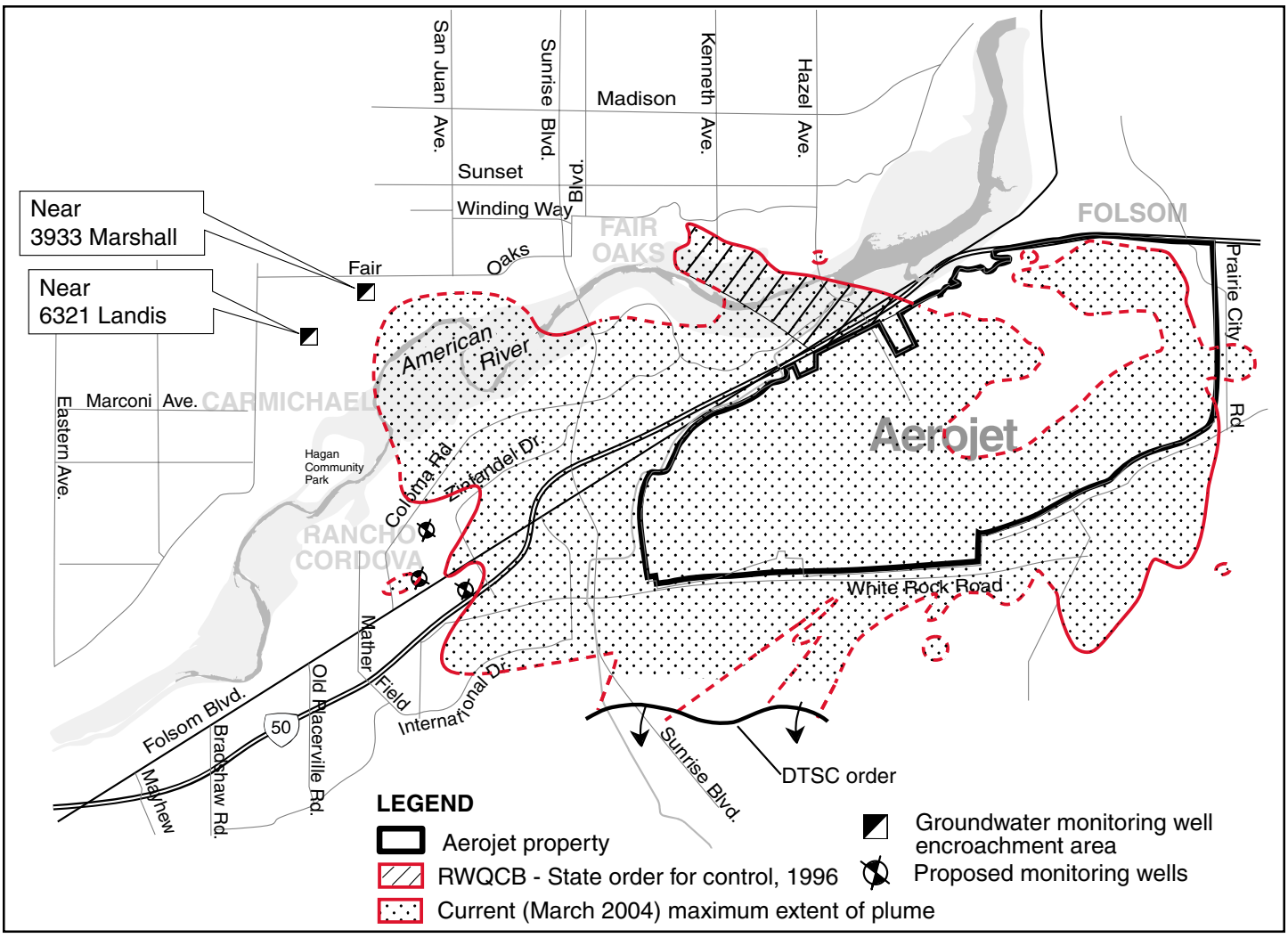


Figure 5: Maximum extent of plume in March 2004, showing northwestern and western fingers of plume

2003. Moving forward with the first phase allows Aerojet and the agencies to gather more precise data on the contaminated aquifer, while beginning construction of the remedy to protect drinking water supply wells. The data collected will help to optimize the placement of future extraction wells, while the initial wells will help contain the plume of contamination.

Initial phase of remedy construction

For the first phase, Aerojet has installed the first three extraction wells, one in each of the three subareas of the Western Groundwater operable unit (see Figures 6a, 6b and 6c on pages 6 and 7). The schedule calls for two of these wells to be operational this summer and one in the fall. All the wells in subareas 1, 2, and 3 are to be completed by next summer. Well C1 is in a commercial area, while wells C-7 and C-9-1 are in residential areas. At USEPA's request, Aerojet distributed drilling notification flyers to residents in the vicinity of the new wells.

Small treatment systems adjacent to wells C-1 and C-7 remove the contaminants. The treatment systems are the size of a truck trailer and require a fenced area the size of half a tennis court, usually screened by landscaping. Water from well C-9-1 will be piped to a treatment system located within a commercial building. Treated groundwater will be discharged to storm drains under permit from the Regional Water Quality Control Board.

When the full remedy is completed, the final outer boundary remediation system will include at least 17 extraction wells in four subareas. The County of Sacramento and other stakeholders are working to find the best use for the remediated water.

Known plume of contamination continues to expand

While looking to the north of the known edge of the plume for a site for a new drinking water well to replace wells lost to contamination, Aerojet discovered that groundwater beneath Rossmoor Bar Park was contaminated, primarily with NDMA. Additional groundwater monitoring showed that the NDMA plume extended northwest underneath the American River and into Carmichael. USEPA and the State regulatory agencies believe the likely source of this plume may be from past discharges of waste via Buffalo Creek into former gravel-mining pits just south of the river, northwest of the Aerojet property.

Is my water safe?

Public water supplies are tested regularly and comply with Department of Health Services requirements.

Private wells in the area of the plume (see Figure 5, on page 4) that are used for drinking water should be tested for contamination.

To the west, levels of perchlorate just high enough to detect have been found, indicating that the perchlorate plume exists further to the west, possibly along a former riverbed channel where groundwater flows more easily. Aerojet believes that its activities are not the source of this perchlorate contamination. USEPA has directed Aerojet to collect data to evaluate the extent of the perchlorate plume in this area.

Next steps for the site

With the Aerojet site divided into specific areas for investigation and cleanup, several projects will be ongoing at the same time in the future (see Figure 7 on page 8 for a timeline of upcoming events). This section describes some upcoming activities.

Extraction wells

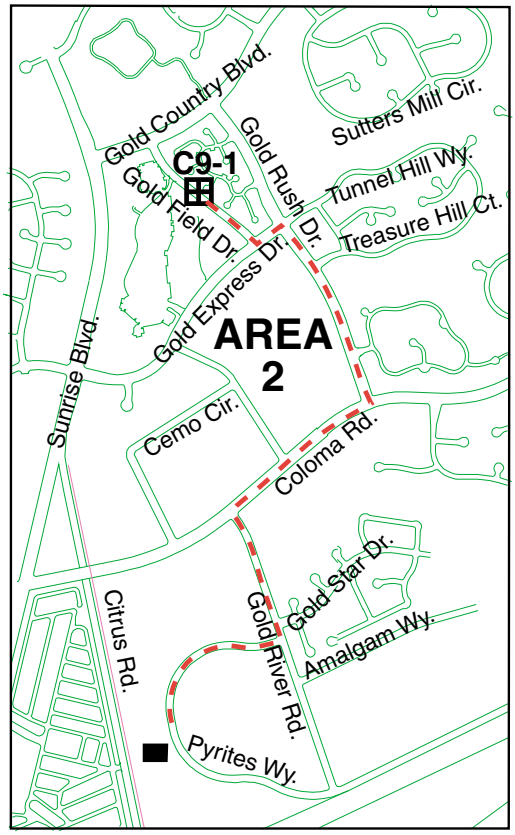
Construction of the Western Groundwater remedy will continue over the next year or more, including installation of extraction wells and associated pipelines and treatment plants (see Figures 6a and 6b on page 6). These activities will likely cause some local traffic disruption and some noise and aesthetic impacts to local businesses and residents. Aerojet has committed to minimize quality-of-life effects of the cleanup effort. When installation is complete, the remedy will continue extracting, treating, and discharging groundwater, probably for decades but likely unnoticed by neighbors, until the groundwater is again a usable source of drinking water.

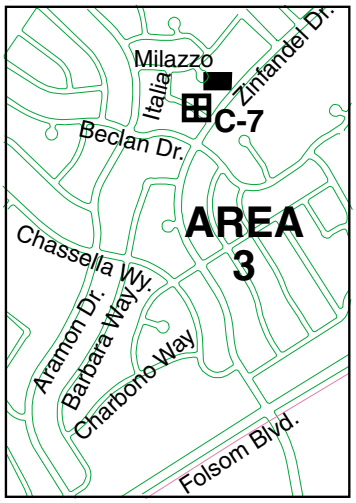
Monitoring wells

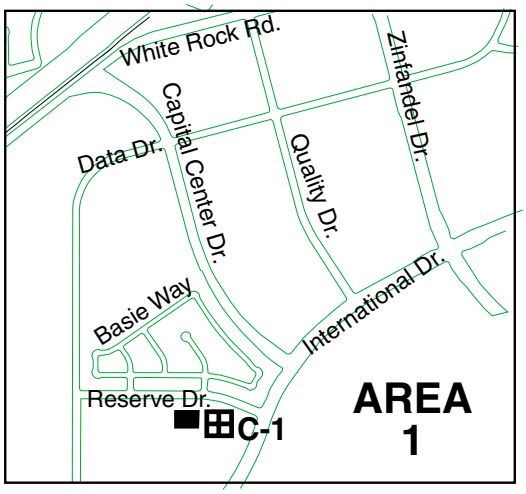
USEPA has requested Aerojet to install monitoring wells to define the extent of the plume of NDMA contamination running under the American River into Carmichael (see Figure 5 on page 4). Aerojet will install monitoring wells in residential areas north of the river. Additional NDMA extraction and treatment capacity will be necessary, creating an additional remediation subarea. USEPA has also asked Aerojet to install monitoring wells to help determine the source and extent of the perchlorate contamination to the west of the main plume (see Figure 5 on page 4).

Perimeter Groundwater investigation report due

As design and construction work continues on the Western Groundwater area, Aerojet is also investigating contamination and evaluating cleanup approaches for the northern, eastern, and southern perimeter of the site. This project is called the Perimeter



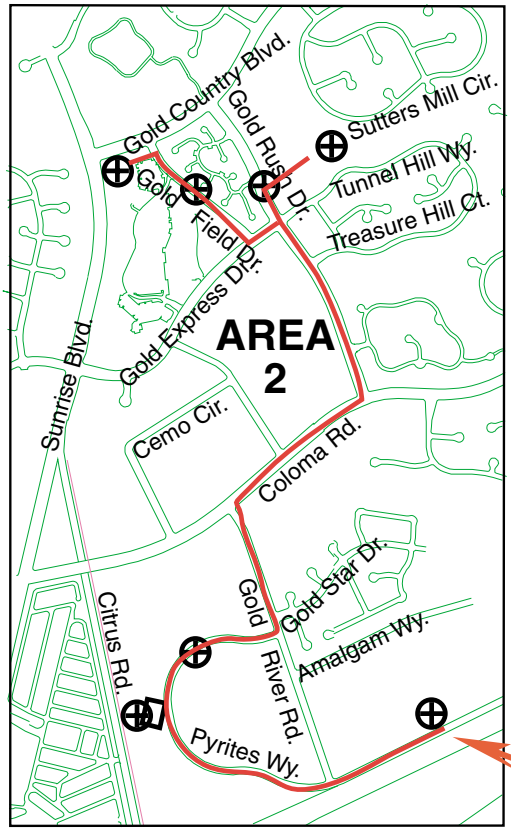


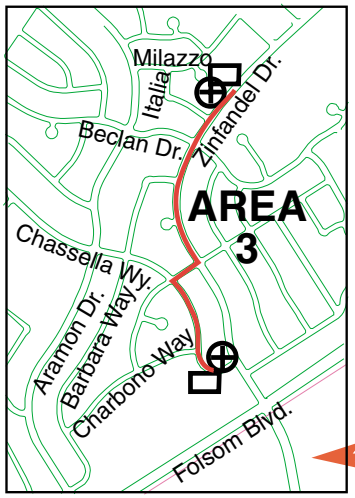


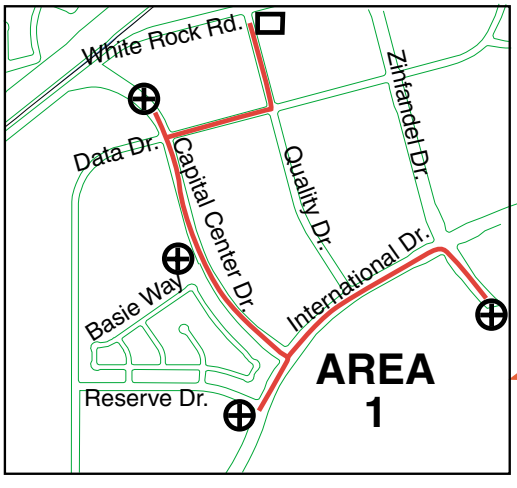
Interim Remedial Action

- Extraction well
- Treatment system
- Pipeline

Figure 6a: Details of subareas 1, 2 and 3, showing initial extraction wells, pipelines and treatment systems







Long Term Plan (Modification pending 12/04, which will select final number and location of extraction wells)

- Potential Extraction well location
- Treament system
- Pipeline

Figure 6b: Details of subareas 1, 2 and 3, showing upcoming extraction wells, pipelines and treatment systems

Groundwater Operable Unit, or OU-5 (see Figure 2 on page 1). The Perimeter Groundwater OU will incorporate the existing groundwater extraction and treatment systems (GETs A, AR, B, and D) in these areas, (see Figure 8 on page 9). USEPA and State regulatory agencies have reviewed the draft Remedial Investigation/Feasibility Study (RI/FS) report to ensure that the RI/FS will result in a cleanup plan that protects human health and the environment. The final RI/FS that addresses the regulatory agencies' comments is due in February 2005.

Perimeter Groundwater public hearing planned

As the Perimeter Groundwater Remedial Investigation/ Feasibility Study is completed, USEPA will present its findings to the community in a Proposed Plan for containing contaminated groundwater and cleaning up source areas in this part of the site. USEPA will then hold an official public hearing to present the plan, answer questions and take comments on the Proposed Plan. After considering comments submitted during the official comment period, USEPA will select a remedy and publish a Record of Decision (ROD) for the Perimeter Groundwater operable unit. The ROD will include a formal response to all relevant comments received. Then USEPA will negotiate with Aerojet to reach a legally enforceable agreement for implementing the Perimeter Groundwater remedy.

Source areas management plan under development

As off-site migration of contamination is contained and cleanup begun, the regulatory agencies will turn their attention increasingly to the sources of the contamination on the Aerojet property. A report recommending a plan for dividing the investigation and cleanup of the source areas into manageable units is due in August 2004 from Aerojet for review and comment by the agencies. Aerojet and the regulatory agencies will likely divide this work into at least four additional operable units, due to the diversity and complexity of the sources.

Opportunities for information and involvement

As the Western Groundwater project continues and as implementation of the Perimeter Groundwater remedy begins, Aerojet will distribute flyers and send letters to announce the location and duration of well installations as well as any specific recommendations for residents of the area. USEPA will hold community meetings on a periodic basis as needed. USEPA will also continue to support the Community Advisory Group for Aerojet Superfund Issues as the primary venue for sharing information on environmental issues in the area among community leaders and local and State agencies. This group meets bi-monthly on the third Tuesday evening to discuss issues stemming from the contamination at the Aerojet site and the related Inactive Rancho Cordova Test Site, just to the south. The next meeting is planned for Tuesday evening, September 21, 2004, 7:00 pm, at the Community Room of the Sheriff's substation at 10361 Rockingham Drive, just off Mather Blvd. south of Highway 50.

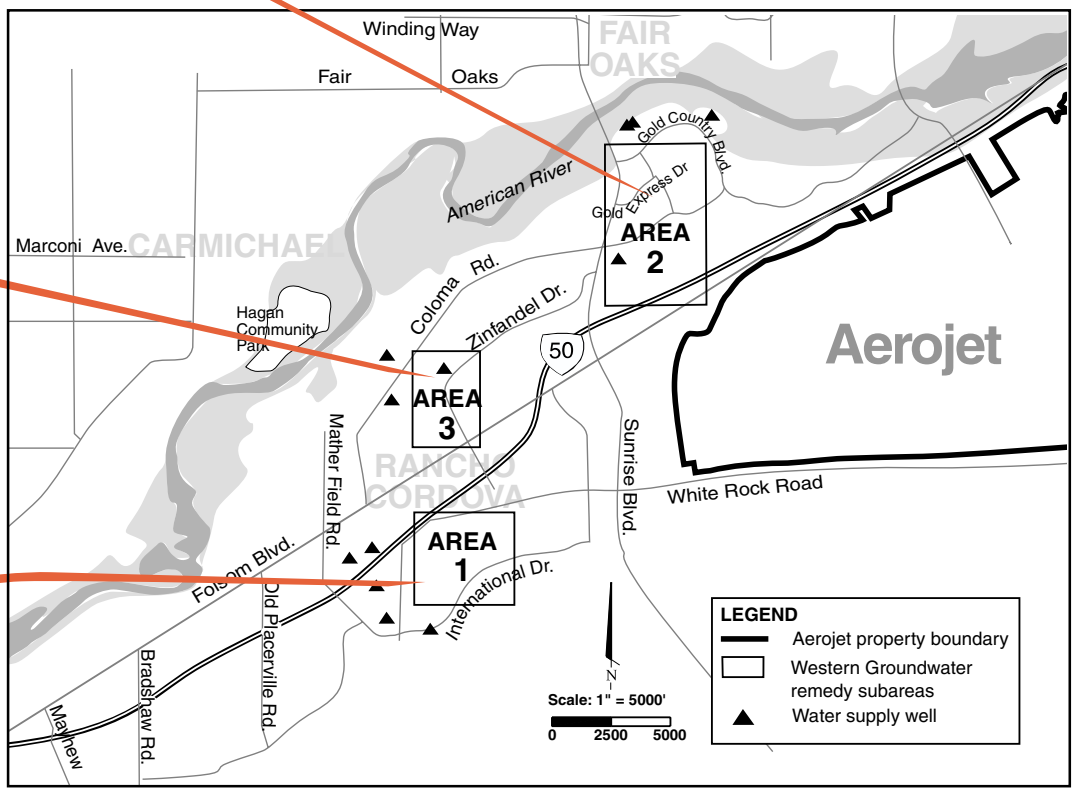


Figure 6c: Aerojet site, showing Western Groundwater Operable Unit Subareas 1, 2, and 3, and locations of water supply wells

Contacts and resources

U.S. Environmental Protection Agency

Remedial Project Manager:
Charles Berrey
(415) 972-3146,
berrey.charles@epa.gov

Community Involvement Coordinators:
Don Hodge (415) 972-3240
hodge.don@epa.gov

Jackie Lane (415) 972-3236
lane.jackie@epa.gov

USEPA's toll-free Community Involvement message line:
1 (800) 231-3075

Web page, Superfund site overviews:
http://yosemite.epa .gov/r9/sfund/overview.nsf under Aerojet General Corp.

State of California agencies

Regional Water Quality Control Board project manager:
Alex MacDonald (916) 464-4625

Department of Toxic Substances Control (DTSC) project manager: **Ed Cargile** (916) 255-3703

DTSC public participation specialist:
Nathan Schumacher (916) 255-3650

Community Advisory Group

Chair: **Janis Heple**, (916) 739-6361

Document repositories:

California State University Library
2000 State University Drive East
Sacramento, CA 95899-6039
(916) 278-6926

Superfund Records Center
95 Hawthorne St., Room 403
Mailcode SFD-7C
San Francisco, CA 94105
(415) 936-2000

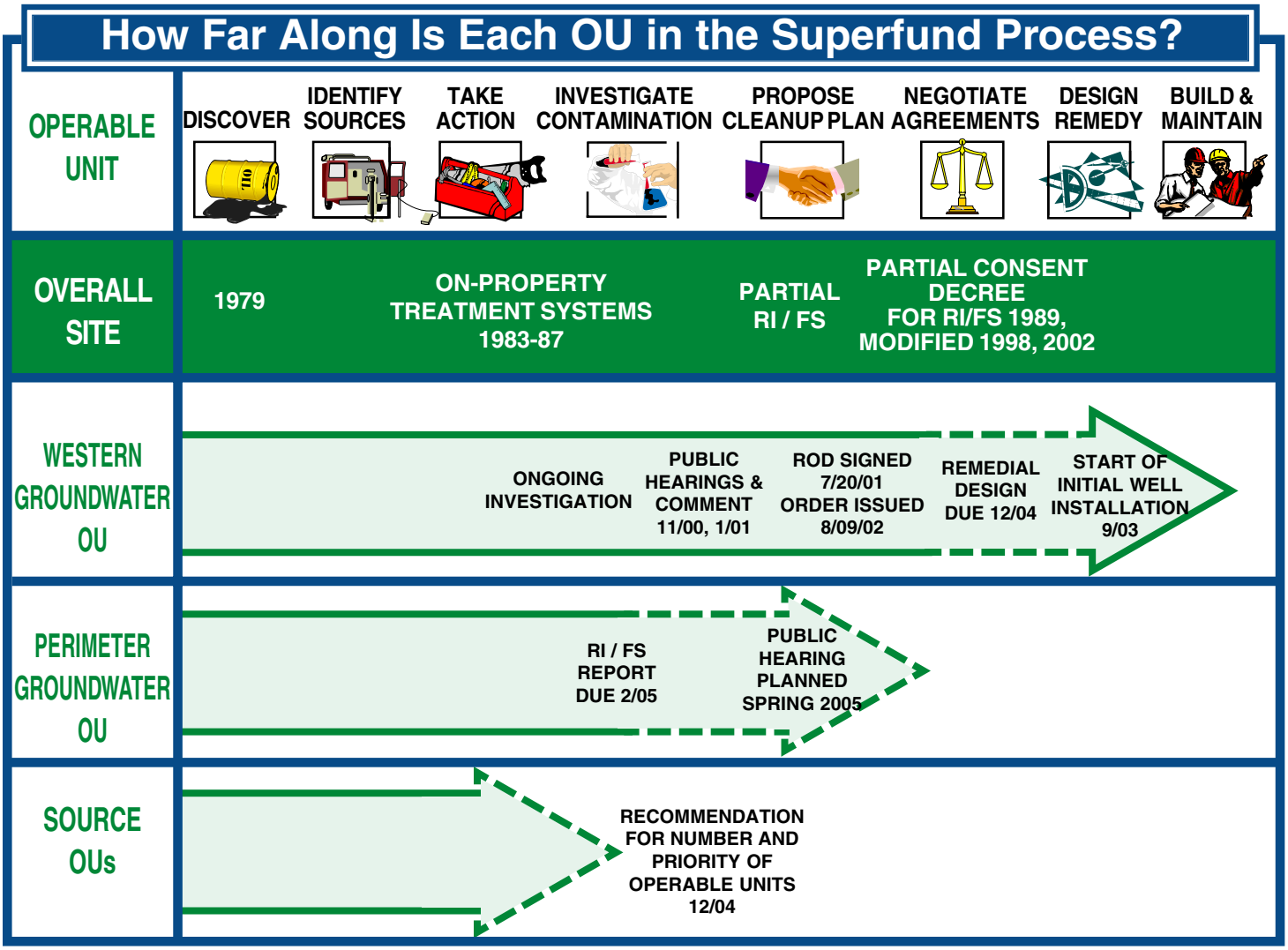


Figure 7: Status of each project area in the Superfund process

Site Characteristics and History

Location

The Aerojet General Corporation property covers 8,500 acres of the American River flood plain on the eastern border of Rancho Cordova, 15 miles east of Sacramento (see Figure 1 on page 1). The northeastern edge of the property is about 1/2 mile from the American River and the closest residence is 500 feet from the property line. Offices and industrial buildings on the property provide space for 2000 employees of Aerojet and other entities. Rancho Cordova, including the Gold River area, has a population of 55,000 according to the 2000 census. Nearby communities affected by the Superfund site include Carmichael (population 50,000) and Fair Oaks (population 28,000) to the north, Folsom (population 52,000) to the northeast, the Cosumnes area of unincorporated Sacramento County to the east and southeast, and the Mather and Vinyard areas to the south and southwest.

Extensive 40- to 100-foot-deep dredge tailings from past gold mining operations form the topography of much of the property. A multi-layer groundwater aquifer underlies the site. Groundwater from wells throughout the Rancho Cordova area supply municipal, domestic, industrial and some irrigation water. The American River is also used for public water supplies. Lake Natoma downstream of Folsom Dam on the American River and nearby Alder Creek are used for recreational activities.

Contamination

Since 1953, Aerojet and its subsidiaries have manufactured liquid- and solid-propellant rocket engines and a number of agricultural, pharmaceutical, and other industrial chemicals. These companies disposed of hazardous waste chemicals, including trichloroethylene (TCE) and other chemicals associated with rocket propellants, as well as various chemical processing wastes, in surface impoundments, landfills, deep injection wells and leachate fields, and by open burning.

In 1979, TCE and other volatile organic compounds (VOCs) were found in private wells off the Aerojet property and in the American River in 1983. Perchlorate, a component of solid rocket fuel, was found in off-property drinking water wells at levels above the provisional health-based standard in January 1997. In the years since, contamination has closed 11 public and private drinking water supply wells. Water suppliers and Aerojet, under State oversight, continue to monitor drinking water supplies to assure compliance with drinking water standards.

Past cleanup efforts

Under oversight by the USEPA, the California Department of Toxic Substances Control (DTSC), and the Central Valley Regional Water Quality Control Board (RWQCB), Aerojet began investigating the nature and extent of groundwater and soil contamination throughout the site in 1979. The first phase of the investigation gathered available information and addressed soil and groundwater; it was completed in 1994. The second phase of investigation includes further sampling, treatability studies, and groundwater treatment technology evaluations.

Between 1983 and 1987, as the investigations showed the extent of VOC contamination, Aerojet installed five groundwater extraction and treatment (GET) facilities (GETs A, B, D, E, and F) primarily to prevent further movement of VOC contaminants off the Aerojet property (see Figure 8, below). The American River extraction and treatment (AR-GET) system was added in 1998 and

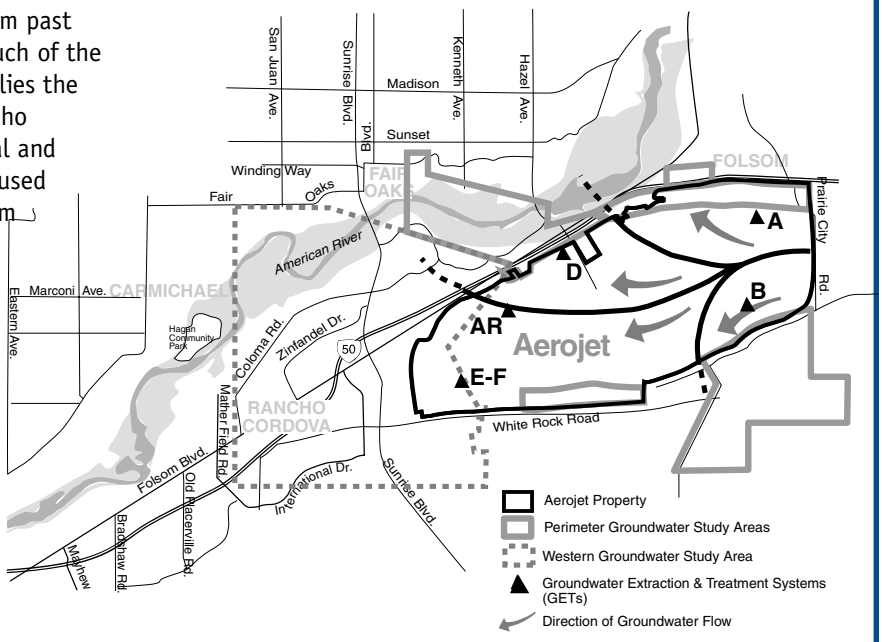


Figure 8: Aerojet property and GET locations

GETs E and F were combined in 1999. Each GET facility consists of a series of extraction wells to intercept the contaminant plume and a groundwater treatment system to remove the contamination. The treated groundwater is either injected back into the aquifer, discharged to land for recharge into the ground, or discharged to surface water bodies that flow to the American River.

Aerojet is currently studying a cleanup method called "in-situ bioremediation" that uses naturally occurring microbes to break down contaminants in place, to determine if it is practical and economical to destroy perchlorate in the groundwater and soil. Meanwhile, both state and federal government scientists continue work to set standards for safe levels of perchlorate in the environment.

Community Advisory Group

The Community Advisory Group for Aerojet Superfund Issues meets bi-monthly on the third Tuesday evening to exchange information with regulatory agencies and Aerojet on the current status of and community concerns regarding the investigation and cleanup of area groundwater contamination.

Next meeting:

September 21, 2004, 7:00 p.m.

Community Room
Sheriff's substation
10361 Rockingham Drive
Rancho Cordova

Typical topics

Update on regulatory milestones

Progress report on remedy construction

Groundwater contamination, toxicology and health effects

Community issues

Community Involvement Planning

USEPA is updating its Community Involvement Plan for the Aerojet site. If you are interested in participating in an interview, please call Jackie Lane, USEPA Community Involvement Coordinator at (415) 972-3236, or leave a message at USEPA's toll-free Community Involvement line 1 (800) 231-3075.

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Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
Attn: Don Hodge (AG)

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