San Fernando Valley Superfund Site

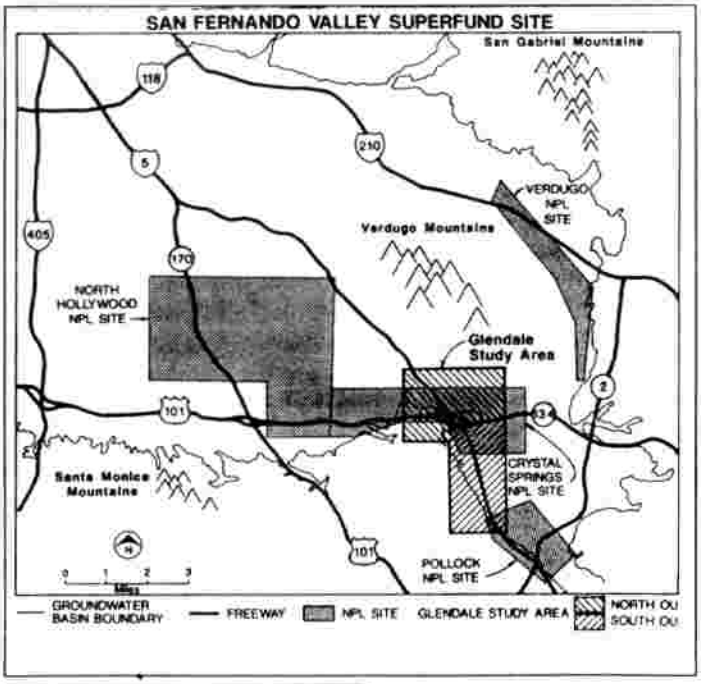
San Fernando Valley, California
September 1992

EPA Proposes Plan for Second Cleanup Project in Glendale Area

This fact sheet is the Proposed Plan for interim cleanup of the South **plume** of groundwater contamination in the Glendale Study Area as proposed by the U. S. Environmental Protection Agency (EPA). The proposed plan is a document EPA is required to issue to fulfill Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). EPA is the lead agency for this project and the Department of Toxic Substances Control of the State of California Environmental Protection Agency (CAL-EPA) is the support agency. Please note that a **special notice** pursuant to CERCLA Section 122 has not been issued for the Glendale South Operable Unit.

EPA has determined its preferred alternative for the South plume of **groundwater** contamination in the Glendale Study Area. This interim remedy is referred to as the Glendale South **Operable Unit (OU)**. An OU is a discrete action that comprises an incremental step toward comprehensively addressing Superfund site problems.

The proposed remedy involves extraction and treatment of groundwater in the shallow **aquifer** system in the Glendale area of the San Fernando Valley. Under this alternative, contaminated groundwater would be extracted at a rate of 2,000 gallons per minute (gpm) by new wells to be installed for this project. All the extracted contaminated groundwater would be filtered to remove any suspended solids and then treated by **air stripping** to remove **volatile organic compounds (VOC)**[1]. After treatment the water would meet drinking water standards for VOCs.



Opportunities For Community Involvement

Community Meeting, Verbal, Written Comments

The public comment period for verbal and written responses to the Proposed Plan for cleanup of the South plume of groundwater contamination in the Glendale Study Area begins October 5 and ends November 4, 1992. U.S. EPA will conduct a public hearing on Wednesday, October 21, 1992, at 6:30 p.m. in the City of Glendale Public Library Auditorium, 222 East Harvard St., Glendale, CA to present its Proposed Plan, respond to questions and receive comments either orally or in writing. Otherwise, written comments, postmarked no later than November 4, 1992, should be sent to:

Kevin Mayer
Remedial Project Manager
U.S. Environmental Protection Agency
75 Hawthorne Street (H-6-4)
San Francisco, CA 94105-3901

[1]For all of the alternatives, single-stage air stripping or liquid-phase granular activated carbon (GAC) may be used instead of dual stage air stripping because EPA determined during the Feasibility Study (August, 1992) that these treatment technologies are equally effective at removing VOCs and are similar in cost. Both technologies have been proven to be reliable in similar applications. The VOC treatment technology to be used for the Glendale South OU will be determined during the remedial design phase.

All terms in **bold** are defined in a glossary on page 13.

BACKGROUND ON THE GROUNDWATER CONTAMINATION IN THE SAN FERNANDO VALLEY

In 1980, after finding organic chemical contamination in the groundwater of the San Gabriel Valley, the California Department of Health Services (DHS) requested that all major water purveyors in the San Fernando Valley using groundwater conduct tests for the presence of certain industrial chemicals in the water they were serving. The results of initial tests and of subsequent testing revealed the presence of volatile organic compound (VOC) contamination in the groundwater of the San Fernando Valley. The primary contaminants of concern were and are the solvents **trichloroethylene (TCE)** and **perchloroethylene (PCE)**, which are widely used in a variety of industries including dry cleaning, metal plating and machinery degreasing.

In 1984, EPA proposed four sites within the San Fernando Valley for inclusion on the NPL and in 1986 the sites were added to the list. Each site boundary encompasses an area in which production wells produced groundwater containing concentrations of TCE and PCE above state and federal standards in 1984. The four NPL sites in the San Fernando Valley are the North Hollywood, Crystal Springs, Verdugo and Pollock sites; also referred to as San Fernando Valley areas 1, 2, 3 and 4, respectively. EPA is managing the four sites as one large site. The **San Fernando Valley Study Area** includes the four sites as listed on the NPL and adjacent areas where contamination has or may have migrated. The basinwide **Remedial Investigation (RI)** Report for the San Fernando Valley Study Area will be completed soon. Groundwater wells installed by EPA as part of the basinwide RI are routinely sampled to continue to monitor the nature and extent of the groundwater contamination in the San Fernando Valley.

Draft Proposed Plan, *from page 1*

Air emissions would be treated using a carbon treatment system called vapor phase **granular activated carbon (GAC)** to ensure that all air emissions meet applicable standards. If necessary to meet drinking water standards, a chromium reduction and settling unit would be included in the treatment process. The exact number and location of the new extraction wells and water treatment units would be determined during the **remedial design** phase of the project. After treatment to remove VOCs, the water would be blended with an alternative drinking water source to meet the drinking water standard for nitrate. The water would then be conveyed to the Los Angeles Department of Water and Power (LADWP) for distribution through its public water supply system. As a contingency, if LADWP does not agree to accept all of the treated water, the water would instead be returned to the aquifer at the Headworks Spreading Grounds. The total duration of the remedy would be 15 years and would include provisions for continued groundwater monitoring.

The Glendale Study Area is in the vicinity of one of the four San Fernando Valley **Superfund National Priorities List (NPL)** sites and includes two portions of the aquifer where high concentrations of contaminants have been identified: the North Plume and the South Plume. (A Proposed Plan for interim cleanup of the Glendale North OU was released by EPA for public comment in June 1992.) The Glendale South OU includes adjacent areas where contamination is known or believed to have migrated. EPA conducted a remedial investigation that characterized the nature and extent of contamination in the Glendale study area (April 1992). Upon completion of the RI, a **feasibility study (FS)** was undertaken for the Glendale South OU which evaluated a range of cleanup alternatives for addressing the contaminated groundwater (August 1992).

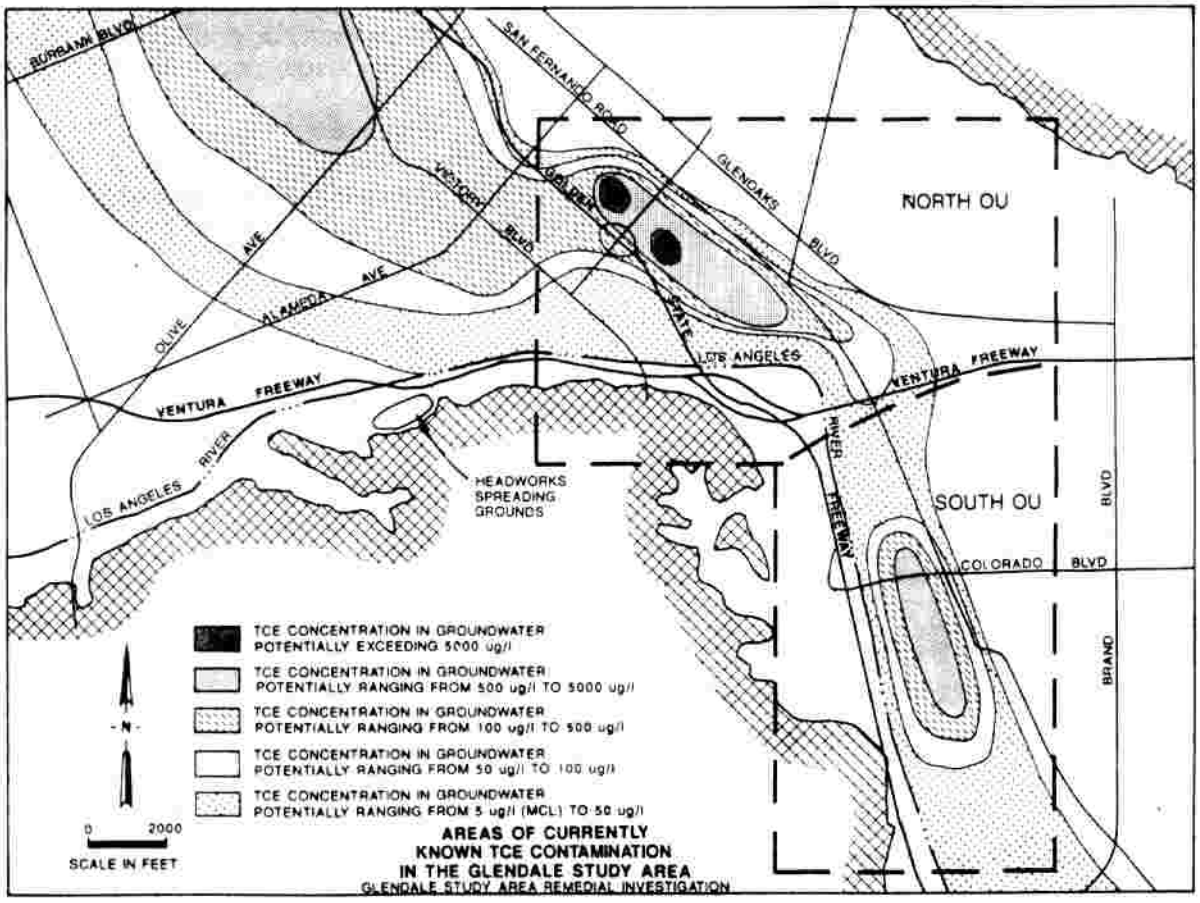
In addition to describing the alternatives considered in the Glendale South FS report, including EPA's preferred alternative, this fact sheet describes the history of the site, explains the federal Superfund program, and indicates opportunities for public participation. This proposed plan highlights key information from the RI and FS reports but is not a substitute for these documents. Both the RI and FS reports are available for review at the five **information repositories** identified on page 14. While EPA has identified a preferred alternative based on available information, the Agency has not yet made a final decision on what remedy to implement. Changes to the preferred alternative or a change from the proposed alternative to another of the alternatives may be made if public comments or additional data indicate that such a change would better achieve the cleanup goals for the site. The community is encouraged to participate in EPA's remedy selection process by commenting on all of the alternatives evaluated in the Glendale South FS report, including the preferred alternative.

Background, *from page 2*

EPA has previously signed **record of decision (ROD)** documents for two OUs in the San Fernando Valley: the North Hollywood OU (1987) and the Burbank OU (1989). The North Hollywood OU interim remedy is currently operating and the Burbank OU is in the remedial design phase. In the Glendale Study area, EPA has identified two OUs: the Glendale North OU and the Glendale South OU. The proposed plan for the Glendale North OU was submitted for public comment earlier this year, and comments are currently being considered in preparation of issuance of a ROD. All of these OUs represent discrete, interim cleanups currently in progress throughout the eastern portion of the San Fernando Valley. All **remedial actions** established by EPA in the ROD for each OU are interim measures but are intended to be consistent with the overall remediation of groundwater in the San Fernando Valley.

Although there are no production wells within the Glendale South OU, TCE and PCE have been detected in the majority of LADWP and City of Glendale wells in the Glendale study area at levels that are above the federal **Maximum Contaminant Level (MCL)**, which is 5 parts per billion (ppb) for both VOCs. The State of California MCL is also 5 ppb for both TCE and PCE. Other VOC contaminants detected above state and/or federal MCLs in monitoring wells in the Glendale South OU area, as a result of at least one sampling event, include: carbon tetrachloride; 1,2 dichloroethane (1,2-DCA); 1,1-dichloroethene (1,1-DCE); and 1,1,2,2 tetrachloroethane. TCE and PCE were the most prevalent. Other VOCs have also been detected in trace quantities. In addition, **nitrate**, an inorganic contaminant, has been detected at levels in excess of the MCL (45 mg/l) in the groundwater of the Glendale Study Area. EPA believes that the nitrate contamination is the result of past agricultural practices and/or septic systems in the San Fernando Valley. In one monitoring well in the Glendale South OU area, chromium has been detected at approximately 1 mg/l, which exceeds the State of California MCL of 0.05 mg/l and the federal MCL of 0.1 mg/l. EPA is continuing to verify the presence of this contaminant in the groundwater.

There are no public water supply wells within the area of the Glendale South OU. It should be noted that the quality of drinking water delivered to residents of Glendale and Los Angeles is closely monitored. The water meets all federal and state requirements.



THE RISK ASSESSMENT

Data regarding contaminants in the groundwater in the Glendale Study Area obtained by EPA during the remedial investigation was used to estimate the health risks associated with exposure to the groundwater. This estimate, called a **risk assessment**, was then used to identify which contaminants pose risks to human health. EPA prepared a "baseline risk assessment" for the Glendale study area to evaluate the potential effects of the no-action alternative.

Risk assessments estimate the possibility that one additional occurrence of cancer will result from exposure to contamination. A risk of one in 1,000,000 (10^{-6}) means that one person in one million exposed could develop cancer as a result of the exposure. EPA considers risks greater than one in 10,000 (10^{-4}) to be unacceptable.

In preparing risk assessments, EPA uses very conservative assumptions that weigh in favor of protecting public health. For example, EPA may assume that individuals consume two liters of drinking water per day from wells situated within a contaminant plume, over a 70-year lifetime or that a person is exposed to a chemical, 24 hours a day, 365 days a year, for a 30-year period, even though typical exposure to the chemical would be far less.

In January 1992, EPA completed a risk assessment for the Glendale study area including the Glendale South OU that estimated the potential risks to public health under current situations and under potential future situations. The risk assessment examined the potential health effects if individuals were exposed to contaminated groundwater from the upper and lower zones of the aquifer.

EPA evaluated three potential methods of exposure to water from both the upper and lower zones of the aquifer: (1) exposure during residential use, (2) exposure from discharge into the Los Angeles River, or (3) exposure in various other commercial uses. Neither exposure from commercial uses nor exposure from discharge to the Los Angeles River were considered significant by EPA.

EPA included two potential exposure routes (ways the contamination gets into the body) in the risk assessment: (1) drinking the groundwater during residential use, and (2) inhaling the chemicals in groundwater vapors during showering. Dermal contact was also considered but was found by EPA not to pose a significant risk.

Chemicals of potential concern in the Glendale South OU used in the risk assessment calculations included: TCE, PCE, 1,1-DCE, nitrate, and others. EPA will continue to monitor the groundwater in the Glendale Study Area and throughout the eastern portion of the San Fernando Valley. If the groundwater were used as a drinking water source without treatment, as many as one in 500 persons would be more likely to develop cancer during their lifetimes.

The results of the risk assessment indicated that contaminant levels in the upper zone of the aquifer of the Glendale Study Area would pose an unacceptable risk to human health if this water were to be delivered directly to local residents, without being treated.

Technical Assistance Grants (TAGs) Program

Under this program, one eligible community group at each Superfund site may obtain one grant up to $50,000 in federal funds to provide technical assistance in understanding site documents. To be eligible, a group must:

- incorporate
- meet a 20% matching funds requirement (in-kind contributions, i.e., donated goods and services, are permissible) or obtain a waiver of this requirement
- meet financial and administrative requirements, and
- prepare a plan to use technical assistance based on EPA's technical work schedule.

FOR MORE INFORMATION ABOUT TAGs, CALL FRASER FELTER, EPA COMMUNITY RELATIONS COORDINATOR, AT (415) 744-2181

SELECTION OF CLEANUP ALTERNATIVES

Project Objectives

Before developing a range of cleanup alternatives for evaluation, EPA identified the objectives of the interim cleanup for the Glendale South OU. All of the alternatives were screened for: 1) effectiveness at protecting public health and the environment, 2) technical feasibility (implementability) and 3) cost. In addition, the alternatives were developed to meet the following specific cleanup objectives for the Glendale South OU:

- To inhibit vertical and horizontal migration of groundwater contamination in the South Plume of the Glendale Study Area
- To begin to remove contaminant mass from the upper zone of the aquifer in the South Plume of the Glendale Study Area.

Summary of Cleanup Alternatives

Based on the results of the RI, EPA identified six cleanup alternatives for addressing groundwater contamination of the Glendale South OU. Detailed descriptions of these alternatives are provided in the Feasibility Study for the Glendale Study Area South OU report (August 1992) located in the information repositories listed on page 14. These six alternatives were evaluated based on nine specific criteria:

1) Overall Protection of Human Health and the Environment
2) Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)**
3) Long-term Effectiveness and Permanence
4) Reduction of Toxicity, Mobility or Volume through Treatmen,
5) Cost
6) Short-term Effectiveness
7) Implementability
8) State Acceptance, and
9) Community Acceptance

(See ***How a Remedy is Selected***, page 11.)

After the public comment period, EPA will select one of these alternatives or a combination of them to begin cleanup of groundwater contamination. EPA will summarize the alternative selected in the ROD document for the Glendale South OU.

The Glendale South OU is an interim action and is not the final remedy for cleanup of contaminated groundwater in the Glendale area. With the exception of the no action alternative, all of the alternatives involve the extraction of 2,000 gpm of groundwater for a period of 12 years. The total duration of the remedy is 15 years, but during the first three years the remedy would be in the remedial design and initial implementation phases and no extraction or treatment of groundwater would be taking place. A computer model was developed and used to determine that the extraction rate of 2,000 gpm over a 12-year period would result in the most effective inhibition of plume migration and optimal contamination removal for this interim action. With the exception of Alternative 1 - No Action, all of the alternatives would involve the construction and operation of a VOC treatment system, and, if necessary, a system to remove chromium.

EPA intends to send special notice letters and to conduct negotiations to fund past and future cleanup costs associated with the Glendale South OU. It is possible that as a result of negotiations it may be agreed that the remedy would be designed and constructed by a private party in cooperation with the LADWP and that it would be operated either by a private party or by the LADWP.

ALTERNATIVE 1: No Action

The No Action alternative serves as a "baseline" against which other alternatives are compared. This alternative is evaluated to determine the risks that would be posed to public health and the environment if no action were taken to treat or contain the contamination. The no action alternative would involve only groundwater monitoring; no additional cleanup activities would be conducted.

ALTERNATIVE 2: EPA's Preferred Alternative Extract/Treat (Air Stripping)/Public Water System, or ALTERNATIVE 6: Extract/Treat(Air Stripping)/Return to the Aquifer at the Headworks Spreading Grounds

Alternative 2 involves the extraction of 2,000 gpm of contaminated groundwater for 12 years, following approximately three years for design and construction. The extraction wells would be located to inhibit most effectively the migration of the contaminant plume. The extracted groundwater would be filtered to remove any suspended solids and then treated for VOCs using dual-stage air stripping with vapor-phase GAC adsorption for emissions control. If necessary to meet drinking water standards, a chromium reduction and settling unit would be included in the treatment process. The treated water would be blended with water which does not contain nitrate in excess of the nitrate **maximum contaminant level (MCL)** to reduce nitrate levels to meet the nitrate MCL. The treated and blended water would meet all legal requirements and would be conveyed to the LADWP for distribution through its public supply system. Groundwater monitoring wells would be installed to evaluate the effectiveness of the remedial action. In addition, EPA is proposing Alternative 6 - extraction, treatment, and return of the treated water to the aquifer - as a contingency if the LADWP does not agree to accept all of the treated water.

EPA believes that its preferred alternative, Alternative 2, with Alternative 6 as a contingency, represents the best balance of the nine evaluation criteria described above. This preferred alternative is as effective as the other alternatives in reducing the short-term and long term risks to human health and the environment by removing contaminants from the upper zone of the aquifer, by inhibiting further downgradient and vertical migration of the contaminant plume, and by reducing the toxicity, mobility and volume of contaminants in the aquifer. This preferred alternative is estimated to remove approximately 80% of the total estimated initial TCE mass. The VOC treatment technology that would be used is technically feasible and effective in meeting ARARs for VOCs in the extracted and treated groundwater. The other treatment technology considered, perozone oxidation, has not been proven to be a reliable technology for removing VOCs from a volume of water as large as 2,000 gpm. This is consideration for treatment of water to be delivered to a public water supply system. Alternative 2, with Alternative 6 as a contingency, could be implemented, both technically and administratively. In a letter dated September 24, 1992, the State indicated they had no objections to EPA's preferred alternative. EPA anticipates the public will support its preferred alternative because it is protective of human health and the environment, meets ARARs, and unlike some other alternatives, such as Alternative 4 (which includes discharge of the treated water to the Los Angeles River), provides a beneficial use for the treated water. The estimated cost of Alternative 2 based on total present worth is $25,030,000, and the estimated cost for Alternative 6 is $22,420,000. These costs are in the middle of the range for all six alternatives. If necessary to meet drinking water standards, a chromium reduction and filtration unit would add an estimated $6,750,000 to either alternative, based on total present worth.

In summary, EPA anticipates that the preferred alternative would satisfy the statutory requirements of CERCLA Section 121. It is protective of human health and the environment, complies with ARARs, is cost-effective, utilizes permanent solutions and alternative treatment to the maximum extent practicable, and uses treatment as a principal element.

ALTERNATIVE 3: Extract/Treat(Perozone Oxidation)/Public Water System

Alternative 3 involves the extraction of 2,000 gpm of contaminated groundwater for 12 years. The extraction wells would be located to inhibit most effectively the migration of the contaminant plume. The extracted groundwater would be treated for VOCs using perozone oxidation, followed by air stripping with vapor-phase GAC adsorption for emissions control. Air stripping (or polishing by liquid phase GAC) would be required to remove any VOCs that are not adequately oxidized by the perozone system. The water would also be treated for chromium if this contaminant exceeded the drinking water standard. The treated water would be blended with water which does not contain nitrate in excess of the nitrate MCL to reduce nitrate levels to meet the nitrate MCL. The treated and blended water would meet all legal requirements and would be conveyed to the LADWP's public distribution system. Groundwater monitoring wells would be installed to evaluate the effectiveness of the remedial action.

ALTERNATIVE 4: Extract/Treat/River

Alternative 4 involves the extraction of 2,000 gpm of contaminated groundwater for 12 years. The extraction wells would be located to inhibit most effectively the migration of the contaminant plume. The extracted groundwater would be filtered to remove any suspended solids and then treated for VOCs using dual-stage air stripping with vapor-phase GAC adsorption for emissions control. The water would also be treated for chromium if this contaminant exceeded the drinking water standard. The treated water would be discharged to the Los Angeles River. Groundwater monitoring wells would be installed to evaluate the effectiveness of the remedial action. The State has expressed concern over this alternative.

ALTERNATIVE 5[2]: Extract/Treat plus Ion Exchange/Spreading Grounds

Alternative 5 involves the extraction of 2,000 gpm of contaminated groundwater for 12 years. The extraction wells would be located to inhibit most effectively the migration of the contaminant plume. The extracted groundwater would be filtered to remove any suspended solids and then treated for VOCs using dual-stage air stripping with vapor-phase GAC adsorption for emissions control. The water would also be treated for chromium if this contaminant exceeded the drinking water standard. Subsequently, the treated water would be treated using ion exchange to reduce the nitrate levels in the water to meet the nitrate MCL. The treated water would be recharged at the Headworks Spreading Grounds. Groundwater monitoring wells would be installed to evaluate the effectiveness of the remedial action.

ALTERNATIVE 6: Extract/Treat/Spreading Grounds

Alternative 6 involves the extraction of 2,000 gpm of contaminated groundwater for 12 years. The extraction wells would be located to inhibit most effectively the migration of the contaminant plume. The extracted groundwater would be filtered to remove any suspended solids and then treated for VOCs using dual-stage air stripping with vapor-phase GAC adsorption for emissions control. The water would also be treated for chromium if this contaminant exceeded the drinking water standard. The treated water would be recharged at the Headworks Spreading Grounds. Alternative 6 could be implemented, both technically and administratively, although availability of the widely used Headworks Spreading Grounds may be limited. Groundwater monitoring wells would be installed to evaluate the effectiveness of the remedial action.

[2] Alternative #5 presented in this Proposed Plan was formerly Alternative #8 in the Feasibility Study for the Glendale Study Area South Plume Operable Unit (August 1992).

SUMMARY OF

Components	Alternative 1	Alternative 2	Alternative 3
Groundwater Extraction	• None	• Extract 2000 gallons per minute of groundwater from 16 wells	• Same as Alternative 2
Treatment	• None	• Treat VOCs with dual-stage air stripping and vapor-phase GAC • Meet nitrate MCL by blending • Chromium treatment to be added if necessary.	• Treat VOCs with perozone oxidation, airstripping, and vapor-phase GAC • Same as Alternative 2 • Same as Alternative 2
Final Use	• Monitor groundwater quality	• Convey treated, blended water to LADWP's Public Distribution System	• Same as Alternative 2
CRITERIA	**EVALUATION**		
Effectiveness and Permanence	• Not effective in the short or long-term	• Inhibit vertical and lateral migration of contaminant plume • Significantly reduced contaminated groundwater discharge to Los Angeles River • Remove contaminant mass from aquifer • Treated groundwater would meet drinking water standards	• Same as Alternative 2 • Same as Alternative 2 • Same as Alternative 2 • Same as Alternative 2
Reduction of Toxicity, Mobility, Volume through Treatment	• No reduction of toxicity, mobility, or volume	• Estimated to reduce TCE concentrations in the aquifer from 200 ppb to less than 10 ppb after 12 years • Removes 80% of the initial mass of TCE in the aquifer	• Same as Alternative 2 • Same as Alternative 2
Compliance with ARARs	• Will not meet ARARs	• Will meet ARARs	• Same as Alternative 2
Overall Protection of Human Health and Environment (Human Health)	• Low risk to public health because institutional controls will reduce risk of ingesting contaminated groundwater	• Protective of human health and the environment • Low risk to public health because institutional controls will reduce risk of ingesting contaminated groundwater	• Same as Alternative 2
(Environment)	• Not protective of environment	• Environmental degradation will be reduced because migration of groundwater containing TCE concentrations inhibited and TCE mass removed	• Same as Alternative 2
Implementability (Technical)	• Monitoring wells easy to construct. Spread of groundwater plume could make future remediation difficult	• Can be implemented	• Can be implemented. Perozone oxidation only proven in pilot-scale tests.
ESTIMATED COSTS			
Total Capital Cost Annual O&M Total Present Worth	$211,000 $109,000 $769,000	$15,540,000* 3,895,000* $25,020,000*	$16,620,000* $1,729,000* $25,470,000*

☐ EPA's Preferred alternatives.

* If chromium treatment is needed, additional capital costs are expected to be $2,590,000, additional annual O&M $611,000, and additional total present worth costs will be $6,750,000.

** Alternative #5 presented in this Proposed Plan was formerly Alternative #8 in the Feasibility Study for the Glendale Study Area: South Plume Operable Unit (August 1992).

ALTERNATIVES

Alternative 4	Alternative 5**	Alternative 6
• Same as Alternative 2	• Same as Alternative 2	• Same as Alternative 2
• Same as Alternative 2 • No nitrate treatment • Same as Alternative 2	• Same as Alternative 2 • Treatment of nitrate with ion exchange • Same as Alternative 2	• Same as Alternative 2 • No nitrate treatment • Same as Alternative 2
• Discharge treated water to Los Angeles River	• Discharge treated water to Headworks Spreading Grounds	• Same as Alternative 5
EVALUATION		
• Same as Alternative 2 • Same as Alternative 2 • Same as Alternative 2 • Treated groundwater would meet drinking water standards for VOCs and surface discharge standards for nitrates	• Same as Alternative 2 • Same as Alternative 2 • Same as Alternative 2 • Treated groundwater would meet drinking water standards for VOCs and nitrates	• Same as Alternative 2 • Same as Alternative 2 • Same as Alternative 2 • Treated groundwater would meet drinking water standards for VOCs and recharge requirements
• Same as Alternative 2 • Same as Alternative 2	• Same as Alternative 2 • Same as Alternative 2	• Same as Alternative 2 • Same as Alternative 2
• Same as Alternative 2	• Same as Alternative 2	• Same as Alternative 2
• Same as Alternative 2	• Same as Alternative 2	• Same as Alternative 2
• Same as Alternative 2	• Same as Alternative 2	• Same as Alternative 2
• Can be implemented. Administrative concerns associated with objection to non-beneficial use of water	• Can be implemented, except issues associated with waste brine disposal from nitrate treatment facility and availability of Headworks Spreading Grounds	• Can be implemented; one administrative issue may be the availability of the Headworks Spreading Grounds for recharge
$10,611,000* $1,384,000* $17,700,000*	$25,140,000* $2,414,000* $37,750,000*	$14,160,000* $1,613,000* $22,420,000*

SUMMARY OF WATER TREATMENT TECHNOLOGIES

Air Stripping

Air stripping involves a mass-transfer process in which a solute in water is removed by exposure to an air-water interface. The application of this process to groundwater is made by running a volume of groundwater treatment through a vertical column containing packing media. The media provides a large surface area over which a counter current flow of air is introduced. The contaminant is transferred from the water to the air phase. Removal efficiencies of greater than 99% can be achieved in properly designed packed towers. Air pollution control technologies can be added for control of VOC air emissions.

Air Stripping with Vapor Phase GAC

The VOCs removed from the water by the air stripper (also referred to as the air stripping tower) remain in the air that leaves the top of the tower. If it is necessary to control these VOC emissions, an off-gas carbon treatment system can be added to the air stripping system. Off-gas carbon treatment filters the air containing VOCs through a vessel containing granular activated carbon. Contaminants adsorb onto the carbon, thereby reducing the level of contaminants released into the air. Once the GAC is spent, it may be disposed of and replaced with fresh carbon.

Carbon Adsorption

Using this process, contaminants are removed by forcing (in a pressurized vessel) the contaminated groundwater through granular activated carbon (GAC). GAC has a very high surface area and a strong attraction for many organic compounds. Contaminated water would be pumped from the wells to the top of pressure vessels containing GAC. As the liquid flows down through the carbon beds, the VOCs would be removed from the water, by clinging to the carbon material (referred to as adsorption), and the concentration of VOCs in the water would decrease.

Carbon adsorption systems can be designed to use single or dual carbon beds. Dual bed carbon adsorption allows for more efficient VOC removal and a higher safety margin than does the single-bed system because the water passes through two separate carbon beds instead of one. The margin of safety is higher because if contamination is not removed completely in the first bed, the second bed can provide additional treatment. Dual-bed systems do, however, involve a significantly higher capital cost than single bed systems.

Ion Exchange

Ion exchange is a physical-chemical process by which ions are transferred from a solid to a liquid phase or vice versa. Ion exchange is used to soften water or remove minerals from water and is effective in reducing the concentration of nitrates in groundwater. The process involves sending contaminated groundwater through basic anion (negative charged) exchange columns where it is blended with sodium chloride. Ion exchange is the primary nitrate removal technology used for drinking water in the United States. A number of full-scale systems are currently in use for removing nitrate from groundwater.

Perozone Oxidation with Air Stripping and Vapor-Phase GAC

This process consists of an oxidation reactor in which the organic contaminants are oxidized (treated) to nonhazardous compounds like carbon dioxide and water. The major advantage to using an oxidation process is that 85% to 95% of the VOCs are destroyed on site rather than merely transferred from the liquid to the solid phase. Additionally, using an oxidation process before an air-stripping with vapor phase GAC adsorption system reduces the volume of VOCs on the carbon system and may extend the carbon life by as much as 70%. An ozone destruction system would be needed to assure that no emissions of ozone occur.

Chromium Treatment by Ferrous Iron

To remove dissolved chromium (hexavalent chromium), ferrous iron is added to chromium-contaminated water (e.g., by adding an iron-containing salt such as ferrous chloride; or, by passing the contaminated water through a series of electrically charged steel plates which release iron). The ferrous form of iron chemically reacts with the dissolved chromium to change the hexavalent chromium to trivalent chromium that will readily settle out of the water. Both chromium and iron are removed from the water by a settling tank and polishing filter. Chromium treatment by ferrous iron is in widespread use and is commercially available in complete-package systems.

SELECTING A CLEANUP REMEDY

The U.S. EPA uses nine criteria to evaluate alternatives for cleaning up a hazardous waste site. The nine criteria are as follows:

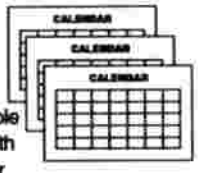
1 Overall Protection of Human Health and the Environment

Addresses whether a remedy provides adequate protection of human health and the environment, and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Addresses whether a remedy will meet all ARARs or Federal and state environmental statutes and/or provide grounds for invoking a waiver.

3 Long-term Effectiveness



Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4 Reduction of Toxicity, Mobility, or Volume Through Treatment (TMV)

Refers to the anticipated ability of a remedy to reduce the toxicity, mobility and volume of the hazardous components present at the site.

5 Cost

Evaluates the estimated captial, operation and maintenance costs of each alternative.

6 Short-term Effectiveness

Addresses the period of time needed to complete the remedy, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals are achieved.

7 Implementability

Refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry out a particular option.

8 State Acceptance

Indicates whether, based on its review of the information, the state concurs with, opposes, or has no comment on the preferred alternative..

9 Community Acceptance

Indicates whether community concerns are addressed by the remedy and whether the community has a preference for a remedy.

Although public comment is an important part of the final decision, EPA is compelled by law to balance community concerns with all of the previously mentioned criteria.

FINAL REMEDY

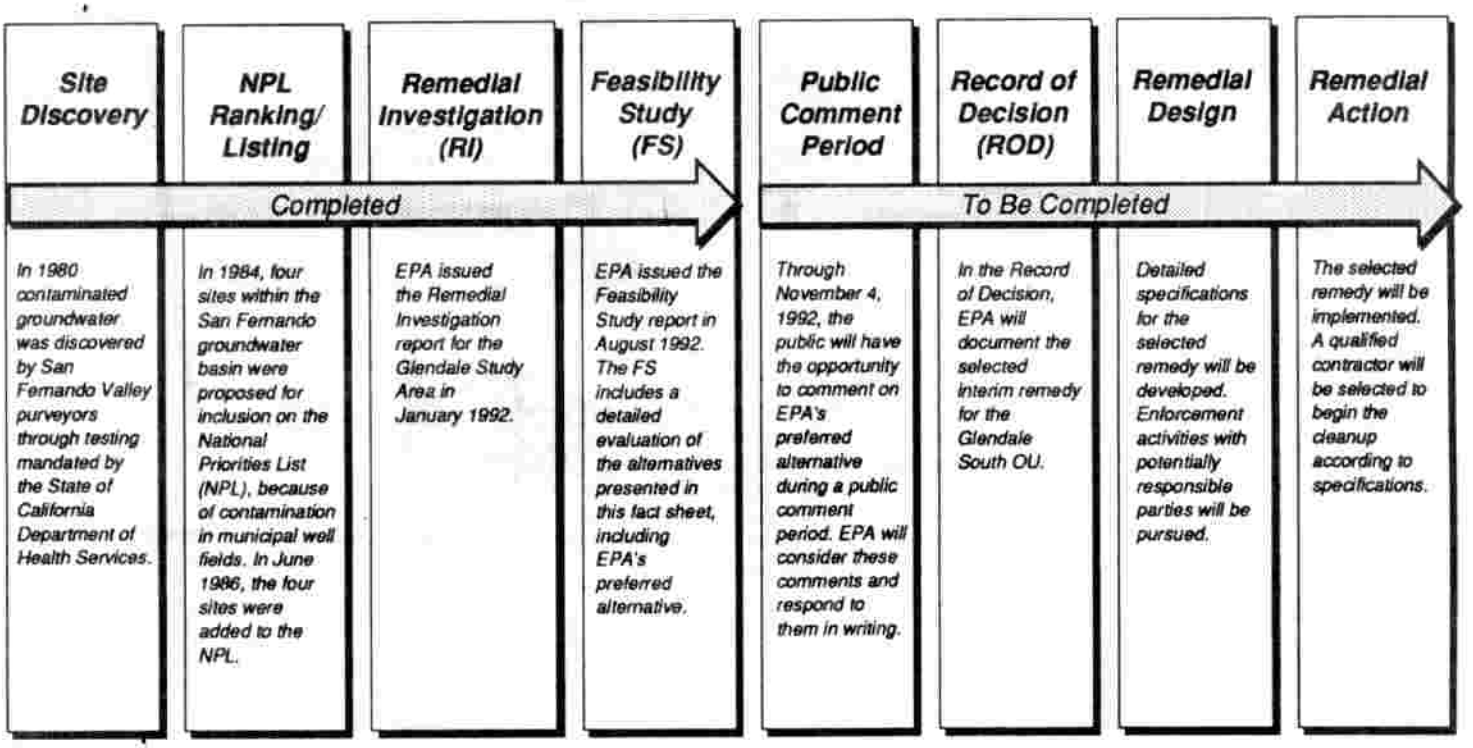
What is Superfund?

Superfund is the commonly-used name for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a federal law enacted in 1980 and amended in 1986. CERCLA enables EPA to respond to hazardous sites that threaten public health and the environment where owners or operators are either unwilling or unable to address the contamination themselves.

Two major steps in the Superfund process are to conduct an in-depth investigation of a site (called a Remedial Investigation) and evaluate possible clean-up alternatives (the Feasibility Study). During the Remedial Investigation, information is gathered to determine the general nature, extent, and sources of contamination at a site. Using the alternatives developed during the Feasibility Study, EPA selects a preferred clean-up alternative considering the following criteria: (1) overall protection of human health and the environment; (2) compliance with state and federal laws; (3) long-term effectiveness; (4) reduction of potency of the contamination (toxicity), ability of the contaminants to move through the environment (mobility), and the amount of contamination (volume); (5) cost; (6) short-term effectiveness; (7) how easily an alternative can be applied (implementability); (8) state acceptance; and (9) community acceptance. See page 11.

Once the final cleanup plan has been selected, EPA formalizes this decision by signing a Record of Decision (ROD). The ROD also contains a Responsiveness Summary, EPA's response to public comments. Design and actual cleanup activities (Remedial Design and Remedial Action) can then proceed.

Superfund Process For Glendale South OU



GLOSSARY

AQUIFER An underground formation composed of materials such as sand, soil, or gravel that can store and supply groundwater to wells and springs. Most aquifers in the United States are within a thousand feet of the earth's surface.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) Remedial actions must comply with all substantive elements of Federal laws and more stringent state laws that apply or are determined to be relevant and appropriate to the remedy.

GROUNDWATER Underground water that fills pores between particles of soil, sand, and gravel or openings in rocks to the point of saturation. Where groundwater occurs in significant quantity, it can be used as a source of water supply.

MAXIMUM CONTAMINANT LEVEL (MCL) The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

MONITORING WELLS Special wells drilled at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine such things as direction in which groundwater flows and the types and amounts of contaminants present.

NATIONAL PRIORITIES LIST (NPL) A list of the top-priority hazardous waste sites in the country that are eligible for investigation and cleanup under the Superfund program.

NITRATE A salt of nitric acid (a colorless, corrosive acid containing nitrogen). Nitrate groundwater contamination can be caused by agricultural practices and septic systems.

OPERABLE UNIT A distinct action taken at a Superfund site that contributes to the permanent site cleanup. A number of operable units can be taken in the course of a Superfund project.

PARTS PER BILLION (PPB) Units commonly used to express low concentrations of contaminants. For example, one ounce of trichloroethylene (TCE) in 7.5 million gallons of water is 1 ppb.

PERCHLOROETHYLENE (PCE) A nonflammable solvent used commonly in dry cleaning and to remove grease from equipment. It is a suspected carcinogen.

PLUME A three-dimensional zone within the groundwater aquifer containing contaminants that generally move in the direction of, and with groundwater flow.

RECORD OF DECISION (ROD) A public document that explains which cleanup alternatives will be used at National Priorities List sites. The Record of Decision is based on information and technical analysis included in the administrative record including data generated during the remedial investigation/feasibility study and consideration of public comments and community concerns.

REMEDIAL DESIGN An engineering phase that follows the Record of Decision when technical drawings and specifications are developed for the subsequent Remedial Action at a site on the National Priorities List.

REMEDIAL ACTION The construction or implementation of the selected clean-up alternative following the Remedial Design phase, which occurs after the feasibility study is completed and EPA has signed the Record of Decision.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) A two-part study of a hazardous waste site that must be completed before the site remedy is chosen and implemented. The first part, or Remedial Investigation, examines the nature and extent of site contamination. The second part, or Feasibility Study, identifies and evaluates alternatives for addressing site contamination.

RISK ASSESSMENT An evaluation performed as part of the remedial investigation to assess conditions at a Superfund site and determine the risk posed to public health and/or the environment.

SPECIAL NOTICE A letter to past and present owners and operators of facilities indicating that EPA has determined that they are potentially liable for contamination. The special notice letter triggers a negotiation period for the cleanup remedy between EPA and the noticed parties. Parties that receive special notice are referred to as potentially responsible parties (PRPs).

SUPERFUND The common named used for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

TRICHLOROETHYLENE (TCE) A nonflammable liquid used commonly as a solvent to remove grease from metal. It is a suspected carcinogen.

VOLATILE ORGANIC COMPOUND (VOC) An organic compound (carbon containing) that evaporates (volatilizes) readily at room temperature.

SAN FERNANDO VALLEY INFORMATION REPOSITORIES

Copies of the Remedial Investigation Report for the Glendale Study Area (January 1992), the Feasibility Study for the Glendale Study Area North Plume Operable Unit (April 1992), the Feasibility Study for the Glendale Study Area South Plume Operable Unit (August 1992), and other study-related documents are available for public review at the following five locations. If the copies are not available, contact Fraser Felter, Community Relations Coordinator, at (415) 744-2181.

City of Glendale Public Library
222 East Harvard Street
Glendale, CA 91205
(818) 548-2027
Contact: Lois Brown

Hours: M-Th 10:00 am-8:55 pm
F-Sat 10:00 am-5:55 pm

Los Angeles Department of Water and Power (LADWP) Library
111 North Hope Street, Room 518
Los Angeles, CA 90012
(213) 481-4612
Contact: Joyce Purcell

Hours: M-F 7:30 am-5:30 pm

The University Research Library/ U.C.L.A.
Public Affairs Service
405 Hilgard Avenue
Los Angeles, CA 90024
(310) 825-3135
Contact: Barbara Silvernail

Hours: M-F 10:00 am-7:00 pm
Sat. 1:00 pm-5:00 pm

City of Burbank Public Library
110 North Glenoaks Boulevard
Burbank, CA 91502
(818) 953-9741
Contact: Helen Wang

Hours: M-Th 9:30 am-9:00 pm
F 9:30 am-6:00 pm
Sat 10:00 am-6:00 pm

California State University Northridge Library
18111 Nordhoff Street
Northridge, CA 91330
(818) 885-1200
Contact: Mary Finley

Hours: M-Th 8:00 am-10:00 pm
F 8:00 am-5:00 pm
Sat. 9:00 am-5:00 pm

For further information about this site, contact:

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San Francisco, CA 94105
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Media Contact: Paula Bruin, (415) 744-1587

United States Environmental Protection Agency
Region 9
75 Hawthorne Street (H-1-1)
San Francisco, CA 94105
Attn: Fraser Felter

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INSIDE: Proposed Plan for Second Cleanup Project In Glendale Area

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