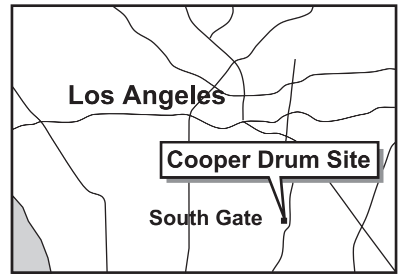
Cooper Drum Superfund Site
PROPOSED PLAN

EPA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION 9 • SAN FRANCISCO, CA • JUNE 2002

EPA Proposes a Plan to Address Groundwater and Soil Contamination

This document describes how the U.S. Environmental Protection Agency proposes to protect people from environmental contaminants at the Cooper Drum Site. We describe the cleanup alternatives we considered and the one we prefer. Finally, we ask for your thoughts on this proposal.

PROPOSED PLAN AT A GLANCE

THE PROBLEM: During past operations at the Cooper Drum Site (Site), **contaminants*** were spilled or released onto Site soils. Some of these contaminants have also moved into the **groundwater** beneath the site. EPA is now proposing ways to clean up these contaminants.

THE SOLUTION: EPA proposes to clean up contaminants in the soil by digging up and removing shallow contaminated soil, extracting and treating contaminated soil vapors, and limiting future use of the area through institutional controls. EPA proposes to clean up contaminants in the groundwater by extracting and treating the groundwater and adding chemicals that break down the contaminants while they are underground.

YOUR COMMENTS: You can provide your comments on this Proposed Plan either verbally during our public meeting on June 27, or in writing via letter, fax or email to Eric Yunker (see back page for contact information). EPA will consider these comments as we develop our final decision on how to clean up the Site, and we will respond to all comments in a final written document.

This Proposed Plan is issued pursuant to the requirements of the ***Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*** *of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA,) to facilitate community involvement in the selection of remedies for the Cooper Drum Superfund Site.*

Public Comment Period

June 11 - July 10, 2002

Community Meeting

Thursday, June 27, 2002
7:00 p.m.
Pop Warner Room
South Gate Sports Complex
9520 Hildreth Avenue

INSIDE **page**

** All words in **bold** are defined in the Glossary on page 15.*

ABOUT THE PROPOSED PLAN

The U.S. Environmental Protection Agency (EPA) is seeking public comments on this **Proposed Plan** to address groundwater and soil **contamination** at the Cooper Drum **Superfund** Site in South Gate, California. The EPA has prepared this Proposed Plan to: (1) inform the community about the history and environmental findings at the Site; (2) describe the cleanup options and EPA's preferred alternative; (3) solicit public comments on EPA's cleanup proposal; and (4) describe how the public can become involved.

This Proposed Plan summarizes the cleanup alternatives that were considered by EPA in a document called the **Remedial Investigation/Feasibility Study Report (RI/FS),** and it describes in detail the reasons for selecting the preferred cleanup method. The RI/FS document is available for public review at the Information Repositories listed on page 13.

The Proposed Plan describes three alternatives for cleaning up contamination in the Site's soil, and six alternatives for cleaning up contamination in the groundwater beneath the Site.

The descriptions of alternatives include EPA's preferred **remedial** (cleanup) alternatives — that is, the cleanup methods that were found to be the most effective, based on a set of established criteria (see Figure 5 on page 7 for a listing of these criteria). EPA's primary objective for the preferred alternatives is to protect human health and the environment.

EPA will select the final cleanup method (the remedy) for the Site after considering the community's input. EPA encourages you to read this Proposed Plan and other related environmental studies for this Site. Public input on all alternatives, and on the information that supports the alternatives, is an important part of the remedy selection process. Your input can influence EPA's decision.

As the lead agency for the Site, EPA has worked with the Los Angeles Regional Water Quality Control Board (LARWQCB) and the California Department of Toxic Substances Control (DTSC) on environmental issues at the Site. After considering public comments, EPA, in consultation with LARWQCB and DTSC, will make a final selection of the remedies to be implemented at the Site. EPA will then present the remedies and implementation plans in a document called the **Record of Decision** (ROD). The ROD will include a Responsiveness Summary, which will present all comments received on the Proposed Plan along with EPA's responses to those comments.

SITE BACKGROUND

The Cooper Drum Superfund Site is located at 9316 South Atlantic Avenue in South Gate, California (see Figure 1 on facing page). It is a 3.8-acre site in a mixed residential, commercial and industrial area. Rayo Avenue borders the site to the east and the former Tweedy Elementary School property is located directly to the south. The Cooper Drum property is zoned for heavy industrial use. The Site has a processing area for cleaning and painting drums, storage areas, an office, a warehouse and maintenance buildings. All buildings have concrete floors and the entire facility was paved with asphalt in 1986.

Several different companies used the site to recondition and recycle used steel drums that once contained a variety of industrial chemicals.

When Cooper Drum Company was in business from 1972 to 1992, the reconditioning process consisted of flushing out and stripping the drums for painting and resale. Wastes were collected in open concrete pits and trenches. This led to the contamination of the soil and groundwater beneath the site. *The contamination from the Cooper Drum Site is not affecting drinking water supplies.*

In 1992, Site facilities were retrofitted to prevent the release of contamination into the ground and provide better environmental protection. Consolidated Drum, the current operator, continues to use an above-ground enclosed system for containing liquids, in compliance with environmental regulations. *Current activities at the Site are not considered to be contributing to contamination found at the Site.*

Beginning in 1984, there were several incidents involving the release of hazardous substances at the Site. This caused the Los Angeles Department of Health Services (LADHS) to start testing site soils. Since 1984, the LADHS, DTSC, EPA and consultants working for the Cooper Drum Company have conducted a number of soil and groundwater studies.

The studies have identified the following hazardous substances in soils at the Site:

- **Volatile Organic Compounds** (VOCs), which include:
  - Tetrachloroethylene (PCE, a cleaning solvent)
  - Trichloroethylene (TCE, a cleaning solvent)
  - Dichloroethylene (DCE, a by-product of TCE)
- Petroleum hydrocarbons (usually associated with fuels and oils)
- Polyaromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs, used in electrical transformers)
- Metals

The groundwater beneath the Site is principally contaminated with VOCs.

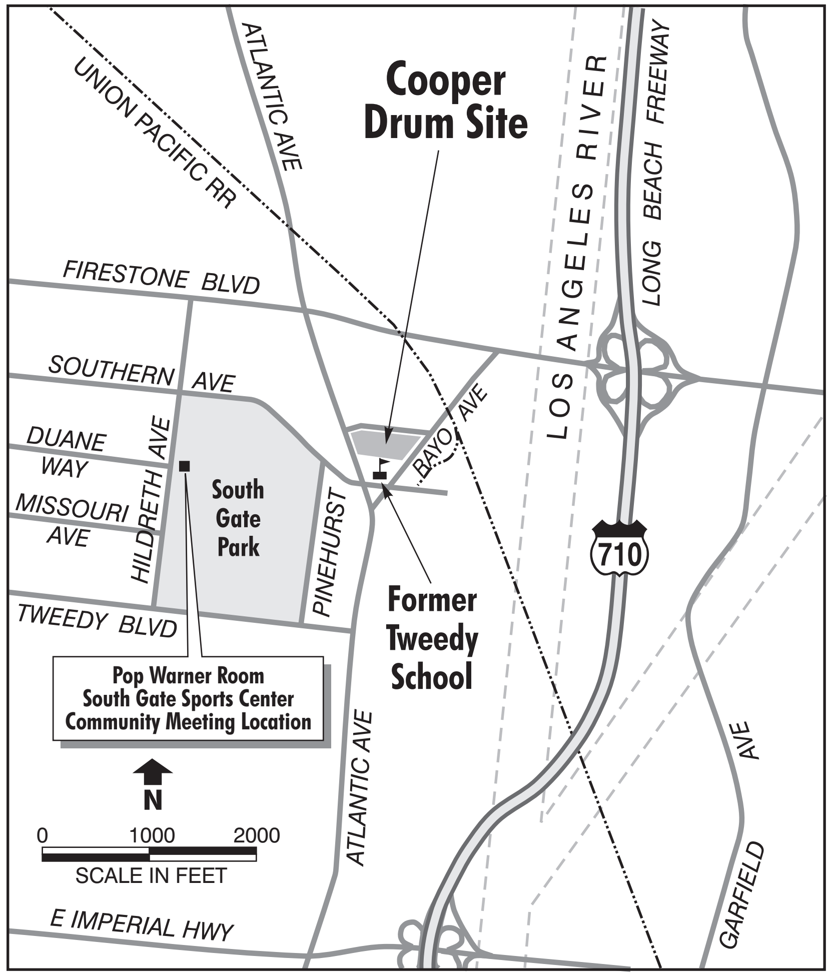
In 1987, the City of South Gate closed four of its municipal water wells when they were found to contain PCE. These wells are located in South Gate Park within 500 feet southwest of the Cooper Drum Site. At that time, the City listed Cooper Drum Company as a possible source of the contamination. Although Site investigations have found groundwater contamination beneath the Site, the Cooper Drum Site contamination is not moving toward these municipal water supply wells.

EPA's more recent studies (1996-2001) of groundwater at the Site found VOC contamination extending from the northeast corner of the Site, under the former hard wash area, several hundred yards toward the south along Rayo Avenue (see Figure 2 below). This groundwater contamination **plume** contains VOCs at levels higher than the **Maximum Contaminant Level**, or established standards.

EPA listed the Cooper Drum Site on the Superfund **National Priorities List** (NPL) in June 2001.

Studies and cleanup of contamination at the Cooper Drum Site will follow the federal Superfund process. The Superfund process is shown in Figure 3 on page 4.

Figure 1. Location Map of Cooper Drum Superfund Site



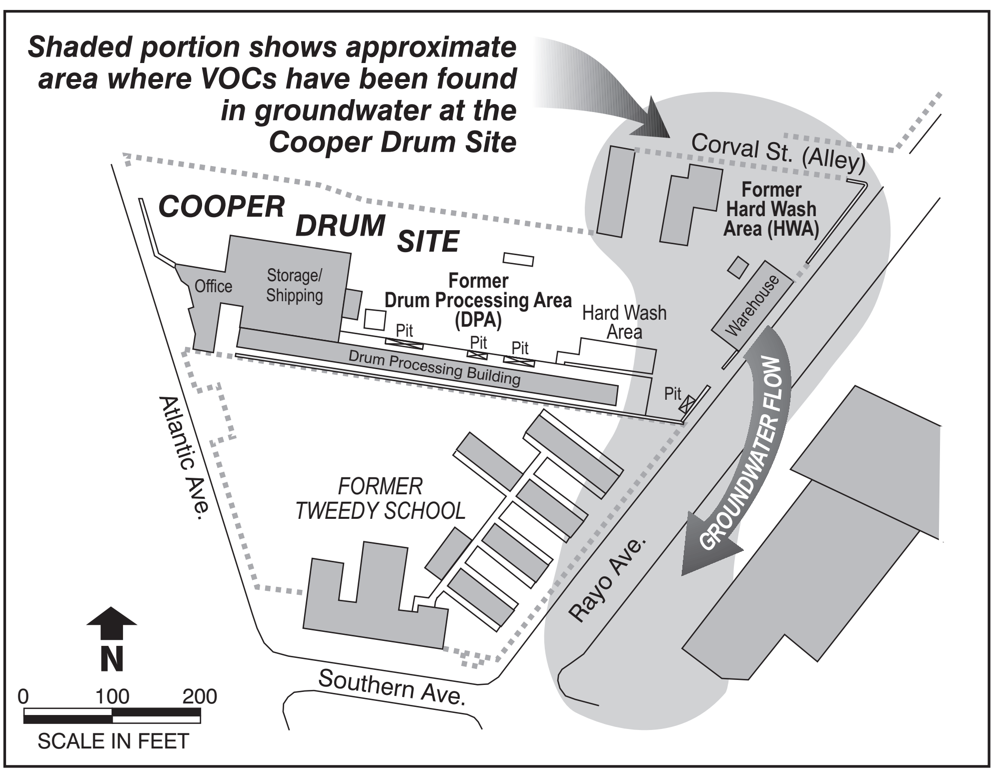
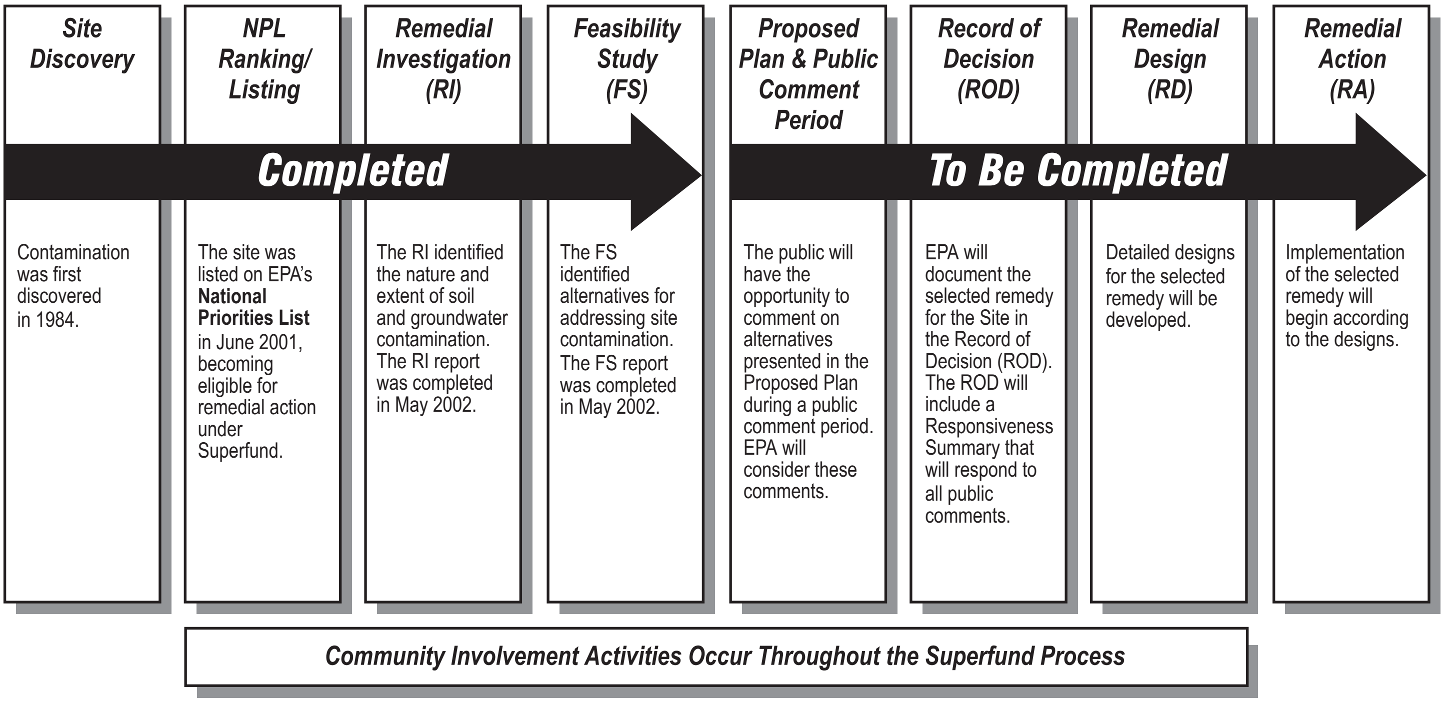


Figure 2. Site Map of Cooper Drum Superfund Site

Figure 3. The Superfund Process for the Cooper Drum Site



SITE CHARACTERISTICS

EPA conducted remedial investigation (RI) activities from 1996 to 2001 to identify the extent of soil and groundwater contamination at the Cooper Drum Site. These activities included collection of soil, soil vapor, and groundwater samples on- and off-site.

As a result of the investigations, various inorganic and organic contaminants were identified in two areas of the Site. The drum cleaning activities that took place within the former hard wash area (HWA) located in the northeast portion of the Site have resulted in extensive soil and groundwater contamination. Contamination of soil has also been discovered within the drum processing area (DPA) in the central portion of the Site (see Figure 2 on page 3).

Soil Investigations

High levels of VOCs in the soil and soil gas indicate a source area beneath the former HWA. Trichloroethene (TCE) and cis-1,2-Dichloroethene (cis-1,2-DCE) are the primary contaminants of concern (COCs), since they are the VOCs that are detected the most often and at the highest concentrations in soil. Nine other VOCs that have been detected are also considered COCs. The soil will need to be cleaned up to prevent VOCs in soil from moving into the groundwater beneath the HWA. Based on limited soil sampling results from the DPA, minimal migration of VOCs to groundwater is expected to occur. In order to determine if soil cleanup is required in the DPA, EPA will conduct additional soil sampling for VOCs beneath the DPA.

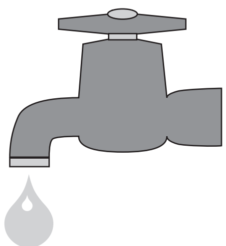
Polyaromatic hydrocarbons (PAHs) and polychlorinated biphenols (PCBs) are also contaminants of concern in the soil. Because the areas where soil contamination exists are covered with asphalt, there is no risk of soil contact to on-Site workers or adjacent residents. These contaminants have lower mobility (as compared to the VOCs), are generally found at a shallow depth beneath the asphalt (down to approximately 10 feet), and are not a threat to groundwater. PCBs have only been detected in the HWA, and PAHs have been detected in both the HWA and DPA.

Although several metals, including arsenic, were detected in Site soils, they are considered to be naturally occurring based on other studies in the Los Angeles area. The one exception is lead, which is a contaminant of concern in soil because it was found at higher levels than those that are typical of the Los Angeles area.

Groundwater Investigations

Groundwater beneath the Cooper Drum Site exists in many layers. The shallowest layer, the Gaspur Aquifer, begins at approximately 55 feet below the ground surface (bgs) and ends at approximately 110 feet bgs. A water layer also exists at a depth of approximately 35 feet and is approximately five feet thick. Saturation of this layer is intermittent, depending on the amount of rainfall and the level of the water table. Shallow groundwater flow is principally to the south. Municipal groundwater production wells in the vicinity of the Site draw water from deeper aquifers beginning at approximately 300 feet bgs.

IS MY DRINKING WATER SAFE ?



Yes.
Although groundwater contamination has occurred, groundwater **aquifers** used for drinking water are much deeper than the contaminated aquifers. Contamination at the Cooper Drum Superfund Site has *not* affected drinking water sources in the South Gate area.

VOCs are the primary contaminants found above state and federal drinking water standards (Maximum Contaminant Levels, or MCLs) in the Site groundwater plume. Eleven VOCs, primarily TCE and cis-1,2-DCE, are the contaminants of concern that have been detected above MCLs and require cleanup.

Arsenic and other metals found in groundwater at concentrations exceeding MCLs are considered to be naturally occurring and do not require cleanup.

In general, the highest concentration of VOCs has been found beneath the northeast area of the Site, in the former HWA, and to the south along Rayo Avenue. The approximate extent of contamination is shown on Figure 2 on page 3. Groundwater contamination above MCLs has been found only in the shallow Gaspur Aquifer. Finer-grained material has formed a barrier within the lower portion of the Gaspur Aquifer, which has prevented the VOCs from moving down into the deeper aquifers that are used for drinking water. The groundwater contamination found under the Site does not impact drinking water wells.

In addition to the groundwater plume that originates from sources on the Cooper Drum Site, another groundwater plume also containing high concentrations of VOCs has been identified in the shallow Gaspur Aquifer immediately northeast of the site; this other plume originates from an off-site source. It appears these two plumes may be mixing together, which is a factor to be considered in evaluating alternative groundwater cleanup methods.

SUMMARY OF SITE RISKS

To help determine whether to take action to protect human health at a site, EPA considers the health risks to people who might be exposed to chemicals at the site. EPA conducted a human health risk assessment for the Cooper Drum Site to evaluate the risk that could occur to workers or residents if the Site was not cleaned up.

The study looked at *potential* risks to humans for the following situations: (1) risks to on-site workers or future residents from contact with chemicals in soil, ingestion of soil, or inhalation of dust; (2) risks to persons who drink contaminated groundwater; and (3) risks to on-site workers or future residents from breathing VOCs in indoor air.

Potential risk associated with chemicals that cause cancer is defined in terms of the probability of a person getting cancer from a long-term exposure to contaminants. This probability is expressed as the number of excess cancers that would occur within a population in addition to the cancers that would occur to people even if they had not been exposed to site contaminants. Risks greater than one “excess” cancer in 10,000 mean that cleanup is generally warranted at a site.

For noncarcinogens (chemicals that do not cause cancer, but may cause other adverse health effects), the potential for adverse health effects to occur is expressed in terms of a Hazard Index. If the Hazard Index is one or less than one, no adverse health effects are expected. If the Hazard Index exceeds one, unacceptable noncarcinogenic health effects may result and remedial action is generally warranted at the site.

Risk from Contaminated Surface Soil

For workers at the Cooper Drum Site, the risk of “excess” cancers (primarily from coming in direct contact with or ingesting soils) is seven in 100,000. For potential future residents living on the Site, the risk from directly contacting or ingesting soils is three in 10,000. This risk requires EPA cleanup.

For workers at the Site, the noncarcinogenic Hazard Index from contaminated surface soil is less than one, which means that no adverse health effects are expected to occur. For potential future residents, the Hazard Index is three. This risk requires EPA cleanup.

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SUMMARY OF SITE RISKS

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Risk from Contaminated Groundwater

Concentrations of contaminants in groundwater beneath the Site exceed federal and state drinking water standards. Although the groundwater is not currently used as drinking water, it is considered a potential drinking water source. If the contaminated groundwater were used for drinking water, it would exceed acceptable levels of risk, which requires EPA cleanup. *No contaminated groundwater from the Cooper Drum Site is used currently or has been used in the past for human consumption.*

Risk from Indoor Air

Exposure to chemicals in indoor air could occur if buildings were built over the most contaminated parts of the Site. The EPA human health risk assessment is based on the levels of chemicals measured in soil, groundwater, and soil gas to estimate concentrations of vapors that could move from on-Site subsurface soils or groundwater into indoor space located above the source of contamination. For potential future indoor workers, the greatest risk of “excess” cancers from indoor air is two in 10,000. For potential future residents living at the Site, the greatest risk of “excess” cancers from indoor air is nine in 10,000. Both of these risks require EPA cleanup. Note that there are no buildings on the Site in which indoor air is being impacted by existing soil or groundwater contamination.

For potential future indoor workers, the noncarcinogenic Hazard Index from indoor air is less than one, which means that no adverse health effects are expected to occur. For potential future residents, the Hazard Index is 3.5. This risk requires EPA cleanup.

Ecological Risk Assessment

EPA’s evaluation of potential risks to ecological receptors indicates that there is virtually no habitat for birds or mammals present at the Site. There is also no available habitat for vegetation due to the industrial nature of the Site. Consequently, the potential for ecological receptors to be exposed to soil contaminants would be considered extremely minimal, and there is no need for any additional screening-level ecological risk assessments.

It is EPA’s judgment that the preferred cleanup alternatives for soil and groundwater identified in this Proposed Plan are necessary to protect public health from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

The remedial action objectives describe what the proposed Site cleanup is expected to accomplish. EPA’s objectives for the Cooper Drum Site are presented in Figure 4 below. EPA has identified cleanup levels for contaminated groundwater and soil beneath the Site. The cleanup goals for VOC contamination in the groundwater and soil are based on California MCLs. The cleanup levels for soil non-VOCs are health-based. By achieving the soil and groundwater cleanup goals, any potential indoor air exposure will also be addressed.

Figure 4. Remedial Action Objectives

GROUNDWATER	• Restore usable groundwater to drinking water standards (MCLs) for beneficial use.
SOIL	• Remediate soil COCs (VOCs) to prevent contaminants from getting into groundwater at levels that would exceed drinking water standards (MCLs). • Remediate non-VOC COCs to health-based cleanup levels that are protective of ongoing and future site activities.
AIR	• Ensure that health-based cleanup levels achieved for COCs (VOCs) in soil and groundwater will protect people potentially exposed to indoor air.

MCL = maximum contaminant level
COC = contaminant of concern
VOC = volatile organic compound

Figure 5.
Remedy Selection:
Nine Criteria for Evaluating Remedial Alternatives

THRESHOLD CRITERIA

These criteria are requirements that each alternative must meet to be eligible for selection.

1 Overall Protection of Human Health and the Environment

How risks to the public and the environment are eliminated, reduced or controlled.

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

Federal and state environmental statutes met and/or grounds for waiver provided.

PRIMARY BALANCING CRITERIA

These criteria are used to weigh major trade-offs among alternatives.

3 Long-Term Effectiveness and Permanence

Maintain reliable protection of human health and the environment over time, once cleanup goals are met.

4 Implementability

Technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry it out.

5 Short-Term Effectiveness

Protection of human health and the environment during construction and implementation period.

6 Reduction of Toxicity, Mobility, and Volume (TMV) Through Treatment

Ability of a remedy to reduce the toxicity, mobility, and volume of the hazardous contaminants present at the site.

7 Cost

Estimated capital, operation, and maintenance costs of each alternative.

MODIFYING CRITERIA

These criteria are considered after public comment is received on the Proposed Plan. They are taken into account in the final remedy selection process.

8 State Acceptance

State concurs with, opposes or has no comment on the preferred alternative.

9 Community Acceptance

Community concerns addressed; community preferences considered.

FINAL REMEDY

SUMMARY OF CLEANUP ALTERNATIVES

Remedial action (cleanup) alternatives were developed for the Site through the feasibility study process.

EPA considered a number of alternatives that could be used to reduce risks from potential exposure to contaminants in the Site soil and groundwater. CERCLA requires these remedial action alternatives to be evaluated in terms of how well the alternatives meet nine specific remedy selection criteria (see Figure 5 on the left).

An initial screening eliminated many of the possible cleanup alternatives that were considered. The remedial action alternatives that are still being considered will be evaluated against the community acceptance criterion following receipt of public comments on this Proposed Plan.

Each of the alternatives evaluated during this process, including EPA's preferred alternatives, is summarized below. EPA's preferred alternatives for soil and groundwater cleanup are considered to be the alternatives that best meet the remedy selection criteria.

SOIL ALTERNATIVES

ALTERNATIVE 1 – No Action

Present Worth Cost Estimate: $0

EPA is required to consider a No Action alternative for comparison with other remedial alternatives. The No Action alternative is also used to evaluate the risk to the public if no action was taken. In this alternative, no remedial actions are taken to clean up or control migration of contaminants from or within the Cooper Drum Site. There is no cost associated with this alternative and it would provide the least overall protection of human health and the environment. The No Action Alternative does not meet EPA's remedial action objectives and does not comply with state and federal requirements.

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SUMMARY OF CLEANUP ALTERNATIVES *(continued from page 7)*

ALTERNATIVE 2 – Dual Phase Extraction and Treatment/Institutional Control

Present Worth Cost Estimate:	**$1,521,400**
Capital Cost Estimate:	**$1,331,500**
Annual O&M Cost Estimate:	**$11,400**

This alternative would use dual phase extraction (DPE) for treatment of VOCs in soil, in combination with institutional controls that would eliminate exposure to non-VOC contaminants by limiting future use of the Site.

DPE, an enhancement of the conventional soil vapor extraction (SVE) technology, is a process in which contaminated soil vapors and groundwater are extracted simultaneously. SVE has been established as an EPA **presumptive remedy** for cleanup of VOCs in soil. DPE is also needed to extract contaminated groundwater located in the saturated soils while SVE is used to extract contaminated soil gas. The VOC soil contamination located in the HWA will require cleanup. Additional soil gas sampling will take place during the remedial design (RD) phase to further identify the extent of VOC contamination in the DPA. The design of the DPE system can be modified to encompass all areas of VOC-contaminated soil.

Dual phase extraction would involve the use of activated carbon for treatment of both the extracted groundwater and soil vapor. The DPE system for the HWA would consist of three wells designed to extract both groundwater and soil gas, and five vapor monitoring wells. Soil vapors and groundwater would be extracted and treated in vessels containing activated carbon and other additives for the treatment of any vinyl chloride contamination. After treatment, the treated water would be discharged to the publicly owned treatment plant (POTW), which would require a discharge permit. After VOCs have been removed, the treated soil gas would be discharged into the air. The total duration of the DPE remedial action is assumed to be five years. Operation of the DPE system is estimated to be two years. It is assumed that vapor monitoring and groundwater extraction wells would continue to be sampled for three more years to be sure the cleanup is complete.

Institutional control actions for soil contaminated with non-VOCs may consist of: 1) Preventing access; 2) Placing limitations on activities that might disrupt the surface cover and expose the subsurface; 3) Implementing deed restrictions that would prevent future residential use; and 4) Inspecting the condition of the ground surface cover and making repairs as needed. Institutional controls would remain in place as long as soil contaminated with non-VOCs posed a health risk.

EPA's PREFERRED SOIL ALTERNATIVE:

ALTERNATIVE 3 – Dual Phase Extraction and Treatment/Institutional Control/Excavation

Present Worth Cost Estimate:	**$3,008,000 (of which $1,487,000 is for excavation and disposal of non-VOC contaminated soil)**
Capital Cost Estimate:	**$2,818,000**
Annual O&M Cost Estimate:	**$11,400**

This alternative is the same as Alternative 2 with the addition of excavation and off-site disposal of shallow soil contaminated with non-VOCs. Institutional controls would still be used in areas where soil excavation is not feasible. Dual phase extraction, as described in Alternative 2, would be used to remediate VOC-contaminated soil.

Alternative 3 is the preferred alternative for soil because soil excavation and off-site disposal would permanently remove non-VOCs from the Site. While implementation of institutional controls may occur over an extended period of time and may face regulatory hurdles, excavation would remove contaminated soil and immediately remove any potential health risk resulting from exposure to non-VOCs. Adequate safety and control measures would have to be taken during excavation to eliminate potential problems associated with dust emissions and exposure to subsurface vapors.

For costing purposes, a maximum excavation depth of five feet was assumed. However, further soil sampling during the remedial design phase is planned to determine the extent of soil contamination where cleanup is needed. Additionally, portions of the contaminated soil areas are located under existing structures, and excavation of these portions may not be practical. These portions of the Site would require institutional controls. It is assumed that the institutional control measures would be identical to those outlined for Alternative 2.

It is assumed that the excavated soil (estimated up to 2,700 tons) would be transferred to a Class I, CERCLA-certified landfill. This offers the most conventional, accepted approach to soil disposal. Clean soil will be used for backfilling excavated areas.

GROUNDWATER ALTERNATIVES

ALTERNATIVE 1 – No Action

Present Worth Cost Estimate: $0

EPA is required to consider a No Action alternative to serve as a basis for comparison with other remedial alternatives. The No Action alternative is also used to evaluate the risk to the public if no action was taken. In this alternative, no remedial actions are taken to clean up or control migration of contaminants from or within the Cooper Drum Site. There is no cost associated with this alternative and it would provide the least overall protection of human health and the environment. The No Action alternative does not meet EPA's remedial action objectives and does not comply with state and federal requirements.

ALTERNATIVE 2 – Extraction and Treatment

Present Worth Cost Estimate:
Discharge to POTW - $4,314,300
Reinjection - $4,716,100
Capital Cost Estimate:
Discharge to POTW - $3,321,000
Reinjection - $2,981,000
Annual O&M Cost Estimate:
Discharge to POTW - $82,500
Reinjection - $145,700
(Costs are based on a 20-year duration.)

This alternative consists of extracting groundwater contaminated with VOCs and treating it with activated carbon to clean up and contain the groundwater contamination underneath the Site. Three extraction wells would be used at an extraction rate of up to 33 gallons per minute (gpm). It is important to note that with this alternative, there is the potential to allow further commingling with upgradient plumes originating off-Site. The rate of extraction would have to be closely monitored and adjusted to minimize this potential.

The extracted water would be pumped through two vessels containing liquid-phase activated carbon. The treatment plant capacity would be 100 gpm. To treat vinyl chloride, potassium permanganate would also be added. In this way, all VOC contaminants of concern would be treated to meet drinking water standards.

The treated water could be reinjected into the groundwater aquifer or discharged to a POTW. If reinjection is selected, three new injection wells would be installed upgradient of the HWA. Reinjection of treated groundwater into the plume must meet state policies and a discharge permit would be required. The benefits of reinjection include reducing the possible commingling with off-site plumes, diluting the groundwater contaminants, and flushing the contaminants toward the extraction wells. Discharge to a POTW would require a discharge permit and a connection fee.

Depending on various factors, the time required to capture the VOC plume was estimated to be between 13 and 20 years. For cost estimation purposes, the duration of remedial action was set to 20 years.

ALTERNATIVE 3 – Extraction and Treatment/ In Situ Chemical Oxidation

Present Worth Cost Estimate: $4,951,000
Capital Cost Estimate: $4,426,000
Annual O&M Cost Estimate: $43,700
(Costs are based on a 20-year duration.)

This alternative consists of extracting groundwater contaminated with VOCs and treating it with activated carbon to clean up and contain the groundwater contamination underneath the Site. Two extraction wells would be used at an extraction rate of up to 20 gallons per minute (gpm). In addition, to enhance treatment of VOCs in groundwater, an application of an oxidizing agent such as sodium permanganate would be used for **in situ** chemical oxidation. It is estimated that a total of 162 injection points will initially be needed to treat the groundwater plume.

Prior to full-scale implementation, a pilot-scale treatability study of the effectiveness of in situ chemical oxidation is required. The treatability study would indicate if oxidation is effective for cleanup of contaminants of concern at the Site. Pending the outcome of a pilot-scale treatability study, it is expected that in situ oxidation would significantly reduce the concentrations of several prominent VOCs (i.e., PCE, TCE, DCE, and vinyl chloride) and reduce the time required to clean up the groundwater, as compared to Alternative 2. If needed, a second application of oxidizing agent was assumed for estimating costs.

With the expected reduction in VOC concentrations, the extraction system would be used to 1) Contain further plume migration at low extraction rates, so as to minimize commingling with off-site plumes; 2) Provide control of the injected sodium permanganate solution; and 3) Remediate residual VOC concentrations down to remedial action goal levels. Treated water could be reinjected into the groundwater aquifer or discharged to a POTW. For estimating costs, the duration of 20 years was used for this alternative.

SUMMARY OF CLEANUP ALTERNATIVES *(continued from page 9)*

EPA's PREFERRED GROUNDWATER ALTERNATIVE:

ALTERNATIVE 4 – Extraction and Treatment/ In Situ Chemical Treatment - Reductive Dechlorination and Oxidation

Present Worth Cost Estimate:	**$6,260,000**
Capital Cost Estimate:	**$5,735,000**
Annual O&M Cost Estimate:	**$43,700**

(Costs are based on a 20-year duration.)

This alternative consists of extracting groundwater contaminated with VOCs and treating it with activated carbon to clean up and contain the groundwater contamination underneath the Site. Two extraction wells would be used at an extraction rate of up to 20 gallons per minute (gpm). In addition, to enhance treatment of VOCs in groundwater, in situ chemical treatment consisting of either **reductive dechlorination** or **chemical oxidation** would be used. Both methods of treatment would be evaluated during treatability studies. The results of the treatability tests would be used to determine which in situ technology (i.e., reductive dechlorination or oxidation) is most effective under Site conditions. It is likely that only the more effective of the two technologies will actually be used. However, to have the greatest flexibility, it was assumed that both technologies would be used to enhance the treatment of groundwater contamination. Using these two in situ treatment options in combination most likely would reduce the time required for meeting remedial action goals.

For cost estimation purposes, it was assumed that a product called HRC® (hydrogen releasing compounds) would be used for reductive dechlorination. HRC® remains in the subsurface over long periods of time and can shorten the time required for natural degradation of chlorinated VOCs. However, HRC® is a patented product, and relatively costly. During the RD phase, other less costly compounds (e.g., molasses, vegetable oil) that enhance reductive dechlorination may also be considered for evaluation. As with Alternative 3, an oxidizing agent such as sodium permanganate would be injected if it was chosen to be the most effective in situ treatment option. It is also possible that both treatments would be used at different times, if needed. The short-term effectiveness, the full remediation of several of the contaminants of concern, and the absence of air emissions make both of these treatment options attractive.

Several hundred injection points may be required to remediate areas of the groundwater plume with the highest concentrations of contaminants of concern, as shown in Figure 2. Implementation would temporarily disturb traffic on Rayo Avenue and other activities on- and off-Site, and would require special permits and coordination with the City of South Gate.

As with Alternative 3, the purpose of the limited extraction/treatment system would be to contain further plume migration, minimize potential mixing with other VOC plumes, and clean up residual VOC concentrations to meet the remedial action goals. Treated water could be reinjected into the groundwater aquifer or discharged to a POTW.

The estimated cost for this alternative is based on a project duration of 20 years. However, this cost does not take into account the potentially significant time and savings resulting from combining enhanced reductive dechlorination and in situ chemical oxidation.

ALTERNATIVE 5 – Extraction and Treatment/ In Situ Reductive Dechlorination

Present Worth Cost Estimate:	**$6,670,700**
Capital Cost Estimate:	**$6,156,100**
Annual O&M Cost Estimate:	**$43,700**

(Costs are based on a 20-year duration.)

For this alternative, the design of the groundwater extraction and treatment system is the same as for Alternatives 3 and 4: limited extraction and treatment of VOCs in groundwater. In addition, in situ chemical treatment would be used to enhance reductive dechlorination of VOCs in groundwater. In situ chemical oxidation would not be used.

As with Alternative 4, it was assumed that a product called HRC® would be used for reductive dechlorination and that other less costly compounds (e.g., molasses, vegetable oil) may also be considered for evaluation. Prior to full-scale implementation, a pilot-scale treatability study of the effectiveness of in situ chemical reduction is required. It is expected that reductive dechlorination would significantly reduce the concentrations of several prominent VOCs (i.e., PCE, TCE, DCE) and reduce the time required to clean up the groundwater as compared to Alternative 2.

It is estimated that a total of 240 injection points of HRC® would initially be used to remediate the groundwater plume. It was assumed that HRC® would be applied a second time, in 120 injection points, in areas where HRC® was not initially effective in reducing VOC concentrations. The second injection of HRC® would be applied one to two years after the initial application.

An advantage of this alternative over Alternatives 3 and 4 is that, if effective, the enhanced reductive treatment would expedite naturally occurring breakdown reactions for VOC contaminants without the need for additional chemical oxidants such as permanganate. Because of the reliance on natural degradation processes, the time required for complete cleanup is uncertain.

The disadvantage of this alternative is that reductive dechlorination could lead to higher concentrations of VOC breakdown compounds such as vinyl chloride. In that case, long-term groundwater extraction would be needed to clean up these breakdown compounds to meet remedial action goals. If HRC® is used at the levels projected, capital costs would also be higher than with Alternatives 2 through 4. For estimating costs, the duration of 20 years was used for this alternative.

ALTERNATIVE 6 – In Situ Air Stripping with Groundwater Circulation Wells

Present Worth Cost Estimate:	**$7,352,000**
Capital Cost Estimate:	**$5,535,000**
Annual O&M Cost Estimate:	**$152,400**

(Costs are based on a 20-year duration.)

This alternative provides in situ treatment of VOCs in groundwater. It consists of installing an estimated 34 groundwater circulation wells (GCWs) within the groundwater plume down to 100 feet below the surface. GCWs are used to achieve in-well air stripping by injecting air into the bottom of the well. This process promotes the circulation of groundwater through the well. Air passing through the groundwater "strips" (removes) VOC contaminants. The contaminated vapor is then passed through an above ground treatment system that uses activated carbon to remove the VOCs. The treated vapor, from which VOCs have been removed, would be discharged to the air.

Due to the uncertainty regarding the effectiveness of using this technology at the Cooper Drum Site, a treatability study is required to measure the effectiveness of this technology in reducing contaminants of concern in groundwater at the Site. The test outcome could then be used to refine the placement and operation of the GCWs. In addition, well installation in high use areas, such as Rayo Avenue, should be avoided.

The advantage of this technology, if it were proven to be effective under existing conditions at this Site, would be the treatment of all contaminants of concern without the need to extract, treat and discharge any groundwater.

Some of the disadvantages associated with this technology include the following:

- Effectiveness of the technology under Site conditions is not guaranteed;
- The duration of remedial action is unknown and may take longer than the estimated 20 years;
- Implementation would require the permanent installation of an estimated 34 GCWs and associated piping. The GCWs would require a large 12-inch borehole down to 100 feet bgs, which would result in the need to dispose of a large amount of soil excavated during drilling. Some of this soil may be contaminated with hazardous substances, which would require special handling and disposal; and
- Operation and maintenance of the GCWs underground could be difficult and costly, since there is a high potential for scaling and biofouling inside the GCWs. O&M cost estimates are much higher for this alternative as compared to the others.

Costs associated with this alternative are based on a project duration of 20 years. These costs could be substantially lower or higher depending on the results of a pilot-scale test, which would indicate the number of wells that would be needed to reach remedial action goals.

EVALUATION OF ALTERNATIVES

Based on EPA's evaluation of alternatives against the first eight of the nine criteria shown in Figure 6 below, EPA prefers Alternative 3 for soil and Alternative 4 for groundwater. EPA's evaluation assessed in situ technologies that could be used either on a stand-alone basis, or as enhancement to other remedial actions. Use of these in situ technologies could minimize discharge of treated water and further commingling of plumes originating from upgradient sources. In some cases, however, in situ technologies may not be suitable as stand-alone remedial alternatives. Although all the in situ technologies selected have been field-tested and proven generally effective, pilot-scale treatability tests are recommended to establish their site-specific effectiveness.

An extraction and treatment option was included, since this technology is effective in removing VOCs from contaminated groundwater. However, pump-and-treat technologies are often costly, they need to be applied over long periods of time to achieve the remedial action objectives, and they are subject to strict discharge requirements. Also at this Site, the presence of other off-site groundwater plumes made the selection of groundwater extraction as a stand-alone remedy, as described in Alternative 2, not possible.

Based on information currently available, EPA believes the preferred alternatives meet the threshold criteria and provide the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the preferred alternatives to satisfy the statutory requirements in CERCLA Section 121(b): 1) be protective of human health and the environment; 2) comply with Applicable or Relevant and Appropriate Requirements (ARARs); 3) be cost-effective; 4) use permanent solutions and alternative treatment technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element.

Figure 6. Alternatives Evaluation Table

● = Fully meets criterion
◓ = Partially meets criterion
○ = Does not meet criterion

	SOIL			GROUNDWATER					
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
EVALUATION CRITERIA:	No action	Dual phase extraction and treatment/ Institutional control	Dual phase extraction and treatment/ Institutional control/ Excavation	No action	Extraction and treatment	Extraction and treatment/ In situ chemical oxidation	Extraction and treatment/ Enhanced reductive dechlorination/ In situ chemical oxidation	Extraction and treatment/ Enhanced reductive dechlorination	In situ air stripping with groundwater circulation wells
Overall Protectiveness	○	●	●	○	●	●	●	●	●
Compliance with State and Federal Requirements	○	◓	●	○	●	●	●	●	◓
Long-term Effectiveness	○	◓	●	○	●	●	●	●	●
Implementability	N/A	●	●	N/A	●	◓	◓	◓	◓
Short-term Effectiveness	N/A	◓	●	N/A	◓	◓	◓	◓	◓
Reduction of Toxicity, Mobility or Volume by Treatment	○	◓	●	○	●	●	●	●	◓
Present Worth Cost ($1,000)	0	1,521	3,008	0	4,314 [(a)] 4,716 [(b)]	4,951	6,260	6,671	7,352
State Agency Acceptance	DTSC and the LARWQCB have concurred with EPA's preferred alternatives.								
Community Acceptance	Community acceptance of the preferred alternatives will be evaluated after the public comment period.								

(a) Treated water discharged to publicly owned treatment works (POTW) (b) Treated water reinjected into aquifer

NOTE: Present worth cost estimates are based on 2001 dollars and were calculated using a 7% discount rate. The remedial action was assumed to start in 2003 and last for 20 years. The cost of three years of post-remedial action compliance monitoring was included for all alternatives. The one exception is Dual Phase Extraction in Soil Alternatives 2 and 3, for which the project duration is five years.

INFORMATION REPOSITORIES

Copies of the Cooper Drum Superfund Site Remedial Investigation/Feasibility Study and other site-related technical documents for the Site are available for review at the locations listed below. These documents are part of the Administrative Record for the Cooper Drum Superfund Site.

U.S. EPA SUPERFUND RECORDS CENTER
95 Hawthorne Street, Suite 403S
San Francisco, CA 94105-3901
Telephone: (415) 536-2000; Fax: (415) 764-4963
Hours: Monday to Friday: 8 a.m. - 5 p.m.
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Sunday, Monday & Holidays: Closed
(Library hours subject to change.)

For Additional Information

For additional copies or other information on the Proposed Plan for the Cooper Drum Superfund Site, please contact the following:

Eric Yunker
Remedial Project Manager
U.S. EPA, Region 9
75 Hawthorne St. (SFD-7-3)
San Francisco, CA 94105
Telephone: (415) 972-3159
Fax: (415) 947-3526
email: *yunker.eric@epa.gov*

Alheli Baños
Community Involvement Coordinator
U.S. EPA, Region 9
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
Telephone: (415) 972-3245
Fax: (415) 947-3528
email: *banos.alheli@epa.gov*

Or you may leave a message on EPA's Office of Community Involvement toll-free line at **(800) 231-3075** and your call will be returned.

MAILING LIST COUPON

If you did not receive this Proposed Plan in the mail and would like to be included on the mailing list to receive future EPA mailings about the Cooper Drum Site, please fill out this coupon and return it to the address printed on the reverse side of this self-mailer. Please cut on the line above, place a stamp as indicated, and drop into the mail.

Alheli Baños, Community Involvement Coordinator
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-3)
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U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105

GLOSSARY OF TERMS

Activated Carbon
Carbon that is prepared for use as a treatment technology to remove contaminants from vapor or water.

Aquifer
Water found within layers of material (such as soil, rock, sand or gravel) below the ground surface.

Chemical Oxidation
A treatment technology used to degrade organic compounds (e.g., VOCs) in water and some soils. An oxidizing agent such as sodium or potassium permanganate is used to react with the contaminant.

Cleanup
Actions taken to address a release of contaminants that could affect human health and/or the environment. The term "cleanup" is sometimes used interchangeably with the term "remedial action."

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a trust fund, known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Contaminants/Contamination
Any chemical, biological or related substance that has an adverse affect on water, soil or air.

Groundwater
The supply of water found below the ground surface, usually in aquifers. Groundwater is often extracted from wells.

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.

Maximum Contaminant Level (MCL)
The maximum level at which a particular chemical is allowed to exist in public drinking water supplies. MCLs are set and enforced through state and federal laws.

National Priorities List (NPL)
A list of hazardous waste sites designated by the EPA as needing long-term remedial cleanup. The NPL is also known as the Superfund list.

Plume
A body of contaminated groundwater flowing from a specific source.

Presumptive Remedy
EPA's preferred technology to address a common category of contamination. Presumptive remedies are selected based on nationwide historic use and favorable performance data for this technology. For example, soil vapor extraction (SVE) is a presumptive remedy for VOC-contaminated soils.

Proposed Plan
A document that summarizes all of the remedial action alternatives that were studied as part of the Remedial Investigation/Feasibility Study (RI/FS) process, and identifies the preferred remedial action alternative for a site.

Record of Decision (ROD)
A document explaining the cleanup actions that will be implemented at a contaminated site. The ROD is based on information and technical analyses generated during the Remedial Investigation/Feasibility Study and on comments received on the Proposed Plan.

Reductive Dechlorination
A treatment technology used to degrade organic componds (e.g., VOCs) in water and some soils. A reducing agent is used to react with the contaminant.

Remedial Investigation/ Feasibility Study (RI/FS)
The study process conducted at a Superfund site to assess contamination and to evaluate cleanup alternatives. The RI examines the nature and extent of contamination. The FS evaluates different methods for cleaning up the contamination.

Superfund
Superfund is the trust fund established by CERCLA to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Volatile Organic Compounds (VOCs)
Carbon-containing chemical compounds that evaporate readily at room temperature. VOCs are commonly used in cleaning solvents.

Important information about your community inside.

Información importante sobre su comunidad.

La traducción al Español se encuentra en el interior.

U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
Attn: Alheli Baños