EPA KOPPERS SUPERFUND SITE

U.S. Environmental Protection Agency • Region 9

Oroville, California March 1999

EPA PROPOSES GROUNDWATER REMEDY MODIFICATION PLAN

INTRODUCTION

The United States Environmental Protection Agency (EPA) is requesting public comments on this Proposed Plan[1] to modify the groundwater remedy at the Koppers Company, Inc. Superfund site (Koppers site) in Oroville, CA (see Fig. 1, page 2). No change is being proposed to the soils remedy. Based on remedial action monitoring and treatability studies the EPA has concluded that modifying the pump and treat (P&T) groundwater remedy is appropriate to complete the remedy.

EPA's preferred modifications include 1) issuing a Technical Impracticability (TI) Waiver for the groundwater cleanup at the former creosote pond and cellon blown areas due to the presence of dense nonaqueous-phase liquids (DNAPL); 2) allowing the pump and treat (P&T) remediation to be augmented by enhanced *in-situ* bioremediation; and 3) making provision for monitored natural attenuation (MNA) as a contingency remedy. A glossary of terms used is found at the end of this document.

The EPA, as the lead agency for the site, has prepared this Proposed Plan in consultation with state agencies (Department of Toxic Substances Control, Region 1 and the California Regional Water Quality Control Broad, Central Valley Region). This Proposed Plan highlights key information about the remedy alternatives considered for groundwater cleanup, potential human health risks posed by the contaminants, and the present extent of groundwater cleanup at the site.

The modification alternatives considered, and EPA's preferred alternative, are presented for public review and comment. The comment period is from March 15, 1999 to April 13, 1999. EPA invites the public to a meeting scheduled for March 23, 1999 where EPA will present the plan and receive verbal comments (See box below for more information).

The EPA's proposed remedy modifications are preliminary and the final decisions will not be made until all significant public comments are considered. After review and response to public comments, the remedy modifications chosen will be formalized in a document called Amendment #2 to the Record of Decision (Amend.#2ROD). The remedy modifications selected for Amend.#2ROD could differ from what is outlined here based on public comment.

PUBLIC COMMENT PERIOD AND COMMUNITY MEETING

A 30-day public comment period on this proposed plan and remedy modifications begins March 15, 1999 and closes April 13, 1999. If requested, EPA may extend the comment period by an additional 30 days.

You are invited to attend a community meeting at which EPA will present the proposed plan, receive verbal comments, and answer questions about the remedy modifications.

Where: Oakdale Heights School
(Multipurpose Room)
2255 Las Plumas Avenue
Oroville, CA

When: March 23, 1999

Time: 7:00 p.m.

Public comments may also be made in writing, postmarked no later than April 13, 1999 and sent to:

EPA, Region 9
75 Hawthorne St.
San Francisco, CA 94105
Attn: Charles Berrey (SFD-7-2)

[1] The publication of this fact sheet fulfills the requirements of Section 117(a)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

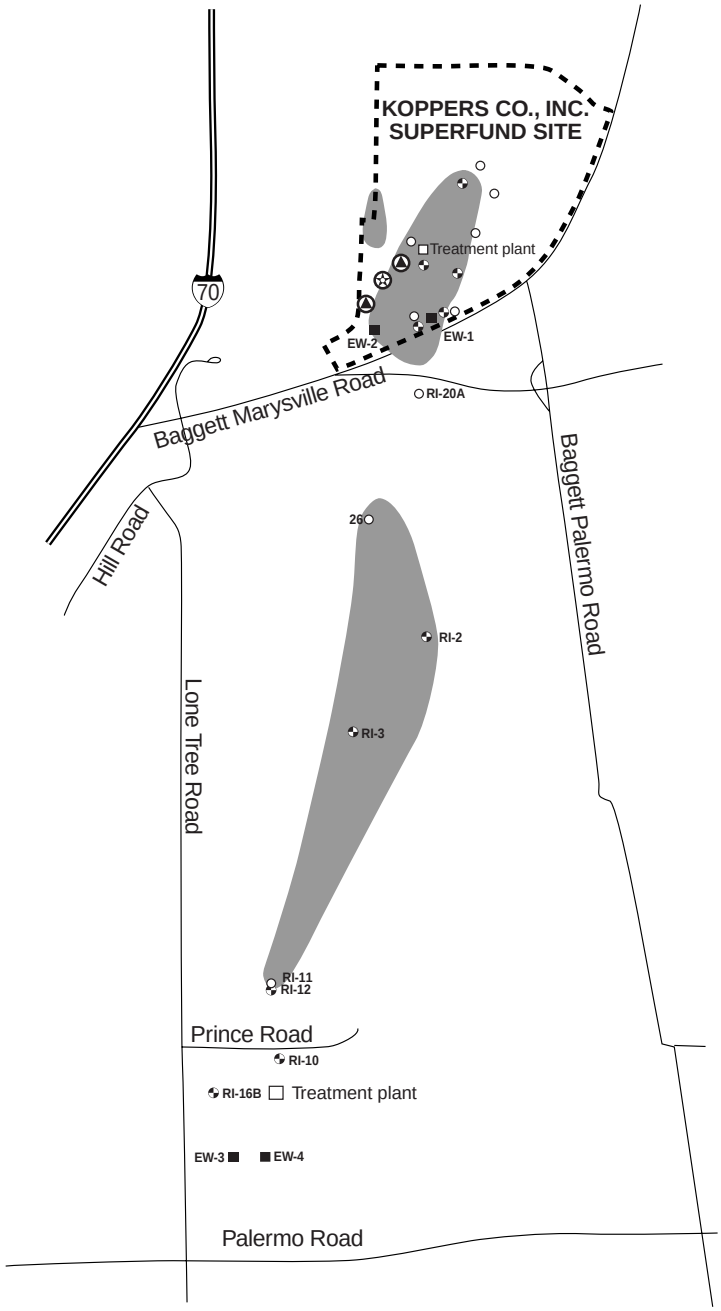

Figure 1: June 1998 Groundwater Plume Map

LEGEND

- Koppers Co., Inc. Superfund Site
- New Monitoring Well
- Plume (June 1998 @ 2.2ppb PCP)
- Wells – Nutrient Addition
- Wells – Monitor Nutrient Transfer and Bioremediation
- Extraction Wells
- Existing Monitoring Wells

N

0 600 1200
Scale in Feet

SITE BACKGROUND

The Koppers Co., Inc. site is in Oroville, California. Hutchinson Lumber Mill owned the property prior to 1948. In 1948, the National Wood Treating Corporation acquired the property and began wood treating operations. Georgia-Pacific acquired the site in 1951, and Koppers Co., Inc. acquired the site from Georgia-Pacific in 1955. Beazer East, Inc. (BEI) purchased Koppers Co., Inc. between June and November 1988. In December 1988, BEI subsequently sold the assets of its Tar and Treated Wood Sector, including the Oroville, California plant operations and property, to a management buy-out group known as Koppers Industries, Inc. (KII). KII continues to operate the plant today, however, BEI retained responsibility for the environmental cleanup issues at the site.

The Koppers facility encompasses approximately 200 acres and has been used for wood treating operations since 1948. Historically, wood poles and ties were pressure treated with pentachlorophenol (PCP), creosote, and inorganic formulations, including chromium and arsenic. Soil and groundwater contamination at the site have resulted from both past wood treatment operations and related waste disposal practices. A fire occurred in the cellon process area in 1963 and again in 1987. The State of California identified the Koppers site as an environmental problem during the early 1970's when constituents associated with

GROUNDWATER REMEDIATION STATUS

wood treatment activities were identified at the site in soils and groundwater. The site was placed on the U.S. EPA's Superfund National Priorities List (NPL) in 1984. Koppers began the Remedial Investigation (RI) in April 1986 and submitted the RI in July 1988. Use of PCP was discontinued at the site in 1988. In November 1988, the EPA completed the Endangerment Assessment (EA), which evaluated risks to human health and the environment from contamination at the site. In May 1989, a Feasibility Study (FS) was conducted which evaluated a wide range of soil and groundwater cleanup alternatives.

In September 1989, the EPA selected soil and groundwater cleanup remedies for the Koppers site and issued a ROD. In January 1991, EPA issued an Explanation of Significant Difference (ESD) to clarify the ROD. Under EPA's oversight, BEI is currently performing the cleanup work under the terms of a Consent Decree, signed in February 1992. In March 1993, a 600 gallon per minute (gpm) off-property groundwater pump and treat (P&T) system began operation. The off-property P&T system was designed to prevent further expansion of the plume of contaminated groundwater that had migrated off the Koppers' plant property, treat the groundwater to remedial standards and then return the water to the aquifer. In December 1995, the P&T system was taken off-line (held in reserve) because the system achieved the cleanup objectives within its zone of capture at extraction wells EW-3 and EW-4 and was unable to affect the up-gradient residual plume.

In February 1994, a 400 gpm on-property groundwater P&T system began operation and continues to operate today. The on-property P&T system was designed to intercept and prevent contaminated groundwater from flowing off the Koppers site by pumping groundwater from beneath the Koppers site, treating the water to the remedial standards and returning the water to the groundwater basin.

In 1996, EPA issued Amend.#1ROD modifying the soils remedy and clarifying certain features of the 1989 ROD. The soils at the Koppers site have been contaminated with a variety of chemicals used in the wood treatment processes. The primary contaminants are PCP, dioxin (which is present as a trace contaminant in industrial grade PCP), arsenic, chromium, and carcinogenic polynuclear aromatic hydrocarbons (cPAHs) which are compounds found in creosote. With the exception of an estimated 20,000 cubic yards of soil in the process area, the soil remedy is complete. The remaining contaminated soil in the process area will be remediated when wood treating ends or the process area equipment is replaced. The overall site status was provided in the August 1998 site fact sheet.

EXPLANATION OF MODIFICATION ALTERNATIVES

The EPA has reviewed the groundwater monitoring program data and determined that a small portion of the site, designated the Area of Interest (AOI) shown on Fig. 2 (on page 4), is not responding to pump and treat remediation efforts. Furthermore, the technology does not exist today to remediate the AOI to drinking water standards. In addition, site data collected outside the AOI has indicated that enhanced *in-situ* bioremediation would speed up groundwater cleanup. As a result of these findings, the EPA is recommending the Record of Decision for the site be amended. The EPA evaluates cleanup alternatives according to nine criteria which are described in Figure #4 (on page 6.) Tables 1 through 3 (on pages 5, 7, & 8) address seven of the nine criteria with comparative analyses for each remedy. State and public acceptance, the eighth and ninth criteria, are being addressed through this proposed plan and public comment period. The proposed groundwater remedy changes for the Koppers site were each reviewed against a no action alternative and other alternatives. A discussion of the remedy alternatives and EPA's preferred alternative are provided below for public comment.

1) TECHNICAL IMPRACTICABILITY (TI) WAIVER PROPOSED REMEDY CHANGE

A TI waiver is used when it is technically impracticable or infeasible, from an engineering perspective, to comply with cleanup standards contained in the applicable or relevant and appropriate requirements (ARARs). The EPA is considering a TI waiver for groundwater restoration at the former creosote pond area and former cellon blow down area

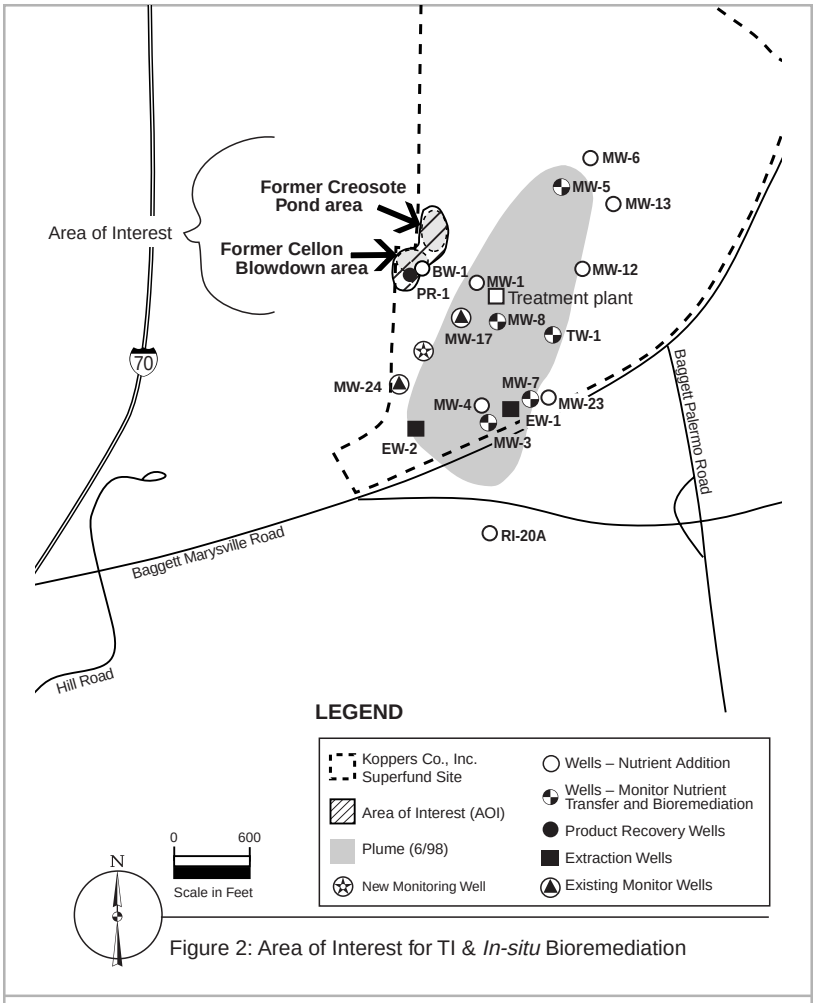

Figure 2: Area of Interest for TI & *In-situ* Bioremediation

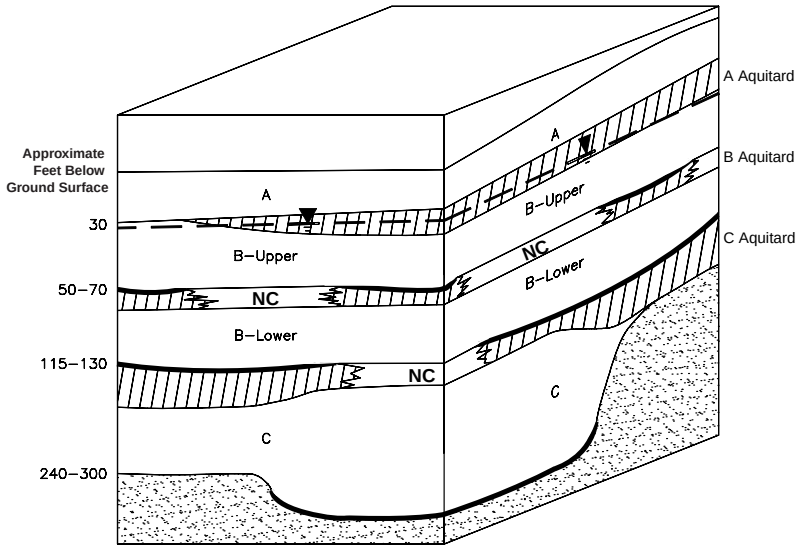

Figure 3: Hydrostratigraphic Block Diagram for the AOI

Legend

- Silt and Clay
- Sand and Silt
- Gravels (Water Transmissive)
- Static Water Level
- DNAPL Residing on Surface of Aquitard
- NC — Not Continuous
- Aquitard — Retards Water Flow

designated the area of interest (AOI) (See Fig. 2). The AOI represents less than 4 acres of the 200 acres at the Koppers site. Specifically, the TI waiver is sought for the following ARARs: Federal drinking water standards; State drinking water standards; Ambient water-quality criteria; State criteria for groundwater cleanup; and California State Water Resources Control Board 68-16 (Statement of Policy with respect to maintaining high quality of waters in California).

A TI waiver is recommended for three reasons at the Koppers site. First, the surface soil contaminants: arsenic, chromium, pentachlorophenol (PCP), creosote, and dioxin which were the source of the groundwater contamination were removed in 1996 and 97. Therefore, potential for additional contaminants cannot impact the groundwater. Second, monitoring data collected since 1986 has <u>not</u> shown contaminants leaving the AOI groundwater area and no creosote or dissolved constituents from creosote have been detected at the P&T system. Third, it is not technically feasible to remove the PCP and creosote DNAPL which remains within the saturated zone beneath the AOI from 30 to 300 feet below ground surface (bgs). DNAPL refers to liquids that do not mix with and are heavier than water, such as creosote. Gravity pulls the DNAPL down through the subsurface until it reaches an impervious or low permeability soil layer like clay. Under the AOI at the Koppers site, the DNAPL is trapped on three clay layers (see Fig. 3). Site boring data indicates creosote is contained on surface depressions at each of the three clay layers 50 to 300 feet below ground. The depressions are like bowls that trap the DNAPL and retard continued migration.

In considering alternative actions to cleanup groundwater in the AOI, EPA evaluated Alternative 1, no

Table 1 - ANALYSIS OF TI WAIVER ALTERNATIVES

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Grout Curtain Wall	Alternative 3: Thermal Treatment - Contained Recovery of Oily Wastes (CROW) Method	Alternative 4: Thermal Treatment - Steam Enhanced Extraction	Alternative 5: Continue Operation of On-Property Pump & Treatment (P&T)	Alternative 6: Monitor After P&T Achieves ARARs Outside of AOI
Protection of Human Health and the Environment	Does not provide overall protection of human health and the environment.	Provides moderately high degree of overall protection of human health and the environment.	Provides low degree of overall protection of human health and the environment.	Provides low degree of overall protection of human health and the environment.	Provides moderately high degree of overall protection of human health and the environment.	Provides moderately high degree of overall protection of human health and the environment.
ARARs Compliance	Does not comply.	Does not comply.	Does not comply.	Does not comply.	Does not comply.	Does not comply.
Long-Term Effectiveness and Permanence	Least effective.	Effective as long as cracks and fissures do not develop in the wall.	Partially effective because 12% of DNAPL would be removed over a 20 yr period. Remaining DNAPL would prevent restoration of groundwater to cleanup standards.	Moderately effective with potential for significant DNAPL removed. However some residual DNAPL would remain preventing restoration of groundwater to cleanup standards.	Not effective as the DNAPL in the AOI would not be removed (P&T will be able to capture the contaminants coming from the AOI).	Not effective as the DNAPL in the AOI would not be removed (if monitoring showed contaminants coming from the AOI, P&T will be operated for removal).
Reduction of Toxicity, Mobility, or Volume	Does not reduce toxicity, mobility, or volume.	Does not reduce toxicity or volume, but effective in reducing mobility.	Effective in reducing toxicity and volume, but not effective in reducing mobility.	Effective in reducing toxicity and volume, but not effective in reducing mobility.	Does not reduce toxicity or volume, but effective in controlling mobility if contamination leaves AOI.	No reduction in toxicity or volume, but effective in controlling contamination leaving AOI.
Implementability	Easy to implement because no action required.	Implementable, but suitability of the soil condition must be evaluated for wall construction.	Difficult to implement technically due to depth of DNAPL. Bench scale testing & computer modeling indicated 12% to 65% of free creosote could be removed within 20 years. Pilot scale test is required.	Difficult to Implement technically because of existence of DNAPL in deeper depths. A pilot scale treatability test is required.	Easy to implement. P&T already in place & operating.	Easy to implement. Requires only maintenance of existing P&T.
Present day Cost with effort up to 30 yrs.	$0	$22 million	$26.7 million	$70 million	$4.5 million	$2.2 million

Note - Alternative 6 is the preferred alternative.

action; Alternative 2, a grout curtain wall barrier; Alternatives 3&4, two different thermal treatment methods; Alternative 5, continuing to operate the P&T once the treatment standards had been achieved outside the AOI; and Alternative 6, shutting down the on-property P&T after reaching ROD cleanup standards outside the AOI and initiating monitoring {EPA's preferred alternative} (See Table 1). In reviewing the remedy alternatives, the remedy must meet the threshold criteria of being protective of human health and the environment and comply with ARARs. None of the alternatives would comply with ARARs because some contamination would still remain, preventing the restoration of groundwater in the AOI to drinking water standards. Thus, none of the alternatives comply with ARARs threshold criteria, and a waiver is required. In addition, the no action alternative is not protective of human health because without monitoring,

EPA could not ensure that the public would be protected. An additional criteria is cost. Alternatives 2, 3, 4, and 5 are no more protective than preferred Alternative 6, but significantly more expensive, (see Table 1, page 5.) Alternative 5, continuing to operate the on-property P&T once cleanup standards have been achieved outside the AOI, would not be more protective than monitoring. The P&T system is unable to extract contaminants out of the AOI. Once the area outside of the AOI is clean, operating the P&T would just be treating already clean groundwater. Alternative 6 is the preferred alternative, because it would be highly protective of public health with long term effectiveness. P&T action could be resumed if monitoring showed contamination leaving the AOI. Also, alternative 6 is the lowest cost and is easy to implement because the system is in place except for one additional monitoring well.

EPA will require monitoring of the AOI semiannually until drinking water standards are met. As part of the contingency plan to support the TI waiver, the on-property P&T system will be maintained even after groundwater outside the AOI is restored. If contaminated groundwater is detected flowing from the AOI, the on-property P&T system will be reactivated to capture and treat the contaminated groundwater. Reactivating the P&T would provide the necessary contingency capability since groundwater from the AOI flows by gravity to the on-property groundwater P&T system extraction wells EW-1 and EW-2 (See Fig. 2, page 4). To ensure adequate data coverage once the P&T is no longer operating, an additional monitoring well will be installed to monitor groundwater south of the AOI as a condition of the TI waiver approval (See Fig. 2, page 4). The monitoring well would be installed and operational prior to allowing the on-property P&T shutdown once groundwater is restored outside the AOI. A deed restriction will be placed on the AOI to prevent future drinking water wells from being installed. Also, an annual review of the industrial activity surrounding the AOI will be conducted to insure no action is taken to adversely influence the AOI.

REMEDY SELECTION NINE CRITERIA ANALYSIS

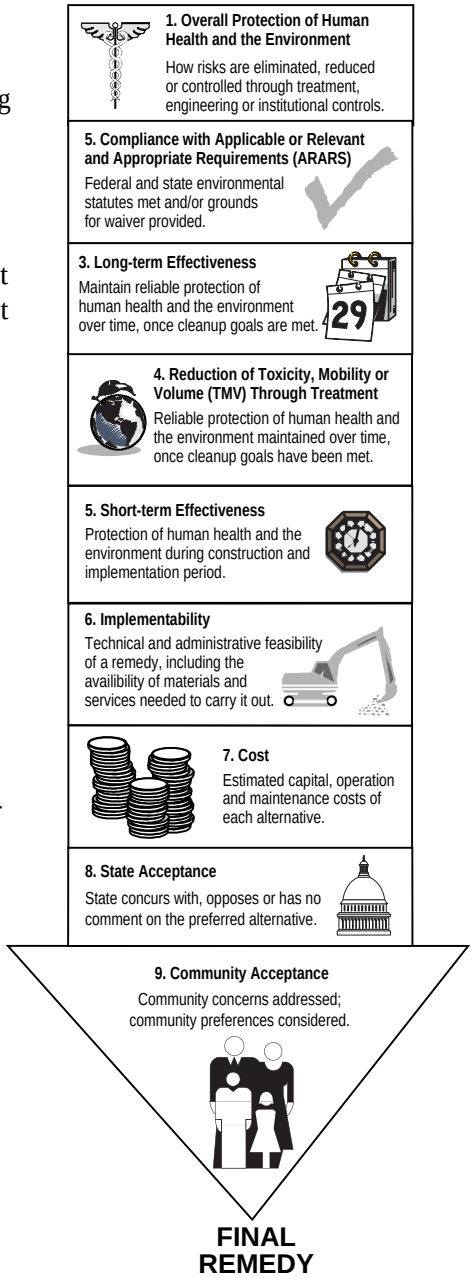

Figure 4

WHAT IS ENHANCED IN-SITU BIOREMEDIATION?

Site and literature data confirm that existing soil bacterium (unicellular microorganisms) will break down PCP to non hazardous substances in place. This break down process that occurs in-place is referred to as *in-situ* bioremediation. The rate and extent of breakdown or degradation depend on various factors such as PCP concentration, temperature, pH, and the amount of nutrient or food available to bacterium. Adequate nutrients such as nitrogen, phosphorous and oxygen aid in the natural breakdown of PCP by bacterium ultimately to carbon dioxide and inorganic chloride. By adding small quantities of nutrients to selected monitoring wells, PCP destruction can be accelerated/enhanced to reduce the time necessary to achieve groundwater cleanup. The needed oxygen, nitrogen and phosphorus can be provided by periodically adding small quantities of magnesium peroxide to release oxygen and diammonium phosphate to supply nitrogen and phosphorous at selected groundwater wells. The addition of nutrients to enhance the natural break down of PCP is enhanced *in-situ* bioremediation. The effect of the nutrients addition will be evaluated by sampling data obtained from down gradient monitoring wells (See Figs.1 & 2 on pages 2 & 4). The duration of the enhanced *in-situ* bioremediation programs will be determined by monitoring results.

2) ENHANCED IN-SITU BIOREMEDIATION GROUNDWATER PROPOSED REMEDY CHANGE

The proposed enhanced *in-situ* bioremediation remedy change alternatives for the on and off-property groundwater plumes were reviewed individually (See Table 2 and 3 on pages 7 & 8). The on-property P&T remediation is an essential part of the continuing groundwater remediation and will run until cleanup standards are met outside the AOI area.

Table 2 - ANALYSIS OF ON-PROPERTY GROUNDWATER REMEDIAL CHANGE ALTERNATIVES

Evaluation Criteria	Alternative 1: No Action	Alternative 2: On-Property Pump and Treatment (P&T) with Enhanced Bioremediation & Monitored Natural Attenuation as Contingency	Alternative 3: On-Property P&T
Protection of Human Health and the Environment	Does not provide overall protection of human health and the environment.	Provides high degree of overall protection of human health and the environment.	Provides high degree of overall protection of human health and the environment.
ARARs Compliance	Does not comply.	Complies.	Complies.
Long-Term Effectiveness and Permanence	Least effective.	Effective as the PCP in the plume will be removed by P&T and then be biodegraded to nonhazardous substance by added nutrients and natural attenuation. Long term effectiveness will depend on how well the added nutrients are distributed in the groundwater for them to act on the PCP. MNA needed as contingency if not all portions of the plume receive nutrients.	Effective as shown by existing P&T.
Reduction of Toxicity, Mobility, or Volume	Partly effective in reducing toxicity, mobility, or volume due to natural attenuation.	Effective in reducing toxicity, mobility, or volume.	Effective in reducing toxicity, mobility, or volume.
Short-Term Effectiveness	Highly effective as no construction needs to be performed.	Effective, but requires adherence to a health and safety plan.	Effective, but requires adherence to a health and safety plan.
Implementability	Easy to implement because no action required.	Easy to implement. Duration of remediation is not known now, but can be estimated using monitoring data collected during the progress of remedial (enhanced bio and natural attenuation) actions.	Easy to implement as P&T already in place and operation.
Present Day Cost With Effort Up to 30 Yrs.	$0	$2.1 million	$4.5 million

Notes - Alternative 2 is the preferred alternative.

P&T is not a needed component for off-property remediation. The existing off-property P&T was turned off in December 1995 because the off-property plume had shrunk and stabilized to such an extent that the P&T system was only treating clean groundwater (See Fig 1, page two). The extent of the off-property plume reduction confirms significant natural attenuation has occurred and a P&T is no longer needed to control the toe of the plume.

• ON-PROPERTY

In considering the alternative actions for the on-property groundwater remedy change, EPA looked at Alternative 1, no action; Alternative 2, the existing on-property P&T aided by enhanced bioremediation with monitored natural attenuation (MNA) as a contingency remedy (EPA's preferred alternative); and Alternative 3, continued operation of the existing P&T without enhanced bioremediation (See Table 2). A no action alternative would not provide overall protection of human health and the environment because it would not provide any monitoring. Operating the on-property P&T with enhanced bioremediation is the preferred remedy due to the faster breakdown of PCP which could allow operation of the on-property P&T to be reduced by 10 to 15 years. Shutting down the on-property P&T and using only enhanced bioremediation was also considered and not included in the alternatives table because it was not considered protective (there is significant risk that on-property contamination could migrate off-site to feed the off-property plume if only enhanced bioremediation is used).

• OFF-PROPERTY

In considering the alternative actions for the off-property groundwater remedy change, EPA looked at Alternative 1, no action; Alternative 2, modify off-property P&T; Alternative 3, enhanced bioremediation; and Alternative 4, monitored natural attenuation. A no action alternative would not provide overall protection

of human health and the environment because it would not provide any monitoring. Enhanced bioremediation by itself was compared to relocating the off-property P&T extraction wells within the residual PCP plume and to the use of monitored natural attenuation as a stand alone remedy (See Table 3). Enhanced bioremediation is the preferred remedy because the method will remediate the residual contamination more efficiently at lower cost than modifying the existing P&T. Site monitoring data has shown that enhanced bioremediation will achieve remediation standards faster than MNA by providing additional or missing nutrients to the natural bacterium that break down PCP. PCP is the only groundwater contaminant off-property. The proposed off-property remedy change would allow the dismantling of the off-property P&T which has not operated for the last three years because extraction wells EW-3 and EW-4 have been PCP free. A contingency plan for MNA will be required if monitoring showed PCP movement toward drinking water wells or the plume was expanding.

3) MONITORED NATURAL ATTENUATION (MNA) PROPOSED CONTINGENCY REMEDY

The EPA is recommending the present groundwater remedies be amended to allow MNA as a contingency remedy to be implemented if (1) EPA finds that nutrient addition cannot be adequately distributed to all areas of the residual on and off-property plumes and (2) if a technical and economic evaluation shows plume degradation has reached a point that MNA will degrade the remaining plume as fast as enhanced *in-situ* bioremediation. MNA uses only

Table 3 - ANALYSIS OF OFF-PROPERTY GROUNDWATER REMEDIAL CHANGE ALTERNATIVES

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Modify Off-Property Pump and Treatment (P&T)	Alternative 3: Enhanced Bioremediation	Alternative 4: Monitored Natural Attenuation
Protection of Human Health and the Environment	Does not provide overall protection of human health and the environment.	Provides high degree of overall protection of human health and the environment.	Provides moderately high degree of overall protection of human health and the environment.	Provides low degree of overall protection of human health and the environment.
ARARs Compliance	Does not comply.	Complies.	Complies.	Complies.
Long-Term Effectiveness and Permanence	Least effective.	Effective as shown by existing P&T.	Effective as the PCP in the plume will be biodegraded to nonhazardous substance by the added nutrients. Long term effectiveness will depend on how well nutrients are distributed in the groundwater for them to act on the PCP.	Moderately effective. PCP in the plume will be biodegraded to nonhazardous substance by natural biological condition of the aquifer. Long term effectiveness will depend on the quantity of the naturally available nutrients in the aquifer.
Reduction of Toxicity, Mobility, or Volume	Partly effective in reducing toxicity, mobility, or volume due to natural attenuation.	Effective in reducing toxicity, mobility, or volume.	Effective in reducing toxicity, mobility, or volume.	Moderately effective in reducing toxicity, mobility, or volume.
Short-Term Effectiveness	Highly effective as no construction needs to be performed.	Effective, but requires adherence to a health and safety plan.	Effective, but requires adherence to a health and safety plan.	Effective.
Implementability	Easy to implement because no action required.	Easy to implement as P&T already in place and operation.	Easy to implement. Duration of remediation is not known now, but can be estimated using monitoring data collected during the progress of remedial action.	Easy to implement. Duration of remediation is not known now, but can be estimated using monitoring data collected during the progress of natural attenuation.
Present day Cost with effort up to 30 yrs.	$0	$5 million	$0.7 million	$1.1 million

Notes - Alternative 3 is the preferred alternative; Alternative 4 is the contingency remedy.

naturally occurring microorganisms such as bacteria to break down hazardous substances into less toxic or nontoxic substances without the addition of enhancing agents. The naturally occurring microorganisms in the soil eat and digest organic substances for nutrients and energy, transforming them into nontoxic substances. The natural bacterium necessary to break down PCP exists at the site, as demonstrated by the off-property plume reduction achieved up-gradient of the off-property P&T system (See Fig. 1, page 2) and the bioremediation treatability soil tests conducted in 1994. The MNA remedy alternative would require the development of a supporting contingency plan for the protection of human health and the environment. MNA was not proposed as the primary remedy because site monitoring data has shown that enhanced bioremediation will achieve remediation standards faster than MNA by providing the appropriate level of nutrients to optimize natural bacterium destruction of PCP.

SUMMARY OF SITE RISKS

Applicable or relevant and appropriate requirements are reviewed as part of a proposed remedy change. The EPA reviewed the groundwater cleanup values for the Koppers Superfund site and determined that changes in cleanup levels were appropriate for Barium and PCP (See Table 4). The proposed changes in cleanup values reflect developments in risk assessment and drinking water standards that have occurred since the signing of the original ROD. The proposed groundwater cleanup changes do not, however, change the basic conclusion in the 1988 Endangerment Assessment (EA). An EA or risk assessment is an evaluation of the risk posed to human health and/or the environment by exposure to contaminants at a site. The EA concluded that off-site and on-site groundwater required remediation to minimize the potential human health risks associated with use of groundwater as a source of drinking water. The EA concluded the excess lifetime cancer risks for the highest exposure which is reasonably expected to occur, ranged from 1x10-3 to 8x10-1, both of which are significantly greater than U.S. EPA's acceptable target risk range of 10-6 to 10-4 for cancer risks. The EA also demonstrated the potential for non-cancer health effects from the use of the groundwater for drinking water purposes. The current standard U.S. EPA Superfund risk assessment procedures are designed to be protective for people drinking 2 liters (a little more than 2 quarts) of drinking water per day, 350 days per year for 30 years - this represents a reasonable maximum exposure (RME) used in risk assessment.

BARIUM:

The EPA proposes changing the original cleanup level of 680 ppb (ug/l) for barium to 1000 ppb (ug/l) to comply with a California maximum contaminant level (MCL), a drinking water standard which is more conservative than the Federal MCL of 2000 ppb (ug/l). Residual non-cancer hazards from human consumption of groundwater cleaned to 1000 ppb (ug/l) barium are not expected to occur because safe drinking water barium levels range as high as 2600 ppb (ug/l).

PENTACHLOROPHENOL:

The EPA proposes changing the original groundwater cleanup value of 2.2 ppb (ug/l) for pentachlorophenol to 1.0 ppb (ug/l) to comply with a federal MCL, a drinking water standard, that was established by U.S. EPA after the ROD was signed. This lowering of the PCP cleanup value was anticipated in the original ROD. Residual excess lifetime cancer risks from drinking water usage of groundwater cleaned to a PCP concentration of 1 ppb would be 4x10-6 using current standard Superfund risk assessment values and procedures, a value that is at the lower end of Superfund's target risk range.

Table 4 - Summary of Groundwater Cleanup (CU) Values

Contaminant	1989 ROD CU Value (ppb)	Proposed CU Value (ppb)	Comment
Pentachlorophenol (PCP)	2.2	1	U.S. EPA MCL
Barium	680	1000	California MCL

HOW EPA ESTIMATES HEALTH RISKS

In the Endangerment Assessment, EPA looks at various ways the public could be exposed to contaminants and evaluates the potential health risks associated with those exposures. For carcinogens (chemicals that can cause concern), potential risk is expressed in terms of the probability of an individual contracting cancer (cancer risk level). This probability is expressed as the maximum number of excess cancers that might occur within a population, and it is calculated assuming an individual has an extended exposure (30 years for residential exposures) to the pollutants. The term "excess cancers" refers to those cancers which would occur in addition to the cancers that would otherwise occur in a population not exposed to site contaminants. For example, a cancer risk level of 6 in 1,000,000 associated with drinking contaminated water means that if one million people drank the water, there may be as many as six additional (or excess) cancers in that population.

For non-carcinogens (chemicals that do not cause cancer but may cause other health effects), the risk level is expressed in terms of the Hazard Index (HI). EPA and other health agencies determine safe levels of daily exposure for non-carcinogens called "reference doses." Safety or risk for a community is determined by comparing its actual daily exposure level to this reference dose - this is done by calculating the HI, which is the actual exposure divided into the reference dose. If the actual exposure is less than the reference dose (HI is less than 1), no health effects are expected to occur. If actual exposure levels are greater than the reference dose (HI greater than 1), a potential health threat may exit. The risk assessment methodology is described in detail in the Endangerment Assessment.

SITE INFORMATION REPOSITORIES AND LOCATIONS

EPA maintains site information repositories at the locations listed below. These site repositories contain project documents, fact sheets and other reference materials, and include the Administrative Record for the site that contains the documents EPA relied on to select the cleanup plans for the site.

The information EPA considered in the evaluation process for this Proposed Plan is available to the public to assist you in providing comments. The administrative record documentation for the site is extensive and you may wish to concentrate initially on the following key documentation: the latest status of groundwater remediation provided in the Semiannual 1998 Remedial Action Groundwater Monitoring Report dated December 09, 1998 by HSI Geotrans; Revised Evaluation of Technical Impracticability of Groundwater Restoration in the Former Creosote Pond and Cellon Blowdown Areas date June 12, 1998; and the soils removal action documentation contained in the Construction Documentation and Closure Report for Cell No. 2 and Associated Soil Removal Activities dated December 3, 1998 by TRC Environmental Solutions, Inc. Additional copies of the fact sheet and the Admistrative Record are available at the following locations:

Oroville Butte County Public Library
1820 Mitchell Avenue
Oroville, CA 95966

Contact: Brenda Crotts
(530) 538-7642

Hour: Tues. and Wed. 10-8 p.m., Thurs. 2-6 p.m., Fri. 10-5 p.m., and Sat. 12-4 p.m.

California State University
Meriam Library
400 West First Street
Chico, CA 95929-0295

Contact: William A. Jones
(530) 898-5710

Special Collection
Monday-Friday 9:00 p.m. - 4:00 p.m.

Superfund Records Center
95 Hawthorne Street
San Francisco, CA 94105

(415) 536-2000

Monday - Friday, 8:30 a.m. to 4:00 p.m.

GLOSSARY

Applicable or relevant and appropriate requirements (ARARs): The Superfund law requires compliances with any promulgated standard requirement, criteria, or limitation under Federal and state environmental laws or facility siting laws under the circumstance of a release or threat of release.

Bioremediation - the use of microorganisms (such as bacteria) to transform substances into non-toxic compounds

Carcinogenic - a substance that causes cancer

Cellon: a process for treating wood with a combination of PCP, diesel, buton, isopropyl ether

Creosote - semi-volatile organic mixture composed of numerous polynuclear aromatic hydrocarbons (PAHs) used as a wood preservative - some PAHs can cause cancer (cPAHs)

Diammonium Phosphate - natural occurring compound used as a source of the nutrients nitrogen and phosphorous

Dense Non-Aqueous Phase Liquids (DNAPLs) - liquids that are both not soluble in water and denser than water such as creosote

Dioxin - constitutes a class of complex organic compounds containing chlorine (chlorinated aromatic hydrocarbons) which were present as impurities in PCP. Dioxin is a strong cancer-causing agent. The main classes of dioxins are polychlorinated dibenzodioxins (PCDs) and the polychorinated dibenzofurans (PCDFs), the most toxic of which is 2,3,7, P-tetrachorodibenzodioxin (2,3,7, P-TCDD).

Endangerment Assessment or Risk Assessment - an evaluation of the risk posed to human health and/or the environment by exposure to contaminants at a site

Extraction Well - a well constructed to remove groundwater. Groundwater extracted from these wells is sent to a treatment facility for cleanup

In-situ - a Latin term meaning *in place*; in situ treatment of soil is performed without the need for excavation

Magnesium Peroxide - a patented formulation called Oxygen Release Compound that slowly releases molecular oxygen when placed in water

Maximum Contaminant Level (MCL) - MCLs are primary and secondary drinking water standards - They are enforceable regulatory levels, under the Safe Drinking Water Act, and must be met by all public drinking water systems to which they apply.

Monitored Natural Attenuation (MNA): MNA is the natural occurrence of microorganisms such as bacteria to break down hazardous substances into less toxic or nontoxic substances

Monitoring well - well used to allow data sampling for analysis of ground water

Off-Property - off-property area is the property south of the wood treatment facility owned by Koppers with impacted groundwater (south of Baggett-Marysville Road)

On-Property - on-property area is the wood treatment facility property owned by Koppers (north and west of Baggett-Marysville Road)

Parts per billion - one part in 1,000,000,000 parts

Pentachlorophenol (PCP) - a polar organic compound used extensively as a wood preservative at Koppers - PCP has been shown to cause cancer in laboratory animals and is a probable human carcinogen.

Pump and Treat System (P&T): P&T system is the installation of extraction wells that remove contaminated ground water. The water is then treated by removing the contamination by carbon absorption

Preliminary Remediation Goals (PRGs) - Risk-based default cleanup levels that combine current EPA toxicity values with "standard" exposure factors to estimate contaminant concentration in environmental media (soil, air, and water) considered protective of humans, including sensitive groups, over a lifetime

pH - scale of acidity

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

Up-gradient - A location with higher or greater, water elevation, relative to a specified reference point

FOR FURTHER INFORMATION ABOUT KOPPERS

You can call Jackie Lane, EPA community involvement coordinator, toll-free at (800) 231-3075 or (415) 744-2267. If you did not receive this proposed plan through the mail, but would like future publications, you can leave your name and address on the toll-free line as well.

PUBLIC COMMENT PERIOD MARCH 15 THROUGH APRIL 13, 1999.

You are invited to attend a community meeting regarding the Proposed Plan for the Koppers Superfund site on:

When: Thursday, March 23, 1999

Where: Oakdale Heights School
2255 Las Plumas Avenue
Oroville, CA

Time: 7:00 p.m.

At this meeting, EPA representatives will describe the alternatives evaluated and present EPA's preferred alternative. You will have the opportunity to ask questions, and give written and verbal comments on all the alternatives.

United States Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
Attention: Jackie Lane

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