United States General Accounting Office

GAO

Report to the Honorable Matthew G. Martinez, House of Representatives

March 1989

SUPERFUND

Analysis of Issues Concerning the Operating Industries Site

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GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-232915

March 30, 1989

The Honorable Matthew G. Martinez
House of Representatives

Dear Mr. Martinez:

As requested, this report discusses the inclusion of the Operating Industries, Inc., hazardous waste site on the Environmental Protection Agency's (EPA) National Priorities List. Among the topics covered are whether the north section of the site should have been included on the list and whether the method EPA selected to treat the site's waste is the most cost effective. The report contains a recommendation to improve EPA's feasibility studies which are used to select cleanup remedies.

Unless you publicly release its contents earlier, we will not make this report available to other interested parties until 30 days from the date of this letter. At that time, copies of the report will be sent to the appropriate congressional committees; the Administrator, EPA; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

This work was performed under the general direction of Richard L. Hembra, Director, Environmental Protection Issues. Major contributors are listed in appendix V.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

estimated that this remedy will cost $4.95 million over the next 5 years, compared with $6.81 million for off-site treatment.

Results in Brief

EPA complied with Superfund and its implementing regulations in establishing the Operating Industries site boundaries to include the north parcel and was within its authority to select a site on the north parcel for a leachate treatment plant. EPA regulations prohibited removing the north parcel from the National Priorities List prior to completion of cleanup as requested by a potential buyer as a precondition of the sale. However, EPA is pursuing other avenues to obtain cleanup actions or funds from responsible parties.

EPA's cost analysis of on-site versus off-site leachate treatment was incomplete because it excluded an analysis of the impact on costs of variations in such things as leachate volume and certain hidden costs such as the imputed value of liability insurance. Exclusion of hidden costs biases the cost analysis in favor of on-site treatment but cost was only one criterion EPA considered in selecting on-site treatment.

EPA considered the two commercial leachate plants within the vicinity of the site in selecting a remedy. Only one of the plants is currently treating leachate, including Operating Industries' leachate. The plant's fees have remained constant since 1986, and the plant is currently in compliance with environmental requirements.

Principal Findings

North Parcel Listing

EPA appropriately included the north parcel as part of the Operating Industries site. GAO found that EPA complied with the process for listing sites on the National Priorities List and defined the site's boundaries based on the extent of known contamination. The north parcel was included because there was evidence of contamination, such as lead. The parcel's contamination was confirmed in March 1988, when EPA released the results of its characterization study on the north parcel. Although commenters on the proposed listing stated that the north parcel should not be included because a freeway separates it from the south parcel, GAO found no requirement that Superfund sites must be contiguous. In fact, several sites that are divided by a roadway or are comprised of

factors EPA considered were public health and the environment, and engineering implementation and constructability.

Although not required by EPA's Guidance on Feasibility Studies, the leachate feasibility study included an evaluation of five alternative plant sites because EPA was aware that there was considerable public interest in where a plant might be sited. EPA selected a site on the north parcel on the basis of several factors. The site is several thousand feet from residential neighborhoods, buffered from residential areas by a freeway and an electrical company easement, and located within the site's boundaries requiring no property acquisition. The other four sites were eliminated because of such factors as proximity to residential neighborhoods, settling problems, and delays due to land acquisition. GAO did not identify any additional information through discussion with concerned parties that suggested that any of the other four sites had not been adequately considered, or that EPA's selection of a site on the north parcel was improper.

The hidden cost shortcomings also apply to EPA's cost analysis of alternative locations for an on-site plant. The exclusion of land value affects three of the five sites' costs, but the exclusion of other hidden costs should have little effect on the cost differences between sites because they generally affect each alternative equally.

Two commercial treatment plants in Southern California are capable of treating Operating Industries' leachate, and both expressed interest in doing so. Also, both were identified in EPA's feasibility study. The one plant that now treats the site's leachate was in full environmental compliance as of June 1988, except for one violation that was being corrected, and its fees have remained the same over the last 2 years. The other plant has not treated leachate since 1985, and as of January 1989, legal action was pending against the plant for eight violations.

Recommendations

To help ensure that feasibility studies at other Superfund sites are performed properly, GAO recommends that EPA revise its guidance to include hidden costs, such as the imputed value of tax liabilities and liability insurance, in its cost analyses.

Agency Comments

GAO discussed the report's contents with responsible EPA officials and included their comments where appropriate. However, as requested, GAO did not obtain official agency comments on a draft of this report.

Abbreviations

CADHS	California Department of Health Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	Environmental Protection Agency
GAO	General Accounting Office
gpd	gallons per day
HRS	Hazard Ranking System
LMFS	Leachate Management Feasibility Study
NCP	National Contingency Plan
NPL	National Priorities List
OII	Operating Industries, Inc.
RCRA	Resource, Conservation, and Recovery Act
SARA	Superfund Amendments and Reauthorization Act

This information is then used to determine if the site should be listed on the NPL. To be included, the site must score above a threshold level of 28.5 using EPA's Hazard Ranking System (HRS), which is used to set priorities for cleaning up sites. A site may also be placed on the NPL because it is designated by a state as its highest priority or because the Department of Health and Human Services has issued a health advisory in connection with it. As of October 1988, the NPL contained 799 sites, with an additional 378 proposed for inclusion.

There are two basic types of Superfund-financed cleanups—removal actions and remedial actions. Removals are short-term responses to address immediate and significant threats at any hazardous waste site but are not necessarily final solutions. Remedial actions are long-term efforts to mitigate or permanently eliminate conditions at hazardous waste sites on the NPL that are considered serious, but not immediate, dangers to the public. To ensure that appropriate remedial cleanup actions are taken, EPA or the states conduct a remedial investigation and a feasibility study for each site to identify the types and quantities of hazardous wastes present and to consider possible remedies.

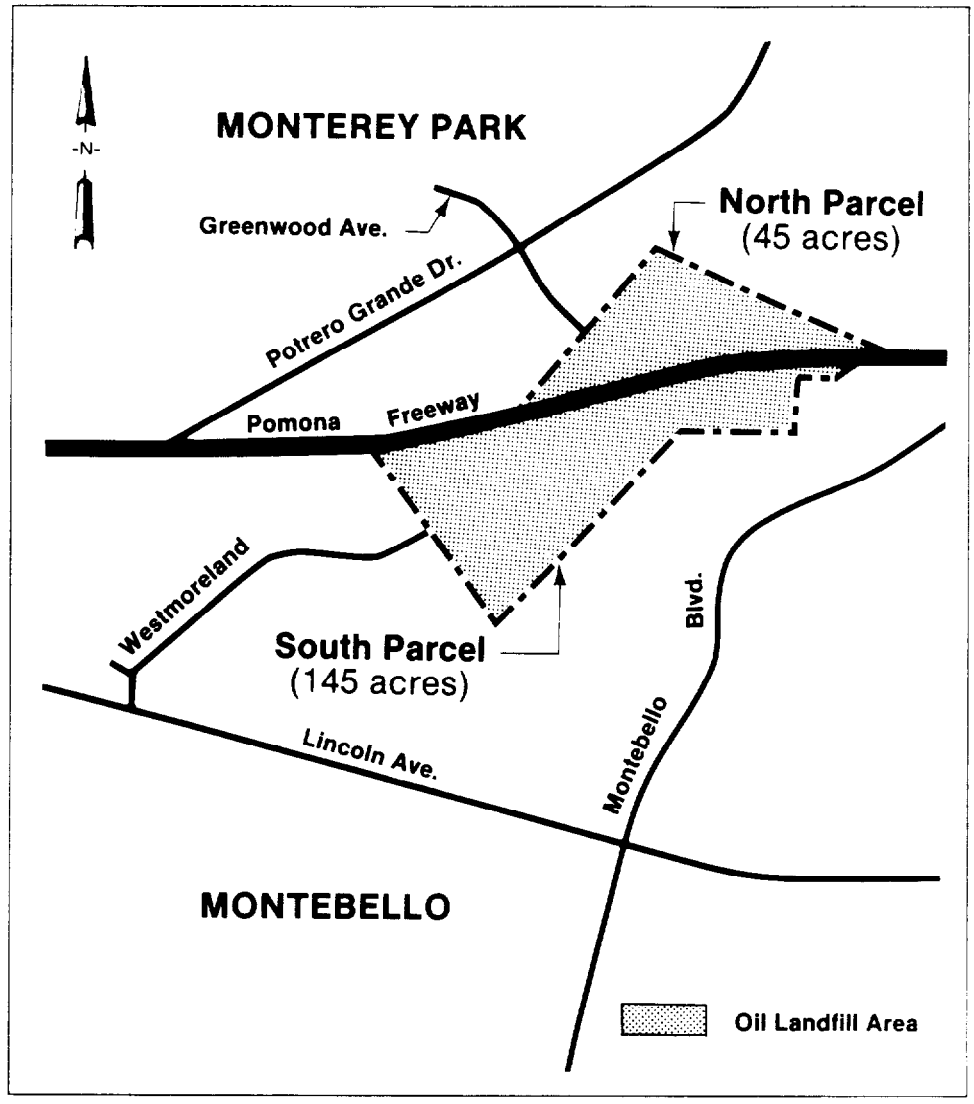
The feasibility study includes a detailed analysis of engineering, institutional, public health, environmental, and cost factors affecting the choice of a remedial action. The final decision is to reflect the remedy that best balances the health/environmental protection, engineering reliability, and cost. The selected remedy is documented in an EPA record of decision, and a detailed design for implementing the remedy is developed. A remedial action may involve cleaning up the entire site or treating a portion of the problem at a time. NPL sites often have multiple remedial actions because multiple sources of contamination must be cleaned up. Whether whole or partial efforts, remedial actions involve implementing the selected remedy. At any point in the process, a removal action may be initiated if circumstances warrant.

CERCLA stipulates that responsible parties should clean up hazardous waste sites themselves or reimburse the government for expenses incurred in cleaning up the sites.[2] EPA uses its enforcement authority to identify, notify, and negotiate with responsible parties in an attempt to reach a settlement whereby responsible parties conduct or pay for cleanups. EPA may negotiate voluntary cleanups at different points in

[2]The parties responsible for site cleanup under Superfund include individuals, corporations, or other entities that are (1) present owners or operators of sites, (2) the past owners or operators at the time of disposal, (3) transporters that selected the site for hazardous substance disposal, and (4) the generators of the substances.

under the ownership of OII. From 1952 to 1984, the site was operated as a landfill for municipal and industrial liquid and solid wastes. The north and south parcels were contiguous and operated as a single landfill before construction of the Pomona Freeway, which opened in 1968. Key events in the history of the OII landfill are presented in appendix I.

Figure 1.1: OII Landfill Superfund Site



In October 1954, the Los Angeles Regional Water Quality Control Board issued the first permit to OII for liquid disposal. However, some of the liquid wastes disposed of before then are considered hazardous by current federal and state regulations. In June 1975, Monterey Park limited

Board's resolution. Examples of problems included OII's failure to maintain hauling and dumping records, failure to mix liquid wastes with earth material, failure to prevent percolation of surface runoff, ponding of oily liquids on the landfill surface, and failure to deposit certain liquids in virgin soil only.

Intense odor problems from the landfill were identified in January 1978. Enforcement agencies found violations involving solid waste hauling and disposal, slopes and cuts (in terrain), intermediate and final (land) cover, gas and erosion control, grading of fill surfaces, excessive odors, and ponding of liquids. Leachate seepage from the landfill into a neighboring residential area was first detected in 1982.[3] The leachate generated at the OII site is considered a hazardous waste because it contains hazardous organic constituents such as vinyl chloride, trichloroethylene, benzene, and toluene. Further instances of leachate seepage were discovered in May, November, and December 1983.

In response to the environmental hazards posed by OII, the California Department of Health Services (CADHS) nominated the site for inclusion on the NPL in December 1983. CADHS also placed the site on the California Hazardous Waste Priority List in January 1984. The OII site was ranked as the 16th most hazardous site out of 97 such sites in California. The site was included in EPA's proposed NPL Update Number 2 published in the Federal Register of October 15, 1984, for public comment, and was listed on the NPL in May 1986. The OII site was ranked as number 71 out of 538 sites on the NPL at that time.

As of October 1988, OII was still ranked as 71st out of 799 sites currently listed on the NPL because of the severity of the environmental hazards it poses. These include: hazardous leachate seepage and breakthrough on the landfill slopes; subsurface and off-site migration of leachate; high landfill gas (methane) levels exceeding the lower explosive limit in nearby residential areas; vinyl chloride present in ambient air emissions and in subsurface gas on-site and off-site; underground fires; slope instability and erosion problems; surface runoff from the elevated fill area; groundwater contamination from leachate and migrating landfill gas; and noxious and offensive odors on-site and off-site.

[3]Leachate is a liquid that forms within landfills as a result of the following processes: (1) rainfall and drainage that percolate into the landfill, (2) liquid wastes disposed of in the landfill, and (3) biodegradation of organic waste disposed of in the landfill. If uncontrolled, the leachate may migrate as surface runoff or percolate downward and contaminate groundwater.

2. Did EPA exceed its authority under Section 104 of CERCLA by selecting a site on the north parcel for constructing an on-site leachate treatment plant?

3. Did any actions taken by EPA improperly prevent the sale of the north parcel (as part of the settlement in the California Superior Court suit by the California Department of Health Services) and violate CERCLA's intent to make responsible parties liable for remedial action costs?

Leachate Treatment

4. Was EPA's cost analysis of on-site vs. off-site leachate treatment, including the analysis of alternative sites for construction of the on-site leachate treatment plant, prepared in accordance with EPA's own regulations/guidance and generally accepted cost analysis standards?

5. Are there operating, under construction, or proposed commercial leachate treatment plants within approximately a 50-square-mile radius of OII which have, or will have, the capability of and interest in treating OII's type of leachate? To what extent have fees charged by the operating plants varied?

6. What are the environmental compliance records of the operating commercial leachate treatment plants according to EPA, state, and local environmental agencies?

Our general approach to respond to these questions was to interview EPA Superfund officials at EPA headquarters and in Region IX; CADHS officials; the Monterey Park Mayor, City Council, City Engineer, and current and former City Managers; the Montebello City Administrator and City Engineer; representatives of the OII Potentially Responsible Party Steering Committee; and the leaders of two local citizen groups—the Homeowners to Eliminate Landfill Problems and the Concerned Citizens of Monterey Park. We discussed the north parcel listing and leachate treatment issues with these officials and representatives and obtained copies of any relevant reports, memos, and other correspondence.

For the three questions concerning the north parcel, we reviewed CERCLA and the implementing regulations in the National Contingency Plan to determine if EPA had exceeded its authority. Additionally, for the first question, we researched published decisions relating to EPA's listing of hazardous waste sites on the NPL. We also reviewed EPA's records to determine whether EPA complied with the NPL scoring and listing requirements. In addition, we obtained and reviewed information from

North Parcel Was Properly Listed

Our review showed that EPA complied with CERCLA and the implementing regulations in establishing the OII site boundaries to include the north parcel when listing the site on the NPL. Therefore, EPA was within its authority under CERCLA to select a location on the north parcel for the leachate treatment plant based on the results of a feasibility study.

EPA had evidence that the north parcel was contaminated when the site was proposed for listing on the NPL in October 1984. Although some closure and cleanup activities on the north parcel were to occur under the terms of a proposed April 1985 sales agreement, the National Contingency Plan (NCP) prohibited EPA from removing the north parcel from the NPL, on the basis of a pending cleanup. EPA's action not to remove the north parcel in listing the OII site did not prevent its sale and did not violate CERCLA's provision that responsible parties are liable and remain liable for remedial action costs. Though no sale proceeds are presently available for cleanup, EPA has offered to supervise a private party cleanup and is pursuing two other avenues of obtaining cleanup funds from the responsible parties.

Listing Requirements Complied With

EPA complied with the process for listing sites for the NPL as required by Section 300.66 of the NCP. The preliminary assessment, site inspection, and HRS scoring package described the OII site as a 190-acre site, which would include both the north and south parcels. The proposed site listing was published in the Federal Register for public comment in October 1984, and the site was listed in May 1986.

EPA received several comments from Monterey Park and CADHS favoring deleting the north parcel from the NPL because the commenters believed it was not contaminated, and/or because it was separated from the south parcel by the Pomona Freeway. Although information was already available on the north parcel contamination, EPA began a separate characterization study in February 1987 to provide more information on the extent and nature of this contamination. The March 1988 report on this study showed contamination throughout the 45-acre north parcel. Furthermore, although the OII site is divided by a freeway, CERCLA does not require that sites be contiguous to be listed as one site. There were several other sites proposed or listed on the NPL prior to, or at the same time as, the OII-proposed listing that are divided by roadways or physically separated, which EPA scored and listed as one site.

The initial CADHS score for the OII site was 38.26, which is well above the NPL cut-off score of 28.5. The scoring was reviewed by EPA prior to publication in the Federal Register in October 1984 and was revised upward to 47.96. EPA revised the score to 57.22 for the final listing. EPA Superfund officials also told us that, as it does with all potential Superfund sites, EPA scored the entire OII site and not any portions of the site separately. According to the EPA Project Manager responsible for the OII site, the primary reason for OII's score increase was additional information EPA had obtained on observed releases of hazardous substances to the groundwater, which was not available at the time of the CADHS nomination of the site. The releases to the groundwater were detected by groundwater-monitoring wells that EPA had installed at the site. As of October 1988, OII was listed as number 71 of 799 sites on the NPL, in terms of its threat to human health or the environment.

Although CADHS initially proposed that OII be included on the NPL, the CADHS Southern California Section Chief stated in an October 1985 letter to EPA that CADHS had made an error in the OII nomination because the north parcel should not be included as part of the Superfund site. The EPA Region IX Superfund Enforcement Branch Chief, however, told us that even if the Preliminary Assessment, Site Inspection, and HRS nominating package had clearly defined the site as only the 145-acre south portion, EPA Region IX would likely have included the north parcel. She stated that the north parcel would have been included because of the long history of OII's operation as one landfill, known contamination of the north parcel, and the access the north parcel provides to the south parcel. An August 1984 EPA letter to the President of OII requesting information on the OII facility, including information on the north parcel, supports EPA's contention that Region IX clearly viewed OII to include both portions prior to proposing the site for the NPL in October 1984.

All sites proposed for addition to the NPL are published in the Federal Register for public comment. OII was included in the NPL Update Number 2 list of proposed sites published in the Federal Register on October 15, 1984, and was listed in May 1986. The final listing was published in the Federal Register on June 10, 1986. In addition, EPA Region IX notified CADHS on September 14, 1984, that it was submitting OII and several other California sites to EPA headquarters as candidates for the NPL. This list of site names was included in a letter sent to conform with Section 300.66(c)4 of the NCP, which requires EPA to notify the states at least 30 days prior to the deadline for submitting candidate hazardous release sites for the NPL or any revisions. The letter stated that EPA was planning to publish an NPL update in October 1984. Additionally, EPA provided

In order to be responsive, prior to the final listing, to concerns regarding whether the north parcel was contaminated, EPA had the groundwater sampled. EPA's contractor sampled a groundwater-monitoring well located west of the north section on August 1985 and February 1986. According to EPA, the results indicated the presence of four hazardous substances, including tetrachloroethane and phenol. EPA concluded that, on the basis of these results and an examination of sampling results from other groundwater wells and soil borings, there was sufficient evidence to suggest that the source of these contaminants was the north parcel.

EPA also decided in early 1986, prior to the final listing, that it would conduct an expedited remedial investigation of the north parcel which would be performed separately from the overall site remedial investigation. However, EPA did not begin the study until February 1987 because of funding problems preceding the 1986 CERCLA amendments, which were not signed into law until October 17, 1986.

The evidence of contamination on the northern 45 acres was confirmed in March 1988 by the results of EPA's Preliminary North Parcel Site Characterization. In particular, the characterization study found groundwater contamination and vinyl chloride gas throughout the north parcel, not just in the 11 acres formerly used as a landfill. In samples from the surface soil, subsurface soil and wastes, perched liquids, surface water, groundwater, and landfill gas, some contaminant was found which exceeded standards. For example, subsurface soil and waste samples exceeded standards for lead, zinc, and chromium. Organic contaminants were detected in 5 of the 13 groundwater-monitoring wells, and mercury, cadmium, iron, manganese, and chloride were found in excess of standards. Gas from the 13 landfill gas-monitoring wells exceeded the ambient air standards for vinyl chloride.

Although CERCLA requires that a facility be contaminated with hazardous substances to be listed, it does not require that a site be contiguous to be listed as one Superfund site. In the case of OII, EPA considered this site to be contiguous because it had been operated as one site until divided by the freeway. In previous NPL rulemaking, EPA had considered sites divided by a roadway to be single contiguous sites. On the other hand, if OII were considered noncontiguous, CERCLA Section 104 (d)(4) provides EPA discretionary authority to treat noncontiguous facilities as one site when the noncontiguous facilities are reasonably related on the basis of either geography, or the threat or potential threat to the public health, welfare, or the environment. The OII site meets this criterion for

public health or welfare, or the environment. The NCP states that a feasibility study shall be conducted, as appropriate, to determine the nature and extent of the contamination and the proposed remedial action. In the case of OII, EPA conducted a feasibility study which was used as the basis for selecting a site on the north parcel for the treatment plant.

In the OII Leachate Management Feasibility Study, EPA considered five alternate locations for siting the leachate treatment plant, including two on the south parcel, one on the north parcel, and two on adjacent properties. The draft Feasibility Study, dated March 1987, considered and eliminated trucking as an alternative and selected an on-site treatment alternative. The study deferred making a recommendation on the leachate treatment plant so that comments received during the period for commenting on the draft could be considered. The feasibility study process and the five alternate locations are discussed in detail in chapter 3.

In the Record of Decision, EPA eliminated four of the sites except for the north parcel because of such factors as proximity to residential neighborhoods, anticipated uneven settling of the site, and for the two sites on adjacent properties, delays due to land acquisition and permit requirements. The site on the north parcel was selected because it is a flat site located several thousand feet from residential neighborhoods, it is buffered from residential areas, and no property acquisition access or permit concerns would be involved because it is located within the OII Superfund site boundaries.

Although selected by EPA, the north parcel was not EPA's original preferred site. According to the OII Project Manager, the original site preferred by EPA was one of the sites on adjacent property. The site on Southern California Edison (electric utility company) property adjacent to the north parcel was preferred because it was close to the existing tanks used for leachate storage and was a good compromise site in terms of the preferences of Monterey Park and Montebello. Monterey Park did not want a plant on the north parcel because it would reduce the development potential for the 45-acre north parcel and because of environmental concerns associated with operating a leachate treatment plant. Montebello did not want a plant on the south parcel because it would be too close to residential homes. However, at a March 26, 1987, public meeting to discuss the draft feasibility study, a Southern California Edison official emphatically objected to using the utility's site on grounds that a plant could potentially disrupt crucial electric power

to develop an acceptable sales agreement since any proposed sale of the north parcel had to be approved by CADHS because of the restraining order. The Agreement of Purchase and Sale and Joint Escrow Instructions dated April 4, 1985, was never signed, however.

The CADHS state attorney told us that the sale did not occur because the potential buyer did not want to buy the property if it was listed on the NPL. The potential buyer was concerned about potential liability to third parties and financing difficulties. The CADHS attorney stated that he did not realize that the north parcel was on the NPL until he approached an EPA representative in April 1985 regarding whether EPA could agree with the terms of the Sales Agreement. At that time, he was told that the site was proposed for the NPL and that EPA could not remove it until it was cleaned up.

Proposed Cleanup Not a Basis for Excluding North Parcel

The terms of the proposed sales agreement provided for some closure and cleanup activities on the north parcel, although the precise extent of cleanup was unclear and focused primarily on the section of the north parcel used for trash removal and landfill operations. According to the CADHS Southern California Section Chief, following the proposed sale, CADHS would have supervised the closure and cleanup of the entire north parcel prior to development, as part of its responsibility to ensure that hazardous waste sites are closed and cleaned up properly. However, EPA policy guidance specifies that EPA cannot exclude a site from the NPL because of a pending cleanup. EPA "Guidance for Establishing the National Priorities List" dated June 28, 1982, prior to the OII NPL nomination, states that:

"In general, enforcement activity, either active or pending litigation or negotiations with responsible parties, is not relevant to candidate selection, investigations, and scoring. Sites which are subject to Federal or State enforcement action should be scored and submitted for the priorities list. Only sites where cleanup by private parties has been completed are to be excluded from the list." [emphasis added]

This policy was further discussed in EPA comments on the NCP regulations addressing NPL eligibility published in the Federal Register on September 21, 1984, which state:

"The Agency believes that even where a site is undergoing response actions, interested parties such as neighboring residents may need to know about the threats posed by that site relative to other sites. In addition, the Agency believes that including sites on the NPL until appropriate cleanup actions have been completed will provide more incentives for early and effective actions than the alternatives

were further clarified in the EPA minutes of an April 24, 1986, meeting on the OII listing issue. At this meeting, the attorney for the potential buyer reportedly stated that the bank will not lend money to buy property which is subject to a CERCLA Section 106 order. In addition, the attorney stated that if the developers (potential buyers) agreed to a Section 106 order for cleanup on the north parcel, they would be agreeing that an imminent hazard exists, which could create substantial vulnerability to civil suits.

EPA recently made a more limited offer to supervise a private party cleanup of part of the north parcel but had not received any response as of October 28, 1988. In a March 11, 1988, letter to Representative Martinez from the Acting Regional Administrator of EPA Region IX, EPA stated:

"In summary, EPA intends to complete the investigation and clean-up of the entire site as swiftly as possible, as the most cost effective, environmentally sound solution. This would defer development of the north parcel to 1993-1995. It is also possible that a private party interested in development of the north parcel sooner than 1995 could proceed at their own expense. The 15 acres of the north parcel not needed for aspects of the Operating Industries clean-up could be made available sooner. If the 15 acres were further investigated, and all EPA-approved remedial actions completed under an enforcement agreement with EPA, this is a potentially viable option. Delisting of the site could then occur after completion of needed remedial action, per EPA requirements."

EPA has also pursued enforcement actions to implement CERCLA's provision that potentially responsible parties are liable for remedial action costs. EPA first began these efforts in August 1984 by sending a letter to the President of OII requesting a complete inventory of all hazardous waste disposed on or near the OII facility (including the 45-acre parcel north of the Pomona Freeway) by OII or any other party. EPA notified almost 200 potentially responsible parties for the OII site of their potential liability.

On June 20, 1986, shortly after OII's final listing on the NPL in May 1986, EPA sent notice letters and requests for information to the 25 largest contributors of waste (first tier). The 56 next largest contributors identified (second tier) were sent similar letters on January 9, 1987. These notice letters advised the contributors that EPA considered them as potentially responsible parties and requested that they notify EPA in writing within 30 calendar days of receiving the letter of their willingness to participate in a remedial investigation; feasibility study; and interim actions to address immediate site problems such as slope instability, gas migration, and leachate generation and migration prior to implementation of a final

and $26 million for past EPA expenses and a fund to cover potential future cost overruns. EPA also announced it will continue to conduct the long-term remedial investigation and feasibility study and will pursue future enforcement activities for landfill gas control and the final site remedy.

Conclusions

EPA complied with CERCLA and NCP requirements in listing the full 190-acre site on the NPL. Since EPA appropriately included the north parcel, after completing a feasibility study, EPA was within its authority to select a site on the north parcel to locate a leachate treatment plant. We also believe that EPA's actions did not prevent the sale of the north parcel and did not violate the intent of CERCLA to hold responsible parties liable for remedial action costs. The NCP prohibited EPA from agreeing to remove the north parcel from the NPL so that it could be sold because the NCP requires that sites be cleaned up prior to delisting. More importantly, the responsible parties remain liable, and EPA is using its authority to obtain cleanup funds or actions from them.

alternative remedial actions are developed and evaluated in terms of engineering implementation and constructability; the extent to which each alternative provides protection to public health and the environment; environmental impacts during or remaining after implementation; and cost. The detailed process for preparing the LMFS is contained in EPA's Guidance on Feasibility Studies Under CERCLA (June 1985).

The costs that EPA develops to analyze the remedial action alternatives are "study estimates" prepared at relatively low cost using data available from the remedial investigation. According to EPA's guidance, these "study estimates" typically provide an accuracy of −30 to +50 percent. Although these study estimates provide considerable room for error, they are subject to present-worth and sensitivity analyses. A present-worth analysis is used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year. This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life.

After the present worth of each alternative is calculated, EPA's Guidance on Feasibility Studies states that the present worth of each remedial action may be evaluated through a sensitivity analysis. A sensitivity analysis assesses the effect that variations in specific assumptions associated with the design, implementation, operation, discount rate, and effective life of an alternative can have on the estimated cost of the alternative. According to EPA's guidance, a sensitivity analysis should be considered for factors that can significantly change overall costs of an alternative with only small changes in their values and for factors for which the expected or estimated value is highly uncertain.

EPA uses the results of the feasibility study to select a remedy, which is set forth in a Record of Decision. Although the costs of the selected remedy are refined during the remedial design phase, no further consideration is given to alternatives following remedy selection.

The OII LMFS, which was prepared for EPA by a contractor, identified the following alternatives for managing the leachate: (1) no action, (2) off-site disposal without treatment, (3) off-site treatment, (4) on-site disposal without treatment, and (5) on-site treatment. The no-action alternative was eliminated because it would result in leachate overflows and off-site seepage into nearby residential areas. Off-site disposal-without-

off-site treatment facilities every 6 months, facilities with significant violations can no longer be used for treating the OII leachate. The Record of Decision further stated that, as a private enterprise, the off-site treatment facility could cease operation at any time, especially if it becomes unprofitable. Costs of leachate treatment at the facility are set by the company and are therefore out of the control of EPA. If a facility becomes unavailable for treatment in the future, an alternative off-site treatment facility would need to be identified. Off-site treatment might then require excessive haul distances and associated increases in cost and risk. If no alternative facilities are available, construction of an on-site treatment facility would then be required. During design and construction of an on-site treatment facility, on-site storage of significant volumes of leachate might be necessary.

In preparing its cost estimates, EPA used an estimate of 10,000 gallons per day (gpd) of leachate even though current leachate collection rates throughout the year average about 4,000 to 6,000 gpd. EPA estimates that the leachate volume and hazardous liquids collected at OII will increase to approximately 10,000 gpd during the interim 5-year period before implementation of the final site remedy. This volume increase is expected because of improvements to the existing leachate collection system and because condensate will also be collected from the gas extraction operations.[1]

EPA has estimated that even greater volumes of leachate and other hazardous liquids could be collected in the future. EPA expects the increases in hazardous liquids to result from collection of leachate from deeper within the landfill, additional collection of more shallow leachate to prevent contamination of perched groundwater, and other factors. In addition, because contamination has been detected in the groundwater in the site vicinity, on-site extraction and treatment of the groundwater may be required. According to the OII Project Manager, EPA will make the decisions regarding both the need to collect and treat leachate from deeper within the landfill, and the need to collect and treat groundwater as part of the remedial investigation and feasibility study for the final remedy.

The CADHS and representatives of the Potentially Responsible Party Steering Committee have expressed concurrence with EPA's decision to build a plant on-site. While CADHS's letter dated November 16, 1987, also

[1]Condensate is a hazardous liquid generated from the cooling of moisture-saturated gas during gas extraction.

However, because a sensitivity analysis was not done as part of the feasibility study, the impact on the final costs of the varied treatment method due to variations in plant capacity is not known, and was not considered when selecting a treatment method.

In addition, we noted that EPA incorrectly added a 15-percent profit margin to the capital costs of its on-site cost estimates. Since the capital costs were based on quotes from the vendors, the profit margin was already included in the vendors' quotes. By erroneously double counting the profit margin, EPA inadvertently overestimated the cost of the four on-site alternatives. The EPA Project Manager and the contractor site manager agreed that this was an error. However, correcting this error will not have any impact on the ranking of alternatives; it will only reduce the cost of on-site treatment by about $100,000 and has no effect on the cost of off-site treatment.

Hidden Costs Not Included

EPA's cost analysis did not adhere to generally accepted standards of cost analysis because it excluded "hidden" costs—that is, resources or items of value provided by the government. These costs include such items as the value of land, staff time provided by the government, the imputed value of tax liabilities and liability insurance, and plant salvage value and closure costs. These items were excluded from the cost analysis because they were not addressed in EPA's guidance on feasibility studies. Their exclusion gives the on-site treatment of leachate a cost advantage over off-site treatment.

EPA's cost estimate did not include as a cost the fair market value of the 1.4 acres of land needed at any of the five sites considered for locating the on-site leachate facility. For example, if the leachate plant was not located on the north parcel of OII, that site could be cleaned up and used for other commercial activities. In OII's case, the fair market value of the site on the north parcel will be approximately the value of the land if it were clean, minus the cost of its cleanup. According to EPA's Project Manager, the specific location on the north parcel will be selected in the design phase, so neither the value of the 1.4-acre site nor the costs of cleaning it up have been estimated.

The imputed value of liability insurance or other financial responsibility mechanisms should also be included in the cost of the on-site treatment facility. Private hazardous waste treatment facilities are required by RCRA to demonstrate their ability to pay liability claims for damages caused by their operations by carrying liability insurance or through

such costs were not included because they were not aware of any precedents for including them in cost analyses and because EPA's guidance is silent on this subject.

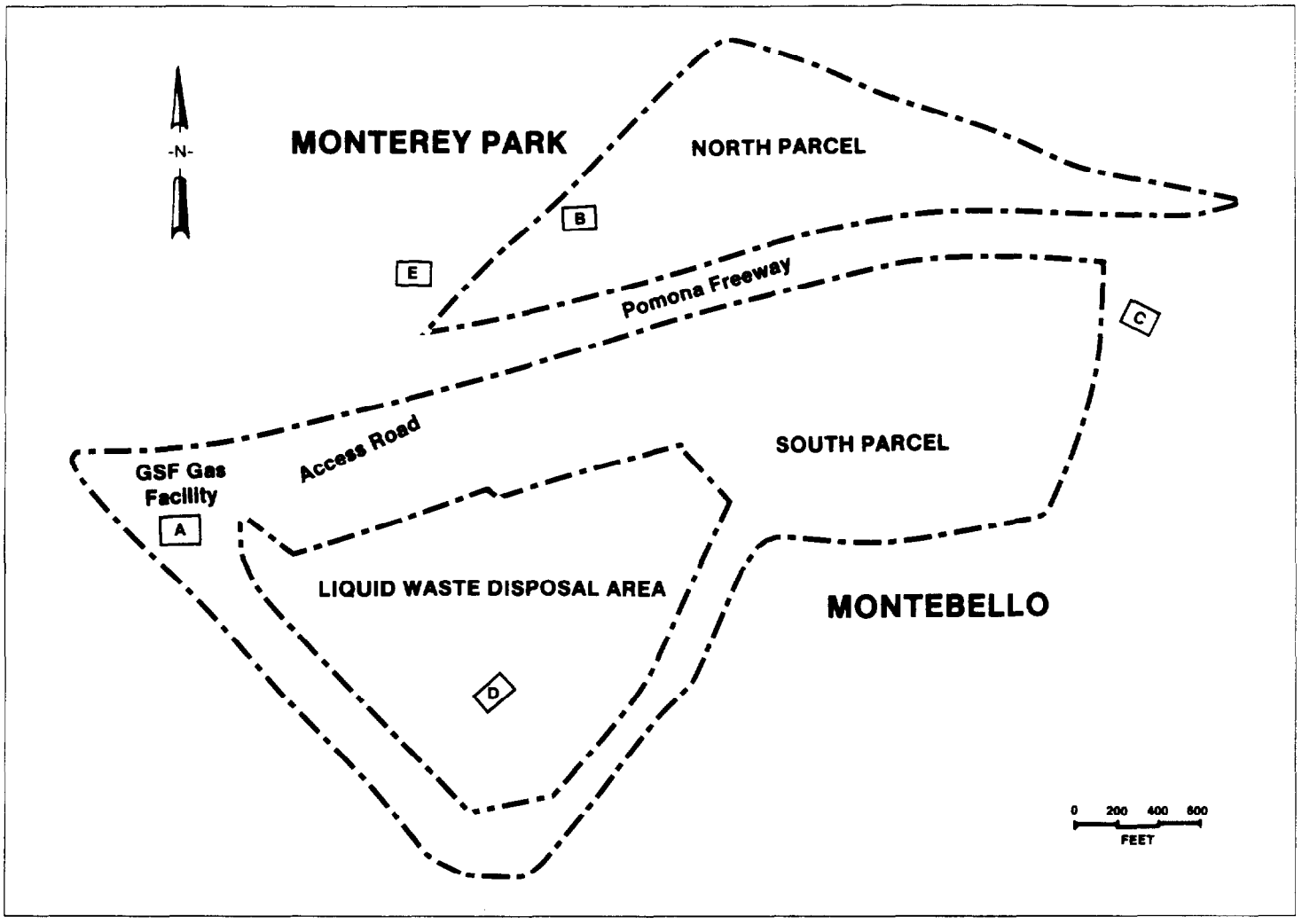
EPA headquarters Superfund officials told us that EPA's guidance was prepared on the assumption that cost estimates for all costs are based on contractors' quotes, which normally include some, if not all, of the "hidden" costs of liability insurance and taxes as a normal business expense. However, rather than obtain contractor quotes for the on-site treatment of OII's leachate, EPA's itemized cost estimates for the on-site treatment of OII's leachate were based on individual cost items EPA paid at other on-site plants. Under these circumstances, EPA headquarters officials agreed that "hidden" costs should have been included in the on-site cost estimates for treating OII's leachate. These officials also told us that they would consider revising EPA's guidance to specify the circumstances for including these costs in the cost analysis.

Analysis of Alternative Plant Sites Was Adequate

In addition to considering alternative on-site and off-site treatment methods, EPA also considered alternative locations for siting the on-site treatment plant in the LMFS. The feasibility study guidance does not require that alternative sites be considered or selected as part of the feasibility study process. According to the OII Project Manager, the siting decision is normally made during the remedial design phase except for special cases such as OII, where there is considerable public interest.

EPA's evaluation of five alternative sites for locating an on-site treatment plant, which was included in OII's feasibility study, and its selection of the north parcel for locating an on-site plant, appeared adequate, except that the value of land was not included in the cost analysis of three of the five alternative sites. The other hidden costs discussed in the preceding section were also not included but would have little effect on the cost differences between alternative sites or their cost ranking, because they generally affect each alternative equally. The impact of including the land value on the final cost ranking of the sites depends on the land value of the sites, which is unknown. Regardless, EPA selected the north parcel for an on-site plant for other reasons, although cost was considered. In addition, our discussions with concerned parties did not surface any additional information suggesting that any of the four other sites had not been adequately considered, or that EPA's selection of the north parcel was improper.

Figure 3.1: On-Site Alternative Treatment Facility Locations



The two south parcel sites were eliminated for various factors. Location A was eliminated because it is within 100 feet of residences in the City of Montebello. Other factors cited were that using this location may conflict with space requirements for future remedial actions, and that the site is the minimum size needed for current design specifications and therefore provides little room for expansion. Location D, right on top of the landfill, was eliminated because it would require a special study to determine a suitable location. Special design considerations would be required to accommodate differential settling of the landfill, which could cause serious difficulties in maintaining the integrity of the facility. This might also delay and add costs to the final remedial action process and may not be compatible with the final remedy for the site.

individual land values for Locations A, B, and D, which are not known. The value of these three locations would be the value cleaned up less the cleanup costs, because they are on the OII site.

Nearby Leachate Treatment Plants

Concerning the question about whether there are other commercial treatment facilities capable of and interested in treating OII's leachate, we found that both existing facilities in Southern California which are permitted under RCRA to treat hazardous waste had been identified by EPA in the Leachate Management Feasibility Study and the presidents of both plants have expressed interest in treating OII's leachate.[2] In addition, another company has submitted a RCRA permit application, according to a CADHS Permit Writer.

The two existing plants were identified in the Feasibility Study as the only two plants in Southern California capable of treating OII's leachate. ChemTech, located in Vernon, California, has an interim RCRA permit, and has been treating the OII leachate since May 1985. The other facility, Oil Process Company, located in Los Angeles, California, obtained its final RCRA permit in 1985. However, it has not treated leachate since obtaining this permit, according to its president. The presidents of both plants told us that they are still interested in treating OII's leachate and have the necessary capacity to treat the present volume of 4,000 to 5,000 gpd or the estimated increase to 10,000 gpd without having to incur capital construction costs.

Fees charged by ChemTech to treat OII's leachate have remained relatively stable. When ChemTech first started treating the OII leachate for the OII owner in 1985, it charged approximately 26 cents per gallon for transportation and treatment, according to ChemTech's President. The President of ChemTech told us that in late 1985 or early 1986, ChemTech raised the price to 30 cents per gallon for treatment, plus transportation. During the period May 1985 through November 1986, ChemTech did not have the transportation contract. Currently, ChemTech is charging 30 cents per gallon for treatment, plus 3 cents per gallon for transportation. The EPA contractor who administers the ChemTech contract verified that since at least December 1986, EPA has paid ChemTech 33 cents per gallon for leachate treatment and transportation.

[2]The Resource Conservation and Recovery Act of 1976 regulates the management and disposal of hazardous waste. Only facilities permitted under RCRA or equivalent state law may treat [illegible] leachate because it is a hazardous waste.

ChemTech is located. The owner, ChemClear, Inc., has submitted a permit application for a liquid and solid hazardous waste treatment, storage, and transfer facility. CADHS and EPA Region IX have reviewed the permit application and have prepared draft permits. The public comment period on the draft permit closed July 29, 1988. CADHS and EPA will be considering all comments received during this comment period and will make a final permit decision no earlier than July 1989, according to the CADHS Permit Writer. He also told us that if a permit is granted, the owner predicts that it will take approximately 8 months to construct the plant.

Conclusions

EPA's analysis of the costs of off-site trucking and treatment of leachate versus on-site construction of a leachate treatment plant did not completely analyze variations in specific assumptions that can affect the estimated cost of alternatives, nor did it include certain "hidden costs" such as the imputed value of liability insurance and taxes. We attribute many of these shortcomings to EPA's guidance on feasibility studies, which does not require that all costs be considered.

The general impact of excluding the "hidden" costs is to bias the cost comparison in favor of on-site facilities. However, the specific dollar amount of these costs is not known. As a result, we do not know if these costs are sufficient to eliminate the approximately $2 million differential between EPA-estimated costs of off-site treatment ($6.81 million) versus on-site treatment ($4.95 million). However, treatment costs are heavily dependent on the volume of leachate that is estimated to be collected. A decrease in the estimated leachate volume will reduce the estimated cost differential between off-site and on-site treatment. This reduction in leachate volume, coupled with inclusion of the hidden costs in the estimation, could potentially affect the costs sufficiently to reverse the cost ranking of alternatives.

Cost effectiveness, however, is only one of the factors that EPA is required to evaluate when selecting treatment alternatives. In the case of OII, EPA selected to construct an on-site plant because EPA believed such a plant better satisfied these other criteria. Even if it had not been the least expensive, EPA might still have selected on-site treatment as the preferred alternative.

EPA's analysis of alternative locations for the on-site treatment plant appeared adequate, except for the exclusion of land value. Our discussions with concerned parties did not surface any additional information

Five-Year Costs of Off-Site Leachate Treatment for OII

Dollars in thousands

	Costs
Capital:	
Site preparation and access	$6
Concrete (40 cubic yards)	12
Contractors' overhead/profit	3
Contingency	5
Engineering, administrative, and legal	5
Subtotal	**31**
Annual operation and maintenance:	
Treatment	1,123
Trucking	112
Storage truck rental	22
Administrative	38
Contingencies	314
Subtotal	**1,609**
Total capital and annual operation and maintenance	**$1,639**
Present worth 5 years (6-percent discount rate)	$6,808

Source: EPA.

Five-Year Costs of Alternative Leachate Treatment Plant Sites for OII[a]

Dollars in thousands

	Costs			
	Site A	**Site B[b]**	**Site C**	**Site D**
Capital:				
Treatment facility	$830	$830	$830	$830
Land			125	
Influence force main	40	146	70	30
Effluent force main	50	40	32	36
Water main	2	10	34	84
Access road	17	17	10	12
Site preparation	20	20	25	125
Architecture, landscaping, and block wall	, 135	135	135	
Contractors' overhead and profit	164	180	189	168
Contingency	273	299	315	279
Engineering, administration, and legal	273	299	315	279
Subtotal	**1,804**	**1,976**	**2,080**	**1,843**
Annual operation and maintenance:				
Labor	384	384	384	384
Maintenance	12	12	12	20
Power	12	16	16	10
Sludge disposal	15	15	15	15
Chemicals	125	125	125	125
Sewering surcharge	12	12	12	12
Contingency	140	141	141	142
Subtotal	**700**	**705**	**705**	**708**
Total capital and annual operation and maintenance	**$2,504**	**$2,681**	**$2,785**	**$2,551**
Present worth 5 years (6-percent discount rate)	$4,755	$4,947	$5,051	$4,825

[a]EPA identified five alternative treatment sites but prepared a cost analysis for only four of them. A cost analysis for siting a plant at Site E on property owned by Southern California Edison was not performed, but according to the LMFS, costs are expected to be similar to those for the other sites.

[b]Site selected by EPA.

Source: EPA.

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